Shifting Tides: Florida's Changing Water Quality Regulations

Statewide Stormwater Rule &
EPA Numeric Nutrient Criteria

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Outline - Statewide Stormwater Rule

- Who's Responsible for Urban Stormwater?
- History of Florida Stormwater Design Criteria
- Are Present Design Criteria Meeting Targets for Stormwater Pollution?
- Florida's Proposed Statewide Stormwater Treatment Rule
- Best Management Practices (BMPs) in the Stormwater Quality Applicant's Handbook

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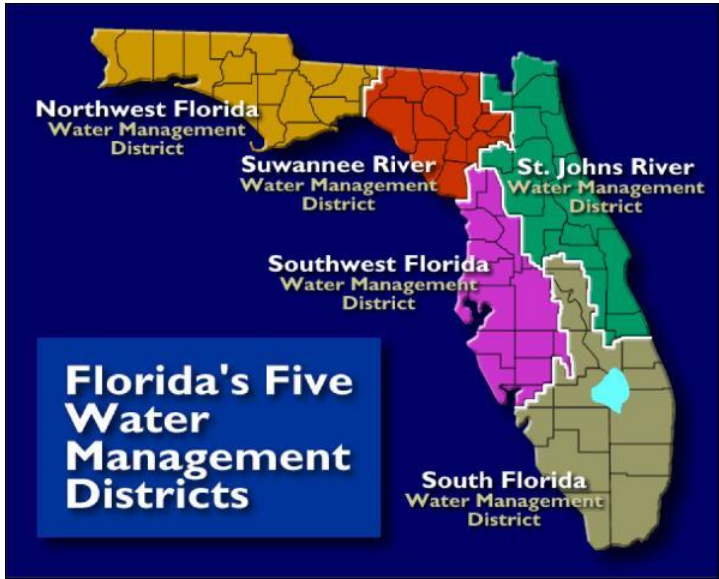
Who's Responsible for Managing Urban Stormwater?

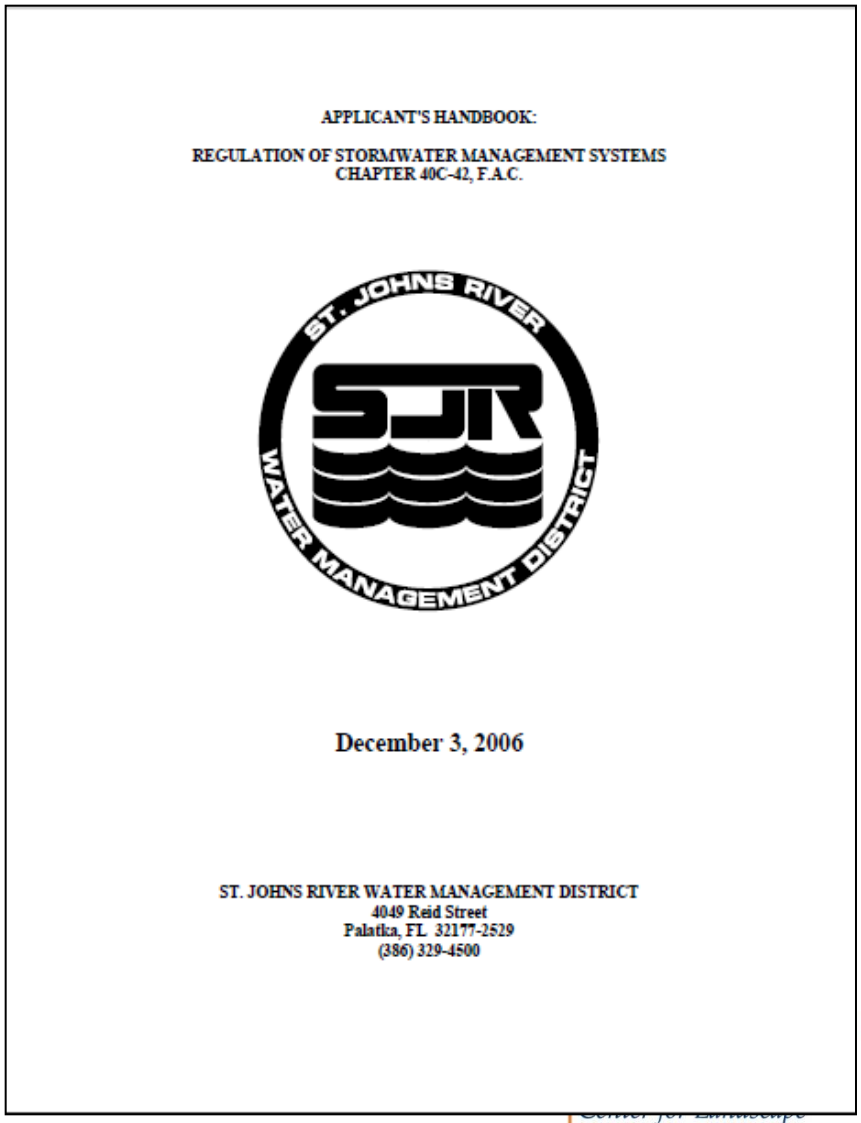
- Florida Department of Environmental Protection (FDEP) administers the state's stormwater management plan (Florida Water Resources Act of 1972).
- FDEP has delegated this authority to four of the five Water Management Districts (WMDs).
- Federal National Pollutant Discharge Elimination System (NPDES) permits required for Municipal Separate Stormwater Systems (MS4s) in urbanized areas.



Presumptive Design Criteria

- WMD Governing Boards have adopted criteria which provide a presumption for meeting the requirements for issuance.

- If specified stormwater design criteria are met, the stormwater system is presumed to be protective of the receiving water body.



APPLICANT'S HANDBOOK:

REGULATION OF STORMWATER MANAGEMENT SYSTEMS
CHAPTER 40C-42, F.A.C.

December 3, 2006

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
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Palatka, FL 32177-2529
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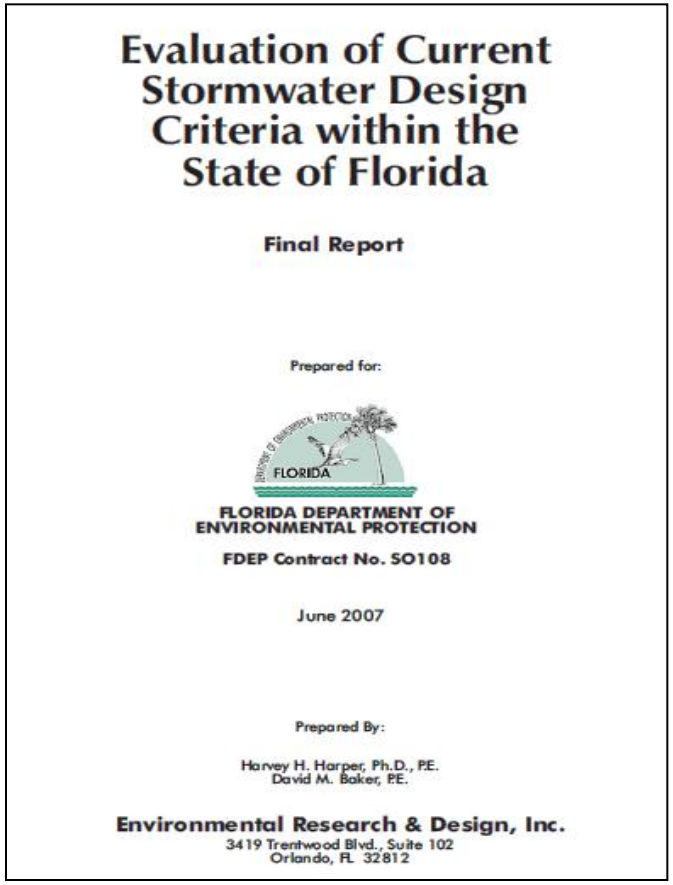
History of Florida Stormwater Design Criteria

- Historically developed to remove 80% of Total Suspended Solids (TSS)
- Or, 95% for Outstanding Florida Waters (OFWs)

- Same level of reduction of other pollutants (including nutrients) presumed…

Are Present Design Criteria Meeting Targets for Stormwater Pollution?

- Research data has shown considerable variability in the pollutant removal effectiveness of commonly systems
- Report provides:
  - Comprehensive review of available performance efficacy, and
  - Analysis of design criteria and its ability to meet target treatment levels.



Evaluation of Current Stormwater Design Criteria within the State of Florida

Final Report

Prepared for:

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

FDEP Contract No. SO108

June 2007

Prepared By:

Harvey H. Harper, Ph.D., P.E.
David M. Baker, P.E.

Environmental Research & Design, Inc.
3419 Trentwood Blvd., Suite 102
Orlando, FL 32812

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Harper and Baker 2007

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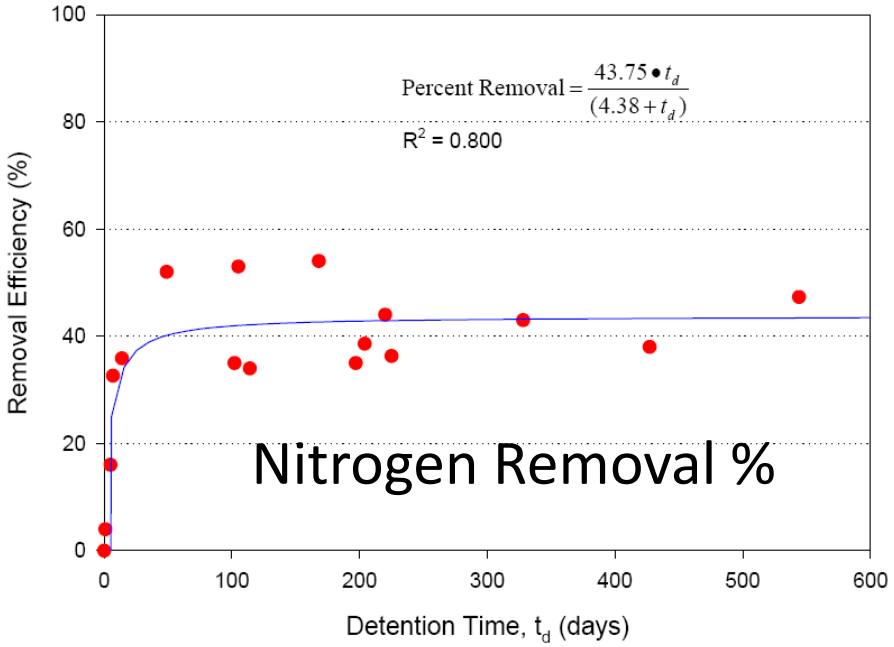
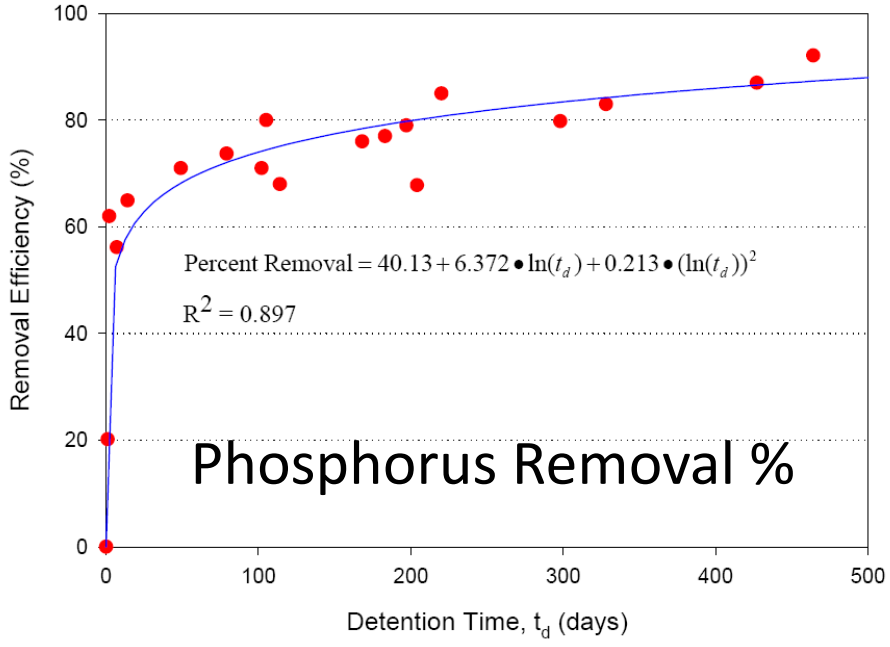
Example Findings of Harper and Baker 2007

"…existing stormwater design criteria fail to consistently meet either the 80% or 95% target goals outlined in Chapter 62-40"

Wet Detention Ponds





Recommendations from Harper and Baker 2007

- Wet Detention Basins
  - Can achieve 80% removal criteria for total phosphorus
  - If 80% removal is necessary for total nitrogen, must be used as part of a treatment train approach
  - Not capable of providing a 95% pollutant removal efficiency for either total nitrogen or total phosphorus. Therefore, 95% removal for discharges to OFWs must use a treatment train approach with wet detention used in series with other techniques

Florida's Proposed Statewide Stormwater Treatment Rule

- Intended to address shortcomings in current design criteria noted by Harper and Baker 2007
- Focused on Total Nitrogen and Total Phosphorus removal (removal of other pollutants presumed sufficient)
- Emphasis on "Treatment Train" approach
- Encourages non-structural BMPs and Low Impact Designs
- Expected adoption – **????**

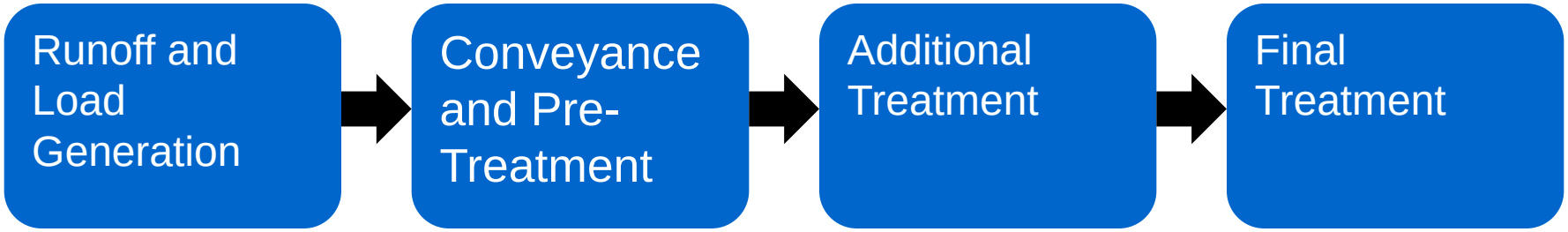
- http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater/

Design Criteria BMPs Currently Contained in the Stormwater Quality Applicant's Handbook

- Retention basins
- Wet detention basins
- Exfiltration trenches
- Underground storage and retention
- Swales (with or without swale blocks)
- Stormwater harvesting
- Vegetated natural buffers
- Managed aquatic plant systems (MAPS) (littoral zones or floating wetlands)
- Pervious pavement
- Green roofs
- Stormwater wetlands
- Low Impact Design (LID) BMPs
- Chemical treatment
- Florida-Friendly Landscaping (FFL)

http://publicfiles.dep.state.fl.us/dwrm/stormwater/stormwater_rule_development/docs/ah_rule_draft_031710.pdf

BMP Treatment Train Example



- Disconnected Impervious Areas
- FFL

- Pervious Pavement
- Swales
- Vegetated Buffers

- Wet Detention
- Dry Detention

- MAPS
- Chemical Treatment
- Stormwater Harvesting

Each step in the treatment train provides a % Reduction of Stormwater Volume & Load and/or Treatment Efficiency based on field-collected data

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Florida's Proposed Statewide Stormwater Treatment Rule

- Still a draft, subject to change
- We are still using the old design criteria, but the draft rule gives an idea of what will come
- Does not apply to agriculture
- Expected to be more dynamic – updated as more information is available

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More Information on the Proposed Statewide Stormwater Rule

- Harper and Baker 2007:
  - http://www.dep.state.fl.us/water/nonpoint/docs/nonpoint/SW_TreatmentReportFinal_71907.pdf
- FDEP Stormwater Rule page:
  - http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater/index.htm
- Applicant's Handbook:
  - http://publicfiles.dep.state.fl.us/dwrm/stormwater/stormwater_rule_development/docs/ah_rule_draft_031710.pdf

Outline - Numeric Nutrient Criteria (NNC) for Florida's Waters

- What are NNC?
- Narrative vs. Numeric Criteria – Which is better?
- History of criteria in Florida
- Site-Specific Alternative Criteria (SSAC) and existing Total Maximum Daily Loads (TMDLs)
- Cost estimates associated with NNC

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What are NNC?

- Specific concentration limit of a nutrient (nitrogen or phosphorus) that a water body cannot exceed within a certain time period

- Differs from a Total Maximum Daily Load (TMDL)
  - NNC = ***Concentration*** (mg/L or parts per million) of a nutrient allowed ***within*** a water body
  - TMDL = ***Load*** (kg or lbs) of a nutrient that can ***enter*** a water body and still meet water quality standards

- Nutrient criteria are not new! NNC are just different.

What happens when a water body does not meet the NNC?

- If the NNC concentration is exceeded, the water body is considered to be impaired

- Corrective action required, unless further study determines that the water body is indeed healthy (Site-Specific Alternative Criteria, SSAC)

Who might be affected by NNC?

- Point sources (NPDES permit holders):
  - Industries discharging to lakes, streams, rivers
  - Wastewater treatment facilities
  - Stormwater systems
- Nonpoint sources:
  - When pollutant reductions are needed
  - implementation of Basin Management Action Plans, BMAPs
    - Agriculture, Urban, Residential, etc.

Narrative Criteria vs. Numeric Criteria

- **Narrative**: “in no case shall nutrient concentrations of body of water be altered so as to cause an imbalance in natural populations of flora or fauna.”

- **Numeric**: "To protect rivers and streams in the western Florida panhandle, the yearly average total nitrogen concentration in the river or stream shall not surpass 0.67 mg/L more than once in a 3-year period." Total nitrogen shall not exceed

Narrative Criteria vs. Numeric Criteria

- Criticism of Narrative Criteria:
  - Too vague
  - Reactive: Tendency to recognize problem only after it has occurred
- Criticism of Numeric Criteria:
  - Single value for large areas/classes of water bodies is too broad
  - Healthy water bodies may be classified as “impaired” and vice versa
- Benefit of Numeric Criteria:
  - Proactive: Eliminates need for case-by-case assessment for a water body to be listed as impaired

Nutrient Criteria - History

- Long standing Narrative: 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
- 1998: EPA issued a strategy encouraging all states to adopt numeric standards
- 2004: Florida Department of Environmental Protection (FDEP) submits draft NNC development plan to EPA

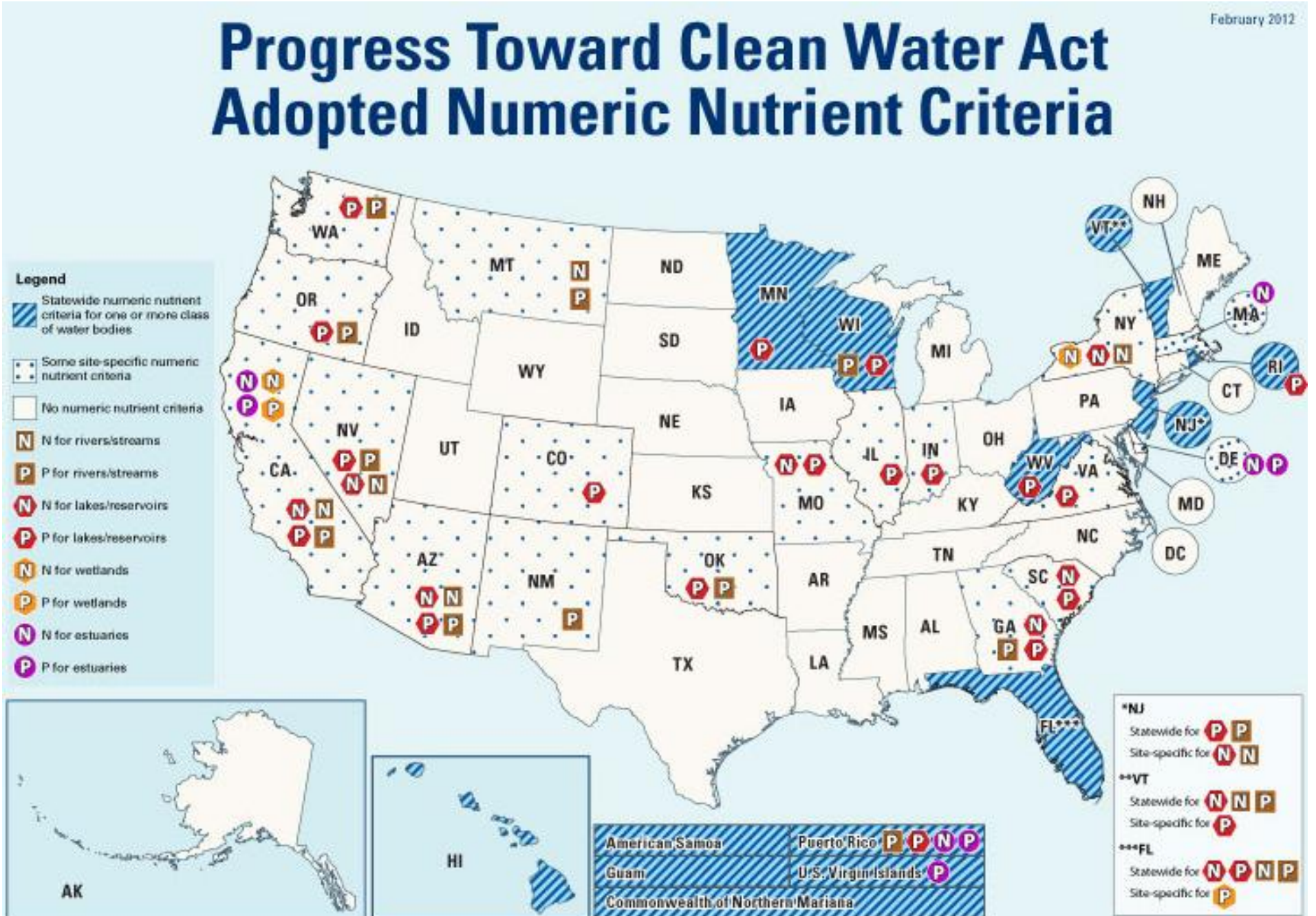
Nutrient Criteria - History

- 2009: EPA formally determines that Florida's narrative criteria is insufficient to meet requirements of Clean Water Act
- 2009: EPA enters consent decree to develop NNC for Florida waters
- 2010: EPA promulgates NNC for Lakes and Flowing Waters (effective July, 2012)
- 2011: FDEP petitions EPA to repeal NNC

Nutrient Criteria - History

- 2011: EPA neither grants or denies petition by FDEP, but is prepared to withdraw the federal standards if FDEP adopts, and EPA approves, its own

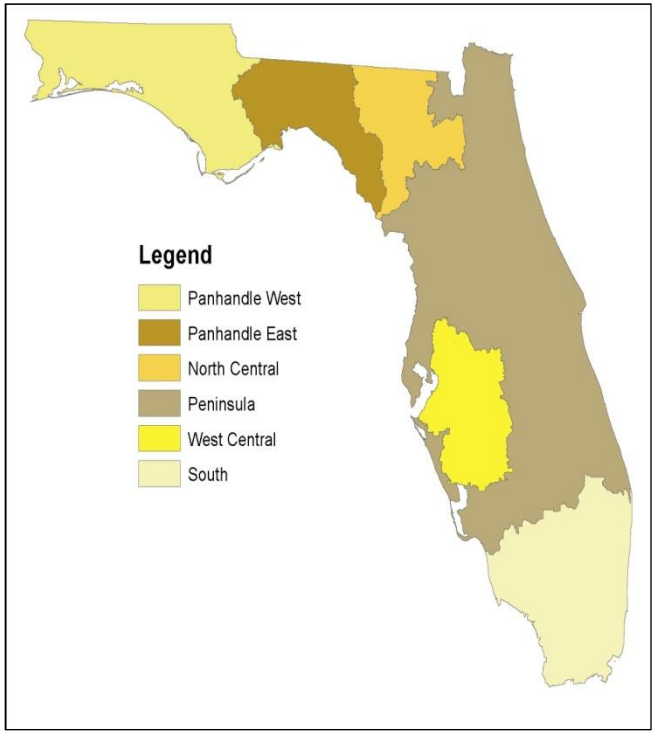
http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/progress.cfm



NNC for Rivers/Streams

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

Regions defined based on "natural" nutrient concentrations



NNC for Inland Waters for South Florida expected May, 2012. with final rulemaking in November 2012

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NNC for Lakes*

Lake Color and Alkalinity	Chlorophyll-a (mg/L)	TN (mg/L)	TP (mg/L)
Colored Lakes	**0.020**	**1.27** [1.27-2.23]	**0.05** [0.05-0.16]
Clear Lakes, High Alkalinity	**0.020**	**1.05** [1.05-1.91]	**0.03** [0.03-0.09]
Clear Lakes, Low Alkalinity	**0.006**	**0.51** [0.51-0.93]	**0.01** [0.01-0.03]

* All concentrations are annual geometric means not to be surpassed more than once in a three-year period. Bracketed numbers reflect the range in which Florida can adjust the TN and TP criteria when data shows the lake is meeting the relevant Chl *a* criterion.

Rule for Springs

- Establishes nitrate-nitrite criterion of 0.35 mg/L as an annual geometric mean, not to be exceeded more than once in a three-year period
- Based on experimental laboratory data and field evaluations that document the response of nuisance algae to nitrate-nitrite concentrations

NNC for Estuaries, Coastal Waters, and Flowing Waters in South Florida

- Expected proposed rule May 2012
- Final rule November 2012
- Several NNCs for specific estuaries have been proposed and submitted to EPA

http://www.dep.state.fl.us/water/wqssp/nutrients/estuarine.htm

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Site-Specific Alternative Criteria (SSAC)

- Rule allows **any** entity to submit a request for SSAC to EPA, based on:
  - Replicating approaches used in the rule with new data or applying to a smaller subsets of waters, or
  - Conducting biological, chemical, and physical assessments, or
  - Using another scientifically defensible approach protective of the designated use
- After notice and comment, EPA may approve the SSAC for purposes of the Federal Rule

Site-Specific Alternative Criteria (SSAC)

- SSAC do not change the designated use of a water body
- SSAC may apply to:
  - A single water body
  - A single water body segment
  - A group of water bodies with similar characteristics
  - A group of water bodies in a watershed.
- SSAC can be **more** or **less** stringent than the NNC

SSAC and Total Maximum Daily Loads (TMDLs)

- FDEP has proposed to use existing TMDLs as site-specific criteria
- EPA finds it reasonable to presume existing TMDLs will result in discharge limits that meet the NNC – not finalized

Implementation of NNC

- EPA has the responsibility to develop (or ensure the development) of NNC
- FDEP had been delegated the responsibility of implementing NNC
  - Likely to follow existing programs (e.g. TMDLs)
  - Processes likely to be the same

NNC Economic Analyses

- EPA estimates annual costs of $135.5 to $206.1 million.
- Cardno ENTRIX estimates a range of costs between $298 million to $4.7 billion.
  - This wide range is due to the uncertainty over how the rule would be implemented.
- National Academy of Sciences review (Feb 2012) concluded costs likely to exceed EPA estimates

Outstanding Issues with NNC

- Will NNC be proactive in identifying potential problems while being receptive to SSAC?
- Water bodies with existing TMDLs?
- Result of court challenges?

What will Florida's NNC look like?

- It depends!
- Agreement between FDEP and EPA
- List water bodies it a "study list" at first?
- Debate on Lake classification?
- Take home: **NNC is here to stay**

Further Information

- EPA page:
  - http://water.epa.gov/lawsregs/rulesregs/florida_index.cfm
- FDEP page:
  - http://www.dep.state.fl.us/water/wqssp/nutrients/
- National Academy review:
  - http://dels.nas.edu/Report/EPA-Economic-Analysis/13376