



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8960

SEP 09 2013

Mr. Tom Frick
Director
Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection
Mail Station 3000
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Frick:

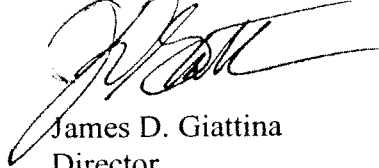
The United States Environmental Protection Agency has completed its review of a portion of the revisions adopted as part of the State's Triennial Review and contained in Rules 62-302 and 62-303. All of the Triennial Review revisions were approved for adoption by the Florida Environmental Regulation Commission (ERC) at a public hearing on April 23, 2013. On July 17, 2013, the EPA received a letter from Matthew Z. Leopold, General Counsel of Florida Department of Environmental Protection to A. Stanley Meiburg, Acting Regional Administrator, U.S. EPA Region 4, dated July 16, 2013, certifying that the amendments were duly adopted pursuant to state law. Today's letter addresses the Agency's review of the dissolved oxygen (DO) and nutrient related water quality standards. The remaining revisions adopted by the State as part of its Triennial Review are still under review by the EPA and will be addressed under separate cover.

As laid out in the enclosed decision document, titled *Decision Document of the United States Environmental Protection Agency Determination Under § 303(c) of the Clean Water Act Review of a Portion of Florida's 2013 Triennial Review of Changes to Rules 62-302 and 62-303*, the EPA is approving the DO and nutrient related water quality standards. These revisions include revised statewide marine and freshwater DO criteria, antidegradation considerations regarding any lowering of DO, protection from negative trends in DO levels, the inclusion of total phosphorus, total nitrogen, and chlorophyll *a* criteria for the Tidal Peace River, among other provisions relating to DO and nutrients. Additionally, the State's revisions include specific provisions for the protection of several federally listed threatened and endangered species, including three sturgeon and one mussel species.

In addition to the EPA's review pursuant to Section 303 of the Clean Water Act, Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies, in consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services), to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species. The Agency's decision to approve the dissolved oxygen and nutrient related provisions is subject to the results of consultation under section 7 of the ESA. The Agency will notify FDEP of the results of the section 7 consultation upon completion of the action.

We would like to commend you and your staff for your continued efforts in environmental protection for the State of Florida, particularly your pre-adoption coordination efforts with our office and the Services. Should you have any questions regarding the EPA's action today, please contact me at (404) 562-9345 or have a member of your staff contact Ms. Lauren Petter, Florida Water Quality Standards Coordinator at (404) 562-9272.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Giattina', with a long horizontal flourish extending to the right.

James D. Giattina
Director
Water Protection Division

Enclosure

cc: Mr. Matthew Z. Leopold, FDEP

Decision Document of the United States Environmental Protection Agency Determination Under § 303(c) of the Clean Water Act Review of a Portion of Florida's 2013 Triennial Review of Changes to Rules 62-302 and 62-303

In a letter dated July 16, 2013, from Matthew Z. Leopold, General Counsel for the FDEP, to A. Stanley Meiburg, Acting Regional Administrator of the EPA's Region 4 Office, the Florida Department of Environmental Protection (the FDEP or the Department) submitted new and revised water quality standards for review by the U.S. Environmental Protection Agency pursuant to section 303(c) of the Clean Water Act (CWA or Act). In the July 16, 2013 letter, the General Counsel certified that the WQS revisions were duly adopted pursuant to Florida law. These new and revised water quality standards (WQS) are set out primarily in Rule 62-302 of the Florida Administrative Code (F.A.C.) [Surface Water Quality Standards]. The State also submitted amendments to Rule 62-303, F.A.C. [Identification of Impaired Surface Waters], which establishes Florida's methodology for assessing whether waters are attaining state water quality standards, and Rule 62-4, F.A.C [Permits], which, in part, sets out Florida's antidegradation implementation procedures. This decision document only addresses the triennial review revisions related to dissolved oxygen (DO) and nutrients. The remaining triennial review provisions, with the exception of subsection 62-302.300(19), which was submitted to and approved by the EPA on June 27, 2013, will be addressed under separate cover. As discussed more fully below, where the EPA has determined that amendments to Rule 62-302 and Rule 62-303 are, themselves, new or revised water quality standards, the EPA has reviewed and approved those revisions pursuant to section 303(c) of the CWA.¹

Section 303 of the Clean Water Act, 33 U.S.C. § 1313, requires states to establish water quality standards and to submit any revised or new standards to the EPA for approval or disapproval. The revisions addressed in this document were approved for adoption by the Florida Environmental Regulation Commission (ERC) at a public hearing on April 23, 2013 and received by the EPA on July 17, 2013.

In addition to the EPA's review pursuant to Section 303 of the CWA, Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies, in consultation with the Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS), to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species. With regard to consultation activities for section 7 of the ESA, the EPA Region 4 has concluded that the Agency's action to approve the DO and nutrient related provisions contained in the July 17, 2013 submittal would either have no effect or would not likely adversely affect the threatened and endangered species or their critical habitat. The EPA's decision to approve the DO and nutrient related provisions is subject to the results of consultation under section 7 of the ESA with the U.S. Fish and Wildlife Service and National Marine Fisheries Service. The EPA will notify Florida of the results of the section 7 consultation upon completion of the action.

EPA's Decision

Each of FDEP's water quality standards revisions is addressed in detail below along with the EPA's analysis and conclusions.

¹ EPA has provided FAQs on "What is a New or Revised Water Quality Standard Under CWA 303(c)(3)?" at <http://water.epa.gov/scitech/swguidance/standards/cwa303faq.cfm>. The link provides detailed information of such analysis.

Revisions to Chapter 62-302²

Section 62-302.500

Paragraph 62-302.500(2)(f) was revised and reads as follows:

(2) General Criteria.

...

(f) Notwithstanding the specific numerical criteria applicable to individual classes of water, dissolved oxygen levels that are attributable to natural background conditions or man-induced conditions which cannot be controlled or abated may be established as alternative dissolved oxygen criteria for a water body or portion of a water body. Alternative dissolved oxygen criteria may be established by the Secretary or a Director of District Management in conjunction with the issuance of a permit or other Department action only after public notice and opportunity for public hearing. The determination of alternative criteria shall be based on consideration of the factors described in subparagraphs 62-302.800(1)(a)1.-4. and subsections 62-302.533(3) – (4), F.A.C. Alternative criteria shall not result in a lowering of dissolved oxygen levels in the water body, water body segment or any adjacent waters, and shall not violate the minimum criteria specified in subsection 62-302.500(1), F.A.C. Daily and seasonal fluctuations in dissolved oxygen levels shall be maintained.

By adding the references to subsections 62-302.533(3) and (4), the State is clarifying the expectations with regard to developing an alternative dissolved oxygen criteria (ADOC). Subsections (3) and (4), and Appendix H, which is referenced in subsection (4), will be discussed further in the analysis and review of the dissolved oxygen revisions to subsections (3) and (4) on pages 15 and 16. Because this revision incorporates considerations to be made when developing criteria the revision to paragraph 62-302.500(2)(f) is consistent with 40 CFR part 131 and the CWA and are approved by the EPA pursuant to section 303(c) of the Act.

The EPA notes that each adoption of an ADOC will be reviewed by the EPA to ensure that all of the requirements for State revision of WQS have been completed, and to determine whether the provisions of 40 CFR part 131 are met. An ADOC based on this provision will only become effective for CWA purposes after approval by the EPA pursuant to CWA section 303(c).

Section 62-302.532

Paragraph 62-302.532(1)(d) was revised and reads as follows:

(1) Estuary-specific numeric interpretations of the narrative nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., are in the table below. The concentration-based estuary interpretations are open water, area-wide averages. The interpretations expressed as load per million cubic meters of freshwater inflow are the total load of that nutrient to the estuary divided by the total volume of freshwater inflow to that estuary.

Estuary	Total Phosphorus	Total Nitrogen	Chlorophyll <i>a</i>
(a) through (c) No change.			

² Unless otherwise stated, all rule and subsection citations are to provisions in the Florida Administrative Code.

(d) Charlotte Harbor/Estero Bay	Annual arithmetic mean values for nutrients and annual arithmetic means for chlorophyll <i>a</i> , not to be exceeded more than once in a three year period. Nutrient and nutrient response values do not apply to tidally influenced areas that fluctuate between predominantly marine and predominantly fresh waters during typical climatic and hydrologic conditions.		
1. through 7. No change.			
8. Tidal Peace River	0.50 mg/L	1.08 mg/L	12.6 µg/L
8. through 9. renumbered 9. through 10. No change.			
(e) through (j) No change.			

The Tidal Peace River is a sub-segment of the Charlotte Harbor/Estero Bay Estuary area. Criteria for the rest of the Charlotte Harbor/Estero Bay Estuary area were established by previous rule, but at that time, as indicated on page 2 of FDEP's Overview Document, the Tidal Peace River was excluded since FDEP "believed that a Total Maximum Daily Load (TMDL) would be established for the Tidal Peace River estuarine segment." Because the TMDL has been delayed indefinitely, numeric nutrient criteria for the Tidal Peace River were included in the Triennial Review revisions.

The criteria for the Tidal Peace River which are included in this submittal were developed at the same time and as part of the same technical exercise as the other sub-segments of the Charlotte Harbor/Estero Bay Estuary area. The resulting values for total phosphorus, total nitrogen, and chlorophyll *a* for the Tidal Peace River were included in the Charlotte Harbor/Estero Bay Estuary Technical Support Document (TSD) that was provided as part of the 2012 submittal but not included in the rule table at that time. The table is being amended in this submittal with values supported by the original TSD. The EPA previously reviewed this TSD and found the overall methodology applied to the Charlotte Harbor/Estero Bay Estuary area to be sound. The criteria included here are the same as the values in that TSD and are supported by the analysis therein. ["Proposed Numeric Nutrient Criteria For The Charlotte Harbor National Estuary Program Estuarine System," September 2011; prepared by Janicki Environmental, Inc. for The Charlotte Harbor National Estuary Program (summarized in tables on pages 9 & 11)]

FDEP has provided support of this rule demonstrating that the numeric nutrient criteria adopted by the State are based on a scientific rationale and will serve to protect the uses designated by the State for the estuarine and marine waters covered by this rule. FDEP concluded that this approach will provide sufficient protection of designated uses for these waters. The EPA concludes that the criteria provided at Subparagraph 62-302.532(1)(d)8. Tidal Peace River are based on a scientific rationale and protect the uses designated by the State in this estuarine area and therefore, are consistent with the CWA, 40 CFR part 131, and the EPA's 304(a) guidance on nutrient criteria.

Subsection 62-302.532(2) was revised and reads as follows:

(2) Estuarine and marine areas are delineated in the eight maps of the Florida Marine Nutrient Regions, all dated February 20, 2013, ~~October 19, 2011~~, which are incorporated by reference. Copies of these maps may be obtained from the Department's internet site at <http://www.dep.state.fl.us/water/wqssp/swq-docs.htm> or by writing to the Florida Department of Environmental Protection, Standards and Assessment Section, 2600 Blair Stone Road, MS 6511, Tallahassee, FL 32399-2400.

The Charlotte Harbor map, included in the submittal, provides the updated spatial application of the estuarine criteria in the table, specifically the Tidal Peace River sub-segment of the Charlotte Harbor/Estero Bay Estuary area. All eight maps were updated to reflect the date change and the subsection was made to be consistent with the file dates of the updated map files.

The EPA concludes that this change to subsection 62-302.532(2) provides updated information regarding the spatial extent of the estuary criteria and is consistent with the CWA, 40 CFR part 131, and the EPA's 304(a) guidance on nutrient criteria. Therefore, this change is approved by the EPA pursuant to CWA section 303(c).

Subsection 62-302.530(30) and Addition of Section 62-302.533

Subsection 62-302.530(30) [Dissolved Oxygen] was revised and reads as follows:

Parameter	Units	Class I	Class II	Class III and Class III-Limited (see Note 4)	
				Predominantly Fresh Waters	Predominantly Marine Waters
(30) Dissolved Oxygen	Milligrams/L	See Rule 62-302.533, F.A.C.			
		Shall not be less than 5.0. Normal daily and seasonal fluctuations above this level shall be maintained.	Shall not average less than 5.0 in a 24-hour period and shall never be less than 4.0. Normal daily and seasonal fluctuations above these levels shall be maintained.	Shall not be less than 5.0. Normal daily and seasonal fluctuations above these levels shall be maintained.	Shall not average less than 5.0 in a 24-hour period and shall never be less than 4.0. Normal daily and seasonal fluctuations above these levels shall be maintained.

The deletion of the minimum 5.0 mg/L (in freshwaters) and average 5.0 mg/L and minimum 4.0 mg/L (in marine waters) is reflective of the State's efforts to revise the DO criteria statewide. In the following section, the EPA lays out the review and analysis of the newly adopted criteria. With regard to the revisions to subsection 62-302.530(30), the EPA reviewed the change to the previously applicable criteria and is approving the deletion of the previous criteria at 62-302.530(30) and subsequent table revision as consistent with 40 CFR part 131 and the CWA pursuant to section 303(c) of the Act. Subsection 62-302.533(1) was added and reads as follows:

- (1) Class I, Class III predominantly freshwaters, and Class III-Limited predominantly freshwaters.
- (a) No more than 10 percent of the daily average percent dissolved oxygen (DO) saturation values shall be below the following values:
 - 1. 67 percent in the Panhandle West bioregion,
 - 2. 38 percent in the Peninsula and Everglades bioregions, or
 - 3. 34 percent in the Northeast and Big Bend bioregions. A map of the bioregions is contained in *SCI 1000: Stream Condition Index Methods* (DEP-SOP-003/11 SCI 1000), which is incorporated by reference in Rule 62-160.800, F.A.C.
- (b) For lakes, the daily average DO level shall be calculated as the average of measurements collected in the upper two meters of the water column at the same location on the same day. For all other freshwaters, the daily average freshwater DO level shall be calculated as the average of all measurements collected in the water column at the same location and on the same day.
- (c) In the portions of the Suwannee, Withlacoochee (North), and Santa Fe Rivers utilized by the Gulf Sturgeon, and in the portions of the Santa Fe and New Rivers utilized by the Oval

Pigtoe Mussel, DO levels shall not be lowered below the baseline distribution such that there is 90 percent confidence that more than 50 percent of measurements are below the median of the baseline distribution or more than 10 percent of the daily average values are below the 10th percentile of the baseline distribution for the applicable waterbody.

(d) In the portions of the St. Johns River utilized by the Shortnose or Atlantic Sturgeon, the DO shall not be below 53 percent saturation during February and March. During other times of the year, the criteria specified in paragraph 62-302.533(1)(a), F.A.C., shall apply.

(e) The baseline distributions and maps showing the specific areas utilized by the Gulf Sturgeon and the Oval Pigtoe Mussel are provided in Appendix I of the “*Technical Support Document for the Derivation of Dissolved Oxygen Criteria to Protect Aquatic Life in Florida’s Fresh and Marine Waters*” (DEP-SAS-001/13), dated March 2013, which is incorporated by reference herein. Copies of Appendix I may be obtained from the Department’s internet site at <http://www.dep.state.fl.us/water/wqssp/swq-docs.htm> or by writing to the Florida Department of Environmental Protection, Standards and Assessment Section, 2600 Blair Stone Road, MS 6511, Tallahassee, FL 32399-2400.

Subsection 62-302.533(1) addresses the three different regionalized criteria for all freshwaters, along with specific details regarding the application of those criteria in different waterbody types. The subsection also addresses location specific criteria which apply in areas where certain endangered species are present. The EPA’s analysis will first focus on paragraphs (a) and (b), including the methodology used to derive the regionalized criteria, followed by analyses regarding the regionalization selected, use of the Stream Condition Index (SCI) and percent saturation, the transferability of the criteria to lakes and the Everglades bioregion, sampling depth, and the duration and frequency components of the three different regionalized criteria. Lastly, the EPA’s analysis will consider the protection and location associated with the threatened and endangered species provisions in paragraphs (c) through (e).

Methodology to Derive Regionalized DO Criteria

The development of the three different criterion magnitudes (67, 38, and 34 percent saturation) was based on multiple lines of evidence. These lines of evidence are included in FDEP’s Technical Support Document: Derivation of Dissolved Oxygen Criteria to Protect Aquatic Life in Florida’s Fresh and Marine Waters, March 2013 Version (FDEP’s DO TSD). The primary line of evidence used by the State was the development of a regional regression relationship between the average SCI score and the daily average DO saturation. For each region, the daily average DO saturation necessary to achieve a minimum SCI score of 40 was selected as protective of healthy, well balanced communities. The criteria were based on data from “minimally disturbed” sites that had been screened from datasets to remove potential anthropogenic influence that could have biased the computation of the final regression relationship. After determining the region specific regression, the State added an additional level of conservatism by analyzing the confidence intervals associated with the data. By selecting the lower confidence bound, a higher value for percent saturation was selected than would have resulted from the regression-based interception point with the SCI of 40. This is demonstrated in Figure 19 on page 38 of FDEP’s DO TSD. The resulting percent saturations of 67, 38, and 34 were then compared to a second line of evidence. The second line of evidence is comparable to the method used by the State in the derivation of its numeric nutrient

criteria for streams, in which the 90th percentile of a reference distribution was used.³ As shown in Table 5 on page 42 of FDEP's DO TSD, the lower confidence interval from the regional regression method was comparable to the 10th percentile value identified from the reference site distribution.⁴ Lastly, in a comparison to a Louisiana study of the effects of DO on invertebrates and fish, the State was able to conclude that the lowland streams and species present in Louisiana and referenced in the Louisiana study are also present in Florida and therefore, the results are transferable, with the final comparison indicating the freshwater criteria adopted in Florida are more conservative than Louisiana's conclusions from the 2012 study.⁵ Because FDEP's methodology, with its multiple lines of evidence, resulted in criteria derivation that will protect the designated uses, the EPA finds that this methodology is reasonable and scientifically defensible.

Regionalization

The existing bioregions were revised to reflect regional differences in biology that had been observed by the State since the 2007 adjustments to the SCI. Appendix B of FDEP's DO TSD provides more detail on the 2012 updates to the SCI. The primary change resulted in the Panhandle bioregion being split into two bioregions, the Panhandle West and Big Bend bioregions. There were also minor adjustments in the borders of the Northeast and Peninsula regions in order to not bisect watersheds. A comparison between the old and new delineations of the bioregions can be found in Figure B8 of FDEP's DO TSD. Although the updated SCI information resulted in a total of five distinct bioregions- Panhandle West, Big Bend, Northeast, Peninsula, and Everglades, there are only three regionalized DO freshwater criteria. Additional information on the combining of the bioregions for purposes of the DO criteria development is discussed in the Transferability section below. The State's development of regions provides a means to describe the spatial extent associated with the criteria derivation and therefore ensures that the criteria are protective and scientifically defensible.

Use of the SCI and Percent Saturation

The State included rationales within their DO TSD and Responsiveness Document regarding the use of the SCI score of 40 as an aquatic life endpoint and the physiological relevance of expressing the criteria as percent saturation. FDEP's DO TSD includes information from scientific studies to support the conclusion that stream macroinvertebrates are representative of the health of the aquatic community as a whole. The studies summarized on pages 23-24 of the DO TSD indicate that a range of DO concentrations generally between 2.1 and 2.8 mg/L are associated with levels necessary for mayfly larval survival and, among fish studies, depending on the life stage, DO levels of 2.2 mg/L and 2.7 mg/L were necessary for the survival of juvenile shortnose sturgeon. Growth in some fish could be affected when DO levels were below 3.0 mg/L. As noted in footnote 5, the DO concentrations associated with the general statewide temperature range corresponds to a range at the higher end of these studies, and, in

³ In the case of DO, the 10th percentile of a reference distribution is comparable because the criteria is intended to protect against the DO becoming too low to support the designated use, as opposed to, in the case of nutrient criteria, the protection is related to the 90th percentile in order to prevent nutrient levels from becoming too high to support the designated use.

⁴ The 67, 38, and 34 percent saturations from the lower confidence bound of the regression line are comparable to the 10th percentile of the reference DO distribution percent saturations of 68.3, 33.6, and 38.7, respectively.

⁵ Based on the results of Figure 21, the DO concentrations associated with a statewide temperature range between 16° C and 25° C corresponds to a range of 2.8 mg/L - 3.4 mg/L in the Northeast and Panhandle East region, and a higher range in the other two regions. In the Louisiana study, the threshold DO concentrations were 2.3 and 2.6 mg/L, for fish and invertebrates, respectively.

many situations are more stringent than the lethal limits for macroinvertebrates and fish obtained from these studies. In addition to analyzing existing macroinvertebrate and fish studies, the State conducted statistical analyses on different scales to test the responsiveness of SCI to DO percent saturation. Figures 13 and 14 on pages 29 and 30 of the DO TSD depict the findings of statewide and regionalized correlations. The State also performed statistical analyses on all 10 of the metric components that comprise the SCI in order to test whether individual SCI metrics were responding consistently to changes in DO levels. As summarized on pages C-1 and C-2:

Predictably, the observed relationships varied across regions and by metric. Generally, the strongest responses to DO levels were for metrics that were measures of the pollution sensitive portion of the macroinvertebrate community such as; number of sensitive taxa, number of clinger taxa, and number of Ephemeroptera (mayfly) taxa (**Figure 1, 2, and 3**). All of these metrics exhibited a positive response to DO, as expected, with the number of sensitive taxa increasing with increasing DO levels. Spatially, the strongest relationships between the metrics indicative of the pollution sensitive taxa and DO levels were generally found in the Panhandle West bioregion where the biological expectation is higher and a greater number of sensitive organisms are typically found in conjunction with higher DO levels. In contrast, metrics that describe portions of the community that are more pollution tolerant such as percent very tolerant individuals, and percent dominant taxa exhibited less significant responses to DO and tended to decrease with increasing DO levels (**Figures 5 and 10**).

The results of the evaluation of the individual SCI metrics followed expected patterns and confirms that the macroinvertebrate community is responding to DO levels and that the relationships between the SCI scores and DO levels are not the random result of a combination of the individual metrics. This finding supports the use of the SCI versus DO relationships in the derivation of the proposed freshwater DO criteria described in this document.

In addition, as part of the Responsiveness Document, FDEP provided the following response to a comment from the Florida Fish and Wildlife Conservation Commission (FWC) regarding the appropriateness of the SCI as a tool in developing the DO criteria with the following:

Response: The Stream Condition Index (SCI) is a macroinvertebrate index developed by the Department to identify biologically healthy freshwaters. The SCI is composed of ten separate metrics that target different components of the macroinvertebrate community (e.g., sensitive, tolerant, long-lived, and different feeding or functional groups). The SCI has been adopted into rule and is currently being used to identify biological impairments. Additionally, the SCI has been accepted by the USEPA as an appropriate indicator of stream health.

Based on available information, Florida macroinvertebrates, as a group, are more sensitive to low DO than are Florida fishes, therefore, the Department used the multi-metric SCI to determine the DO level that is sufficient to support a healthy, well-balanced community. Although there may be examples of extremely tolerant species of stream invertebrates (e.g., “blood worms”) that can tolerate DO concentrations below those of many fish species, it should be noted that the SCI metrics recognize the differences in individual species sensitivity and tolerance, and are scored accordingly. This assures that sites with passing SCI scores of 40 or greater are inhabited by a healthy well-balanced community, including reproducing populations of representative sensitive taxa.

Additionally, whereas most fish species will migrate in and out of an area depending on the current conditions, benthic invertebrates typically remain sessile until conditions approach lethal limits, at which point those species with the capacity to do so will attempt to drift out of the affected area. This results in the invertebrate community being a more stable indicator of system health.

Lastly, as noted on page 25 of the DO TSD, FDEP concluded “[i]n aquatic systems where the natural DO levels are above the sub-lethal effects level, lowering the DO levels below the threshold may induce adverse effects on some sensitive species within the community, which may in turn affect biological community structure and function. To prevent this from occurring, the revised DO criteria include a provision that requires the continued maintenance of the existing DO regime in aquatic systems having DO levels naturally higher than the minimum criteria.” This concept will be discussed in greater detail in the EPA’s analysis of subsection 62-302.533(5).

In addition to providing support for the use of the SCI, the use of percent saturation was an important component of the criteria derivation. The use of percent saturation as the format for expressing a DO criterion is one acceptable way of measuring the available DO in a waterbody. As summarized in Section 4.2.2 of DEP’s DO TSD, the state determined that “factors that influence the short-term changes in DO concentrations [could] be taken into account or included in the analyses” to further refine the SCI versus DO relationship. Therefore, FDEP considered the use of percent saturation as an important way to consider both DO levels and temperature. On page iv of the DO TSD, the following explanation was given for the use of percent saturation: “FDEP selected DO percent saturation rather than concentration because a) the daily average DO saturation provided the best correlation with SCI scores, and b) saturation automatically accounts for the inherent relationship between temperature and DO.” The expression of the criteria as percent saturation was discussed, among other topics, by a peer review panel. Additionally, during the development of DEP’s DO criteria, the EPA Region 4 considered input from Dr. Glen Thursby of EPA’s Narragansett Lab and M. Craig Barber of the Athens Ecosystems Research Division of the Office of Research and Development on the concept of using percent saturation as opposed to concentration. Dr. Thursby’s National Saltwater Criteria for Dissolved Oxygen: Potential Addenda to Virginian Province Saltwater Criteria for Warmer and Colder Waters (October 2003) and Barber’s Review of Marine Dissolved Oxygen for Fish and Invertebrates (July 2012) are analyses that reflect some of the differing bases for using concentrations and percent saturation, respectively. Based on the reasons outlined above, the State was able to conclude that the use of SCI and application of the criteria as percent saturation values will result in criteria that are fully protective of the designated use. FDEP’s analyses, peer review panel, and solicitation of input from national experts enable the EPA to conclude the State’s use of the SCI and percent saturation are reasonable approaches for the State’s criteria derivation.

Transferability to Lakes and Other Bioregions

Within paragraph 62-302.533(1)(a) it is indicated that freshwaters, including lakes, are covered by the three regionalized DO criteria, and specifically, the Everglades is identified as covered by the DO criterion associated with the Peninsula bioregion. Streams and regionalization beyond the Everglades bioregion have been discussed in detail in previous sections of this decision document, but the transferability of the stream criteria to lakes and the combination of regions into fewer DO regions will be discussed here.

Page 46 of DEP's DO TSD discusses the State's decision to apply the regionalized DO criteria (based on stream data) to lakes. Based on the difficulty using the Lake Condition Index to establish DO criteria specific to lakes and the expected lesser DO sensitivity of lake species compared to stream species, the State chose to apply the more conservative stream criteria to lakes to ensure the DO was fully protective of lake communities.

The following response from FDEP to a comment regarding the State's decision to apply the criteria derived for streams to lakes also, is useful in summarizing the basis for this decision and in explaining how the State concluded that using the stream criteria was the best available scientific approach:

Response: Based on information available in the scientific literature, the DO requirements of sensitive species in flowing waters (streams) are generally higher than those of species in lentic environments (lakes), and sensitive invertebrates are generally more sensitive to low DO than are fish and other lentic species. Additionally, many of the more sensitive lentic species also occur in streams and rivers. Therefore, based on the available information, the recommended stream DO criteria derived using the SCI response to DO is considered to be fully protective of lake communities. Additionally, for lakes that naturally have DO levels above the proposed minimum criteria, provisions in the proposed rule would require that the higher DO levels be maintained.

The decision to use the most sensitive endpoint statewide – macroinvertebrates in lotic waters – is a reasonable approach based upon the studies cited in the TSD (and referenced earlier in the “Use of SCI” section), along with the support from the peer review panel.⁶

With regard to the combining of regions to be covered by the three different regionalized DO criteria, page 35 of FDEP's DO TSD indicates that initially regression analyses were conducted on the regional datasets “to determine if there were apparent regional differences in the SCI versus DO relationships.” Figure 18 indicates that the Panhandle West region is different from the Northeast, Big Bend, and Peninsula Regions. However, additional analyses were completed to ensure whether the distinction was statistically significant. The additional analysis resulted in the formation of the three different regions/combinations: the “Panhandle West,” “Peninsula,” and “Big Bend + Northeast.” The three regions are depicted in Figure 19 and provide “the best regionalized models of the SCI versus DO saturation relationships for Florida streams that also incorporates the effect of temperature on the expected DO levels.” Additionally, page 46 provides further description on the transferability of the Peninsula regional DO criterion to the Everglades bioregion, by concluding that “DO criteria for the Peninsula bioregion is believed to be fully protective of the biological communities within the remaining natural waterbodies as well as the limited communities inhabiting the man-made or altered waterbodies that predominate this area [and therefore the] Peninsula criteria will also apply to freshwaters within the Everglades bioregion where SSACs have not been adopted.”

The use of three different DO levels among five different biologically based regions is a reasonable approach given the information included in the above referenced pages and figures.

⁶ On pages G-5 and G-10 of the FDEP DO TSD, FDEP noted several locations where additional support was requested to support the use of the stream criteria derivation to lakes based on peer review panel comments and agreement on the concept.

Sampling Depth

In paragraph (b), FDEP clarifies that the measurements of DO will need to be handled in two specific ways, depending on whether the waterbody is a lake or some other type of freshwater. For lakes, the State identified several reasons why measuring DO in the upper two meters of the water column would be appropriate. As noted on page 47 of FDEP's DO TSD, the reasons include: the "vertical differences are more pronounced," "it is difficult to accurately measure bottom water column DO because of interference and interactions with (generally low DO) sediments, and the Kaller et al (2010) study to avoid the "influence of water temperature, flooding levels, water movement, and depth on DO levels and stratification." These considerations will ensure that "habitat and nursery areas [of littoral zones most often utilized by lake fish and invertebrates]" will be protected and will "limit the number of healthy lakes erroneously listed as impaired due to natural conditions." Because many of the factors in lakes do not apply in streams, the State has identified that all other freshwaters can be measured from anywhere in the water column. For all freshwaters, the State averages grab samples taken at the same location on the same day. The EPA finds the current revision will allow for more appropriate application of the freshwater DO criteria. The considerations in 62-302.533(1)(b) are reasonable and consistent with DO criteria approved in other states.

Duration and Frequency

The state is replacing the previously adopted minimum of 5.0 mg/L, which was never to be exceeded, with a daily average of a given percent saturation based on one of three regions, that allows for variability associated with the DO-SCI relationship. As summarized in the State's August 23, 2013, letter (August 2013 letter) to Annie Godfrey, the State provided the following supplemental information regarding the selected duration and frequency:

To statistically account for the inherent variability in the relationships, the criteria were derived from a 90 percent confidence interval for the response rather than the "mean" response. Based on the use of the 90 percent confidence interval, 10 percent of healthy sites would statistically be predicted to fail the criteria (even though these sites passed the SCI). The criteria derived based on the SCI versus DO relationships were also supported by the 10th percentile DO levels of "Reference" sites (meaning approximately 10% of the minimally disturbed reference sites would also fail the DO criterion). The application of the 10 percent excursion frequency to the daily average freshwater DO criteria is therefore consistent with the derivation of the criteria and would help minimize the potential for healthy sites to be incorrectly identified as being impaired.

Additional support for the use of a daily average, as opposed to a daily minimum as was used previously, can be found in FDEP's response to FWC's questions on the use of average daily percent saturation during criterion development.

Response: The Department used the average daily percent saturation as the basis for the proposed criteria because it was better correlated to biological response. Additionally, analysis of DO concentrations in Florida waterbodies indicate that there is a very high degree of correlation ($r^2 = 0.97$ for streams/rivers and $r^2 = 0.89$ for lakes) between the daily average and daily minimum DO concentrations. That is, as the daily average increases so does the daily minimum. While it is theoretically possible, it is unlikely that the daily minimum DO levels fall to problematic levels without the daily average also decreasing, as demonstrated by the high degree of correlation between the two metrics. Further, the Department has included additional

provisions that will help identify cases where the daily minimum DO levels may decrease while the daily average is not affected. First, in the cases where grab samples are used to assess compliance, a time of day specific translation of the criteria will be made that identifies the expected DO level at the time of sampling based on the typical diel DO patterns (i.e., low in the morning and high in the afternoon).

The Department has also included a trend test as part of the assessment of compliance. The trend test will be applied to both the DO concentrations as well as the daily range in DO concentrations (i.e., difference between daily maximum and minimum concentrations). If either the daily average or daily minimum DO levels change significantly, those changes will be identified and the Department will take further action as appropriate.

Along with the multiple lines of evidence used to develop the magnitude component of the criteria, the use of a daily average and up to a 10 percent exceedance frequency results in DO criteria that will protect the designated uses of the freshwaters in Florida, and therefore represent a reasonable and scientifically defensible methodology.

Threatened and Endangered Species Provisions

During the development of the DO criteria, the EPA took part in conversations between FDEP and the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services) to discuss the protection of threatened and endangered species in certain segments of the State. The result of the conversations was detailed maps for portions of the Suwannee, Withlacoochee (North), Santa Fe, New, and St. Johns Rivers and the development of specific times when and/or locations where different criteria than the newly revised DO criteria contained in paragraph 62-302.533(1)(a) apply to ensure protection of the three sturgeon and one mussel species identified in 62-302.533(1)(c) and (d). The State concluded that all other threatened or endangered species were protected by the otherwise applicable criteria located in paragraphs 62-302.533(1)(a) and 62-302.533(2)(a) based on the best available information.

The DO requirements of sturgeon, specifically the Gulf Sturgeon, Shortnose Sturgeon, and Atlantic Sturgeon, and the Oval Pigtoe Mussel were considered in more detail in Sections 6.1.3 and 6.3 of FDEP's DO TSD which documents the State's conclusion that the criteria are expected to be fully protective of the Oval Pigtoe Mussel habitats and "all life stages of the Gulf, Atlantic, and Shortnose Sturgeons in both their fresh and marine waters habitats within Florida based on the best available information." The State's development of the methodology contained in Appendix I of FDEP's DO TSD was the result of the inability to derive specific thresholds from existing scientific studies and/or limited data that existed for the species.

The methodology used for all locations, except the St. Johns River, was based on maintaining existing conditions based on the conclusion that "the populations of the sturgeon and mussel are stable and may actually be increasing in [the Suwannee, Santa Fe, New, and Withlacoochee] river systems." As noted in the DO TSD, the DO data from a 21 year period (1991-2011) was compiled to capture the expected range of temporal variability and overlap with the time period of stable or increasing sturgeon population. The summary statistics from this data period are included in Table 1 of Appendix I (for the Oval Pigtoe Mussel in the Santa Fe and New Rivers) and Table 2 (Gulf Sturgeon in the Suwannee, Santa Fe, and Withlacoochee Rivers). Table 3 then provides the reach-specific⁷ 10th percentile and median

⁷ The segments identified in Table 3 are also depicted in Figure 1 of Appendix I to the DO TSD.

values, which represent the baseline distribution, that will be used for determining whether DO values in the future have decreased and whether the waterbody is no longer meeting the criteria in subsection 62-302.533(1)(c). In order to maintain the distribution of DO values, criteria were derived from both the middle (median) and lower portion (10th percentile) of the distribution – to help detect if either the central tendency of the data has shifted or if the dataset has been skewed. Since the goal is to protect the baseline distribution, as applied using the median and 10th percentile, the State has also included Table 4 which outlines the number of exceedances necessary to make a determination that the water needs to be placed on the planning and verified lists.

In portions of the St. Johns River, FDEP also determined that an additional consideration beyond the regionalized criteria would be necessary. FDEP concluded that maintaining the 5.0 mg/L minimum DO criterion in the location where spawning would occur should “assure no adverse effects on the Atlantic and shortnose sturgeon juveniles.” NMFS staff indicated that the portions of the St. Johns River where spawning could occur is between the U.S. Highway 17 Bridge in Palatka north to the Shands Bridge (U.S. Highway 16) bridge near Green Cove Springs during the months of February and March.”⁸ During other times of the year, the Northeast and Big Bend regionalized DO criterion applies.

Regarding the State’s consideration of threatened and endangered species, FDEP provided a good summary in its Responsiveness Document:

Response: The Department recognized the need to assure that the proposed criteria are protective of all threatened and endangered species. We worked extensively with staff at U.S.EPA, U.S. Fish and Wildlife Service, NOAA’s National Marine Fisheries Service, and staff at Florida FWC to assure threatened and endangered species will be protected by the proposed DO criteria. The conclusions reached as a result of the discussions with the other agencies are described in Section 6 of the TSD (which FWC staff helped review and edit). Additionally, Appendix I of the TSD describes the areas where the proposed criteria were modified to assure protection of specific threatened or endangered species.

The EPA believes that the State’s efforts reflect the best available information at the time of the adoption and provide protective criteria for the threatened and endangered species/critical habitat for the locations and/or times identified in 62-302.533(1)(c), (d), and (e).

Conclusion

For all of the reasons outlined in the previous sections summarizing the EPA’s analysis of subsection 62-302.533(1), the EPA has concluded the freshwater DO provisions are consistent with 40 CFR 131.11(b)(1)(iii) and the CWA, and are therefore approved by the EPA pursuant to section 303(c) of the Act.

Subsection 62-302.533(2) was added and reads as follows:

(2) Class II, Class III predominantly marine waters, and Class III-Limited predominantly marine waters.

(a) Minimum DO saturation levels shall be as follows:

⁸ Although not specifically mentioned in the regulation text by name, the map associated with the location in the St. Johns River for the Atlantic and shortnose sturgeon, can be found in Figure 2 of Appendix I.

1. The daily average percent DO saturation shall not be below 42 percent saturation in more than 10 percent of the values;
2. The seven-day average DO percent saturation shall not be below 51 percent more than once in any twelve week period; and
3. The 30-day average DO percent saturation shall not be below 56 percent more than once per year.
 - (b) To calculate a seven-day average DO percent saturation, there shall be a minimum of three full days of diel data collected within the seven-day period, or a minimum of ten grab samples collected over at least three days within that seven-day period, with each sample measured at least four hours apart.
 - (c) To calculate a 30-day average DO percent saturation, there shall be a minimum of three full days of diel data with at least one day of data collected in three different weeks of the 30-day period, or grab samples collected from a minimum of ten different days of the 30-day period.
 - (d) A full day of diel data shall consist of 24 hours of measurements collected at a regular time interval of no longer than one hour.

Subsection 62-302.533(2) primarily lays out the three parts of the newly adopted marine DO criteria with daily, seven, and 30-day averages contained in paragraph (a). Paragraphs (b), (c), and (d) were determined to not be new or revised water quality standards since they are related to data sufficiency requirements and do not establish or revise the magnitude, duration or frequency of the revised criteria. The remainder of the discussion for this subsection will focus on the EPA's analysis of the methodology behind the marine DO criteria derivation.

The State used the underlying work contained in the EPA's 2000 Ambient Aquatic Life Water Quality Criteria for Dissolved Oxygen (Saltwater): Cape Cod to Cape Hatteras document (Virginian Province Method) to develop a Criterion Minimum Concentration (CMC), Criterion Continuous Concentration (CCC), and Final Recruitment Curve (FRC) for marine waters in Florida. The primary difference in the outcomes of the Virginian Province Method and FDEP's Marine Method was the use of data from species found within Florida waters. The details of the inclusion and deletion of species is more fully covered in FDEP's DO TSD, including Appendices E and F. After considering the Florida-specific data, FDEP was able to derive a CMC of 2.8 mg/L, a CCC of 4.9 mg/L, and a corresponding FRC. Because of the State's preference for using percent saturation, the same analysis was completed using the Florida specific data after converting the information into percent saturations using the temperature and salinity associated with the underlying data. The resulting values were as follows: a CMC of 42 percent saturation, a CCC of 64 percent saturation, and a corresponding FRC. To simplify the expression of the values indicated by the FRC, FDEP expressed the longer duration components using the percent saturations associated with the seven and 30-day averages, 51 and 56 percent saturation, respectively.

Therefore, the state is replacing the previously adopted two component criteria, a daily average of 5.0 mg/L and a minimum of 4.0 mg/L, with a three component criteria to address the acute and chronic effects of low DO on marine species in Florida. Values from the FRC can be used in place of the derived CCC from the Virginian Province Method as explained on page 36 of the Virginian Province Method document, which states that the limit for "protection of growth effects from persistent exposure" may be "replaced with a limit derived in (3) as described below, when exposure data are adequate to derive an allowable number of days from persistent exposure." The limit in item (3), as further described on page 37, "represents allowable DO conditions below the CCC, provided the exposure duration does not exceed a corresponding allowable number of days that ensure adequate recruitment during the larval recruitment season." Selection of the 7 and 30 day points along the FRC were supported by both the

peer review panel (Comment/Response # 8 on page G-12 of FDEP's DO TSD) and interest in a less intensive monitoring duration than was used in the St. Johns River DO SSAC. A precedent for using less intensive monitoring durations has been established by other states (page 62 of FDEP's DO TSD).

Subparagraph 62-302.533(2)(a)1. provides that no more than "10% of the values" shall be below a daily average of 42 percent saturation. The daily average is intended to protect against acute effects. By not allowing more than 10% of the values to be below the daily average the State can take into account natural variability and potential measurement error which is allowed in the State's regulations as part of the binomial method. Furthermore, as noted on page 3 of the August 2013 letter, "...USEPA approved the use of the binomial method when assessing criteria expressed as not to be exceeded, including the previous instantaneous and daily average DO criteria for both fresh and marine waters, and it is conservative to apply it to the revised DO criteria." Subparagraph 62-302.533(2)(a)2. provides that "no more than once in any 12 week period" shall the seven day average be below 51 percent saturation. The seven day average is intended to protect against longer term effects and as demonstrated by its location on the FRC should ensure adequate recruitment during the larval recruitment season. The same logic would apply to the location of the 30 day average on the curve and its implied sufficient recruitment duration. Subparagraph 62-302.533(2)(a)3. provides that that "no more than once per year" shall the 30 day average be below 56 percent saturation. Both the allowance for a frequency of a single seven day and single 30 day average excursion with the specified exceedance is explained in further detail on pages 3 and 4 of the August 2013 letter.

Both the 7- and 30-day average DO criteria for marine waters were derived to be protective of larval recruitment, and, as described in the TSD, ensure that the criteria are protective against adverse larval recruitment effects for sensitive species (no more than a 5% reduction in sensitive taxa recruitment due to low DO). The criteria take into account life history information for the four Florida species most sensitive to low DO levels, which exhibit larval recruitment seasons from approximately 49 to 300 days and larval development periods from 21 to 28 days. This information indicates that larvae of sensitive organisms span over several weeks at a minimum and are present for extended periods during the year (up to 327 days).

The frequency component of the 7- and 30-day criteria and the concomitant IWR assessment methodology take into account the natural variability and measurement error (as required by the statute) by listing waters as impaired if the 7-day criterion is exceeded more than 1 week out of 12 weeks or the 30-day criterion is exceeded more than 1 month out of 12 months. This approach is analogous to the expression for the daily average criterion, which allows the criteria to not be attained up to 10% of the time in acknowledgement of natural variability and measurement error (1 week out of 12 weeks, and 1 month out of 12 months are both 8.3%). It should be noted that adopting all three expressions of the DO criteria (daily average, 7-day, and 30-day) provides additional protection, and any significant decreases in DO below the 7-day or 30-day criterion would be assessed as exceedances of the daily average criterion. As an additional conservative measure, the 7- and 30-day average criteria will be applied throughout the year, and not only during periods when sensitive larvae are present.

Based on the rationale provided by the State with regard to the duration and frequency components associated with the daily, seven, and 30 day average marine criteria, the EPA found that the differing duration and frequencies are reasonable and represent a defensible method for supporting the criteria.

For all of the reasons outlined above summarizing the EPA's analysis of subsection 62-302.533(2), with the exception of those provisions determined not to be new or revised water quality standards, the EPA has concluded the marine DO provisions are consistent with 40 CFR 131.11(b)(1)(iii) and the CWA, and are therefore approved by the EPA pursuant to section 303(c) of the Act.

Subsections 62-302.533(3) and (4) were added and read as follows:

(3) If it is determined that the natural background DO saturation in the waterbody (including values that are naturally low due to vertical stratification) is less than the applicable criteria stated above, the applicable criteria shall be 0.1 mg/l below the DO concentration associated with the natural background DO saturation level.

(4) For predominately marine waters, a decrease in magnitude of up to 10 percent from the natural background condition is allowed if it is demonstrated that sensitive resident aquatic species will not be adversely affected using the procedure described in the DEP document titled Appendix H of the "Technical Support Document for the Derivation of Dissolved Oxygen Criteria to Protect Aquatic Life in Florida's Fresh and Marine Waters: Determination of Acceptable Deviation from Natural Background Dissolved Oxygen Levels in Fresh and Marine Waters" (DEP-SAS-001/13), dated March 2013, which is incorporated by reference herein. Copies of Appendix H may be obtained from the Department's internet site at <http://www.dep.state.fl.us/water/wqssp/swq-docs.htm> or by writing to the Florida Department of Environmental Protection, Standards and Assessment Section, 2600 Blair Stone Road, MS 6511, Tallahassee, FL 32399-2400.

In Section 4, Precision and Bias, of the Membrane Electrode Method in *Standard Methods for the Examination of Water and Wastewater*, it is noted "most commercially available membrane electrode systems an accuracy of ± 0.1 mg DO/L and a precision of ± 0.05 mg DO/L can be obtained."

Additionally, on page 35 of the EPA's April 1986 Ambient Water Quality Criteria for Dissolved Oxygen (DO Guidance Document), the following was stated regarding the allowance for deviations that result from natural conditions.

Where natural conditions alone create dissolved oxygen concentrations less than 110 percent of the applicable criteria means or minima or both, the minimum acceptable concentration is 90 percent of the natural concentration. These values are similar to those presented graphically by Doudoroff and Shumway (1970) and those calculated from Water Quality Criteria 1972 (NAS/NAE, 1973). Absolutely no anthropogenic dissolved oxygen depression in the potentially lethal area below the 1-day minima should be allowed unless special care is taken to ascertain the tolerance of resident species to low dissolved oxygen.

Based on these two documents, a 0.1 mg/L deficit from the natural DO value based on measurement variability or up to a 10% deficit if it is demonstrated that resident aquatic species shall not be adversely affected are two acceptable bounds to apply to the allowable amount of deviation from natural background. The State's revision to subsection (3) allows for the 0.1 mg/L deficit in magnitude from the natural background DO saturation level in both fresh and marine waters and the revision to subsection (4) addresses the possibility of a decrease in magnitude of up to 10 percent saturation in marine waters upon demonstration that resident aquatic species will not be adversely affected.

Appendix H lays out both FDEP's approach to determining whether there is an unacceptable effect on resident aquatic species, as well as methods for estimating natural background DO levels in fresh and marine waters. The State's preference is to establish a procedure in the future which is performance-based and would not require subsequent approval by the EPA on future applications of the methodology, following an initial approval of the method as performance-based by the EPA. At this time the EPA is not reviewing the use of the methodology incorporated by reference in Appendix H as a performance-based approach or a new or revised WQS. At the time of criteria development by FDEP, finalization of a performance-based methodology had not been established.

The EPA has conducted a preliminary review of Appendix H and determined that parts of the approach as currently described may provide acceptable methods for estimating natural background DO and determining effects on resident aquatic species. However, the EPA has concerns with some parts of the approach and is continuing discussions with FDEP on revisions to Appendix H. As a result, the EPA is not acting on Appendix H as new or revised WQS at this time. We will review FDEP's application of Appendix H, or any other scientifically defensible method, at the time FDEP submits future site specific criteria for EPA review.

If the state begins to utilize the provisions in subsections (3) and (4), prior to establishing a performance-based approach, the EPA recommends early coordination during the drafting of any revisions, but at a minimum, all applications of the provisions, including the determinations of the natural background conditions, must be adopted by the State, submitted to the EPA for 303(c) review, and approved by the EPA, prior to becoming effective for CWA purposes.

The concept of modifying criteria to reflect site specific conditions, relating to natural background DO conditions provided for in subsections 62-302.533(3) and (4) is consistent with 40 CFR 131.11(b)(1)(iii) and the CWA, and is therefore approved by the EPA pursuant to section 303(c) of the Act.

Subsection 62-302.533(5) was added and reads as follows:

(5) Ambient DO levels above the minimum criteria specified in subsections 62-302.533(1) and (2), F.A.C., shall be maintained in accordance with and subject to Rules 62-302.300 and 62-4.242, F.A.C. Ambient DO levels will be considered to have declined, for purposes of this subsection if, after controlling for or removing the effects of confounding variables, such as climatic and hydrologic cycles, quality assurance issues, and changes in analytical methods, a waterbody segment is shown to have a statistically significant decreasing trend in DO percent saturation or an increasing trend in the range of daily DO fluctuations at the 95 percent confidence level using the one-sided Seasonal Kendall test for trend, as described in Helsel, D.R. and R.M. Hirsh, 2002, Statistical Methods in Water Resources, USGS, pages 338 through 340, which is incorporated by reference herein, or an alternative statistically valid trend at a one-sided confidence level of 95 percent. It must be demonstrated that the data satisfy all statistical assumptions of any alternative method used, including residual distribution, variance, and shape of relationship.

Subsection 62-302.533(5) was added to address concerns that existing higher ambient DO concentrations in waterbodies could be lowered as a result of the newly adopted DO criteria. As described on page 85 of FDEP's DO TSD, FDEP included a "clause in the DO criteria that would require that these higher ambient DO levels be maintained, except as allowed under [Rules 62-302.300 and 62-4.242]." Page 85 goes on to conclude that during the permitting process, "a discharger must

show that any lowering of the DO below existing ambient levels is clearly in the public interest, or such lowering will not be allowed.” In addition to the implications for the permitting process, the majority of the provision outlines the method by which either a decline in percent saturation or an increasing trend in range of daily DO fluctuations will be determined to have occurred, through the use of the one-sided Seasonal Kendall test for trend. Further discussion of similar provisions located in the planning and verified lists will be discussed in the EPA’s review of subsection 62-303.320(14) and subsection 62-303.420(13). The discussion of the statistical analysis in subsection 62-302.533(5) is discussed in more detail later in this section.

The following responses provided by FDEP on pages 6 and 33-34 of the Responsiveness Document highlight the intent to include additional water quality protection through the addition of the DO trend provision at 62-302.533(5).

Comment: The Conservancy requests the establishment of a higher use classification (“exceptional waters”).

Response: The Department considered this option during the reclassification rulemaking, but the ERC did not support a higher classifications. Stakeholders have the option of submitting SSAC that reflect natural conditions that are better than the generally applicable criteria. The Department also included trend tests for both DO and nutrients that are specifically designed to protect waters that have exceptional water quality. Additionally, exceptional biological communities, as measured by both the SCI and LVI, are listed as impaired if there is a 20 point drop in the historic maximum value.

Comment: The dissolved oxygen (D.O.) criteria are being weakened in most of the state ...The basis for changing the D.O. criteria is not scientific and we request that if any changes are made to the current criteria that it be to make it more protective of our waters....Shifts burden of proof to the public to prove a water body is under protected by the revised Dissolved Oxygen water quality criterion without providing a mechanism for petitioning FDEP for same.

Response: The Department disagrees. The revised DO criteria are more accurate than the previous criteria and do not allow for lowering of the DO regime over time, without any demonstration that existing DO levels above the criteria are, in fact, needed to support the existing aquatic community. No other state has incorporated the level of protection offered by this adverse trends test, which also prohibits increases in the diel range of DO swings, which can be caused by nutrient enrichment. It is not clear what rule provisions the CWN alleges to transfer the burden of proof to the public, but the Department disagrees that any such shift has occurred.

In fact, regulated parties have expressed concerns that they have the burden of proof to support a SSAC for DO for natural conditions.

By providing a specific statistical test and circumstances that must be addressed in the use of an alternative trend test, subsection 62-302.533(5) establishes an objective, quantitative process to assess trends in ambient data for DO, based on either the magnitude of DO or the range of daily DO fluctuations.

The rule provides that some data can be excluded from the analysis to remove the effects of confounding variables, “such as climatic and hydrologic cycles, quality assurance issues, and changes in analytical methods.” The EPA agrees that it is reasonable to exclude data from such analyses under certain limited

circumstances. The State's choice of data exclusions are reasonable in that they address water quality variations that may not directly relate to an analysis of whether DO levels and/or fluctuations are decreasing or increasing, respectively, over a period of multiple years. Also, the EPA notes that the trend analyses conducted by the State are subject to the EPA's review of State CWA Section 303(d) listing decisions, including the State's decisions regarding specific ambient data that should be considered in the State's assessment process.

The provision requires that the statistical evaluation of data be conducted using a one-sided Seasonal Kendall (SK) test for trend. The SK test accounts for seasonality and data are not compared across season boundaries. Additionally, the method is able to accommodate variations in sampling frequency during the years of interest.

By adding subsection 62-302.533(5) to the State's water quality standards, there is an additional level of protection available for ensuring the designated use of a waterbody is supported for purposes of DO. Addressing DO levels and ranges to be maintained provides additional information for consideration during permitting and assessment activities that will ensure existing higher ambient water quality will be maintained in accordance with the State's antidegradation policy and procedures. The specification of the Seasonal-Kendall test or "an alternative statistically valid trend" at the same levels of confidence will ensure a defensible and repeatable way for assessing this provision. Therefore, this provision is consistent with 40 CFR part 131 and the CWA, and is therefore approved by the EPA pursuant to section 303(c) of the Act.

Overview of Revisions to the Impaired Waters Rule, Chapter 62-303

Chapter 62-303, F.A.C., entitled Identification of Impaired Surface Waters (Impaired Waters Rule or IWR), establishes a methodology for the FDEP to identify waterbodies for inclusion on the list of water quality-limited segments requiring total maximum daily loads (TMDLs) pursuant to section 303(d) of the Act and 40 C.F.R. Part 130. FDEP amended the IWR in 2013, primarily to amend the assessment methodology for DO to be consistent with the new or revised DO water quality standards addressed above.

EPA previously reviewed and approved or disapproved new or revised WQS within the IWR in 2005⁹, and again in 2008¹⁰, after Florida revised the rule to make substantive and editorial changes to the IWR. In its review and approval of the new or revised WQS portions of the 2013 amended IWR (amended IWR), EPA applied the same analytical framework that it used in the 2005 and 2008 Determinations.¹¹ In its review of the amended IWR, EPA examined only those portions of the rule that were amended in 2013.

⁹ "Determination on Referral Regarding Florida Administrative Code Chapter 62-303 Identification of Impaired Surface Waters," United States Environmental Protection Agency, July 7, 2005.

¹⁰ "Determination Upon Review of Amended Florida Administrative Code Chapter 62-303 Identification of Impaired Surface Waters," **Error! Main Document Only.** United States Environmental Protection Agency, February 8, 2008.

¹¹ See also EPA answers to frequently asked questions (FAQs) on "What is a New or Revised Water Quality Standard Under CWA 303(c)(3)?" at <http://water.epa.gov/scitech/swguidance/standards/cwa303faq.cfm>. The link provides detailed information of such analysis.

For the reasons discussed below, EPA has concluded that several portions of the amended IWR are new or revised water quality standards, but also has concluded that many portions of the amended IWR are not new or revised water quality standards. Specifically, those provisions of the IWR relating to magnitude, duration and frequency of load or concentration exceedances that define or revise the “ambient condition” or “level of protection” that the State affords waters for purposes of making attainment decisions constitute new or revised water quality standards. An attainment decision is one where a State decides what it means to attain or to not attain any “water quality standard applicable to such waters” for purposes of establishing total maximum daily loads (TMDLs) under section 303(d)(1)(A) of the Act, 33 U.S.C. § 1313(d)(1)(A). TMDLs, in turn, serve as the basis for NPDES permit limitations. Provisions that affect attainment decisions made by the State and that define, change, or establish the level of protection to be applied in those attainment decisions have the effect of revising existing standards under section 303(c) of the Act. These provisions constitute new or revised water quality standards subject to EPA review pursuant to the Act. Conversely, provisions that merely describe the sufficiency or reliability of information necessary for the State to make an attainment decision, and do not change a level of protection, are not WQS but are rather methodologies under section 303(d) of the Act. See 40 C.F.R. § 130.7(b)(6). While these provisions are not reviewed by EPA as new or revised water quality standards, they are considered by EPA in reviewing lists of impaired waters submitted by the State pursuant to section 303(d) of the CWA.

EPA has determined that provisions of the amended IWR that affect only the State’s decision to include a waterbody on the planning list do not constitute new or revised water quality standards, because placing a water on the planning list does not affect an attainment decision. To the extent that a planning list provision also affects the State’s decision to identify a waterbody on the study or verified lists, however, that provision does affect an attainment decision. EPA considered such provisions further to determine whether the provision also defined, changed, or established the level of protection to be applied in those attainment decisions.

Pursuant to section 303(c) of the CWA, as set forth more fully below, EPA has reviewed and is approving those portions of the amended IWR that the Agency has determined to be new or revised water quality standards.

Section 62-303.320

Paragraphs 62-303.320(4)(a) – (d) were revised and read as follows:

(4) To place a water segment on the planning list using Table 1, a water segment shall have a minimum of ten samples for the ten-year period, with at least five temporally independent samples. To be treated as a temporally independent sample, samples shall be at least one week apart, regardless of whether the samples are collected at different locations within the segment. (a) ~~For parameters other than dissolved oxygen (DO), samples~~ Samples collected at the same location less than four days apart shall be considered as one sample, with the median value used to represent the sampling period. However, if any of the individual dissolved oxygen (DO) values are less than 1.5 mg/l or, for other parameters, individual values exceed acutely toxic levels as listed in Table 2, then the worst-case value shall be used to represent the sampling period. The worst-case value is the minimum value for DO, both the minimum and maximum for pH, or the maximum value for other parameters. ~~However, when DO data are available from diel or depth profile studies, the lower tenth percentile value shall be used to represent worst case conditions for comparison against the minimum criteria.~~

(b) For lakes, the daily average DO level shall be calculated as the average of measurements collected in the upper two meters of the water column at the same location on the same day. For all other freshwaters, the daily average freshwater DO level shall be calculated as the average of all measurements collected in the water column. If any individual DO measurement is greater than 100 percent saturation, 100 percent shall be substituted for that value for the purpose of calculating daily averages.

(c) The daily average freshwater DO criteria shall be assessed preferentially using daily average values calculated from full days of diel monitoring data. A full day of diel data shall consist of 24 hours of measurements collected at a regular time interval of no longer than one hour. If diel monitoring data are not available, instantaneous samples may be used to assess the DO criterion by comparing the instantaneous value with a time-of-day-specific translation of the daily average criterion. To determine the time-of-day-specific translation of the daily average criterion, the time (T) at which the DO sample was taken (in minutes past midnight) is entered into the appropriate equation below for the applicable region and waterbody type. The actual DO measurement collected at a given time is assessed against the calculated time-of-day-specific translation for that time, and if the instantaneous DO is greater than or equal to the calculated value, the daily average DO criterion is achieved.

Region	Equations for Time-of-Day-Specific Translation of the Daily Average DO Criterion
<u>Streams</u>	
Northeast + Big Bend	$1.1844 \times 10^{-13} \cdot T^5 - 4.1432 \times 10^{-10} \cdot T^4 + 4.7729 \times 10^{-7} \cdot T^3 - 1.9692 \times 10^{-4} \cdot T^2 + 0.02314 \cdot T + 31.24$
Peninsula + Everglades	$1.9888 \times 10^{-13} \cdot T^5 - 6.8941 \times 10^{-10} \cdot T^4 + 7.8373 \times 10^{-7} \cdot T^3 - 3.1598 \times 10^{-4} \cdot T^2 + 0.03551 \cdot T + 33.43$
Panhandle West	$9.0851 \times 10^{-14} \cdot T^5 - 2.9941 \times 10^{-10} \cdot T^4 + 3.1560 \times 10^{-7} \cdot T^3 - 1.0851 \times 10^{-4} \cdot T^2 + 0.006285 \cdot T + 65.61$
<u>Lakes</u>	
Northeast + Big Bend	$1.4578 \times 10^{-13} \cdot T^5 - 5.5607 \times 10^{-10} \cdot T^4 + 7.0683 \times 10^{-7} \cdot T^3 - 3.1879 \times 10^{-4} \cdot T^2 + 0.02817 \cdot T + 34.19$
Peninsula + Everglades	$1.3709 \times 10^{-13} \cdot T^5 - 5.0496 \times 10^{-10} \cdot T^4 + 6.1352 \times 10^{-7} \cdot T^3 - 2.5817 \times 10^{-4} \cdot T^2 + 0.01960 \cdot T + 37.14$
Panhandle West	$7.1190 \times 10^{-14} \cdot T^5 - 2.6420 \times 10^{-10} \cdot T^4 + 3.2247 \times 10^{-7} \cdot T^3 - 1.3607 \times 10^{-4} \cdot T^2 + 0.01071 \cdot T + 66.35$

(d) If multiple instantaneous DO samples are available in a day, the time-of-day-specific translation of the daily average criterion will be calculated for each individual sample. Achievement of the daily average DO criteria will be assessed by comparing the average of the actual DO measurements collected at each time against the average of the calculated time-of-day-specific translations for each time. If the average of the measured DO values is greater than or equal to the average of the time-of-day-specific translations of the criteria, the daily average DO criterion is achieved. An average of multiple daily values calculated in this manner will be considered as a single sample for assessment purposes.

As set out above, the EPA has determined that provisions of 62-303 that affect only the State's decision to include a waterbody on the planning list do not constitute new or revised water quality standards, because placing a water on the planning list does not affect an attainment decision. However, the deleted portion of paragraph 62-303.320(4)(a) was determined to be a new or revised water quality standard in the EPA's February 19, 2008 action because the provision was also relied upon in making decisions to include a waterbody on the verified list. The revisions to paragraph 62-303.320(4)(a) remove DO as a parameter covered by this paragraph, due to the significant revisions made to address the newly revised DO criteria in the following paragraphs (b) through (d) and elsewhere in the regulations. For the reasons

outlined specifically in the EPA's review and approval of 62-303.420(10)(b) later in this document, and more generally in the approval of other DO related provisions as part of this rulemaking, the EPA finds the revisions to paragraph 62-303.320(4)(a) consistent with 40 CFR part 131 and the CWA and they are approved by the EPA pursuant to section 303(c) of the Act.

With regard to the remaining paragraphs (b) through (d) in subsection 62-303.320(4), the EPA concluded that the first two sentences of (b) merely restate what was adopted at 62-302.533(1)(b), the third sentence of (b) is not a restatement of any provision from 62-302, but because the sentence is part of the planning list section does not affect attainment decisions,¹² and paragraphs (c) and (d), in addition to being planning list provisions, do not change the underlying criteria located at 62-302.533. More detail on the purpose of paragraphs (c) and (d) is provided below.

While paragraphs 62-303.320(4)(c) and (d) do not modify the underlying criteria, those paragraphs provide the equations and process by which FDEP will determine whether an instantaneous sample is in compliance with the newly adopted freshwater criteria located at 62-302.533(1). As stated on page 49 of FDEP's DO TSD, "the fitted curves depicted by the polynomial equations represent the daily DO regime at a site exactly meeting the daily average DO criteria with a typical diel fluctuation. Therefore, to achieve the daily average DO criterion, the measured DO level at any specific time of day would be expected to be at or above the level predicted by the curve." Since the criteria were developed using diel monitoring data, the State has attempted to provide a method for translating a grab sample into a time-of-day specific value that can be used for assessing compliance against the percent saturation criteria contained in subsection 62-302.533(1). The methods set out in paragraphs 62-303.320(c) and (d) are consistent with the State's newly adopted DO criteria.

Therefore, with the exception of the revisions to paragraph 62-303.320(4)(a), the remaining revisions within paragraphs 62-303.320(4)(b) through (d) were determined to not be new or revised water quality standards.

Subsection 62-303.320(5) was revised and reads as follows:

(5) For assessment of the portions of the Suwannee, Withlacoochee (North), and Santa Fe Rivers utilized by the Gulf Sturgeon, and in the portions of the Santa Fe and New Rivers utilized by the Oval Pigtoe Mussel, waters will be listed on the planning list when more than 50 percent of the measurements are below the applicable median or more than 10 percent of the daily average values are below the applicable 10th percentile value at a minimum of a 80 percent confidence level using the binomial distribution. The applicable median and 10th percentile values are specified by river segment in Appendix I of the "Technical Support Document: Derivation of Dissolved Oxygen Criteria to Protect Aquatic Life in Florida's Fresh and Marine Waters" (DEP-SAS-001/13), dated March, 2013, which is incorporated by reference herein. Copies of Appendix I may be obtained from the Department's internet site at <http://www.dep.state.fl.us/water/wqssp/swq-docs.htm> or by writing to the Florida Department of Environmental Protection, Standards and Assessment Section, 2600 Blair Stone Road, MS 6511, Tallahassee, FL 32399-2400.

¹² The text of the third sentence of paragraph (b) is also found at 62-303.420(8) and will be discussed in more detail there, as it relates to the verified list.

Because subsection 62-303.320(5) affects only the State's decision to include a waterbody on the planning list, it does not affect an attainment decision and does not constitute new or revised water quality standards.

Subsection 62-303.320(6) was revised and reads as follows:

- ~~(6) (5)~~ For predominantly marine waters, the Department shall evaluate ~~both the minimum allowable DO of 4.0 mg/l and the daily average DO criterion of 5.0 mg/l~~ using Table 1 set forth in subsection 62-303.320(1) above, and shall also evaluate whether the seven-day and 30-day average criteria have been achieved during the planning period. A water segment shall be placed on the planning list for potential DO impairment if the number of samples that do not meet the daily average DO criterion is greater than or equal to the number listed in Table 1 for the given sample size, or if it has a weekly average value below the weekly average DO criterion or a monthly average value below the monthly average DO criterion in the planning period. At least four temporally independent samples are required to calculate the daily average for any given day. For DO, temporally independent shall be defined as at least 4 hours apart. If there are sufficient data to determine daily averages for more than one day within a four-day period, the Department shall use the median value of the daily averages to represent the sampling period.
- (a) If any individual DO measurement is greater than 100 percent saturation, 100 percent shall be substituted for that value for the purpose of calculating daily, weekly and monthly averages.
- (b) Where DO values are collected at multiple depths at a given station and time, the average of the values shall be used to represent the measurements unless any of the individual DO values are less than 2 mg/l, in which case the lower 25th percentile of the measured values shall be used.
- (c) For assessment purposes, the seven-day average DO percent saturation shall be calculated as a weekly average using a minimum of three full days of diel data collected within a week, or a minimum of ten grab samples collected over at least three days within a week, with each sample measured at least four hours apart.
- (d) For assessment purposes, the 30-day average DO percent saturation shall be calculated as a monthly average using a minimum of three full days of diel data, with each diel sampling conducted in different weeks of the month, or grab samples collected from a minimum of ten different days of the month.
- (e) A full day of diel data shall consist of 24 hours of measurements collected at a regular time interval of no longer than one hour.

As set out above, the EPA has determined that provisions of 62-303 that affect only the State's decision to include a waterbody on the planning list do not constitute new or revised water quality standards, because placing a water on the planning list does not affect an attainment decision. However, the text being deleted in 62-303.320(6), previously 62-303.320(5), was determined to be new or revised water quality standards in the EPA's February 19, 2008 action because the provision was also relied upon in making decisions to include a waterbody on the verified list. Therefore, the EPA must review the deletion of the previously approved WQS. FDEP has deleted the text as a result of the modifications to 62-302.533 addressed previously in this decision. The EPA is approving the deletion as consistent with 40 CFR part 131 and the CWA pursuant to section 303(c) of the Act.

For the additions made to subsection 62-303.320(6), the EPA has concluded that the new text addresses placing a waterbody on the planning list and does not affect an attainment decision. Therefore, with the exception of the deletions to subsection 62-303.320(6), the remaining revisions within paragraphs 62-303.320(6) were determined to not be new or revised water quality standards.

Subsection 62-303.320(11) was revised and reads as follows:

(11) For the assessment of the DO criteria, any DO data collected as a concentration in mg/l shall be converted to percent saturation using the temperature and salinity measured at the same location within fifteen minutes of the DO measurement. Percent DO saturation shall be calculated using the method in Section 5.4 of the “Technical Support Document: Derivation of Dissolved Oxygen Criteria to Protect Aquatic Life in Florida’s Fresh and Marine Waters,” (DEP-SAS-001/13), dated March, 2013, which is incorporated by reference herein. Copies of Section 5.4 may be obtained from the Department’s internet site at <http://www.dep.state.fl.us/water/wqssp/swq-docs.htm> or by writing to the Florida Department of Environmental Protection, Standards and Assessment Section, 2600 Blair Stone Road, MS 6511, Tallahassee, FL 32399-2400.

Because subsection 62-303.320(11) is related to data sufficiency requirements and does not establish or revise the magnitude, duration or frequency of Florida’s newly revised DO criteria the EPA determined this subsection was not a new or revised water quality standard.

Subsection 62-303.320(14) was revised and reads as follows:

(14) A water segment shall be placed on the planning list for DO impairment if there has been a statistically significant decreasing trend in DO levels or increasing trend in the range of daily DO fluctuations at the 90 percent confidence level using a one-sided Seasonal Kendall test for trend, as described in Helsel, D.R. and R.M. Hirsh, 2002, Statistical Methods in Water Resources, USGS, pages 338 though 340, which are incorporated by reference herein, after controlling for or removing the effects of confounding variables, such as climatic and hydrologic cycles, quality assurance issues, and changes in analytical methods, and except as provided for under Rules 62-302.300 and 62-4.242, F.A.C. A copy of pages 338 through 340 may be obtained from the Department’s internet site at <http://www.dep.state.fl.us/water/wqssp/swq-docs.htm> or by writing FDEP, Standards and Assessment Section, 2600 Blair Stone Road, MS 6511, Tallahassee, FL 32399-2400.

Because subsection 62-303.320(14) affects only the State’s decision to include a waterbody on the planning list, it does not constitute new or revised water quality standards.

Section 62-303.353

Subsection 62-303.353(2) was revised and reads as follows:

Estuaries, estuary segments, or open coastal waters shall be included on the planning list for nutrients if:

- (1) The numeric interpretation of the narrative nutrient criterion established in subsection 62-302.531(2), F.A.C., is exceeded; or
- (2) For estuaries or open coastal waters without a numeric interpretation of the narrative nutrient criterion, their annual geometric mean chlorophyll *a* for any year is greater than 11 ug/l,
- (3) through (4) No change.

The basis given for the change to subsection 62-303.353(2) was addressed on page 29 of FDEP's August 24, 2012, document titled *DEP's Responses to EPA's Questions and Requests for Clarification* (FDEP's Q&A Document).

We also plan to clarify that the 11 ug/L chlorophyll nutrient impairment threshold will not be assessed in estuaries with estuary-specific chlorophyll *a* criteria. This is consistent with the hierarchy in Rule 62-302.531, (2), F.A.C., which establishes site specific numeric interpretations of the narrative nutrient criterion as the primary interpretation of the narrative nutrient criterion.

The revision to subsection 62-303.353(2) clarifies that the more recently adopted numeric nutrient criteria for certain waters will be used in assessing those waters, instead of the previously adopted one-sided impairment threshold for chl *a*. Because not all of Florida's estuaries and open coastal waters are covered by more recently adopted numeric nutrient criteria, the one sided impairment threshold for chl *a* continues to apply to any waters without numeric nutrient criteria established in 62-302.352. The revision to subsection 62-303.353(2) is consistent with 40 CFR part 131 and the CWA and is approved by the EPA pursuant to section 303(c) of the Act.

Section 62-303.420

Subsection 62-303.420(8) was added and reads as follows:

(8) For lakes, the daily average DO level shall be calculated as the average of measurements collected in the upper two meters of the water column at the same location on the same day. For all other freshwaters, the daily average freshwater DO level shall be calculated as the average of all measurements collected in the water column. If any individual DO measurement is greater than 100 percent saturation, 100 percent shall be substituted for that value for the purpose of calculating daily averages.

The first two sentences of subsection 62-303.420(8) are restatements of text found within 62-302.533(1)(b) and therefore, are not new or revised water quality standards because they do not further modify the magnitude, duration or frequency of the newly revised DO criteria. With regard to the last sentence of subsection (8), in the August 2013 letter, FDEP indicates the inclusion "ensures that percent saturation measurements above 100% do not artificially result in compliance with the revised criteria." While this consideration is important, particularly in fresh waters that are subject to eutrophication and significant ranges in DO levels can exist, the EPA determined this provision does not modify the underlying DO criteria contained in subsection 62-302.533(1). Therefore, the EPA determined the last sentence does not constitute a new or revised water quality standard.

Subsection 62-303.420(9) was added and reads as follows:

(9) The daily average freshwater DO criteria shall be assessed preferentially using daily average values calculated from full days of diel monitoring data. A full day of diel data shall consist of 24 hours of measurements collected at a regular time interval of no longer than one hour. If diel monitoring data are not available, instantaneous samples may be used to assess the DO criterion by comparing the instantaneous value with a time-of-day-specific translation of the daily average criterion. To determine the time-of-day-specific translation of the daily average criterion, the time (T) at which the DO sample was taken (in minutes past midnight) is entered into the appropriate equation below for the applicable region and waterbody type. The actual DO

measurement collected at a given time is assessed against the calculated time-of-day-specific translation for that time, and if the instantaneous DO is greater than or equal to the calculated value, the daily average DO criterion is achieved.

Region	Equations for Time-of-Day-Specific Translation of the Daily Average DO Criterion
<u>Streams</u>	
Northeast + Big Bend	$1.1844 \times 10^{-13} \cdot T^5 - 4.1432 \times 10^{-10} \cdot T^4 + 4.7729 \times 10^{-7} \cdot T^3 - 1.9692 \times 10^{-4} \cdot T^2 + 0.02314 \cdot T + 31.24$
Peninsula + Everglades	$1.9888 \times 10^{-13} \cdot T^5 - 6.8941 \times 10^{-10} \cdot T^4 + 7.8373 \times 10^{-7} \cdot T^3 - 3.1598 \times 10^{-4} \cdot T^2 + 0.03551 \cdot T + 33.43$
Panhandle West	$9.0851 \times 10^{-14} \cdot T^5 - 2.9941 \times 10^{-10} \cdot T^4 + 3.1560 \times 10^{-7} \cdot T^3 - 1.0851 \times 10^{-4} \cdot T^2 + 0.006285 \cdot T + 65.61$
<u>Lakes</u>	
Northeast + Big Bend	$1.4578 \times 10^{-13} \cdot T^5 - 5.5607 \times 10^{-10} \cdot T^4 + 7.0683 \times 10^{-7} \cdot T^3 - 3.1879 \times 10^{-4} \cdot T^2 + 0.02817 \cdot T + 34.19$
Peninsula + Everglades	$1.3709 \times 10^{-13} \cdot T^5 - 5.0496 \times 10^{-10} \cdot T^4 + 6.1352 \times 10^{-7} \cdot T^3 - 2.5817 \times 10^{-4} \cdot T^2 + 0.01960 \cdot T + 37.14$
Panhandle West	$7.1190 \times 10^{-14} \cdot T^5 - 2.6420 \times 10^{-10} \cdot T^4 + 3.2247 \times 10^{-7} \cdot T^3 - 1.3607 \times 10^{-4} \cdot T^2 + 0.01071 \cdot T + 66.35$

If multiple instantaneous DO samples are available in a day, the time-of-day-specific translation of the daily average criterion will be calculated for each individual sample. Achievement of the daily average DO criterion will be assessed by comparing the average of the actual DO measurements collected at each time against the average of the calculated time-of-day-specific translations for each time. If the average of the measured DO values is greater than or equal to the average of the time-of-day-specific translations of the criteria, the daily average DO criterion is achieved. An average of multiple daily values calculated in this manner will be considered as a single sample for assessment purposes.

Subsection 62-303.420(9) provides the equations and process by which FDEP will determine whether an instantaneous sample is in compliance with the newly adopted freshwater criteria located at 62-302.533(1). As noted in the summary in the comparable planning list provision, since the DO criteria were developed using diel monitoring data, the State has attempted to provide a method for translating a grab sample into a time-of-day specific value that can be used for assessing compliance against the percent saturation criteria contained in subsection 62-302.533(1). The addition of subsection 62-303.420(9) to the verified list provisions does not modify the underlying DO criteria and therefore, the EPA determined subsection 62-33.420(9) does not constitute a new or revised water quality standard.

Subsection 62-303.420(10) was added and reads as follows:

(10) For predominantly marine waters, the Department shall evaluate the daily average DO criterion using Table 3 of this section and shall also evaluate whether the seven-day and 30-day average criteria have been achieved during the verified period. A water segment shall be placed on the verified list for DO impairment if the number of samples that do not meet the daily average DO criterion is greater than or equal to the number listed in Table 3 for the given sample size, or if there is more than one weekly average value below the weekly average DO criterion in any twelve week period of the verified period or more than one monthly average value below the monthly average DO criterion in any calendar year of the verified period. Prior to placing a waterbody on the verified list, the Department shall identify the causative pollutant(s) responsible for the exceedances of the DO criteria. Before assessing the weekly and monthly

average DO criterion, the DO data shall be evaluated pursuant to subsections 62-303.420(3) and (5), F.A.C.

(a) If any individual DO measurement is greater than 100 percent saturation, 100 percent shall be substituted for that value for the purpose of calculating daily, weekly and monthly averages.

(b) Where DO values are collected at multiple depths at a given station and time, the average of the values shall be used to represent the measurements unless any of the individual DO values are less than 2 mg/l, in which case the lower 25th percentile of the measured values shall be used.

(c) For assessment purposes, the seven-day average DO percent saturation shall be calculated as a weekly average using a minimum of three full days of diel data collected within a week, or a minimum of ten grab samples collected over at least three days within a week, with each sample measured at least four hours apart.

(d) For assessment purposes, the 30-day average DO percent saturation shall be calculated as a monthly average using a minimum of three full days of diel data, with each diel sampling conducted in different weeks of the month, or grab samples collected from a minimum of ten different days of the month.

(e) A full day of diel data shall consist of 24 hours of measurements collected at a regular time interval of no longer than one hour.

The first two sentences of subsection 62-303.420(10) are generally restatements of text found within 62-302.533, with only minor editorial type differences to include mention of Table 3. These editorial differences are not new or revised water quality standards because they do not further modify the magnitude, duration or frequency of the newly revised DO criteria. The third sentence of subsection 62-303.420(10) was determined not to be a new or revised water quality standard because it describes when a water body shall not be placed on the verified list (in the case of an unknown causative pollutant) and does not establish a level of protection related to the magnitude, duration, or frequency of water quality criteria that is then utilized to make an attainment decision to identify water quality limited segments. However, this language is not problematic for section 303(d) purposes, because those waters will be listed on the 303(d) list via implementation of the provisions at 62-303.390. Lastly, the fourth sentence were determined to not be a new or revised water quality standard since it is related to data sufficiency requirements and does not establish or revise the magnitude, duration or frequency of the revised criteria.

With regard to the addition of paragraph (a), and as noted for the third sentence in the EPA's review of subsection 62-303.420(8), this provision "ensures that percent saturation measurements above 100% do not artificially result in compliance with the revised criteria." It is reasonable to make sure that waters are being determined to be impaired and not missed due to averaging of elevated DO levels, but as stated above in the review of subsection 62-303.420(8), the EPA has determined this provision does not modify the underlying DO criteria contained in subsection 62-302.533(1). Therefore, the EPA has determined that paragraph 62-303.420(10)(a) does not constitute a new or revised water quality standard.

With regard to the addition of paragraph (b), as indicated in other revisions, the State's preference is to articulate a specific preference for assessing different depths for measurement of DO. Based on suggestions from the EPA during criteria development, FDEP has included paragraph (10)(b) in addition to the adopted marine DO criteria in 62-302. This paragraph provides an additional consideration related to the protection from low dissolved oxygen conditions in the lower part of the water column that can occur in stratified marine systems. Based on the information provided by Jim Hagy, Gulf Ecology Division, US EPA, to Wayne Magley, FDEP, the 2 mg/L value incorporated into paragraph (10)(b)

represents an “acute threshold” value that is widely accepted threshold, below which mortality in aquatic species is more likely to be seen. The State’s decision to not average the DO values lower than 2 mg/L will ensure more appropriate characterization of a reduced DO condition when it exists. The use of the 25th percentile in this revision is intended to provide a consistent application of this provision, although the depth may vary based on the quantity of samples taken in the water column. The EPA finds paragraph(b) will allow for more appropriate application of the freshwater DO criteria and is consistent with 40 CFR part 131 and the CWA and is therefore approved by the EPA pursuant to section 303(c) of the Act.

Paragraphs (c), (d), and (e) were determined to not be new or revised water quality standards since they are related to data sufficiency requirements and do not establish or revise the magnitude, duration or frequency of the revised criteria.

Subsection 62-303.420(11) was added and reads as follows:

(11) For assessment of the DO criteria for the portions of the Suwannee, Withlacoochee (North), and Santa Fe Rivers utilized by the Gulf Sturgeon, and in the portions of the Santa Fe and New Rivers utilized by the Oval Pigtoe Mussel, waters will be placed on the verified list when more than 50 percent of measurements are below the applicable median or more than 10 percent of the daily average values are below the applicable 10th percentile values, specified in Appendix I of the “Technical Support Document: Derivation of Dissolved Oxygen Criteria to Protect Aquatic Life in Florida’s Fresh and Marine Waters,” which was incorporated by reference in subsection 62-303.320(5), F.A.C, at a minimum of a 90 percent confidence level using the binomial distribution.

Subsection 62-303.420(11) is generally a restatement of text found within paragraphs 62-302.533(1)(c) and (e), with only minor editorial type differences. Subsection 62-303.420(11) is not a new or revised water quality standard because it does not further modify the magnitude, duration or frequency of the newly revised DO criteria. Although paragraph 62-302.533(1)(d) is not specifically referenced in 62-303.420, the EPA expects FDEP to assess the St. Johns River in a manner consistent with the standard adopted and approved by the EPA.

Subsection 62-303.420(12) was added and reads as follows:

(12) For the assessment of the DO criteria, any DO data collected as a concentration in mg/L shall be converted to percent saturation using the temperature and salinity measured at the same location within fifteen minutes of the DO measurement. Percent DO saturation shall be calculated using the method in Section 5.4 of the “Technical Support Document: Derivation of Dissolved Oxygen Criteria to Protect Aquatic Life in Florida’s Fresh and Marine Waters,” which was incorporated by reference in subsection 62-303.320(11), F.A.C.

Because this provision is related to data sufficiency requirements and does not establish or revise the magnitude, duration or frequency of the revised criteria the EPA determined this subsection was not a new or revised water quality standard.

Subsection 62-303.420(13) was added and reads as follows:

(13) A water segment shall be placed on the verified list for DO impairment if there has been a statistically significant decreasing trend in DO levels or an increasing trend in the range of daily DO fluctuations at the 95 percent confidence level using a one-sided Seasonal Kendall test for trend, as described in Helsel, D.R. and R.M. Hirsh, 2002, Statistical Methods in Water Resources, USGS, pages 338 through 340, which were incorporated by reference in subsection 62-303.320(14) F.A.C., after controlling for or removing the effects of confounding variables, such as climatic and hydrologic cycles, quality assurance issues, and changes in analytical methods. Water segments shall not be placed on the verified list for DO impairment until the Department has identified a pollutant causing the decrease or if the decrease in DO levels was authorized under Rules 62-302.300 and 62-4.242, F.A.C.

Similar to subsection 62-302.533(5), the first sentence of subsection 62-303.420(13) establishes an objective, quantitative process to assess trends in ambient data for DO, based on either the magnitude of DO or the range of daily DO fluctuations. The primary difference in this provision and the one located at subsection 62-302.533(5) is the use of the term “DO levels” as opposed to “DO percent saturation.” The difference in these terms is likely to reflect the fact that the new criteria are expressed as percent saturation; while historically the State has expressed DO as concentration. The broader term “DO levels” could allow consideration of DO data that is either in the form of concentration or percent saturation. This more general terminology allows for inclusion of the trend test to more waters, and therefore, is a reasonable and defensible approach for the State to use. For the same reasons the trend for DO is approved in subsection 62-302.533(5), the EPA finds the first sentence in subsection 62-303.420(13) is consistent with 40 CFR part 131 and is approved by the EPA pursuant to CWA section 303(c).

The last sentence of subsection 62-303.420(13) was determined not to be a new or revised water quality standard. This sentence, which provides that a water body shall not be placed on the verified list where the pollutant causing the DO impairment is unknown, does not affect an attainment decision related to a level of protection afforded by Florida to its ambient waters. Rather, pursuant to paragraph 62-303.390(2)(c), such water bodies will be placed on the study list, which is also submitted to EPA pursuant to section 303(d) of the CWA.

Section 62-303.450

Subsection 62-303.450(1) was revised and reads as follows:

(1) A stream or estuary shall be placed on the verified list for impairment due to nutrients if it exceeds the chlorophyll *a* thresholds in subsection 62-303.351(4), F.A.C., or subsection 62-303.353(2)(1), F.A.C., more than once in any consecutive three year period, and there are sufficient data from the last 7.5 years, combined with historical data (if needed to establish historical chlorophyll *a* levels), to meet the data sufficiency requirements of subsection 62-303.350(2), F.A.C. If there are insufficient data, additional data shall be collected as needed to meet the requirements. Once these additional data are collected, the Department shall determine if there is sufficient information, including paleoecological data, to develop a site-specific chlorophyll *a* threshold that better reflects conditions beyond which an imbalance in flora or

fauna occurs in the water segment. If there is sufficient information, the Department shall re-evaluate the data using the site-specific thresholds. If there is insufficient information, the Department shall re-evaluate the data using the thresholds provided in subsections 62-303.351(4) and 62-303.353(1), F.A.C., for streams and estuaries and verify impairment if there is more than one exceedance in any consecutive three year period. In any case, the Department shall limit its analysis to the use of data collected during the last 7.5 years. If alternative thresholds are used for the analysis, the Department shall provide the thresholds for the record and document how the alternative threshold better represents conditions beyond which an imbalance in flora or fauna is expected to occur.

The revision to subsection 62-303.450(1) corrects an error in the version of the IWR reviewed by EPA in 2012. As identified on page 104 of the EPA's November 30, 2012 decision document, "FDEP has noted this error [of referencing to 62-3030.353(1)] on page 29 of FDEP's Q&A Document and states that the citation error will be corrected in the next state triennial review. The EPA will review the corrected provision when it is submitted to EPA." FDEP has now amended subsection 62-303.450(1) to reference subsection 62-303.353(2), rather than subsection 62-303.353(1).

As a result of this correction, the EPA is now reviewing the revised subsection 62-303.450(1). By referencing to 62-303.353(2), subsection 62-303.450(1) correctly identifies the provision associated with the one sided impairment chl *a* threshold for estuaries. Subsection 62-303.450(1) now allows the chl *a* threshold for estuaries in subsection 62-303.353(2) to be exceeded once every three years, although that part of the provision was added during the State's previous submittal on June 13, 2012.

The basis given for the change was addressed on pages 27-28 of FDEP's Q&A Document.

The Department changed the exceedance frequency for the chlorophyll *a* impairment threshold for streams and estuaries from not to be exceeded in any year to not to be exceeded more than once in three years because

- a) it makes the thresholds consistent with the expression of the vast majority of newly adopted numeric interpretations of the nutrient standards,
- b) during the first ten years of implementation of the IWR, Florida listed many waters for nutrient impairment based on single year exceedances of the chlorophyll *a* threshold that were caused by extreme weather conditions (both droughts and El Nino events) rather than anthropogenic nutrient loading, and these waters were subsequently delisted when there were at least three subsequent years that did not exceed the threshold. Given the delisting threshold that delists waters when the listing threshold is not exceeded for three consecutive years, the change in exceedance frequency is actually not a significant change in the rule. However, this cycling of waters on and off the 303(d) list is administratively very inefficient, and the Department wants to ensure that only truly impaired waters are listed as such.

A chl *a* concentration of 11 µg/L, not to be exceeded more than once in any three year period, for estuaries is still recognized as an impairment threshold in the absence of site specific information, such as those criteria adopted in section 62-302.532, which have been demonstrated to be more appropriate criteria for purposes of protecting the designated uses of the waterbody. The one sided threshold of impairment for chl *a* is still not appropriate for use in permitting, TMDL target development, or any other uses where a protective water quality criterion is required because the one sided threshold does not identify a protective level of chl *a* to be used in those regulatory programs. For the same reasons provided in the EPA's November 30, 2012 action to approve the change in frequency for streams, the

incorporation of the revised frequency for estuaries, through the above revision to subsection 62-303.450(1), is consistent with 40 CFR part 131 and the CWA and is approved by the EPA pursuant to section 303(c) of the Act.

Section 62-303.720

Paragraphs 62-303.720(2)(o) and (p) were revised and read as follows:¹³

(2) Waterbody segments shall be removed from the State's verified list only after adoption of a TMDL, a Department determination that pollution control programs provide reasonable assurance that water quality standards will be attained pursuant to Rule 62-303.600 F.A.C., or upon demonstration that the waterbody meets the waterbody quality standard that was previously established as not being met.

(a) No change.

...

(g) through (n) No change.

(o) For waters listed based on the monthly average DO criterion for predominantly marine waters, the waterbody shall be delisted when the monthly average DO criterion is met for at least three consecutive years and there are new data available for the same seasons in which the criterion was previously not achieved.

(p) For waters listed based on the weekly average DO criterion for predominantly marine waters, the waterbody shall be delisted when the weekly average DO criterion is met for at least three consecutive years and there are new data available for the same seasons in which the criterion was previously not achieved.

In regards to paragraphs 62-303.720(2)(o) and (p), FDEP provided the following response in their Responsiveness Document:

Comment: Proposed Section 62-303.420(8), F.A.C., allows a water body to be listed as impaired for dissolved oxygen if more than one monthly average in a calendar year falls below the proposed new criteria. To delist predominantly marine waters for dissolved oxygen, the monthly and weekly averages must be met for a minimum of three years. Three years is an unnecessarily long period for delisting for dissolved oxygen. A year would be sufficient especially if the months in question appear to have returned to normal ambient dissolved oxygen levels.

Response: The three years of demonstrated acceptable DO conditions was included to provide strong assurance that a TMDL to address pollutants that cause low DO was no longer needed. Waterbodies should only be delisted when there is a robust demonstration that the listing is no longer appropriate.

Based on this response and the previous conclusions in the EPA's February 19, 2008 decision document, paragraphs 62-303.720(2)(o) and (p) are not new or revised water quality standards because the reference to the exceedance frequency refers to the reliability of the measurements, rather than the ambient condition of the water body (magnitude, duration, and frequency of exceedance). In other words, where the annual average is not exceeded for three consecutive years, this is an indication that the information of attainment is sufficiently reliable to justify delisting. Therefore, the EPA has

¹³ Paragraphs 62-303.720(2)(b) and (f) will be addressed under separate cover as noted in the introduction.

concluded that the revisions to IWR paragraphs 62-303.720(2)(o) and (p) do not constitute new or revised water quality standards.

SEP 09 2013

Date



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