A primer on managing water quality in the State of Florida and an update on numeric nutrient criteria

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Clean Water Act 1972

- As part of the Federal Clean Water Act 1972, USEPA requested states develop:
  - Designated uses for waters of the state (lakes, reservoirs, rivers, streams, estuaries and wetlands),
  - Criteria that protect designated uses,
  - Corrective process that would be implemented if a designated use was not being met (i.e. if the waterbody was determine to be “impaired”)

Designated Uses for Florida Waterbodies

- Class I – Potable Water Supplies
- Class II – Shellfish Propagation or Harvesting
- Class III – Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife
- Class III-Limited – Fish Consumption; Recreation or Limited Recreation; and/or Propagation and Maintenance of a Limited Population of Fish and Wildlife
- Class IV – Agricultural Water Supplies
- Class V – Navigation, Utility and Industrial Use

F.A.C. Chapter 62-302 Surface Water Quality Standards

http://www.dep.state.fl.us/legal/rules/shared/62-302.pdf

Example Criteria for Dissolved Oxygen (recently updated)

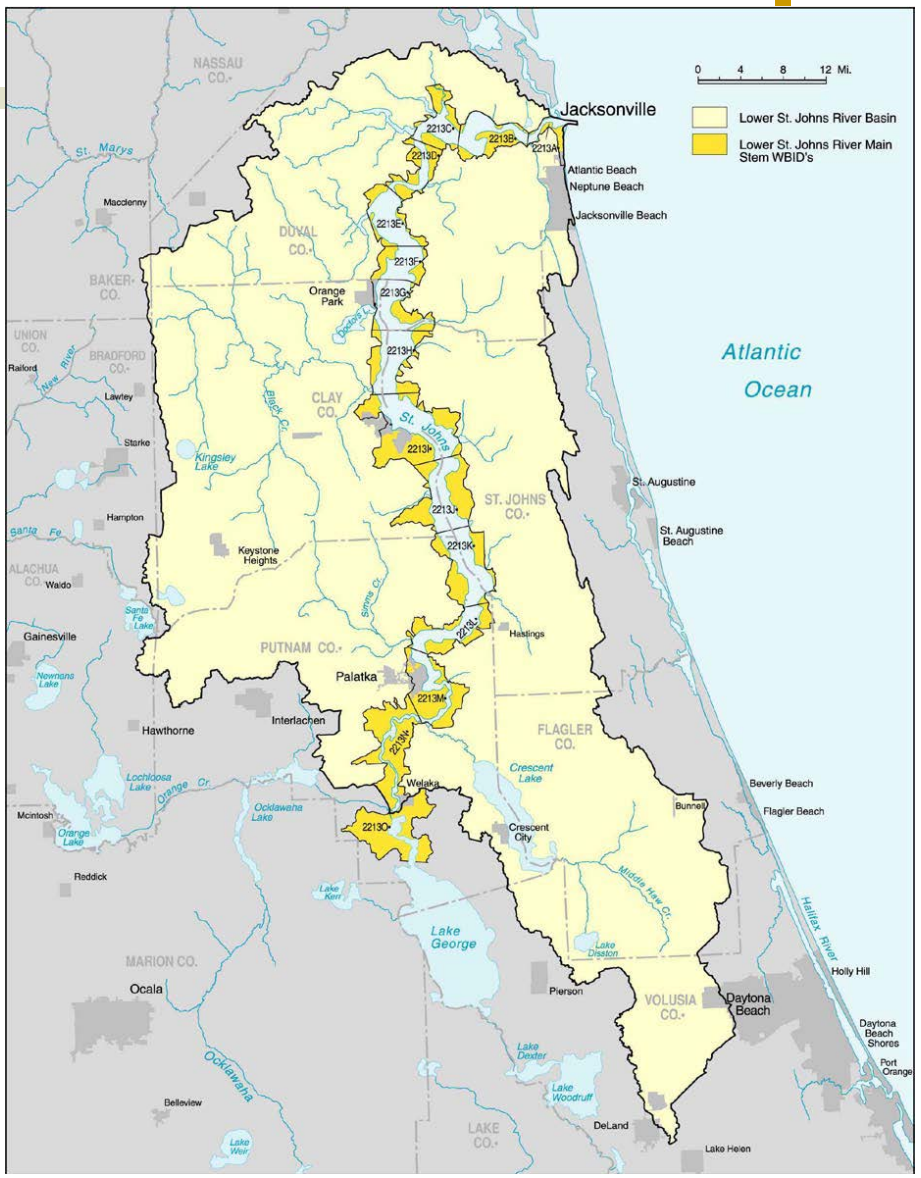
- Class I and Class III Freshwater
  - *No more than ten percent of the daily average percent DO saturation values shall be below 67 percent in the Panhandle West bioregion, or 38 percent in the Peninsula and Everglades bioregions, or 34 percent in the Big Bend and Northeast bioregions.*

- Class II and Class III Marine Waters
  - *The daily average percent DO saturation shall not be below 42 percent in more than ten percent of the values.*

    AND
  - *The weekly- and monthly average percent DO saturations shall not be below 51 and 56 percent, respectively.*

Monitoring

- FDEP has Integrated Water Resource Monitoring Network (IWRM)
- Tier 1 used for State wide Status and Trends assessment.
  - 41,000 ambient WQ stations
    - 14,454 miles of rivers and streams,
    - 1,965 square miles of lakes,
    - 5,473 square miles of estuaries,
    - 6,487 square miles of coastal waters
  - Trend Monitoring Network,
    - 76 surface water stations
    - 48 ground water wells
- Tier 2 used for TMDL development.
- Tier 3 used for Site Specific Alternative Criteria (SSAC) or other criteria revisions (i.e. DO criteria).



Biannual Reporting

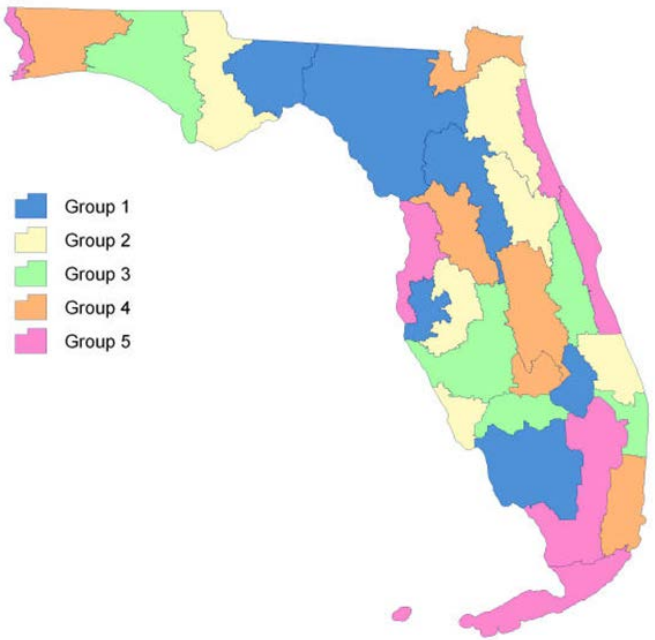
- **Integrated Water Quality Assessment for Florida: 2012**
- Section 305(b) requires each state to report to the U.S. Environmental Protection Agency (EPA) on the condition of its surface waters.
- Section 303(d) requires each state to report on its impaired waterbodies (those not meeting water quality standards).

What if a water body does not meet protective criteria?

- Section 303(d) of the Clean Water Act (CWA) requires states to submit lists of surface waters that do not meet applicable water quality standards (potentially impaired waters).
- Water body is then added to a planning list to further evaluate condition and verify if the water body is indeed impaired.

Planning Rotation

- Major watershed basins are divided into 5 groups and distributed among six DEP Districts.
- Each Watershed group then goes through a 5 year cycle
  - **Phase 1**: Preliminary Evaluation of water quality
  - **Phase 2**: Strategic Monitoring and Assessment to verify water quality impairments
  - **Phase 3**: Development and Adoption of TMDLs for waters verified as impaired
  - **Phase 4**: Development of Basin Management Action Plan (BMAP) to achieve the TMDL
  - **Phase 5**: Implementation of the BMAP and monitoring of results



Basin Rotation Schedule For TMDL Development and Implementation

YEAR*	00	01	01	02	02	03	03	04	04	05	05	06	06	07	07	08	08	09	09	10
Group 1	PHASE 1		PHASE 2		PHASE 3		PHASE 4		PHASE 5		PHASE 1		PHASE 2		PHASE 3		PHASE 4		PHASE 5	
Group 2			PHASE 1		PHASE 2		PHASE 3		PHASE 4		PHASE 5		PHASE 1		PHASE 2		PHASE 3		PHASE 4	
Group 3					PHASE 1		PHASE 2		PHASE 3		PHASE 4		PHASE 5		PHASE 1		PHASE 2		PHASE 3	
Group 4							PHASE 1		PHASE 2		PHASE 3		PHASE 4		PHASE 5		PHASE 1		PHASE 2	
Group 5									PHASE 1		PHASE 2		PHASE 3		PHASE 4		PHASE 5		PHASE 1	
	1st Five-year Cycle – High-priority Waters										2nd Five-year Cycle – Medium-Priority Waters									

*Projected years for phases 3, 4, and 5 may change due to accelerated local activities, length of plan development, legal challenges, etc.

What if a waterbody is Verified Impaired?

- **Total Maximum Daily Load (TMDL) Process**
  - Determine source of Impairment.
  - Determine threshold concentration or load of pollutant that will still maintain a water body's designated use (systems assimilative capacity) or TMDL.
  - Determine the existing load and sources to for pollutant of concern.
  - Determine the difference between existing loads and the TMDL..
  - Allocate load reduction required among watershed sources.

Example TMDL

Water body Identification	Acceptable load	Existing load	Acceptable load from point sources	Acceptable load from non point sources	Required load reduction
	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)
Freshwater					
2213I to 2213N	500,325 TP	599,610	46,357 TP	453,968 TP	99,285
2213I to 2213N	8,571,563 TN	10,115,552	236,695 TN	8,334,868 TN	1,543,989
Marine					
2213A to 2213H	1,376,855 TN	2,453,258	1,027,590 TN	349,265	1,076,403

- **WBID(s) – Waterbody Identification number**
- **TMDL – Total Maximum Daily Load (reported as annual load not daily)**
- **TMDL baseline load = existing load to system**
- **WLA – Wasteload Allocation (aggregate allowable load from point sources)**
- **LA – Load Allocation (aggregate allowable load from nonpoint sources)**

Guidelines for initial TMDL Load Allocation (point vs. nonpoint sources)

- FDEP Formed **Allocation Technical Advisory Committee** (ATAC)
- First step to **achieve equity** was to “level the playing field” in treatment effort **between point and nonpoint sources**. Point source are already required to provide, at a minimum, technology based treatment levels.
- ATAC felt **nonpoint sources** should be **expected to provide comparable minimum levels of treatment**, before additional reductions were expected of point sources.
- The ATAC subsequently decided that the **comparable minimum treatment for nonpoint sources should be the Best Management Practice (BMPs)** developed and adopted for that activity.

TMDL Allocation Example

Water Body:	Appasuwwanee River
Pollutant of Concern:	Nitrogen
Assimilative Capacity:	100,000 pounds
Current Loadings:	
Agriculture:	30,000 pounds
Silviculture:	5,000 pounds
Urban Stormwater:	50,000 pounds
Septic Tanks:	10,000 pounds
Atm. Deposition	10,000 pounds
Wastewater Facilities:	
Domestic WWTP:	25,000 pounds
Industrial WWTP:	20,000 pounds
Current Total	150,000 pounds
Needed Reduction	50,000 pounds

Maximum load allowed (TMDL)

Nonpoint sources

Point sources

Existing load

Allocation process address this excess load

Step 1

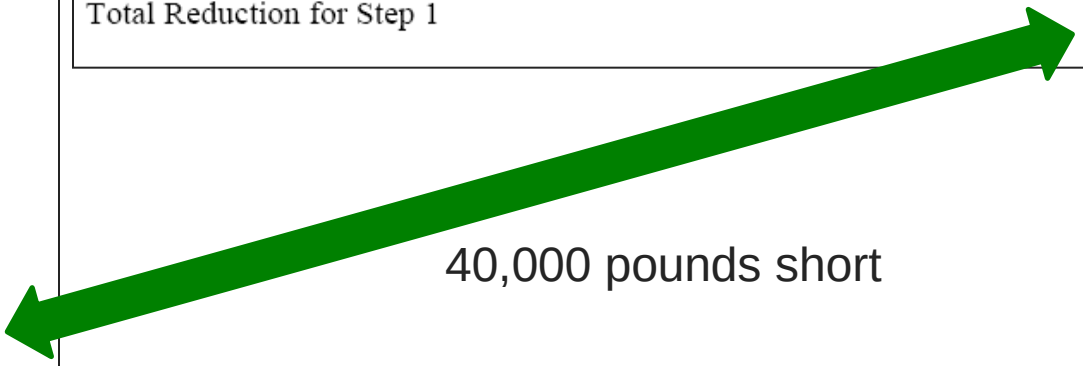
- Calculate the amount of pollutant reductions that would be achieved if:
  - a) 45% of all agricultural and silviculture operations in the basin and in upstream watersheds implemented the appropriate BMPs
  - b) 45% of **all** urban areas met stormwater treatment requirements for new construction, and
  - c) 45% of the homes with septic tanks within the 100-year floodplain were hooked up to a regional sewer system.

  - "**all**" does not include urban areas that are under Municipal Separate Storm Sewer Stormwater

Step 1 Reductions

Water Body:	Appasuwwanee River
Pollutant of Concern:	Nitrogen
Assimilative Capacity:	100,000 pounds
Current Loadings:	
Agriculture:	30,000 pounds
Silviculture:	5,000 pounds
Urban Stormwater:	50,000 pounds
Septic Tanks:	10,000 pounds
Atm. Deposition	10,000 pounds
Wastewater Facilities:	
Domestic WWTP:	25,000 pounds
Industrial WWTP:	20,000 pounds
Current Total	150,000 pounds
Needed Reduction	50,000 pounds

Allocation Process	
Step 1:	
A. Reduction from Implementation of BMPs for Ag to meet 45%	4,000
B. Reduction from retrofitting developed areas	5,000
C. Reduction from removing septic tanks	1,000
Total Reduction for Step 1	10,000



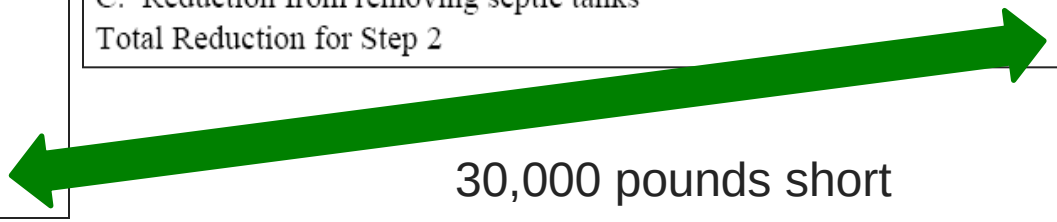
Step 2

- If step 1 was not sufficient to meet the TMDL, then calculate if
  - a) **90**% of all agricultural and silviculture operations in the basin implemented the BMPs,
  - b) 90% of **all** urban areas met stormwater treatment requirements for new construction, and
  - c) 90% of the homes with septic tanks within the 100-year floodplain were hooked up to a regional sewer system.

Step 2 Reduction

Water Body:	Appasuwwanee River
Pollutant of Concern:	Nitrogen
Assimilative Capacity:	100,000 pounds
Current Loadings:	
Agriculture:	30,000 pounds
Silviculture:	5,000 pounds
Urban Stormwater:	50,000 pounds
Septic Tanks:	10,000 pounds
Atm. Deposition	10,000 pounds
Wastewater Facilities:	
Domestic WWTP:	25,000 pounds
Industrial WWTP:	20,000 pounds
Current Total	150,000 pounds
Needed Reduction	50,000 pounds

Step 1:	
A. Reduction from Implementation of BMPs for Ag to meet 45%	4,000
B. Reduction from retrofitting developed areas	5,000
C. Reduction from removing septic tanks	1,000
Total Reduction for Step 1	10,000
Step 2	
A. Reduction from Implementation of BMPs for Ag to meet 90%	8,000
B. Reduction from retrofitting developed areas	10,000
C. Reduction from removing septic tanks	2,000
Total Reduction for Step 2	20,000



30,000 pounds short

Step 3

- If the reductions for step 2 were not sufficient to meet the TMDL, the third recommended step is to allocate reductions to all sources as a percentage of there existing loads except those where loading is at background levels or those that have provided treatment beyond Best Available Technology (BAT) levels, in increments of 10% until the TMDL is met.

Step 3 Reductions

Existing loads

Water Body:	Appasuwwanee River
Pollutant of Concern:	Nitrogen
Assimilative Capacity:	100,000 pounds
Current Loadings:	
Agriculture:	30,000 pounds
Silviculture:	5,000 pounds
Urban Stormwater:	50,000 pounds
Septic Tanks:	10,000 pounds
Atm. Deposition	10,000 pounds
Wastewater Facilities:	
Domestic WWTP:	25,000 pounds
Industrial WWTP:	20,000 pounds
Current Total	150,000 pounds
Needed Reduction	50,000 pounds

10% of Existing loads

Step 3 (assuming point sources at BAT)
All sources, including atmospheric deposition, reduce by 10%

Agriculture:	3,000 pounds
Silviculture:	500 pounds
Urban Stormwater:	5,000 pounds
Septic Tanks:	1,000 pounds
Atm. Deposition	1,000 pounds
Wastewater Facilities:	
Domestic WWTP:	2,500 pounds
Industrial WWTP:	2,000 pounds
Total	15,000 pounds

Step 2	20,000 lbs
Step 3a (10% =15,000 lbs)	15,000 lbs
Step 3b (10% = 15,000 lbs)	15,000 lbs
	50,000 lbs

Need a total of 30% reduction in step 3 to meet TMDL target

Load reduction is initially allocated, now what?

Load and wasteload allocations for Total Phosphorus in freshwater portion of Lower St. Johns River,

Source Category or Name of Facility	Allocation (kg/yr)	Required Percent Reduction
Point Sources - Wastewater		
Georgia-Pacific	33,181.8	48.05%
Palatka WWTF	6,669.5	33.00%
Green Cove Springs - Harbor[1]	1,851.5	38.00%
Green Cove Springs - South[1]	545.2	38.00%
Future Apricot/RO Dischargers	3,320.1	0.00%
Point Sources - MS4s[2]		
Green Cove Springs[1]	575.9	47.44%
Clay County	212.6	47.44%
Load Allocations[2]		
Agriculture	70,974.2	14.96%
Non-MS4 Stormwater[2]		
Putnam County	3,964.9	33.81%
Palatka	792.5	47.44%
St. Johns Co.	3,296.6	11.56%
Clay Co. non-MS4	499.4	34.92%
Welaka	90.4	47.44%
Hastings	49.3	46.93%
Pomona Park	15.8	0.00%
Alachua County	83.8	0.00%
Flagler Co.	0.9	0.00%
Atmospheric Deposition	**1,355.9**	**0.00%**

Basin Management Action Plan

- A Basin Management Action Plan (BMAP) is the primary tool to go about implementing the Total Maximum Daily Load (TMDL)
- The process for BMAP development involves collaboration among local stakeholders and FDEP staff.

1999 Florida Watershed Restoration Act (amended in 2005)

- Provides for TMDL allocation to be initial, but allows option for more detailed allocation within the BMAP.
- Identifies Agricultural nonpoint sources to be addressed through BMPs under DACS
- Identifies Urban nonpoint sources of pollution to be addressed using BMPs under DEP
- Provides guidance for pollution trading

Range of Management Actions within BMAP for Nonpoint Sources

- *Stormwater Retrofits*
- *Urban Structural Best Management Practices (BMPs)*
- *Urban Nonstructural BMPs*
- *Habitat Restoration*
- *Ordinances and Land Development Regulations (LDRs)*
- *Education and Outreach*
- *Agricultural BMPs*

Stormwater Retrofits

- Upgrade failing infrastructure
  - Damaged culverts
  - Eroded ditches
- Upgrade infrastructure to newer technologies, (e.g. overflow weir structure design with skimmers).
- Add infrastructure to areas that were built prior to State of Florida's stormwater rules. (urban "infill" development must upgrade to existing stormwater rules).

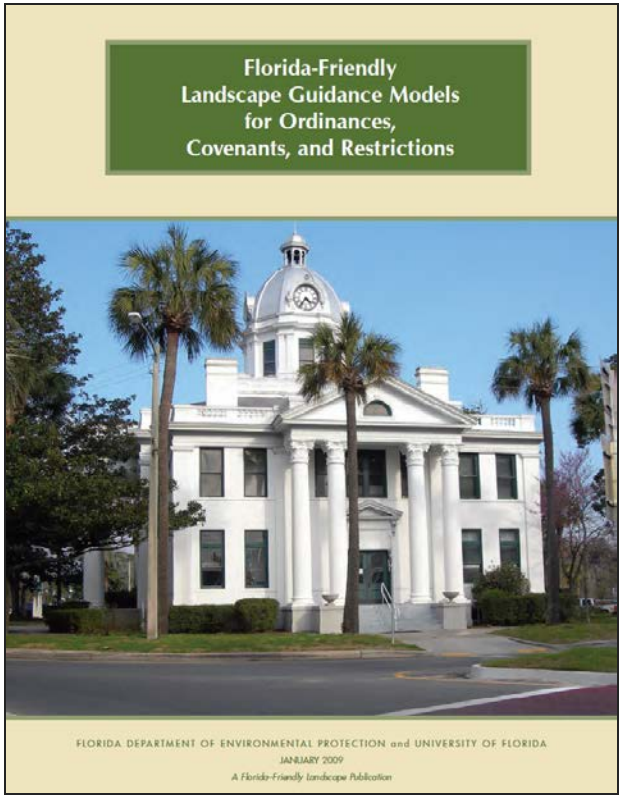
Urban Structural Best Management Practices (BMPs)

- Hydrodynamic separators (sediment traps)
- Erosion and sediment control requirements for construction sites.
- Treatment train/LID practices
  - Pervious pavement, vegetated swales, bioretention areas, greenroof, enhanced stormwater basin design etc.
- Increased stormwater treatment volume

Urban Nonstructural BMPs

- Source control focus
- Fertilizer labeling (state level) local fertilizer ordinances.
- Street sweeping and increased maintenance at structural BMPs
- Pet waste management
- Principals of the Florida-Friendly Landscape guidance.

  Site Planning and Design; Soils; Land Clearing Standards and Preservation of Native Vegetation; Appropriate Plant Selection, Location, and, Arrangement; Practical Use of Turf; Efficient Irrigation; Yard Waste Management, Composting and Use of Mulches; Fertilizer Management; Pesticide Management; Landscape Maintenance; Shoreline Considerations



Habitat Restoration

- Land acquisition
- Hydrologic restoration of drained sites
  - Kissimmee River floodplain
- Waterbody shoreline/bank stabilization
  - Shoreline restoration
  - In some instances armoring of shoreline

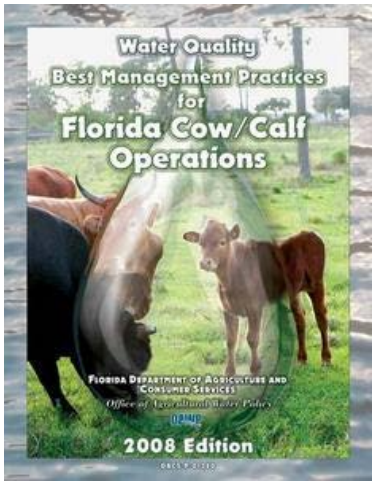
Ordinances and Land Development Regulations (LDRs)

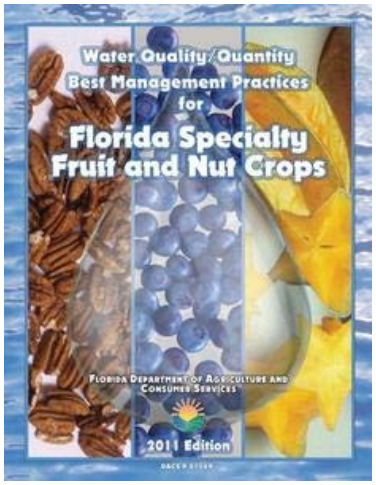
- Incentives for Low Impact Design (LID)
- Waterbody buffers/set backs
- Open space requirements
- Adoption of FFL principals

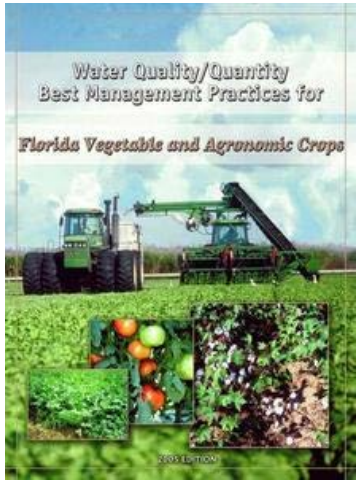
Education and Outreach

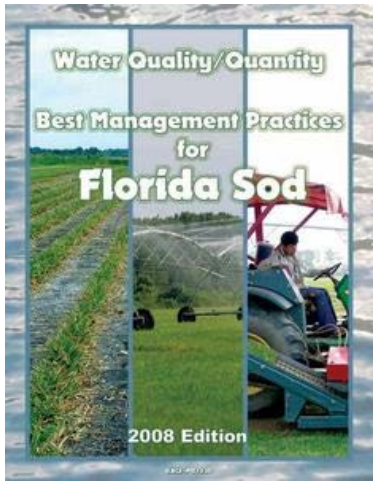
- Florida Friendly Landscaping – UF/IFAS extension
- Green Industries BMP training and certification
- NPDES Phase 2 Permit requirements
  - 6 minimum control measures
    - 2 specifically related to public education and outreach, stormdrain markers, media campaigns etc.

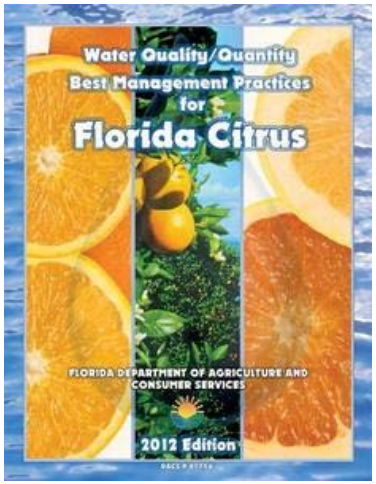
Agricultural BMPs











What's in the manual?

1.0 NUTRIENT MANAGEMENT

Nutrient management for livestock operations requires a systematic management approach that includes several different, yet related, practices. It is arguably the most important category of BMPs in this manual. It includes managing plant nutrients for optimum forage yields and managing feeding practices to deliver proper nutrition for the animal. It also includes proper animal waste management to protect waterbodies. Nutrient management considers the amount, source, form, placement, and timing of fertilizer application materials. All potential sources of plant nutrients, such as organic and synthetic fertilizer inputs, as well as nutrient reserves within the soil, are identified, inventoried, and addressed.

One of the first steps in developing a sound fertilization management program involves a basic knowledge of soils. Many of Florida's soils naturally contain the required amount of phosphorus, assuming the pH levels are within the range to make this nutrient available. As such, soil testing and analysis is considered to be a cornerstone of any nutrient management program. For most ranches, soil testing should be conducted at a minimum of once every three to five years, or whenever phosphorous fertilizer is used. Nitrogen, which is not analyzed as part of a routine soil test, is a critically important macronutrient for vegetative growth. Plant tissue testing, which can detect plant nitrogen levels, can be used in conjunction with soil testing to diagnose the overall effectiveness of a fertilization program. Tissue testing is especially useful to help a grower fine-tune their fertilizer application program.

Proper animal nutrition and feedstock management for environmental protection must consider the type, blend, and amount of feed to obtain maximum nutrition and animal health. Moreover, supplemental feed, its content and proximity to a waterbody, must also be considered, as it can secondarily affect nonpoint source pollution. In addition, animal waste management is a final consideration in developing an overall nutrient management budget. The principle goal of this BMP is to minimize nutrient loss to the environment because the offsite transport of nutrients to surface waters from various sources has caused most of the water quality impairment issues in Florida's watersheds.

Working Definition:

Nutrient management consists of fertilizer management, animal nutrition, feedstock management, and animal waste management.

1.1 Fertilizer Management

√ 1. Use a soil test from a lab using the Mehlich-1 or another method approved by the UF-IFAS Extension Soils Testing Laboratory to determine P fertilization rate. Analyze the need for tissue testing based on the soil test results.

√ 2. If planting legumes or fertilizing with manure or wastewater residuals, use the Nutrient Budget Worksheet in Appendix 5 to determine whether supplemental fertilizer is needed.

√ 3. Follow UF-IFAS-recommended rates in SL-129 for the particular forage. The criteria to determine phosphorus application on established bahiagrass pastures are: a tissue analysis < 0.15 percent phosphorus, soil pH ≥ 5.5, and soil analysis is *very low (less than 10 ppm)* or *low (10 to 15 ppm)* for phosphorus. If using organic materials or manure, adjust the rate of supplemental fertilizer materials based on the product's nutrient content analysis.

√ 4. Time fertilizer applications with plant growth to maximize nutrient uptake and to minimize leaching and runoff.

√ 5. Prevent spreading fertilizer material in streams, sinkholes, or wetlands by maintaining at least a 50 foot setback from these features.

■ Maintain records of fertilizer application. Records should include soil test analysis, date of application, fertilizer formulation, application rate, location and acreage, and worksheet results.

1.2 Residuals or Biosolids Application

√ 1. Abide by all applicable regulations in FDEP Rule 62-640, F.A.C., for residuals application, and/or Florida Department of Health (FDOH) Rule 64E-6, F.A.C., for *septage* application.

√ 2. Request the calcium carbonate equivalency and nutrient analysis of the product, expressed as a dry weight, for residuals or septage treated by lime stabilization. Use this analysis to determine what amount to apply without adversely affecting soil pH. This is especially important when applying the product to bahia grass, since it is an "acid loving" plant.

√ 3. Obtain a copy of the FDEP Agricultural Use Plan from the hauler/applicator when applying residuals or septage, and abide by all grazing restriction and setback requirements.

1.3 Animal Nutrition and Feedstock

√ 1. If using a high amount of supplemental feed, manage your operation so that nutrients in feed will not lead to high rates of nutrient loads from waste. Keep in mind that livestock generally excrete 60 to 85% of the phosphorus fed to them.

√ 2. Locate any confined feeding areas away from watercourses, wetlands, sinkholes or excessively sloped terrain. Ensure that filter strips or other conservation buffers are maintained between feeding areas and adjacent features.

√ 3. Locate supplemental feeding and mineral stations at least 100 feet away from watercourses, streams, wetlands, wells or sinkholes.

1.4 Animal Waste Management

√ 1. Manage livestock distribution to reduce any concentrated accumulation of wastes that could lead to nutrients contaminating ground water or surface waters.

√ 2. Use onsite concentrated manure sources, if available, as a fertilizer supplement in accordance with soil test results. This will recycle nutrients and reduce the need for inorganic fertilizers.

Operation and Maintenance:

- Maintain and calibrate fertilizer application equipment properly.
- Do not mix or load fertilizers near environmentally sensitive areas.
- Store fertilizers properly and in a safe location.

References:

(1) USDA-NRCS Nutrient Management, Code 590, FOTG-Section IV, http://www.nrcs.usda.gov/technical/efotg/

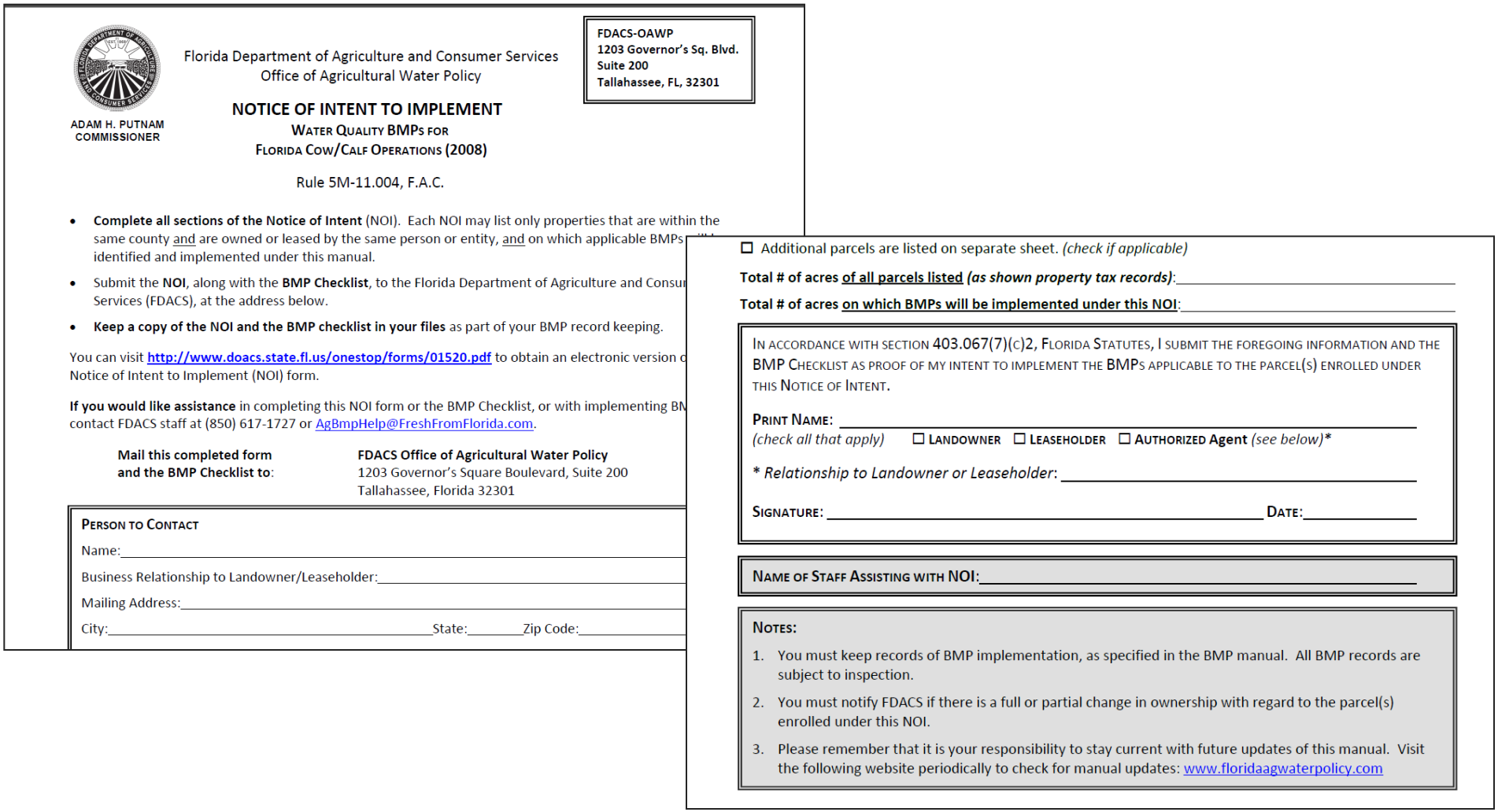
(2) Beef Cattle Production Best Management Practices, LSU Ag Center, http://www.lsuagcenter.com/en/crops_livestock/livestock/beef_cattle/production_management/Beef+Cattle+Production+Best+Management+Practices.htm

(3) Standardized Fertilization Recommendations for Agronomic Crops, UF-IFAS Fact Sheet SL-129, http://edis.ifas.ufl.edu/SS163

(4) USDA-NRCS Waste Utilization, Code 633, FOTG-Section IV, http://www.nrcs.usda.gov/technical/efotg/

(5) USDA-NRCS Feed Management, Code 592, FOTG-Section IV, http://www.nrcs.usda.gov/technical/efotg/

Agricultural BMPs
Notice of Intent (NOI)



ADAM H. PUTNAM
COMMISSIONER

Florida Department of Agriculture and Consumer Services
Office of Agricultural Water Policy

FDACS-OAWP
1203 Governor's Sq. Blvd.
Suite 200
Tallahassee, FL, 32301

NOTICE OF INTENT TO IMPLEMENT
WATER QUALITY BMPS FOR
FLORIDA COW/CALF OPERATIONS (2008)

Rule 5M-11.004, F.A.C.

- **Complete all sections of the Notice of Intent** (NOI). Each NOI may list only properties that are within the same county and are owned or leased by the same person or entity, and on which applicable BMPs will be identified and implemented under this manual.
- Submit the **NOI**, along with the **BMP Checklist**, to the Florida Department of Agriculture and Consumer Services (FDACS), at the address below.
- **Keep a copy of the NOI and the BMP checklist in your files** as part of your BMP record keeping.

You can visit http://www.doacs.state.fl.us/onestop/forms/01520.pdf to obtain an electronic version of the Notice of Intent to Implement (NOI) form.

If you would like assistance in completing this NOI form or the BMP Checklist, or with implementing BMPs, contact FDACS staff at (850) 617-1727 or AgBmpHelp@FreshFromFlorida.com.

Mail this completed form and the BMP Checklist to:
FDACS Office of Agricultural Water Policy
1203 Governor's Square Boulevard, Suite 200
Tallahassee, Florida 32301

PERSON TO CONTACT

Name: _____

Business Relationship to Landowner/Leaseholder: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

☐ Additional parcels are listed on separate sheet. *(check if applicable)*

Total # of acres of all parcels listed *(as shown property tax records)*: _____

Total # of acres on which BMPs will be implemented under this NOI: _____

IN ACCORDANCE WITH SECTION 403.067(7)(C)2, FLORIDA STATUTES, I SUBMIT THE FOREGOING INFORMATION AND THE BMP CHECKLIST AS PROOF OF MY INTENT TO IMPLEMENT THE BMPS APPLICABLE TO THE PARCEL(S) ENROLLED UNDER THIS NOTICE OF INTENT.

PRINT NAME: _____

(check all that apply) ☐ **LANDOWNER** ☐ **LEASEHOLDER** ☐ **AUTHORIZED AGENT** *(see below)**

* *Relationship to Landowner or Leaseholder*: _____

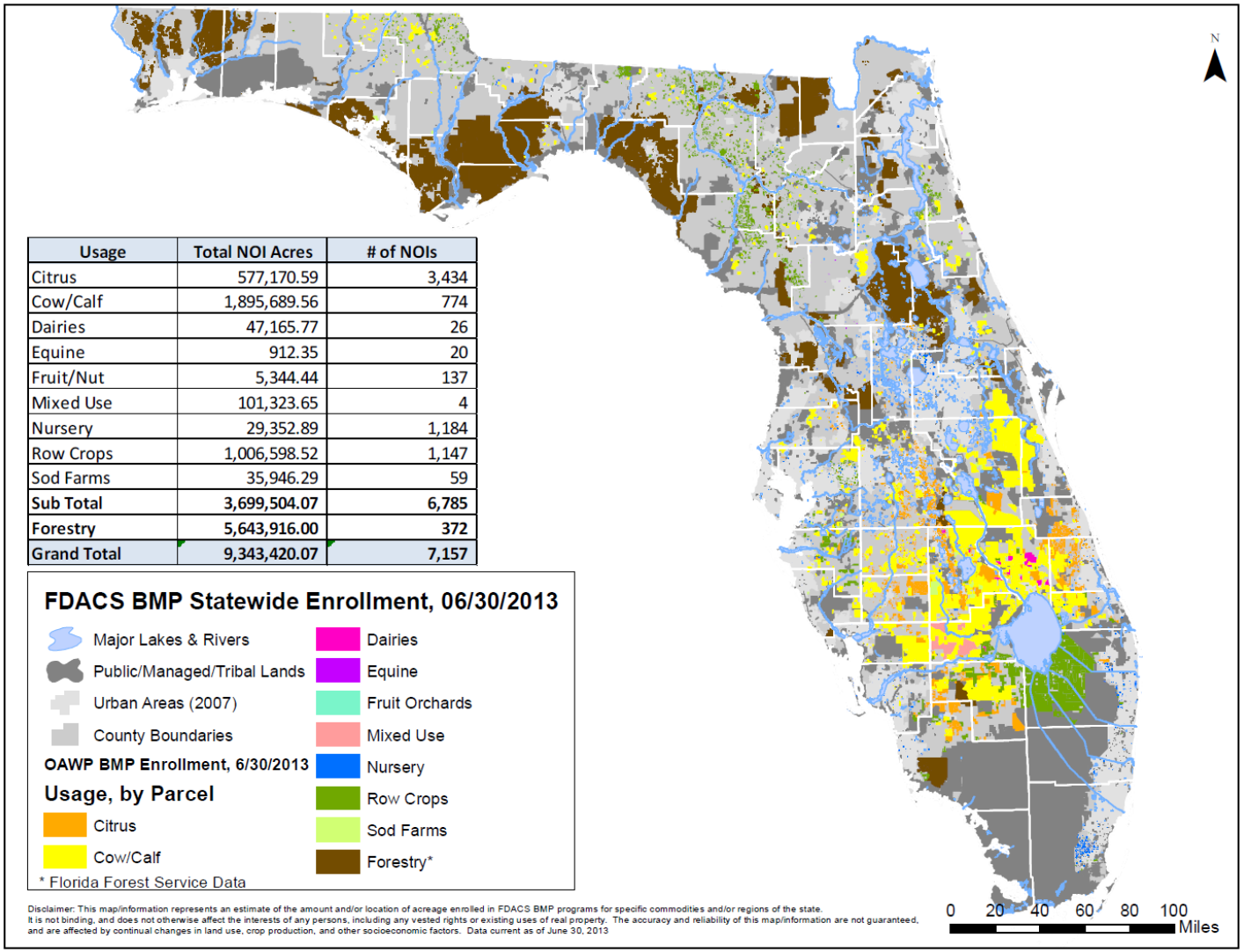
SIGNATURE: _____ **DATE:** _____

NAME OF STAFF ASSISTING WITH NOI: _____

NOTES:

1. You must keep records of BMP implementation, as specified in the BMP manual. All BMP records are subject to inspection.
2. You must notify FDACS if there is a full or partial change in ownership with regard to the parcel(s) enrolled under this NOI.
3. Please remember that it is your responsibility to stay current with future updates of this manual. Visit the following website periodically to check for manual updates: www.floridaagwaterpolicy.com

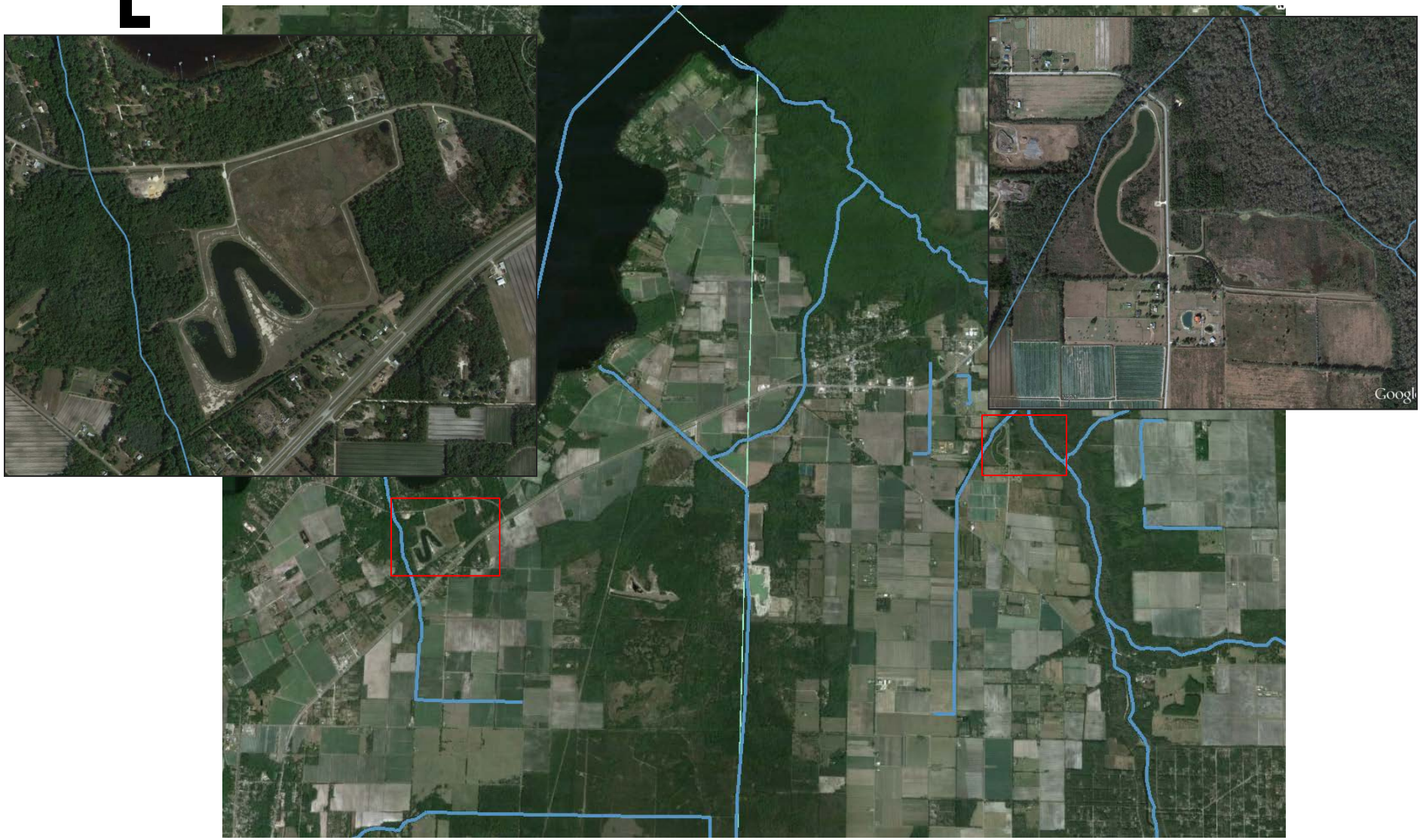
Statewide Enrollment 6/30/2013



Usage	Total NOI Acres	# of NOIs
Citrus	577,170.59	3,434
Cow/Calf	1,895,689.56	774
Dairies	47,165.77	26
Equine	912.35	20
Fruit/Nut	5,344.44	137
Mixed Use	101,323.65	4
Nursery	29,352.89	1,184
Row Crops	1,006,598.52	1,147
Sod Farms	35,946.29	59
Sub Total	**3,699,504.07**	**6,785**
Forestry	**5,643,916.00**	**372**
Grand Total	**9,343,420.07**	**7,157**

Disclaimer: This map/information represents an estimate of the amount and/or location of acreage enrolled in FDACS BMP programs for specific commodities and/or regions of the state. It is not binding, and does not otherwise affect the interests of any persons, including any vested rights or existing uses of real property. The accuracy and reliability of this map/information are not guaranteed, and are affected by continual changes in land use, crop production, and other socioeconomic factors. Data current as of June 30, 2013

Agricultural (and urban) regional treatment systems



Regional treatment systems

- If load reductions from non-point source BMPs is not sufficient to meet allocated load reduction, regional treatment systems are often used to make up the difference.

TABLE AP.3. SUMMARY OF NET ESTIMATED LOADINGS OF TOTAL PHOSPHORUS TO TMDL WATERS IN THE UPPER OCKLAWAHA RIVER BASIN AFTER BMAP IMPLEMENTATION

Sub-basins	Lake Apopka	Lake Beau-clair	Lake Carlton (trib to Lake Beau-clair)	Lake Dora	Lake Eustis	Trout Lake (trib to Lake Eustis)	Lake Harris & Little Lake Harris	Palatla-kaha (trib to Lake Harris)	Lake Griffin	Lake Yale (trib to Lake Griffin)	Basinwide Totals
	Net Estimated Loads										
Loading information											
TMDL *Baseline* TP-loading (lbs/yr)	137,451	46,672	477	39,646	35,503	2,604	26,864	2,350	77,881	3,158	372,606
Loading Changes from Implemented Projects: *a. Tributary inflows*	--	-26,015	--	-20,071	-10,762	--	--	--	-7,813	--	-64,661
b. Agricultural discharges	-117,015	--	--	--	-746	--	-174	--	-22,703	--	-140,638
c. Restoration	37,477		--	--	-603	--	-4,441	--	-18,747	--	-13,686
d. Stormwater	-35	--	--	8	-313	--	-98	--	-202	--	-640
e. Point sources or other treatment options	1,256	--	--	--	--	--	--	--	--	-109	1,147
f. Explicit margin of safety	1,168	--	--	--	--	--	--	--	--	--	1,168
(Subtotal) Estimated change from implemented projects (TP loading lbs/yr)	-77,149	-26,015	0	-20,063	-12,424	0	-4,713	0	-49,465	-109	-189,938
Loading Changes from Future Projects: *a. Tributary inflows*	-134	-9,746	--	-11,379	-6,114	--	-99	--	-4,310	--	-31,984
b. Agricultural discharges	0	--	--	--	-458	-19	--	--	--	--	-477
c. Restoration	-26,231		--	--	-138	-726	-2,465	--	415	--	-29,145
d. Stormwater	0	--	--	--	-145	--	-150	-13	-185	--	-493
e. Point sources or other treatment options	--	-5,000	--	--	--	--	--	--	--	--	-5,000
f. Explicit margin of safety	--	--	--	--	--	--	--	--	--	--	0
(Subtotal) Estimated change from future projects (TP loading lbs/yr)	-26,365	-14,746	0	-11,379	-6,855	-745	-2,714	-13	-4,080	0	-66,897
Estimated change from *implemented and future projects* (TP loading lbs/yr)	-103,514	-40,761	0	-31,442	-19,279	-745	-7,427	-13	-53,545	-109	-256,835
Estimated change from *growth* (TP loading lbs/yr – 2001–2010)	0	831	240	1,263	3,040	592	2,874	346	2,694	606	12,486
Estimated change from *projects and growth* (TP-loading lbs/yr)	-103,514	-39,930	240	-30,179	-16,239	-153	-4,553	333	-50,851	497	-244,349
Net estimated TP-loading (lbs/yr)	33,937	6,742	717	9,467	19,264	2,451	22,311	2,683	27,030	3,655	128,257
TMDL (Total Maximum Daily Load) (lbs/yr)	35,052	7,056	195	13,230	20,286	521	18,302	2,207	26,901	2,844	126,594
Additional TP load reduction needed	0	0	522	0	0	1,930	4,009	476	129	811	7,877

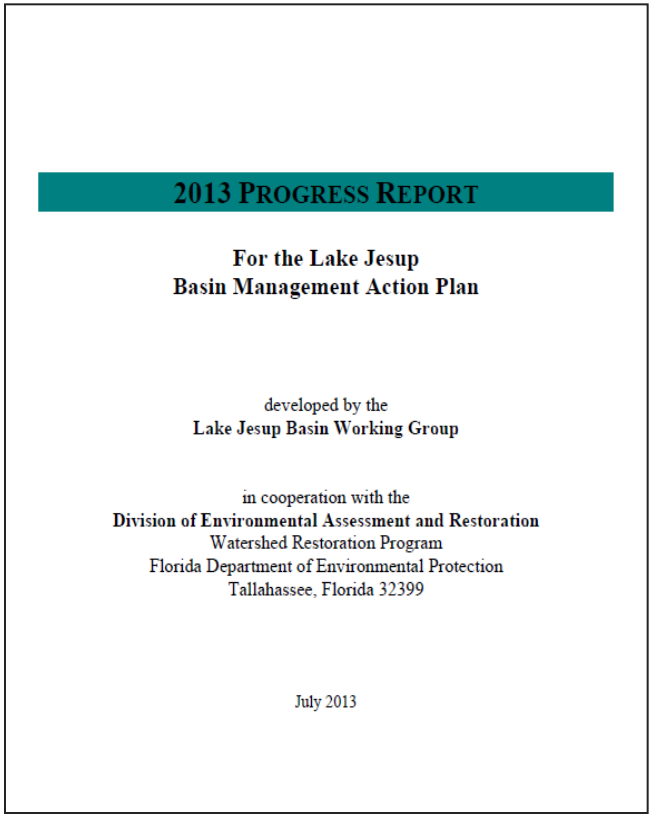
Water quality credit trading rule

Main Trading Scenarios

	BUYER		
SELLER	Wastewater Facility	MS4 (Phase I and II)	Nonpoint Source
Wastewater Facility	Both Permits Revised	Sellers Permit Revised, and MS4 submits affidavit	Sellers Permit Revised, and NPS submits affidavit
Phase I MS4s (Phase II MS4s not allowed under pilot)	Both Permits Revised	Sellers Permit Revised, and MS4 Buyer submits affidavit	Sellers Permit Revised, and NPS submits affidavit
Nonpoint Source	Buyer's Permit Revised to incorporate NPS Control Activity, and buyer fully liable.	Limited to Phase I MS4s as buyer because Buyers Permit must be revised to include NPS Control Activity	Not Allowed

BMAP also identifies a monitoring plan and how progress will be tracked

- BMAP includes a monitoring plan to determine if reductions are being implemented.
- Annual Reporting Forms
- Annual Progress Reports
- BMAPs are to be revisited after 5 years with changes made if necessary.



2013 PROGRESS REPORT

For the Lake Jesup
Basin Management Action Plan

developed by the
Lake Jesup Basin Working Group

in cooperation with the
Division of Environmental Assessment and Restoration
Watershed Restoration Program
Florida Department of Environmental Protection
Tallahassee, Florida 32399

July 2013

BMAP also establishes stakeholders commitments

- Stakeholders often provide letters of commitment or resolutions to FDEP as needed to show they are committed to implementing the projects and activities outline in the BMAP
- Notices of Intent (NOI) are a commitment by agricultural producers

What if BMAP commitments are not implemented?

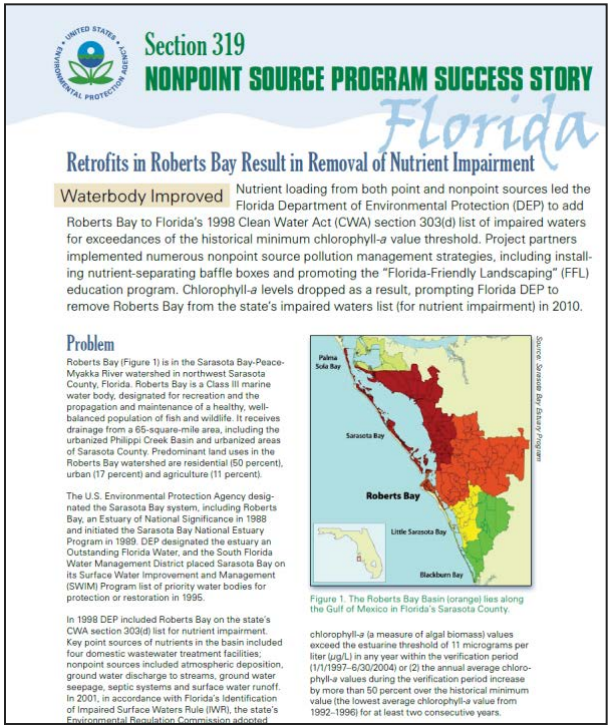
- In general, BMAPs are approved by Secretarial Order and may be enforced directly or through parallel legal authorities.
- Urban point source
  - Renewal of NPDES Phase I (discharge permit) could be challenged.
- Urban non-point source
  - MS4 NPDES Phase II (stormwater discharge permit) could be challenged.
- Agricultural non-point source.
  - The agricultural producer has a legal burden to either enter a Notice-of-Intent or demonstrate no adverse impact through water quality monitoring.

What if improvements in water quality or TMDL targets are not achieved?

- This is somewhat uncharted territory.
- Major questions exist regarding efficacy of certain load reduction practices mainly in non-point sources (both urban and agricultural BMPs).
- Sources from legacy loads (watershed) and internal loads (waterbody) may need refinement.
- Time delay or “lag time” between load reduction efforts and waterbody response are often uncertain and different for each waterbody.
- FDEP will need to address areas of uncertainty and modify TMDL accordingly, BMAP stakeholders will need to address any changes in TMDL.
- There will likely be legal challenges if impaired waterbody is not making at least some progress toward water quality targets – very important for maintain active BMAP stakeholder involvement.

Success stories?

- **Significant project and region related improvements**
  - Everglades Agricultural Area BMP implementation > 50% load reduction
  - Kissimmee River Restoration
  - LID, cluster design and other urban BMPs have shown significant potential to reduce loads.
  - Point source reduction almost guaranteed (although loads associated with reuse of treated wastewater is coming into question.)
- **Some BMAPs showing directionally correct load reductions**.
- **Limited delisting of impaired watersheds.**
  - Roberts Bay



Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Florida

Retrofits in Roberts Bay Result in Removal of Nutrient Impairment

Waterbody Improved

Nutrient loading from both point and nonpoint sources led the Florida Department of Environmental Protection (DEP) to add Roberts Bay to Florida's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for exceedances of the historical minimum chlorophyll-*a* value threshold. Project partners implemented numerous nonpoint source pollution management strategies, including installing nutrient-separating baffle boxes and promoting the "Florida-Friendly Landscaping" (FFL) education program. Chlorophyll-*a* levels dropped as a result, prompting Florida DEP to remove Roberts Bay from the state's impaired waters list (for nutrient impairment) in 2010.

Problem

Roberts Bay (Figure 1) is in the Sarasota Bay-Peace-Myakka River watershed in northwest Sarasota County, Florida. Roberts Bay is a Class III marine water body, designated for recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. It receives drainage from a 65-square-mile area, including the urbanized Philippi Creek Basin and urbanized areas of Sarasota County. Predominant land uses in the Roberts Bay watershed are residential (50 percent), urban (17 percent) and agriculture (11 percent).

The U.S. Environmental Protection Agency designated the Sarasota Bay system, including Roberts Bay, an Estuary of National Significance in 1988 and initiated the Sarasota Bay National Estuary Program in 1989. DEP designated the estuary an Outstanding Florida Water, and the South Florida Water Management District placed Sarasota Bay on its Surface Water Improvement and Management (SWIM) Program list of priority water bodies for protection or restoration in 1995.

In 1998 DEP included Roberts Bay on the state's CWA section 303(d) list for nutrient impairment. Key point sources of nutrients in the basin included four domestic wastewater treatment facilities; nonpoint sources included atmospheric deposition, ground water discharge to streams, ground water seepage, septic systems and surface water runoff. In 2001, in accordance with Florida's Identification of Impaired Surface Waters Rule (IWR), the state's Environmental Regulation Commission adopted

Figure 1. The Roberts Bay Basin (orange) lies along the Gulf of Mexico in Florida's Sarasota County.

chlorophyll-*a* (a measure of algal biomass) values exceed the estuarine threshold of 11 micrograms per liter (µg/L) in any year within the verification period (1/1/1997–6/30/2004) or (2) the annual average chlorophyll-*a* values during the verification period increase by more than 50 percent over the historical minimum value (the lowest average chlorophyll-*a* value from 1992–1996) for at least two consecutive years.

Summary

- Water quality criteria are determined based on designated use and used to determine if a water body is impaired.
- If a waterbody is verified impaired, TMDL is initial step in determining load reductions to address an impaired water.
- BMAP is developed by stakeholders to more explicitly identify the load allocations and develop a plan to achieve targets.
- Specific strategies and formal agreements are made between stakeholders and FDEP as part of BMAP.
- There are project level successes, but significant challenges exist in watershed scale restoration of impaired waterbodies. Maintaining active stakeholder involvement in BMAP process will reduce the probability of legal challenges.

Florida's Numeric Nutrient Criteria

Mark W. Clark

Soil and Water Science Department

University of Florida, Gainesville

In-Service Training October 29, 2013

“Narrative” vs. “Numeric” Nutrient Standard

- State previously used a “narrative” standard to guide management and protection of waters from nutrient pollution
- Rule 2-302.530 FAC
  - **“in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of flora or fauna”**
- Numeric criteria – theoretically provides a “bright line” that more effectively determines the point of designated use “impairment”.



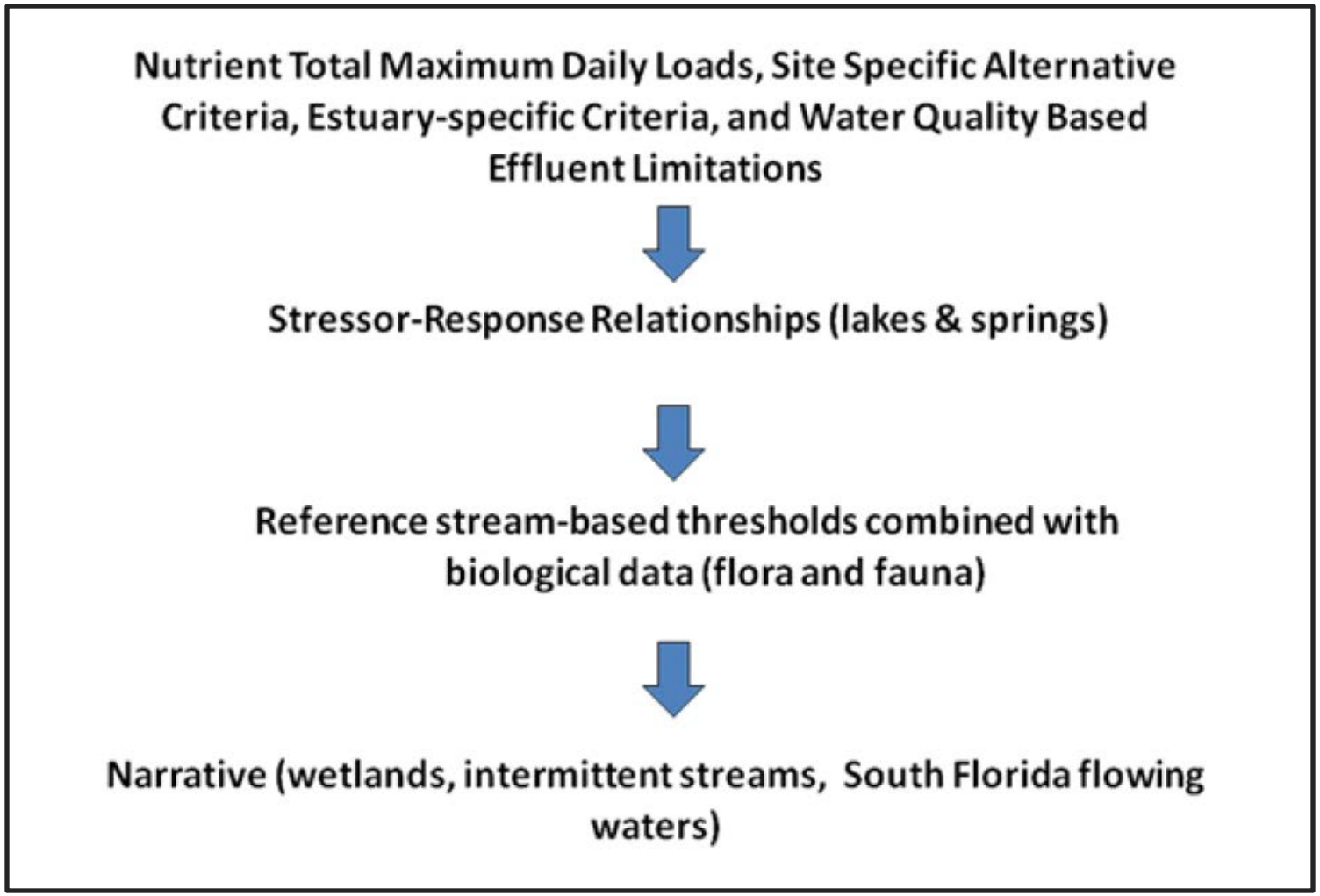
History of Numeric Nutrient Criteria in Florida

- 1998 – EPA initiates nation wide effort to establish more quantitative approach to nutrient standards.
- 2001 - FDEP begins development of NNC and in 2002 enters into an agreement with EPA to establish NNC.
- 2008 - EPA sued by Earthjustice on behalf of several Florida environmental organizations – citing unacceptable delays and argued that EPA was obliged to propose criteria for Florida.
- November,2010 - EPA Administrator signed **Final** "Water Quality Standards for the State of Florida's Lakes and Flowing Waters." (did not include S. Florida flowing waters)

Florida's Alternative Rule for Numeric Nutrient Criteria

- November 10, 2011 - FDEP developed alternative rule for rivers, streams, lakes and to estuaries from Tampa Bay to Biscayne Bay, including the Florida Keys.
- January and February, 2012 - Florida Legislature and Governor approve amendments to chapters 62-302 and 62-303, F.A.C. (numeric nutrient standards) .
- November 30, 2012 - EPA approved FDEP's alternative rule for most inland and coastal water with exception of tidally influenced waters, a non-perennial stream, or an actively maintained conveyance, such as a canal or ditch.
- June 28, 2013, EPA made a revised determination regarding Florida numeric nutrient standards that removed all fresh waters from the previous determination. EPA also filed a Motion to modify the Consent Decree in Federal Court

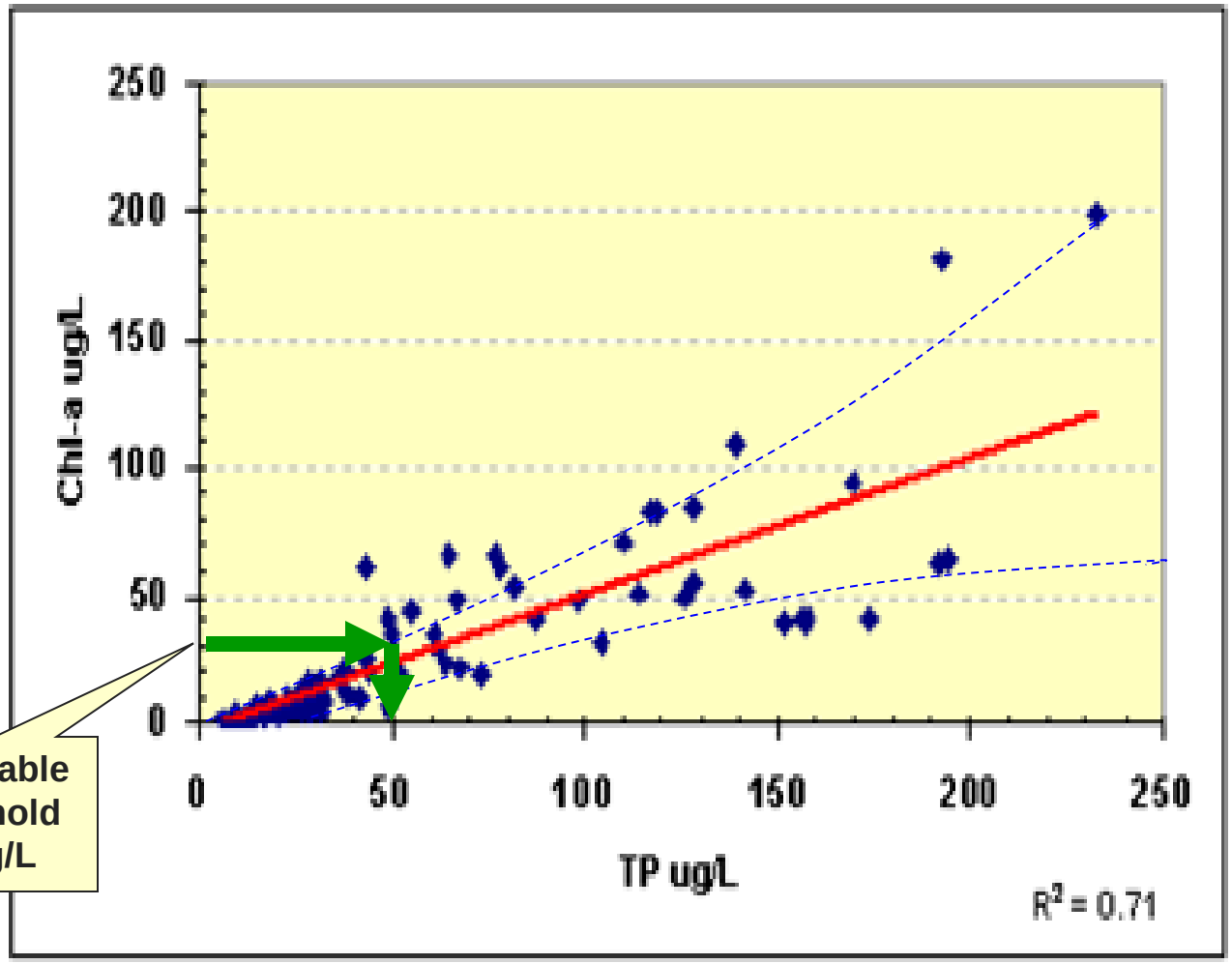
FDEP's Alternative Rule: A Hierarchical Approach to Interpret Narrative Criteria

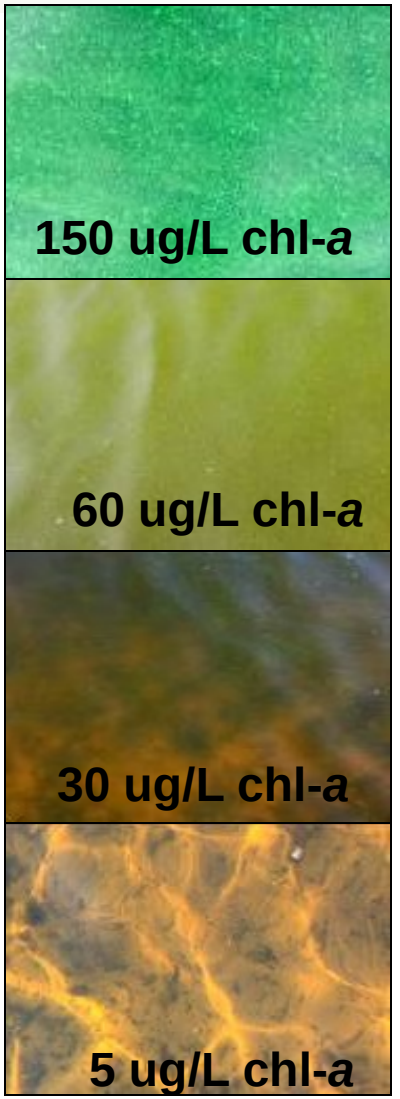


How are Numeric Nutrient Criteria generally developed?

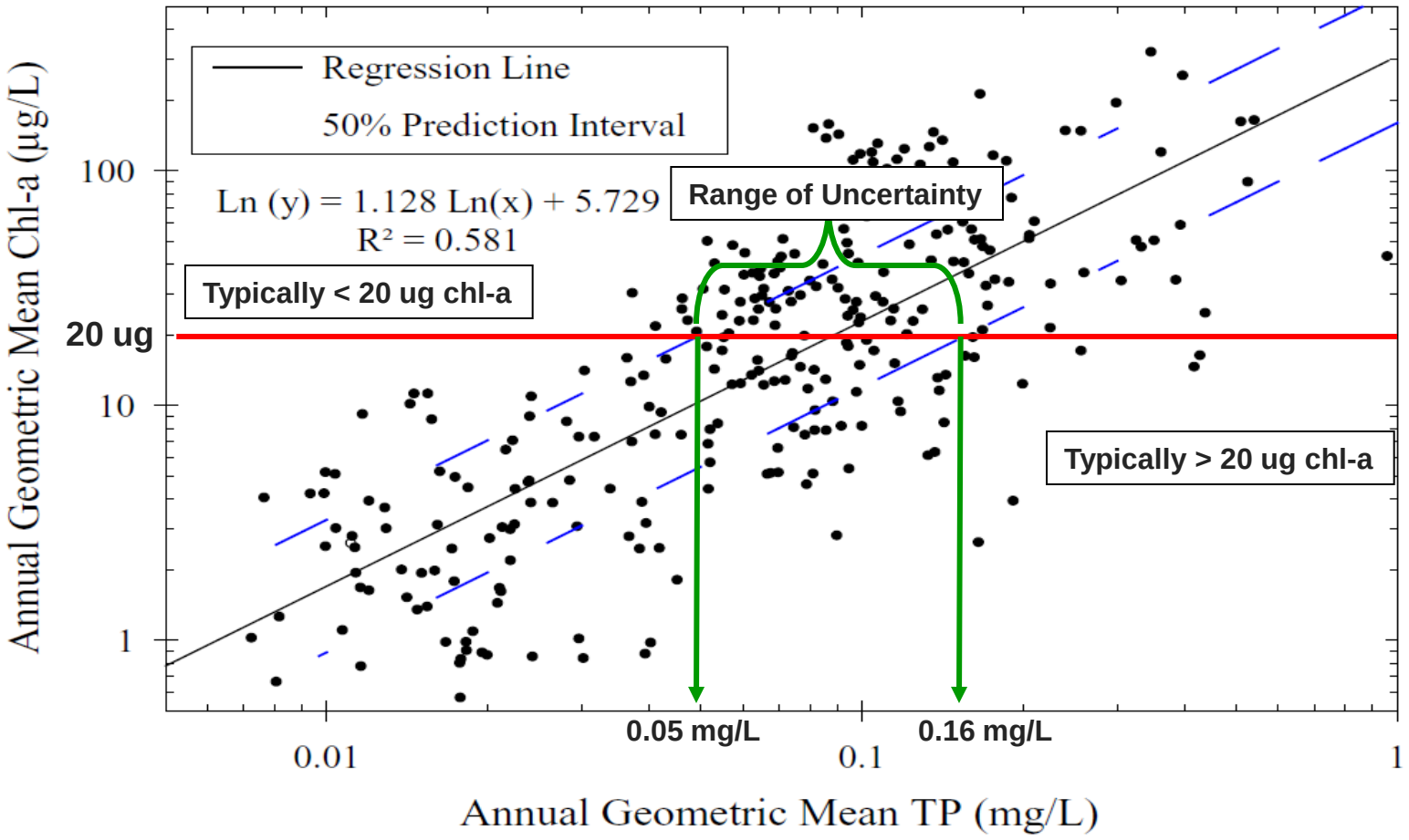
- Two main approaches
  - Stressor-Response relationship
    - Set nutrient level slightly below the point at which ecological response is undesirable (i.e. designated use is impacted).
  - Reference condition
    - Use minimally impacted or known to be healthy benchmark sites and take some upper percentile of the nutrient distribution to establish nutrient threshold.
      - This approach makes the assumption that any increase in nutrient level will cause an undesirable impact.
      - Provides inherent protection of downstream systems.

Stressor > Response Relationship (good fit)





Determination of Numeric Nutrient Criteria for Lakes



Lake Numeric Nutrient Criteria

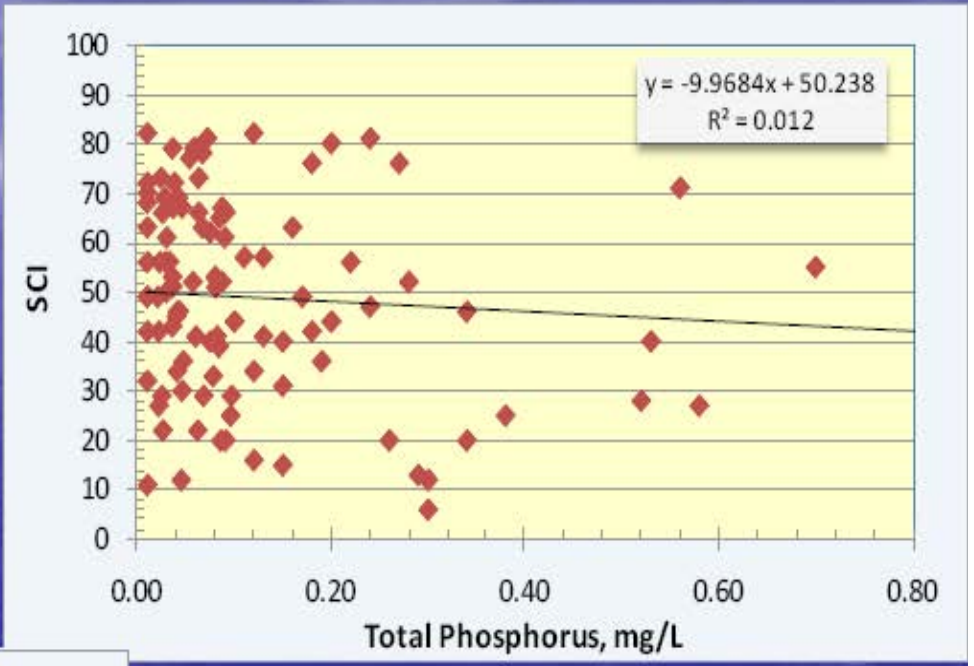
Long Term Geometric Mean Lake Color and Alkalinity	Annual Geometric Mean Chlorophyll *a*	Minimum calculated numeric interpretation		Maximum calculated numeric interpretation	
		Annual Geometric Mean Total Phosphorus	Annual Geometric Mean Total Nitrogen	Annual Geometric Mean Total Phosphorus	Annual Geometric 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**

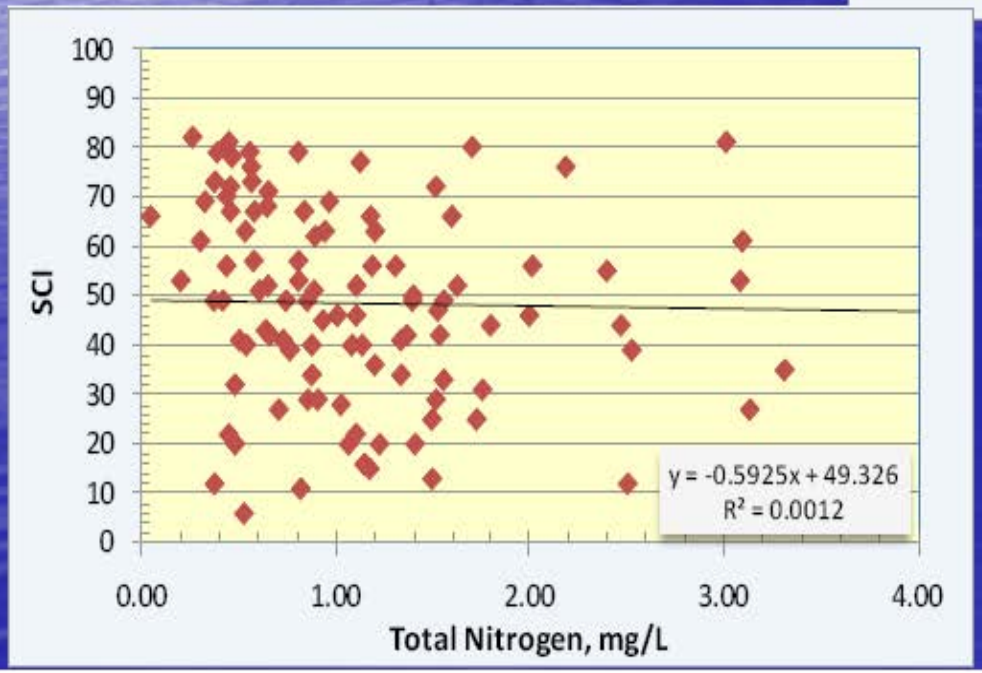
[1] For lakes with color > 40 PCU in the West Central Nutrient Watershed Region, the maximum TP limit is 0.49 mg/L, which is the TP streams threshold for the region.

Criteria based on strong stressor response relationship between TN or TP concentration and algae (chlorophyll-a)

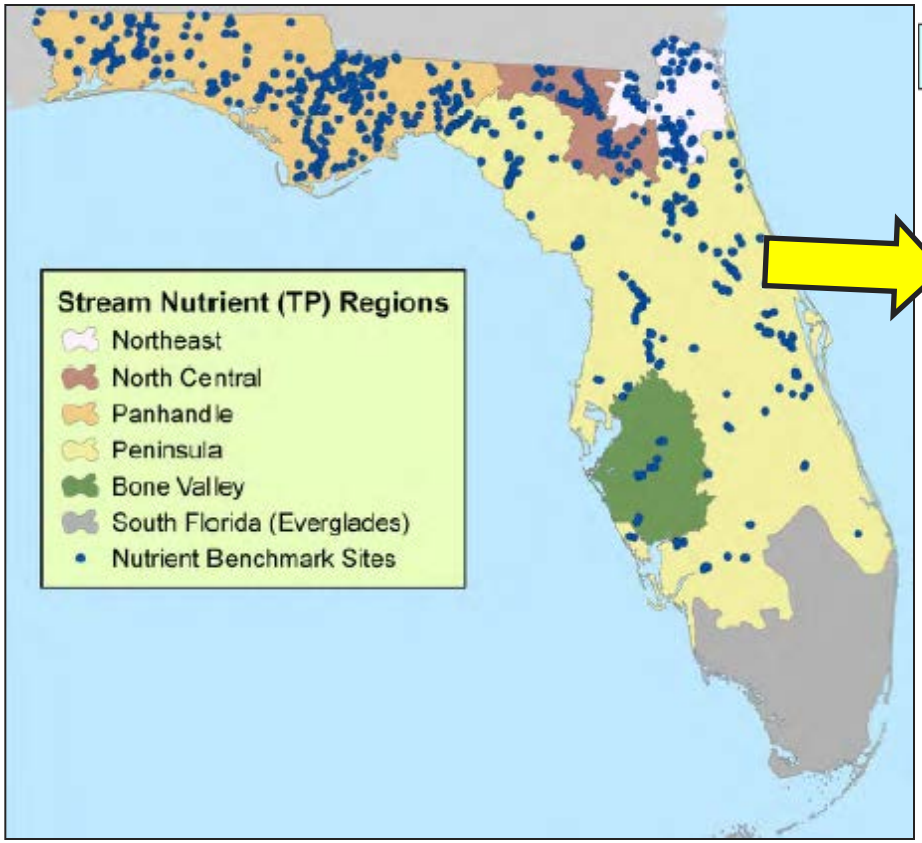
Biological response (Stream Condition Index) vs. Nutrients

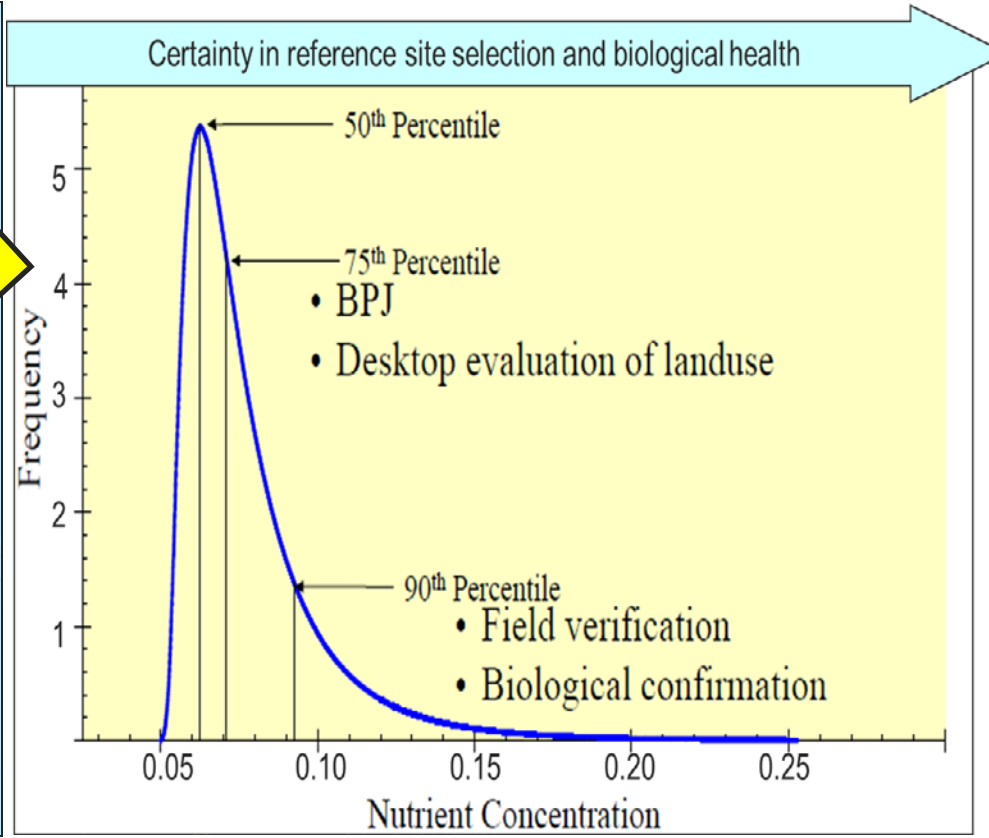
(poor/no fit)



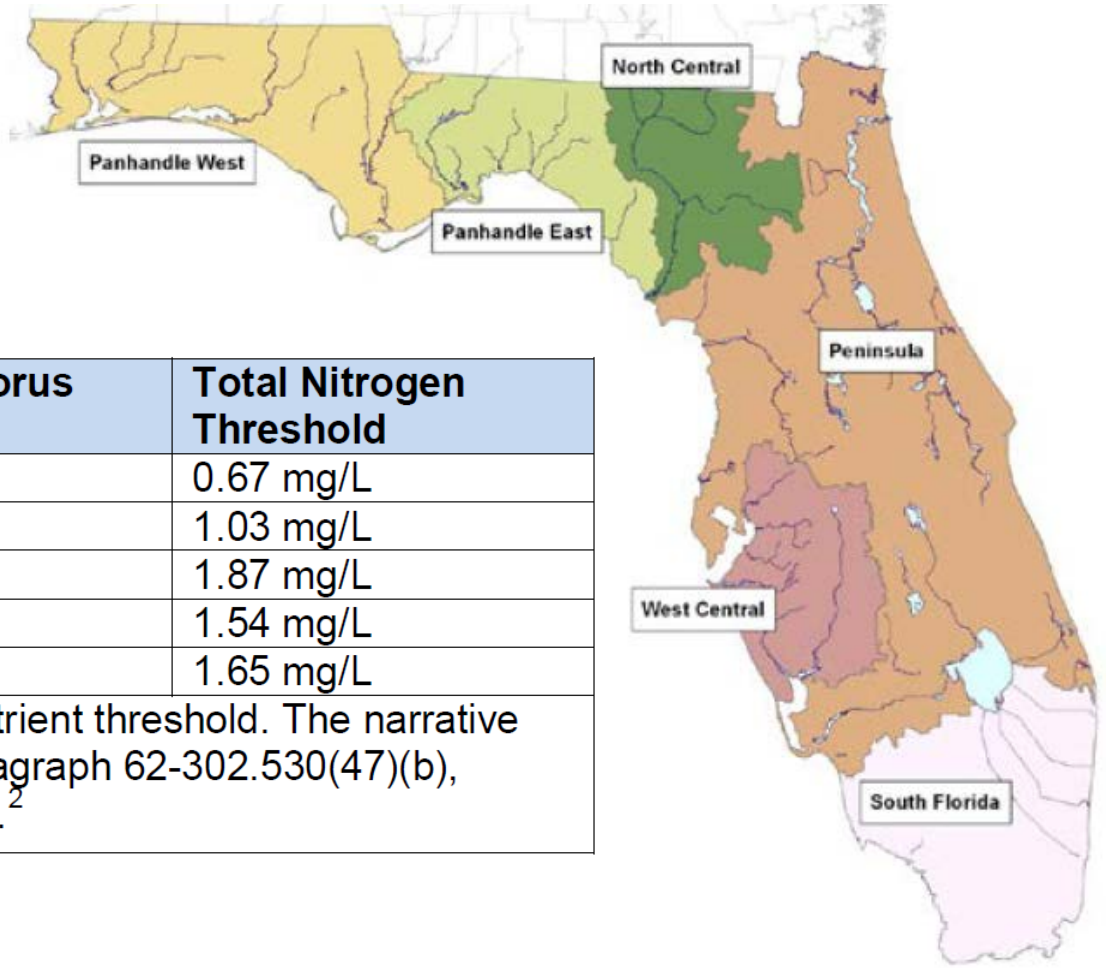


Distribution of Stream Benchmark Sites





Stream Numeric Nutrient Criteria



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.[2]	

Based on reference stream approach

Stream Numeric Nutrient Criteria

- The NNC shall be interpreted as being achieved in a stream segment if:
  - *Chlorophyll-a levels, algal mats or blooms, nuisance macropyte 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 (SCI) performed at representative locations and times is 40 or higher with neither of the two most recent SCI scores less than 35, OR*
  - *The regional nutrient thresholds are not exceeded more than once in a three year period.*
- This approach provides a biological confirmation of nutrient impairment.

Spring Numeric Nutrient Criteria

- Nitrate-Nitrite Criterion
  - Not to exceed an annual geometric mean of 0.35 mg/L more than once in any three consecutive calendar year period.

Criterion based on stressor response relationships between Nitrate+nitrite-N concentration and algal growth in mesocosm studies, in-situ biomass relationships and periphytometer studies.

Estuarine Nutrient Criteria

- ***A reference period approach**, where data from a period within a waterbody or an individual segment of the waterbody shown to be healthy were used to develop criteria;*
- ***A reference site approach**, where a data from a nearby and functionally similar healthy estuarine area were used to develop criteria for a segment with data limitations;*
- ***A combination of the reference site and reference period approach**, where data from an adjacent system was selected during periods that achieved environmental targets (e.g., depth-to-seagrass endpoints), were used to develop criteria for a nearby segment; or*
- ***A modeling approach**, where mechanistic models determined criteria values associated with healthy conditions (model targets were sometimes based on reference periods).*

Estuarine Criteria

Estuary	Total Phosphorus	Total Nitrogen	Chlorophyll *a*
(q) Loxahatchee River Estuary	For estuary segments with criteria expressed as annual geometric means (AGM), the values shall not be exceeded more than once in a three year period. For all other estuary segments, the criteria shall not be exceeded in more than 10 percent of the measurements.		
1. Lower Loxahatchee	0.032 mg/L as AGM	0.63 mg/L as AGM	1.8 µg/L as AGM
2. Middle Loxahatchee	0.030 mg/L as AGM	0.80 mg/L as AGM	4.0 µg/L as AGM
3. Upper Loxahatchee	0.075 mg/L as AGM	1.26 mg/L as AGM	5.5 µg/L as AGM
(r) Lake Worth Lagoon	For estuary segments with criteria expressed as annual geometric means (AGM), the values shall not be exceeded more than once in a three year period. For all other estuary segments, the criteria shall not be exceeded in more than 10 percent of the measurements.		
1. Northern Lake Worth Lagoon	0.044 mg/L as AGM	0.54 mg/L as AGM	2.9 µg/L as AGM
2. Central Lake Worth Lagoon	0.049 mg/L as AGM	0.66 mg/L as AGM	10.2 µg/L
3. Southern Lake Worth Lagoon	0.050 mg/L as AGM	0.59 mg/L as AGM	5.7 µg/L as AGM
(s) Halifax River Estuary	For estuary segments with criteria expressed as annual geometric means (AGM), the values shall not be exceeded more than once in a three year period.		
Lower Halifax River	0.142 mg/L as AGM	0.72 mg/L as AGM	6.2 µg/L as AGM

The concentration-based estuary interpretations are open water, area-wide averages.

Coastal Waters Criteria

- **Criteria for chlorophyll-*a* in open ocean coastal waters, derived from satellite remote sensing techniques**, are provided in the table below. In each coastal segment specified in the Map of Florida Coastal Segments, dated May 13, 2013, which is incorporated by reference herein, the Annual Geometric Mean remotely sensed chlorophyll *a* value, calculated excluding *Karenia brevis* blooms (>50,000 cells/L), shall not be exceeded more than once in a three year period

Coastal Segment	Annual Geometric Mean Remotely Sensed Chlorophyll *a*	MODIS Standardization Factor	MERIS Standardization Factor
1	2.45	0.54	-0.71
2	2.65	0.99	-0.07
3	1.48	0.41	-0.22
4	1.20	0.26	-0.30
5	1.09	0.15	-0.28
6	1.07	0.29	-0.01
7	1.17	0.33	-0.02

Site Specific Alternative Criteria (SSAC)

- Site Specific Alternative Criteria are a means by which a confirmed outlier within a population can have an alternative nutrient criteria established.
- Addresses naturally eutrophic systems, upper 10th percentile, etc.
- SSACs can be implemented at different scales, does not have to be an individual water body.
- Can be more or less restrictive than existing Numeric Nutrient Criteria.
- Guidelines to develop SSAC have been established.

SSAC Process

- Final Rule allows any entity to submit a request for site-specific alternative criteria (SSAC) with supporting rationale based on:
  - Replicating approaches used in the rule with new data or applying to a smaller subset of waters, or
  - Conducting biological, chemical, and physical assessments, or
  - Using another scientifically defensible approach protective of the designated use

Summary

- Numeric Nutrient Criteria have now been established for, and by, the State of Florida and are a hierarchical quantitative interpretation of the existing narrative nutrient criteria.
- Depending on the type of waterbody, different scientifically based numeric values were established.
- Site Specific Alternative Criteria (SSAC) are used to deal with waterbodies that naturally have higher or lower nutrient concentrations so that the general nutrient criteria are not over or under protective.

FDEP Nutrient Enrichment Conceptual Model