Implementation of

Florida's Numeric Nutrient Standards

Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection
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ACRONYMS

AGM- Annual Geometric Mean
AO- Administrative Order
BA- Basin Area
BMAP- Basin Management Action Plan
DA- Drainage Area
DO- Dissolved Oxygen
C of C- Coefficient of Conservatism
CFS- Cubic Feet per Second
EPA- Environmental Protection Agency
F.A.C.- Florida Administrative Code
FLEPPC- Florida Exotic Plant Pest Council
F.S.- Florida Statute
FWRA- Florida Watershed Restoration Act
HA- Habitat Assessment
HBG- HydroBioGeomorphic
IWR- Impaired Waters Rule
LVS- Linear Vegetation Survey
NEFCP- Northeast Florida Coastal Plain
NNC- Numeric Nutrient Criteria
NPDES- National Pollutant Discharge Elimination System
NRCS- Natural Resource Conservation Service
NWFCP- Northwest Florida Coastal Plain
PCU- Platinum Cobalt Units
PFCP- Peninsula Florida Coastal Plain
RA- Reasonable Assurance
RAP- Reasonable Assurance Plan
RPS- Rapid Periphyton Survey
SCI- Stream Condition Index
SFCP- South Florida Coastal Plain
SI- Stressor Identification
SMP- Strategic Monitoring Plan
SOP- Standard Operating Procedure
SSAC- Site Specific Alternative Criteria
SSURGO- Soil Survey Geographic Database
TBEP- Tampa Bay Estuary Program
TMDL- Total Maximum Daily Load
TN- Total Nitrogen
TP- Total Phosphorus
WLA- Wasteload Allocation
WQBEL- Water Quality Based Effluent Limitation

1.0 INTRODUCTION

1.1 Purpose of Document

This document describes how certain aspects of the numeric nutrient standards in Chapters 62-302 (Surface Water Quality Standards) and 62-303 (Identification of Impaired Surface Waters), Florida Administrative Code (F.A.C.), are implemented by the Florida Department of Environmental Protection (Department). This document provides background information, reiterates the existing rule language in Chapters 62-302 and 62-303, F.A.C., and gives examples of how existing rule language is implemented. The document also includes important details on the floral evaluation (Sections 6.3 to 6.8) and stream exclusions (Chapter 12.0). These sections and chapter are specifically incorporated by reference into Rule 62-302.300, F.A.C. (the details on the floral evaluation are also incorporated by reference into Chapter 62-303, F.A.C.). To the extent that this document in any way conflicts with any provision in Chapters 62-302 or 62-303, F.A.C., those provisions control.

The major topics in this document include the hierarchical approach used to interpret the narrative nutrient criterion on a site specific basis; summaries of the numeric nutrient criteria (NNC) for lakes, spring vents, streams and estuaries; the role of floral measures in determining attainment of the numeric nutrient standard for streams; and a description of how the Level I and Level II Water Quality Based Effluent Limitation (WQBEL) processes are used to implement the nutrient standards in wastewater permitting.

1.2 Background

Nutrients are naturally present in aquatic systems and are necessary for the proper functioning of biological communities. Nutrient effects on aquatic ecosystems are moderated in how they are expressed by many natural factors (*e.g.*, light penetration, hydraulic residence time, food web interactions, and habitat considerations). As a result, determining the appropriate protective nutrient regime is largely a site specific undertaking, requiring information about ecologically relevant responses.

1.3 The Hierarchical Approach

The narrative nutrient criterion in paragraph 62-302.530(48)(b), F.A.C., states that "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna." The method for numerically interpreting this narrative nutrient criterion, on a site specific basis, is provided in Rule 62-302.531, F.A.C., using a hierarchical process for determining the NNC that apply to a given waterbody.

The hierarchical approach in Rule 62-302.531, F.A.C., gives preference to site specific analyses that result in a numeric interpretation of the narrative nutrient criterion. Site specific or "Hierarchy 1" (H1) interpretations are generally deemed superior to more broadly applicable interpretations of the narrative nutrient criterion because of the many natural factors affecting the expression of nutrient loadings on a given waterbody. If there is a site specific interpretation of the narrative, such as a Total Maximum Daily Load (TMDL), Site Specific Alternative Criterion (SSAC), Level II Water Quality Based Effluent Limitation (WQBEL), or other Department-approved action that numerically interprets the narrative criterion [*e.g.*, Reasonable Assurance Plan (RAP) derived values], that numeric interpretation can be the applicable nutrient criterion[1]. These numeric interpretations of the narrative criterion must establish the total allowable load or ambient concentration for at least one nutrient that represents achievement of a healthy, well-balanced aquatic community.

Each nutrient [Total Phosphorus (TP) and Total Nitrogen (TN)] and nutrient response variable (chlorophyll *a*) is interpreted independently using this hierarchical approach. If the site specific interpretation only addresses one nutrient, then the generally applicable numeric interpretations in subsection 62-302.531(2), F.A.C., or Rule 62-302.532, F.A.C., will apply for the other nutrient and the nutrient response variable.

If a Hierarchy 1 interpretation is not available, the Rule's hierarchical approach then gives preference to numeric nutrient values based on quantifiable stressor-response relationships between nutrients and biological response (*i.e.*, springs and lakes). If no quantifiable stressor-response relationship has been established, such as is the case for Florida streams, reference-based nutrient thresholds, in conjunction with biological information, are used to determine the applicable interpretation of the narrative nutrient criterion. For those waters without a numeric interpretation under any of these approaches (*e.g.*, South Florida flowing waters, tidal creeks, and wetlands), the narrative nutrient criterion continues to apply to the waterbody[2]. If there is more than one Hierarchy 1 interpretation for a given waterbody, the most recently adopted interpretation controls, in accordance with paragraph 62-302.531(2)(a), F.A.C.

2.0 Discussion of TMDLs as NNC

- Only nutrient TMDLs that are state-adopted are eligible as site specific interpretations of the narrative nutrient criteria.

- To be eligible as a site specific numeric interpretation of paragraph 62-302.530(48)(b), F.A.C., nutrient TMDLs must be based upon prevention of imbalances of natural populations of aquatic flora or fauna. Nutrient TMDLs that address dissolved oxygen (DO) impairment (paragraph 62-302.530(48)(a), F.A.C.) are also eligible if nutrients were identified as a causative pollutant and the TMDL demonstrated that it would also prevent an imbalance of natural populations of aquatic flora or fauna. As an example, surplus anthropogenic nutrients could be shown to generate excess plant biomass

[1] Consistent with the Clean Water Act, these site specific interpretations will be submitted to EPA for review and approval as a change to Florida's surface water quality criteria.
[2] The narrative nutrient criterion applies in all Class I, II, III, and III-Limited waters.

(periphyton, phytoplankton, or vascular plants) that could lead to low DO from decomposition or respiration of excess plant biomass. While the waterbody may be listed based on the low DO levels, the excess plant biomass could also constitute an imbalance in flora or result in an imbalance in fauna due to habitat smothering (*e.g.*, excess periphyton accumulation) or food web alteration (*e.g.*, dominance of taxa that thrive in nutrient enriched conditions). If the TMDL is written to achieve the DO criterion and prevent the imbalance, it can be eligible as the numeric nutrient interpretation of paragraph 62-302.530(48)(b), F.A.C.

For these DO TMDLs to be considered H1 TMDLs, DO would need to be demonstrated to be a "nutrient response variable" (see subsection 62-302.200(25), F.A.C.). This demonstration can be made using modeling or standard statistical tests, such as regression or other appropriate empirical or deterministic models, to demonstrate there is a "predictable and measurable" DO response to nutrients. For statistical demonstrations, the *p*-value associated with the regression or other statistical model must be less than 0.05 and the variability in DO explained by nutrients must be sufficient to expect that nutrient reductions would lead to improvements in DO and maintain or restore a healthy, well-balanced biological community.

- Many TMDLs are expressed as loads instead of concentrations, but the loads do not have to be translated into concentrations to be deemed the numeric interpretation of the narrative nutrient criterion.

- TMDLs can be modified based on new data, new science, or different targeted endpoints (such as DO). When nutrient TMDLs are modified and re-adopted, they become the new interpretation of the narrative nutrient criterion.

- TMDL rules may include a response target (chlorophyll *a*, for example) designed to implement the narrative nutrient criterion and the response variable can become part of the site specific interpretation of the narrative. For TMDLs for streams that include a response variable and establish site specific interpretations of the narrative nutrient standard for both TN and TP, the TMDL replaces the entire numeric nutrient standard for streams, including the floral metrics.

- TMDLs can be written to achieve NNC established in subsection 62-302.531(2), F.A.C., or to achieve conditions necessary to protect the narrative nutrient criterion.

- Nutrient TMDLs that the Department intends to be Hierarchy 1 interpretations must be publicly noticed as new numeric interpretations of the narrative criterion and as changes to state water quality standards. Consistent with the CWA, these site specific interpretations will be submitted to EPA for review.

3.0 Discussion of Site Specific Alternative Criteria as NNC

- Nutrient SSACs can also serve as H1 interpretations of the narrative nutrient criterion if they are duly adopted pursuant to Rule 62-302.800, F.A.C., and are noticed as site specific interpretations of the narrative nutrient criterion.

- Since NNC are intended to protect healthy, well-balanced natural populations of aquatic flora and fauna, the existing nutrient concentrations are deemed protective if the biology is found to be healthy and protection of downstream waters is demonstrated pursuant to subparagraph 62-302.800(3)(a)3., F.A.C. Nutrient SSACs will need to address the natural variability in nutrient concentrations and must demonstrate that the designated uses are being protected in the waters covered by the SSAC and in downstream waters.
- As part of Type III SSAC development, aquatic life use support must be demonstrated. The phytoplankton, periphyton, vascular plant community and benthic macroinvertebrate responses are used as primary evidence to demonstrate systems are meeting their designated use. Streams that do not exhibit excess algal growth or abundant nuisance aquatic plants and where the average of two consecutive temporally independent SCI results is greater than 40 and neither score is less than 35 are biologically healthy, and the associated nutrient regime is demonstrated to be protective.

4.0 Nutrient criteria for Lakes

The lakes criteria were based on a strong stressor-response relationship between nutrients (TN and TP) and phytoplankton response (chlorophyll *a*). The lakes chlorophyll *a* criteria were derived using multiple lines of evidence. The lakes criteria maintain naturally low nutrient lakes in an oligotrophic state and naturally moderate nutrient lakes in a mesotrophic state. Naturally eutrophic lakes (high in nutrients and productivity) are addressed on a site specific basis.

For purposes of interpreting the narrative nutrient criterion, a "lake" is defined in subsection 62-302.200(18), F.A.C., as "a lentic fresh waterbody with a relatively long water residence time and an open water area that is free from emergent vegetation under typical hydrologic and climatic conditions. Lakes do not include springs, wetlands, or streams (except portions of streams that exhibit lake-like characteristics, such as long water residence time, increased width, or predominance of biological taxa typically found in non-flowing conditions)." Note that, while lakes are typically characterized by a fringe of emergent vegetation, the presence of an open water area where emergent vegetation is absent distinguishes lakes from wetlands. Floating or submersed vegetation may be present in this open water area, and the system would still be defined as a lake, and numeric nutrient criteria would apply.

For lakes, the applicable numeric interpretations of the narrative nutrient criterion in paragraph 62-302.530(48)(b), F.A.C., for chlorophyll *a* are shown in **Table 1**. The Department allows for an acceptable range of annual geometric means (AGMs) of TN and TP, up to the values shown in the "maximum calculated numeric interpretation" column, if the applicable chlorophyll *a* criterion is achieved in that same year. These numeric interpretations for TN, TP, and chlorophyll *a* cannot be exceeded more than once in any consecutive three-year period and apply statewide. While the magnitude of the applicable TN and TP NNC vary depending on the chlorophyll *a* level in the lake, all three criteria are applied independently. Exceedance of any of the three applicable criteria more than once in a three-year period constitutes non-attainment.

Table 1. Lakes chlorophyll *a*, TN, and TP criteria.

Long Term Geometric Mean Lake Color and Alkalinity	Annual Geometric Mean Chlorophyll *a*	Minimum calculated numeric interpretation		Maximum calculated numeric interpretation	
		Annual Geometric Mean Total Phosphorus	Annual Geometric Mean Total Nitrogen	Annual Geometric Mean Total Phosphorus	Annual Geometric Mean Total Nitrogen
> 40 Platinum Cobalt Units	**20 µg/L**	**0.05 mg/L**	**1.27 mg/L**	**0.16 mg/L**[1]	**2.23 mg/L**
≤ 40 Platinum Cobalt Units and > 20 mg/L $CaCO_3$	**20 µg/L**	**0.03 mg/L**	**1.05 mg/L**	**0.09 mg/L**	**1.91 mg/L**
≤ 40 Platinum Cobalt Units and ≤ 20 mg/L $CaCO_3$	**6 µg/L**	**0.01 mg/L**	**0.51 mg/L**	**0.03 mg/L**	**0.93 mg/L**

[1] For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit is 0.49 mg/L, which is the TP streams threshold for the region.

If there are insufficient data to calculate the AGMs of chlorophyll *a* for a given year or the AGM of chlorophyll *a* exceeds the values in **Table 1** for the lake type, then the applicable numeric interpretations for TN and TP are the minimum values in the table. If there are sufficient data to calculate the AGM chlorophyll *a* and the mean **does not** exceed the chlorophyll *a* value for the lake type in **Table 1**, then any AGMs of ambient TN and TP samples for the lake below the maximum TN and TP limits in the table comply with the criterion. However, if the AGMs for TN and/or TP are above the maximum value, then the lake does not attain the nutrient criterion for that year regardless of the fact that the lake attained the chlorophyll *a* criterion.

Note that for lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the relationship between chlorophyll *a* and TP is sufficiently variable such that the maximum allowable TP based on the upper prediction interval would be higher than the TP nutrient threshold for streams. The maximum TP limit was set at 0.49 mg/L, which is the TP streams threshold for the region, to ensure the protection of downstream streams.

5.0 Nitrate-Nitrite Criterion for Spring Vents

The spring vent nitrate-nitrite criterion is based on a strong stressor-response relationship between nitrate-nitrite and the presence of nuisance algal mats, with the criterion established at a concentration that prevents nuisance mats from occurring (compared with natural background levels). See Section 4 of the Technical Support Document: Development of Numeric Nutrient Criteria for Florida Lakes, Spring Vents, and Streams for additional details regarding the derivation of the nitrate-nitrite criterion for spring vents (FDEP, 2012; reference provided for informational purposes only). A "spring vent" is defined in subsection 62-302.200(37), F.A.C., as "a location where groundwater flows out of a natural, discernible opening in the ground onto the land surface or into a predominantly fresh surface water."

For spring vents, the applicable numeric interpretation of the narrative nutrient criterion in paragraph 62-302.530(48)(b), F.A.C., is 0.35 mg/L of nitrate-nitrite ($NO_3 + NO_2$) as an AGM, not to be exceeded more than once in any three consecutive calendar year period.

6.0 Numeric Nutrient Standard for Streams

Despite an extensive effort to develop stressor-response relationships between nutrients and biological responses in streams, insufficient consistent responses were observed to develop stand-alone numeric nutrient criteria. To address this issue, the Department established a numeric nutrient standard for streams that includes an evaluation of water chemistry, biological data (flora and fauna), and physical information to determine if a stream's nutrient concentrations are protective of balanced flora and fauna. The final result, which was promulgated as paragraph 62-302.531(2)(c), F.A.C., includes TN and TP "thresholds" rather than TN and TP "criteria." The nutrient values are termed thresholds to differentiate them from "criteria" because a waterbody can attain the numeric nutrient standard for streams even when the thresholds are exceeded if the floral and faunal measures are met.

This chapter provides details on implementing the numeric nutrient standard for streams in paragraph 62-302.531(2)(c), F.A.C. Please see Section 2.7 of *Sampling and Use of the Stream Condition Index (SCI) for Assessing Flowing Waters: A Primer* (DEP-SAS-001/11) (FDEP, 2011B), which was incorporated by reference in subsection 62-302.300(20), F.A.C., for additional discussion on the complexity of nutrient enrichment effects and appropriate use of assessment tools.

6.1 Stream Definition

For purposes of interpreting the numeric nutrient standard for streams in paragraph 62-302.531(2)(c), F.A.C., a "stream" is defined under subsection 62-302.200(38), F.A.C., as "a predominantly fresh surface waterbody with perennial flow in a defined channel with banks during typical climatic and hydrologic conditions for its region within the state. During periods of drought, portions of a stream channel may exhibit a dry bed, but wetted pools are typically still present during these conditions. Streams do not include: (a) non-perennial water segments where fluctuating hydrologic conditions, including periods of desiccation, typically result in the dominance of wetland and/or terrestrial taxa (and corresponding reduction in obligate fluvial or lotic taxa), wetlands, or portions of streams that exhibit lake characteristics *(e.g.,* long water residence time, increased width, or predominance of biological taxa typically found in non-flowing conditions), or tidally influenced segments that fluctuate between predominantly marine and predominantly fresh waters during typical climatic and hydrologic conditions; or (b) ditches, canals and other conveyances, or segments of conveyances, that are man-made, or predominantly channelized or predominantly physically altered; and 1) are primarily used for water management purposes, such as flood protection, stormwater management, irrigation, or water supply; and 2) have marginal or poor stream habitat or habitat components, such as a lack of habitat or substrate that is biologically limited, because the conveyance has cross sections that are predominantly trapezoidal, has armored banks, or is maintained primarily for water conveyance."

This stream definition applies only to the numeric nutrient standard for streams adopted under paragraph 62-302.531(2)(c), F.A.C. The definition does not apply to any other water quality criteria adopted within Florida rules except those that specifically reference paragraph 62-302.531(2)(c), F.A.C. The narrative nutrient criterion continues to apply for all Class I, II, III and III-Limited waters, including those streams without NNC.

The stream definition in subsection 62-302.200(38), F.A.C., was carefully crafted to ensure consistency with the scientific procedures and methods used to establish the numeric nutrient standard for streams expressed in paragraph 62-302.531(2)(c), F.A.C. Neither canals nor non-perennial streams were used to derive the nutrient thresholds in paragraph 62-302.531(2)(c), F.A.C. Furthermore, the physical and hydrologic alterations within a canal would almost always cause the failure of the SCI component of the standards in paragraph 62-302.531(2)(c), F.A.C., regardless of nutrient levels, which limits the utility of the SCI for determining the effects of nutrients in canals.

6.2 Implementation of NNC in Streams

To evaluate ecosystem health in streams, it is important to acknowledge that adverse nutrient enrichment effects follow a conceptual ecological model (**Figure 1**). When anthropogenic nutrient loading or concentrations exceed a system's assimilative capacity, the primary response consists of changes to the primary producer communities (periphyton, phytoplankton, or vascular plants) and excess production of plant biomass. This enhanced floral biomass can lead to habitat loss from excess periphyton smothering or nuisance plant biomass accumulation, food web alterations (*e.g*., dominance of taxa that thrive in nutrient/organic matter enriched conditions), and/or low dissolved oxygen (DO) from the decomposition of plant biomass or respiration. This chain of events is ultimately reflected in meaningful biological endpoints, such as excessive algal mats, excess water column chlorophyll *a*, excess nuisance vascular plant growth, and/or failing Stream Condition Index (SCI) scores. These adverse biological endpoints constitute imbalances of aquatic flora and/or fauna.

Conversely, if data show that biological health is fully supported in an aquatic system (no adverse responses consistent with the conceptual nutrient enrichment model), one may conclude that the associated nutrient regime is inherently protective of the waterbody, and the narrative nutrient criterion is achieved.

For streams, if a site specific interpretation pursuant to paragraph 62-302.531(2)(a), F.A.C., (TMDL, SSAC, Level II WQBEL, or RA Plan) has not been established, nutrient thresholds are used to interpret the narrative nutrient criterion in combination with biological information. The narrative nutrient criterion in paragraph 62-302.530(48)(b), F.A.C., shall be interpreted as being achieved in a stream segment if:

- Information on chlorophyll *a* levels, algal mats or blooms, nuisance macrophyte growth, and changes in algal species composition do not indicate an imbalance in flora or fauna; AND EITHER
- The average score of at least two temporally independent SCIs performed at representative locations and times is 40 or higher, with neither of the two most recent SCI scores less than 35 (*i.e.*, no faunal imbalance), OR
- The nutrient thresholds (expressed as AGMs) in **Table 2** are not exceeded more than once in a three-year period (see **Figure 2** for a map of the nutrient watershed regions).

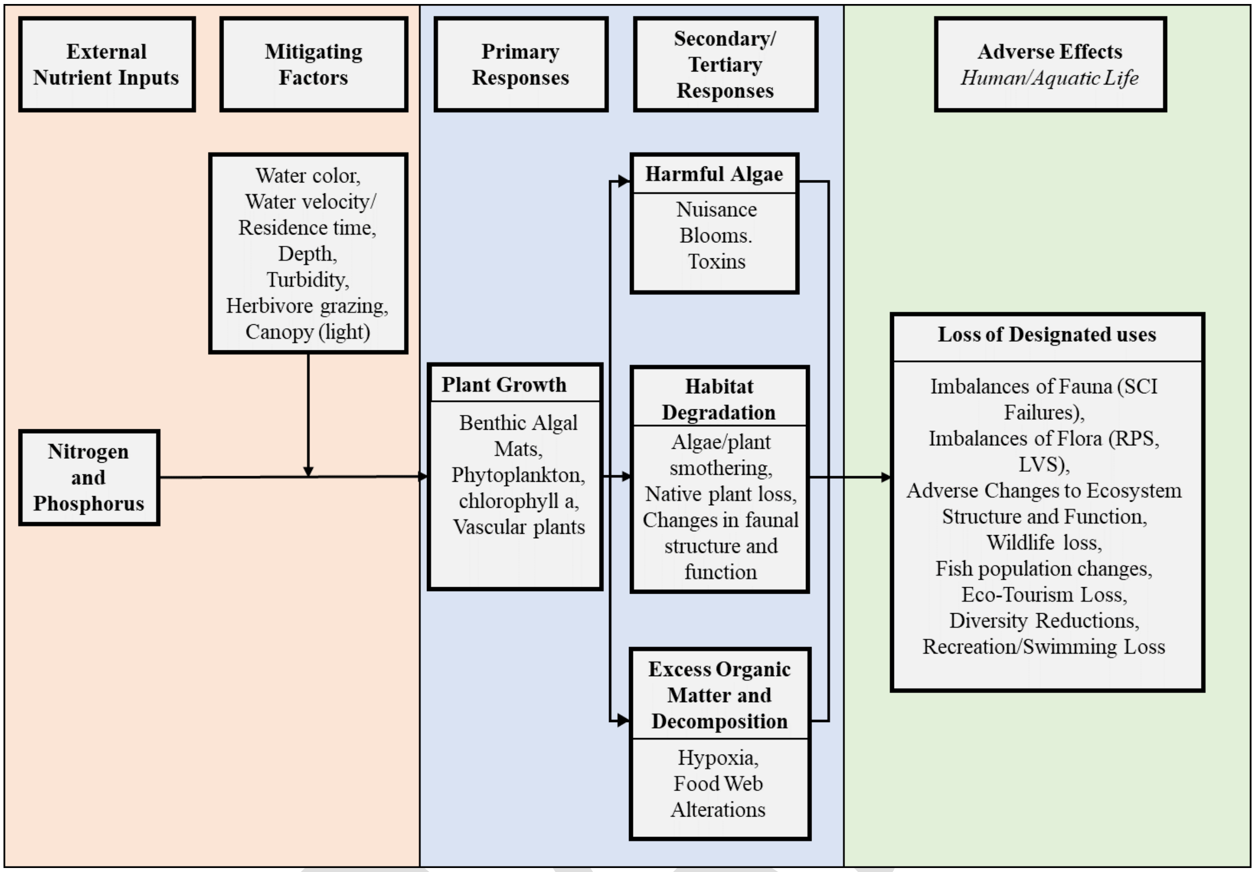

Figure 1. **Conceptual nutrient enrichment model used to assess potential adverse effects of nutrients on aquatic life and human uses in streams. Relationships between nutrients and biological responses are highly influenced by site specific and mitigating factors. Note: the conceptual nutrient enrichment model represents a simplified model that does not fully reflect all linkages between stressors (nutrients) and ecological attributes.**

Table 2. Reference stream-based nutrient thresholds (subparagraph 62-302.531(2)(c)2., F.A.C.)

Nutrient Region	Total Phosphorus Threshold	Total Nitrogen Threshold
Panhandle West	0.06 mg/L	0.67 mg/L
Panhandle East	0.18 mg/L	1.03 mg/L
North Central	0.30 mg/L	1.87 mg/L
Peninsula	0.12 mg/L	1.54 mg/L
West Central	0.49 mg/L	1.65 mg/L
South Florida	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(48)(b), F.A.C., applies.[3]	No numeric nutrient threshold. The narrative criterion in paragraph 62-302.530(48)(b), F.A.C., applies.[3]

[3] Chlorophyll *a* impairment thresholds in the IWR will continue to be used to assess South Florida flowing waters.

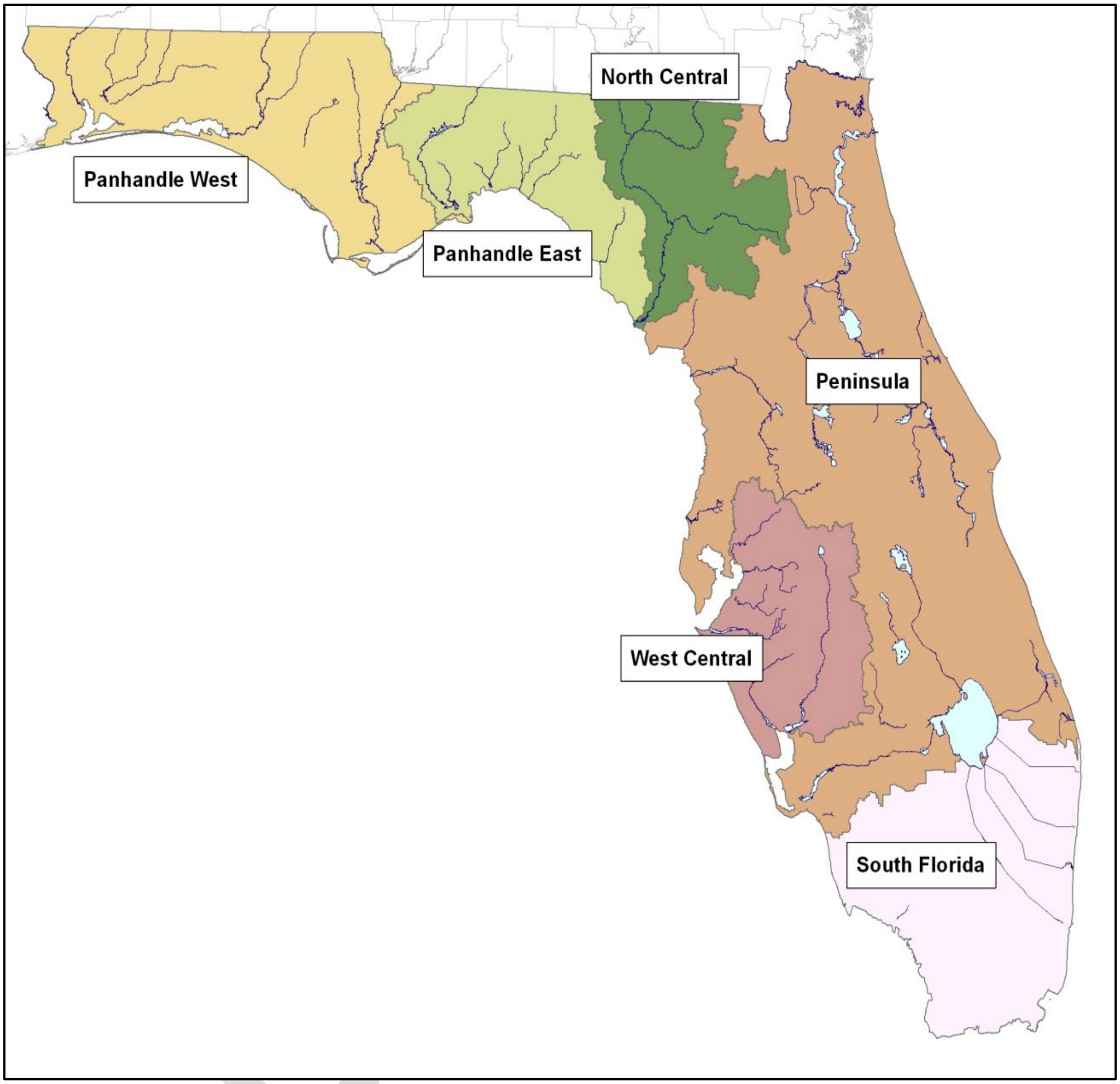

Figure 2. Map of nutrient watershed regions for stream thresholds. Narrative nutrient criteria apply to all Class I, II, III, and III-Limited waters, including flowing waters in the South Florida nutrient region.

6.3 Floral Evaluation for Determining Achievement of NNC

During NNC development, the Department, in coordination with EPA, conducted a series of comprehensive statistical analyses to identify relationships between human disturbance (such as nutrient enrichment) and floral responses (such as adverse changes to algal taxonomic composition, algal and vascular plant abundance, and chlorophyll *a*) using an extensive data set collected in Florida streams. The relationships were statistically weak, and neither the

Department nor EPA could identify floral health/impairment thresholds for streams associated with human disturbance or nutrient concentrations or loads.

To establish floral health metrics and impairment thresholds, the Department decided to determine whether measures of the algal and plant communities at a given stream were consistent with the measures found within the reference stream distribution (generally the 90th percentile, as was used to develop the nutrient thresholds). If all floral measures were within the reference site distribution, it was reasonable to conclude the presence of a balanced floral community.

Based on all potential floral outcomes associated with the conceptual nutrient enrichment model (**Figure 1)**, the Department evaluates the Rapid Periphyton Survey (RPS), Linear Vegetation Survey (LVS), and chlorophyll *a* data at stream sites as described below.

If any one of these floral measures indicates an imbalance, then the Department would conclude that the stream site does not attain the numeric nutrient standard for streams. Floral measures alone can provide evidence that the nutrient standard in paragraph 62-302.531(2)(c), F.A.C., is not achieved, potentially leading to the waterbody being placed on the Florida Verified List of impaired waters and Clean Water Act Section 303(d) list if the Department identifies the causative pollutant(s) and the concentration of the pollutant(s) causing the impairment, pursuant to rule 62-303.710(1), F.A.C. However, because invasive exotic or tolerant species can occur even in the absence of anthropogenic nutrient enrichment, streams that fail the LVS will be placed on the Study List of potentially impaired waters to evaluate whether nutrients contribute to the LVS failure.

If floral data (RPS, LVS, and chlorophyll *a*) are unavailable for a stream that exceeds the nutrient thresholds for TN or TP, the waterbody is placed on the Study List, indicating additional information needs to be collected. It is the Department's intent to collect the additional information before the next assessment of the waterbody.

For the RPS and LVS, one survey is insufficient to document a stream's long-term floral health because natural climate-related circumstances during any given period can cause shifts in the vascular plant and algal communities. Therefore, at least two temporally independent (collected ≥ 3 months apart) bioassessment evaluations, with at least one of them collected during October-April, are required to make a decision about floral health for a site.

For the RPS and LVS, greater weight will be given to the most recent samples because changes can occur rapidly in the primary producer communities in response to changes in nutrients or a mitigating factor (*e.g.* loss of canopy cover). If the two most recent samples (temporally independent, with at least one of them collected during October- April) pass the RPS or LVS evidentiary thresholds described in the following sections, then there is no indication of floral imbalance at the site. If the two most recent samples fail the RPS or LVS evidentiary thresholds, there is evidence of floral imbalance at the site. If one "pass" and one "fail" comprise the two most recent samples, then the next most recent assessment should be considered, and the assessment determination will be based on the results of this third assessment.

6.4 Evaluating Algal Mats

The RPS is a rapid assessment tool for evaluating streams' ecological condition based on the attached algae (periphyton). The RPS quantifies periphyton length and extent in a 100-meter stretch of a stream by assigning a rank category to the length of periphyton filaments. Ranks 4, 5 and 6 represent filament lengths of > 6 mm. In deriving the RPS threshold, the Department compiled RPS results from the population of Benchmark and healthy sites sampled by the Department as part of NNC development. RPS rank 4-6 coverage at Nutrient Benchmark (reference) streams ranged from 0% to 66%, with a mean value of 6% and a 90th percentile value of 25%. RPS rank 4-6 coverage at all biologically healthy sites (as indicated by SCI scores > 40) ranged from 0% to 91%, with a mean value of 8% and a 90th percentile value of 32%. Although these RPS distributions are similar, the Department concluded that use of an RPS evidentiary threshold based on the 90th percentile of the Benchmark sites would be consistent with how the nutrient thresholds were derived. Therefore, the RPS evidentiary threshold was set at 25%.

If a stream site exhibits a percent coverage of periphyton ranks 4-6 of 25% or less for two consecutive, temporally independent samples collected ≥3 months apart with at least one of the samples collected during October- April, the RPS results indicate evidence of a balanced periphyton community. If a stream site exceeds an RPS 4-6 coverage of 25% for two consecutive, temporally independent samples (≥3 months apart) with at least one of the samples collected during October- April, the Department considers this as evidence that the numeric nutrient standard for streams is not achieved.

If the two most recent surveys have differing results in relation to the evidentiary threshold, the third most recent survey will be used to make the assessment determination. If there are no additional survey results available, an additional, temporally independent RPS shall be conducted, and the results of the additional RPS will determine the assessment status of the site.

When the RPS rank 4-6 coverage is ≥ 20%, an evaluation of the algal species composition (identifying the five dominant taxa) must also be conducted to provide additional information on whether there is an imbalance of flora. Where RPS 4-6 coverage is < 20%, there is no need to collect samples for algal species composition because the stream is clearly within the reference site distribution. Therefore, the algal species composition is presumed to be acceptable.

6.5 Evaluating Dominant Algal Species Composition

Although the Department conducted a comprehensive study of stream periphyton in Florida in an attempt to formulate a multi-metric index for assessing human disturbance (including nutrient effects), the statewide data indicated that the periphyton community composition was more highly correlated with pH and conductivity than with nutrients or measures of human disturbance. Additionally, common metrics that typically decrease in response to human disturbance in invertebrate communities, such as taxa richness and diversity, often increase in algal communities when comparing oligotrophic to eutrophic streams, meaning such metrics are not useful for assessing anthropogenic nutrient inputs. Given these constraints, the Department assesses the environmental information associated with dominant algal taxa qualitatively using the scientific literature and Florida occurrence data to determine if they indicate nutrient enriched/imbalanced conditions.

Nutrient enriched Florida springs are typically characterized by an abundance of one or more of the following taxa: *Plectonema wollei (*formerly *Lyngbya wollei),* *Vaucheria* sp., *Dichotomosiphon* sp. Potential toxin-producing taxa include: *Geitlerinema acutissimum, Lyngbya aestuarii, Lyngbya majuscula, Oscillatoria limosa, Oscillatoria tenuis, Phormidium aerugineo-caeruleum,* and *Plectonema wollei.* The dominance of such taxa at a stream site where the RPS rank 4-6 ≥ 20% would be evidence that the numeric nutrient standard is not achieved.

A stream is considered to have a balanced periphyton community if two consecutive temporally independent samples do not include dominance by taxa known to be nutrient enrichment indicators or to produce toxins. Streams are considered to have an imbalanced periphyton community if both assessments indicate dominance by taxa known to be nutrient enrichment indicators or to produce toxins. As was the case for the RPS ranks, a third bioassessment result, either from a previously conducted survey or a subsequent survey, will be used to make the assessment call if the results of the two most recent surveys are contradictory.

6.5.1 RPS AND ALGAL SPECIES COMPOSITION DECISION KEY

1) Was one of the two most recent RPS assessments collected during October through April, and were the two most recent RPS assessment collected at least 3 months apart (temporally independent), and under representative conditions (*e.g.*, flow between 10th and 90th percentile of long-term discharge, light penetration/canopy cover characteristic of the system, sampling location representative of waterbody segment) for the system?

1a. Yes. Proceed to step 2.

1b. No. Evaluate previous RPS assessments, and either use previous RPS or conduct an additional RPS and collect algal taxonomic composition samples (if needed) at representative locations and during representative conditions and return to step 1.

2) Do both RPS assessments evaluated in step 1 attain the expectations for algal mat occurrence and taxonomic composition when applicable? To attain the expectations, conditions A **or** B must be met: A) RPS Rank 4-6 are < 20% **or** B) RPS Ranks 4-6 are ≥20 but ≤ 25%, and the

dominant algal taxa are not nutrient enrichment indicators or potential toxin producers (**Table 3**).

2a. Yes. The site attains the expectations for algal mat occurrence and taxonomic composition outlined in step 2. Stop.

2b. No. Proceed to step 3.

3) Do both RPS assessments evaluated in step 1 fail the expectations for algal mat occurrence and taxonomic composition? To fail the expectations, conditions C **or** D must be met: C) RPS ranks 4-6 > 25%, **or** D) RPS ranks 4-6 are ≥20 but ≤ 25%, and the dominant algal taxa are nutrient enrichment indicators or potential toxin producers (**Table 3**).

3a. Yes. The site does not meet expectations for algal mat occurrence and taxonomic composition. Stop.

3b. No. The two RPS assessments evaluated in steps 2 and 3 have differing results (i.e., one "pass" and one "fail"). Either review results of the next most recent temporally independent RPS assessment or collect an additional temporally independent RPS assessment. Proceed to step 4.

4) Does the result of the next most recent temporally independent RPS assessment or the result of an additional temporally independent RPS assessment achieve the expectations for algal mat occurrence and taxonomic composition?

4a. Yes. The site attains the expectations for algal mat occurrence and taxonomic composition. Stop.

4b. No. The site does not meet expectations for algal mat occurrence and taxonomic composition. Stop.

Table 3. Algal Taxa that are Nutrient Enrichment Indicators or Potentially Toxin Producing[1]

Taxa	Nutrient enrichment indicator	Potential toxin-producing
Dichotomosiphon sp.	Y	N
Geitlerinema acutissimum	N	Y
Lyngbya aestuarii	N	Y
Lyngbya majuscula	N	Y
Oscillatoria limosa	N	Y
Oscillatoria tenuis	N	Y
Phormidium aerugineo-caeruleum	N	Y
Plectonema wollei	Y	Y
Vaucheria sp.	Y	N

[1]Y=Yes and N=No

6.6 Evaluating the Presence or Absence of Nuisance Macrophyte Growth

The Linear Vegetation Survey (LVS) is a rapid assessment tool for evaluating the ecological condition of streams based on vascular plants. Because many streams naturally have very little or no aquatic vegetation, LVS data interpretation requires that a minimum of two square meters (2 m^2) of macrophyte coverage be present within a 100-meter stream reach. If there is < 2 m^2 of vascular plant coverage present in a 100 m stream reach, there are no floral imbalances attributable to aquatic macrophytes. To determine an LVS threshold for streams that would clearly support aquatic life, the Department evaluated LVS data from the Benchmark streams. The Department concluded that if a site's average Coefficient of Conservatism (C of C) score is greater than or equal to 2.5 (the 10^{th} percentile of the distribution), the plant community composition is part of the reference site distribution. Based on the Department's experience in minimally disturbed streams and the types of plants associated with C of C scores greater than or equal to 2.5, this threshold was determined to be reasonable and protective.

The Department also analyzed the frequency of occurrence of Florida Exotic Plant Pest Council (FLEPPC) exotics in the Benchmark streams and found that FLEPPC exotics made up approximately 40% of the total plant occurrences at the 90^{th} percentile. Considering the somewhat limited number of reference streams with > 2 m^2 of vascular plants (nineteen) and the variability in the data, the Department decided to set the FLEPPC threshold at the 80^{th} percentile of the distribution (25%) to be more protective of aquatic life. Therefore, if the frequency of occurrence of FLEPPC exotics at a site is less than or equal to 25% of the total plant occurrences, the site may be considered part of the reference site distribution.

Based on the analysis of the Benchmark streams described above, if a site's average C of C score is ≥ 2.5 and the frequency of occurrence of FLEPPC exotic taxa is ≤ 25% of the total plant occurrences in the two most recent temporally independent samples, with at least one of the samples collected during October-April, there is no imbalance of flora in the vascular plant community. If a site's C of C score is < 2.5 and the frequency of occurrence of FLEPPC exotic taxa is > 25% of the total plant occurrence in the two most recent temporally independent samples, there is evidence that the numeric nutrient standard is not achieved.

If the two metrics have differing results (one passes, and one fails) in an individual sample, that sample is inconclusive. If there are additional LVS results available, the third most recent sample with conclusive results can be used to make the assessment determination. If there are no other LVS assessment results available, an additional, temporally independent sampling should be conducted. The results of the additional bioassessment, if conclusive, will determine the assessment status of the site.

Because invasive exotic or tolerant species can occur even in the absence of anthropogenic nutrient enrichment, streams with failing LVS scores shall be placed on the Study List for further evaluation to determine if LVS results can be linked to anthropogenic nutrient enrichment. If a stressor identification study is conducted and it is determined that nutrients are not the causative factor contributing to the LVS failure, the waterbody will be removed from the Study List.

6.6.1 LVS Decision Key

1) Was one of the two most recent LVS assessment collected during October through April, and were the two most recent LVS assessments collected at least 3 months apart (temporally independent) and under representative conditions (*e.g.*, flow between 10^{th} and 90^{th} percentile of long-term discharge, light penetration/canopy cover characteristic of the system, sampling location representative of waterbody segment) for the system?

1a. Yes. Proceed to step 2.
1b. No. Evaluate LVS assessments previous to the two most recent, and either use previous LVS or conduct an additional LVS at representative locations during representative conditions and return to step 1.

2) Do the two LVS assessments evaluated above in step 1 attain the expectations for stream macrophyte communities, with a mean C of C score $\geq$ 2.5 AND a frequency of occurrence of FLEPPC exotic taxa $\leq$ 25%?
2a. Yes. The site attains the expectations for stream macrophyte communities outlined in step 2. Stop.
2b. No. Proceed to step 3.

3) Do both LVS assessments evaluated in step 1 fail to meet the expectations for stream macrophyte communities, with a mean C of C score < 2.5 AND a frequency of occurrence of FLEPPC exotic taxa > 25%?
3a. Yes. Proceed to step 5.
3b. No. The two LVS assessments evaluated in steps 2 and 3 have differing results (i.e., one "pass" and one "fail"). Either review results of the next most recent temporally independent LVS assessment or collect an additional temporally independent LVS assessment. Proceed to step 4.
3c. No. One or both of the LVS assessments meets the expectation for one metric (i.e., mean C of C or occurrence of FLEPPC taxa) but not the other. Either review results of the next most recent temporally independent LVS assessments or collect additional temporally independent LVS assessments until you find two samples for which the metrics either both meet or do not meet expectations for stream macrophyte communities. Return to step 1.

4) Do the results of the next most recent temporally independent LVS assessment or the results of an additional temporally independent LVS assessment attain the expectations for stream macrophyte communities?
4a. Yes. The site attains the expectations for stream macrophyte communities. Stop.

4b. No. Place the waterbody on the Study List for IWR assessment purposes, and proceed to step 5.

5) Based on a stressor ID study, is there evidence the LVS results can be linked to anthropogenic nutrient inputs?
5a. Yes. There is evidence that the waterbody does not attain the nuisance macrophyte growth component of floral measures. Stop.
5b. No. The LVS results are inconclusive, and the water should stay on the Study List for IWR assessment purposes.

5c. Stressor ID indicates the impairment is due to something other than nutrients. The waterbody should be removed from the Study List for the LVS for IWR assessment purposes.

6.7 Evaluating Algal Blooms, Chlorophyll *a*, and Phytoplankton Taxonomic Data

A chlorophyll *a* annual geometric mean (AGM) value of > 20 µg/L is used as an impairment threshold for both lakes and streams in Chapter 62-303, F.A.C. However, it is commonly understood that healthy lakes in Florida may be characterized by chlorophyll *a* AGMs up to 20 µg/L, while most healthy streams would be expected to have significantly lower chlorophyll *a* levels. While this impairment threshold for streams was supported by an expert panel of Florida scientists that helped the Department develop the Impaired Waters Rule (IWR), neither the expert panel nor a review of stream chlorophyll *a* literature was able to identify a stream chlorophyll *a* value below 20 µg/L that definitively did, or did not, support aquatic life uses.

To develop a chlorophyll *a* threshold for streams, the Department evaluated the chlorophyll *a* results compiled from the population of minimally disturbed and healthy sites the Department sampled as part of NNC development. If a stream exhibits chlorophyll *a* AGMs below the 90th percentile of values (3.2 µg/L), this is a clear indication of no imbalance of flora. However, some Nutrient Benchmark streams and biologically healthy streams also exhibit chlorophyll *a* AGMs up to 17 µg/L and 19 µg/L, respectively. Because the remaining distribution of observed chlorophyll *a* AGMs include values approaching the IWR impairment threshold (and higher percentiles of the distribution exceeded it), the Department chose to continue to utilize 20 µg/L as a chlorophyll *a* impairment threshold.

Streams with chlorophyll *a* AGMs between 3.2 µg/L and 20 µg/L are evaluated on a site specific basis by comparing the values to chlorophyll *a* values for similar reference streams in the region. Factors such as upstream sources of chlorophyll *a*, water residence time, flow, color, climatological conditions, and size of the stream/river (*i.e.*, stream order) are considered when comparing the chlorophyll *a* values to values for reference streams in the region. If a site has chlorophyll *a* AGMs within the 3.2 µg/L to 20 µg/L range, the assessment is inconclusive until the Department documents a decision regarding whether chlorophyll *a* conditions reflect an imbalance in flora or not. When the Department determines that the values indicate enrichment (*e.g.*, are higher than functionally similar reference streams in the region), the Department considers this evidence of imbalances in flora, and vice versa.

The Department also assesses trends in chlorophyll *a* using the Mann-Kendall Trend Test in conjunction with the chlorophyll *a* impairment threshold. The observation of a statistically significant and ecologically relevant increase in chlorophyll *a* in a stream is another line of evidence used by the Department to determine floral imbalances.

The Department also uses the presence of phytoplankton blooms as an indicator of floral imbalances. An unacceptable phytoplankton bloom would consist of a situation where an algal species, whose noxious characteristics or presence, biomass, or areal extent, may reasonably be expected to prevent, or unreasonably interfere with the designated use of a waterbody. The Department evaluates the autecological information for the dominant bloom species, in conjunction with the associated chlorophyll *a* when assessing imbalances of flora.

6.7.1 Chlorophyll/Algal Bloom Decision Key

1. Were there sufficient chlorophyll *a* data to calculate an AGM? Chlorophyll *a* AGMs require at least 4 samples with at least one sample collected between May 1 and September 30 and at least one sample collected during the other months of the calendar year. Were samples collected when environmental conditions were representative of typical conditions for the system? Typical conditions include flow between 10^{th} and 90^{th} percentile of long-term discharge, light penetration/canopy cover characteristic of the system and, use of sampling locations representative of the waterbody segment.
   1a. No. Collect additional chlorophyll *a* samples at representative locations and during representative conditions, and return to step 1.
   1b. Yes. Proceed to step 2.

2. Is the chlorophyll *a* AGM > 3.2 µg/L more than once in a three-year period?
   2a. No. There is evidence that the waterbody attains the chlorophyll *a*/algal bloom component of floral measures. Stop.
   2b. Yes. Proceed to step 3.

3. Is the chlorophyll *a* AGM > 20 ug/L more than once in a three-year period?
   3a. Yes. The narrative nutrient standard at paragraph 62-302.531(2)(c), F.A.C., is not attained. Stop
   3b. No, the chlorophyll *a* AGMs are > 3.2 and ≤ 20 µg/L, proceed to step 4.

4. After considering site specific factors that affect chlorophyll *a* concentrations, such as system morphology, water residence time, whether the chlorophyll *a* levels are due to

primary productivity in the stream or due to upstream sources, or consistency with other functionally similar reference sites, can it be documented that the chlorophyll *a* values represent a healthy well balanced phytoplankton community?

4a. Yes. There is evidence that the waterbody attains the chlorophyll *a*/algal bloom component of floral measures.

4b. No. There is evidence that the chlorophyll *a* component of the nutrient standard at paragraph 62-302.531(2)(c), F.A.C., is not attained.

4c. Inconclusive because of insufficient contemporaneous data from other functionally similar reference sites. Waterbody will be placed on the Study List.

6.8 Floral Measures Summary

As described previously, the Department derived the floral thresholds used to interpret the numeric nutrient standard for streams using a distribution of a population of minimally disturbed Benchmark streams (the same streams used by EPA for their criteria development). The thresholds summarized in **Table 4** are used when developing evidence to support a Department conclusion regarding the balance of the floral community. If all floral measures are achieved, a stream site meets the floral component of a healthy, well-balanced aquatic system because it is within the minimally disturbed Benchmark stream condition. However, if any one of these floral measures indicates an imbalance, then the stream site does not attain the Numeric Nutrient Standard.

Table 4. Floral community metric summary. These values were based on the distribution of a population of minimally disturbed Benchmark sites sampled by the Department as part of NNC development (the same Benchmark sites EPA used for their criteria).

Floral Community	Floral Metric	Evidentiary Threshold of No Imbalances
Macrophytes	LVS C of C	Site average $\geq$ 2.5
Macrophytes	LVS FLEPPC	Site average $\leq$ 25%
Periphyton	RPS Rank	$\leq$ 25% rank 4-6 coverage
Periphyton	RPS Algal Community Composition (Autecology)	If 20 to 25% rank 4-6 coverage, no dominant nuisance taxa
Phytoplankton	Chlorophyll *a*	3.2 to 20 µg/L = site specific; < 3.2 µg/L

6.9 Faunal Evaluation for Determining Achievement of NNC

Paragraph 62-302.531(2)(c), F.A.C., requires a demonstration that a stream has well-balanced populations of flora and either attains the nutrient thresholds or has healthy, well-balanced fauna. The presence of healthy fauna can be shown through the SCI.

The SCI is a biological assessment procedure that measures the degree to which flowing fresh waters support a healthy, well-balanced biological community, as indicated by benthic macroinvertebrates. The Department and EPA have concluded that a balanced faunal community is achieved if the average score of at least two temporally independent SCIs, performed at representative locations and times, is 40 or higher, with neither of the two most recent SCI scores less than 35. To qualify as temporally independent samples, each SCI must be conducted ≥ 3 months apart. SCIs collected at the same location less than three months apart will be considered one sample, with the mean value used to represent the sampling period.

Attainment of the SCI threshold is an indication that the faunal community of the stream is not adversely affected by nutrients to the extent that there is a loss in designated use. However, an SCI failure does not necessarily mean that the stressor causing the loss of designated use is nutrients. Evaluation of mitigating factors, as indicated by the conceptual nutrient enrichment model (**Figure 1),** could indicate nutrients are a factor. While the stressor may not be known, a failed SCI does indicate that fauna is not well-balanced.

Alternatively, if the benchmark nutrient thresholds in the Table in paragraph 62-302.531(2)(c), F.A.C., are attained, then the faunal community of the stream is presumed healthy with respect to nutrients because the benchmark thresholds were derived using nutrient levels in high quality, minimally disturbed streams. However, regardless of attainment of benchmark thresholds, if SCI results are available and a stressor identification study demonstrates that the faunal community is not healthy because of nutrients, then the stream will be listed as impaired for nutrients.

In summary, where the nutrient thresholds are exceeded, but there are no imbalances in either aquatic flora (phytoplankton, periphyton, or vascular plants) or fauna (invertebrate community), the numeric nutrient standard for streams is achieved.

6.10 Stream Sampling Locations and Other Environmental Considerations

When conducting nutrient studies (*e.g.*, SSAC or WQBEL development), it is important to confirm that sampling locations and other environmental conditions (such as canopy cover, habitat, water depth, and flow) are representative of the system and that water quality data are collected in the same homogeneous waterbody segment as the biological monitoring stations. Establishing spatial relationships between the water quality data and biological health data depends on the homogeneity of the stream or stream segment. In stream segments with homogeneous nutrient concentrations, at least one biological site (for floral and faunal measures) must be sampled during two temporally independent periods. If a stream is not homogeneous with regard to nutrients, the stream should be divided into homogeneous units (segments), and the biological evaluation conducted for each segment.

The stream area targeted for biological evaluation or assessment will also vary based on the objective of your sampling. For example, if sampling is being conducted to evaluate a wastewater discharge, sites should be selected at both a location near the outfall to evaluate near-field impacts and at a site further downstream to evaluate far-field impacts. A near-field site should be as close to the discharge as possible, while the far-field site should be at some point further downstream before major tributaries enter the system or the stream reaches a river or lake. When sampling for impaired waters assessments, sites should be selected to ensure the station is representative of the water quality segment being assessed.

The following elements should be addressed when sampling to evaluate attainment of the numeric nutrient standard for streams in paragraph 62-302.531(2)(c), F.A.C., and to affirmatively demonstrate that nutrients are not adversely affecting flora and fauna:

1. Biological sampling locations should be selected to reduce or eliminate the effects of confounding variables. Sampling should be conducted in areas where physical factors, especially habitat and hydrology, do not limit biological expectations. Efforts should be taken to establish sites in stream reaches (where possible) with minimal hydrological modifications and optimal habitat, including adequate substrate diversity and availability, intact stream morphology (minimal or no artificial channelization), adequate velocity and flow, and optimal riparian buffer zones (see the Department's SOP FT 3000 for Habitat Assessment procedures). Sites should also be selected where light penetration through the tree canopy is representative of the stream segment (*i.e.*, avoid bridge or powerline crossings where the canopy has been artificially changed in a relatively small area). Additional information on controlling for the effects of confounding factors is presented in the SCI Primer (FDEP, 2011B). All biological sampling must be conducted consistent with the Department's Standard Operating Procedures (SOPs) and SCI Primer (FDEP, 2011B).

2. Water quality stations should be located where there is a clear relationship between the nutrient regime and the system's biological health, as assessed using either the floral or faunal measures. For streams, this means that site specific information should be relied upon to ensure that the biological sampling site(s) provide response information representative of potential effects caused by nutrients in the system. Therefore, site specific confounding factors and the potential for downstream expression of nutrients should be considered when determining sampling locations. For example, if a discharge or tributary significantly influences the nutrient concentrations in an area associated with the biological collection site, then data from stations located upstream of that discharge should not be used for establishing the ambient values associated with the biological data.

3. Unless a very large data set has been established, sampling during extreme climatic or hydrologic conditions, such as floods, droughts, or hurricanes, should be avoided.

7.0 Nutrient Criteria in Estuaries

Rule 62-302.532, F.A.C., contains estuary-specific numeric interpretations of the narrative nutrient criterion in paragraph 62-302.530(48)(b), F.A.C. These criteria were developed individually for each estuary segment to protect recreation and a healthy, well-balanced population of fish and wildlife, and are H1 interpretations pursuant to paragraph 62-302.531(2)(a), F.A.C. For estuaries with H1 interpretations based on TMDLs, the rule references the TMDL rule citation in Chapter 62-304, F.A.C. As new estuary H1 TMDLs are adopted in Chapter 62-304, F.A.C., the Department plans to update the criteria table during the subsequent Triennial Review to include references to the TMDLs, and the H1 TMDLs will supersede the NNC previously adopted in Rule 62-302.532, F.A.C. The concentration-based estuary interpretations are open water, area-wide averages unless specified otherwise in the rule.

8.0 NNC and Protection of Downstream Waters

Protection of downstream waters is required under subsection 62-302.531(4), F.A.C., through the statement, "The loading of nutrients from a waterbody shall be limited as necessary to provide for the attainment and maintenance of water quality standards in downstream waters." This provision is implemented by the Department by:

- Using models to allocate to upstream watersheds when establishing the TMDL for the downstream waterbody;
- Requiring dischargers, at the time of permit issuance, to provide reasonable assurance that their effluent does not cause or contribute to nutrient impairments in the receiving waterbody and downstream waterbodies; and
- Identifying trends in nutrient concentrations in all waters, including downstream waters, during the assessment cycle.

8.1 Water Quality Modeling

Scientifically suitable waterbody models can be applied to ensure that the narrative downstream water quality standard is achieved when developing and allocating TMDLs and when developing nutrient SSACs. The model can be used to ensure that "loading of nutrients from a waterbody shall be limited as necessary to provide for the attainment and maintenance of water quality standards in downstream waters." TMDLs will be developed using a variety of watershed loading and hydrodynamic/water quality models, such as WASP, HSPF, EFDC, LSPC, WAM, SWIL, WASH, Bathtub, and PLSM, and empirical modeling techniques, such as multiple-regression, linear-regression, and limiting factor regression.

8.2 Issuance of NPDES Permits

An upstream regulatory decision, such as a National Pollutant Discharge Elimination System (NPDES) permit issuance, might be executed by evaluating the nutrient conditions of direct and downstream receiving waterbodies. Evaluating near-field conditions is described in Section 11. Downstream evaluations can be conducted similarly. Downstream waters may include a receiving stream, river, lake, or estuary downstream from the discharge's immediate receiving water. For example, if a downstream lake is currently attaining its nutrient standards, then currently permitted discharges in the upstream waters provide for that attainment condition. If an immediate receiving stream empties into a larger stream or river, water quality and bioassessment portions of the numeric nutrient standard for streams must be evaluated until the point at which the discharge does not have reasonable potential to impact the downstream waterbody. A Level II WQBEL will be needed to evaluate the impacts on downstream waters if the facility requests an increase in their permitted load.

If a downstream waterbody is not attaining nutrient standards, the permit cannot be issued until reasonable assurance is provided that the facility's discharge is not contributing to the impairment. This demonstration can be done via a Department adopted TMDL or independent data collection and/or modeling conducted in the watershed. Once modeling is conducted, the results of that modeling can be used to ensure that loading of nutrients from the upstream waterbody is limited as necessary to provide for the attainment and maintenance of the water quality standards of downstream waters.

9.0 OTHER COMPONENTS OF NNC

9.1 Spatial Component

Pursuant to subsection 62-302.531(7), F.A.C., attainment of the narrative criterion is assessed over a spatial area consistent with its derivation. For H1 numeric interpretations based on paragraph 62-302.531(2)(a), F.A.C., the spatial application of the numeric interpretation is as defined in the associated order or rule. For lakes, the numeric interpretation shall be applied as a lake-wide average unless the lake has been segmented, in which case it is applied to each segment as a lake segment-wide average. For spring vents, the numeric interpretation shall be applied in the surface water at or above the spring vent. For streams, the spatial application of the numeric interpretation shall be determined by relative stream homogeneity and shall be applied to waterbody segments as determined by the site specific considerations. The spatial application of estuary specific numeric interpretations of the narrative nutrient criterion is defined in Rule 62-302.532, F.A.C.

9.2 Chlorophyll *a*

Chlorophyll *a* data shall be measured according to the Department document titled "Applicability of Chlorophyll *a* Methods" (DEP-SAS-002/10) (FDEP, 2011A), and be corrected for, or free from, the interference of phaeophytin.

10.0 Implementing the NNC in the Impaired Waters Rule (Chapter 62-303, F.A.C.)

The IWR (Chapter 62-303, F.A.C.) provides a methodology to determine if waterbodies or waterbody segments should be placed on the Verified List of Impaired Waters for subsequent TMDL development. The listings are made in accordance with evaluation thresholds and data sufficiency and data quality requirements in the IWR. The results of the assessment are used to identify waters for which TMDLs may be developed. The Department evaluates all readily available water quality data using the methodology prescribed in the IWR to identify any potentially impaired waters, waters that need additional data, and waters that do not attain water quality standards or are "impaired." For the nutrient assessment, key provisions of the IWR include Rules 62-303.350 (Assessments of Numeric Interpretation of Narrative Nutrient Criterion for the Planning List), 62-303.390 (The Study List), and 62-303.450 (Assessments of Numeric Interpretation of Narrative Nutrient Criterion for the Verified List), F.A.C.

The Planning List provisions in the IWR for streams (Rule 62-303.351, F.A.C.) include two references to the numeric nutrient thresholds for streams (subsections 62-302.531(1) and (2), F.A.C.). Under subsection 62-303.351(1), F.A.C., streams can be placed on the Planning List for nutrient impairment if they do not attain the numeric interpretation of the narrative nutrient criterion, which requires a combination of both nutrient and biological data to be fully assessed. Under subsection 62-303.351(2), F.A.C., streams can also be placed on the Planning List[4] if they exceed the numeric nutrient thresholds for TN or TP in subparagraph 62-302.531(2)(c)2., F.A.C., if there is insufficient biological information to fully assess achievement of subsection 62-302.531(2), F.A.C.

Waters found to be potentially impaired (meet the Planning List thresholds) or need additional data (meet the Study List requirements) are prioritized for additional monitoring. Subsequent assessments are performed, taking into account the new data collected by the Department and any other new information from other data providers.

As demonstrated through this process, a waterbody may be placed directly on the Verified List if sufficient data are available, even if it was not previously identified as potentially impaired. Furthermore, there is no requirement that waters be placed on either the Planning List or Study List before they can be placed on the Verified List.

[4]These waters would also be eligible for the "Study List" depending on which applicable assessment period the data are available in and if sufficient biological data are not collected during the Strategic Monitoring phase.

10.1 303(d) Assessment of the Floral Metrics of the Numeric Nutrient Standard for Streams

For IWR assessment purposes, implementing the floral evaluation component of the NNC is based on the **w**ater**b**ody **id**entification (WBID) assessment unit. Assessments for a WBID will be based on floral results from all representative sites, defined as unique stations, within a WBID. For assessment of chlorophyll *a*, the Department will evaluate all data collected within a WBID that meet the requirements of Rules 62-303.350, F.A.C. and 62-303.450, F.A.C., and will follow the procedures described in Section 6.7. The Department will evaluate the RPS and LVS results at each station to make a station assessment following the procedures described in Sections 6.3 through 6.8. If any station fails to attain the RPS or LVS evidentiary thresholds based on representative, conclusive results, the WBID will be assessed as failing the expectation for that floral evidentiary threshold, regardless of whether or not the failing station results are the most recent results available in the WBID. If the WBID assessment is determined to be inconclusive, the WBID will be prioritized for additional data collection.

10.2 Assessment of Estuaries

As noted previously, the Department has adopted estuary-specific numeric interpretations of the narrative nutrient criterion into Rule 62-302.532 F.A.C. Assessment of the estuary-specific numeric interpretations is straightforward because the listing thresholds for both the Planning and Verified Lists are based on the adopted numeric interpretations of the narrative nutrient criterion [see subsections 62-303.353(1), and 62-303.450(3), F.A.C.]. Exceptions include the TN and TP criteria developed for Tampa Bay, which are expressed as delivery ratios (addressed in the next section) and site specific interpretations of the narrative such as nutrient TMDLs or RA plans expressed as loads. For the nutrient assessment for estuaries, the only added review elements under the IWR include the time frame, data sufficiency requirements, and an evaluation of whether the data were collected under extreme climatic conditions (the Department will not list waters as impaired based solely on extreme climatic conditions) or significant changes in the monitoring network. An example of a significant change in the monitoring network is when stations that provided a significant portion of the data used to develop the NNC for a specific waterbody are no longer monitored.

For tidal creeks without adopted estuary-specific numeric interpretations of the narrative nutrient criterion, the Department assesses the narrative nutrient criterion pursuant to subsections 62-303.353(2)-(4), F.A.C., (Planning List) and subsection 62-303.450(2), F.A.C., (Verified List).

10.3 Assessment of Waterbodies with Interpretations of the narrative nutrient criterion Expressed as Loads or Delivery Ratios

For waters with site specific numeric interpretations of the narrative nutrient criteria expressed as a load, attainment of the allowable loads will be evaluated as the waterbody begins to attain the associated concentration-based targets (typically for chlorophyll *a*). Nonattainment will be assumed until information is provided to prove attainment of the loads (a combination of model estimated loads of nonpoint sources and measured loads from point sources). Waters attain the NNC if they meet the load-based criteria for the causative pollutants (TN and TP) and any concentration-based response criteria (*e.g.,* chlorophyll *a*). If the waterbody attains the allowable nutrient loading, but there is site specific information indicating an imbalance in flora or fauna related to nutrients, the site specific interpretation of the narrative nutrient criteria (*e.g.,* TMDL, RA) would be revisited and revised as needed.

10.4 Evaluation of Trends

Pursuant to Chapter 62-303, F.A.C., the Department assesses whether there is an adverse trend in the AGMs of nutrients (nitrate+nitrite, TN or TP) or a nutrient response variable (chlorophyll *a*) and whether the trend is statistically significant. If statistically significant adverse trends are present in causal variables or chlorophyll *a* over the 10-year planning period*,* then the waterbody will initially be placed on the Planning List of potentially impaired waters so that additional statistical analyses can be conducted. A waterbody segment is placed on the Verified List if there are statistically significant increasing trends, at an alpha of 0.05, in both the period of record (POR) and most recent 7.5 years, and the trend is determined to be ecologically relevant. A nutrient trend is be deemed ecologically relevant if the Sen slope of the POR trend expressed as units per year is at least 20% of the difference between the applicable NNC for the given parameter and current levels (the 7.5-year average of AGMs). The trend test and listing decisions for nutrients is be applied for each nutrient parameter independently.

The statistical test used to evaluate trends is the Mann-Kendall Trend Test (Helsel, D.R. and R.M. Hirsch, 2002; reference provided for informational purposes only), applied as a one-sided, upper-tailed test to determine increasing trends over time. For the evaluations, the alpha level will be set at 0.05 for both the Planning and Verified List assessment. For the POR assessment, there must be at least 10 years with sufficient data to calculate AGMs. The POR shall start with the most recent year with sufficient data to calculate AGMs and go as far back in time as possible as long as at least 50% of the years in the POR have sufficient data to calculate AGMs. The minimum data required for the 7.5-year assessment will be at least 5 years with sufficient data to calculate AGMs.

11.0 WQBELs FOR SURFACE WATER DISCHARGE WASTEWATER PERMITS

This chapter describes how the NNC are implemented in domestic and industrial wastewater permits authorizing discharges to surface waters when the discharges have sufficient nutrient levels to constitute a reasonable potential to cause or contribute to exceedances of NNC. The Water Quality Based Effluent Limitation (WQBEL) process, pursuant to Chapter 62-650, F.A.C., is the mechanism for determining the levels of nutrients in a point source discharge (*i.e.*, effluent nutrient limits) that attain the NNC. Level I nutrient WQBELs cannot constitute a

Hierarchy 1 interpretation. Derivation of a Level II nutrient WQBEL can be a site specific, H1 interpretation of the narrative nutrient criterion. However, WQBEL derivation has historically focused on the worst-case scenario (permitted flows) and the associated nutrient loads from a discharge rather than the total nutrient load to the receiving waters. For a Level II WQBEL to serve as an H1 interpretation of the narrative nutrient criterion, the WQBEL has to include both effluent limits for the discharge and the total allowable nutrient load to the receiving waterbody. Further, if downstream waters are anticipated to be potentially affected by the discharge of nutrients from an upstream facility, the potential impact must be assessed, regardless of distance (see section on "NNC and Protection of Downstream Waters").

For permit renewals, the Level I WQBEL process can be used to establish effluent limits consistent with existing permitted nutrient levels if a) the receiving waters currently achieve the numeric nutrient standard and b) the permit applicant is not expanding its discharge above currently permitted levels and will not increase its nutrient concentrations over the permit cycle. WQBELs for existing discharges are implemented through either a permit revision or the permit renewal process.

New or expanded discharges are subject to the antidegradation review, and if the discharge contains nutrients with a reasonable potential to cause or contribute to violations of the narrative nutrient standard, it will need to have a WQBEL established and provide reasonable assurance when the permit is issued that the WQBEL will be met. For most new or expanded discharges, a Level II WQBEL will be needed.

Existing WQBELs are reviewed at the time of permit renewal (every five years), and if the factors associated with the derivation of the WQBEL have not substantively changed during the five-year period, the WQBEL can be considered valid for another five-year period.

11.1 WQBEL Procedures for Each Tier of the Hierarchy

1. H1 Interpretations

   Site specific interpretations of the narrative nutrient criterion include nutrient TMDLs, SSACs for nutrients, RA demonstrations, or other site specific interpretations formally established by rule or Final Order of the Department. The applicable interpretations, if available, include both nutrient [*e.g.*, TN or TP] and response variables (*e.g.,* chlorophyll *a*). The Department maintains a list of the site specific interpretations established to date on the Department website.

   Details for establishing WQBELs for the different types of site specific interpretations are as follows:

- H1 TMDLs – Where a TMDL[5] is the applicable H1 interpretation, a WQBEL is derived in accordance with the Wasteload Allocation (WLA) provided in the TMDL for the H1 parameter(s). In accordance with subsection 62-302.531(8), F.A.C., if the (WLA) is expressed as a load, the WQBEL can be expressed as a load[6] (*i.e.*, there is no requirement to "translate" the load to a concentration for the WQBEL).
- SSAC – Where a SSAC is the applicable interpretation, a WQBEL is derived to ensure that the discharge does not cause or contribute to an exceedance of the SSAC within the spatial area where the SSAC is applicable in all years (*e.g.*, if a SSAC for a stream segment is a TP AGM of 40 µg/L, then the WQBEL is calculated to ensure the discharge does not cause or contribute to the stream segment exceeding an AGM of 40 µg/L). If the waterbody currently achieves the SSAC value, the Level I WQBEL process can be used to establish effluent limits consistent with permitted nutrient levels, but only if the permit applicant is not expanding its discharge above currently permitted levels and will not increase its nutrient concentrations over the permit cycle. However, if the waterbody does not achieve the SSAC or if the permit is for a new or expanded discharge, the Level II WQBEL process is more appropriate.
- Reasonable Assurance Plan (RAP) – Where the Department has approved a RAP pursuant to the subsection 62-303.100(5), F.A.C., related to nutrient impairment, the nutrient-related target in the RAP can serve as the applicable numeric interpretation of the narrative nutrient standard. The WQBEL would be calculated to ensure the attainment of the numeric interpretation in the same manner as the TMDL or SSAC procedures, depending on how the RAP was crafted. For example, if the RAP included an allocation to a permitted facility, that allocation can be treated as the WLA similar to those contained in a TMDL.

For the examples above that include a WLA, the WQBEL is established using the Level I process in Rule 62-650.400, F.A.C., to implement the site specific interpretation of the narrative. If the Department did not establish a WLA for a facility in a TMDL, the appropriate nutrient permit limits must be evaluated at the time of permit issuance/renewal.

Where a TMDL, SSAC or RAP does not exist, a Level II WQBEL is recognized as the applicable interpretation of the narrative nutrient criteria if:

a) The documentation for the WQBEL includes a site specific numeric interpretation of the narrative criterion at paragraph 62-302.530(48)(b), F.A.C., for the waterbody;

[5] TMDL means a H1 TMDL adopted under Chapter 62-304, F.A.C., that interprets the narrative water quality criterion for nutrients in paragraph 62-302.530(48)(b), F.A.C., for one or more nutrients or nutrient response variables.
[6] Note – permit load (mass) limits are generally expressed as a rolling annual load.

b) The WQBEL is established pursuant to the Level II process contained at Rule 62-650.500, F.A.C.; and
c) The public notice for the WQBEL specifically states that the Level II WQBEL includes a site specific interpretation of the narrative for the receiving waterbody.

Revisions to a WQBEL to reflect any new site specific interpretation will generally be implemented through the permit renewal process, and compliance schedules are used to give permittees time to come into compliance with any new requirements pursuant to the provisions of paragraphs 403.088(2)(e) and (f), F.S., and subsections 62-620.610(12) and 62-620.620(6), F.A.C. In certain cases, permits may need to be re-opened prior to permit renewal to include revised WQBELs based on the priority of restoration needs, time remaining before permit renewal, and workload considerations.

2. Hierarchy 2 Interpretations (Lakes and Springs)

If there is no site specific interpretation in effect as described in the preceding paragraph that applies to the receiving waters, but there is an established, quantifiable stressor response relationship between one or more nutrients and nutrient response variables for those waters, then the values set forth in paragraph 62-302.531(2)(b), F.A.C., are the applicable numeric interpretation of paragraph 62-302.530(48)(b), F.A.C. Such an interpretation has only been made for lakes and spring vents. There are currently no wastewater discharges directly to spring vents, and it is unlikely that such discharges will be proposed in the future. Effluent limits for discharges to groundwaters in the springshed are developed through the standard process for groundwater discharges or through the TMDL implementation process for that spring where sufficient information exists.

For lakes, the WQBEL may be derived to ensure that the discharge does not cause or contribute to exceedances of the numeric interpretation for the waterbody segment, which is expressed as a lake average. Florida's wastewater permitting process requires the applicant to provide all the necessary documentation for permit issuance, including demonstrating that their discharge will not cause violations of the water quality standards applicable to the lake. Depending on the circumstances, either a Level I or Level II WQBEL is established that implements this numeric interpretation of the narrative criteria. This is accomplished as follows:

- If a lake is influenced by an upstream NPDES discharger, the WQBEL evaluation for that discharge would determine the specific TN and TP levels (subject to the upper nutrient values for TN and TP unless it is a Level II WQBEL) that would maintain the appropriate chlorophyll *a* target for the lake (6 µg/L) during **all** years, including years representing critical conditions. If this demonstration of attainment of the chlorophyll *a* criterion cannot be made, the discharger could pursue other options, which include effluent nutrient reductions, discharge re-location (*e.g.,* land application), or a SSAC (establish alternate chlorophyll *a* and nutrient targets that are fully protective of the designated uses).

- If the discharge can meet the applicable lake NNC (at end of pipe), a Level I WQBEL is calculated to ensure the discharge does not exceed the TN and TP values contained in sub-subparagraph 62-302.531(2)(b)1.a., F.A.C.; or
- For existing discharges, a Level I WQBEL can be established at currently permitted nutrient loads if the receiving lake attains the applicable lake NNC at sub-subparagraph 62-302.531(2)(b)1.a., F.A.C.; or
- For new or expanded nutrient discharges to a lake that attains the applicable NNC, a Level II WQBEL will generally be needed to demonstrate that the lake will continue to attain the lake NNC; or
- If the lake does not attain the upper end of the range for TN or TP values in sub-subparagraph 62-302.531(2)(b)1.a., F.A.C., but attains the applicable chlorophyll *a* value in sub-subparagraph 62-302.531(2)(b)1.a., F.A.C., a Level II WQBEL can be developed to determine higher in-lake TN and TP concentrations and effluent limits that still attain the applicable chlorophyll *a* value in all years.

In any case, a permittee applying for a new or expanded discharge for its facility would need to conduct water quality modeling during critical conditions to provide reasonable assurance that the discharge will not cause a violation of lake water quality standards during critical conditions. Note that the WQBEL is subject to change upon permit renewal if a site specific interpretation is established pursuant to paragraph 62-302.531(2)(a), F.A.C.

3. Hierarchy 3 – Streams

For streams in which an applicable site specific interpretation (*i.e.*, TMDL, SSAC, WQBEL, or RA plan) has not been adopted as described in paragraph 1, the provisions set forth in paragraph 62-302.531(2)(c), F.A.C., are the applicable numeric nutrient interpretation of paragraph 62-302.530(48)(b), F.A.C. A facility that has effluent nutrient concentrations greater than the applicable numeric nutrient thresholds adopted at subparagraph 62-302.531(2)(c)2., F.A.C., is required to have effluent limits as necessary to meet the nutrient standards in Chapter 62-302, F.A.C. In that case, a WQBEL that implements the numeric nutrient interpretation of the narrative criteria is derived as follows:

- If there is evidence that the stream receiving an existing discharge and downstream waters (to the point at which the discharge no longer has a reasonable potential to cause or contribute to violations of water quality standards) has balanced flora based on available information on chlorophyll *a* levels, algal mats or blooms, nuisance macrophyte growth, and algal species composition and either achieves the reference thresholds at subparagraph 62-302.531(2)(c)2., F.A.C., or achieves evidence of balanced fauna based on available Stream Condition Index (SCI) scores[7], the receiving waters will be deemed to have attained the numeric nutrient standard for streams at paragraph 62-302.531(2)(c), F.A.C., and the narrative criterion of paragraph 62-302.530(48)(b), F.A.C. In that case, the Level I WQBEL process is used to establish effluent limits consistent with permitted nutrient loads if the permit applicant is not expanding its discharge above currently permitted levels and will not increase their nutrient concentrations over the permit cycle. However, if a facility is discharging significantly below its permitted capacity, the Department will review the WQBEL that was the basis for the current permit limits to ensure that it is still a valid interpretation of the NNC.

- If insufficient biological data are available to determine if the stream is healthy pursuant to paragraph 62-302.531(2)(c), F.A.C., the applicant will need to collect additional biological data to provide reasonable assurance. If the additional biological data indicate that the stream is not healthy, the following scenario will apply.

- If there is evidence that a stream receiving an existing discharge or its downstream waters (to the point at which the discharge no longer has a reasonable potential to cause or contribute to violations of water quality standards) has an imbalance in flora based on available information on chlorophyll *a* levels, algal mats or blooms, nuisance macrophyte growth, then the waterbody is not achieving the narrative nutrient criterion of paragraph 62-302.530(48)(b), F.A.C., regardless of whether the reference thresholds at paragraph 62-302.531(2)(c), F.A.C., or the SCI thresholds are met. If the flora are determined to be healthy, but neither the reference thresholds in subparagraph 62-302.531(2)(c)2., F.A.C., nor the SCI thresholds are met, then the waterbody is also not achieving the narrative nutrient criterion of paragraph 62-302.530(48)(b), F.A.C. In either case, the discharge to that waterbody is not allowed unless a Level II WQBEL is developed or other administrative process is implemented that ensures the discharge does not cause or contribute to nonattainment of subparagraph 62-302.531(2)(c)2., F.A.C., or the narrative criterion of paragraph 62-302.530(48)(b), F.A.C. In the circumstance where flora are balanced, but the SCI fails, a stressor identification study would likely be needed as part of the Level II WQBEL evaluation. Stressor identification studies evaluate and identify causes of biological impairment, including both pollutant and hydrologic/habitat related stressors.

- Where a stream is verified as impaired for nutrients pursuant to the IWR, a site specific interpretation of the narrative nutrient standard will be developed as part of the TMDL process, which will include WLAs for discharges to the stream. The subsequent WQBEL would be consistent with the WLA. As noted previously, the WQBEL is subject to change upon permit renewal if a site specific interpretation is established pursuant to paragraph 62-302.531(2)(a), F.A.C.

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[7] See Section 2.7 of the SCI Primer FDEP (2011B) for details on the floral assessment.

The Level II WQBEL process is available for new discharges or facility expansions that result in increased nutrient loads[8]. A WQBEL for a new or expanded nutrient discharge must ensure that a healthy, well-balanced floral community will be attained at the proposed discharge, and that either the nutrient thresholds will be achieved in the receiving stream (averaged over appropriate stream segments with homogeneous water quality) or the waterbody has healthy fauna (SCI). If SCI measurements indicate that the waterbody is currently not biologically healthy AND a stressor identification study indicates that nutrients are the cause, a Level II WQBEL that prevents nutrients from impacting stream fauna would need to be calculated.

One of the challenges related to developing a Level II WQBEL for a discharge to a stream is that, except for chlorophyll *a*, most water quality models cannot predict whether the floral or faunal metrics will be achieved at a given level of nutrient loading. Stream models that can estimate periphyton biomass (in addition to chlorophyll *a* and nutrient concentrations) should be used so that periphyton biomass can be a surrogate for the RPS.

WQBELs established by all of the above methods must prevent discharges from causing or contributing to a violation of the narrative nutrient criterion in paragraph 62-302.530(48)(b), F.A.C. Also, in accordance with subsection 62-302.531(4), F.A.C., WQBELs cannot allow the loading of nutrients from a waterbody to cause or contribute to an exceedance of water quality standards in a downstream waterbody. The reasonable assurance demonstration that the construction, modification, or operation of the wastewater facility or activity will meet this requirement may include information that: a) water quality standards of downstream waters are being attained with the existing discharge, b) the existing or future discharge does or will not affect downstream waters, or c) the discharge is in compliance with downstream TMDLs.

Finally, a permittee has the option of pursuing relief from any of the above site specific interpretations through the establishment of a SSAC under Rule 62-302.800, F.A.C., a variance under the provisions of 403.201, F.S., or a designated use modification under Rule 62-302.400, F.A.C.

12.0 Basic Information Needs for Distinguishing Flowing Waters under Paragraph 62-302.200(38), F.A.C.

The numeric nutrient standard for streams only applies to "flowing waters" meeting the stream definition in paragraph 62-302.200(38), F.A.C. While the default assumption is that any flowing water meets this definition, permittees or other interested parties may want to provide the information necessary to demonstrate that a waterbody meets one of the exclusions in the

[8] Since paragraph 62-302.531(7)(d), F.A.C., specifies that the spatial application of the numeric interpretation shall be determined by relative stream homogeneity and shall be applied to waterbody segments or aggregations of segments as determined by the site specific considerations, mixing zones are not applicable.

definition for streams. Information can be submitted to the Department prior to or during the Watershed Assessment Cycle or as a component of a permit application. The Department will review the submitted information, and all approved exclusions will be tracked by the Water Quality Standards Program including a GIS record of all stream exclusions.

The definition of stream in paragraph 62-302.200(38), F.A.C., states:

> (38) "Stream" shall mean, for purposes of interpreting the narrative nutrient criterion in paragraph 62-302.530(48)(b), F.A.C., under paragraph 62-302.531(2)(c), F.A.C., a predominantly fresh surface waterbody with perennial flow in a defined channel with banks during typical climatic and hydrologic conditions for its region within the state. During periods of drought, portions of a stream channel may exhibit a dry bed, but wetted pools are typically still present during these conditions. Streams do not include:
>
> (a) Non-perennial water segments where fluctuating hydrologic conditions, including periods of desiccation, typically result in the dominance of wetland and/or terrestrial taxa (and corresponding reduction in obligate fluvial or lotic taxa), wetlands, portions of streams that exhibit lake characteristics (*e.g*., long water residence time, increased width, or predominance of biological taxa typically found in non-flowing conditions), or tidally influenced segments that reverse flows or fluctuate between predominantly marine and predominantly fresh waters during typical climatic and hydrologic conditions; or
>
> (b) Ditches, canals and other conveyances, or segments of conveyances, that are man-made, or predominantly channelized or predominantly physically altered; and
>
> 1. Are primarily used for water management purposes, such as flood protection, stormwater management, irrigation, or water supply; and
>
> 2. Have marginal or poor stream habitat or habitat components, such as a lack of habitat or substrate that is biologically limited, because the conveyance has cross sections that are predominantly trapezoidal, has armored banks, or is maintained primarily for water conveyance.

The Department applies relevant water quality standards when assessing waterbodies for attainment of water quality standards under section 403.067, F.S., or implementing the NPDES permitting programs. When applying the nutrient standards adopted in subsection 62-302.531(2), F.A.C., the Department will make clear whether the numeric nutrient standards for streams adopted in paragraph 62-302.531(2)(c), F.A.C., apply. When preparing draft lists of impaired waters under the IWR, the Department provides public notice of the draft lists and requests information relevant to determining whether a flowing water meets one of the exclusions in the streams definition, including the purpose of the waterbody, such as flood protection, stormwater management, irrigation, water supply, navigation, boat access to an adjacent waterbody, or frequent recreational use relevant to a stream exclusion. The Department considers all relevant information in implementing water quality standards and maintain the administrative records of such decisions, which will be available to the public.

Until a Class I or III stream segment is identified as meeting one of the exclusions in paragraph 62-302.200(38)(a) or (b), F.A.C., the criteria in paragraph 62-302.531(2)(c), F.A.C., applies. Interested parties wishing to demonstrate that a stream segment qualifies for one of the exclusions in subsection 62-302.200(37), F.A.C., may provide the Department with the information needed.

A clear delineation of the segment's geographic boundaries in question is necessary so that the Department knows exactly where the numeric nutrient standard for streams does not apply. Delineation of segment boundaries can include physical, biological, and chemical information, such as intersections of tributaries into a segment, control structures, the interface of wetlands, or other factors that indicate that the homogeneous physical, biological, or chemical condition of the segment would change at the boundary.

For waters that meet one of the exclusions of 62-302.200(38)(a) or (b), F.A.C., the narrative nutrient criteria still apply, and the Department shall assess the stream using the nutrient impairment thresholds in subsection 62-303.351(4) (AGM chlorophyll *a* of 20 ug/L), subsection 62-303.351(3) (algal mats or blooms), and subsection (5) (increasing trends in nutrients or chlorophyll *a*), F.A.C.

12.1 Non-Perennial Water Segments

The numeric nutrient standard for streams was not designed to apply to wetlands, uplands, or non-perennial streams. The duration and frequency of surface flow in streams must be understood to avoid confounding effects of natural drying events when assessing the ecological integrity of flowing waters. Some knowledge of flow permanence is critical and may be the key variable influencing the communities in many small streams in Florida. Different ecological expectations and sampling procedures are needed when assessing the condition of perennial versus temporary streams. The drying process causes changes in the physical and chemical conditions (*e.g.*, loss of wetted habitat, reduced dissolved oxygen), which can exclude some species while allowing others to thrive. These effects are not related to nutrients and therefore need to be controlled for in nutrient evaluations. Geophysical, hydrological, and biological information may be used individually or in combination to make a demonstration whether a segment is non-perennial. Specific information to be included in a demonstration is discussed below.

There are two methods for demonstrating that a segment is non-perennial: 1) site specific gage and discharge data, 2) biological demonstration based on the resident flora or fauna. Either method can be used to independently establish non-perenniality. If both lines of evidence are available and the results conflict, the biological demonstration will take precedence.

Demonstrations may be strengthened by employing multiple methods. Each method is described below.

12.1.1 Stream Flow characteristics as an Indicator

Perenniality has been defined in several ways, including threshold-based definitions (such as 90% flow durations) and biologically-based criteria (such as 180 consecutive days of flow to support macroinvertebrate taxa). The terminology used here combines both elements. *Perennial streams* are defined for NNC purposes as those that have non-zero flow for at least 180 consecutive days (*i.e.,* 6 months) in at least 90% of years in the available period of record. The period of record must consist of at least 5 years of flow data. *Likely perennial steams* have measurable flow for at least 180 consecutive days in greater than 50% of years. *Seasonally perennial streams* achieve 90-day (*i.e.,* 3 months) flow spells in at least 75% of years, and *non-perennial streams* do not meet the flow thresholds for perennial, likely perennial, or seasonally perennial. Streams that are seasonally perennial or non-perennial fit the non-perennial exclusion for the stream numeric nutrient standard.

A demonstration that a stream is neither perennial or likely perennial, as defined above, can be made using pre-existing gage data or by deploying gages specifically for determining flow duration in the streams of interest. Stream flow statistics shall be calculated for a minimum of 360 days to capture seasonal variability. The demonstration shall include the mean annual flow, mean monthly flows, and 30-day low-flow frequencies. Longer periods of record will provide greater confidence that the mean, high, and low flow conditions have been adequately characterized. Streamflow statistics can be estimated using accepted regression equations for the region and site of interest and will be evaluated on a case-by-case basis for data sufficiency and accuracy.

12.1.2 Biological Information as Indicators

<u>Vascular Plants</u>

The Department has long relied on lists of vascular plants, including obligate wetland indicators, facultative wetland indicators, and facultative (neutral) indicators, as one component of the method used to identify and delineate wetland boundaries, as defined in Chapter 62-340, F.A.C. If available, vascular plant community composition will help distinguish streams from non-perennial water segments. Often, both types of systems contain few or no rooted herbaceous plants in the stream channel because natural turbidity, canopy cover, and color reduce the light available for photosynthesis. If herbaceous plants are present, perennial and non-perennial systems often share many taxa, particularly in areas where they transition to adjacent floodplains. However, the presence of certain facultative or facultative-wetland herbaceous species within the stream bed can be a valid indication that the stream is non-perennial. These taxa may require moist or saturated conditions to germinate and grow but would not tolerate the inundation of a perennially flowing stream. Examples of these taxa include: grasses such as *Chasmanthium* *latifolium* and *Tripsacum dactyloides*, sedges such as *Cyperus esculentus* and *Cyperus retrorsus*, forbs such as *Cuphea cartagenensis*, *Bidens pilosa*, and *Sphagneticola trilobata*, and ferns such as *Woodwardia virginica* and *Thelypteris* spp. (see complete lists of obligate wetland, facultative wetland and facultative taxa in Chapter 62-340, F.A.C.).

During a habitat assessment (HA) or Linear Vegetation Survey (LVS) conducted during a site visit, the presence of facultative and facultative-wetland herbaceous vascular plant taxa in the channel bed would be an indicator that the system is non-perennial. Many plants within a permanently wetted channel are aquatic plants, which are defined but not listed in Chapter 62-340, F.A.C. Under extremely dry conditions, terrestrial taxa could also invade the channel bed of a non-perennial system.

<u>Macroinvertebrates</u>
If available, macroinvertebrates will also be used to distinguish perennial from non-perennial/wetland systems. Many rheophilic invertebrates require relatively consistent inundation and water velocity to complete their life cycle, although they have mechanisms to survive extreme drought conditions if perennial streams reduce to a series of pools. Other mostly wetland taxa are adapted to survive the frequent (generally annual) periods of desiccation associated with non-perennial streams or wetlands. Some invertebrate species could be classified as facultative, able to occupy both perennial and non-perennial streams. This is due in part to the colonization of non-perennial streams by the movement of invertebrates from nearby perennial waters, especially those with adaptations that allow them to survive in temporary environments, such as a multivoltine life cycle, highly mobile adults, and rapid growth during the wet season. Some rarely inundated non-perennial streams may be completely lacking in aquatic invertebrates (terrestrial animals may be present) or have a limited number of facultative species that can complete their life cycles rapidly before the stream dries.

The Department has compiled taxa lists to distinguish perennial from non-perennial streams/wetland systems (**Tables 5 and 6**). Paragraph 62-302.531(2)(c), F.A.C., does not apply to non-perennial water segments where there is a dominance of wetland and/or terrestrial taxa (with a corresponding reduction in obligate fluvial or lotic taxa) or to wetlands. Paragraph 62-302.531(2)(c), F.A.C., does apply to perennial streams where drought conditions result in portions of a stream channel temporarily exhibiting a dry bed but where wetted pools are still present.

SCI sampling, the method normally used to collect stream invertebrate taxa, requires certain hydrologic conditions to distinguish the effects of natural drought from water quality issues. SCI sampling (following DEP Standard Operating Procedure SCI 1000) is conducted during periods when water velocity has been 0.05 m/sec or greater for at least 28 days or after a 6-month period if the site has gone completely dry. Following these SOPs ensures that perennial streams are typically dominated by taxa from **Table 5**, while non-perennial systems (which tend to transition into linear wetland strands) either would usually not be sampled for SCI or would typically be dominated by taxa in **Table 6**. The presence of long-lived aquatic species (benthic macroinvertebrates that require water for their entire life cycle) is another reliable method to determine if a stream is more characterized by perennial flow or wetland/terrestrial conditions. A list of long-lived taxa is included in DEP SOP SCI 2100.

For purposes of establishing segments that are excluded from the stream definition, the Department will evaluate the taxa that occur in the segment, as well as the vascular plant information described above.

Table 5. The most commonly encountered invertebrate taxa in flowing streams in Florida. Taxa information was retrieved from the Florida Statewide Biological DataBase ("SBIO") and represents 5,309 perennial stream samples collected over the entire state. Some of the organisms are ubiquitous (*e.g., Chironomidae*) and are found in several system types, however, in flowing systems there are a large number of rheophilic and long-lived taxa that are not commonly encountered in wetlands or non-perennial streams.

Taxa	# occurrences (n = 5309)
Hyalella Azteca	3918
Stenelmis	3715
Cheumatopsyche	3515
Caenis (except C. diminuta)	3162
Rheotanytarsus exiguus grp.	3028
Microcylloepus pusillus	2913
Stenochironomus	2769
Dubiraphia vittata	2588
Polypedilum flavum	2575
Simulium	2503
Ablabesmyia mallochi	2402
Polypedilum scalaenum grp.	2222
Tubificidae	2056
Argia (except A. sedula)	2022
Oecetis	1992
Hydroptila	1990
Pentaneura inconspicua	1889
Palpomyia/bezzia grp.	1821
Tanytarsus sp. c epler	1780
Hemerodromia	1752
Corbicula fluminea	1696
Tanytarsus sp. l epler	1641
Hydrobiidae	1639
Enallagma	1590
Hydropsyche	1587
Baetidae	1533
Tricorythodes albilineatus	1516
Tanytarsus	1510
Caecidotea	1490
Micromenetus	1428

Taxa	# occurrences (n = 5309)
Sphaeriidae(mollusca)	1367
Neotrichia	1362
Thienemannimyia grp.	1347
Triaenodes	1315
Limnodrilus hoffmeisteri	1311
Pseudochironomus	1288
Heptageniidae (except Stenacron interpunctatum)	1286
Palaemonetes	1274
Ancyronyx variegatus	1256
Rheotanytarsus pellucidus	1156
Chimarra	1149
Cryptochironomus	1139
Cambaridae	1131

Table 6. The most abundant invertebrate taxa found in wetland systems in Florida from 169 samples retrieved from SBIO. The organisms are dominated by oligochaetes (*e.g.*, represented by the genera *Dero*, *Bratislavia,* and others), midges (*e.g., Polypedilum* and *Goeldichironomus*), and damselflies and dragonflies (*e.g., Coenagrionidae* and *Libellulidae*).

Taxon	# of occurrences (n = 169)
Chironomus	105
Dero digitata complex	98
Polypedilum trigonum	96
Kiefferulus	80
Polypedilum tritum	67
Chaoborus	65
Libellulidae	65
Culicidae	60
Hydrocanthus	59
Enchytraeidae	58
Monopelopia boliekae	58
Goeldichironomus holoprasinus	56
Berosus	56
Dero	55
Dero vaga	51
Goeldichironomus	49
Dero pectinata	47
Bratislavia unidentata	46
Odonata	42
Dytiscidae	42
Dero lodeni	39
Oribatei	39
Aeshnidae (except Boyeria and Nasiaeschna)	38
Haemonais waldvogeli	36

Taxon	# of occurrences (n = 169)
Goeldichironomus natans	35
Belostoma	35
Uranotaenia	34
Pristinella longisoma	32
Callibaetis	32
Larsia berneri	31
Gastropoda	31
Pachydiplax longipennis	31
Arrenurus	30
Curculionidae	30
Pristina leidyi	28
Hydrovatus	28
Crangonyx	26
Pristina aequiseta	26
Buenoa	26
Anopheles	26
Callibaetis floridanus	25
Atrichopogon	25
Larsia	25
Corixidae	25
Pristina	25

12.1.3 Use of Geomorphology to Identify Candidates Sites

Given the large number of potentially non-perennial streams, the Department plans to use GIS resources to help identify candidates for the collection of biological data or flow monitoring. Drainage area and dominant water source (surface versus groundwater), which rely on readily available GIS layers, provide insight into the typical flow regime and degree of flow permanence in a stream. Drainage area in this context refers only to the contributing area upstream of a sampling location. As drainage area increases, groundwater storage increases and approaches the streambed level, ensuring a more continuous flow. (Exceptions to this include springs and seepage streams where even the upper reaches sustain year-round surface flow.) Similarly, as groundwater's relative contribution versus surface water increases, so does the permanence of flow in a system.

Elements of the HydroBioGeomorphic (HBG) Classification System developed by John Kiefer and subsequently refined under DEP contract (AMEC, 2013; reference provided for informational purposes only) provides critical information that can be used to estimate the perenniality of a stream at a given location. The HBG system is a hierarchical, four-step process. The first step involves segregating streams based on broad differences in regional climate and geology (**Figure 3**). The second step divides streams into classes (karst, highlands, and flatwoods) based on the soils and dominant mode of water delivery in a watershed and is described in greater detail in a later paragraph (**Table 7**). The third step incorporates slope and valley configuration, and the fourth and final step, considers the dimensions and habitats of the channel and floodplain corridor (AMEC, 2013; reference provided for informational purposes only). For purposes of determining the likelihood of perenniality of a given system, the first two steps in the HBG classification process, identifying the hydrophysiographic region and mode of water delivery, are critical.

There are three regions for stream classification purposes: Northwest Florida Coastal Plain (NWFCP), Northeast Florida Coastal Plain (NEFCP), and Peninsula Florida Coastal Plain (PFCP). A fourth region, the South Florida Coastal Plain (SFCP) has been fundamentally hydrologically altered and thus is not included in this discussion. The hydrophysiographic regions are illustrated in **Figure 3**. The NWFCP generally comprises the Florida panhandle west of and including the Ochlockonee River basin. The NEFCP lies to the east of the Ochlockonee River and north of an imaginary diagonal line running from the mouth of the Waccasassa River on the west (Gulf) coast to the mouth of the St Johns River on the east (Atlantic) coast. The PFCP region lies to the south of the same line as shown in **Figure 3**. It is important to note that sites near regional boundaries require more careful consideration and may exhibit characteristics that are intermediate between the bordering regions. If the system under evaluation crosses multiple regions, then each region should be evaluated. Department staff should be contacted if there is any uncertainty when conducting these determinations.

Florida's geology results in three distinctly different water delivery systems for Florida streams (karst, highlands, and flatwoods). Karst systems are those with abundant and steady groundwater discharged through limestone springs under pressure. The steady groundwater flow typical of karst systems exempts them from further non-perennial discussion. Highlands systems have unconfined lateral groundwater seepage through thick columns of sand through relict dunes, and flatwoods streams are dominated by surface water runoff seasonally coursing through and over combinations of flat, shallow, organic, and sandy soils. Accurately determining the dominant water source for highlands and flatwoods systems requires calculating the percentage of well-drained soils in the watershed of a given site. Surrogates for this information, such as the presence or absence of tannins in the water, *i.e*. color, is highly variable and not a reliable long-term indicator.

There are clear differences between the soil composition between the flashy, surface water dominated flatwoods systems and the steady, groundwater-dominated highlands systems among the three regions. Highlands generally have well-drained soils, low water tables, and rolling topography. Flatwoods generally have an abundance of poorly-drained soils, high water tables, and flat topography.

Figure 3. Hydro-physiographic regions versus FDEP Bioregions. This figure was adapted from AMEC (2013). For informational purposes only.

Soils are classified by the Natural Resource Conservation Service (NRCS) into four hydrologic soil groups based on the soil's runoff potential. The four hydrologic soil groups are A, B, C and D. A-soils are the most well-drained and generally have the smallest runoff potential, and D soils are the poorest drained and have the greatest runoff potential. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the second letter should be used in the calculation. The first letter expresses the "potential" for a soil to be well-drained if drained or otherwise altered.

To determine the hydrologic soil groups in the drainage area of a given site, a Geographic Information System (GIS) layer (*e.g.* NRCS, SSURGO) with hydrologic soil content is required. The percent of hydric soils in the drainage area of interest should be calculated by adding up the soil types A and C in the PFCP region and the soil types A and B in the NEFCP and NWFCP regions. In GIS, this feature is typically designated as "HYDRGRP" or something similar in the attribute table of the soil layer. The percent thresholds in **Table 7** should be used to determine whether the site is highlands or flatwoods.

Table 7. Hydrologic soil thresholds for Flatwoods and Highlands stream by Hydrophysiographic Region.

Region	Flatwoods	Highlands
Peninsula (PFCP)	<40% A+C Soils	≥40% A+C Soils
Northeast (NEFCP)	<40% A+B Soils	≥40% A+B Soils
Northwest (NWFCP)	<40% A+B Soils	≥40% A+B Soils

12.1.3.1 Peninsula

The peninsula's distinct wet and dry seasons lead to the state's largest seasonal water deficits, which are most severe in April and May. The wet season typically starts in June and usually ends in November. The seasonal water stress creates the potential for a highly variable flow regime that is ameliorated in areas where the watershed's dominant soil characteristics consist of thick columns of unsaturated sands that allow for substantial infiltration consistent with the highland's physiography.

- Flatwoods Streams - Streams in the peninsular region with watersheds smaller than 5 sq. miles have highly variable hydroperiods and are inherently non-perennial. Streams with drainage areas above 5 square miles but less than 20 sq. miles are seasonally perennial. Peninsula flatwoods streams are likely perennial with drainage areas of at least 20 sq. miles and perennial above 50 square miles. Adequate flow volumes should not be an issue in these systems.

- Highlands Streams - In contrast to the flatwoods systems, highlands streams have a more consistent base flow and become perennial with much smaller drainage areas. Streams smaller than 1 sq. mile are typically non-perennial, but those above this size are likely perennial.

12.1.3.2 Northeast

Streams in the northeast achieve perenniality in smaller basins than in the peninsula due to a more equitable distribution of rainfall throughout the year and lower evaporation potential.

- Flatwoods Streams - Northeast flatwoods streams with drainage areas less than 1 sq. mile are non-perennial. Systems between 1 and 5 sq. miles are seasonally perennial. Streams with drainage areas greater than 5 sq. miles are either seasonally perennial or perennial.

- Highlands Streams - There are very few highlands sites in the northeast region. Stream with drainage areas less than 3 sq. miles are likely to be non-perennial.

12.1.3.3 Northwest

Streams in the northwest region receive more rain than the peninsula or northeast regions, primarily in the winter and spring. With evapotranspiration potential the lowest and rainfall the highest, streams achieve perenniality in smaller basins when compared to the other regions.

- Flatwoods Streams – There are a limited number of these systems in the northwest region; most in this region tend to occur in or near the Apalachicola River basin. Given the climatic regime, it is likely that flatwoods sites become perennial when the drainage area exceeds 5 sq. miles.
- Highlands Streams – All sizes of highlands streams in northwest Florida are likely to be perennial.

A summary of the perenniality and associated NNC applicability based on region, water source, and drainage area is provided in **Table 8**. As noted in **Table 8**, peninsula flatwoods with a DA less than 5 square miles and peninsula highlands with a DA less than 1 square mile are expected to be nonperennial and therefore are candidates for further study. The nonperennial DA threshold for candidates in both Northeast and Northwest flatwoods is 1 square mile, while there is no DA threshold below which non-perenniality can be concluded for Northeast and Northwest highlands.

Table 8. Summary of NNC perenniality factors based on region, water source, and drainage area.

Region	Water Source	Drainage Area (DA) sq. miles	Perenniality	Candidate for Further Study
Peninsula	**Flatwoods**	DA <5	Non-perennial	Yes
Peninsula	**Flatwoods**	≥5 DA <20	Seasonally Perennial	Potential Candidate
Peninsula	**Flatwoods**	≥20 DA <50	Likely Perennial	No
Peninsula	**Flatwoods**	DA ≥50	Perennial	No
Peninsula	**Highlands**	DA <1	Non-perennial	Yes
Peninsula	**Highlands**	≥1 DA ≤5	Likely Perennial	No
Peninsula	**Highlands**	DA ≥ 5	Perennial	No
Northeast	**Flatwoods**	DA <1	Non-perennial	Yes
Northeast	**Flatwoods**	≥1 DA <5	Seasonally Perennial	Potential Candidate
Northeast	**Flatwoods**	≥5 DA <20	Likely Perennial	No
Northeast	**Flatwoods**	DA ≥20	Perennial	No
Northeast	**Highlands**	DA <3	Seasonally perennial	Potential Candidate
Northeast	**Highlands**	3 ≥DA ≥5	Likely Perennial	No
Northeast	**Highlands**	DA ≥5	Perennial	No
Northwest	**Flatwoods**	DA <1	Non-perennial	Yes
Northwest	**Flatwoods**	≥1 DA <5	Seasonally Perennial	Potential Candidate
Northwest	**Flatwoods**	≥5 DA <10	Likely Perennial	No
Northwest	**Flatwoods**	DA ≥10	Perennial	No
Northwest	**Highlands**	DA <1	Seasonally Perennial	Potential Candidate
Northwest	**Highlands**	≥1 DA <5	Likely Perennial	No
Northwest	**Highlands**	DA ≥5	Perennial	No

12.2 Tidally Influenced Segments

Tidally influenced segments are those that fluctuate (daily, weekly, or seasonally) between predominantly marine and predominantly fresh waters during typical climatic and hydrologic conditions. The delineation of the segment is important as only portions of segments that are demonstrated to fluctuate between marine and fresh conditions qualify for the exclusion under paragraph 62-302.200(38)(a), F.A.C. The definitions of predominantly fresh and predominantly marine waters in Rule 62-302.200, F.A.C., are as follows:

> (31) "Predominantly fresh waters" shall mean surface waters in which the chloride concentration is less than 1,500 milligrams per liter or specific conductance is less than

4,580 µmhos/cm. If there are depth profile data, measurement for making this determination shall be those taken within the bottom half of the water column.

(32) "Predominantly marine waters" shall mean surface waters in which the chloride concentration is greater than or equal to 1,500 milligrams per liter or specific conductance is greater than or equal to 4,580 µmhos/cm. If there are depth profile data, measurements for making this determination shall be those taken within the bottom half of the water column.

This demonstration can be made with chloride or specific conductance data collected during typical hydrologic conditions, taking into account tidal cycles and seasonal and climatic variability. The presence of typical hydrologic conditions may be shown by tide and flow data temporally coupled with the water quality sampling events. Typical hydrologic conditions exclude periods of high rainfall or drought that would create flow conditions well outside of average annual flow conditions.

Tidally influenced segments also include those for which the direction of flow changes during the typical tidal cycle, such that the flow reverses during flood tide and resumes toward the coast during ebb tide or the water level increases during flood tide. Routine changes in the direction of flow or water level prevent consistent conditions required for the biological assessment tools included in the numeric nutrient standard.

As part of the NPDES permitting process for domestic and industrial discharges, existing Florida law requires that dischargers need to provide reasonable assurance that water quality standards will not be violated as a result of their discharge. For those waters that qualify as tidally influenced segments under paragraph 62-302.200(37)(a), F.A.C., the numeric nutrient standard for streams in paragraph 62-302.531(2)(c), F.A.C., does not apply. Nutrient WQBELs for NPDES permitted domestic and industrial wastewater discharges into such tidal segments will be based on the applicable numeric nutrient standards in waters both downstream (estuaries) and upstream (if tidally influenced), as well as the narrative nutrient water quality standard at the point of discharge.

12.3 Water Management Conveyances

The stream definition in paragraph 62-302.200(38)(b), F.A.C., excludes the following: ditches, canals and other conveyances, or segments of conveyances (hereafter referred to collectively as "conveyances"), that are man-made, or predominantly channelized or predominantly physically altered; and

1. Are primarily used for water management purposes, such as flood protection, stormwater management, irrigation, or water supply; and

2. Have marginal or poor stream habitat or habitat components, such as a lack of habitat or substrate that is biologically limited because the conveyance has cross sections that are

predominantly trapezoidal, has armored banks, or is maintained primarily for water conveyance.

The following information will be used in identifying segments that qualify for the exclusion for conveyances in paragraph 62-302.200(38)(b), F.A.C.

12.3.1 DELINEATION

Only those sections of the stream that meet the requirements in paragraph 62-302.200(38)(b), F.A.C., are eligible for the exclusion. A map of the applicable areas for review must clearly delineate the upstream and downstream extent of the artificial conveyance.

12.3.2 PRIMARY WATER MANAGEMENT PURPOSE

Information must show that the current purpose of the man-made or physically altered conveyance is primarily water management such as flood protection, stormwater management, irrigation, or water supply. Relevant documentation can include photographic evidence, funding authorizations, operational protocols, local agreements, permits, memoranda of understanding, contracts, or other records that indicate how the conveyance is operated and maintained, and must verify that the conveyance's design or maintenance allows the conveyance to currently function in a manner consistent with the primary water management purpose.

The phrase "primarily used for water management purposes" in subparagraph 62-302.200(38)(b)1., F.A.C., does not include use for navigation or boat access to an adjacent waterbody or frequent recreational activities. The purpose of the conveyance design in conjunction with the purpose of any subsequent alterations or maintenance is evaluated to help differentiate whether its primary function is navigation, boat access, or frequent recreational activities versus flood protection, stormwater management, irrigation, or water supply. If available information provided by the public, in response to public notice and request for information, or otherwise known by the Department, demonstrates that the segment is commonly used for navigation, boat access, or other frequent recreational activities such as swimming or boating, then the primary purpose is not water management and the Department will apply the nutrient standards in subsection 62-302.531(2) F.A.C. Freshwater finger canals dug during the construction of neighborhoods designed to create homes with boat access to waterbodies are an example of navigation or access as a primary purpose.

12.3.3 *PHYSICAL ALTERATION THAT LIMITS HABITAT*

The exclusion at subparagraph 62-302.200(38)(b)2., F.A.C., outlines that the conveyance must have marginal or poor stream habitat or habitat components that limit biological function because the conveyance has cross sections that are predominantly trapezoidal, has armored banks, or is maintained primarily for water conveyance. Photographic evidence of these limitations can demonstrate the habitat condition of the conveyance. Also, Standard Operating Procedures (SOPs) for conducting stream Habitat Assessments (HAs) have been adopted by the Department in DEP SOP FT 3000. To qualify under subparagraph 62-302.200(38)(b)2., F.A.C., the overall HA score must be either poor (0-40 points) or marginal (41-80 points), and the Substrate Diversity and Artificial Channelization metrics must score in the poor category (≤ 5 points). However, the exclusion may still apply when Substrate Diversity or Artificial Channelization scores are in the marginal range if it can be demonstrated that the higher scores are due to a lack of maintenance of the conveyance when the HA was completed. The Department will evaluate information related to ongoing maintenance programs and schedules to determine whether a lack of recent maintenance likely caused the scores to be within the marginal category, and to demonstrate that the conveyance is still being maintained primarily for water management purposes. If the overall HA score is other than poor or marginal, the conveyances do not meet the definition.

The HA procedures include long-established criteria that can be used to demonstrate physical alterations in a system, and can provide information verifying that ongoing maintenance activities are associated with perpetuating those physical alterations. The lack of substrate and degree of artificial channelization are part of the Habitat Assessment scoring system's definition and components. An HA score must be completed by an individual with demonstrated proficiency (as per DEP SOP FT 3000) to indicate that the definition related to the segment's modification is met. If there are different segments within the conveyance that exhibit different features, an HA is needed for each segment.

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