The Role of Biological Indicators in Florida’s NNC

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Senior Consultant

Cardno
Shaping the Future
Estuaries – “Hold the Line” Strategy

Lakes – Nutrient/Chlorophyll-a Relationship

Rivers/Streams – Biological Indicators
### Nutrient Watershed Region

<table>
<thead>
<tr>
<th>Region</th>
<th>TN (mg/L)</th>
<th>TP (mg/L)</th>
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<tbody>
<tr>
<td>Panhandle West</td>
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<tr>
<td>Panhandle East</td>
<td>1.03</td>
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**Legend**

- Panhandle West
- Panhandle East
- North Central
- Peninsula
- West Central

**Images**

- Chlorophyll-a
- Linear Vegetation Survey
- Rapid Periphyton Survey
- Stream Condition Index

**Map**

- Nutrient Watershed Region

**FDEP**

**Table**

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Floral Metrics

Nutrient Thresholds

Stream Condition Index

Attains Nutrient Standard

Attains Nutrient Standard
Floral Metrics

Nutrient Thresholds
Does Not Attain

Stream Condition Index
Does Not Attain
Floral Metrics

Nutrient Thresholds

Does Not Attain

Stream Condition Index

Attains Nutrient Standard
Floral Metrics and Nutrient Thresholds

- Reference System Approach

- No Causal Relationship Established

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> Exotic aquatic vegetation not greater than 25%
> Mean C of C score greater than 2.5
> Benthic algae coverage of 6 mm or greater not more than 25%
> Benthic algae species is not nuisance or undesirable (if more than 20 % coverage observed)
> Annual geometric mean chlorophyll-a less than 20 µg/L
  - Between 3.2 and 20 µg/L – site specific conditions must indicate nutrients not an issue
  - No increasing trend observed
“macrionvertebrate response to nutrients was statistically weak...”
(FDEP 2012)

“DEP could not identify specific thresholds for establishing numeric nutrient criteria”
(FDEP 2012)
...If the biology of the system is ok, then nutrients must not be causing a problem.
If the numeric interpretation of the narrative nutrient criterion is exceeded, then nutrients shall be identified as the causative pollutant unless a stressor identification study links the adverse biological effects to causal factor(s) other than nutrients.

62-303.430(5)(b)2., F.A.C.
Data Quality

Data Integrity

You have the power to make a good site fail, but you cannot make a bad site pass!
Stream below 7Q10 flow during sampling
Rapid Periphyton Survey

January 2011  Fail
February 2011  Pass
March 2011    Fail
May 2011      Pass
June 2011     Fail
August 2011   Pass
NNC Progress

Not Including Biological Information

Including Biological Information
Lessons Learned

> Florida’s NNC compliance linked to biological sampling judgment – not nutrients
> Indicators based on general waterbody health are insufficient
> Implementation issues burden stakeholders
> Biological indicators must show valid relationship with nutrient effects
FDEP Rule | EPA Rule
---|---
55% | 31%

EPA’s rule would have resulted in fewer waterbodies listed as impaired!

The difference is the biological information.