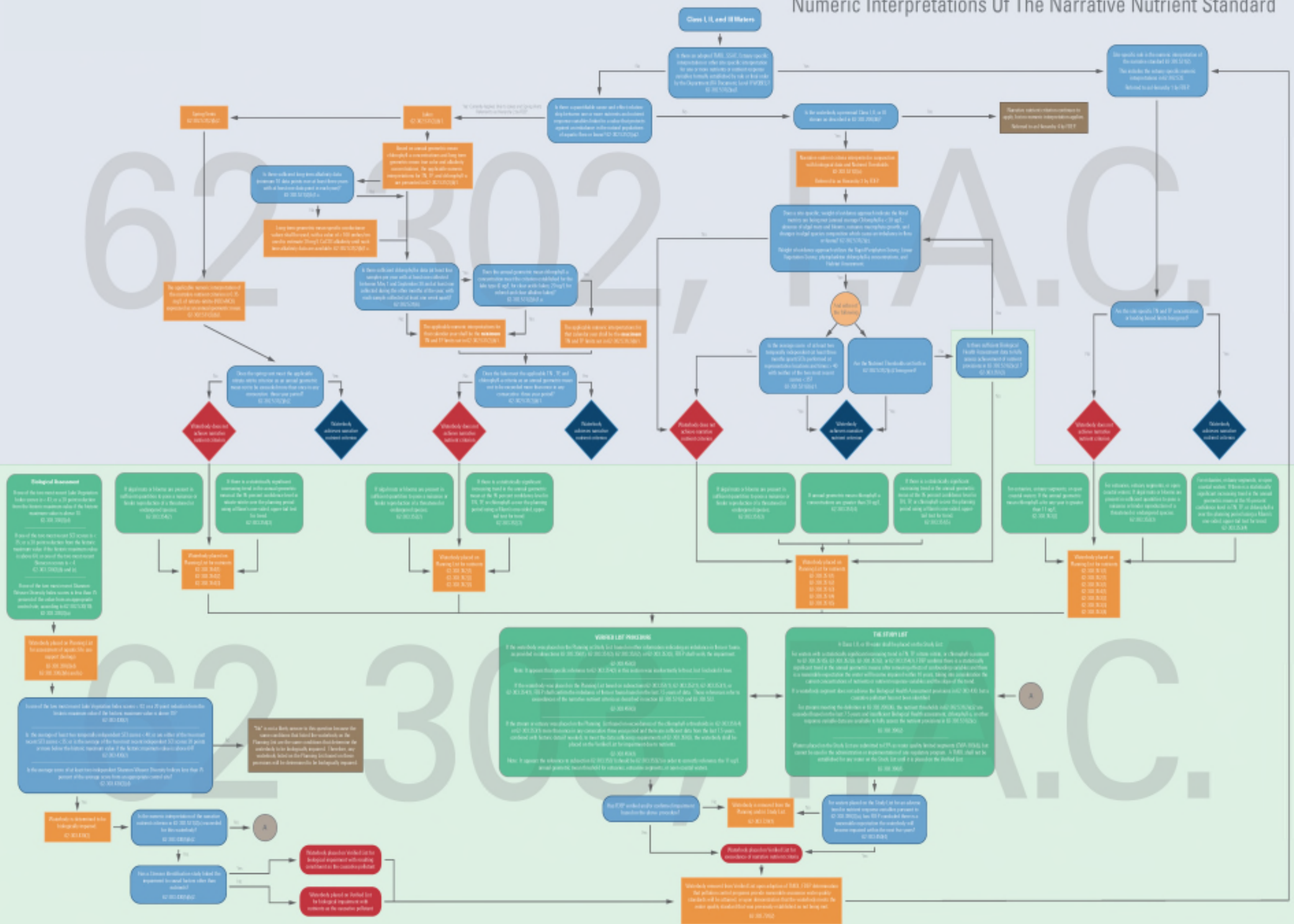


The Role of Biological Indicators in Florida's NNC

Daniel Hammond
Senior Consultant



Numeric Interpretations Of The Narrative Nutrient Standard





Estuaries – “Hold the Line” Strategy



Lakes – Nutrient/Chlorophyll-a
Relationship



Rivers/Streams – Biological Indicators

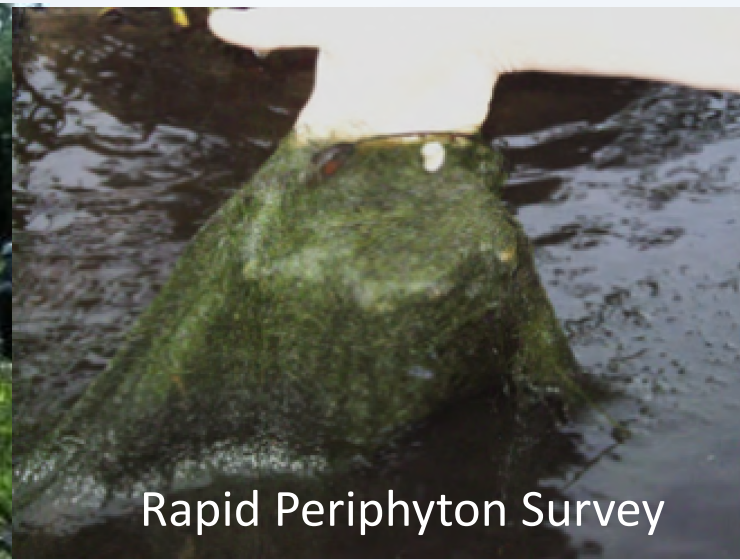
Chlorophyll-a



Linear
Vegetation
Survey



Rapid Periphyton Survey



Legend

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

Nutrient Watershed Region	South TN (mg/L)	TP (mg/L)
Panhandle West	0.67	0.06
Panhandle East	1.03	0.18
North Central	1.87	0.30
West Central	1.65	0.49
Peninsula	1.54	0.12



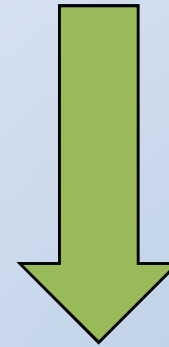
Stream Condition Index

Floral Metrics



Nutrient Thresholds

Stream Condition Index



**Attains Nutrient
Standard**

**Attains Nutrient
Standard**

Floral Metrics

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graph TD; FM((Floral Metrics)) --> NT[Nutrient Thresholds]; FM --> SCI[Stream Condition Index]; NT --> DNT1[Does Not Attain]; SCI --> DNT2[Does Not Attain];
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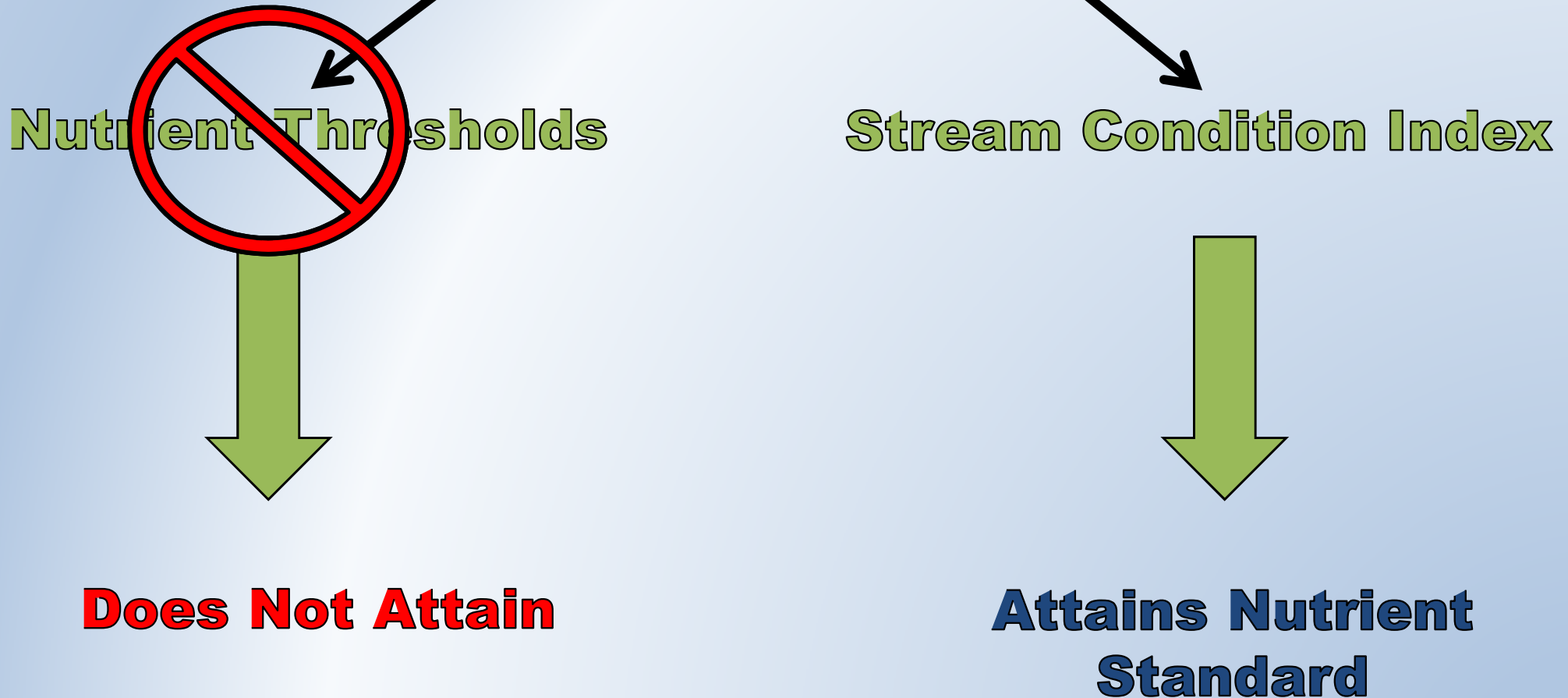
Nutrient Thresholds

Stream Condition Index

Does Not Attain

Does Not Attain

Floral Metrics



Floral Metrics



Nutrient Thresholds

Stream Condition Index



**Attains Nutrient
Standard**



Does Not Attain



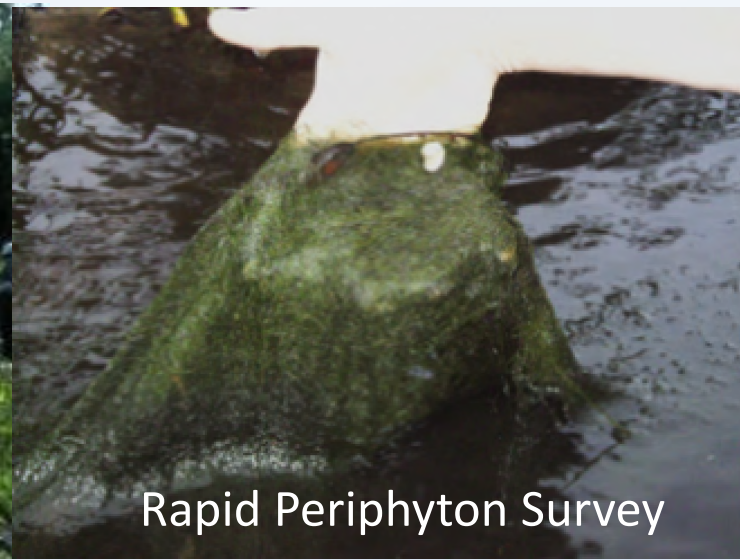
Chlorophyll-a



Linear
Vegetation
Survey

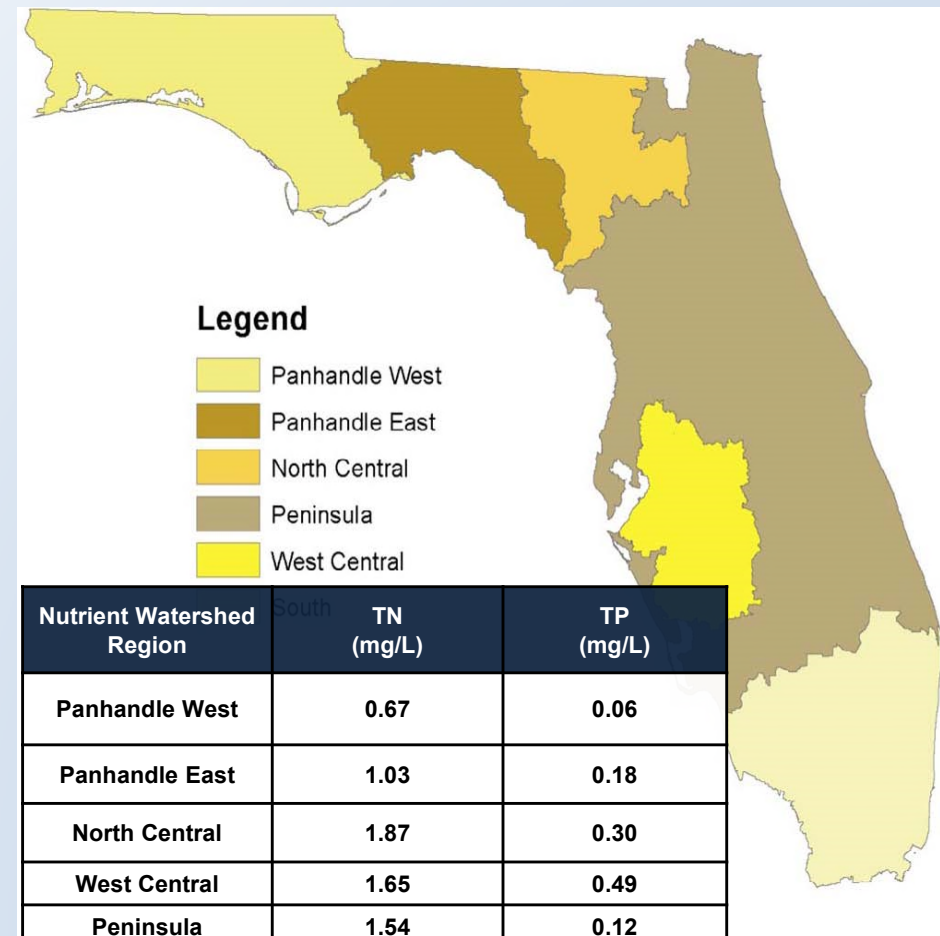


Rapid Periphyton Survey

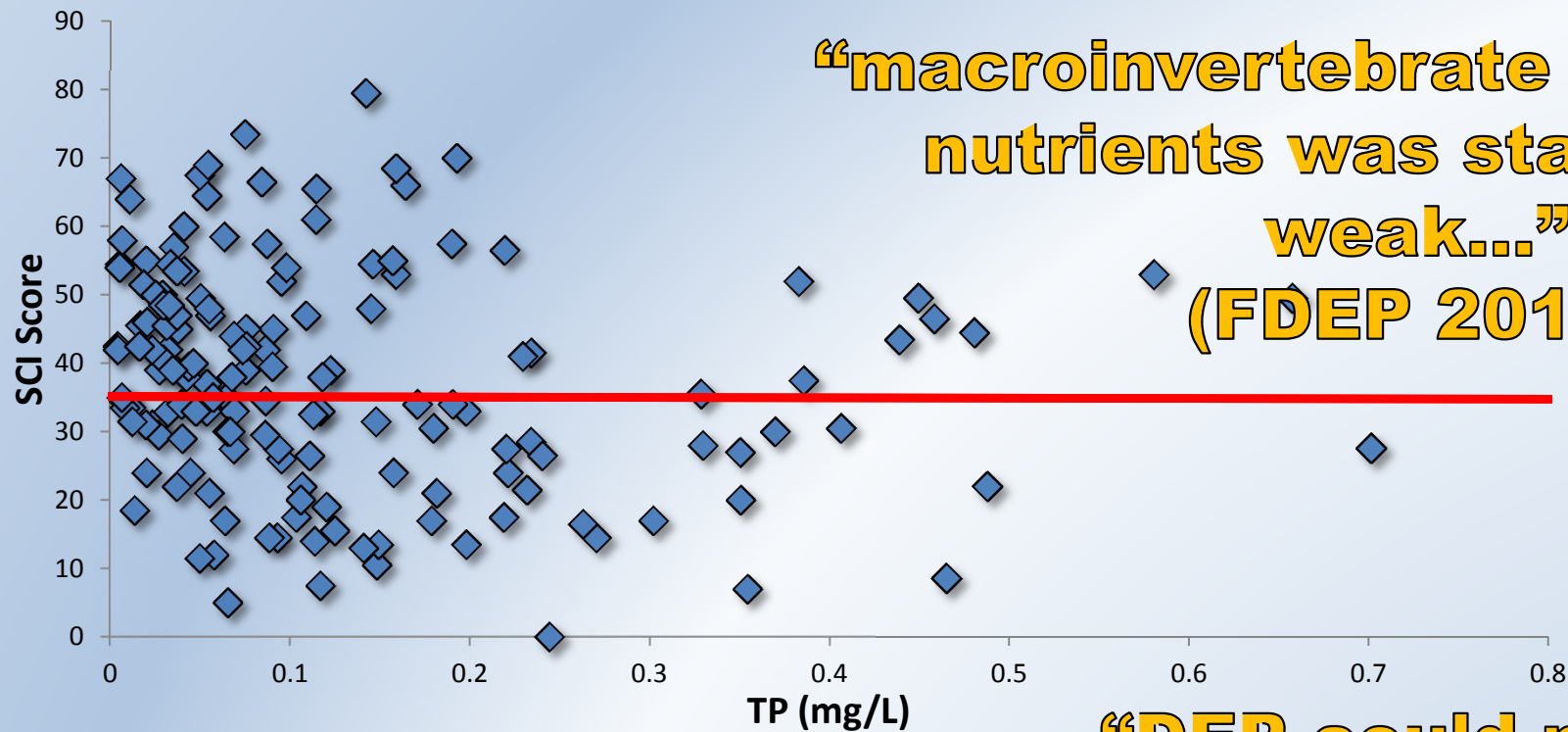


Floral Metrics and Nutrient Thresholds

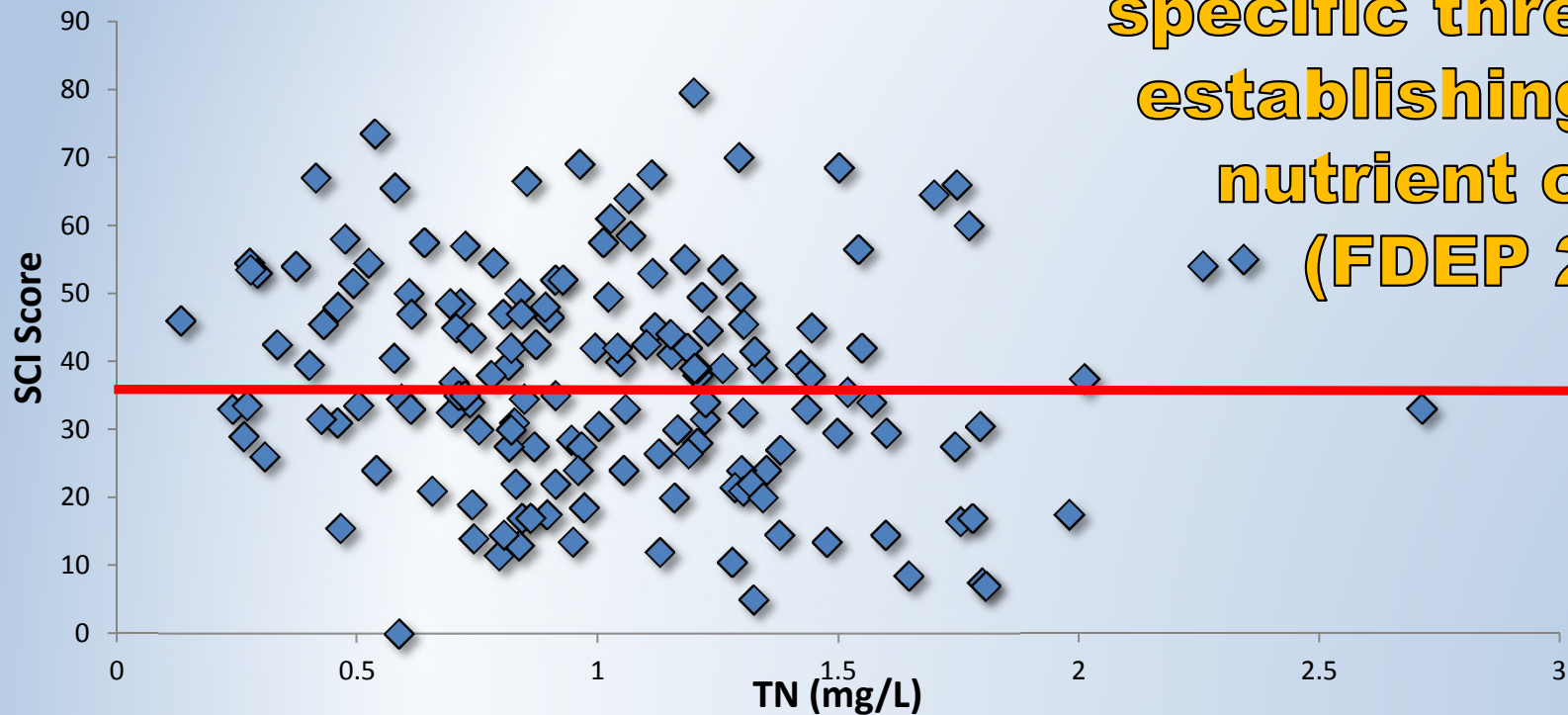
- Reference System Approach
- No Causal Relationship Established



- > 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**



**“macroinvertebrate 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.

A photograph of two environmental scientists wading in a river. They are both wearing white hard hats, safety glasses, and life vests. They are focused on a small white container held by one of them, possibly collecting a water sample. The river is surrounded by dense green trees and vegetation. The text 'Data Quality' is overlaid on the left side of the image.

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**

An aerial photograph of a landscape featuring a residential area on the left, a dense forest in the center, and a road with a bridge on the right. A red line is drawn along a stream that flows from the top center towards the bottom center, passing under the bridge. The text "Linear Vegetation Survey" is overlaid in white on the forested area.

Linear Vegetation Survey

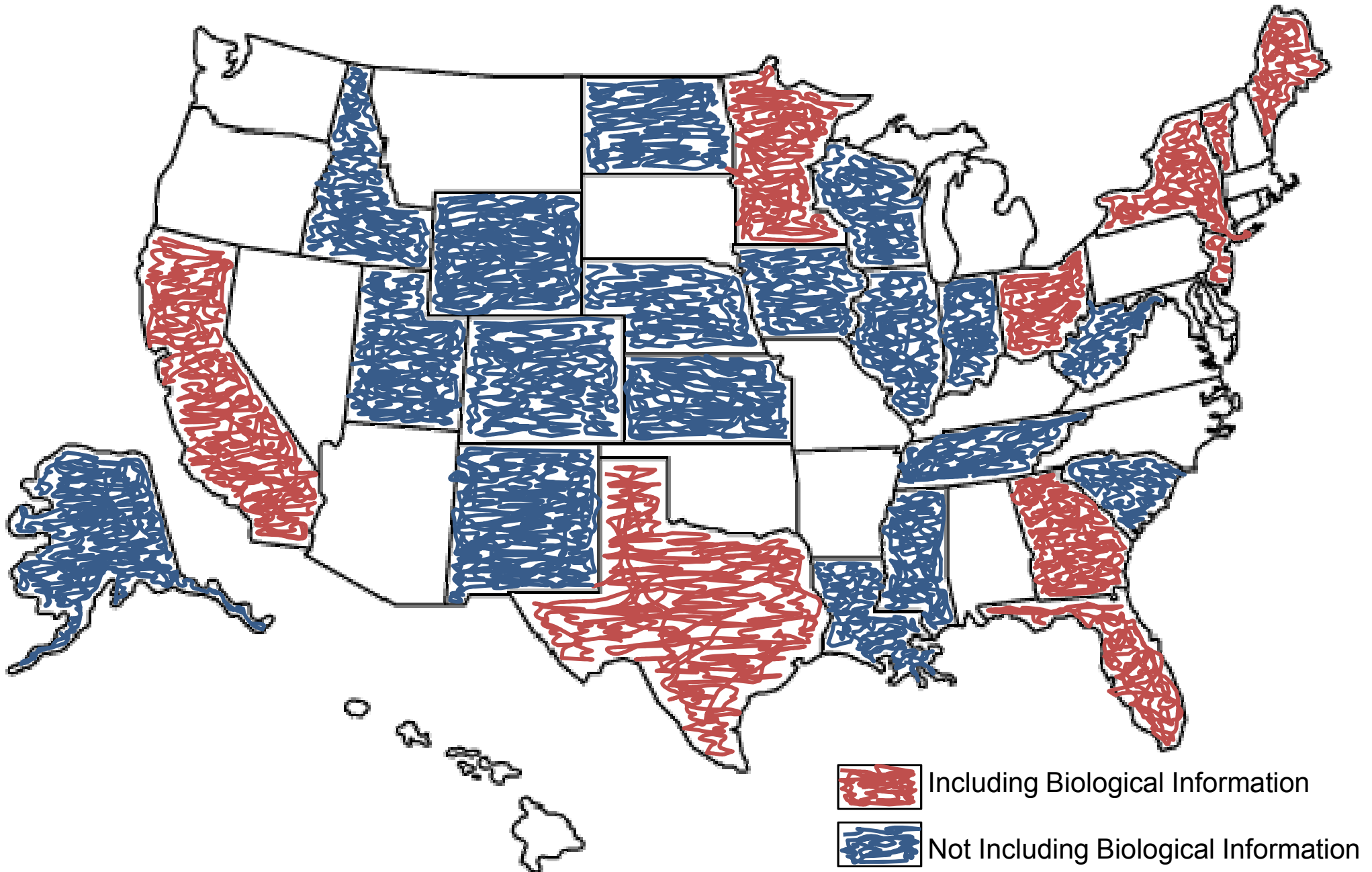


An aerial photograph of a forested area. A road runs diagonally from the upper left towards the bottom right. A red line is drawn on the road, indicating a survey area. In the upper left, there are some buildings and a parking lot. The forest is dense and green.

Rapid Periphyton Survey

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

NNC Progress



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

55%

EPA Rule

31%

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

The difference is the biological information.