Florida Department of Environmental Protection

Standards and Assessment

Use of Biological Assessments in Permitting and Establishment of Site Specific Alternative Criteria (SSACs) and Water Quality Based Effluent Limits (WQBELs)





Presentation Overview

- **Uses of Bioassessment Information**
- **NNC Hierarchy and Nutrient Standard for Streams**
- **Permitting**
  - **Permitting 101**
  - **Demonstrations Needed for Renewals**
- **Site Specific Alternative Criteria (SSACs)**
  - **Types of SSACs**
- **Complicating Factors**

Uses of Bioassessment Info

- **Permitting**
  - **Determine if NNC met in receiving waters and downstream waters**
  - **Water quality based effluent limits (WQBELs)**
- **Administrative Relief**
  - **If water quality criteria are not met in receiving waters but system is biologically healthy, bioassessments can be used to demonstrate alternative criteria protective**
  - **Site specific alternative criteria (SSACs)**
- **Impaired Waters Assessments**
  - **NNC and Biological Health**

Hierarchical Approach

Hierarchy 1: (Site-specific)

Nutrient Total Maximum Daily Loads
Level II Water Quality-Based Effluent Limitations,
Site Specific Alternative Criteria,
Reasonable Assurance Plans, and
Estuary-specific Criteria

Hierarchy 2: Lakes/Springs

Stressor-Response Relationships (lakes & springs)

Hierarchy 3: Streams

Reference-based thresholds (streams)
combined with biological data (flora and fauna)

Hierarchy 4: Narrative

Ditches/canals used for water conveyance,
wetlands, non-perennial streams, tidally fluctuating areas, and
South Florida flowing waters

NNC in Streams Achieved 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 Stream Condition Indices (SCIs) is 40 or higher, with neither of the two most recent SCI scores less than 35, OR**
- **The Nutrient Thresholds (expressed as annual geometric means) are not exceeded more than once in a three year period**

Floral Tools in Streams

- **DEP floral information**
  - **Linear Vegetation Survey (LVS)**
    - **Coefficient of Conservatism, invasive exotics**
  - **Rapid Periphyton Survey (RPS)**
    - **Thickness and extent, autecology (interpreting species information)**
  - **Phytoplankton chlorophyll a (current and trends)**

Floral Metric Summary

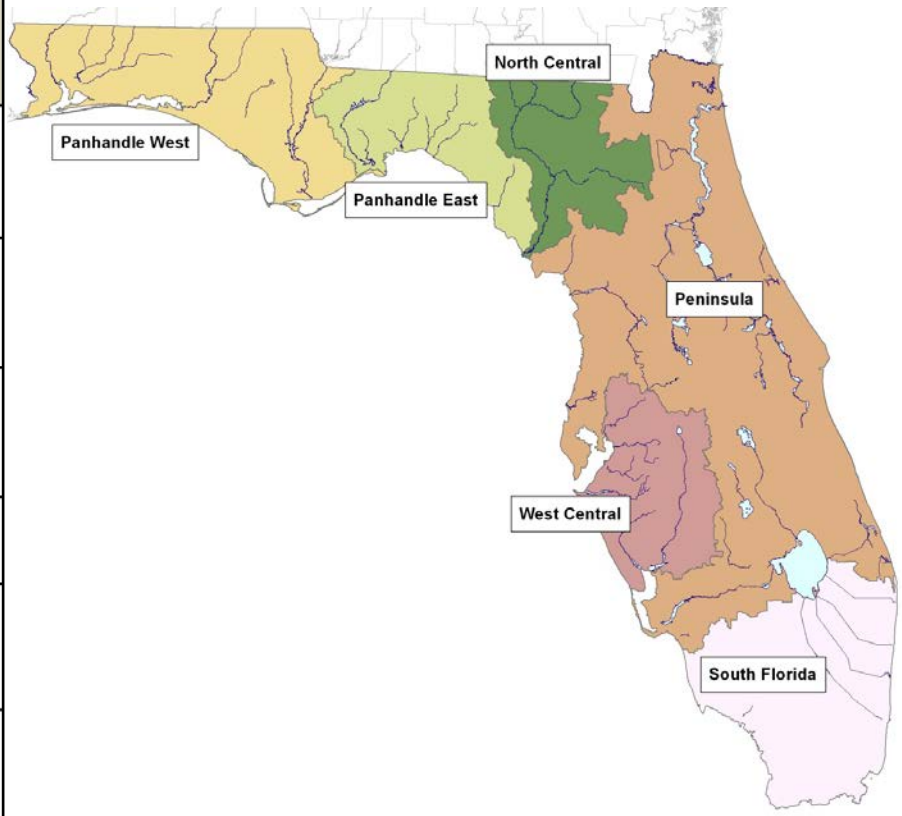
Floral Metric	Evidentiary Threshold of No Imbalances (All parameters required)
LVS C of C	Site average ≥ 2.5
LVS FLEPPC	Site average ≤ 25%
RPS	≤ 25% rank 4-6 coverage 20 to 25 % rank 4-6 coverage, evaluate algal autoecological data
Chlorophyll	< 20 ug/L; 3.2 to 20 ug/L = site specific
Algal Community Composition (Autecology)	No adverse shifts in dominant taxa

Stream NNC Data Quantity

- **Need at least two temporally independent (> 3 months apart) sets of bioassessment information**
  - **If 2 consecutive samples "pass", then reasonable assurance (RA) for biological health demonstrated**
  - **If one "pass" and one "fail," must sample again**
  - **2 "fail" indicates lack of RA for biological health**

Streams Thresholds and Regions

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(47)(b), F.A.C., applies.	

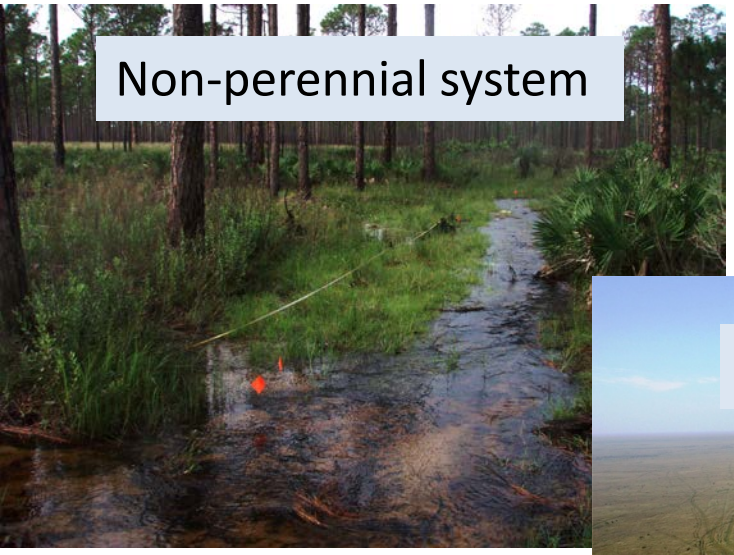


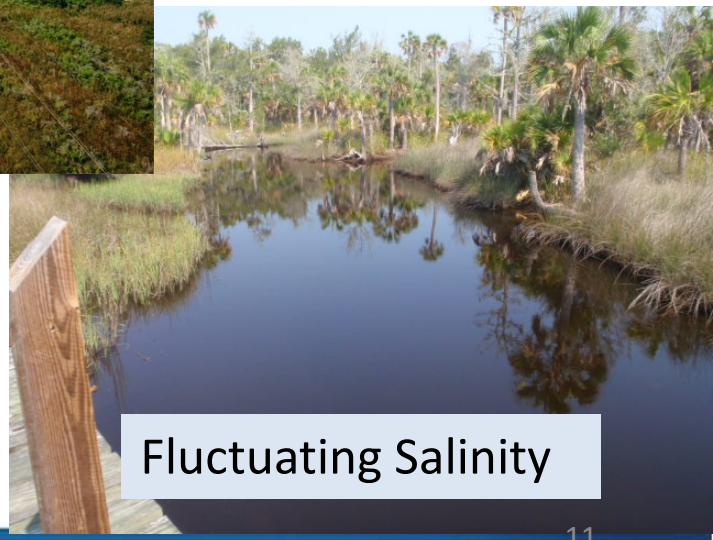
- **NNC Tracker Tool!**

Exclusions from Stream Definition

- **Definitions of "stream" excludes the following:**
  - **Wetlands**
  - **Non-perennial water segments**
  - **Ditches, canals and other conveyances that are primarily used for water management purposes and have marginal or poor stream habitat components**
  - **Tidal areas that fluctuate between salt and fresh (4,580 µmhos/cm)**
- **<u>However</u>, Permittee or DEP must document that a water is excluded from categories covered by numeric criteria**
  - **see p 49-57 Implementation Document**

Narrative Criterion Applies to these waters





How to Identify Waters Subject Only to the Narrative Criterion

- **Non-perennial streams – based on biological evidence**
  - **Vascular plants and benthic macroinvertebrates show dominance of taxa more typically found in wetland or terrestrial conditions**
- **Tidally influenced streams – fluctuate between marine and fresh**
  - **Chloride or specific conductance data collected during typical hydrologic conditions, taking into account tidal cycles and seasonal and climatic variability**
- **Wetlands – typically minimal open water area**
  - **Wetland taxa prevail**

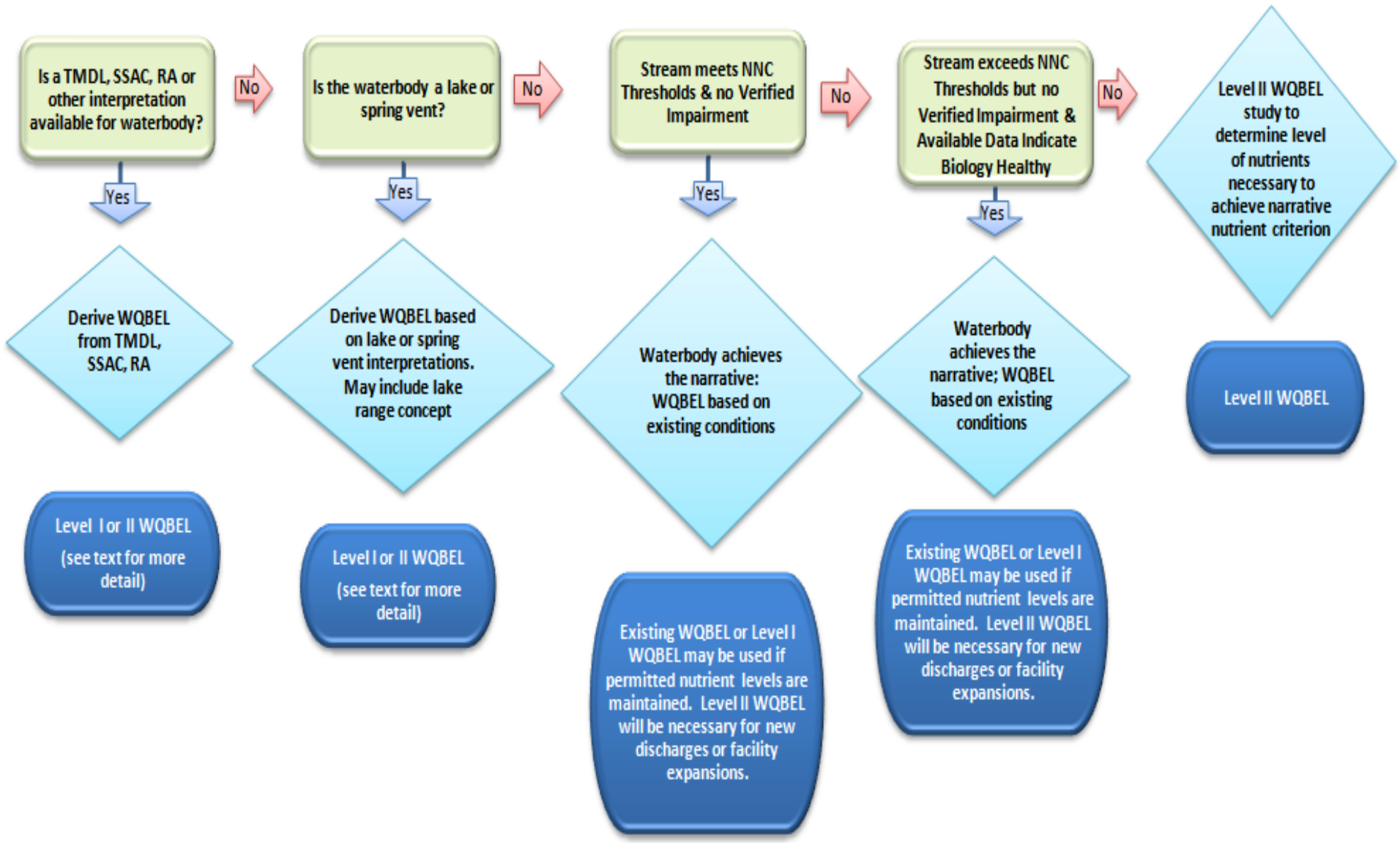
How to Identify Waters Subject Only to the Narrative Criterion

- **Water management conveyances – artificial, or altered streams**
  - **Current purpose of man-made or physically altered conveyance is primarily water management such as flood protection, stormwater management, irrigation, or water supply**
  - **Designed/maintained for primary water management purpose**
  - **Marginal or poor stream habitat limiting biological function (evaluated using the DEP Habitat Assessment SOP); i.e. trapezoidal, armored banks, or maintained for water conveyance.**
- **If used for navigation or boat access to an adjacent waterbody, or other frequent recreational activities such as swimming or boating, then the primary purpose is not water management and nutrient stream standards apply**
  - **Canals developed to provide boat access to waterbodies are an example of a navigation or access as a primary purpose**

DEP's Permitting Process

- **Require dischargers, at the time of permit issuance, to provide *reasonable assurance* that their effluent does not cause or contribute to exceedances of water quality criteria in:**
  - **the receiving waterbody, and**
  - **downstream waterbodies**
- **Numeric nutrient criteria (NNC) have changed the role of biological assessments related to permit renewal decisions**

NPDES Permitting



Downstream Waters Protection

- **When issuing permit, must ensure that both initial receiving water and downstream waters protected**
  - **Rule 62-302.531(4), F.A.C., states "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."**
- **Use Reasonable Potential (RP) analysis to decide how far downstream to evaluate**
  - **RP generally used to determine if permit limit needed**
  - **Is site-specific, and should take into account nutrient load, flow, and frequency of the discharge**
  - **No RP if facility nutrient load is very minor component of downstream water nutrient load or receiving water flow**

Downstream Waters Protection

(cont.)

- **If receiving waters and downstream waters currently attain nutrient standards, then <u>current discharge</u> provides for downstream protection**
  - **Permit writer may request review of biological data to determine attainment**
  - **If attains, can renew permit with Level I WQBEL**
- **However, if the facility requests an increase in their permitted load, a Level II WQBEL likely needed to evaluate the impacts on downstream waters**
  - **Modeling can be used to determine the acceptable loading of nutrients from the discharger (and other upstream sources) that protects downstream waters**

Downstream Waters Protection

(cont.)

- **If downstream waters do not currently attain nutrient standards, then need to see if any downstream TMDLs address the discharge**
  - **If TMDL provides allocation, can generally presume downstream protection**
- **If downstream waters impaired and there is RP, then likely need Level II WQBEL**
- **If waters do not attain numeric criteria, but biology is good, may be eligible for a SSAC**

SITE SPECIFIC ALTERNATIVE CRITERIA

Site Specific Alternative Criteria

- **Rule 62-302.800, F.A.C., allows for establishing a SSAC when an affirmative demonstration is made that an alternative criterion is more appropriate for a specified portion of waters of the state**
- **SSACs developed/reviewed in Tallahassee by Water Quality Standards Program staff**

Alternative Criteria Justification

- **Study plan typically approved by WQSP**
- **Data collection efforts must meet data quality and quantity objectives (data usability review)**
- **Select sites to avoid confounding factors (flow considerations, avoid non-representative areas, consider habitat)**
- **Establish clear relationship between the water quality and the system's biological health**
- **If petitioner shows that system is biological healthy under demonstrated water quality conditions, then alternative criteria reflecting those conditions are supported**

Types of Site Specific Alternative Criteria

- **Type I SSAC based on natural background conditions (reference-based approach)**
- **Type II SSAC must demonstrate that the criterion would fully maintain and protect existing uses, and the level of water quality necessary to protect designated uses**
- **Type III SSAC for nutrients only, and requires a demonstration of healthy flora and fauna at given nutrient regime**

Type I SSAC-Reference Condition

- **Reference sites should be:**
  - **Minimally disturbed by anthropogenic activities,**
  - **Functionally comparable to the test site, and**
  - **Have a similar natural disturbance regime to that expected in the assessment watershed**
- **Stream NNC were developed using this approach**
  - **Data were collected from rigorously vetted reference sites**

Type I SSAC Reference Site Criteria

1. **Landscape Development Intensity Index (LDI):**
   - **Score < 2 for land use within the 100 meter corridor 10 km upstream of site;**
   - **Watershed or near-field LDI scores < 3;**
2. **No observed significant anthropogenic inputs (watershed visit); and**
3. **Biologically healthy (*e.g.*, average SCI scores ≥ 40 or LVI scores ≥ 43)**

Type II SSAC

- **Allows SSACs for conditions that are not natural background if demonstrate waterbody fully supports designated use**
  - **Healthy, well balanced aquatic communities**
- **More flexibility in how demonstrate use support at proposed alternative criteria**
  - **Biological tools**
  - **Modeling (mechanistic or empirical)**

Type III SSAC- Nutrients

- **Must achieve the narrative nutrient criteria in paragraph 62-302.530(47)(b), F.A.C., and protect downstream waters**
  - **For streams: Healthy flora and average SCI > 40**
  - **For lakes: Healthy flora including LVI > 43**
- **Must follow *Development of Type III Site Specific Alternative Criteria (SSAC) for Nutrients*, (DEP-SAS-004/11)**

Type III SSAC

(continued)

- **Study design should include:**
  - **Minimum of two bioassessments per station or lake (one conducted during the final year of study)**
  - **Water quality sampling, with temporal link between nutrients to biology**
  - **Representative stations and hydrology**
  - **Proper Quality Assurance**

Complicating Factors

- **Type III SSACs limited to streams and lakes**
- **Don't have bioassessment methods for all types of waters, particularly marine waters**
  - **Elevenmile Creek in Pensacola**
- **SCI not appropriate tool for some "streams" due to elevated conductivity or hydrology**
  - **Big Boggy Branch in St. Marks Basin**
  - **Sweetwater Branch in Gainesville**
- **Can compare biological community to reference waterbody**