IN THE UNITED STATES DISTRICT COURT FOR
THE NORTHERN DISTRICT OF FLORIDA
PENSACOLA DIVISION

Case No.

THE STATE OF FLORIDA and CHARLES H. BRONSON, Florida Commissioner of Agriculture,

Plaintiffs,

v.

LISA P. JACKSON, as Administrator of the United States Environmental Protection Agency; and THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Defendants.
____/

COMPLAINT

THE STATE OF FLORIDA and CHARLES H. BRONSON, Florida Commissioner of Agriculture, sue the U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) and its Administrator, LISA JACKSON, acting in her official capacity, and assert:

JURISDICTION AND VENUE

1. This is an action for declaratory and injunctive relief brought pursuant to the federal Administrative Procedures Act (APA), 5 U.S.C. §§ 701-706. The court has jurisdiction under 28 USC § 1331.

2. The Pensacola Division of the U. S. District Court, Northern District of Florida, located in Pensacola, Escambia County, Florida is an appropriate venue.

THE PARTIES

3. Plaintiff is the sovereign State of Florida. Control of nutrient loading from predominately non-point sources involves traditional States' rights and responsibilities for water and land resource management which Congress expressly intended to preserve in the Clean Water Act, 33 U.S.C. §1251(b) & (g). EPA's usurpation of the responsibility for nutrient criteria violates the premise of cooperative federalism which Congress intended to be the underpinning of the CWA. EPA's actions here are inconsistent with the federal-state balance that Congress so carefully struck in creating the CWA. Florida has embarked on an ambitious Total Maximum Daily Load (TMDL) program and has been working diligently to maintain compliance with the CWA through a program designed to adopt TMDL's for impaired waterways and numeric nutrient criteria where possible. These model programs have improved the quality of Florida's waters. These sovereign interests give Florida standing to challenge the arbitrary and capricious interference by EPA in Florida's ongoing successful *EPA approved* nutrient pollution abatement programs.

4. Plaintiff, the Florida Commissioner of Agriculture,Charles H. Bronson, supervises all matters pertaining to agriculture in the State of Florida, pursuant to Article IV, Section 4(f), of the Florida Constitution, except as otherwise provided by law. The Commissioner of Agriculture is also the head of the Florida Department of Agriculture and Consumer Services under Section 20.14(1) Florida Statutes, and is statutorily charged with the duty to "protect the agricultural and horticultural interests of the state" under Section 570.07(13), Florida Statutes. The Florida legislature has declared in Section 604.001(2) & (5), Florida Statutes that "[t]he production of agricultural commodities in this state is a large and basic industry that is important to the health and welfare of the people and to the economy of the state" [and] "that additional problems are

not created for growers and ranchers engaged in the Florida agricultural industry by laws and regulations that cause, or tend to cause, agricultural production to become inefficient or unprofitable." Under Sections 570.074 and 570.085, Florida Statutes, the Commissioner has created and oversees an office of water coordination for the purpose of engaging in any matter "relating to water policy affecting agriculture, application of such policies, and coordination of such matters with state and federal agencies."

The Department of Agriculture and Consumer Services has a statutory duty, pursuant to section 403.067, Florida Statutes, to adopt by rule Best Management Practices that ensure that agricultural impacts on impaired waters meet the requirements of the TMDLs that are adopted by the state and approved by EPA. The arbitrary and capricious nature of the EPA rule will affect this regulatory responsibility. Therefore the Commissioner has standing to challenge EPA's Rule.

5. Defendant EPA is the principal federal agency responsible for implementing the Clean Water Act (CWA). EPA has oversight authority as to the Florida National Pollutant Discharge Elimination System (NPDES) Permit Program, Water Quality Standards Program, and TMDL Program.

6. Defendant Lisa Jackson is the current Administrator of the EPA. Administrator Jackson is named in this action in her official capacity only.

ALLEGATIONS APPLICABLE TO ALL COUNTS

7. On July 17, 2008, a citizen's suit was filed against EPA and former EPA Administrator Stephen Johnson alleging that the Administrator had failed to exercise a nondiscretionary duty to promulgate numeric nutrient criteria for surface waters within the State of Florida because the State had allegedly failed to do so. The suit was filed in the U. S. District Court, Northern

District of Florida. *Florida Wildlife Federation, Inc., Sierra Club, Inc., Conservancy of Southwest Florida, Inc., Environmental Confederation of Southwest Florida, Inc., and the St. Johns Riverkeeper, Inc. v. Johnson*, Case No.: 4:08-cv-00324-RH-WCS.

8. The plaintiffs in the citizen's suit asserted that a non-discretionary duty to adopt numeric nutrient criteria for Florida was triggered by publication of EPA's 1998 *Clean Water Action Plan*, which EPA co-authored with the U. S. Department of Agriculture. Section 303(c)(4) of the Clean Water Act states in relevant part:

> (4) The Administrator shall promptly prepare and publish proposed regulations setting forth a revised or new water quality standard for the navigable waters involved
>
> (A) if a revised or new water quality standard submitted by such State under paragraph (3) of this subsection for such waters is determined by the Administrator not to be consistent with the applicable requirements of this Act, or
>
> (B) in any case where the Administrator *determines* that a revised or new standard is *necessary* to meet the requirements of this Act. The Administrator shall promulgate any revised or new standard under this paragraph not later than ninety days after he publishes such proposed standards, unless prior to such promulgation, such State has adopted a revised or new water quality standard which the Administrator determines to be in accordance with this Act. (Emphasis added).

The plaintiffs in the citizen's suit asserted that EPA's 1998 *Clean Water Action Plan* was a formal determination by the Administrator, under Section 303(c)(4)(B), that numeric nutrient criteria are necessary for Florida surface waters for the State of Florida to remain in compliance with the Clean Water Act.

9. EPA initially defended the suit and contested the argument that the 1998 document was a formal necessity determination under the Clean Water Act. By letter dated September 28, 2007, EPA had recently approved the State of Florida's revised *Numeric Nutrient Criteria Development Plan* which included a timetable through 2011. ***Exhibit 1.***

The January 14, 2009 "Necessity Determination"

10. On January 14, 2009, EPA released a letter from Benjamin H. Grumbles, former Assistant Administrator of EPA, to Michael Sole, (then) Secretary of the Florida Department of Environmental Protection (DEP), which stated: "This letter constitutes a determination under the Clean Water Act (CWA) section 303(c)(4)(B) that new or revised water quality standards for nutrients are necessary to meet the requirements of the CWA for the State of Florida." ***Exhibit 2***.

11. EPA documents from December, 2008 reveal that the January 14, 2009, necessity determination was not prepared in conjunction with a reasoned analysis of scientific issues and environmental policy, but rather as part of a strategy either to induce settlement of the August, 2008 citizen's suit or to support a motion to dismiss that suit.

12. In late December 2008, (then) EPA Assistant Administrator Luis Luna provided a memorandum to (then) EPA Administrator Stephen Johnson requesting that the Administrator grant Assistant EPA Administrator Benjamin Grumbles a one-time delegation to sign a necessity determination for the State of Florida. ***Exhibit 3***. Mr. Luna stated:

> EPA does not agree with the plaintiffs' allegation that we made a CWA determination in our 1998 Strategy[1] that numeric nutrient criteria are necessary for Florida to meet the requirements of the CWA. <u>There is, however, some risk that the court could agree with the plaintiffs that the 1998 Strategy constitutes a CWA determination that nutrient criteria are necessary for Florida. Such a ruling could spur similar litigation in other states</u>. Presently, 49 states have one or more 303(d) listings for waters impaired by nutrients. (Emphasis added).
>
> The litigants have highlighted that water quality in Florida is declining due to nutrient pollution and that numeric criteria are needed to address the environmental degradation.

[1] Plaintiffs initially alleged that EPA's 1998 *National Strategy for the Development of Regional Nutrient Criteria* was the document serving as a necessity determination. In their first amended complaint, the plaintiffs alleged that it was the 1998 *Clean Water Action Plan*, coauthored with the U. S. Department of Agriculture, that was the document triggering EPA's mandatory duty to promulgate numeric nutrient criteria for Florida.

> In response to this lawsuit, we believe that we should collect and analyze nutrients-related information pertaining to Florida and decide whether to make a Section 303(c)(4)(B) determination that revised nutrient standards are necessary for the State of Florida to meet the requirements of the CWA. Making such a determination could give EPA a basis to propose a settlement to the plaintiffs or to request that the court dismiss the case. While making a determination may not resolve the litigation, we believe it is an option we should seriously consider and therefore are requesting delegation of authority. A CWA Section 303(c)(4)(B) can only be made by the Administrator or the Administrator's duly authorized delegate. (Emphasis added).

Administrator Johnson approved Mr. Luna's memorandum and signed the delegation on Monday, December 29, 2008.

13. With weekends and federal holidays excluded, Mr. Grumbles—who did not heretofore have the authority to make a necessity determination applicable to Florida—had only 11 working days, between December 29, 2008 and January 14, 2009, to make such a determination. Contrary to Mr. Luna's suggestion that the agency "collect and analyze nutrients- related information pertaining to Florida" in order to justify a necessity determination, EPA released the January 14, 2009 letter. There is no record that would justify EPA taking such a sudden change in position.

14. EPA did not "collect and analyze nutrient related information pertaining to Florida" (*see* Luna memorandum, paragraph 11 of this Complaint and Exhibit 3), but in lieu thereof referenced existing information regarding Florida water quality in the letter prepared for Assistant Administrator Grumbles' signature.

15. EPA's January 14, 2009 necessity determination also failed to abide by the public participation and public consultation requirements in 40 C.F.R. 25.4(c) and (d), which are applicable to the January 14, 2009 determination pursuant to 40 C.F.R. 25(a)(2) and (5).

16. The January 14, 2009 necessity determination was not the product of careful deliberation but a legal maneuver to quash the debate over the 1998 *Clean Water Action Plan* and limit any nationwide precedential effect of the suit filed in Florida.

17. A privilege log provided by EPA in response to a request for documents filed under the federal Freedom of Information Act (FOIA) revealed that EPA was preparing a press release related to the January 14, 2009 necessity determination on the same day of, or prior to, Administrator Johnson having delegated the one-time authority to Assistant Administrator Grumbles to sign the determination indicating that a decision had been made to issue the necessity determination prior to the delegation or any collection or analysis of nutrient information related to Florida.

18. A deliberative marshalling of conclusive evidence is a necessary component of the Administrator's necessity determination under § 303(c)(4)(B) of the Clean Water Act. *See* 57 Fed. Reg. 60848, 60858 ("In normal circumstances, it might be argued that to exercise section 303(c)(4)(B) the Administrator might have the burden of marshalling conclusive evidence of 'necessity' for Federally promulgated water quality standards").[2] In the instant case, EPA was faced with "normal circumstances" but failed to marshal any evidence, much less conclusive evidence, that *federal* numeric nutrient criteria are necessary for Florida waters.

19. The January 14, 2009 necessity determination is a condition precedent to and an integral part of the rulemaking procedure leading up to the promulgation of the challenged rules.

[2] In explaining why the Administrator did not engage in the "normal" process of "marshaling conclusive evidence of necessity" for promulgating federal water quality criteria in that specific circumstance, EPA emphasized that Congress had mandated promulgation of criteria for certain toxic constituents through amendments to the Clean Water Act. 57 Fed. Reg. 60848. EPA is operating under no such Congressional mandate in regard to numeric nutrient criteria.

The August 18, 2009 Consent Decree

20. On or about August 18, 2009, EPA executed a consent decree committing EPA to propose numeric nutrient criteria for Florida fresh waters by January 14, 2010 and to finalize the freshwater criteria no later than October 15, 2010. ***Exhibit 4***. Under the Consent Decree, EPA must propose numeric nutrient criteria for Florida estuarine and marine waters by January 14, 2011 and must finalize those criteria by October 15, 2011.[3]

21. Over the objection of several intervenors, the Court in the original citizen's suit approved entry of the consent decree. ***Exhibit 5***.

EPA's Criteria Proposed January 14, 2010

22. On January 14, 2010, EPA Administrator Lisa Jackson signed EPA's rule proposing numeric nutrient criteria for Florida's fresh waters (lakes and streams). Notice of the proposed rule was published in the Federal Register on January 26, 2010. ***Exhibit 6***.

23. On November 14, 2010, Administrator Jackson signed the final rule adopting numeric nutrient criteria for Florida's fresh waters (lakes and streams). ***Exhibit 7.*** The final rule is effective 15 months after publication in the Federal Register, except for section 131.43(e), which is effective 60 days after publication in the Federal Register.

24. EPA's promulgation of the Final Rule on November 14, 2010, is final agency action subject to challenge under the federal Administrative Procedures Act (APA). The January 14, 2009, necessity determination is a necessary preliminary step in the rulemaking process and therefore is amenable to challenge as a basis for holding that the final rule is invalid.

[3] On June 7, 2010, the parties to the Consent Decree filed a Joint Notice to the Court of Extension of Consent Decree Deadlines with the Court in the August 2008 citizen's suit. The Joint Notice extends the deadlines by which EPA must propose and finalize numeric nutrient criteria for Florida estuarine and marine waters to November 14, 2011 and August 15, 2012, respectively. The deadline for finalizing numeric nutrient criteria for South Florida canals is extended to August 15, 2012. The Joint Notice did not affect the October 15, 2010 deadline by which EPA was to finalize numeric nutrient criteria for all lakes and all remaining streams within the State; EPA moved for, and was granted, a 30 day extension through November 14, 2010 which is a Sunday. EPA's new deadline to finalize the freshwater criteria became Monday, November 15, 2010.

COUNT I

Necessity Determination

Arbitrary and Capricious Standard of Review, 5 U.S.C. §§ 701-706

25. Plaintiffs contest EPA's numeric nutrient criteria rule for Florida as final agency action as provided by the federal Administrative Procedure Act, 5 U.S.C., §§ 701 – 706 and specifically § 706(2)(A) which allows this Court to set aside final agency action that is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law; paragraphs one (1) through twenty-four (24) are again alleged in this paragraph twenty-five (25) as if set out herein in full.

26. Section 706 of the Administrative Procedure Act, addressing the scope of judicial review of final agency action, states in relevant part that "the reviewing court shall . . . hold unlawful and set aside agency action, findings and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A).

27. The final rule is invalid because the January 14, 2009 necessity determination is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." In addition to the allegations as set out below, the January 14, 2009 necessity determination: A) was created as a litigation tool to implement a litigation strategy of inducing settlement; B) was developed to limit the potential precedential effect of the suit against Florida although nutrient enrichment of surface waters is not at all unique to Florida; C) was not based upon scientific water quality related factors within the scope of the Clean Water Act; D) was not a determination of necessity whereby the Assistant Administrator marshaled evidence to support the need for federal water quality standards in Florida; E) requires the Administrator to set statewide or regional numeric nutrient criteria for which there is no professionally accepted peer reviewed methodology for setting such criteria; F) sets deadlines for the development of statewide numeric

nutrient criteria which cannot be met because there is no professionally accepted peer reviewed methodology for developing such criteria; G) singles out the State of Florida and its regulated community notwithstanding that substantial nutrient pollution of surface waters from anthropogenic sources occurs in other states; H) singles out Florida and its regulated community notwithstanding that the State of Florida was in the process of developing its own numeric nutrient criteria under an EPA-approved plan; I) disregards Florida's 79 EPA approved Total Maximum Daily Load determinations developed under Florida's EPA approved Impaired Waters Rule, pursuant to which TMDLs are developed, as a change to Florida's water quality standards. J) arbitrarily deprived stakeholders of any meaningful public participation in the development of the criteria; and K) is contrary to the intent of Congress by ignoring the infrastructure of the CWA based on cooperative federalism.

28. EPA's Final Rule ignored recent relevant recommendations from the Agency's Science Advisory Board (SAB) regarding the development of nutrient criteria. The SAB emphasized the necessity to understand the causative link between nutrient levels and impairment. See SAB Report at 4. Such an understanding is required to ensure that "managing for particular nutrient levels will lead to desired outcomes." *Id*. In particular, the SAB stressed that, "[i]f the numeric criteria are not based upon well-established causative relationships [between nutrient levels and impairment], the scientific basis for the water quality standards will be seriously undermined." *Id*. at 6. The SAB also highlighted the importance of using site-specific data so modeling results will be scientifically defensible: "It is possible to use these water quality models to describe exposure (in terms of ambient nutrient concentrations) but in the absence of empirical data, this would not be scientifically defensible." *Id*. at 18. There is no assurance that water quality criteria will protect designated uses in the absence of the consideration of site-specific

conditions. See *id*. at 37. EPA's Final Rule ignores these SAB recommendations: the rule establishes state-wide criteria that fail to account for local conditions, cause-and-effect relationships, and impairment threshold levels.

29. EPA had committed in the Consent Decree to proposing statewide criteria for fresh waters across the entire State of Florida by January 14, 2010 but as of November 3, 2009, approximately 60 days from EPA's self-imposed deadline, EPA had not yet determined the methods to be used stating in a declaration filed in the pending citizen suit regarding the 1998 document that "EPA is evaluating considering a range of possible approaches and methodologies for developing nutrient criteria for Florida…."

COUNT II

Necessity Determination

Final Agency Action in Excess of Authority, Short of Statutory Right, 5 U.S.C. §§ 701-706

30. The final rule is invalid as provided by the federal Administrative Procedure Act, 5 U.S.C., §§ 701-706 and specifically § 706(2)(C), because the necessity determination underlying those rules is "in excess of statutory jurisdiction, authority, or limitations, or short of statutory right"; paragraphs one (1) through twenty-four (24) are again alleged in this paragraph thirty (30) as if set out herein in full.

31. The Assistant Administrator issued the January 14, 2009 necessity determination to settle the suit filed against EPA in August of 2008 (or give EPA a basis for seeking dismissal). ***Exhibit 3.***

32. A necessity determination under § 303(C)(4)(B) must be a science-based decision based upon a determination that water quality criteria authorized by, and within the scope of, the Clean Water Act are necessary to protect the designated uses of a State's surface waters.

33. EPA itself has stated that, under § 303(C)(4)(B), the Administrator must marshal conclusive evidence that federally promulgated criteria are necessary for a State's surface waters before imposing federally generated criteria upon the State. *See* 57 Fed. Reg. 60848, 60858.

34. Nothing within the Clean Water Act grants EPA the authority to declare that a state needs federally promulgated surface water criteria as a means of inducing the settlement or dismissal of a lawsuit filed against the federal agency with the express purpose of limiting precedential impacts in other states. In promulgating the January 14, 2009 necessity determination as a litigation strategy (***Exhibit 3***), EPA has exceeded its statutory authority under the Clean Water Act in violation of 5 U.S.C. § 706(2)(C).

COUNT III

Necessity Determination

Failure to Observe Proper Procedures, 5 U.S.C. §§ 701-706

35. The final rule is invalid as provided by the federal Administrative Procedure Act, 5 U.S.C., §§ 701-706 and specifically § 706(2)(D) because the necessity determination underlying those rules was promulgated "without observance of procedure required by law" and if the necessity determination is deemed invalid, then the final rule was promulgated in a fatally defective manner; paragraphs one (1) through twenty-four (24) are again alleged in this paragraph thirty-five (35) as if set out herein in full.

36. In response to a request for information and copies of public records under the federal Freedom of Information Act (FOIA), counsel for EPA responded in June of 2009 that <u>no record was established</u> [for the promulgation of the necessity determination] because the January 14, 2009 document was not final agency action subject to challenge under the federal APA. As reflected in withheld item 554 at page 105 of the 150 page privilege log provided in response to

the FOIA request, an e-mail was circulated on January 13, 2009, the day before the letter was released, wherein EPA legal counsel were questioning whether the January 14, 2009 necessity determination was indeed final agency action—although the action had already been taken.

37. The January 14, 2009 necessity determination was "without observance of procedure required by law" in that it was performed without the development of a proper record of decision.

38. Additionally, the rule is invalid because the January 14, 2009 determination was "without observance of procedure required by law." EPA failed to abide by the public notification and public consultation requirements of 40 C.F.R. 25.

COUNT IV

Instream Criteria

Arbitrary and Capricious Standard, 5 U.S.C. §§ 701-706

39. Plaintiff challenges EPA's final rule, 40 C.F.R. § 131.43(c)(2)(i), as final agency action as provided by the federal Administrative Procedure Act, 5 U.S.C. §§ 701 – 706 and specifically § 706(2)(A) which allows this Court to set aside final agency action that is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law; paragraphs one (1) through twenty-four (24) are again alleged in this paragraph thirty-nine (39) as if set out herein in full.

40. As conceded by EPA in the preamble to its proposed rule, EPA was unable to establish a cause-and-effect (or dose-response) relationship between the instream concentrations of nutrients, both total nitrogen (TN) and total phosphorus (TP), and an observable negative biological response when reviewing data from Florida streams.

41. The failure to establish a cause-and-effect or dose-response relationship means that EPA cannot establish the instream concentration at which negative environmental impacts occur in Florida's freshwater streams i.e., EPA's rule lacks an adequate scientific basis.

42. Notwithstanding its failure to establish a relationship between instream nutrient concentrations and environmental (primarily biological) impacts, EPA has promulgated numeric nutrient criteria for instream TP and TN using a reference water approach that is both facially invalid and invalid as applied.

43. EPA reviewed TP and TN data from Florida streams considered to have "good biology" which, for EPA's purposes, means that the waters reviewed exceeded a score of 40 points applying Florida's Stream Condition Index (SCI) or waters selected as "benchmark waters" by the State of Florida. Designation of a stream as a "benchmark water," also uses the SCI as a determining factor.

44. EPA then prepared a frequency distribution (graph or plot of the data) looking at the frequency of occurrence of nutrient data (TP and TN data expressed as milligrams per liter or mg/l) from those waters with an SCI score exceeding 40 points and a limited number of the State's benchmark or reference waters. EPA then arbitrarily drew a line at either the 75th percentile, i.e., the point on the graph of the data at which 75 percent of the data would lie to the left of the line under the curve, or the 90th percentile depending upon the location of the streams within the State. EPA declared that TP or TN concentrations corresponding to the 75th or 90th percentile on the graph, depending upon the nutrient region, are the new federal instream nutrient criteria.

45. EPA's reference water basis for its nutrient criterion is arbitrary and capricious for a number of reasons, including but not limited to:

A. Arbitrarily selecting the 75th percentile means that 25 percent of the data from EPA's reference streams exceed the new criterion; similarly, choosing the 90th percentile means that 10% of the data from biologically healthy streams now exceeds the criterion. As a result, under EPA's rule, a large proportion of EPA's reference waters—the biologically healthy clean waters that EPA used to set its standards—by law are impaired and must be "restored" under the Clean Water Act Total Maximum Daily Load (TMDL) program under § 303(d) of the Act.

B. EPA conceded that it could not establish a cause-and-effect or dose-response relationship between nutrient concentrations and biological response in streams. EPA's reference water approach arbitrarily claimed that a relationship existed between good stream biology and nutrient concentrations without any evidence to support it.

C. EPA's own Science Advisory Board (SAB) advised EPA that the failure to establish a cause-and-effect relationship could render EPA's attempt to set numeric endpoints for nutrients meaningless stating: "[w]ithout a mechanistic understanding and a clear causative link between nutrient levels and impairment, there is no assurance that managing for particular nutrient levels will lead to the desired outcome." Final Report, April 28, 2010.

46. The reference water approach, as applied by EPA, is invalid for a number of reasons including but not limited to:

A. Using an SCI score of 40 points, EPA filtered out tens of thousands of data points within Florida's STORET database down to 521 sampling locations for TN and 525 sampling sites for TP, with data restricted to a 6-year period of record (2004 – 2009); based on these limited data points a geometric mean of the TP and TN data were calculated for each site and the various sites were assigned to one of four nutrient regions.

B. For most sites, EPA only had two data points over the six year period from which EPA calculated a mean (average) nutrient concentration; in some nutrient regions, from 45% to 59% of the site "geometric means," were based upon a single measurement over the 6-year period of record. It is not possible to calculate a mean from a single measurement.

C. One or two measurements over a 6-year period of record are meaningless for characterizing the nutrient regime of the water body. This is especially true in Florida which experiences regularly occurring extreme high rainfall and drought cycles that result in great variation in concentrations.

D. After proposing criteria using the approach set out in subparagraphs A through C above, EPA changed course in August of 2010 abandoning its SCI-approach and using nutrient data from the State's benchmark or reference waters but arbitrarily eliminating waters that EPA did not prefer notwithstanding the State's database establishing the waters as reference waters. EPA then reversed itself again, applying the SCI approach only to the phosphate rich West Central Nutrient Region (a/k/a the Florida Bone Valley) applying the 75th percentile but the applying the benchmark-approach using the 90th percentile to other parts of the State.

E. Whether using the SCI-Approach or Benchmark Approach, neither establishes a cause-and-effect relationship between nutrient concentrations and instream biological harm and, but for EPA's own self-serving guidance from the late 1990s, and contrary to the April 2010 SAB report, these reference water approaches are not peer reviewed approved methods for establishing water quality criteria because neither method assures that if the number is met the Clean Water Act mandate of protecting designated uses will be met.

F. Using a reference water approach is an admission by EPA that the agency cannot interpret Florida's narrative criterion into ecologically meaningful numeric endpoints notwithstanding that the preamble to EPA's final rule claims to have done just that; EPA's assertion that it has, or can, interpret Florida's narrative nutrient criterion—for all streams across the state—using some variation of a reference water approach is false.

47. EPA's methods for determining compliance with the instream criteria are also arbitrary; while EPA derived the criteria using an undefined "long-term geometric mean," it decided to assess compliance using an annual geometric mean, or a long-term arithmetic mean of geometric means. The various statistical expressions are neither the same nor interchangeable.

COUNT V

Instream Criteria

Final Agency Action in Excess of Authority, Short of Statutory Right, 5 U.S.C. §§ 701-706

48. Plaintiff challenges EPA's final rule, 40 C.F.R. § 131.43(c)(2)(i), as final agency action as provided by the federal Administrative Procedure Act, 5, U.S.C., §§ 701-706 and specifically § 706(2)(C), which allows this Court to set aside final agency action that is "in excess of statutory jurisdiction, authority, or limitations, or short of statutory right"; paragraphs one (1) through twenty-four (24) and paragraphs thirty-nine (39) through forty-seven (47) are again alleged in this paragraph forty-eight (48) as if set out herein in full.

49. EPA's numeric nutrient criteria for Florida streams are not protective of the designated uses for those streams and therefore beyond the scope of EPA's rulemaking authority in that:

A. The criteria are not based upon a dose-response or cause-and-effect relationship and therefore there is no scientific basis to support EPA's assertion that maintaining a given instream concentration of TN or TP is necessary to protect the waterbody from negative impacts;

B. The criteria are based upon a reference water approach that does not establish cause and effect. EPA has established threshold principles that all water quality criteria should meet. See Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Use (USEPA 1985). The purpose of water quality criteria is to protect aquatic organisms and their uses from unacceptable effects. See *id*. at vi. Proper criteria derivation requires the establishment of a cause-and-effect relationship to ensure that regulation of the pollutant is necessary and will produce the desired effect. *Id.* at 15- 16, 21. For materials that have a threshold effect (like nutrients), the threshold of unacceptable effect must be determined. *Id*. at 8. As applied by EPA, the criteria did not include sufficient nutrient data to properly characterize the reference waters and therefore could not be used to predict the biological reaction of unrelated surface waters to instream nutrient concentrations;

C. As originally proposed, EPA's rule included downstream protective values (DPVs) for streams flowing to estuaries that effectively reduced the proposed instream protective values (IPVs) to a fraction of the IPV concentration; EPA deferred action on its estuarine DPVs but proceeded to finalize its instream criteria (IPVs).

D. By asserting that the DPVs are necessary, EPA has conceded that the IPVs were not developed to be protective of downstream waters in violation of 40 CFR s. 131.10(b). If the IPVs were developed consistent with federal law, there would be no need to propose the DPVs. By withdrawing the DPVs, EPA has left standing (and has finalized), instream criteria that are not protective of the designated uses of the streams for which they have been set (using the reference water approach with insufficient data) or for downstream waters.

Count VI

Lakes Criteria

Arbitrary and Capricious Standard, 5 U.S.C. §§ 701-706

50. Plaintiff challenges EPA's final rule, 40 C.F.R. § 131.43(c)(1), as final agency action as provided by the federal Administrative Procedure Act, 5 U.S.C., §§ 701 – 706 and specifically § 706(2)(A) which allows this Court to set aside final agency action that is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law; paragraphs one (1) through twenty-four (24) and paragraphs thirty-nine (39) through forty-seven (47) are again alleged in this paragraph fifty (50) as if set out herein in full.

51. Many lakes within the Bone Valley region of Florida, are naturally high in TP because they are located in phosphorous rich soils and phosphate rock substrate.

52. EPA's rule imposes total phosphorus criteria on naturally occurring and constructed lakes within Florida's Bone Valley that are lower than what is expected to occur naturally.

53. Lakes with ambient TP concentrations greater than EPA's lakes criteria would be deemed impaired and would have to be "restored" under s. 303(d) of the Clean Water Act to meet nutrient targets that are not attainable and would never have occurred naturally.

54. The Clean Water Act does not require, and EPA has no authority to mandate, criteria that are more stringent than naturally occurring background conditions.

Count VII

Downstream Values for Lakes, BATHTUB Model

Arbitrary and Capricious Standard, 5 U.S.C. §§ 701-706

55. Plaintiff challenges EPA's final rule, 40 C.F.R. § 131.43(c)(2)(ii), as final agency action as provided by the federal Administrative Procedure Act, 5 U.S.C., §§ 701 – 706 and specifically

§ 706(2)(A) which allows this Court to set aside final agency action that is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law; paragraphs one (1) through twenty-four (24) and paragraphs thirty-nine (39) through forty-seven (47) are again alleged in this paragraph fifty-five (55) as if set out herein in full.

56. EPA's rule adopts the BATHTUB nutrient loading model to establish additional numeric criteria that reduce instream criteria for those streams which flow into lakes.

57. The BATHTUB model was developed for southeastern impounded waters and was not intended, nor is it applicable, to shallow subtropical Florida lakes.

58. As with the DPVs for streams flowing into estuaries, EPA's determination that downstream protective values for lakes are needed is an admission that its instream criteria are insufficient to protect downstream waters as required by 40 CFR 131.10(b); if the instream criteria are protective of instream designated uses and downstream waters, there is no basis for establishing the downstream protective values for lakes.

59. Consequently, EPA's application of the BATHTUB or any alternative model to establish downstream protective values for lakes is arbitrary, capricious and otherwise contrary to law.

60. EPA's final rule requires that flows into a lake meet the TP and TN values for the lake at the point of entry. Therefore, if a lake does not meet standards, the IPV for all streams in the watershed must be reduced even if they do not cause or contribute to the lake's failure to meet the required limits. As a result, the IPVs for **all** influent streams would have to be reduced below the levels needed to protect the streams themselves. This imposes an unreasonable and arbitrary requirement on the upstream components.

Count VIII

Nitrate-Nitrite Criterion for Springs

Arbitrary and Capricious Standard, 5 U.S.C. §§ 701-706

61. Plaintiff challenges EPA's final rule, 40 C.F.R. § 131.43(c)(3), as final agency action as provided by the federal Administrative Procedure Act, 5 U.S.C., §§ 701 – 706 and specifically § 706(2)(A) which allows this Court to set aside final agency action that is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law; paragraphs one (1) through twenty-four (24) and paragraphs thirty-nine (39) through forty-seven (47) are again alleged in this paragraph sixty-one (61) as if set out herein in full.

62. EPA has finalized a numeric criterion of 0.35 mg/l nitrate-nitrite which was originally developed by the Florida Department of Environmental Protection (DEP) for spring boils and spring vents; the State has not yet finalized the criterion.

63. EPA did no studies or analyses to determine that 0.35 mg/l nitrate-nitrite was an appropriate criterion for all springs across the State of Florida.

64. State studies presented in support of the criterion at public workshops indicated that nitrate-nitrite concentrations of 0.44 mg/l could occur in spring boils and vents without demonstrating negative biological response.

65. EPA's finalization and application of the unadopted State criterion to all springs within the State of Florida is arbitrary, capricious and contrary to law.

Count IX

Failure to Exclude Waters with Nutrient TMDLs from the Rule is Arbitrary and Capricious

66. Plaintiff challenges EPA's final rule as final agency action as provided by the federal Administrative Procedure Act, 5 U.S.C., §§ 701 – 706 and specifically § 706(2)(A) which allows this Court to set aside final agency action that is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law; paragraphs one (1) through twenty-four (24) are again alleged in this paragraph sixty-six (66) as if set out herein in full.

67. EPA previously approved Florida's Impaired Waters Rule, Rule 62-303, Fla. Admin. Code, as a change to Florida's water quality standards. EPA has also approved at least 79 Total Maximum Load Determinations (TMDLs) by Florida as the appropriate water quality standards for those waters.

68. In the final rule, EPA fails to exempt waters with existing EPA-approved nutrient TMDLs from the rule. Failure to recognize the already approved TMDLs is a change in EPA's position on the ability of those limits to meet the requirements of the CWA. Nutrient TMDLs include numeric limits similar to that of water quality criteria in that both the TMDLs and the water quality criteria must protect the designated use of the applicable waters. <u>See</u> 44 U.S.C. §§ 1313(c)-(d); 40 C.F.R. §§ 130.2(j) and 130.7 Such a change in position without adequate explanation and support in the record is arbitrary and capricious and an abuse of discretion.

Count X

Failure to Fully Disclose the Rulemaking's Technical Basis, Regulatory Implications, and Economic Impacts Constitutes a Failure to Observe Procedures Required by Law. 5 U.S.C. § 706(2)(D).

69. Plaintiff challenges EPA's final rule as final agency action as provided by the federal Administrative Procedure Act, 5 U.S.C., §§ 701 – 706 and specifically § 706(2)(D) which allows this Court to set aside final agency action made without observance to procedures required by law; paragraphs one (1) through twenty-four (24) are again alleged in this paragraph sixty-nine (69) as if set out herein in full.

70. Throughout this rulemaking process, EPA has failed to disclose the rulemaking's technical basis, regulatory implications, and economic impacts. Cf. 5 U.S.C. § 533(b). EPA was not forthcoming with data, methods, analyses, or clear explanations of rule provisions. EPA has not explained the Science Advisory Board's critical review of EPA's nutrient criteria derivation method. EPA has incorrectly represented that this rule will have, at most, only indirect impacts on regulated entities in Florida. EPA has consistently understated the economic implications of the rule on Florida. Contrary to the requirements of the Administrative Procedure Act, EPA conducted this rulemaking in a manner that frustrated the public's right to effectively participate in the process.

RELIEF REQUESTED

Plaintiff respectfully requests that this Court enter judgment in favor of Plaintiff as follows:

1. Finding the November 15, 2010 Final Rule invalid because the January 14, 2009 necessity determination violates the federal Administrative Procedures Act in that it is: A)

arbitrary, capricious an abuse of discretion, or otherwise not in accordance with law; B) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; and, C) that the necessity determination and therefore the final rule were prepared without observance of procedure required by law;

2. Finding 40 CFR §§ 131.43(c) (1), (2) and (3) to be final agency action in violation of the federal Administrative Procedures Act in that the rule provisions are: A) arbitrary, capricious an abuse of discretion, or otherwise not in accordance with law; B) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right; and or, C) prepared without observance of procedure required by law;

3. Enjoining the Administrator and EPA from implementing the federal numeric nutrient criteria for Florida in the Final Rule, 40 CFR part 131.

4. Grant any further relief this Court may deem just and proper.

Dated this 7th day of December, 2010.

s/ Carol A. Forthman
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BILL McCOLLUM
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s/ Jonathan A. Glogau
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

SEP 2 8 2007

Mr. Jerry Brooks
Director
Division of Environmental Assessment and
Restoration,
Florida Department of Environmental Protection
2600 Blairstone Road, Mail Stop 3560
Tallahassee, Florida 32399-2400

Dear Mr. Brooks:

This letter documents the mutual agreement between the Florida Department of Environmental Protection (FDEP) and the U.S. Environmental Protection Agency (EPA) in regards to the State's revised voluntary numeric nutrient criteria development plan, entitled *State of Florida Numeric Nutrient Criteria Development Plan* (Plan), submitted to EPA in final version for review on September 27, 2007.

EPA recognizes that this Plan represents considerable effort undertaken by the State to address the issue of nutrient over-enrichment. We especially appreciate the close cooperation of your staff with EPA Region 4 in development of Florida's Plan, and your continued support of their participation in our Regional Technical Advisory Group (RTAG). The achievement of mutual agreement on your revised Plan reflects the success of that process.

Based upon our review, we believe this Plan describes a reasonable process by which the State of Florida (State) can develop appropriate protective numeric nutrient criteria for adoption into Florida water quality standards; and that completion of this process by the target dates indicated in the Plan should provide increased protection of state waters from the effects of nutrient over-enrichment.

By this agreement, EPA is acknowledging that this revised plan reflects a reasonable course of action by which the State can proceed to develop numeric nutrient criteria; but this agreement does not, nor should it in anyway be interpreted to constitute an approval, or conditional approval of Florida water quality standards. EPA's agreement at this time does not reflect an in-depth review or a judgment that the resulting criteria will, or will not be protective, or otherwise consistent with the Clean Water Act (CWA).

According to the time-line projected in your revised Plan, we will expect you to submit numeric water quality standards for nutrients for associated waterbody types to EPA for approval during the respective rulemakings. In the interim, we request that the State provide updates to EPA to document progress according to the Plan through the established 106 process conducted by EPA. In the event that the Plan needs to be revised, changes can be made with mutual agreement, and EPA will update this letter to document our agreement with the revisions.

At the end of 2007 (and we anticipate annually thereafter), EPA will use the Plan to evaluate Florida's progress and determine whether or not the State is likely to complete numeric nutrient criteria development and adoption within the agreed upon time frames. If the State has not met the milestones as scheduled in the plan, EPA will evaluate whether a federal promulgation would be appropriate. At that time, the Administrator may choose to exercise his discretion under the CWA § 303(c)(4)(B) to determine that new or revised standards are necessary to meet the requirements of the CWA, and accordingly may choose to promulgate water quality criteria for nutrients applicable to surface waters within Florida in accordance with § 303. However, the revised Plan submitted by FDEP and agreed to here makes this possibility unlikely at this time.

EPA will make every effort to assist the State in developing nutrient criteria in a manner consistent with your Plan. We expect the continued cooperation and communication between Florida and EPA to lead to scientifically defensible and protective nutrient criteria for the State's waters. We applaud the State for making such a significant commitment of time and resources toward completion of this endeavor.

We look forward to working with Florida over the next year as the State continues to refine its approach for rivers and lakes. In addition, we are especially pleased at the updates within the revised plan to address nutrient enrichment in estuarine waters and look forward to the opportunity to work closely with the state on those waters in the coming months. As the State continues the work already initiated through pollution load reduction goal development in several estuaries, exploring development of regional response variable nutrient criteria, participating in the Gulf of Mexico Alliance, and holding an estuary nutrient criteria kick-off meeting, the Region's Nutrient Task Force would welcome the opportunity for dialogue and interaction. The Region's Nutrient Task Force expects to continue working with states to provide technical assistance and we would like to make sure Florida is aware of this resource.

If you have any questions now, or in the future, regarding this matter, please feel free to contact me at 404-562-9345 or have a member of your staff contact the Florida Water Quality Standards Coordinator on my staff, Laurie Lindquist at 404-562-9249.

Sincerely,

Gail Mitchell, for

James D. Giattina
Director
Water Management Division

cc: Ken Weaver, FDEP

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 14 2009

OFFICE OF WATER

Mr. Michael Sole, Secretary
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, Mail Stop 49
Tallahassee, FL 32399-3000

Dear Secretary Sole: Mike

This letter constitutes a determination under Clean Water Act (CWA) section 303(c)(4)(B) that new or revised water quality standards for nutrients are necessary to meet the requirements of the CWA for the State of Florida. I am gratified to have learned that your Department supports EPA's determination that numeric nutrient water quality criteria are necessary to meet the requirements of the CWA for the State of Florida.

In considering whether new or revised standards are necessary, EPA recognizes that Florida has invested over $20 million in collecting and analyzing data on the relationship between nutrient levels and biological impacts for purposes of developing numeric nutrient criteria and that Florida has implemented some of the most progressive nutrient management strategies in the Nation. Moreover, for over a decade, the State has developed and demonstrated an impressive track record of commitment, innovation, and stakeholder outreach and collaboration in its efforts to manage nutrient-related pollution. Florida achieved this record not only as a result of its longstanding commitment to environmental protection but also because it recognized the widespread and very substantial nutrient pollution challenges it faces.

Despite Florida's widely recognized efforts, substantial water quality degradation from nutrient over-enrichment remains a significant challenge in the State and one that is likely to worsen with continued population growth and environmental and land-use changes. EPA has determined that numeric nutrient water quality criteria are necessary for the State of Florida to meet the CWA requirement to have criteria that protect applicable designated uses. Additionally, numeric nutrient criteria will create clear water quality goals and easily measurable quantitative baselines to support stronger collaboration and more effective partnerships with both point and nonpoint source dischargers of nutrient pollution.

Today's determination affirms the wisdom of the substantial investments that Florida has made to date in nutrient data collection, analysis, and stakeholder involvement, and is fully consistent with the State's commitment to a stronger nutrient control program through a greater emphasis on the development of numeric nutrient criteria. Today's determination will support Florida in building upon its already strong record of water quality protection, result in criteria protective of applicable designated uses, and further expand and strengthen the numerous partnerships and collaborative projects Florida has led and supported to date.

Statutory and Regulatory Background

Section 303(c) of the CWA requires States and authorized Tribes (hereafter, collectively referred to as "States") to adopt water quality standards for waters of the United States within their applicable jurisdictions. Section 303(c)(2)(A) and EPA's implementing regulations at 40 CFR part 131 require, among other provisions, that State water quality standards include the designated use or uses to be made of the waters and the criteria necessary to protect those uses. EPA's regulations at 40 CFR § 131.11(a)(1) provide that States shall "adopt those water quality criteria that protect the designated use" and that such criteria "must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use."

States are also required to review their water quality standards at least once every three years and, if appropriate, revise or adopt new standards (CWA section 303(c)(1)). States are required to submit these new or revised water quality standards to EPA for review and approval or disapproval (CWA section 303(c)(2)(A)). Finally, CWA section 303(c)(4)(B) authorizes the Administrator to determine, even in the absence of a State submission, that a new or revised standard is needed to meet the CWA's requirements. When deciding whether a CWA section 303(c)(4)(B) determination is warranted for a particular state, EPA considers each situation based on its particular facts and circumstances. The CWA does not specify particular information or factors that EPA must consider when deciding to exercise its discretion under section 303(c)(4)(B), and EPA thus considers each individual case on its merits. The authority to make a determination under CWA section 303(c)(4)(B) is discretionary and resides exclusively with the Administrator, unless delegated by the Administrator. For the purposes of today's determination, the Administrator has delegated this authority to me, Benjamin H. Grumbles, EPA's Assistant Administrator for Water.

Florida's Current Nutrient Program

Florida has taken a number of steps to control nutrient pollution within the State. In addition to adopting a narrative nutrient criterion and implementing that criterion through NPDES permits, water body assessments, and TMDLs, Florida has established other programs and laws to control nutrient pollution in the State. Despite the State's substantial efforts, however, EPA concludes that, based on the available data, information, and trends, Florida's narrative nutrient criterion alone is not sufficient to protect applicable designated uses, and that numeric nutrient criteria are necessary to meet the requirements of the CWA.

With respect to addressing nutrient pollution, Florida:

(1) has adopted a nutrient-specific narrative criterion in its water quality standards, in addition to detailed nutrient-specific assessment procedures in its Impaired Waters Rule (IWR),
(2) encourages individual watershed management plans through the State's Basin Management Action Plans (BMAPs), and
(3) has enacted other State laws and programs regarding point and nonpoint source control such as the Grizzle-Figg Act of 1990.

Florida's Narrative Water Quality Criterion for Nutrients and the IWR

Florida's narrative water quality criterion for nutrients provides, in relevant part, that "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna."[1] Florida's implementation of the criterion is based on site-specific detailed biological assessments and analyses together with site-by-site outreach and stakeholder engagement in the context of specific CWA-related actions, specifically National Pollutant Discharge Elimination System (NPDES) permits, total maximum daily loads (TMDLs), and assessment and listing decisions.

When deriving NPDES permit limits, Florida initially conducts a site-specific analysis to determine whether a proposed discharge has the reasonable potential to cause or contribute to an exceedance of the narrative water quality criterion in the receiving water or any other affected water. This analysis first involves examining the proposed discharge to determine, in the case of nutrients, whether the discharge contains phosphorus or nitrogen and second, determining the ambient water quality of the receiving water and any other affected waters with regard to nutrient levels and biological impacts. In Florida's case, the State then determines what levels of nutrients would "cause an imbalance in natural populations of aquatic flora or fauna" and translates those levels into numeric "targets" for the receiving water and any other affected waters. If Florida finds that there is reasonable potential, the State calculates permit limits stringent enough to ensure that such a discharge will not cause or contribute to an exceedance of the nutrient target levels (and therefore cause an "imbalance in natural populations of aquatic flora and fauna") for the water body and any other affected water bodies.

Accurately determining, on a water-by-water basis for thousands of waters, the levels of nutrients that would "cause an imbalance in natural populations of aquatic flora or fauna" is a difficult, lengthy, and data-intensive undertaking. This work involves performing detailed site-specific analyses of the receiving water and any other affected waters. If the State has not already completed this analysis for a particular water, it can be very difficult to accurately determine, in the context and timeframe of the NPDES

[1] See Florida Administrative Code (F.A.C. rule 62-302-530(47)(b)).

permitting process, the levels of nutrients that would "cause an imbalance in natural populations of aquatic flora or fauna" and process NPDES permits in a timely manner. For example, in some cases, adequate "cause and effect" data may take several years to collect and therefore may not be available for a particular water at the time of permitting.

Numeric nutrient criteria in Florida would enhance the effectiveness of NPDES permits in protecting designated uses and enable Florida permit writers to derive effluent limitations without the resource intensive and burdensome process of conducting site-specific analyses to determine the appropriate numeric target value. Therefore, numeric nutrient criteria would ensure that criteria are in place that will protect the designated uses of Florida's waters as required by the CWA and EPA's implementing regulations.

Having numeric nutrient criteria in place would have a similar effect in development of TMDLs. When developing TMDLs, Florida translates, as it does when determining reasonable potential and deriving limits in the permitting context, the narrative nutrient criterion into a numeric target that the State determines is necessary to meet the narrative criterion and protect applicable designated uses. This process also involves a site-specific analysis to determine the nutrient levels that would "cause an imbalance in natural populations of aquatic flora or fauna" in a particular water. Each time a site-specific analysis is conducted to determine what the narrative criterion means for a particular water body in developing a TMDL, the State takes site-specific considerations into account and devises a method that works for the data and information available. EPA maintains that numeric criteria for nutrients would enable the State to, in a more timely manner, establish TMDLs that identify nutrient reductions necessary to protect the designated uses. These resource intensive efforts to interpret the State's narrative criterion contribute to delays in implementing the criterion and therefore affect the State's ability to provide the needed protections for applicable designated uses.

In adopting the IWR, Florida took important steps toward improving implementation of its narrative nutrient criterion by establishing and publishing an assessment methodology to identify waters impaired for nutrients. This methodology includes numeric nutrient impairment "thresholds," above which waters are automatically deemed impaired. For all other waters, the IWR specifies a process for conducting site-specific assessments to enable Florida to determine on a site-specific basis whether there is an imbalance in flora or fauna, before a formal impairment or listing decision can be made for these waters. This site-specific process necessarily results in additional delays in identifying all waters impaired by nutrients; such a delay would not exist with numeric criteria.

The thresholds of impairment used in the IWR are expressed as an increasing annual trend in trophic state index (TSI) for lakes and chlorophyll-a mean values for streams, estuaries, and open coastal waters. While these impairment thresholds and the site-specific assessment processes are useful for identifying impaired waters, significant delays in identifying all nutrient-impaired waters unavoidably result from the need to implement the narrative criterion on a site-specific basis for many waters. Numeric nutrient criteria are necessary to facilitate and expedite the identification of all nutrient impaired waters in Florida; thereby providing necessary protection for the State's designated uses, as required by the CWA.

Implementation of the State's Basin Management Action Plans (BMAPs) and Other Florida Laws and Programs for Nutrient Control

As mentioned above, Florida has other innovative and important State programs designed to control nutrient pollution, such as those adopted to limit nutrient pollution in geographically specific areas. Numeric nutrient criteria will provide more precise, pre-determined targets that will facilitate more effective implementation of these programs and provide greater certainty as to the level of water quality necessary to protect the State's designated uses.

One of the State's innovative programs is the development of Basin Management Action Plans (BMAPs) through which Florida assembles groups of stakeholders to develop plans in order to implement State-adopted and EPA-approved TMDLs. These BMAPs outline strategies to implement TMDLs once they are established and include an implementation schedule, a method for evaluating the effectiveness of the BMAP, and funding strategies, as well as ways to address any future increases in pollutant loadings. NPDES permits may also be revised as necessary in order to implement BMAPs, and permitted dischargers (including storm water and other nonagricultural dischargers) implement Best Management Practices (BMPs) "to the maximum extent practicable" to reduce pollution. Nonpoint source dischargers are also covered by BMAPs, and may demonstrate compliance with the Plan by implementing BMPs or conducting water quality monitoring.[2] An essential prerequisite for successful implementation of this critical watershed approach is that the State first must undertake the process of determining impairments and then developing a TMDL. Timely development of TMDLs, established at levels necessary to protect designated uses, will be facilitated by having numeric nutrient criteria in place so that the State can more effectively and expeditiously implement the State's BMAP program.

In addition to BMAPs, Florida has implemented additional innovative approaches to address nutrient pollution. A good example is the 1990 Grizzle-Figg Act, (see Florida Statutes 403.086[3]), which requires limits of 5/5/3/1 mg/l (BOD_5/SS/TN/TP[4]) for all domestic wastewater treatment facilities in the Tampa Bay area. In 1999, the Florida State Legislature established Advanced Wastewater Treatment (AWT) limits at 5/5/3/1 mg/l (BOD_5/SS/TN/TP) for wastewater facilities in the Florida Keys (see Laws of Florida Chapter 99-395[5]). Florida has also adopted other rules to limit nutrient pollution in geographically specific areas like the Indian River Lagoon System, the Everglades Protection Area, and Wekiva Springs. In these cases, Florida has either specifically limited nutrient pollution in the water body, from point and nonpoint source discharges, limited discharges altogether, or, in the case of the Everglades Protection Area,

[2] http://www.waterinstitute.ufl.edu/research/projects/downloads/p001-Ch7_SpringsNutrients.pdf
[3]http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0403/Sec086.HTM
[4] Biological Oxygen Demand (BOD_5), Suspended Solids (SS), Total Nitrogen (TN), and Total Phosphorus (TP)
[5] http://laws.flrules.org/files/Ch_1999-395.pdf

constructed stormwater treatment areas that can remove nutrients from runoff. Implementation of these types of programs could be refined and enhanced if decision makers are aware of the numeric nutrient criteria that are necessary to protect designated uses.

Magnitude of Nutrient Over-Enrichment in Florida

Water quality degradation due to nutrient over-enrichment is a significant environmental issue in Florida. Florida's Department of Environmental Protection has acknowledged and documented the magnitude of over-enrichment. According to Florida's 2008 Integrated Report,[6] approximately 1,000 miles of rivers and streams, 350,000 acres of lakes, and 900 square miles of estuaries are impaired for nutrients in the State. To put this into context, these values represent approximately 16% of the assessed river and stream miles, 36% of the assessed lake acres, and 25% of the assessed square miles of estuaries that Florida has listed as impaired under the IWR. The actual number of miles and acres of waters impaired for nutrients is likely higher, as many waters currently classified as "unassessed" may also be impaired.

This conclusion is based upon a range of available information, including the vast amounts of monitoring data that exist on nutrient-related parameters in Florida waters. With almost 800,000 nutrient-related data points in STORET (including nitrogen, phosphorus, chlorophyll-a, and turbidity), Florida has substantially more data points than any other State or Territory to clearly characterize the magnitude of its nutrient challenges.

Monitoring Data and Impairments Indicate that Nutrient Problems Persist in Florida

An analysis of United States Geological Survey (USGS) monitoring data for nutrients in certain locations in Florida shows that levels of nutrient pollution have not significantly improved since 1980 despite strong efforts to control nutrient pollution. Concentrations of Total Phosphorus (TP) and Total Nitrogen (TN) have remained relatively constant at an average of 0.15mg/L and 1.4mg/L, respectively.[7] Additionally, Florida's recurrent harmful algal blooms continue to pose threats to public drinking water supplies and recreational sites. Harmful algal blooms that occur inland and near shore are typically caused by excess nutrients.[8]

Nutrient pollution in Florida has a predictable and widespread impact. The extent of this impact has been well documented and tracked for many years. According to Florida's most recent EPA-approved CWA section 303(d) list from 2002,[9] of the 823 waters listed as impaired in Florida, over 60% (over 550 waters) are impaired for nutrients.

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[6] http://www.dep.state.fl.us/water/docs/2008_Integrated_Report.pdf
[7] USEPA. 2000. STORET Legacy Data Center. http://www.epa.gov/storet/dbtop.html
[8] http://www.dep.state.fl.us/water/tmdl/docs/2006_Integrated_Report.pdf
[9] http://www.dep.state.fl.us/water/tmdl/adopted_gp1.htm

Florida's Environment is Unique and Presents Special Challenges

Florida's natural physical factors, including flat topography and numerous wetlands, a warm and humid climate, nutrient-rich soils, hydrology, and erosion caused by tropical storms and hurricanes make controlling nutrient pollution particularly challenging because these conditions are especially conducive to nutrient over-enrichment. In addition, human caused impacts such as hydrological modifications (i.e., canals), intensive agricultural production, population growth and associated urban and suburban development have had a broad and widespread effect. Effectively addressing current nutrient impairments in the State represents a significant challenge and is compounded by a projected population growth of almost 80 percent in Florida from 2000 to 2030.[10] Further development and urbanization will likely result in increased nutrient runoff and pressure to utilize remaining agricultural lands more intensively.[11]

Within the continental United States, Florida possesses unique and nationally valued aquatic ecosystems, including shallow coral reefs, freshwater and salt marshes, swamps, and mangroves.[12] These aquatic ecosystems are particularly sensitive to the effects of excessive nutrients which threaten the State's significant biological diversity. The number of species in Florida (3,500 native vascular plants and 1,500 vertebrates) is higher than in all but three other states. Further, Florida also has many endemic species (410 invertebrates, 258 plants and vertebrates) that are not found anywhere else on Earth.[13] Florida has many water-filled caves and sinkholes that serve as hotspots of biological diversity and provide homes to many species of aquatic life, some unique to particular Florida locations.[14] Additionally, Florida is the only state in the continental United States to have extensive shallow coral reef formations near its coasts (i.e. within five miles).[15] A recent study initiated by the United Nations Food and Agriculture Organization found that the single richest concentration of marine life in the Atlantic Ocean lies some 10 miles off the tip of Southern Florida within the Florida Straits.[16] This biological diversity relies on sufficient quality habitat and other natural resources, including clear, transparent waters low in phosphate and nitrogen nutrients.[13, 14] Especially in the case of coral reefs and flora and fauna in natural spring environments, clear water with plenty of light and oxygen available is critical to the protection of the species that inhabit these locations. Nutrient enriched water can have reduced transparency and low dissolved oxygen levels that are not protective of the natural biology in Florida. Effectively managing nutrient levels in Florida's lakes, flowing waters, estuaries and coastal waters through numeric nutrient criteria is important to maintaining the ecosystems in these waters and important ecosystems that are near shore.

The combined impacts of urban and agricultural activities along with Florida's physical features and important and unique aquatic ecosystems make it clear that the

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[10] http://www.census.gov/population/projections/SummaryTabA1.pdf
[11] http://www.dep.state.fl.us/water/docs/2008_Integrated_Report.pdf
[12] http://sofia.usgs.gov/publications/ofr/2005-1021/
[13] http://edis.ifas.ufl.edu/CR004
[14] http://www.floridasprings.org/anatomy/life/
[15] http://www.dep.state.fl.us/coastal/habitats/coral.htm
[16] http://www.scienceblog.com/community/older/2003/D/20031748.html

current use of the narrative nutrient criterion alone is insufficient to ensure protection of applicable designated uses. Numeric nutrient criteria will strengthen the foundation for identifying impaired waters, preparing TMDLs and developing NPDES permits, as well as support the State's ability to effectively partner to with point and nonpoint sources to control nutrients, thus providing the necessary protection for the State's designated uses.

Determination

Nutrient pollution in Florida remains a significant and growing challenge. Recognizing this, Florida has invested tens of millions of dollars in the collection of data to establish the cause and effect relationship between nutrients and biological conditions in order to be well positioned to establish what the State, itself, believes are much needed numeric nutrient water quality criteria. As discussed above, despite Florida's considerable data collection and analysis efforts and outreach with stakeholders to date, the State is relying on its narrative nutrient criterion, the application of which is resource intensive, time consuming, and less than effective in implementing programs to protect water quality and prevent impairments of designated uses due to nutrient over-enrichment. The very substantial and widespread nature of nutrient challenges faced by the State and the barriers to effective implementation associated with narrative nutrient criteria in Florida, such as the need for numerous, highly technical site-specific analyses prior to the development of water quality-based effluent limitations in NPDES permits and TMDLs, strongly support the need in this case for numeric nutrient criteria to effectively protect designated uses and prevent impairments. In many circumstances, narrative criteria can be an effective tool for protecting designated uses, particularly when the scope and nature of the environmental problem is easily and clearly defined and derivation of appropriate control measures can be effectively and expeditiously accomplished (e.g., toxic pollutants and bioassessments). However, achieving faster and more effective progress in water quality protection with regard to nutrients is critical in Florida due to the significant and far-reaching impacts of nutrient pollution on the unique and highly valued aquatic ecosystems that exist in the State. In this case, numeric nutrient criteria are needed to protect Florida's designated uses.

While Florida has made headway on this issue by developing a methodology in the IWR that allows the State to automatically list certain waters with higher levels of nutrients, Florida still must conduct case-by-case assessments to determine if an imbalance in flora or fauna exists for waters below the IWR impairment thresholds. The existence of numeric nutrient criteria will facilitate Florida's efforts to identify all nutrient-impaired waters. Quantifiable nutrient criteria also will facilitate Florida's efforts to establish TMDLs and appropriate WQBELs in NPDES permits as necessary to adequately protect applicable designated uses. It will also create a strong and clear baseline against which to measure progress and upon which to support stronger and more effective point and nonpoint partnerships.

For all of these reasons, EPA hereby determines under CWA section 303(c)(4)(B) that new or revised water quality standards for nutrients in the form of numeric nutrient criteria are necessary in the State of Florida to meet the requirements of the CWA (CWA section 303(c)(2)(A) and 40 CFR § 131.11(a)(1)). Numeric nutrient criteria will enable the State to implement nutrient controls more broadly, effectively, and expeditiously to protect applicable designated uses and meet the challenge of the extent and severity of nutrient pollution in Florida. EPA notes that it has not previously made a determination on whether numeric nutrient criteria are necessary in Florida, and clarifies this point so as to resolve any questions that may previously have arisen on this issue.

EPA's Expectation Regarding a Remedy to this Situation

Section 303(c)(4) of the CWA requires that the Administrator promptly prepare and publish proposed regulations setting forth a new or revised water quality standard when the Administrator makes a determination. EPA will move forward to develop federal proposed regulations setting forth numeric nutrient criteria for Florida and expects that these criteria will be developed in a manner that ensures that there will be no imbalance in natural populations of flora and fauna in Florida waters. EPA will work collaboratively with Florida's technical experts to generate data and conduct analyses. EPA understands that Florida has an extensive stakeholder outreach and comment process underway and has already committed to share with EPA the public comments and stakeholder input received by Florida in this process, so that EPA may consider this input as it develops the federal proposal. EPA intends that the criteria will be protective of applicable designated uses, based on sound scientific rationale, responsive to the specific needs of Florida's waters, and sufficient to meet the needs of the State's complete suite of water quality management tools.

In terms of schedule, the State of Florida has made significant progress in collecting data needed to adopt nutrient criteria for its lakes and flowing waters. Florida expects to complete data collection, laboratory analysis of the data, and compilation of the data by March 2009. EPA anticipates that six months will then be required to complete detailed analyses of the data to identify the relationships between nutrient causal variables, e.g. nitrogen and phosphorus, and key response variables, e.g., chlorophyll a, Secchi depth, periphyton, and dissolved oxygen (DO). This analysis will be an important step in developing the numeric nutrient criteria. EPA expects that an additional four months will be needed to organize, document and assemble the complex technical analysis and administrative record to support and prepare the preamble and federal proposal for publication.

For estuaries and coastal waters, Florida is working to compile and assess the adequacy of the data available to develop nutrient criteria. EPA has reviewed the State's progress and assessed the remaining work associated with this analysis and estimates that 12-24 months will be necessary to develop these criteria values, reflecting the broader technical uncertainties and additional evaluation that will be necessary to determine cause and effect relationships between nutrients and biological response parameters in these waters. Additionally, there is a possibility that additional data collection may be needed should the analyses yield inconclusive results.

In conclusion, EPA expects to propose numeric nutrient criteria for lakes and flowing waters within 12 months, and for estuaries and coastal waters, within 24 months. EPA expects to work closely and collaboratively with the State of Florida to ensure that these numeric nutrient criteria are protective of applicable designated uses, based on sound scientific rationale, responsive to the specific needs of Florida's waters, responsive to available public and stakeholder input, and sufficient to meet the needs of the State's complete suite of water quality management tools. As always, in the event that Florida adopts and EPA approves new or revised water quality standards that sufficiently address this determination before EPA promulgates federal water quality standards, EPA would no longer be obligated to promulgate federal water quality standards.

Sincerely,

Benjamin H. Grumbles
Assistant Administrator

cc: Mr. Jimmy Palmer, Regional Administrator, EPA Region 4
Mr. James D. Giattina, Director, Water Management Division, EPA Region 4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 22 2008

OFFICE OF ADMINISTRATION AND RESOURCES MANAGEMENT

MEMORANDUM

SUBJECT: One-time Delegation of Authority for the Purpose of Determining Pursuant to Section 303(c)(4)(B) of the Clean Water Act Whether the State of Florida Needs New or Revised Water Quality Standards for Nutrients

FROM: Luis A. Luna
Assistant Administrator

TO: Stephen L. Johnson
Administrator

ISSUE

The purpose of this memorandum is to request a one-time Delegation of Authority to the Assistant Administrator for the Office of Water to determine pursuant to Section 303(c)(4)(B) of the Clean Water Act (CWA) whether the State of Florida needs new or revised water quality standards for nutrients. This authority may not be redelegated.

BACKGROUND

On July 17, 2008, plaintiffs Florida Wildlife Federation, Inc. and other environmental groups filed a lawsuit alleging that EPA failed to perform a nondiscretionary duty to promptly propose numeric nutrient criteria for Florida. *Florida Wildlife Federation, et al. v. EPA*, No. 4:08cv00324 (N.D. Fla.). The plaintiffs allege that EPA made a CWA section 303(c)(4)(B) determination in 1998 that numeric criteria for nitrogen and phosphorus were necessary in Florida in order to meet the requirements of the CWA. The plaintiffs maintain that EPA made this determination in its 1998 "National Strategy for the Development of Regional Nutrient Criteria." The plaintiffs allege that this determination triggered EPA's nondiscretionary duty to promptly propose federal criteria for Florida. Because Florida has not adopted numeric nutrient criteria, the plaintiffs seek a declaration from the court that EPA has failed to perform its nondiscretionary duty under Section 303(c)(4) to promptly propose numeric nutrient standards for Florida, and they ask the court to require EPA to take this action.

EPA does not agree with the plaintiffs' allegation that we made a CWA determination in our 1998 Strategy that numeric nutrient criteria are necessary for Florida to meet the requirements of the CWA. There is, however, some risk that the court could agree with the plaintiffs that the 1998 Strategy constitutes a CWA determination that nutrient criteria are necessary in Florida. Such a ruling could spur similar litigation in other states. Presently, 49 states have one or more 303(d) listings for waters impaired by nutrients.

The litigants have highlighted that water quality in Florida is declining due to nutrient pollution and that numeric nutrient criteria are needed to address the environmental degradation. In response to this lawsuit, we believe that we should collect and analyze nutrients-related information pertaining to Florida and decide whether to make a Section 303(c)(4)(B) determination that revised nutrient standards are necessary for the State of Florida to meet the requirements of the CWA. Making such a determination could give EPA a basis to propose a settlement to the plaintiffs or to request that the court dismiss the case. While making a determination may not resolve the litigation, we believe it is an option we should seriously consider and therefore are requesting delegation of authority. A CWA Section 303(c)(4)(B) determination can only be made by the Administrator or the Administrator's duly authorized delegate.

REVIEW AND ANALYSIS

The Office of Human Resources determined that the proposed Delegation is a one-time Temporary Delegation, and thus is not subject to an Agency-wide review via the Directives Clearance process. Per OHR Directive rules, proposed Temporary Delegations of Authority do not require Agency-wide review since these delegations are in effect for limited duration ranging from one day not to exceed one year, and do not automatically renew without being submitted for a new approval. The Office of General Counsel concurs with this request, and this authority may not be redelegated.

RECOMMENDATION

I recommend that the Administrator delegate the authority to the Assistant Administrator for the Office of Water to make a CWA Section 303(c)(4)(B) determination.

Approved: ______________________
Stephen L. Johnson
Administrator

Date: DEC 29 2008

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 29 2009

THE ADMINISTRATOR

MEMORANDUM

SUBJECT: One-time Delegation of Authority for the Purpose of Determining Pursuant to Section 303(c)(4)(B) of the Clean Water Act Whether the State of Florida Needs New or Revised Nutrient Standards

TO: Benjamin H. Grumbles
Assistant Administrator, Office of Water

I hereby delegate to the Assistant Administrator for the Office of Water the authority to determine, pursuant to Section 303(c)(4)(B) of the Clean Water Act, whether the State of Florida needs new or revised water quality standards for nutrients.

This delegation is limited to the purposes stated above and may be exercised only within the limitations of the Clean Water Act. This authority may not be re-delegated.

Stephen L. Johnson

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF FLORIDA
TALLAHASSEE DIVISION

CASE NO. 4:08-cv-00324-RH-WCS

FLORIDA WILDLIFE FEDERATION, INC.; SIERRA CLUB, INC.; CONSERVANCY OF SOUTHWEST FLORIDA, INC.; ENVIRONMENTAL CONFEDERATION OF SOUTHWEST FLORIDA, INC.; and ST. JOHNS RIVERKEEPER, INC;

Plaintiffs,

vs.

LISA P. JACKSON, Administrator of the United States Environmental Protection Agency; and the UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Defendants,

CONSENT DECREE

FLORIDA PULP AND PAPER ASSOCIATION ENVIRONMENTAL AFFAIRS, INC., the FLORIDA FARM BUREAU FEDERATION, SOUTHEAST MILK, INC., FLORIDA CITRUS MUTUAL, INC., FLORIDA FRUIT AND VEGETABLE ASSOCIATION, AMERICAN FARM BUREAU FEDERATION, FLORIDA STORMWATER ASSOCIATION, FLORIDA CATTLEMAN'S ASSOCIATION, and FLORIDA ENGINEERING SOCIETY,

Intervenor-Defendants,

and

SOUTH FLORIDA WATER
MANAGEMENT DISTRICT,

Intervenor-Defendant. /

WHEREAS, Plaintiffs Florida Wildlife Federation, Inc.; Sierra Club, Inc.; Conservancy of Southwest Florida, Inc.; Environmental Confederation of Southwest Florida, Inc.; and St. Johns Riverkeeper, Inc. ("Plaintiffs") filed their original Complaint on July 17, 2008 pursuant to section 505(a)(2) of the Clean Water Act ("CWA"), 33 U.S.C. § 1365(a)(2).

WHEREAS, Plaintiffs filed their First Amended Complaint on August 5, 2008, and their Second Amended Complaint on January 6, 2009.

WHEREAS, Plaintiffs' original and Amended Complaints each allege that Defendants Lisa P. Jackson and the United States Environmental Protection Agency (collectively "EPA") failed to perform a non-discretionary duty to set numeric nutrient criteria for the State of Florida as required by CWA Section 303(c)(4)(B), 33 U.S.C. § 1313(c)(4)(B).

WHEREAS, Section 303(c)(4)(B) of the CWA, 33 U.S.C. § 1313(c)(4)(B), provides that EPA's Administrator shall promptly prepare and publish proposed regulations setting forth a revised or new water quality standard for the navigable waters involved in any case where the Administrator determines that a revised or new water quality standard is necessary to meet the requirements of the CWA.

WHEREAS, Plaintiffs' Second Amended Complaint alleged that the 1998 Clean Water Action Plan constituted a determination by the Administrator that new or revised water quality standards for nutrients were necessary to meet the requirements of the CWA.

WHEREAS, on January 14, 2009, EPA's Assistant Administrator, pursuant to a one-time delegation of authority by the Administrator, made a determination under Section 303(c)(4)(B) of the CWA, 33 U.S.C. § 1313(c)(4)(B), that new or revised water quality standards for nutrients are necessary in the State of Florida.

WHEREAS, on April 9, 2009, Plaintiffs mailed EPA a notice of intent, pursuant to the requirements of Section 505(b)(2) of the CWA, 33 U.S.C. § 1365(b)(2), to sue EPA for failure to perform its nondiscretionary duty to promptly propose new water quality standards for nutrients in the State of Florida in connection with the January 14, 2009 determination.

WHEREAS, the Court has granted Plaintiffs' motion to amend their Second Amended Complaint to add those claims set forth in their April 9, 2009 notice of intent.

WHEREAS, Plaintiffs and EPA (collectively "the Parties") wish to effectuate a settlement of the above-captioned matter without continued litigation.

WHEREAS, Plaintiffs and EPA have agreed to meet on an informal basis to discuss EPA's progress toward the proposal and finalization of water quality standards for nutrients in Florida;

WHEREAS, the Parties consider this Decree to be an adequate and equitable resolution of the claims in the above-captioned matter.

WHEREAS, the Court, by entering this Decree, finds that the Decree is fair, reasonable, in the public interest, and consistent with the CWA, 33 U.S.C. §§ 1251-1387.

NOW THEREFORE, without trial or determination of any issue of fact or law, and upon the consent of the Parties, it is hereby ORDERED, ADJUDGED and DECREED that:

I. GENERAL TERMS

1. This Court has subject matter jurisdiction over the claims set forth in the Third

Amended Complaint to order the relief contained in this Decree. Venue is proper in the United States District Court for the Northern District of Florida.

2. Plaintiffs and EPA shall not challenge the terms of this Decree or this Court's jurisdiction to enter and enforce this Decree. Upon entry, no party shall challenge the terms of this Decree.

II. TERMS OF AGREEMENT

3. Numeric water quality criteria for nutrients proposed pursuant to this consent decree will consist of numeric values that EPA determines are protective of the designated uses of waters addressed by the requirements in Paragraphs 4 through 11.

4. Except as provided in Paragraph 5 below, the appropriate EPA official shall, by January 14, 2010, sign for publication in the Federal Register proposed regulations setting forth numeric water quality criteria for lakes and flowing waters in the State of Florida, pursuant to section 303(c) of the Clean Water Act, 33 U.S.C. 1313(c). “Lakes and flowing waters” are inland surface waters that have been classified as Class I or III waterbodies pursuant to Rule 62-302.400, F.A.C., excluding wetlands.

5. The requirements of Paragraph 4 shall not apply to any item in Paragraph 4 for which, on or before January 14, 2010, the State has submitted new or revised water quality standards for such item and EPA has approved such standards pursuant to section 303(c)(3) of the Clean Water Act. Any such approval by EPA shall be in writing and signed by the EPA official with the authority to make such approvals.

6. Except as provided in Paragraph 7 below, EPA shall, by October 15, 2010, sign for publication in the Federal Register a notice(s) of final rulemaking addressing each of the

items identified in Paragraph 4 for which EPA signed a notice(s) of proposed rulemaking pursuant to Paragraph 4 of this Decree.

7. The requirements of Paragraph 6 shall not apply to any item identified in Paragraph 6 for which on or before October 15, 2010, the State submits new or revised water quality standards for such item and EPA has approved such standards pursuant to section 303(c)(3) of the Clean Water Act. Any such approval by EPA shall be in writing and signed by the EPA official with the authority to make such approvals.

8. Except as provided in Paragraph 9 below, the appropriate EPA official shall, by January 14, 2011, sign for publication in the Federal Register proposed regulations setting forth numeric water quality criteria for coastal and estuarine waters in the State of Florida, pursuant to section 303(c) of the Clean Water Act, 33 U.S.C. § 1313(c). "Coastal waters" are waters of the Gulf of Mexico and Atlantic Ocean that are not classified as estuarine or open ocean, that are within the three-mile territorial seas of Florida (see CWA section 502(8)), and that have been classified as Class I, II, or III waterbodies pursuant to Rule 62-302.400, F.A.C., excluding wetlands. "Estuarine waters" are predominantly marine regions of interaction between rivers and nearshore ocean waters, where tidal action and river flow mix fresh and salt water. Estuarine waters are bays, mouths of rivers, and lagoons, that are within the boundaries of the State of Florida, and that have been classified as Class I, II, or III waterbodies pursuant to Rule 62-302.400, F.A.C., excluding wetlands.

9. The requirements of Paragraph 8 shall not apply to any item in Paragraph 8 for which, on or before January 14, 2011, the State has submitted new or revised water quality standards for such item and EPA has approved such standards pursuant to section 303(c)(3) of

the Clean Water Act. Any such approval by EPA shall be in writing and signed by the EPA official with the authority to make such approvals.

10. Except as provided in Paragraph 11 below, EPA shall, by October 15, 2011, sign for publication in the Federal Register a notice(s) of final rulemaking addressing each of the items identified in Paragraph 8 for which EPA signed a notice(s) of proposed rulemaking pursuant to Paragraph 8 of this Decree.

11. The requirements of Paragraph 10 shall not apply to any item identified in Paragraph 10 for which on or before October 15, 2011, the State submits new or revised water quality standards for such item and EPA has approved such standards pursuant to section 303(c)(3) of the Clean Water Act. Any such approval by EPA shall be in writing and signed by the EPA official with the authority to make such approvals.

III. ATTORNEYS' FEES AND COSTS

12. The Parties agree that Plaintiffs are entitled to reasonable attorneys' fees and costs accrued as of the Effective Date of this Consent Decree on all claims asserted in their Third Amended Complaint. The Parties will attempt to reach agreement as to the appropriate amount of the recovery. Plaintiffs shall file any request for attorneys' fees within sixty (60) of the Effective Date of this Consent Decree. EPA shall have forty-five (45) days to respond to Plaintiffs' fee request.

IV. EFFECTIVE DATE

13. This Consent Decree shall become effective upon the date of its entry by the Court. If for any reason the District Court does not enter this Consent Decree, the obligations set forth in this Consent Decree are null and void.

V. REMEDY, SCOPE OF JUDICIAL REVIEW

14. Nothing in this Consent Decree shall be construed to confer upon the Court jurisdiction to review any decision, either procedural or substantive, to be made by EPA pursuant to this Consent Decree, except for the purpose of determining EPA's compliance with this Consent Decree.

15. Nothing in this Consent Decree alters or affects the standards for judicial review, if any, of any final EPA action.

VI. RELEASE BY PLAINTIFFS

16. Upon entry of this Consent Decree by the Court, this Consent Decree shall constitute a complete and final settlement of all claims that were asserted, or that could have been asserted, by Plaintiffs against Defendants relating to the allegations in the Third Amended Complaint.

17. Plaintiffs hereby release, discharge, and covenant not to assert (by way of the commencement of an action, the joinder of the Administrator and/or EPA in an existing action, or in any other fashion) any and all claims, causes of action, suits or demands of any kind whatsoever in law or in equity that they may have had, or may now have, against Defendants related to the allegations in the Third Amended Complaint, expressly including any allegation that EPA has failed to promptly propose and to promulgate numeric nutrient standards in Florida for lakes, flowing waters, estuarine waters, and coastal waters under CWA section 303(c), 42 U.S.C. § 1313(c). Plaintiffs expressly reserve the right to challenge in any forum and on any ground the lawfulness of any nutrient water quality criteria EPA ultimately promulgates pursuant to CWA § 303(c), 33 U.S.C. § 1313(c). Defendants reserve all defenses to any such challenge.

VII. TERMINATION OF CONSENT DECREE AND DISMISSAL OF CLAIMS

18. When EPA's obligations under Paragraphs 4 through 11 have been completed, and the Plaintiffs' claims for costs of litigation have been resolved pursuant to the process described in Paragraph 12, this Consent Decree shall terminate. Upon termination of the Consent Decree, the above-captioned matter shall be dismissed with prejudice. The Parties shall file the appropriate notice with the Court so that the Clerk may close the file.

VIII. FORCE MAJEURE AND APPROPRIATED FUNDS

19. The obligations imposed upon EPA under this Decree can only be undertaken using appropriated funds. No provision of this Decree shall be interpreted as or constitute a commitment or requirement that the Administrator obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. § 1341, or any other applicable federal statute.

20. The Parties recognize that the performance of this Consent Decree is subject to fiscal and procurement laws and regulations of the United States which include, but are not limited to, the Anti-Deficiency Act, 31 U.S.C. § 1341, et seq. The possibility exists that circumstances outside the reasonable control of EPA could delay compliance with the obligations in this Consent Decree. Such situations include, but are not limited to, a government shutdown; catastrophic environmental events requiring immediate and/or time-consuming response by EPA; and extreme weather events (including but not limited to drought and hurricanes). Should a delay occur due to such circumstances, any resulting failure to fulfill any obligation set forth herein shall not constitute a failure to comply with the terms of this Consent Decree, and any deadline so affected shall be extended one day for each day of the delay. EPA will provide Plaintiffs with reasonable notice in the event that EPA invokes this Paragraph. Any

dispute regarding such invocation shall be resolved in accordance with the dispute resolution provision of Paragraph 21.

IX. DISPUTE RESOLUTION

21. In the event of a dispute between the Parties concerning the interpretation or implementation of any aspect of this Decree, the disputing Party shall provide the other Party with a written notice outlining the nature of the dispute and requesting informal negotiations. If the Parties cannot reach an agreed-upon resolution within thirty (30) days after receipt of the notice, any Party may move the Court to resolve the dispute.

X. MODIFICATIONS AND EXTENSIONS

22. The deadlines set forth in Paragraphs 4 through 11 above may be extended by written agreement of the Parties with notice to the Court. To the extent the Parties are not able to agree on an extension of any deadline set forth in this Consent Decree, EPA may seek modification of the deadline in accordance with the procedures specified below.

A. If EPA files a motion requesting modification of any date or dates established by this Consent Decree totaling more than thirty (30) days for each date and provides notice to Plaintiffs at least thirty (30) days prior to filing such motion, and files the motion at least sixty (60) days prior to the date for which modification is sought, then the filing of such motion shall, upon request, automatically extend the date for which modification is sought. Such automatic extension shall remain in effect until the earlier of (i) a dispositive ruling by this Court on such motion, or (ii) the date sought in such motion. EPA may seek only one extension under this subparagraph for each date established by this Consent Decree.

B. If EPA files a motion requesting modification of a date or dates established by this Consent Decree totaling thirty (30) days or less for each date, provides notice to Plaintiffs at least fifteen (15) days prior to the filing of such motion, and files the motion at least seven (7) days prior to the date for which modification is sought, then the filing of such motion shall, upon request, automatically extend the date for which modification is sought. Such extension shall remain in effect until the earlier of (i) a dispositive ruling by this Court on such motion, or (ii) the date sought in the motion. EPA may seek only one extension under this subparagraph for each date established by this Consent Decree.

C. If EPA does not provide notice pursuant to Subparagraphs 22.A or 22.B above, EPA may move the Court for a stay of the date for which modification is sought. EPA shall give notice to Plaintiffs as soon as reasonably possible of its intent to seek a modification and/or stay of the date sought to be modified.

D. If the Court denies a motion by EPA to modify a date established by this Consent Decree, then the date for performance for which modification had been requested shall be such date as the Court may specify.

E. Any motion to modify the schedule established in this Consent Decree shall be accompanied by a motion for expedited consideration.

XI. CONTINUING JURISDICTION

23. The Court retains jurisdiction for the purposes of resolving any disputes arising under this Consent Decree, and issuing such further orders or directions as may be necessary or appropriate to construe, implement, modify, or enforce the terms of this Consent Decree, and for granting any further relief as the interests of justice may require.

XII. AGENCY DISCRETION

24. Except as provided herein, nothing in this Decree shall be construed to limit or modify any discretion accorded the Administrator by the CWA, the APA, or by general principles of administrative law in taking the actions that are the subject of this Decree.

25. Nothing in this decree shall be construed as an admission of any issue of fact or law.

XIII. NOTICE AND CORRESPONDENCE

26. Any notices required or provided for by this Decree shall be made in writing, via electronic mail or other means, and sent to the following:

For Plaintiffs:

DAVID G. GUEST
MONICA K. REIMER
111 South Martin Luther King Blvd.
P.O. Box 1329
Tallahassee, FL 32301
dguest@earthjustice.org
mreimer@earthjustice.org

For Defendants:

MARTHA C. MANN
United States Department of Justice
Environmental Defense Section
P.O. Box 23986
Washington, D.C. 20026-3986
martha.mann@usdoj.gov

BARBARA PACE
U.S. Environmental Protection Agency
Office of General Counsel
Mail Code 2355A

1200 Pennsylvania Ave., N.W.
Washington, DC 20460
pace.barbara@epa.gov

XV. REPRESENTATIVE AUTHORITY

27. The undersigned representatives of each Party certify that they are fully authorized by the Party they represent to bind that Party to the terms of this Decree.

COUNSEL FOR PLAINTIFFS:

Dated: 8/18/09

DAVID G. GUEST
MONICA K. REIMER
111 South Martin Luther King Blvd.
P.O. Box 1329
Tallahassee, FL 32301

COUNSEL FOR DEFENDANTS:

Dated: 19 August 2009

JOHN C. CRUDEN
Acting Assistant Attorney General
Env. & Natural Resources Division

MARTHA C. MANN
United States Department of Justice
Environmental Defense Section
P.O. Box 23986
Washington, D.C. 20026-3986
Phone (202)305-0897
Fax (202) 514-2664
martha.mann@usdoj.gov

SO ORDERED.

Dated: ____________________ ______________________________

ROBERT L. HINKLE
United States District Judge

IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF FLORIDA TALLAHASSEE DIVISION

FLORIDA WILDLIFE FEDERATION, INC., et al.,

Plaintiffs,

v. CASE NO. 4:08cv324-RH/WCS

LISA P. JACKSON, etc., et al.,

Defendants.

______________________________/

ORDER APPROVING CONSENT DECREE

This is a dispute over water-quality standards in the State of Florida. The plaintiff environmental groups and the defendants—the United States Environmental Protection Agency and its Administrator—have agreed to entry of a consent decree. Various intervenors object. This order approves the proposed consent decree.

I. Background

The objective of the Clean Water Act of 1972 was "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). The explicitly declared "national goal" was "that the discharge of

Case 4:08-cv-00324-RH-WCS Document 152 Filed 12/30/09 Page 2 of 16

pollutants into the navigable waters be eliminated by 1985." *Id.* § 1251(a)(1). The goal was not achieved; it remains a work in progress.

The Act recognizes the primary responsibility of the states to prevent or reduce pollution. *See id.* § 1251(b). The Act thus allows a state to adopt its own water-quality standards, subject to the EPA Administrator's approval. If the Administrator determines that a state standard is not "consistent with" the Act's requirements, or that "a revised or new standard is necessary" to meet the Act's requirements, the Administrator must "promptly prepare and publish proposed regulations setting forth a revised or new" standard. *Id.* § 1313(c)(4). The Administrator must adopt the revised or new standard within 90 days after publication, unless by that time the state has adopted a revised or new standard that is approved by the Administrator. *Id.*

In 1998 the Administrator, together with the Secretary of the United States Department of Agriculture, reported that about 40 percent of the waters assessed by the various states did not meet water-quality goals. Letter from Carol Browner, Adm'r, U.S. Envtl. Prot. Agency and Dan Glickman, Sec'y, U.S. Dept. of Agric., to Albert Gore, Jr., Vice President of the United States (Feb. 14, 1998) (document 57-27 at 3). The Administrator and the Secretary adopted a Clean Water Action Plan intended to improve the situation. *See* U.S. Dep't of Envtl. Prot. & U.S. Dep't of Agric., *Clean Water Action Plan: Restoring and Protecting America's Waters*

58-59 (1998) (excerpted at documents 57-27 and 81-14).

Later in 1998, as part of the effort to implement the Clean Water Action Plan, the Administrator issued a report entitled, "National Strategy for the Development of Regional Nutrient Criteria." (*See* document 33-1.) As the report recognized, excessive nutrients—nitrogen and phosphorous—were a substantial part of the nation's water-quality problem. Many states, including Florida, had nonnumeric or "narrative" standards governing the introduction of nitrogen and phosphorous into water bodies. (*See id.* at 33-36.) The National Strategy report indicated that the EPA expected all states "to adopt and implement *numerical* nutrient criteria" by December 31, 2003. (*Id.* at 9) (emphasis added). There were good grounds to doubt that the narrative standards then in effect were adequately protecting the nation's waters. Affording the states five years to adopt numeric standards seemed reasonable.

By 2001 the State of Florida Department of Environment Protection was at work on the development of numeric nutrient standards. The Department, in conjunction with the state's Water Management Districts, conducted detailed studies and held meetings. But the state did not adopt or even propose numeric standards—not by December 31, 2003, and not by today, as 2009 draws to a close. Instead, the state retained its narrative standard: the concentration of nutrients in a water body must not be altered "so as to cause an imbalance in natural populations of aquatic flora or fauna." Fla. Admin Code Ann. r. 62-302.530(47)(b). The standard proved inadequate. Nutrient pollution of the state's navigable waters continued and in many instances grew worse. Extensive and devastating algae blooms were not uncommon.

II. This Lawsuit

Five environmental groups filed this lawsuit in July 2008.[1] They named as defendants the EPA and its Administrator. For convenience, this order refers only to the Administrator, without noting each time that the EPA itself is also a defendant. Over time, 13 entities intervened as defendants.[2]

The plaintiffs sought relief under the Clean Water Act's citizen-suit provision. It allows a citizen to sue the Administrator to compel her to perform a duty that the Act makes nondiscretionary. *See* 33 U.S.C. § 1365(a)(2). The plaintiffs asserted that the 1998 Clean Water Action Plan, or the 1998 National

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[1] The plaintiffs are the Florida Wildlife Federation, Inc.; Sierra Club, Inc.; Conservancy of Southwest Florida, Inc.; Environmental Confederation of Southwest Florida, Inc.; and St. Johns Riverkeeper, Inc.

[2] The intervenors are Florida Pulp and Paper Association Environmental Affairs, Inc.; the Florida Farm Bureau Federation; Southeast Milk, Inc.; Florida Citrus Mutual, Inc.; Florida Fruit and Vegetable Association; American Farm Bureau Federation; Florida Stormwater Association; Florida Cattleman's Association; Florida Engineering Society; the South Florida Water Management District; the Florida Water Environment Association Utility Council, Inc.; the Florida Minerals and Chemistry Council, Inc.; and the Florida Department of Agriculture and Consumer Services.

Strategy report, constituted a "determination" that Florida's narrative nutrient standard was inadequate, thus imposing on the Administrator the nondiscretionary duty to "promptly" publish proposed new standards, and the further nondiscretionary duty to adopt new standards within 90 days after the publication. The Administrator and intervenors denied that the 1998 documents constituted a "determination."

Before the issue was resolved, the Administrator made an explicit and unequivocal determination that the Florida narrative nutrient standard was inadequate and that a revised or new standard was necessary to meet the Clean Water Act's requirements. The determination was made in a letter dated January 14, 2009, signed by the Administrator's designee. The determination did not render the original claim moot, because the publication of new standards could be sufficiently prompt after the 2009 determination but not sufficiently prompt after a 1998 determination; the assertion that the Administrator made a determination in 1998 thus could have entitled the plaintiffs to relief they could not have obtained based only on the 2009 determination.

Even so, the 2009 determination rendered the 1998 issue less important. The plaintiffs filed an amended complaint—denominated the "third amended supplemental complaint" because there had been two earlier amendments on other grounds—that added a claim for relief based on the 2009 determination. The

Administrator does not deny her nondiscretionary duty to promptly publish revised or new standards based on the 2009 determination. But at least some of the intervenors do deny the duty; they assert the 2009 determination was invalid.

On August 25, 2009, the plaintiffs and the Administrator moved for entry of a consent decree. The proposed consent decree would require the Administrator to sign for publication—by January 14, 2010, one year after the 2009 determination—numeric nutrient standards for Florida lakes and flowing waters. The proposed decree would require the Administrator to *adopt* standards by October 15, 2010. These requirements would not apply, however, if by the same deadlines the state proposed its own numeric standards and the Administrator approved them. The proposed decree would impose analogous deadlines one year later—on January 14, 2011, and October 15, 2011—for publication and adoption of numeric nutrient standards for coastal and estuarine waters. The proposed decree would allow an extension of a deadline by agreement between the plaintiffs and the Administrator, with notice to the court. The decree would allow an extension on the Administrator's motion, without the plaintiffs' consent, in the court's discretion.

All parties—including the intervenors—were allowed to file briefs, declarations, and other written evidence addressing the motion for entry of the consent decree. The parties presented extensive oral argument. The parties have been fully heard.[3]

III. Consent-Decree Standards

A court may properly enter a consent decree only if the settlement it incorporates is "fair, adequate, and reasonable and is not the product of collusion between the parties." *Cotton v. Hinton*, 559 F.2d 1326, 1330 (5th Cir. 1977). As a general rule, "[d]istrict courts should approve consent decrees so long as they are not unconstitutional, unlawful, unreasonable, or contrary to public policy." *Stovall v. City of Cocoa, Fla.*, 117 F.3d 1238, 1240 (11th Cir. 1997). The decree must not violate the Constitution, statutes, or governing law. *Id.*; *Howard v. McLucas*, 871 F.2d 1000, 1008 (11th Cir. 1989). When the underlying claim is to enforce a statute, the consent decree must be consistent with the statutory objectives. *See White v. Alabama*, 74 F.3d 1058, 1074 & n.52 (11th Cir. 1996). And finally, a court must not enter a consent decree without the consent of a party whose rights would be affected. *See United States v. City of Hialeah*, 140 F.3d 968, 978-81 (11th Cir. 1998); *White*, 74 F.3d at 1073.

IV. The Merits

The proposed consent decree easily meets these standards. First, this is a reasonable compromise—each side could have done better or worse by continuing

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[3] In addition, the Northwest Florida, Southwest Florida, and Suwannee River Water Management Districts filed amicus curiae briefs.

to litigate. Second, the settlement was made at arm's length without collusion. Third, the proposed decree is consistent with the Clean Water Act's objectives, it is substantively reasonable, and it is not contrary to public policy. And fourth, all parties whose rights are affected have consented; the decree does not abridge the rights of the nonconsenting intervenors. This order addresses each of these conclusions in turn.

A. *Reasonable Compromise*

As all sides seem to acknowledge, if the Administrator determines that a state standard is not "consistent with" the Clean Water Act's requirements, or determines that "a revised or new standard is necessary" to meet the Act's requirements, the Administrator has a nondiscretionary duty to "promptly prepare and publish proposed regulations setting forth a revised or new" standard. 33 U.S.C. § 1313(c)(4). Further, the Administrator has a nondiscretionary duty to adopt a revise or new standard within 90 days after the publication, unless by that time the state has adopted a revised or new standard and the Administrator approves it. *Id.*

The plaintiffs asserted that the Administrator determined in 1998 that narrative nutrient standards were inadequate to meet the Clean Water Act's requirements. The assertion was not frivolous. The 1998 Clean Water Action Plan and National Strategy report made clear that the existing regulations had not achieved the Act's goals and that numeric nutrient standards were a necessary part of the solution. Still, it was by no means clear that the 1998 documents set forth a "determination" within the meaning of § 1313(c)(4). They did not explicitly announce a determination under § 1313(c)(4), and they contemplated that corrective action would be taken not "promptly" but only by the end of 2003. When the settlement was entered, neither side could have said with certainty that it would win the litigation over whether the 1998 documents constituted a "determination."

The 2009 determination, in contrast, was explicit and unequivocal. The Administrator said that the existing Florida nutrient standard was inadequate and that a revised or new standard was necessary to meet the Clean Water Act's requirements. The likelihood was high that the plaintiffs would win on the issue of whether the Administrator had a nondiscretionary duty to promptly publish a revised or new standard. The substantial issue was not whether, but how promptly, the Administrator was going to be required to act.

The plaintiffs and the Administrator agreed to deadlines that fit comfortably within the range of possible outcomes of the litigation. An earlier deadline could have been set, especially if the 1998 documents were deemed a determination. Even when analyzed based only on the 2009 determination, a delay of one year (for lakes and flowing waters) or two years (for coastal and estuarine waters) to the publication of a proposed new standard might or might not have been deemed sufficiently "prompt." When the parties agreed to settle, neither side could have predicted with certainty whether a court ruling would have imposed an earlier or later deadline.

Importantly, the proposed consent decree also extends the deadline for adoption of a new standard after publication. And it provides for extensions of the deadlines by agreement or by court order. These are benefits for the Administrator—and for the intervenors and in some respects for the plaintiffs—that could not have been achieved through litigation alone.

In sum, the settlement was fair, adequate, and reasonable. It set deadlines for publishing proposed regulations that were close to those that likely would have been adopted as a result of continued litigation. And the settlement extended the deadline for adopting new standards after publication. Continued litigation would have cost more but otherwise probably would have benefitted nobody.

B. Absence of Collusion

The plaintiffs and the Administrator began this litigation as opponents and agreed to settle at arm's length. Their attorneys were experienced in this field, showed commendable professionalism, represented their clients well, and negotiated reasonable settlement terms. The record includes not a hint of collusion.

Some of the intervenors assert, though, that the Administrator's real motivation in making the 2009 determination was not to protect Florida's waters but only to settle the lawsuit. The assertion is long on speculation and short on facts. This record and the determination letter itself include substantial evidence of excessive nutrients in Florida waters.

Moreover, even if there were grounds for challenging the 2009 determination, and even if those grounds could have been raised in defense of the plaintiffs' claims, this would not require the disapproval of the proposed consent decree. The issue for a court reviewing a proposed consent decree is not whether the plaintiff would necessarily have won the lawsuit, but only whether the proposed settlement—that is, the agreement to avoid a final decision and instead to resolve the case on agreed terms—is fair, reasonable, and adequate; is not the product of collusion; is consistent with the Constitution and laws; and preserves the rights of nonconsenting persons. That a party was motivated in part by the desire to avoid further litigation is hardly disqualifying.

This settlement did not result from collusion or any improper motivation.

C. Consistency with Clean Water Act and Public Policy

This record does not definitively resolve the question whether Florida's narrative nutrient standard is adequate to meet the requirements of the Clean Water Act. The Administrator has determined, though, that it is not. This is an issue

Case 4:08-cv-00324-RH-WCS Document 152 Filed 12/30/09 Page 12 of 16

properly resolved in the first instance by the Administrator.

Nothing in this record casts doubt on the Administrator's determination. Florida's waters have suffered substantial nutrient pollution. Algae blooms have been extensive and devastating. The narrative standard has not solved the problem. Any assertion that the narrative standard will measure up if given more time seems more than a little unrealistic.

Perhaps recognizing this, the intervenors' primary assertion is not that numeric standards are unnecessary, but that *appropriate* numeric standards cannot be put in place as quickly as the consent decree would require. Some intervenors suggest that *any* deadline would be unsupportable, because, they say, one cannot rush science.

Good managers often set deadlines, even on scientific endeavors. President Kennedy and the space program come to mind. In any event, the deadlines in the proposed consent decree are reasonable. The inadequacy of narrative standards was noted in 1998, more than 11 years ago. Florida agencies have been amassing data as a basis for numeric standards for nearly as long. Meanwhile, nutrient pollution has continued.

The Clean Water Act mandates "prompt" action when a state standard is determined to be inadequate. The proposed consent decree and its deadlines are fully consistent with the Act, substantively reasonable, and not contrary to public policy.

D. No Abridgement of Rights

Finally, the proposed decree does not abridge the rights of the intervenors or anyone else who has not consented.

The intervenors have no right to pollute Florida's waters or to introduce nutrients into them without numeric limits. The intervenors have no right to delay administrative action that is taken in compliance with the governing law.

To be sure, the intervenors who own property—or whose members own property—have a right not to have nutrient limits set at a level that would constitute a taking of their property, at least without the payment of just compensation. But nobody has proposed—or even suggested the possibility—that nutrient limits would be set at such a level. The consent decree surely does not require it.

The intervenors may also have a right not to be subjected to procedurally or substantively invalid nutrient standards. But the consent decree does not abridge the right; to the contrary, the consent decree scrupulously protects it. The decree contemplates the publication and adoption of standards in full compliance with all applicable procedural and substantive laws. The consent decree does not limit the intervenors' participation in the administrative process or the right to judicial review. The consent decree does not predetermine the result of the process.

Ignoring this, the intervenors suggest that the Administrator will propose and adopt unsupportable standards. But the suggestion has no basis in this record and fails to account for the Clean Water Act's extensive procedural and substantive safeguards—including the right to judicial review of any standard ultimately adopted. The conjured risk that the Administrator and a reviewing court ultimately will get it wrong is not a basis for rejecting the proposed consent decree.

One final point deserves mention. The consent decree obligates the Administrator to do nothing more than she could voluntarily choose to do anyway. The Administrator has already determined that the Florida narrative standard fails to meet the Clean Water Act's requirements. She could publish a revised or new standard for lakes and flowing waters by January 14, 2010, and for coastal or estuarine waters by January 14, 2011—and could do so earlier if she chose. She could adopt a revised or new standard as soon after publication as the administrative process would allow—and thus by October 15, 2010, or October 15, 2011. Any revised or new standard would have to comply with the governing procedural and substantive law and would be subject to judicial review—but the same is true under the consent decree. The intervenors challenge the underlying determination that Florida's narrative standard is inadequate, but with or without the consent decree, that determination will be equally subject to challenge—based on the same standard of review and with an equal level of deference to the

Administrator—on judicial review of any revised or new standard. The consent decree has compromised the intervenors' rights not at all.

V. Conclusion

The EPA Administrator has determined that Florida's narrative nutrient standard is inadequate to meet the requirements of the Clean Water Act. The Act thus imposes on the Administrator the nondiscretionary duty to "promptly" publish a proposed new or revised standard and to adopt a standard within 90 days after the publication. The plaintiffs sued to enforce the duty. The plaintiffs and the Administrator reached a settlement calling for entry of a consent decree that sets deadlines of one and two years after the determination for the *publication* of standards, and nine months later for the *adoption* of standards. The proposed decree is fair, adequate, and reasonable; it is not the product of collusion; it does not violate the Constitution, statutes, or governing law; it is consistent with the Clean Water Act's objectives; and it does not affect the rights of any nonconsenting person. For these reasons,

IT IS ORDERED:

The motion for entry of the proposed consent decree (document 90) is GRANTED. The consent decree is approved and will be separately entered.

SO ORDERED on December 30, 2009.

s/Robert L. Hinkle
United States District Judge

Federal Register

Tuesday,
January 26, 2010

Part III

Environmental Protection Agency

40 CFR Part 131

Water Quality Standards for the State of Florida's Lakes and Flowing Waters; Proposed Rule

4174 Federal Register / Vol. 75, No. 16 / Tuesday, January 26, 2010 / Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 131

[EPA–HQ–OW–2009–0596; FRL–9105–1]

RIN 2040–AF11

Water Quality Standards for the State of Florida's Lakes and Flowing Waters

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is proposing numeric nutrient water quality criteria to protect aquatic life in lakes and flowing waters, including canals, within the State of Florida and proposing regulations to establish a framework for Florida to develop "restoration standards" for impaired waters. On January 14, 2009, EPA made a determination under section 303(c)(4)(B) of the Clean Water Act ("CWA" or "the Act") that numeric nutrient water quality criteria for lakes and flowing waters and for estuaries and coastal waters are necessary for the State of Florida to meet the requirements of CWA section 303(c). Section 303(c)(4) of the CWA requires the Administrator to promptly prepare and publish proposed regulations setting forth new or revised water quality standards ("WQS" or "standards") when the Administrator, or an authorized delegate of the Administrator, determines that such new or revised WQS are necessary to meet requirements of the Act. This proposed rule fulfills EPA's obligation under section 303(c)(4) of the CWA to promptly propose criteria for Florida's lakes and flowing waters.

DATES: Comments must be received on or before March 29, 2010.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OW–2009–0596, by one of the following methods:

1. *www.regulations.gov:* Follow the online instructions for submitting comments.

2. *E-mail: ow-docket@epa.gov.*

3. *Mail to:* Water Docket, U.S. Environmental Protection Agency, Mail Code: 2822T, 1200 Pennsylvania Avenue, NW., Washington, DC 20460, Attention: Docket ID No. EPA–HQ–OW–2009–0596.

4. *Hand Delivery:* EPA Docket Center, EPA West Room 3334, 1301 Constitution Avenue, NW., Washington, DC 20004, Attention: Docket ID No. EPA–HQ–OW–2009–0596. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA–HQ–OW–2009–0596. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *www.regulations.gov,* including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through *www.regulations.gov* or e-mail. The *www.regulations.gov* Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through *www.regulations.gov* your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm.*

Docket: All documents in the docket are listed in the *www.regulations.gov* index. Although listed in the index, some information is not publicly available, *e.g.,* CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *www.regulations.gov* or in hard copy at a docket facility. The Office of Water (OW) Docket Center is open from 8:30 until 4:30 p.m., Monday through Friday, excluding legal holidays. The OW Docket Center telephone number is (202) 566–2426, and the Docket address is OW Docket, EPA West, Room 3334, 1301 Constitution Avenue, NW., Washington, DC 20004. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744.

Public hearings will be held in the following cities in Florida: Tallahassee, Orlando, and West Palm Beach. The public hearing in Tallahassee is scheduled for Tuesday, February 16, 2010 and will be held from 1 p.m. to 5 p.m. and 7 p.m. to 10 p.m. at the Holiday Inn Capitol East, 1355 Apalachee Parkway, Tallahassee, FL 32301. The public hearing in Orlando is scheduled for Wednesday, February 17, 2010 and will be held from 1 p.m. to 5 p.m. and 7 p.m. to 10 p.m. at the Crowne Plaza Orlando Universal, 7800 Universal Boulevard, Orlando, FL 32819. The public hearing in West Palm Beach is scheduled for Thursday, February 18, 2010 and will be held from 1 p.m. to 5 p.m. and 7 p.m. to 10 p.m. at the Holiday Inn Palm Beach Airport, 1301 Belvedere Road, West Palm Beach, FL 33405. If you need a sign language interpreter at any of these hearings, you should contact Sharon Frey at 202–566–1480 or *frey.sharon@epa.gov* at least ten business days prior to the meetings so that appropriate arrangements can be made. For further information, including registration information, please refer to the following Web site: *http://www.epa.gov/waterscience/standards/rules/florida/.*

FOR FURTHER INFORMATION CONTACT: Danielle Salvaterra, U.S. EPA Headquarters, Office of Water, Mailcode: 4305T, 1200 Pennsylvania Avenue, NW., Washington, DC 20460; telephone number: 202–564–1649; fax number: 202–566–9981; e-mail address: *salvaterra.danielle@epa.gov.*

SUPPLEMENTARY INFORMATION: This supplementary information section is organized as follows:

Table of Contents

I. General Information

A. Executive Summary

Excess loadings of nitrogen and phosphorus, commonly referred to as nutrient pollution, are one of the most prevalent causes of water quality impairment in the United States. Anthropogenic nitrogen and phosphorus over-enrichment in many of the Nation's waters is a widespread, persistent, and growing problem. Nutrient pollution can significantly impact aquatic life and long-term ecosystem health, diversity, and balance. More specifically, high nitrogen and phosphorus loadings, or nutrient pollution, result in harmful algal blooms (HABs), reduced spawning grounds and nursery habitats, fish kills, and oxygen-starved hypoxic or "dead" zones. Public health concerns related to nutrient pollution include impaired drinking water sources, increased exposure to toxic microbes such as cyanobacteria, and possible formation of disinfection byproducts in drinking water, some of which have been associated with serious human illnesses such as bladder cancer. Nutrient problems can exhibit themselves locally or much further downstream leading to degraded lakes, reservoirs, and estuaries, and to hypoxic zones where fish and aquatic life can no longer survive.

In the State of Florida, nutrient pollution has contributed to severe water quality degradation. Based upon waters assessed and reported in the *2008 Integrated Water Quality Assessment for Florida*, approximately 1,000 miles of rivers and streams, 350,000 acres of lakes, and 900 square miles of estuaries are known to be impaired for nutrients by the State.[1] The actual number of stream miles, lake acres, and estuarine square miles of waters impaired for nutrients in Florida may be higher, as many waters currently are classified as "unassessed."

The challenge of nutrient pollution has been a top priority for Florida's Department of Environmental Protection (FDEP). Over the past decade or more, FDEP has spent over 20 million dollars collecting and analyzing data on the relationship between phosphorus, nitrogen, and nitrite-nitrate concentrations and the biological health of aquatic systems. Moreover, Florida is one of the few states that has in place a comprehensive framework of accountability that applies to both point and nonpoint sources and provides the enforceable authority to address nutrient reductions in impaired waters based upon the establishment of site-specific total maximum daily loads (TMDLs).

Despite FDEP's intensive efforts to diagnose and control nutrient pollution, substantial water quality degradation from nutrient over-enrichment remains a significant problem. On January 14, 2009, EPA determined under CWA section 303(c)(4)(B) that new or revised WQS in the form of numeric nutrient water quality criteria are necessary to meet the requirements of the CWA in the State of Florida. The Agency considered (1) the State's documented unique and threatened ecosystems, (2) the high number of impaired waters due to existing nutrient pollution, and (3) the challenge associated with growing nutrient pollution resulting from expanding urbanization, continued agricultural development, and a significantly increasing population that is expected to grow 75% between 2000 to 2030.[2] EPA also reviewed the State's regulatory nutrient accountability system, which represents an impressive synthesis of technology-based standards, point source control authority, and authority to establish enforceable controls for nonpoint source activities. However, the significant challenge faced by the water quality components of this system is its dependence upon an approach involving resource-intensive and time-consuming site-specific data collection and analysis to interpret non-numeric narrative nutrient criteria. EPA determined that Florida's reliance on a case-by-case interpretation of its narrative nutrient criterion in implementing an otherwise comprehensive water quality framework of enforceable accountability was insufficient to ensure protection of applicable designated uses. As part of the Agency's determination, EPA indicated that it expected to propose numeric nutrient criteria for lakes and flowing waters within 12 months, and for estuarine and coastal waters within 24 months, of the January 14, 2009 determination.

On August 19, 2009, EPA entered into a phased Consent Decree with Florida Wildlife Federation, Sierra Club, Conservancy of Southwest Florida, Environmental Confederation of Southwest Florida, and St. Johns Riverkeeper, committing to sign a proposed rule setting forth numeric nutrient criteria for lakes and flowing waters in Florida by January 14, 2010, and for Florida's estuarine and coastal waters by January 14, 2011, unless Florida submits and EPA approves State numeric nutrient criteria before EPA's proposal. The phased Consent Decree also provides that EPA issue a final rule by October 15, 2010 for lakes and flowing water, and by October 15, 2011 for estuarine and coastal waters, unless Florida submits and EPA approves State numeric nutrient criteria before a final EPA action.

Accordingly, this proposal is part of a phased rulemaking process in which EPA will propose and take final action in 2010 on numeric nutrient criteria for lakes and flowing waters and for estuarine and coastal waters in 2011. The two phases of this rulemaking are linked because nutrient pollution in Florida's rivers and streams affects not only instream aquatic conditions but also downstream estuarine and coastal waters ecosystem conditions. The Agency could have waited to propose estuarine and coastal downstream protection criteria values for rivers and streams as part of the second phase of this rulemaking process. However, the substantial data, peer-reviewed methodologies, and extensive scientific

[1] Florida Department of Environmental Protection. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update, p. 67.

[2] *http://www.census.gov/population/projections/SummaryTabA1.pdf.*

analyses available to and conducted by the Agency to date indicate that numeric nutrient water quality criteria for estuarine and coastal waters, when proposed and finalized in 2011, may result in the need for more stringent rivers and streams criteria to ensure protection of downstream water quality, particularly for the nitrogen component of nutrient pollution. Therefore, considering the numerous requests for the Agency to share its analysis and scientific and technical conclusions at the earliest possible opportunity to allow for full review and comment, EPA is including downstream protection values for total nitrogen (TN) as proposed criteria for rivers and streams to protect the State's estuaries and coastal waters in this notice.

As described in more detail below and in the technical support document accompanying this notice, these proposed nitrogen downstream protection values are based on substantial data, thorough scientific analysis, and extensive technical evaluation. However, EPA recognizes that additional data and analysis may be available, including data for particular estuaries, to help inform what numeric nutrient criteria are necessary to protect Florida's waters, including downstream lakes and estuaries. EPA also recognizes that substantial site-specific work has been completed for a number of these estuaries. This notice and the proposed downstream protection values are not intended to address or be interpreted as calling into question the utility and protectiveness of these site-specific analyses. Rather, the proposed values represent the output of a systematic and scientific approach that was developed to be generally applicable to all flowing waters in Florida that terminate in estuaries for the purpose of ensuring the protection of downstream estuaries. EPA is interested in obtaining feedback at this time on this systematic and scientific approach. EPA is also interested in feedback regarding site-specific analyses for particular estuaries that should be used instead of this general approach for establishing final values. The Agency further recognizes that the proposed values in this notice will need to be considered in the context of the Agency's numeric nutrient criteria for estuarine and coastal waters scheduled for proposal in January of 2011.

Regarding the criteria for flowing waters for protection of downstream lakes and estuaries, at this time, EPA intends to take final action on the criteria for protection of downstream lakes as part of the first phase of this rulemaking (by October 15, 2010) and to finalize downstream protection values in flowing waters as part of the second phase of this rulemaking process (by October 15, 2011) in coordination with the proposal and finalization of numeric nutrient criteria for estuarine and coastal waters in 2011. However, if comments, data and analyses submitted as a result of this proposal support finalizing these values sooner, by October 2010, EPA may choose to proceed in this manner. To facilitate this process, EPA requests comments and welcomes thorough evaluation on the technical and scientific basis of these proposed downstream protection values, as well as information on estuaries where site-specific analyses should be used, as part of the broader comment and evaluation process that this proposal initiates.

In accordance with the terms of EPA's January 14, 2009 determination and the Consent Decree, EPA is proposing numeric nutrient criteria for Florida's lakes and flowing waters which include the following four water body types: Lakes, streams, springs and clear streams, and canals in south Florida. In developing this proposal, EPA worked closely with FDEP staff to review and analyze the State's extensive dataset of nutrient-related measurements as well as its analysis of stressor-response relationships and benchmark or modified-reference conditions. EPA also conducted further analyses and modeling, in addition to requesting an independent external peer review of the core methodologies and approaches that support this proposal.

For lakes, EPA is proposing a classification scheme using color and alkalinity based upon substantial data that show that lake color and alkalinity play an important role in the degree to which TN and total phosphorus (TP) concentrations result in a biological response such as elevated chlorophyll *a* levels. EPA found that correlations between nutrients and biological response parameters in the different types of lakes in Florida were sufficiently robust, combined with additional lines of evidence, to support stressor-response criteria development for Florida's lakes. The Agency is also proposing an accompanying supplementary analytical approach that the State can use to adjust TN and TP criteria for a particular lake within a certain range where sufficient data on long-term ambient TN and TP levels are available to demonstrate that protective chlorophyll *a* criteria for a specific lake will still be maintained and attainment of the designated use will be assured. This information is presented in more detail in Section III.B below.

Regarding numeric nutrient criteria for streams and rivers, EPA considered the extensive work of FDEP to analyze the relationship between TN and TP levels and biological response in streams and rivers. EPA found that relationships between nutrients and biological response parameters in rivers and streams were affected by many factors that made derivation of a quantitative relationship between chlorophyll *a* levels and nutrients in streams and rivers difficult to establish in the same manner as EPA did for lakes (*i.e.*, stressor-response relationship). EPA considered an alternative methodology that evaluated a combination of biological information and data on the distribution of nutrients in a substantial number of healthy stream systems. Based upon a technical evaluation of the significant available data on Florida streams and related scientific analysis, the Agency concluded that reliance on a statistical distribution methodology was a stronger and a more sound approach for deriving TN and TP criteria in streams and rivers. This information is presented in more detail in Section III.C below.

In developing these proposed numeric nutrient criteria for rivers and streams, EPA also evaluated their effectiveness for assuring the protection of downstream lake and estuary designated uses pursuant to the provisions of 40 CFR 130.10(b), which requires that WQS must provide for the attainment and maintenance of the WQS of downstream waters. For rivers and streams in Florida, EPA must ensure, to the extent that available science allows, that its nutrient criteria take into account the impact of near-field nutrient loads on aquatic life in downstream lakes and estuaries. EPA currently has evaluated the protectiveness of its rivers and streams TP criteria for lake protection and also the protectiveness of its rivers and streams TN criteria for 16 out of 26 of Florida's downstream estuaries using scientifically sound approaches for both estimating protective loads and deriving concentration-based upstream values. Of the ten downstream estuaries not completely evaluated to date, seven are in south Florida and receive TN loads from highly managed canals and waterways and three are in low lying areas of central Florida.

As noted above, EPA used best available science and data related to downstream waters and found that there are cases where the nutrient criteria EPA is proposing to protect instream aquatic life may not be stringent enough to ensure protection of aquatic life in certain downstream lakes and estuaries. Accordingly, EPA is also proposing an equation that would be used to adjust stream and river TP criteria to protect downstream lakes and a different methodology to adjust TN criteria for streams and rivers to ensure protection of downstream estuaries. These approaches as reflected in these proposed regulations and the revised criteria that would result from adjusting TN criteria for streams and rivers to ensure protection of downstream estuaries, based on certain assumptions, are detailed in Section III.C(6)(b) below. The Agency specifically requests comment on the available information, analysis, and modeling used to support the approaches EPA is proposing for addressing downstream impacts of TN and TP. EPA also invites additional stakeholder comment, data, and analysis on alternative technically-based approaches that would support the development of numeric nutrient WQS, or some other scientifically defensible approach, for protection of downstream waters. To the degree that substantial data and analyses are submitted that support a significant revision to downstream protection values for TN outlined in Section III.C(6)(b) below, EPA would intend to issue a supplemental **Federal Register** Notice of Data Availability (NODA) to present the additional data and supplemental analyses and solicit further comment and input. EPA anticipates obtaining the necessary data and information to compute downstream protection values for TP loads for many estuarine water bodies in Florida in 2010 and will also make this additional information available by issuing a supplemental **Federal Register** NODA.

Regarding numeric nutrient criteria for springs and clear streams, EPA is proposing a nitrate-nitrite criterion for springs and clear streams based on experimental laboratory data and field evaluations that document the response of nuisance algae and periphyton to nitrate-nitrite concentrations. This criterion is explained in more detail in Section III.D below.

For canals in south Florida, EPA is proposing a statistical distribution approach similar to its approach for rivers and streams, and based on sites meeting designated uses with respect to nutrients identified in four canal regions to best represent the necessary criteria to protect these highly managed water bodies. This approach is presented in more detail in Section III.E below. The Agency has also considered several alternative approaches to developing numeric nutrient criteria for canals and these are described, as well, for public comment and response.

Stakeholders have expressed concerns that numeric nutrient criteria must be scientifically sound. Under the Clean Water Act and EPA's implementing regulations, numeric nutrient standards must protect the designated use of a water (as well as ensure protection of downstream uses) and must be based on sound scientific rationale. In the case of Florida, EPA and FDEP scientists completed a substantial body of scientific work; EPA believes that these proposed criteria clearly meet the regulatory standards of protection and that they are clearly based on a sound scientific rationale.

Separate from and in addition to proposing numeric nutrient criteria, EPA is also proposing a new WQS regulatory tool for Florida, referred to as "restoration WQS" for impaired waters. This tool will enable Florida to set incremental water quality targets (uses and criteria) for specific pollutant parameters while at the same time retaining protective criteria for all other parameters to meet the full aquatic life use. The goal is to provide a challenging but realistic incremental framework in which to establish appropriate control measures. This provision will allow Florida to retain full aquatic life protection (uses and criteria) for its water bodies while establishing a transparent phased WQS process that would result in planned implementation of enforceable measures and requirements to improve water quality over a specified time period to ultimately meet the long-term designated aquatic life use. The phased numeric standards would be included in Florida's water quality regulations during the restoration period. This proposed regulatory tool is discussed in more detail in Section VI below.

Finally, EPA is including in this notice a proposed approach for deriving Federal site-specific alternative criteria (SSAC) based upon State submissions of scientifically defensible recalculations that meet the requirements of CWA section 303(c). TMDL targets submitted to EPA by the State for consideration as new or revised WQS could be reviewed under this SSAC process. This proposed approach is discussed in more detail in Section V.C below.

Overall, EPA is soliciting comments and data regarding EPA's proposed criteria for lakes and flowing waters, the derivation of these criteria, the protectiveness of the streams and rivers criteria for downstream waters, and all associated alternative options and methodologies discussed in this proposed rulemaking.

B. What Entities May Be Affected by This Rule?

Citizens concerned with water quality in Florida may be interested in this rulemaking. Entities discharging nitrogen or phosphorus to lakes and flowing waters of Florida could be indirectly affected by this rulemaking because WQS are used in determining National Pollutant Discharge Elimination System ("NPDES") permit limits. Stakeholders in Florida facing obstacles in immediately achieving full aquatic life protection in impaired waters may be interested in the restoration standards concept outlined in this rulemaking. Categories and entities that may ultimately be affected include:

Category	Examples of potentially affected entities
Industry	Industries discharging pollutants to lakes and flowing waters in the State of Florida.
Municipalities	Publicly-owned treatment works discharging pollutants to lakes and flowing waters in the State of Florida.
Stormwater Management Districts.	Entities responsible for managing stormwater runoff in Florida.

This table is not intended to be exhaustive, but rather provides a guide for entities that may be directly or indirectly affected by this action. This table lists the types of entities of which EPA is now aware that potentially could be affected by this action. Other types of entities not listed in the table could also be affected, such as nonpoint source contributors to nutrient pollution in Florida's waters. Any parties or entities conducting activities within watersheds of the Florida waters covered by this rule, or who rely on, depend upon, influence, or contribute to the water quality of the lakes and flowing waters of Florida, might be affected by this rule. To determine whether your facility or activities may be affected by this action, you should examine this proposed rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

C. What Should I Consider as I Prepare My Comments for EPA?

1. *Submitting CBI.* Do not submit this information to EPA through *http://www.regulations.gov* or e-mail. Clearly mark the part or all of the information that you claim to be CBI. For CBI information in a disk or CD–ROM that

you mail to EPA, mark the outside of the disk or CD–ROM as CBI and then identify electronically within the disk or CD–ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

2. *Tips for Preparing Your Comments.* When submitting comments, remember to:

1. Identify the rulemaking by docket number and other identifying information (subject heading, **Federal Register** date, and page number).

2. Follow directions—The agency may ask you to respond to specific questions or organize comments by referencing a Code of Federal Regulations (CFR) part or section number.

3. Explain why you agree or disagree; suggest alternatives and substitute language for your requested changes.

4. Describe any assumptions and provide any technical information and/or data that you used.

5. If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow for it to be reproduced.

6. Provide specific examples to illustrate your concerns, and suggest alternatives.

7. Make sure to submit your comments by the comment period deadline identified.

D. How Can I Get Copies of This Document and Other Related Information?

1. *Docket.* EPA has established an official public docket for this action under Docket Id. No. EPA–HQ–OW–2009–0596. The official public docket consists of the document specifically referenced in this action, any public comments received, and other information related to this action. Although a part of the official docket, the public docket does not include CBI or other information whose disclosure is restricted by statute. The official public docket is the collection of materials that is available for public viewing at the OW Docket, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC 20004. This Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The Docket telephone number is 202–566–1744. A reasonable fee will be charged for copies.

2. *Electronic Access.* You may access this **Federal Register** document electronically through the EPA Internet under the "Federal Register" listings at *http://www.epa.gov/fedrgstr/.*

An electronic version of the public docket is available through EPA's electronic public docket and comment system, EPA Dockets. You may use EPA Dockets at *http://www.regulations.gov* to view public comments, access the index listing of the contents of the official public docket, and to access those documents in the public docket that are available electronically. For additional information about EPA's public docket, visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm.* Although not all docket materials may be available electronically, you may still access any of the publicly available docket materials through the Docket Facility identified in Section I.D(1).

II. Background

A. Nutrient Pollution

1. What Is Nutrient Pollution?

Excess anthropogenic concentrations of nitrogen (typically in oxidized, inorganic forms, such as nitrate) [3] and phosphorus (typically as phosphate), commonly referred to as nutrient pollution, in surface waters can result in excessive algal and aquatic plant growth, referred to as eutrophication.[4] One impact associated with eutrophication is low dissolved oxygen, due to decomposition of the aquatic plants and algae when these plants and algae die. As noted above, high nitrogen and phosphorus loadings also result in HABs, reduced spawning grounds and nursery habitats for aquatic life, and fish kills. Public health concerns related to eutrophication include impaired drinking water sources, increased exposure to toxic microbes such as cyanobacteria, and possible formation of disinfection byproducts in drinking water, some of which have been associated with serious human illnesses such as bladder cancer.[5 6] Nutrient problems can manifest locally or much further downstream in lakes, reservoirs, and estuaries.

Excess nutrients in water bodies come from many sources, which can be grouped into five major categories: (1) Sources associated with urban land use and development, (2) municipal and industrial waste water discharge, (3) row crop agriculture, (4) animal husbandry, and (5) atmospheric deposition that may be increased by production of nitrogen oxides in electric power generation and internal combustion engines. These sources contribute significant loadings of nitrogen and phosphorus to surface waters causing major impacts to aquatic ecosystems and significant imbalances in the natural populations of flora and fauna.[7]

2. Adverse Impacts of Nutrient Pollution on Aquatic Life, Human Health, and the Economy

To protect aquatic life, EPA regulates pollutants that have adverse effects on aquatic life. For most pollutants, these effects are typically negative impacts on growth, reproduction, and survival. As previously noted, excess nutrients can lead to increases in algal and other aquatic plant growth, including toxic algae that can result in HABs. Increases in algal and aquatic plant growth provide excess organic matter in a water body and can contribute to subsequent degradation of aquatic communities, human health impacts, and ultimately economic impacts.

Fish, shellfish, and wildlife require clean water for survival. Changes in the environment resulting from elevated nutrient levels (such as algal blooms, toxins from HABs, and hypoxia/anoxia) can cause a variety of effects. When excessive nutrient loads change a water body's algae and plant species, the change in habitat and available food resources can induce changes affecting an entire food chain. Algal blooms block

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[3] To be used by living organisms, nitrogen gas must be fixed into its reactive forms; for plants, either nitrate or ammonia.

[4] Eutrophication is defined as an increase in organic carbon to an aquatic ecosystem caused by primary productivity stimulated by excess nutrients—typically compounds containing nitrogen or phosphorus. Eutrophication can adversely affect aquatic life, recreation, and human health uses of waters.

[5] Villanueva, C.M. *et al.*, 2006. Bladder Cancer and Exposure to Water Disinfection By-Products through Ingestion, Bathing, Showering, and Swimming in Pools. *American Journal of Epidemiology*, 165(2):148–156.

[6] U.S. EPA. 2009. What Is in Our Drinking Water. United States Environmental Protection Agency, Office of Research and Development. *http://www.epa.gov/extrmurl/research/process/drinkingwater.html.* Accessed December 2009.

[7] National Research Council, 2000. Clean Coastal Waters: Understanding and Reducing the Effects of Nutrient Pollution. Report prepared by the Ocean Study Board and Water Science and Technology Board, Commission on Geosciences, Environment and Resources, National Resource Council. National Academy Press, Washington, DC; Howarth, R.W., A. Sharpley, and D. Walker. 2002. Sources of nutrient pollution to coastal waters in the United States: Implications for achieving coastal water quality goals. *Estuaries.* 25(4b):656–676; Smith, V.H. 2003. Eutrophication of freshwater and coastal marine ecosystems. *Environ. Sci. and Poll. Res.* 10(2):126–139; Dodds, W.K., W.W. Bouska, J.L. Eitzmann, T.J. Pilger, K.L. Pitts, A.J. Riley, J.T. Schloesser, and D.J. Thornbrugh. 2009. Eutrophication of U.S. freshwaters: Analysis of potential economic damages. *Environ. Sci. Tech..* 43(1):12–19.

sunlight that submerged grasses need to grow, leading to a decline of seagrass beds and decreased habitat for juvenile organisms. Algal blooms can also increase turbidity and impair the ability of fish and other aquatic life to find food.[8] Algae can also damage or clog the gills of fish and invertebrates.[9]

HABs can form toxins that cause illness or death for some animals. Some of the more commonly affected animals include sea lions, turtles, seabirds, dolphins, and manatees.[10] More than 50% of unusual marine mortality events may be associated with HABs.[11] Lower level consumers, such as small fish or shellfish, may not be harmed by algal toxins, but they bioaccumulate toxins, causing higher exposures for higher level consumers (such as larger predator fish), resulting in health impairments and possibly death.[12 13]

There are many examples of HAB toxins significantly affecting marine animals. For example, between March and April 2003, 107 bottlenose dolphins *(Tursiops truncatus)* died, along with hundreds of fish and marine invertebrates, along the Florida Panhandle.[14] High levels of brevetoxin (a neurotoxin), produced by a harmful species of dinoflagellate (a type of algae), were measured in all of the stranded dolphins examined, as well as in their fish prey.[15]

In freshwater, cyanobacteria can produce toxins that have been implicated as the cause of a large number of fish and bird mortalities. These toxins have also been tied to the death of pets and livestock that may be exposed through drinking contaminated water or grooming themselves after bodily exposure.[16] A recent study showed that at least one type of cyanobacteria has been linked to cancer and tumor growth in animals.[17]

Excessive algal growth contributes to increased oxygen consumption associated with decomposition, potentially reducing oxygen to levels below that needed for aquatic life to survive and flourish.[18 19] Low oxygen, or hypoxia, often occurs in episodic "events," which sometimes develop overnight. Mobile species, such as adult fish, can sometimes survive by moving to areas with more oxygen. However, migration to avoid hypoxia depends on species mobility, availability of suitable habitat, and adequate environmental cues for migration. Less mobile or immobile species, such as oysters and mussels, cannot move to avoid low oxygen and are often killed during hypoxic events.[20] While certain mature aquatic animals can tolerate a range of dissolved oxygen levels that occur in the water, younger life stages of species like fish and shellfish often require higher levels of oxygen to survive.[21] Sustained low levels of dissolved oxygen cause a severe decrease in the amount of aquatic life in hypoxic zones and affect the ability of aquatic organisms to find necessary food and habitat. In extreme cases, anoxic conditions occur when there is a complete lack of oxygen. Very few organisms can live without oxygen (for example some microbes), hence these areas are sometimes referred to as dead zones.[22]

Primary impacts to humans result directly from elevated nutrient pollution levels and indirectly from the subsequent water body changes that occur from increased nutrients (such as algal blooms and toxins). Direct impacts include effects on human health through drinking water or consuming toxic shellfish. Indirect impacts include restrictions on recreation (such as boating, swimming, and kayaking). Algal blooms can prevent opportunities to swim and engage in other types of recreation. In areas where recreation is determined to be unsafe because of algal blooms, warning signs are often posted to discourage human use of the waters.

Highly elevated nitrogen levels, in the form of nitrate, in drinking water supplies and private wells can cause methemoglobinemia (blue baby syndrome, which refers to high levels of nitrate in a baby's blood that reduce the blood's ability to deliver oxygen to the skin and organs resulting in a bluish tinge to the skin; in severe cases methemoglobinemia can lead to coma and death).[23] Monitoring of Florida Public Water Supplies from 2004–2007 indicates that violations of nitrate maximum contaminant levels (MCL) ranged from 34–40 violations annually.[24] In addition, in the predominantly agricultural regions of Florida, of 3,949 drinking water wells analyzed for nitrate by the Florida Department of Agriculture and Consumer Services, (FDACS) and the FDEP, 2,483 (63%) contained detectable nitrate and 584 wells (15%) contained nitrate above the U.S. EPA MCL. Of the 584 wells statewide that exceeded the MCL, 519 were located in the Central Florida Ridge citrus growing region, encompassed primarily by Lake, Polk and Highland Counties.[25] Human health can also be impacted by disinfection byproducts formed when disinfectants (such as chlorine) used to treat drinking water react with organic carbon (from the algae in source waters). Some disinfection byproducts have been linked to rectal, bladder, and colon cancers; reproductive health risks; and liver, kidney, and central nervous

[8] Hauxwell, J. C. Jacoby, T. Frazer, and J. Stevely. 2001. Nutrients and Florida's Coastal Waters. Florida Sea Grant.

[9] NOAA. 2009. Harmful Algal Blooms: Current Programs Overview. National Oceanic and Atmospheric Administration. *http://www.cop.noaa.gov/stressors/extremeevents/hab/welcome.html.* Accessed December 2009.

[10] NOAA. 2009. Harmful Algal Blooms: Current Programs Overview. National Oceanic and Atmospheric Administration. *http://www.cop.noaa.gov/stressors/extremeevents/hab/welcome.html.* Accessed December 2009.

[11] WHOI. 2008. HAB Impacts on Wildlife. Woods Hole Oceanographic Institution. *http://www.whoi.edu/redtide/page.do?pid=9682.* Accessed December 2009.

[12] WHOI. 2008. Marine Mammals. Woods Hole Oceanographic Institution. *http://www.whoi.edu/redtide/page.do?pid=14215.* Accessed December 2009.

[13] WHOI. 2008. HAB Impacts on Wildlife. Woods Hole Oceanographic Institution. *http://www.whoi.edu/redtide/page.do?pid=9682.* Accessed December 2009.

[14] WHOI. 2008. Marine Mammals. Woods Hole Oceanographic Institution. *http://www.whoi.edu/redtide/page.do?pid=14215.* Accessed December 2009.

[15] WHOI. 2008. Marine Mammals. Woods Hole Oceanographic Institution. *http://www.whoi.edu/redtide/page.do?pid=14215.* Accessed December 2009.

[16] WHOI. 2008. HAB Impacts on Wildlife. Woods Hole Oceanographic Institution. *http://www.whoi.edu/redtide/page.do?pid=9682.* Accessed December 2009.

[17] Falconer, I.R., A.R. Humpage. 2005. Health Risk Assessment of Cyanobacterial (Blue-green Algal) Toxins in Drinking Water. *Int. J. Environ. Res. Public Health.* 2(1): 43–50.

[18] NOAA. 2009. Harmful Algal Blooms: Current Programs Overview. National Oceanic and Atmospheric Administration. *http://www.cop.noaa.gov/stressors/extremeevents/hab/welcome.html.* Accessed December 2009.

[19] USGS. 2009. Hypoxia. U.S. Geological Survey. *http://toxics.usgs.gov/definitions/hypoxia.html.* Accessed December 2009.

[20] ESA. 2009. Hypoxia. Ecological Society of America. *http://www.esa.org/education_diversity/pdfDocs/hypoxia.pdf.* Accessed December 2009.

[21] USEPA. 2000. Ambient Aquatic Life Water Quality Criteria for Dissolved Oxygen (Saltwater): Cape Cod to Cape Hattaras. Environmental Protection Agency, Office of Water, Washington DC PA–822–R–00–012.

[22] Ecological Society of America. 2009. Hypoxia. Ecological Society of America, Washington, DC. *http://www.esa.org/education/edupdfs/hypoxia.pdf.* Accessed December 2009.

[23] USEPA. 2007. Nitrates and Nitrites. U.S. Environmental Protection Agency. *http://www.epa.gov/teach/chem_summ/Nitrates_summary.pdf.* Accessed December 2009.

[24] FDEP 2009. *Chemical Data for 2004, 2005, 2006, 2007 and 2008.* Florida Department of Environmental Protection. *http://www.dep.state.fl.us/water/drinkingwater/chemdata.htm.* Accessed January 2010.

[25] Southern Regional Water Program. 2010. Drinking Water and Human Health in Florida. Southern Regional Water Program, *http://srwqis.tamu.edu/florida/program-information/florida-target-themes/drinking-water-and-human-health.aspx.* Accessed January 2010.

system problems.[26 27] Humans can also be impacted by accidentally ingesting toxins, resulting from toxic algal blooms in water, while recreating or by consuming drinking water that still contains toxins despite treatment. For example, cyanobacteria toxins can sometimes pass through the normal water treatment process.[28] After consuming seafood tainted by toxic HABs, humans can develop gastrointestinal distress, memory loss, disorientation, confusion, and even coma and death in extreme cases. Some toxins only require a small dose to cause illness or death.[29] EPA expects that by addressing protection of aquatic life uses through the application of the proposed numeric nutrient criteria in this rulemaking, risks to human health will also be alleviated, as nutrient levels that represent a balance of natural populations of flora and fauna will not produce HABs nor result in highly elevated nitrate levels.

Nutrient pollution and eutrophication can also impact the economy through additional reactive costs, such as medical treatment for humans who ingest HAB toxins, treating drinking water supplies to remove algae and organic matter, and monitoring water for shellfish and other affected resources.

Economic losses from algal blooms and HABs can include reduced property values for lakefront areas, commercial fishery losses, and lost revenue from recreational fishing and boating trips, as well as other tourism-related businesses. Commercial fishery losses occur because of a decline in the amount of fish available for harvest due to habitat and oxygen declines. Some HAB toxins can make seafood unsafe for human consumption, and can reduce the amount of fish bought because people might question if eating fish is safe after learning of the presence of the algal bloom.[30] To put the issue into perspective, consider the following estimates: For freshwater lakes, losses in fishing and boating trip-related revenues nationwide due to eutrophication are estimated to range from $370 million to almost $1.2 billion dollars and loss of lake property values from excessive algal growth are estimated to range from $300 million to $2.8 billion annually on a national level.[31]

3. Nutrient Pollution in Florida

Water quality degradation resulting from excess nitrogen and phosphorus loadings is a documented and significant environmental issue in Florida. According to Florida's 2008 Integrated Report,[32] approximately 1,000 miles of rivers and streams, 350,000 acres of lakes, and 900 square miles of estuaries are impaired for nutrients in the State. To put this in context, these values represent approximately 5% of the assessed river and stream miles, 23% of the assessed lake acres, and 24% of the assessed square miles of estuaries that Florida has listed as impaired in the 2008 Integrated Report.[33] Nutrients are ranked as the fourth major source of impairment for rivers and streams in the State (after dissolved oxygen, mercury in fish, and fecal coliforms). For lakes and estuaries, nutrients are ranked first and second, respectively. As discussed above, impairments due to nutrient pollution result in significant impacts to aquatic life and ecosystem health. Nutrient pollution also represents, as mentioned above, an increased human health risk in terms of contaminated drinking water supplies and private wells.

Florida is particularly vulnerable to nutrient pollution. Historically, the State has experienced a rapidly expanding population, which is a strong predictor of nutrient loading and associated effects, and which combined with climate and other natural factors, make Florida waters sensitive to nutrient effects. Florida is currently the fourth most populous state in the nation, with an estimated 18 million people.[34] Population is expected to continue to grow, resulting in an expected increase in urban development, home landscapes, and wastewater. Florida's flat topography causes water to move slowly over the landscape, allowing ample opportunity for eutrophication responses to develop. Similarly, small tides in many of Florida's estuaries (especially on the Gulf coast) also allow for well-developed eutrophication responses in tidal waters. Florida's warm and wet, yet sunny, climate further contributes to increased run-off and subsequent eutrophication responses.[35] Exchanges of surface water and ground water contribute to complex relationships between nutrient sources and the location and timing of eventual impacts.[36]

In addition, extensive agricultural development and associated hydrologic modifications (*e.g.*, canals and ditches) amplify the State's susceptibility to nutrient pollution. Many of Florida's inland areas have extensive tracts of agricultural lands. Much of the intensive agriculture and associated fertilizer usage takes place in locations dominated by poorly drained sandy soils and with high annual rainfall amounts, two conditions favoring nutrient-rich runoff. These factors, along with population increase, have contributed to a significant upward trend in nutrient inputs to Florida's waters.[37] High historical water quality and the human and aquatic life uses of many waterways in Florida often means that very low nutrients, low productivity, and high water clarity are needed and expected to maintain uses.

B. Statutory and Regulatory Background

Section 303(c) (33 U.S.C. 1313(c)) of the CWA directs states to adopt WQS for their navigable waters. Section 303(c)(2)(A) and EPA's implementing regulations at 40 CFR part 131 require, among other provisions, that state WQS include the designated use or uses to be made of the waters and criteria that protect those uses. EPA regulations at 40 CFR 131.11(a)(1) provide that states shall "adopt those water quality criteria

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[26] USEPA. 2009. Drinking Water Contaminants. U.S. Environmental Protection Agency. Accessed *http://www.epa.gov/safewater/hfacts.html*. December 2009.

[27] CFR. 2006. *40 CFR parts 9, 141, and 142:* National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule. Code of Federal Regulations, Washington, DC. *http://www.epa.gov/fedrgstr/EPA-WATER/2006/January/Day-04/w03.htm*. Accessed December 2009.

[28] Carmichael, W.W. 2000. Assessment of Blue-Green Algal Toxins in Raw and Finished Drinking Water. AWWA Research Foundation, Denver, CO.

[29] NOAA. 2009. Marine Biotoxins. National Oceanic and Atmospheric Administration. *http://www.nwfsc.noaa.gov/hab/habs_toxins/marine_biotoxins/index.html*. Accessed December 2009.

[30] WHOI. 2008. Hearing on 'Harmful Algal Blooms: The Challenges on the Nation's Coastlines.' Woods Hole Oceanographic Institution. *http://www.whoi.edu/page.do?pid=8916&tid=282&cid=46007*. Accessed December 2009.

[31] Dodds, W.K., W.W. Bouska, J.L. Eitzmann, T.J. Pilger, K.L. Pitts, A.J. Riley, J.T. Schloesser, and D.J. Thornbrugh. 2009. Eutrophication of U.S. freshwaters: analysis of potential economic damages. *Environ.l Sci. Tech.y.* 43(1):12–19.

[32] Florida Department of Environmental Protection. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.

[33] Florida Department of Environmental Protection. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.

[34] U.S. Census Bureau. 2009. 2008 Population Estimates Ranked by State. *http://factfinder.census.gov*.

[35] Perry, W.B. 2008. Everglades restoration and water quality challenges in south Florida. *Ecotoxicology* 17:569–578.

[36] USGS. 2009. Florida Waters: A Water Resources Manual. *http://sofia.usgs.gov/publications/reports/floridawaters/*. Accessed June 9, 2009.

[37] Florida Department of Environmental Protection. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.

that protect the designated use" and that such criteria "must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use." As noted above, 40 CFR 130.10(b) provides that "In designating uses of a water body and the appropriate criteria for those uses, the state shall take into consideration the water quality standards of downstream waters and ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters."

States are also required to review their WQS at least once every three years and, if appropriate, revise or adopt new standards (CWA section 303(c)(1)). States are required to submit these new or revised WQS for EPA review and approval or disapproval (CWA section 303(c)(2)(A)). Finally, CWA section 303(c)(4)(B) authorizes the Administrator to determine, even in the absence of a state submission, that a new or revised standard is needed to meet CWA requirements. The criteria proposed in this rulemaking apply to lakes and flowing waters of the State of Florida. EPA's proposal defines "lakes and flowing waters" to mean inland surface waters that have been classified by Florida as Class I (Potable Water Supplies Use) or Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife Use) water bodies pursuant to Florida Administrative Code (F.A.C.) Rule 62–302.400, excluding wetlands, and which are predominantly fresh waters.

C. Water Quality Criteria

EPA has issued guidance for use by states when developing criteria. Under CWA section 304(a), EPA periodically publishes criteria recommendations (guidance) for use by states in setting water quality criteria for particular parameters to protect recreational and aquatic life uses of waters. When EPA has published recommended criteria, states have the option of adopting water quality criteria based on EPA's CWA section 304(a) criteria guidance, section 304(a) criteria guidance modified to reflect site-specific conditions, or other scientifically defensible methods. 40 CFR 131.11(b)(1).

For nutrients, EPA has published under CWA section 304(a) a series of peer-reviewed, national technical approaches and methods regarding the development of numeric nutrient criteria for lakes and reservoirs,[38] rivers and streams,[39] and estuaries and coastal marine waters.[40] Basic analytical approaches for nutrient criteria derivation include, but are not limited to: (1) Stressor-response analysis, (2) the reference condition approach, and (3) mechanistic modeling. The stressor-response, or effects-based, approach relates a water body's response to nutrients and identifies adverse effect levels. This is done by selecting a protective value based on the relationships of nitrogen and phosphorus field measures with indicators of biological response. This approach is empirical, and directly relates to the designated uses. The reference condition approach derives candidate criteria from distributions of nutrient concentrations and biological responses in a group of waters. Measurements are made of causal and response variables and a protective value is selected from the distribution. The mechanistic modeling approach predicts a cause-effect relationship using site-specific input to equations that represent ecological processes. Mechanistic models require calibration and validation. Each approach has peer review support by the broader scientific community, and would provide adequate means for any state to develop scientifically defensible numeric nutrient criteria.

In cases where scientifically defensible numeric criteria cannot be derived, EPA regulations provide that narrative criteria should be adopted. 40 CFR 131.11(b)(2). Narrative criteria are descriptions of conditions necessary for the water body to attain its designated use. Often expressed as requirements that waters remain "free from" certain characteristics, narrative criteria can be the basis for controlling nuisance conditions such as floating debris or objectionable deposits. States often establish narrative criteria, such as "no toxics in toxic amounts," in order to limit toxic pollutants in waters where the state has yet to adopt an EPA-recommended numeric criterion and or where EPA has yet to derive a recommended numeric criterion. For nutrients, in the absence of numeric nutrient criteria, states have often established narrative criteria such as "no nuisance algae." Reliance on a narrative criterion to derive NPDES permit limits, assess water bodies for listing purposes, and establish TMDL targets can often be a difficult, resource-intensive, and time-consuming process that entails conducting case-by-case analyses to determine the appropriate numeric target value based on a site-specific translation of the narrative criterion. Narrative criteria are most effective when they are supported by procedures to translate them into quantitative expressions of the conditions necessary to protect the designated use.

D. Agency Determination Regarding Florida

On January 14, 2009, EPA determined under CWA section 303(c)(4)(B) that new or revised WQS in the form of numeric nutrient water quality criteria are necessary to meet the requirements of the CWA in the State of Florida. Florida's currently applicable narrative nutrient criterion provides, in part, that "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna." Florida Administrative Code (F.A.C.) 62–302–530(47)(b). EPA determined that Florida's narrative nutrient criterion alone was insufficient to ensure protection of applicable designated uses. The determination recognized that Florida has a proactive and innovative program to address nutrient pollution through a strategy of comprehensive National Pollutant Discharge Elimination System (NPDES) permit regulations, Basin Management Action Plans (BMAPs) for implementation of TMDLs which include controls on nonpoint sources, municipal wastewater treatment technology-based requirements under the 1990 Grizzle-Figg Act, and rules to limit nutrient pollution in geographically specific areas like the Indian River Lagoon System, the Everglades Protection Area, and Wekiva Springs. However, the determination noted that despite Florida's intensive efforts to diagnose and control nutrient pollution, substantial water quality degradation from nutrient over-enrichment remains a significant challenge in the State and one that is likely to worsen with continued population growth and land-use changes.

Florida's implementation of its narrative water quality criterion for nutrients is based on site-specific detailed biological assessments and analyses, together with site-by-site outreach and stakeholder engagement in the context of specific CWA-related

[38] U.S. EPA. 2000a. Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs. Office of Water, Washington, DC. EPA–822–B–00–001.

[39] U.S. EPA. 2000b. Nutrient Criteria Technical Guidance Manual: Rivers and Streams. Office of Water, Washington, DC. EPA–822–B–00–002.

[40] U.S. EPA. 2001. Nutrient Criteria Technical Manual: Estuarine and Coastal Marine Waters. Office of Water, Washington, DC. EPA–822–B–01–003, and wetlands (U.S. EPA, 2007).

actions, specifically NPDES permits, TMDLs required for both permitting and BMAP activities, and assessment and listing decisions. When deriving NPDES water quality-based permit limits, Florida initially conducts a site-specific analysis to determine whether a proposed discharge has the reasonable potential to cause or contribute to an exceedance of its narrative nutrient water quality criterion. The State then determines what levels of nutrients would "cause an imbalance in natural populations of aquatic flora or fauna" and translates those levels into numeric "targets" for the receiving water and any other affected waters. Determining on a water-by-water basis for thousands of State waters the levels of nutrients that would "cause an imbalance in natural populations of aquatic flora or fauna" is a difficult, lengthy, and data-intensive undertaking. This work involves performing detailed site-specific analyses of the receiving water and any other affected waters. If the State has not already completed this analysis for a particular water, it can be very difficult to accurately determine in the context and timeframe of the NPDES permitting process. For example, in some cases, adequate data may take several years to collect and therefore, may not be available for a particular water at the time of permitting issuance or re-issuance.

When developing TMDLs, as it does when determining reasonable potential and deriving limits in the permitting context, Florida translates the narrative nutrient criterion into a numeric target that the State determines is necessary to meet its narrative criterion and protect applicable designated uses. This process also involves a site-specific analysis to determine the nutrient levels that would "cause an imbalance in natural populations of aquatic flora or fauna" in a particular water. Each time a site-specific analysis is conducted to determine what the narrative criterion means for a particular water body in developing a TMDL, the State takes site-specific considerations into account and devises a method that works with the available data and information.

In adopting the Impaired Waters Rule (IWR), Florida took important steps toward improving implementation of its narrative nutrient criterion by establishing and publishing an assessment methodology to identify waters impaired for nutrients. This methodology includes numeric nutrient impairment "thresholds" above which waters are automatically deemed impaired. Even when a listing is made, however, development of a TMDL is then generally required to support issuance of a permit or development of a BMAP.

Based on the considerations outlined above, EPA concluded that numeric criteria for nutrients will enable the State to take necessary actions to protect the designated uses, in a timelier manner. The resource intensive efforts to interpret the State's narrative criterion contribute to delays in implementing the criterion and therefore, affect the State's ability to provide the needed protections for applicable designated uses. EPA, therefore, determined that numeric nutrient criteria are necessary for the State of Florida to meet the CWA requirement to have criteria that protect applicable designated uses.

The combined impacts of urban and agricultural activities, along with Florida's physical features and important and unique aquatic ecosystems, made it clear that the current use of the narrative nutrient criterion alone and the resulting delays that it entails do not ensure protection of applicable designated uses for the many State waters that are either unimpaired and need protection or have been listed as impaired and require loadings reductions. EPA determined that numeric nutrient water quality criteria would strengthen the foundation for identifying impaired waters, establishing TMDLs, and deriving water quality-based effluent limits in NPDES permits, thus providing the necessary protection for the State's designated uses in its waters. In addition, numeric nutrient criteria will support the State's ability to effectively partner with point and nonpoint sources to control nutrients, thus further providing the necessary protection for the designated uses of the State's water bodies. EPA's determination is available at the following Web site: *http://www.epa.gov/waterscience/standards/rules/fl-determination.htm.*

The January 14, 2009 determination stated EPA's intent to propose numeric nutrient criteria for lakes and flowing waters in Florida within twelve months of the January 14, 2009 determination, and for estuarine and coastal waters within 24 months of the determination. EPA has also entered into a Consent Decree with Florida Wildlife Federation, Sierra Club, Conservancy of Southwest Florida, Environmental Confederation of Southwest Florida, and St. Johns Riverkeeper, committing to the schedule stated in EPA's January 14, 2009 determination to propose numeric nutrient criteria for lakes and flowing waters in Florida by January 14, 2010, and for Florida's estuarine and coastal waters by January 14, 2011. The Consent Decree also requires that final rules be issued by October 15, 2010 for lakes and flowing waters, and by October 15, 2011 for estuarine and coastal waters.

In accordance with the determination and EPA's Consent Decree, EPA is proposing numeric nutrient criteria for Florida's lakes and flowing waters with this proposed rule. As envisioned in EPA's determination, this time frame has allowed EPA to utilize the large data set collected by Florida as part of a detailed analysis of nutrient-impaired waters. In a separate rulemaking, EPA intends to develop and propose numeric nutrient criteria for Florida's estuarine and coastal waters by January 14, 2011. EPA's determination did not apply to Florida's wetlands, and as a result, Florida's wetlands will not be addressed in this rulemaking or in EPA's forthcoming rulemaking involving estuarine and coastal waters.

III. Proposed Numeric Nutrient Criteria for the State of Florida's Lakes and Flowing Waters

A. General Information

(1) Which Water Bodies Are Affected by This Proposed Rule?

The criteria proposed in this rulemaking apply to lakes and flowing waters of the State of Florida. EPA's proposal defines "lakes and flowing waters" to mean inland surface waters that have been classified as Class I (Potable Water Supplies) or Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife) water bodies pursuant to Rule 62–302.400, F.A.C., excluding wetlands, and which are predominantly fresh waters. Pursuant to Rule 62–302.200, F.A.C., EPA's proposal defines "predominantly fresh waters" to mean surface waters in which the chloride concentration at the surface is less than 1,500 milligrams per liter (mg/L) and "surface water" means water upon the surface of the Earth, whether contained in bounds created naturally, artificially, or diffused. Waters from natural springs shall be classified as surface water when it exits from the spring onto the Earth's surface.

In this rulemaking, EPA is proposing numeric nutrient criteria for the following four water body types: Lakes, streams, springs and clear streams, and canals in south Florida. EPA's proposal also includes definitions for each of these waters. "Lake" means a freshwater water body that is not a stream or other watercourse with some open contiguous water free from emergent vegetation. "Stream" means a free-flowing, predominantly fresh surface water in a defined channel, and includes rivers, creeks, branches, canals (outside south Florida), freshwater sloughs, and other similar water bodies. "Spring" means the point where underground water emerges onto the Earth's surface, including its spring run. "Spring run" means a free-flowing water that originates from a spring or spring group whose primary (>50%) source of water is from a spring or spring group. Downstream waters from a spring that receive 50% or more of their flow from surface water tributaries are not considered spring runs. "Clear stream" means a free-flowing water whose color is less than 40 platinum cobalt units (PCU, which is assessed as true color free from turbidity). Classification of a stream as clear or colored is based on the instantaneous color of the sample. Consistent with Rule 62–312.020, F.A.C., "canal" means a trench, the bottom of which is normally covered by water with the upper edges of its two sides normally above water. Consistent with Rule 62–302.200, F.A.C., all secondary and tertiary canals wholly within Florida's agricultural areas are classified as Class IV waters, not Class III, and therefore, are not subject to this proposed rulemaking. The classes of waters, as specified in this paragraph and as subject to this proposed rulemaking, are hereinafter referred to as "lakes and flowing waters" in this proposed rule.

The CWA requires adoption of WQS for "navigable waters." CWA section 303(c)(2)(A). The CWA defines "navigable waters" to mean "the waters of the United States, including the territorial seas." CWA section 502(7). Whether a particular water body is a water of the United States is a water body-specific determination. Every water body that is a water of the United States requires protection under the CWA. EPA is not aware of any waters of the United States in Florida that are currently exempted from the State's WQS. For any privately owned water in Florida that is a water of the United States, the applicable numeric nutrient criteria for those types of waters would apply. This rule does not apply to waters for which the Miccosukee Tribe of Indians or Seminole Tribe of Indians has obtained Treatment as a State for Section 303 of the CWA, pursuant to Section 518 of the CWA.

(2) Background on EPA's Derivation of Proposed Numeric Nutrient Criteria for the State of Florida's Lakes and Flowing Waters

In proposing numeric nutrient criteria for Florida's lakes and flowing waters, EPA developed numeric nutrient criteria to support a balanced natural population of flora and fauna in Florida lakes and flowing waters, and to ensure, to the extent that the best available science allows, the attainment and maintenance of the WQS of downstream waters. Where numeric nutrient criteria do not yet exist, in proposed or final form, for a water body type that is downstream from a lake or flowing water (*e.g.*, estuaries) in Florida, EPA has interpreted the currently applicable State narrative criterion, "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna," to ensure that the numeric criteria EPA is proposing would not result in nutrient concentrations that would "cause an imbalance in natural populations of aquatic flora or fauna" in such downstream water bodies. EPA's actions are consistent with and support existing Florida WQS regulations. EPA used the best available science to estimate protective loads to downstream estuaries, and then used these estimates (and assumptions about the distribution of the load throughout the watershed), along with mathematical models, to calculate concentrations in upstream flowing waters that would have to be met to ensure the attainment and maintenance of the State's narrative criterion applicable to downstream estuaries.

EPA relied on an extensive amount of Florida-specific data, collected and analyzed, in large part, by FDEP and then reviewed by EPA. EPA worked extensively with FDEP on data interpretation and technical analyses for developing scientifically sound numeric nutrient criteria for this proposed rulemaking. Because EPA is committed to ensuring the use of the best available science, the Agency submitted its criteria derivation methodologies, developed by EPA in close collaboration with FDEP experts and scientists, to an independent, external, scientific peer review in July 2009.

To support derivation of EPA's proposed lakes criteria, EPA searched extensively for relevant and useable lake data. In this case the effort resulted in 33,622 samples from 4,417 sites distributed among 1,599 lakes statewide.

Regarding the derivation of EPA's proposed streams criteria, EPA evaluated water chemistry data from 11,761 samples from 6,342 sites statewide in the "all streams" dataset. EPA also used data collected for linking nutrients to specific biological responses that consisted of 2,023 sample records from more than 1,100 streams.

For EPA's proposed springs and clear streams criteria, EPA evaluated data gathered and synthesized by FDEP using approximately 50 studies including historical accounts, laboratory nutrient amendment bioassays, field surveys, and TMDL reports that document increasing patterns of nitrate-nitrite levels and corresponding ecosystem level responses observed within the last 50 years. At least a dozen of these studies were used to develop and support the proposed nitrate-nitrite criterion for spring ecosystems.

For EPA's proposed criteria for canals for south Florida, EPA started with more than 1,900,000 observations from more than 3,400 canal sites. These were filtered for data relevant to nutrient criteria development and resulted in observations at more than 500 sites for variables (nutrient parameter data and chlorophyll *a* data). Reliance on these extensive sets of data has enabled EPA to use the best available information and science to derive robust, scientifically sound criteria applicable to Florida's lakes and flowing waters.

Section III describes EPA's proposed numeric nutrient criteria for Florida's lakes, streams, springs and clear streams, and canals and the associated methodologies EPA employed to derive them. These criteria are based on sound scientific rationale and will protect applicable designated uses in Florida's lakes and flowing waters. EPA solicits public comment on these criteria and their derivation. This preamble also includes discussions of alternative approaches that EPA considered but did not select as the preferred option to derive the proposed criteria. EPA invites public comment on the alternative approaches as well. In addition, EPA requests public comment on whether the proposed numeric nutrient criteria are consistent with Florida's narrative criterion with respect to nutrients at Rule 62–302.530(47)(a), F.A.C., specifying that the discharge of nutrients shall be limited as needed to prevent violations of other standards. EPA seeks scientific data and information on whether, for example, nutrient criteria should be more stringent to prevent exceedances of dissolved oxygen criteria.

EPA has created a technical support document that provides detailed information regarding all methodologies discussed herein and the derivation of the proposed criteria. This document is entitled "Technical Support Document for EPA's Proposed Rule For Numeric Nutrient Criteria for Florida's Inland Surface Fresh Waters" (hereafter, EPA TSD for Florida's Inland Waters) and is located at *www.regulations.gov,* Docket ID No. EPA–HQ–OW–2009–0596.

B. Proposed Numeric Nutrient Criteria for the State of Florida's Lakes

Florida's 2008 Integrated Water Quality Assessment Report[41] indicates that Florida lakes provide important habitats for plant and animal species and are a valuable resource for human activities and enjoyment. The State has more than 7,700 lakes, which occupy close to 6% of its surface area. The largest lake, Lake Okeechobee (covering 435,840 acres), is the ninth largest lake in surface area in the United States and the second largest freshwater lake wholly within the coterminous United States.[42] Most of the State's lakes are shallow, averaging seven to 20 feet deep, although many sinkhole lakes and parts of other lakes are much deeper.

Florida's lakes are physically, chemically, and biologically diverse. Many lakes are spring-fed, others are seepage lakes fed by ground water, and still others (about 20%) are depression lakes fed by surface water sources. For purposes of developing numeric nutrient criteria, EPA identified two classifications of lakes, colored lakes and clear lakes, which respond differently to inputs of TN and TP, as discussed in detail below. EPA further classified the clear lakes into clear alkaline lakes (relatively high alkalinity) and clear acidic lakes (relatively low alkalinity), which have different baseline expectations for the level of nutrients present.

(1) Proposed Numeric Nutrient Criteria for Lakes

EPA is proposing the following numeric nutrient criteria and geochemical classifications for Florida's lakes classified as Class I or III waters under Florida law (Rule 62–302.400, F.A.C.):

Long-term average lake color and alkalinity	Chlorophyll *a* [f] (µg/L) [a]	Baseline criteria [b]		Modified criteria (within these bounds) [c]	
		TP (mg/L) [a]	TN (mg/L) [a]	TP (mg/L) [a]	TN (mg/L) [a]
A	B	C	D	E	F
Colored Lakes > 40 PCU	20	0.050	1.23	0.050–0.157	1.23–2.25
Clear Lakes, Alkaline ≤ 40 PCU [d] and > 50 mg/L $CaCO_3$ [e]	20	0.030	1.00	0.030–0.087	1.00–1.81
Clear Lakes, Acidic ≤ 40 PCU [d] and ≤ 50 mg/L $CaCO_3$ [e]	6	0.010	0.500	0.010–0.030	0.500–0.900

[a] Concentration values are based on annual geometric mean not to be surpassed more than once in a three-year period. In addition, the long-term average of annual geometric mean values shall not surpass the listed concentration values. (Duration = annual; Frequency = not to be surpassed more than once in a three-year period or as a long-term average).

[b] Baseline criteria apply unless data are readily available to calculate and apply lake-specific, modified criteria as described below in footnote c and the Florida Department of Environmental Protection issues a determination that a lake-specific modified criterion is the applicable criterion for an individual lake. Any such determination must be made consistent with the provisions in footnote c below. Such determination must also be documented in an easily accessible and publicly available location, such as an official State Web site.

[c] If chlorophyll *a* is below the criterion in column B and there are representative data to calculate ambient-based, lake-specific, modified TP and TN criteria, then FDEP may calculate such criteria within these bounds from ambient measurements to determine lake-specific, modified criteria pursuant to CWA section 303(c). Modified TN and TP criteria must be based on at least three years of ambient monitoring data with (a) at least four measurements per year and (b) at least one measurement between May and September and one measurement between October and April each year. These same data requirements apply to chlorophyll *a* when determining whether the chlorophyll *a* criterion is met for purposes of developing modified TN and TP criteria. If the calculated TN and/or TP value is below the lower value, then the lower value is the lake-specific, modified criterion. If the calculated TN and TP value is above the upper value, then the upper value is the lake-specific, modified criterion. Modified TP and TN criteria may not exceed criteria applicable to streams to which a lake discharges. If chlorophyll *a* is below the criterion in column B and representative data to calculate modified TN and TP criteria are not available, then the baseline TN and TP criteria apply. Once established, modified criteria are in place as the applicable WQS for all CWA purposes.

[d] Platinum Cobalt Units (PCU) assessed as true color free from turbidity. Long-term average color based on a rolling average of up to seven years using all available lake color data.

[e] If alkalinity data are unavailable, a specific conductance of 250 micromhos/cm may be substituted.

[f] Chlorophyll *a* is defined as corrected chlorophyll, or the concentration of chlorophyll *a* remaining after the chlorophyll degradation product, phaeophytin *a*, has been subtracted from the uncorrected chlorophyll *a* measurement.

The following section describes the methodologies EPA used to develop its proposed numeric nutrient criteria for lakes. EPA is soliciting comments and scientific data regarding the proposed criteria for lakes and their derivation. Section III.B(4) describes one alternative approach and two supplementary modifications considered by the Agency in developing this lakes proposal. EPA solicits comments and data on that approach and those modifications.

(2) Methodologies for Deriving EPA's Proposed Criteria for Lakes

The process used to develop proposed numeric nutrient criteria for a range of diverse waters begins with grouping those waters into categories that generally have a common response to elevated levels of the stressor pollutants, in this case TN and TP. The following sections provide a discussion of (1) the lake classification approach for this proposal, (2) identification of an appropriate response variable and the levels of that variable that indicate or represent healthy aquatic conditions associated with each water body classification, and (3) the concentrations of TN and TP that correspond to protective levels of the response variable, in this case, chlorophyll *a*.

EPA has recommended that nutrient criteria include both causal (*e.g.,* TN and TP) and response variables (*e.g.,* chlorophyll *a* and some measure of clarity) when establishing numeric nutrient criteria for water bodies.[43] EPA

[41] FDEP. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update. Florida Department of Environmental Protection.

[42] Fernald, E.A. and E.D. Purdum. 1998. Water Resources Atlas of Florida. Tallahassee: Institute of Science and Public Affairs, Florida State University.

[43] U.S. EPA. 1998. National Strategy for the Development of Regional Nutrient Criteria. Office of Water, Washington, DC. EPA 822–R–98–002; Grubbs, G. 2001. U.S. EPA. (Memorandum to Directors of State Water Programs, Directors of Great Water Body Programs, Directors of Authorized Tribal Water Quality Standards Programs and State and Interstate Water Pollution Control Administrators on Development and Adoption of Nutrient Criteria into Water Quality Standards. November 14, 2001); Grumbles, B.H. 2007. U.S. EPA. (Memorandum to Directors of State Water Programs, Directors of Great Water Body Programs, Directors of Authorized Tribal Water Quality Standards Programs and State and Interstate Water Pollution Control Administrators on Nutrient Pollution and Numeric Water Quality Standards. May 25, 2007).

recommends causal variables, in part, to have the means to develop source control targets and, in part, to have the means to assess water body conditions with knowledge that responses can be variable, suppressed, delayed, or expressed at different locations. EPA recommends response variables, in part, to have a means to assess water body conditions that synthesize the effect of causal variables over time, recognizing the daily, seasonal, and annual variability in measured nutrient levels.[44] The ability to establish protective criteria for both causal and response variables depends on available data and scientific approaches to evaluate these data. For its lake criteria, EPA is proposing causal variables for TN and TP and a response variable for chlorophyll *a*. For water clarity, Florida has criteria for transparency and turbidity, applicable to all Class I and III waters, expressed in terms of a measurable deviation from natural background (Rules 32–302.530(67) and (69), F.A.C.). For further information on this topic, refer to EPA's TSD for Florida's Inland Waters.

Interested readers should consult EPA TSD for Florida's Inland Waters, Chapter 1: Methodology for Deriving U.S. EPA's Proposed Criteria for Lakes, for more detailed information, data, and graphs supporting the development of the proposed lake criteria.

(a) Methodology for Proposed Lake Classification

Based on analyses of geochemical influences in Florida's lakes, EPA proposes the following classification scheme for Florida lakes: (1) Colored Lakes > 40 Platinum Cobalt Units (PCU), (2) Clear Lakes ≤ 40 PCU with alkalinity > 50 mg/L calcium carbonate ($CaCO_3$), and (3) Clear Lakes ≤ 40 PCU with alkalinity ≤ 50 mg/L $CaCO_3$.

Following original work conducted by FDEP, EPA considered several key characteristics to categorize Florida's lakes and tailor numeric nutrient criteria, recognizing that different types of lakes in Florida may respond differently to nutrients. Many of Florida's lakes contain dissolved organic matter leached from surface vegetation that colors the water. More color in a lake limits light penetration within the water column, which in turn limits algal growth. Thus, in lakes with colored water, higher levels of nutrients may occur without exceeding desired algal levels. EPA evaluated the relationships between nutrients and algal responses for these waters (as measured by chlorophyll *a* concentration), which indicated that water color influences algal responses to nutrients. Based on this analysis, EPA found color to be a significant factor for categorizing lakes. More specifically, EPA found the correlations between nutrients and chlorophyll *a* concentrations to be stronger and less variable when lakes were categorized into two distinct groups based on a threshold of 40 PCU. This threshold is consistent with the distinction between clear and colored lakes long observed in Florida.[45] Different relationships between nutrients and chlorophyll *a* emerged when lakes were characterized by color, with clear lakes demonstrating greater sensitivity to nutrients as would be predicted by the increased light penetration, which promotes algal growth.

Within the clear lakes category, where color is not generally the controlling factor in algal growth, EPA evaluated alkalinity as an additional distinguishing characteristic. Calcium carbonate ($CaCO_3$), dissolved from limestone formations and calcareous soils, affects the alkalinity and pH of groundwater that feeds into lakes. Alkalinity and pH increase when water is in contact with limestone or limestone-derived soil. Limestone is also a source of TP, and lakes that are higher in alkalinity in Florida are often associated with naturally elevated TP levels. These types of lakes are often in areas of the State where the underlying geology includes limestone. The alkalinity (measured as $CaCO_3$) of Florida clear lakes ranges from zero to well over 200 mg/L. FDEP's Nutrient Criteria Technical Advisory Committee (TAC) evaluated available data from Florida lakes and concluded that 50 mg/L alkalinity as $CaCO_3$ is an appropriate threshold above which associated nutrient levels would be expected to be significantly elevated among clear lakes. EPA concluded that FDEP's proposed approach of using 50 mg/L alkalinity as $CaCO_3$ is an appropriate distinguishing characteristic in clear lakes in Florida because lakes with alkalinity ≤50 $CaCO_3$ represent a comprehensive group of lakes that may be naturally oligotrophic. Thus, EPA proposes to classify Florida clear lakes as either acidic (≤50 mg/L alkalinity as $CaCO_3$) or alkaline (>50 mg/L alkalinity as $CaCO_3$).

EPA recognizes that in certain cases FDEP may not have historic alkalinity data on record to classify a particular clear lake as either alkaline or acidic. When alkalinity data are unavailable, EPA proposes a specific conductivity threshold of 250 microSiemens per centimeter (μS/cm) as a substitute for the threshold of 50 mg/L alkalinity as $CaCO_3$. Specific conductivity is a measure of the ionic activity in water and a data analysis performed by FDEP and re-examined by EPA found that a specific conductivity threshold value of 250 μS/cm is sufficiently correlated with alkalinity to serve as a surrogate measure. Of these two measures, alkalinity is the preferred parameter to measure because it is less variable and therefore, a more reliable indicator, and also because it is a more direct measure of the presence of underlying geology associated with elevated nutrient levels.

EPA solicits comment on the proposed categorization scheme and associated thresholds used to classify Florida's lakes. Please see Section III.B(4)(b) below in which EPA invites comment on alternative lake categorization approaches that EPA considered, in particular, those approaches with respect to alkalinity classification and lakes occurring in sandhills of northwestern and central Florida.

(b) Methodology for Proposed Chlorophyll *a* Criteria

Because excess algal growth is associated with degradation in aquatic life and because chlorophyll *a* levels are a measure of algal growth, EPA is using chlorophyll *a* levels as indicators of healthy biological conditions, supportive of aquatic life in each of the categories of Florida's lakes described above. EPA found multiple lines of evidence supporting chlorophyll *a* criteria as an effective indicator of ambient conditions that would be protective of Florida's aquatic life use in lakes. These lines of evidence included trophic state of lakes, historical reference conditions in Florida lakes, and model results.

As a primary line of evidence, EPA reviewed and evaluated the Trophic State Index (TSI) information in deriving chlorophyll *a* criteria that are protective of designated aquatic life uses in Florida's lakes. The TSI quantifies the degree of eutrophication (oligotrophic, mesotrophic, eutrophic)[46] in a water body based on observed measurements of nutrients and chlorophyll *a*. These types of boundaries are commonly used in scientific literature and represent an

[44] U.S. EPA. 2000. Nutrient Criteria Technical Guidance Manual: Rivers and Streams. Office of Water, Washington, DC. EPA–822–B–00–002.

[45] Shannon, E.E. and P.L. Brezonik. 1972. Limnological characteristics of north and central Florida lakes. *Limnol. Oceanogr.* 17(1): 97–110.

[46] Trophic state describes the nutrient and algal state of an aquatic system: Oligotrophic (low nutrients and algal productivity), mesotrophic (moderate nutrients and algal productivity), and eutrophic (high nutrients and algal productivity).

established, scientific classification system to describe current status and natural expectations for lake conditions with respect to nutrients and algal productivity.[47] EPA's review of TSI studies[48 49] indicated that in warm-water lakes such as those in Florida, TSI values of 50, 60, and 70 are associated with chlorophyll *a* concentrations of 10, 20, and 40 micrograms per liter (μg/L), respectively. Studies indicated that mesotrophic lakes in Florida have TSI values ranging from 50 to 60 and eutrophic lakes have TSI values ranging from 60 to 70. Thus a TSI value of 60 (chlorophyll *a* concentration of 20 μg/L) represents the boundary between mesotrophy and eutrophy. EPA concluded that mesotrophic status is the appropriate expectation for colored and clear alkaline lakes because they receive significant natural nutrient input and support a healthy diversity of aquatic life in warm, productive climates such as Florida, and mesotrophy represents a lake maintaining a healthy balance between benthic macrophytes (*i.e.*, plants growing on the lake bottom) and algae in such climates under such conditions. However, clear acidic lakes in Florida do not receive comparable natural nutrient input to be classified as mesotrophic, and for those lakes, EPA has developed criteria that correspond to an oligotrophic status. Oligotrophic lakes support less algal growth and have lower chlorophyll *a* levels. Studies indicate that a TSI value of 45 reflects an approximate boundary between oligotrophy and mesotrophy (corresponding to chlorophyll *a* at about 7 μg/L). EPA requests comment on these conclusions regarding oligotrophic and mesotrophic status expectations for these categories of Florida lakes.

Another line of evidence that supports EPA's proposed chlorophyll *a* criteria is historical reference conditions. Diatoms are a very common type of free-floating algae (*i.e.*, phytoplankton) that have shells or "frustules" made of silica that are preserved in the fossil record. Diatoms preserved in lake sediments can be used to infer chlorophyll *a* levels in lakes prior to any human disturbance. Paleolimnological studies[50] that examined preserved diatom frustules in Florida lake sediments indicate that historical levels of chlorophyll *a* are consistent with mesotrophic expectations derived from the TSI studies described above, with chlorophyll *a* levels falling just below the selected criterion for mesotrophic lakes. (These studies did not evaluate lakes expected to be naturally oligotrophic so there is no comparable information for those lakes).

In addition to this evidence, EPA used information from the application of a Morphoedaphic Index (MEI) model[51] that predicts nutrient and chlorophyll *a* concentrations for any lake given its depth, alkalinity, and color to support the proposed chlorophyll *a* criteria. Scientists from the St. John's Water Management District presented modeling results for various Florida lakes in each colored and clear category at the August 5, 2009 meeting of the Nutrient Criteria TAC in Tallahassee. In addition to predicting natural or reference conditions, these scientists used the model to predict chlorophyll *a* and TP concentrations associated with a 10% reduction in water transparency for a set of lakes with varying color levels and alkalinities. Because submerged aquatic vegetation is dependent on light, maintaining a lake's historic balance between algae and submerged aquatic plants requires maintaining overall water transparency. The risk of disrupting the balance between algae and submerged aquatic plants increases when reductions in transparency exceed 10%. The MEI predictions corroborated the results from lake TSI studies and investigations of paleolimnological reference conditions because natural or reference predictions (*i.e.*, a "no effect" level) were generally below selected criteria levels and 10% transparency loss predictions (*i.e.*, a "threshold effect" level) were at or slightly above selected criteria levels. EPA considered these lines of evidence to develop the proposed chlorophyll *a* criteria, discussed below by lake class:

(i) *Colored Lakes:* EPA proposes a chlorophyll *a* criterion of 20 μg/L in colored lakes to protect Florida's designated aquatic life uses. As indicated by the warm-water TSI studies discussed above, chlorophyll *a* concentrations of 20 μg/L represent the boundary between mesotrophy and eutrophy. Because mesotrophy maintains a healthy balance of plant and algae populations in these types of lakes, limiting chlorophyll *a* concentrations to 20 μg/L would, therefore, protect colored lakes in Florida from the adverse impacts of eutrophication. Paleolimnological studies of six colored lakes in Florida demonstrated natural (*i.e.*, before human disturbance) chlorophyll *a* levels in the range of 14–20 μg/L and the MEI model predicted reference chlorophyll *a* concentrations of 1–25 μg/L for a set of colored lakes in Florida. The model also predicted that concentrations of chlorophyll *a* ranging from 15–36 μg/L in individual lakes would result in a 10% loss of transparency (all but two lakes were above 20 μg/L). Because of natural variability, it is typical for ranges of natural or reference conditions to overlap with ranges of where adverse effects may begin occurring (such as the 10% transparency loss endpoint) for any sample population of lakes. In addition, these modeling results, as with any line of evidence, have uncertainty associated with any individual lake prediction. Given these considerations, EPA found that because the clear majority (eight of eleven) of lakes had predicted natural or referenced conditions below 20 μg/L chlorophyll *a* and the clear majority (nine of eleven) of lakes had predicted 10% transparency loss above 20 μg/L chlorophyll *a*, these results supported the TSI-based proposed chlorophyll *a* criterion.

(ii) *Clear, Alkaline Lakes:* EPA proposes a chlorophyll *a* concentration of 20 μg/L in clear, alkaline lakes to protect Florida's designated aquatic life uses. As noted in Section III.B(2)(a), alkalinity and TP are often co-occurring inputs to Florida lakes because of the presence of TP in limestone, which is often a feature of the geology in Florida. Clear, alkaline lakes, therefore, are likely to be naturally mesotrophic. EPA's analysis determined that aquatic life in clear, alkaline lakes is protected at similar chlorophyll *a* levels as colored lakes (at the TSI boundary between mesotrophy and eutrophy). The MEI model predicted reference chlorophyll *a* concentrations of 12–24 μg/L for a set of clear, alkaline lakes in Florida, and predicted a 10% loss of transparency when chlorophyll *a* concentrations ranged from 19–33 μg/L. Similar to the results for colored lakes, half of the clear, alkaline lakes had predicted natural or referenced conditions at or below 20 μg/L chlorophyll *a* and all but one clear,

[47] Carlson, R.E. 1977. A trophic state index for lakes. *Limnol. Oceanogr.* 22:361–369.

[48] Carlson, R.E. 1977. A trophic state index for lakes. *Limnol. Oceanogr.* 22:361–369.

[49] Salas and Martino. 1991. A simplified phosphorus trophic state index for warm water tropical lakes. *Wat. Res.* 25:341–350.

[50] Whitmore and Brenner. 2002. Paleologic characterization of pre-disturbance water quality conditions in EPA defined Florida lake regions. Univ. Florida Dept. Fisheries and Aquatic Sciences. 30 pp.

[50] Whitmore and Brenner. 2002. Paleologic characterization of pre-disturbance water quality conditions in EPA defined Florida lake regions. Univ. Florida Dept. Fisheries and Aquatic Sciences. 30 pp.

[51] Vighi and Chiaudani. 1985. A simple method to estimate lake phosphorus concentrations resulting from natural background loadings. *Wat. Res.* 19:987–991.

alkaline lake had predicted 10% transparency loss above 20 µg/L chlorophyll *a*. Thus, EPA found this evidence to be supportive of the proposed chlorophyll *a* criterion. EPA solicits comment on this chlorophyll *a* criterion and the evidence EPA used to support the criterion.

(iii) *Clear, Acidic Lakes:* EPA proposes a chlorophyll *a* concentration of 6 µg/L in clear, acidic lakes to ensure balanced natural populations of flora and fauna (*i.e.*, aquatic life) in these lakes. In contrast to colored lakes and clear, alkaline lakes, this category of lakes does not receive significant natural nutrient inputs from groundwater or other surface water sources. EPA has thus based the proposed criteria on an expectation that these lakes should be oligotrophic in order to support balanced natural populations of flora and fauna. Some of Florida's clear, acidic lakes, in the sandhills in northwestern and central Florida, have been identified as extremely oligotrophic [52] with chlorophyll *a* levels of less than 2 µg/L. As discussed above, warm water TSI studies suggest a chlorophyll *a* level of approximately 7 µg/L at the oligotrophic-mesotrophic boundary.

In July 2009, FDEP proposed a chlorophyll *a* criterion for clear, acidic lakes of 9 µg/L.[53] In comments sent to EPA via e-mail in October 2009,[54] FDEP reported that the Nutrient TAC suggested in June 2009 that maintaining chlorophyll *a* below 10 µg/L in clear, acidic lakes would be protective of the designated use, because a value of < 10 µg/L would still be categorized as oligotrophic. However, EPA's review of the TSI categorization based on the work of Salas and Martino (1991) on warm water lakes indicates that a chlorophyll *a* of 10 µg/L (TSI of 50) would better represent the central tendency of the mesotrophic category rather than the oligotrophic-mesotrophic boundary. In the October 2009 comments, FDEP also presented an analysis of lake data that showed lack of correlation between an index of benthic macroinvertebrate health and chlorophyll *a* levels in the range of 5–10 µg/L as supporting evidence for a chlorophyll a criterion of 9 µg/L in clear acidic lakes. However, within this small range of chlorophyll *a*, it is not surprising that a correlation with an indicator responsive to numerous aspects of natural conditions and stressors such as benthic macroinvertebrate health would not exhibit a clear statistical relationship. Importantly, there was some evidence of meaningful distinctions within the range of 5–10 µg/L chlorophyll *a* based on endpoints more directly responsive to nutrients. In this case, the MEI model predicted reference chlorophyll *a* concentrations within the range of 1.4–7.0 µg/L (with seven of the eight values below 5 µg/L) for a set of clear, acidic lakes in Florida, and predicted a 10% loss of transparency when chlorophyll *a* concentrations ranged from 5.6–11.8 µg/L (with five of the eight values below 7 µg/L). All but one of the clear, acid lakes had predicted natural or reference conditions below 6 µg/L chlorophyll *a* and the majority (six of eight) of clear, alkaline lakes had predicted 10% transparency loss above 6 µg/L chlorophyll *a*. Given available information on reference condition and predicted effect levels, EPA adjusted the approximate oligotrophic-mesotrophic boundary value of 7 µg/L slightly downward to 6 µg/L as the proposed chlorophyll *a* criterion. For determining the proposed chlorophyll *a* criterion in the three lake categories, only in this case for clear, acid lakes did EPA use reference condition information and predicted effect levels for more than just support of the value coming from the TSI-based line of evidence, and in this case EPA deviated from that value by only 1 µg/L.

EPA specifically solicits comment on the chlorophyll *a* criterion of 6 ug/L and the evidence EPA used to support the criterion. EPA also solicits comment on whether a higher criterion of 9 ug/L, as proposed by Florida in its July 2009 proposed nutrient WQS, would be fully protective of clear acidic lakes, and the scientific basis for such a conclusion.

(c) Methodology for Proposed Total Phosphorus (TP) and Total Nitrogen (TN) Criteria in Lakes

EPA proposes TP and TN criteria for each of the classes of lakes described in Section III.B(2)(a). The proposed TP and TN criteria are based principally on independent statistical correlations between TN and chlorophyll *a*, and TP and chlorophyll *a* for clear and colored lakes in Florida. Each data point used in the statistical correlations represents a geometric mean of samples taken over the course of a year in a particular Florida lake. After establishing the protective levels of chlorophyll *a* as 20 µg/L for colored lakes and clear alkaline lakes and 6 µg/L for clear acidic lakes, EPA evaluated the data on TN and TP concentrations associated with these chlorophyll *a* levels and the statistical analyses performed by FDEP in support of the State's efforts to develop numeric nutrient criteria.

These analyses showed that the response dynamics of TN and TP with chlorophyll *a* were different for colored versus clear lakes, as would be expected because color blocks light penetration in the water column and limits algal growth. These analyses also showed that the correlation relationships for TN and TP compared with chlorophyll *a* in acidic and alkaline clear lakes were comparable, as would be expected because alkalinity does not affect light penetration. These analyses are available in EPA's TSD for Florida's Inland Waters, Chapter 1: Methodology for Deriving U.S. EPA's Proposed Criteria for Lakes.

The difference between clear, acidic and clear, alkaline lakes is that clear, alkaline lakes naturally receive more nutrients and, therefore, have an expected trophic status of mesotrophic to maintain a healthy overall production and balance of plants and algae. On the other hand, clear, acidic lakes naturally receive much lower nutrients and, therefore, have an expected trophic status of oligotrophic to maintain a healthy, but lower than mesotrophic, level of plant and algae aquatic life. Because of the different expectations for trophic condition, different chlorophyll *a* criteria are appropriate (as mentioned earlier, chlorophyll *a* is a measure of algal production). Although clear, alkaline lakes and colored lakes have the same proposed chlorophyll *a* criterion, they will have different TP and TN criteria because of the effect of color on light penetration and algal growth.

The TN and TP values EPA is proposing are based on the lower and upper TN and TP values derived from the 50th percentile prediction interval of the regression (*i.e.*, best-fit line) through the chlorophyll *a* and corresponding TN or TP values plotted on a logarithmic scale. In other words, the prediction interval displays the range of TN and TP values typically associated with a given chlorophyll *a* concentration. At any given chlorophyll *a* concentration, there will be a lower

[52] Canfield, D.E., Jr., M.J. Maceina, L.M. Hodgson, and K.A. Langeland. 1983. Limnological features of some northwestern Florida lakes. *J. Freshw. Ecol.* 2:67–79; Griffith, G.E., D.E. Canfield, Jr., C.A. Horsburgh, J.M. Omernik, and S.H. Azevedo. 1997. Lake regions of Florida. Map prepared by U.S. EPA, Corvallis, OR; available at *http://www.epa.gov/wed/pages/ecoregions/fl_eco.htm* (accessed 10/09/2009).

[53] More information on this issue is available on FDEP's Web site at *http://www.dep.state.fl.us/water/wqssp/nutrients/docs/dep_responses_100909.pdf* and included in the "External Peer Review of EPA's 'Proposed Methods and Approaches for Developing Numeric Nutrient Criteria for Florida's Inland Waters'" and EPA's TSD for Florida's Inland Waters located in the docket ID No. EPA–HQ–OW–2009–0596.

[54] FDEP document titled, "DEP's Responses to EPA's 9/16 Comment Letter." October 9, 2009. Located in the docket ID EPA–HQ–OW–2009–0596.

TN or TP value and an upper TN or TP value corresponding to this prediction interval. EPA agrees with the FDEP approach that uses the 50th percentile prediction interval because it effectively separates the data into three distinct groups. This analysis of the substantial lake data collected by Florida indicates that the vast majority of monitored lakes with nutrient levels below the lower TN or TP value have associated chlorophyll *a* values below the protective chlorophyll *a* threshold level. Similarly, the vast majority of monitored lakes with measured nutrient levels above the upper TN or TP value have associated measured chlorophyll *a* values above the protective chlorophyll *a* threshold level. Between these TN and TP bounds, however, this analysis indicates that monitored lakes are equally likely to be above or below the protective chlorophyll *a* threshold level. Setting TN and TP criteria based on the bounds of the 50th percentile prediction interval, in conjunction with lake-specific knowledge of whether the lake chlorophyll *a* threshold is met, accounts for the naturally variable behavior of TN and TP while ensuring protection of aquatic life.

EPA's proposed criteria framework sets a protective chlorophyll *a* threshold and TN and TP criteria at the lower values of the range defined by the 50th percentile prediction interval for the three different categories of lakes as "baseline" criteria. The criteria framework also provides flexibility for FDEP to derive lake-specific, modified TN and TP criteria within the bounds of the upper and lower values based on at least three years of ambient measurements where a chlorophyll *a* threshold is not exceeded. More specifically, if the chlorophyll *a* criterion for an individual lake is met for a period of record of at least three years, then the corresponding TN and TP criteria may be derived from ambient measurements of TN and TP from that lake within the bounds of the lower and upper values of the prediction interval discussed above. Both the ambient chlorophyll *a* levels as well as the corresponding ambient TN and TP concentrations in the lake must be established with at least three years worth of data. EPA's proposed rule provides that these modified criteria need to be documented by FDEP. EPA's rule, however, does not require that FDEP go through a formal SSAC process subject to EPA review and approval.

In this proposed rule, EPA specifies that in no case, however, may the modified TN and TP criteria be higher than the upper value specified in the criteria bounds, nor lower than the lower value specified in the criteria bounds. In addition to nutrients, chlorophyll *a* in a lake may be limited by high water color, zooplankton grazing, mineral turbidity, or other unknown factors. In the absence of detailed, site-specific knowledge, the upper values represent increasing risk that chlorophyll *a* will exceed its criterion value. To maintain the risk at a manageable level, the upper values are not to be exceeded. EPA requests comments on this approach. EPA also requests comment on whether the rule should specify that the modified TN and TP criteria be set at levels lower than the lower value of the criteria bounds if that is what is reflected in the outcome of the ambient-based calculation.

EPA's proposed approach for TN and TP criteria in lakes reflects the natural variability in the relationship between chlorophyll *a* concentrations and corresponding TP and TN concentrations that may exist in lakes. This variability remains even after some explanatory factors such as color and alkalinity are addressed by placing lakes in different categories based on color and alkalinity because other natural factors play important roles. Natural variability in the physical, chemical, and biological dynamics for any individual lake may result from differences in geomorphology, concentrations of other constituents in lake waters, hydrological conditions and mixing, and other factors.

This approach allows for consideration of readily available site-specific data to be taken into account in the expression of TN and TP criteria, while still ensuring protection of aquatic life by maintaining the associated chlorophyll *a* level at or below the proposed chlorophyll *a* criterion level. Because the chlorophyll *a* level in a lake is the direct measure of algal production, it can be used to evaluate levels that pose a risk to aquatic life. The scientific premise for the lake-specific ambient calculation provision for modified TN and TP criteria is that if ambient lake data show that a lake's chlorophyll *a* levels are below the established criteria and its TN and/or TP levels are within the lower and upper bounds, then those ambient levels of TN and TP represent protective conditions. Basing the ambient calculation upon at least three years worth of data is a condition set to address and account for year-to-year hydrologic variability in the derivation of modified criteria. EPA requests comment on the requirement of three years worth of data for both chlorophyll *a* and TN and TP in order to use this option. Specifically, are there situations in which less than three years of data might be adequate for an adjusted TN or TP criterion?

EPA selected the proposed TP and TN criteria based on the relationships with chlorophyll *a* described above. However, the MEI modeling results described in Section III.B(2)(b) also provide additional support for the TP criteria selection. The MEI predicted a 10% transparency loss when TP concentrations ranged from 0.053–0.098 mg/L in colored lakes (with one predicted value at 0.037 mg/L), from 0.038–0.068 mg/L in clear, alkaline lakes, and from 0.012–0.024 mg/L in clear, acidic lakes. All but one of these predicted values are within the lower and upper bounds of the proposed TP criteria. The MEI modeling results did not address TN.

(d) Proposed Criteria: Duration and Frequency

Numeric criteria include magnitude (*i.e.*, how much), duration (*i.e.*, how long), and frequency (*i.e.*, how often) components. Beginning with EPA's 2004 Integrated Report Guidance,[55] EPA has used the term "exceeding criteria" to refer to situations where all criteria components are not met. The term "digression" refers to an ambient level that goes beyond a level specified by the criterion-magnitude (*e.g.*, in a given grab sample). The term "excursion" refers to conditions that do not meet the criterion-magnitude and criterion-duration, in combination. A criterion-frequency specifies the maximum rate at which "excursions" may occur.

For the chlorophyll *a*, TN, and TP criteria for lakes, the criterion-magnitude values (expressed as a concentration) are provided in the table and the criterion-duration (or averaging period) is specified as annual. The criterion-frequency is no-more-than-once-in-a-three-year period. In addition, the long-term arithmetic average of annual geometric mean values shall not exceed the criterion-magnitude values (concentration values).

Appropriate duration and frequency components of criteria should be based on how the data used to derive the criteria were analyzed, and what the implications are for protection of designated uses given the effects of exposure at the specified criterion concentration for different periods of time and recurrence patterns. For lakes, the stressor-response relationship was based on annual geometric means for

[55] USEPA. Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act. *http://www.epa.gov/OWOW/tmdl/tmdl0103/Accessed* December 2009.

individual years at individual lakes. The appropriate duration period is therefore annual. The key question is whether this annual geometric mean needs to be met every year, or if some allowance for a particular year to exceed the applicable criterion could still be considered protective.

Data that contribute to the analysis of TSI, as well as data generated from supporting paleolimnological studies and MEI modeling, typically represent periods of time greater than a single year. Moreover, many of the models and analyses that form the basis of TSI results are designed to represent the "steady-state," or long-term stable water quality conditions. However, researchers have suggested caution in applying steady-state assumptions to lakes with long residence times.[56] In other words, the effects of spikes in annual loading could linger and disrupt the steady-state in some lakes. As a result, EPA is proposing two expressions of allowable frequency, both of which are to be met. First, EPA proposes a no-more-than-one-in-three-years excursion frequency for the annual geometric mean criteria for lakes. Second, EPA proposes that the long-term arithmetic average of annual geometric means not exceed the criterion-magnitude concentration. EPA anticipates that Florida will use its standard assessment periods as specified in Rule 62–303, F.A.C. (Impaired Waters Rule) to implement this second provision. These selected frequency and duration components recognize that hydrological variability will produce variability in nutrient regimes, and individual measurements may exceed the criteria magnitude concentrations. Furthermore, they balance the representation of underlying data and analyses based on the central tendency of many years of data (*i.e.*, the long-term average component) with the need to exercise some caution to ensure that lakes have sufficient time to process individual years of elevated nutrient levels and avoid the possibility of cumulative and chronic effects (*i.e.*, the no-more-than-one-in-three-year component). More information on this specific topic is provided in EPA's TSD for Florida's Inland Waters, Chapter 1: Methodology for Deriving U.S. EPA's Proposed Criteria for Lakes.

EPA requests comment on these proposed criteria duration and frequency expressions, and the basis for their derivation. EPA notes that some scientists and resource managers have suggested that nutrient criteria duration and frequency expressions should be more restrictive to avoid seasonal or annual "spikes" from which the aquatic system cannot easily recover, whereas others have suggested that criteria expressed as simply a long-term average of annual geometric means, consistent with data used in criteria derivation, would still be protective. EPA also requests comment on any alternative duration and frequency expressions that might be considered protective, including (1) a criterion-duration expressed as a monthly average or geometric mean, (2) a criterion-frequency expressed as meeting allowable magnitude and duration every year, (3) a criterion-frequency expressed as meeting allowable magnitude and duration in more than half the years of a given assessment period, and (4) a criterion-frequency expressed as meeting allowable magnitude and duration as a long-term average only. EPA further requests comment on whether an expression of the criteria in terms of an arithmetic average of annual geometric mean values based on rolling three-year periods of time would also be protective of the designated use.

(e) Application of Lake-Specific, Ambient Condition-Based Modified TP and TN Criteria

As described in Section III.B(2)(c), EPA is proposing a framework that uses both the upper and lower bounds of the 50th percentile prediction interval to allow the derivation of modified TP and TN lake-specific criteria to account for the natural variability in the relationship between chlorophyll *a* and TP and TN that may exist in certain lakes. The proposed rule would allow FDEP to calculate ambient modified criteria for TN and TP based on at least three years of ambient monitoring data with (a) at least four measurements per year and (b) at least one measurement between May and September and one measurement between October and April each year. If a calculated modified TN and TP criterion is below the lower value, then the lower value is the criteria. If a calculated modified TN and TP criterion is above the upper value, then the upper bound is the criteria. Calculated modified TP and TN values may not exceed criteria applicable to streams to which a lake discharges.

EPA's proposed rule provides that FDEP must document these modified criteria and establish them in a manner that clearly recognizes their status as the applicable criterion for a particular lake so that the public and all regulatory authorities are aware of its existence. However, EPA's proposed rule does not require that FDEP go through a formal SSAC process subject to EPA review and approval. (For more information on the SSAC process, please refer to Section V of this proposal). EPA believes such modified criteria do not need to go through the SSAC process because the conditions under which they are applicable are clearly stated in the proposed rule and the methods of calculation are clearly laid out so that the outcome is predictable and transparent. By providing a specific process for deriving modified criteria within the WQS rule itself, each individual outcome of this process is an effective WQS for CWA purposes and does not need separate approval by EPA.

One technical concern is the extent to which the variability in the data relating chlorophyll *a* levels to TN and TP levels truly reflects differences between lakes, as opposed to temporal differences in the conditions in the same lake. To address this issue, EPA verified that the observed variability in the supporting analysis was indeed predominantly "across lake" variability, not "within lake" variability.

Another technical concern is that there may be a time lag between the presence of high nutrients and the biological response. In a study of numerous lakes, researchers found that there was often a lag period of a few years in chlorophyll *a* response to changes in nutrient loading, but that there was correlation between chlorophyll *a* and nutrient concentrations on an annual basis.[57] The difference between nutrient loading and nutrient concentration as a function of time is related to the hydraulic retention time of a lake. EPA proposed TN and TP criteria as concentration values with an annual averaging period, so any time lag in response would not be expected to confound the derivation of modified criteria. Furthermore, EPA is proposing to require three years worth of data, which would reflect any short time lag in response.

A third technical concern is the presence of temporary or long-term site-specific factors that may suppress biological response, such as the presence of grazing zooplankton, excess sedimentation that blocks light penetration, extensive canopy cover, or seasonal herbicide use that impedes proliferation of algae. If any of these suppressing factors are removed, then nutrient levels may result in a spike in algal production above protective levels.

[56] Kenney (1998) as reported in Salas and Martino (1991).

[57] Jeppeson *et al.* 2005. Lake responses to reduced nutrient loading—an analysis of contemporary long-term data from 35 case studies. *Freshwater Biology* 50: 1747–1771.

EPA is proposing to require that the ambient calculation for modified TP and TN criteria be based on at least a three-year record of observation, and be based on representative sampling (*i.e.*, four samples per year with at least one between May and September and one between October and April) during each year. These requirements will minimize the influence of long-term site-specific factors and ensure longer-term stable conditions. EPA selected three years as a reasonable minimum length of time to appropriately account for anomalous conditions in any given year that could lead to erroneous conclusions regarding the true relationship between nutrient levels in a lake and chlorophyll *a* levels. EPA anticipates that the State would use all recent consecutive years of data on record (*i.e.*, it would not be appropriate to select three random years within a complete record over the past seven years). EPA is requiring four measurements within a year to provide seasonal representation (*i.e.*, May–September and October–April). Providing seasonal representation is important because nutrient levels can vary by season. In addition, this minimum sample size is conducive to the derivation of central tendency measurements, such as a geometric mean, with an acceptable degree of confidence. EPA is proposing that the chlorophyll *a* criterion must be met in each of the three or more years of ambient monitoring that define the record of observation for the lake to be eligible for the ambient calculation modified provision for TN and TP. EPA requests comment on whether three years of data is sufficient to establish for a particular lake that there is a fundamentally different relationship between chlorophyll *a* levels and TN and TP levels. EPA also requests comment on whether less data or a different specification would be sufficient to establish this different relationship in a particular lake, *e.g.* whether revised TN and TP ambient criteria should be allowed when the chlorophyll *a* criterion concentration has been exceeded once in three years.

Application of the ambient calculation provision has implications for assessment and permitting because the outcome of applying this provision is to establish alternate numeric TN and TP values as the applicable numeric nutrient criteria for TN and TP. For accountability and tracking purposes, the State would need to document in a publicly available and accessible manner, such as on an official State Web site, the result of the ambient calculation for any given lake. The State may wish to issue a public notification, with an opportunity to submit additional data and check calculations, to ensure an appropriate value is determined. The State may wish to publicly certify the outcome via a Secretarial order or some other official statement of intent and applicability. EPA's preference is that once modified criteria are developed, they remain the applicable criteria for the long-term. The State has the flexibility to revise the criteria, but the expectation is that they will not be a continuously moving target for implementation purposes. As an example of how the lakes criteria might work in practice, consider a colored lake which meets the chlorophyll *a* criterion. If FDEP established a modified TP criterion of 0.110 mg/L and subsequent monitoring showed levels at 0.136 mg/L, that lake would not be considered attaining the applicable criteria for CWA purposes (unless the State goes through the process of establishing a revised modified criterion).

The permitting authority would use publicly certified modified TN or TP criteria to develop water quality-based effluent limits (WQBELs) that derive from and comply with applicable WQS. In this application, the permit writer would use the modified ambient criterion, computed as described above, as the basis for any reasonable potential analysis or permit limit derivation. In this case, as in any other case, EPA expects the details to be fully documented in the permit fact sheet.

This type of ambient calculation provision based on meeting response criteria applicable to the assessed water may not be appropriate when the established TN and TP criteria are serving to maintain and protect waters downstream. To address this concern, EPA proposes that calculated TP and TN values in a lake that discharges to a stream may not exceed criteria applicable to the stream to which a lake discharges. EPA requests comment on this provision.

(3) Request for Comment and Data on Proposed Approach

EPA is soliciting comment on the approaches described in this proposal, the data underlying those approaches, and the proposed criteria. EPA will evaluate all data and information submitted by the close of the public comment period for this rulemaking with regard to nutrient criteria for Florida's lakes. For the application of the modified ambient calculation provision, EPA is seeking comment on allowing the calculation to occur one time only, based on an adequate period of record, and then holding that value as the protective TP or TN criteria for future assessment and implementation purposes. EPA is also seeking comment on whether to require an ambient chlorophyll *a* level demonstrated to be below the chlorophyll *a* threshold criterion for at least three years become the protective chlorophyll *a* criterion for a lake subject to the modified ambient calculation provision (*i.e.*, whether to require a more stringent chlorophyll *a* criterion if three years of data show that the more stringent level reflects current conditions in the lake). EPA also requests comment on whether an additional condition for being able to apply a modified criterion include continued ambient monitoring and verification that chlorophyll *a* levels remain below the protective criterion. EPA could specify that modified criteria remain in effect as long as FDEP subsequently conducts monthly (or some other periodic) monitoring of the lake to ensure that chlorophyll *a* levels continue to meet the protective criterion. If this monitoring is not conducted and documented, EPA could specify that the baseline criterion would become the applicable criterion. Among others, this provision may address concerns about whether the modified criterion adequately represents long-term hydrologic variability. Finally, EPA requests comment on the appropriate procedure for documenting and tracking the results of modified criteria that allows transparency, public access, and accountability.

(4) Alternatives Considered by EPA

During EPA's review of the available data and information for development of numeric nutrient criteria for Florida's lakes, EPA considered and is soliciting comment on an alternative approach to deriving lakes criteria from the statistical correlation plots and regression analysis. The alternative approach would use either the central tendency values or the lower values associated with the 50th percentile prediction interval for TN and TP criteria and would not include the framework to calculate modified TP and TN criteria when the chlorophyll *a* criterion is met. EPA is also seeking comments on the following two supplementary modifications that EPA considered but did not include in this proposal: (1) the use of a modified categorization of lakes in Florida; and (2) the addition of upper percentile criteria with a different exceedance frequency.

(a) Single Value Approach To Derive Lakes Criteria—Derive TN and TP Criteria Using Correlations Associated With the Regression Line or Lower Value of the 50th Percentile Prediction Interval

One alternative means of selecting TN and TP criteria is to use the regression line (central tendency) to calculate TP and TN concentrations that correlate to the proposed chlorophyll *a* criteria for each lake class. A second alternative is to use the lower value of the 50th percentile prediction interval to calculate TP and TN concentrations. Establishing TP and TN criteria using the central tendency of the regression line represents the best estimate of TN and TP associated with a protective chlorophyll *a* criterion across all lakes, but carries some risk of being overprotective for some individual lakes and under-protective for others because of the demonstrated variability of the data. On the other hand, establishing TP and TN criteria using the lower value of the 50th percentile prediction interval will likely be protective in most cases, but could be overprotective for a greater number of lakes because the data demonstrate that many lakes achieve the protective chlorophyll *a* criterion with higher levels of TN and TP. Neither approach accounts for lake-specific natural variability, apart from that accounted for by color and alkalinity classification. However, the correlated TP and TN concentrations within each lake class at these alternative statistical boundaries would result in single criteria values for TN and TP, which is an approach that water quality program managers will have more familiarity. EPA's rationale for proposing a framework that uses both the upper and lower values of the 50th percentile prediction interval to allow the derivation of modified TN and TP lake-specific criteria rather than either of these single values was to account for the natural variability in the relationship between chlorophyll *a* and TN and TP that may exist in lakes. EPA solicits comment, however, on this alternative approach of using single values for TN and TP criteria in Florida's lakes.

(b) Modification to Proposed Lakes Classification

As discussed in Section III.B(2)(a), EPA used available data to determine a classification scheme for Florida's lakes, based on a color threshold of 40 PCU and a threshold of 50 mg/L alkalinity as $CaCO_3$. In its July 2009 numeric nutrient criteria proposal, Florida considered a similar classification approach based on color and alkalinity but proposed a chlorophyll *a* criterion of 9 µg/L to protect aquatic life in clear, acidic lakes. As discussed above, EPA believes that the scientific evidence more strongly supports a chlorophyll *a* criterion of 6 µg/L to protect Florida's clear, acidic lakes that include the very oligotrophic lakes found in Florida's sandhills, principally in three areas: the Newhope Ridge/Greenhead slope north of Panama City (locally called the Sandhill Lakes region); the Norfleet/Springhill Ridge just west of Tallahassee, and Trail Ridge northeast of Gainesville.[58] However, some stakeholders have suggested that many lakes in the clear, acidic class (as currently defined) might be sufficiently protected with a chlorophyll *a* criterion of 9 µg/L. EPA believes the scientific basis for a 9 µg/L chlorophyll *a* value may be more applicable to clear acidic lakes other than those in Florida's sandhills (*i.e.*, other than those in the Sandhill Lakes region, the Norfleet/Springhill Ridge just west of Tallahassee and Trail Ridge northeast of Gainesville). To address this, EPA could separate clear, acidic lakes into two categories: one category for clear, acidic lakes in sandhill regions of Florida, and a second category for clear, acidic lakes in other areas of the State. EPA could assign the first category (clear, acidic sandhill lakes) a chlorophyll *a* criterion of 6 µg/L and the second category (clear, acidic non-sandhill lakes) a chlorophyll *a* criterion of 9 µg/L.

Alternatively, EPA could lower the defining alkalinity threshold to 20 mg/L $CaCO_3$ so that the clear, acidic lakes category would only include lakes with very acidic values and correspondingly low chlorophyll *a*, TN, and TP values. EPA's analysis of a distribution of alkalinity data from Florida's clear lakes found that lakes with alkalinity values ≥ 20 mg/L $CaCO_3$ had higher levels of nutrients and nutrient response parameters than lakes with alkalinity values < 20 mg/L $CaCO_3$. By adjusting the alkalinity threshold to 20 mg/L $CaCO_3$, EPA would be creating a smaller group of clear, acidic lakes that may be more representative of naturally more acidic, oligotrophic conditions than the proposed alkalinity threshold of 50 mg/L $CaCO_3$. EPA opted to propose a threshold of 50 mg/L $CaCO_3$ because it represents a more comprehensive group of lakes that may be naturally oligotrophic (*i.e.*, ensures protection where there may be some uncertainty). EPA solicits comment on these alternative approaches to classifying Florida's lakes. EPA also notes, as discussed previously, that FDEP recommended a criterion of 9 µg/L as being protective of all clear acidic lakes, including sandhill lakes and that the Nutrient Criteria TAC supported "less than 10 µg/L" as protective. EPA also requests comment on 9 µg/L chlorophyll *a* as being protective of all clear acidic lakes, including sandhill lakes.

[58] Griffith, G.E., D.E. Canfield, Jr., C.A. Horsburgh, J.M. Omernik, and S.H. Azevedo. 1997. Florida lake regions. U.S. EPA, Corvallis, OR. *http://www.epa.gov/wed/pages/ecoregions/fl_eco.htm.*

(c) Modification To Include Upper Percentile Criteria

EPA is considering promulgating upper percentile criteria for chlorophyll *a*, TN, and TP in colored, clear alkaline, and clear acidic lakes to provide additional aquatic life protection. Accordingly, EPA could add that the instantaneous concentration in the lake not surpass these criterion-magnitude concentrations more than 10% of the time (criterion-duration: instant; criterion-frequency: 10% of the time). EPA derived example upper percentile criteria using the observed standard deviation from the mean of lake samples meeting the respective criteria (lower values of the TN and TP ranges) within each lake class. Using this example, the calculated criteria-magnitude concentrations for chlorophyll *a*, TN, and TP respectively by lake class are: 63 µg/L, 1.5 mg/L and 0.09 mg/L for colored lakes; 48 µg/L, 1.8 mg/L and 0.05 mg/L for clear, alkaline lakes; and 15 µg/L, 0.6 mg/L and 0.02 mg/L for clear, acidic lakes.

These criteria would provide the means to protect lakes from episodic events that increase loadings for significant periods of time during the year, but are balanced out by lower levels in other parts of the year such that the annual geometric mean value is met. EPA chose not to propose such criteria because of the significant variability of chlorophyll *a*, TN, and TP, the variety of other factors that may influence levels of these parameters in the short-term, and that significant environmental damage from eutrophication is more likely when levels are elevated for longer periods of time. However, EPA solicits comment on this additional approach of promulgating upper percentile criteria for chlorophyll *a*, TN, and TP.

(5) Request for Comment and Data on Alternative Approaches

EPA is soliciting comment on the Agency's proposed approach, as well as the alternative approach to deriving numeric nutrient criteria for Florida's lakes and the supplemental modifications as described in Section III.B(4). EPA will evaluate all data and information submitted by the close of the public comment period for this rulemaking with regard to nutrient criteria for Florida's lakes.

C. Proposed Numeric Nutrient Criteria for the State of Florida's Rivers and Streams

(1) Proposed Numeric Nutrient Criteria for Rivers and Streams

EPA is proposing numeric nutrient criteria for TN and TP in four geographically distinct watershed regions of Florida's rivers and streams (hereafter, streams) classified as Class I or III waters under Florida law (Rule 62–302.400, F.A.C.).

Nutrient watershed region	Instream protection value criteria	
	TN (mg/L)[a]	TP (mg/L)[a]
Panhandle[b]	0.824	0.043
Bone Valley[c]	1.798	0.739
Peninsula[d]	1.205	0.107
North Central[e]	1.479	0.359

[a] Concentration values are based on annual geometric mean not to be surpassed more than once in a three-year period. In addition, the long-term average of annual geometric mean values shall not surpass the listed concentration values. (Duration = annual; Frequency = not to be surpassed more than once in a three-year period or as a long-term average).

[b] Panhandle region includes the following watersheds: Perdido Bay Watershed, Pensacola Bay Watershed, Choctawhatchee Bay Watershed, St. Andrew Bay Watershed, Apalachicola Bay Watershed, Apalachee Bay Watershed, and Econfina/Steinhatchee Coastal Drainage Area.

[c] Bone Valley region includes the following watersheds: Tampa Bay Watershed, Sarasota Bay Watershed, and Charlotte Harbor Watershed.

[d] Peninsula region includes the following watersheds: Waccasassa Coastal Drainage Area, Withlacoochee Coastal Drainage Area, Crystal/Pithlachascotee Coastal Drainage Area, Indian River Watershed, Caloosahatchee River Watershed, St. Lucie Watershed, Kissimmee River Watershed, St. John's River Watershed, Daytona/St. Augustine Coastal Drainage Area, Nassau Coastal Drainage Area, and St. Mary's River Watershed.

[e] North Central region includes the Suwannee River Watershed.

The following section describes the methodology used to derive the proposed numeric nutrient criteria for streams. EPA is soliciting comments and scientific data and information regarding these proposed criteria and their derivation.

(2) Methodology for Deriving EPA's Proposed Criteria for Streams

Like other aquatic ecosystems, excess nutrients in streams increases vegetative growth (plants and algae), and changes the assemblage of plant and algal species present in the system. These changes can affect the organisms that are consumers of algae and plants in many ways. For example, these changes can alter the available food resources by providing more dead plant material versus live plant material, or providing algae with a different cell size for filter feeders. These changes can also alter the habitat structure by covering the stream or river bed with periphyton (attached algae) rather than submerged aquatic plants, or clogging the water column with phytoplankton (floating algae). In addition, these changes can lead to the production of algal toxins that can be toxic to fish, invertebrates, and humans. Chemical characteristics of the water, such as pH and concentrations of dissolved oxygen, can also be affected by excess nutrients. Each of these changes can, in turn, lead to other changes in the stream community and, ultimately, to the stream ecology that supports the overall function of the linked aquatic ecosystem.

Although the general types of adverse effects can be described, not all of these effects will occur in every stream at all times. For example, some streams are well shaded, which would tend to reduce the near-field effect of excess nutrients on primary production because light, which is essential for plant or algae growth, does not reach the water surface. Some streams are fast moving and pulses of nutrients are swiftly carried away before any effect can be observed. However, if the same stream widens and slows downstream or the canopy that provided shading opens up, then the nutrients present may accelerate plant and algal biomass production. As another example, the material on the bottom of some streams, referred to as substrate, is frequently scoured from intense rain storms. These streams may lack a natural grazing community to consume excess plant growth and may be susceptible to phytoplankton algae blooms during periods when water velocity is slower and water residence time is longer. The effects of excess nutrients may be subtle or dramatic, easily captured by measures of plant and algal response (such as chlorophyll *a*) or not, and may occur in some locations along a stream but not others.

Notwithstanding natural environmental variability, there are well understood and documented analyses and principles about the underlying biological effects of TN and TP on an aquatic ecosystem. There is a substantial and compelling scientific basis for the conclusion that excess TN and TP will have adverse effects; however, it is often unclear where precisely the impacts will occur. The value of regional numeric nutrient criteria for streams is that the substantial expenditure of time and scarce public resources to document and interpret inevitable and expected stream variability on a site-by-site, segment-by-segment basis (*i.e.*, as in the course of interpreting a narrative WQS for WQBELs and TMDL estimations) is no longer necessary. Rather, regional numeric nutrient criteria for streams allows an expedited and expanded level of aquatic protection across watersheds and greatly strengthens local and regional capacity to support and maintain State designated uses throughout aquatic ecosystems. In terms of environmental outcomes, the result is a framework of expectations and standards that is able to extend the protection needed to restore and maintain valuable aquatic resources to entire watersheds and associated aquatic ecosystems. At the same time, the ability to promulgate SSAC, as well as other flexibilities discussed in this proposal, allows the State to continue to address water bodies where substantial data and analyses show that the regional criteria may be either more stringent than necessary or not stringent enough to protect designated uses.

As mentioned earlier, to effectively apply this well understood and documented science, EPA has recommended that nutrient criteria include both causal (*e.g.*, TN and TP) and response variables (*e.g.*, chlorophyll *a* and some measure of clarity) for water bodies.[59] EPA recommends causal variables, in part, to have the means to develop source control targets and, in part, to have the means to assess stream condition with knowledge that responses can be variable, suppressed, delayed, or expressed at different locations. EPA recommends response variables, in part, to have a means to assess stream condition that synthesizes the effect of causal variables over time, recognizing the daily, seasonal, and annual variability in measured nutrient levels.[60]

The ability to establish protective criteria for both causal and response variables depends on available data and scientific approaches to evaluate these data. Whereas, there are data available for water column chlorophyll *a* (phytoplankton) and algal thickness on various substrates (periphyton) for certain types of streams in Florida, there are currently no available approaches to interpret these data to infer scientifically supported thresholds for these nutrient-specific response variables in Florida streams. Additionally, in previously published guidance,[61] EPA has recommended water clarity as a response variable for numeric nutrient criteria because algal density in a water column results in turbidity, and thus a related decrease in water clarity can serve as an indicator of excess algal growth. For water clarity, Florida has criteria for transparency and turbidity, applicable to all Class I and III waters, expressed in terms of a measurable deviation from natural background (32–302.530(67) and (69), F.A.C.). Therefore, EPA is not proposing criteria for any response variable in Florida's streams at this time, however, EPA will consider additional data that becomes available during the comment period. One approach for deriving criteria for water quality variables such as a measure for water clarity or chlorophyll *a*, could be to apply a statistical distribution approach to a population of streams for each of the proposed NWRs. This approach is further described in previous EPA guidance.[62]

For Florida streams, EPA has determined that there are sufficient available data on TN and TP concentrations with corresponding information on biological condition for a wide variety of stream types that can be used to derive numeric nutrient criteria for those causal variables. EPA used multiple measures of stream condition (or metrics) that describe the biological condition of the benthic invertebrate community. EPA then coupled the stream condition metrics with associated measurements of TN and TP concentrations to provide the basis for deriving causal variable numeric nutrient criteria.

EPA's proposed instream numeric nutrient criteria for Florida's streams are based upon EPA's evaluation of data on TN and TP levels in rivers and streams that have been carefully evaluated by FDEP, and subsequently by EPA, on a site-specific basis and identified as biologically healthy. EPA's approach results in numeric criteria that are protective of the streams themselves. EPA has determined, however, that these instream values may not always be protective of the designated uses in downstream lakes and estuaries. Therefore, EPA has also developed an approach for deriving TN and TP values for rivers and streams to ensure the protection of downstream lakes and estuaries. This approach is discussed in Section III.C(6).

(a) Methodology for Stream Classification: EPA's Nutrient Watershed Regions (NWRs)

EPA classified Florida's streams north of Lake Okeechobee by separating watersheds with a substantially different ratio of TN and TP export into Nutrient Watershed Regions (NWR). The resulting regions reflect the inherent differences in the natural factors that contribute to nutrient concentrations in streams (*e.g.*, geology, soil composition, and/or hydrology). Reliance on a watershed-based classification approach reflects the understanding that upstream water quality affects downstream water quality. This watershed classification also facilitates the ability to address the effects of TN and TP from streams to downstream lakes or estuaries in the same watershed.

EPA's classification approach results in four watershed regions: the Panhandle, the Bone Valley, the Peninsula, and the North Central (for a map of these regions, refer to the EPA TSD for Florida's Inland Waters or the list of watersheds in the table above). These four regions do not include the south Florida region (corresponding to FDEP's Everglades Bioregion) that is addressed separately in Section III.E which sets out EPA's proposed numeric nutrient criteria for canals in south Florida. All flowing waters in this region are either a canal or a wetland.

When classifying Florida's streams, EPA identified geographic areas of the State as having phosphorus-rich soils and geology, such as the Bone Valley and the northern Suwannee River watershed. As indicated above, the Bone Valley region and the Suwannee River watersheds are classified in this proposal as separate NWRs because it is well established that the naturally phosphorus-rich soils in these areas significantly influence stream phosphorus concentrations in these watersheds. EPA would expect from a general ecological standpoint that the associated aquatic life uses, under these naturally-occurring, nutrient-rich conditions, would be supported. The Agency requests comment on this particular classification decision (regions based on phosphorus-rich soils), as well as an alternate classification approach that would not separate out the phosphorus-rich watersheds described in this notice. The latter approach is similar to the approach proposed by EPA, but would not result in separate NWRs for the Bone Valley and/or North Central. Rather these NWRs would be integrated within the other NWRs.

(b) The Use of the Stream Condition Index as an Indicator of Biologically Healthy Conditions

For EPA's proposed approach, the Agency utilized a multi-metric index of benthic macroinvertebrate community composition and taxonomic data known as the Stream Condition Index (SCI) developed by FDEP to assess the

[59] U.S. EPA. 1998. National Strategy for the Development of Regional Nutrient Criteria. Office of Water, Washington, DC. EPA 822–R–98–002; Grubbs, G. 2001. U.S. EPA. (Memorandum to Directors of State Water Programs, Directors of Great Water Body Programs, Directors of Authorized Tribal Water Quality Standards Programs and State and Interstate Water Pollution Control Administrators on Development and Adoption of Nutrient Criteria into Water Quality Standards. November 14, 2001); Grumbles, B.H. 2007. U.S. EPA. (Memorandum to Directors of State Water Programs, Directors of Great Water Body Programs, Directors of Authorized Tribal Water Quality Standards Programs and State and Interstate Water Pollution Control Administrators on Nutrient Pollution and Numeric Water Quality Standards. May 25, 2007).

[60] U.S. EPA. 2000. Nutrient Criteria Technical Guidance Manual: Rivers and Streams. Office of Water, Washington, DC. EPA–822–B–00–002.

[61] U.S. EPA. 2000. Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs. Office of Water, Washington, DC. EPA–822–B–00–001; U.S. EPA. 2000. Nutrient Criteria Technical Guidance Manual: Rivers and Streams. Office of Water, Washington, DC. EPA–822–B–00–002; U.S. EPA. 2001. Nutrient Criteria Technical Manual: Estuarine and Coastal Marine Waters. Office of Water, Washington, DC. EPA–822–B–01–003.

[62] U.S. EPA. 2000. Nutrient Criteria Technical Guidance Manual: Rivers and Streams. Office of Water. 4304. EPA–822–B–00–002.

biological health of Florida's streams.[63] Of the metrics that comprise the SCI, some decrease in response to human disturbance-based stressors, such as excess nutrients; for example, (1) total taxa richness, (2) richness of Ephemeroptera (mayflies), (3) richness of Plecoptera (stoneflies), (4) percentage of sensitive taxa, and (5) percentage of filterers and suspension feeders. Other metrics increase in response to human disturbance-based stressors; for example, percent of very tolerant taxa (*e.g.*, Genera *Prostoma, Lumbriculus*) and percent of the dominant taxa (*i.e.*, numerical abundance of the most dominant taxon divided by the total abundance of all taxa).

The SCI was developed by FDEP in 2004, with subsequent revisions in 2007 to reduce the variability of results. In order to ensure that data are produced with the highest quality, field biologists and lab technicians must follow detailed Standard Operating Procedures (SOPs) and additional guidance for sampling and data use provided through a FDEP document entitled "Sampling and Use of the Stream Condition Index (SCI) for Assessing Flowing Waters: A Primer (DEP–SAS–001/09)." Field biologists must pass a rigorous audit with FDEP, and laboratory taxonomists are regularly tested and must maintain greater than 95% identification accuracy.

EPA considered two lines of evidence in determining the SCI range of scores that would indicate biologically healthy systems. The first line of evidence was an evaluation of SCI scores in streams considered by FDEP to be least-disturbed streams in Florida. A statistical analysis balanced the probability of a stream being included in this reference set with the probability of a stream not being included in this reference set, and indicated that an SCI score of 40 was an appropriate threshold. SCI scores range from 1 to 100 with higher scores indicating healthier biology.

A second line of evidence was the result of an expert workshop convened by FDEP in October 2006. The workshop included scientists with specific knowledge and expertise in stream macroinvertebrates. These experts were asked to individually and collectively evaluate a range of SCI data (*i.e.*, macroinvertebrate composition and taxonomic data) and then assign those data into one of the six Biological Condition Gradient (BCG)[64] categories, ranging from highly disturbed (Category 6) to pristine (Category 1). EPA analyzed the results of these categorical assignments using a proportional odds regression model[65] that predicts the probability of an SCI score occurring within one of the BCG categories by overlapping the ranges of SCI scores associated with each category from the individual expert assignment. The results of the analysis provided support for identifying a range of SCI scores that minimized the probability of incorrectly assigning a low quality site to a high quality category, and incorrectly assigning a high quality site to a low quality category, using the collective judgment of expert opinion. The results indicated a range of SCI scores of 40–44 to represent an appropriate threshold of healthy biological condition. Please refer to the EPA TSD for Florida's Inland Waters for more information on such topics as EPA's estimates of the Type I and Type II error associated with various threshold values. Thus, two very different approaches yielded comparable results. A subsequent EPA statistical analysis indicated that nutrient conditions in Florida streams within different regions remain essentially constant within an SCI score range of 40–50 providing further support for a selection of 40 as a threshold that is sufficiently protective for this application. The resulting TN and TP concentrations associated with a SCI score of 40 versus 50 did not represent a statistical difference and 40 was more in line with other lines of evidence for a SCI score threshold.

(c) Methodology for Calculating Instream Protection Values: The Nutrient Watershed Region Distribution Approach

EPA evaluated several methodologies, including reference conditions and stressor-response relationships, to develop values that protect designated uses of Florida streams instream. EPA analyzed stressor-response relationships in Florida streams based on available data, but, as mentioned above, did not find sufficient scientific support for their use in the derivation of numeric nutrient criteria for Florida streams. More specifically, EPA was not able to demonstrate a sufficiently strong correlation between the biological response indicators (*e.g.*, chlorophyll *a*, periphyton biomass, or SCI) and TN or TP concentrations. Thus, the Agency could not confidently predict a specific biological response (such as an SCI score) for an individual stream solely from the associated stream measurements of TN or TP concentrations.

There may be several reasons why empirical relationships between field-derived data of nutrient stressor and biological response variables show a relatively weak correlation. First, the relationship between nutrient concentrations and a biological response, such as algal growth, can be confounded by the presence of other stressors. For example, other stressors, such as excessive scour could cause low benthic invertebrate diversity, as measured by the SCI, even where nutrients are low. Excessive scour could also suppress a biological response (such as chlorophyll *a* or periphyton biomass) when nutrients are high. Another reason for stressor-response relationships with low correlations is that algal biomass accumulation is difficult to characterize because dynamic conditions in an individual stream can allow algae to accumulate and be removed rapidly, which is difficult to capture with periodic monitoring programs.

As an alternative to the stressor-response approach, EPA analyzed the TN and TP concentrations associated with a healthy biological condition in streams, and examined the statistical distributions of these data in order to identify an appropriate threshold for providing protection of aquatic life designated uses. To derive the instream protection values under this approach, EPA first assembled the available nutrient concentrations and biological response data for streams in Florida. EPA used FDEP's data from the IWR and STORET[66] databases and identified sites where SCI scores were 40 and higher. EPA further screened these sites by cross-referencing them with Florida's CWA section 303(d) list for Florida and excluded sites with identified nutrient impairments or dissolved oxygen impairments associated with elevated nutrients. EPA grouped the remaining sites (hereafter, biologically healthy sites) according to its nutrient watershed regions (Panhandle, Bone Valley, Peninsula, and North Central). For each nutrient watershed region, EPA compiled nutrient data (TN and TP

[63] The SCI method was developed and calibrated by FDEP. See "Fore et al. 2007. Development and testing biomonitoring tools for macroinvertebrates in Florida streams (Stream Condition Index and BioRecon). Final report to Florida Department of Environmental Protection" and the EPA TSD for Florida's Inland Waters for more information on the SCI.

[64] Appendix H in "Fore et al. 2007. Development and testing biomonitoring tools for macroinvertebrates in Florida streams (Stream Condition Index and BioRecon). Final report to Florida Department of Environmental Protection".

[65] See the EPA TSD for Florida's Inland Waters for more information on the proportional odds regression model.

[66] FL IWR and STORET can be found at: *http://www.dep.state.fl.us/WATER/STORET/INDEX.HTM*.

concentrations) associated with the biologically healthy sites, and calculated distributional statistics for annual average TN and TP concentrations.

The second step in deriving instream protection values was to further characterize the distribution of TN and TP among biologically healthy sites. Specifically, EPA calculated the number of biologically healthy sites within integer log-scale ranges of TN and TP concentrations, as well as the cumulative distribution. These nutrient distributions from biologically healthy sites in each nutrient watershed region are represented on a log-scale because concentration data are typically log-normally distributed. A log-normal distribution is skewed, with a mode near the geometric mean rather than the arithmetic mean.

The third step in deriving instream protection values was to determine appropriate thresholds from these distributions for providing protection of aquatic life designated uses. Selection of a central tendency of the distribution (*i.e.*, the median or geometric mean of a log-normal distribution) would imply that half of the biologically healthy sites are not attaining their uses. In contrast, an extreme upper end of the distribution (*e.g.*, the 90th or 95th percentile) may be the most likely to be heavily influenced by extreme event factors that are not representative of typically biologically healthy sites. This might be the case because the upper tail of the distribution might reflect a high loading year (landscape and/or atmospheric), and/or lack of nutrient uptake by algae (in turn due to a myriad of physical and biological factors like scour, grazing, light limitation, other pollutants). Thus, this tail of the distribution may just represent the most nutrient "tolerant" among the sites. Another possibility is that these streams may experience adverse effects from nutrient enrichment that are not yet reflected in the SCI score. A reasonable choice for a threshold is one which lies just above the vast majority of the population of healthy streams. This choice is reasonable because it reflects a point where most biologically healthy sites will still be identified as attaining uses, but avoids extrapolations into areas of the distribution characterized by only a few data points (as would be the case for the 90th or 95th percentile). When a threshold is established as a water quality criterion, sites well below that threshold might be allowed to experience an increase in nutrient levels up to the threshold level. There is little assurance that biologically healthy sites with nutrient concentrations well below the 90th or 95th percentile would remain biologically healthy if nutrient concentrations increased to those levels because relatively few sites with nutrient concentrations as high as those at the 90th or 95th percentile are demonstrated to be biologically healthy.

The range between the 25th and 75th percentiles, or inter-quartile range, is a common descriptive statistic used to characterize a distribution of values. For example, statistical software packages typically include the capability to display distributions as "box and whisker" plots, which very prominently identify the inter-quartile range. The inter-quartile range of a log normal distribution spans a smaller range of values than the inter-quartile range of a distribution of the data evenly spread across the entire range of values. This means that the further a value goes past the 75th percentile of a log normal distribution, the less representative it is of the majority of data (in this case, less representative of biologically healthy sites). Within the inter-quartile range of a log normal distribution, the slope of the cumulative frequency distribution will be the greatest. The 75th percentile represents a reasonable upper bound of where there is the greatest confidence that biologically healthy sites will be represented. Beyond the inter-quartile range (*i.e.*, below the 25th percentile and above the 75th percentile), there is a greater chance that measurements may represent anomalies that would not correspond to long-term healthy conditions in the majority of streams. Based on this analysis, EPA concluded that the 75th percentile represents an appropriate and well-founded protective threshold derived from a distribution of nutrient concentrations from biologically healthy sites. EPA solicits comment on its analysis of what constitutes a protective threshold.

(d) Proposed Criteria: Duration and Frequency

Aquatic life water quality criteria contain three components: Magnitude, duration, and frequency. For the TN and TP numeric criteria for streams, the derivation of the criterion-magnitude values is described above and these values are provided in the table in Section III.C(1). The criterion-duration of this magnitude is specified in *footnote a* of the streams criteria table as an annual geometric mean. EPA is proposing two expressions of allowable frequency, both of which are to be met. First, EPA proposes a no-more-than-one-in-three-years excursion frequency for the annual geometric mean criteria for lakes. Second, EPA proposes that the long-term arithmetic average of annual geometric means not to exceed the criterion-magnitude concentration. EPA anticipates that Florida will use their standard assessment periods as specified in Rule 62–303, F.A.C. (Impaired Waters Rule) to implement this second provision. These proposed duration and frequency components of the criteria are consistent with the data set used to derive these criteria, which applied distributional statistics to measures of annual geometric mean values from multiple years of record. EPA has determined that this frequency of excursions will not result in unacceptable effects on aquatic life as it will allow the stream ecosystem enough time to recover from an occasionally elevated year of nutrient loadings. The Agency requests comment on these proposed duration and frequency components of the stream numeric nutrient criteria.

EPA notes that some scientists and resource managers have suggested that nutrient criteria duration and frequency expressions should be more restrictive to avoid seasonal or annual "spikes" from which the aquatic system cannot easily recover, whereas others have suggested that criteria expressed as simply a long-term average of annual geometric means, consistent with data used in criteria derivation, and would still be protective. EPA requests comment on alternative duration and frequency expressions that might be considered protective, including (1) a criterion-duration expressed as a monthly average or geometric mean, (2) a criterion-frequency expressed as meeting allowable magnitude and duration every year, (3) a criterion-frequency expressed as meeting allowable magnitude and duration in more than half the years of a given assessment period, and (4) a criterion-frequency expressed as meeting allowable magnitude and duration as a long-term average only. EPA further requests comment on whether an expression of the criteria in terms of an arithmetic average of annual geometric mean values based on rolling three-year periods of time would also be protective of the designated use.

(3) Request for Comment and Data on Proposed Approach

EPA is soliciting comments on the approaches taken by the Agency to derive these proposed criteria, the data underlying those approaches, and the proposed criteria specifically. EPA is requesting that the public submit any other scientific data and information that may be available related to nutrient concentrations and associated biological responses in Florida's streams. EPA is soliciting comment specifically on the selection of criteria parameters for TN and TP; the proposed classification of streams into four regions based on aggregated watersheds; and the conclusion that the proposed criteria for streams are protective of designated uses and adequately account for the spatial and temporal variability of nutrients. In addition, EPA requests comment on folding the Suwannee River watershed in north central Florida into the larger Peninsula NWR (*i.e.*, not having a separate North Central region) or, alternatively, making a smaller North Central region within Hamilton County alone where the highest phosphorus-rich soils are located, with the remainder of the North Central becoming part of the Peninsula Region.

(4) Alternative Approaches Considered by EPA

During EPA's review of the available data and information for derivation of numeric nutrient criteria for Florida's streams, EPA also considered an alternative approach for criteria derivation. EPA is specifically requesting comment on a modified reference condition approach called the benchmark distribution approach, as described below.

(a) Benchmark Distribution Approach

EPA's previously published guidance has recommended a variety of methods to derive numeric nutrient criteria.[67] One method, the reference condition approach, relies on the identification of reference waters that exhibit minimal impacts from anthropogenic disturbance and are known to support designated uses. The thresholds of nutrient concentrations where designated uses are in attainment are calculated from a distribution of the available associated measurements of ambient nutrient concentrations at these reference condition sites.

EPA is seeking comment on a modified reference condition approach, which was developed by FDEP and is referred to as the benchmark distribution approach. The benchmark approach relies on least-disturbed sites rather than true reference, or minimally-impacted, sites. The benchmark distribution is a step-wise procedure used to calculate distributional statistics of TN and TP from identified least-disturbed streams.

(i) Identification of Least-Disturbed Streams

FDEP identified benchmark stream sites in the following step-wise manner (1) compiled a list of sites with low landscape development intensity using FDEP's Landscape Development Intensity Index,[68] (2) eliminated any sites on Florida's CWA section 303(d) list of impaired waters due to nutrients, as well as certain sites impaired for dissolved oxygen, where the State determined the dissolved oxygen impairment was caused by nutrients, (3) eliminated any sites with nitrate concentrations greater than FDEP's 0.35 mg/L proposed nitrate-nitrite criterion in order to reduce the possibility of including sites with far-field human disturbance from groundwater impacts, (4) eliminated sites known by FDEP district scientists to be disturbed, (5) eliminated potentially erroneous data through outlier analysis, (6) verified sites using high resolution aerial photographs, and (7) verified a random sample of the sites in the field.

(ii) Calculation of Benchmark Distribution Approach and Selection of Percentiles From the Benchmark Distribution

FDEP selected either the 75th or 90th percentile of the benchmark distribution approach from FDEP's proposed nutrient regions (75th percentile—Bone Valley; 90th percentile—Panhandle, North Central, Northeast, and Peninsula). FDEP's rationale for selecting either the 75th or 90th percentiles was based on the degree of certainty regarding the benchmark sites reflecting least-disturbed conditions and a probability (10% for the 90th percentile) of falsely identifying a least-disturbed site as being impaired for nutrients.

With this approach, the distribution of available annual geometric means of nutrient concentrations for the benchmark sites within the regional classes of streams is calculated. To compute the numeric criteria for the causal variables, TN, and TP, EPA is seeking comment on whether the 75th or 90th percentile of the benchmark distribution for each nutrient stream region should be selected. As mentioned above, the rationale for selecting either the 75th or 90th percentiles is based on the degree of certainty regarding the benchmark sites reflecting least-disturbed conditions and a probability of falsely identifying a least-disturbed site as being impaired for nutrients or vice-versa. In cases where data are more limited for a given nutrient region (*i.e.*, in the Bone Valley there were only four sites), the 75th percentile may be more appropriate because the 90th percentile may not be sufficiently robust (*i.e.*, may be highly sensitive to a few data points). In other cases, the 90th percentile may be more appropriate when there is a more extensive data set. For further information, please refer to EPA's TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Proposed Criteria for Streams.

In evaluating whether to propose this approach, EPA determined that a considerable amount of uncertainty remained whether this approach would result in a list of benchmark sites that represented truly least-disturbed conditions. Specifically, EPA is concerned that nutrient concentrations at these sites may reflect anthropogenic sources (*e.g.*, sources more than 100 meters away from and/or 10 kms upstream of the segment), even if the sites appear least-disturbed on a local basis. EPA is particularly concerned that several benchmark sites in the FDEP dataset appear to have a high potential to be affected by fertilizations associated with forestry activities. FDEP provided an analysis in which FDEP concluded that this is not likely.[69] EPA solicits comment on this issue and more generally on whether the benchmark sites identified by FDEP in its July 2009 proposal are an appropriate set of least-disturbed sites on which to base the criteria calculations.

(5) Request for Comment and Data on Alternative Approach

EPA is soliciting comment on the alternative to deriving numeric nutrient criteria for Florida's streams as described in Section III.C(4).

(6) Protection of Downstream Lakes and Estuaries

Two key objectives of WQS are: First, to protect the immediate water body to which a criterion initially applies and, second, to ensure that criteria provide for protection of downstream WQS affected by flow of pollutants from the upstream water body. *See* 40 CFR 131.11 and 131.10(b). EPA WQS regulations reflect the importance of protecting downstream waters by requiring that upstream WQS "provide for the attainment and maintenance of the water quality standards of

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[67] U.S. EPA. 2000. Nutrient Criteria Technical Guidance Manual: Rivers and Streams. Office of Water. 4304. EPA–822–B–00–002.

[68] A quantitative, integrated measure of the degree of human landscape disturbance within 100 meters on either side of a specified stream reach and extending to 10 kilometers upstream of the same stream reach.

[69] FDEP document titled, "Responses to Earthjustice's Comments on the Department's Reference Sites." Draft October 2, 2009. Located in the docket ID EPA–HQ–OW–2009–0596.

downstream waters." 40 CFR 131.10(b). Thus, in developing numeric nutrient criteria for Florida, EPA considered both instream aquatic conditions and downstream aquatic ecosystem needs. In addressing the issue of how, if at all, instream criteria values need to be adjusted to assure attainment of downstream standards, EPA necessarily examined the WQS for downstream lakes and estuaries. For lakes, this analysis starts with the numeric nutrient criteria proposed in this notice. For estuaries, this notice proposes an analytical approach to determine the loadings that a particular estuary can receive and still assure attainment and maintenance of the State's WQS for the estuary (*i.e.*, a protective load). An approach is then proposed for translating those downstream loading values into criteria levels in the contributing watershed stream reaches in a manner that ensures that the protective downstream loadings are not exceeded.

In connection with both lakes and estuaries, EPA fully recognizes that there are a range of important technical questions and related significant issues raised by this proposed approach for developing instream water quality criteria that are protective of downstream designated uses. With regard, in particular, to the protection of estuaries, the Agency is working closely with FDEP to derive estuarine numeric nutrient criteria for proposal and publication in 2011. Even though estuarine numeric nutrient criteria will be developed in 2011, there is already a substantial body of information, science, and analysis that presently exists that should be considered in determining flowing water criteria that are protective of downstream water quality.

The substantial data, peer-reviewed methodologies, and extensive scientific analyses available to and conducted by the Agency to date indicate that numeric nutrient criteria for estuaries, when proposed and finalized in 2011, may result in the need for more stringent rivers and streams criteria to ensure protection of downstream water quality, particularly for the nitrogen component of nutrient pollution. Therefore, considering the numerous requests for the Agency to share its analysis and scientific and technical conclusions at the earliest possible opportunity to allow for full review and comment, EPA is including downstream protection values for TN as proposed criteria for rivers and streams to protect the State's estuaries in this notice.

As described in more detail below and in EPA's TSD for Florida's Inland Waters accompanying this notice, these proposed nitrogen downstream protection values are based on substantial data, thorough scientific analysis, and extensive technical evaluation. However, EPA recognizes that additional data and analysis may be available for particular estuaries to help inform what water quality criteria are necessary to protect these waters. EPA also recognizes that substantial site-specific work (including some very sophisticated analyses in the context of certain TMDLs) has been completed for a number of these estuaries. This notice and the proposed downstream protection values are not intended to address or be interpreted as calling into question the utility and protectiveness of these site-specific analyses. Rather, the proposed values represent the output of a systematic and scientific approach that may be generally applicable to all flowing waters in Florida that terminate in estuaries for the purpose of ensuring the protection of downstream estuaries. EPA is interested in obtaining feedback at this time on this systematic and scientific approach. The Agency further recognizes that the proposed values in this notice will need to be considered in the context of the Agency's numeric nutrient criteria for estuaries scheduled for proposal in January of 2011. At this time, EPA plans to finalize any necessary downstream protection values for nitrogen in flowing waters as part of the second phase of this rulemaking process in coordination with the proposal and finalization of numeric criteria for estuarine and coastal waters in 2011. However, if comments, data and analyses submitted as a result of this proposal support finalizing such values sooner, by October 2010, EPA may choose to proceed in this manner. To facilitate this process, EPA requests comments and welcomes thorough evaluation on the need for and the technical and scientific basis of these proposed downstream protection values as part of the broader comment and evaluation process that this proposal initiates.

EPA believes that a detailed consideration and related proposed approach to address protection of downstream water quality in this proposal is necessary for several reasons, including (1) water quality standards are required to protect downstream uses under Federal regulations at 40 CFR 131.10(b), meaning also for prevention of impairment; (2) it may be a relevant consideration in the development of any TMDLs, NPDES permits, and Florida BMAPs that the State completes in the interim period between the final rule for Florida lakes and flowing waters in October 2010 and a final rule for Florida estuarine and coastal waters in October of 2011; and (3) perhaps most importantly, it is essential for informing and supporting a transparent and engaged public consideration, evaluation, and discussion on the question of what existing information, tools, and analyses suggest regarding the need to ensure protection of downstream waters. The Agency continues to emphasize its interest in and request for additional information, further analysis, and any alternative technically-based approaches that may be available to address protection of downstream water quality. EPA also reiterates its commitment to a full evaluation of all comments received and notes the ability to issue a NODA to allow a full public review should significant new additional information and analysis become available as part of the comment period.

In deriving criteria to protect designated uses, as noted above, Federal WQS regulations established to implement the CWA provide WQS must provide for the protection of designated uses in downstream waters. In the case of deriving numeric nutrient criteria for streams in Florida, EPA's analyses reflected in this notice indicate that the proposed criteria values for instream protection of streams may not fully protect downstream lakes and downstream estuaries. EPA's proposed criteria for lakes are, in some cases, more stringent than the proposed criteria for streams that flow into the lakes. For estuaries, EPA's analyses of protective loads delivered to a specific estuary, and the corresponding expected concentration values for streams that flow into that estuary, indicate the proposed criteria for instream protection may not always be sufficient to provide for the attainment and maintenance of the estuarine WQS. For more detailed information, please consult EPA's TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Proposed Criteria for Streams.

To address each of these issues, EPA is proposing first, for lakes, an equation that allows for input of lake characteristics to determine the concentration in flowing streams that is needed to attain and maintain the receiving lake's designated use and protective criteria. Second, for estuaries, EPA is proposing an approach for identifying the total nutrient loads a particular estuary can receive and still attain and maintain the State's designated use for the water body.

Third, also for estuaries, the Agency is proposing a methodology to derive protective concentration values for the instream criteria where necessary to assure that downstream estuarine loads are not exceeded. The following sections provide a more detailed explanation of the proposed downstream protective approach for lakes and then for estuaries.

(a) Downstream Protection of Lakes

EPA is proposing an equation to relate a lake TP concentration criterion to the concentration needed to be met in incoming streams to support the lake criterion. EPA proposes to apply the resulting stream concentration as the applicable criterion for all stream segments upstream of the lake. EPA used a mathematical modeling approach to derive this equation, with allowable input of lake-specific characteristics, to calculate protective criteria necessary to assure attainment and maintenance of the numeric lake nutrient criteria in this proposal. More specifically, EPA started with a phosphorus loading model equation first developed by Vollenweider.[70] EPA assumed that rainfall exceeds evaporation in Florida lakes and that all external phosphorus loading comes from streams. EPA considers the first assumption reasonable given the rainfall frequency and volume in Florida. The second assumption is reasonable to the extent that surface runoff contributions are far greater than groundwater or atmospheric sources of TP in Florida lakes. EPA requests comment on both these assumptions. After expressing these assumptions in terms of the mathematical relationships among loading rates, stream flow, and lake and stream concentrations, EPA derived the following equation to relate a protective lake criterion to a corresponding protective stream concentration:

$$[TP]_S = \frac{1}{c_f}[TP]_L\left(1+\sqrt{\tau_w}\right)$$

where:

$[TP]_S$ is the total phosphorus (TP) downstream lake protection value, mg/L

$[TP]_L$ is applicable TP lake criterion, mg/L

c_f is the fraction of inflow due to all stream flow, $0 \le c_f \le 1$

τ_w is lake's hydraulic retention time (water volume divided by annual flow rate)

The term

$$\left(1+\sqrt{\tau_w}\right)$$

expresses the net phosphorus loss from the water column (*e.g.* via settling of sediment-sorbed phosphorus) as a function of the lake's retention time

This model equation requires input of two lake-specific characteristics: The fraction of inflow due to stream flow and the hydraulic retention time. Water in a lake can come from a combination of groundwater sources, rainfall, and streams that flow into it. Using the model equation above, the calculated stream TP criterion to protect a downstream lake will be more stringent for lakes where the portion of its volume coming from streams flowing into it is the greatest. In addition, the calculated stream TP criterion to protect a downstream lake will be more stringent for lakes with short hydraulic retention times (how long water stays in a lake) because the longer the water stays in the lake, the more phosphorus will settle out in the underlying lake sediment.

Because lake-specific input values may not always be readily available, EPA is providing preset values for percent contribution from stream flow and hydraulic retention time. In Florida lakes, rainfall and groundwater sources tend to contribute a large portion of the total volume of lake water. In fact, only about 20% of the more than 7,000 Florida lakes have a stream flowing into them,[71] with the rest entirely comprised of groundwater and rainwater sources. EPA evaluated representative values for percent contribution from stream flow[72] and hydraulic retention time,[73] and selected 50% stream flow contribution and 0.2 years (about two and a half months) retention time as realistic and representative preset values to provide a protective outcome for Florida lakes, in the absence of site-specific data. Using these preset values, streams that flow into colored lakes would have a TP criterion of 0.12 mg/L, and streams that flow into clear, alkaline lakes would have a TP criterion of 0.073 mg/L, with respect to downstream lake protection. In the Peninsula NWR, this compares to a 0.107 mg/L TP stream criterion protective of instream designated uses. EPA's proposed rule does offer the flexibility to use site-specific inputs to the Vollenweider equation for fraction of inflow from streamflow and hydraulic retention time, as long as data supporting such inputs are sufficiently robust and well-documented.

EPA carefully evaluated use of a settling/loss term for phosphorus in the model equation. Florida lakes tend to be shallow, and internal loadings to the lake water (*e.g.* from re-suspension of settled phosphorus after storms that stir up lake sediment) may be substantial. A more detailed model might be able to simulate this phenomenon mechanistically, but would likely require substantial site-specific data for calibration. For this reason, EPA chose to use the model formulation above. EPA considered a simpler alternative to exclude the settling/loss term from the above equation, or even to reverse the sign on the settling/loss term so that it becomes a net source term, perhaps with the inclusion of a default multiplier. However, EPA did not have sufficient information to conclude that such a conservative approach was necessary as a general application to all Florida lakes. EPA remains open and receptive to comment on these alternatives or other technically sound and protective approaches. EPA's supporting analyses and detailed information on this downstream lake protection methodology are provided in the accompanying TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Proposed Criteria for Streams.

The same processes that occur in lakes and affect lake water phosphorus concentration may also occur in streams that feed lakes and affect stream water phosphorus concentrations. These processes include sorption to stream bed sediments, uptake into biota, and release into the water column from decaying vegetation. EPA took into consideration these processes when deciding whether it would be appropriate to add a term to the model equation to account for phosphorus loss or uptake within the streams in deriving stream criteria for downstream lake protection. However, the net result of these processes is nutrient spiraling, whereby nutrients released upstream gradually propagate downstream at a rate slower than that of the moving water, and cycle into and out of the food chain in the process. Over the short term, the result may be water concentrations that decrease in the downstream direction. However, unlike for nitrogen, there are no long-term phosphorus net removal processes at work in streams. Phosphorus adsorbed to sediment particles is eventually

[70] Vollenweider, R.A. 1975. Input-output models with special reference to the phosphorus loading concept in limnology. Schweizerische Zeitschrift fur Hydrologie. 37: 53–84; Vollenweider, R.A. 1976. Advances in differing critical loading levels for phosphorus in lake eutrophication. Mem. Ist. Ital. Idrobid. 33:53:83.

[71] Fernald, E.A. and E.D. Purdum. 1998. Water Resources Atlas of Florida. Tallahassee: Institute of Science and Public Affairs, Florida State University.

[72] Gao, X. 2006. Nutrient and Unionized Ammonia TMDLs for Lake Jesup, WBIDs 2981 and 2981A. Prepared by Florida Department of Environmental Protection, Division of Water Resource Management, Bureau of Watershed Management, Tallahassee, FL.

[73] Steward, J.S. and E.F. Lowe. In Press. General empirical models for estimating nutrient load limits for Florida's estuaries and inland waters. *Limnol. Oceanogr.* 55: (in press).

carried downstream with the sediment, and phosphorus taken up by plants is eventually returned to the flowing water. Over the long term, upstream phosphorus inputs are in equilibrium with downstream phosphorus outputs. Recognizing this feature of stream systems and the conservative nature of phosphorus in aquatic environments, EPA concluded that it was not appropriate to include a phosphorus loss term that would apply to streams as they progress toward a downstream lake. For further information, please refer to EPA's TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Proposed Criteria for Streams.

EPA requests comment on the need for additional instream criteria to protect uses in downstream lakes. EPA further requests comment on the model equation approach presented here to protect downstream lakes, and also requests comment on use of an alternative model such as one with a negative or zero settling term (*i.e.*, set $(1+\sqrt{\tau_w})$ in the equation above either equal to zero or with the plus sign switched to a minus sign). EPA also requests comment on whether and how to address direct surface runoff into the lake. Where this input is substantial and land use around the lake indicates that phosphorus input is likely, EPA believes it may be appropriate to include this water volume contribution as part of the fraction of inflow considered to be streamflow to be protective and consistent with the assumption of no loading from sources other than streamflow. EPA specifically requests comment on use of the Land Development Index (LDI) as an indicator of how to treat this inflow, examination of regional groundwater phosphorus levels to see if a zero TP input from this source is appropriate, and potential development of regionally-specific preset values as inputs to the equation. In addition, EPA requests comment on the potential to develop a corollary approach for nitrogen.

EPA is open to alternative technically-supported approaches based on best available data that offer the ability to address lake-specific circumstances. The Agency recognizes that more specific information may be readily available for individual lakes which could allow the use of alternative approaches such as the BATHTUB model.[74] The Agency welcomes comment and technical analysis on the availability and application of these models. In this regard, EPA requests comment on whether there should be a specific allowance for use of alternative lake-specific models where demonstrated to be protective and scientifically defensible based upon readily and currently available data, and whether use of such alternatives should best be facilitated through use of the SSAC procedure described in Section V.C.

(b) Downstream Protection of Estuaries

(i) Overview

EPA is proposing a methodology for calculation of applicable criteria for streams that flow into estuaries and provide for their protection. The proposed methodology would allow the State to utilize either (1) EPA's downstream protection values (DPVs), or (2) the EPA DPV methodology utilizing EPA's estimates of protective loading to estuaries but with the load re-distributed among the tributaries to each estuary, or (3) an alternative quantitative methodology, based on scientifically defensible approaches, to derive and quantify the protective load to each estuary and the associated protective stream concentrations. The DPV methodology with a re-distributed load may be used if the State provides public notice and opportunity for comment. To use an alternative technical approach, based on scientifically defensible methods to derive and quantify the protective load to each estuary and the associated protective stream concentrations, the State must go through the process for a Federal SSAC as described in Section V.C. In some cases, the substantial and sophisticated analyses and scientific effort already completed in the context of the TMDL process may provide sufficient support for a SSAC. In such circumstances, EPA encourages FDEP to submit these through the SSAC process and EPA looks forward to working with FDEP in this process.

EPA's approach to developing nutrient criteria for streams to protect downstream estuaries in Florida involves two separate steps. The first step is determining the average annual nutrient load that can be delivered to an estuary without impairing designated uses. This is the protective load. The second step is determining nutrient concentrations throughout the network of streams and rivers that discharge into an estuary that, if achieved, are expected to result in nutrient loading to estuaries that do not exceed the protective load. These concentrations, called "downstream protection values" or DPVs, depend on the protective load for the receiving estuary and account for nutrient losses within streams from natural biological processes. In this way, higher DPVs may be appropriate in stream reaches where a significant fraction of either TN or TP is permanently removed within the reach before delivery to downstream receiving waters. EPA's approach utilizes results obtained from a watershed modeling approach called SPAtially Referenced Regressions on Watershed attributes, or SPARROW.[75] The specific model that was used is the South Atlantic, Gulf and Tennessee (SAGT) regional SPARROW model.[76] EPA selected this model because it provided the information that was needed at the appropriate temporal and spatial scales and it applies to all waters that flow to Florida's estuaries.[77] SPARROW was developed by the United States Geological Survey (USGS) and has been reviewed, published, updated and widely applied over the last two decades. It has been used to address a variety of scientific applications, including management and regulatory applications.[78] In order to fully understand EPA's methodology for developing DPVs, it is useful to understand how the approach utilizes results from SPARROW, as well some aspects of how SPARROW works.

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[74] Kennedy, R.H., 1995. *Application of the BATHTUB Model to Selected Southeastern Reservoirs.* Technical Report EL–95–14, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. Walker, W.W., 1985. *Empirical Methods for Predicting Eutrophication in Impoundments; Report 3, Phase II: Model Refinements.* Technical Report E–81–9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

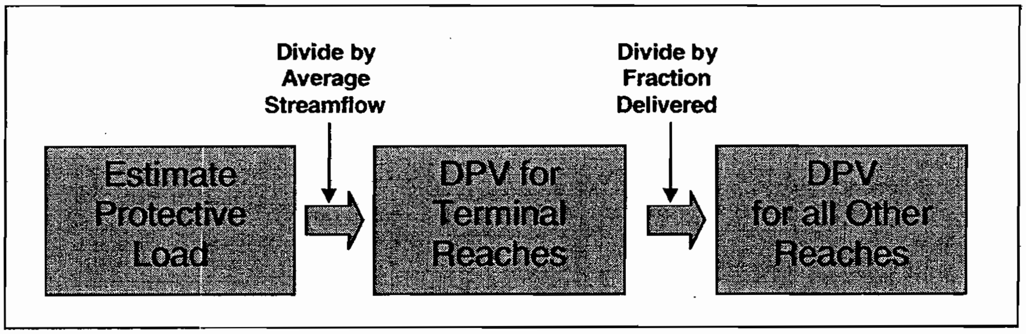
Walker, W.W., 1987. *Empirical Methods for Predicting Eutrophication in Impoundments; Report 4, Phase III: Applications Manual.* Technical Report E–81–9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

[75] *http://water.usgs.gov/nawqa/sparrow.*

[76] Hoos, A.B., and G. McMahon. 2009. Spatial analysis of instream nitrogen loads and factors controlling nitrogen delivery to stream in the southeastern United Sates using spatially referenced regression on watershed attributes (SPARROW) and regional classification frameworks. *Hydrological Processes.* DOI: 10.1002/hyp.7323.

[77] Hoos, A.B., S. Terziotti,, G. McMahon, K. Savvas, K.C. Tighe, and R. Alkons-Wolinsky. 2008. Data to support statistical modeling of instream nutrient load based on watershed attributes, southeastern United States, 2002: U.S. Geological Survey Open-File Report 2008–1163, 50 p.

[78] USGS SPARROW publications Web site: *http://water.usgs.gov/nawqa/sparrow/intro/pubs.html.*



The remaining discussion focuses on TN, for which EPA has already computed DPVs. The approach for computing DPVs for TP from estimates of the protective TP load is expected to be essentially the same as for TN. However, there is some question as to whether the same approach used to determine the protective TN load will also apply to TP. EPA requests comment on this issue.

(ii) EPA Approach to Estimating Protective Nitrogen Loads for Estuaries

The first step in EPA's approach is to narrow the range of possible values. The protective TN load is expected to vary widely among Florida estuaries because they differ significantly in their size and physical and biological attributes. For example, well flushed estuaries are able to receive higher TN loading without adverse effect compared to poorly flushed estuaries. EPA recognized that it may be possible to narrow this initially very broad range of possible protective loads using one consistent approach, and then consider whether additional information might enable a further reduction in uncertainty. EPA is soliciting credible scientific evidence that may improve these estimates and further reduce uncertainty surrounding the proposed protective loads. The most useful evidence would provide a scientific rationale, an alternative estimate of the protective load, and an associated confidence interval for the estimate. For further information, please refer to EPA's TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Proposed Criteria for Streams.

EPA first narrowed the range of possible protective loads by establishing an estimate of current loading as an upper bound. Most of Florida's estuaries are listed as impaired to some extent by nutrients or nutrient-related causes. Florida's 1998 CWA section 303(d) verified list of impaired waters under the Impaired Waters Rule (FAC 62–303) identify many estuaries or estuary segments that are impaired by nutrients, chlorophyll *a*, or low dissolved oxygen. Many or most estuaries have reduced water clarity and substantial loss of seagrass habitats. The National Estuarine Eutrophication Assessment[79] reports that current conditions are poor for many estuaries in Florida. This information implies that current levels of TN loading are at least an upper limit for the protective load and likely exceed the protective load in many estuaries.

EPA used the SAGT–SPARROW regional watershed model to estimate current loading to each estuary in Florida. While nitrogen loads have been estimated from monitored gauge stations in many stream and rivers, a large fraction of Florida streams and watersheds are not gauged and thus load estimates were not previously available. An approach was needed to spatially extrapolate the available measurements of loading to obtain estimates of loading for all streams including those in unmonitored watersheds or portions of watersheds. The SAGT SPARROW model provided these estimates for all Florida estuarine watersheds. The SPARROW modeling approach utilizes a multiple regression equation to describe the relationship between watershed attributes (*i.e.*, the predictors) and measured instream nutrient loads (*i.e.*, the responses). The statistical methods incorporated into SPARROW help explain instream nutrient water quality data (*i.e.*, the mass flux of nitrogen) as a function of upstream sources and watershed attributes. The SAGT–SPARROW model utilized period of record monitored streamflow and nutrient water quality data from Florida and across the SAGT region for load estimation. SAGT–SPARROW also used extensive geospatial data sets describing topography, land-use, climate, and soil characteristics, nitrogen loading for point sources in Florida obtained from EPA's permit compliance system, and estimates of nitrogen in fertilizer and manure from county-level fertilizer sales, census of agriculture, and population estimates. TN load estimates explain 96% of the variation in observed loads from monitoring sites across the region with no spatial bias at Florida sites.[80] A more thorough description of the SAGT–SPARROW model, the data sources, and analyses are found in the EPA TSD for Florida's Inland Waters and in USGS publications.[81]

EPA further narrowed the range of possible protective loads by establishing the background load as a lower bound. EPA recognizes that a measure of natural background TN loading is the true lower limit, yet EPA recognizes also that some level of anthropogenic nutrient loading is acceptable, difficult to avoid, and unlikely to cause adverse biological responses. The current TN load minus the fraction of TN loading estimated to result from anthropogenic sources is used as an estimate of the background TN load. EPA used the SAGT–SPARROW regional watershed model to estimate background loading. SAGT–SPARROW empirically associates 100% of the measured nutrient loading into one of five classes (fertilizer, manure, urban, point sources, and atmospheric). EPA recognizes that some watershed models define more types of sources, according to their modeling objectives; however, it is important to recognize that these are

[79] Bricker, S., B. Longstaff, W. Dennison, A. Jones, K. Boicourt, C. Wicks and J. Woerner, 2007. Effects of nutrient enrichment in the Nation's estuaries: A decade of change. NOAA Coastal Ocean Program Decision Analysis Series No. 26. National Centers for Coastal Ocean Science, Silver Spring, MD 322.

[80] Hoos, A.B., and G. McMahon. 2009. Spatial analysis of instream nitrogen loads and factors controlling nitrogen delivery to stream in the southeastern United Sates using spatially referenced regression on watershed attributes (SPARROW) and regional classification frameworks. *Hydrological Processes.* DOI: 10.1002/hyp.7323.

[81] Hoos, A.B., S. Terziotti,, G. McMahon, K. Savvas, K.C. Tighe, and R. Alkons-Wolinsky. 2008. Data to support statistical modeling of instream nutrient load based on watershed attributes, southeastern United States, 2002: U.S. Geological Survey Open-File Report 2008–1163, 50 p.

source classes, not sources, and that 100% of the measured loading is accounted for explicitly or implicitly by SPARROW in terms of these source classes.

The class termed "atmospheric" reflects all loading that cannot be empirically attributed to causal variables associated with the other classes. EPA used the estimate for this class of loading as the background TN load. EPA recognizes that the SPARROW-estimated "atmospheric" load includes anthropogenic contributions associated with regional-scale nitrogen emissions and does not represent pre-industrial or true "natural" background loading. The "atmospheric" source term from SPARROW is also not equal to atmospheric nitrogen deposition as measured by the National Atmospheric Deposition Program (NADP). To properly interpret the TN load attributed to the "atmospheric" source term in SPARROW, it is useful to recognize that SPARROW is a nonlinear regression model that seeks to explain measured TN loads in streams and rivers in terms of a series of explanatory variables. The atmospheric term is in all cases less, and often much less, than the measured deposition because not all the nitrogen deposited to the landscape is transported to streams, and not all of the nitrogen transported in streams reaches estuaries. The atmospheric source term from SPARROW excludes all the loading associated with both local anthropogenic nitrogen sources and factors contributing to increased transport of nitrogen from all sources (*e.g.*, impervious surfaces). Therefore, EPA expects that reasonable values for the protective TN load are not likely to be less than these values.

The protective TN load should be less than the current load and greater than the background load. Although this recognition may appear to be trivial, it is important. EPA estimates that TN loads to estuaries across Florida vary approximately 25-fold (~2 to 50 grams of nitrogen per square meter of estuary area). However, the ratio of the current load to the background load varies only between 1.7 and 5; for most estuaries, the range is between 2 and 4. Alternatively stated, current TN loads, which include local anthropogenic nitrogen sources, are two to four-fold higher than the background loads which do not include those sources. Thus, for any specific estuary, there is a relatively narrow range between the upper and lower bounds of potential protective loads.

EPA acknowledges that not all the TN entering estuaries comes directly from the streams within its watershed. In some estuaries, direct atmospheric nitrogen deposition to the estuary surface may be an important source of TN loading to the estuary. Similarly, point sources such as industrial or wastewater treatment plant discharges directly to the estuary can be significant. In general, these sources are most significant when the ratio of watershed area to estuary area is relatively small compared to other estuaries (*e.g.*, St. Andrew Bay, Sarasota Bay). In a few cases in Florida, point source loads directly to the estuary account for a large fraction of the aggregate load from all sources.

As a second step, EPA sought to further reduce the range of possible protective loading values by considering additional evidence. One line of evidence EPA considered is previous estimates of protective loads. These have been developed as part of TMDLs for Florida estuaries or as part of Florida's Pollutant Load Reduction Goal or PLRG program. The scientific approaches utilized for TMDLs and PLRGs vary from simple to sophisticated and have recommended TN loading reductions between 3% and 63%, with a median of 38%. Higher reductions are typically associated with portions of estuaries currently receiving higher anthropogenic loading. Unfortunately, these analyses have not been completed for all of Florida's estuaries. Steward and Lowe (2009) [82] showed that the TN loading limits suggested by TMDLs and PLRGs for a variety of aquatic ecosystems in Florida, including estuaries, could be statistically related to water residence time for the receiving water. EPA evaluated these relationships as an additional line of evidence for estimating protective TN loads for estuaries. EPA found these relationships to confirm in most cases, but not all, that the loading limits were likely between the bounds EPA previously established using SPARROW. However, the limits of uncertainty associated with the relationship were nearly as large as those already established. Nonetheless, the models provide additional support for EPA's estimates of protective estuary loads, but no further refinement of the estimates.

Another approach to considering existing TMDLs and PLRGs is to consider directly the loading rate reductions recommended from those efforts, the median of which is 38% in Florida. This percent TN reduction is similar to the scientific consensus for several well-studied coastal systems elsewhere (*e.g.*, Chesapeake Bay, northern Gulf of Mexico) which have been subjected to increased TN loads from known anthropogenic sources. EPA recognizes that the magnitude of anthropogenic TN loads varies across Florida estuaries and that applying a uniform percent reduction across all estuaries does not account for the variable extent of anthropogenic loads and could lead to estimates below background load. An alternative approach is to assume that the appropriate loading reduction is proportional to the magnitude of anthropogenic enrichment. Thus, EPA suggests that protective TN loading may be estimated by assuming that the anthropogenic component of TN loading should be reduced by a constant fraction.

As a result, EPA computed the protective TN load by reducing the current TN load by one half of the anthropogenic contribution to that load. EPA's protective load estimates are on average 25% less than current TN loading (range = 5 to 40%), consistent with most TMDLs and PLRGs for Florida estuaries.

EPA developed protective TN loads for 16 estuarine water bodies in Florida for the purpose of computing DPVs for streams that are protective of uses in the estuarine receiving waters. EPA did not develop loading targets for the seven estuarine water bodies in south Florida (Caloosahatchee, St. Lucie, Biscayne Bay, Florida Bay, North and South Ten Thousand Islands, and Rookery Bay), because requisite information related to TN loading from the highly managed canals and waterways cannot be derived from SAGT–SPARROW and were not available otherwise, and three in central Florida (coastal drainage areas of the Withlacoochee River, Crystal-Pithlachascotee River and Daytona-St. Augustine) because EPA is still evaluating appropriate protective loads and the flows necessary to derive DPVs.

EPA notes that some stakeholders, including FDEP staff,[83] have raised

[82] Steward, J.S. and E.F. Lowe. 2010. General empirical models for estimating nutrient load limits for Florida's estuaries and inland waters. *Limnology and Oceanography 55(1):433–445.*

[83] For further information on concerns raised by FDEP regarding the use of SPARROW, refer to "Florida Department of Environmental Protection Review of SPARROW: How useful is it for the purposes of supporting water quality standards development?," "Assessment of FDEP Panhandle Stream proposed benchmark numeric nutrient criteria for downstream protection of Apalachicola Bay," and "Analysis of Proposed Freshwater Stream Criteria's Relationship to Protective Levels in the Lower St. Johns River Based on the Lower St. Johns River Nutrient TMDL." located in EPA's docket ID No. EPA–HQ–OW–2009–0596.

concerns about the suitability of the SAGT SPARROW to address downstream protection of estuaries and have suggested alternative models and approaches that have been applied for several of Florida's larger estuaries and their watersheds. These concerns include known limitations of the SPARROW model, particularly related to inadequate resolution of complex hydrology in several parts of the State. EPA also recognizes this limitation and as a result, has not used SAGT SPARROW to propose protective loads and associated downstream protection values for ten estuaries and their watersheds in Florida. EPA acknowledges that other approaches and models may also provide defensible estimates of protective loads.

Among the technical concerns that stakeholders including FDEP staff have raised are that: (1) SPARROW is useful for general pattern, but the large scale calibration lead to large errors for specific areas, (2) SPARROW only utilizes four source inputs, and (3) SPARROW was calibrated to only one year's worth of data. As presented in the above sections, but to briefly reiterate here: (1) SPARROW is calibrated across a larger area, but it utilizes a large amount of Florida site-specific data and it explains 96% of the variation in observed loads from monitoring sites, (2) SPARROW accounts for all sources, but groups them into four general categories, and (3) SPARROW uses available data from the 1975–2004 period at monitored sites. This last concern may be confused with the technical procedure of presenting loading estimates as "detrended to 2002". This procedure accounts for long-term, inter-annual variability to ensure that long-term conditions and trends are represented. The year 2002 was selected as a baseline because it has the best available land use/land cover information available, but the loading estimates, in fact, represent a long-term condition representative of many years of record. EPA encourages technical reviewers to consult with the technical references cited in this section for the complete explanations of technical procedures.

EPA requests comment on its use of the SPARROW model to derive protective loads for downstream estuaries, as well as data and analyses that would support alternate methods of deriving downstream loads, or alternate methods of ensuring protection of designated uses in estuaries. For estuaries where sophisticated scientific analyses have been completed, relying on ample site-specific data to derive protective loads in the context of TMDLs, EPA encourages FDEP to submit resulting alternative DPVs under the SSAC process.

(iii) Computing Downstream Protection Values (DPVs)

Once an estimate of protective TN loads is derived, EPA developed a methodology for computing DPVs, for streams that, if achieved, are expected to result in an average TN loading rate that does not exceed the protective load. EPA's methodology, which is used as the narrative translator, allows for the fraction of the protective TN loading contributed from each tributary within the watershed of an estuary to be determined by the fraction of the total freshwater flow contributed by that tributary. The DPV is specified as an average TN concentration, which is computed by dividing the protective TN load by the aggregate average freshwater inflow from the watershed. This approach results in the same DPV for each stream or river reach that terminates into a given estuary.

EPA's methodology accounts for instream losses of TN. EPA recognizes that not all the TN transported within a stream network will ultimately reach estuaries. Rather, some TN is permanently lost from streams. This is not the same as reversible transformations of TN, such as algal uptake. Losses of TN are primarily associated with bacterially-mediated processes in stream sediments that convert biologically available nitrogen into inert N_2 gas, which enters the atmosphere (a process called denitrification). This occurs more rapidly in shallow streams and at almost negligible rates in deeper streams and rivers. EPA refers to the fraction of nitrogen transported in streams that ultimately reaches estuaries as the "fraction delivered." Estimates of the fraction delivered in Florida are less than 50% in streams very distant from the coast, but is between 80 and 100% in approximately half the stream reaches in Florida's estuarine watersheds.

EPA's approach relies on estimating the fraction of TN delivered to downstream estuaries. Measuring instream loss rates at the appropriate time and space scale is exceedingly difficult, and it is not possible to do State-wide. EPA is not aware of other models or data suitable to estimating nitrogen losses in streams across the State of Florida. EPA obtained estimates from the SAGT–SPARROW model,[84] which is possibly the best generally applicable approach to obtaining these estimates. One reason is that SPARROW estimates watershed-scale instream losses at the annual time scales across the entire region. Estimates of instream losses are modeled in SPARROW using a first-order decay rate as a function of time-of-travel in the reach. The inverse exponential relationship is consistent with scientific understanding that nitrogen losses decrease with increasing stream size and with results from experimental reach-scale studies using a variety of methods.[85] EPA recognizes that stream attributes other than reach time-of-travel or size may influence instream loss rates and though the SPARROW model did not include these, the lack of spatial bias in model residuals suggests that inclusion of other potential subregional-scale or State-wide stream attributes may not improve modeled instream loss estimates.

EPA developed and applied this methodology to compute DPVs for every stream reach in each of 16 estuarine watersheds starting with estuarine-specific estimates of the protective load. These estuarine watersheds align with the Nutrient Watershed Regions (NWR) used to derive instream protection values (IPVs). It is important to note that the scale at which protective loads and DPVs were derived is smaller than for IPVs (*i.e.*, 16 estuarine watersheds vs. 4 nutrient watershed regions). EPA's recognition that some fraction of nitrogen transported in streams is retained or assimilated before reaching estuarine waters help ensure that the DPVs are not overprotective of downstream use in any particular estuary.

In determining TN DPVs, EPA considered the contribution of TN inputs from wastewater discharged in shoreline catchments directly to the estuary. EPA found these point source inputs to be significant (> 5% of total loading) in three (St. Andrew's Bay, St. Marys, St. John's) of the 16 estuaries. However, for the purpose of computing stream reach DPVs for a given estuarine watershed, EPA considered only those TN loads delivered from the estuarine watershed stream network and did not

[84] Hoos, A.B., and G. McMahon. 2009. Spatial analysis of instream nitrogen loads and factors controlling nitrogen delivery to streams in the southeastern United States using spatially referenced regression on watershed attributes (SPARROW) and regional classification frameworks. *Hydrological Processes*. DOI: 10.1002/hyp.7323.

[85] Bohlke, J.K., R.C. Antweiler, J.W. Harvey, A.E. Laursen, L.K. Smith, R.L. Smith, and M.A. Voytek. 2009. Multi-scale measurements and modeling of Denitrification in streams with varying flow and nitrate concentration in the upper Mississippi River basin, USA. *Biogeochemistry* 93: 117–141. DOI 10.1007/s10533–008–9282–8.

include TN inputs from wastewater discharged in shoreline catchments directly to an estuary because these loads do not originate from upstream sources. However, point sources loads directly to the estuary would need to be considered in developing TMDLs based on estuary-specific criteria.

EPA's computation of DPVs using estimates of protective loading for each estuary and the fraction-delivered to estuaries is shown by equation (1):

$$\bar{C}_i = kL_{est}\frac{1}{Q_W F_i}, \qquad (1)$$

where the terms are defined as follows for a specific or (ith) stream reach:

$\bar{C}_i$ maximum flow-averaged nutrient concentration for a specific (the ith) stream reach consistent with downstream use protection (*i.e.*, the DPV)

k fraction of all loading to the estuary that comes from the stream network resolved by SPARROW

L_{est} protective loading rate for the estuary, from all sources

$\bar{Q}_W$ combined average freshwater discharged into the estuary from the portion of the watershed resolved by the SPARROW stream network

F_i fraction of the flux at the downstream node of the specific (ith) reach that is transported through the stream network and ultimately delivered to estuarine receiving waters (*i.e.*, Fraction Delivered).

Note that the quantity kLest is equal to the loading to the estuary from sources resolved by SPARROW. For the purposes of practical implementation, EPA classified each stream water body (*i.e.*, Water Body Identification or "WBID" using the FDEP term) according to the estuarine receiving water and one of six categories based on the fraction of TN delivered (0 to 50%, 51–60%, 61–70%, 71–80%, 81–90%, and 91–100%). For each category, the upper end of the range was utilized to compute the applicable DPV for streams in the category, resulting in a value that will be protective. This approach reduces the number of unique DPVs from thousands to less than 100. Because the stream network utilized by the SAGT–SPARROW watershed model (ERF1) does not recognize all of the smaller streams in Florida (*i.e.*, it is on a larger scale), EPA mapped WBIDs to the applicable watershed-scale unit, or "incremental watersheds," of the ERF1 reaches, assigning to each WBID the fraction of TN delivered estimated for the ERF1 reach whose incremental watershed includes the WBID. Where the WBID includes portions of the incremental watersheds of more than one ERF1 reach, EPA computed a weighted-average based on the proportion of WBID area in the watershed of each ERF1 reach.

Given an even distribution of reaches within each 10% interval, EPA's "binning" approach to the fraction-delivered estimates results in a 5% to 10% margin of safety for the average reach in each range (closer to 10% for the lower fraction-delivered ranges). Potentially larger margins are possible within the 0 to 50% range, where the fraction delivered might be 20%, but the DPV would be computed assuming a fraction delivered of 50%. However, only one watershed in Florida for which EPA is proposing DPVs, the St. Johns River, has a substantial number of reaches estimated to have less than 50% TN delivered to estuarine waters. The SAGT–SPARROW watershed model estimates that 17% of the stream reaches in the St. Johns watershed are in this category, with about half the reaches delivering nearly 50% of TN and a substantial number delivering only 20% of TN. Given EPA's DPV for terminal reaches in the St. Johns watershed, however, the DPV for reaches with a fraction delivered less than 50% will be higher than the IPV, and therefore, will not apply. EPA requests comment on the binning approach for calculating DPVs, which allows for a relatively simple table of DPVs to be presented as compared to using the actual estimate of fraction TN delivered to calculate a DPV unique to each WBID using formula (1), above.

At this time, EPA has not calculated protective TP loads for Florida's estuaries or DPVs for TP. However, advances in the application of regional watershed models, such as SPARROW, that address the sources and terrestrial and aquatic processes that influence the supply and transport of TP in the watershed and delivery to estuaries are currently in advanced stages of development.[86] EPA anticipates obtaining the necessary data and information to compute TP loads for the estuarine water bodies in Florida in 2010 and could make this additional information available by issuing a supplemental **Federal Register** Notice of Data Availability (NODA), which would also be posted in the public docket for this proposed rule. EPA intends to derive proposed protective loads and DPVs for TP using an analogous approach as used for TN DPVs. EPA expects the approach will recognize that TP, like TN, is essential for estuarine processes but in excess will adversely impact aquatic life uses.

(iv) EPA Downstream Protection Values (DPVs)

The following criteria tables and corresponding DPVs for a given stream reach category have been geo-referenced to specific WBIDs which are managed by FDEP as the principal assessment unit for Florida's surface waters. To see where the criteria are geographically applicable, refer to EPA's TSD for Florida's Inland Waters, Appendix B–18: In-Stream and Downstream Protection Value (IPV/DPV) Tables with DPV Geo-Reference Table to Florida WBIDs.

River/stream reach category—percent delivered to estuary [4]	(mg L⁻¹)		TP (mg L⁻¹)	
	TN IPV [5]	TN DPV [6]	TP IPV [7]	TP DPV [8]
Perdido Bay Watershed [PH] (EDA Code: [1] G140x) Protective TN Load for the Estuary: [2]: 847,520 kg y⁻¹ Protective TP Load for the Estuary: [3] TBD				
Less than 50%	*NR*	*NR*	0.043	*TBD*
50.1–60.0%	*NR*	*NR*	0.043	*TBD*
60.1–70.0%	*NR*	*NR*	0.043	*TBD*
70.1–80.0%	*NR*	*NR*	0.043	*TBD*
80.1–90.0%	0.824	0.34	0.043	*TBD*
90.1–100%	0.824	0.30	0.043	*TBD*

[86] Hoos, A.B., S. Terziotti, G. McMahon, K. Savvas, K.C. Tighe, and R. Alkons-Wolinsky. 2008. Data to support statistical modeling of instream nutrient load based on watershed attributes, southeastern United States, 2002: U.S. Geological Survey Open-File Report 2008—1163, 50 p.

River/stream reach category—percent delivered to estuary [4]	(mg L^{-1})		TP (mg L^{-1})	
	TN IPV [5]	TN DPV [6]	TP IPV [7]	TP DPV [8]
Pensacola Bay Watershed [PH] (EDA Code: [1] G130x) Protective TN Load for the Estuary: [2] 4,388,478 kg y^{-1} Protective TP Load for the Estuary: [3] TBD				
Less than 50%	*NR*	*NR*	0.043	*TBD*
50.1–60.0%	*NR*	*NR*	0.043	*TBD*
60.1–70.0%	*NR*	*NR*	0.043	*TBD*
70.1–80.0%	*NR*	*NR*	0.043	*TBD*
80.1–90.0%	0.824	0.48	0.043	*TBD*
90.1–100%	0.824	0.43	0.043	*TBD*
Choctawhatchee Bay Watershed [PH] (EDA Code: [1] G120x) Protective TN Load for the Estuary: [2] 2,875,861 kg y^{-1} Protective TP Load for the Estuary: [3] TBD				
Less than 50%	*NR*	*NR*	0.043	*TBD*
50.1–60.0%	*NR*	*NR*	0.043	*TBD*
60.1–70.0%	*NR*	*NR*	0.043	*TBD*
70.1–80.0%	0.824	0.48	0.043	*TBD*
80.1–90.0%	0.824	0.43	0.043	*TBD*
90.1–100%	0.824	0.39	0.043	*TBD*
St. Andrew Bay Watershed [PH] (EDA Code: [1] G110x) Protective TN Load for the Estuary: [2] 310,322 kg y^{-1} Protective TP Load for the Estuary: [3] TBDK				
Less than 50%	0.824	0.48	0.043	*TBD*
50.1–60.0%	*NR*	*NR*	0.043	*TBD*
60.1–70.0%	*NR*	*NR*	0.043	*TBD*
70.1–80.0%	0.824	0.30	0.043	*TBD*
80.1–90.0%	0.824	0.27	0.043	*TBD*
90.1–100%	0.824	0.24	0.043	*TBD*
Apalachicola Bay Watershed [PH] (EDA Code: [1] G100x) Protective TN Load for the Estuary: [2] 10,971,582 kg y^{-1} Protective TP Load for the Estuary: [3] TBD				
Less than 50%	0.824	0.91	0.043	*TBD*
50.1–60.0%	*NR*	*NR*	0.043	*TBD*
60.1–70.0%	0.824	0.65	0.043	*TBD*
70.1–80.0%	0.824	0.57	0.043	*TBD*
80.1–90.0%	0.824	0.51	0.043	*TBD*
90.1–100%	0.824	0.46	0.043	*TBD*
Apalachee Bay Watershed [PH] (EDA Code: [1] G090x) Protective TN Load for the Estuary: [2] 2,539,883 kg y^{-1} Protective TP Load for the Estuary: [3] TBD				
Less than 50%	*NR*	*NR*	0.043	*TBD*
50.1–60.0%	*NR*	*NR*	0.043	*TBD*
60.1–70.0%	*NR*	*NR*	0.043	*TBD*
70.1–80.0%	0.824	0.67	0.043	*TBD*
80.1–90.0%	0.824	0.59	0.043	*TBD*
90.1–100%	0.824	0.53	0.043	*TBD*
Econfina/Steinhatchee Coastal Drainage Area [PH] (CDA Code: [1] G086x) Protective TN Load for the Estuary: [2] 185,301 kg y^{-1} Protective TP Load for the Estuary: [3] TBD				
Less than 50%	*NR*	*NR*	0.043	*TBD*
50.1–60.0%	*NR*	*NR*	0.043	*TBD*
60.1–70.0%	*NR*	*NR*	0.043	*TBD*
70.1–80.0%	*NR*	*NR*	0.043	*TBD*
80.1–90.0%	0.824	0.41	0.043	*TBD*
90.1–100%	0.824	0.37	0.043	*TBD*
Suwannee River Watershed [NC] (EDA Code: [1] G080x) Protective TN Load for the Estuary: [2] 5,421,050 kg y^{-1} Protective TP Load for the Estuary: [3] TBD				
Less than 50%	*NR*	*NR*	0.359	*TBD*
50.1–60.0%	*NR*	*NR*	0.359	*TBD*
60.1–70.0%	1.479	0.78	0.359	*TBD*

River/stream reach category—percent delivered to estuary [4]	(mg L⁻¹)		TP (mg L⁻¹)	
	TN IPV [5]	TN DPV [6]	TP IPV [7]	TP DPV [8]
70.1–80.0%	1.479	0.69	0.359	*TBD*
80.1–90.0%	1.479	0.61	0.359	*TBD*
90.1–100%	1.479	0.55	0.359	*TBD*
Waccasassa Coastal Drainage Area PN (CDA Code: [1] 078x) Protective TN Load for the Estuary: [2] 433,756 kg y⁻¹ Protective TP Load for the Estuary: [3] TBD				
Less than 50%	*NR*	*NR*	0.107	*TBD*
50.1–60.0%	*NR*	*NR*	0.107	*TBD*
60.1–70.0%	*NR*	*NR*	0.107	*TBD*
70.1–80.0%	*NR*	*NR*	0.107	*TBD*
80.1–90.0%	1.205	0.45	0.107	*TBD*
90.1–100%	1.205	0.40	0.107	*TBD*
Withlacoochee Coastal Drainage Area PN (CDA Code: [1] G076x) Protective TN Load for the Estuary: [2] TBD Protective TP Load for the Estuary: [3] TBD				
Less than 50%	1.205	*TBD*	0.107	*TBD*
50.1–60.0%	1.205	*TBD*	0.107	*TBD*
60.1–70.0%	1.205	*TBD*	0.107	*TBD*
70.1–80.0%	1.205	*TBD*	0.107	*TBD*
80.1–90.0%	1.205	*TBD*	0.107	*TBD*
90.1–100%	1.205	*TBD*	0.107	*TBD*
Crystal/Pithlachascotee Coastal Drainage Area PN (CDA Code: [1] G074x) Protective TN Load for the Estuary: [2] TBD Protective TP Load for the Estuary: [3] TBD				
Less than 50%	1.205	*TBD*	0.107	*TBD*
50.1–60.0%	*NR*	*TBD*	0.107	*TBD*
60.1–70.0%	*NR*	*TBD*	0.107	*TBD*
70.1–80.0%	*NR*	*TBD*	0.107	*TBD*
80.1–90.0%	1.205	*TBD*	0.107	*TBD*
90.1–100%	1.205	*TBD*	0.107	*TBD*
Tampa Bay Watershed BV (EDA Code: [1] G070x) Protective TN Load for the Estuary: [2] 1,289,671 kg y⁻¹ Protective TP Load for the Estuary: [3] TBD				
Less than 50%	1.798	1.11	0.739	*TBD*
50.1–60.0%	1.798	0.93	0.739	*TBD*
60.1–70.0%	1.798	0.80	0.739	*TBD*
70.1–80.0%	1.798	0.70	0.739	*TBD*
80.1–90.0%	1.798	0.62	0.739	*TBD*
90.1–100%	1.798	0.56	0.739	*TBD*
Sarasota Bay Watershed BV (EDA Code: [1] G060x) Protective TN Load for the Estuary: [2] 155,576 kg y⁻¹ Protective TP Load for the Estuary: [3] TBD				
Less than 50%	*NR*	*NR*	0.739	*TBD*
50.1–60.0%	*NR*	*NR*	0.739	*TBD*
60.1–70.0%	*NR*	*NR*	0.739	*TBD*
70.1–80.0%	*NR*	*NR*	0.739	*TBD*
80.1–90.0%	*NR*	*NR*	0.739	*TBD*
90.1–100%	1.798	0.54	0.739	*TBD*
Charlotte Harbor Watershed BV (EDA Code: [1] G050w) Protective TN Load for the Estuary: [2] 2,710,107 kg y⁻¹ Protective TP Load for the Estuary: [3] TBD				
Less than 50%	NR	NR	0.739	*TBD*
50.1–60.0%	1.798	1.58	0.739	*TBD*
60.1–70.0%	1.798	1.35	0.739	*TBD*
70.1–80.0%	1.798	1.18	0.739	*TBD*
80.1–90.0%	1.798	1.05	0.739	*TBD*
90.1–100%	1.798	0.95	0.739	*TBD*

River/stream reach category—percent delivered to estuary [4]	(mg L⁻¹)		TP (mg L⁻¹)	
	TN IPV [5]	TN DPV [6]	TP IPV [7]	TP DPV [8]
Indian River Watershed [PN] (EDA Code: [1] S190x) **Protective TN Load for the Estuary:** [2] **463,724 kg y⁻¹** **Protective TP Load for the Estuary:** [3] **TBD**				
Less than 50%	*NR*	*NR*	0.107	*TBD*
50.1–60.0%	*NR*	*NR*	0.107	*TBD*
60.1–70.0%	*NR*	*NR*	0.107	*TBD*
70.1–80.0%	1.205	0.87	0.107	*TBD*
80.1–90.0%	1.205	0.77	0.107	*TBD*
90.1–100%	1.205	0.69	0.107	*TBD*
Caloosahatchee River Watershed [PN,#] (EDA Code: [1] G050a) **Protective TN Load for the Estuary:** [2] TBD **Protective TP Load for the Estuary:** [3] TBD				
Less than 50%	1.205	*TBD*	0.107	*TBD*
50.1–60.0%	1.205	*TBD*	0.107	*TBD*
60.1–70.0%	1.205	*TBD*	0.107	*TBD*
70.1–80.0%	1.205	*TBD*	0.107	*TBD*
80.1–90.0%	1.205	*TBD*	0.107	*TBD*
90.1–100%	1.205	*TBD*	0.107	*TBD*
St. Lucie River Watershed [PN,#] **(EDA Code:** [1] S190x) **Protective TN Load for the Estuary:** [2] **TBD** **Protective TP Load for the Estuary:** [3] TBD				
Less than 50%	1.205	*TBD*	0.107	*TBD*
50.1–60.0%	1.205	*TBD*	0.107	*TBD*
60.1–70.0%	1.205	*TBD*	0.107	*TBD*
70.1–80.0%	1.205	*TBD*	0.107	*TBD*
80.1–90.0%	1.205	*TBD*	0.107	*TBD*
90.1–100%	1.205	*TBD*	0.107	*TBD*
Kissimmee River Watershed [PN,^] **Protective TN Load for the Estuary:** [2] TBD **Protective TP Load for the Estuary:** [3] TBD				
Less than 50%	1.205	*TBD* [9]	0.107	*TBD* [9]
50.1–60.0%	1.205	*TBD* [9]	0.107	*TBD* [9]
60.1–70.0%	1.205	*TBD* [9]	0.107	*TBD* [9]
70.1–80.0%	1.205	*TBD* [9]	0.107	*TBD* [9]
80.1–90.0%	1.205	*TBD* [9]	0.107	*TBD* [9]
90.1–100%	1.205	*TBD* [9]	0.107	*TBD* [9]
St. John's River Watershed; [PN] (EDA Code: [1] S180x) **Protective TN Load for the Estuary:** [2] 4,954,662 kg y⁻¹ **Protective TP Load for the Estuary:** [3] **TBD**				
Less than 50%	1.205	1.41	0.107	*TBD*
50.1–60.0%	1.205	1.17	0.107	*TBD*
60.1–70.0%	1.205	1.00	0.107	*TBD*
70.1–80.0%	1.205	0.88	0.107	*TBD*
80.1–90.0%	1.205	0.78	0.107	*TBD*
90.1–100%	1.205	0.70	0.107	*TBD*
Daytona/St. Augustine Coastal Drainage Area [PN] (CDA Code: [1] S183x) **Protective TN Load for the Estuary:** [2] TBD **Protective TP Load for the Estuary:** [3] TBD				
Less than 50%	*NR*	*TBD*	0.107	*TBD*
50.1–60.0%	*NR*	*TBD*	0.107	*TBD*
60.1–70.0%	*NR*	*TBD*	0.107	*TBD*
70.1–80.0%	*NR*	*TBD*	0.107	*TBD*
80.1–90.0%	1.205	*TBD*	0.107	*TBD*
90.1–100%	1.205	*TBD*	0.107	*TBD*
Nassau Coastal Drainage Area [PN] (CDA Code: [1] S175x) **Protective TN Load for the Estuary:** [2] 131,389 kg y⁻¹ **Protective TP Load for the Estuary:** [3] TBD				
Less than 50%	1.205	0.59	0.107	*TBD*
50.1–60.0%	*NR*	*NR*	0.107	*TBD*
60.1–70.0%	*NR*	*NR*	0.107	*TBD*

River/stream reach category—percent delivered to estuary [4]	(mg L−1)		TP (mg L−1)	
	TN IPV [5]	TN DPV [6]	TP IPV [7]	TP DPV [8]
70.1–80.0%	*NR*	*NR*	0.107	*TBD*
80.1–90.0%	1.205	0.33	0.107	*TBD*
90.1–100%	1.205	0.30	0.107	*TBD*
St. Mary's River Watershed [PN] (EDA Code: [1] S170x) **Protective TN Load for the Estuary:** [2] 562,644 kg y−1 **Protective TP Load for the Estuary:** [3] TBD				
Less than 50%	*NR*	*NR*	0.107	*TBD*
50.1–60.0%	*NR*	*NR*	0.107	*TBD*
60.1–70.0%	*NR*	*NR*	0.107	*TBD*
70.1–80.0%	1.205	0.43	0.107	*TBD*
80.1–90.0%	1.205	0.38	0.107	*TBD*
90.1–100%	1.205	0.34	0.107	*TBD*

Footnotes associated with this table:

[1] Watershed delineated by NOAA's Coastal Assessment Framework and associated Florida Department of Environmental Protection's estuarine and coastal water body identifier (WBID).

[2] Estimated TN load delivered to the estuary protective of aquatic life use. These estimates may be revised pursuant to the EPA final rule for numeric nutrient criteria for Florida's estuaries and coastal waters (October 2011).

[3] Estimated TP load delivered to the estuary protective of aquatic life use. These estimates are currently under development. Preliminary estimates may be revised pursuant to the EPA final rule for numeric nutrient criteria for Florida's estuaries and coastal waters (October 2011).

[4] River/Stream reach categories within each estuarine watershed are linked spatially to a specific FDEP water body identifier (WBID). See Appendix B–18 of the "Technical Support Document for EPA's Proposed Rule for Numeric Nutrient Criteria for Florida's Inland Surface Fresh Waters."

[5] Instream Protection Value (IPV) is the TN concentration protective of instream aquatic life use.

[6] Downstream protection values (DPVs) are estimated TN concentrations in the river/stream reach that meet the estimated TN load, protective of aquatic life use, delivered to the estuarine waters. These estimates may be revised pursuant to the EPA final rule for numeric nutrient criteria for Florida's estuaries and coastal waters (October 2011).

[7] Instream Protection Value (IPV) is the TP concentration protective of instream aquatic life use.

[8] Downstream protection values (DPVs) are estimated TP concentrations in the river/stream reach that meet the estimated TP load, protective of aquatic life use, delivered to the estuarine waters. These estimates are currently under development. Preliminary estimates may be revised pursuant to the EPA final rule for numeric nutrient criteria for Florida's estuaries and coastal waters (October 2011).

[9] EPA's proposed TN and TP criteria for colored lakes (>40 PCU) are 1.2 and 0.050 mg L−1, respectively.

Estimated TN and TP loads protective of aquatic life in the Caloosahatchee and St. Lucie River estuaries, and in turn estimated TN and TP concentrations that would meet those protective loads, could not be calculated using EPA's downstream protection approach. An alternative downstream protection approach will be proposed in EPA's proposed rule for FL estuaries (January 2011).

^ Kissimmee River watershed does not have an EDA or CDA code because it does not drain directly to an estuary or coastal area, but rather indirectly through Lake Okeechobee and the south Florida canal system.

A protective TN and TP load for Lake Okeechobee has not been calculated, however, a TMDL is in effect for TP. EPA's proposed colored lake criteria (> 40 PCU) could be used to develop DPVs for TN and TP for the Kissimmee watershed (see footnote 9).

[LO] DPVs to be based on protective TN and TP loads for Lake Okeechobee. EPA's proposed colored lake criteria (>40 PCU) could be used to develop DPVs for TN and TP for the Kissimmee watershed (see footnote 9).

[NR] There are no stream reaches present in this watershed that have a percent-delivered within this range and thus criteria are not applicable.

[PH] Panhandle Nutrient Watershed Region.

[BV] Bone Valley Nutrient Watershed Region.

[PN] Peninsula Nutrient Watershed Region.

[NC] North Central Nutrient Watershed Region.

[TBD] To be determined.

(v) Application of DPVs for Downstream Estuary Protection

The following discussion further explains the conceptual relationship between IPVs and DPVs for stream criteria. EPA developed IPVs to protect the uses that occur within the stream itself at the point of application, such as protection of the benthic invertebrate community and maintenance of a healthy balance of phytoplankton species. In contrast, EPA developed DPVs for streams to protect WQS of downstream waters. EPA derived DPVs in Florida streams by distributing the protective load from the aggregate stream network identified for each downstream estuary (that is protective of estuarine conditions) across the watershed in proportion to the amount of flow contributed by each stream reach. EPA's approach also accounts for attenuation of nutrients (or loss from the system) as water travels from locations upstream in the watershed to locations near the mouth of the estuary.

When comparing an IPV and DPV that are each deemed to apply to a particular stream segment, the more stringent of the two values is the numeric nutrient criterion that would need to be met when implementing CWA programs. Water bodies can differ significantly in their sensitivity to nutrients in general and to TN specifically. Although not universally true, freshwaters are generally phosphorus-limited and thus more sensitive to phosphorus enrichment because nitrogen is present in excess. Enriching freshwaters with phosphorus does not usually drive these systems into nitrogen limitation but can simply encourage growth of nitrogen-fixing algal species which can convert atmospheric nitrogen into ammonia. Conversely, estuaries are more often nitrogen limited and thus more sensitive to adverse impacts from nitrogen enrichment. As a result, it is not at all surprising that DPVs for TN in Florida are often less than the corresponding IPVs.

Adjustments to DPVs are possible with a redistribution approach, which revises the original uniform assignment of protective downstream estuarine loadings across the estuarine drainage area using the DPV methodology, or by revising either the protective load delivered to the downstream estuary and/or the equivalent DPVs using a technical approach of comparable scientific rigor and the Federal SSAC procedure described in section V.C of this notice.

Re-distributing the allocation of protective loading within an estuarine drainage area, or subset of an estuarine drainage area, is appropriate and protective because the total load delivered to the mouth of the estuary would still meet the protective load. DPVs may be a series of values for each reach in the upstream drainage area such that the sum of reach-specific incremental loading delivered to the estuary equals the protective loading rate taking into account that downstream reaches must reflect loads established for upstream reaches. Adjustments to DPVs may also factor in additional nutrient attenuation provided by already existing landscape modifications or treatment systems, such as constructed wetlands or stormwater treatment areas, where the attenuation is sufficiently documented and not a temporary condition. Unlike re-allocation of an even distribution of loading, these types of adjustments, as well as other site-specific information on alternative fractions delivered, would require use of the SSAC procedure under this proposal. EPA requests comment on whether these adjustments should be allowed to occur in the implementation of the re-allocation process rather than as a SSAC.

A technical approach of comparable scientific rigor will include a systematic data driven evaluation and accompanying analysis of relevant factors to identify a protective load delivered to the estuary. An acceptable alternate numeric approach also includes a method to distribute and apply the load to streams and other waters within the estuarine drainage area in a manner that recognizes conservation of mass and makes use of a peer-reviewed model (empirical or mechanistic) of comparable or greater rigor and scientific defensibility than the USGS SPARROW model. To use an alternative technical approach, the State must go through the process for a Federal SSAC procedure as described in Section V.C.

EPA requests comment on the DPV approach, the technical merit of the estimated protective loadings, and the technical merit of the method for calculating stream reach values. EPA also requests comment on other scientifically defensible approaches for ensuring protection of designated uses in estuaries. At this time, EPA plans to take final action with respect to downstream protection values for nitrogen as part of the second phase of this rulemaking process in coordination with the proposal and finalization of numeric standards for estuarine and coastal waters in 2011. However, if comments, data and analyses submitted as a result of this proposal support finalizing these values sooner, by October 2010, EPA may choose to proceed in this manner. To facilitate this process, EPA requests comments and welcomes thorough evaluation on the technical and scientific basis of these proposed downstream protection values as part of the broader comment and evaluation process that this proposal initiates.

D. Proposed Numeric Nutrient Criteria for the State of Florida's Springs and Clear Streams

(1) Proposed Numeric Nutrient Criteria for Springs and Clear Streams

Springs and their associated spring runs in Florida are a unique class of aquatic ecosystem, highly treasured for their biological, economic, aesthetic, and recreational value. Globally, the largest number of springs (per unit of area), occur in Florida; Florida has over 700 springs and associated spring runs. Many of the larger spring ecosystems in Florida have likely been in existence since the end of the last major ice age (approximately 15,000 to 30,000 years ago). The productivity of the diverse assemblage of aquatic flora and fauna in Florida springs is primarily determined by the naturally high amount of light availability of these waters (naturally high clarity).[87] As recently as 50 years ago, these waters were considered by naturalists and scientists to be some of the most unique and exceptional waters in the State of Florida and the Nation as a whole.

In Florida, springs are also highly valued as a water resource for human use: people use springs for a variety of recreational purposes and are interested in the intrinsic aesthetics of clear, cool water emanating vigorously from beneath the ground. A good example of the value of springs in Florida is the use of the spring boil areas that have sometimes been modified to encourage human recreation (bathing or swimming).[88]

Over the past two decades, scientists have identified two significant anthropogenic factors linked to adverse changes in spring ecosystems that have the potential to permanently alter Florida's spring ecosystems. These are: (1) Pollution of groundwater,[89] principally with nitrate-nitrite, resulting from human land use changes, cultural practices, and explosive population growth; and (2) simultaneous reductions in groundwater supply from human withdrawals.[90] Pollution associated with human activities is one of the most critical issues affecting the health of Florida's springs.[91]

Excess nutrients, in particular excess nitrogen, seep into the soils and move to groundwater.[92] When in excess, nutrients lead to eutrophication of groundwater-fed springs, allowing algae and invasive plant species to displace native plants, which in turn results in an ecological imbalance.[93] Excessive growth of nuisance algae and noxious plant species in turn result in reduced habitat and food sources for native wildlife,[94] excess organic carbon production, accelerated decomposition, and lowered quality of the floor or "bottom" of springs and spring runs, all of which adversely impact the overall health and aesthetics of Florida's springs.

Adverse impacts on the overall health of Florida's springs have been evident over the past several decades. Within the last 20–30 years, observations at

[87] Brown M.T., K. Chinners Reiss, M.J. Cohen, J.M. Evans, P.W. Inglett, K. Sharma Inglett, K. Ramesh Reddy, T.K. Fraze, C.A. Jacoby, E.J. Phlips, R.L. Knight, S.K. Notestein, R.G. Hamann, and K.A. McKee. 2008. Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems. *http://www.dep.state.fl.us/springs/reports/files/UF_SpringsNutrients_Report.pdf*, University of Florida, Gainesville, Florida.

[88] Scott, T.M., G.H. Means, R.P. Meegan, R.C. Means, S.B. Upchurch, R.E. Copeland, J. Jones, T. Roberts, and A. Willet. 2004. Springs of Florida. Bulletin No, 66. Florida Geological Survey. Tallahassee, FL. 677 pp.

[89] Katz, B.G., H.D. Hornsby, J.F. Bohlke and M.F. Mokray. 1999. Sources and chronology of nitrate contamination in spring water, Suwannee River Basin, Florida. U.S. Geological Survey Water-Resources Investigations Report 99–4252. Reston, VA.

[90] Brown M.T., K. Chinners Reiss, M.J. Cohen, J.M. Evans, P.W. Inglett, K. Sharma Inglett, K. Ramesh Reddy, T.K. Fraze, C.A. Jacoby, E.J. Phlips, R.L. Knight, S.K. Notestein, R.G. Hamann, and K.A. McKee. 2008. Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems. *http://www.dep.state.fl.us/springs/reports/files/UF_SpringsNutrients_Report.pdf*, University of Florida, Gainesville, Florida.

[91] Ibid.

[92] Katz, B.G., H.D. Hornsby, J.F. Bohlke and M.F. Mokray. 1999. Sources and chronology of nitrate contamination in spring water, Suwannee River Basin, Florida. U.S. Geological Survey Water-Resources Investigations Report 99–4252. Reston, VA.

[93] Doyle, R.D. and R.M. Smart. 1998. Competitive reduction of noxious *Lyngbya wollei* mats by rooted aquatic plants. Aquatic Botany 61:17–32.

[94] Stevenson, R.J., A. Pinowska, A. Albertin, and J.O. Sickman. 2007. Ecological condition of algae and nutrients in Florida springs: The Synthesis Report. Prepared for the Florida Department of Environmental Protection. Tallahassee, FL. 58 pp.

Bonn, M.A. and F.W. Bell. 2003. Economic Impact of Selected Florida Springs on Surrounding Local Areas. Report prepared for the Florida Department of Environmental Protection. Tallahassee, FL.

several of Florida's springs suggest that nuisance algae species have proliferated, and are now out-competing and replacing native submerged vegetation. Numerous biological studies have documented excessive algal growth at many major springs. In some of the more extreme examples, such as Silver Springs and Weeki Wachee Springs, algal mat accumulations have become over three feet thick.[95,96]

As a result of human-induced land use changes, cultural practices, and explosive population growth, there has been an increase in the level of pollutants, especially nitrate, in groundwater over the past decades.[97] Because there is no geologic source of nitrogen in springs, all of the nitrogen emerging in spring vents originates from that which is deposited on the land. Historically, nitrate concentrations in Florida's spring discharges were thought to have been around 0.05 mg/L or less, which is sufficiently low to restrict growth of algae and vegetation under "natural" conditions.[98]

Regions where springs emanate in Florida have experienced unprecedented population growth and changes in land use over the past several decades.[99] With these changes in population and growth came a transfer of nutrients, particularly nitrate, to groundwater. Of 125 spring vents sampled by the Florida Geological Survey in 2001–2002, 42% had nitrate concentrations exceeding 0.50 mg/L and 24% had concentrations greater than 1.0 mg/L.[100] Similarly, a recent evaluation of water quality in 13 springs shows that mean nitrate-nitrite levels have increased from 0.05 mg/L to 0.9 mg/L between 1970 and 2002. Overall, data suggest that nitrate-nitrite concentrations in many spring discharges have increased from 10 to 350 fold over the past 50 years, with the level of increase closely correlated with anthropogenic activity and land use changes within the karst regions of Florida where springs predominate.

As nitrate-nitrite concentrations have increased during the past 20 to 50 years, many Florida springs have undergone adverse environmental and biological changes. According to FDEP, there is a general consensus in the scientific community that nitrate is an important factor leading to the observed changes in spring ecosystems, and their associated biological communities. Nitrogen, particularly nitrate-nitrite, appears to be the most problematic nutrient problem in Florida's karst region.[101]

Because nitrate-nitrite has been linked to many of the observed detrimental impacts in spring ecosystems, there is an immediate need to reduce nitrate-nitrite concentrations in spring vents and groundwater. A critical step in achieving reductions in nitrate-nitrite is to develop a numeric nitrate-nitrite criterion for spring systems that will be protective of these unique and treasured resources.[102]

To protect springs and clear streams and to provide assessment levels and restoration goals for those that have already been impaired by nutrients, EPA is proposing numeric nutrient criteria for the following parameter for Florida's springs and clear streams (< 40 PCU) classified as Class I or III waters under Florida law (Rule 62–302.400, F.A.C.):

> Nitrate (NO_3)+Nitrite (NO_2) shall not surpass a concentration of 0.35 mg/L as an annual geometric mean more than once in a three-year period, nor surpassed as a long-term average of annual geometric mean values.

In addition to the nitrate-nitrite criterion, TN and TP criteria developed for streams on a watershed basis are also applicable to clear streams. *See* Section III.C(1) "Proposed Numeric Nutrient Criteria for the State of Florida's Rivers and Streams" for the table of proposed TN and TP criteria that would apply to clear streams located within specific watersheds.

(2) Methodology for Deriving EPA's Proposed Criteria for Springs and Clear Streams

EPA's proposed nitrate-nitrite criterion for springs and clear streams are derived from a combination of FDEP laboratory data, field surveys, and analyses which include analyses conducted to determine the stressor response-based thresholds that link nitrate-nitrite levels to biological risk in springs and clear streams. These data document the response of nuisance algae, *Lyngbya wollei* and *Vaucheria sp.*, and periphyton to nitrate-nitrite concentrations. Please refer to EPA's TSD for Florida's Inland Waters, Chapter 3: Methodology for Deriving U.S. EPA's Proposed Criteria for Springs and Clear Streams.

As described in Section III.C(2), the ability to establish protective criteria for both causal and response variables depends on available data and scientific approaches to evaluate these data. EPA has not undertaken the development of TP criteria for springs because phosphorus has historically been present in Florida's springs, given the State's naturally phosphorus-rich geology, and the lack of an increasing trend of phosphorus concentrations in most spring discharges. EPA is not proposing chlorophyll *a* and clarity criteria due to the lack of available data for these response variables in spring systems. Furthermore, scientific evidence examining the strong relationship between rapid periphyton survey data (measurements of the thickness of algal biomass attached to substrate rather than free-floating) and nutrients in clear streams (those with color <40 PCU and canopy cover ≤ 40% which are comparable to most waters found in springs and spring runs) show that benthic algal thickness is highly dependent on nitrogen parameters (TN and total inorganic nitrogen), as opposed to phosphorus. In addition,

[95] Pinowska, A., R.J. Stevenson, J.O. Sickman, A. Albertin, and M. Anderson. 2007. Integrated interpretation of survey for determining nutrient thresholds for macroalgae in Florida Springs: Macroalgal relationships to water, sediment and macroalgae nutrients, diatom indicators and land use. Florida Department of Environmental Protection, Tallahassee, FL.

[96] Stevenson, R.J., A. Pinowska, and Y.K. Wang. 2004. Ecological condition of algae and nutrients in Florida springs. Florida Department of Environmental Protection, Tallahassee, FL.

[97] Scott, T.M., G.H. Means, R.P. Meegan, R.C. Means, S.B. Upchurch, R.E. Copeland, J. Jones, T. Roberts, and A. Willet. 2004. Springs of Florida. Bulletin No, 66. Florida Geological Survey. Tallahassee, FL. 677 pp.

[98] Maddox, G.L., J.M. Lloyd, T.M. Scott, S.B. Upchurch and R. Copeland. 1992. Florida's Groundwater Quality Monitoring Program—Background Hydrochemistry. Florida Geological Survey Special Publication 34. Tallahassee, FL.

[99] Katz, B.G., H.D. Hornsby, J.F. Bohlke and M.F. Mokray. 1999. Sources and chronology of nitrate contamination in spring water, Suwannee River Basin, Florida. U. S. Geological Survey Water-Resources Investigations Report 99–4252. Reston, VA.

Brown M.T., K. Chinners Reiss, M.J. Cohen, J.M. Evans, P.W. Inglett, K. Sharma Inglett, K. Ramesh Reddy, T.K. Fraze, C.A. Jacoby, E.J. Phlips, R.L. Knight, S.K. Notestein, R.G. Hamann, and K.A. McKee. 2008. Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems. *http://www.dep.state.fl.us/springs/reports/files/UF_SpringsNutrients_Report.pdf,* University of Florida, Gainesville, Florida.

[100] Scott, T.M., G.H. Means, R.P. Meegan, R.C. Means, S.B. Upchurch, R.E. Copeland, J. Jones, T. Roberts, and A. Willet. 2004. Springs of Florida. Bulletin No, 66. Florida Geological Survey. Tallahassee, FL. 677 pp.

[101] Brown M.T., K. Chinners Reiss, M.J. Cohen, J.M. Evans, P.W. Inglett, K. Sharma Inglett, K. Ramesh Reddy, T.K. Fraze, C.A. Jacoby, E.J. Phlips, R.L. Knight, S.K. Notestein, R.G. Hamann, and K.A. McKee. 2008. Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems. *http://www.dep.state.fl.us/springs/reports/files/UF_SpringsNutrients_Report.pdf,* University of Florida, Gainesville, Florida.

[102] Brown M.T., K. Chinners Reiss, M.J. Cohen, J.M. Evans, P.W. Inglett, K. Sharma Inglett, K. Ramesh Reddy, T.K. Fraze, C.A. Jacoby, E.J. Phlips, R.L. Knight, S.K. Notestein, R.G. Hamann, and K.A. McKee. 2008. Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems. *http://www.dep.state.fl.us/springs/reports/files/UF_SpringsNutrients_Report.pdf,* University of Florida, Gainesville, Florida.

EPA is proposing to apply the nitrate-nitrite criteria derived for springs to clear streams as a measure to gauge anthropogenic contributions to TN. EPA is not currently proposing criteria for clarity and chlorophyll *a* for clear streams due to the lack of scientific evidence supporting the relationship between these response variables and nutrients. Clear streams show weak relationships between nutrients and chlorophyll *a*, as opposed to color streams where phytoplankton responses occur more readily than periphyton growth. Please refer to EPA's TSD for Florida's Inland Waters, Chapter 3: Methodology for Deriving U.S. EPA's Proposed Criteria for Springs and Clear Streams.

(a) Derivation of Proposed Nitrate-Nitrite Criteria

EPA's goal in deriving nitrate-nitrite criteria for Florida springs and clear streams is to ensure that the criteria will preserve the ecosystem structure and function of Florida's springs and clear streams. EPA reviewed Florida data, FDEP's approach and analyses, and FDEP's proposed nitrate-nitrite criterion for springs and clear streams and has concluded that the FDEP approach and the values FDEP derived represent a scientifically sound basis for the derivation of these criteria. FDEP evaluated results from laboratory scale dosing studies, data from in-situ algal monitoring, real-world surveys of biological communities and nutrient levels in Florida springs, and data on nitrate-nitrite concentrations found in minimally-impacted reference locations.

FDEP analyzed laboratory data[103] that evaluated the growth response of nuisance algae to nitrate addition. FDEP's analysis showed that *Lyngbya wollei* and *Vaucheria sp.* reached 90% of their maximum growth at 0.230 mg/L and 0.261 mg/L nitrate-nitrite, respectively. FDEP also reviewed long-term field surveys that examined the response of nuisance algae, periphyton, and eutrophic indicator diatoms to nitrate-nitrite concentration.[104] The results showed a sharp increase in abundance and/or biomass of the nuisance algae, periphyton, and diatoms at 0.44 mg/L nitrate-nitrite.

FDED also reviewed the field surveys used to develop TMDLs for Wekiva River and Rock Spring Run to evaluate the relationship between the observed excessive algal growth and imbalance in aquatic flora with measurements of nutrients in these particular systems. FDEP found that taxa indicative of eutrophic conditions increased significantly with increasing nitrate-nitrite concentrations above approximately 0.35 mg/L.

Based on its review of a combination of this laboratory and field data, FDEP concluded that significant alterations in community composition (eutrophic indicator diatoms), in combination with an increase in periphyton cell density and biomass, clearly demonstrate that a nitrate-nitrite level in the range between 0.23 mg/L (the laboratory threshold) and 0.44 mg/L (the field study derived value associated with the upper bound nitrate-nitrite concentration where substantial observed biological changes were apparent) is the amount of nitrate-nitrite associated with an imbalance of aquatic flora in spring systems.[105]

FDEP conducted further statistical analyses of the available data from the multiple lines of evidence, applied an appropriate safety factor to ensure that waters would not reach the nitrate-nitrite levels associated with "substantial observed biological changes," and averaged the results to arrive at a final protective threshold value for nitrate-nitrite in springs and clear streams of 0.35 mg/L. Based on the discussion above and corresponding analysis in the TSD for Florida's Inland Waters, EPA has concluded that this value was derived in a scientifically sound manner, appropriately considering the available data, and appropriately interpreting the multiple lines of evidence. Accordingly, EPA is proposing 0.35 mg/L nitrate-nitrite as a protective criterion for aquatic life in Florida's springs and clear streams.

(b) Proposed Criteria: Duration and Frequency

EPA is proposing a duration and frequency expression of an annual geometric mean not to be surpassed more than once in a three-year period to be consistent with the expressions of duration and frequency for other water body types (*e.g.*, lakes, streams, canals) for TN and TP and for the same reasons EPA selected a three-year period for those waters. Second, EPA proposes that the long-term arithmetic average of annual geometric means not exceed the criterion-magnitude concentration. EPA anticipates that Florida will use its standard assessment periods as specified in Rule 62–303, F.A.C. (Impaired Waters Rule) to implement this second provision. EPA has determined that this frequency of excursions should not result in unacceptable effects on aquatic life as it will allow the springs and clear streams aquatic systems enough time to recover from an occasionally elevated year of nutrient loadings. The Agency requests comment on these proposed duration and frequency expressions of the springs and clear streams numeric nutrient criteria.

EPA also considered as an alternative, expressing the criterion as a monthly median not to be surpassed more than 10% of the time. Stated another way, the median value over any given calendar month shall not be higher than the criterion-magnitude value in more than one out of every ten months. It is appropriate to express a monthly criterion as a median because the median is less susceptible to outliers than the geometric mean. This is particularly important when dealing with small sample sizes. This alternative is consistent with the expression that FDEP proposed in July 2009 for its State rule and the expression in the TSD for Florida's Inland Waters that EPA sent out for external scientific peer review in July 2009. The rationale for this alternative is that field data indicate that the response in springs is correlated to monthly exposure at the criterion-magnitude concentration value and a 10% frequency of excursions is a reasonable and fully protective allowance given small sample sizes in any given month (*i.e.*, the anticipated amount of data that will be available for assessment purposes in the future). The clear streams nitrate-nitrite criterion was derived by FDEP based on multiple lines of evidence, with the primary lines of evidence being mesocosm dosing experiments and field studies. These two main studies were conducted by FDEP over very different time frames. One set of mesocosm studies was conducted by FDEP for periods just under one month (*i.e.*, 21 to 28 days), while another, the algal biomass field survey, was conducted over an 18-year period and was analyzed using four to five year averaging periods.[106] While lab

[103] Stevenson, R.J., A. Pinowska, A. Albertin, and J.O. Sickman. 2007. Ecological condition of algae and nutrients in Florida springs: The Synthesis Report. Prepared for the Florida Department of Environmental Protection. Tallahassee, FL. 58 pp.

Cowell, B.C. and C.J. Dawes. 2004. Growth and nitrate-nitrogen uptake by the cyanobacterium *Lyngbya wollei*. *J. Aquatic Plant Management* 42: 69–71.

[104] Gao, X. 2008. Nutrient TMDLs for the Wekiva River (WBIDs 2956, 2956A, and 2956C) and Rock Springs Run (WBID 2967). Florida Department of Environmental Protection, Tallahassee, Florida.

[105] Mattson, R.A., E.F. Lowe, C.L. Lippincott, D. Jian, and L. Battoe. 2006. Wekiva River and Rock Springs Run Pollutant Load Reduction Goals. St. Johns River Water Management District, Palatka, Florida.

[106] Gao, X. 2008. Nutrient TMDLs for the Wekiva River (WBIDs 2956, 2956A, 2956C) and Rock

studies indicate that algal communities can respond to excess nitrate-nitrite over a short period of time, the mesocosm and other dosing studies indicate that this response occurs on the order of a month, which might support a monthly expression of the criterion.[107] However, there is no evidence to suggest that the responses observed within a month under controlled lab settings equate to impairment of the designated use in conditions experienced in State waters. Please refer to EPA's TSD for Florida's Inland Waters, Chapter 3: Methodology for Deriving U.S. EPA's Proposed Criteria for Springs and Clear Streams.

The 10% excursion frequency would recognize that in most cases the monthly "median" would actually be based on a single sample, given that most springs are only sampled monthly at the most. A 10% excursion frequency may be considered a reasonable and fully protective allowance given small sample sizes in any given month, essentially requiring that the monthly median nitrate-nitrate concentrations thought to be fully supportive of relevant designated uses be met 90% of the time.

EPA requests comment on these proposed criteria duration and frequency expressions, and the basis for their derivation. EPA notes that some scientists and resource managers have suggested that nutrient criteria duration and frequency expressions should be more restrictive to avoid seasonal or annual "spikes" from which the aquatic system cannot easily recover, whereas others have suggested that criteria expresssed as simply a long-term average of annual geometric means, consistent with data used in criteria derivation, would still be protective. EPA requests comment on alternative duration and frequency expressions that might be considered protective, including (1) a criterion-duration expressed as a monthly average or geometric mean, (2) a criterion-frequency expressed as meeting allowable magnitude and duration every year, (3) a criterion-frequency expressed as meeting allowable magnitude and duration in more than half the years of a given assessment period, and (4) a criterion-frequency expressed as meeting the allowable magnitude and duration as a long-term average only. EPA further requests comment on whether an expression of the criteria in terms of an arithmetic average of annual geometric mean values based on rolling three-year periods of time would also be protective of the designated use.

(3) Request for Comment and Data on Proposed Approach

EPA believes the proposed nutrient criterion for springs and clear streams in this rule are protective of the designated aquatic life use of these waters in Florida. EPA is soliciting comment on the approach FDEP used and EPA adopted to derive nitrate-nitrite criterion for springs and clear streams, including the data and analyses underlying the proposed criterion. EPA is seeking additional, readily-available, pertinent data and information related to nutrient concentrations or nutrient responses in springs and clear streams in Florida. EPA is also soliciting views on other potential, scientifically sound approaches to deriving protective nitrate-nitrite criterion for springs and clear streams in Florida.

(4) Alternative Approaches: Nitrate-Nitrite Criterion for All Waters as an Independent Criterion

EPA is soliciting comment on the environmental benefits associated with deriving a nitrate-nitrite criterion for all waters covered by this proposal (*i.e.*, all streams, lakes, and canals), in addition to the other proposed nutrient criteria for those water bodies. Adoption of a nitrate-nitrite criterion for waters other than springs and clear streams could be useful from an assessment and management perspective. Florida could use nitrate-nitrite data to identify increasing trends that may indicate the need for more specific controls of certain nitrogen enrichment sources. In cases where waters are impaired for either TN, nitrate-nitrite, or both TN and nitrate-nitrite, FDEP could use the nitrate-nitrite data to potentially target discharges of anthropogenic origin given their relative source contribution to nitrogen enrichment.

This alternative approach, which would involve EPA deriving nitrate-nitrite criteria for all waters or alternatively applying 0.35 mg/L nitrate-nitrite to all waters, could provide additional protection for aquatic life designated uses. The alternative approach would also eliminate the need for FDEP to characterize streams as clear or not. Deriving and applying a nitrate-nitrite criterion to all waters would reduce the likelihood of excess loading of the specific anthropogenic components of TN to colored waters. However, these colored streams may be less likely to show an observed response to nitrate-nitrite due to the presence of tannins that block light penetration. Thus, the presence of color in streams may confound the relationship that produced the 0.35 mg/L nitrate-nitrite criterion.

E. Proposed Numeric Nutrient Criteria for South Florida Canals

(1) Proposed Numeric Nutrient Criteria for South Florida Canals

There are thousands of miles of canals in Florida, particularly in the southeastern part of the State. Canals are artificial waterways that are either the result of modifications to existing rivers or streams, or waters that have been created for various purposes, including drainage and flood control (stormwater management), irrigation, navigation, and recreation. These canals also allow for the creation of many waterfront home sites in Florida. Ecosystems that existed in rivers and streams prior to their modification into canals are altered. These changes can affect fish and wildlife and plant growth, as further explained in the following paragraphs. Newly created canals may have a tendency to fill with aquatic plants. Canals in south Florida vary greatly in size and depth. They can be anywhere from a few feet wide and a few feet deep to hundreds of feet wide and as deep as 30–35 feet.

South Florida canals vary in their hydrology and behavior due to their size, function, and seasonality. Shallow canals with slow water flow have poor turnover of water and little flushing. Large canals also may have low flow and turnover during the dry season. In contrast, during the wet season these same large canals are flowing systems that quickly move large volumes of water, as they were designed to accomplish. Excess nutrients in canals in combination with poor water circulation and decreased levels of dissolved oxygen, can lead to accelerated eutrophication and adverse impacts on other forms of aquatic life such as fish and other aquatic animals. In these canals, the accumulation of decaying organic matter on the canal bottom can also adversely impact healthy aquatic ecosystems.

South Florida canals are highly managed waterways. Some canals are prone to an over-abundance of aquatic plants. Without regular and frequent management, dense vegetation can clog the waterways making navigation difficult and slowing the movement of water through the canal system. This can interfere with flood control, boating, and fishing. Aquatic plants (like plants in the terrestrial environment) respond

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Springs Run (WBID 2967). Florida Department of Environmental Protection, Tallahassee, Florida.

[107] Stevenson, R.J., A. Pinowska, A. Albertin, and J.O. Sickman. 2007. Ecological condition of algae and nutrients in Florida springs: The Synthesis Report. Prepared for the Florida Department of Environmental Protection. Tallahassee, FL. 58 pp.

and grow when fertilized with nutrients such as phosphorus and nitrogen, and thus nutrient runoff into canals is likely a significant contributor to both nuisance algal blooms and clogging of canal systems by aquatic plants.

EPA is proposing numeric nutrient criteria for the following parameters and geographic classifications in south Florida, for canals classified as Class III waters under Florida law (Rule 62–302.400, F.A.C.). The proposed and alternative approaches described herein would not apply for TP in canals within the Everglades Protection Area (EvPA) since there is an existing TP criterion of 0.010 mg/L that currently applies to the marshes and adjacent canals within the EvPA (Rule 62–302.540, F.A.C.).

	Chlorophyll *a* (µg/L) [a]	Total phosphorus (TP) (mg/L) [a b]	Total nitrogen (TN) (mg/L) [a]
Canals	4.0	0.042	1.6

[a] Concentration values are based on annual geometric mean not to be surpassed more than once in a three-year period. In addition, the long-term average of annual geometric mean values shall not surpass the listed concentration values. (Duration = annual; Frequency = not to be surpassed more than once in a three-year period or as a long-term average).

[b] Applies to all canals within the Florida Department of Environmental Protection's South Florida bioregion, with the exception of canals within the Everglades Protection Area (EvPA) where the TP criterion of 0.010 mg/L currently applies.

The following sections detail the methodology EPA used to develop the proposed numeric nutrient criteria for canals in south Florida, and request comment on the proposed criteria and their derivation. In addition, EPA is providing details of two alternative options for deriving canal criteria values that EPA considered and is soliciting comments on these alternatives.

(2) Methodology for Deriving EPA's Proposed Criteria for South Florida Canals

Based on the available information for canals, EPA determined that the most scientifically sound way to derive protective numeric nutrient criteria for south Florida's canals is to use a similar approach to what EPA used to derive numeric nutrient criteria for streams. That is, EPA chose a nutrient concentration distribution-based approach using data from only those canals that have been determined to support the applicable designated use. EPA used existing water quality assessments and identified canals that have been determined to be impaired for nutrients. Data for those canals were excluded from the larger data set in order to create a set of data representing canals attaining the designated use of aquatic life, according to FDEP's assessment decisions. For further information, please refer to EPA's TSD for Florida's Inland Waters, Chapter 4: Methodology for Deriving U.S. EPA's Proposed Criteria for Canals.

(a) Derivation of Proposed Numeric Nutrient Criteria for South Florida Canals

EPA derived numeric nutrient criteria for south Florida canals for two causal variables, TN and TP, and one response variable, chlorophyll *a*. In contrast to EPA's proposed criteria for Florida's streams, EPA concluded that there was a sufficient scientific basis for a chlorophyll *a* criterion for south Florida canals. EPA considered chlorophyll *a* to be an appropriate indicator of nutrient impairment in canals on the basis of the observed seasonal flow regimes, particularly during the relatively drier winter months when flows are relatively lower and canal water residence time is relatively higher (as compared to wetter, summer months). Furthermore, EPA found evidence that canals are susceptible to impairment due to excessive chlorophyll *a* based on the number of canals on Florida's CWA section 303(d) list with chlorophyll *a* cited as the parameter of concern. EPA analyzed the range of chlorophyll *a* concentrations in canals and found that 12% of chlorophyll *a* concentration observations occurred at 10 µg/L or higher and 5% of chlorophyll *a* concentration observations occurred at 20 µg/L or higher. As a point of reference, Florida has chlorophyll *a* thresholds of 20 as the numeric interpretations of its narrative nutrient criteria for streams and 11 µg/L for estuaries/open coastal waters, respectively, in its Impaired Waters Rule (IWR) (Rules 62–303.351 and 62–303.353, F.A.C.). Thus, EPA included chlorophyll *a* as a nutrient criterion to protect canal aquatic life designated uses from an unacceptable biological response to excess nutrients.

EPA employed a statistical distribution approach for deriving numeric nutrient criteria for south Florida canals. Specifically, EPA computed statistical distributions and descriptive statistics (*e.g.*, quartiles, mean, standard deviation) of TN, TP, and chlorophyll *a* concentrations from data derived at canal sites across south Florida that are not on the impaired waters list for Florida. EPA has determined that the criteria derived from a distribution of canal data from canals with no evidence of nutrient impairment are appropriate and protective of designated uses.

As described in detail in Section III.C(2)(c), EPA concluded that the 75th percentiles of the respective TN, TP, and chlorophyll *a* distributions would yield values that would ensure that aquatic life designated uses would be protected in south Florida canals. A reasonable choice is one that lies just above the vast majority of the population. The 75th percentile represents such a point on the distribution of TN, TP, and chlorophyll *a* values.

(b) Other Data and Analyses Conducted and Considered by EPA in the Derivation of Proposed Numeric Nutrient Criteria for South Florida Canals

EPA undertook extensive analyses and considered a variety of data and methods for deriving numeric nutrient criteria for Florida's canals. Although EPA derived the proposed values based on the approach outlined in the section above, EPA also factored into its decision-making process the results of these other analyses as additional lines of evidence.

One line of additional evidence is based on an evaluation of the stressor-response relationship between chlorophyll *a* levels in canals and TN and TP levels using a variety of statistical tools. A second line of evidence is based on a consideration of the distribution of chlorophyll *a* measurements, TN measurements, and TP measurements from all canals, impaired and not impaired. Nutrient concentrations at the lower end of these distributions were compared to the concentration that the stressor-response analysis determined to be associated with canals with no evidence of nutrient impairment. The third line of evidence is based on a consideration of the distribution of chlorophyll *a*, TN, and

TP values from only those canals considered to be minimally impacted by nutrient-related pollution. EPA considered each of these lines of evidence in deriving the numeric nutrient criteria for canals.

Because soil or substrate type at the bottom of a canal can influence the nutrient cycling and relationships between the observed biological response and the TP and TN levels in canals, EPA used data on soil types in south Florida along with knowledge of the Everglades Agricultural Area (EAA) and the Everglades Protection Area (EvPA) to subdivide the canal areas for criteria derivation. Thus the first step in these other analyses was to group canals and canal data by soil type. The four groupings consist of histosol and entisol soils of the EAA; histosol and entisol soils of the EvPA; spodosol and alfisol soils and areas west of the EvPA and EAA (hereafter, West Coast); and spodosol, entisol and alfisol soils and areas east of the EvPA and EAA (hereafter East Coast).

EPA then sorted canal data (provided by FDEP, Miami-Dade County, and the South Florida Water Management District) into the four canal groupings. EPA screened the data to ensure the exclusion of the following: (1) Sites without relevant data (*e.g.*, nitrogen, phosphorus, chlorophyll *a*), (2) sites influenced by marine waters, (3) sites within Class IV canals or Lake Okeechobee, (4) data not originating within a canal, (5) data with questionable units, and (6) outlier data. Data were organized by canal regions and year. Each site occurring near the border of a region and/or WBID was visually inspected using geographic information system (GIS) tools to ensure the correct placement of those sites. Local experts were also consulted by EPA. EPA analyzed the resulting regionalized data using statistical distribution and regression analyses. EPA undertook its additional analyses using these canal (and data) groupings.

EPA's analysis of the distribution of chlorophyll *a* values in each of the four groupings of canals (using data from impaired and unimpaired sites) indicated that the lower percentile (*i.e.*, 25th percentile) ranged from 1.9 to 2.2 µg/L for chlorophyll *a* in the EvPA, West Coast, and East Coast, and was 6.3 µg/L for the EAA. EPA's analysis of the distribution of TN values in each of the four groupings of canals indicated that the lower percentile (*i.e.*, 25th percentile) ranged from 0.8 to 1.4 mg/L for the EvPA, West Coast, and East Coast and was 2.1 mg/L for the EAA. EPA's analysis of the distribution of TP values in each of the four groupings of canals indicated that the lower percentile (*i.e.*, 25th percentile) ranged from 0.013 to 0.023 mg/L for the EvPA, West Coast, and East Coast and was 0.048 mg/L for the EAA canals.

In an effort to consider chlorophyll *a*, TN, and TP values in canals minimally impacted by nutrient pollution, EPA identified canal sites surrounded by the EvPA in the east and the Big Cypress National Preserve in the west and considered the distribution of chlorophyll *a*, TN and TP values for these sites. Although EPA acknowledges that these sites have not been thoroughly vetted for biological condition, EPA believes that because they are remote and surrounded by wetlands, that these canal sites represent sites with the lowest impact from human activities. The upper percentile values (*i.e.*, the 75th percentile) from the distributions of chlorophyll *a*, TN and TP values for these lower impact sites are 3.4 µg/L for chlorophyll *a*, 1.3 mg/L for TN and 0.018 mg/L for TP.

When considering the results of these additional analyses and comparing these results to the outcome of EPA's analysis of TN, TP, and chlorophyll *a* concentrations from data derived at canal sites across south Florida that are not on the impaired waters list for Florida, it is clear that EPA's proposed criteria for canals are similar to those derived from alternative approaches and therefore, represent a reasonable integration of these multiple lines of evidence. For further information, please refer to EPA's TSD for Florida's Inland Waters, Chapter 4: Methodology for Deriving U.S. EPA's Proposed Criteria for Canals.

(c) Proposed Criteria: Duration and Frequency

Aquatic life water quality criteria contain three components: magnitude, duration, and frequency. For the TN and TP numeric criteria for canals, the derivation of the criterion-magnitude values is described above and these values are provided in the table in Section III.E(1). The criterion-duration for this magnitude (or averaging period) is specified in *footnote a* of the canals criteria table as an annual geometric mean. EPA is proposing two expressions of allowable frequency, both of which are to be met. First, EPA proposes a no-more-than-one-in-three-years excursion frequency for the annual geometric mean criteria for canals. Second, EPA proposes that the long-term arithmetic average of annual geometric means not exceed the criterion-magnitude concentration. EPA anticipates that Florida will use their standard assessment periods as specified in Rule 62–303, F.A.C. (Impaired Waters Rule) to implement this second provision. These proposed duration and frequency components of the criteria are consistent with the data set used to derive the criteria that contained data from multiple years of record, all seasons, and a variety of hydrologic conditions. EPA has determined that this frequency of excursions should not result in unacceptable effects on aquatic life as it will allow the canal aquatic system enough time to recover from an occasionally elevated year of nutrient loadings. The Agency requests comment on these proposed duration and frequency expressions of the canal numeric nutrient criteria.

EPA notes that some scientists and resource managers have suggested that nutrient criteria duration and frequency expressions should be more restrictive to avoid seasonal or annual "spikes" from which the aquatic system cannot easily recover, whereas others have suggested that criteria expressed as simply a long-term average of annual geometric means, consistent with data used in criteria derivation, would still be protective. EPA requests comment on alternative duration and frequency expressions that might be considered protective, including (1) a criterion-duration expressed as a monthly average or geometric mean, (2) a criterion-frequency expressed as meeting allowable magnitude and duration every year, (3) a criterion-frequency expressed as meeting allowable magnitude and duration in more than half of the years of a given assessment period, and (4) a criterion-frequency expressed as meeting the allowable magnitude and duration as a long-term average only. EPA further requests comment on whether an expression of the criteria in terms of an arithmetic average of annual geometric mean values based on rolling three-year periods of time would also be protective of the designated use.

(3) Request for Comment and Data on Proposed Approach

EPA believes the proposed numeric nutrient criteria for south Florida canals in this rule are protective of the designated uses, consistent with CWA section 303(c)(2)(A) and 40 CFR 131.11(a)(1). EPA solicits comment on the approaches taken by the Agency in this proposal, the data underlying those approaches, and the proposed criteria. EPA is seeking other pertinent scientific data and information that are readily available related to nutrient concentrations or nutrient responses in Class III canals in south Florida.

EPA is soliciting comment specifically on the selection of criteria parameters for TN, TP, and chlorophyll *a;* development of criteria for Class III canals across south Florida; and the conclusion that the proposed criteria for Class III canals are protective of designated uses and adequately account for the spatial and temporal variability of nutrients.

(4) Alternative Approaches for Comment

EPA is requesting comments and views on the advantages and disadvantages of alternative approaches to deriving protective criteria for south Florida canals. These approaches include: (1) A stressor-response approach (based on data from all canals or canals grouped by soil type), and (2) methodologies that have been employed to develop nutrient targets in an EPA-proposed TMDL for dissolved oxygen and nutrients.[108]

As previously described in Section III.E(2)(b), EPA considered the underlying soil type of south Florida canals as a possible basis for geographic classification. Analysis of the underlying soil types, indicated by STATSGO,[109] led EPA to identify the following four canal regions: Everglades Agricultural Area (EAA) comprised of histosol and entisol soils, EvPA comprised of histosol and entisol soils, areas west of the EvPA and EAA, or West Coast, comprised of spodosol and alfisol soils, and areas east of the EvPA and EAA, or East Coast, comprised of spodosol, entisol, and alfisol soils.

Subsequent to classification, the proposed statistical distribution-based approach or the alternatives to the proposed approach described in the following sections could be used to derive numeric nutrient criteria by canal region for any or all of the proposed criteria (*i.e.*, TN, TP, and chlorophyll *a*) provided that sufficient data are available.

(a) Stressor-Response Approach

EPA considered two statistical analyses for assessing the stressor-response relationship between nutrients and biological response. In contrast to the proposed option, which included only data from sites with no evidence of nutrient impairment, the stressor-response analyses included all data regardless of whether sites were associated with WBIDs that have been determined to be impaired. EPA conducted linear and quantile regression analyses between chlorophyll *a*, TP, and TN on a regional and aggregated regional basis. EPA used the linear regression model as a statistical tool to predict the chlorophyll *a* response based on matched chlorophyll *a* and TN and TP data. Similarly, quantile regression was used to analyze the matched nutrient and chlorophyll *a* data. In this application, quantile regression was used to predict the 90th percentile of the distribution of chlorophyll *a* concentration at a given concentration of TN or TP.

To apply either statistical approach for developing numeric nutrient criteria for TP or TN, EPA would need to identify the concentration of chlorophyll *a* that would be protective of the designated use for these canal systems. One approach would be to use EPA's proposed chlorophyll *a* criterion of 4.0 μg/L for canals to derive the TN and TP criteria from stressor-response relationships.

(b) Calculation of TP Criteria for the Everglades Agricultural Area (EAA) Using a Downstream Protection Approach

EPA considered using the methodologies described in the EPA-proposed TMDL[110] for dissolved oxygen and nutrients to develop numeric nutrient criteria, specifically TP, for portions of the EAA. These methodologies are described in the TMDL in Section 4.2.2.1 of the TMDL document, "Approach #1: Estimate STA inflow loads resulting in WQS in downstream waters", and Section 4.2.2.2 of the TMDL document, "Approach #2: Simple modeling approach." The first approach takes into account the downstream criterion of the EvPA and the performance of the stormwater treatment areas (STAs). Based on these considerations, inflowing TP concentrations within the EAA to the STAs were derived to meet the downstream EvPA TP criterion of 0.010 mg/L. The second approach used a model that extrapolated natural background TP concentrations, based on land use changes, for specific WBIDs within the EAA. These approaches could support the derivation of numeric nutrient criteria for TP within the EAA region. Approach #1 would result in a TP concentration of 0.10 mg/L, while Approach #2 would result in a TP concentration of 0.087 mg/L.

(5) Request for Comment and Data on Alternative Approaches

The alternatives for Class III south Florida canal criteria in this proposed rule represent alternative approaches given the availability of data in the State of Florida to date and are consistent with the requirements of both the CWA and EPA's implementing regulations. EPA is soliciting comment on the alternative approaches considered by the Agency in this proposal, the data underlying those approaches, and the proposed alternatives themselves, including criteria expressed as an upper percentile maxima not to be exceeded more than 10% of the time in one year, similar to those discussed for lakes. For further information on the upper percentile criteria for canals, refer to EPA's TSD on Florida's Inland Waters, Chapter 4: Methodology for Deriving U.S. EPA's Proposed Criteria for Canals. EPA is seeking other pertinent data and information related to nutrient concentrations or nutrient responses in Class III canals in south Florida.

F. Comparison Between EPA's and Florida DEP's Proposed Numeric Nutrient Criteria for Florida's Lakes and Flowing Waters

To date, Florida has invested significant resources in its statewide nutrient criteria effort, and has made substantial progress toward developing numeric nutrient criteria. For several years, FDEP has been actively working with EPA on the development of numeric nutrient criteria and EPA has worked extensively with FDEP on data interpretation and technical analyses for developing EPA's recommended numeric nutrient criteria proposed in this rulemaking.

On January 14, 2009, EPA formally determined that numeric nutrient criteria were necessary to protect Florida's lakes and flowing waters and should be developed by January 14, 2010. FDEP, independently from EPA, initiated its own State rulemaking process to adopt numeric nutrient water quality criteria protective of Florida's lakes and flowing waters. According to FDEP, the State initiated its rulemaking process to facilitate the assessment of designated use attainment for Florida's waters and to provide a better means to protect its waters from the adverse effects of nutrient over-enrichment. Florida established a technical advisory committee, which met over a number of years, to help develop its proposed numeric nutrient criteria. The State also held several public workshops to solicit

[108] Proposed Total Maximum Daily Load (TMDL) for Dissolved Oxygen and Nutrient in the Everglades. Prepared by U.S. EPA Region 4. September 2007.

[109] State Soil Geographic (STATSGO) database provided by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS).

[110] Proposed Total Maximum Daily Load (TMDL) for Dissolved Oxygen and Nutrient in the Everglades. Prepared by U.S. EPA Region 4. September 2007.

comment on the draft WQS. While FDEP was progressing with its State rulemaking, EPA moved forward to develop Federal numeric nutrient criteria for Florida's lakes and flowing waters, consistent with EPA's January 14, 2009 determination and based on the best available science.

Most recently, in July 2009, FDEP solicited public comment on its proposed numeric nutrient criteria for lakes and flowing waters. In October 2009, FDEP decided not to bring the draft criteria before the Florida Environmental Regulation Commission (ERC), as had been previously scheduled. FDEP did not make any final decisions as to whether it might be appropriate to ask the ERC to adopt the criteria or some portions of the criteria at a later date.

As described in Section III., EPA is proposing numeric nutrient criteria for the following four water body types: Lakes, streams, springs and clear streams, and canals in south Florida. Given that FDEP has made its proposed numeric nutrient criteria available to the public via its Web site (*http://www.dep.state.fl.us/water/wqssp/nutrients/index.htm*), it is worth providing a comparative overview between the criteria and approaches that EPA is proposing in this rulemaking and the criteria and approaches FDEP had initially proposed. Both EPA and FDEP developed numeric criteria recognizing the hydrologic and spatial variability of nutrients in Florida's lakes and flowing waters. As FDEP indicated on its Web site, FDEP's preferred approach is to develop cause and effect relationships between nutrients and valued ecological attributes, and to establish nutrient criteria based on those cause and effect relationships that ensure that the designated uses of Florida's waters are protected and maintained. As described in EPA's guidance, EPA also recommends this approach when scientifically defensible data are available. Where cause and effect relationships could not be demonstrated, however, both FDEP and EPA relied on a distribution-based approach to derive numeric nutrient criteria protective of applicable designated uses.

To set numeric nutrient criteria for lakes, EPA, like FDEP, is proposing a classification scheme using color and alkalinity based upon substantial data that show that lake color and alkalinity play an important role in the degree to which TN and TP concentrations result in a biological response such as elevated chlorophyll *a* levels. EPA and FDEP both found that correlations between nutrients and response parameters were sufficiently robust to use for criteria development in Florida's lakes. EPA is proposing the same chlorophyll *a* criteria for colored lakes and clear alkaline lakes as FDEP proposed, however, EPA is proposing a lower chlorophyll *a* criterion for clear acidic lakes. EPA, like FDEP, is also proposing an accompanying supplementary analytical approach that Florida can use to adjust general TN and TP lake criteria within a certain range where sufficient data on long-term ambient TN and TP levels are available to demonstrate that protective chlorophyll *a* criteria for a specific lake will still be maintained and attainment of the designated use will be assured.

Lake class	EPA proposed criteria			Florida proposed criteria		
	Chl *a*, µg/L	TN, mg/L	TP, mg/L	Chl *a*, µg/L	TN, mg/L	TP, mg/L
Colored Lakes > 40 PCU	20	1.23–2.25	0.050–0.157	20	1.23–2.25	0.05–0.157
Clear Lakes, Alkaline ≤ 40 PCU and > 50 mg/L $CaCO_3$	20	1.00–1.81	0.030–0.087	20	1.00–1.81	0.03–0.087
Clear Lakes, Acidic ≤ 40 PCU and ≤ 50 mg/L $CaCO_3$	6	0.500–0.900	0.010–0.030	9	0.85–1.14	0.015–0.043

To set numeric nutrient criteria for streams, FDEP recommended a statistical distribution approach based on "benchmark sites" identified in five nutrient regions (five regions for TP and two regions for TN), given that FDEP determined cause and effect relationships to be insufficiently robust for establishing numeric thresholds. FDEP relied on the use of a narrative criterion to protect downstream waters. EPA also concluded that a scientifically defensible cause and effect relationship could not be demonstrated with the available data and that a distribution-based approach was most appropriate. However, EPA considered an alternative approach that evaluated a combination of biological information and data on the distribution of nutrients in a substantial number of healthy stream systems to derive scientifically sound TN and TP criteria for streams.

The respective criteria for instream protection of Florida's streams derived using EPA's recommended approach and FDEP's recommended approach are comparable.

EPA nutrient watershed regions	EPA proposed instream criteria		Florida nutrient watershed regions	FL proposed instream criteria	
	TN (mg/L)	TP (mg/L)		TN (mg/L)	TP (mg/L)
Panhandle	0.824	0.043	Panhandle	0.820	0.069
Bone Valley	1.798	0.739	Bone Valley	1.730	0.415
Peninsula	1.205	0.107	Peninsula	....	0.116
North Central	1.479	0.359	North Central	....	0.322
			Northeast	....	0.101

In terms of protecting downstream waters, EPA used best available science and data related to downstream waters and found that there are cases where the numeric nutrient criteria EPA is proposing to protect instream aquatic life may not be stringent enough to ensure protection of WQS for aquatic life in certain downstream lakes and estuaries. Accordingly, EPA is proposing an equation to be used to adjust stream TP criteria to protect downstream lakes, and a different methodology to adjust TN criteria for streams to ensure protection of WQS for downstream estuaries. In cases where a stream first flows into a lake and then flows out from the lake into another lake or estuary, the portion of the stream that exits the lakes needs to comply with the downstream protection values for estuaries, assuming that is the terminal reach.

EPA is proposing the same nitrate-nitrite causal variable criterion for springs and clear streams as proposed by FDEP. For canals in south Florida, EPA is proposing a statistical distribution approach based on sites meeting designated uses with respect to nutrients (*i.e.*, not identified as impaired by FDEP) identified in four canal regions. FDEP did not propose numeric nutrient criteria for canals in its rulemaking.

Please refer to Section IV. Under What Conditions Will Florida Be Removed From a Final Rule for information on how State-adopted and EPA-approved WQS could become effective under the CWA 303(c).

G. Applicability of Criteria When Final

EPA's proposed numeric nutrient criteria for Florida's lakes and flowing waters will be effective for CWA purposes 60 days after publication of final criteria and will apply in addition to any other existing CWA-effective criteria for Class I or Class III waters already adopted by the State and submitted to EPA (and for those adopted after May 30, 2000, approved by EPA). EPA requests comment on this proposed effective date. FDEP establishes its designated uses through a system of classes and Florida waters are designated into one of several different classes. Class III waters provide for healthy aquatic life and safe recreational use. Class I waters include all the protection of designated uses provided for Class III waters, and also include protection for designated uses related to drinking water supply. Class I and III waters, together with Class II waters that are designated for shellfish propagation or harvesting, comprise the set of Florida waters that meet the goals articulated in section 101(a)(2) of the CWA and the waters for which EPA is proposing criteria. Pursuant to the schedule set out in EPA's January 2009 determination, Class II waters will be addressed in rulemaking in January 2011. For water bodies designated as Class I and Class III predominately fresh waters, any final EPA numeric nutrient criteria will be applicable CWA water quality criteria for purposes of implementing CWA programs including permitting under the NPDES program, as well as monitoring and assessment based on applicable CWA WQS and establishment of TMDLs.

The proposed criteria in this rule, if and when finalized, would be subject to Florida's general rules of applicability in the same way and to the same extent as are other State-adopted and/or federally-promulgated criteria for Florida waters. *See* proposed 40 CFR 131.43(d)(2). For example, Florida regulations at Rule 62–4.244, F.A.C. authorize mixing zones when deriving effluent limitations for discharges of pollutants to Florida waters. These regulations would apply to permit limitations implementing the criteria in this rule. This proposal includes some additional language on mixing zone requirements to help guide Florida in developing and applying mixing zone policies for nutrient criteria. Specifically, EPA provides that the criteria apply at the appropriate locations within or at the boundary of the mixing zones; otherwise the criteria apply throughout the water body including at the point of discharge into the water body. *See* proposed 40 CFR 131.43(d)(2)(i). Likewise, EPA includes proposed regulatory language specifying that Florida use an appropriate design flow condition, one that matches the proposed criteria duration and frequency, for use in deriving permit limits and establishing wasteload and load allocations for a TMDL. *See* proposed 40 CFR 131.43(d)(2)(ii).

In addition, EPA recognizes that Florida regulations include provisions for assessing whether waters should be included on the list of impaired waters pursuant to section 303(d) of the CWA. *See* Rule 62–303, F.A.C. The Impaired Waters Rule, or IWR, sets out a methodology to identify waters that do not meet the State's WQS and, therefore, are required to be included on CWA section 303(d) lists. The current IWR does not address how to assess waters based on EPA's proposed numeric nutrient criteria. The numeric nutrient criteria in any final rule, nevertheless, will be applicable WQS that must be addressed when the State assesses waters pursuant to CWA section 303(d).

EPA proposes language in this rulemaking that acknowledges the IWR procedures and their function, specifying that those procedures apply where they are consistent with the level of protection provided by the proposed criteria. *See* proposed 40 CFR 131.43(d)(2)(iii). Some IWR provisions, which describe the sufficiency or reliability of information necessary for the State to make an attainment decision, do not change the level of protection afforded Florida waters. These are beyond the scope of WQS under CWA section 303(c). Other provisions of the IWR may provide some additional detail relevant to assessment, such as the number of years worth of data assessed for a particular listing cycle submittal, which should be consistent with the level of protection provided with the proposed criteria. Should any IWR provisions apply a different level of protection than the Federal criteria when making attainment decisions based on proposed criteria, EPA would expect to take appropriate action to ensure that the States' CWA section 303(d) list of impaired waters includes all waters not attaining the Federal criteria.

IV. Under What Conditions Will Federal Standards Be Either Not Finalized or Withdrawn?

Under the CWA, Congress gave states primary responsibility for developing and adopting WQS for their navigable waters. *See* CWA section 303(a)–(c). Although EPA is proposing numeric nutrient criteria for Florida's lakes and flowing waters, Florida continues to have the option to adopt and submit to EPA numeric nutrient criteria for the State's lakes and flowing waters consistent with CWA section 303(c) and implementing regulations at 40 CFR part 131. Consistent with CWA section 303(c)(4), if Florida adopts and submits numeric nutrient criteria and EPA approves such criteria as fully satisfying the CWA before publication of the final rulemaking, EPA will not proceed with the final rulemaking for those waters for which EPA approves Florida's criteria.

Pursuant to 40 CFR 131.21(c), if EPA does finalize this proposed rule, the EPA promulgated WQS would be applicable WQS for purposes of the CWA until EPA withdraws the federally-promulgated standard. Withdrawing the Federal standards for the State of Florida would require rulemaking by EPA pursuant to the requirements of the Administrative Procedure Act (5 U.S.C. 551 *et seq.*). EPA would undertake such a rulemaking to withdraw the Federal criteria only if and when Florida adopts and EPA approves numeric nutrient criteria that fully meet the requirements of section 303(c) of the CWA and EPA's implementing regulations at 40 CFR part 131.

If EPA finalizes the proposed restoration standard provision (discussed in Section VI below), that provision would be adopted into regulation and would allow Florida to establish interim designated uses with associated water quality criteria, while maintaining the full CWA section 101(a)(2) aquatic life and/or recreational designated use of the water as the ultimate goal. EPA may proceed to promulgate numeric nutrient criteria for Florida together with or separate from EPA's proposed restoration standards provision, depending on the comments received on that proposal.

V. Alternative Regulatory Approaches and Implementation Mechanisms

A. Designating Uses

Under CWA section 303(c), states shall adopt designated uses after taking "into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish, and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation." Designated uses "shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of [the CWA]." CWA section 303(c)(1). EPA's regulation at 40 CFR 131.3(f) defines "designated uses" as "those uses specified in water quality standards for each water body or segment whether or not they are being attained." Under 40 CFR 131.10, EPA's regulation addressing "Designation of uses", a "use" is a particular function of, or activity in, waters of the United States that requires a specific level of water quality to support it. In other words, designated uses are a state's concise statements of its management objectives and expectations for each of the individual surface waters under its jurisdiction.

In the context of designating uses, states often work with stakeholders to identify a collective goal for their waters that the state intends to strive for as it manages water quality. States may evaluate the attainability of these goals and expectations to ensure they have designated appropriate uses (*see* 40 CFR 131.10(g)). Consistent with CWA sections 101(a)(2) and 303(c)(2)(A), 40 CFR 131.2 provides that states "should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water." Where states do not designate those uses, or remove those uses, they must demonstrate that such uses are not attainable consistent with 40 CFR 131.10(g). States may determine, based on a UAA, that attaining a designated use is not feasible and propose to EPA to change the use and/or the associated pollutant criteria to something that is attainable. This action to change a designated use must be completed in accordance with EPA regulations (see 40 CFR 131.10(g) and (h)).

Within the framework described above, states have discretion in designating uses. EPA's proposed numeric nutrient criteria for lakes and flowing waters would apply to those waters designated by FDEP as Class I (Potable Water Supplies) or Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife). If Florida removes the Class I or Class III designated use for any particular water body ultimately affected by this rule, and EPA finds that removal to be consistent with CWA section 303(c) and the regulations at 40 CFR part 131, then the federally-promulgated numeric nutrient criteria would not apply to that water body. Instead, the nutrient criteria associated with the newly designated use would apply to that water body. FDEP has recently restarted an effort to refine the State's current designated use classifications. As this process continues, EPA expects that the State may find some instances where this particular discussion may be relevant and useful as the refinement of uses is investigated further.

Where states can identify multiple waters with similar characteristics and constraints on attainability, EPA interprets the Federal WQS regulation to allow states to conduct a "categorical" use attainability analysis (UAA) under 40 CFR 131.10(g) for such waters. This approach may reduce data collection needs, allowing a single analysis to represent many sites. To use such an approach, however, the State would need to have enough information about each particular site to reliably place each site into a broader category and Florida would need to specifically identify each site covered by the analysis. Florida may wish to consider such an approach for certain waters, such as a network of canals with similar hydrologic and morphological characteristics, which can be characterized as a group and where the necessary level of protection may differ substantially from other lakes or flowing waters within the State.

B. Variances

A variance is a temporary modification to the designated use and associated water quality criteria that would otherwise apply to the receiving water. A variance is based on a UAA and identifies the highest attainable use and associated criteria during the variance period. Typically, variances are time-limited (*e.g.*, three years), but renewable. Modifying the designated use for a particular water through a variance process allows a state to limit the applicability of a specific criterion to that water and to identify an alternative designated use and associated criteria to be met during the term of the variance. A variance should be used instead of removal of a use where the state believes the standard can be attained in a short period of time. By maintaining the standard rather than changing it, the state ensures that further progress will be made in improving water quality and attaining the standard. A variance may be written to address a specified geographical coverage, a specified pollutant or pollutants, and/or a specified pollutant source. All other applicable WQS not specifically modified by the variance would remain applicable (*e.g.*, any other criteria adopted to protect the designated use). State variance procedures, as part of state WQS, must be consistent with the substantive requirements of 40 CFR part 131. A variance allows, among other things, NPDES permits to be written such that reasonable progress is made toward attaining the underlying standards for affected waters without violating section 402(a)(l) of the Act, which requires that NPDES permits must meet the applicable WQS. *See also* CWA section 301(b)(1)(C).

For purposes of this proposal, EPA is proposing criteria that apply to use designations that Florida has already established. EPA believes that the State has sufficient authority to use its adopted and EPA-approved variance procedures with respect to modification of their Class I or Class III uses as it pertains to any federally-promulgated nutrient criteria. For this reason, EPA is not proposing a Federal variance procedure.

C. Site-Specific Criteria

A site-specific criterion is an alternative value to a statewide, or otherwise applicable, water quality criterion that meets the regulatory test of protecting the designated use and having a basis in sound science, but is tailored to account for site-specific conditions. Site-specific alternative criteria (SSAC) may be more or less stringent than the otherwise applicable criteria. In either case, because the SSAC must protect the same designated use and must be based on sound science (*i.e.*, meet the requirement of 40 CFR 131.11(a)), there is no need to modify the designated use or conduct a UAA. SSAC may be appropriate when additional scientific consideration can bring added precision or accuracy to express the necessary level or concentration of a water quality parameter that is protective of the designated use.

Florida has adopted procedures for developing and adopting SSAC in its WQS regulations at Florida Administrative Code (Rule 62–302.800, F.A.C.). Florida's Type I SSAC procedure is intended to address site-specific situations where a particular water body cannot meet the applicable water quality criterion because of natural conditions. *See* Rule 62–302.800(1). Florida's Type II SSAC procedure is intended to address site-specific situations other than natural conditions where it can be established that an alternative criterion from the broadly applicable criteria established by the State is protective of a water's designated uses. *See* Rule 62–302.800(1), F.A.C. Florida's Type II procedure is primarily intended to address toxics but there is no limitation in its use for other parameters, except for certain parameters identified by FDEP, including nutrients. *See* Rule 62–302.800(2). Florida's regulations currently do not allow use of Type II procedures for nutrient criteria development because the State currently does not have broadly applicable numeric nutrient criteria for State waters. Rather, the current narrative criterion for nutrients is implemented by translating it into numeric loads or concentrations on a case-by-case basis. EPA's proposed rule would not affect Florida's Type I or Type II SSAC procedures.

EPA believes that there would be benefit in establishing a specific procedure in the Federal rule for EPA adoption of SSAC. In this rulemaking, EPA is proposing a procedure whereby the State could develop a SSAC and submit the SSAC to EPA with supporting documentation for EPA's consideration. The State SSAC could be developed under either the State SSAC procedures or EPA technical processes as set out more fully below. EPA elected to propose this approach because this procedure maintains the State in a primary decision-making role regarding development of SSAC for State waters. The procedure that EPA is proposing would also allow the State to submit a proposed SSAC to EPA without having to first go through the State's rulemaking process.

The proposed procedure would provide that EPA could determine that the SSAC should apply in lieu of the generally applicable criteria promulgated pursuant to this rule. The proposed procedures provide that EPA would solicit public comment on its determination. Because EPA's rule would establish this procedure, implementation of this procedure would not require withdrawal of federally-promulgated criteria for affected water bodies in order for the SSAC to be effective for purposes of the CWA. EPA has promulgated similar procedures for EPA granting of variances and SSACs in other federally-promulgated WQS.

EPA also considered technical processes necessary to develop protective numeric nutrient criteria on a site-specific basis. To complete a thorough and successful analysis to develop numeric nutrient SSAC, EPA expects the State to conduct, or direct applicants to the State to conduct, a variety of supporting analyses. For the instream protection value (IPV) for streams, this analysis would, for example, consist of examining both indicators of longer-term response to multiple stressors such as benthic macroinvertebrate health, as determined by Florida's Stream Condition Index (SCI) and indicators of shorter-term response specific to nutrients, such as periphyton algal thickness or chlorophyll *a* levels. The former analysis will help address concerns that a potential nutrient effect is masked by other stressors (such as turbidity which can limit light penetration and primary production response to nutrient response), whereas the latter analysis will help address concerns that a potential nutrient effect is lagging in time and has not yet manifested itself. Indicators of shorter-term response generally would not be expected to exhibit a lag time.

It will also be important to examine a stream system on a watershed basis to ensure that a SSAC established for one segment does not result in adverse effects in nearby segments. For example, a shaded, relatively swift flowing segment may open up to a shallow, slow moving, open canopy segment that is more vulnerable to adverse nutrient impacts. Empirical data analysis of multiple factors affecting the expression of response to nutrients and mechanistic models of ecosystem processes can assist in this type of analysis. It will also be necessary to ensure that a larger load allowed from an upstream segment as a result of a SSAC does not compromise protection on a downstream segment that has not been evaluated.

The intent of this discussion is to illustrate a process that is rigorous and based on sound scientific rationale, without being inappropriately onerous to complete. Corollary analyses for a lake, spring or clear stream, or canal situation would need to be pursued for a SSAC on those systems.

In addition to the procedure that EPA is proposing, Florida always has the option of submitting State-adopted SSAC as new or revised WQS to EPA for review and approval under the CWA section 303(c). There is no bar to a state adopting new or revised WQS for waters covered by a federally-promulgated WQS. For any State-adopted SSAC that EPA approves under section 303(c) of the Act, EPA would also have to complete federal rulemaking to withdraw the Federal WQS for the affected water body before the State SSAC would be the applicable WQS for the affected water body for purposes of the Act. As discussed above, Florida WQS regulations currently do not authorize the State to adopt nutrient SSAC except where natural conditions are outside the limits of broadly applicable criteria established by the State (Rule 62–302.800, F.A.C.).

This proposed SSAC process would also not limit EPA's authority to promulgate SSAC in addition to those developed by the State under the process described in this rule. The proposed rule recognizes that EPA always has the authority to promulgate through rulemaking SSAC for waters that are subject to federally-promulgated water quality criteria.

D. Compliance Schedules

A compliance schedule, or schedule of compliance, refers to "a schedule of remedial measures included in a 'permit,' including an enforceable sequence of interim requirements * * * leading to compliance with the CWA and regulations." 40 CFR 122.2. In an NPDES permit, WQBELs are effluent limits based on applicable WQS for a given pollutant in a specific receiving water (*See* NPDES Permit Writers Manual, EPA–833–B–96–003, December, 1996). In addition, EPA regulations provide that schedules of compliance are to require compliance "as soon as possible."

Florida has adopted a regulation authorizing compliance schedules, and that regulation is not affected by this proposed rule (Rule 62–620.620(6), F.A.C.). The regulation provides, in part, for schedules providing for compliance "as soon as sound engineering practices allow, but not later than any applicable statutes or rule deadline." The complete text of the Florida rules concerning compliance schedules is available at *https://www.flrules.org/gateway/RuleNo.asp?ID=62-620.620*. Florida is, therefore, authorized to grant compliance schedules under its rule for WQBELs based on federally-promulgated criteria.

VI. Proposed Restoration Water Quality Standards (WQS) Provision

As described above, many of Florida's waters do not meet the water quality goals established by the State and envisioned by the CWA because of excess amounts of nutrients. In some cases, restoring these waters could take many years to achieve, especially where there is a large difference between current water quality conditions and the nutrient criteria levels necessary to protect aquatic life. In such cases, Florida may conclude that restoration programs will not result in waters attaining their designated aquatic life use (and associated numeric nutrient criteria) for a long period of time.

EPA's current regulations provide that a state may remove a designated use if it meets certain requirements outlined at 40 CFR 131.10. Under this provision, if the State demonstrates that a designated use is not attainable it may conduct a use attainability analysis (UAA) to revise the designated use to reflect the highest attainable aquatic life use, even though that use may not meet the CWA section 101(a)(2) goal.[111] Another option that states use to address situations for an individual discharger is a discharger-specific variance.[112] Neither of these approaches may be optimal or appropriate solutions if a state determines that certain waters cannot attain aquatic life uses due to excess nutrient in the near term.

Based on numerous workshops, meetings, conversations and day-to-day interactions with state environmental managers, EPA understands that states interested in restoring impaired water may desire the ability to express, in their WQS, successive time periods with incrementally more stringent designated uses and criteria that ultimately result in a designated use and criteria that reflect a CWA section 101(a)(2) designated use. Such an approach would allow the state and stakeholders necessary time to take incremental steps to achieve interim WQS as they move forward to ultimately attain a CWA section 101(a)(2) designated use. Some states have used variances to provide such time in their WQS. However, variances are typically time limited (*e.g.*, three years) and discharger-specific and do not address the challenges of pursuing reductions from a variety of sources across a watershed. In addition, Federal regulations are not explicit in requiring that states pursue feasible (*i.e.* attainable) progress toward achieving the highest attainable use when implementing a variance. Variances also often lack specific milestones and a transparent set of expectations for the public, dischargers, and stakeholders.

EPA seeks comment on this approach to providing Florida with an explicit regulatory mechanism for directing state efforts to achieve incremental progress in a step-wise fashion, applicable to all sources, as a part of its WQS. The proposed regulatory mechanism described in this section applies only to WQS for nutrients in Florida waters subject to this proposed rule.

A "restoration water quality standard" under EPA's proposed rule would be a WQS that Florida could adopt for an impaired water. Under EPA's proposal, the State would retain the current designated use as the ultimate designated use (*e.g.* providing for eventual attainment of a full CWA section 101(a)(2) designated use and the associated criteria). However, under the restoration standard approach proposed in this rule, the State would also adopt interim less stringent designated uses and criteria that would be the basis for enforceable permit requirements and other control strategies during the prescribed timeframes. These interim uses could be no less stringent than an existing use as defined in 40 CFR 131.3, and would have to meet the requirements of 40 CFR 131.10(h)(2). The State would need to demonstrate that the interim uses and criteria, as well as the timeframe, are based on a UAA evaluation of what is attainable and by when. These interim designated uses and criteria and the applicable timeframes would all be incorporated into the State WQS on a site-specific basis, as would be any other designated use change or adoption of site-specific criteria.

For example, a restoration WQS for nutrients for an impaired Class I or Class III colored lake in Florida may take the form of the following for a lake whose current condition represents severely impaired aquatic life with chlorophyll *a* = 40 mg/L, TN = 2.7 mg/L, and TP = 0.15 mg/L:

Time	*Chl a*	TN	TP	Designated Use Description
Year 0–5	35	2.4	0.10	Moderately Impaired Aquatic Life.
Year 6–10	25	1.45	0.06	Slightly Impaired Aquatic Life.
Year 11	20	1.2	0.05	Full Aquatic Life Use.

Including such revised interim designated uses and criteria within the regulations could support efforts by Florida to formally establish enforceable long-term plans for different watersheds or stream reaches to attain the ultimate designated use and the associated criteria. At the same time, the State would be able to ensure that its WQS explicitly reflect the attainable designated uses and water quality criteria to be met at any given time, consistent with the CWA and implementing regulations.

Restoration WQS would provide in the Federal regulations the framework for authorizing the State of Florida to adopt restoration WQS for nutrients, along with maintaining the availability of other tools (*e.g.*, variances and compliance schedule provisions), which provide flexibility regarding permitting individual dischargers. Restoration WQS would require a full public participation process to assure transparency as well as the opportunity for different parties to work together, exchange information and determine what is actually attainable within a particular time frame. Going through this process would provide Florida with a transparent set of expectations to push its waters towards restoration in a realistic yet verifiable manner.

In this notice, EPA proposes restoration WQS as a clear regulatory pathway for the State of Florida to adjust the Class I and Class III designated uses (and associated nutrient criteria) of waters impaired by nutrients that is intended to promote active restoration, maintain progressive improvement, and ensure accountability. This approach would provide the State of Florida with the flexibility to adopt revised designated uses and criteria under a set of specific regulatory requirements.

[111] Clean Water Act section 101(a)(2) states that it is a national goal for water quality, wherever attainable, to provide for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water

[112] A variance is a temporary modification to the designated use and associated water quality criteria that would otherwise apply. It is based on a use attainability demonstration and targets achievement of the highest attainable use and associated criteria during the variance period.

Under this proposal, the interim designated uses and criteria would be the basis for NPDES permits during the applicable period reflecting the fact that the restoration WQS introduces the critical element of time as part of the complete WQS. This is intended to allow imposition of the maximum feasible point source controls and nonpoint source nutrient reduction strategies to be phased in within the overall context of restoration activities within the watershed. By reflecting how it expects the existing poor quality of its waters to incrementally improve to achieve longer-term WQS goals, Florida could create the flexibility to explore more innovative ways to reach the requirements of the next phase, thus possibly reducing costs or allowing new approaches to resolve complex technological issues, and maximizing transparency with the public during each phase. These waters, however, would still be considered impaired for CWA assessment and listing purposes because the ultimate designated use and criteria would be part of the restoration WQS and would not yet be met.

The restoration standards would be Florida WQS revisions that would go through the process of first being adopted under State law and then approved by EPA. This proposal would include eight requirements for the development of a restoration WQS for nutrients:

1. It must be demonstrated that it is infeasible to attain the full CWA section 101(a)(2) aquatic life designated use during the time periods established for the restoration phases with a UAA based on one of the factors at 40 CFR 131.10(g).

2. The highest attainable designated use and numeric criteria that apply at the termination of the restoration WQS (*i.e.*, the ultimate long-term designated use and numeric criteria to be achieved) must be specified and this use is to include, at a minimum, uses that are consistent with the CWA section 101(a)(2) uses.

3. Interim restoration designated uses and numeric water quality criteria, with each based on achieving the maximum feasible progress during the applicable phase as determined in the UAA, must be established.

4. Specific time periods for each restoration phase must be established. The length of each phase must be based on the UAA demonstration of when interim uses can be attained on a case-specific basis. Interim restoration designated uses and numeric water quality criteria must reflect the highest attainable use during the time period of the restoration phase. The sum of these times periods may not exceed twenty years.

5. The spatial extent to which the restoration WQS will apply (*e.g.*, how far downstream the restoration WQS would apply) must be specified. EPA notes the importance of continuing to meet the requirements for protection of downstream WQS as expressed in section 40 CFR 131.10(b). Adopting restoration WQS upstream of another impaired water may mean the State should also consider restoration WQS for the downstream water.

6. The regulatory requirements for public participation and EPA review and approval whenever revising its WQS must continue to be met. Specifically, a restoration WQS may not include interim uses less stringent than a use that is an "existing use" as defined in 40 CFR 131.3 or that do not meet the requirements of 40 CFR 131.10(h)(2).

7. The State must include in its restoration WQS that if the water body does not attain the interim designated use and numeric water quality criteria at the end of any phase, the restoration WQS will no longer be in effect and the designated use and criteria that was to become effective at the end of the final restoration phase will become immediately effective unless Florida adopts and EPA approves a different revised designated use and criteria.

8. The State must provide that waters for which a restoration WQS is adopted will be recognized as impaired for the purposes of listing impaired waters under section 303(d) of the CWA until the final use is attained.

Under this proposal, EPA would require Florida to adopt the ultimate highest attainable designated use and criteria along with multiple phases reflecting the stepwise improvements in water quality between the initial effective date and when they expect to meet the ultimate highest attainable use as a single restoration WQS package. As with any revision to an aquatic life use, Florida would be required to demonstrate that the ultimate highest attainable designated use cannot be attained during the restoration period, based on one of the factors at 40 CFR 131.10(g)(1)–(6) (*i.e.*, through a UAA). EPA would review the WQS and all supporting documents before approving the restoration WQS.

At the beginning of the first restoration phase, the State would identify current conditions and establish the principle that there can be no further degradation. WQS for the first restoration phase should reflect the outcomes of all controls that can be implemented within the first restoration phase. Additionally, EPA expects that the interim restoration designated use and numeric criteria that are attainable at the end of the restoration phase apply at the beginning of each phase as well as throughout the phase. For each phase, the State would adopt interim designated uses and numeric water quality criteria that reflect achieving the maximum feasible progress. At the end of the first phase, EPA would expect the water body to be meeting the first interim designated use and water quality criteria.

At the beginning of the second phase, the next (more stringent) interim designated use and water quality criteria would go into effect as the applicable WQS that the State would use to direct the next set of control actions. At the conclusion of the second phase, the next (more stringent) interim designated use and water quality criteria would become the applicable WQS. This process would repeat with each subsequent phase. Permit limits written during the restoration phases would include effluent limits as stringent as necessary to meet the applicable interim designated uses and numeric water quality criteria. In constructing each restoration phase (*i.e.* duration and interim designated use and numeric water quality criteria), EPA will require the maximum feasible progress. This means that necessary control actions that would improve water quality and can be implemented within the first phase must be reflected in the interim targets for the first restoration phase. This would include all technology-based requirements for point sources, and cost-effective and reasonable BMPs for nonpoint sources. For treatment upgrades to point sources, EPA expects careful scrutiny of technology that has been successfully implemented in comparable situations and presumes that this is feasible. EPA further expects careful scrutiny of all existing and new technology that will help achieve the ultimate highest attainable use.

EPA recognizes that circumstances may change as controls are implemented and that new information may indicate that the timeframes established in the restoration WQS are too lengthy or possibly unrealistically short. If this is the case, the state has the discretion under 40 CFR 131.10 to conduct a new UAA and revise the interim targets in its restoration WQS after a full public process and EPA approval. However, there is a significant burden on the state to demonstrate what changed to alter the initial analysis and associated expectations for what was attainable for that phase. EPA would expect such a revision only if there was significant new information that demonstrated that a different schedule and/or set of interim standards represents the maximum feasible progress towards the final designated use and criteria.

If at the end of a phase, the water body is not meeting interim targets, then the restoration WQS would no longer be applicable. In such a case, the applicable WQS would be the ultimate highest attainable use and associated criteria unless the state adopted and submitted for EPA approval a revised WQS. This would help ensure that there would be no delay in implementing control measures. Alternatively, EPA considered an option of allowing the subsequent restoration phases to become applicable on the schedule adopted in the restoration WQS and as supported by the original UAA demonstration, even if the interim use and criteria are not fully achieved on schedule. This might have the advantage of encouraging the adoption of ambitious interim goals in the initial restoration standards, and would allow continued orderly progress towards achievement of the final use and criterion even where an interim step was not fully attained. EPA solicits comment on this alternative approach.

To develop restoration WQS for numeric nutrient criteria, EPA would expect that the state identify waters in need of restoration, produce an inventory of point and nonpoint sources within the watershed, and evaluate current ambient conditions and the necessary reductions to achieve the numeric criteria. The next part of the process would involve determining the combinations of control strategies and management practices available, how likely they are to produce results, and the resources needed to implement them. At this point, the State would be in a good position to determine how much pollution reduction is likely to be attainable under what timeframes. The State could use this information to establish the time periods for each restoration phase consistent with the maximum feasible and attainable progress toward meeting the numeric criteria, establish interim restoration designated uses and water quality criteria, and make the necessary demonstration that it is infeasible to attain the long-term designated use during the time periods established and that the interim phases reflect the highest attainable uses and associated criteria.

For excess nutrient pollution, the contributors to nutrient pollution could include publicly-owned treatment works (POTWs), industrial dischargers, urban and agricultural runoff, atmospheric deposition, and septic systems. Restoration WQS might reflect in an early phase, for example, all feasible short-term POTW treatment upgrades and a schedule to select, fund, and implement longer term nutrient reduction technologies, while aggressively pursuing reductions in nonpoint source runoff. This might include specific plans and a schedule to develop and implement innovative alternative approaches, such as trading programs, where appropriate.

In Florida, many of the steps described above occur in the context of Basin Management Action Plans (BMAPs). FDEP describes BMAPs as:

> * * *the "blueprint" for restoring impaired waters by reducing pollutant loadings to meet the allowable loadings established in a Total Maximum Daily Load (TMDL). It represents a comprehensive set of strategies—permit limits on wastewater facilities, urban and agricultural best management practices, conservation programs, financial assistance and revenue generating activities, etc.—designed to implement the pollutant reductions established by the TMDL. These broad-based plans are developed with local stakeholders—they rely on local input and local commitment—and they are adopted by Secretarial Order to be enforceable.

(*http://www.dep.state.fl.us/Water/watersheds/bmap.htm*) Florida has adopted BMAPs for the Hillsborough River Basin, Lower St. John's River, Log Branch, Orange Creek, and Upper Ocklawaha, and has plans for others to follow. To the extent necessary, FDEP could potentially use aspects of the BMAP process and plans such as these to help form the basis for restoration WQS.

In summary, the WQS program is intended to protect and improve water quality and WQS are meant to guide actions to address the effects of pollution on the Nation's waters. The reality is that as more assessments are being done and TMDLs are being contemplated, and as new criteria are developed and considered, EPA and states face questions about what pollution control measures will meet the WQS, how long it might take, and whether it is feasible to attain the WQS established to meet the goals of the Act. These questions are often difficult to answer because of lack of data, lack of knowledge, and lack of experience in attempting restoration of waters. Stakeholders and co-regulators alike have expressed a desire for ways to pursue progressive water quality improvement and evaluate those improvements to gain the data, knowledge, and experience necessary to ultimately determine the highest attainable use. In response, EPA has been investigating the best ways to use UAAs and related tools to make progress in identifying and achieving the most appropriate designated use.

EPA requests comments on the usefulness of the "restoration WQS" proposal for Florida. EPA requests comment on how restoration WQS will operate in conjunction with listing impaired waters, and establishing NPDES permit limitations, and nonpoint source control strategies, as well as how these requirements should be reflected in regulatory language. EPA also requests comment on the proposed 20-year limit on the schedule to attain the final use and criteria. EPA also requests comments on how a restoration WQS process would be coordinated with the TMDL program and whether the transparency and review procedures for the two approaches, including the conditions under which a State or EPA would be required to develop a TMDL, are comparable. EPA also requests comment on any unintended adverse consequences of this approach for any of its water quality programs. Finally, EPA requests comment on potential definitions of "maximum feasible progress."

VII. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is a "significant regulatory action." Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under EO 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

This proposed rule does not establish any requirements directly applicable to regulated entities or other sources of nutrient pollution. Moreover, existing narrative water quality criteria in State law already require that nutrients not be present in waters in concentrations that cause an imbalance in natural populations of flora and fauna in lakes and flowing waters in Florida.

B. Paperwork Reduction Act

This action does not impose an information collection burden under the provisions of the *Paperwork Reduction Act,* 44 U.S.C. 3501 *et seq.* Burden is defined at 5 CFR 1320.3(b). It does not include any information collection, reporting, or record-keeping requirements.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of this action on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration's (SBA) regulations at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Under the CWA WQS program, states must adopt WQS for their waters and must submit those WQS to EPA for approval; if the Agency disapproves a state standard and the state does not adopt appropriate revisions to address EPA's disapproval, EPA must promulgate standards consistent with the statutory requirements. EPA also has the authority to promulgate WQS in any case where the Administrator determines that a new or revised standard is necessary to meet the requirements of the Act. These state standards (or EPA-promulgated standards) are implemented through various water quality control programs including the NPDES program, which limits discharges to navigable waters except in compliance with an NPDES permit. The CWA requires that all NPDES permits include any limits on discharges that are necessary to meet applicable WQS.

Thus, under the CWA, EPA's promulgation of WQS establishes standards that the State implements through the NPDES permit process. The State has discretion in developing discharge limits, as needed to meet the standards. This proposed rule, as explained earlier, does not itself establish any requirements that are applicable to small entities. As a result of this action, the State of Florida will need to ensure that permits it issues include any limitations on discharges necessary to comply with the standards established in the final rule. In doing so, the State will have a number of choices associated with permit writing. While Florida's implementation of the rule may ultimately result in new or revised permit conditions for some dischargers, including small entities, EPA's action, by itself, does not impose any of these requirements on small entities; that is, these requirements are not self-implementing. Thus, I certify that this rule will not have a significant economic impact on a substantial number of small entities.

EPA has prepared an analysis of potential costs associated with meeting these standards.[113] EPA's analysis uses the criteria proposed by FDEP in July 2009 as a baseline against which to estimate the incremental costs of meeting the standards in this proposal. The baseline costs of meeting Florida's proposed standards are estimated to be $102 to $130 million per year. The incremental costs, over and above these baseline costs, of meeting the standards in this NPRM are estimated to be $4.7 to $10.1 million per year. This analysis assumes that most of these costs would fall on non-point sources and the categories of point sources that would be primarily affected are municipal wastewater treatment plants and industrial and general dischargers.[114] EPA estimates the incremental costs for these two categories of dischargers, including small entities, at about $1 million per year.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on state, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that may result in expenditures to state, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation of why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

This proposed rule contains no Federal mandates (under the regulatory provisions of Title II of the UMRA) for state, local, or tribal governments or the private sector. The State may use these resulting water quality criteria in implementing its water quality control programs. This proposed rule does not regulate or affect any entity and, therefore, is not subject to the requirements of sections 202 and 205 of UMRA.

EPA determined that this proposed rule contains no regulatory requirements that might significantly or uniquely affect small governments. Moreover, WQS, including those proposed here, apply broadly to dischargers and are not uniquely applicable to small governments. Thus, this proposed rule is not subject to the requirements of section 203 of UMRA.

E. Executive Order 13132 (Federalism)

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. EPA's authority and responsibility to promulgate Federal WQS when state standards do not meet the requirements of the CWA is well established and has been used on various occasions in the past. The proposed rule would not substantially affect the relationship between EPA and the states and territories, or the distribution of power or responsibilities between EPA and the various levels of government. The proposed rule would not alter Florida's considerable discretion in implementing these WQS. Further, this proposed rule would not

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[113] Refer to Docket ID EPA–HQ–OW–2009–0596.

[114] EPA was not able to estimate costs for municipal stormwater systems because the need for incremental controls is uncertain.

preclude Florida from adopting WQS that meet the requirements of the CWA, either before or after promulgation of the final rule, thus eliminating the need for Federal standards. Thus, Executive Order 13132 does not apply to this proposed rule.

Although section 6 of Executive Order 13132 does not apply to this action, EPA had extensive communication with the State of Florida to discuss EPA's concerns with the State's nutrient water quality criteria and the Federal rulemaking process. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and state and local governments, EPA specifically solicits comment on this proposed rule from State and local officials.

F. Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments)

Subject to the Executive Order 13175 (65 FR 67249, November 9, 2000) EPA may not issue a regulation that has tribal implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by tribal governments, or EPA consults with tribal officials early in the process of developing the proposed regulation and develops a tribal summary impact statement. EPA has concluded that this action may have tribal implications. However, the rule will neither impose substantial direct compliance costs on tribal governments, nor preempt Tribal law.

In the State of Florida, there are two Indian tribes, the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida, with lakes and flowing waters. Both tribes have been approved for treatment in the same manner as a state (TAS) status for CWA sections 303 and 401 and have federally-approved WQS in their respective jurisdictions. These tribes are not subject to this proposed rule. However, this rule may impact the tribes because the numeric nutrient criteria for Florida will apply to waters adjacent to the tribal waters.

EPA has contacted the tribes to inform them of the potential future impact this proposal could have on tribal waters. A meeting with tribal officials has been requested to discuss the draft proposed rule and potential impacts on the tribes. EPA specifically solicits additional comment on this proposed rule from tribal officials.

G. Executive Order 13045 (Protection of Children From Environmental Health and Safety Risks)

This action is not subject to EO 13045 (62 FR 19885, April 23, 1997) because it is not economically significant as defined in EO 12866, and because the Agency does not believe the environmental health or safety risks addressed by this action present a disproportionate risk to children.

H. Executive Order 13211 (Actions That Significantly Affect Energy Supply, Distribution, or Use)

This rule is not a "significant energy action" as defined in Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355 (May 22, 2001)), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

I. National Technology Transfer Advancement Act of 1995

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law 104–113, section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.*, materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This proposed rulemaking does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards.

J. Executive Order 12898 (Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations)

Executive Order (EO) 12898 (59 FR 7629 (Feb. 16, 1994)) establishes Federal executive policy on environmental justice. Its main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this proposed rule does not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it would afford a greater level of protection to both human health and the environment if these numeric nutrient criteria are promulgated for Class I and Class III waters in the State of Florida.

List of Subjects in 40 CFR Part 131

Environmental protection, water quality standards, nutrients, Florida.

Dated: January 14, 2010.

Lisa P. Jackson,

Administrator.

For the reasons set out in the preamble, EPA proposes to amend 40 CFR part 131 as follows:

PART 131—WATER QUALITY STANDARDS

1. The authority citation for part 131 continues to read as follows:

Authority: 33 U.S.C. 1251 *et seq.*

Subpart D—[Amended]

2. Section 131.43 is added as follows:

§ 131.43 Florida.

(a) *Scope*. This section promulgates numeric nutrient criteria for lakes, streams, springs, canals, estuaries, and coastal waters in the State of Florida. This section also contains provisions for site-specific criteria.

(b) *Definitions*—

(1) *Canal* means a trench, the bottom of which is normally covered by water with the upper edges of its two sides normally above water, excluding all secondary and tertiary canals, classified as Class IV waters, wholly within Florida's agricultural areas.

(2) *Clear stream* means a free-flowing water whose color is less than 40 platinum cobalt units (PCU).

(3) *Lake* means a freshwater water body that is not a stream or other watercourse with some open contiguous water free from emergent vegetation.

(4) *Lakes and flowing waters* means inland surface waters that have been classified as Class I (Potable Water Supplies) or Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife) water bodies pursuant to Rule 62–302.400, F.A.C., excluding wetlands, and are predominantly fresh waters.

(5) *Nutrient watershed region* means an area of the State, corresponding to coastal/estuarine drainage basin and differing geographical conditions

affecting nutrient levels, as delineated in the Technical Support Document for EPA's Proposed Rule for Numeric Nutrient Criteria for Florida's Inland Surface Fresh Waters.

(6) *Predominantly fresh waters* means surface waters in which the chloride concentration at the surface is less than 1,500 milligrams per liter.

(7) *Spring* means the point where underground water emerges onto the Earth's surface, including its spring run.

(8) *Spring run* means a free-flowing water that originates from a spring or spring group whose primary (>50%) source of water is from a spring or spring group.

(9) *State* shall mean the State of Florida, whose transactions with the U.S. EPA in matters related to this regulation are administered by the Secretary, or officials delegated such responsibility, of the Florida Department of Environmental Protection (FDEP), or successor agencies.

(10) *Stream* means a free-flowing, predominantly fresh surface water in a defined channel, and includes rivers, creeks, branches, canals (outside south Florida), freshwater sloughs, and other similar water bodies.

(11) *Surface water* means water upon the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs shall be classified as surface water when it exits from the spring onto the Earth's surface.

(c) Criteria for Florida waters—

(1) *Criteria for lakes.* The applicable criterion for chlorophyll *a*, total nitrogen (TN), and total phosphorus (TP) for lakes within each respective lake class is shown on the following table:

Long-term average lake color and alkalinity	Chlorophyll *a* [f] (µg/L) [a]	Baseline criteria [b]		Modified criteria (within these bounds) [c]	
		TP (mg/L) [a]	TN (mg/L) [a]	TP (mg/L) [a]	TN (mg/L) [a]
A	B	C	D	E	F
Colored Lakes > 40 PCU	20	0.050	1.23	0.050–0.157	1.23–2.25
Clear Lakes, Alkaline ≤ 40 PCU [d] and > 50 mg/L $CaCO_3$ [e]	20	0.030	1.00	0.030–0.087	1.00–1.81
Clear Lakes, Acidic ≤ 40 PCU [d] and ≤ 50 mg/L $CaCO_3$ [e]	6	0.010	0.500	0.010–0.030	0.500–0.900

[a] Concentration values are based on annual geometric mean not to be surpassed more than once in a three-year period. In addition, the long-term average of annual geometric mean values shall not surpass the listed concentration values. (Duration = annual; Frequency = not to be surpassed more than once in a three-year period or as a long-term average).

[b] Baseline criteria apply unless data are readily available to calculate and apply lake-specific, modified criteria as described below in footnote c and the Florida Department of Environmental Protection issues a determination that a lake-specific modified criterion is the applicable criterion for an individual lake. Any such determination must be made consistent with the provisions in footnote c below. Such determination must also be documented in an easily accessible and publicly available location, such as an official State Web site.

[c] If chlorophyll *a* is below the criterion in column B and there are representative data to calculate ambient-based, lake-specific, modified TP and TN criteria, then FDEP may calculate such criteria within these bounds from ambient measurements to determine lake-specific, modified criteria pursuant to CWA section 303(c). Modified TN and TP criteria must be based on at least three years of ambient monitoring data with (a) at least four measurements per year and (b) at least one measurement between May and September and one measurement between October and April each year. These same data requirements apply to chlorophyll *a* when determining whether the chlorophyll *a* criterion is met for purposes of developing modified TN and TP criteria. If the calculated TN and/or TP value is below the lower value, then the lower value is the lake-specific, modified criterion. If the calculated TN and TP value is above the upper value, then the upper value is the lake-specific, modified criterion. Modified TP and TN criteria may not exceed criteria applicable to streams to which a lake discharges. If chlorophyll *a* is below the criterion in column B and representative data to calculate modified TN and TP criteria are not available, then the baseline TN and TP criteria apply. Once established, modified criteria are in place as the applicable WQS for all CWA purposes.

[d] Platinum Cobalt Units (PCU) assessed as true color free from turbidity. Long-term average color based on a rolling average of up to seven years using all available lake color data.

[e] If alkalinity data are unavailable, a specific conductance of 250 micromhos/cm may be substituted.

[f] Chlorophyll *a* is defined as corrected chlorophyll, or the concentration of chlorophyll *a* remaining after the chlorophyll degradation product, phaeophytin *a*, has been subtracted from the uncorrected chlorophyll *a* measurement.

(2) *Criteria for streams.*

(i) The applicable instream protection value (IPV) criterion for total nitrogen (TN) and total phosphorus (TP) for streams within each respective nutrient watershed region is shown in the following table:

Nutrient watershed region	Instream protection value criteria	
	TN (mg/L) [a]	TP (mg/L) [a]
Panhandle [b]	0.824	0.043
Bone Valley [c]	1.798	0.739
Peninsula [d]	1.205	0.107
North Central [e]	1.479	0.359

[a] Concentration values are based on annual geometric mean not to be surpassed more than once in a three-year period. In addition, the long-term average of annual geometric mean values shall not surpass the listed concentration values. (Duration = annual; Frequency = not to be exceeded more than once in a three-year period or as a long-term average).

[b] Panhandle region includes the following watersheds: Perdido Bay Watershed, Pensacola Bay Watershed, Choctawhatchee Bay Watershed, St. Andrew Bay Watershed, Apalachicola Bay Watershed, Apalachee Bay Watershed, and Econfina/Steinhatchee Coastal Drainage Area.

[c] Bone Valley region includes the following watersheds: Tampa Bay Watershed, Sarasota Bay Watershed, and Charlotte Harbor Watershed.

[d] Peninsula region includes the following watersheds: Waccasassa Coastal Drainage Area, Withlacoochee Coastal Drainage Area, Crystal/Pithlachascotee Coastal Drainage Area, Indian River Watershed, Caloosahatchee River Watershed, St. Lucie Watershed, Kissimmee River Watershed, St. John's River Watershed, Daytona/St. Augustine Coastal Drainage Area, Nassau Coastal Drainage Area, and St. Mary's River Watershed.

[e] North Central region includes the Suwannee River Watershed.

(ii) *Criteria for protection of downstream lakes.*

(A) The applicable total phosphorus criterion-magnitude for a stream that flows into downstream lakes is the more stringent of the value from the preceding table in paragraph (c)(2)(i) of this section or a downstream lake protection value derived from the following equation to protect the downstream lake:

$$[TP]_S = \frac{1}{c_f}[TP]_L\left(1+\sqrt{\tau_w}\right)$$

where:

$[TP]_S$ is the total phosphorus (TP) downstream lake protection value, mg/L
$[TP]_L$ is applicable TP lake criterion, mg/L
c_f is the fraction of inflow due to all streamflow, $0 \le c_f \le 1$
τ_w is lake's hydraulic retention time (water volume divided by annual flow rate)

The term

$$\left(1+\sqrt{\tau_w}\right)$$

expresses the net phosphorus loss from the water column (*e.g.*, via settling of sediment-sorbed phosphorus) as a function of the lake's retention time.

(B) The preset values for c_f and τ_w, respectively, are 0.5 and 0.2. The State may substitute site-specific values for these preset values where the State determines that they are appropriate and documents the site-specific values in an easily accessible and publicly available location, such as an official State Web site.

(iii) *Criteria for protection of downstream estuarine waters.*

(A) The applicable criteria for a stream that flows into downstream estuary is the more stringent of the values from the preceding table in paragraph (c)(2)(i) of this section or downstream protection values derived from the following equation to protect the downstream estuary. EPA's preset DPVs are listed in the Technical Support Document (TSD) for Florida's Inland Waters located at *www.regulations.gov*, Docket ID No. EPA–HQ–OW–2009–0569, and calculated for each stream reach as the average reach-specific concentration ($\bar{C}_i$) equal to the average reach-specific annual loading rate (L_i) divided by the average reach-specific flow ($\bar{Q}_i$) where:

$$\bar{C}_i = kL_{est}\frac{1}{Q_W F_i},$$

and where the terms are defined as follows for a specific or (i[th]) stream reach:

$\bar{C}_i$ maximum flow-averaged nutrient concentration for a specific (the i[th]) stream reach consistent with downstream use protection (*i.e.*, the DPV)
k fraction of all loading to the estuary that comes from the stream network resolved by SPARROW
L_{est} protective loading rate for the estuary, from all sources
$\bar{Q}_w$ combined average freshwater discharged into the estuary from the portion of the watershed resolved by the SPARROW stream network
F_i fraction of the flux at the downstream node of the specific (i[th]) reach that is transported through the stream network and ultimately delivered to estuarine eceiving waters (*i.e.* Fraction Delivered).

DPVs may not exceed other criteria established for designated use protection in this section, nor result in an exceedance of other criteria for other water quality parameters established pursuant to Rule 62–302, F.A.C.

(B) The State may calculate alternative DPVs as above for $\bar{C}_i$ except that L_i is determined as a series of values for each reach in the upstream drainage area such that the sum of reach-specific incremental loading rates equals the target loading rate to the downstream water protective of downstream uses, taking into account that downstream reaches must reflect loads established for upstream reaches. Alternative DPVs may factor in additional nutrient attenuation provided by already existing landscape modifications or treatment systems, such as constructed wetlands or stormwater treatment areas. For alternative DPVs to become effective for Clean Water Act purposes, the State must provide public notice and opportunity for comment.

(C) To use an alternative technical approach of comparable scientific rigor to quantitatively determine the protective load to the estuary and associated protective stream concentrations, the State must go through the process for a Federal site-specific alternative criterion pursuant to paragraph (e) of this section.

(3) *Criteria for springs, spring runs, and clear streams.* The applicable nitrate-nitrite criterion is 0.35 mg/L as an annual geometric mean not to be surpassed more than once in a three year period, nor surpassed as a long-term average of annual geometric mean values. In addition to this nitrate-nitrite criterion, criteria identified in paragraph (c)(2) of this section are applicable to clear streams.

(4) *Criteria for south Florida canals.* The applicable criterion for chlorophyll *a*, total nitrogen (TN), and total phosphorus (TP) for canals within each respective canal geographic classification area is shown on the following table:

	Chlorophyll a (µg/L) [a]	Total phosphorus (TP) (mg/L) [a b]	Total nitrogen (TN) (mg/L) [a]
Canals	4.0	0.042	1.6

[a] Concentration values are based on annual geometric mean not to be surpassed more than once in a three-year period. In addition, the long-term average of annual geometric mean values shall not surpass the listed concentration values. (Duration = annual; Frequency = not to be surpassed more than once in a three-year period or as a long-term average).
[b] Applies to all canals within the Florida Department of Environmental Protection's South Florida bioregion, with the exception of canals within the Everglades Protection Area (EvPA) where the TP criterion of 0.010 mg/L currently applies.

(5) *Criteria for estuaries.* [Reserved]

(6) *Criteria for coastal waters.* [Reserved]

(d) *Applicability.*

(1) The criteria in paragraphs (c)(1) through (4) of this section apply to surface waters of the State of Florida designated as Class I (Potable Water Supplies) or Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife) water bodies pursuant to Rule 62–302.400, F.A.C., excluding wetlands, and apply concurrently with other applicable water quality criteria, except when:

(i) State regulations contain criteria which are more stringent for a particular parameter and use;

(ii) The Regional Administrator determines that site-specific alternative criteria apply pursuant to the procedures in paragraph (e) of this section;

(iii) The State adopts and EPA approves a water quality standards variance to the Class I or Class III designated use pursuant to § 131.13 that meets the applicable provisions of State law and the applicable Federal regulations at § 131.10; or

(iv) The State adopts and EPA approves restoration standards pursuant to paragraph (g) of this section.

(2) The criteria established in this section are subject to the State's general rules of applicability in the same way and to the same extent as are the other federally-adopted and State-adopted numeric criteria when applied to the same use classifications.

(i) For all waters with mixing zone regulations or implementation procedures, the criteria apply at the appropriate locations within or at the boundary of the mixing zones; otherwise the criteria apply throughout the water body including at the point of discharge into the water body.

(ii) The State shall use an appropriate design flow condition, where necessary, for purposes of permit limit derivation or load and wasteload allocations that is consistent with the criteria duration and frequency established in this section (*e.g.,* average annual flow for a criterion magnitude expressed as an average annual geometric mean value).

(iii) The criteria established in this section apply for purposes of determining the list of impaired waters pursuant to section 303(d) of the Clean Water Act, subject to the procedures adopted pursuant to Rule 62–303, F.A.C., where such procedures are consistent with the level of protection provided by the criteria established in this section.

(e) *Site-specific alternative criteria.* (1) Upon request from the State, the Regional Administrator may determine that site-specific alternative criteria shall apply to specific surface waters in lieu of the criteria established in paragraph (c) of this section. Any such determination shall be made consistent with § 131.11.

(2) To receive consideration from the Regional Administrator for a determination of site-specific alternative criteria, the State must submit a request that includes proposed alternative numeric criteria and supporting rationale suitable to meet the needs for a technical support document pursuant to paragraph (e)(3) of this section.

(3) For any determination made under paragraph (e)(1) of this section, the Regional Administrator shall, prior to making such a determination, provide for public notice and comment on a proposed determination. For any such proposed determination, the Regional Administrator shall prepare and make available to the public a technical support document addressing the specific surface waters affected and the justification for each proposed determination. This document shall be made available to the public no later than the date of public notice issuance.

(4) The Regional Administrator shall maintain and make available to the public an updated list of determinations made pursuant to paragraph (e)(1) of this section as well as the technical support documents for each determination.

(5) Nothing in this paragraph (e) shall limit the Administrator's authority to modify the criteria in paragraph (c) of this section through rulemaking.

(f) *Effective date.* All criteria will be in effect [date 60 days after publication of final rule].

(g) *Restoration Water Quality Standards (WQS).* The State may, at its discretion, adopt restoration WQS to allow attainment of a designated use over phased time periods where the designated use is not currently attainable as a result of nutrient pollution but is attainable in the future. In establishing restoration WQS, the State must:

(1) Demonstrate that the designated use is not attainable during the time periods established for the restoration phases based on one of the factors identified in § 131.10(g)(1) through (6);

(2) Specify the designated use to be attained at the termination of the restoration period, as well as the criteria necessary to protect such use, provided that the final designated use and corresponding criteria shall include, at a minimum, uses and criteria that are consistent with CWA section 101(a)(2) ;

(3) Establish interim restoration designated uses and water quality criteria, that apply during each phase that will result in maximum feasible progress toward the highest attainable designated use and the use identified in paragraph (g)(2) of this section. Such interim uses and criteria may not provide for further degradation of a water body and may be revised prior to the end of each phase in accordance with §§ 131.10 and 131.20 and submitted to EPA for approval;

(4) Establish the time periods for each restoration phase that will result in maximum feasible progress toward the highest attainable use and the designated use identified in paragraph (g)(2) of this section, except that the sum of such time periods shall not exceed twenty years from the initial date of establishment of the restoration WQS under this section;

(5) Specify the spatial extent of applicability for all affected waters;

(6) Meet the requirements of §§ 131.10 and 131.20; and

(7) Include, in its State water quality standards, a specific provision that if the interim restoration designated uses and criteria established under paragraph (g)(3) of this section are not met during any phased time period established under paragraph (g)(4) of this section, the restoration WQS will no longer be applicable and the designated use and criteria identified in paragraph (g)(2) of this section will become applicable immediately.

(8) Provide that waters for which a restoration water quality standard is adopted will be recognized as impaired for the purposes of listing impaired waters under section 303(d) of the CWA until the use designated identified in paragraph (g)(2) of this section is attained.

[FR Doc. 2010–1220 Filed 1–25–10; 8:45 am]
BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 131

[EPA-HQ-OW-2009-0596; FRL-XXXX-X]

RIN 2040-AF11

Water Quality Standards for the State of Florida's Lakes and Flowing Waters

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA or Agency) is promulgating numeric water quality criteria for nitrogen/phosphorus pollution to protect aquatic life in lakes, flowing waters, and springs within the State of Florida. These criteria apply to Florida waters that are designated as Class I or Class III waters in order to implement the State's narrative nutrient provision at Subsection 62-302-530(47)(b), Florida Administrative Code (F.A.C.), which provides that "[i]n no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna."

DATES: This final rule is effective [insert date 15 months after publication in the Federal Register], except for section 131.43(e), which is effective [insert date 60 days after publication in the Federal Register].

ADDRESSES: An electronic version of the public docket is available through EPA's electronic public docket and comment system, EPA Dockets. You may use EPA Dockets at http://www.regulations.gov to view public comments, access the index listing of the contents of the official public docket, and to access those documents in the public docket that are available electronically. For additional information about EPA's public docket, visit the EPA Docket Center homepage at http://www.epa.gov/epahome/dockets.htm. Although listed in the index, some information is not publicly available, i.e., Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyright material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically in www.regulations.gov or in hard copy at the Docket Facility. The Office of Water (OW) Docket Center is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The OW Docket Center telephone number is 202-566-1744 and the Docket address is OW Docket, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC 20004. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744.

FOR FURTHER INFORMATION CONTACT: For information concerning this rulemaking, contact Danielle Salvaterra, U.S. EPA Headquarters, Office of Water, Mailcode: 4305T, 1200 Pennsylvania Avenue, NW, Washington, DC 20460; telephone number: 202-564-1649; fax number: 202-566-9981; email address: salvaterra.danielle@epa.gov.

SUPPLEMENTARY INFORMATION: This supplementary information section is organized as follows:

Table of Contents

I. General Information

A. Executive Summary

Florida is known for its abundant and aesthetically beautiful natural resources, in particular its water resources. Florida's water resources are very important to its economy, for example, its $6.5 billion fishing industry.[1] However, nitrogen/phosphorus pollution has contributed to severe water quality degradation in the State of Florida.

[1] Florida Fish and Wildlife Conservation Commission. 2010. *The economic impact of freshwater fishing in Florida.* <http://www.myfwc.com/CONSERVATION/Conservation_ValueofConservation_EconFreshwaterImpact.htm.>. Accessed August 2010.

Based upon waters assessed and reported by the Florida Department of Environmental Protection (FDEP) in its *2008 Integrated Water Quality Assessment for Florida*, approximately 1,049 miles of rivers and streams (about 5% of total assessed streams), 349,248 acres of lakes (about 23% of total assessed lakes), and 902 square miles of estuaries (about 24% of total assessed estuaries) are known to be impaired for nutrients by the State.[2]

The information presented in FDEP's latest water quality assessment report, the *2010 Integrated Water Quality Assessment for Florida*, documents increased identification of assessed waters that are impaired due to nutrients. In the FDEP *2010 Integrated Water Quality Assessment for Florida*, approximately 1,918 miles of rivers and streams (about 8% of assessed river and stream miles), 378,435 acres of lakes (about 26% of assessed lake acres), and 569 square miles of estuaries[3] (about 21% of assessed square miles of estuaries)[4] are identified as impaired by nutrients.[5] The challenge of nitrogen/phosphorus pollution has been an ongoing focus for FDEP. Over the past decade or more, FDEP reports that it has spent over 20 million dollars collecting and analyzing data related to concentrations and impacts of nitrogen/phosphorus pollution in

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[2] Florida Department of Environmental Protection (FDEP). 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.

[3] The estimated miles for estuaries were recalculated in 2010. FDEP used revised GIS techniques to calculate mileages and corrected estuary waterbody descriptions by removing land drainage areas that had been included in some descriptions, which reduced the estimates of total estuarine water area for Florida waters generally, as well as for some of the estuary classifications in the 2010 report.

[4] For the Integrated Water Quality Assessment for Florida: 2010 305(b) Report and 303(d) List Update, Florida assessed about 3,637 additional miles of streams, about 24,833 fewer acres of lakes, and about 1,065 fewer square miles of estuaries than the 2008 Integrated Report. In addition, Florida reevaluated the WBID segment boundaries using "improved GIS techniques" for mapping. The most significant result of the major change in mapping was the reduction of assessed estuarine area from 3,726 to 2,661 square miles. The net result to the impaired waters for estuaries is that the percent of assessed estuaries impaired remains about the same in 2008 (24%) as in 2010 (21%).

[5] FDEP. 2010. Integrated Water Quality Assessment for Florida: 2010 305(b) Report and 303(d) List Update.

the State.[6] Despite FDEP's intensive efforts to diagnose and evaluate nitrogen/phosphorus pollution, substantial and widespread water quality degradation from nitrogen/phosphorus over-enrichment has continued and remains a significant problem.

On January 14, 2009, EPA determined under Clean Water Act (CWA) section 303(c)(4)(B) that new or revised water quality standards (WQS) in the form of numeric water quality criteria are necessary to protect the designated uses from nitrogen/phosphorus pollution that Florida has set for its Class I and Class III waters. The Agency considered 1) the State's documented unique and threatened ecosystems, 2) the large number of impaired waters due to existing nitrogen/phosphorus pollution, and 3) the challenge associated with growing nitrogen/phosphorus pollution associated with expanding urbanization, continued agricultural development, and a significantly increasing population that the U.S. Census estimates is expected to grow over 75% between 2000 and 2030.[7] EPA also reviewed the State's regulatory accountability system, which represents a synthesis of both technology-based standards and point source control authority, as well as authority to establish enforceable controls for nonpoint source activities.

A significant challenge faced by Florida's water quality program is its dependence and current reliance upon an approach involving resource-intensive and time-consuming site-by-site data collection and analysis to interpret non-numeric narrative criteria. This approach is used to make water quality impairment determinations under

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[6] FDEP. 2009. Florida Numeric Nutrient Criteria History and Status. <http://www.dep.state.fl.us/water/wqssp/nutrients/docs/fl-nnc-summary-100109.pdf>. Accessed September 2010.

[7] U.S. Census Bureau, Population Division, Interim State Population Projections, 2005. <http://www.census.gov/population/projections/SummaryTabA1.pdf>.

CWA section 303(d), to set appropriately protective numeric nitrogen and phosphorus pollution targets to guide restoration of impaired waters, and to establish numeric nitrogen and phosphorus goals to ensure effective protection and maintenance of non-impaired waters. EPA determined that Florida's reliance on a case-by-case interpretation of its narrative criterion in implementing an otherwise comprehensive water quality framework of enforceable accountability mechanisms was insufficient to ensure protection of applicable designated uses under Subsection 62-302.530(47)(b),F.A.C., which, as noted above, provides "[i]n no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna."

In accordance with the terms of EPA's January 14, 2009 determination, an August 2009 Consent Decree, and June 7, 2010 and October 27, 2010 revisions to that Consent Decree, which are discussed in more detail in Section II.D, EPA is promulgating and establishing final numeric criteria for lakes and springs throughout Florida, and flowing waters (e.g., rivers, streams, canals, etc.) located outside of the South Florida Region.[8]

Regarding numeric criteria for streams, the Agency conducted a detailed technical evaluation of the substantial amount of sampling, monitoring and associated water quality analytic data available on Florida streams together with a significant amount of related scientific analysis. EPA concluded that reliance on a reference-based methodology was a strong and scientifically sound approach for deriving numeric criteria, in the form of total

[8] For purposes of this rule, EPA has distinguished South Florida as those areas south of Lake Okeechobee and the Caloosahatchee River watershed to the west of Lake Okeechobee and the St. Lucie watershed to the east of Lake Okeechobee, hereinafter referred to as the South Florida Region. Numeric criteria applicable to flowing waters in the South Florida Region will be addressed in the second phase of EPA's rulemaking regarding the establishment of estuarine and coastal numeric criteria. (Please refer to Section I.B for a discussion of the water bodies affected by this rule).

nitrogen (TN) and total phosphorus (TP) concentration values for flowing waters including streams and rivers. This information is presented in more detail in Section III.B below.

For lakes, EPA is promulgating a classification approach using color and alkalinity based upon substantial data that show that lake color and alkalinity are important predictors of the degree to which TN and TP concentrations result in a biological response such as elevated chlorophyll a levels. EPA found that correlations between nitrogen/phosphorus and biological response parameters in the different types of lakes in Florida were specific, significant, and documentable, and when considered in combination with additional lines of evidence, support a stressor-response approach to criteria development for Florida's lakes. EPA's results show a significant relationship between concentrations of nitrogen and phosphorus in lakes and algal growth. The Agency is also promulgating an accompanying supplementary analytical approach that the State can use to adjust TN and TP criteria within a certain range for individual lakes where sufficient data on long-term ambient chlorophyll a, TN, and TP levels are available to demonstrate that protective chlorophyll a criterion for a specific lake will still be maintained and attainment of the designated use will be assured. This information is presented in more detail in Section III.C below.

EPA also evaluated what downstream protection criteria for streams that flow into lakes is necessary for assuring the protection of downstream lake water quality pursuant to the provisions of 40 CFR 130.10(b), which requires that water quality standards (WQS) must provide for the attainment and maintenance of the WQS of downstream waters. EPA examined a variety of lake modeling techniques and data to ensure protection of aquatic life in downstream lakes that have streams flowing into them. Accordingly, this final rule includes a tiered approach to adjust instream TP and TN criteria for flowing waters to ensure protection of downstream lakes. This approach is detailed in Section III.C(2)(f) below.[9]

Regarding numeric criteria for springs, EPA is promulgating a nitrate+nitrite criterion for springs based on stressor-response relationships that are based on laboratory data and field evaluations that document the response of nuisance[10] algae and periphyton growth to nitrate+nitrite concentrations in springs. This criterion is explained in more detail in Section III.D below.

Finally, EPA is promulgating in this notice an approach to authorize and allow derivation of Federal site-specific alternative criteria (SSAC) based upon EPA review and approval of applicant submissions of scientifically defensible recalculations that meet the requirements of CWA section 303(c) and EPA's implementing regulations at 40 CFR part 131. Total maximum daily load (TMDL) targets submitted to EPA for consideration as new or revised WQS would be reviewed under this SSAC process. This approach is discussed in more detail in Section V.C below.

Throughout the development of this rulemaking, EPA has emphasized the importance of sound science and widespread input in developing numeric criteria. Stakeholders have reiterated that numeric criteria must be scientifically sound. As demonstrated by the extent and detail of scientific analysis explained below, EPA

[9] As provided by the terms of the June 7, 2010 amended Consent Decree, downstream protection values for estuaries and coastal waters will be addressed in the context of the second phase of this rulemaking process.
[10] Nuisance algae is best characterized by Subsection 62-302.200(17), F.A.C.: "Nuisance Species" shall mean species of flora or fauna whose noxious characteristics or presence in sufficient number, biomass, or areal extent may reasonably be expected to prevent, or unreasonably interfere with, a designated use of those waters.

continues to strongly agree. Under the CWA and EPA's implementing regulations, numeric criteria must protect the designated use of a waterbody (as well as ensure protection of downstream uses) and must be based on sound scientific rationale. (*See* CWA section 303(c); 40 CFR 131.11). In Florida, EPA relied upon its published criteria development methodologies[11] and a substantial body of scientific analysis, documentation, and evaluation, much of it provided to EPA by FDEP. As discussed in more detail below, EPA believes that the final criteria in this rule meet requirements for designated use and downstream WQS protection under the CWA and that they are clearly based on sound and substantial data and analyses.

B. Which Water Bodies Are Affected By This Rule?

The criteria in this final rulemaking apply to a group of inland waters of the United States within Florida. Specifically, as defined below, these criteria apply to lakes and springs throughout Florida, and flowing waters (e.g., rivers, streams, canals, etc.) located outside of the South Florida Region. For purposes of this rule, EPA has distinguished South Florida as those areas south of Lake Okeechobee and the Caloosahatchee River watershed to the west of Lake Okeechobee and the St. Lucie watershed to the east of Lake Okeechobee, hereinafter referred to as the South Florida Region. In this section, EPA defines the water bodies affected by this rule with respect to the Clean Water Act, Florida Administrative Code, and geographic scope in Florida.

[11] USEPA. 2000a. *Nutrient Criteria Technical Guidance Manual: Lakes and Reserviors.* EPA-822-B-00-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
USEPA. 2000b. *Nutrient Criteria Technical Guidance Manual:Rivers and Streams.* EPA-822-B-00-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

Because this regulation applies to inland waters, EPA defines fresh water as it applies to the affected water bodies.

The CWA requires adoption of WQS for "navigable waters." CWA section 303(c)(2)(A). The CWA defines "navigable waters" to mean "the waters of the United States, including the territorial seas." CWA section 502(7). Whether a particular waterbody is a water of the United States is a waterbody-specific determination. Every waterbody that is a water of the United States requires WQS under the CWA. EPA is not aware of any waters of the United States in Florida that are currently exempted from the State's WQS. For any privately-owned water in Florida that is a water of the United States, the applicable numeric criteria for those types of waters would apply. This rule does not apply to waters for which the Miccosukee Tribe of Indians or Seminole Tribe of Indians has obtained Treatment in the Same Manner as a State status for Sections 303 and 401 of the CWA, pursuant to Section 518 of the CWA.

EPA's final rule defines "lakes and flowing waters" (a phrase that includes lakes, streams, and springs) to mean inland surface waters that have been classified as Class I (Potable Water Supplies) or Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife) water bodies pursuant to Section 62-302.400,F.A.C., which are predominantly fresh waters, excluding wetlands. Class I and Class III surface waters share water quality criteria established to "protect recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife" pursuant to Subsection 62-302.400(4), F.A.C.[12]

[12] Class I waters also include an applicable nitrate limit of 10 mg/L and nitrite limit of 1 mg/L for the protection of human health in drinking water supplies. The nitrate limit applies at the entry point to the distribution system (i.e., after any treatment); see Chapter 62-550, F.A.C., for additional details.

Geographically, the regulation applies to all lakes and springs throughout Florida. EPA is not finalizing numeric criteria for Florida's streams or canals in south Florida at this time. As noted above, EPA has distinguished South Florida as those areas south of Lake Okeechobee and the Caloosahatchee River watershed to the west of Lake Okeechobee and the St. Lucie watershed to the east of Lake Okeechobee, hereinafter referred to as the South Florida Region. The Agency will propose criteria for south Florida flowing waters in conjunction with criteria for Florida's estuarine and coastal waters by November 14, 2011.

Consistent with Section 62-302.200, F.A.C., EPA's final rule defines "predominantly fresh waters" to mean surface waters in which the chloride concentration at the surface is less than 1,500 milligrams per liter (mg/L). Consistent with Section 62-302.200, F.A.C., EPA's final rule defines "surface water" to mean "water upon the surface of the earth, whether contained in bounds created naturally, artificially, or diffused. Water from natural springs shall be classified as surface water when it exits from the spring onto the earth's surface." In this rulemaking, EPA is promulgating numeric criteria for the following waterbody types: lakes, streams, and springs. EPA's final rule also includes definitions for each of these waters. "Lake" means a slow-moving or standing body of freshwater that occupies an inland basin that is not a stream, spring, or wetland. "Stream" means a free-flowing, predominantly fresh surface water in a defined channel, and includes rivers, creeks, branches, canals, freshwater sloughs, and other similar water bodies. "Spring" means a site at which ground water flows through a natural opening in the ground onto the land surface or into a body of surface water.

Consistent with Section 62-312.020, F.A.C., "canal" means a trench, the bottom of which is normally covered by water with the upper edges of its two sides normally above water.

C. What Entities May Be Affected By This Rule?

Citizens concerned with water quality in Florida may be interested in this rulemaking. Entities discharging nitrogen or phosphorus to lakes and flowing waters of Florida could be indirectly affected by this rulemaking because WQS are used in determining National Pollutant Discharge Elimination System (NPDES) permit limits. Categories and entities that may ultimately be affected include:

Category	Examples of potentially affected entities
Industry	Industries discharging pollutants to lakes and flowing waters in the State of Florida.
Municipalities	Publicly-owned treatment works discharging pollutants to lakes and flowing waters in the State of Florida.
Stormwater Management Districts	Entities responsible for managing stormwater runoff in Florida.

This table is not intended to be exhaustive, but rather provides a guide for entities that may be directly or indirectly affected by this action. This table lists the types of entities of which EPA is now aware that potentially could be affected by this action. Other types of entities not listed in the table, such as nonpoint source contributors to nitrogen/phosphorus pollution in Florida's waters may be affected through implementation of Florida's water quality standards program (i.e., through Basin Management Action Plans (BMAPs)). Any parties or entities conducting activities within watersheds of the Florida waters covered by this rule, or who rely on, depend upon, influence, or contribute to the water quality of the lakes and flowing waters of Florida, may be affected by this rule. To determine whether your facility or activities may be affected by this action, you should carefully examine the language in 40 CFR 131.43, which is the final rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

D. How Can I Get Copies of This Document and Other Related Information?

1. *Docket*. EPA has established an official public docket for this action under Docket Id. No. EPA-HQ-OW-2009-0596. The official public docket consists of the document specifically referenced in this action, any public comments received, and other information related to this action. Although a part of the official docket, the public docket does not include CBI or other information whose disclosure is restricted by statute. The official public docket is the collection of materials that is available for public viewing at the OW Docket, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC 20004. This Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The Docket telephone number is 202-566-2426. A reasonable fee will be charged for copies.

2. *Electronic Access*. You may access this **Federal Register** document electronically through the EPA Internet under the "Federal Register" listings at http://www.epa.gov/fedrgstr/.

An electronic version of the public docket is available through EPA's electronic public docket and comment system, EPA Dockets. You may use EPA Dockets at http://www.regulations.gov to view public comments, access the index listing of the contents of the official public docket, and to access those documents in the public docket that are available electronically. For additional information about EPA's public docket, visit the EPA Docket Center homepage at http://www.epa.gov/epahome/dockets.htm. Although not all docket materials may be available electronically, you may still access any of the publicly available docket materials through the Docket Facility identified in Section I.C(1).

II. Background

A. Nitrogen/Phosphorus Pollution

1. What is Nitrogen/Phosphorus Pollution?

Excess loading of nitrogen and phosphorus compounds,[13] is one of the most prevalent causes of water quality impairment in the United States. Nitrogen/phosphorus pollution problems have been recognized for some time in the U.S., for example a 1969 report by the National Academy of Sciences[14] notes "[t]he pollution problem is critical because of increased population, industrial growth, intensification of agricultural production, river-basin development, recreational use of waters, and domestic and industrial exploitation of shore properties. Accelerated eutrophication causes changes in plant and animal life – changes that often interfere with use of water, detract from natural beauty, and reduce property values." Inputs of nitrogen and phosphorus lead to over-enrichment in many of the Nation's waters and constitute a widespread, persistent, and growing problem. Nitrogen/phosphorus pollution in fresh water systems can

[13] To be used by living organisms, nitrogen gas must be fixed into its reactive forms; for plants, either nitrate or ammonia (Boyd, C.E. 1979. *Water Quality in Warmwater Fish Ponds*. Auburn University: Alabama Agricultural Experiment Station, Auburn, AL). Eutrophication is defined as the natural or artificial addition of nitrogen/phosphorus to bodies of water and to the effects of added nitrogen/phosphorus (National Academy of Sciences (U.S). 1969. *Eutrophication: Causes, Consequences, Correctives*. National Academy of Sciences, Washington, DC.)
[14] National Academy of Sciences (U.S). 1969. *Eutrophication: Causes, Consequences, Correctives*. National Academy of Sciences, Washington, DC.

significantly impact aquatic life and long-term ecosystem health, diversity, and balance. More specifically, high nitrogen and phosphorus loadings result in harmful algal blooms (HABs), reduced spawning grounds and nursery habitats, fish kills, and oxygen-starved hypoxic or "dead" zones. Public health concerns related to nitrogen/phosphorus pollution include impaired surface and groundwater drinking water sources from high levels of nitrates, possible formation of disinfection byproducts in drinking water, and increased exposure to toxic microbes such as cyanobacteria.[15,16] Degradation of water bodies from nitrogen/phosphorus pollution can result in economic consequences. For example, given that fresh and salt water fishing in Florida are significant recreational and tourist attractions generating over six billion dollars annually,[17] changes in Florida's waters that degrade water quality to the point that sport fishing populations are affected, will also affect this important part of Florida's economy. Elevated nitrogen/phosphorus levels can occur locally in a stream or groundwater, or can accumulate much further downstream leading to degraded lakes, reservoirs, and estuaries where fish and aquatic life can no longer survive.

Excess nitrogen/phosphorus in water bodies comes from many sources, which can be grouped into five major categories: 1) urban stormwater runoff - sources associated with urban land use and development, 2) municipal and industrial waste water discharges,

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[15] Villanueva, C.M. et al., 2006. Bladder Cancer and Exposure to Water Disinfection By-Products through Ingestion, Bathing, Showering, and Swimming in Pools. *American Journal of Epidemiology* 165(2):148-156.

[16] USEPA. 2009. *What is in Our Drinking Water?*. United States Environmental Protection Agency, Office of Research and Development. <http://www.epa.gov/extrmurl/research/process/drinkingwater.html>. Accessed December 2009.

[17] Florida Fish and Wildlife Conservation Commission. 2010. *The economic impact of freshwater fishing in Florida.* <http://www.myfwc.com/CONSERVATION/Conservation_ValueofConservation_EconFreshwaterImpact.htm>. Accessed August 2010.

3) row crop agriculture, 4) livestock production, and 5) atmospheric deposition from the production of nitrogen oxides in electric power generation and internal combustion engines. These sources contribute significant loadings of nitrogen and phosphorus to surface waters, causing major impacts to aquatic ecosystems and significant imbalances in the natural populations of flora and fauna.[18, 19]

2. Adverse Impacts of Nitrogen/Phosphorus Pollution on Aquatic Life, Human Health, and the Economy

Fish, shellfish, and wildlife require clean water for survival. Changes in the environment resulting from elevated nitrogen/phosphorus levels (such as algal blooms, toxins from harmful algal blooms, and hypoxia/anoxia) can cause a variety of effects. The causal pathways that lead from human activities to excess nutrients to impacts on designated uses in lakes and streams are well established in the scientific literature (e.g., Streams: Stockner and Shortreed 1976, Stockner and Shortreed 1978, Elwood et al. 1981, Horner et al. 1983, Bothwell 1985, Peterson et al. 1985, Moss et al. 1989, Dodds and Gudder 1992, Rosemond et al. 1993, Bowling and Baker 1996, Bourassa and Cattaneo 1998, Francoeur 2001, Biggs 2000, Rosemond et al. 2001, Rosemond et al. 2002, Slavik et al. 2004, Cross et al. 2006, Mulholland and Webster 2010; Lakes: Vollenweider 1968, NAS 1969, Schindler et al. 1973, Schindler 1974, Vollenweider 1976, Carlson 1977,

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[18] National Research Council. 2000. *Clean coastal waters: Understanding and reducing the effects of nutrient pollution.* National Academies Press, Washington, D.C.; Howarth, R.W., A. Sharpley, and D. Walker. 2002. Sources of nutrient pollution to coastal waters in the United States: Implications for achieving coastal water quality goals. *Estuaries* 25(4b):656-676; Smith, V.H. 2003. Eutrophication of freshwater and coastal marine ecosystems. *Environmental Science and Pollution Research* 10(2):126-139; Dodds, W.K., W.W. Bouska, J.L. Eitzmann, T.J. Pilger, K.L. Pitts, A.J. Riley, J.T. Schloesser, and D.J. Thornbrugh. 2009. Eutrophication of U.S. freshwaters: Analysis of potential economic damages. *Envrionmental Science and Technology* 43(1):12-19.

[19] State-EPA Nutrient Innovations Task Group. 2009. *An Urgent Call to Action: Report of the State-EPA Nutrient Innovations Task Group.*

Paerl 1988, Elser et al. 1990, Smith et al. 1999, Downing et al. 2001, Smith et al. 2006, Elser et al. 2007). [20]

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[20] For Streams:
Stockner, J.G., and K.R.S. Shortreed. 1976. Autotrophic production in Carnation Creek, a coastal rainforest stream on Vancouver Island, British Columbia. *Journal of the Fisheries Research Board of Canada* 33:1553–1563.;
Stockner, J.G., and K.R.S. Shortreed. 1978. Enhancement of autotrophic production by nutrient addition in a coastal rainforest stream on Vancouver Island. *Journal of the Fisheries Research Board of Canada* 35:28–34.;
Elwood, J.W., J.D. Newbold, A.F. Trimble, AND R.W. Stark. 1981. The limiting role of phosphorus in a woodland stream ecosystem: effects of P enrichment on leaf decomposition and primary producers. *Ecology* 62:146–158.;
Horner, R.R., E.B. Welch, and R.B. Veenstra. 1983. Development of nuisance periphytic algae in laboratory streams in relation to enrichment and velocity. Pages 121–134 in R. G. Wetzel (editor). *Periphyton of freshwater ecosystems*. Dr. W. Junk Publishers, The Hague, The Netherlands.;
Bothwell, M.L. 1985. Phosphorus limitation of lotic periphyton growth rates: an intersite comparison using continuous-flow troughs (Thompson River system, British Columbia). *Limnology and Oceanography* 30:527–542.;
Peterson, B.J., J.E. Hobbie, A.E. Hershey, M.A. Lock, T.E. Ford, J.R. Vestal, V.L. McKinley, M.A.J. Hullar, M.C. Miller, R.M. Ventullo, and G. S. Volk. 1985. Transformation of a tundra river from heterotrophy to autotrophy by addition of phosphorus. *Science* 229:1383–1386.;
Moss, B., I. Hooker, H. Balls, and K. Manson. 1989. Phytoplankton distribution in a temperate floodplain lake and river system. I. Hydrology, nutrient sources and phytoplankton biomass. *Journal of Plankton Research* 11: 813-835.;
Dodds, W.K., and D.A. Gudder. 1992. The ecology of Cladophora. *Journal of Phycology* 28:415–427.;
Rosemond, A. D., P. J. Mulholland, and J. W. Elwood. 1993. Top-down and bottom-up control of stream periphyton: Effects of nutrients and herbivores. *Ecology* 74: 1264–1280.;
Bowling, L.C., and P.D. Baker. 1996. Major cyanobacterial bloom in the Barwon-Darling River, Australia, in 1991, and underlying limnological conditions. *Marine and Freshwater Research* 47: 643–657.;
Bourassa, N., and A. Cattaneo. 1998. Control of periphyton biomass in Laurentian streams (Quebec). *Journal of the North American Benthological Society* 17:420–429.;
Francoeur, S.N. 2001. Meta-analysis of lotic nutrient amendment experiments: detecting and quantifying subtle responses. Journal *of the North American Benthological Society* 20: 358–368.;
Biggs, B. J. F. 2000. Eutrophication of streams and rivers: dissolved nutrient–chlorophyll relationships for Benthic algae. *Journal of the North American Benthological Society* 19:17–31.;
Rosemond, A. D., C. M. Pringle, A. Ramirez, and M.J. Paul. 2001. A test of top-down and bottom-up control in a detritus-based food web. *Ecology* 82: 2279–2293.;
Rosemond, A. D., C. M. Pringle, A. Ramirez, M.J. Paul, and J. L. Meyer. 2002. Landscape variation in phosphorus concentration and effects on detritus-based tropical streams. *Limnology and Oceanography* 47: 278–289.;
Slavik, K., B. J. Peterson, L. A. Deegan, W. B. Bowden, A. E. Hershey, and J. E. Hobbie. 2004. Long-term responses of the Kuparuk River ecosystem to phosphorus fertilization. *Ecology* 85: 939 – 954.;
Cross, W. F., J. B. Wallace, A. D. Rosemond, and S. L. Eggert. 2006. Whole-system nutrient enrichment Increases secondary production in a detritus-based ecoystem. *Ecology* 87: 1556–1565.;
Mulholland, P.J. and J.R. Webster. 2010. Nutrient dynamics in streams and the role of J-NABS. *Journal of the North American Benthological Society* 29: 100-117.;

For Lakes:
Vollenweider, R.A. 1968. *Scientific Fundamentals of the Eutrophication of Lakes and Flowing Waters, With Particular Reference to Nitrogen and Phosphorus as Factors in Eutrophication* (Tech Rep DAS/CS/68.27, OECD, Paris).;

National Academy of Science. 1969. *Eutrophication: Causes, Consequences, Correctives.* National Academy of Science, Washington, DC.;
Schindler D.W., H. Kling, R.V. Schmidt, J. Prokopowich, V.E. Frost, R. A. Reid, and M. Capel. 1973. Eutrophication of Lake 227 by addition of phosphate and nitrate: The second, third, and fourth years of enrichment 1970, 1971, and 1972. *Journal of the Fishery Research Board of Canada* 30:1415–1440.;
Schindler D.W. 1974. Eutrophication and recovery in experimental lakes: Implications for lake management. *Science* 184:897–899.;
Vollenweider, R.A. 1976. *Advances in Defining Critical Loading Levels for Phosphorus in Lake Eutrophication.* Memorie dell'Istituto Italiano di Idrobiologia 33:53 – 83.;
Carlson R.E. 1977. A trophic state index for lakes. *Limnology and Oceanography* 22:361 – 369.;
Paerl, H.W. 1988. Nuisance phytoplankton blooms in coastal, estuarine, and inland waters. *Limnology and Oceanography* 33:823-847.;
Elser, J.J., E.R. Marzolf, and C.R. Goldman. 1990. Phosphorus and nitrogen limitation of phytoplankton growth in the freshwaters of North America: a review and critique of experimental enrichments. *Canadian Journal of Fisheries and Aquatic Science* 47: 1468–1477.;
Smith, V.H., G.D. Tilman, and J.C. Nekola. 1999. Eutrophication: impacts of excess nutrient inputs on freshwater, marine, and terrestrial ecosystems. *Environmental Pollution* 100: 179–196.;
Downing, J. A., S. B. Watson, and E. McCauley. 2001. Predicting cyanobacteria dominance in lakes. *Canadian Journal of Fisheries and Aquatic Sciences* 58: 1905–1908.;
Smith, V.H., S.B. Joye, and R.W. Howarth. 2006. Eutrophication of freshwater and marine ecosystems. *Limnology and Oceanography* 51: 351-355.;
Elser, J.J., M.E.S. Bracken, E.E. Cleland, D.S. Gruner, W.S. Harpole, H. Hillebrand, J.T. Ngai, E.W. Seabloom, J.B. Shurin, and J.E. Smith. 2007. Global analysis of nitrogen and phosphorus limitation of primary production in freshwater, marine, and terrestrial ecosystems. *Ecology Letters* 10: 1135-1142.

When excessive nitrogen/phosphorus loads change a waterbody's algae and plant species, the change in habitat and available food resources can induce changes affecting an entire food chain. Algal blooms block sunlight that submerged grasses need to grow, leading to a decline of submerged aquatic vegetation beds and decreased habitat for juvenile organisms. Algal blooms can also increase turbidity and impair the ability of fish and other aquatic life to find food.[21] Algae can also damage or clog the gills of fish and invertebrates.[22] Excessive algal blooms (those that use oxygen for respiration during periods without sunlight) can lead to diurnal shifts in a waterbody's production and consumption of dissolved oxygen (DO) resulting in reduced DO levels that are sufficiently low to harm or kill important recreational species such as largemouth bass.

Excessive algal growth also contributes to increased oxygen consumption associated with decomposition (e.g. decaying vegetative matter), in many instances reducing oxygen to levels below that needed for aquatic life to survive and flourish.[23, 24] Mobile species, such as adult fish, can sometimes survive by moving to areas with more oxygen. However, migration to avoid hypoxia depends on species mobility, availability of suitable habitat, and adequate environmental cues for migration. Less mobile or immobile species, such as mussels, cannot move to avoid low oxygen and are often killed

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[21] Hauxwell, J., C. Jacoby, T. Frazer, and J. Stevely. 2001. *Nutrients and Florida's Coastal Waters:* Florida Sea Grant Report No. SGEB-55. Florida Sea Grant College Program, University of Florida, Gainesville, FL

[22] NOAA. 2009. Harmful Algal Blooms: Current Programs Overview. National Oceanic and Atmospheric Administration. <http://www.cop.noaa.gov/stressors/extremeevents/hab/default.aspx>. Accessed December 2009.

[23] NOAA. 2009. Harmful Algal Blooms: Current Programs Overview. National Oceanic and Atmospheric Administration. <http://www.cop.noaa.gov/stressors/extremeevents/hab/default.aspx>. Accessed December 2009.

[24] USGS. 2009. *Hypoxia*. U.S. Geological Survey. <http://toxics.usgs.gov/definitions/hypoxia.html>. Accessed December 2009.

during hypoxic events.[25] While certain mature aquatic animals can tolerate a range of dissolved oxygen levels that occur in the water, younger life stages of species like fish and shellfish often require higher levels of oxygen to survive.[26] Sustained low levels of dissolved oxygen cause a severe decrease in the amount of aquatic life in hypoxic zones and affect the ability of aquatic organisms to find necessary food and habitat.

In freshwater, HABs including, for example, blue-green algae from the phylum of bacteria called cyanobacteria,[27] can produce toxins that have been implicated as the cause of a number of fish and bird mortalities.[28] These toxins have also been tied to the death of pets and livestock that may be exposed through drinking contaminated water or grooming themselves after bodily exposure.[29] Many other states, and countries for that matter, are experiencing problems with algal blooms.[30] Ohio on September 3, 2010,[31] for example, listed eight water bodies as "Bloom Advisory,"[32] six water bodies as "Toxin Advisory,"[33] and two waters as "No Contact Advisory." [34] Species of cyanobacteria

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[25] ESA. 2009. *Hypoxia*. Ecological Society of America. <http://www.esa.org/education_diversity/pdfDocs/hypoxia.pdf>. Accessed December 2009.
[26] USEPA. 1986. *Ambient Water Quality Criteria for Dissolved Oxygen Freshwater Aquatic Life.* EPA-800-R-80-906. Environmental Protection Agency, Office of Water, Washington D.C.
[27] CDC. 2010. *Facts about cyanobacteria and cyanobacterial harmful algal blooms. Centers for Disease Control and Prevention*. < http://www.cdc.gov/hab/cyanobacteria/facts.htm> Accessed August 2010.
[28] Ibelings, Bas W. and Karl E. Havens. 2008*Chapter 32: Cyanobacterial toxins: a qualitative meta-analysis of concentrations, dosage and effects in freshwater, estuarine and marine biota. In* Cyanobacterial Harmful Algal Blooms: State of the Science and Research Needs. From the Monograph of the September 6-10, 2005 International Symposium on Cyanobacterial Harmful Algal Blooms (ISOC-HAB) in Durham, NC. <http://www.epa.gov/cyano_habs_symposium/monograph/Ch32.pdf>. Accessed August 19, 2010.
[29] WHOI. 2008. *HAB Impacts on Wildlife*. Woods Hole Oceanographic Institution. <http://www.whoi.edu/redtide/page.do?pid=9682>. Accessed December 2009.
[30] FDEP. 2010. Blue Green Algae Frequently Asked Questions. <http://www.dep.state.fl.us/water/bgalgae/faq.htm,>. Accessed August 2010.
[31]Ohio DNR. 2010. News Release September 3, 2010. <http://www.epa.state.oh.us/portals/47/nr/2010/september/9-3samplingresults.pdf >. Accessed September 2010.
[32] Defined as: Cautionary advisory to avoid contact with any algae. Ohio DNR. 2010. News Release September 3, 2010. http://www.epa.state.oh.us/portals/47/nr/2010/september/9-3samplingresults.pdf. Accessed September 2010.
[33] Defined as: Avoid contact with any algae and direct contact with water. Ohio DNR. 2010. News Release September 3, 2010. http://www.epa.state.oh.us/portals/47/nr/2010/september/9-3samplingresults.pdf.

associated with freshwater algal blooms include: *Microcystis aeruginosa, Anabaena circinalis, Anabaena flos-aquae, Aphanizomenon flos-aquae, and Cylindrospermopsis raciborskii.* The toxins from cyanobacterial harmful algal blooms can produce neurotoxins (affect the nervous system), hepatotoxins (affect the liver), produce lipopolysaccharides that affect the gastrointestinal system, and some are tumor promoters.[35] A recent study showed that at least one type of cyanobacteria has been linked to cancer and tumor growth in animals.[36] Cyanobacteria toxins can also pass through normal drinking water treatment processes and pose an increased risk to humans or animals.[37]

Health and recreational use impacts to humans result directly from exposure to elevated nitrogen/phosphorus pollution levels and indirectly from the subsequent waterbody changes that occur from increased nitrogen/phosphorus pollution (such as algal blooms and toxins). Direct impacts include effects to human health through potentially contaminated drinking water. Indirect impacts include restrictions on recreation (such as boating and swimming). Algal blooms can prevent opportunities to swim and engage in other types of recreation. In areas where recreation is determined to be unsafe because of algal blooms, warning signs are often posted to discourage human use of the waters.

Accessed September 2010.

[34] Defined as: Avoid any and all contact with or ingestion of the lake water. This includes the launching of any watercraft on the lake. Ohio DNR. 2010. News Release September 3, 2010. http://www.epa.state.oh.us/portals/47/nr/2010/september/9-3samplingresults.pdf. Accessed September 2010.

[35] CDC. 2010. Facts about cyanobacteria and cyanobacterial harmful algal blooms, Centers for Disease Control and Prevention. <http://www.cdc.gov/hab/cyanobacteria/facts.htm, accessed>. Accessed August 2010.

[36] Falconer, I.R., and A.R. Humpage. 2005. Health Risk Assessment of Cyanobacterial (Blue-green Algal) Toxins in Drinking Water. *International Journal of Research and Public Health* 2(1): 43-50.

[37] Carmichael, W.W. 2000. *Assessment of Blue-Green Algal Toxins in Raw and Finished Drinking Water.* AWWA Research Foundation, Denver, CO.

Nitrate in drinking water can cause serious health problems for humans,[38] especially infants. EPA developed a Maximum Contaminant Level (MCL) of 10 mg/L for nitrate in drinking water.[39] In the 2010 USGS National Water-Quality Assessment Program report, nitrate was found to be the most frequently detected nutrient in streams at concentrations greater than 10mg/L. The report also found that concentrations of nitrate greater than the MCL of 10mg/L were more prevalent and widespread in groundwater used for drinking water than in streams. [40] Florida has adopted EPA's recommendations for the nitrate MCL in Florida's regulated drinking water systems and a 10 mg/L criteria for nitrate in Class I waters. FDEP shares EPA's concern regarding blue-baby syndrome as can be seen in information FDEP reports on its drinking water information for the public: "Nitrate is used in fertilizer and is found in sewage and wastes from human and/or farm animals and generally gets into drinking water from those activities. Excessive levels of nitrate in drinking water have caused serious illness and sometimes death in infants less than six months of age[41]...EPA has set the drinking water standard at 10 parts per million (ppm) [or 10 mg/L] for nitrate to protect against the

[38] For more information, refer to Manassaram, Deana M., Lorraine C. Backer, and Deborah M. Moll. 2006. *A Review of Nitrates in Drinking Water: Maternal Exposure and Adverse Reproductive and Developmental Outcomes*. Environmental Health Perspect. 114(3): 320-327.

[39] USEPA. 2007. *Nitrates and Nitrites: TEACH Chemical Summary.* U.S. Environmental Protection Agency. <http://www.epa.gov/teach/chem_summ/Nitrates_summary.pdf>. Accessed December 2009.

[40] Dubrovsky, N.M., Burow, K.R., Clark, G.M., Gronberg, J.M., Hamilton P.A., Hitt, K.J., Mueller, D.K., Munn, M.D., Nolan, B.T., Puckett, L.J., Rupert,M.G., Short, T.M., Spahr, N.E., Sprague, L.A., and Wilber, W.G. 2010. *The quality of our Nation's waters—Nutrients in the Nation's streams and groundwater, 1992–2004*: U.S. Geological Survey Circular 1350, 174p. Available electronically at:<http://water.usgs.gov/nawqa/nutrients/pubs/circ1350>.

[41] The serious illness in infants is caused because nitrate is converted to nitrite in the body. Nitrite interferes with the oxygen carrying capacity of the child's blood. This is an acute disease in that symptoms can develop rapidly in infants. In most cases, health deteriorates over a period of days. Symptoms include shortness of breath and blueness of the skin. (source: FDEP. 2010. Drinking Water: Inorganic Contaminants. Florida Department of Environmental Protection. < http://www.dep.state.fl.us/water/drinkingwater/inorg_con.htm>. Accessed Septemeber 2010.)

risk of these adverse effects[42]...Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to nitrate."[43]

Human health can also be impacted by disinfection byproducts formed when disinfectants (such as chlorine) used to treat drinking water react with organic carbon (from the algae in source waters). Some disinfection byproducts have been linked to rectal, bladder, and colon cancers; reproductive health risks; and liver, kidney, and central nervous system problems.[44,45]

Economic losses from algal blooms and harmful algal blooms can include increased costs for drinking water treatment, reduced property values for streams and lakefront areas, commercial fishery losses, and lost revenue from recreational fishing, boating trips, and other tourism-related businesses.

In terms of increased costs for drinking water treatment, for example, in 1991, Des Moines (Iowa) Water Works constructed a $4 million ion exchange facility to remove nitrate from its drinking water supply. This facility was designed to be used an average of 35-40 days per year to remove excess nitrate levels at a cost of nearly $3000 per day.[46]

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[42] EPA has also set a drinking water standard for nitrite at 1 mg/L. To allow for the fact that the toxicity of nitrate and nitrite are additive, EPA has also established a standard for the sum of nitrate and nitrite at 10 mg/L. (source: FDEP. 2010. Drinking Water: Inorganic Contaminants. Florida Department of Environmental Protection.. . < http://www.dep.state.fl.us/water/drinkingwater/inorg_con.htm>. Accessed September 2010.)

[43] FDEP. 2010. Drinking Water: Inorganic Contaminants. Florida Department of Environmental Protection. <http://www.dep.state.fl.us/water/drinkingwater/inorg_con.htm>. Accessed September 2010.

[44] USEPA. 2009. *National Primary Drinking Water Regulations.* Contaminants. U.S. Environmental Protection Agency. Accessed <http://www.epa.gov/safewater/hfacts.html>. December 2009.

[45] National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule, 40 CFR Parts 9, 141, and 142. U.S. Environmental Protection Agency, Fed. Reg. 71:2 (January 4, 2006). pp. 387-493. Available electronically at: <http://www.epa.gov/fedrgstr/EPA-WATER/2006/January/Day-04/w03.htm>. Accessed December 2009.

[46] Jones, C.S., D. Hill, and G. Brand. 2007. Use a multifaceted approach to manage high sourcewater nitrate. *Opflow* June pp. 20–22.

Fremont, Ohio (a city of approximately 20,000) has experienced high levels of nitrate from its source, the Sandusky River, resulting in numerous drinking water use advisories. An estimated $15 million will be needed to build a reservoir (and associated piping) that will allow for selective withdrawal from the river to avoid elevated levels of nitrate, as well as to provide storage.[47]

In regulating allowable levels of chlorophyll _a_ in Oklahoma drinking water reservoirs, the Oklahoma Water Resources Board estimated that the long-term cost savings in drinking water treatment for 86 systems would range between $106 million and $615 million if such regulations were implemented.[48]

3. Nitrogen/Phosphorus Pollution in Florida

Florida's flat topography causes water to move slowly over the landscape, allowing ample opportunity for nitrogen and phosphorus to dissolve and eutrophication responses to develop. Florida's warm and wet, yet sunny, climate further contributes to increased run-off and ideal temperatures for subsequent eutrophication responses.[49]

As outlined in the EPA January 2009 determination and the January 2010 proposal, water quality degradation resulting from excess nitrogen and phosphorus loadings is a documented and significant environmental issue in Florida. FDEP notes in its _2008 Integrated Water Quality Assessment_ that nutrient pollution poses several challenges in Florida. For example, the FDEP _2008 Integrated Water Quality Assessment_ notes: "the close connection between surface and ground water, in combination with the

[47] Taft, Jim, Association of State Drinking Water Administrators (ASDWA). 2009. Personal Communication.
[48] Moershel, Philip, Oklahoma Water Resources Board (OWRB) and Mark Derischweiler, Oklahoma Department of Environmental Quality (ODEQ). 2009. Personal Communication.
[49] Perry, W. B. 2008. Everglades restoration and water quality challenges in south Florida. *Ecotoxicology* 17:569-578.

pressures of continued population growth, accompanying development, and extensive agricultural operations, present Florida with a unique set of challenges for managing both water quality and quantity in the future. After trending downward for 20 years, beginning in 2000 phosphorus levels again began moving upward, likely due to the cumulative impacts of nonpoint source pollution associated with increased population and development. Increasing pollution from urban stormwater and agricultural activities is having other significant effects. In many springs across the state, for example, nitrate levels have increased dramatically (twofold to threefold) over the past 20 years, reflecting the close link between surface and ground water."[50] To clarify current nitrogen/phosphorus pollution conditions in Florida, EPA analyzed recent STORET data pulled from Florida's Impaired Waters Rule (IWR),[51] (which are the data Florida uses to create its integrated reports) and found increasing levels of nitrogen and phosphorus compounds in Florida waters over the past 12 years (1996-2008). Florida's IWR STORET data indicates that levels of total nitrogen have increased from a state-wide average of 1.06 mg/L in 1996 to 1.27 mg/L in 2008 and total phosphorus levels have increased from an average of 0.108 mg/L in 1996 to 0.151 mg/L in 2008.

The combination of the factors reported by FDEP and listed above (including population increase, climate, stormwater runoff, agriculture, and topography) has contributed to significant nitrogen/phosphorus effects to Florida's waters.[52] For example, newspapers in Florida regularly report about impacts associated with nitrogen/phosphorus pollution; recent examples include reports of algal blooms and fish

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[50] FDEP. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.
[51] IWR Run 40. Updated through February 2010.
[52] FDEP. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.

kills in the St Johns River[53] and reports of white foam associated with algal blooms lining parts of the St. Johns River.[54] Spring releases of water from Lake Okeechobee into the St Lucie Canal, necessitated by high lake levels due to rainfall, resulted in reports of floating mats of toxic *Microcystis aeruginosa* that prompted Martin and St Lucie county health departments to issue warnings to the public.[55]

The *2008 Integrated Water Quality Assessment* lists nutrients as the fourth major source of impairment for rivers and streams in Florida (after dissolved oxygen, mercury in fish, and fecal coliforms). For lakes and estuaries, nutrients are ranked first and second, respectively. These same rankings are also confirmed in FDEP's latest *2010 Integrated Water Quality Assessment.*

According to FDEP's *2008 Integrated Water Quality Assessment,*[56] approximately 1,049 miles of rivers and streams, 349,248 acres of lakes, and 902 square miles of estuaries are impaired by nutrients in the State. To put this in context and as noted above, approximately 5% of the total assessed river and stream miles, 23% of the total assessed lake acres, and 24% of the total assessed square miles of estuaries are impaired for nutrients according to the 2008 Integrated Report.[57] In recent published listings of impairments for 2010, Florida Department of Environmental Protection lists nutrient impairments in 1,918 stream miles (about 8% of the total assessed stream miles),

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[53] Patterson, S. 2010, July 23. *St John's River Looks Sick* Florida Times Union. <http://jacksonville.com/news/metro/2010-07-23/story/st-johns-looks-sick-nelson-says>. Accessed September 2010.

[54] Patterson, S. 2010, July 21. *Foam on St. John's River Churns Up Environmental Interest*. Florida Times Union. < http://jacksonville.com/news/metro/2010-07-21/story/foam-st-johns-churns-environmental-questions>. Accessed October 2010.

[55] Killer, E. 2010, June 10. *Blue-green Algae Found Floating Near Palm City as Lake Okeechobee Releases Continue.* Treasure Coast Times. <http://www.tcpalm.com/news/2010/jun/10/blue-green-algae-found-floating-near-palm-city-o/>. Accessed October 2010.

[56] FDEP. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.

[57] FDEP. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.

378,435 lake acres (about 26% of total assessed lake acres), and 569 square miles of estuaries (about 21% of total assessed estuarine square miles).[58]

Compared to FDEP's *2008 Integrated Water Quality Assessment*, the *2010 Integrated Water Quality Assessment* shows an increase in nutrient impairments for rivers and streams (from approximately 1000 miles to 1918 miles) and lakes (from approximately 350,000 lake acres to 378,435 lake acres). While the square miles of estuaries identified as impaired by nutrients decreased from 2008 to 2010 (from approximately 900 to 569 square miles), the *2010 Integrated Water Quality Assessment* notes that all square miles of estuaries in the report were decreased based on improved GIS techniques and corrected waterbody descriptions.[59] Consequently, the decrease in estuarine square miles identified as impaired by nutrients in 2010 does not necessarily reflect a corresponding decrease in nitrogen/phosphorus pollution affecting Florida's estuarine water bodies.

FDEP has expressed concern about nitrogen/phosphorus pollution in Florida surface waters,[60] in addition to concerns about freshwater harmful algal blooms and the potential for adverse human health impacts as noted in FDEP's *2008 Integrated Water Quality Assessment.*[61] This concern is underscored by a toxic blue-green algae bloom

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[58] FDEP. 2010. Integrated Water Quality Assessment for Florida: 2010 305(b) Report and 303(d) List Update

[59] FDEP. 2010. Integrated Water Quality Assessment for Florida: 2010 305(b) Report and 303(d) List Update.

[60] "While significant progress has been made in reducing nutrient loads from point sources and from new development, nutrient loading and the resulting harmful algal blooms continue to be an issue. The occurrence of blue-green algae is natural and has occurred throughout history; however, algal blooms caused by nutrient loading from fertilizer use, together with a growing population and the resulting increase in residential landscapes, are an ongoing concern." FDEP. 2010. Integrated Water Quality Assessment for Florida: 2010 305(b) Report and 303(d) List Update.

[61] "Freshwater harmful algal blooms (HABs) are increasing in frequency, duration, and magnitude and therefore may be a significant threat to surface drinking water resources and recreational areas. Abundant populations of blue-green algae, some of them potentially toxigenic, have been found statewide in numerous lakes and rivers. In addition, measured concentrations of cyanotoxins—a few of them of above

that occurred north of the Franklin Lock on the Caloosahatchee River in mid-June 2008. The Olga Water Treatment Plant, which obtains its source water from the Caloosahatchee and provides drinking water for 30,000 people, was forced to temporarily shut down as a result of this bloom.[62]

There has also been an increase in the level of pollutants, especially nitrate, in groundwater over the past decades.[63] The Florida Geological Survey concluded that "The presence of nitrate and the other nitrogenous compounds in ground water, is not considered in Florida to be a result of interaction of aquifer system water with surrounding rock materials. Nitrate in ground water is a result of specific land uses."[64]

Historically, nitrate+nitrite concentrations in Florida's spring discharges were estimated to have been around 0.05 mg/L or less, which is sufficiently low to restrict growth of algae and vegetation under "natural" conditions.[65] Of 125 spring vents sampled by the Florida Geological Survey in 2001-2002, 42% had nitrate+nitrite concentrations exceeding 0.50 mg/L and 24% had concentrations greater than 1.0 mg/L.[66] In the same study, mean nitrate+nitrite levels in 13 first-order springs were observed to have increased from 0.05 mg/L to 0.9 mg/L between 1970 and 2002. Overall, data suggest that nitrate+nitrite concentrations in many spring discharges have

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the suggested guideline levels—have been reported in finished water from some drinking water facilities." FDEP. 2008. Integrated Water Quality Assessment for Florida: 2008 305(b) Report and 303(d) List Update.

[62]Peltier, M. 2008. *Group files suit to enforce EPA water standards*. Naples News. < http://news.caloosahatchee.org/docs/NaplesNews_080717.htm> . Accessed August 2010.

[63] Scott, T.M., G.H. Means, R.P. Meegan, R.C. Means, S.B. Upchurch, R.E. Copeland, J. Jones, T. Roberts, and A. Willet. 2004. *Springs of Florida*. Bulletin No. 66. Florida Geological Survey, Tallahassee, FL. 677 pp.

[64]FL Geological Survey. 1992. Special Publication No. 34, Florida's Ground Water Quality Monitoring Program, (nitrate-pp 36-6)

[65] Maddox, G.L., J.M. Lloyd, T.M. Scott, S.B. Upchurch and R. Copeland. 1992. *Florida's Groundwater Quality Monitoring Program – Background Hydrochemistry*. Florida Geological Survey Special Publication No. 34, Tallahassee, FL.

[66] Scott, T.M., G.H. Means, R.P. Meegan, R.C. Means, S.B. Upchurch, R.E. Copeland, J. Jones, T. Roberts, and A. Willet. 2004. *Springs of Florida*. Bulletin No. 66. Florida Geological Survey, Tallahassee, FL. 677 pp.

increased by an order of magnitude or a factor of 10 over the past 50 years, with the level of increase closely correlated with anthropogenic activity and land use changes within the karst regions of Florida where springs most often occur.[67]

Nitrates are found in ground water and wells in Florida, ranging from the detection limit of 0.02 mg/L to over 20 mg/L. Monitoring of Florida Public Water Supplies from 2004-2009 indicates that exceedances of nitrate maximum contaminant levels (MCL) (which are measured at the entry point of the distribution system and represent treated drinking water from a supplier) reported by drinking water plants in Florida ranged from 34-40 annually, during this period.[68]

About 10% of Florida residents receive their drinking water from a private well or small public source not inventoried under public supply.[69] A study in the late 1980's conducted by Florida Department of Agriculture and Consumer Services (FDACS) and FDEP, analyzed 3,949 shallow drinking water wells for nitrate.[70] [71] Nitrate was detected in 2,483 (63%) wells, with 584 wells (15%) above the MCL of 10 mg/L. Of the 584 wells that exceeded the MCL, 519 were located in Lake, Polk, and Highland counties

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[67] Katz, B.G., H.D. Hornsby, J.F. Bohlke and M.F. Mokray. 1999. *Sources and chronology of nitrate contamination in spring water, Suwannee River Basin, Florida.* Water-Resources Investigations Report 99-4252. U.S. Geological Survey, Tallahassee, FL. Available electronically at: <http://fl.water.usgs.gov/PDF_files/wri99_4252_katz.pdf>.
Scott, T.M., G.H. Means, R.P. Meegan, R.C. Means, S.B. Upchurch, R.E. Copeland, J. Jones, T. Roberts, and A. Willet. 2004. *Springs of Florida.* Bulletin No. 66. Florida Geological Survey, Tallahassee, FL. 677 pp.

[68] FDEP. 2009. *Chemical Data for 2004, 2005, 2006, 2007 2008, and 2009.* Florida Department of Environmental Protection.< http://www.dep.state.fl.us/water/drinkingwater/chemdata.htm>. Accessed January 2010.

[69] Marella, R.L. 2009. *Water Withdrawals, Use, and Trends in Florida, 2005.* Scientific Investigations Report 2009-5125. U.S. Geological Survey, Reston, VA.

[70] Southern Regional Water Program. 2010. *Drinking Water and Human Health in Florida.* < http://srwqis.tamu.edu/florida/program-information/florida-target-themes/drinking-water-and-human-health.aspx>. Accessed January 2010.

[71] T.A. Obreza and K.T. Morgan. 2008. *Nutrition of Florida Citrus Trees*15 months after publication of the final rule, except for the Federal site-specific alternative criteria (SSAC) procedure in section 131.43(e) of the rule which will go into effect 60 days after publication. 2nd ed. SL 253. University of Florida, IFAS Extension. < http://edis.ifas.ufl.edu/pdffiles/SS/SS47800.pdf,>. Accessed September 2010.

located in Central Florida. Results of monitoring conducted between 1999 and 2003 in a network of wells in that area indicated that of the 31 monitoring wells, 90% exceeded the nitrate drinking-water standard of 10 mg/L one or more times.[72] [73] FDEP monitored this same area (the VISA monitoring network) in 1990, 1993, and 1996, analyzing samples from 15-17 wells each cycle and reported median concentrations ranging from 17 to 20 mg/L nitrate, depending on the year.[74] Some areas of Florida tend to be more susceptible to groundwater impacts from nitrogen pollution, especially those that have sandy soils, have high hydraulic conductivity, and have overlying land uses that are subject to applications of fertilizers and animal or human wastes.[75] For example, USGS reports that in Highland county, highly developed suburban and agricultural areas tend to have levels of nitrates in the surficial groundwater that approach and can exceed the state primary drinking water standard of 10 mg/L for public water systems. Other areas in Highland county that are less developed tend to have much lower levels of nitrates in the surficial groundwater, often below detection levels.

The Floridian aquifer system is one of the largest sources of ground water in the US, and serves as a primary source of drinking water in Northern Florida. The Upper Floridian aquifer is unconfined or semiconfined in areas in Northern Florida, but is also confined by the overlying surficial aquifer system which is used for water supply. Wells in unconfined areas of the Upper Floridian aquifer tested in northern Florida had nitrate

[72] T.A. Obreza and K.T. Morgan. 2008. *Nutrition of Florida Citrus Trees*. 2nd ed. SL 253. University of Florida, IFAS Extension. < http://edis.ifas.ufl.edu/pdffiles/SS/SS47800.pdf,>. Accessed September 2010
[73] USGS. 2009, November. *Overview of Agricultural Chemicals: Pesticides and Nitrate*. <http://fl.water.usgs.gov/Lake_Wales_Ridge/html/overview_of_agrichemicals.html.> Accessed September 2010.
[74] FDEP. 1998. *Ground Water Quality and Agricultural Land Use in the Polk County Very Intense Study Area (VISA).* Florida Department of Environmental Protection, Division of Water Facilities. <http://www.dep.state.fl.us/water/monitoring/docs/facts/fs9802.pdf>. Accessed September 2010.
[75] USGS. 2010. *Hydrogeology and Groundwater Quality of Highlands County, FL*. Scientific Investigations Report 2010-5097. U.S. Geological Survey, Reston, VA.

levels higher than 1 mg/L in 40% of wells; 17% of samples from the semiconfined area had nitrate levels above 1 mg/L. In both aquifer systems this indicates the widespread impact of nitrate on groundwater quality in this area.[76] [77] This baseline sampling indicates a pattern of widespread nitrate occurrence in the Upper Floridian aquifer from two decades ago. A portion of these early samples exceeded 10 mg/L nitrate (25 of the 726 samples taken from this unconfined or semi-confined aquifer; 50 of the 421 water samples from the surficial aquifer).

Growing population trends in Florida contribute to the significant challenge of addressing nitrogen/phosphorus pollution in Florida. Historically, the State has experienced a rapidly expanding population. Significantly growing demographics are considered to be a strong predictor of nitrogen/phosphorus loading and associated effects because of increases in stormwater runoff from increased impervious surfaces and increased wastewater treatment flows both of which typically contain some level of nitrogen/phosphorus.[78] Florida is currently the fourth most populous state in the nation, with an estimated 18 million people.[79] The U.S. Census bureau predicts the Florida population will exceed 28 million people by 2030, making Florida the third most populous state in the U.S.[80]

B. Statutory and Regulatory Background

[76] Berndt, M.P., 1996. *Ground-water quality assessment of the Georgia-Florida Coastal Plain study unit—Analysis of available information on nutrients, 1972-92.* Water-Resources Investigations Report 95-4039. U.S. Geological Survey, Tallahassee, FL.
[77] Berndt, Marian P., 1993. *National Water-Quality Assessment Program-Preliminary assessment of nitrate distribution in ground water in the Georgia-Florida Coastal Plain Study Unit, 1972-90.* Open-File Report 93-478. U.S. Geological Survey.
[78] National Research Council, Committee on Reducing Stormwater Discharge Contributions to Water Pollution. 2008. *Urban Stormwater Management in the United States.* National Academies Press, Washington, DC.
[79] U.S. Census Bureau. 2009. 2008 Population Estimates Ranked by State. <http://factfinder.census.gov>. Accessed January 2010.
[80] U.S. Census Bureau. 2009. 2008 Population Estimates Ranked by State. <http://factfinder.census.gov>. Accessed January 2010.

Section 303(c) of the CWA (33 U.S.C. 1313(c)) directs states to adopt WQS for their navigable waters. Section 303(c)(2)(A) and EPA's implementing regulations at 40 CFR part 131 require, among other things, that state WQS include the designated use or uses to be made of the waters and criteria that protect those uses. EPA regulations at 40 CFR 131.11(a)(1) provide that states shall "adopt those water quality criteria that protect the designated use" and that such criteria "must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use." As noted above, 40 CFR 130.10(b) provides that "[i]n designating uses of a waterbody and the appropriate criteria for those uses, the state shall take into consideration the water quality standards of downstream waters and ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters."

States are also required to review their WQS at least once every three years and, if appropriate, revise or adopt new standards. (*See* CWA section 303(c)(1)). Any new or revised WQS must be submitted to EPA for review and approval or disapproval. (*See* CWA section 303(c)(2)(A)). Finally, CWA section 303(c)(4)(B) authorizes the Administrator to determine, even in the absence of a state submission, that a new or revised standard is needed to meet CWA requirements. The criteria finalized in this rulemaking translate Florida's narrative nutrient provision at Subsection 62-302-530(47)(b), F.A.C., into numeric values that apply to lakes and springs throughout Florida and flowing waters outside of the South Florida Region.[81]

C. Water Quality Criteria

[81] The criteria finalized in this rulemaking do not address or translate Florida's narrative nutrient provision at Subsection 62-302.530(47)(a), F.A.C. Subsection 62-302.530(47)(a), F.A.C., remains in place as an applicable WQS for CWA purposes.

Under CWA section 304(a), EPA periodically publishes criteria recommendations (guidance) for use by states in setting water quality criteria for particular parameters to protect recreational and aquatic life uses of waters. Where EPA has published recommended criteria, states have the option of adopting water quality criteria based on EPA's CWA section 304(a) criteria guidance, section 304(a) criteria guidance modified to reflect site-specific conditions, or other scientifically defensible methods. (See 40 CFR 131.11(b)(1)). For nitrogen/phosphorus pollution, EPA has published under CWA section 304(a) a series of peer-reviewed, national technical approaches and methods regarding the development of numeric criteria for lakes and reservoirs,[82] rivers and streams,[83] and estuaries and coastal marine waters.[84]

EPA based the methodologies used to develop numeric criteria for Florida in this regulation on its published guidance on developing criteria that identifies three general approaches for criteria setting. The three types of empirical analyses provide distinctly different, independently and scientifically defensible, approaches for deriving nutrient criteria from field data: (1) reference condition approach derives candidate criteria from observations collected in reference waterbodies, (2) mechanistic modeling approach represents ecological systems using equations that represent ecological processes and parameters for these equations that can be calibrated empirically from site-specific data, and (3) empirical nutrient stressor-response modeling is used when data are available to accurately estimate a relationship between nutrient concentrations and a

[82] USEPA. 2000a. *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs.* EPA-822-B-00-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

[83] USEPA. 2000b. *Nutrient Criteria Technical Guidance Manual: Rivers and Streams.* EPA-822-B-00-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

[84] USEPA. 2001. *Nutrient Criteria Technical Manual: Estuarine and Coastal Marine Waters.* EPA-822-B-01-003. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

response measure that is directly or indirectly related to a designated use of the waterbody (e.g., a biological index or recreational use measure). Then, nutrient concentrations that are protective of designated uses can be derived from the estimated relationship).[85] Each of these three analytical approaches is appropriate for deriving scientifically defensible numeric nutrient criteria when applied with consideration of method-specific data needs and available data. In addition to these empirical approaches, consideration of established (e.g., published) nutrient response thresholds is also an acceptable approach for deriving criteria.[86]

For lakes, EPA used a stressor-response approach to link nitrogen/phosphorus concentrations to predictions of corresponding chlorophyll a concentrations. EPA used a reference-based approach for streams, relying on a comprehensive screening methodology to identify least-disturbed streams as reference streams. For springs, EPA used algal or nitrogen/phosphorus thresholds developed under laboratory conditions and stressor-response relationships from several field studies of algal growth in springs. For each type of waterbody, EPA carefully considered the available data and evaluated several lines of evidence to derive scientifically sound approaches (as noted above) for developing the final numeric criteria.

Based on comments received from the Scientific Advisory Board (SAB), EPA has modified a draft methodology guidance document on using stressor-response

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[85] USEPA. 2000a. *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs.* EPA-822-B-00-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
USEPA. 2000b. *Nutrient Criteria Technical Guidance Manual:Rivers and Streams.* EPA-822-B-00-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
USEPA. 2001. *Nutrient Criteria Technical Guidance Manual: Estuarine and Coastal Marine Waters.* EPA-822-B-01-003. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
USEPA. 2008. *Nutrient Criteria Technical Guidance Manual: Wetlands.* EPA-822-B-08-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
[86] USEPA. 2000a. *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs.* EPA-822-B-00-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

relationships for deriving numeric criteria, which is available as a final technical guidance document.[87] In addition, the reference-based and algal or nitrogen/phosphorus threshold approaches have been peer reviewed and have been available for many years.

As mentioned above, the criteria finalized in this rulemaking translate Florida's narrative nutrient provision at Subsection 62-302.530(47)(b), F.A.C., ("[i]n no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna") into numeric values that apply to lakes and springs throughout the State and flowing waters outside of the South Florida Region. EPA believes that numeric criteria will expedite and facilitate the effective implementation of Florida's existing point and non-point source water quality programs in terms of timely water quality assessments, TMDL development, NPDES permit issuance and, where needed, Basin Management Action Plans (BMAPs) to address nitrogen/phosphorus pollution. EPA notes that Subsection 62-302.530(47)(a), F.A.C. ("[t]he discharge of nutrients shall continue to be limited as needed to prevent violations of other standards contained in this chapter. Man-induced nutrient enrichment (total nitrogen or total phosphorus) shall be considered degradation in relation to the provisions of Sections 62-302.300, 62-302.700, and 62-4.242, F.A.C.") could result in more stringent nitrogen/phosphorus limits, where necessary to protect other applicable WQS in Florida.

D. EPA Determination Regarding Florida and EPA's Rulemaking

On January 14, 2009, EPA determined under CWA section 303(c)(4)(B) that new or revised WQS in the form of numeric water quality criteria for nitrogen/phosphorus

[87] USEPA. 2010. *Using Stressor-Response Relationships to Derive Numeric Nutrient Criteria.* EPA-820-S-10-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

pollution are necessary to meet the requirements of the CWA in the State of Florida. As noted above, the portion of Florida's currently applicable narrative criterion translated by this final rule provides, in part, that "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna." (*See* Subsection 62-302.530(47)(b), F.A.C.). EPA determined that Florida's narrative criterion alone was insufficient to ensure protection of applicable designated uses. The determination recognized that Florida has a comprehensive regulatory and non-regulatory administrative water quality program to address nitrogen/phosphorus pollution through a water quality strategy of assessments, non-attainment listing and determinations, TMDL development, and National Pollutant Discharge Elimination System (NPDES) permit regulations; individual watershed management plans through the State's BMAPs; advanced wastewater treatment technology-based requirements under the 1990 Grizzle-Figg Act; together with rules to limit nitrogen/phosphorus pollution in geographically specific areas like the Indian River Lagoon System, the Everglades Protection Area, and Wekiva Springs. However, the determination noted that despite Florida's existing regulatory and non-regulatory water quality framework and the State's intensive efforts to diagnose nitrogen/phosphorus pollution and address it on a time-consuming and resource-intensive case-by-case basis, substantial water quality degradation from nitrogen/phosphorus over-enrichment remains a significant challenge in the State and conditions are likely to worsen with continued population growth and land-use changes.

Overall, the combined impacts of urban and agricultural activities, along with

Florida's physical features and important and unique aquatic ecosystems, made it clear that the current reliance on the narrative criterion alone and a resource-intensive, site-specific implementation approach, and the resulting delays that it entails, do not ensure protection of applicable designated uses for the many State waters that either have been listed as impaired and require loadings reductions or those that are high quality and require protection from future degradation. EPA concluded that numeric criteria for nitrogen/phosphorus pollution will enable the State to take necessary action to protect the designated uses in a timely manner that will ensure protection of the designated use. The resource-intensive efforts to interpret the State's narrative criterion contribute to substantial delays in implementing the criterion and, therefore, undercut the State's ability to provide the needed protections for applicable designated uses. EPA, therefore, determined that numeric criteria for nitrogen/phosphorus pollution are necessary for the State of Florida to meet the CWA requirement to have criteria that protect applicable designated uses. EPA determined that numeric water quality criteria would strengthen the foundation for identifying impaired waters, establishing TMDLs, and deriving water quality-based effluent limits in NPDES permits, thus providing the necessary protection for the State's designated uses in its waters. In addition, numeric criteria will support the State's ability to effectively partner with point and nonpoint sources to control nitrogen/phosphorus pollution, thus further providing the necessary protection for the designated uses of the State's water bodies. EPA's determination is available at the following Web site: http://www.epa.gov/waterscience/standards/rules/fl-determination.htm

While Florida continues to work to implement its watershed management program, the impairments for nutrient pollution are increasing as evidenced by the 2008 and 2010 *Integrated Water Quality Assessment for Florida* report results, and the tools to correct the impairments (TMDLs and BMAPs) are not being completed at a pace to keep up. Numeric criteria can be used as a definitive monitoring tool to identify impaired waters and as an endpoint for TMDLs to establish allowable loads necessary to correct impairments. When developing TMDLs, as it does when determining reasonable potential and deriving limits in the permitting context, Florida translates the narrative criterion into a numeric target that the State determines is necessary to meet its narrative criterion and protect applicable designated uses. This process involves a site-specific analysis to determine the nitrogen and phosphorus concentrations that would "cause an imbalance in natural populations of aquatic flora or fauna" in a particular water.

When deriving NPDES water quality-based permit limits, Florida initially conducts a site-specific analysis to determine whether a proposed discharge has the reasonable potential to cause or contribute to an exceedance of its narrative water quality criterion. The absence of numeric criteria make this "reasonable potential" analysis more complex, data-intensive, and protracted. Following a reasonable potential analysis, the State then evaluates what levels of nitrogen and phosphorus would "cause an imbalance in natural populations of aquatic flora or fauna" and translates those levels into numeric "targets" for the receiving water and any other affected waters. Determining on a State-wide, water-by-water basis the levels of nitrogen and phosphorus that would "cause an imbalance in natural populations of aquatic flora or fauna" is a difficult, lengthy, and data-intensive undertaking. This work involves performing detailed location-specific analyses of the receiving water. If the State has not already completed this analysis for a particular waterbody, it can be very difficult to accurately determine in the context and timeframe of the NPDES permitting process. For example, in some cases, site-specific data may take several years to collect and, therefore, may not be available for a particular waterbody at the time of permitting issuance or re-issuance.

The January 14, 2009 determination stated EPA's intent to propose numeric criteria for lakes and flowing waters in Florida within 12 months of the January 14, 2009 determination, and for estuarine and coastal waters within 24 months of the determination. On August 19, 2009, EPA entered into a Consent Decree with Florida Wildlife Federation, Sierra Club, Conservancy of Southwest Florida, Environmental Confederation of Southwest Florida, and St. Johns Riverkeeper, committing to the schedule stated in EPA's January 14, 2009 determination to propose numeric criteria for lakes and flowing waters in Florida by January 14, 2010, and for Florida's estuarine and coastal waters by January 14, 2011. The Consent Decree also required that final rules be issued by October 15, 2010 for lakes and flowing waters, and by October 15, 2011 for estuarine and coastal waters. FDEP, independently from EPA, initiated its own State rulemaking process in the spring/summer of 2009 to adopt nutrient water quality standards protective of Florida's lakes and flowing waters. FDEP held several public workshops on its draft numeric criteria for lakes and flowing waters. In October 2009, however, FDEP decided not to bring the draft criteria before the Florida Environmental Regulation Commission, as had been previously scheduled.

Pursuant to the Consent Decree, EPA's Administrator signed the proposed numeric criteria for Florida's lakes and flowing waters on January 14, 2010, which was published in the Federal Register on January 26, 2010. EPA conducted a 90-day public comment period for this rule that closed on April 28, 2010. During this period, EPA also conducted 13 public hearing sessions in 6 cities in Florida. EPA received over 22,000 public comments from a variety of sources, including environmental groups, municipal wastewater associations, industry, State agencies, local governments, agricultural groups, and private citizens. The comments addressed a wide range of issues, including technical analyses, policy issues, economic costs, and implementation concerns. In this notice, EPA explains the inland waters final rule and provides a summary of major comments and the Agency's response in the sections that describe each of the provisions of the final rule. EPA has prepared a detailed "Comment Response Document," which includes responses to the comments contributed during the public hearing sessions, as well as those submitted in writing on the proposed rule, and is located in the docket for this rule.

On June 7, 2010, EPA and Plaintiffs filed a joint notice with the Court extending the deadlines for promulgating numeric criteria for Florida's estuaries and coastal waters, flowing waters in south Florida (including canals), and the downstream protection values for flowing waters into estuaries and coastal waters. The new deadlines are November 14, 2011 for proposing this second phase of criteria, and August 15, 2012 for publishing a final rule for these three categories. This will allow EPA time to hold a public peer review by EPA's Scientific Advisory Board (SAB) of the scientific methodologies for estuarine and coastal criteria, flowing waters in south Florida, and downstream protection values for estuaries and coastal waters.

Based upon comments and new data and information received during the public comment phase of the January 2010 proposed rule, on August 3, 2010 EPA published a supplemental notice of data availability and request for comment related to the Agency's January 26, 2010 notice of proposed rulemaking. In its supplemental notice, EPA solicited comment on a revised regionalization approach for streams, additional information and analysis on least-disturbed sites as part of a modified benchmark distribution approach, and additional options for developing downstream protection values (DPVs) for lakes. EPA did not solicit additional comment on any other provisions of the January 2010 proposal. EPA received 71 public comments from a variety of sources, including local and state governments, industry, and environmental groups. As mentioned above, EPA provides a summary of major comments and the Agency's response in the sections that describe each of the provisions of the final rule. Responses to comments submitted during the public comment period associated with the supplemental notice are also included in EPA's detailed "Comment Response Document," located in the docket for this rule.

On October 8, 2010, EPA filed an unopposed motion with the Court requesting that the deadline for signing the final rule be extended to November 14, 2010. The Court granted EPA's motion on October 27, 2010. EPA used this additional time to review and confirm that all comments were fully considered.

In accordance with the January 14, 2009 determination, the August 19, 2009 Consent Decree, and the June 7, 2010 and October 27, 2010 revisions to that Consent Decree, in this final notice EPA is promulgating final numeric criteria for streams, lakes, and springs in the State of Florida.[88]

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[88] For purposes of this rule, EPA has distinguished South Florida as those areas south of Lake Okeechobee and the Caloosahatchee River watershed to the west of Lake Okeechobee and the St. Lucie watershed to the east of Lake Okeechobee, hereinafter referred to as the South Florida Region. Numeric criteria applicable to flowing waters in the South Florida Region will be addressed in the second phase of EPA's rulemaking

III. Numeric Criteria for Streams, Lakes, and Springs in the State of Florida

A. General Information

For this final rule, EPA derived numeric criteria for streams, lakes and springs to implement Florida Subsection 62-302.530(47)(b), F.A.C.[89] This final rule also includes downstream protection values (DPVs) to ensure the attainment and maintenance of the WQS for downstream lakes. Derivation of these criteria is based upon an extensive amount of Florida-specific data. EPA has carefully considered numerous comments from a range of stakeholders and has worked in close collaboration with FDEP technical and scientific experts to analyze, evaluate, and interpret these Florida-specific data in deriving scientifically sound numeric criteria for this final rulemaking.

To support derivation of the final streams criteria, EPA screened and evaluated water chemistry data from more than 11,000 samples from over 6,000 sites statewide. EPA also evaluated biological data consisting of more than 2,000 samples from over 1,100 streams. To support derivation of the final lakes criteria, EPA screened and evaluated relevant lake data, which consisted of over 17,000 samples from more than 1,500 lakes statewide. Finally, for the final springs criterion, EPA evaluated and relied on scientific information and analyses from more than 40 studies including historical accounts, laboratory scale dosing studies and field surveys.

In deriving these final numeric values, the EPA met and consulted with FDEP expert scientific and technical staff on numerous occasions as part of an ongoing collaborative process. EPA carefully considered and evaluated the technical approaches

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regarding the establishment of estuarine and coastal numeric criteria. (Please refer to Section I.B for a discussion of the water bodies affected by this rule).

[89] In no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna.

and scientific analysis that FDEP presented as part of its July 2009 draft numeric criteria,[90] as well as its numerous comments on different aspects of this rule. The Agency also received and carefully considered substantial stakeholder input from 13 public hearings in 6 Florida cities. Finally, EPA reviewed and evaluated further analysis and information included in more than 22,000 comments on the January 2010 proposal and an additional 71 comments on the August 2010 supplemental notice.

EPA has created a technical support document that provides detailed information regarding the methodologies discussed herein and the derivation of the final criteria. This document is entitled "Technical Support Document for EPA's Final Rule for Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters" ("EPA Final Rule TSD for Florida's Inland Waters" or "TSD") and is part of the record and supporting documentation for this final rule. As part of its review of additional technical and scientific information, EPA has documented its consideration of key comments and issues received from a wide range of interested parties during the rulemaking process. This analysis and consideration is included as part of a comment response document entitled "Response to Comments – EPA's Numeric Criteria for Nitrogen/Phosphorus Pollution in the State of Florida's Lakes and Flowing Waters" that is also part of the record and supporting documentation for this final rule.

This section of the preamble describes EPA's final numeric criteria for Florida's streams (III.B), lakes (III.C), and springs (III.D), with the associated methodologies EPA employed to derive them. Each subsection includes the final numeric criteria (magnitude,

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[90] FDEP. 2009. *Draft Technical Support Document: Development of Numeric Nutrient Criteria for Florida's Lakes and Streams.* Florida Department of Environmental Protection, Standards and Assessment Section. Available electronically at: http://www.dep.state.fl.us/water/wqssp/nutrients/docs/tsd_nutrient_crit.docx. Accessed October 2010.

duration, and frequency) and background information and supporting analyses. Section III.E discusses the applicability and implementation of these final criteria.

As discussed, the scientific basis for the derivation of the applicable criteria for streams, lakes and springs in this final rule is outlined below and explained in more detail in the Technical Support Document accompanying this rulemaking. The final criteria and related provisions in this rule reflect a detailed consideration and full utilization of the best available science, data, literature, and analysis related to the specific circumstances and contexts for deriving numeric criteria in the State of Florida. This includes, but is not limited to, the substantial quantity and quality of available data in Florida, Florida's regional hydrologic, biological, and land use characteristics, and the biological responses in Florida's surface water systems.

B. Numeric Criteria for the State of Florida's Streams

(1) Final Rule

EPA is promulgating numeric criteria for TN and TP in five geographically distinct watershed regions of Florida's streams classified as Class I or III waters under Florida law (Section 62-302.400, F.A.C.).

Table B-1. EPA's Numeric Criteria for Florida Streams.

Nutrient Watershed Region	Instream Protection Value Criteria	
	TN (mg/L) *	TP (mg/L) *
Panhandle West [a]	0.67	0.06
Panhandle East [b]	1.03	0.18
North Central [c]	1.87	0.30
West Central [d]	1.65	0.49
Peninsula [e]	1.54	0.12

Watersheds pertaining to each Nutrient Watershed Region (NWR) were based principally on the NOAA coastal, estuarine, and fluvial drainage areas with modifications to the NOAA drainage areas in the West Central and Peninsula Regions that account for unique watershed geologies. For more detailed information on regionalization and which WBIDs pertain to each NWR, see the Technical Support Document.

[a] Panhandle West region includes: Perdido Bay Watershed, Pensacola Bay Watershed, Choctawhatchee Bay Watershed, St. Andrew Bay Watershed, Apalachicola Bay Watershed.

[b] Panhandle East region includes: Apalachee Bay Watershed, and Econfina/Steinhatchee Coastal Drainage Area.

[c] North Central region includes the Suwannee River Watershed.
[d] West Central region includes: Peace, Myakka, Hillsborough, Alafia, Manatee , Little Manatee River Watersheds, and small, direct Tampa Bay tributary watersheds south of the Hillsborough River Watershed.
[e] Peninsula region includes: Waccasassa Coastal Drainage Area, Withlacoochee Coastal Drainage Area, Crystal/Pithlachascotee Coastal Drainage Area, small, direct Tampa Bay tributary watersheds west of the Hillsborough River Watershed, Sarasota Bay Watershed, small, direct Charlotte Harbor tributary watersheds south of the Peace River Watershed, Caloosahatchee River Watershed, Estero Bay Watershed, Kissimmee River/Lake Okeechobee Drainage Area, Loxahatchee/St. Lucie Watershed, Indian River Watershed, Daytona/St. Augustine Coastal Drainage Area, St. John's River Watershed, Nassau Coastal Drainage Area, and St. Mary's River Watershed.
[*] For a given waterbody, the annual geometric mean of TN or TP concentrations shall not exceed the applicable criterion concentration more than once in a three-year period.

(2) Background and Analysis

(a) Methodology for Stream Classification

In January 2010, EPA proposed to classify Florida's streams into four regions (referred to in the proposed rule as "Nutrient Watershed Regions") for application of TN and TP criteria. This proposal was based upon the premise that streams within each of these regions (Panhandle, Bone Valley, Peninsula and North Central) reflect similar geographical characteristics, including phosphorus-rich soils, nitrogen/phosphorus concentrations and nitrogen to phosphorus ratios. To classify these four regions, EPA began by considering the watershed boundaries of downstream estuaries and coastal waters in recognition of the hydrology of Florida's flowing waters and the importance of protecting downstream water quality. This is consistent with a watershed approach to water quality management, which EPA encourages to integrate and coordinate efforts within a watershed in order to most effectively and efficiently protect our nation's water resources.[91] EPA then classified Florida's streams based upon a consideration of the natural factors that contribute to variability in nutrient concentrations in streams (e.g., geology, soil composition). In the State of Florida, these natural factors are mainly

[91] U.S. EPA. 2008. *Handbook for Developing Watershed Plans to Restore and Protect Our Waters.* EPA 841-B-08-002. U.S. Environmental Protection Agency, Office of Water, Washington DC.

associated with phosphorus. EPA's proposal reflected a conclusion that these natural factors could best be represented by separating the watersheds in the State into four regions and then using the least-disturbed sites within those regions to differentiate between the expected natural concentrations of TN and TP.

EPA received comments suggesting that the proposed stream regionalization be amended to more accurately account for naturally-high phosphorus soils in the northern Panhandle, west of the proposed North Central region. Specifically, EPA was asked to consider the westward extent of the Hawthorn Group, a phosphorus-rich geological formation that can influence stream phosphorus concentrations. At proposal, EPA had taken the Hawthorn Group into account when it proposed two distinct stream regions to the east and south of the panhandle region: the North Central and the West Central (formerly called the Bone Valley at proposal). Following proposal and in response to these comments, EPA revisited its review of underlying soils and geology in the Panhandle, itself, and the relationship of those geological characteristics to observed patterns in phosphorus concentrations in streams. EPA further considered how well such a revised regionalization explained observed variability in TP concentrations relative to the proposed regionalization. EPA concluded that a revised regional classification subdividing the proposed Panhandle region into a western and eastern section accurately reflected phosphate contributions from the underlying geologic formations that are reflected in the expected instream phosphorus concentrations. As discussed in the August 2010 supplemental notice, EPA has used the revised Panhandle regions for TN criteria to assure consistency and clarity in applicability decisions and implementation. This approach addresses the concerns of commenters that regionalization is an important consideration in developing stream criteria. EPA provided a supplemental notice and solicitation of comment in August 2010 on this potential change to the Panhandle region. In this final rule, EPA has thus taken into account the portion of the Hawthorn Group that lies in the eastern portion of the Panhandle region and has delineated the Panhandle region along watershed boundaries into East and West portions divided by the eastern edge of the Apalachicola River watershed (or alternatively, the western edge of the Suwannee River watershed). For more information regarding the EPA's consideration of alternative approaches for classification, please see the TSD and response to comments.

EPA also received comment that the original West Central region (referred to as the Bone Valley in the proposed rule) was too broad and incorporated watersheds that were not influenced by underlying Hawthorn Group geology, especially small, direct coastal drainage watersheds along the western and southern boundaries. EPA reexamined the watershed delineations of the West Central and Peninsula regions based on information in these comments and concluded that the comments were technically correct. EPA also provided a supplemental notice and solicitation of comment on this potential change to the West Central and Peninsula regions. In this final rule, EPA has refined the boundary delineations accordingly. The result for the West Central region was a modified boundary that shifts small, direct Tampa Bay tributary watersheds west of the Hillsborough River Watershed; small, direct Charlotte Harbor tributary watersheds south of the Peace River Watershed; and the entire Sarasota Bay Watershed from the West Central (Bone Valley) to the Peninsula region. EPA believes these adjustments to the West Central and Peninsula stream region boundaries more accurately reflect the watershed boundaries and better reflect natural differences in underlying geological formations and expected stream chemistry.

In summary, EPA is finalizing numeric stream criteria for TN and TP for five separate Nutrient Watershed Regions (NWR): Panhandle West, Panhandle East, North Central, West Central and Peninsula (north of Lake Okeechobee, including the Caloosahatchee River Watershed to the west and the St. Lucie Watershed to the east). For a map of these regions, refer to "Technical Support Document for U.S. EPA's Final Rule for Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters" (Chapter 1: Derivation of EPA's Numeric Criteria for Streams) included in the docket as part of the record for this final rule.

(b) Methodology for Calculating Instream Protective TN and TP Values

In the January 2010 proposal, EPA used a reference condition approach to derive numeric criteria that relied on the identification of biologically healthy sites that were unimpaired by nitrogen or phosphorus. EPA identified these sites from FDEP's streams data set, selecting sites where Stream Condition Index (SCI) scores were 40 and higher. The SCI is a multi-metric index of benthic macroinvertebrate community composition and taxonomic data developed by FDEP to assess the biological health of Florida's streams.[92] An SCI score > 40 has been determined to be indicative of biologically healthy conditions based on an expert workshop and analyses performed by both FDEP and EPA. Please refer to the EPA's January 2010 proposal and the final TSD accompanying this final rule for more information on the SCI and the selection of the SCI value of 40 as an appropriate threshold to identify biologically healthy sites.

[92] The SCI method was developed and calibrated by FDEP. *See* Fore et al. 2007. *Development and Testing of Biomonitoring Tools for Macroinvertebrates in Florida Streams (Stream Condition Index and BioRecon).* Final prepared for the Florida Department of Environmental Protection, Tallahassee, FL.

EPA further screened these sites by cross-referencing them with Florida's 2008 CWA section 303(d) list and excluded sites in waterbody identification numbers (WBIDs) with identified nutrient impairments or dissolved oxygen impairments. EPA grouped the remaining sites (hereinafter referred to as "SCI sites") according to the four proposed Nutrient Watershed Regions (Panhandle, North Central, West Central (referred to as Bone Valley at proposal), and Peninsula). For each NWR, EPA compiled data (TN and TP concentrations). EPA then calculated the average concentration at each site using all available samples. The resulting site average concentrations represent the distribution of nitrogen/phosphorus concentrations for each region. EPA found that while these sites were determined to be biologically healthy, the proposed SCI approach does not include information that can be directly related to an evaluation of least anthropogenically-impacted conditions (e.g., a measure of land use surrounding a reference site), which can be used as a factor in identifying a minimally-impacted reference population for criteria development. For these reasons, EPA concluded the 75th percentile of the distribution of site average values was an appropriate threshold to use in the SCI approach for criteria derivation.

EPA requested comment on basing the TN and TP criteria for the Nutrient Watershed Regions on the SCI approach. The Agency also requested comment on an alternative approach that utilizes benchmark sites identified by FDEP. EPA received comments supporting the benchmark reference condition approach and the selection of the 90th percentile (generally) for deriving the TN and TP criteria. The criteria in this final rule are based on a further evaluation and more rigorous screening of the benchmark data set of reference sites using the population of least-disturbed benchmark sites developed by FDEP and further refined by EPA as discussed in the August 2010 supplemental notice. EPA concluded that the revised benchmark approach is an appropriate reference condition approach for deriving stream criteria because it utilizes a quantitative assessment of potential human disturbance through the use of surrounding land cover analysis of stream corridor and watershed land development indices that provide an added dimension to the benchmark approach not considered in EPA's proposed SCI site approach. EPA is finalizing stream criteria for most NWRs based on the benchmark approach with the addition of supplemental data screening steps to ensure that an evaluation of benchmark sites utilizes best available information representing reference conditions related to least-disturbed as well as and biologically healthy streams in the State. For this reason, EPA found the benchmark reference condition approach to be a compelling basis to support numeric criteria for Florida's streams more closely associated with least-disturbed sites. For the West Central region only, EPA is finalizing stream criteria based on SCI sites because the benchmark approach resulted in the identification of only one WBID as being least-disturbed. EPA found the SCI sites provide a more compelling basis to support numeric criteria in that region because more data are available at more sites that have been identified as biologically healthy, which provide a broader representation of nitrogen and phosphorus concentrations within this region.

For this final rule, EPA is using the large amount of high-quality scientific data available on TN and TP concentrations with corresponding information on land use and human disturbance for a wide variety of stream types as part of a reference condition approach to derive numeric criteria for Florida's streams. EPA used available data that are quantitative measures of land use, indicators of human disturbance, and site-specific evaluations of biological condition using a multi-metric biological index to identify a population of least-disturbed benchmark locations (benchmark sites). EPA used associated measurements of TN and TP concentrations from the benchmark sites and SCI sites (in the case of the West Central region) as the basis for deriving the final numeric criteria for streams.

The reference condition approach used in this final rule for streams consist of three steps: (1) defining the reference population, (2) calculating a distribution of values, and (3) determining appropriate thresholds. For the first step as discussed above, EPA used the least-disturbed benchmark reference condition approach initially developed by FDEP to define the reference condition population, this approach starts with a query of FDEP's data in the STORET[93] (STOrage and RETrieval) and GWIS (Generalized Water Information System) databases and identified sites with data that met quality assurance standards.[94] Sites with data were then evaluated by FDEP to assess the level of human disturbance in the vicinity of the site using the Landscape Development Intensity Index (LDI)[95] to analyze a 100 meter distance of land on both sides of and 10 kilometers upstream of each stream site (i.e., corridor LDI). Sites with stream corridor LDI scores less than or equal to two[96] were considered sites with relatively low potential human disturbance. The group of sites with LDI scores less than or equal to two were further reviewed and inspected by FDEP based on site visits and aerial photography to assess the

[93] FL STORET can be found at: <http://www.dep.state.fl.us/WATER/STORET/INDEX.HTM>
[94] Quality assurance review conducted by FDEP and detailed in EPA's accompanying Technical Support Document.
[95] Brown, M.T., and M.B. Vivas. 2005. Landscape Development Intensity Index. *Environmental Monitoring and Assessment* 101: 289-309.
[96] Brown, M.T., and M.B. Vivas. 2005. Landscape Development Intensity Index. *Environmental Monitoring and Assessment* 101: 289-309.

degree of potential human impact. Based on this review, sites that FDEP determined had potential human impact were removed. Sites with mean nitrate concentrations greater than 0.35 mg/L, a concentration identified by several lines of evidence to result in the growth of excessive algae in laboratory studies and extensive field evaluations of spring and clear stream sites in Florida[97] were also removed. Following proposal and in response to additional comments and information, EPA further evaluated the benchmark sites and screened out additional sites with identified nutrient impairments or dissolved oxygen impairments according to Florida's 2008 CWA section 303(d) list. EPA also removed sites that have available watershed LDI scores greater than three as this reflects a higher level of human disturbance on a watershed basis[98]. Finally, EPA removed benchmark sites that have available Stream Condition Index (SCI) scores less than 40. These additional screens provide greater confidence that the remaining sites are both least-disturbed and biologically healthy. The benchmark approach resulted in the identification of only one WBID as least-disturbed within the West Central region. For this reason, EPA is utilizing the SCI sites identified at proposal to define the reference population for the West Central region in this final rule. EPA grouped the remaining sites (hereinafter referred to as "reference sites") according to its Nutrient Watershed Regions (Panhandle West, Panhandle East, North Central, West Central, and Peninsula). For each NWR, EPA compiled data (TN and TP concentrations) from the reference sites.

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[97] See the springs criterion discussion below.

[98] The threshold value for watershed LDI is higher than the threshold value for the corridor LDI because human disturbance in the watershed is known to more weakly influence in-stream nitrogen/phosphorus concentrations than human disturbance in the stream corridor (Peterjohn, W.T. and D. L. Correll. 1984. Nutrient dynamics in an agricultural watershed: Observations on the role of a riparian forest. *Ecology* 65: 1466 – 1475).

The second step in deriving instream protection values was to calculate the distribution of nitrogen/phosphorus values of benchmark sites within each region. EPA calculated the geometric mean of the annual geometric mean of nitrogen/phosphorus concentrations for each WBID within which reference sites occurred. EPA provided notice and solicited comment on calculating streams criteria on the basis of WBIDs in the August 2010 supplemental notice. All samples from reference sites within those WBIDs were used to calculate the annual geometric mean. The geometric mean of this annual geometric mean for each WBID is utilized so that each WBID represents one average concentration in the distribution of concentrations for each NWR. Geometric means were used for all averages because concentrations were log-normally distributed.

The third step in deriving instream protection values was to determine appropriate thresholds from these distributions to support balanced natural populations of aquatic flora and fauna. The upper end of the distribution (the 90th percentile) is appropriate if there is confidence that the distribution reflects minimally-impacted reference conditions and can be shown to be supportive of designated uses (i.e., balanced natural populations of aquatic flora and fauna).[99] EPA concluded that the benchmark data set and the resulting benchmark distributions of TN and TP were based on substantial evidence of least-disturbed reference conditions after the additional quality assurance screens applied by EPA. This analysis provides EPA with the confidence that the benchmark sites are least-disturbed sites and with the additional screens applied by the Agency provide a basis for the use of the 90th percentile of values from this population to establish the final rule criteria. It is appropriate to use the 90th percentile for the benchmark distribution

[99] USEPA. 2008. *Nutrient Criteria Technical Guidance Manual: Wetlands*. EPA-822-B-08-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

because the least-disturbed sites identified in Florida that are used to derive the criteria more closely approximate minimally-impacted conditions[100]. For the West Central region, where reference sites are identified using the SCI approach, there is less confidence that these sites are least-disturbed and represent minimally-impacted conditions. As mentioned above, this is because this approach does not rely on a quantitative assessment of potential human disturbance through the use of surrounding land cover analysis of stream corridor and watershed land development indices. Therefore, EPA is finalizing the stream criteria in the West Central region using the 75th percentile values of the distribution from the SCI sites.[101]

EPA's approach in this final rule results in numeric criteria that are protective of a balanced natural population of aquatic flora and fauna in Florida's streams. EPA has determined, however, that these instream values may not always ensure the attainment and maintenance of WQS in downstream lakes and that more stringent criteria may be necessary to assure compliance with 40 CFR 131.10(b). Therefore, EPA is finalizing an approach in this rule for deriving TN and TP values for streams to ensure the attainment and maintenance of WQS in downstream lakes.[102] This approach is discussed in Section III.C(2)(f).

(c) Duration and Frequency

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[100] The 90th percentile is selected so that nitrogen/phosphorus concentrations that are above the criterion value have a low probability (< 10%) of being observed in sites that are similar to benchmark sites.
[101] USEPA. 2000b. *Nutrient Criteria Technical Guidance Manual: Rivers and Streams.* EPA-822-B-00-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
These percentages were initially proposed by FDEP. *See* FDEP. 2009. *Draft Technical Support Document: Development of Numeric Nutrient Criteria for Florida's Lakes and Streams.* Florida Department of Environmental Protection, Standards and Assessment Section. Available electronically at: http://www.dep.state.fl.us/water/wqssp/nutrients/docs/tsd_nutrient_crit.docx. Accessed October 2010.

[102] EPA will propose and request comment on the comparable issue for deriving TN and TP values for streams to ensure the attainment and maintenance of WQS in downstream estuaries as part of the coastal and estuarine waters rule on November 14, 2011.

Aquatic life water quality criteria contain three components: magnitude, duration, and frequency. For the numeric TN and TP criteria for streams, the derivation of the criterion-magnitude values is described above and these values are provided in the table in Section III.B(1). The duration component of these stream criteria is specified in *footnote a* of Table B-1 as an annual geometric mean. EPA is finalizing the proposed frequency component as a no-more-than-one-in-three-years excursion frequency for the annual geometric mean criteria for streams. These duration and frequency components of the criteria are consistent with the data set used to derive these criteria, which applied distributional statistics to measures of annual geometric mean values from multiple years of record. EPA has determined that this frequency of excursions will not result in unacceptable effects on aquatic life as it will allow the stream ecosystem enough time to recover from occasionally elevated levels of nitrogen/phosphorus in the stream.[103, 104, 105] These selected duration and frequency components recognize that hydrological variability (e.g., high and low flows) will produce variability in nitrogen and phosphorus concentrations, and that individual measurements may at times be greater than the criteria magnitude concentrations without causing unacceptable effects to aquatic organisms and their uses. Furthermore, the frequency and duration components balance the representation of underlying data and analyses based on the central tendency of many years of data with the need to exercise some caution to ensure that streams have sufficient

[103] USEPA. 1985. *Guidelines for Deriving Numeric National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses.* EPA PB85-227049. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratories.

[104] Hutchens, J. J., K. Chung, and J. B. Wallace. 1998. Temporal variability of stream macroinvertebrate abundance and biomass following pesticide disturbance. *Journal of the North American Benthological Society* 17:518-534.

[105] Wallace, J.B. D. S.Vogel, AND T.F. Cuffney. 1986. Recovery of a headwater stream from an insecticide induced community disturbance. Journal of North American Benthological Society 5: 115-1 26.

time to process individual years of elevated nitrogen and phosphorus levels and avoid the possibility of cumulative and chronic effects (i.e., the no-more-than-one-in-three-year component). More information on this specific topic is provided in EPA's Final Rule TSD for Florida's Inland Waters, Chapter 1: Methodology for Deriving U.S. EPA's Criteria for Streams located in the record for this final rule.

d. Reference Condition Approach

In deriving the final criteria for streams, EPA has relied on a reference condition approach, which has been well documented, peer reviewed, and developed in a number of different contexts.[106,107,108,109,110] In the case of Florida, this approach is supported by a substantial Florida-specific database of high quality information, sound scientific analysis and extensive technical evaluation.

EPA received comments regarding the scientific defensibility of the reference condition approach, using either the benchmark sites or the SCI sites. Many commenters observed that such approaches do not mechanistically link biological effects to nitrogen/phosphorus levels and therefore assert that EPA cannot scientifically justify numeric criteria without an observed biological effect. EPA views the reference condition approach as scientifically appropriate to derive the necessary numeric criteria in Florida streams. Reference conditions provide the appropriate benchmark against

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106 USEPA. 2000a. *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs.* EPA-822-B-00-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

107 USEPA. 2000b. *Nutrient Criteria Technical Guidance Manual: Rivers and Streams.* EPA-822-B-00-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

108 Stoddard, J. L., D. P. Larsen, C. P. Hawkins, R. K. Johnson, and R. H. Norris. 2006. Setting expectations for the ecological condition of streams: the concept of reference condition. *Ecological Applications* 16:1267 – 1276.

109 Herlihy, A. T., S. G. Paulsen, J. Van Sickle, J. L. Stoddard, C. P. Hawkins, L. L. Yuan. 2008. Striving for consistency in a national assessment: the challenges of applying a reference-condition approach at a continental scale. *Journal of the North American Benthological Society* 27:860 – 877.

110 U.S. EPA. 2001. Nutrient Criteria Technical Manual: Estuarine and Coastal Marine Waters. Office of Water, Washington, DC. EPA-822-B-01-003.

which to determine the nitrogen and phosphorus concentrations present when the designated use is being met. When the natural background concentrations of specific parameters can be defined by identifying reference conditions at anthropogenically-undisturbed sites, then the concentrations at these sites can be considered as sufficient to support the aquatic life expected to occur naturally at that site.[111] Also, setting criteria based on the conditions observed in reference condition sites reflects both the stated goal of the Clean Water Act and EPA's National Nutrient Strategy that calls for states, including Florida, to take protective and preventative steps in managing nitrogen/phosphorus pollution to maintain the chemical, physical and biological integrity of the Nation's waters before adverse biological and/or ecological effects are observed.[112]

The effects of TN and TP on an aquatic ecosystem are well understood and documented. There is a substantial and compelling scientific basis for the conclusion that excess TN and TP will have adverse effects on streams,[113] [114] [115] [116] [117] [118] [119] [120] [121] [122]

[111] Davies, T.T., USEPA. 1997, November 5. Memorandum to Water Management Division Directors, Regions 1-10, and State and Tribal Water Quality Management Program Directors on Establishing Site Specific Aquatic Life Criteria Equal to Natural Background.

[112] USEPA. 1998. *National Strategy for the Development of Regional Nutrient Criteria.* EPA 822-R-98-002. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.; Grubbs, G., USEPA. 2001, November 14. Memorandum to Directors of State Water Programs, Directors of Great Water Body Programs, Directors of Authorized Tribal Water Quality Standards Programs and State and Interstate Water Pollution Control Administrators on Development and Adoption of Nutrient Criteria into Water Quality Standards.; Grumbles, B.H., USEPA. 2007, May 25.Memorandum to Directors of State Water Programs, Directors of Great Water Body Programs, Directors of Authorized Tribal Water Quality Standards Programs and State and Interstate Water Pollution Control Administrators on Nutrient Pollution and Numeric Water Quality Standards.

[113] Biggs, B.J.F. 2000. Eutrophication of streams and rivers: dissolved nutrient–chlorophyll relationships for benthic algae. *Journal of the North American Benthological Society* 19:17–31

[114] Bothwell, M.L. 1985. Phosphorus limitation of lotic periphyton growth rates: an intersite comparison using continuous-flow troughs (Thompson River system, British Columbia). *Limnology and Oceanography* 30:527–542

[115] Bourassa, N., and A. Cattaneo. 1998. Control of periphyton biomass in Laurentian streams (Quebec). *Journal of the North American Benthological Society* 17:420–429

[116] Bowling, L.C., and P.D. Baker. 1996. Major cyanobacterial bloom in the Barwon-Darling River, Australia, in 1991, and underlying limnological conditions. *Marine and Freshwater Research* 47: 643–657

[117] Cross, W. F., J. B. Wallace, A. D. Rosemond, and S. L. Eggert. 2006. Whole-system nutrient

[123] [124] [125] [126] [127] As discussed in Section II above, excess nitrogen/phosphorus in streams, like other aquatic ecosystems, increase vegetative growth (plants and algae), and change the assemblage of plant and algal species present in the system. These changes can affect the organisms that are consumers of algae and plants by altering the balance of food resources available to different trophic levels. For example, excess nitrogen/phosphorus promotes the growth of opportunistic and short-lived plant species that die quickly leaving more dead vegetative material available for consumption by lower tropic levels. Additionally, excess nitrogen/phosphorus can promote the growth of less palatable nuisance algae species that results in less food available for filter feeders. These changes can also alter the habitat structure by covering the stream or river bed with periphyton (attached algae) rather than submerged aquatic plants, or clogging the water column with phytoplankton (floating algae). In addition, excess nitrogen/phosphorus can lead to the production of algal toxins that can be toxic to fish, invertebrates, and humans.

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enrichment increases secondary production in a detritus-based ecosystem. *Ecology* 87: 1556–1565

[118] Dodds, W.K., and D.A. Gudder. 1992. The ecology of Cladophora. *Journal of Phycology* 28:415–427

[119] Elwood, J.W., J.D. Newbold, A.F. Trimble, and R.W. Stark. 1981. The limiting role of phosphorus in a woodland stream ecosystem: effects of P enrichment on leaf decomposition and primary producers. *Ecology* 62:146–158

[120] Francoeur, S.N. 2001. Meta-analysis of lotic nutrient amendment experiments: detecting and quantifying subtle responses. *Journal of the North American Benthological Society* 20: 358–368

[121] Moss, B., I. Hooker, H. Balls, and K. Manson. 1989. Phytoplankton distribution in a temperate floodplain lake and river system. I. Hydrology, nutrient sources and phytoplankton biomass. *Journal of Plankton Research* 11: 813–835

[122] Mulholland, P.J. and J.R. Webster. 2010. Nutrient dynamics in streams and the role of J-NABS. *Journal of the North American Benthological Society* 29: 100-117

[123] Peterson, B.J., J.E. Hobbie, A.E. Hershey, M.A. Lock, T.E. Ford, J.R. Vestal, V.L. McKinley, M.A.J. Hullar, M.C. Miller, R.M. Ventullo, and G. S. Volk. 1985. Transformation of a tundra river from heterotrophy to autotrophy by addition of phosphorus. *Science* 229:1383–1386

[124] Rosemond, A. D., P. J. Mulholland, and J. W. Elwood. 1993. Top-down and bottom-up control of stream periphyton: Effects of nutrients and herbivores. *Ecology* 74: 1264–1280

[125] Rosemond, A. D., C. M. Pringle, A. Ramirez, and M.J. Paul. 2001. A test of top-down and bottom-up control in a detritus-based food web. *Ecology* 82: 2279–2293

[126] Rosemond, A. D., C. M. Pringle, A. Ramirez, M.J. Paul, and J. L. Meyer. 2002. Landscape variation in phosphorus concentration and effects on detritus-based tropical streams. *Limnology and Oceanography* 47: 278–289

[127] Slavik, K., B. J. Peterson, L. A. Deegan, W. B. Bowden, A. E. Hershey, J. E. Hobbie. 2004. Long-term responses of the Kuparuk River ecosystem to phosphorus fertilization. *Ecology* 85: 939 – 954

Chemical characteristics of the water, such as pH and concentrations of dissolved oxygen (DO), can also be affected by excess nitrogen/phosphorus leading to low DO conditions and hypoxia. Each of these changes can, in turn, lead to other changes in the stream community and, ultimately, to changes in the stream ecology that supports the overall function of the linked aquatic ecosystem.

C. Numeric Criteria for the State of Florida's Lakes

(1) Final rule

EPA is promulgating numeric criteria for chlorophyll *a*, TN and TP in three classes of Florida's lakes, classified as Class I or III waters under Florida law (Section 62-302.400, F.A.C.):

Table C-1. EPA's Numeric Criteria for Florida Lakes.

Lake Color[a] and Alkalinity	Chl-a (mg/L)[b, *]	TN (mg/L)	TP (mg/L)
Colored Lakes[c]	**0.020**	**1.27** [1.27-2.23]	**0.05** [0.05-0.16]
Clear Lakes, High Alkalinity[d]	**0.020**	**1.05** [1.05-1.91]	**0.03** [0.03-0.09]
Clear Lakes, Low Alkalinity[e]	**0.006**	**0.51** [0.51-0.93]	**0.01** [0.01-0.03]

[a] Platinum Cobalt Units (PCU) assessed as true color free from turbidity.
[b] Chlorophyll *a* is defined as corrected chlorophyll, or the concentration of chlorophyll *a* remaining after the chlorophyll degradation product, phaeophytin *a*, has been subtracted from the uncorrected chlorophyll *a* measurement.
[c] Long-term Color > 40 Platinum Cobalt Units (PCU)
[d] Long-term Color ≤ 40 PCU and Alkalinity > 20 mg/L $CaCO_3$
[e] Long-term Color ≤ 40 PCU and Alkalinity ≤ 20 mg/L $CaCO_3$
* For a given waterbody, the annual geometric mean of chlorophyll *a*, TN or TP concentrations shall not exceed the applicable criterion concentration more than once in a three-year period.

For each class of water defined by color and alkalinity, the applicable criteria are the values in **bold** for chlorophyll *a*, TN and TP. The criteria framework provides flexibility for FDEP to derive lake-specific, modified TN and TP criteria if the annual geometric mean chlorophyll *a* concentration is less than the criterion for an individual lake in each of the three immediately preceding years. In such a case, the corresponding criteria for TN and/or TP may be modified to reflect maintenance of ambient conditions within the range specified in the parenthetical below each baseline TN and TP criteria printed in bold in Table C-1 above. Modified criteria for TN and/or TP must be based on data from at least the immediately preceding three years[128] in a particular lake. Modified TN and/or TP criteria may not be greater than the higher value specified in the range. Modified TN and/or TP criteria for a lake also may not be above criteria applicable to streams to which a lake discharges in order to ensure the attainment and maintenance of downstream water quality standards.

Utilization of the range flexibility in the numeric lake criteria in this final rule requires that the ambient calculation for modified TN and TP criteria be based on: (1) the immediately preceding three-year record of observation for each parameter,[129] (2) representative sampling during each year (at least one sample in May – September and at least one sample in October – April), and (3) a minimum of 4 samples from each year. Requiring at least three years of data accounts for year-to-year hydrological variability, ensures longer-term stable conditions, and appropriately accounts for anomalous conditions in any given year that could lead to erroneous conclusions regarding the true relationship between nitrogen/phosphorus and chlorophyll *a* levels in a lake. Representative samples from each year minimize the effects of seasonal variations in

[128] The previous three years of data are required as a basis for modifying TN and TP criteria and must meet FDEP's data quality assurance objectives. Additional historical data may be used to augment the three years of data characterizing the lake's annual and inter-annual variability. Only historical data containing data for all three parameters can be used and the data must meet FDEP's data quality assurance objectives.
[129] As noted above, if more than three years of data are available for each parameter, then more data can be used.

nitrogen/phosphorus and chlorophyll a concentrations. Finally, the minimum sample size of 4 samples per year allows estimates of reliable geometric means while still maintaining a representative sample of lakes. The State shall notify EPA Region 4 and provide the supporting record within 30 days of determination of modified lake criteria.

To ensure attainment of applicable downstream lake criteria, this final rule provides a tiered approach for adjusting instream criteria presented in section III.B.(1)above for those streams that flow into lakes.[130] Where site-specific data on lake characteristics are available, the final rule provides a modeling approach for the calculation of downstream lake protection values that relies upon the use of the BATHTUB model.[131] In circumstances where sufficient site-specific lake data are readily available and either EPA or FDEP determine that another scientifically defensible model is more appropriate (e.g., the Water Quality Analysis Simulation Program, or WASP), the modeling approach accommodates use of a scientifically defensible alternative. In the absence of models, other approaches for ensuring protection of downstream lakes are provided and described further below.

(2) Background and Analysis

(a) Methodology for Lake Classification

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[130] Approximately 30% of Florida lakes are fed by streams to which this DPV analysis would apply (Schiffer, Donna M. 1998. *Hydrology of Central Florida Lakes - A Primer.* U.S Geological Survey in cooperation with SJWMD and SFWMD: Circular 1137).

[131] Kennedy, R.H. 1995. *Application of the BATHTUB model to Selected Southeastern Reservoirs.* Technical Report EL-95-14. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.;
Walker, W.W., 1985. *Empirical Methods for Predicting Eutrophication in Impoundments; Report 3, Phase II: Model Refinements.* Technical Report E-81-9. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.;
Walker, W.W., 1987. *Empirical Methods for Predicting Eutrophication in Impoundments; Report 4, Phase III: Applications Manual.* Technical Report E-81-9. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.;

In the January 2010 proposal, EPA used color and alkalinity to classify Florida's lakes based on substantial data demonstrating that these characteristics influence the response of lakes to increased nitrogen/phosphorus and the expected background chlorophyll *a* concentration. Many of Florida's lakes contain dissolved organic matter leached from surface vegetation that colors the water. More color in a lake limits light penetration within the water column, which in turn limits algal growth. Thus, in lakes with colored water, higher levels of nitrogen/phosphorus may occur without exceeding the chlorophyll *a* criteria concentrations. EPA evaluated relationships among TN, TP, and chlorophyll *a* concentration data, and found that lake color influenced these relationships. More specifically, EPA found the correlations between nitrogen/phosphorus and chlorophyll *a* concentrations to be stronger and less variable when lakes were categorized into two distinct groups based on a color threshold of 40 PCU, with clear lakes demonstrating more algal growth with increased nitrogen/phosphorus, as would be predicted by the increased light penetration. This threshold is consistent with the distinction between clear and colored lakes long observed in Florida.[132]

Within the clear lakes category, color is not the dominant controlling factor in algal growth. For these clear lakes, EPA proposed the use of alkalinity as an additional distinguishing characteristic. Alkalinity and pH increase when water is in contact with carbonate rocks, such as limestone, or limestone-derived soil in the State of Florida. Limestone is also a natural source of phosphorus, and thus, in Florida, lakes that are higher in alkalinity are often associated with naturally elevated TP levels. The alkalinity

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[132] Shannon, E.E., and P.L. Brezonik. 1972. Limnological characteristics of north and central Florida lakes. Limnology and Oceanography 17(1): 97-110.

(measured as $CaCO_3$ concentration) of Florida clear lakes ranges from zero to over 200 mg/L. EPA proposed classifying clear Florida lakes into acidic and alkaline classes based on an alkalinity threshold of 50 mg/L $CaCO_3$, and solicited comment on whether a 20 mg/L $CaCO_3$ threshold would be more appropriate. EPA received comments noting that that the lower alkalinity classification threshold would be more representative of naturally oligotrophic conditions by creating a class of lakes with very low alkalinity and correspondingly low chlorophyll a concentrations. After reviewing available lake data, EPA found that clear lakes below 20 mg/L $CaCO_3$ were more similar to one another in terms of naturally expected chlorophyll a, TN, and TP concentrations than clear lakes below 50 mg/L $CaCO_3$. Thus, EPA concluded that an alkalinity threshold of 20 mg/L $CaCO_3$ was an appropriate threshold for classifying clear lakes and EPA is finalizing the lower alkalinity threshold in this rule. More information on this specific topic is provided in EPA's Finals TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Criteria for Lakes located in the record for this final rule.

EPA also proposed the use of specific conductance as a surrogate for alkalinity. EPA received comments that conductivity was not an accurate surrogate measure for alkalinity. EPA evaluated the association between specific conductivity and alkalinity and concluded that alkalinity is a preferred parameter for lake classification because it is a more direct measure of the presence of carbonate rocks, such as limestone that are associated with natural elevated phosphorus levels. Changes in specific conductivity can be attributed to changes in alkalinity, but in many cases may be caused by increases in the concentrations of other compounds that originate from human activities. Thus, EPA has concluded that alkalinity is a more reliable indicator for characterizing natural background conditions for Florida lakes.

A number of comments suggested EPA consider a system that delineates 47 lake regions and a system that classifies lakes as a continuous function of both alkalinity and color. As discussed in more detail in the TSD supporting this final rule, EPA evaluated each of these alternative classification approaches, and found that they did not improve the predictive accuracy of biological responses to nitrogen/phosphorus over EPA's classification, nor result in a practical system that can be implemented by FDEP. For example, in the case of the 47 lake region approach, insufficient data are available to derive numeric criteria across all of the 47 regions and in the case of the continuous function approach there is a reliance on an assumption that TN and TP are always co-limiting that is not always true.[133]

A number of commenters suggested that lake-specific criteria would be more appropriate than the three broad classes that EPA proposed. The substantial data available in the record for this final rule supports the conclusion that many of Florida's lakes share similar physical, chemical, and geological characteristics, which in turn justifies, based on sound scientific evidence, broad classification of Florida lakes. EPA concluded, based on the substantial data and associated analysis explained above, that color and alkalinity are primary distinguishing factors in Florida lakes with respect to nitrogen/phosphorus dynamics and the associated biological response. With respect to consideration of site-specific information that goes beyond the detailed site-specific

[133] Guildford, S. J. and R. E. Hecky. 2000. Total nitrogen, total phosphorus, and nutrient limitation in lakes and oceans: Is there a common relationship? *Limnology and Oceanography* 45: 1213 – 1223.

sampling and monitoring analysis already discussed,[134] the numeric lake criteria in this final rule are established within a flexible regulatory framework that allows adjustment of TN, TP, and/or chlorophyll a criteria based on additional lake-specific data. This framework provides an opportunity to derive lake-specific criteria similar to the manner suggested in public comment, where lake-specific data and information are available, while ensuring that numeric criteria are in place to protect all of Florida's lakes. Further site-specific flexibility is provided in this final rule through the derivation of alternative criteria by a Federal Site Specific Adjusted Criteria (SSAC) process discussed in more detail below in Section V.C.

In this final rule, EPA is dividing Florida's lakes into three classes: 1) Colored Lakes > 40 Platinum Cobalt Units (PCU), 2) Clear, High Alkalinity Lakes (≤ 40 PCU with alkalinity > 20 mg/L calcium carbonate ($CaCO_3$)), and 3) Clear, Low Alkalinity Lakes (≤ 40 PCU with alkalinity ≤ 20 mg/L $CaCO_3$). These two parameters, color and alkalinity, both affect lake productivity and plant biomass, as measured by chlorophyll a. For more information regarding these classes, please refer to EPA's Final Rule TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Criteria for Lakes.

(b) Methodology for Chlorophyll a Criteria

EPA proposed the use of chlorophyll a concentration as an indicator of a healthy biological condition, supportive of natural balanced populations of aquatic flora and fauna in each of the classes of Florida's lakes. Excess algal growth is associated with degradation in aquatic life, and chlorophyll a levels are a measure of algal growth. To

[134] Technical Support Document for EPA's Final Rule for Numeric Nutrient Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters.

derive the proposed chlorophyll a concentrations that would be protective of natural balanced populations of aquatic flora and fauna in Florida's lakes, EPA utilized the expected trophic status of the lake, based on internationally accepted lake use classifications.[135]

As discussed in more detail at proposal, lakes can be classified into one of three trophic state categories (i.e., oligotrophic, mesotrophic, eutrophic).[136] EPA concluded at proposal that healthy colored lakes and clear, high alkalinity lakes should maintain a mesotrophic status, because they receive significant natural nitrogen/phosphorus input and still support a healthy diversity of aquatic life in warm, productive climates such as Florida. For these two categories of lakes, EPA proposed a chlorophyll a criterion of 0.020 mg/L to support balanced natural populations of aquatic life flora and fauna. At concentrations above 0.020 mg/L chlorophyll a, the trophic status of the lake is more likely to become eutrophic and the additional chlorophyll a will reduce water clarity, negatively affecting native submerged macrophytes, and the invertebrate and fish communities that depend on them. Commenters suggested that this threshold is overly protective of naturally eutrophic lakes in the State. For those lakes that may currently be naturally eutrophic, this final rule contains a formal SSAC process to revise these criteria for this unique type of lake. For more information on the SSAC process, please refer to Section V.C of this final rule.

In contrast, clear, low alkalinity lakes in Florida do not receive natural nitrogen/phosphorus input from underlying geological formations in the watershed and

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[135] OECD. 1982. *Eutrophication of Waters. Monitoring, Assessment and Control.* Organisation for Economic Development and Co-Operation, Paris, France.

[136] Trophic state describes the nitrogen/phosphorus levels and algal state of an aquatic system: oligotrophic (low nitrogen/phosphorus and algal productivity), mesotrophic (moderate nitrogen/phosphorus and algal productivity), and eutrophic (high nitrogen/phosphorus and algal productivity).

thus, they support less algal growth and have lower chlorophyll a levels than colored or clear, high alkalinity lakes. EPA concluded at proposal that these lakes should maintain an oligotrophic status to support balanced natural populations of aquatic flora and fauna. EPA proposed a chlorophyll a criterion of 0.006 mg/L in clear, low alkalinity lakes to support balanced natural populations of aquatic life flora and fauna. At concentrations above 0.006 mg/L chlorophyll a, the trophic status of the lake is more likely to become mesotrophic and the additional chlorophyll a will reduce water clarity, negatively affecting native submerged macrophytes, and the invertebrate and fish communities that depend on them. Commenters suggested that this chlorophyll a concentration may not be appropriate for clear lakes with alkalinity less than 50 mg/L. As explained in more detail above, in this final rule EPA concluded that 20 mg/L is an appropriate threshold between low and high alkalinity lakes. Thus, lakes with alkalinity greater than 20 mg/L will have a chlorophyll a criterion that is applicable to clear, high alkalinity lakes. Based on the revision of the alkalinity threshold to 20 mg/L, EPA reviewed the available chlorophyll a data for clear, low alkalinity lakes and found that the majority of lakes have chlorophyll a concentrations less than 0.006 mg/L reflective of oligotrophic conditions which leads EPA to conclude that this chlorophyll a concentration will serve to maintain the trophic status of these lakes.

In this final rule, EPA is promulgating chlorophyll a criteria of 0.020 mg/L in colored lakes and clear, high alkalinity lakes and a chlorophyll a criterion of 0.006 mg/L in clear, low alkalinity lakes as an indicator of a healthy biological condition, supportive of natural balanced populations of aquatic flora and fauna in these classes of Florida's lakes. For more information regarding these chlorophyll a criteria, please refer to EPA's

Final Rule TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Criteria for Lakes.

(c) Methodology for Total Nitrogen (TN) and Total Phosphorus (TP) Criteria in Lakes

EPA proposed TN and TP criteria for each of the classes of lakes described in Section III.C(2)(a) based on the response of chlorophyll *a* to increases in TN and TP for clear and colored lakes in Florida. These responses were quantitatively estimated with linear regressions. Each data point used in estimating the statistical relationships was the geometric mean of samples taken over the course of a year in a particular Florida lake. Statistical analyses of these relationships showed that the chlorophyll *a* responses to changes in TN and TP differed for colored versus clear lakes, as would be expected, because color blocks light penetration in the water column and limits algal growth. These analyses also showed that chlorophyll *a* responds to changes in TN and TP in high and low alkalinity clear lakes similarly, as would be expected, because alkalinity does not affect light penetration. These relationships were used to derive TN and TP criteria that would maintain chlorophyll *a* concentrations at desired levels known to be supportive of balanced natural populations of aquatic flora and fauna as discussed above. These analyses are explained in more detail in EPA's Final Rule TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Criteria for Lakes included in the record for this final rule.

EPA proposed baseline TN and TP criteria based on the 75th percentile of the predicted distribution of chlorophyll *a* concentrations, given a TN or TP concentration. Commenters suggested alternative approaches for deriving TN and TP criteria, including using either the mean predicted chlorophyll a concentration, using the 25th percentile of the predicted distribution of chlorophyll a concentrations, and using an additional criterion based on a higher percentile that is associated with a different exceedance frequency. EPA considered these alternative approaches and concluded that calculating the TN and TP criteria as a baseline concentration with an associated concentration range was a more flexible approach than a single value approach manifested as the TN and TP concentration associated with a specific chlorophyll a concentration. Thus, the approach included in this final rule takes into account the natural variability observed in different classes of lakes (i.e., colored or clear) in a way that a single value approach based on the regression line or the lower value of the 50th percentile prediction interval does not.

In this final rule, the TN and TP criteria are based on linear regressions (i.e., best-fit lines) predicting the annual geometric mean chlorophyll a concentration as a function of the annual geometric mean TN or TP. Baseline TN and TP criteria are calculated as the point at which the 75th percentile of the predicted distribution of chlorophyll a concentrations from the regression relationship is equivalent to the chlorophyll a criterion for the appropriate lake class. The range of values in the predicted distribution of chlorophyll a concentrations arises from small differences in the nitrogen/phosphorus – chlorophyll a relationships across different lakes and variability in these relationships between years in the same lake. Hence, TN and TP criteria are based on the 75th percentile that will be protective at the majority of lakes and in the majority of years.

The predicted distribution of chlorophyll a concentrations for lakes differs inherently from the distribution of TN and TP concentrations calculated from reference sites for criteria for Florida streams (Section III.B(2)(b)). In the case of the criteria for

Florida streams for most NWRs, benchmark sites represent a population of least-disturbed sites and the criteria based on the 90th percentile of nitrogen and phosphorus concentrations from these sites are selected to characterize the upper bound of nitrogen/phosphorus concentrations that one would expect from such sites. Criteria for Florida lakes rely on a predictive relationship between nitrogen/phosphorus and chlorophyll a concentrations, and the 75th percentile is selected from the distribution of chlorophyll a concentrations predicted for *specific* concentrations of TN and TP. As discussed above, basing criteria on this percentile provides a means of accounting for variability in chlorophyll a concentrations predicted for a given TN and TP concentration. In short, the percentile for the streams criteria is selected to ensure that nitrogen/phosphorus concentrations in all streams are at least as low as those observed in reference streams, whereas the percentile for the lakes criteria is selected such that concentrations appropriately account for variability in the relationships between nitrogen/phosphorus and chlorophyll a concentrations.

(d) Duration and Frequency

Aquatic life water quality criteria include magnitude, duration, and frequency components. For the chlorophyll a, TN, and TP criteria for lakes, the criterion-magnitude values, expressed as a concentration, are provided in Table C-1 in bold. The criterion-duration of this magnitude is specified in a footnote to this Table as an annual geometric mean. EPA is finalizing the criterion-frequency as a no-more-than-once-in-three-years excursion frequency of the annual geometric mean criteria for lakes. The duration component of the criteria is based on annual geometric means to be consistent with the data set used to derive these criteria, which applied stressor-response relationships based on annual geometric means for individual years at individual lakes. These selected duration and frequency components recognize that hydrological variability (e.g., high and low flows) will produce variability in nitrogen and phosphorus concentrations, and that individual measurements may at times be greater than the criterion-magnitude concentrations without causing unacceptable effects to aquatic organisms and their uses. Furthermore, they balance the representation of the central tendency of the predicted relationship between TN or TP and chlorophyll a based from many years of data with the need to exercise some caution to ensure that lakes have sufficient time to process individual years of elevated nitrogen and phosphorus concentrations and avoid the possibility of cumulative and chronic effects (i.e., the no-more-than-one-in-three-year component). Additionally, because nitrogen/phosphorus pollution is best managed on a watershed basis, this is the same frequency and duration used in the final streams criteria. More information on this specific topic is provided in EPA's Final Rule TSD for Florida's Inland Waters, Chapter 2: Methodology for Deriving U.S. EPA's Criteria for Lakes located in the record for this final rule.

(e) Application of Lake-specific, Ambient Condition-based Modified TN and TP Criteria

EPA proposed an accompanying approach that the State could use to adjust TN and TP criteria for a particular lake within a certain range where sufficient data on long-term ambient chlorophyll a, TN and TP levels are available to demonstrate that protective chlorophyll a criterion for a specific lake will still be maintained and a balance of natural populations of aquatic flora and fauna will be supported. This approach allows for readily available site-specific data to be taken into account in the expression of TN and

TP criteria, while still ensuring support of balanced natural populations of aquatic flora and fauna by maintaining the associated chlorophyll a level at or below the chlorophyll a criterion level. The scientific premise for the lake-specific ambient calculation provision for modified TN and/or TP criteria is that if ambient lake data show that a lake's chlorophyll a levels are at or below the established criteria (i.e., magnitude) for at least the last three years and its TN and/or TP levels are within the lower and upper bounds, then those ambient levels of TN and TP represent conditions that will continue to support the specified chlorophyll a response level. The lower bound of the range is based on the TN/TP values that correspond to the 75th percentile of the predicted chlorophyll a distribution and the upper bound of the range is based on the TN/TP values that correspond to the 25th percentile of the same predicted distribution. The use of the 25th and 75th percentiles accounts for the majority of variability that may occur around the central tendency of the predicted relationship between TN or TP and chlorophyll a.

This final rule provides that FDEP must establish and document these modified criteria in a manner that clearly recognizes their status as the applicable criteria for a particular lake. To this end, FDEP must submit a letter to EPA Region 4 formally documenting the use of modified criteria as the applicable criteria for particular lakes. This final rule allows for a one-time adjustment without a requirement that FDEP go through a formal SSAC process. EPA believes that such modified TN and TP criteria do not need to go through the SSAC process because the conditions under which they are applicable are clearly stated in this final rule and data requirements are clearly laid out so that the outcome is clear, consistent, transparent, and reproducible. By providing a specific process for deriving modified criteria within the WQS rule itself, each individual outcome of this process is an effective WQS for CWA purposes and does not need separate adoption by FDEP or approval by EPA. For more information on the SSAC process, please refer to Section V.C of this final rule.

Application of the ambient calculation provision has implications for assessment and permitting because the outcome of applying this provision is to establish alternate numeric TN and/or TP values as the applicable lake criteria. For accountability and tracking purposes, the State must document the result of the ambient calculation for any given lake. Once modified criteria are established under this approach, they remain the applicable criteria for the long-term for purposes of implementing the State's water quality program until they are subsequently modified either through the Federal SSAC process or State revision to the applicable WQS, which has been approved by EPA pursuant to CWA section 303(c).

This site-specific lake criteria adjustment provision is subject to the downstream protection requirements more broadly discussed below. Thus in a comparable manner this final rule provides that calculated TN and/or TP values in a lake that discharges to a stream may not exceed criteria applicable to the stream to which a lake discharges.

(f) *Downstream Protection of Lakes*

In developing the proposed stream criteria, EPA also evaluated their effectiveness for assuring the protection of downstream lake water quality standards pursuant to the provisions of 40 CFR 130.10(b), which requires that WQS must provide for the attainment and maintenance of the WQS of downstream waters.[137] EPA's criteria for lakes are, in some cases, more stringent than the final criteria for streams that flow into

[137] EPA will assess the effectiveness of final stream criteria for assuring the protection of downstream estuaries in a separate rulemaking that focuses on estuarine and coastal waters to be proposed by November 14, 2011 and finalized by August 15, 2012.

the lakes, and thus the instream criteria may not be stringent enough to ensure protection of WQS in certain downstream lakes. As a result, EPA proposed application of the Vollenweider equation to ensure that the TP criteria in streams are protective of downstream lakes, and requested comment on alternative approaches such as the BATHTUB model and whether there should be an allowance for use of other models that are demonstrated to be protective and scientifically defensible.

The proposed use of the Vollenweider model equation to ensure the protection of downstream lakes requires input of two lake-specific characteristics: the fraction of inflow due to stream flow and the hydraulic retention time. EPA provided alternative preset values for percent contribution from stream flow and hydraulic retention time that could be used in those instances where lake-specific input values are not readily available. EPA's January 2010 proposed rule discussed the flexibility for the State to use site-specific inputs to the Vollenweider equation for these two parameters, as long as the State determines that such inputs are appropriate and documents the site-specific values. Some commenters stated that the Vollenweider equation is overly simplistic and does not include the necessary factors to account for physical, hydrologic, chemical, and biological processes necessary to determine protective criteria. Several commenters also suggested the need for TN values to protect downstream lakes that are nitrogen-limited (such as many of the lakes in the phosphorus-rich areas of the State). Comments included a recommendation to use models that can better represent site-specific conditions, such as BATHTUB.

EPA's August 2010 Supplemental Notice of Data Availability and Request for Comment requested additional comment on using the BATHTUB model in place of the

Vollenweider equation for deriving both TP and TN criteria to protect downstream lakes, allowing the use of alternative models under certain circumstances, and providing for an alternative approach to protect downstream lakes when limited data are available that would use the lake criteria themselves as criteria for upstream waters flowing into the lake.

In the final rule, protection of downstream lakes is accomplished through establishment of a downstream protection value (DPV). The applicable criteria for streams that flow into downstream lakes include both the instream criteria for TN and TP and the DPV, which is a concentration or loading value at the point of entry into a lake that results in attainment of the lake criteria. EPA selected the point of entry into the lake, also referred to as the "pour point," as the location to measure water quality because the lake responds to the input from the pour point and all contributions from the stream network above this point in a watershed affect the water quality at the pour point. When a DPV is exceeded at the pour point, the waters that collectively comprise the network of streams in the watershed above that pour point are considered to not attain the DPV for purposes of section 303(d) of the Clean Water Act. The State may identify these impaired waters as a group rather than individually.

It is appropriate to express the DPV as either a load or concentration (load divided by flow) because both are expressions of the amount of TN and TP that are delivered to the downstream water. In an expression of load, the amount is expressed directly as mass per time (e.g., pounds per year), whereas a concentration expresses the amount in terms of the mass contained in a particular volume of water (e.g., milligrams per liter). Either expression may be used for assessment and source control allocation purposes.

Calculating a DPV as a load will require modeling or other technical information, such as a TMDL, that accounts for both the volume of the receiving water and the flow contributed through the pour point. A DPV expressed as a concentration may be based on a model or TMDL or may reflect a TN or TP level that corresponds to a TN, TP, or chlorophyll a concentration that protects the lake.

Contributions of TN and/or TP from sources in stream tributaries upstream of the point of entry are accountable to the DPV because the water quality in the stream tributaries must result in attainment of the DPV at the pour point into the lake. The spatial allocation of load within the watershed is an important accounting step to ensure that the DPV is achieved at the point of entry into the lake. How the watershed load is allocated may differ based on watershed characteristics and existing sources (e.g., areas that are more susceptible to physical loss of nitrogen; location of towns, farms, and dischargers), so long as the DPV is met at the point of entry into the downstream lake. Where additional information is available, watershed modeling could be used to develop allocations that reflect hydrologic variability and other water quality considerations. For protection of the downstream lake, what is important is an accounting for nutrient loadings on a watershed scale that results in meeting the DPV at the point of entry into the downstream lake.

The final rule provides that additional DPVs may be established in upstream locations to represent sub-allocations of the total allowable loading or concentration. Such sub-allocations may be useful where there are differences in hydrological conditions and/or sources of TN and/or TP in different parts of the watershed. The rule specifies that DPVs apply to stream tributaries up to the point of reaching a waterbody that is not a stream as defined in the rule (e.g., up to reaching another lake in a "nested" or chain of lakes situation). The rule also includes an option, however, to establish a DPV to account for a larger watershed area in a modeling context. Establishing DPVs that apply to a larger watershed may be useful to address a situation where the water that is furthest downstream in a watershed is also the water that is most sensitive to nitrogen/phosphorus pollution. That situation may require a more equitable distribution, across the larger watershed, of the load that protects the most sensitive waterbody.

Where multiple tributaries enter a lake, the total allowable loading to the lake may be distributed among the tributaries for purposes of DPV calculation in any manner that results in meeting the total allowable loading for the lake, remembering that those tributaries are also subject to the instream protection value established for the tributaries.

Where sufficient data and information are available, DPVs may be established through application of the BATHTUB model. BATHTUB applies empirical models to morphometrically complex lakes and reservoirs. The model performs steady-state water and nutrient balance calculations, uses spatially segmented hydraulic networks, and accounts for advective and diffusive transport of nutrients. When properly calibrated and applied, BATHTUB predicts nutrient-related water quality conditions such as TP, TN, and chlorophyll a concentrations, transparency, and hypolimnetic oxygen depletion rates. The model can apply to a variety of lake sizes, shapes and transport characteristics. A high degree of flexibility is available for specifying model segments as well as multiple influent streams. Because water quality conditions are calculated using relationships derived from data specific to each lake, BATHTUB accounts for differences between lakes, such as the rate of internal loading of phosphorus from bottom sediments. The above descriptive information is summarized from available technical references that also describe the model and its applications in greater detail.[138,139,140] EPA believes BATHTUB is appropriate for DPV calculations because BATHTUB can represent a number of site-specific variables that may influence nutrient responses and can estimate both TN and TP concentrations at the pour points to protect the receiving lake. BATHTUB has been previously used for lake water quality management purposes, such as the development of TMDLs in states, including Florida. This model was selected because it does not have extensive data requirements, yet it provides for the capability to be calibrated based on observed site-specific lake data and it provides for reliable estimates that will ensure the protection of downstream lakes.

EPA's final rule also specifically authorizes FDEP or EPA to use a model other than BATHTUB when either FDEP or EPA determines that it would be appropriate to use another scientifically defensible modeling approach that results in the protection of downstream lakes. While BATHTUB is a peer-reviewed and versatile model, there are other models that, when appropriately calibrated and applied, can offer additional capability to address complex situations with an even greater degree of site-specificity. Adopted and approved TMDLs may contain sufficient information to support derivation of a DPV when the TMDL is based on relevant data, defensible science, and accurate analysis.

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[138] Walker, W.W., 1981. *Empirical Methods for Predicting Eutrophication in Impoundments; Report 1, Phase I: Data Base Development*. Technical Report E–81–9. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
[139] Walker, W.W., 1982. *Empirical Methods for Predicting Eutrophication in Impoundments; Report 2, Phase II: Model Testing.* Technical Report E–81–9. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
[140] Walker, W.W., 1999. *Simplified Procedures for Eutrophication Assessment and Prediction: User Manual*; Instruction Report W-96-2. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, M.S.

As discussed in more detail in the Agency's August 2010 Supplemental Notice of Data Availability and Request for Comment on this issue, one example of an alternative model that FDEP or EPA might consider using for particularly complex site-specific conditions is the Water Quality Analysis Simulation Program (WASP) model. This model allows users to conduct detailed simulations of water quality responses to natural and manmade pollutant inputs. WASP is a dynamic compartment-modeling program for aquatic systems, including both the water column and the underlying benthos. WASP allows the user to simulate systems in 1, 2, or 3 dimensions, and a variety of pollutant types. The model can represent time varying processes of advection, dispersion, point and diffuse mass loading, and boundary exchange. WASP also can be linked with hydrodynamic and sediment transport models that can provide flows, depths, velocities, temperature, salinity and sediment fluxes. The above summary information as well as additional technical information may be found at http://www.epa.gov/athens/wwqtsc/html/wasp.html. Like BATHTUB, WASP has also been previously used for lake water quality management purposes, such as TMDLs, nationally and in the State of Florida. This model is different from BATHTUB because it does have extensive data requirements that allow for the capability to be finely calibrated based on observed site-specific lake data, but is similar to BATHTUB in that it also provides for reliable estimates that will ensure the protection of downstream lakes.

EPA is finalizing a provision in this section of the rule for situations where data are not readily available to derive TN and/or TP DPVs using BATHTUB or another scientifically defensible model. In that situation, the rule describes how DPVs are determined where the downstream lake is attaining the lake criteria and where the downstream lake is either not assessed or is impaired.

Where sufficient information is not available to derive TN and/or TP DPVs using BATHTUB or another scientifically defensible technical model and the lake attains the applicable criteria, the DPVs would be the associated ambient instream levels of TN and/or TP at the point of entry into the lake. As long as the TN and TP concentrations necessary to support a balanced natural population of aquatic flora and fauna in the downstream lake are maintained in the inflow from streams, this approach will provide adequate protection of downstream lakes and would be used as the applicable DPVs in the absence of readily available data to support derivation of TN and TP DPVs using BATHTUB or another scientifically defensible technical model such as WASP.

EPA's final rule provides that when the DPV is based on the ambient condition associated with attainment of criteria in the downstream lake, degradation in water quality from those established levels would be considered impairment, unless the State or EPA revises the DPV using a modeling approach or TMDL to show that higher levels of nutrient contribution from the tributaries would still result in attainment of applicable lake criteria. This provision is not intended to limit growth and/or development in the watershed, nor intended to maintain current conditions regardless of further analysis. Rather this provision is intended to ensure that WQS are not only restored when found to be impaired, but are in fact maintained when found to be attained, consistent with the goals of the Clean Water Act. Higher levels of TN and/or TP may be allowed in such watersheds where it is demonstrated that such higher levels will fully protect the lake's WQS.

Where sufficient information is not available to derive TN and/or TP DPVs using BATHTUB or another scientifically defensible technical model and the lake does not attain the applicable TN, TP, and/or chlorophyll a criteria or is un-assessed, lake criteria values for TN and/or TP are to be used as the DPVs. EPA believes that this approach is protective because the TN and TP concentrations entering the lake are unlikely to need to be lower than the criterion concentration necessary to be protective of the lake itself.

(g) Stressor-Response Approach

In deriving the final criteria for lakes, EPA has relied on a stressor-response approach which has been well documented and developed in a number of different contexts.[141,142,143] Stressor-response approaches estimate the relationship between nitrogen/phosphorus concentrations and a response measure that is either directly or indirectly related to the designated use (in this case, chlorophyll a as a measure of attaining a balanced natural population of aquatic flora and fauna). Then, concentrations that support the designated use can be derived from the estimated relationship. In the case of Florida, the use of this approach is supported by a substantial Florida-specific database of high quality information, sound scientific analysis and technical evaluation.

The effects of nitrogen/phosphorus pollution are manifested in lakes in a variety of ways and are well-documented.[144] [145] [146] [147] A common effect of nitrogen/phosphorus

[141] USEPA. 2000a. *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs.* EPA-822-B-00-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
[142] USEPA. 2000b. *Nutrient Criteria Technical Guidance Manual: Rivers and Streams.* EPA-822-B-00-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.
[143] USEPA. 2008. *Nutrient Criteria Technical Guidance Manual: Wetlands.* EPA-822-B-08-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

[144] Lee, G. F., W. Rast, R. A. Jones. 1978. Eutrophication of water bodies: Insights for an age-old problem. *Environmental Science and Technology* 12: 900-908.
[145] Carlson R.E. 1977. A trophic state index for lakes. *Limnology and Oceanography* 22:361-369.

pollution in lakes is the over-stimulation of algal growth resulting in algal blooms, which can cause changes in algal and animal assemblages due to adverse changes in important water quality parameters necessary to support aquatic life. Algal blooms can decrease water clarity and aesthetics, which in turn can affect the suitability of a lake for primary (e.g., swimming) and secondary (e.g., boating) contact recreation. Algal blooms can adversely affect drinking water supplies by releasing toxins, interfering with disinfection processes, or requiring additional treatment. Algal blooms can adversely affect biological process by decreasing light availability to submerged aquatic vegetation (which serves as habitat for aquatic life), degrading food quality and quantity for other aquatic life, and increasing the rate of oxygen consumption.

D. Numeric Criterion for the State of Florida's Springs

(1) Final Rule

EPA defines "spring" as a site at which ground water flows through a natural opening in the ground onto the land surface or into a body of surface water. This definition is drawn from the U.S Geological Survey, Circular 1137.[148] This definition is not intended to include streams that flow in a defined channel that have some groundwater baseflow component. EPA recognized that groundwater-surface water interactions in Florida are complex and that FDEP will need to make site-specific determinations about whether water is subject to the stream criteria or the springs

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[146] Smith, V.H., G.D. Tilman, and J.C. Nekola. 1999. Eutrophication: impacts of excess nutrient inputs on freshwater, marine, and terrestrial ecosystems. *Environmental Pollution* 100: 179-196.
[147] Smith, V.H., S.B. Joye, and R.W. Howarth. 2006. Eutrophication of freshwater and marine ecosystems. *Limnology and Oceanography* 51:351-355.
[148] Schiffer, Donna M. 1998. *Hydrology of Central Florida Lakes - A Primer.* U.S Geological Survey in cooperation with SJWMD and SFWMD: Circular 1137.

criterion. EPA is promulgating the numeric criterion for nitrate+nitrite for Florida's springs classified as Class I or III waters under Florida law (Section 62-302.400, F.A.C.):

> The applicable nitrate (NO_3^-)+Nitrite (NO_2^-) is 0.35 mg/L as an annual geometric mean, not to be exceeded more than once in a three-year period

(2) <u>Background and Analysis</u>

<u>(a) Derivation of Nitrate+Nitrite Criterion</u>

In its January proposal, EPA proposed a nitrate+nitrite criterion of 0.35 mg/L for springs and clear streams that would support balanced natural populations of aquatic flora and fauna in springs. EPA proposed criteria for nitrate+nitrite because one of most significant factors causing adverse changes in spring ecosystems is the pollution of groundwater, principally with nitrate+nitrite, resulting from human land use changes, cultural practices, and significant population growth.[149] [150]

EPA based its proposed criterion on multiple lines of stressor-response evidence, which included controlled, laboratory-scale experimental data and analysis of field-based data. EPA's first line of evidence is stressor-response data from controlled laboratory experiments, which studied the growth response of algae in springs to different concentrations of nitrate+nitrite. EPA found in its review of comprehensive surveys[151]

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[149] Katz, B.G., H.D. Hornsby, J.F. Bohlke and M.F. Mokray. 1999. *Sources and chronology of nitrate contamination in spring water, Suwannee River Basin, Florida.* Water-Resources Investigations Report 99-4252. U.S. Geological Survey, Tallahassee, FL. Available electronically at: <http://fl.water.usgs.gov/PDF_files/wri99_4252_katz.pdf>.

[150] Brown M.T., K. Chinners Reiss, M.J. Cohen, J.M. Evans, P.W. Inglett, K. Sharma Inglett, K. Ramesh Reddy, T.K. Fraze, C.A. Jacoby, E.J. Phlips, R.L. Knight, S.K. Notestein, R.G. Hamann, and K.A. McKee. 2008. *Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems.* University of Florida, Gainesville, Florida. Available electronically at: <http://www.dep.state.fl.us/springs/reports/files/UF_SpringsNutrients_Report.pdf>. Accessed October 2010.

[151] Pinowska, A., R. J. Stevenson, J. O. Sickman, A. Albertin, and M. Anderson. 2007a. *Integrated interpretation of survey for determining nutrient thresholds for macroalgae in Florida Springs: Macroalgal relationships to water, sediment and macroalgae nutrients, diatom indicators and land use.* Florida Department of Environmental Protection, Tallahassee, FL.

[152]and a study[153] of 29 Florida springs at over 150 sampling sites, conducted on behalf of FDEP over three years, that two nuisance algal taxa, the cyanobacterium *Lyngbya wollei* and the macroalgae *Vaucheria sp.*, were the most commonly occurring taxa. The authors of the study conducted controlled laboratory experiments, which tested the growth response of *Lyngbya wollei* and *Vaucheria sp.* to different doses of nitrate+nitrite. They found that *Lyngbya wollei* and *Vaucheria sp.* growth rates increased in response to increased doses of nitrate+nitrite and that most of their highest growth rates were reached at and above 0.23 mg/L nitrate+nitrite. EPA interpreted the results from these studies as strong empirical evidence of a stressor-response relationship between nuisance algae and nitrate+nitrite and further indicated specific concentrations above which undesirable growth of nuisance algal may be likely to occur.

In addition to the laboratory-based experimental evidence, EPA reviewed information compiled by FDEP in its assessment of limits to restore springs and protect them from excess algal growth.[154] [155] The second line of evidence was based on data collected from *in-situ* algal monitoring and long-term field surveys in rivers FDEP considered to exhibit similar aquatic conditions to springs (e.g., algal communities, water clarity, and proportion of flow coming from a spring). EPA found additional stressor-

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[152] Stevenson, R.J., A. Pinowska, and Y.K. Wang. 2004. *Ecological Condition of Algae and Nutrients in Florida Springs.* Florida Department of Environmental Protection, Tallahassee, FL.
[153] Pinowska, A., R. J. Stevenson, J. O. Sickman, A. Albertin, and M. Anderson. 2007b. *Integrated interpretation of survey and experimental approaches for determining nutrient thresholds for macroalgae in Florida Springs: Laboratory experiments and disturbance study.* Florida Department of Environmental Protection, Tallahassee, FL.
[154] Gao, X. 2008. *Nutrient TMDLs for the Wekiva River (WBIDs 2956, 2956A, and 2956C) and Rock Springs Run (WBID 2967).* Florida Department of Environmental Protection, Division of Water Resource Management, Tallahassee, FL.
[155] Hallas, J.F. and W. Magley. 2008. *Nutrient and Dissolved Oxygen TMDL for the Suwannee River, Santa Fe River, Manatee Springs (3422R), Fanning Springs (3422S), Branford Spring (3422J), Ruth Spring (3422L), Troy Spring (3422T), Royal Spring (3422U), and Falmouth Spring (3422Z).* Florida Department of Environmental Protection, Bureau of Watershed Management , Tallahassee, FL.

response evidence in an analysis[156] based on over 200 algal samples collected from 13 different algal monitoring stations along the Suwannee, Santa Fe, and Withlacoochee Rivers from 1990 to 1998. The analysis examined algal growth response over a range of nitrate+nitrite concentration. Results indicated a sharp increase in algal abundance and biomass above 0.4 mg/L nitrate+nitrite.

EPA concluded the two different lines of stressor-response evidence point to a nitrate+nitrite concentration of 0.35 mg/L that would prevent excess algal growth and be supportive of balanced natural populations of aquatic flora and fauna in Florida springs. This concentration is higher than that observed in laboratory-scale experiments that may not be closely representative of reference spring sites in Florida, but lower than the concentration that was associated with changes in the balance of natural populations of aquatic flora and fauna observed in an analysis of field data. EPA believes a nitrate+nitrite criterion set at 0.35 mg/L represents an appropriate and reasonable balance of the scientific evidence.

EPA received a number of comments regarding EPA's proposed criterion for springs, including concerns that the biological responses observed in the field were not representative of all springs in Florida. EPA disagrees with these commenters who suggested that the observed effects in the field are not sufficient evidence to support numeric criteria derivation in springs. The algal taxa, *Lyngbya sp.* and *Vaucheria sp.*, are representative taxa found in Florida springs. In fact, *Lyngbya* and *Vaucheria* are the most

[156] Niu, X.-F. 2007. Appendix B. Change Point Analysis of the Suwannee River Algal Data. *In* Gao, X.. 2008. *Nutrient TMDLs for the Wekiva River (WBIDs 2956, 2956A, and 2956C) and Rock Springs Run (WBID 2967).* Florida Department of Environmental Protection, Division of Water Resource Management Tallahassee, FL.

commonly observed macroalgae in Florida springs.[157] Thus, the Agency considers the biological responses of these representative taxa observed in the field and in laboratory experiments to be ecologically meaningful and indicative of an adverse biological response to elevated nitrate+nitrite concentrations above 0.35 mg/L.

EPA also received comment that the proposed nitrate+nitrite criterion was inappropriately applied to all clear streams within the State. After considering these comments, EPA concluded that clear streams are more appropriately addressed as part of the regionalized reference approach that is supported by a broader range of stream monitoring data as discussed above. Therefore, EPA has decided not to finalize the springs nitrate+nitrite criterion in clear streams because EPA considers the numeric criteria it is finalizing in this rule for streams in the five NWRs, which includes clear streams, to be adequately protective and scientifically defensible. These systems will also be protected from excess nitrogen from groundwater by the nitrate+nitrite criteria applicable in the springs that flow into them; thus, additional nitrate+nitrite criteria are not needed.

In this final rule, EPA is finalizing nitrate+nitrite criterion for springs with a magnitude of 0.35 mg/L. For more information regarding the springs criterion, please refer to EPA's Final Rule TSD for Florida's Inland Waters, Chapter 3: Methodology for Deriving U.S. EPA's Criteria for Springs located in the record for this final rule.

(b) Duration and Frequency

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[157] Stevenson, R.J., A. Pinowska, and Y.K. Wang. 2004. *Ecological Condition of Algae and Nutrients in Florida Springs.* Florida Department of Environmental Protection, Tallahassee, FL.

EPA proposed a nitrate+nitrite criterion duration as an annual geometric mean with a criterion frequency of not to be exceeded more than once in three years. EPA also took comment on alternative durations, such as a monthly geometric mean, and alternative frequencies, such as a not to be exceeded more than 10% of the time. EPA considered that the timescales of the algal responses in the laboratory experiments (i.e., 21 to 28 days) might support a shorter duration over which biological response to nitrate+nitrite could occur. However, EPA found in its review of springs data and information that nitrate concentrations can be variable from month to month, and this intra-annual variability was not necessarily associated with impairment of the designated use. Therefore, to account for intra-annual variability, EPA chose to express the nitrate+nitrite criterion for springs on an annual basis. Comments included a suggestion to express the frequency component of the criterion as "not to be exceeded during a three year period as a three year average." However, EPA is concerned that cumulative effects of exposure may manifest themselves in shorter periods of time than three years. This is because springs tend to be clear which provides the opportunity for fast growing nuisance algal species to quickly utilize the excess nitrogen. When nuisance algae species grow prolifically, they outcompete and replace native submerged aquatic vegetation. Thus, more frequent exceedances of the criterion-magnitude will not support a balanced natural population of aquatic flora and fauna in springs because submerged aquatic vegetation can be lost quickly from the effects of nitrate+nitrite pollution, but can take many years, if not decades, to recover.[158] For these reasons, EPA is finalizing the proposed duration

[158] Duarte, C.M. 1995. Submerged aquatic vegetation in relation to different nutrient regimes. *Ophelia: International Journal of Marine Biology* 41: 87–112.

and frequency of an annual geometric mean not to be exceeded more than once in three years.

E. Applicability of Criteria When Final

(1) Final Rule

This final rule is effective 15 months after publication in the Federal Register, except for the Federal site-specific alternative criteria (SSAC) provision of section 131.43(e), which is effective 60 days after publication in the Federal Register. This rule will apply in addition to any other existing CWA-effective criteria for Class I or Class III waters already adopted and submitted to EPA by the State (and for those adopted and submitted to EPA after May 30, 2000, approved by EPA). FDEP establishes its designated uses through a system of classes and Florida waters are designated into one of several different classes. Class III waters provide for healthy aquatic life and safe recreational use. Class I waters include all the protection of designated uses provided for Class III waters, and also include protection for designated uses related to drinking water supply. See Section 62-302.400, F.A.C. Class I and III waters, together with Class II waters that are designated for shellfish propagation or harvesting, comprise the set of Florida waters that are assigned designated uses that include the goals articulated in Section 101(a)(2) of the CWA (i.e. protection and propagation of fish, shellfish, and wildlife and recreation in and on the water).[159] Class II waters will be covered under EPA's forthcoming rulemaking efforts for estuarine and coastal waters. EPA is promulgating numeric criteria for lakes and flowing waters, consistent with the terms of the Agency's Consent Decree, that Florida has designated as Class I or Class III.

[159] Because FL classifications are cumulative, Class I waters include protections for aquatic life and recreation, in addition to protecting drinking water supply use.

In terms of final rule language, EPA has removed regulatory provisions at 40 CFR 131.43(c)(2)(iii) and 131.43(c)(4)-(6) because these criteria (criteria for protection of downstream estuarine waters, flowing waters in the South Florida Region, and estuaries and coastal waters) will be included with the Agency's 2011 proposed rulemaking for estuarine and coastal waters. For water bodies designated as Class I and Class III predominately fresh waters, EPA's final numeric criteria will be applicable CWA water quality criteria for purposes of implementing CWA programs, including permitting under the NPDES program, as well as monitoring, assessments, and listing of impaired waters based on applicable CWA WQS and establishment of TMDLs.

In this final rule, the Agency has also deleted proposed regulatory provisions at 40 CFR 131.43(d)(2)(i)-(iii) on mixing zones, design flow, and listing impaired waters. EPA notes that the final criteria in this rule are subject to Florida's general rules of applicability in the same way and to the same extent as are other State-adopted and/or federally-promulgated criteria for Florida waters. (See 40 CFR 131.43(d)(2)). States have discretion to adopt policies generally affecting the application and implementation of WQS. (See 40 CFR 131.13). There are many applications of criteria in Florida's water quality programs. Therefore, EPA believes that it is not necessary for purposes of this final rule to enumerate each of them, nor is it necessary to restate any otherwise applicable requirements. This broad reference to general rules of applicability provides sufficient coverage and has been used without further elaboration in EPA's most recent criteria promulgation applicable to state waters.[160] The Agency is also concerned that addressing some applications in this final regulations and not others may create

[160] See 40 CFR 131.41(d)(2)

unnecessary and unintended questions, confusion, and uncertainty about the overall application of Florida's general rules.

(2) Summary of Major Comments

Regarding application of criteria, several commenters asked EPA to provide more detail on how waters would be monitored, whether EPA would use the rotating basin approach that FDEP uses, how EPA would enforce the criteria, and how specific entities would be affected. In response, EPA points out that WQS generally, and EPA's rule specifically, do not specify how to achieve those WQS. As discussed above, the State of Florida will determine how best to meet these federal numeric criteria in a way that most effectively meets the needs of its citizens and environment. FDEP is the primary agency responsible for implementing CWA programs in the State of Florida. As such, EPA defers to FDEP in administering applicable CWA programs consistent with the CWA and EPA's implementing regulations. EPA has worked closely with the State to address nitrogen/phosphorus pollution problems in Florida. EPA will continue to collaborate with FDEP as the State implements EPA's federally-promulgated numeric criteria.

Several commenters asserted that Florida would not be able to implement EPA's federally-promulgated numeric criteria without first adopting the criteria into State law. EPA does not believe that, in order to implement EPA's federally-promulgated numeric criteria, FDEP is required to adopt EPA's rule into State law. EPA's numeric criteria for Florida's lakes and flowing waters will be effective for CWA purposes 15 months after publication of the final criteria in the Federal Register and will apply in addition to any other existing CWA-effective criteria for Class I or Class III waters already adopted by the State and submitted to EPA (and for those adopted after May 30, 2000, adopted and submitted by FDEP and approved by EPA). FDEP retains the authority to move forward with its own rulemaking process at any time to establish State numeric criteria and to submit such criteria to EPA for review and approval under section 303(c) of the CWA. If FDEP does not adopt State numeric criteria, the Department retains its current authority to implement federally promulgated criteria through the State's narrative or "free from" criteria. FDEP's General Counsel has confirmed, in a 2005 letter to EPA that the State's water quality criteria regulations for surface waters, set out at Section 62-302.500, F.A.C., provide authority for the Department to address and implement EPA promulgated criteria in CWA programs.[161]

Several commenters suggested that EPA incorporate water quality targets from adopted and approved TMDLs as site-specific criteria (SSAC) for specific waters in lieu of the more broadly applicable criteria promulgated by EPA. These commenters asserted that the TMDL values better reflect site-specific needs and were already serving as the basis for many pollutant reduction actions, including Basin Management Action Plans (BMAPs). Commenters expressed concern that actions to implement the TMDLs would be curtailed or delayed because of the uncertainty whether additional reductions might be required, and that both the Federal SSAC process (described in Section V.C of this notice) and use attainability analysis (UAA)/variance process would be too burdensome and time-consuming to be effective alternatives. Similarly, some commenters requested that specific restoration projects be exempted from EPA's criteria or that EPA employ a process for delaying application of the criteria where a water is under study.

[161] FDEP. 2005, January 5. "Petition to Withdraw Florida's NPDES Authority of March 19, 2004 Response to EPA Letter of December 8, 2004." Letter from George Munson, General Counsel.

EPA's position is that EPA-established or approved TMDLs may provide sufficient information to support a site-specific alternative criterion, but that such a demonstration should be made after considering and taking into account any new relevant information available, including but not limited to the substantial analysis and data considered and made a part of the record for this final rule. For this reason, EPA considers the Federal SSAC procedure to be the appropriate mechanism for determining whether any specific TMDL target should be adopted as a SSAC. For restoration projects or waters under study, a State-issued variance may also be an appropriate vehicle for regulatory flexibility.

Several commenters requested clarification regarding the effect of EPA's federally-promulgated numeric criteria on existing TMDLs. A TMDL is established at levels necessary to attain and maintain "applicable narrative and numerical water quality standards." (See 40 CFR 130.7(c)(1)). A TMDL addressing a narrative WQS requires translating the narrative WQC into a numeric water quality target (e.g., a concentration). TMDLs are not implemented directly but through other programs such as NPDES permitting and non-point source programs. For example, a NPDES permitting authority must ensure at the time of permit issuance that WQBELs are consistent with the assumptions and requirements of any available wasteload allocation (WLA) for that discharge contained in a TMDL, as well as derive from and comply with all applicable WQS. (See 40 CFR 122.44(d)(1)(vii)(A) and (B)).

Some existing TMDLs translate the same portion of Florida's narrative criterion, Subsection 62-302.530(47)(b), F.A.C., as EPA has translated to derive its numeric criteria, e.g. no imbalance in natural populations of aquatic flora and fauna. The permitting authority must ensure that any permit issuance or re-issuance include WQBELs that are as stringent as necessary to meet the promulgated numeric criteria, pursuant to CWA section 301(b)(1)(C) and 40 CFR 122.44(d)(1). These existing TMDLs will likely include information that is relevant and helpful in evaluating necessary discharge limitations, such as consideration of other sources of the pollutant and hydrodynamics of the waterbody. EPA recommends that existing TMDLs that are based on translation of Subsection 62-302.520(47)(b), F.A.C. ("no imbalance in natural population of aquatic flora and fauna"), undergo a two-part evaluation. The first step is to assess whether the waterbody is still, in fact, water quality-limited (impaired) using the new numeric WQC. If the waterbody is still water quality-limited, then a second evaluation should be conducted to determine whether the existing TMDL based on the narrative is sufficient to meet the new numeric criterion, and in turn, whether or not it may be appropriate to revise the TMDL. The State may also wish to pursue submitting the TMDL water quality target derived by translating the narrative for determination as a Federal SSAC.

Other existing TMDLs translate another part of Florida's narrative nutrient criterion, Subsection 62-302.530(47)(a) F.A.C. This provision provides that nitrogen/phosphorus pollution shall be limited so as to prevent violation of another Florida WQS. Where a TMDL water quality target was developed as a translation of this part of Florida's narrative nutrient criterion (for example, that amount of nitrogen/phosphorus that would not cause excursions of Florida's dissolved oxygen WQS), the appropriate WQBEL is the more stringent result of applying the TMDL WLA or the promulgated numeric criteria.

It is important to keep in mind that no TMDL will be rescinded or invalidated as a result of this final rule, nor does this final rule have the effect of withdrawing any prior EPA approval of a TMDL in Florida. Neither the CWA nor EPA regulations require TMDLs to be completed or revised within any specific time period after a change in water quality standards occurs. TMDLs are typically reviewed as part of states' ongoing water quality assessment programs. Florida may review TMDLs at its discretion based on the State's priorities, resources, and most recent assessments. NPDES permits are subject to five-year permit cycles, and in certain circumstances are administratively continued beyond five years. In practice, states often prioritize their administrative workload in permits. This prioritization could be coordinated with TMDL review.

EPA-established or approved TMDLs may provide sufficient information to support a site-specific alternative criterion (SSAC). The SSAC path is one that local governments or businesses may want to pursue where they desire assurance that the TMDL will become the applicable numeric criteria in advance of the State's review of the TMDL or where substantial investments in pollution controls are predicated on water quality based effluent limits, and local governments or businesses need long-term planning certainty before making these investments. The demonstrations supporting SSAC requests for TMDLs should reflect any new relevant information that has become available since the TMDL was developed, including but not limited to the substantial analysis and data considered and made a part of the record for this final rule. For this reason, EPA considers the Federal SSAC procedure to be the appropriate mechanism for determining whether any specific TMDL target should replace the otherwise applicable numeric criteria in this final rule. EPA will work cooperatively with entities requesting

SSAC to expedite consideration of TMDL targets and associated TN and/or TP levels as Federal SSAC for purposes of this final rule. As explained in the preamble to the final rule, EPA has delayed the effective date of its numeric criteria for 15 months. EPA encourages any entity wishing to have EPA adopt a particular TMDL target as a SSAC to submit such TMDL to EPA for consideration as a SSAC as soon as possible during these 15 months. When submitting such requests to EPA, such entity must copy FDEP so that FDEP may provide any comments it has to EPA. EPA would then review the SSAC application and prepare the SSAC for public notice once this final rule takes effect. Following this process, the TMDL target, if scientifically and technically justified, could replace the otherwise applicable numeric criteria within a very short period of time after this final rule takes effect. Following any such establishment of site-specific numeric criteria, the State of Florida may review and/or revise the TMDL at its discretion based on the changed criteria and the State's priorities, resources, and most recent assessments. EPA is still required to approve any changes to a previously approved TMDL.

EPA is extending the effective date of this rule, with the exception of the site-specific alternative criteria provision for reasons discussed below, for 15 months to allow time for the Agency to work with stakeholders and FDEP on important implementation issues and to help the public and all affected parties better understand the final criteria and the bases for those criteria. EPA solicited comment on the rule's proposed effective date in the preamble to the proposed rule (75 Federal Register 4216 (January 26, 2010)) and received many comments requesting that EPA delay the effective date of the final criteria. A range of commenters suggested delayed effective dates from several months to several years, including linking the effective date of this rule with the forthcoming estuaries and coastal waters rule to allow closer coordination of the related parts of the two rulemakings. EPA does not agree with some commenters that such an extensive delay is necessary. However, EPA does believe, as discussed below, that these criteria present a unique opportunity for substantial nitrogen and phosphorus loadings reductions in the State that would be greatly facilitated and expedited by strongly coordinated and well-informed stakeholder engagement, planning, and support before a rule of this significance and broad scope begins to take effect and be implemented through the State's regulatory programs.

EPA believes that it is critical, before the rule becomes effective, to engage and support, in full partnership with FDEP, the general public, stakeholders, local governments, and sectors of the regulated community across the State in a process of public outreach, education, discussion, and constructive planning. EPA solicited comment on the proposed rule in January 2010 and has carefully considered those comments, which numbered more than 22,000, in developing the final rule. However, the nature of rule development has kept EPA from publicly discussing the contents of the final rule until the rule development process, itself, was complete. An investment in outreach, information, coordination, technical assistance and planning following this action may result in far more effective, expeditious, and ultimately effective implementation of appropriate and badly needed nutrient pollution reduction measures leading to public health and environmental improvements, the goals of this rule.

EPA recognizes that in order for FDEP to effectively implement the final criteria for nutrients, it needs to plan how to best address the criteria in State programs such as the permits, waterbody assessment and listing, and TMDL programs. The State may need to develop implementation plans and guidance for affected State regulatory programs, train employees, and educate the public and regulated communities. EPA will work with FDEP as a partner over the next 15 months as FDEP takes the steps necessary to implement the new standards in an orderly manner. Moreover, EPA believes it would be useful and beneficial to have discussions with State and local officials, organizations of interested parties, and with the general public to explain the final rule, the bases for that rule, and respond to implementation questions and concerns.

Several stakeholder groups have provided comments about particular implementation issues that will require time to address before effective implementation of the final rule can be achieved. Florida has a unique local government administration structure that includes county, municipal, and special districts, all which have overlapping authorities with respect to managing water resources. The special districts provide water resource management oversight of flood control and water supply services. These multiple layers of government authorities will require time to coordinate responsibilities. An additional concern for local governments is their budgeting process. Most local governments operate on a fiscal year cycle of October to September; thus they have recently begun a new fiscal year. These local governments engage in multi-year budget planning and have already begun laying the budget foundations for up to five successive years. EPA recognizes that Florida's agricultural community has implemented a variety of best management practices (BMPs) that are effective at reducing nitrogen and phosphorus pollution from farms. However, Florida's agriculture industry is composed of a large number of small farms (about 17,000) that have average annual sales of less than $10,000 each, and most do not receive any form of government assistance.[162] EPA anticipates that the Natural Resource Conservation Service and the University of Florida/Institute of Food and Agricultural Sciences Extension will need time to educate those not currently enrolled in nutrient management and BMP programs to control nutrient runoff.

A delayed effective date of 15 months for the criteria will also provide time for interested parties to pursue site-specific alternative criteria (SSAC) for a given waterbody. EPA's final rule and associated preamble describe the process by which any entity may seek a SSAC. A decision to seek a SSAC could not be made, however, until interested parties know what the applicable criteria would be. The Federal SSAC portion of the rule, § 131.43(e), goes into effect 60 days after publication of this rule to allow this important work to proceed in advance of the effective date for the remaining provisions of the rule. During the 15 months before the criteria become effective, parties may evaluate the final criteria, decide whether they want to seek a SSAC, and, if so, submit their SSAC application materials to EPA, copying FDEP. EPA could then review the application, and if complete, public notice the application and technical support document pursuant to the SSAC provision in the final rule. If, after reviewing public comment, EPA believes that the SSAC application meets the requirements of this rule, EPA could determine that such SSAC apply to the specific waterbody in lieu of the

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[162] NASS. 2009a. 2007 Census of agriculture Florida state and county data, Volume 1, Geographic Area Series, Part 9, AC-07-A-9, Updated December 2009, National Agricultural Statistics Service, U.S. Department of Agriculture, Washington, DC. http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_1_State_Level/Florida/flv1.pdf (retrieved July 15, 2010).

NASS. 2009. 2009 state agriculture overview - Florida. U.S. Department of Agriculture, National Agricultural Statistics Service, Washington, DC, http://www.nass.usda.gov/Statistics_by_State/Ag_Overview/AgOverview_FL.pdf (retrieved June 17, 2010).

criteria in the final rule, even before the criteria in the final rule become effective due to the earlier effective date of the SSAC provision.

EPA believes that the 15-month period of time between publication in the Federal Register and the effective date of the criteria will ultimately result in attainment of the criteria in an overall shorter period of time. As EPA frequently points out in its guidance and training materials, criteria are not "self-implementing", that is, it takes knowledgeable and experienced professionals to effectively and properly employ the criteria in monitoring and assessment programs, permit limit derivation and expression, nonpoint source (NPS) control strategies, and other program applications. Without time to develop procedures, there is the risk of ineffective implementation that will not meet the underlying objective of this action – to restore and protect Florida's waters from harm caused by nitrogen and phosphorus pollution. Well designed and mapped out NPS control strategies, in particular, will be critical to gain stakeholder trust and participation.

EPA wishes to actively engage in partnership with FDEP to support FDEPs implementation of these new standards, for example by considering applications for site-specific alternative criteria. After careful consideration of time requirements for critical steps, along with recognition of important planning and accounting mechanisms such as fiscal years, and local and county meeting and planning cycles, EPA has determined that a 15-month time period is both reasonable and will allow time for important implementation activities to take place. This 15-month period will allow for a four-month education and outreach rollout to cover the major interest sectors and geographic locations throughout the State of Florida; a three-month period of training and guidance concurrent with data synthesis and analysis to support potential SSAC development; a two-month public comment and response period to allow development of effective guidance, training and possible workshops to run concurrent with SSAC submittals; a three-month period for finalizing guidance materials along with development of rollout strategies (e.g., for NPS control) concurrent with notice and comment of SSAC; and finally a 3-month period for statewide education and training on guidance and contingency planning. In short, the 15 months before the criteria become effective will ensure application of programs to achieve criteria in a manner that makes the most efficient use of limited resources and gains the broadest possible support for timely and effective action upon reaching the effective date of the criteria.

IV. Under What Conditions Will Federal Standards Be Withdrawn?

Under the CWA, Congress gave states primary responsibility for developing and adopting WQS for their navigable waters. (See CWA section 303(a)-(c)). Although EPA is promulgating numeric criteria for lakes and springs throughout Florida and flowing waters outside the South Florida Region, Florida continues to have the option to adopt and submit to EPA numeric criteria for the State's Class I and Class III waters consistent with CWA section 303(c) and implementing regulations at 40 CFR part 131.

Pursuant to 40 CFR 131.21(c), EPA's promulgated WQS are applicable WQS for purposes of the CWA until EPA withdraws those federally-promulgated WQS. Withdrawing the Federal standards for the State of Florida would require rulemaking by EPA pursuant to the requirements of the Administrative Procedure Act (5 U.S.C.551 *et seq*.). EPA would undertake such a rulemaking to withdraw the Federal criteria if and when Florida adopts and EPA approves numeric criteria that fully meet the requirements of section 303(c) of the CWA and EPA's implementing regulations at 40 CFR part 131.

V. Alternative Regulatory Approaches and Implementation Mechanisms

A. Designating Uses

(1) Background and Analysis

Under CWA section 303(c), states shall adopt designated uses after taking "into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish, and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation." Designated uses "shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of [the CWA]." (*See* CWA section 303(c)(2)(A)). EPA's regulation at 40 CFR 131.3(f) defines "designated uses" as "those uses specified in water quality standards for each waterbody or segment whether or not they are being attained." A "use" is a particular function of, or activity in, waters of the United States that requires a specific level of water quality to support it. In other words, designated uses are a state's concise statements of its management objectives and expectations for each of the individual surface waters under its jurisdiction.

In the context of designating uses, states often work with stakeholders to identify a collective goal for their waters that the state intends to strive for as it manages water quality. States may evaluate the attainability of these goals and expectations to ensure they have designated appropriate uses. (*See* 40 CFR 131.10(g)). Consistent with CWA sections 101(a)(2) and 303(c)(2)(A), EPA's implementing regulations specify that states adopt designated uses that provide water quality for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water, wherever attainable. (See 40 CFR 131.10). Where states do not designate those uses, or remove those uses, they must demonstrate that such uses are not attainable consistent with the use attainability analysis (UAA) provisions of 40 CFR 131.10, specifically 131.10(g). States may determine, based on a UAA, that attaining a designated use is not feasible and propose to EPA to change the use to something that is attainable. This action to change a designated use must be completed in accordance with EPA regulations. (See 40 CFR 131.10(g) and (h)). In implementing these regulations, EPA allows grouping waters together in a watershed in a single UAA, provided that there is site-specific information to show how each individual water fits into the group in the context of any single UAA and how each individual water meets the applicable requirements of 40 CFR 131.10(g).

EPA's final numeric criteria for lakes and flowing waters apply to those waters designated by FDEP as Class I (Potable Water Supplies) or Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife). If Florida removes either the Class I and/or Class III designated use for any particular waterbody ultimately affected by this rule, and EPA finds that removal to be consistent with CWA section 303(c) and regulations at 40 CFR part 131, then the federally-promulgated numeric criteria would not apply to that waterbody because it would no longer be designated Class I or III. Instead, any criteria associated with the newly designated use would apply to that waterbody.

(2)Summary of Major Comments

Many commenters took the opportunity to emphasize the need to adhere to the regulations governing the process of modifying or removing a designated use. Some commenters suggested that the process to change a designated use is extremely difficult. EPA's experience is that UAAs may range from simple to complex, depending on a variety of factors, such as the type of waterbody involved, the size of the segment, the use being changed, the relative degree of change proposed for the designated use, the presence of unique ecological habitats, and the level of public interest/involvement in the designated use decision. EPA agrees that, while a UAA is being conducted, the current designated use and corresponding criteria remain in place. In the case of Florida's Class I and Class III flowing waters and lakes, EPA's promulgated numeric criteria will remain the applicable WQS for CWA purposes, including assessments, listings, TMDL development and the issuance of NPDES permits, unless and until the State adopts revised designated uses (with different associated criteria) that are submitted to and approved by EPA under CWA section 303(c).

B. Variances

(1) Final Rule

For purposes of this rule, EPA is promulgating criteria that apply to use designations that Florida has already established. EPA believes that the State has sufficient authority to use its currently EPA-approved variance procedures with respect to a temporary modification of its Class I or Class III uses as it pertains to any federally-promulgated criteria. For this reason, EPA did not propose and is not promulgating an alternative Federal variance procedure.

(2) Background and Analysis

A variance is a temporary modification to the designated use and associated water quality criteria that would otherwise apply to the receiving water.[163] Variances constitute new or revised WQS subject to the substantive requirements applicable to removing a designated use.[164] Thus, a variance is based on the same factors, set out at 40 CFR 131.10(g), that are required to revise a designated use through a UAA. Typically, variances are time-limited (e.g., three to five years), but renewable. Temporarily modifying the designated use for a particular waterbody through a variance process allows a state to limit the applicability of a specific criterion to that water and to identify an alternative designated use and associated criteria to be met during the term of the variance. A variance should be used instead of removal of a use where the state believes the standard can be attained at some point in the future. By maintaining the designated use for all other criteria and dischargers, and by specifying a point in the future when the designated use will be fully applicable in all respects, the state ensures that further progress will be made in improving water quality and attaining the standard. A variance may be written to address a specified geographic area, a specified pollutant or pollutants, and/or a specified pollutant source. All other applicable WQS not specifically modified by the variance would remain applicable (e.g., any other criteria adopted to protect the designated use). State variance procedures, as part of state WQS, must be consistent with the substantive requirements of 40 CFR part 131. Each variance, as a revised WQS, must be submitted to EPA for review pursuant to CWA section 303(c). A variance allows, among other things, NPDES permits to be written such that reasonable progress is

[163] Water Quality Standards Regulation, 40 C.F.R. Part 131: Advance notice of proposed rulemaking. USEPA Fed. Reg. 63:129 (July 7, 1998). p. 36741-36806.
[164] *In re Bethlehem Steel Corporation,* General Counsel Opinion No. 58. March 29, 1977 (1977 WL 28245 (E.P.A. G.C.)).

made[165] toward attaining the underlying standards for affected waters without violating section 402(a)(l) of the Act, which requires that NPDES permits must meet the applicable WQS. (See CWA section 301(b)(1)(C)).

(3) Summary of Major Comments

In response to comments, EPA agrees that variances could be adopted on a multiple-discharger basis and can be renewed so long as the State and EPA concludes that such variances are consistent with the CWA and implementing regulations. In this regard, EPA allows grouping waters together in a watershed in a single variance application, provided that there is site-specific information to show how each individual water fits into the group in the context of any single variance and how each individual water meets the applicable requirements of 40 CFR 131.10(g). EPA disagrees that Florida law, at 403.201(2), F.S., prohibits the State from issuing variances for waters affected by the federally-promulgated numeric criteria. Florida law at 403.201(2), F.S., provides that a variance may not be granted that would result in State requirements that are less stringent than a comparable Federal provision or requirement. As discussed above, a variance is a temporary modification to the designated use and thus to the associated water quality criteria that would otherwise apply to the receiving water. EPA's Federal rule, however, does not promulgate or revise any Florida designated uses. EPA's criteria are intended to protect the Class I and Class III designated uses that Florida already has in place. EPA's criteria do not apply where and when the use is something other than Class I or Class III, as would be the case for a variance. Rather, Florida would establish alternative criteria associated with the variance. Any variance

[165] USEPA. 1994. *Water Quality Standards Handbook: Second Edition*. EPA-823-B-94-005a. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

would constitute a new or revised WQS subject to EPA review and approval pursuant to section 303(c) of the CWA.

C. Site-specific Alternative Criteria

(1) Final Rule

EPA believes that there is benefit in establishing a specific procedure in the Federal rule for EPA adoption of Federal site-specific alternative criteria (SSAC) for the numeric chlorophyll a, TN, TP, and nitrate+nitrite criteria in this rule. In this rulemaking, EPA is promulgating a procedure whereby the Regional Administrator, Region 4, may establish a SSAC after providing for public comment on the proposed SSAC and the supporting documentation. (*See* 40 CFR 131.43(e)). This procedure allows any entity, including the State, to submit a proposed Federal SSAC directly to EPA for the Agency's review and assessment as to whether an adjustment to the applicable Federal numeric criteria is appropriate and warranted. The Federal SSAC process is separate and distinct from the State's SSAC processes in its WQS.

The Federal SSAC procedure allows EPA to determine that a revised site-specific chlorophyll a, TN, TP, or nitrate+nitrite numeric criterion should apply in lieu of the generally applicable criteria promulgated in this final rule where that SSAC is demonstrated to be protective of the applicable designated use(s). The promulgated procedure provides that EPA will solicit public comment on its determination. Because EPA's rule establishes this procedure, implementation of this procedure does not require withdrawal of federally-promulgated criteria for affected water bodies for the Federal SSAC to be effective for purposes of the CWA. EPA has promulgated similar procedures for EPA granting of variances and SSACs in other federally-promulgated WQS.[166]

EPA is aware of concerns expressed by some commenters that a waterbody may exceed the numeric criteria in this rule and still meet Florida's designated uses related to recreation, public health, and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. EPA recognizes that there may be certain situations where additional, new, or more specific data related to the local conditions or biology of a particular waterbody may well support an alternate site-specific numeric criteria which may appropriately be more (or less) stringent than the criteria in this final rule in order to ensure maintenance of instream designated uses and protection of downstream waters. EPA believes that the SSAC process is an appropriate mechanism to address such situations and is committed to acting on Federal SSAC applications intended to address such situations as expeditiously as possible.

The process for obtaining a Federal SSAC includes the following steps. First, an entity seeking a SSAC compiles the supporting data, conducts the analyses, develops the expression of the criterion, and prepares the supporting documentation demonstrating that alternative numeric criteria are protective of the applicable designated use. The "entity" may be the State, a city or county, a municipal or industrial discharger, a consulting firm acting on a behalf of a client, or any other individual or organization. The entity requesting the SSAC bears the burden of demonstrating that any proposed SSAC meets the requirements of the CWA and EPA's implementing regulations, specifically 40 CFR 131.11. Second, if the entity is not the State, the entity must provide notice of the

[166] See 40 CFR 131.33(a)(3), 40 CFR 131.34(c), 40 CFR 131.36(c)(3)(iii), 40 CFR 131.38(c)(2)(v), 40 CFR 131.40(c).

proposed SSAC to the State, including all supporting documentation so that the State may provide comments on the proposal to EPA. Third, the Regional Administrator will evaluate the technical basis and protectiveness of the proposed SSAC and decide whether to publish a public notice and take comment on the proposed SSAC. The Regional Administrator may decide not to publish a public notice and instead return the proposal to the entity submitting the proposal, with an explanation as to why the proposed SSAC application did not provide sufficient information for EPA to determine whether it meets CWA requirements or not. If EPA solicits public comment on a proposed SSAC, upon review of comments, the Regional Administrator may determine that the Federal SSAC is appropriate to account for site-specific conditions and make that determination publicly available together with an explanation of the basis for the decision. The Regional Administrator may also determine that the Federal SSAC is not appropriate and make that determination publicly available together with an explanation of the basis for the decision.

To successfully develop a Federal SSAC for a given lake, stream, or spring, a thorough analysis is necessary that indicates how designated uses are being supported both in the waterbody itself and in downstream water bodies at concentrations of either TN, TP, chlorophyll a, or nitrate+nitrite that are either higher or lower than the federally-promulgated applicable criteria. This analysis should have supporting documentation that consists of examining both indicators of longer-term response to multiple stressors, such as benthic macroinvertebrate health as determined by Florida's Stream Condition Index (SCI), and indicators of shorter-term response specific to nitrogen/phosphorus pollution, such as periphyton algal thickness or water column chlorophyll a concentrations. To pursue a Federal SSAC on a watershed-wide basis, the same types of procedures that EPA used to develop the federally promulgated applicable criteria can be used with further refinements to the categorization of water bodies. For example, an entity could derive alternative instream protective TP and/or TN values using EPA's approach by further sub-delineating the Nutrient Watershed Regions and providing the corresponding data, analysis and documentation to support derivation of an alternative criteria that is protective of the designated use that applies both to the smaller watershed regions as well as to downstream waters. This type of refined reference condition approach is described in EPA guidance manuals[167] and would be consistent with methods used to develop the federally-promulgated criteria for Florida. In developing either a site-specific or watershed-wide Federal SSAC, it is necessary to ensure that values allowed in an upstream segment as a result of a SSAC provide for the attainment and maintenance of the WQS of downstream waters. It will be important to examine a stream system on a broader basis to ensure that a SSAC established for one segment does not result in adverse effects in nearby segments or downstream waters, such as a downstream lake.

This rule specifically identifies four approaches for developing SSAC. The first two approaches are replicating the approaches EPA used to develop stream and lake criteria, respectively, and applying these methods to a smaller subset of waters. The third approach for developing SSAC is to conduct a biological, chemical, and physical assessment of waterbody conditions. The fourth approach for developing SSAC is a general provision for using another scientifically defensible approach that is protective of

[167] USEPA. 2000b. *Nutrient Criteria Technical Guidance Manual: Rivers and Streams.* EPA-822-B-00-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

the designated use. The first two approaches for developing SSAC replicate EPA's methods in deriving the stream and lake criteria set out in this final rule. To understand the necessary steps in this analysis, interested parties should refer to the complete documentation of these methods in the materials included in the rule docket.

The third approach for developing SSAC is to conduct a biological, chemical, and physical assessment of waterbody conditions. This is a more general approach than the replication approaches and would need additional detail and description of supporting rationale in the documentation submitted to EPA. The components of this approach could include, but not be limited to, evaluation of benthic macroinvertebrate health using the Stream Condition Index (SCI), presence or absence of native flora and fauna, chlorophyll _a_ concentrations or periphyton density, average daily dissolved oxygen fluctuation, organic versus inorganic components of total nitrogen, habitat assessment, and hydrologic disturbance. This approach could apply to any waterbody type, with specific components of analysis tailored for the situation. The fourth approach for developing SSAC is a general provision for using another scientifically defensible approach that is protective of the designated use. This provision allows applicants to make a complete demonstration to EPA using methods not otherwise described in the rule or its statement of basis, consistent with 40 CFR 131.11(b)(1)(iii). This approach could potentially include use of mechanistic models or other data and information.

(2) Background and Analysis

A SSAC is an alternative value to criteria set forth in this final rule that would be applied on a watershed, area-wide, or water-body specific basis that meets the regulatory test of protecting the instream designated use, having a basis in sound science, and ensuring the protection and maintenance of downstream WQS. SSAC may be more or less stringent than the otherwise applicable Federal numeric criteria. In either case, because the SSAC must protect the same designated use and must be based on sound science (i.e., meet the requirements of 40 CFR 131.11(a)), there is no need to modify the designated use or conduct a UAA. A SSAC may be appropriate when further scientific data and analyses can bring added precision or accuracy to express the necessary level or concentration of chlorophyll a, TN, TP, and/or nitrate+nitrite that protects the designated use for a particular waterbody.

(3) Summary of Major Comments

Many commenters expressed support for the concept of EPA's proposed SSAC procedure, although many also expressed concerns about the viability, requirements, expense, and time associated with the process. In EPA's proposed rule, the SSAC process was to be initiated by the State submitting a request to EPA. Many commenters were confused about the relationship between the Federal SSAC process and the State's Type 1 and Type 2 SSAC processes, and how the processes relate for purposes of the Federal rule. The Federal SSAC process is separate and independent from the State SSAC processes. A Federal SSAC is established by the Regional Administrator of EPA Region 4 after due notice and comment from the public. To resolve this confusion, and to provide a more direct means for entities other than the State to initiate the SSAC process, EPA's final rule provides that any entity may submit a request for a SSAC directly to the Regional Administrator. The final rule adds a requirement that entities submit proposed SSAC and supporting materials to the State at the same time those materials are submitted to EPA to ensure the State has the opportunity to submit comments to EPA.

As several commenters have pointed out, Florida WQS regulations currently do not authorize the State to adopt a SSAC as State WQS except where natural conditions are outside the limits of broadly applicable criteria established by the State (Section 62-302.800, F.A.C.). However, the State may choose to be the entity that submits a SSAC request to EPA under the Federal process described above and set forth at 40 CFR 131.43(e). There is no requirement that the State go through its own State-level Type 1 or Type 2 SSAC process before submitting a proposed SSAC to EPA for consideration under this rule.

Commenters included suggestions for specific approaches for developing SSAC as well as an "expedited" process for determination as a Federal SSAC. EPA agrees that many of the suggested approaches have merit for purposes of developing SSAC, and has adapted many of the suggestions to provide more information on approaches that would meet the general requirements for protective criteria. Many of the comments regarding an "expedited" process suggested a process where SSAC become effective automatically, without need for EPA review and approval. With the exception of State adjustment of lake criteria within a very specific and limited range accompanied by a specified data set and calculation as discussed in Section III.C(2)(e) above, the Agency does not agree with the view that criteria established in this rule can be revised without documentation and public notice and comment process as outlined above.[168] Another commenter asked

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[168] EPA's criteria allow for one-time site-specific modifications to the promulgated lake criteria, without requiring those modifications to be submitted as SSAC. See 40 CFR 131.43(c)(1)(ii) and Section III.C(2)(e).

about the potential to develop a SSAC on a "watershed-scale." EPA does not see any barrier to conducting such an analysis, where it can be demonstrated that the watershed-scale SSAC is protective for all waters in a particular grouping and meets the requirements of 40 CFR 131.11 and 40 CFR 131.10(b). Many commenters expressed the desire to defer the applicability of promulgated criteria prior to developing a SSAC. The Federal SSAC portion of the rule, § 131.43(e), goes into effect 60 days after publication of this rule to allow this important work to proceed in advance of the effective date of 15 months after publication for the remaining provisions of the rule. The SSAC review process will depend in substantial part on the nature of the SSAC proposal itself: its clarity, substance, documentation, and scientific rigor. Some commenters stated that EPA's requirement that Federal SSAC be scientifically defensible and protective of designated uses is too vague; however, it is the same requirement for criteria in the Federal WQS regulation. (See 40 CFR 131.11). EPA will consider the need for further developing supporting technical guidance in the future if it appears at that time that such guidance would help support the process.

D. Compliance Schedules

(1) Final Rule

Florida has adopted a regulation authorizing compliance schedules. That regulation, Subsection 62-620.620(6), F.A.C., is not affected by this final rule. The complete text of the Florida rules concerning compliance schedules is available at https://www.flrules.org/gateway/RuleNo.asp?ID=62-620.620. Florida is, therefore, authorized to grant compliance schedules, as appropriate, under its rule for WQBELs based on EPA's numeric criteria.

(2) Background and Analysis

A compliance schedule, or schedule of compliance, refers to "a schedule of remedial measures included in a 'permit,' including an enforceable sequence of interim requirements … leading to compliance with the CWA and regulations." (*See* 40 CFR 122.2, CWA section 502(17)). In an NPDES permit, WQBELs are effluent limits based on applicable WQS for a given pollutant in a specific receiving water (*See* NPDES Permit Writers Manual, EPA-833-B-96-003, December, 1996). EPA regulations provide that schedules of compliance may only be included in permits if they are determined to be "appropriate" given the circumstances of the discharge and are to require compliance "as soon as possible" (*See* 40 CFR 122.47).[169]

(3) Summary of Major Comments

EPA generally received favorable comment on its description of compliance schedules. Some commenters asked EPA to consider promulgating its own compliance schedule provisions as part of the final rule. Florida's regulations, however, already include an authorizing provision that allows NPDES permit writers to include compliance schedules in permits, where appropriate. Florida's regulations do not limit the criteria which may be subject to compliance schedules. Therefore, Florida may choose to issue permit compliance schedules for nitrogen/phosphorus pollution, as appropriate. As a result, there is no need for EPA to provide an additional compliance schedule authorizing provision in this final rule. EPA disagrees with commenters who assert that Florida's regulation at Subsection 62-620.620(6), F.A.C., authorizing compliance schedules applies only to industrial and domestic wastewater facilities. Chapter 62-620, F.A.C., sets out

[169] Hanlon, Jim, USEPA Office of Wastewater Management. 2007, May 10. Memorandum to Alexis Stauss, Director of Water Division EPA Region 9, on "Compliance Schedules for Water Quality-Based Effluent Limitations on NPDES Permits."

permit procedures for wastewater facilities or activities that discharge wastes into waters of the State or which will reasonably be expected to be a source of water pollution. (See Subsection 62-620.100(1), F.A.C.). Subsection 62-620.620(6), F.A.C., applies, therefore, more broadly than to just industrial and domestic wastewater facilities. In addition, Chapter 62-4, F.A.C., which sets out procedures on how to obtain a permit from FDEP, provides that permits may include a reasonable time for compliance with new or revised WQS. Subsection 62-4.160(10), F.A.C., does not limit the type of permits that may include such compliance schedules.

E. Proposed Restoration Water Quality Standard

(1) Final Rule

In EPA's January 2010 proposal, the Agency proposed a new WQS regulatory tool for Florida, referred to as "restoration WQS" for impaired waters. This provision was intended to allow Florida to retain full aquatic life protection (uses and criteria) for its water bodies while establishing a transparent phased WQS process that would result in implementation of enforceable measures and requirements to improve water quality over a specified time period to ultimately meet the long-term designated aquatic life use. For reasons discussed below and in EPA's response to comment document, EPA has decided not to promulgate a restoration WQS tool specifically for Florida, as proposed.

(2) Summary of Major Comments

EPA received a significant number of comments on its proposal that provided constructive and useful information for EPA to consider regarding the proposed restoration WQS provision. Such comments ranged from identifying additional needed requirements to concerns that the restoration WQS tool was so burdensome it would not be helpful. EPA evaluated the current, existing flexibility available to Florida to implement this final rule through variances, compliance schedules, permit reissuance cycles, permit reopener provisions, TMDL scheduling, and workload and administrative prioritization. These are all considerations that FDEP presently brings to the administration of it water quality program. EPA also considered the flexibility that this final rule offers through lake criteria adjustment provisions, alternative approaches to deriving downstream lake protection values and the SSAC process discussed above. The Agency concluded that the range of implementation tools available to the State in combination with a number of the provisions contained in this final rule provide adequate flexibility to implement EPA's numeric criteria finalized in this rule. Florida may use any of these existing tools or exercise its authority to propose additional tools in the future that allow implementation flexibility where demonstrated to be appropriate and consistent with the CWA and implementing regulations. Therefore, EPA believes that its decision not to finalize restoration WQS will not adversely affect Florida's ability to implement the Federal numeric criteria.

VI. Economic Analysis

State implementation of this rule may result in new or revised National Pollutant Discharge Elimination System (NPDES) permit conditions for point source dischargers, and requirements for nitrogen/phosphorus pollution treatment controls on other sources (e.g., agriculture, urban runoff, and/or septic systems) through the development of additional Total Maximum Daily Loads (TMDLs) and Basin Management Action Plans (BMAPs). To provide information on the potential incremental costs associated with these related State actions, EPA conducted an analysis to estimate both the additional impaired waters that may be identified as a result of this final rule and the potential State of Florida requirements that may be necessary to assure attainment of applicable State water quality designated uses. EPA's analysis is fully described in the document entitled: "*Economic Analysis of Final Water Quality Standards for Nutrients for Lakes and Flowing Waters in Florida*," which can be found in the docket and record for this final rule.

An economic analysis of a regulation compares a likely scenario absent the regulation (the baseline) to a likely scenario with the regulation. The impacts of the regulation are measured by the resulting differences between these two scenarios (incremental impacts). However, the regulatory effect of this final rule can be interpreted in several ways, which can significantly influence the conditions considered appropriate for representing the baseline. On January 14, 2009 EPA made a determination that numeric nutrient water quality criteria were necessary to meet the requirements of the CWA in the State of Florida. In July 2009 the State of Florida released draft numeric nutrient criteria for lakes and streams.[170] Therefore, when the Agency proposed this rule for lakes and flowing waters in January 2010, EPA evaluated the incremental impacts of the proposed rule in comparison with the provisions of the Florida July 2009 draft criteria. Although the State subsequently did not proceed forward with those numeric criteria provisions, EPA has conducted the same evaluation as part of the economic analysis accompanying this final rule to illustrate the difference between Florida's draft approach and the provisions of this rule. Using this same baseline approach and the refined analysis methodology described below, EPA estimates the potential incremental

[170] Florida Department of Environmental Protection, 2009, "Draft Technical Support Document: Development of Numeric Nutrient Criteria for Florida Lakes and Streams," available electronically at: http://www.dep.state.fl.us/water/wqssp/nutrients/docs/tsd_nutrient_crit.docx

costs associated with this rule as ranging between $16.4 million/year and $25.3 million/year.

An alternative interpretation of the impact of this final rule is that EPA is promulgating numeric criteria to address deficiencies in the State of Florida's current narrative nutrient criteria (current conditions approach), and the incremental impacts of this rule are those associated with the difference between EPA's numeric criteria and Florida's narrative criteria. Under this scenario, the baseline incorporates requirements associated with current water quality, impaired waters, and TMDLs that exist at the time of the analysis. The incremental impacts of this rule are the costs and benefits associated with additional pollution controls beyond those currently in place or required as a result of Florida's existing narrative criteria. This analysis is principally designed to gain an understanding of the potential costs and benefits associated with implementation of EPA's numeric criteria for lakes and flowing waters above and beyond the costs associated with State implementation of its current narrative nutrient criteria for those waters. For waters that the State of Florida has already identified as impaired, EPA expects that the effect of this final rule will be to shorten the time and reduce the resources necessary for the State of Florida to implement its existing regulatory and nonregulatory framework of tools, limits, measures and BMP guidance to initiate a broader, expedited, more comprehensive, and more effective approach to reducing nutrient loadings necessary to meet the numeric criteria that support current State designated uses. The further effect of this final rule will likely be the assessment and identification of additional waters that are impaired and not meeting the designated use set forth at Section I.B, and new or revised water quality-based effluent limits in NPDES permits. EPA's economic analysis quantifies the costs and cost savings associated with the identification of newly impaired waters and new or revised water quality-based effluent limits, but does not attempt to measure the costs and cost savings associated with addressing waters that are currently listed as impaired under Florida's existing narrative nutrient criteria (these costs are considered part of the baseline).

Although using the State of Florida's draft numeric criteria as a baseline provides one possible measure of the incremental impact associated with this final rule, the current conditions approach can provide valuable information to the State of Florida and the public about other potential costs and benefits that may be realized as a result of this final rule. To provide this additional information, and in part to respond to public comments on the economic analysis at proposal, this economic analysis also measures the incremental costs and benefits of this final rule using current conditions in the State of Florida as the baseline. Using this interpretation of the baseline, EPA estimates the potential incremental costs associated with this final rule as ranging between $135.5 million per year and $206.1 million per year. Although analyses using both baselines are described in EPA's economic analysis document entitled: "*Economic Analysis of Final Water Quality Standards for Nutrients for Lakes and Flowing Waters in Florida*," the analytical methods and results described below highlight the current conditions baseline in detail.

To develop this analysis, EPA first assessed State control requirements associated with current water quality, impaired waters, and total maximum daily loads (the baseline). EPA then assessed the costs and benefits associated with additional pollution controls beyond those currently in place or required to meet EPA's numeric criteria that support Florida designated uses. To estimate incremental point source costs, EPA gathered publicly available information and data on control technologies currently in place at wastewater treatment plants and other industrial facilities, and used Florida Department of Environmental Protection (FDEP) point source implementation procedures to project the potential additional treatment that the State may require as a result of applying the criteria in this final rule. EPA assessed potential non-point source control costs by using publicly available information and data to determine land uses near waters that would likely be identified as impaired under this rule, and using FDEP and the Florida Department of Agriculture and Consumer Services (FDACS) nonpoint source control procedures, estimated costs to implement agricultural best management practices (BMPs) the State may require in order to attain the new numeric criteria. EPA also estimated the potential costs of additional State control requirements for storm water runoff, and potential costs associated with upgrades of homeowner septic systems. EPA also assessed additional potential government regulatory costs of developing additional total maximum daily loads (TMDLs) for waters identified as impaired under this rule. Finally, EPA qualitatively and quantitatively described and estimated some of the potential benefits of complying with the new water quality standards. Because of the inherent uncertainties associated with the benefits analysis, potential benefits are likely underestimated compared to costs. Although it is difficult to predict with certainty how the State of Florida will implement these new water quality standards, the results of these analyses represent EPA's estimates of costs and benefits of this final rule.

A. Point Source Costs

Point sources of wastewater must have a National Pollution Discharge Elimination System (NPDES) permit to discharge into surface waters. EPA identified point sources potentially discharging nitrogen or phosphorus to lakes and flowing waters by evaluating EPA's NPDES Permit Compliance System (PCS) database. EPA identified all the industry codes associated with any permitted discharger with an existing numeric effluent limit or monitoring requirement for nitrogen or phosphorus. This analysis identified 193 point sources as having the potential to discharge nitrogen and/or phosphorus. The following table summarizes the number of point sources with the potential to discharge nitrogen and/or phosphorus.

Table VI(A). Point-sources potentially discharging nitrogen and/or phosphorus to Florida lakes and flowing waters

Discharger Category	Major Dischargers [a]	Minor Dischargers [b]	Total
Municipal Wastewater	43	42	85
Industrial Wastewater	57	51	108
Total	100	93	193

[a] Facilities discharging greater than one million gallons per day and likely to discharge toxic pollutants in toxic amounts.

[b] Facilities discharging less than one million gallons per day and not likely to discharge toxic pollutants in toxic amounts.

1. Municipal Waste Water Treatment Plant (WWTP) Costs

EPA considered the costs of known nitrogen and phosphorus treatment options for municipal WWTPs. Nitrogen and phosphorus removal technologies that are available can reliably attain an annual average total nitrogen (TN) concentration of approximately 3.0 mg/L or less and an annual average total phosphorus (TP) concentration of approximately 0.1 mg/L or less.[171] Wastewater treatment to these concentrations was considered target levels for the purpose of this analysis.

[171] U.S. EPA, 2008, "Municipal Nutrient Removal Technologies Reference Document. Volume 1 –

The NPDES permitting authority determines the need for water quality based effluent limits for point sources on the basis of analysis of reasonable potential to exceed water quality criteria. To estimate the potential incremental costs for WWTPs, the likelihood that WWTPs discharging to Florida lakes and flowing waters have reasonable potential to exceed the numeric criteria in this final rule should be evaluated. However, the site-specific data and information required to precisely determine reasonable potential for each facility was not available. Thus, on the basis that most WWTPs are likely to discharge nitrogen and phosphorus at concentrations above applicable criteria, EPA made the conservative assumption that all WWTPs have reasonable potential to exceed the numeric criteria.

For municipal wastewater, EPA estimated costs to reduce effluent concentrations to 3 mg/L or less for TN and 0.1 mg/L or less for TP using advanced biological nutrient removal (BNR). Although reverse osmosis and other treatment technologies may have the potential to reduce nitrogen and phosphorus concentrations even further, EPA believes that implementation of reverse osmosis applied on such a large scale has not been demonstrated as practical or necessary.[172] Such treatment has not been required for WWTPs by the State of Florida in the past, even those WWTPs under TMDLs with nutrient targets comparable to the criteria in this final rule. EPA believes that should state-of-the-art BNR technology together with other readily available physical and chemical treatment demonstrated to be effective in municipal WWTP operations not result in compliance with permit limits associated with meeting the new numeric nutrient criteria, then it is reasonable to assume that entities would first seek out other available

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Technical Report," EPA 832-R-08-006.

[172] Treatment using reverse osmosis also requires substantial amounts of energy and creates disposal issues as a result of the large volume of concentrate that is generated.

means of attaining water quality standards such as reuse, nonpoint source reductions, site-specific alternative criteria, variances, and designated use modifications.

To estimate compliance costs for WWTPs, EPA identified current WWTP treatment performance using information obtained from NPDES permits and/or water quality monitoring reports. EPA assumed that WWTPs under existing TMDLs are currently meeting their wasteload allocation requirements and would not incur additional treatment costs. EPA further assumed that costs to WWTPs discharging to currently impaired waters are not attributable to this final rule because those costs would be incurred absent the rule (under the baseline). However, sufficient location information was not available to insure that all WWTPs discharging to impaired waters were identified. Thus, costs may be overstated to the extent that some WWTPs discharging to currently impaired waters are included in EPA's estimate. The following table summarizes EPA's best estimate of the number of potentially affected municipal WWTPs that may require additional treatment to meet the numeric criteria supporting State designated uses.

Table VI(A)(1)(a). Potential Additional Nutrient Controls for Municipal Wastewater Treatment Plants

Discharge Type	Number of Dischargers				
	Additional Reduction in TN and TP [a]	Additional Reduction in TN Only [b]	Additional Reduction in TP Only [c]	No Incremental Controls Needed [d]	Total
Major	11	2	9	21	43
Minor	19	1	3	19	42
Total	30	3	12	40	85

[a] Includes dischargers without treatment processes capable of achieving the target levels or existing WLA for TN and TP, or for which the treatment train description is missing or unclear.
[b] Includes dischargers with chemical precipitation only and those with a wasteload allocations under a TMDL for TP only.
[c] Includes dischargers with MLE, four-stage Bardenpho, and BNR specified to achieve less

than 3 mg/L and those with WLA under a TMDL for TN only.
[d] Includes dischargers with A^2/O, modified Bardenpho, modified UCT, oxidation ditches, or other BNR coupled with chemical precipitation and those with WLAs under a TMDL for both TN and TP.

An EPA study provides unit cost estimates for biological nutrient removal controls for various TN and TP performance levels.[173] To estimate costs for WWTPs, EPA used the average capital and average operation and maintenance (O&M) unit costs for technologies that achieve an annual average of 3 mg/L or less for TN and/or 0.1 mg/L or less for TP. EPA also estimated a maximum cost for TN and TP reduction by using the highest cost TN and TP removal technology (estimated by finding the maximum of annualized costs for each technology option). Using average and maximum unit costs and multiplying unit costs by flow reported in EPA's PCS database, EPA estimated total capital costs could be approximately $108 million to $219 million and operation and maintenance (O&M) costs could be approximately $12 million per year to $18 million per year. Total annual costs would be approximately $22.3 million per year to $38.1 million per year (capital costs annualized at 7% over 20 years). The following table summarizes estimated costs for municipal WWTPs.

Table VI(A)(1)(b). Potential Incremental Costs for Municipal Waste Water Treatment Plants

Cost Component	Capital Costs (millions)[a]	O&M Costs (millions per year)	Annual Costs (millions per year)
Advanced BNR	$108 - $219	$12 - $18	$22.3 - $38.1

[a] Low estimate represents average of unit costs; high estimate represents costs for treatment processes that results in the highest annualized costs (annualized capital at 7% over 20 years plus O&M).

Using Florida's 2009 draft criteria as the baseline, municipal WWTP costs associated with this final rule are zero because treatment technologies needed to achieve

[173]U.S. EPA, 2008.

Florida's 2009 draft criteria are the same as those needed to achieve the criteria in this final rule, even though the criteria themselves are somewhat different.

After EPA published its proposed criteria for Florida (75 FR 4173), several organizations in Florida developed alternative estimates of compliance costs for WWTPs that were substantially higher than EPA's estimated costs. EPA disagrees with these cost estimates because they included costs for nutrient controls that are beyond what would be required by Florida to meet the new numeric criteria. For example, the Florida Water Environment Association Utility Council (FWEAUC) estimated annual costs for WWTPs would be approximately $2.0 billion per year to $4.4 billion per year.[174] However, FWEAUC included in their analysis facilities that discharge to estuaries or coastal waters, and facilities that utilize deep well injection or generate reuse water which are not covered by this rule. FWEAUC also estimated costs to upgrade WWTPs regardless of the treatment that already exists at the facilities. Finally, FWEAUC assumed that all WWTPs will require expensive microfiltration and reverse osmosis control technology to comply with the new standard. EPA is not aware of any WWTPs in Florida that utilize microfiltration or reverse osmosis, even those discharging to currently impaired waters with TMDLs that have nutrient targets comparable to the criteria in this final rule. Thus, as noted above, EPA does not believe that this type of treatment technology for WWTPs in Florida has been demonstrated as practical or necessary. These differences appear to explain the discrepancy between FWEAUC and EPA estimates.

[174] Florida Water Environment Association Utility Council, 2009, "Numeric Nutrient Criteria Cost Implications for Florida POTWs," available electronically at: http://www.fweauc.org/PDFs/FWEAUC%20letter%20to%20Crist%20re%20NNC%20Cost%20Implications%20for%20Fla%20POTWs%20with%20attachment.pdf

2. Industrial Point Source Costs

Incremental costs for industrial dischargers are likely to be facility-specific and depend on process operations, existing treatment trains, and composition of waste streams. EPA previously estimated that 108 industrial dischargers may potentially be affected by this rule (Table VI(A)). Of those 108 dischargers, EPA identified 38 of them as under an existing TMDL for nitrogen and/or phosphorus and 14 of them as discharging to waters listed as impaired for nutrients and/or dissolved oxygen. As with WWTPs, EPA assumed that industrial dischargers under an existing TMDL are currently meeting their wasteload allocation requirements and would not incur additional treatment costs, and costs at facilities discharging to currently impaired waters are not attributable to this final rule because those costs would be incurred absent the rule (under the baseline). To estimate the potential costs to the remaining 56 potentially affected industrial facilities, EPA took a random sample of those facilities from each industry. EPA then analyzed their effluent data obtained from EPA's PCS database and other information in NPDES permits to determine whether or not they have reasonable potential to cause or contribute to an exceedance of the numeric nutrient criteria in this final rule. For those facilities with reasonable potential, EPA further analyzed their effluent data and estimated potential revised water quality based effluent limits (WQBEL) for TN and TP. If the data indicated that the facility would not be in compliance with the revised WQBEL, EPA estimated the additional nutrient controls those facilities would likely implement to allow receiving waters to meet State designated uses and the costs of those controls. EPA then calculated the average flow-based cost of compliance for the sampled facilities in each industrial category, and used the average cost to extrapolate to the potential cost for the total flow associated with all facilities in each category (see economic analysis support document for more information). Using this method, EPA estimated the potential costs for industrial dischargers could be approximately $25.4 million per year.

Table VI(A)(2). Potential Incremental Costs for Industrial Dischargers

Industrial Category	**Total Number of Facilities**	**Number of Facilities Sampled**	**Average Sample Cost ($/mgd/yr)[a]**	**Total Annual Costs[b]**
Chemicals and Allied Products	9	2	$14,100	$1,116,800
Electric Services	9	2	$0	$0
Food	7	2	$123,300	$1,390,000
Mining	10	2	$160,600	$16,442,300
Other	17	3	$0	$0
Pulp and Paper	4	1	$117,300	$6,466,800
Total	56	12	--	$25,415,900

[a] Calculated by dividing total annual sample discharger costs by total sample discharger flow. Note that where flow for a sample discharger is not available, EPA used the average flow for dischargers in that category and discharger type (major or minor).
[b] Represents average sample discharger unit cost multiplied by total flow of dischargers affected by the rule in each industrial category.

Using Florida's 2009 draft criteria as the baseline, industrial discharger costs associated with this final rule is zero because treatment technologies needed to achieve the Florida's 2009 draft criteria are the same as those needed to achieve the criteria in this final rule, even though the criteria themselves are somewhat different.

Several organizations in Florida developed alternative estimates of compliance costs for EPA's proposed rule that were substantially higher than EPA's estimated costs for industrial dischargers. EPA disagrees with these cost estimates because they assumed that facilities will need to install treatment technologies that are much more expensive than those that would likely be required by Florida to meet the numeric criteria. For example, FDEP estimated that the costs for industrial dischargers would be approximately $2.1 billion per year.[175] However, FDEP assumed that every industrial facility would treat their total discharge volume using reverse osmosis which EPA believes is impractical and unnecessary. In addition, FDEP estimated costs for reverse osmosis on the basis of each facility's maximum daily discharge flow instead of its reported design capacity (in some cases the maximum daily flow was more than double the design capacity). Installing treatment technology to handle maximum daily flows would be unnecessary because equalization basins or storage tanks (used to temporarily hold effluent during peak flows) would be a less expensive compliance strategy. Finally, EPA found no indication that industrial facilities in Florida have installed reverse osmosis for the purpose of complying with a nutrient-related TMDL, even those TMDLs with nutrient targets comparable to the criteria in this final rule. These differences appear to explain the discrepancy between FDEP and EPA estimates.

B. Incrementally Impaired Waters

To estimate nonpoint source incremental costs associated with State control requirements that may be necessary to assure attainment of designated uses, EPA first removed from further consideration any waters the State of Florida has already determined to be impaired or has established a TMDL and/or BMAP because these waters were considered part of the baseline for this analysis. EPA next identified Florida

[175] Florida Department of Environmental Protection, 2010, "FDEP Review of EPA's 'Preliminary Estimate of Potential Compliance Costs and Benefits Associated with EPA's Proposed Numeric Nutrient Criteria for Florida'," p. 3.

waters that may be identified as incrementally impaired using the criteria of this final rule, and then identified the watersheds surrounding those incrementally impaired waters. EPA analyzed FDEP's database of ambient water quality monitoring data and compared monitoring data for each waterbody with EPA's new criteria for TN and TP in lakes and flowing waters, and nitrate+nitrite concentrations in springs. To account for streams that may have downstream protection values (DPVs) as applicable criteria, streams intersecting lakes were assigned the applicable lake criteria. Costs may be overestimated because the method does not distinguish between upstream and downstream intersecting streams. Thus DPVs and additional controls may have been attributed to streams downstream of an impaired lake. EPA compiled the most recent five years of monitoring data, calculated the annual geometric mean for each waterbody identified by a waterbody identification number (WBID), and identified waters as incrementally impaired if they exceeded the applicable criteria in this final rule.

Table VI(B). Summary of Potential Incrementally Impaired Waters

Category	Number of Water bodies			Total
	Lake	Stream[a]	Spring	
Total in State	1,310	3,901	126	5,337
Not Listed/Covered by TMDL[b]	1,099	3,608	119	4,826
Water Quality Monitoring Data for Nutrients [c]	878	1,273	72	2,223
Sufficient Data Available[d]	655	930	72	1,657
Potentially Exceeding Criteria (incrementally impaired)[e]	148	153	24	325

[a] Includes blackwater.
[b] As reported in TMDL documents and FDEP.
[c] Data within last 5 years meeting data quality requirements.
[d] Annual geometric means based on at least 4 samples with one sample from May to September and one sample from October to April in a given year.
[e] Annual geometric mean exceeding the applicable criteria more than once in a three year period.

C. Non-Point Source Costs

To estimate the potential incremental costs associated with controlling nitrogen/phosphorus pollution from non-point sources, EPA identified land areas near incrementally impaired waters using GIS analysis. EPA first identified all the 10-digit hydrologic units (HUCs) in Florida that contain at least a *de minimus* area of an incrementally impaired WBID (WBIDs were GIS polygons), and excluding those HUCs that contain at least a *de minimus* area of a currently impaired WBID. EPA then identified land uses using GIS analysis of data obtained from the State of Florida.[176]

1. Costs for Urban Runoff

EPA's GIS analysis indicates that urban land (excluding land for industrial uses covered under point sources) accounts for approximately seven percent of the land near incrementally impaired waters. EPA's analysis also indicates that urban runoff is already regulated on approximately one half of this land under EPA's storm water program requiring municipal storm sewer system (MS4) NPDES permits. Florida has a total of 28 large (Phase I) permitted MS4s serving greater than 100,000 people and 131 small (Phase II) permitted MS4s serving less than 100,000 people. MS4 permits generally do not have numeric nutrient limits, but instead rely on implementation of BMPs to control pollutants

[176] Florida Geological Data Library, 2009, "GIS Data: WBIDs," available electronically at: http://www.fgdl.org/download/index.html

in storm water to the maximum extent practicable. Even those MS4s in Florida discharging to impaired waters or under a TMDL currently do not have numeric limits for any pollutant.

In addition to EPA's storm water program, several existing State rules are intended to reduce pollution from urban runoff. Florida's Urban Turf Fertilizer rule (administered by FDACS) requires a reduction in the amount of nitrogen and phosphorus that can be applied to lawns and recreational areas. Florida's 1982 storm water rule (Chapter 403 of Florida statues) requires storm water from new development and redevelopment to be treated prior to discharge through the implementation of BMPs. The rule also requires that older systems be managed as needed to restore or maintain the beneficial uses of waters, and that water management districts establish and implement other storm water pollutant load reduction goals. In addition, Chapter 62-40, F.A.C., "Water Resource Implementation Rule," establishes that storm water design criteria adopted by FDEP and the water management districts shall achieve at least 80% reduction of the average annual load of pollutants that cause or contribute to violations of WQS (95% reduction for outstanding natural resource waters). The rule also states that the pollutant loading from older storm water management systems shall be reduced as necessary to restore or maintain the designated uses of waters.

Although urban runoff is currently regulated under the statutes and rules described above, this final rule may indirectly result in changes to MS4 NPDES permit requirements for urban runoff so that Florida waters meet State designated uses. However, the combination of additional pollution controls required will likely depend on the specific nutrient reduction targets, the controls already in place, and the relative amounts of nitrogen/phosphorus pollution contained in urban runoff at each particular location. Because storm water programs are usually implemented using an iterative approach, with the installation of controls followed by monitoring and re-evaluation to determine the need for additional controls, estimating the complete set of pollution controls required to meet a particular water quality target would require site-specific analysis.

Although it is difficult to predict the complete set of potential additional storm water controls that may be required to meet the numeric criteria that supports State designated uses in incrementally impaired waters, EPA estimated potential costs for additional treatment by assessing the amount of urban land that may require additional pollution controls for storm water. FDEP has previously assumed that all urban land developed after adoption of Florida's 1982 storm water rule would be in compliance with this final rule.[177] Using this same assumption, EPA used GIS analysis of land use data obtained from the State of Florida[178] to identify the amount of remaining urban land located near incrementally impaired waters. Using this procedure, EPA estimated that up to 48,100 acres of Phase I MS4 urban land, 30,700 acres of Phase II MS4 urban land, and 30,600 acres of non-MS4 urban land may require additional storm water controls. EPA estimated costs of implementing controls for Phase I MS4 urban land based on a range of acres with 48,100 acres as the upper bound and zero acres as the lower bound because Phase I MS4 urban land already must implement controls to the "maximum extent

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[177] Florida Department of Environmental Protection, 2010, "FDEP Review of EPA's 'Preliminary Estimate of Potential Compliance Costs and Benefits Associated with EPA's Proposed Numeric Nutrient Criteria for Florida'," p. 9.
[178] Florida Geological Data Library, 2009.

practicable" and may not require additional controls if existing requirements are already fully implemented.

The cost of storm water pollution controls can vary widely. FDEP has assessed the cost of completed storm water projects throughout the State in dollars per acre treated.[179] Capital costs range from $62 to $60,300 per acre treated, with a median cost of $6,800 per acre. EPA multiplied FDEP's median capital cost per acre by the number of acres identified as requiring controls to estimate the potential additional storm water control costs that may be needed to meet the numeric criteria in this rule. EPA also used FDEP's estimate of operating and maintenance (O&M) costs as 5% of capital costs, and annualized capital costs using FDEP's discount rate of 7% over 20 years. EPA estimates the total annual cost for additional storm water controls could range between approximately $60.5 and $108.0 million per year. The following table summarizes these estimates.

Table VI(C)(1). Potential Incremental Urban Storm Water Cost Scenarios

Land Type	Acres Needing Controls[a]	Capital Cost (millions $)[b]	O&M Cost (millions $)[c]	Annual Cost (millions $)[d]
MS4 Phase I Urban	0 – 48,100	$0 - $329.1	$0 - $16.4	$0 - $47.5
MS4 Phase II Urban	30,700	$210.0	$10.5	$30.3
Non-MS4 Urban	30,600	$208.8	$10.4	$30.2
Total	61,300 – 109,400	$418.8 - $747.0	$20.9 - $37.4	$60.5 - $108.0

[a] Phase I MS4s range represents implementation of BMPs to the MEP resulting in compliance with EPA's rule or controls needed on all pre-1982 developed land; Phase II MS4s and urban land outside of MS4s represent controls needed on all pre-1982 developed land that is not low density residential.
[b] Represents acres needing controls multiplied by median unit costs of storm water retrofit costs obtained from FDEP.
[c] Represents 5% of capital costs.
[d] Capital costs annualized at 7% over 20 years plus annual O&M costs.

[179] Florida Department of Environmental Protection, 2010, appendix 3.

Using Florida's 2009 draft criteria as the baseline, potential incremental costs for urban storm water are estimated to range from $13.7 million per year to $27.2 million per year.

Several organizations in Florida developed alternative estimates of compliance costs for EPA's proposed rule that were substantially higher than EPA's estimated costs for urban storm water. EPA disagrees with these cost estimates because they utilized incorrect assumptions about the areas that would have to implement controls. For example, FDEP estimated costs for urban storm water controls at $1.97 billion per year.[180] However, FDEP estimated costs for pollution controls on urban land in watersheds that may not be listed as impaired, have already been listed as impaired, or will require controls under existing rules (e.g. land currently permitted under EPA's MS4 storm water program). In contrast, EPA estimated costs for urban storm water controls only for urban land with storm water flows to waters that may be listed as impaired as a result of this rule. This difference appears to explain the discrepancy between FDEP and EPA estimates.

2. Agricultural Costs

EPA's GIS analysis of land use indicates that agriculture accounts for about 19 percent of the land near incrementally impaired waters. Agricultural runoff can be a source of phosphorus and nitrogen to lakes and streams through the application of fertilizer to crops and pastures and from animal wastes. Some agricultural practices may also contribute nitrogen and phosphorus to groundwater aquifers that supply springs. For

[180] Florida Department of Environmental Protection, 2010, p. 3.

waters impaired by nitrogen/phosphorus pollution, the 1999 Florida Watershed Restoration Act established that agricultural BMPs should be the primary instrument to implement TMDLs. Thus, additional waters identified by the State as impaired under this rule may result in State requirements or provisions to reduce the discharge of nitrogen and/or phosphorus to incrementally impaired waters through the implementation of BMPs.

EPA estimated the potential costs of additional agricultural BMPs by evaluating land use data obtained from Florida's five water management districts. BMP programs designed for each type of agricultural operation and their costs were taken from a study of agricultural BMPs to help meet TMDL targets in the Caloosahatchee River, St. Lucie River, and Lake Okeechobee watersheds.[181] Three types of BMP programs were identified in this study. The first program, called the "Owner Implemented BMP Program," consists of a set of BMPs that land owners might implement without additional incentives. The second program, called the "Typical BMP Program," is the set of BMPs that land owners might implement under a reasonably funded cost share program or a modest BMP strategy approach. The third program, called the "Alternative Program," is a more expensive program designed to supplement the "Owner Implemented Program" and "Typical Program" if additional reductions are necessary.

The BMPs in the "Owner Implemented Program" and "Typical Program" are similar to the BMPs adopted by FDACS. EPA has found no indication that the "Alternative BMP Program," which includes storm water chemical treatment, has been required in historically nutrient impaired watersheds with significant contributions from

[181] Soil and Water Engineering Technology, 2008, "Nutrient Loading Rates, Reduction Factors and Implementation Costs Associated with BMPs and Technologies," (report prepared for South Florida Water Management District).

agriculture for which TMDLs have been developed (e.g. Lake Okeechobee). Therefore, for purposes of this analysis, EPA believes it is reasonable to assume that nutrient controls for agricultural sources are best represented by the "Owner Implemented Program" and "Typical Program" described in the study used here.[182] EPA estimated potential incremental costs of BMPs by multiplying the number of acres in each agricultural category by the sum of unit costs for the "Owner Implemented Program" and "Typical Program." The following table summarizes the potential incremental costs of BMPs on agricultural lands near incrementally impaired lakes and streams for each agricultural category.

[182] Soil and Water Engineering Technology, 2008.

Table VI(C)(2)(a). Potential Incremental BMP Costs for Lakes and Streams

Agricultural Category	**Area (acres)[a]**	**"Owner Implemented Program" plus "Typical Program" Unit Costs ($/ac/yr)[e]**	**Total "Owner Implemented Program" and "Typical Program" Costs ($/yr)**
Animal Feeding	1,814 - 1,846	$18.56	$33,671 - $34,260
Citrus	15,482 - 27,343	$156.80	$2,427,652 - $4,287,343
Cow Calf Production (Improved Pastures)	153,978 - 168,665	$15.84	$2,439,007 - $2,671,656
Cow Calf Production (Unimproved Pastures)	49,054 - 51,057	$4.22	$207,203 - $215,663
Cow Calf Production (Rangeland and Wooded)	74,449 - 75,790	$4.22	$314,474 - $320,136
Row Crop	7,846 - 9,808	$70.40	$552,352 - $690,453
Cropland and Pastureland (general)[b]	152,976 - 160,814	$27.26	$4,169,512 - $4,383,135
Sod/Turf Grass	2,007	$35.20	$70,631
Ornamental Nursery	840	$70.00	$58,783
Dairies	583 - 621	$334.40	$194,803 - $207,777
Horse Farms	1,632	$15.84	$25,857
Field Crop (Hayland) Production	194,181 - 215,168	$18.56	$3,603,996 - $3,993,521
Other Areas [c]	54,499 - 67,364	$18.56	$1,011,500 - $1,250,281
Total [d]	709,340 - 782,954	--	$15,109,436 - $18,209,496

[a] Based on GIS analysis of land use data from five water management districts (for entire state) and FDACS BMP program NOI GIS data layer. Low end reflects acres in incrementally impaired HUCs (that are not included in HUCs for baseline impairment) that are not enrolled in BMPs under FDACS; high end reflects all acres in incrementally impaired HUCs, regardless of FDACS BMP enrollment.

[b] "Owner program" and "Typical Program" BMP unit costs based on average costs for improved pastures, unimproved/wooded pasture, row crops, and field crops.

[c] Includes FLUCCS Level 3 codes 2160, 2200, 2230, 2400, 2410, 2500, 2540, and 2550

[d] Excludes land not in production.

[e] Soil and Water Engineering Technology, 2008, Nutrient Loading Rates, Reduction

Factors and Implementation Costs Associated with BMPs and Technologies, Report prepared for South Florida Water Management District.

In addition to estimating potential costs associated with agricultural BMPs to reduce nitrogen/phosphorus pollution to lakes and streams as described above, EPA estimated potential costs associated with BMPs to protect groundwater aquifers that supply water to springs. Fertilizer application and other agricultural practices can significantly increase nutrient loadings to springs, especially those springs supplied by relatively large groundwater aquifers. EPA evaluated the potential incremental costs to meet the numeric criteria in this final rule for springs by assuming that all applicable agricultural operations may be identified for implementation of nutrient management. Nutrient management reduces over application of fertilizers by determining realistic yield expectations, the nitrogen requirements necessary to obtain those yields, and adjusting application methods and timing to minimize nitrogen pollution.

Nutrient management is a cost-effective way to reduce groundwater nitrogen, and may even result in cost savings to some farmers by reducing unnecessary fertilizer application. Therefore, for the purpose of this analysis, EPA assumed that all agricultural operations applying fertilizer to land would implement a nutrient management program, even those operations that are not associated with incrementally impaired waters. To estimate the potential costs of nutrient management, EPA estimated the amount of agricultural land where nutrient management could be applicable. EPA identified general agriculture[183] and specialty crops[184] as agricultural categories appropriate for nutrient management. EPA then used GIS analysis of land use data obtained from the State of

[183] Cropland and pastureland, cow calf production (improved pastures), cropland and pastureland (general), dairies, horse farms, and field crop (hayland) production.
[184] Citrus, row crops, sod/turf grass, and ornamental nursery.

Florida[185] to identify the land areas categorized as general agriculture or specialty crops. Approximately 4.9 million acres of agricultural land was identified as general agriculture and 1 million acres was identified as specialty crops. EPA further analyzed this agricultural land to identify the land near waters already listed as impaired for nutrients or under a TMDL. Similar to point sources, EPA assumed that nonpoint sources under an existing TMDL are currently meeting their load allocation requirements and would not incur additional costs, and costs to nonpoint sources associated with waters that are currently listed as impaired for nutrients are not attributable to this final rule because those costs would be incurred absent the rule (under the baseline). EPA also removed from this analysis land associated with incrementally impaired waters to avoid double counting the costs of BMPs that were already estimated to protect lakes and streams as described above. As a result of this analysis, approximately 1 million acres of general agriculture and 0.12 million acres of specialty crops was identified as land that may need to implement a nutrient management program to meet the numeric criteria for Florida springs in this final rule. Using unit costs of $10 per acre for general agriculture and $20 per acre for specialty crops obtained from Florida's Environmental Quality Incentive Program,[186] EPA estimated the annual cost of nutrient management could be approximately $4.7 million per year. The following table summarizes the estimated potential incremental costs of BMPs on agricultural lands to protect State designated uses of springs on the basis of the criteria in this final rule.

185 Florida Geological Data Library, 2009.

186 Florida Environmental Quality Incentive Program, 2009, "FY 2009 Statewide Payment Schedules," available electronically at: ftp://ftp-fc.sc.egov.usda.gov/FL/eqip/EQIP_FY2009PaySched_STATEWIDE_FINAL.pdf.

Table VI(C)(2)(b). Potential Incremental BMP Costs for Springs

Nutrient Management Program Type	Total Acres in Florida[a]	Acres Identified for Nutrient Management[b]	Unit Cost ($/acre)	Total Cost	Annual Cost ($/year)[c]
General Agriculture	4,885,643	1,003,973	$10	$10,039,729	$3,825,656
Specialty Crop	1,057,107	120,558	$20	$2,411,163	$918,778
Total	5,942,750	1,124,531	--	$12,450,892	$4,744,433

[a] Excludes unimproved and woodland pastures, abandoned groves, aquaculture, tropical fish farms, open rural lands, and fallow cropland.
[b] Calculated by subtracting agricultural land near incrementally impaired waters needing controls and agricultural land types participating in FDACS BMP program (assuming all Tri-county agricultural area land is regular nutrient management land) from total land use area in Florida.
[c] Costs annualized at 7% over 3 years on basis of 3 year useful life.

The following table summarizes the total estimated potential incremental costs of BMPs on agricultural lands to meet the numeric criteria.

Table VI(C)(2)(c). Potential Annual Incremental Compliance Costs for Agriculture

Waterbody Type	Applicable Acres	Annual Costs[a]
Lakes and Streams	709,340 - 782,954	$15,109,400 - $18,209,500
Springs	1,124,531	$4,744,400
Total	1,833,871 – 1,907,485	$19,853,900 - $22,953,900

Using Florida's 2009 draft criteria as the baseline, potential incremental costs to agriculture are estimated to range from -$2.4 million per year (a negative cost represents a cost savings) to $2.1 million per year.

Several organizations in Florida developed alternative estimates of compliance costs for EPA's proposed rule that were substantially higher than EPA's estimated costs for agriculture. EPA disagrees with these cost estimates because they use incorrect assumptions that overestimate costs. For example, the FDACS estimated that costs for agriculture would be approximately $0.9 billion to $1.6 billion per year.[187] However,

[187] Florida Department of Agriculture and Consumer Services, 2010, "Consolidated Comments on

FDACS estimated BMP costs for all 13.6 million acres of agricultural land in the State of Florida. This land includes watersheds where waters are not expected to become listed as impaired due to this final rule (including coastal and estuarine watersheds), have already been listed as impaired, or will require controls under existing rules (e.g. animal feeding operations) and thus are not potentially affected by the rule. A portion of the agricultural land used by FDACS to estimate costs includes 4.8 million acres of forest, 98.1% of which the State of Florida has claimed current BMPs effectively protect surface waters[188] and thus EPA assumes will not require further controls. FDACS also estimated costs using the highest cost Alternative BMP program. The Alternative BMP Program, which includes storm water chemical treatment, is not yet required in historically nutrient-impaired watersheds with significant contributions from agriculture. Thus, it is uncertain whether such controls would be necessary or required to meet the new numeric criteria which are intended to implement Florida's existing narrative criteria. In contrast, EPA estimated costs for BMPs that are likely to be necessary, and only on the agricultural land identified as incrementally impaired under this final rule (although costs could be higher in some cases if further reductions are found to be necessary). These differences appear to explain the discrepancy between FDACS and EPA estimates.

The alternative BMP program, which includes storm water chemical treatment, is not yet required in the study basins which have significant contributions from agriculture.

Proposed EPA Numeric Nutrient Criteria for Florida's Lakes and Flowing Waters," p. 1, available electronically at: http://www.floridaagwaterpolicy.com/PDF/FINAL_FDACS_Consolidated_Comments_on_Docket_ID_No_EPA_HQ_OW_2009_0596.pdf

188 Florida Division of Forestry, Department of Agriculture and Consumer Services, 2010, "Silviculture Best Management Practices: 2009 Implementation Survey Report," available electronically at: http://www.fl-dof.com/publications/2009_BMP_survey_report.pdf.

Thus, for this analysis, EPA assumed that nutrient controls for agricultural sources are best represented by the owner/typical programs.

3. Septic System Costs

Some nutrient reductions from septic systems may be necessary for incrementally impaired waters to meet the numeric nutrient criteria in this final rule. Several nutrient-related TMDLs in Florida identify septic systems as a significant source of nitrogen/phosphorus pollution. Although properly operated and maintained systems can provide treatment equivalent to secondary wastewater treatment,[189] even properly functioning septic systems can be expected to contribute to nitrogen/phosphorus pollution at some locations.[190] Some of the ways to address pollution from septic systems may include greater use of inspection programs and repair of failing systems, upgrading existing systems to advanced nutrient removal, installation of decentralized cluster systems where responsible management entities would ensure reliable operation and maintenance, and connecting households and businesses to wastewater treatment plants. On the basis of current practice in the State of Florida, EPA assumed that the most likely strategy to reduce nutrients loads from septic systems would be to upgrade existing conventional septic systems to advanced nutrient removal systems.

Septic systems in close proximity to surface waters are more likely to contribute nutrient loads to waters than distant septic systems. Florida Administrative Code provides that in most cases septic systems should be located at least 75 feet from surface

[189] Petrus, K., 2003, "Total Maximum Daily Load for the Palatlakaha River to Address Dissolved Oxygen Impairment, Lake County, Florida," (Florida Department of Environmental Protection), available electronically at:
http://www.dep.state.fl.us/water/tmdl/docs/tmdls/final/gp1/palatlakaha_river_do_tmdl.pdf.
[190] Florida Department of Environmental Protection, 2006, "TMDL Report. Nutrient and Unionized Ammonia TMDLs for Lake Jesup, WBIDs 2981 and 2981A," available electronically at:
http://www.dep.state.fl.us/water/tmdl/docs/tmdls/final/gp2/lake-jessup-nutr_ammonia-tmdl.pdf

waters (F.A.C. 64E-6.005(3)). In addition, many of Florida's existing nutrient-related TMDLs identify nearby failing septic systems as contributing to nutrient impairments in surface waters.

For this economic analysis, EPA assumed that some septic systems located near incrementally impaired lakes and streams may be required to upgrade to advance nutrient removal systems. However, the distance that septic systems can be safely located relative to these surface waters depends on a variety of site-specific factors. Because of this uncertainty, EPA conservatively assumed that septic systems located within 500 feet of any lake or stream in watersheds associated with incrementally impaired lakes or streams[191] may be identified for upgrade from conventional to advanced nutrient removal systems.

EPA identified the number of septic systems within 500 feet of any lake or stream in watersheds associated with incrementally impaired lakes and streams using GIS analysis on data obtained from the Florida Department of Health [192] that provides the location of active septic systems in the State. This analysis yielded 8,224 active septic systems that may potentially need to be upgraded from conventional to advanced nutrient removal systems to meet the numeric nutrient criteria in this final rule.

EPA evaluated the cost of upgrading existing septic systems to advanced nutrient removal systems. Upgrade costs range from $2,000 to $6,500 per system. For O&M costs, EPA relied on a study that compared the annual costs associated with various

[191] In this analysis EPA considered septic systems within 500 feet of any lake or stream in an incrementally impaired watershed rather than only within 500 feet of an incrementally impaired lake or stream to account for the possibility of some downstream transport of nutrients from nearby streams that may not themselves be classified as incrementally impaired.
[192] Florida Department of Health, 2010, "Bureau of Onsite Sewage GIS Data Files," available electronically at: http://www.doh.state.fl.us/Environment/programs/EhGis/EhGisDownload.htm.

septic system treatment technologies including conventional onsite sewage treatment and disposal system and fixed film activated sludge systems.[193] This study estimated the incremental O&M costs for an advanced system to be $650 per year. Thus, based on annual O&M costs of $650 and annualizing capital costs at 7% over 20 years, annual costs could range from approximately $800 to $1,300 for each upgrade. EPA estimated the total annual costs of upgrading septic systems by multiplying this range of unit costs with the number of systems identified for upgrade. Using this method, total annual costs for upgrading septic systems to meet State designated uses could range from $6.6 million per year to $10.7 million per year.

Using Florida's 2009 draft criteria as the baseline, potential incremental costs to upgrade septic systems are estimated to range from $1.3 million per year to 2.2 million per year.

Several organizations in Florida developed alternative estimates of compliance costs for septic systems in EPA's proposed rule that were substantially higher than EPA's estimated costs. EPA disagrees with these cost estimates because they used incorrect assumptions that overestimate costs. For example, FDEP estimated that the costs related to septic systems would be approximately $0.9 billion per year to 2.9 billion per year.[194] However, FDEP assumed that 1,687,500 septic systems would require complete replacement (calculated as the proportion of all septic systems in the State of Florida on lots less than 3 acres assumed to discharge to fresh waters because all urban storm water discharges to freshwaters in that proportion). In contrast, EPA estimated costs to upgrade

[193] Chang, N., M. Wanielista, A. Daranpob, F. Hossain, Z. Xuan, J. Miao, S. Liu, Z. Marimon, and S. Debusk, 2010, "Onsite Sewage Treatment and Disposal Systems Evaluation for Nutrient Removal," (Stormwater Management Academy, University of Central Florida).
[194] Florida Department of Environmental Protection, 2010, p. 3

8,224 septic systems to advanced nutrient removal systems that GIS analysis identified as located within 500 feet of any water within an incrementally impaired watershed.

D. Governmental Costs

This final rule may result in the identification of additional impaired waters that would require the development of additional TMDLs. As the principal State regulatory agency implementing water quality standard, the State of Florida may incur costs related to developing additional TMDLs. EPA's analysis identified 325 incrementally impaired waters potentially associated with this final rule. Because current TMDLs in Florida include an average of approximately two water bodies each, EPA estimates that the State of Florida may need to develop and adopt approximately 163 additional TMDLs. A 2001 EPA study found that the cost of developing a TMDL could range between $6,000 and $154,000, with an average cost of approximately $28,000.[195,196] The low end of the range reflects the typical cost associated with TMDLs that are the easiest to develop and/or have the benefit of previous TMDL development for other pollutants. Because most of the incrementally impaired waters in EPA's analysis exceeded the criteria for both nitrogen and phosphorus, EPA assumed that TMDLs would need to be developed for both nitrogen and phosphorus. Under this assumption, EPA estimated the average TMDL cost to be approximately $47,000 ($28,000 on average for one pollutant, plus $6,000 on average for the other pollutant, and adjusting for inflation). For 163 TMDLs, total costs could be approximately $7.7 million. FDEP currently operates its TMDL schedule on a five-phase cycle that rotates through the five basins over five years. Under

[195] U.S. EPA, 2001, "The National Costs of the Total Maximum Daily Load Program (Draft Report)," (EPA-841-D-01-003).

[196] EPA did not adjust these estimates to account for potential reductions in resources required to develop TMDLs as a result of this final rule.

this schedule, completion of TMDLs for high priority waters will take 9 years; it will take an additional 5 years to complete the process for medium priority waters. Thus, assuming all the incremental impairments are high priority and FDEP develops the new TMDLs over a 9-year period, annual costs could be approximately $851,000 per year. Using Florida's 2009 draft criteria as the baseline, potential incremental costs to develop additional TMDLs could be approximately $261,000 per year.

Should the State of Florida submit current TMDL targets as Federal site specific alternative criteria (SSAC) for EPA review and approval, EPA believes it is reasonable to assume that information used in the development of the TMDLs will substantially reduce the time and effort needed to provide a scientifically defensible justification for such applications. Thus, EPA assumed that incremental costs associated with SSAC, if any, would be minimal.

Similarly, state and local agencies regularly monitor TN and TP in ambient waters. These data are the basis for the extensive IWR database the State of Florida maintains and which provided baseline water quality data for EPA's analyses. Because Florida is currently monitoring TN, TP, and chlorophyll a concentrations in many waters, EPA assumed that this final rule is unlikely to have a significant impact on costs related to water quality monitoring activities.

E. Benefits

Elevated concentrations of nutrients in surface waters can result in adverse ecological effects and negative economic impacts. Excess nutrients in water can cause eutrophication, which can lead to harmful (sometimes toxic) algal blooms, loss of rooted plants, and decreased dissolved oxygen, which can lead to adverse impacts on aquatic life, fishing, swimming, wildlife watching, camping, and drinking water. Excess nutrients can also cause nuisance surface scum, reduced food for herbivorous wildlife, fish kills, alterations in fish communities, and unsightly shorelines that can decrease property values. This final rule will help reduce nitrogen and phosphorus concentrations in lakes and flowing waters in Florida, and help improve ecological function and prevent further degradation that can result in substantial economic benefits to Florida citizens. EPA's economic analysis document entitled: *Economic Analysis of Final Water Quality Standards for Nutrients for Lakes and Flowing Waters in Florida* describes many of the potential benefits associated with meeting the water quality standards for nitrogen/phosphorus pollution in this rule.

Florida waters have historically provided an abundance of recreational opportunities that are a vital part of the State's economy. In 2007, over 4.3 million residents and over 5.8 million visitors participated in recreational activities related to freshwater beaches in Florida.[197] Of these residents and visitors, over 2.7 million residents and approximately 1 million visitors used freshwater boat ramps, over 3 million residents and over 900,000 visitors participated in freshwater non-boat fishing, and over 2.6 million residents and almost 1 million visitors participated in canoeing and kayaking. Florida also ranks first in the nation in boat registrations with 973,859 recreational boats registered across the State.

Tourism comprises one of the largest sectors of the Florida economy. In 2000, there were over 80.9 million visitors to the State of Florida, accounting for an estimated

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[197] Florida Department of Environment, 2008, "State Comprehensive Outdoor Recreation Plan (SCORP)," available electronically at: http://www.dep.state.fl.us/parks/planning/default.htm

$65 billion in tourism spending.[198] In 2008, tourism spending resulted in approximately $3.9 billion in State sales tax revenues and contributed to the direct employment of more than 1 million Florida residents.[199] Florida has ranked first in the nation for the number of in-state anglers, angler expenditures, angler-supported jobs, and State and local tax revenues derived from freshwater fishing.[200] In 2006, total fishing-related expenditures by residents and nonresidents were more than $4.3 billion.[201] In addition, Florida's freshwater springs are an important inter- and intra-state tourist attraction.[202] In 2002, Blue Springs State Park estimated over 300,000 visitors per year.

Nitrogen/phosphorus pollution has contributed to severe water quality degradation of Florida waters. In 2010, the State of Florida reported approximately 1,918 miles of rivers and streams, and 378,435 acres of lakes that were known to be impaired by nitrogen/phosphorus pollution (the actual number of waters impaired for nutrients may be higher because many waters were not assessed).[203] As water quality declines, water resources have less recreational value. Waters impaired by nitrogen/phosphorus pollution may become unsuitable for swimming and fishing, and in some cases even unsuitable for boating. Nutrient-impaired waters also are less likely to support native plant and animal species, further lowering their value as tourist destinations.[204] Drinking

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[198] VISIT Florida, 2010, available electronically at: http://media.visitflorida.org/research.php

[199] VISIT Florida, 2010.

[200] Bonn, Mark A. and Frederick W. Bell., 2003, Economic Impact of Selected Florida Springs on Surrounding Local Areas. For Florida Department of Environmental Protection. Available electronically at: http://www.dep.state.fl.us/springs/reports/files/EconomicImpactStudy.doc

[201] 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Florida. U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. Available electronically at: http://myfwc.com/docs/Freshwater/2006_Florida_NationalSurvey.pdf

[202] Florida Department of Environmental Protection, 2008.

[203] Florida Department of Environmental Protection, 2010, "Integrated Water Quality Assessment for Florida: 2010 305(b) and 303(d) List Update," available electronically at: http://www.dep.state.fl.us/water/docs/2010_Integrated_Report.pdf

[204] Zheng, Lei and Michael J. Paul., 2006, *Effects of Eutrophication on Stream Ecosystems*. Available

water supplies may also be more expensive to treat as a result of nutrient impairments. Also, Florida citizens that depend on individual wells for their drinking water may need to consider whether on-site treatment is necessary to reduce elevated nitrate+nitrite levels. Freshwater springs are particularly at risk due to nitrate+nitrite.[205,206] Silver Springs, the largest of Florida's springs, has experienced reduced ecosystem health and productivity over the past half century, due largely to nitrate+nitrite.[207] Nutrient impairment, characterized by algal blooms, reduced numbers of native species, and lower water quality, in turn leads to reduced demand and lower values for these resources.

Some of the benefits of reducing nitrogen and phosphorus concentrations can be monetized, at least in part, by translating these changes into an indicator of overall water quality (water quality index) and valuing these improvements in terms of willingness to pay (WTP) for the types of uses that are supported by different water quality levels. For this analysis, EPA used a Water Quality Index (WQI) approach to link specific pollutant levels with suitability for particular recreational uses. Using Florida water quality data, available information on WTP, and an analytical approach described in EPA's accompanying economic assessment report and supporting references, EPA estimated potential changes that would result from implementation of this final rule and their value to a distribution of full-time and part-time Florida residents. This approach recognizes that there are differences in WTP among a population and values for households. Using

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electronically at: http://n-steps.tetratech-ffx.com/PDF&otherFiles/literature_review/Eutrophication%20effects%20on%20streams.pdf

[205] Florida Department of Environment, "Deep Trouble: Getting to the Source of Threats to Springs," accessed on October 1, 2010 at: http://www.floridasprings.org/protection/threats/

[206] Munch, D.A., D.J. Toth, C. Huang, J.B. Davis, C.M. Fortich, W.L. Osburn, E.J. Phlips, E.L. Quinlan, M.S. Allen, M.J. Woods, P. Cooney, R.L. Knight, R.A. Clarke and S.L. Knight., 2006, "Fifty-year retrospective study of the ecology of Silver Springs, Florida," (SJ2007-SP4)

[207] Florida Department of Environment, 2008, Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems," available at: http://www.dep.state.fl.us/springs/reports/files/UF_SpringsNutrients_Report.pdf

the mid-point WTP and current conditions as the baseline, total monetized benefits are estimated to be approximately $21.7 million per year for improvements to flowing waters and $6.6 million per year for improvements to lakes for a total of $28.2 million per year. Although these monetized benefits estimates do not account for all potential economic benefits, they help to partially demonstrate the economic importance of restoring and protecting Florida waters from the impacts of nitrogen/phosphorus pollution.

F. Summary

The following table summarizes EPA's estimates of potential incremental costs and benefits associated with additional State requirements to meet the numeric criteria that supports State designated uses. Because of uncertainties in the pollution controls ultimately implemented by the State of Florida, actual costs may vary depending on the procedures for assessing waters for compliance and the site-specific source reductions needed to meet the new numeric criteria.

Table VI(F)(a). Summary of Potential Annual Costs (millions of 2010 dollars per year)

Source Sector	**Annual Costs**
Municipal Waste Water Treatment Plants [a]	$22.3 - $38.1
Industrial Dischargers [b]	$25.4
Urban Storm Water [c]	$60.5 - $108.0
Agriculture [d]	$19.9 - $23.0
Septic Systems [e]	$6.6 - $10.7
Government/Program Implementation [f]	$0.9
Total	$135.5 - $206.1

VII. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is a "significant regulatory action." Accordingly, EPA submitted this action to the Office of

Management and Budget (OMB) for review under EO 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action. This final rule does not establish any requirements directly applicable to regulated entities or other sources of nitrogen/phosphorus pollution. Moreover, existing narrative water quality criteria in State law already require that nutrients not be present in waters in concentrations that cause an imbalance in natural populations of flora and fauna in lakes and flowing waters in Florida.

B. Paperwork Reduction Act

This action does not impose an information collection burden under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. Burden is defined at 5 CFR 1320.3(b). It does not include any information collection, reporting, or record-keeping requirements.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of this action on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration's (SBA) regulations at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Under the CWA WQS program, states must adopt WQS for their waters and must submit those WQS to EPA for approval; if the Agency disapproves a state standard and the state does not adopt appropriate revisions to address EPA's disapproval, EPA must promulgate standards consistent with the statutory requirements. EPA also has the authority to promulgate WQS in any case where the Administrator determines that a new or revised standard is necessary to meet the requirements of the Act. These state standards (or EPA-promulgated standards) are implemented through various water quality control programs including the NPDES program, which limits discharges to navigable waters except in compliance with an NPDES permit. The CWA requires that all NPDES permits include any limits on discharges that are necessary to meet applicable WQS.

Thus, under the CWA, EPA's promulgation of WQS establishes standards that the State implements through the NPDES permit process. The State has discretion in developing discharge limits, as needed to meet the standards. This final rule, as explained earlier, does not itself establish any requirements that are applicable to small entities. As a result of this action, the State of Florida will need to ensure that permits it issues include any limitations on discharges necessary to comply with the standards established in the final rule. In doing so, the State will have a number of choices associated with permit writing. While Florida's implementation of the rule may ultimately result in new or revised permit conditions for some dischargers, including small entities, EPA's action, by itself, does not impose any of these requirements on small entities; that is, these requirements are not self-implementing. Thus, I certify that this rule will not have a significant economic impact on a substantial number of small entities

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104-4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on state, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ``Federal mandates" that may result in expenditures to state, local, and Tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation of why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

This final rule contains no Federal mandates (under the regulatory provisions of Title II of the UMRA) for state, local, or tribal governments or the private sector. The State may use these resulting water quality criteria in implementing its water quality control programs. This final rule does not regulate or affect any entity and, therefore, is not subject to the requirements of sections 202 and 205 of UMRA.

EPA determined that this final rule contains no regulatory requirements that might significantly or uniquely affect small governments. Moreover, WQS, including those promulgated here, apply broadly to dischargers and are not uniquely applicable to small governments. Thus, this final rule is not subject to the requirements of section 203 of UMRA.

E. Executive Order 13132 (Federalism)

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. EPA's authority and responsibility to promulgate Federal WQS when state standards do not meet the requirements of the CWA is well established and has been used on various occasions in the past. The final rule will not substantially affect the relationship between EPA and the states and territories, or the distribution of power or responsibilities between EPA and the various levels of government. The final rule will not alter Florida's considerable discretion in implementing these WQS. Further, this final rule will not preclude Florida from adopting WQS that EPA concludes meet the requirements of the CWA, after promulgation of the final rule, which would eliminate the need for these Federal standards and lead EPA to withdraw them. Thus, Executive Order 13132 does not apply to this final rule.

Although section 6 of Executive Order 13132 does not apply to this action, EPA had extensive communication with the State of Florida to discuss EPA's concerns with the State's water quality criteria and the Federal rulemaking process.

F. Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments)

Subject to the Executive Order 13175 (65 FR 67249, November 9, 2000) EPA may not issue a regulation that has tribal implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by tribal governments, or EPA consults with tribal officials early in the process of developing the proposed regulation and develops a tribal summary impact statement. EPA has concluded that this action may have tribal implications. However, the rule will neither impose substantial direct compliance costs on tribal governments, nor preempt Tribal law.

In the State of Florida, there are two Indian tribes, the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida, with lakes and flowing waters. Both tribes have been approved for treatment in the same manner as a state (TAS) status for CWA sections 303 and 401 and have federally-approved WQS in their respective jurisdictions. These tribes are not subject to this final rule. However, this rule may impact the tribes because the numeric criteria for Florida will apply to waters adjacent to the tribal waters. EPA met with the Seminole Tribe on January 19, 2010 and requested an opportunity to meet with the Miccosukee Tribe to discuss EPA's proposed rule, although a meeting was never requested by the Tribe.

G. Executive Order 13045 (Protection of Children From Environmental Health and Safety Risks)

This action is not subject to EO 13045 (62 FR 19885, April 23, 1997) because it is not economically significant as defined in EO 12866, and because the Agency's promulgation of this rule will result in the reduction of environmental health and safety risks that could present a disproportionate risk to children.

H. Executive Order 13211 (Actions That Significantly Affect Energy Supply, Distribution, or Use)

This rule is not a "significant energy action" as defined in Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355 (May 22, 2001)), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

I. National Technology Transfer Advancement Act of 1995

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law 104–113, section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This final rulemaking does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards.

J. Executive Order 12898 (Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations)

Executive Order (EO) 12898 (Feb. 16, 1994) establishes Federal executive policy on environmental justice. Its main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this final rule does not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it will afford a greater level of protection to both human health and the environment if these numeric criteria are promulgated for Class I and Class III waters in the State of Florida.

K. Congressional Review Act

The Congressional Review Act.5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A "major rule" cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a "major rule" as defined by 5 U.S.C. 804(2). This rule is effective [insert date 15 months after publication in the Federal Register], except for section 131.43(e), which is effective [insert date 60 days after publication in the Federal Register].

List of Subjects in 40 CFR Part 131

Environmental protection, water quality standards, nitrogen/phosphorus pollution, nutrients, Florida.

Dated: November 14, 2010.

Lisa P. Jackson,
Administrator.

For the reasons set out in the preamble, 40 CFR part 131 is amended as follows:

PART 131 – WATER QUALITY STANDARDS

1. The authority citation for part 131 continues to read as follows:

Authority: 33 U.S.C. 1251 *et seq*.

Subpart D-[Amended]

2. Section 131.43 is added as follows:

§ 131.43 Florida.

(a) *Scope*. This section promulgates numeric criteria for nitrogen/phosphorus pollution for Class I and Class III waters in the State of Florida. This section also contains provisions for site-specific alternative criteria.

(b) *Definitions*.

(1) *Canal* means a trench, the bottom of which is normally covered by water with the upper edges of its two sides normally above water.

(2) *Clear, high- alkalinity lake* means a lake with long-term color less than or equal to 40 Platinum Cobalt Units (PCU) and Alkalinity greater than 20 mg/L $CaCO_3$.

(3) *Clear, low-alkalinity lake* means a lake with long-term color less than or equal to 40 PCU and alkalinity less than or equal to 20 mg/L $CaCO_3$.

(4) *Colored lake* means a lake with long-term color greater than 40 PCU.

(5) *Lake* means a slow-moving or standing body of freshwater that occupies an inland basin that is not a stream, spring, or wetland.

(6) *Lakes and flowing waters* means inland surface waters that have been classified as Class I (Potable Water Supplies) or Class III (Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife) water bodies

pursuant to Rule 62-302.400, F.A.C., excluding wetlands, and are predominantly fresh waters.

(7) *Nutrient watershed region* means an area of the State, corresponding to drainage basins and differing geological conditions affecting nutrient levels, as delineated in Table 2.

(8) *Predominantly fresh waters* means surface waters in which the chloride concentration at the surface is less than 1,500 milligrams per liter.

(9) *South Florida Region* means those areas south of Lake Okeechobee and the Caloosahatchee River watershed to the west of Lake Okeechobee and the St. Lucie watershed to the east of Lake Okeechobee.

(10) *Spring* means a site at which ground water flows through a natural opening in the ground onto the land surface or into a body of surface water.

(11) *State* means the State of Florida, whose transactions with the U.S. EPA in matters related to 40 CFR 131.43 are administered by the Secretary, or officials delegated such responsibility, of the Florida Department of Environmental Protection (FDEP), or successor agencies.

(12) *Stream* means a free-flowing, predominantly fresh surface water in a defined channel, and includes rivers, creeks, branches, canals, freshwater sloughs, and other similar water bodies.

(13) *Surface water* means water upon the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs shall be classified as surface water when it exits from the spring onto the Earth's surface.

(c) *Criteria for Florida waters.*

(1) *Criteria for lakes*.

(i) The applicable criteria for chlorophyll a, total nitrogen (TN), and total phosphorus (TP) for lakes within each respective lake class are shown on Table 1.

Table 1:

Lake Color[a] and Alkalinity	Chl-a (mg/L)[b,*]	TN (mg/L)	TP (mg/L)
Colored Lakes[c]	**0.020**	**1.27** [1.27-2.23]	**0.05** [0.05-0.16]
Clear Lakes, High Alkalinity[d]	**0.020**	**1.05** [1.05-1.91]	**0.03** [0.03-0.09]
Clear Lakes, Low Alkalinity[e]	**0.006**	**0.51** [0.51-0.93]	**0.01** [0.01-0.03]

[a] Platinum Cobalt Units (PCU) assessed as true color free from turbidity.
[b] Chlorophyll a is defined as corrected chlorophyll, or the concentration of chlorophyll a remaining after the chlorophyll degradation product, phaeophytin a, has been subtracted from the uncorrected chlorophyll a measurement.
[c] Long-term Color > 40 Platinum Cobalt Units (PCU)
[d] Long-term Color ≤ 40 PCU and Alkalinity > 20 mg/L $CaCO_3$
[e] Long-term Color ≤ 40 PCU and Alkalinity ≤ 20 mg/L $CaCO_3$
* For a given waterbody, the annual geometric mean of chlorophyll a, TN or TP concentrations shall not exceed the applicable criterion concentration more than once in a three-year period.

(ii) Baseline criteria apply unless the State determines that modified criteria within the range indicated in Table 1 apply to a specific lake. Once established, modified criteria are the applicable criteria for all CWA purposes. The State may use this procedure one time for a specific lake in lieu of the site-specific alternative criteria procedure described in paragraph (e) of this section.

(A) The State may calculate modified criteria for TN and/or TP where the chlorophyll a criterion-magnitude as an annual geometric mean has not been exceeded and sufficient ambient monitoring data exist for chlorophyll a and TN and/or TP for at least the three immediately preceding years. Sufficient data include at least four measurements per year, with at least one measurement between May and September and one measurement between October and April each year.

(B) Modified criteria are calculated using data from years in which sufficient data are available to reflect maintenance of ambient conditions. Modified TN and/or TP criteria may not be greater than the higher value specified in the range of values in column C of Table 1 in paragraph (c)(1(i) of this section. Modified TP and TN criteria may not exceed criteria applicable to streams to which a lake discharges.

(C) The State shall notify the public and maintain a record of these modified lake criteria, as well as a record supporting their derivation. The State shall notify EPA Region 4 and provide the supporting record within 30 days of determination of modified lake criteria.

(2) *Criteria for streams*.

(i) The applicable instream protection value (IPV) criteria for total nitrogen (TN) and total phosphorus (TP) for streams within each respective nutrient watershed region are shown on Table 2.

Table 2:

	Instream Protection Value Criteria	
Nutrient Watershed Region	TN (mg/L) *	TP (mg/L) *
Panhandle West [a]	0.67	0.06
Panhandle East [b]	1.03	0.18
North Central [c]	1.87	0.30
West Central [d]	1.65	0.49
Peninsula [e]	1.54	0.12

Watersheds pertaining to each Nutrient Watershed Region (NWR) were based principally on the NOAA coastal, estuarine, and fluvial drainage areas with modifications to the NOAA drainage areas in the West Central and Peninsula Regions that account for unique watershed geologies. For more detailed information on regionalization and which WBIDs pertain to each NWR, see the Technical Support Document.

[a] Panhandle West region includes: Perdido Bay Watershed, Pensacola Bay Watershed, Choctawhatchee Bay Watershed, St. Andrew Bay Watershed, Apalachicola Bay Watershed.

[b] Panhandle East region includes: Apalachee Bay Watershed, and Econfina/Steinhatchee Coastal Drainage Area.

[c] North Central region includes the Suwannee River Watershed.

[d]West Central region includes: Peace, Myakka, Hillsborough, Alafia, Manatee, Little Manatee River Watersheds, and small, direct Tampa Bay tributary watersheds south of the Hillsborough River Watershed.
[e] Peninsula region includes: Waccasassa Coastal Drainage Area, Withlacoochee Coastal Drainage Area, Crystal/Pithlachascotee Coastal Drainage Area, small, direct Tampa Bay tributary watersheds west of the Hillsborough River Watershed, Sarasota Bay Watershed, small, direct Charlotte Harbor tributary watersheds south of the Peace River Watershed, Caloosahatchee River Watershed, Estero Bay Watershed, Kissimmee River/Lake Okeechobee Drainage Area, Loxahatchee/St. Lucie Watershed, Indian River Watershed, Daytona/St. Augustine Coastal Drainage Area, St. John's River Watershed, Nassau Coastal Drainage Area, and St. Mary's River Watershed.
[*] For a given waterbody, the annual geometric mean of TN or TP concentrations shall not exceed the applicable criterion concentration more than once in a three-year period.

(ii) *Criteria for protection of downstream lakes.*

(A) The applicable criteria for streams that flow into downstream lakes include both the instream criteria for total phosphorus (TP) and total nitrogen (TN) in Table 2 in paragraph (c)(2)(i) and the downstream protection value (DPV) for TP and TN derived pursuant to the provisions of this paragraph. A DPV for stream tributaries (up to the point of reaching water bodies that are not streams as defined by this rule) that flow into a downstream lake is either the allowable concentration or the allowable loading of TN and/or TP applied at the point of entry into the lake. The applicable DPV for any stream shall be determined pursuant to paragraphs (B), (C), or (D) below. Contributions from stream tributaries upstream of the point of entry location must result in attainment of the DPV at the point of entry into the lake. If the DPV is not attained at the point of entry into the lake, then the collective set of streams in the upstream watershed does not attain the DPV, which is an applicable water quality criterion for the water segments in the upstream watershed. The State or EPA may establish additional DPVs at upstream tributary locations that are consistent with attaining the DPV at the point of entry into the lake. The State or EPA also have discretion to establish DPVs to account for a larger watershed area (i.e., include waters beyond the point of reaching water bodies that are not streams as defined by this rule).

(B) In instances where available data and/or resources provide for use of a scientifically defensible and protective lake-specific application of the BATHTUB model, the State or EPA may derive the DPV for TN and/or TP from use of a lake-specific application of BATHTUB. The State and EPA are authorized to use a scientifically defensible technical model other than BATHTUB upon demonstration that use of another scientifically defensible technical model would protect the lake's designated uses and meet all applicable criteria for the lake.

The State or EPA may designate the wasteload and/or load allocations from a TMDL established or approved by EPA as DPV(s) if the allocations from the TMDL will protect the lake's designated uses and meet all applicable criteria for the lake.

(C) When the State or EPA has not derived a DPV for a stream pursuant to (B), and where the downstream lake attains the applicable chlorophyll *a* criterion and the applicable TP and/or TN criteria, then the DPV for TN and/or TP is the associated ambient instream levels of TN and/or TP at the point of entry to the lake. Degradation in water quality from the DPV pursuant to this paragraph is to be considered nonattainment of the DPV, unless the DPV is adjusted pursuant to paragraph (B) above.

(D) When the State or EPA has not derived a DPV pursuant to (B), and where the downstream lake (1) does not attain applicable chlorophyll *a* criterion or the applicable TN and/or TP criteria or (2) has not been assessed, then the DPV for TN and/or TP is the applicable TN and/or TP criteria for the downstream lake.

(E) The State and EPA shall maintain a record of DPVs they derive based on the methods described in paragraphs (B) and (C) of this section, as well as a record supporting their derivation, and make such records available to the public. The State and

EPA shall notify one another and provide a supporting record within 30 days of derivation of DPVs pursuant to paragraphs (B) or (C) of this section.

(3) *Criteria for springs.* The applicable nitrate+nitrite criterion is 0.35 mg/L as an annual geometric mean, not to be exceeded more than once in a three-year period

(d) *Applicability*.

(1) The criteria in paragraphs (c)(1) through (3) of this section apply to lakes and flowing waters, excluding flowing waters in the South Florida Region, and apply concurrently with other applicable water quality criteria, except when:

(i) State water quality standards contain criteria that are more stringent for a particular parameter and use;

(ii) The Regional Administrator determines that site-specific alternative criteria apply pursuant to the procedures in paragraph (e) of this section; or

(iii) The State adopts and EPA approves a water quality standards variance to the Class I or Class III designated use pursuant to § 131.13 that meets the applicable provisions of State law and the applicable Federal regulations at § 131.10.

(2) The criteria established in this section are subject to the State's general rules of applicability in the same way and to the same extent as are the other federally-adopted and State-adopted numeric criteria when applied to the same use classifications.

(e) *Site-specific alternative criteria*.

(1) The Regional Administrator may determine that site-specific alternative criteria shall apply to specific surface waters in lieu of the criteria established in paragraph (c) of this section. Any such determination shall be made consistent with §131.11.

(2) To receive consideration from the Regional Administrator for a determination of site-specific alternative criteria, an entity shall submit a request that includes proposed alternative numeric criteria and supporting rationale suitable to meet the needs for a technical support document pursuant to paragraph (e)(3) of this section. The entity shall provide the State a copy of all materials submitted to EPA, at the time of submittal to EPA, to facilitate the State providing comments to EPA. Site-specific alternative criteria may be based on one or more of the following approaches.

(i) Replicate the process for developing the stream criteria in paragraph (c)(2)(i) of this section.

(ii) Replicate the process for developing the lake criteria in paragraph (c)(1) of this section.

(iii) Conduct a biological, chemical, and physical assessment of waterbody conditions.

(iv) Use another scientifically defensible approach protective of the designated use.

(3) For any determination made under paragraph (e)(1) of this section, the Regional Administrator shall, prior to making such a determination, provide for public notice and comment on a proposed determination. For any such proposed determination, the Regional Administrator shall prepare and make available to the public a technical support document addressing the specific surface waters affected and the justification for each proposed determination. This document shall be made available to the public no later than the date of public notice issuance.

(4) The Regional Administrator shall maintain and make available to the public an updated list of determinations made pursuant to paragraph (e)(1) of this section as well as the technical support documents for each determination.

(5) Nothing in this paragraph (e) shall limit the Administrator's authority to modify the criteria in paragraph (c) of this section through rulemaking.

(f) _Effective date_. This rule is effective [insert date 15 months after publication in the Federal Register], except for section 131.43(e), which is effective [insert date 60 days after publication in the Federal Register].