

**STATE OF FLORIDA**  
**NUMERIC NUTRIENT CRITERIA**  
**DEVELOPMENT PLAN**

**September 2007**

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**Water Resource Division**  
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# STATE OF FLORIDA DRAFT NUMERIC NUTRIENT CRITERIA DEVELOPMENT PLAN

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## Criteria Development Process

### *Conceptual Approach*

The State of Florida intends to adopt quantitative nutrient water quality standards to facilitate the assessment of designated use attainment for its waters and to provide a means to protect state waters from the adverse effects of nutrient over-enrichment. To that end, the Florida Department of Environmental Protection (DEP) plans to develop numeric criteria for causal variables (phosphorus and nitrogen) and/or response variables (potentially chlorophyll *a*) recognizing the hydrologic (waterbody type) and spatial (location within Florida) variability of the nutrient levels of the state's waters and the variability in the response to nutrient concentrations. It is DEP's intent to establish numeric nutrient criteria that are protective of natural populations of aquatic flora and fauna.

To that end, DEP has assigned a dedicated staff member to coordinate the development of numeric nutrient criteria. This nutrient coordinator is responsible for communication with EPA on the development of nutrient criteria, and also ensuring that the process is properly integrated with other DEP program areas.

Review of a memorandum from the Director of Environmental Protection Agency's Office of Science and Technology, Geoff Grubbs (2001) indicates that states will be allowed the flexibility to develop and adopt nutrient criteria other than those currently proposed by EPA for waterbody types for Level III Nutrient Ecoregions (EPA 1998) (Figure 1 and Table 1). As the proposed criteria (EPA 2000a, b, c, d, e) do not fully reflect localized conditions or specific waterbody designated uses, DEP proposes to undertake activities to formulate criteria for lakes, streams, estuaries and wetlands within the state, based upon subregional data.

Development of criteria for these subregions will be prioritized based on Florida's watershed program needs and the availability and order of EPA guidance documents. The regions for these criteria will be based initially on the ecoregions delineated in the early 1990s as part of Florida's biocriteria development efforts for streams and lakes. Those efforts yielded thirteen (13) level IV subecoregions (Griffith et al., 1994) for wadeable streams (Figure 2) and forty-seven (47) level IV subecoregions (Griffith et al., 1997) for lakes (Figure 3). It is anticipated that some level of aggregation of these ecoregions may be necessary to make these regions suitable for use in nutrient criteria development.

DEP has continued to utilize the state's extensive water quality data resources (Florida STORET, DEP LIMS, DEP IWR/TMDL database, etc.) to determine appropriate levels of nutrients in different Florida's ecoregions. DEP intends to analyze the distribution and frequency of the sample points, along with the locations and intensity of sampling efforts planned as part of Florida's watershed management approach (as described below) to determine potential data gaps. Additional efforts will be focused on acquiring data to fill these voids through a three-pronged approach: entry/upload of existing sample data to Florida STORET; acquisition of third

party (e.g., local and county government, universities) nutrient data; and targeted sampling efforts to address still remaining needs.

Technical Advisory Committee (TAC) discussions during 2003 helped DEP staff identify potential data gaps. In response to these and other data needs, DEP initiated an intensive one year statewide dissolved oxygen (DO) and nutrient monitoring program in March of 2005 targeted at sampling reference (minimally disturbed) conditions. This study was designed to provide the data necessary to supplement existing water quality (STORET) and biological (SBIO) data sources, with the objective of characterizing the naturally-occurring nutrient levels for Florida's diverse streams and lakes. Additionally, biological data collected during this study will be used to establish new bioassessment methods (e.g., phytoplankton and periphyton indices). As an ongoing part of the watershed approach and nutrient criteria refinement process, DEP staff may complete additional monitoring and water quality assessments at the watershed/ecoregion level.

In 1999 DEP's Division of Water Resource Management initiated implementation of a watershed approach patterned after EPA guidance (EPA 1991, 1995), including prioritization of waterbodies for TMDL development. DEP plans to draw upon lessons learned and knowledge gained through these processes to prioritize development of numeric nutrient standards. Additionally, the DEP managed five external projects, completed between 2001 and 2003, that focused upon specific approaches outlined in EPA nutrient guidance documents (Gibson et al., 2000, Buck et al., 2000). The idea was to see if these approaches would be feasible on a regional scale. These projects included:

1. Paleolimnological characterization of pre-disturbance water quality in two Florida lake regions.
2. Sedimented algal pigment profiles in the Florida paleolimnological study lakes.
3. Development of stream diatom population indices for Florida streams.
4. Comparison of nutrient criteria approaches for Florida lakes with recommendations for lake TN, TP, Chlorophyll *a*, and Secchi depth criteria.
5. Another paleolimnological study with further resolution on the lakes in studies 1 and 2 above.

It was determined that some of these approaches, while excellent for a specific waterbody, were too time and cost intensive for a subregional approach. However, the above efforts will provide information and insight into both causal and response aspects of waterbody nutrient status at both site specific and ecoregional levels. DEP also anticipates the possibility of applying for funding on additional projects during the next three years.

While DEP plans to develop nutrient criteria that would be applicable to specific regions, the conceptual approach outlined within this document also incorporates the state's responsibilities to address nutrient impairment through the development of TMDLs or Pollutant Load Reduction Goals (PLRGs) as described in state laws and rules, which serve to develop more site-specific nutrient targets that could supersede the regional criteria. Within this context, DEP has developed and received approval from EPA Region IV for the Lake Okeechobee phosphorus TMDL, which established the phosphorus concentration that would address algal blooms within

that system. Similarly, the Tampa Bay Estuary Program has adopted chlorophyll a targets for portions of Tampa Bay that were specifically designed to protect seagrass communities within the bay. The Tampa Bay Estuary Program has also established a protocol that considers the magnitude frequency, and duration in changes to algal biomass.

It should be noted that DEP is exploring development of numeric nutrient criteria for adoption in Chapter 62-302 as water quality criteria, and incorporation of the criteria into the Impaired Waters Rule (Chapter 62-303, Florida Administrative Code (F.A.C.)), which establishes the State's methodology to identify and verify impaired waters (waters not meeting applicable water quality standards). As such, the criteria could serve to both protect healthy well-balanced natural populations of flora and fauna from the effects of excess nutrient enrichment and help identify waters impaired by nutrients.

### *Use of a Technical Advisory Committee*

To assist DEP with the development of numeric nutrient criteria, DEP convened a Technical Advisory Committee (TAC) of individuals with expertise in areas related specifically to water quality and biological community response to nutrients in Florida. DEP assembled a diverse TAC consisting of representatives with significant experience in the ecology of specific aquatic systems (lacustrine, riverine, estuarine, and or palustrine systems) and the interpretation of water quality data through the use of statistical modeling tools. These individuals were chosen, not only for their ability to provide guidance in the dynamics of these systems, but also to represent the diverse parties with interest in the development of criteria. They include academic and public institution representatives, along with individuals with significant technical experience drawn from industry, agriculture, and environmental groups.

The TAC is charged with the review of the existing knowledge base related to these systems and the development of recommendations to DEP on numeric nutrient criteria. Through the initial TAC process and staff evaluations of available data, it became clear that there are numerous remaining technical complexities and limitations associated with the verification, analysis, and interpretation of the currently available data. Given these complexities, the DEP decided to extend the TAC process through mid-2009 at a minimum. Furthermore, it is anticipated that smaller subgroups may need to be formed to consult with other experts to address specific waterbody types (e.g., South Florida canals) under criteria development.

In accordance with Florida's Sunshine Laws, all of these meetings will be open to the public. To further promote public awareness and involvement in the process, each TAC meeting will incorporate designated periods for informal public participation and comment. Based upon a "kickoff" public meeting held in Tallahassee in December 2001, there is significant public interest in the incorporation of some type of public meeting scheduled in conjunction with the TAC meetings or at key points in the process. In recognition of the geographic span of the state, TAC meetings will be held at different locations within Florida on a rotational basis. Also a link on the DEP website (<http://www.dep.state.fl.us/water/wqssp/nutrients.htm>) has been established to report all TAC activities.

As a starting point, the TAC considered analysis of data on the EPA recommended **causal** (TN and TP) and the **response** (Chlorophyll *a*) parameters. The Florida-derived bioassessment methods, the Stream Condition, Lake Condition, and Lake Vegetation Indices, was also considered. Additionally, DEP began using a rapid periphyton survey methodology for streams in early 2007 and has initiated the development of phytoplankton and periphyton indices for lakes and streams, respectively.

The TAC and DEP staff have made significant progress towards the development of regional nutrient criteria for streams. DEP's reference site approach was discussed with the TAC over the course of numerous meetings. The TAC indicated their general support for the overall approach and recommended that DEP needed to provide sufficient documentation substantiating the minimally disturbed condition of the selected reference sites. Based on the direction provided during TAC discussions in 2006, DEP staff conducted a pilot study to develop nutrient criteria for streams in the Peninsular bioregion (Figure 4) using the reference streams approach. DEP developed and utilized an extensive multi-step evaluation of potential reference sites to assure that the reference sites used in the derivation of nutrient thresholds for the Lake Okeechobee tributaries truly represented minimally disturbed conditions. This multi-step evaluation included: screening for sites with a Landscape Development Intensity Index (LDI) score  $\leq 2$ , screening based on the state's 303(d) list of impaired waters, verification of surrounding land-use using high resolution aerial photographs, obtaining input from district biologists knowledgeable of the area, a statistical outlier analysis, and an extensive field evaluation of a large number of the remaining waterbodies (WBIDs<sup>1</sup>) containing reference sites.

A key issue of the pilot study is the selection of the appropriate percentile to use for the numeric criterion. EPA (2000) stream guidance states that "*it is reasonable to select a higher percentile (i.e., 75<sup>th</sup> percentile) as the reference condition, because reference streams are already acknowledged to be in an approximately ideal state for a particular class of streams.*" In other words, the range of nutrient concentrations associated with reference sites is considered to represent nutrient levels expected in areas with minimal human influence. DEP agrees that using an upper percentile distribution of the reference site population will yield an ecologically justifiable, inherently protective criterion. Case studies in the EPA guidance document, as well as state presentations at the March 2006 All States Nutrient Criteria Workshop, suggested percentiles in the 75<sup>th</sup> to 95<sup>th</sup> range. Since reference sites are optimally functioning systems, selecting a percentile at the upper end of the distribution (i.e., 90<sup>th</sup> to 95<sup>th</sup> percentile) as a criterion appropriately establishes the range of nutrients characteristic of these biologically healthy sites, and results in only 5 to 10 percent of these biologically healthy reference sites from being misidentified as impaired.

DEP intends to continue the validation of its selected reference sites before adoption of numeric nutrient criteria. Specifically, DEP plans to investigate whether there are biological thresholds at and below the reference percentile thresholds (i.e., 75<sup>th</sup> and 90<sup>th</sup>). The objective of the expanded validation will be to confirm that healthy well-balanced biological communities (flora and fauna) are maintained at or below the selected numeric thresholds. Biological demonstrations will likely include both the existing SCI for macroinvertebrates as well as periphyton in streams and

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<sup>1</sup> WBIDs were originally developed for 303(d) assessment purposes and were developed based on drainage basins defined by the USGS eight digit Hydrologic Unit Codes (HUCs).

macrophytes and phytoplankton in lakes. Fore (2005) developed a Lake Vegetation Index (LVI) to assess the biological condition of aquatic plant communities in Florida lakes. Work to develop a periphyton index for Florida streams will begin during the last quarter of 2007. Significant progress towards the development of a periphyton index is expected by the end of 2008.

Although Florida has made significant progress towards the development of numeric nutrient criteria using a reference site approach, DEP will continue to investigate alternative approaches that more directly link nutrient levels to biological responses. To this end, DEP will utilize its extensive biological database and assessment tools to explore response based thresholds. Additionally, thresholds of biological response will be explored during development of the stream periphyton index. Ultimately, these alternative approaches may serve as the sole basis for Florida's numeric nutrient criteria or the information may be coupled with the reference sites to form the basis for a weight-of-evidence approach.

After completion of TAC activities and, prior to submittal of potential criteria to the Environmental Regulation Commission (ERC), DEP will hold rule development workshops, draft rule text, and allow for review and revisions. The ERC is an unpaid citizenry board, which, in exercising its authority, considers scientific and technical validity, economic impacts, and relative risks and benefits to the public and the environment of all proposed rules and standards related to environmental resources. It is anticipated that ERC activities can be completed in a timeframe of twelve months, barring major dissent. The level of control that DEP has over the time schedule of the ERC's process of approval of such rules is limited, making the establishment of a firm completion date for nutrient criteria adoption difficult.

### ***Relation to State Use Classifications***

Florida's designated use classes are currently focused on general applicability to all uses, with all of the state's waterbodies grouped into one of five designated use classes: Class I (potable water supplies); Class II (shellfish propagation or harvesting); Class III (recreation, propagation of fish and wildlife); Class IV (agricultural water supplies); and Class V (navigation, utility, and industrial use). Under current classifications, the majority of the states waterbodies (i.e. lakes, streams, estuaries, and wetlands) are classified as Class III and are held to the same criteria, failing to recognize potential differences in natural background conditions in various waterbody types and regions. In acknowledgment of the limitations of such generic classifications, in 2006 the Department established a policy advisory committee (PAC) to review the range of waters in the state and make recommendations on how to more accurately characterize and protect them. The PAC, which included independent experts from local governments, other state agencies, industries and EPA, has been reviewing the state's use classifications and will make recommendations to DEP. Summaries of the groups meetings, including initial recommendations, can be found at [http://www.dep.state.fl.us/water/wqssp/ducr\\_archive.htm](http://www.dep.state.fl.us/water/wqssp/ducr_archive.htm).

It is important to note that DEP has not yet made a decision on whether to pursue, modify or reject the recommendations of this committee. Ultimately, any revisions to the current classification system would require additional public participation and formal rulemaking which would appear before the Environmental Regulation Commission (ERC) for approval at an advertised public meeting. In addition, the EPA would also need to authorize final approval.

Once established, designated use classification will have to be considered during the development of nutrient criteria.

### ***Relation to Biogeographic Classification***

DEP initially used Level IV ecological subregions, separately defined for streams (Griffith et al., 1994) and lakes (Griffith et al., 1997) in Florida's biocriteria development program, as a starting point for regionalization efforts necessary to establish nutrient criteria. DEP has analyzed stream reference site macroinvertebrate community patterns in all nine ecological subregions north of Lake Okeechobee (Barbour et al., 1996). The data indicated the presence of four distinct bioregions, within which there were similar biological community composition and structure (Figure 4). These bioregions include the panhandle (regions 65f, 65g, 65h, and the majority of 75a), the northeast (region 75e and 75f), the peninsula (regions 75b, 75c, and 75d, and a small part of 75a), and the Everglades (regions 76a, 76b, 76c, and 76d).

Similar patterns of relatively homogeneous groupings in the peninsula versus the panhandle have been observed in wetlands macrophyte, algae, and invertebrate data (Lane et al. 2003). Lake macrophyte (for percent invasive species) and invertebrate (based on ecoregion, pH, and color) indices also utilize a similar bioregion scheme, with the three peninsular ecoregions being collapsed into a single peninsular bioregion (Fore, 2005, Gerritsen et al., 2000). DEP is currently evaluating the potential of using ecological subregions collapsed into biological regions as the basis for future nutrient criteria groupings, although the issue is still a matter of continued discussion with the TAC (Weaver 2006a, Weaver 2006b, Weaver and Frydenborg 2006).

Based upon the observed biological community resemblance within a bioregion, it is logical that these biologically-similar regions will have analogously similar responses to nutrient concentrations. If additional data indicate an alternate spatial classification scheme is more appropriate, a revision to the current system may be made, however, current biological data suggest bioregions are the most defensible approach to establish appropriate protection of biota.

The current bioregions were derived based on macroinvertebrate assemblage patterns, which may not be entirely indicative of homogeneous response to nutrients. DEP and its consultants are currently evaluating bioregions based on stream periphyton assemblages. If these evaluations reveal significantly different biological regions then the nutrient spatial classifications will be adjusted accordingly.

DEP and the TAC are also evaluating scientifically defensible bases for sub-regionalization of known naturally high phosphate areas in the central peninsula and north-central Florida (Weaver 2006b). Currently, in the Peninsula bioregion pilot study, DEP used an outlier analysis to exclude these naturally high phosphate areas. DEP intends to evaluate other methods to explicitly sub-regionalize these areas.

### ***Inventory of Existing Data***

Under DEP's watershed approach, the identification of data sources and development of tools to facilitate data entry and upload to STORET have become high priorities for the agency. Florida's Impaired Waters Rule (Chapter 62-303, F.A.C.) designates STORET as the primary data source to be used by DEP to assess water quality under the watershed approach. Furthermore, DEP maintains a Florida specific version of STORET known as Florida STORET, which currently contains over 18 million records. Efforts to upload new and additional data of

known and defensible quality, pursuant to Chapter 62-160, F.A.C., are ongoing and supported by a dedicated STORET group within DEP. This group provides support to other state agencies, local governments, and various organizations in the transfer of data to Florida STORET.

### ***Requirements for New Data Collection***

DEP's watershed approach includes a strategic monitoring phase to gather new data within watersheds to supplement existing data. This monitoring is used to further characterize basin conditions; to investigate areas with identified or potential water quality problems; to evaluate the effectiveness of management actions; and for TMDL development. These activities, addressed in detail in strategic monitoring plans, are intended to identify data gaps at the watershed level; to prioritize areas of data collection by DEP or other partners; to establish a process for data dissemination; and to specify QA/QC requirements.

DEP is committed to pursuing additional grants and other funding opportunities to support specific projects directed toward establishing numeric nutrient criteria, including the collection of additional data. As the TAC identifies key parameters for criteria development, new data gaps may arise; therefore, it is not possible, at this time, to know the amount of data collection that will be needed to propose ecoregional nutrient criteria.

In addition, under the watershed approach, water quality sampling is being conducted both at specific locations and under a randomized approach that considers different physical characteristics of waterbody types (i.e., wadeable versus nonwadeable streams). Information obtained from both sampling programs will be available for consideration in the development of numeric nutrient criteria.

### ***Coordination with Bordering States***

Florida shares some waterbodies with the states of Alabama and Georgia. Therefore, efforts will be made to coordinate with those states, in reference to any nutrient criteria Florida is considering on shared lakes and streams, prior to submittal to the Florida Environmental Regulatory Commission for rule development.

### ***Prioritization of Waters and Schedule for Development and Adoption***

DEP initially prioritized waters for development and adoption of regional numeric nutrient criteria based on the availability of EPA guidance documents; that is, lake and river stream guidance were available first, followed by estuaries and coastal waters, and finally wetland guidance. Additionally, site specific numeric nutrient target development has been driven by TMDL development schedules, including a number of nutrient TMDLs for specific waterbodies, to be completed in accordance with the consent decree between EPA Region IV and EarthJustice. Furthermore, DEP will continue to identify (and prioritize for TMDL development) other waterbodies potentially impaired by nutrients under Chapter 62-303, F.A.C. Regional nutrient criteria development and the site specific TMDL efforts are highly integrated in Florida, and information and experience gained in each effort has been and will continue to be used to refine the other. Methods originally developed by the TAC and DEP to derive regional nutrient criteria have been used by DEP to develop recommended TMDL thresholds for specific water bodies. Conversely, site specific targets developed via the TMDL process will be

evaluated for potential regional application or possible consideration as site specific nutrient criteria for given water bodies, particularly for estuaries and coastal waters.

DEP has already made significant progress towards nutrient criteria development and anticipates continuing on a schedule consistent with EPA's expectations for substantial progress towards criteria adoption (Grubbs 2001). DEP's commitment to this nutrient criteria development process is demonstrated by the assignment of seven staff and a statistical consultant to work at least part-time on this project; DEP's continued consultation with its nutrient criteria development TAC; and DEP staffs' participation in numerous regional and national nutrient criteria related meetings, workshops, and conferences (e.g., Region 4 RTAG, 2006 All States meeting, Gulf of Mexico Alliance).

As DEP's schedule follows the availability of EPA guidance documents, the state schedule is affected by the availability of those guidance documents and approaches. Additionally, continued progress on this schedule is contingent on continued funding through state and federal programs to assist in the completion of the necessary research, development of appropriate assessment tools, and verification of the criteria.

#### **Lakes and Streams (1<sup>st</sup> Priority):**

The state of Florida identified lakes and streams as its first priority for regional numeric nutrient criteria development and adoption. DEP has been meeting with the TAC and primarily discussing the development of nutrient criteria for these waters since January 2003. The TAC has held sixteen meetings addressing various topics related to lake, stream, and canal nutrient criteria. Summaries of these meetings as well as meeting materials are provided on the Department's website ([http://www.dep.state.fl.us/water/wqssp/nutrients/tac\\_archive.htm](http://www.dep.state.fl.us/water/wqssp/nutrients/tac_archive.htm)). DEP currently anticipates that the TAC process for lakes and streams will be concluded by December 2009, with subsequent submission to the Environmental Regulation Commission in 2010. The schedule below provides additional detail regarding Florida's progress to date and anticipated future activities. It should be noted that the projected future milestones are based on the assumption that DEP's current track and technical approach are acceptable to EPA.

Florida also contains a large number of artificial canals or highly altered streams, particularly in ecoregion XIII (Figure 1). DEP recognizes that the biological communities found within these canals are substantially different from natural rivers and streams due to severe habitat limitation and unnatural hydrologic conditions. It can be reasonably expected that response to nutrients within these systems is different from natural streams. Therefore, DEP and the TAC have been developing numeric nutrient criteria for canals separately from the natural water bodies. However, DEP currently expects to use a technical approach very similar to the one under development for streams; that is, one based on a best attainable reference condition. It is currently anticipated that nutrient criteria for ecoregion XIII canals will be developed following the same schedule as the natural lakes and streams.

#### **Estuaries (2<sup>nd</sup> Priority):**

DEP selected estuaries as the second priority because of the site-specific nature of nutrient response in estuaries. EPA (2001) estuary and coastal marine waters nutrient criteria guidance recognized this nature, noting that "estuaries and coastal marine ecosystems tend to be relatively

individualistic in their sensitivity and response to nutrient over enrichment.” The guidance further states that “the lack of physically similar waterbodies may severely limit grouping (classifying) waterbodies as recommended for lakes, reservoirs, rivers, and streams where frequency distributions are used to derive reference conditions.” DEP concurs with these findings and anticipates that numeric nutrient criteria for Florida’s estuaries and coastal waters will be based primarily on site specific efforts, including TMDL related efforts. Although DEP has not initiated a formal estuary nutrient criteria development process, there are numerous and extensive existing activities that have either identified or will in the near future identify nutrient response thresholds. For example, the Tampa Bay Estuary Program (NEP) has established Chlorophyll *a* targets for the different segments of the bay based upon a goal of restoring seagrass beds.

DEP envisions initially developing regional response variable nutrient criteria based on site specific thresholds developed for many of the larger coastal systems in the state (e.g., Tampa Bay, Indian River Lagoon, Caloosahatchee, St. Lucie River) and subsequently deriving causal variable criteria based on statistical relationships between these response variables and the causal variables. However, it should be noted that in many cases such relationships may not exist, as was the case in Tampa Bay. Under this scenario, DEP may only propose response variable-based criteria until the relationships are determined on a site-specific basis.

As a result of the State’s 1987 Surface Water Improvement and management Act (SWIM) and National Estuary Program (NEP), efforts to develop nutrient related thresholds for many of the states largest estuaries and coastal waters are well underway and are briefly described below.

#### Tampa Bay

As previously discussed, the Tampa Bay NEP has established Chlorophyll *a* targets for various bay segments based upon a goal of restoring seagrass beds.

#### Indian River Lagoon and Banana River

The Indian River/Banana River Lagoon PLRG study set maximum loading targets for TN, TP, and total suspended solids (TSS) as a function of seagrass depth limits in the lagoon. The PLRG study found strong, negative correlations between watershed loadings of nutrients and TSS and the depth limit of seagrass. EPA proposed a TMDL in April 2007 based on the Indian River/Banana River Lagoon PLRG, and DEP staff are currently working to propose a state TMDL for the main stem of Indian River and Banana River by March 2008.

#### Caloosahatchee and St. Lucie Estuaries

The Northern Everglades and Estuaries Protection Program expanded the Lake Okeechobee Protection Plan (LOPP) requirements to the Caloosahatchee and St. Lucie River watersheds. This legislation created the Caloosahatchee and St. Lucie River Watershed Protection Program, which includes the development of Watershed Protection Plans for both rivers. Each Watershed Protection Plan shall include: a watershed construction project, a watershed pollutant control program, and a watershed research and water quality monitoring program. Under this legislation, the South Florida Water Management District (SFWMD), in collaboration with

coordinating agencies, must develop River Watershed Protection Plans for the Caloosahatchee and St. Lucie River watersheds by January 1, 2009.

A primary objective of the program will be “pollutant load reductions based upon adopted total maximum daily loads established in accordance with s. 403.067” (Senate Bill 392, 2007). After the total maximum daily loads (TMDLs) are completed, basin management action plans will be developed. The TMDLs for the St. Lucie estuary are due in 2008 based on the consent decree schedule. The Northern Everglades Bill did not change this deadline. TMDLs for tidal portions of the Caloosahatchee River and estuary are to be proposed for final agency action by December 31, 2008 by DEP.

In addition to the site specific efforts previously mentioned, Florida DEP is actively involved in the Gulf of Mexico Alliance (GOMA). DEP is working with the other Gulf states to develop broader based strategies for developing nutrient criteria and control programs within the shared waters of the Gulf of Mexico. DEP has assigned two staff members to directly participate in the GOMA. Nutrient criteria related activities are being coordinated between these staff and DEP’s Standards program.

DEP currently intends to utilize its existing TAC, coordinated with the Florida Oceans Council and the Gulf Alliance, to begin development of nutrient criteria for estuaries and coastal waters. Although DEP will evaluate whether the need to augment the TAC with additional TAC members are needed and may or convene a smaller working group of with expertise in estuarine and coastal systems. It is DEP’s intention to hold an estuary nutrient kickoff meeting by May 2008. The objective of this meeting will be to discuss the state of nutrient science, research and monitoring for Florida’s coastal waters as well as potential numeric criteria derivation methods.

### **Wetlands (3<sup>rd</sup> Priority):**

Florida leads the nation in the development of protective nutrient criteria for wetlands, having adopted a numeric phosphorus criterion for the Everglades in 2004 well in advance of EPA’s draft wetland guidance, as documented in the summary timeline provided in this document. In fact, EPA’s draft wetland guidance includes an appendix summarizing much of the research used to establish the Everglades phosphorus criterion of 10 µg/L. Furthermore, Florida leads the nation in innovative treatment and BMP technologies and research to achieve compliance with ultra low nutrient standards (e.g, Burns and McDonnell 2003, Piccone 2007).

The DEP does not plan to initiate development of regional wetland nutrient criteria until after the estuary nutrient criteria are into the rule development phase and after EPA releases its final guidance on wetland nutrient criteria development, whichever is later. EPA released draft wetland guidance for review in December of 2006 (EPA 2006), and specifically solicited information, data, and views on issues of science pertaining to the information the Agency used to develop the draft document. Pursuant to this request, DEP submitted review comments on the draft wetland guidance on February 15, 2007. It is our understanding that EPA expects to finalize the guidance by September 2007, and DEP will re-evaluate its statewide wetland strategy upon final release of the EPA guidance.

The lower priority assigned to wetlands is based on an acknowledgement that wetland are biologically very different from other water body types; the state of the science on wetland nutrient dynamics is still evolving; biological and water quality monitoring efforts for wetlands generally lag behind those of other water body types; and with a few notable exceptions wetlands tend to have a higher nutrient assimilative capacity. Implementation of nutrient threshold research or reference condition evaluations will take some time given the current state of wetland science.

### **Past, Current and Future Schedule for Nutrient Criteria Development for Florida's Waters<sup>2</sup>:**

1992	To begin the phosphorus criterion development process in the Everglades, a research plan was developed to specifically determine the level of phosphorus necessary to prevent an imbalance in Everglades flora and fauna. This plan, the Everglades Nutrient Threshold Research Plan (Lean et al., 1992), was intended to provide appropriate data in support of a numerical interpretation of the existing State of Florida narrative nutrient criterion.
June 1995	DEP formed the Everglades Technical Advisory Committee (ETAC) to review and comment to DEP on Everglades Research and monitoring in support of the process of developing a numeric phosphorus criterion for the Everglades.
Sept. 1999-Oct. 2001	DEP staff published and revised three technical support documents in support of a numeric phosphorus criterion for the Everglades Protection Area (Payne et al., 2000, 2001a, 2001b). These reports recommended a phosphorus criterion of 10 µg/L.
December 2001	Based on the results of the DEP's extensive analyses, the agency filed a notice of rulemaking and recommended a protective Everglades TP criterion of 10 µg/L for approval by the Environmental Regulation Commission (ERC).  DEP conducted a statewide numeric nutrient criteria development "kickoff" meeting in Tallahassee.
March 2002	Created a Nutrient Criteria website (accessible to the public at <a href="http://www.dep.state.fl.us/water/wqssp/nutrients.htm">http://www.dep.state.fl.us/water/wqssp/nutrients.htm</a> ) to facilitate the dissemination of information about Florida's nutrient criteria development process. This site includes agendas, minutes, and presentations from the TAC meetings, copies of reports from the studies sponsored by DEP on nutrient related topics, links to federal nutrient websites, and other pertinent information.  Established electronic mail listserver to distribute information directly to interested parties.

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<sup>2</sup>Milestones projected past May 2007 are based on the assumption that DEP's current track and technical approach are acceptable to EPA.

April 2002	<p>Refined the first draft of State of Florida's Numeric Nutrient Criteria Development Plan.</p> <p>Identified potential Nutrient Criteria Technical Advisory Committee (TAC) members.</p> <p>Received draft report from Tetra Tech, Inc. detailing efforts to date on review of nutrient data and proposed potential nutrient criteria for Florida lakes.</p> <p>Received draft report from the University of Florida presenting paleolimnological characterization of pre-disturbance water quality conditions in Florida lake regions (Griffith 1997).</p> <p>Hired a designated staff person to coordinate DEP's Nutrient Criteria Development efforts.</p>
May 2002	<p>Submitted Draft Numeric Nutrient Criteria Development Plan to EPA Region IV for review.</p> <p>DEP representative participated in the Region IV Regional Technical Advisory Group (RTAG) and presented an overview of Florida's Numeric Nutrient Criteria Plan for comment by RTAG members.</p> <p>Solicited participation of identified potential Nutrient Criteria TAC members.</p>
June/July 2002	<p>Participated in the National Nutrient Team and the national stakeholders meetings in Washington, DC.</p>
December 2002	<p>Completed University of Florida contract to conduct paleolimnological Cyanobacteria pigment studies to determine if past changes in abundance of Cyanobacteria coincide with fossil diatom analysis in Florida lakes.</p>
January 2003	<p>Convened first meeting of the Nutrient Criteria TAC.</p>
March – July 2003	<p>Nutrient criteria coordinator position became vacant; therefore, no TAC meetings were held.</p>
July 2003	<p>The ERC approved the 10 µg/L TP criterion for the Everglades Protection Area during a July 8, 2003 hearing. Subsequent to the approval by ERC, both environmental and agricultural interest groups filed administrative challenges to the phosphorus criterion rule. Following discussions with the DEP concerning the application of the rule, all parties except the Miccosukee Tribe of Indians and the Friends of the Everglades withdrew their challenges.</p> <p>Contracted a position to work with the TAC; to plan and facilitate/coordinate TAC meetings.</p>
August 2003	<p>Held second TAC meeting in Tallahassee; agenda items included: Florida water quality standards overview, existing narrative criteria,</p>

potential nutrient criteria tools and nutrient criteria development approaches.

October 2003 University of Florida paleolimnological project completed and final report received.

Third TAC meeting held in Orlando on Florida Lake Nutrient Criteria and data availability.

November 2003 DEP representatives participated in EPA Region IV RTAG meeting in Atlanta.

Nov. 2003-Jan. 2004 An administrative hearing was held to resolved the remaining challenges to the Everglades phosphorus criterion rule.

December 2003 DEP submitted revised DEP nutrient criteria development plan to EPA.

January 2004 Held the fourth TAC meeting and started having TAC meetings approximately every one and a half months.

DEP representatives participated in Region IV RTAG meeting

February 2004 Designated staff position took over TAC facilitation/coordination duties

Fifth TAC meeting held in West Palm Beach, FL. Meeting focused exclusively on canal nutrient criteria development

April 2004 Sixth TAC meeting held in Tallahassee, FL

Seventh TAC meeting (two days) held in Fort Myers, FL

May 2004 Eighth TAC meeting held in West Palm Beach, FL

June 2004 The final order filed by the Administrative Law Judge on June 17, 2004 upheld all parts of the proposed Everglades phosphorus criterion rule, finding that the rule “is not an invalid exercise of delegated legislative authority” by DEP.

July 2004 EPA and State reached mutual agreement on Numeric Nutrient Criteria Development Plan for Florida

August 2004 Ninth TAC meeting (two days) held in Tampa, FL

November 2004 Tenth TAC meeting held in Tallahassee, FL

January 2005 EPA approved all portions of the Everglades phosphorus criterion rule, except the use of the assessment methodology specified in Appendix B of the Settlement Agreement in the Federal Everglades lawsuit, Case No. 88-1886-CIV-Hoeveler, U.S., as modified by Omnibus Order entered in the case on April 27, 2001.

February 2005 Eleventh TAC meeting held in Gainesville, FL

March 2005 Florida initiated an intensive 1 year DO and nutrient study. Nutrient and biological data were collected in streams, canals, and lakes across the entire state. These data, in addition to other ambient data (STORET), will be used to establish numeric nutrient criteria. Additionally, data

	will be used to establish new bioassessment methods (phytoplankton and periphyton indices).
April 2005	A revised Everglades phosphorus criterion rule was presented to the ERC and received unanimous approval on April 7, 2005.
June 2005	The Everglades phosphorus criterion rule was resubmitted to EPA for approval.
July 2005	The Everglades phosphorus criterion received final approval from EPA.
August 2005	Twelfth Nutrient TAC meeting (two day) held in West Palm Beach, FL
October 2005	DEP representatives participated in EPA Region IV RTAG meeting in Atlanta, GA; presented an overview the status of Florida's numeric nutrient criteria development.
February 2006	DEP representatives participated in EPA's all states numeric nutrient criteria meeting held in Dallas, TX.  Thirteenth Nutrient TAC meeting held at Wakulla Springs State Park, Wakulla, FL.
May 2006	Fourteenth Nutrient TAC meeting held in Gainesville, FL.  DO and nutrient study data collection concluded..
October 2006	Fifteenth Nutrient TAC meeting held in Ponte Vedra Beach, FL.
December 2006	Sixteenth Nutrient TAC meeting held in Tallahassee, FL.
January 2007	DEP established and SFWMD began monitoring an ambient monitoring network within the Everglades Protection Area designed to assess achievement of the Everglades phosphorus criterion rule.  DEP representatives participated in the Gulf of Mexico Alliance Nutrient Criteria Conference in Gulf Breeze, FL.
February 2007	DEP submitted a revised nutrient Plan to EPA.  Submitted review comments on EPA's <i>Draft Nutrient Criteria Technical Guidance Manual for Wetlands</i> (EPA 823-F-05-015 – December 2006).
Feb. 2007-Dec. 2009	Continue data synthesis and analysis (e.g., biological indices, regionalization analyses) for lakes, streams, and canals, and meetings with the Nutrient TAC as needed.  Continue additional data collection as needed.
March 2007	DEP representatives participated in EPA Region IV RTAG meeting in Decatur, GA.
May 2007	DEP submitted to EPA Region IV a pilot study application of its reference site approach as part of DEP's comments on EPA's <i>Proposed Total Maximum Daily Load (TMDL) For Biochemical Oxygen Demand, Dissolved Oxygen, Nutrients and Unionized Ammonia In the Lake Okeechobee Tributaries</i> .

May 2007 - ??	DEP is currently waiting for feedback from EPA on its Peninsula bioregion pilot study application of the reference site approach. Future timelines may be need to be altered based on the feedback DEP receives about the general approach.
August 2007	All macroinvertebrate, periphyton, and phytoplankton data from the intensive one year DO and nutrient study were marked complete and entered into Florida's biological database.
May 2008	Conduct, by May 2008, an estuaries and coastal waters numeric nutrient criteria meeting with the existing TAC and other experts.
December 2009	Conclude TAC process for lakes, streams, and canals. Anticipated products of the TAC process include both the recommended numeric nutrient criteria for Florida lakes, streams, and ecoregion XIII canals and draft rule language to be incorporated into state water quality standards.
January 2010	Begin rulemaking process to incorporate nutrient for lakes, streams, and canals criteria into Florida's water quality standards. Refine draft rule text; allow time for draft rule review and public workshops on proposed rule. It is anticipated that the rulemaking process should take six to twelve months.
Jan. 2010-Jan. 2011	Submission of nutrient criteria rule language to the ERC for possible adoption. It is anticipated that this process may take from six to twelve months to complete.

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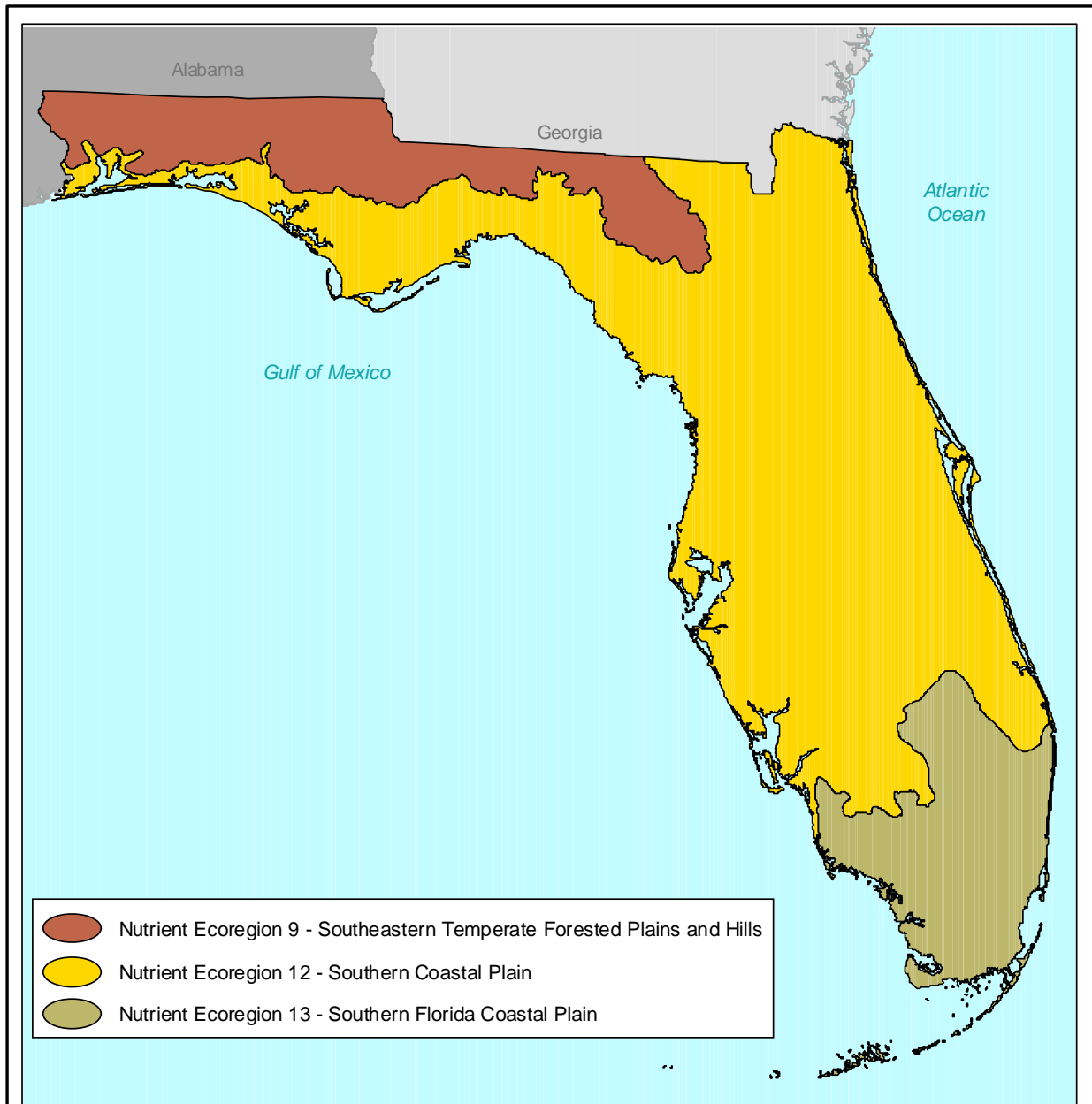
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**FIGURE 1**



**Draft Aggregations of Level III Ecoregions  
for the National Nutrient Strategy within Florida**

<http://www.epa.gov/waterscience/standards/ecomap.html>



0 50 100 150 200 Miles



Map prepared April 18, 2002 by: the GIS subsection  
Bureau of Watershed Management  
Division of Water Resource Management  
This map is a representation of ground condition and is  
Not intended for delineations or analysis of the features shown.  
For more information, contact [devan.branscum@dep.state.fl.us](mailto:devan.branscum@dep.state.fl.us)

**TABLE 1**

**EPA Generated Nutrient Criteria Recommendations for Nutrient Ecoregions  
Including All or Part of the State of Florida**

*Lakes and Reservoirs*

<b>Parameter</b>	<b>Region IX<sup>1</sup></b>	<b>Region XII<sup>2</sup></b>	<b>Region XIII<sup>3</sup></b>
Total Phosphorus (µg/L)	20	10	17.5
Total Nitrogen (mg/L)	0.36	0.52	1.27
Chlorophyll a (µg/L)	4.93	2.6	12.35
Secchi depth (meters)	1.53	2.1	0.79

*Rivers and Streams*

<b>Parameter</b>	<b>Region IX<sup>4</sup></b>	<b>Region XII<sup>5</sup></b>	<b>Region XIII<sup>6</sup></b>
Total Phosphorus (µg/L)	36.56	40.0	N/A
Total Nitrogen (mg/L)	0.69	0.9	N/A
Chlorophyll a (µg/L)	0.93	0.40	N/A
Periphyton Chlorophyll a (mg/m <sup>3</sup> ) <sup>7</sup>	20.35	N/A	N/A
Turbidity (NTU)	5.7	1.9	N/A

<sup>1</sup> EPA 2000a.

<sup>2</sup> EPA 2000b.

<sup>3</sup> EPA 2000c.

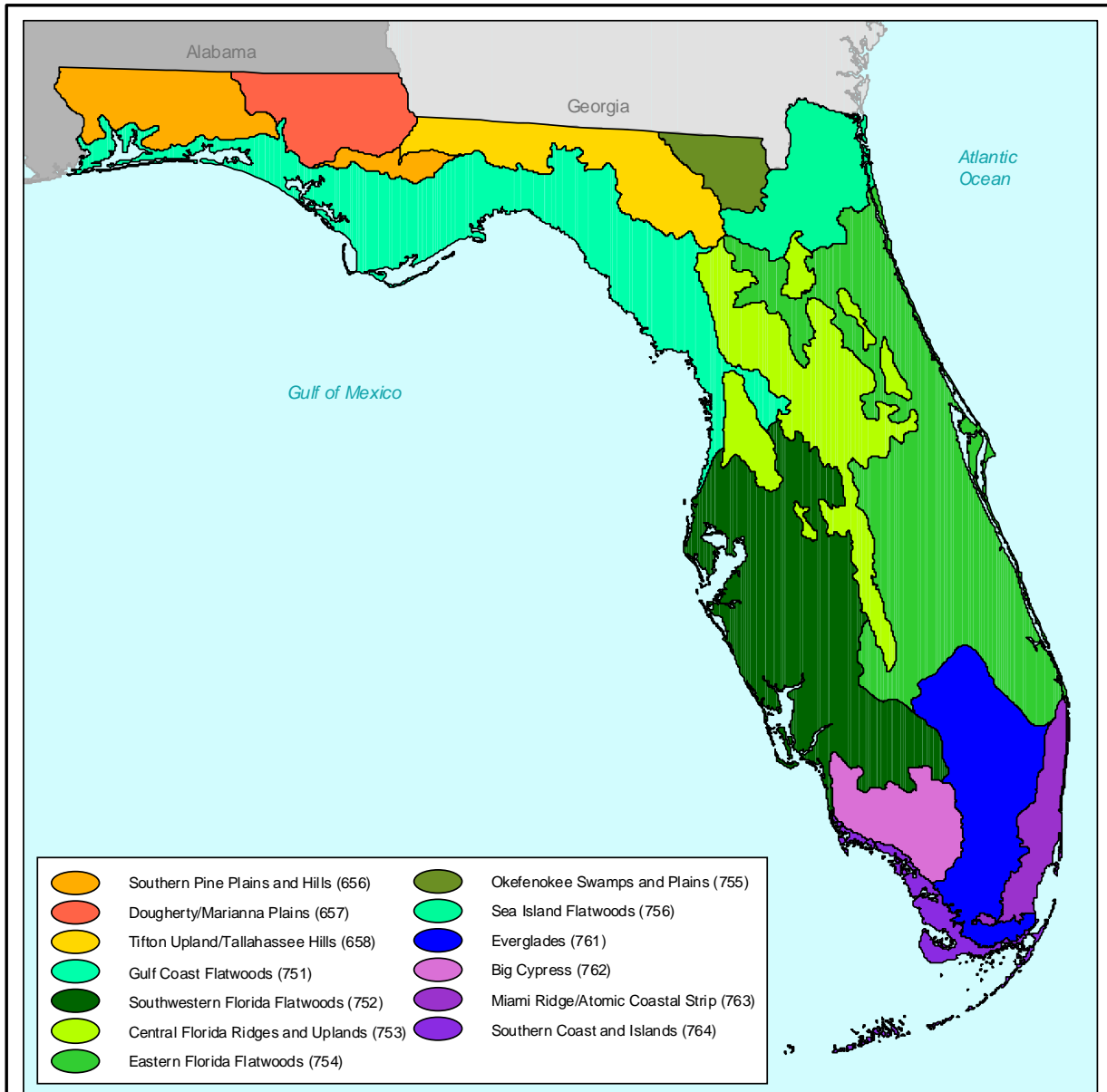
<sup>4</sup> EPA 2000d.

<sup>5</sup> EPA 2000e.

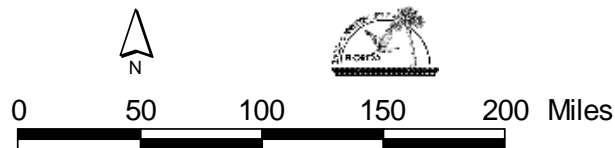
<sup>6</sup> EPA has not issued ambient water quality criteria recommendations in support of the development of nutrient criteria for rivers and streams in Nutrient Ecoregion XIII.

<sup>7</sup> Only the guidance for rivers and streams in Nutrient Ecoregion IX included recommendations for Periphyton Chlorophyll a.

**FIGURE 2**

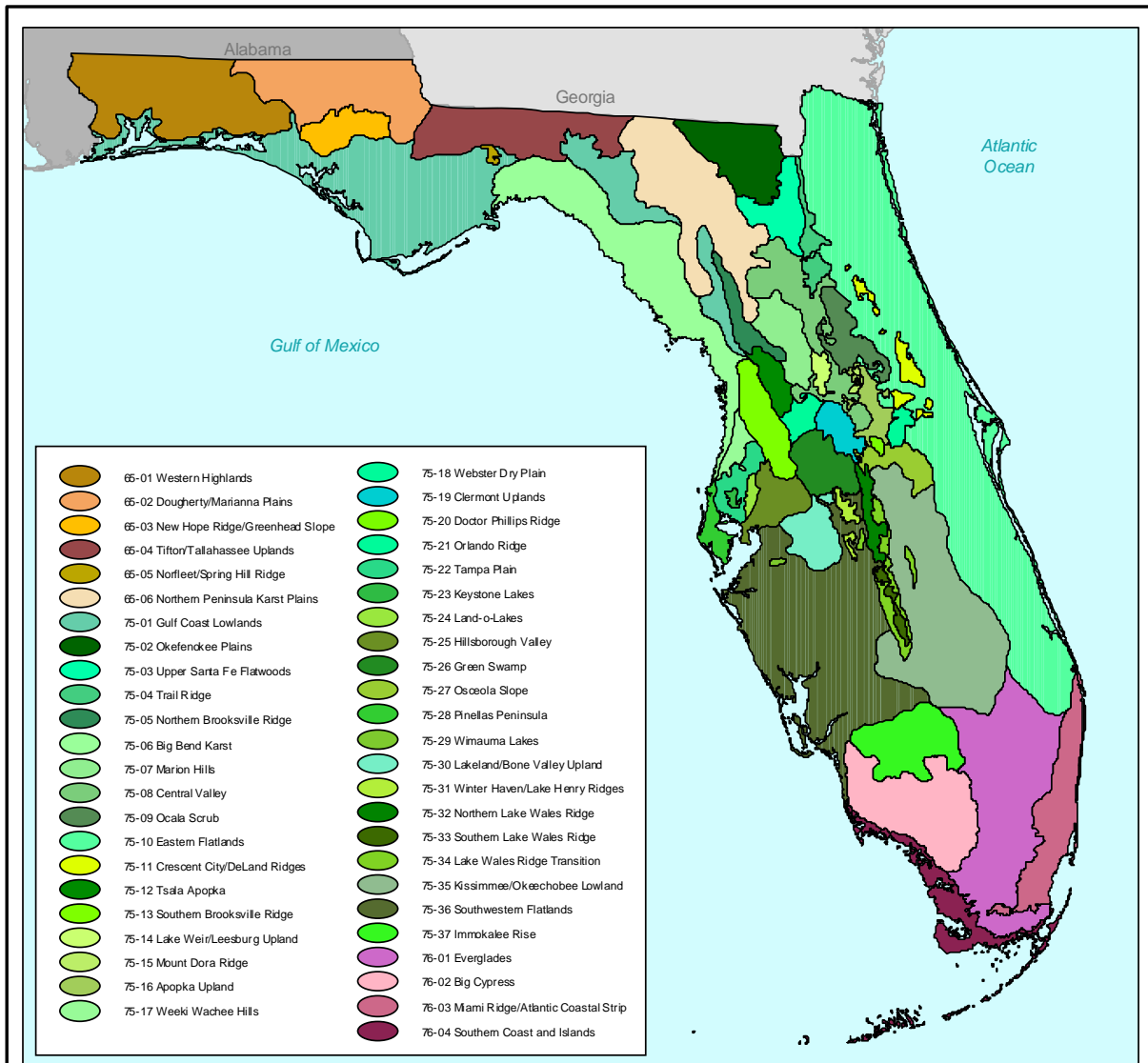


**Level IV Subcoregions for Florida  
Small / Wadeable Streams  
Griffith 1994**

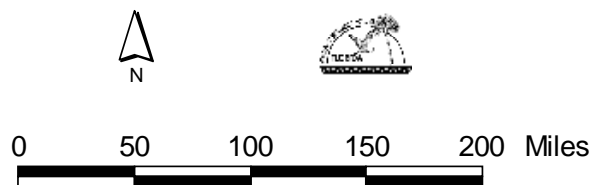


Map prepared April 18, 2002 by: the GIS subsection  
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This map is a representation of ground condition and is  
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**FIGURE 3**



**Level IV Subcoregions for Florida Lakes**  
Griffith 1997



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FIGURE 4



### Stream Bioregions of Florida

Barbour et al., 1996

