The Florida Wetlands Delineation Manual

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Forward

This manual was developed to assist in the implementation of Chapter 62-340, Florida Administrative Code, *Delineation of the Landward Extent of Wetlands and Surface Waters.* The Department of Environmental Protection (DEP) and the five Water Management Districts (WMDs) were directed through Chapter 94 - 356, Laws of Florida, to develop a training manual describing the use of Chapter 62-340, F.A.C. through its application to selected, publicly accessible, reference sites located throughout the state. Funding for this project was provided for one year from the Department's Pollution Recovery Trust Fund.

The concept for this manual originated with Dr. Michael Dennis of Breedlove Dennis & Associates, and Chuck Littlejohn of Littlejohn & Associates, representing the Florida Chamber of Commerce, during the discussions which resulted in the ratification by the legislature of the Florida unified wetland delineation methodology (Chapter 62-340, F.A.C.). As representatives of affected regulated interests, they were seeking a solution to the perception that, through time, interpretations of rules have changed, while the wording of the rules have not changed. To prevent what has been perceived by them as the "creeping up hill" of previous wetland delineation rule interpretations, Dr. Dennis suggested establishing a number of control sites where the use of the Florida unified wetland delineation methodology could be demonstrated. These sites would be used to "anchor" the rule interpretation in time, thus reducing future innovative interpretations which may differ from the common understanding as it existed when the legislature ratified the rule. In the view of the Department and the Water Management Districts, this approach also provides the opportunity for staff and private sector training.

Emergent aquatic vegetation *Nelumbo lutea* (American lotus)

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Front cover photo by David Bickner.

Introduction

This manual should be used as an aid in the use of Chapter 62-340, F.A.C. It will not answer every question that may arise in the use of the rule. It is not a substitute for the rule. Hands-on training will continue to be necessary to achieve and maintain a proficient understanding of wetland delineation.

The sole topic of this manual is the *identification and delineation of wetlands and other surface waters*. The definition of *wetlands* provides a categorization of the areas intended for inclusion in this process. The *regulation* of areas determined to be *wetlands and other surface waters* is **not** the topic of this manual. *Regulation*, including permitting thresholds and criteria, is covered under different rules and statutes and is not part of the wetland delineation methodology.

To aid Floridians in understanding the science and nuances of *wetland delineation*, this manual provides reference site examples of *wetland* identification and delineation as defined and prescribed in Chapter 62-340, F.A.C. Nineteen references sites, at fifteen locations representing common wetlands in Florida, are described. Each site and the wetland delineation are discussed. The sites are located on public lands and are readily accessible to the public. In some cases prior notice will be necessary and a fee may be required to access some sites. Examples of altered sites are not provided because the community characteristics necessary to establish a firm boundary are generally masked or may be in a state of redevelopment.

This manual is structured to provide the reader with necessary information prior to discussing the actual mechanics of Chapter 62-340, F.A.C. Important preliminary discussions are found in this Introduction, in the section titled Applied Concepts and Interpretations of Chapter 62-340, F.A.C., and under Methodology in the subsection titled Delineation Procedures - Tools.

Several fundamental topics need to be understood prior to the use of this manual, and the rule: the wetland definition, reasonable scientific judgement, ecotones, and hydric soils.

Wetland Definition

Chapter 62-340, F.A.C., *Delineation of the Landward Extent of Wetlands and Surface Waters*, provides a single methodology that is applicable statewide. While both *wetlands* and *other surface waters* are addressed by this rule, the primary focus is *wetlands*, the more complex of the topics. The intent of this rule is to identify and delineate as *wetlands* those areas found to be in accordance with the definition of *wetlands* provided in subsection 373.019(17), Florida Statutes.

> ***"Wetlands" means those areas that are inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support, and under normal circumstances do support,***

> ***a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate hydrophytic macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce or persist in aquatic environments or anaerobic soil conditions. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps and marshes, mangrove swamps and other similar areas. Florida wetlands generally do not include longleaf or slash pine flatwoods with an understory dominated by saw palmetto.***

This definition provides the concept for the types of areas intended to be included as *wetland*. A list of *wetland* types found in Florida is provided to assist in the interpretation of the terms and concepts of the definition. The list of wetland types is not all-inclusive of the *wetland* communities throughout the state however, and therefore the definition contains the phrase *other similar areas*. This phrase is intended to include the less common varieties of *wetland* communities, altered *wetlands*, and ecotonal areas which are *wetlands*. The definition also provides an example of community types that are generally not intended to be identified as wetlands, *long leaf and slash pine flatwoods with a dominant understory of saw palmetto*. During rule development this definition was used to shape the vegetative, hydrologic, and soil parameters used for wetland delineation.

Reasonable Scientific Judgement

Reasonable scientific judgement is used several times throughout the rule and applies both to specific sections and to the overall application of the rule. *Reasonable scientific judgement* involves the ability to collect and analyze information using technical knowledge, and personal skills and experience to serve as a basis for decision making. Examples of situations where *reasonable scientific judgement* is very important include: ecotonal, seasonally wet or occasionally wet lands which are not the *wetlands* intended by the statutory definition, wetland communities dominated by non-listed plant species such as *Quercus virginiana* (live oak) and *Magnolia grandiflora* (southern magnolia), i.e. hydric hammock, altered areas which still have relict wetland vegetation and/or hydric soils but may have lost the hydrology necessary to maintain a wetland condition, and *wetland* ecotones, especially throughout south Florida. When employing the provisions of section 62-340.300, F.A.C., an area may be identified or delineated as a *wetland* only to the extent that it is a *reasonable scientific judgement* that the area adheres to the wetland definition. The definition should be read often!

Ecotones

The rule is used both to identify areas as wetlands and to delineate their boundaries. Delineating the boundaries between wetlands and uplands often involves evaluations in areas with a broad transition zone. This type of area is referred to as an *ecotone*. An *ecotone* is an area where two or more communities grade into each other. The *wetland* boundary line is often located within an *ecotone*. Understanding the concept of *ecotone* is necessary to use this rule. It is in the *ecotones,* those areas of shared or gradually changing attributes, that *reasonable scientific judgement* is often put to its greatest use.

Hydric soils

Hydric soils play an integral role in defining *wetland* limits. The terms *hydric soil* and *wetland* are neither equivalent, nor interchangeable under Florida law. *Hydric soils* are present in some flatwoods which are not *wetlands* as statutorily defined. Conversely, there are some site specific exceptions where hydric soil indicators are absent or are very difficult to interpret in *wetlands*. Hydric mapping units delineated in county soil surveys make excellent initial review information, but *in-situ* (in place) confirmation of hydric soil indicators by the regulating agency is required. Hydric mapping units of a county soil survey can not substitute for in-situ observations by experienced soil scientists.

Hydric soils are formed by either inundation or saturation for very long periods of time (USDA - SCS, 1991). The United States Department of Agriculture - Natural Resource Conservation Service (USDA - NRCS), formerly the Soil Conservation Service, has identified four morphologic features which are consistent with a long-term water table at or above the surface (subsection 62-340.550(8), F.A.C.). Using reasonable scientific judgement, the presence of one or more of these four morphologic features, in an *undrained condition,* provides reliable evidence that the site is very wet for an extended period of time and is typically considered a *wetland*. Similarly, in the *undrained condition* (subsection 62340.300(2)(c), F.A.C.), the remaining soil indicators (USDA - NRCS, 1992) provide evidence that the water table rises to within six inches of the soil surface for sandy textured soils and to within twelve inches for loamy and clayey soils for long periods of time. These saturation indicators do not exclude the possibility of inundation for a site. They also do not by themselves define an area as a wetland.

Certain types of hydric soils can be used as the sole basis for a wetland delineation. The very wet mapping units, those designated as frequently flooded or depressional, along with soil *great groups* considered very poorly drained by the USDA - NRCS, are wetlands, provided that careful site verification of the extent and the hydric nature of the soil is conducted. These very poorly drained (very wet) soils, in their *undrained condition* (subsection 62-340.300(2)(c), F.A.C.) are always contained within the definition of wetlands, unlike hydric soils in general which can extend beyond the boundaries of *wetlands* as defined in Chapter 62-340, F.A.C. Because soils can be a very powerful aspect of wetland delineation, identification of hydric soils should be performed by a trained soil scientist. This does not prevent the use of some of the more obvious soil features by other trained professionals; however, there is no substitute for field expertise.

Applied Concepts and Interpretation of Chapter 62-340, F.A.C.

This manual was developed to provide guidance for consistent interpretation of the wetland and surface water delineation rule by providing information and examples instructive of the intent of the various sections of the rule. Anyone familiar with wetland delineation or any other type of land evaluation understands that rarely are two non-contiguous properties exactly alike in their community structure and ecological condition. The primary parameters utilized to determine the boundaries between wetlands and uplands are *vegetation, soil characteristics*, and *hydrologic indicators*. The rule establishes the use of these parameters for consistent application to wetland delineation.

Care should be given to evaluate *all facts and factors* influencing these parameters whenever feasible. Throughout the manual, guidance is provided for the use and interpretation of data considered. This guidance is based on a compilation of extensive statewide experience in wetland delineation among DEP and WMD staff. Implementation of the procedures within this rule does require some degree of knowledge and experience in evaluating plant communities, hydric soils and observations of the effects of surficial hydrology.

As you follow the procedures described herein and implement the rule, please remember that the rule was developed through the cooperative effort of the DEP, the five WMDs, many local governments, representatives of the regulated public and representatives of concerned citizen groups. The regulatory scope of this rule is intended to approximate the combination of *wetland* areas regulated by the DEP and the WMDs immediately prior to July 1, 1994, the effective date of the rule. Changes in the location of the *wetland or surface water* boundary in any particular area, if any, are more than likely because of the influence of procedures already employed in other areas of the state. Remember, this rule is a *statewide, unified* approach to wetland and other surface water delineation within Florida, and *it is the law* (subsection 373.412(2), F.S.).

Water is the driving force of a *wetland*. The influence of water in the concept of *wetlands* is best demonstrated by hydropatterns. *Hydropatterns* include the frequency, distribution and duration of surficial hydrology along with topographic and edaphic features. The hydropatterns of Florida wetlands are quite variable, differing both by type and location. Because of this, there is no single criteria by which the observation of water alone can be rationally and efficiently used to deduce wetland delineation. The influence of water in establishing wetlands is evaluated in the rule using the physical landscape markers provided by the hydropattern as expressed by the parameters of: vegetation, hydric soils and hydrologic indicators. This rule does not use mandatory hydrology criteria with respect to frequency, duration, and depth of inundation or saturation to delineate wetlands. Water as an indicator is never used alone or outside the control of reasonable scientific judgement. (See section 62-340.550, F.A.C., for special circumstances involving wetland hydrology). According to USDA - NRCS, areas with hydric soil, in the *undrained condition*, possess sufficient hydrology to support a hydrophytic community, yet not every area of hydric soil constitutes a *wetland*. To many observers, a community not dominated by wetland indicator plant species (subsections 62340.450(a) and (b), F.A.C.) is

not a wetland. Hydric hammock, as previously noted, often is dominated by non-listed vegetation. *Hydropatterns* provide the integrating link that determines if an area will be a wetland. In some areas of Florida, this has resulted in wetlands occurring beyond the edge depicted by listed vegetation. There is more to a *wetland* than an observation of inundation and species composition.

Cypress swamp

Methodology

The methodology described in Chapter 62-340, F.A.C., is to be applied consistently throughout the state regardless of environmental variation. The criteria of this rule are binding on all political subdivisions of Florida when used in the identification and delineation of wetlands as directed in Section 373.421(1), F.S.:

> "Upon ratification of such methodology, the Legislature preempts the authority of any water management district, state or regional agency, or local government to define wetlands or develop a delineation methodology to implement the definition and determines that the exclusive definition and delineation methodology for wetlands shall be that established pursuant to s. 373.019(17) and this section. Upon such legislative ratification, any existing wetlands definition or wetlands delineation methodology shall be superseded by the wetland definition and delineation methodology established pursuant to this chapter."

Shallow hardwood swamp
(Wakulla County)

The methodology is a best fit combination of the methodologies and practices employed by the water management districts and the DEP prior to the ratification of Chapter 62-340, F.A.C. The wetland boundary may or may not change in your area. It may or may not be in the same exact location as delineated under previous rules and policies. For most areas, the wetland boundary will be very close to where it had been previously delineated by the Water Management Districts.

In the following discussion, Chapter 62-340, F.A.C., will be covered section by section. Supplemental information is provided which should be read in conjunction with the text of Chapter 62-340, F.A.C.

Intent (section 62-340.100, F.A.C.)

The intent of Chapter 62-340, F.A.C. is to provide a wetland delineation methodology which can be consistently applied throughout the state of Florida. The phrase *combined landward extent* means the total extent of area under the wetland regulatory jurisdictions of the WMDs and the DEP. This rule was developed by a working group of representatives from the DEP and the five WMDs with the aid of representatives of the regulated public and environmental organizations. Careful attempts were made to provide a methodology which reflects the wetland and surface water jurisdictional authority of the DEP and the WMDs as it existed immediately prior to the effective date of Chapter 62-340, F.A.C., July 1, 1994.

The focus of the methodology is on the use of vegetation, hydric soil characteristics and hydrologic indicators to delineate those areas which meet the definition of wetlands provided in subsection 62-340.200(19), F.A.C.

The department is vested with the responsibility of maintaining the consistent statewide application of Chapter 62-340, F.A.C., and intends to be actively engaged in this responsibility.

Emergent wetland vegetation associated with a lake (Marion County)

Definitions (section 62-340.200, F.A.C.)

When interpreting or implementing Chapter 62-340, F.A.C., the definitions provided in this section of the rule shall apply. Additional information and guidance is provided below for some of the definitions. **The definitions are listed by the same numbers used in the rule. Not all the definitions are included below.**

(1) ***Aquatic plants*** are free floating or underwater plants. Some of the free floating plants are *Lemna* and *Spirodella* (duckweeds), *Eichhornia crassipes* (water hyacinth), *Pistia stratiodes* (water lettuce), and *Salvinia*. Examples of underwater plants include but are not limited to *Hydrilla* and *Vallisneria americana* (eel-grass). *Nymphaea* spp. (water lilies), *Nelumbo* spp. (lotus), *Nuphar luteum* (spatterdock) and other emergent plants, which send a leafy stem above the surface of the water, are not considered aquatic plants for the purposes of Chapter 62-340, F.A.C. Aquatic plants are not considered when determining the dominance of plant species or in the determination of strata. The presence of aquatic plants may be considered as a hydrological indicator in accordance with subsection 62-340.500(3), F.A.C.

(2) ***Canopy*** is often referred to as the top layer of the forest. The definition in the rule further qualifies the characteristics as woody plants or palms with a main trunk at least 4 inches in diameter (four inches wide) at a point 4.5 feet above the base of the tree (Diameter at Breast Height - DBH). If the tree is on a slope, the diameter is measured from the midpoint of the base of the tree on the slope. Vines are not considered for this or any other vegetative evaluation.

(4) ***Facultative plants (FAC)*** are plants which are so problematic in their distribution as to render them inappropriate for indicating inundation or soil saturation. Specifically included are exotic plants with a weedy distribution. Facultative plants are not used when evaluating the dominance of plants species or when determining the appropriate strata.

(5) ***Facultative wet plants (FACW)*** are plants which under natural conditions typically exhibit their maximum cover in areas subject to surface water inundation and/or soil saturation, but can also be found in an upland.

(6) ***Ground Cover*** includes all plants which are less than 4.5' tall or have a DBH of less than 1". Vines are not considered. Groundcover is the lower most of the three layers of vegetation which are evaluated for the vegetation analysis.

(7) ***Ground truthing*** or on-site evaluations of the wetlands and their parameters are necessary to accurately delineate a *wetland*. The conditions of the *wetlands* and the boundaries observed should be documented during the ground truthing of the site.

(8) ***Hydric soils***. A soil is inundated when the water table is at or above the soil surface. A soil is flooded if the water is moving across the soil surface as in a slough or on a floodplain. A soil is ponded if the water is sitting on top of the soil

with no movement to an outlet as is the case with some depressions. A soil is saturated if the water table is within 6 inches of the soil surface for sandy textured soils or within 12 inches for loamy or clayey textured soils. These water table depths for each textural category will support a capillary rise of water to the soil surface. If the duration of saturation or inundation is long enough, (greater than several weeks during the growing season), the oxygen content of the water in the topsoil will be exhausted. The subsequent anaerobic conditions in the soil result in an accumulation of organic matter and the reduction and movement of iron which produce a soil morphology that is identifiable in the field (*hydric soil indicators*). Hydric soil information is available through the county Natural Resource Conservation Service (formerly the Soil Conservation Service) office.

(9) ***Hydric Soil Indicators*** are those listed in *Florida's Ecological Communities* (1992). It is highly recommended that all who evaluate hydric soil seek professional training provided by qualified soil scientists. Hydric soil indicators must be verified on site, throughout the site.

(10) ***Inundation*** pertains to all surface water at or above the soil surface.

(11) ***Obligate plants*** are those plant species which under natural conditions are only found or achieve their greatest abundance in an area which is subject to surface water inundation and/or soil saturation. Some obligate plant species can be observed in an upland, especially under a controlled environment. Included in this category are the littoral plants and emergent aquatics, such as *Nymphaea* spp. (water lilies), *Nelumbo* spp. (lotus), and *Nuphar luteum* (spatterdock).

(13) ***Riverwash*** includes areas generally considered to be alluvial.

(14) ***Saturation.*** The extent to which shallow water tables can create anaerobic conditions throughout the soil profile is to a great extent a function of the soil texture. Soil texture determines the size and nature of open pores which exist within the soil. Capillary action, the adhesion and cohesion of water molecules in these pores, results in the lifting of water from the water table towards the soil surface. The smaller the pores, the greater the distance which capillary action will lift water. In order for water to reach the soil surface via capillary action, a water table must be closer to the surface in sandy soils than in finer textured soils because the soil pores are larger in the sandy soil.

(15) ***Seasonal High Water*** means the elevation to which the ground and surface water can be expected to rise in a normal wet season. Indicators of seasonal high water may be observed whether the mark is above or below ground. The characteristics may not always be obvious or even present. The presence of hydrologic indicators must be used with reasonable scientific judgement. Seasonal high water is particularly applicable to the delineation of isolated wetland systems.

(16) ***Subcanopy*** is generally thought of as the smaller trees and tall shrubs in the forest. It is typically the middle of the three vegetative layers considered in the

vegetation analysis. A plant must have a main stem more than 4.5 feet tall and greater than 1" in diameter to be in the subcanopy. Most species of palms will not be in the subcanopy category if their diameter is greater than 4.5" when the trunk is at least 4.5 feet tall.

(18) ***USDA - SCS*** is the former United States Department of Agriculture - Soil Conservation Service, now know as the **USDA - Natural Resource Conservation Service (USDA - NRCS)**.

(19) ***Wetlands.*** This definition lists the types of areas that are intended to be considered *wetlands* and areas which are generally not intended to be considered *wetlands. Wetland types* are quite variable within the climatological extent of Florida. *Other similar areas* includes less common *wetland types* and *wetland ecotonal* areas that may have a mixture of characteristics of adjoining communities. Please refer to the *characteristics of wetlands* as provided in the methodology to determine if these areas are wetlands or uplands in accordance with this definition. Please note the word *generally*. *Generally* means *in most cases*. All applications of the methodologies should reflect this definition of *wetlands*.

Wetland vegetation along lake margin, *Taxodium ascendens* (pond cypress), *Nymphaea odorata* (white water lily), and *Typha domingensis* (southern cattail).

Delineation Procedures - Tools (subsection 62-340.300(2), F.A.C.)

The tools used in the delineation of wetlands are very specific:

Vegetative Index - This is a list of most plant species which can be found in Florida wetlands. When the term *spp.* is used, it represents all species in that genus within the geographical range of the boundaries of Florida (some exceptions are stated on the list). Each species or group of species is assigned an indicator status of either obligate (OBL), facultative wet (FACW), or facultative (FAC), that can be used in the technical procedures described below. All plant species which are not specifically assigned an indicator status, except for vines, aquatic plants and plants introduced into the geographic area of Florida subsequent to July 1, 1994, shall be considered to be assigned an indicator status of upland (UPL).

Hydric Soil Indicators - Hydric soil characteristics are those identified in Soil and Water Relationships of Florida's Ecological Communities (Florida Soil Conservation ed. Staff 1992). Additionally, included in subsection 62-340.300(2)(c), F.A.C., are specific types of *very wet* soils.

Hydrologic Indicators - Hydrologic Indicators, and conditions thereof, shall be used in accordance with section 62-340.500, F.A.C., using ***reasonable scientific judgement***.

Reasonable Scientific Judgement - Reasonable scientific judgement takes into account all available information and factors pertinent to the surficial hydrology of the area (see introduction). Some of the important factors to consider when applying reasonable scientific judgement include the following: antecedent moisture conditions, vegetation present, hydrologic alterations, landscape position, local knowledge, and climactic conditions.

Vegetative Index (section 62-340.450, F.A.C.)

The *vegetative index* (section 62-340.450, F.A.C.), is used in the identification and delineation of *wetlands* within Florida. At times, the *landward extent of surface waters* will be determined by factors other than wetlands. In these situations, the vegetative index may not be useful (see section 62340.600, F.A.C.).

The use of plant species in the rule shall be consistent at all times with the indicator status of the species on the *vegetative index*. Plants on the *vegetative index* are specifically listed as *obligate* (OBL), *facultative wet* (FACW), and *facultative* (FAC). Any plant not specifically listed is considered an upland plant except *vines, aquatic plants, and any plant species not introduced into the State of Florida as of the effective date of Chapter 62-340, F.A.C.* (subsection 62-340.200(17), F.A.C.).

Vine refers to any plant species which has a twinning or clasping extended growth form originating at the base of the plant and which is dependent on its own accumulated growth or the growth of other plants for support. Some common vines are: *Vitis* spp. (grape vines), *Smilax* spp. (greenbriers), and *Parthenocissus quinquefolia* (Virginia-creeper). *Lygodium japonicum* (Japanese climbing fern) and *L. macrophyllum* are ferns which grow as a vine. *Rubus* spp. (blackberries) are considered canes, not vines.

Aquatic plants will generally not be observed along the boundary of a wetland unless they have floated up with rising water. Because of the general need for support from surface water, the presence of aquatic plants may be used as an indicator of hydrology, in accordance with subsection 62-340.500(3), F.A.C. This is one of the indicators which may reflect extraordinary events. Always use *reasonable scientific judgement* when using this hydrologic indicator.

Facultative species are not used in the evaluation of the dominant vegetative cover (subsection 62340.300(2)(a) and (b), F.A.C.) or in determining the appropriate strata (subsection 62-340.400, F.A.C.). Facultative species can be observed as dominant vegetation in uplands as often as in wetlands. The ***presence*** of facultative species does not provide information on the exact placement of the boundary of a wetland. In general, facultative species may be thought of as neutral. At times certain facultative species or even upland species may develop morphological adaptations to soil saturation and inundation. These structures are often excellent hydrologic indicators and may be used as such independent of the indicator status of the species, provided such use is in keeping with subsections 62340.300(2)(d) and .500(9), F.A.C.

The *vegetative index* (section 62-340.450, F.A.C.) is not a complete list of all the plants which occur in Florida wetlands. Some Florida wetlands are even dominated by non-listed plants. The indicator status assigned to certain common native plants, which are difficult to categorize ecologically, reflects the intent to maintain the wetland delineation within the scope of the wetland definition. (Please refer to the previous discussions under Introduction, Applied Concepts, and Methodology, section 62340.100, F.A.C.). Among the common plants for which the indicator status of *upland* may not accurately express the complete ecological range of the species are: *Pinus elliottii* (slash pine), *Ilex*

glabra (gallberry), *Quercus virginiana* (live oak), and *Serenoa repens* (saw palmetto). The ecological preference typically exhibited by some species does not reflect the entire range of tolerance to hydrologic conditions which the species may exhibit statewide. For example, the typical ecological preference of saw palmetto throughout most of the state is upland. However, in the Florida Keys, it is found almost exclusively in wetlands (rockland depressions). The wispy, magenta flowered grass, *Muhlenbergia capillaris* (muhly grass) illustrates the reverse situation. It has an obligate status on the *vegetative index* and in south Florida is restricted to inundated and saturated areas, covering extensive wet prairie and similar habitats. Along the north Florida Atlantic coast it is also observed growing on the exposed *upland* coastal sands (these areas would not be delineated as wetlands by the rule). If vegetation were a mandatory criterion under the rule, the inclusion of these and some other species as obligate, upland or wetland indicators would result in the incorrect application of the intent of the wetland definition. The rule provisions regarding choosing appropriate vegetative strata, use of certain soils, commonly referred to as very wet soils, and use of hydrologic indicators in conjunction with hydric soils, are all included in the methodology, at least in part, as a means of addressing the contradictions which can arise because of these plants, which can not be satisfactorily categorized. Remember, it is the methodology as a whole, not any one provision, that is to be used to accurately delineate wetlands as defined by statute.

Please refer to the list of recommended references provided at the back of this manual for assistance in plant identification.

Hydric Soils and Hydric Soil Indicators

A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile that favor the growth and regeneration of hydrophytic vegetation (USDA - SCS, 1991). A soil is inundated when the water table is at or above the soil surface. A soil is flooded if the water is moving across the soil surface as in a slough or on a floodplain. A soil is ponded if the water is sitting on top of the soil with no movement to an outlet, as is the case with some depressions. A soil is saturated if the water table is within 6 inches of the soil surface for sandy textured soils or within 12 inches for loamy or clayey textured soils. These water table depths for each textural category will support a capillary rise of water to the soil surface. If the duration of saturation or inundation is long enough, (greater than several weeks during the growing season) the oxygen content in the in the topsoil water will be exhausted. The subsequent anaerobic conditions in the soil result in an accumulation of organic matter and the reduction and movement of iron which produce a soil morphology that is identifiable in the field (hydric soil indicators).

The USDA - NRCS recognizes four (4) of the hydric soil indicators that are evidence of a water table at or above the soil surface for more than several weeks during the growing season. The hydric soil indicators are muck, mucky texture, gley colors, and sulfidic odor. A complete description of these indicators plus additional criteria needed for each indicator can be found in *Soil and Water Relationships of Florida's Ecological Communities* (Florida Soil Conservation Service, Staff, 1992). The remaining hydric soil indicators are

recognized as evidence of saturation (Table 1.) of the top layer of soil for more than several weeks. These hydric soil indicators are also discussed in detail in the FL - SCS publication previously mentioned.

Table 1. Hydric soil indicators of saturation

1. Dark surface
2. Organic accretions
3. Oxidized rhizospheres
4. Polychromatic matrix (matrix stripping)
5. Stratified layers
6. Iron and Manganese concretions*
7. Distinct or Prominent mottles*
8. Marl*

* For loamy and clayey textured soils only

Hydric soil sample from hardwood swamp
(Wakulla County)

Hydrologic Indicators (section 62-340.500, F.A.C.)

It is important to read the first paragraph of section 62-340.500, F.A.C. as it qualifies the use of the hydrologic indicators with ***reasonable scientific judgement*** (see introduction). *Reasonable scientific judgement* involves consideration of the conditions causing the indicators. The presence of hydrologic indicators may not provide any information on the normalcy of the event or series of events causing the conditions. Every effort should be made to acquire detailed knowledge about the site prior to considering factors which are directly caused by the immediate presence of water. The lack of certain or specific hydrologic indicators at a site should not be viewed as negative evidence when other indicators are present. It is the total weight of the evidence of wetland conditions on site, provided by the indicators present that, once subjected to reasonable scientific judgement, is used or rejected in establishing the wetland boundary. The following thirteen hydrologic indicators are listed in the rule.

(1) Algal mats are the presence or remains of nonvascular plant material which develops during periods of inundation and persists after the surface water has receded. Algal mats are important indicators of inundation when the vegetation and soil has been altered. In addition, seasonally flooded natural areas such as depression marsh, interdunal swale, rocklands in the Florida Keys and extensive areas of marl/swale of the Everglades may have extensive algal mats as the only hydrologic indicator present. In southwest Florida, algae mats are one of the most important wetland indicators because of the lack of organic accumulation in many of the seasonally inundated communities. Algal mats are often associated with aufwuchs and water marks. The degree to which this indicator is expressed on a site is best interpreted when the rainfall history of the area is known.

Algal mat, rockland depression, Big Pine Key
(Monroe County)

Algal mat in depression marsh, Southwest Florida

(2) Aquatic mosses or liverworts on trees or substrates. Mosses and liverworts are in a group of plants collectively called bryophytes. They lack true roots and leaves and are generally found in shaded, moist environments. Look for epiphytic or epipteric mosses and liverworts along rivers, streams, bayous, sloughs and strands as they typically occur in shaded, forested floodplains that experience prolonged, seasonal inundation. After

Fontinalis sp. on tree base in a riverine swamp

water levels have fallen, they will appear as a dark greenish-brown "shaggy" growth, suspended on the bark of trees and the surface of rocks. Typically encountered mosses include: *Brachelyma* spp., *Dichelyma capillaceum*, *Fissidens debilis, Fissidens manateensis*, *Fontinalis* spp., *Hygroamblystegium tenax*, *Leptodictyum riparium, Sciaromnium lescurii*, and *Sphagnum* spp.; liverworts include: *Porella pinnata*. Identification of dried bryophytes is aided by a hand lens and the application of water to the dried plant body. Two taxonomic references of use are: *Mosses of Florida* by Ruth Schornherst Breen, 1963 and *Mosses of the Gulf South* by William Dean Reese, 1984.

Aquatic bryophytes on *Nyssa ogeche*

(3) Aquatic plants. Aquatic plants are defined in section 62-340.200, F.A.C. as "plants which typically float on water or require water for its entire structural support, or which will desiccate outside of water." Aquatic plants naturally grow in

Eichhornia crassipes (water-hyacinth), an aquatic plant.

areas where inundation is permanent or nearly so. The presence of aquatic plants at a site not presently inundated by water is an excellent indicator that the normal condition at the site is much wetter or, in the case of floating plants, that the site experiences periodic flooding by an adjacent surface waterbody. Look for evidence of aquatic plants in seasonally fluctuating water bodies. Typical floating aquatics include such genera as: *Riccia, Ricciocarpus, Azolla, Salvinia, Pistia, Echhinoria, Lemna, Spirodela, Wolffia*, and *Wolffiella* in seasonally flooded, shallow lakes and ponds or surrounding floodplain forests. An aid to the identification of the previously mentioned plants can be found in R. K. Godfrey, *Aquatic and Wetland Plants of Southeastern U. S.*, 1979 and floras published for a particular area of the state. Water lines and aufwuchs are often also associated with a seasonal drawdown of water bodies.

(4) Aufwuchs is the presence or remains of the assemblage of sessile, attached or free-living, nonvascular plants and invertebrate animals (including protozoans and fresh water sponges) which develop a community on inundated surfaces. Look for the presence of aufwuchs on branches, rocks and other objects that have been submerged.

Aufwuchs on emergent wetland vegetation

Aufwuchs are important indicators in seasonally inundated areas. They often appear as a crust-like growth, sometimes bleaching to white in sunlight during the dry seasons.

(5) Drift lines and rafted debris are vegetation, litter, and other natural or manmade material deposited in discrete lines or locations on the ground or against fixed objects, or entangled above the ground within or on fixed objects in a form and manner which indicates that the material was waterborne. This indicator should be used with caution to ensure that the drift lines or rafted debris represent usual and recurring events typical

Drift line in a salt marsh, Choctawhatchee Bay

of inundation or saturation at a frequency and duration sufficient to meet the wetland definition of subsection 62-340.200(19), F.A.C. When debris has been carried by water and deposited in an area, especially an area foreign to the origin of the material, then the conditions contributing to the observations must be considered. For example, extreme events such as hurricanes and tropical storms may induce unusually high drift lines and rafted debris associated with a storm surge that would not be typical for a particular area. Look for drift lines in tidal areas, rivers and streams that regularly flood, or any wetland where high water deposits or arranges leaves and twigs in a distinguishable pattern. In evaluating rafted vegetative debris, be sure to consider only water-induced evidence.

Rafted debris, North Florida stream

(6) Elevated lichen lines. Lichens are a symbiotic association of a fungus and an alga. Typical lichen forms include crustose, foliose and fruticose. Crustose lichens are flattened and appressed like a film on the bark. Foliose lichens are flattened, thin and lobed. Fruticose lichens are highly branched, forming a shrubby, bushy

structure of flattened or cylindrical branches. The crustose and foliose type of lichen are the most commonly encountered on the bark of trees. Lichen are not tolerant of inundation. When water routinely stands around the trunks of trees it abruptly limits the growth of lichens producing a distinct line. These are instructive as part of the

Elevated lichen lines, riverine swamp

information used in determining the ordinary or seasonal high water line for some types of wetlands and other water bodies. Many shallow swamps have a seasonal high water which does not result in prolonged inundation of the tree trunks. These wetlands exhibit inundation as the pooling of water over the swamp floor which is typically at a lower elevation than the base of the trees (see vegetated tussocks and hummocks). Lichen lines would not be anticipated in this type of wetland.

(7) Evidence of aquatic fauna. This indicator considers the presence or indications of the presence of animals which spend all or portions of their life cycle in water. Only those life stages which depend on being in or on water for daily survival are included in this indicator. Remember that some types of aquatic fauna are extremely motile and can move into non-wetland areas because of abnormal conditions such as prolonged flooding. Additionally, some adult aquatic beetles and bugs are capable of flight and readily leave the water during warm humid nights. It is not unusual to encounter these animals in uplands, especially if night lighting is present. Look for evidence in the cast skins of insect larva, especially dragonflies, on emergent vegetation, or remanent molluscan shells (bivalves and snail). Crayfish burrows are excellent hydrologic indicators but must be considered with care as they can occur outside areas defined as wetlands and may only be indicators of a seasonal high water table. When this is the

case however, the burrows are, almost without exception, much more numerous on the wetland side of the boundary.

(8) Hydrologic data consists of reports, measurements, or direct observation of inundation or saturation which support the presence of water to an extent consistent with the provisions of the definition of wetlands and the criteria within the rule, including evidence of a seasonal high water table at or above the surface according to methodologies set forth in *Soil and Water Relationships of Florida's Ecological Communities* (Florida Soil Conservation Staff 1992) (see introduction). These observations should be used in conjunction with observations offered by local residents, published reports or data and other hydrologic indicators observed in the field. Provided that a site has not been extensively drained, county soil surveys are an excellent source for hydrological conditions typically associated with a specific map unit.

Dragonfly emerging, (larval cast on the vegetation is a hydrologic indicator)

Crayfish chimney, Withlachoochee River floodplain, (Madison County)

(9) Morphological plant adaptations are specialized structures or tissues produced by certain plants in response to inundation or saturation which normally are not observed when the plant has not been subject to conditions of inundation or saturation. These are often observed in the form of hydric adventitious roots and hypertrophied lenticels. Hydric adventitious roots are typically produced on the stem or trunk of certain plants, when inundated, as an alternative mechanism for aerobic respiration during

a period of anoxia in the soil root zone. Once inundation subsides, these roots cease growth. Hydric adventitious roots are seldom observed rooted into soil. The expression of hydric adventitious roots can vary from only a few individual roots to a bushy abundance which may totally cover the stem. Hypertrophied lenticels are abnormally large lenticels which appear as expanded portions of the outer bark of stems and roots. These also appear to function as a mechanism to enhance opportunities for aerobic respiration. Look for hydric adventitious roots and hypertrophied lenticels on stems of flooded plants such as *Myrica cerifera* (wax myrtle), *Ludwigia* spp. (primrose willow) and *Hypericum* spp. (St. John's-wort). Expanded lenticels can also be found on many species of bottomland hardwood trees. Other examples of morphological plant adaptations produced in response to extended wetness are the conspicuous prop-roots of *Rhizophora mangle* (red mangrove), the "knees" of *Taxodium distichum* (bald cypress), and the buttressing of tree bases as exhibited by *Nyssa sylvatica* var. *biflora* (swamp tupelo), *Ulmus americana* (American elm) and *Quercus laurifolia* (swamp laurel oak).

Hydric adventitious roots and hypertrophied lenticels on stem of *Myrica cerifera* (wax myrtle)

Caution: Once a morphological adaption develops it does not disappear if the site is drained and no longer functions as a wetland.

(10) Secondary flow channels are discrete and obvious natural pathways of water flow landward of the primary bank of a stream watercourse and typically parallel to the main channel. These often occur in conjunction with sediment deposition and water marks. Look for these along streams and rivers, especially adjacent to or within floodplain forests.

(11) Sediment deposition is mineral or organic matter deposited in or shifted to positions indicating water transport. The current of a river or stream during high flow

Butressed roots of *Ulmus americana* var. *floridana* (Florida elm), Peace River (Hardee County)

Prop-roots of *Rhizophora mangle* (red mangrove), Key Largo, (Monroe County)

Buttressed bases of *Taxodium ascendens* (pond cypress), (Leon County)

Sediment deposition, Ochlockonee River floodplain, (Liberty County)

carries sediment that is normally in equilibrium with the lower flow velocity and is thus retained near the bottom as bed flow. When a stream overflows its primary bank and occupies the floodplain, the resultant increase in capacity causes a sudden decrease in velocity in the water outside the main channel. This results in the over bank flow dropping its acquired sediment load in the floodplain usually but not always close to the primary bank. Look for material deposition on rocks and plants especially when the deposition is observed on the upstream surface and not on the downstream surface. Sediment deposited as erosion from uplands is not included in this indicator.

(12) Vegetated tussocks or hummocks are areas where vegetation is elevated above the natural grade on a mound built up of plant debris, roots, and soils so that the growing vegetation is not subject to the prolonged effects of soil anoxia. Look for these in hydric hammocks and in areas of shallow prolonged

Vegetated hummocks

inundation or where the soil is saturated to the surface for long duration. Tree buttressing is often associated with tussocks or hummocks in saturated soils.

(13) Water marks. Water marks are created by the staining effect of a sustained water elevation. This will appear as a distinct line created on fixed objects, including vegetation. The length of time the object has been inundated influences the expression of this indicator, as does the color and sediment burden of the water. Look for this in conjunction with sediment deposition, especially along rivers and streams. Seasonal high water marks in wetlands and other water bodies often appear related to the elevated lichen lines, aquatic moss and liverwort zones and water stained areas of trees, rocks and other objects.

Water marks in hydric hammock, (Citrus County)

Delineation of Wetlands (section 62-340.300, F.A.C.)

This section lays out the physical evaluations which are conducted on site to determine the placement of a wetland boundary. These evaluations are conducted as a continuous process to produce a spatial line or boundary on the ground. The area landward of this line is the ***upland*** and the areas waterward of this line is the ***wetland.*** The line represents ***the landward extent of wetlands.*** The procedures for evaluating the placement of the boundary line should be conducted using **reasonable scientific judgement**.

Direct Application of the Wetland Definition (subsection 62-340.300(1), F.A.C.)

The first evaluation that is performed before delineating a wetland is to determine if the area meets the *definition of a wetland* as stated in subsection 62-340.200(19), F.A.C. The transition between some wetland areas and the uplands is so abrupt that a visual observation is all that is required to established the wetland boundary. If it is determined that the area qualifies as a wetland and the boundary line can be easily located on site independent of the technical procedures described below, then the wetland boundary may be delineated solely on the basis of the on-site characteristics consistent with the wetland definition. When this section is implemented there is an assumption that the boundary line placement is very close, if not equivalent, to the line which would be determined using the technical procedures. Remember that this is a legal boundary with specific characteristics.

If the boundary line cannot easily be located without a closer examination of its characteristics, then the technical procedures of the rule described below shall be followed and adequate descriptions of the in-situ conditions and the placement of the delineation will be recorded.

Technical Delineation Procedures (subsection 62-340.300(2), F.A.C.)

This section provides the conditions for determining when an area qualifies as a wetland. Before using the technical procedures requiring vegetative dominance, it is important to understand the application of the phrase *appropriate vegetative stratum* as presented in section 62-340.400, F.A.C.

Selection of Appropriate Vegetative Stratum (section 62-340.400, F.A.C.)

The rule employs three vegetative strata: canopy, subcanopy, and ground cover. An explanation of each of these terms is found in the definition section of the rule and was further explained previously. When applying the provisions of the rule that use vegetative dominance, only the vegetation in one of these strata is used to evaluate dominance.

Always begin the process using the uppermost stratum which is present. In some wetlands, such as a marsh, the ground cover is the only stratum present and is therefore the uppermost stratum.

The uppermost stratum is not used if the areal extent (coverage by the vegetation) of the stratum is less than 10% of the area (community) being evaluated. In determining coverage of the uppermost strata, ***facultative*** plants are not considered. For example, a forest where *Melaleuca quinquenervia* makes up greater than 90% of the cover of the canopy would be evaluated using either the subcanopy or ground cover, not the canopy. When the ground cover is the uppermost stratum, the 10% coverage is moot as there is no lower stratum that could be used.

Canopy of *Pinus elliottii* (slash pine) growing under inundated conditions (a wetland!)

The canopy is often the uppermost stratum. Do not separate individual "holes in forest" using this provision unless they represent a separate community type. For example, pine flatwoods, which are open forests, frequently have individual areas of less than 10% areal coverage by the pine tree canopy, yet the forest as a whole usually exhibits 40-60% canopy coverage. Remember, anything less than a 100% closed canopy has some area where there is no canopy: view the forest as a unit when it constitutes a uniform community. Conversely, only include the plants actually growing in a specific community in the

determination of appropriate strata. At times, trees in one community may over hang another. A stream is still a water body even if totally covered by overhanging live oaks growing on upland banks. A small upland peninsula extending into a swamp is still an upland even if totally covered by the spreading branches of cypress trees growing in the adjacent swamp.

The uppermost stratum is also not used when the indicator status of the uppermost stratum is clearly in conflict with the hydrologic conditions on-site. A determination that the upper stratum is not an accurate indicator of the true nature of the area being evaluated must be accomplished using reasonable scientific judgment (see Introduction) and requires that the party shifting from the uppermost stratum bear an addition burden of proof. Those wetlands that do not express their wet nature in the canopy can be delineated using this provision. Some severely drained former wetlands that retain their original canopy are also candidates for this provision. When the uppermost stratum is discounted after careful review of all factors related to the on-site hydrology, then the

Seasonally inundated hydric pine flatwoods (a wetland!)

remaining stratum most indicative of the true nature of the site should be used to make the determination. Differences between the indicator status of the vegetative strata do not automatically allow the shifting from the uppermost stratum; additional on-site derived evidence is required. The indicator status of lower strata vegetation can, however, influence the weight attributed to other on-site hydrologic evidence used in arriving at a reasonable scientific judgment regarding whether to shift from the uppermost stratum. Using this principle, the presence of obligate vegetation in a lower stratum would provide greater support to weak hydrologic evidence than would

facultative wet vegetation. While facultative wet vegetation can certainly serve as the basis for a lower strata most indicative of the true hydrologic nature of a site, it is a reasonable scientific judgment to expect that the site would exhibit hydrologic evidence that is convincing for the type of wetland community and its location in the state. In evaluating on-site hydrologic evidence, knowledge of the rainfall status of the site is vital because similar expressions of wetness may provide differing degrees of evidence under differing rainfall conditions. Shifting out of the uppermost stratum may only be used to accurately establish the wetland or upland nature of the community not to reflect the immediate (short term) hydrological status of low, occasional wet uplands or drought impacted wetlands.

Points to remember:

- **This procedure shall be conducted when the indicator status of the top stratum appears not be indicative of the normal hydrology of the area being evaluated.**

- **The evaluation must be backed up by sufficient information for the delineator to be sure that the decision to use another stratum is correct.**

- **This evaluation can be used at any time during the delineation procedure.**

Technical Delineation Procedures (subsection 62-340.300(2), F.A.C.)

The order in which these procedures are used does not matter. The approach used varies from individual to individual. Some will notice the topographic changes and hydrologic indicators before observing vegetation patterns. Others may not make any judgement until evaluating the soil conditions. A knowledge of the applicability of each of the four technical procedures is essential to accurately use the rule. The boundary will be delineated by the procedure (*test*) that distinguishes wetland conditions from upland conditions as defined and represented in the rule.

First, make a determination that the area is a wetland, then starting within the wetland move landward to the point on the slope where the technical procedures of the rule all fail. Variability should be limited to the realm of *reasonable scientific judgement*. If *hydric soil indicators* and *hydrologic indicators* extend beyond the area of listed species dominance, the result must be reviewed with *reasonable scientific judgement*. This allows the evaluation of ecological information as well as all other facts and factors. Once a boundary point is established the delineation typically proceeds parallel to the wetland as an extension of the initial point. Along this boundary fixed points are periodicly marked (flagged) to designate the location. Because the boundary is a continuous feature, the visual line of sight between points must reflect the upland/wetland interface. If it does not, additional points must be flagged. As the delineation continues, remember that **all** the provisions of the methodology are constantly in operation. This requires the delineator to frequently reaccess the technical procedures and use of appropriate strata. Fortunately, most wetland delineations only involve a couple of procedures and the

pattern in which these are used becomes apparent along the way.

62-340.300(2)(a) "A" Test: is the dominance of obligate vegetation over upland vegetation in the appropriate stratum and ecological support for wetland conditions on site in the form of either hydric soils or convincing hydrologic indicators (Figure 1).

OBLIGATE VEGETATION > UPLAND VEGETATION
AND
HYDRIC SOIL CHARACTERISTICS OR RIVERWASH
OR
HYDROLOGIC INDICATORS

Figure 1. The "A" test (obligate plant test) conditions in brief.

62-340.300(2)(b) "B" Test: is the dominance by any combination of obligate and facultative wet vegetation at a coverage of 80% or greater (this is the same as saying that the coverage by upland vegetation must be less than 20%) and ecological support for wetland conditions on site in the form of either hydric soils or convincing hydrologic indicators. (Remember, facultative plant coverage is not included in this comparison.) (Figure 2).

OBLIGATE + FACULTATIVE WET ≥ 80% (UPLAND < 20%)
AND
HYDRIC SOIL CHARACTERISTICS OR RIVERWASH
OR
HYDROLOGIC INDICATORS

Figure 2. The "B" test (facultative wet plant test) conditions in brief.

The Plant Tests "A" Test and "B" Test

Since vegetation is one of the most apparent aspects of a landscape, the use of vegetation dominance is a frequently used procedure for determining a wetland boundary. Neither the "A" nor the "B" test include the use of facultative vegetation, vines, nor aquatic plants in estimating the percent areal coverage for dominance. Many plant species have a variable tolerance to microenvironmental conditions. The vegetation patterns may reflect zones of hydrology across a landscape which may not necessarily coincide with the wetland/upland boundary. When using vegetative dominance to establish the wetland boundary, be sure to consider the remaining technical procedures prior to formalizing the determination.

Both the "A" and "B" tests have additional provisions that allow a positive demonstration of wetland conditions in the absence of either hydric soil indicators or hydrologic indicators when the upper soil profile has been mechanically mixed or when the substrate is not technically a soil. Use of these additional provisions should only be implemented in consultation with a professional soil scientist present on site.

Reticulate Communities are areas where two or more vegetative communities intergrade in a complex labyrinth. In such a situation, the dominant community should be used for the vegetative test. Examples of reticulate communities include: ecotonal flatwoods with mixtures of mesic flatwoods and wet prairies or savannahs, wetland pine rockland areas of the Keys, and wet prairies along the footslopes of the central highlands and some coastal areas of the panhandle. This is not intended to apply when discreet communities can be delineated, such as wetland flowways through mesic flatwoods. Only one hydric soil indicator or one hydrologic indicator subject to reasonable scientific judgement is needed to support the dominance of hydrophytic vegetation.

62-340.300(2)(c) "C" Test: is the use of specific soil situations to delineate wetlands. In the "C" test certain soil situations are identified as providing sufficient evidence to serve as the sole factor in wetland identification and delineation. The "C" test cannot be used in pine flatwoods, improved pastures and drained soils. Both pine flatwoods and improved pastures are defined for purpose of this section only.

> *"Pine flatwoods shall mean a plant community type in Florida occurring on flat terrain with soils which may experience a seasonal high water table near the surface. The canopy species consist of a monotypic or mixed forest of long leaf pine or slash pine. The subcanopy is typically sparse or absent. The ground cover is dominated by saw palmetto with areas of wire grass, gallberry, and other shrubs, grasses and forbs which are not obligate or facultative wet species. Pine flatwoods do not include those wetland communities as listed in the wetland definition contained in subsection 62-340.200(19) which occur in the broader landscape setting of pine flatwoods and which may contain slash pine."*
>
> *"Improved pasture shall mean areas where the dominant native plant community has been replaced with planted or natural recruitment of herbaceous species which are not obligate or facultative wet species and which have been actively maintained for livestock through mechanical means or grazing."*

An area is considered to have drained soils only when the hydrology has been changed to such an extent as to prevent the formation and maintenance of hydric soils as defined in the rule. The definition of hydric soils can be found in the definition section of the wetland delineation rule (Appendix A) and applies to the entire rule. As with any part of the rule, on-site observation and verification of the specific soil conditions mentioned in the "C" test is mandatory.

1. Soil Taxonomy
From the soil classification system (Soil Survey Staff, 1994), six great groups and one soil order are identified as having soils that form only under very poorly drained conditions. The taxonomic names of the six *great groups* are: ***Argiaquolls, Hydraquents, Humaquepts, Sulfaquents, Umbraqualfs,*** and ***Umbraquults***. ***Histosols*** are the order that is included in this section. The organic soils belong to this order. All Histosols are included in the "C" test except the Folists, which do not form under saturated or inundated conditions. In Florida, Folists are found only in the Keys and lower Dade County. The six great groups and the organic soils can be considered to be the wettest of the hydric soils and are always found in wetlands under natural drainage conditions.

Soil Taxonomy has an hierarchial scheme similar to the biological classification used for plants and animals. Moving from the broadest classification level to the most specific, the classification levels of *Soil Taxonomy* are: order, suborder, great group, subgroup, family, and series. The great group level is the third level of soil classification. Within each of the six great groups mentioned in the "C" test, there are from 2 to 10 soil series in Florida. The soil series is the lowest level of classification. Common names are used for soil series which were named after towns, rivers, lakes, or geologic formations in the vicinity of where the soil was first identified as a discrete soil entity. For example, in Florida, the three soil series (Turnbull, McKee, and Riomar) are classified as belonging to the great group *Hydraquents* and can be used in the "C" test. The taxonomic names of the various soil series within a county can be found on the map legend between the text and the aerial photographs in the county soil surveys produced by the USDA - NRCS. Field verification of the great groups within a soil map unit is required. The boundary of the great group or organic soil will define the limit of the wetland using the "C" test.

2. Saline sands
Saline sands are tidal areas that have limited or no plant growth due to high salt concentrations. These areas are generally tidal, very poorly drained, and are found in high marsh areas.

3. Frequently Flooded and Depressional Map Units
Soil mapping units are not a part of soil classification, but are a subdivision of the soil series based on different land use and management. Map units generally have inclusions of other soils series and non-soil. The **frequently flooded** and **depressional** map units are also included as stand-alone criteria in this section of the rule. The county soil surveys have a list of map units in the map legend. Once an area has been located on the aerial photographs, the map unit can be identified from the map unit symbols. Because of the constraints on the detail of soil maps, the boundaries of depressional and frequently flooded areas must be verified in the field. The boundary of the hydric soils within this map unit is the field adjusted boundary of the frequently flooded or depressional map unit. Areas above the adjusted boundary may still inundate or flood but may not meet the duration requirements necessary for wetland formation. Other areas above the boundary may also be inclusions of upland soils within the map unit that

neither inundate nor flood. The boundary of a depressional or frequently flooded map unit can be systematically checked by examining the soils along a traverse moving uphill from the center of the map unit. A soil scientist from the USDA - NRCS can serve as a third party to settle boundary disputes between the petitioner and the regulating agency. Unlike the field test for the great groups and organic soils, the soils within the map unit need only be hydric and proof that they are the soil that the map unit defines is not necessary.

62-340.300(2)(d) "D" Test : is the presence of a hydric soil and a hydrologic indicator (Figure 3). Using this procedure, the presence of a hydric soil and a hydrologic indicator, once subjected to reasonable scientific judgement, represents sufficient information for designating an area as a wetland. The application of reasonable scientific judgement is very important in the use of this procedure. Vegetative dominance by species listed in section 62-340.450, F.A.C., is not required in order to use this procedure. Vegetation present on site may however be considered in the application of reasonable scientific judgement. A list of 13 hydrologic indicators that meet the hydrologic criteria is provided in section 62-340.500, F.A.C., of the rule. Among the hydrologic criteria, hydrologic data specifies that any evidence of a seasonal high water table at or above the surface according to methodologies set forth in *Soil and Water Relationships of Florida's Ecological Communities* (Florida Soil Conservation Service Staff, 1992) can be used as a hydrologic indicator. This allows the hydric soil indicators of muck, mucky texture, gley colors, and sulfidic odor to act as both a hydric soil indicator and a hydrologic indicator.

HYDRIC SOIL INDICATORS + HYDROLOGIC INDICATORS

Figure 3. The "D" test (Hydrologic Indicators Test) in brief

Altered Sites (subsection 62-340.300(3)(a), F.A.C.)

This subsection is only used when the technical procedures discussed above cannot be applied because of man-induced or natural disturbances or alterations. An activity that could produce this scenario would be the clearing and tilling of shallow wetlands or low uplands when no additional drainage is involved. With the vegetation taken away and the soil surface layer scrambled, it may be difficult, if not impossible to use the technical procedures outlined above.

When this is the case, all alternative information relating to conditions on site immediately prior to the alteration shall be considered. The rule provides examples of reliable sources of information.

Two questions to consider while evaluating the available information are:

1. What was the ecological community in place prior to the alteration? (Was this area upland or wetland before the alteration?)

2. Has the alteration had a temporary or permanent effect on the hydrology of the site? Sites, where exempted or permitted dredging or filling activities have altered the hydrology to the extent that it is no longer a reasonable scientific judgement that the site is a wetland, are not included in the altered sites provision. When the only alteration is the removal of the vegetation from a site, it can reasonably be expected that the site, if no further alterations occurred, can and probably will return to its former condition. Lowering of the soil surface may constitute a change to the on-site hydrology.

Wetland Hydrology (section 62-340.550, F.A.C.)

While the rule does not, can not, and should not provide a numerical criteria for the use of the presence of water in the identification and delineation of wetlands, the absence of water under certain circumstances may be used in a backstop mode to evaluate sites which have possibly lost wetland functions through excessive drainage. This provision is used only to refute a wetland delineation established by the other procedures of the rule. The numeric criteria used in this section were developed from standards which, under typical seasonal expression and recurrence, will usually result in the formation of hydric soils. Areas with soils that exhibit hydric soil indicators yet clearly fail these numeric criteria under the terms prescribed in the rule are relict hydric soils. A relict hydric soil does not correlate to current hydrologic conditions extant on site. Use of this provision, through the application of the numeric criteria, requires long-term records or site specific hydrologic data.

Site specific, field-verified, analytic or numerical models may also be used to refute a wetland delineation. A model must demonstrate that the area delineated as a wetland using the procedures of the rule is no longer subject to either regular and periodic inundation or saturation. In order to prevent possible loss of time or waste of capital, the rule mandates that the use of models occur only after agreement by the regulating agency. Rejection of a proposed model by the regulating agency must be accompanied by reasons based on generally accepted scientific and engineering practices.

Surface Waters (section 62-340.600, F.A.C.)

It is the purpose of Chapter 62-340, F.A.C., to provide a methodology for delineating the landward extent of all surface water bodies subject to the legislative intent of subsections 373.421(1) and .414(1), F.S. This intent is expressed in subsection 62-340.600(1), F.A.C., as follows:

> *"For the purposes of section 373.421, F.S., surface waters are waters on the surface of the earth, contained in bounds created naturally or artificially, including, the Atlantic Ocean, the Gulf of Mexico, bays, bayou, sounds, estuaries, lagoons, lakes, ponds, impoundments, rivers, streams, springs, creeks, branches, sloughs, tributaries, and other watercourses..."*

Surface waters include *wetlands* as a subset of the types of surface waters found in Florida. *Wetlands* are those areas defined in subsection 62-340.200(19), F.A.C.:

> *"...those areas that are inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate hydrophytic macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce or persist in aquatic environments or anaerobic soil conditions. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps and marshes, mangrove swamps and other similar areas. Florida wetlands generally do not include longleaf or slash pine flatwoods with an understory dominated by saw palmetto".*

Some types of surface waters have both wetland and non-wetland components. Some surface waters have no associated wetlands. Some surface waters are all wetland. The technical procedures previously discussed are used whenever the landward boundary of the surface water coincides with the boundary of a wetland as defined. Because of topographic, climatic, and geologic factors, there are areas adjacent to most Florida surface water bodies that regularly flood but which do not develop wetland characteristics. The landward extent of surface waters, when it is other than a wetland, is determined through the location of the *ordinary high water line* (OHWL) for freshwater surface waters, the *mean high water line* (MHWL) for tidal surface waters, and the top of bank or seasonal high water for excavated surface waters as described in subsections 62-340.600(2)(b)(c) and (d), F.A.C. These non-wetland boundary criteria are never used to establish the surface water boundary waterward of a wetland boundary determined using the technical procedures of section 62-340.300 F.A.C. If a wetland is identified landward of the non-wetland surface water boundary, the provisions for wetland delineation can be applied landward and adjacent to the OHWL, MHWL, or top of bank.

Mean high water is an established series of elevations for specific locations along the coast based on the preceding 19 years of tidal data. The elevation for *mean high water* can be located by a professional land surveyor with available NOAA tidal data. The *mean high water line* is the average elevation of the high tides for any particular point on the coast. Half of the normal high tides will be above the MHW line. In some low coastal areas, wetlands occur landward of the MHWL beyond a zone of bare sand created by the continual disturbance of waves. When determining if the upper wetland is either part of the larger tidal waterbody or a separate wetland, *reasonable scientific judgement* should be applied to the analysis of the nature and frequency of the tidal connection. Repeated chronic disturbances such as waves or the disturbances caused by all terrain vehicles do not generally interfere with the placement of the boundary line. Such areas should be evaluated as if those disturbances have not occurred.

Ordinary high water is that point on the slope or bank where the surface water from the water body ceases to exert a dominant influence on the character of the surrounding vegetation and soils. The OHWL frequently encompasses areas dominated by non-listed vegetation and non-hydric soils. When the OHWL is not at a wetland edge, the general view of the area may present an "upland" appearance. This is deceiving in that flooding is common. This area, close to the OHWL, is subjected to an extreme variety of wet and dry conditions. It often proves to be a harsh environment for many plants. This is reflected by the denuded band of sand observed around many Florida lakes.

Water bodies display a cyclic pattern that is expressed through the periodicity of the high and low water elevations above and beyond the typical seasonal variation. The cycle for any given waterbody can be as variable as the water bodies themselves. To determine an accurate elevation for the OHWL, the hydropattern of the waterbody needs to be assessed. This can of course be accomplished through long-term hydrologic data collection. When available, the mean annual flood elevation is an acceptable approximation of the OHWL for flowing water systems. Often, however, this data is not available. An additional way to understand a particular hydropattern is through an evaluation of the age and condition of the plant community on the slope and the structure of the soils. Soil structure is the least used approach as it involves the tedious and time consuming examination and analysis of grain size distribution. Organic content of the soil is also not particularly useful as an indicator for determining the OHWL.

The vegetative characteristics are more prominent and reliable as an indicator in determining the OHWL. Overall, the most productive approach is to locate the least disturbed area along the waterbody and determine the edge of the mature, upland vegetative community. Flooding events are major physical disruption to non-wetland vegetative communities. Between high water events, the community will begin to regenerate, however, there will be an apparent, discrete differential in the age and/or condition of the vegetation in the regeneration zone. Be careful when evaluating the age of the trees. Many species can display their largest form within the OHWL. Some species of pines and *Myrica cerifera* (wax myrtle) provide an excellent example of this situation. *Pinus teada* (loblolly pine), especially, are known to develop fine specimen individuals under conditions that warrant an OHWL evaluation. The condition of the tree rings, if available for analysis, will reflect the age of the trees and periods of high water, drought and fire. *Quercus virginiana* (live oak) is one of the most common species

observed along the OHWL edges of lakes. Don't attempt to core the live oaks. The wood is so dense, the core will probably break and it takes an expert in this field to correctly analyze the information captured within the dense rings. Pines are easy to core and it is also easier to interpret the information which the rings reveal. The number of tree rings will provide an age for the tree. Additionally, the size and condition of individual tree rings will correlate to specific events in the history of the tree. Coring, however, is not necessarily good for the health of the tree and permission should be obtained from the property owner prior to any attempt to core a tree.

High water events leave indicators on the vegetative community, including but not limited to those listed in section 62-340.500, F.A.C., which are correlated to the duration and frequency of the events. When determining an OHWL, additional indicators of use include basal scarring and the partial to complete death of the non-wetland woody vegetation caused by repetitive high water events. Live oaks can be observed with the waterward portion of the tree dead and the landward portion of the tree alive. Basal scarring involves the process of bark saturation (and drying) resulting in a swelling and sometimes, fissuring of the bark.

Features of the overall community can also be of use. A distinct or abrupt change in the community composition, character, age, or distribution will often occur near or at the OHWL. Experience with this type of delineation will reveal more subtle characteristics. To be associated with an OHWL indicators should all agree within a narrow elevational zone.

The OHWL as presented in Chapter 62-340, F.A.C., is to be used only for the purposes of surface water regulatory authority under Chapter 373, F.S. The OHWL as that term is used in this text and in the delineation of wetlands has no relationship with the OHWL determinations conducted by the Division of State Lands of DEP in determining the landward extent of state ownership of sovereignty submerged lands.

The St. Marks River, a surface water body, (Wakulla County)

Exemptions (section 62-340.700, F.A.C.)

This section further expresses the legislative intent regarding the regulation of surface waters by excluding from delineation entirely or by limiting the scope of regulatory review in surface waters approved for use as wastewater treatment areas. The details of this section are summarized below in figure 4.

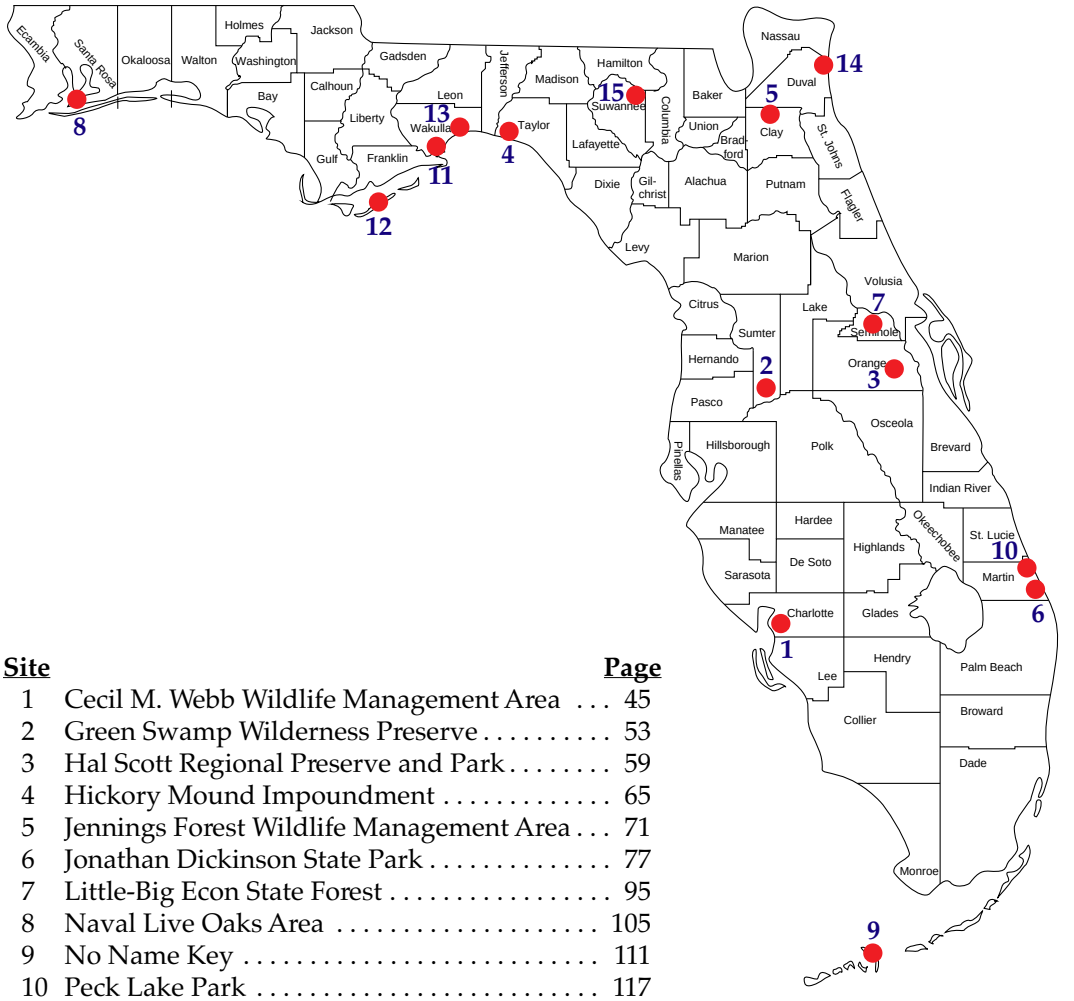
Wastewater Treatment areas except wetlands used for treating effluents under permit.	**Not delineated as Wetlands or Surface Waters** **None of the additional wetland permitting criteria apply**
Small (less than 0.5 acres of combined area) Stormwater Treatment areas	**Not delineated as Wetlands or Surface Waters** **None of the additional wetland permitting criteria apply**
Larger (greater than 0.5 acres of combined area) Stormwater Treatment areas	**Wetland in these systems are delineated** **Only the permitting criteria related to Endangered and Threatened Species apply**
Previously existing wetlands incorporated into Stormwater Treatment areas	**Delineated as wetlands** **Permitting criteria relating to Fish and Wildlife apply**

Figure 4

Mosquito Control (section 62-340.750, F.A.C.)

All areas which were historically *upland* pursuant to Chapter 373, F.S., and which have become *wetland* **solely** because of excavation or impoundment conducted **solely** for the purpose of mosquito control, and which were performed by a governmental entity, shall not be considered wetlands pursuant to Chapter 62-340, F.A.C. In order for the regulating agency to review this exemption, the applicant must provide proof of the conditions as stated in the previous sentence.

Location of Sites



Reference Site Information

Considerable time and effort was required to locate reference sites which were: hydrologically stable, publicly accessible, and secure from general uncontrolled disturbance. The reference sites are all located on properties which are preserves, reserves or management areas. These treasures are here for everyone to use and enjoy, including our future generations. You may not collect plant specimens or otherwise disturb the natural resources in any of these areas without a permit. The reference sites are all small demonstration areas. Please leave them as you find them. Take only pictures. Impacts to the reference sites may alter the information provided to others visiting after you. Several of the sites require prior authorization before entering. This is both for the protection of the visitors and of the natural resources. Fees are required to enter a few of the properties. The fees also go towards protecting the natural resources or enhancing appropriate public use.

If you believe that an alteration has occurred at a reference site, please contact the nearest DEP or WMD resource permitting office and describe the alteration. We will address the situation as soon as possible.

Cecil M. Webb Wildlife Management Area

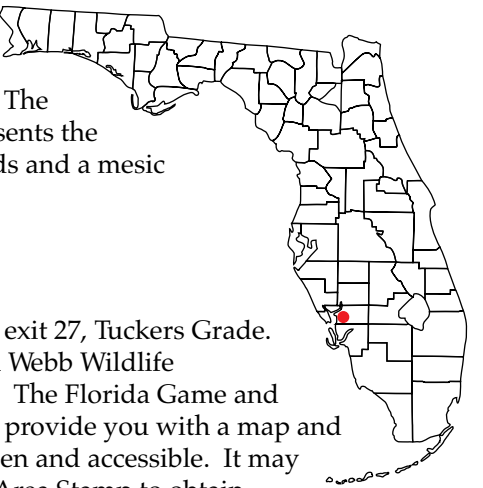
(Charlotte County)

SLOUGH/HYDRIC PINE FLATWOODS

Hydric pine flatwoods

LOCATION

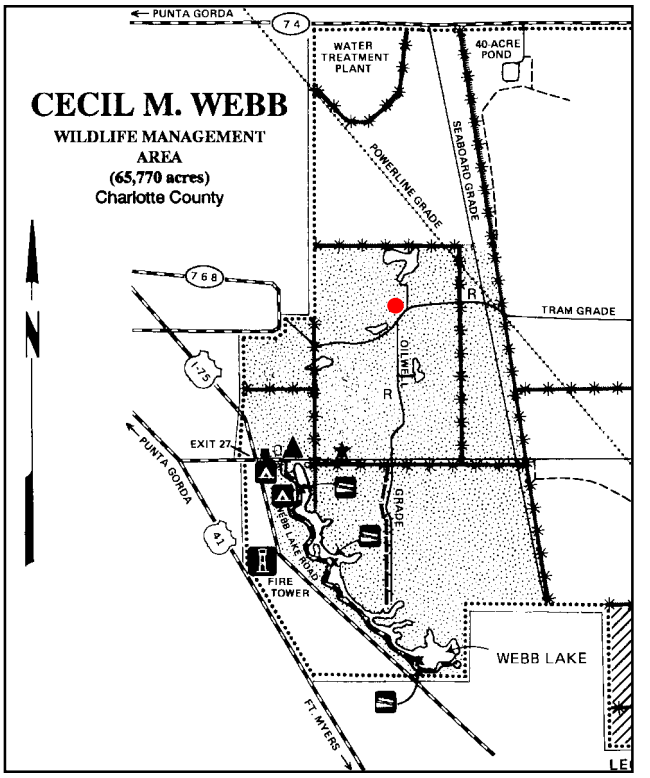
The Cecil M. Webb Wildlife Management Area is located in Charlotte County along the east side of I-75 south of Punta Gorda. The property is an extensive mosaic of mesic and hydric pine flatwoods interspersed with ponds, sloughs, and small areas of hardwood hammock. The reference site is relatively easy to locate and represents the boundary between a slough/hydric pine flatwoods and a mesic pine flatwoods.



ACCESS

The property may be reached from I-75 by way of exit 27, Tuckers Grade. Travel east on Tuckers Grade and stop at the Cecil Webb Wildlife Management Area office which will be on the left. The Florida Game and Freshwater Fish Commission personnel there will provide you with a map and information on which areas of the property are open and accessible. It may be necessary to purchase a Wildlife Management Area Stamp to obtain access. The cost at the time of this printing is $26 per year. The stamps can be obtained

wherever a hunting license may be obtained, but are not available at the management area office. If you wish to visit, please contact the management area office at (941) 639-



1531 or Suncom 721-7161, or the Lakeland regional office at (941) 648-3205 or Suncom 595-3205 prior to your trip. The location of the reference site is not far from the main entrance. Specifically, the reference site is located at the intersection of Oilwell Grade and Tram Grade (as indicated by the red dot on the map). There is a section of upland pine flatwoods along the left side of the road just before the intersection. The wetland boundary is located on the inside of that small upland area and is marked by concrete monuments.

COMMUNITY CHARACTERIZATION

The reference site is a hydric pine flatwoods bordering a shallow freshwater slough located along the headwaters of Alligator Creek. In places, the herbaceous components of the ground cover along with the density of saw palmetto present a clear picture of the difference between the mesic and the hydric flatwoods. However, the wetland boundary in an area such as this is often not defined by sharp breaks in soil characteristics, or in vegetative composition. A slight but perceptible slope is present from the wetland through the upland. Hydrologic indicators are helpful but also may be obscured by the

effects of fire and the shallow inundation and saturation within the outer zones of the wetland.

DELINEATION PROCEDURE

The presence of a wetland is established by the use of a depressional soil mapping unit, Felda fine sand, depressional. Pursuant to subsection 62-340.300(2)(c), F.A.C., the hydric nature of soils within the depressional mapping unit are confirmed by the presence of oxidized rhizospheres. Moving landward from the depressional soil mapping unit, hydric soil indicators continue to be present and the herbaceous vegetation is typical of a hydric flatwoods community, with many obligate grasses and sedges and thin stemmed dicots. The wetland boundary is determined using vegetative dominance and the presence of hydric soil indicators (subsections 62-340.300(2)(a) and (b), F.A.C.). A shift in ground cover dominance marked by the abundance of *Serenoa repens* (saw palmetto) or the absence of hydric soil indicators establishes the wetland/upland boundary. In other places along the boundary, it will be necessary to consider a canopy of *Pinus elliottii* (slash pine). Locating the edge in these areas will require consideration of all facts and factors

Active crayfish burrow in hydric pine flatwoods

relating to the hydrologic nature of the site. At this local, an abundance of crayfish borrows, along with a prevalence of obligate plants in the ground cover, provides sufficient data to conclude that the areas are wetlands in keeping with the wetland definition. The appropriate stratum to use in the application of vegetative dominance would be the ground cover not the canopy. Because crayfish borrows extend landward

of the dominance of listed plants, the provisions of subsection 62-340.300(2)(d), F.A.C., are also evaluated. An obvious decrease in the number of active crayfish chimneys is observed as the vegetative boundary is crossed moving landward. The key word here is *active*. Crayfish are ambulatory creatures and will move their burrow location or burrow entrance with changing ground water elevations. It was acknowledged that water levels had been higher in the recent past. It is not uncommon for mesic pine flatwoods in south Florida to have short periods of surface water inundation during the peak of the rainy season. The presence of the crayfish burrows in the upland was not deemed significant enough to compare to the numerous observations of crayfish chimneys observed waterward of the line. In considering all facts and factors pertaining to the intent of the wetland definition, reasonable scientific judgment did not support the use of subsection 62-340.300(2)(d), F.A.C., in this situation. The wetland boundary line is thus set where there is a vegetative change to a dominance of saw palmetto or a lack of hydric soil indicators.

Vegetation Immediately Waterward of the Wetland Boundary

Ground cover

Amphicarpum muhlenbergianum	FACW	blue maidencane
Cirsium horridulum	UPLAND	thistle
Eleocharis sp.	OBL	hairgrass
Eryngium baldwinii	FAC	coyote-thistle
Juncus sp.	OBL	rush
Melochia corchorifolia	FAC	chocolate weed
Myrica cerifera	FAC	wax myrtle
Panicum tenerum	OBL	bluejoint panicum
Phyla nodiflora	FAC	frog fruit
Pluchea spp.	FACW	marsh fleabane
Rhynchospora microcarpa	OBL	southern beakrush
Schizachyrium rhizomatum	FAC	little bluestem
Setaria geniculata	FAC	bristle grass
Stillingia aquatica	OBL	corkwood

Note: The species diversity in this wetland community is very high. A list of the species characteristic of the internal slough wetland area was recorded but not presented here. Only those species observed landward of the *Hypericum fasciculatum* zone are included. These lists were recorded following a burn and the vegetative species diversity observed was low.

Vegetation Immediately Landward of the Wetland Boundary

Canopy

Pinus elliottii	UPLAND	slash pine

Subcanopy

Pinus elliottii	UPLAND	slash pine

Ground cover

**	*Aristida stricta*	FAC	wiregrass
	Erigeron vernus	FACW	early fleabane
	Melochia villosa	UPLAND	hairy chocolate weed
	Myrica cerifera	FAC	wax myrtle
**	*Serenoa repens*	UPLAND	saw palmetto

** Designates species which are overwhelmingly dominant.

SOIL DESCRIPTIONS

USDA-NRCS Soil Survey of Charlotte County - Sheet 35
The wetland soil is mapped as Felda fine sand, depressional (mapping unit #49)

49 - Felda fine sand, depressional is composed of:

85% - Felda soil	hydric component
10% - Malabar soil	hydric inclusion
5% - Pompano soil	hydric inclusion

The upland soil is mapped as Heights fine sand (mapping unit #70)

70 - Heights fine sand is composed of:

70% - Heights soil	non-hydric component
10% - Felda soil	hydric inclusion
20% - Heights soil	hydric inclusion

Soil Profile Descriptions

Point 1. Seventy-two feet waterward of the wetland boundary line (water table - 2 inches).

Horizon	Depth (in)	
A1	0-2	very dark grayish brown (10YR 3/2) fine sand
E or C	2-12+	grayish brown (10YR 5/2), dark grayish brown (10YR 4/2), and

very dark grayish brown (10YR 3/2) fine sand with yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) oxidized rhizospheres in the upper three inches of the horizon

Hydric soil: Yes
Hydric soil field indicators: presence of oxidized rhizospheres in the upper part of the E horizon.

Point 2.

Point 2. One feet waterward of the wetland boundary line (water table - 9 inches).

Horizon	Depth (in)	
A1	0-3	very dark gray (10YR 3/1) fine sand, many fine and few medium roots
A2	3-5	dark gray (10YR 4/1) fine sand with dark yellowish brown (10YR 4/4) oxidized rhizospheres, common medium roots
E or C	5-12+	grayish brown (10YR 5/2) fine sand with yellowish brown (10YR 5/6) oxidized rhizospheres, few large and medium roots

Hydric soil: Yes
Hydric soil field indicators: presence of oxidized rhizospheres in the A2 and E horizons.

Point 3. in the South Florida flatwoods areas, the upland soils (non-hydric) tend to be darker in color (more organic matter) then the hydric soils.

Point 3. Fifty feet landward of the wetland boundary line (water table - 14 inches).

Horizon	Depth (in)	
A1	0-4	very dark gray (10YR 3/1) fine sand, many fine roots
A2	4-6	dark gray (10YR 4/1) fine sand, common fine and medium roots
B?	6-11	dark grayish brown (10YR 4/2) fine sand with yellowish brown (10YR 5/6) oxidized rhizospheres, common fine and medium roots
Cr	11+	white (10YR 8/1) very crumbly limestone

Hydric soil: No
Hydric soil field indicators: presence of oxidized rhizospheres in the B horizon were below six inches.

Green Swamp Wilderness Preserve

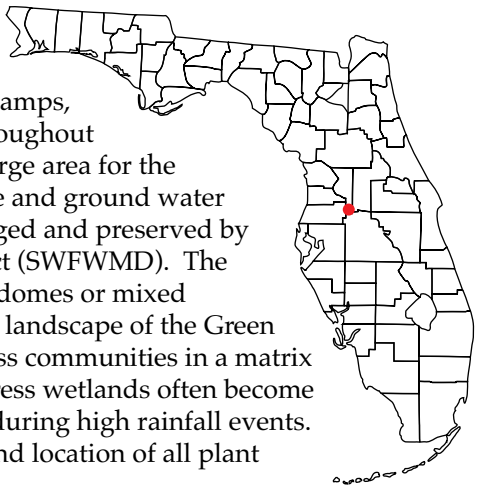
(Sumter County)

CYPRESS DOME

Interior of a cypress dome

LOCATION

The Green Swamp is an important ecosystem of central Florida. Located between Tampa and Orlando, the drainage from the Green Swamp forms the headwaters of the Withlacoochee, Hillsborough, Oklawaha, and Peace River watersheds. This vast area of bay swamps, shrub bogs and cypress swamps interspersed throughout low ridges and pine flatwoods is a primary recharge area for the Floridan aquifer. Due to its importance in surface and ground water supplies, portions of the Green Swamp are managed and preserved by the Southwest Florida Water Management District (SWFWMD). The cypress swamps of the area are typically cypress domes or mixed hardwood-cypress strands. Much of the wetland landscape of the Green Swamp has an abundance of these isolated cypress communities in a matrix of pine flatwoods. These seemingly isolated cypress wetlands often become connected by sheetflow over the pine flatwoods during high rainfall events. Fire plays an important role in the composition and location of all plant communities in the Green Swamp area.



ACCESS

The reference site, known as Cypress Dome #6 by the SWFWMD, is located within the Green Swamp Wildlife Management Area in Sumter County. The reference site is approximately 2.5 miles east of State Road 471, approximately 7 miles south of the intersection of S.R. 471 with State Road 50. Look for the sign, "Green Swamp, Southwest Florida Water Management District". At this point S.R. 471 intersects with South Grade, an unpaved road. Take South Grade east to Tanic Grade. Take Tanic Grade south from this intersection, parallelling Devil's Creek Swamp, to the intersection with Three Mile Grade. Take Three Mile grade north. The site is approximately one mile from the intersection of Tanic Grade and Three Mile Grade on the south side of Three Mile Grade.

COMMUNITY CHARACTERIZATION

A cypress dome is a shallow, forested, circular depression with a domed cross sectional profile created by a growth pattern that concentrates the larger trees in the central area. Cypress domes get most of their water from the surrounding flatwoods. The boundaries of cypress domes are maintained by periodic fires, which prevent invasion of hydrophytic tree species into the pine flatwoods.

DELINEATION PROCEDURE

The reference site wetland boundary is the landward edge of the ecotone of a cypress dome dominated by *Taxodium ascendens* (pond cypress). Upland of the ecotone is a low pine flatwoods dominated by *Pinus palustris* (longleaf pine). Beginning in the cypress dome, a wetland identified by the use of the definition in subsection 62-340.200(19), F.A.C., the vegetative dominance provisions of subsections 62340.300(2)(a) and (b), F.A.C., are followed landward, examining for either the presence of hydric soils or hydrologic indicators along this transect. Vegetative dominance by hydrophytic species within the ground cover of the ecotone extends to the pine flatwoods. While hydric soils extend landward of the hydrophytic plant dominance, additional hydrologic indicators are not present to support the use of subsection 62-340.300(2)(d), F.A.C. The wetland boundary is located where vegetative dominance by hydrophytic species is lost.

The following plant lists with corresponding soils descriptions were prepared during the visit to the delineation site. The first list describes the vegetation found waterward of the delineation line. The second lists those species found landward of the delineation line. Lastly, there are descriptions and photographs of soil profiles from each location.

Vegetation Waterward of the Wetland Boundary

Canopy

Taxodium ascendens	OBL	cypress, pond

Subcanopy

Taxodium ascendens	OBL	cypress, pond

Ground cover

Agalinis sp.	UPLAND	false-foxglove
Andropogon virginicus var. *glaucus* (Hackel)	FAC	broom-sedge
Bacopa caroliniana	OBL	water-hyssop
Bigelowia nudata	FACW	rayless goldenrod
Carex spp.	FACW	sedges
Centella asiatica	FACW	coinwort
Cyperus haspan	FACW	nut sedge
Erianthus giganteus	OBL	plumegrass, sugarcane
Eriocaulon compressum	OBL	pipewort
Eriocaulon decangulare	OBL	pipewort
Eupatorium leptophyllum	OBL	marsh thoroughwort
Gratiola spp.	FACW	hedgehyssop
Helenium pinnatifidum	FACW	flatwoods sneezeweed
Hypericum cistifolium	OBL	St. John's-wort
Juncus repens	OBL	rush
Juncus polycephalus	OBL	rush
Juncus trigonocarpus	OBL	rush
Lachnanthes caroliniana	FAC	redroot
Ludwigia virgata	OBL	ludwigia
Myrica cerifera	FAC	bayberry, southern
Panicum hemitomon	OBL	maidencane
Panicum longifolium	OBL	panicum, tall thin
Paspalum praecox	OBL	paspalum
Pluchea rosea	FACW	camphor-weed
Polygala cymosa	FACW	milkwort
Polygonum hydropiperoides	OBL	smartweed
Pontederia cordata	OBL	pickerel weed
Rhexia sp.	FACW	meadow beauty
Rhynchospora cephalantha	OBL	beakrush
Rhynchospora decurrens	OBL	beakrush
Rhynchospora fascicularis	FACW	beakrush
Rhynchospora microcarpa	OBL	beakrush
Rhynchospora microcephala	FACW	beakrush
Sagittaria graminea	OBL	arrowhead
Scleria sp.	FACW	nut-rush

Sphagnum spp.	OBL	sphagnum moss
Utricularia inflata	OBL	bladderwort
Utricularia purpurea	OBL	bladderwort
Woodwardia virginica	FACW	chain fern
Xyris elliotii	OBL	yellow-eyed grass
Xyris fimbriata	OBL	yellow-eyed grass

Vegetation Landward of the Wetland Boundary

Canopy

Pinus palustris	UPLAND	pine, longleaf

Subcanopy

Myrica cerifera	FAC	bayberry, southern
Pinus palustris	UPLAND	pine, longleaf

Ground cover

Andropogon virginicus var. *glaucus* (Hackel)	FAC	broom-sedge
Aster dumosus	UPLAND	aster
Aristida stricta	FAC	three-awn grass, pineland
Carphephorus carnosus	FACW	chaffhead, pineland
Centella asiatica	FACW	coinwort
Elephantopus carolinianus	UPLAND	elephant's-foot
Eupatorium spp.	FAC	thoroughworts
Hedyotis (=*Oldenlandia*)*boscii*	UPLAND	hedyotis
Hypericum tetrapetalum	FAC	St. John's-wort, four-petal
Ilex cassine	OBL	holly, dahoon
Ilex glabra	UPLAND	gallberry
Lyonia ferruginea	UPLAND	fetter-bush
Myrica cerifera	FAC	bayberry, southern
Panicum dichotomiflorum	FACW	panicum, fall
Pinus palustris	UPLAND	pine, longleaf
Rhynchospora ciliata	FACW	beakrush, ciliate
Rhynchospora spp.	FACW	beakrush
Schizachyrium scoparium	FAC	bluestem
Serenoa repens	UPLAND	saw palmetto
Solidago tortifolia	UPLAND	goldenrod
Vaccinium myrsinites	UPLAND	shiny blueberry
Xyris caroliniana	FACW	yellow-eyed grass, Carolina

SOIL DESCRIPTIONS

USDA-NRCS Soil Survey of Sumter County - Sheet 12
Cypress Dome No. 6
The wetland is identified by a wet spot symbol within the upland soil on field sheet 12.
The upland soil is mapped as Vero fine sand (mapping unit #67).

67 - Vero fine sand is composed of:

60% - Vero soil	non-hydric component
10% - EauGallie soil	non-hydric inclusion
10% - Paisley soil	hydric inclusion
20% - Vero soil	hydric inclusion

Soil Profile Descriptions

Point 1. twelve feet waterward of the wetland boundary line (water table - 0 inches).

Horizon	Depth (in)	
Oa	0-0.5	black (10YR 2/1) muck
A1	0.5-2	black (10YR 2/1) mucky fine sand, common fine roots
A2	2-4	very dark gray (10YR 3/1) fine sand, common fine roots
A3	4+	dark gray (10YR 4/1) fine sand, few fine roots

Hydric soil: Yes
Hydric soil field indicators: presence of 0.5 inches of muck in the Oa horizon.

Point 2. one foot waterward of the wetland boundary line (water table - four inches).

Horizon	Depth (in)	
A1	0-2	black (10YR 2/1) mucky fine sand, many fine roots
A2	2-3	black (10YR 2/1) fine sand, few fine roots
E1	3-6	dark gray (10YR 4/1) fine sand, few fine and few medium roots
E2	6-20	gray (10YR 6/1) fine sand, few fine roots
Bh	20+	dark grayish brown (10YR 4/2) fine sand

Hydric soil: Yes
Hydric soil field indicators: presence of 2 inches of mucky texture in the A1 horizon.

Point 3. five feet landward of the wetland boundary line (water table - eight inches).

Horizon	Depth (in)	
A1	0-1.5	black (10YR 2/1) mucky fine sand, many fine roots
A2	1.5-4	very dark gray (10YR 3/1) fine sand, common fine roots
E1	4-9	dark gray (10YR 4/1) fine sand, common fine and few medium roots
E2	9-21	light brownish gray (10YR 6/2) fine sand, few fine roots
Bh	21+	dark reddish brown (5YR 3/4) fine sand

Hydric soil: Yes
Hydric soil field indicators: presence of four inches of greater than 70% coated sand grains (combination of A1 and A2 horizons).

Point 4. thirty feet landward of the wetland boundary line (water table not observed).

Horizon	Depth (in)	
A1	0-4	very dark gray (10YR 3/1) fine sand, common fine roots
A2	4-6	dark gray (10YR 4/1) fine sand, common fine roots
E	6-17	grayish brown (10YR 5/2) fine sand, few fine and few medium roots
Bh	17+	dark brown (10YR 3/3) fine sand, few fine roots

Hydric soil: No
Hydric soil field indicators: none.

Hal Scott Regional Preserve and Park

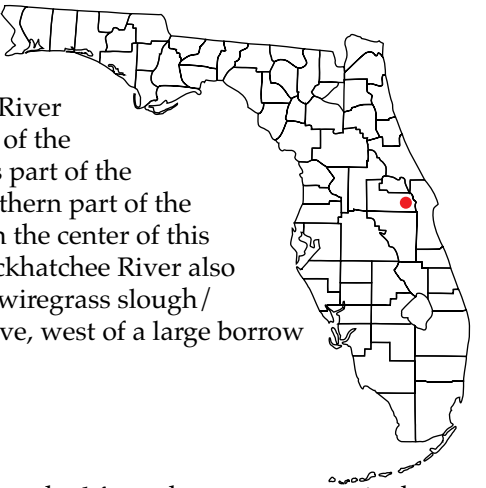
(Orange County)

WET PRAIRIE

A wiregrass wet prairie depression

LOCATION

The Hal Scott Regional Reserve and Park is located in east Orange County, southeast of the city of Orlando, within the northwest quadrant of the intersection of the Bee Line Expressway (S.R. 528) and Dallas Blvd. The property is owned and managed by the St. Johns River Water Management District (SJRWMD). Portions of the property were purchased using funds obtained as part of the mitigation for the beltway construction in the southern part of the county. The Econlockhatchee River flows through the center of this property. Several streams tributary to the Econlockhatchee River also occur on the property. The reference site is a wet wiregrass slough/ prairie located in the eastern portion of the preserve, west of a large borrow pit.



ACCESS

The Hal Scott Regional Reserve and Park may be reached from the expressway via the

Dallas Blvd exit. Travel north on Dallas Blvd approximately 2 miles and the entrance is on the left (west). Coming from the north, follow S.R. 50 south to S.R. 520. From S.R. 520 turn (south) into the Wedgefield subdivision on Maxim Parkway. From Maxim Parkway turn left onto Bancroft, then right on to Meredith Parkway to Dallas Blvd. Turn left (south) on Dallas Blvd. and the entrance to the park will be 1.6 miles south on the right side (west) of the road. Access information may be obtained form the SJRWMD Land Management Division at (407) 897-4311. The reference site wetland boundary is along the south edge of an *Aristida stricta* (wiregrass) slough/wet prairie immediately west of the borrow pit.

COMMUNITY CHARACTERISTICS

A wet prairie is a type of wetland which is maintained by a combination of fire and wetness. Frequent fires, by restricting the invasion of woody perennials, are an important factor in the maintenance of a prairie system. The vegetation of the prairie system is fire adapted. Wet prairies are routinely dry enough to burn, usually on a seasonal basis. Wet prairies are also either seasonally inundated or saturated. The wet prairie vegetative community must therefore also be tolerant of anaerobic soil conditions. Verification of a wet prairie and the wetland boundary is usually limited to the observation of the vegetation dominance and hydric soil indicators. Hydrologic indicators are often not apparent within a wet prairie system. Vegetative cover and dominance by hydrophytic species within wet prairie systems is subject to natural seasonal change. Within the reference site wet prairie, the dominant plants observed are *Amphicarpum muhlenbergianum* (blue maidencane, FACW) and *Aristida stricta* (wiregrass, FAC). Both of these species are present throughout the year. The species occurring with the dominant species at the time of observation (listed below) may not always be apparent.

Wiregrass is a dominant ground cover in several different vegetative communities where fire is a frequent occurrence. Wiregrass is also tolerant of a wide range of moisture conditions and is classified as a facultative species in Chapter 62-340, F.A.C. Dominance of wiregrass in the ground cover appears to be related more to the fire history of a site than to the hydrological regime.

DELINEATION PROCEDURE

Wet prairie is a type of wetland identified in the wetland definition, but it is often not immediately recognizable as a wetland. At this reference site, subsections 62-340.300(2)(a) and (b), F.A.C., are used to establish that the central area is in fact a wetland. Wiregrass, as a facultative plant, while numerically dominant is not used in determining vegetative dominance for locating the boundary between the wetland and upland. Vegetative dominance by hydrophytic species is established at this reference site by obligate species within the wiregrass dominated community. The wetland nature of the site is confirmed by the presence of hydric soil indicators. At this reference site *algal mats*, a hydrologic indicator, are also present, further supporting the conclusion that the reference site is a wetland. Moving landward, the wetland boundary is established where vegetative dominance using subsections 62-340.300(2)(a) and (b), F.A.C., is no

longer present. Hydric soil indicators extend beyond the vegetative dominance in some areas but are not definitive of wetland conditions.

Vegetation Interior To The Wetland Boundary - Vegetation List recorded March 6, 1995

Aristida spiciformis	FAC	bottlebrush three awn grass
Aster sp.	FAC/FACW	aster
Andropogon virginicus	FAC	broomsedge
Baccharis halimifolia	FAC	salt bush
Drosera sp.	OBL/FACW	sundew
Eustachys sp.	FAC/FACW	finger grass
Fuirena sp.	OBL	umbrella sedge
Hypericum cistifolium	FACW	St. John's wort
Hypericum fasciculatum	OBL	marsh St. John's wort
Mikania scandens	Vine	climbing hempvine
Myrica cerifera	FAC	wax myrtle
Panicum scabrisculum	OBL	wooly panicum
Pityopsis graminifolia	FAC	golden aster
Sacciolepis indica	FAC	Indian cupscale
Scleria sp.	FACW	bald-rush
Sonchus sp.	UPLAND	sow thistle
Quercus pumila	UPLAND	running oak
Xyris brevifolia	OBL	short leaf yellow-eyed grass

Vegetation Upland Of The Wetland Boundary.

Aristida stricta	FAC	wiregrass
Aristida spiciformis	FAC	bottlebrush three-awn grass
Andropogon virginicus	FAC	broomsedge
Asimina sp.	UPLAND	pawpaw
Befaria racemosa	UPLAND	tarflower
Drosera sp.	OBL/FACW	sundew
Eragrostis sp.	FAC	love grass
Euthamia sp.	UPLAND	flat-topped goldenrod
Hypericum reductum	UPLAND	Atlantic St. John's wort
Hypericum tetrapetalum	FAC	St. John's wort
Ilex glabra	UPLAND	gallberry
Lyonia fruticosa	UPLAND	fetterbush
Lyonia lucida	FACW	fetterbush
Penstemon australis	UPLAND	beard tongue
Pityopsis graminifolia	UPLAND	golden aster
Quercus pumila	UPLAND	running oak
Rhexia sp.	FACW	meadow beauty
Schizachyrium spp.	FAC	bluestem
Serenoa repens	UPLAND	saw palmetto
Vaccinium myrsinites	UPLAND	low blueberry

SOIL DESCRIPTIONS

USDA - NRCS Orange County Soil Survey - Sheet 58 Section 22
Mapped as Smyrna fine sand (mapping unit #44)

44 - Smyrna fine sand is composed of:

70% - Smyrna soil	non-hydric component
5% - Pineda soil	hydric inclusion
20% - Smyrna soil	hydric inclusion
5% - Wabasso soil	non-hydric inclusion

Soil Profile Descriptions

Point 1. Eight feet waterward of the saw palmetto edge. (Water table - 22 inches)

Horizon	Depth (in)	
Oa	0-1	black (10YR 2/1) mucky fine sand
A1	1-2	black (10YR 2/1) fine sand
A2	2-4	very dark gray (10YR 3/1) fine sand
E or C	4-12	dark gray (10YR 4/1) fine sand

Hydric soil: Yes
Hydric soil field indicators: four inches of greater than 70% coatings on the sand grains.

Point 1

Point 2. Thirty feet upland of the saw palmetto edge - towards borrow pit. (Water table > 12 inches)

Horizon	Depth (in)	
A1	0-1	very dark gray (10YR 3/1) fine sand with many fine roots
A2?	1-3	dark gray (10YR 4/1) fine sand with common medium roots
A3?	3-12	very dark gray (10YR 3/1) fine sand (50% coated) with many medium roots

Hydric soil: No
Hydric soil field indicators: none

Point 2

Hickory Mound Impoundment

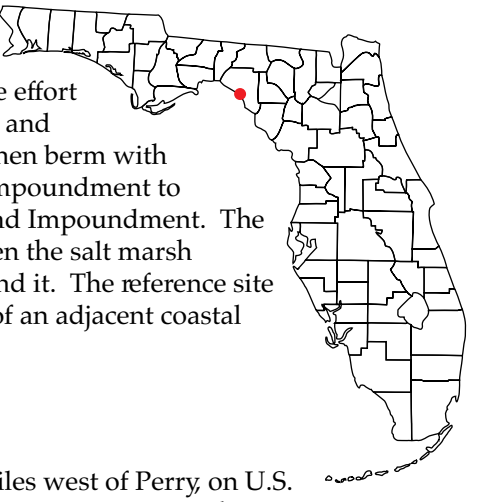
(Taylor County)

BRACKISH MARSH

Coastal hammock/brackish water marsh

LOCATION

Hickory Mound is located in coastal Taylor County. This region is characterized by large expanses of salt marsh punctuated by "tree islands" of low coastal hammocks. The reference site is adjacent to a tidal marsh and a manmade brackish water marsh. As a cooperative effort between Buckeye Cellulose and the Florida Game and Fresh Water Fish Commission (FGFWFC), an earthen berm with culverts was built in 1968 to create a fluctuating impoundment to enhance waterfowl habitat. This is Hickory Mound Impoundment. The FGFWFC regulates the saltwater exchange between the salt marsh seaward of the berm and the brackish marsh behind it. The reference site is within the brackish marsh on the western side of an adjacent coastal hammock.



ACCESS

The Hickory Mound Impoundment is about 20 miles west of Perry, on U.S. Highway 98. The sign for Hickory Mound Impoundment is east of the Ecofina River.

Turn south onto Cow Creek Grade, a secondary road and travel past the game checkpoint station. Continue on the berm, past the culvert/floodgate and look for an observation tower and picnic area. The reference site is about 100 feet to the south of the tower along the western edge of a coastal hammock island.

COMMUNITY CHARACTERIZATION

Hickory Mound Impoundment is an area of extensive salt marshes, brackish marshes, coastal hammocks (tree islands), and hydric hammocks. The salt marsh is dominated by *Spartina* spp. (cordgrass); the brackish marsh has a diverse mixture of emergent herbaceous perennials (mostly grasses and sedges). *Cladium jamaicense* (sawgrass) and *Sabal palmetto* (sabal palm) dominate the landward portion of the brackish marsh. There is little topographic relief in coastal Taylor County and a slight rise in elevation can support a forested coastal hammock similar to those found landward of the salt marsh. Tree "islands" of coastal hammock vegetation dominated by *Quercus virginiana* (live oak) and *Pinus elliottii* (slash pine) with a *Serenoa repens* (saw palmetto) ground cover are found within the marsh.

DELINEATION PROCEDURE

The reference site is in an ecotone between the brackish marsh and coastal hammock. Beginning in the brackish marsh, a wetland identifiable by direct reference to the wetland definition, vegetative dominance is followed landward, examining either for the presence of hydric soils or hydrologic indicators (subsections 62-340.300(2)(a) and(b), F.A.C.). Hydrologic indicators consisted of observed inundation, rack lines and more than two inches of mucky texture in the upper soil profile. Continuing landward toward the coastal hammock, dominance by hydrophytic plants was lost within the ecotone between the brackish marsh and the hammock. Hydric soils and hydrologic indicators, however, extended farther landward into the edge of the coastal hammock beneath a canopy of *Quercus virginiana* (live oak). The wetland boundary occurs at the point where the mucky texture in the soil is less than two inches. Hydric soil is present beyond this point but neither vegetative dominance nor hydrologic indicators provide sufficient evidence using reasonable scientific judgment, to extend the wetland boundary to the limits of hydric soil.

The following plant lists with corresponding soils descriptions were prepared during the June 1995 visit to the delineation site. The first list describes the vegetation found waterward of the delineation line. The second lists those species found landward of the delineation line. Lastly, there are descriptions and photographs of corresponding soil samples from each location.

Vegetation Immediately Waterward of the Wetland Boundary.

Canopy

Quercus virginiana	UPLAND	oak, live

Subcanopy

Ilex vomitoria	FAC	yaupon holly
Sabal palmetto	FAC	palm, cabbage

Ground cover

Ammannia latifolia	OBL	toothcup
Bacopa monnieri	OBL	water-hyssop
Cyperus spp.	FACW	flatsedge
Distichlis spicata	OBL	saltgrass, seashore
Eleocharis sp.	OBL	spikerush
Juncus roemerianus	OBL	needle rush
Leptochloa fascicularis	FACW	bearded sprangle-top
Lycium carolinianum	OBL	Christmas berry
Scirpus pungens	OBL	sword-grass; three square bulrush
Spartina alterniflora	OBL	cordgrass, saltmarsh

Vegetation Immediately Landward of the Wetland Boundary.

Canopy

Pinus elliottii	UPLAND	slash pine
Quercus virginiana	UPLAND	oak, live
Sabal palmetto	FAC	palm, cabbage

Ground cover

Andropogon glomeratus (Campbell)	FACW	bluestem, bushy
Campsis radicans	VINE	trumpet creeper
Callicarpa americana	UPLAND	beautyberry
Digitaria sp.	UPLAND	crabgrass
Erythrina herbacea	UPLAND	coralbean

Panicum virgatum	FACW	switchgrass
Pteridium aquilinum	UPLAND	bracken fern
Quercus virginiana	UPLAND	oak, live
Rhus copallina	UPLAND	winged sumac
Rubus trivialis	FAC	southern dewberry
Serenoa repens	UPLAND	saw palmetto
Smilax bona-nox	VINE	greenbrier; catbrier
Solidago sempervirens	FACW	golden-rod, seaside
Spartina bakeri	FACW	cordgrass, sand
Toxicodendron radicans	UPLAND	poison ivy

SOIL DESCRIPTIONS

USDA-NRCS Taylor County Soil Survey - Sheet 38
The wetland soil is mapped as Clara, Meadowbrook, and Bodiford soils, frequently flooded (mapping unit #34)
The upland soil is mapped as Leon fine sand, rarely flooded (mapping unit #71)

Soil Profile Descriptions

Point 1. Twenty feet waterward of the wetland boundary line.

Horizon	Depth (in)	
Oa	0-4	black (10YR 2/1) muck
A1	4-5	black (10YR 2/1) mucky fine sand
A2	5-7	very dark gray (10YR 3/1) fine sand
E	7-16	gray (10YR 5/1) fine sand; oxidized rhizospheres were present
Bh	16-24	very dark brown (10YR 2/2) fine sand
C	24+	light brown gray (10YR 6/2) fine sand

Hydric soil: Yes
Hydric soil field indicators: four inches of muck (horizon Oa).

Point 1: wetland soil

Point 2: upland soil

Point 2. Ten feet landward of the wetland boundary line.

Horizon	Depth (in)	
A	0-3	dark gray brown (10YR 4/2) fine sand
E	3-31	light brown gray (10YR 6/2) fine sand
Bh	31+	very dark grayish brown (10YR 3/2) fine sand

Hydric soil: No
Hydric soil field indicators: none

Jennings Forest Wildlife Management Area

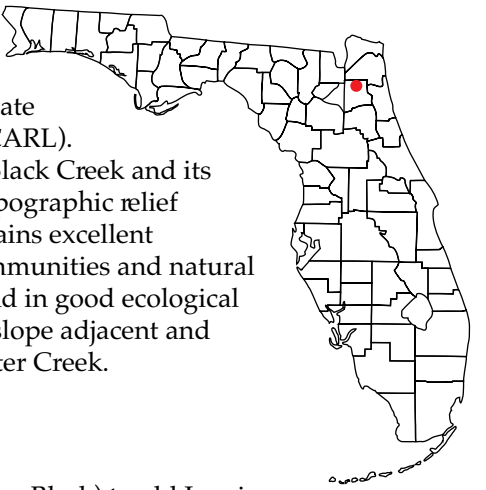
(Clay County)

HYDRIC SEEPAGE SLOPE

Wetland boundary/pond pine seepage slope

LOCATION

Jennings State Forest is located in northern Clay county adjacent to the Duval County line and immediately southwest of the Cecil Field Naval Air Station. The acquisition of the property is a joint effort of the St. Johns River Water Management District (SJRWMD) and the state Conservation and Recreational Lands program (CARL). Jennings State Forest protects the headwaters of Black Creek and its tributaries. The landscape exhibits substantial topographic relief throughout the parcel. Jennings State Forest contains excellent examples of longleaf pine/wiregrass sandhill communities and natural seepage slopes which are hydrologically stable and in good ecological condition. The reference site is a hydric seepage slope adjacent and tributary to Mill Branch, a tributary of Yellow Water Creek.



ACCESS

To visit Jennings State Forest, take S.R. 21 (Blanding Blvd.) to old Jennings

Rd. and travel west to Live Oak Lane. Turn north onto Live Oak Lane and go to the gated entrance. Once through the gate stay to the right (Forest Rd. 13) and cross Wheeler Branch. Continue to Forest Rd 14 then turn west and travel approximately 1.5 miles to Forest Rd 15. Take Forest Rd 15 to Mill Branch. The reference site is on the seepage slope south of (up the hill from) the creek and east of the road. Please contact the SJRWMD Land Management Division at (904) 329-4404 prior to your visit, as you will need a key to the gate to obtain access.

COMMUNITY CHARACTERIZATION

The reference site is located along the south side of Mill Branch on a seepage slope dominated by *Pinus serotina* (pond pine). Pond pine slope forests are vegetative communities which extend both above and below wetland boundaries. This is typically indicated by changes in the soil characteristics from very poorly drained (hydric) to poorly drained (non-hydric). The subcanopy is generally scant and the groundcover generally low enough to walk through (unless the area has been subjected to fire suppression). A subtle shift in the composition of the ground cover is observed landward (up slope), as the nature of the pond pine forest changes from a hydric to non-hydric slope. Ground water in close proximity to the soil surface is the defining feature of seepage wetlands. In general, the wetland boundary line within pond pine slope forests will be located by hydric soil indicators.

DELINEATION PROCEDURE

Mill Creek is a surface water body as described by section 62-340.600, F.A.C. A narrow hardwood floodplain lies adjacent and contiguous to the creek. This area is identified in the Clay County soil survey as a frequently flooded mapping unit. Subsection 62-340.300(c), F.A.C., establishes that a frequently flooded mapping unit is a wetland when the soil internal to the mapping unit is confirmed to be hydric by in-situ analysis. Hydric soil indicators are present within the hard wood floodplain but are somewhat obscured by the alluvial processes of the stream. Moving landward from the stream side wetland, a change in the vegetative community occurs as the landscape topography abruptly slopes upward. The vegetative community of the slope is a pond pine forest. The canopy dominance meets the provisions of subsection 62-340.300(2)(b), F.A.C. Vegetative dominance in the canopy continues up slope until merging into a sandhill community where vegetative dominance by hydrophytic species is lost. Establishing the wetland boundary, using vegetative dominance, requires additional ecologic support by either hydrologic indicators or hydric soil indicators. The hydrologic indicators typically encountered on wetland seepage slopes are usually contained within the soil. By following hydric soil indicators up slope, the wetland boundary is established within the zone of vegetative dominance (subsection 62-340.300(2)(b), F.A.C.) at the point where the indicators are no longer present.

When evaluating slope conditions, it is often helpful to first look at the upland. This provides physical clues for discriminating subtle, but contrasting characteristics, that separate the hydric from non-hydric portions of the slope.

The following plant lists, with corresponding soils descriptions, were prepared during a visit to this reference site. The common plant species of the seepage slope community and the sandhill community are listed below. Descriptions and photographs of soil profiles are also provided from each location.

Vegetation of the Seepage Slope Community, Waterward of the Wetland Boundary.

Canopy

Gordonia lasianthus	FACW	loblolly bay
Magnolia virginiana var. *australis*	OBL	sweetbay magnolia
Persea palustris	OBL	swamp bay
Pinus elliottii	UPLAND	slash pine
Pinus serotina	FACW	pond pine

Subcanopy

Gordonia lasianthus	FACW	loblolly bay
Magnolia virginiana var. *australis*	OBL	sweetbay magnolia
Persea palustris	OBL	swamp bay
Pinus serotina	FACW	pond pine

Ground cover

Aristida stricta	FAC	pineland three-awn grass
Arundinaria gigantea	FACW	giant cane
Gaylussacia frondosa	FAC	dangleberry
Ilex coriacea	FACW	bay-gall holly
Ilex glabra	UPLAND	gallberry
Kalmia hirsuta	UPLAND	wicky
Lyonia lucida	FACW	fetter-bush
Myrica cerifera	FAC	southern bayberry
Osmunda cinnamomea	FACW	cinnamon fern
Pteridium aquilinum	UPLAND	bracken fern
Rhododendron canescens	UPLAND	pinxter azalea
Serenoa repens	UPLAND	saw palmetto
Toxicodendron vernix	FACW	poison sumac
Vaccinium corymbosum	FACW	highbush blueberry
Vaccinium myrsinites	UPLAND	shiny blueberry

Vegetation of the Sandhill Community, Landward of the Wetland Boundary.

Canopy

Pinus palustris	UPLAND	pine, longleaf

Subcanopy

Quercus incana	UPLAND	blue-jack oak
Quercus leavis	UPLAND	turkey oak
Quercus marilandica	UPLAND	black-jack oak

Ground cover

Andropogon virginicus	FAC	broom-sedge
Aristida stricta	FAC	three-awn grass, pineland
Cassia fasciculata	UPLAND	partridge pea
Licania michauxii	UPLAND	gopher apple
Lyonia ferruginea	UPLAND	fetter-bush
Pteridium aquilinum	UPLAND	bracken fern
Serenoa repens	UPLAND	saw palmetto
Sorghastrum secundum	UPLAND	lopside Indiangrass
Tephrosia virginiana	UPLAND	goat's rue
Vaccinium arboreum	UPLAND	sparkleberry

SOIL DESCRIPTIONS

USDA-NRCS Soil Survey of Clay County - Sheet 2
The wetland soil is mapped as Rutlege-Osier complex, frequently flooded (mapping unit #29).

45% - Rutlege soil	hydric component
40% - Osier soil	hydric inclusion
15% - Pamlico soil	hydric inclusion

The upland soil is mapped as Penney fine sand, 0 to 5 percent slope (mapping unit #5).

Soil Profile Descriptions

Point 1. fifteen feet waterward of the wetland boundary line (water table - twelve inches).

Horizon	Depth (in)	
A1	0-5	black (10YR 2/1) mucky fine sand, many medium roots
A2	5-8	black (10YR 2/1) fine sand, few medium roots
E or C	8-13	dark gray (10YR 4/1) fine sand with common medium faint gray (10YR 5/1) mottles, few fine and medium roots

Point 1

Hydric soil: Yes
Hydric soil field indicators: five inches of mucky texture in horizon A1.

Point 2. fifteen feet waterward of the wetland boundary line (water table - twenty inches).

Horizon	Depth (in)	
Oi	1-0	litter
A1	0-9	dark gray (10YR 4/1) fine sand, many medium and few large roots
A2	9-13	dark gray (10YR 4/1) fine sand with common fine distinct gray (10YR 6/1) mottles, few medium roots
E or C	13-21+	light brownish gray (10YR 6/2) fine sand, few fine roots

Hydric soil: No
Hydric soil field indicators: none

Point 2

Jonathan Dickinson State Park

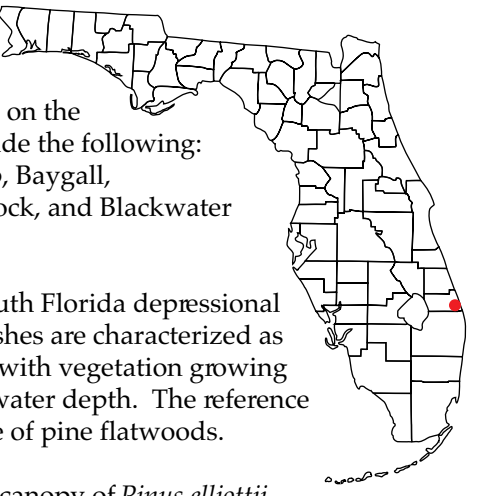
(Martin County)

DEPRESSION MARSH

Depression marsh

LOCATION

Jonathan Dickinson State Park consists of 11,383 acres situated in southern Martin County. This is a region of xeric uplands, mesic to dry flatwoods dominated by *Pinus elliottii* var. *densa* (South Florida slash pine) and forested/herbaceous wetlands. The Natural Communities described within the park are based on the Florida Natural Areas Inventory (FNAI) and include the following: Mesic/Dry Flatwoods, Depressional Marsh, Scrub, Baygall, Floodplain Forest, Strand Swamp, Hydric Hammock, and Blackwater Stream.



Two reference sites, both excellent examples of south Florida depressional marshes, are located in the park. Depression marshes are characterized as shallow, rounded depressions in a sand substrate with vegetation growing in concentric bands defined by hydroperiod and water depth. The reference sites selected are located within a larger landscape of pine flatwoods.

These are mesic to dry flatwoods dominated by a canopy of *Pinus elliottii*

Mesic pine flatwoods looking upland from wetland boundary of southern marsh

var. *densa* (South Florida slash pine) and a well developed understory consisting of *Serenoa repens* (saw palmetto), *Ilex glabra* (gallberry), *Lyonia lucida* (fetterbush), *Hypericum* spp.(St. John's-wort), *Ilex cassine* (dahoon holly), *Myrica cerifera* (wax myrtle), and *Asimina reticulata* (pawpaw). The herbaceous layer is dominated by *Aristida stricta* (wiregrass), *Aristida rhizomorpha* (Florida three-awn), *Pteridium aquilinum* (bracken fern), *Rhexia nuttallii* (meadowbeauty), *Xyris* spp.(yellow-eye grass), *Carphephorus paniculatus* (carphephorus), *Hypoxis juncea* (yellow-star grass) and *Pterocaulon virgatum* (blackroot). The occurrence of the depressional marshes in this otherwise flat landscape is a factor of the local topography and soils which prevent rapid runoff or infiltration.

ACCESS

The entrance to Jonathan Dickinson State Park is on the west side of U.S. Highway 1 in southern Martin County, between Hobe Sound and Jupiter. After entering the park, follow the main road towards the picnic and boating area. The first reference site is located along the north side of the depressional marsh immediately west of the road as it turns due south. The second reference site can be reached only by hiking approximately one quarter mile west on the first access road south of the first reference site. The second reference site is located along the north side of the depressional marsh southeast of the road.

GENERAL COMMUNITY CHARACTERIZATION OF BOTH SITES

Both marshes are typical in appearance in being dominated throughout by hydrophytic

plants. The duration of inundation (hydroperiod) influences the dominant plant communities. Maidencane (*Panicum hemitomon*) for example, cannot tolerate continuous flooding and requires a drawdown during a portion of the annual hydroperiod (Kushian *in* Ecosystems of Florida, 1991). Thus, it is significant that both reference sites contain areas dominated by maidencane, usually in the deepest area. A band of St. John's-wort (*Hypericum fasciculatum*) occurs landward of the maidencane zone. The shallow rooted species, such as St. John's-wort (*Hypericum* spp.), are killed by drying and fire but quickly reseed during wet periods, while rhizomatous species such as maidencane survive these extremes underground. As a result, zones of dominance migrate up and down slope in response to changing water conditions (B. H. Winchester, personal communication to Kushian *in* Ecosystems of Florida, 1991).

Due to variable soil conditions and hydroperiods the ecotone between marsh and flatwoods is often reticulate in nature. This is the palmetto "edge" often seen around depression marshes. It is here that we find the highest diversity of herbaceous plant species associated with these wetlands. The wetland boundary will most often occur in this ecotone.

The marshes differ in the degree of slope along the wetland/upland boundary which is expressed as differences in the vegetative transition within the fringe zone of *Serenoa repens* (saw palmetto). The fringing palmetto zone along the northern reference site consists of patches of *Serenoa repens* intermixed with areas dominated by grasses or gallberry. The southern marsh site has a steeper gradient at the edge and a more apparent community change from the wetland to the upland. The palmetto edge at the southern reference site is continuous and distinct.

GENERAL DELINEATION PROCEDURE

The marshes chosen as reference sites are identifiable as wetlands by direct use of the wetland definition. Further, each reference site is represented on the Martin County soil survey as a depressional mapping unit (**Waveland sand, depressional**). Areas mapped in County Soil surveys as frequently flooded or depressional are wetlands contingent on in-situ confirmation of the hydric soil characteristics (subsection 62-340.300(2)(c), F.A.C.). Hydric soil indicators within these areas are readily confirmed. Implementing subsection 62-340.300(2)(c), F.A.C., is a technical exercise that most often requires the expertise of a soil scientist because it is necessary to located the edge of the depressional area as mapped on the soil map. Once the edge of the depressional unit is located, then the other provisions of Chapter 62-340, F.A.C., must be examined to discern whether the wetland being delineated extends landward of the depressional area.

NORTHERN MARSH

• Observations begin in the marsh at the edge of the "*Hypericum* zone", a site clearly within the depressional soil mapping unit. *Hypericum fasciculatum* is an ecologically obligate wetland plant which often develops as an apparent broad band of vegetation within inundated areas of a marsh. Vegetative dominance in this zone meets the provisions of subsection 62-340.300(2)(a), F.A.C. Further supporting this conclusion, at

this location, is the presence of greater than two inches of mucky texture at the soil surface. Starting at the landward edge of this zone, the dominance of obligate and facultative wet species is followed landward with a coincident examination for the presence of the hydric soil indicators and hydrologic indicators. During this progression, the presence of obligated species became negligible and vegetative dominance shifts to subsection 62-340.300(2)(b), F.A.C.

• Moving outward into the ecotone, the vegetative pattern became dominated in part by

Northern depression marsh looking in from wetland boundary

large clumps of *Serenoa repens* (saw palmetto). At this point, using only vegetative dominance and hydric soil indicators, would produce a sinuous, hydrologically inconsistent boundary line. The soil profile within the waterward portions of the *Serenoa* clumps exhibit at least two inches of mucky texture at the surface indicating the presence of water at or above the surface for extended periods of time. The depth of mucky texture decreases moving landward through the *Serenoa*. By using the provisions of subsection 62-340.300(2)(d), F.A.C., a consistent line is established for the wetland boundary.

• The accurate placement of the wetland boundary based upon hydrologic indicators and not along the landward edge of the *Serenoa* patches was confirmed by measuring the elevation of the points along the lines. The waterward edge of the *Serenoa* clumps do not occur at a consistent elevation. The elevations of the points consistent with the hydrologic indicators are well within the range of each other. Placement of the wetland boundary along the waterward edge of the *Serenoa* patches for a reticulated vegetative community of this type would neglect the presence of evidence of inundation above the

Serenoa patches.

The assumed elevations of the five points determining the wetland boundary using subsection 62-340.300(2)(d), F.A.C., are:

#1	9.30'	#4	9.36′
#2	9.42′	#5	9.50'
#3	9.44'		

Vegetation within the Marsh

Marsh Interior
Canopy and Subcanopy

Taxodium ascendens	OBL	pond cypress

Ground cover

Panicum hemitomon	OBL	maidencane

Hypericum Fringe
Ground cover

Eriocaulon compressum	OBL	pipewort
Eriocaulon decangulare	OBL	pipewort
Fuirena scirpoidea	OBL	umbrella sedge
Hypericum fasciculatum	OBL	St. Johns wort
Panicum erectifolium	OBL	erect-leaf witch grass
Xyris spp.	OBL	yellow-eyed grass
Xyris ambigua	OBL	yellow-eyed grass
Xyris elliottii	OBL	yellow-eyed grass
Lycopodium alopecuroides	FACW	clubmoss
Scleria spp.	FACW	bald rush
Utricularia spp.	OBL	bladderwort

Vegetation Immediately Waterward of the Wetland Boundary

Canopy and Subcanopy

Pinus elliottii	UPLAND	slash pine

Groundcover

Hypericum fasciculatum	OBL	St. Johns wort
Sphagnum spp.	OBL	sphagnum moss

Utricularia spp.	OBL	bladderwort
Xyris ambigua	OBL	yellow-eyed grass
Xyris elliottii	OBL	yellow-eyed grass
Utricularia subulata	OBL	bladderwort
Utricularia cornuta	OBL	bladderwort
Utricularia juncea	OBL	bladderwort
Andropogon glomeratus	FACW	broom sedge
Drosera capillaris	FACW	pink sundew
Panicum dichotomum	FACW	panicum
Rhynchospora ciliaris	FACW	beak rush
Rhynchospora fascicularis	FACW	beak rush
Aristida rhizomophora	FAC	three-awn grass
Aristida spiciformis	FAC	three-awn grass
Aristida stricta	FAC	wire grass
Myrica cerifera	FAC	wax myrtle
Ilex glabra	UPLAND	gallberry

Vegetative Immediately Landward of the Wetland Boundary Line

Canopy and Subcanopy

Pinus elliottii	UPLAND	slash pine

Ground cover

Scleria spp.	FACW	bald rush
Aristida rhizomophora	FAC	three-awn grass
Aristida spiciformis	FAC	three-awn grass
Aristida stricta	FAC	wire grass

Vegetation In the Upland

Canopy and Subcanopy

Pinus elliottii	UPLAND	slash pine

Ground cover

Burmannia biflora	OBL	burmannia
Scleria spp.	FACW	bald rush
Aristida rhizomophora	FAC	three awn grass
Aristida stricta	FAC	wire grass
Schizachyrium scoparium	FAC	bluestem
Myrica cerifera	FAC	wax myrtle
Satureja rigida	UPLAND	pennyroyal
Ilex glabra	UPLAND	gallberry

SOUTHERN MARSH

• The initial review of the plant communities reveals a distinct break between the outer area of the depressional marsh, dominated by FACW plant species, and the upland pine flatwoods, dominated by *Serenoa repens*. This apparent edge corresponds to a visual estimate of the landward extent of the depressional mapping unit. Often however, as is the case here, the true wetland boundary is different from the depressional mapping unit boundary as depicted in the soil survey. Use of the palmetto edge as an interpretation of the depressional mapping unit boundary at this site results in a boundary which is not reflective of a consistent water level as determined by on-site elevations. This would not be unusual for a seepage area, but in a flatwoods landscape the elevation of the wetland boundary should, in most cases, be consistent. By using the provisions of subsection 62-340.300(2)(d), F.A.C. A wetland boundary is established based upon the occurrence of two or more inches of mucky texture in conjunction with the hydric soil indicators, that reflects a consistent water level. Portions of this boundary are located slightly landward of the waterward edge of the saw palmetto.

Vegetation Within The Marsh

Ground cover

Hypericum fasciculatum	OBL	St. John's-wort, marsh
Panicum erectifolium	OBL	witchgrass, erect-leaf
Panicum hemitomon	OBL	maidencane
Taxodium ascendens	OBL	cypress, pond

Note: the *Hypericum* had adventitious rooting. The *Taxodium* showed signs of fire, even in the deepest portion of this marsh.

Vegetation Immediately Waterward of the Wetland Boundary

Shallow portions of marsh up to the first stunted *Pinus elliottii* var. *densa* and not past the *Serenoa repens*. This wetland/upland line is more abrupt as the palmetto is less reticulate in its growth pattern and the uplands are drier with sandy soils and sandhill vegetation.

Ground cover

Andropogon glomeratus (Campbell)	FACW	bluestem, bushy
Aristida spiciformis	FAC	bottlebrush, three-awn
Balduina atropurpurea	FACW	honeycomb-head, purple
Bigelowia nudata	FACW	golden-rod, rayless
Ctenium spp.	FACW	toothache grass
Cyperus spp.	FACW	flatsedge

Drosera capillaris	FACW	sundew, pink
Eleocharis baldwinii	OBL	spikerush
Eriocaulon decangulare	OBL	pipewort
Fuirena scirpoidea	OBL	umbrella-sedge
Juncus spp.	OBL	rush
Lycopodium alopecuroides	FACW	clubmoss
Oxypolis filiformis	OBL	water drop-wort
Rhexia petiolata	FACW	meadow-beauty, white
Rhynchospora tracyi	FACW	beakrush
Sabatia bartramii	OBL	rose-gentian, Bartram's
Sphagnum spp.	OBL	sphagnum mos
Utricularia subulata	OBL	bladderwort
Xyris ambigua	OBL	yellow-eyed grass
Xyris spp.	OBL	yellow-eyed grass

Vegetation Immediately Landward of the Wetland Boundary

Pine flatwoods. This is a dry pine flatwoods site. It is of note that the palmetto is most dense at the edge of the wetland.

Canopy

Pinus elliottii var. *densa*	UPLAND	So. Florida slash pine

Subcanopy

Pinus elliottii var. *densa*	UPLAND	So. Florida slash pine

Ground cover

Andropogon glomeratus (Campbell)	FACW	bluestem, bushy
Aristida stricta	FAC	three-awn grass, pineland
Hypoxis juncea	FACW	stargrasses, yellow
Ilex glabra	UPLAND	gallberry
Schizachyrium scoparium	FAC	bluestem
Scleria reticularis	FACW	nutrush
Serenoa repens	UPLAND	saw palmetto

Note: this plant list was compiled during the winter season and some components of the summer flora will be missing. Also, this area has been burned recently.

SOILS DESCRIPTIONS

NOTHERN MARSH
USDA - NRCS Martin County Soil Survey - Sheet 42

The wetland soil is mapped as Waveland sand, depressional (mapping unit #5).
The upland soil is mapped as Waveland sand (mapping unit #4).

5 - Waveland sand, depressional is composed of:

100% - Waveland soil	hydric component

4 - Waveland sand is composed of:

40% - Waveland soil	non-hydric component
40% - Immokalee soil	non-hydric inclusion
10% - St. Johns soil	hydric inclusion
10% - Waveland soil	hydric inclusion

Soil Profile Descriptions

Point 2-1. Five-eight feet waterward of the wetland boundary line (inundation present).

Horizon	Depth (in)	
Oa	0-2	black (10YR 2/1) muck
A	2-3	very dark gray (10YR 3/1) fine sand
E or C	3+	gray (10YR 5/1) fine sand

Hydric soil: Yes
Hydric soil field indicators: presence of two inches of muck in the Oa horizon.

Point 2-2

Point 2-2. Six feet waterward of the wetland boundary line (water table - 7 inches).

Horizon	Depth (in)	
A1	0-4	black (10YR 2/1) mucky sand; many medium roots
A2	4-9	very dark gray (10YR 3/1) sand; few medium and fine roots
E or C	9-15+	gray (10YR 5/1) fine sand; few medium and large roots

Hydric soil: Yes
Hydric soil field indicators: presence of more than two inches of mucky texture (sand) in the A1 horizon.

Point 2-4a

Point 2-4a. Just waterward of the wetland boundary line (water table - 10 inches).

Horizon	Depth (in)	
A1	0-2	black (10YR 2/1) mucky sand
A2	2-10	very dark gray (10YR 3/1) sand
E or C	10+	light brownish gray (10YR 6/2) sand

Hydric soil: Yes
Hydric soil field indicators: presence of two inches of mucky texture (sand) in the A1 horizon.

Point 2-4b

Point 2-4b. Just landward of the wetland delineation line (water table - 11 inches).

Horizon	Depth (in)	
A1	0-4	black (10YR 2/1) sand;
A2	4-8	very dark gray (10YR 3/1) and gray (10YR 5/1) sand; stripped matrix
A3	8-12	dark gray (10YR 4/1) sand
E or C	12+	gray (10YR 6/1) sand

Hydric soil: Yes
Hydric soil field indicators: presence of four inches of greater than 70% coated sand grains in the A1 horizon.

Point 2-5

Point 2-5. Landward of the wetland boundary line.

Horizon	Depth (in)	
A1	0-1/2	black (10YR 2/1) mucky sand; few fine roots
A2	1/2-4	very dark gray (10YR 3/1) and gray (10YR 5/1) sand
E or C	4+	dark gray (10YR 4/1) and gray (10YR 6/1) sand

Hydric soil: No
Hydric soil field indicators: no hydric soil field indicators present.

SOUTHERN MARSH
USDA - NRCS Martin County Soil Survey - Sheet 42

The wetland soil is mapped as Waveland sand, depressional (mapping unit #5).
The upland soil is mapped as Waveland sand (mapping unit #4).

5 - Waveland sand, depressional is composed of:

100% - Waveland soil	hydric component

4 - Waveland sand is composed of:

40% - Waveland soil	non-hydric component
40% - Immokalee soil	non-hydric inclusion
10% - St. Johns soil	hydric inclusion
10% - Waveland soil	hydric inclusion

Point 2-2

Soil Profile Descriptions

Point 2-2. Waterward of the wetland boundary line (water table - 7 inches).

Horizon	Depth (in)	
A1	0-4	black (10YR 2/1) sand
A2	4-11	dark gray (10YR 4/1) sand
E or C	11+	gray (10YR 5/1) sand

Hydric soil: Yes
Hydric soil field indicators: presence of four inches of greater than 70% coated sand grains in the A1 horizon.

Point 2-3a. Waterward of the wetland boundary line (water table - 9 inches).

Horizon	Depth (in)	
A1	0-6	black (10YR 2/1) sand
E or C	6+	gray (10YR 5/1) sand

Hydric soil: Yes
Hydric soil field indicators: presence of four inches of greater than 70% coated sand grains in the A1 horizon.

Point 2-3b. Landward of the wetland boundary line.

Horizon	Depth (in)	
A	0-5	very dark gray (10YR 3/1) and light gray (10YR 7/1) sand
E or C	5+	gray (10YR 5/1) and light gray (10YR 7/1) sand

Hydric soil: No
Hydric soil field indicators: no hydric soil field indicators present.

Point 2-3b

Point 2-4. Landward of the wetland boundary line.

Horizon	Depth (in)	
A	0-2	gray (10YR 5/1) sand
E or C	2+	gray (10YR 7/1) sand

Hydric soil: No
Hydric soil field indicators: no hydric soil field indicators present.

Point 2-4

Little-Big Econ State Forest

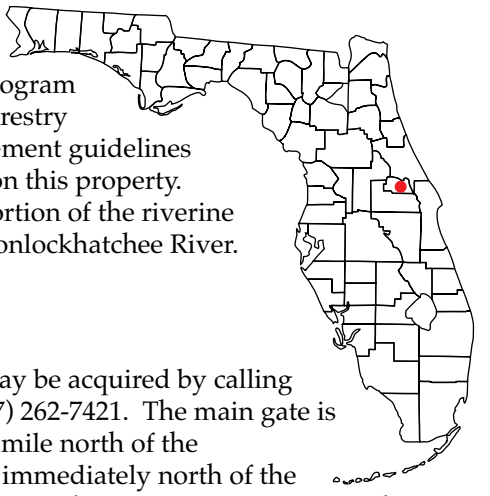
(Seminole County)

DEPRESSION MARSH AND RIVERINE SWAMP

Econlockhatchee River floodplain wetland/riverine swamp

LOCATION

The Little-Big Econ State Forest is located south of Geneva between C.R. 426 and C.R. 419 in Seminole County. The property is part of a cooperative program involving the St. Johns River Water Management District (SJRWMD), the state Conservation and Recreational Lands program (CARL), Seminole County, and the Division of Forestry (DOF). The DOF is currently developing management guidelines for the property. Two reference sites are located on this property. One site is an isolated marsh and the other is a portion of the riverine swamp contained within the floodplain of the Econlockhatchee River.



ACCESS

Permits are required to enter this property and may be acquired by calling the SJRWMD at (407) 897- 4311 or the DOF at (407) 262-7421. The main gate is located on Snow Hill Rd. approximately one half mile north of the Econlockhatchee River. The marsh site is located immediately north of the main gate entrance on the west side of Snow Hill Rd. The river swamp site is on the

north side of the Econlockhatchee River also immediately west of Snow Hill Rd.

COMMUNITY CHARACTERIZATION - DEPRESSION MARSH

The reference site is an isolated, depression marsh located in the northern portion of the property, close to the main entrance. A depression marsh wetland is generally a small rounded depression in a sand substrate with vegetation growing in distinct bands reflective of the hydroperiod and water depth. These open, bowl shaped wetlands are subject to both very wet and very dry conditions. Although it is likely that this site was originally situated within a pine flatwoods, the surrounding area has been converted to improved pasture. The outer edge of the marsh has been severely impacted by the associated activities including disking and seeding with pasture grass. Both the vegetative community and the upper portion of the soil profile reflect this disturbance. Although the upper portion of the soil profile has been mixed, the soil still retains hydric indicators. The combination of disking and the introduction of *Paspalum notatum* (bahia grass) has altered the vegetative dominance of the landward most zone of the marsh.

DELINEATION PROCEDURE - DEPRESSION MARSH

An initial inspection of the depression marsh establishes that the area is a wetland by direct application of the wetland definition. As would be expected from the location of the reference site within a pasture, the influence of pasture grasses on the vegetative dominance of the landward zone of the marsh is quickly revealed. Although not placed on the vegetative index, bahia grass does display a strong tolerance for wetland conditions and is often observed as a dominant component in the ground cover of disturbed wetlands. This is also the situation for several other species of pasture grass including *Axonopus furcatus*, *A. affinis* and *A. compressus* (carpet grasses) and *Cynodon dactylon* (Bermuda grass). Because of the confounding effect on vegetative dominance elicited by the presence of pasture grasses growing in the wetland, subsections 62-340.300(2)(a) and (b), F.A.C., are not used in determining the wetland boundary at this reference site.

When vegetative dominance can not be used to locate the edge of the wetland, hydrologic indicators often provide the necessary data with which to make decisions. The center of the marsh contains a small clump of *Nyssa sylvatica* var. *biflora* (swamp tupelo) trees which provides a clear hydrologic indicator in the form of a distinct lichen line. Further, although the soils of the landward zone of the marsh were disturbed by the disking, hydric soil indicators are still evident. The combination of the clear hydrologic indicator and the presence of hydric soil indicators allow the application of subsection 62-340.300(d), F.A.C. In order to use the distinct lichen line as a hydrologic indicator, it is necessary to establish that it does not reflect either relict or atypical conditions (reasonable scientific judgment). At this site, there is no sign of significant drainage that would lead to an altered hydrologic regime. A laser level was used to record the elevation of the lichen line and to project this elevation onto the surrounding land. The elevation of the lichen line corresponds very well with the landward extent of existing hydric soil indicators. Because mechanical mixing of the upper soil profile typically obliterates many of the hydric soil indicators, the current extent of hydric soil is regarded

as a conservative approximation which further supports the legitimate use of the lichen line. Using subsection 62-340.300(2)(d), F.A.C., the wetland boundary is established where a combination of hydric soil indicators (> 70% organic coating) and hydrologic indicators (the elevation of a lichen line on a swamp tupelo from the center of the depression) are both present. The wetland boundary line is marked with concrete monuments.

If the hydrologic indicator had not been present, subsection 62-340.300(3), F.A.C., the altered site provision, would have applied. The altered site provision is only to be used when the primary parameters of soil, vegetation, and hydrologic indicators can not be used to establish an accurate wetland boundary.

Vegetation Within the Marsh
(Observations recorded March 6, 1995)

(from the central area of the marsh)
Canopy/subcanopy

	Nyssa sylvatica var. *biflora*	OBL	water tupelo

Ground cover

	Bacopa spp.	OBL	water-hyssop
	Centella asiatica	FACW	coin wort
	Hydrocotyle spp.	FACW	water pennywort
	Ludwigia repens	OBL	ludwigia
	Micranthemum spp.	OBL	baby tears
	Panicum repens	FACW	torpedo grass
	Polygonum spp.	OBL	smartweed
	Pontederia cordata	OBL	pickerelweed
**	*Scirpus* spp.	OBL	bulrush
	Utricularia sp.	OBL	bladderwort

Vegetation Immediately Waterward of the Wetland Boundary line
(Observations recorded March 6, 1995)

(from the landward zone of the marsh)
Ground cover

	Andropogon virginicus	FAC	broomsedge
**	*Axonopus furcatus*	FAC	big carpet grass
	Baccharis halimifolia	FAC	salt bush
**	*Paspalum notatum*	UPLAND	bahia grass
	Carex albolutescens	FACW	sedge

Circeum horridulum	UPLAND	thistle
Desmodium sp.	UPLAND	beggar's lice
Eleocharis vivipara	OBL	hair grass
Eragrostis spp.	FAC	love grass
Eupatorium capillifolium	FAC	dog fennel
Euthamia sp.	FAC	bushy goldenrod
Hedyotis uniflora (*Oldenlandia*)	FAC	bluets
Hydrocotyle spp.	FACW	water pennywort
Juncus spp.	OBL	rush
Phyla nodiflora	FAC	frog-fruit
Myrica cerifera	FAC	wax myrtle
Panicum anceps	FAC	panic grass
Panicum dichotomum	FACW	panic grass
Panicum strigosum	FAC	panic grass
Paspalum urvillei	FAC	vasey grass
Rhynchospora fascicularis	FACW	beak-rush
Rhynchospora microcarpa	OBL	beak-rush
Sabal palmetto	FAC	cabbage palm
Scoparia dulcis	FAC	sweet broom
Scirpus spp.	OBL	bulrush
Scleria spp.	FACW	bald-rush
Sisyrinchium atlanticum	FACW	eastern blue-eyed grass
Solidago spp.	UPLAND	goldenrod
Sonchus sp.	UPLAND	sow thistle

** Designates species which are overwhelmingly dominant

Landward of the wetland boundary line the vegetation continues to be dominated by *Paspalum notatum* (bahia grass).

COMMUNITY CHARACTERIZATION - RIVERINE SWAMP

The reference site is the wetland limits of the Econlockhatchee River floodplain along the north side of the river. The wetland area is characterized by a canopy composed of species tolerant of periods of surface water inundation. Inundation is most frequent during the peak of the summer rainy season. As with most floodplain forests, a gradual slope is present. The depth and duration of inundation for any typical flooding event is a factor of this slope. The upper most extent of the community experiences less inundation than the portion at lower elevations.

DELINEATION PROCEDURES - RIVERINE SWAMP

The Econlockhatchee River is a surface water body identifiable by the use of section 62-430.600, F.A.C. Beginning at the river and moving landward, the vegetative dominance meets the provisions of subsections 62-340.300(2)(a) and (b), F.A.C., and is supported by the presence of hydric soil. Vegetative dominance continues landward to a point on the slope where the dominance of facultative wet species in the canopy rapidly gives way to the increasing influence of *Quercus virginiana* (live oak). Here, the provisions of subsection 62-340.300(2)(b), F.A.C., are no longer met in the canopy. The ground cover likewise changes, as *Serenoa repens* (saw palmetto) becomes a significant component. Hydric soil indicators also fall out where the canopy dominance changes from *Quercus laurifolia* (swamp laurel oak) to *Quercus virginiana* (live oak). The wetland boundary occurs at this break in communities.

Floodplains may or may not have hydric soil indicators because inundation does not always result in the creation of markers in the soil profile. It is important to note that the actual landward extent of some rivers may not be the limits of the associated wetlands, but rather are defined by the ordinary high water line. Please refer to section 62-340.600, F.A.C., in the main text of this document for further discussion of the ordinary high water line.

Vegetation Immediately Waterward of the Wetland Boundary Line

Canopy

Carpinus caroliniana	FACW	ironwood
Liquidambar styraciflua	FACW	sweetgum
Pinus elliottii	UPLAND	slash pine
Pinus serotina	FACW	pond pine
Quercus laurifolia	FACW	swamp laurel oak
Sabal palmetto	FAC	swamp cabbage

Subcanopy

Carpinus caroliniana	FACW	ironwood

Ground cover

Axonopus furcatus	FAC	big carpet grass
Carex albolutescens	FACW	sedge
Centella asiatica	FACW	coinwort
Chasmanthium sessiliflorum	FAC	spangle grass
Hypericum hypericoides	FAC	St. John's wort
Hypoxis leptocarpa	FACW	yellow star grass
Mitchella repens	UPLAND	partridge berry
Oxalis sp.	UPLAND	wood sorrel
Panicum sp.	FAC	panic grass

Vegetation Immediately Landward of the Wetland Boundary Line

Canopy

Pinus elliottii	UPLAND	slash pine
Quercus virginiana	UPLAND	live oak

Subcanopy

Crataegus crus-galli	UPLAND	hog-apple

Ground cover

Chasmanthium sessiliflorum	FAC	spangle grass
Erythrina herbacea	UPLAND	coral bean
Serenoa repens	UPLAND	saw palmetto

SOIL DESCRIPTIONS

Depression Marsh
USDA-NRCS Soil Survey of Seminole County - Sheet 25
The wetland is indicated by a wet spot symbol on the field sheet.
The upland soil is mapped as Myakka and EauGallie fine sand (mapping unit #20).

20 - Myakka and EauGallie fine sand is composed of:

48% - Myakka soil	non-hydric component
22% - EauGallie soil	non-hydric component
10% - EauGallie soil	hydric inclusion
10% - Myakka soil	hydric inclusion
5% - Pompano soil	hydric inclusion
5% - Basinger soil	hydric inclusion

Soil Profile Descriptions

Point 1. twenty feet waterward of the wetland boundary line (water table - 20 inches).

Horizon	Depth (in)	
A1	0-1	black (10YR 2/1) mucky fine sand, many fine roots
A2	1-5	black (10YR 2/1) fine sand, common medium roots
AE	5-9	black (10YR 2/1) and dark gray (10YR 4/1) fine sand, few medium roots
E or C	9-12+	gray (10YR 5/1) fine sand, common mdium roots

Hydric soil: Yes
Hydric soil field indicators: greater than four inches of 70% or more coated sand grains.

Point 2. twenty feet landward of the wetland boundary line (water table - below 24 inches).

Horizon	Depth (in)	
A	0-5	very dark gray (10YR 3/1) and gray (10YR 6/1) fine sand, many fine roots
E or C	5-12+	gray (10YR 5/1) fine sand, few medium roots

Hydric soil: No
Hydric soil field indicators: none

Riverine Swamp
USDA-NRCS Soil Survey of Seminole County - Sheet 25
The wetland soils are mapped as Pompano fine sand, occasionally flooded (mapping unit #28) and **Basinger and Delray fine sands** (mapping unit #9).

28 - Pompano fine sand, occasionally flooded is composed of:

90% - Pompano soil	hydric component
10% - Nittaw soil	hydric inclusion

9 - Basinger and Delray fine sands is composed of:

60% - Basinger soil	hydric component
32% - Delray soil	hydric component
4% - Malabar soil	hydric inclusion
4% - Wabasso soil	non-hydric inclusion

The upland soil is mapped as Myakka and EauGallie fine sand (mapping unit #20).

20 - Myakka and EauGallie fine sand is composed of:

48% - Myakka soil	non-hydric component

22% - EauGallie soil	non-hydric component
5% - Basinger soil	hydric inclusion
10% - EauGallie soil	hydric inclusion
10% - Myakka soil	hydric inclusion
5% - Pompano soil	hydric inclusion

Soil Profile Descriptions

Point 1. twelve feet waterward of the wetland boundary line.

Horizon	Depth (in)	
A	0-1	very dark gray (10YR 3/1) fine sand with black (10YR 2/1) 1-2cm organic accretions, many fine roots
AE	1-6	very dark gray (10YR 3/1) fine sand with yellowish brown (10YR 5/6) oxidized rhizospheres in the lower part, common fine and few medium roots
B	6-10+	dark grayish brown (10YR 4/2) loamy fine sand with fine medium prominent yellowish brown (10YR 5/6) mottles, few fine roots

Hydric soil: Yes
Hydric soil field indicators: organic accretions in the A horizon, and oxidized rhizospheres in the AE horizon.

Point 1

Point 2. 45 feet landward of the wetland boundary line.

Horizon	Depth (in)	
A	0-7	very dark gray (10YR 3/1) very fine sand, many fine and few medium roots
C	7-12+	dark grayish brown (10YR 4/2) and brown (10YR 5/3) fine sand, few fine roots

Hydric soil: No
Hydric soil field indicators: none

Point 2

Naval Live Oaks Area

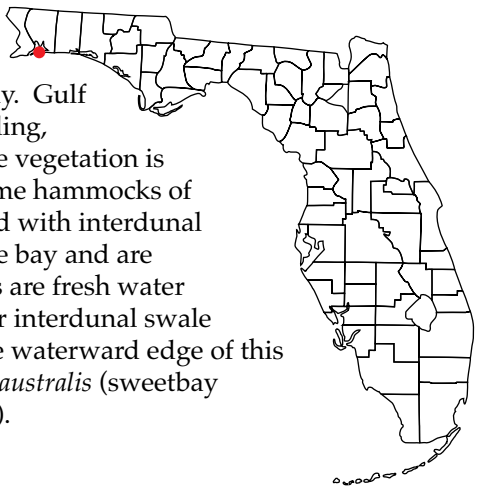
(Santa Rosa County)

FRESHWATER INTERDUNAL SWALE

Maritime hammock

LOCATION

The Naval Live Oaks Area, part of the Santa Rosa Island National Seashore, is located in coastal Santa Rosa county. The park includes large areas of tidal marsh and maritime coastal hammock. The reference site is located on the peninsula between Santa Rosa sound and East Bay. Gulf Breeze is the nearest town. The land is gently rolling, reflecting a history of coastal dunes. Seaward, the vegetation is stunted by the wind, producing the dense maritime hammocks of live oak. The maritime hammocks are punctuated with interdunal swales. Some of these swales are connected to the bay and are dominated by salt marsh vegetation, while others are fresh water marshes. The reference site is part of a freshwater interdunal swale dominated by *Cladium jamaicense* (sawgrass). The waterward edge of this wetland is dominated by *Magnolia virginiana* var. *australis* (sweetbay magnolia) and *Myrica cerifera* (southern bayberry).



ACCESS

This reference site is located west of the visitors center at the Naval Live Oaks area of Gulf Islands National Seashore. The visitor center is located between Gulf Breeze and Navarre on U.S. Highway 98. Parking is available in the visitor center parking area. The site is easily reached by a trail that parallels Santa Rosa sound. Access is through the visitor center, across the deck in back, and west on the hiking trail. The interdunal swale can be reached in a few minutes by a pleasant walk through a maritime hammock. The wetland boundary is marked with wooden posts.

COMMUNITY CHARACTERIZATION

The reference site is a freshwater marsh of an interdunal swale. The center of this wetland is dominated by *Caladium jamaicense* (sawgrass) with an outer zone of *Magnolia virginiana* var. *australis* (sweetbay magnolia) and *Myrica cerifera* (southern bayberry). The wetland boundary is established immediately upslope from the sweetbay magnolia. Landward of the boundary line, the maritime forest of *Quercus geminata* (sand live-oak), *Magnolia grandiflora* (southern magnolia), *Carya glabra* (pignut hickory) and *Persea borbonia* (redbay) produces a closed canopy of twisting branches.

Sawgrass marsh within interdunal swale

DELINEATION PROCEDURE

The deepest portion of the interdunal swale is a marsh dominated by sawgrass, a wetland that is identifiable by using the wetland definition. Surrounding the marsh is dense forest. Beginning at the marsh/forest interface, vegetative dominance by hydrophytic species in the canopy, corroborated by hydric soil indicators (subsections 62-340.300(2)(a) and (b), F.A.C.), is followed landward. The initial canopy encountered is composed of sweetbay magnolia, an obligate species and *Persea borbonia* (red bay), an upland species. The wetland boundary is established where the areal extent of sweetbay no longer exceeds the areal extent of upland species. Landward of the *Magnolia virginiana* var. *australis* zone, the composition of the canopy changed rapidly to upland species. Similarly the soil also changes from hydric to non-hydric. Further observation showed that recent extreme inundation, probably associated with the tropical storms of July and August of 1994 has killed the *Myrica cerifera* around the edge of this wetland but not the *Magnolia virginiana* var. *australis*.

Vegetation of the Wetland Interior.

Ground cover

Cephalanthus occidentalis	OBL	buttonbush
Caladium jamaicense	OBL	sawgrass

Vegetation Immediately Waterward of the Wetland Boundary.

Canopy

Magnolia virginiana var. *australis*	OBL	magnolia, sweetbay
Persea borbonia	UPLAND	bay, red

Subcanopy

Myrica cerifera	FAC	bayberry, southern

Vegetation Immediately Landward of the Wetland Boundary.

Canopy

Magnolia grandiflora	UPLAND	magnolia, southern
Persea borbonia	UPLAND	bay, red
Pinus elliottii	UPLAND	slash pine
Quercus hemisphearica	UPLAND	oak, laurel
Quercus geminata	UPLAND	oak, sand-live

Subcanopy

Myrica cerifera	FAC	bayberry, southern

Ground Cover

Aronia arbutifolia	FACW	red chokeberry
Bignonia capreolata	VINE	cross-vine

SOIL DESCRIPTIONS

USDA-NRCS Santa Rosa County Soil Survey - Sheet 83
The soil is mapped as Kureb sand, 0 to 8 persent slope.

Soil Profile Descriptions

Transect 1:
Point 1-1. One foot waterward of the wetland boundary line (water table - one inch).

Horizon	Depth (in)	
Oe	3-0	dark reddish brown (5YR 3/3) peat
Oa	0-1	black (10YR 2/1) muck
A1	1-3	black (10YR 2/1) mucky fine sand
A2	3+	very dark gray (10YR 3/1) fine sand

Hydric soil: Yes
Hydric soil field indicators: one inches of muck (horizon Oa), three inches of mucky texture

Point 1-2. Ten feet landward of the wetland boundary line (water table - ten inches).

Horizon	Depth (in)	
Oe	1-0	dark reddish brown (5YR 3/3) peat
A1	0-2	brown (7.5YR 4/2) fine sand
A2	2-7	dark gray (10YR 4/1) fine sand
E or C	7+	gray (10YR 5/1) fine sand

Hydric soil: No
Hydric soil field indicators: none

Transect 2:
Point 2-1. One foot waterward of the wetland boundary line (water table - one inch).

Horizon	Depth (in)	
Oe	2-0	dark reddish brown (5YR 3/3) peat
Oa	0-1	black (10YR 2/1) muck
A1	1-3	black (10YR 2/1) mucky fine sand
A2	3+	very dark gray (10YR 3/1) fine sand

Hydric soil: Yes
Hydric soil field indicators: one inches of muck in the Oa horizon and three inches of mucky texture in the A1 horizon.

Point 2-2

Point 2-2. Ten feet landward of the wetland boundary line (water table - eight inch).

Horizon	Depth (in)	
Oe	2-0	dark reddish brown (5YR 3/3) peat
A	0-4	dark gray (10YR 4/1) fine sand
E or C	4+	gray (10YR 5/1) fine sand

Hydric soil: No
Hydric soil field indicators: none

No Name Key

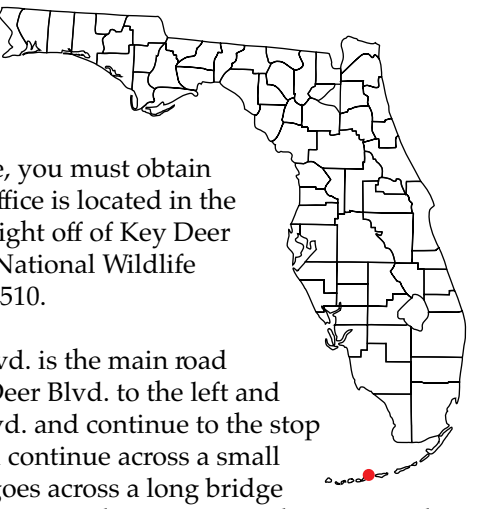
(Monroe County)

BUTTONWOOD FOREST

Buttonwood Forest

LOCATION

No Name Key is located immediately east of Big Pine Key, within the National Key Deer Refuge. The reference site is located on the east end of the island.



ACCESS

To enter this area of the National Key Deer Refuge, you must obtain permission from the Refuge Headquarters. The office is located in the shopping center that is one block from the traffic light off of Key Deer Blvd. Contact the Refuge Manager, Florida Keys National Wildlife Refuge, P.O. Box 430510, Big Pine Key, Fl. 33043-0510.

Take Key Deer Blvd. to Watson Blvd. Key Deer Blvd. is the main road through Big Pine Key and will fork left into Key Deer Blvd. to the left and Wilder Rd. to the right. Take a right at Watson Blvd. and continue to the stop sign. At the stop sign turn left onto Avenue A and continue across a small bridge and through a residential area. This road goes across a long bridge to No Name Key. Continue on this road across the key to the east end of the island. The

road dead ends at a concrete barrier. Parking is allowed on the shoulder of the road. Along the right side (south side) of the road, approximately 100 feet from the barrier, is a ditch filled with mangroves. The reference site is located between the tropical hardwood hammock and the buttonwood forest, about 100 feet from the road.

COMMUNITY CHARACTERIZATION

The reference site is located adjacent to a buttonwood forest. The wetland is only inundated by the highest tides during certain times of the year, and remains dry for long periods. The soils are rocky and often without continuous plant cover. The forest nearest the wetland boundary is dominated by *Conocarpus erecta* (buttonwood). This is an open forest with salt-tolerant herbaceous perennials and woody shrubs such as *Fimbristylis castanea* (fringe-rush), *Monanthochloe littoralis* (Key grass), *Spartina patens* (saltmeadow cordgrass), *Spartina spartinae* (Gulf cordgrass), and *Sporobolus virginicus* (seashore dropseed). The ecotone between the wetland and tropical hammock is dominated by *Manilkara bahamensis* (wild dilly), *Coccoloba uvifera* (sea grape), *Randia aculeata* (indigo berry), and *Reynosia septentrionalis* (darling plum).

To facilitate identification of the woody vegetation of the keys we recommend *Native Trees and Shrubs of the Florida Keys* by J. Paul Scurlock.

DELINEATION PROCEDURE

The wetland boundary is located at the landward interface of the buttonwood forest and the tropical hammock. Beginning in the fringing mangrove swamp (located east of the buttonwood forest), a wetland identified by the use of the definition in subsection 62-340.200(19), F.A.C., the dominance of obligate and facultative wet vegetation is followed landward using the provisions of subsection 62-340.300(2)(a), F.A.C. The mangrove swamp, composed of *Rhizophora mangle* (red mangrove), *Laguncularia racemosa* (white mangrove), and *Avicennia germinans* (black mangrove), grades into an open forest of buttonwood. Soils and hydrologic indicators are present along a transect from the mangrove forest through the buttonwood forest. Using subsection 62-340.300(2)(b), F.A.C., the wetland delineation extended through the open canopy of the buttonwood forest to the ecotone between the buttonwood forest and tropical hammock. Proceeding landward within the ecotone, dominance by hydrophytic plants is lost as are hydric soil indicators (upper soil surface contains organic soil impurities from the Folists found in the tropical hammock and the marl color grades from very dark grey to grey). For this reference site the wetland boundary is placed at the interface between the buttonwood forest and the tropical hammock.

The following plant lists with corresponding soils descriptions were prepared during the December 1994 visit to the delineation site. The common plant species in the buttonwood forest and tropical hammock are listed below. Soil descriptions and photographs follow the plant lists.

Vegetation Immediately Waterward of the Wetland Boundary

Canopy

Manilkara bahamensis	FACW	wild dilly
Conocarpus erectus	FACW	buttonwood
Coccoloba uvifera	UPLAND	seagrape

Subcanopy

Manilkara bahamensis	FACW	wild dilly
Conocarpus erectus	FACW	buttonwood

Ground cover

Monanthochloe littoralis	OBL	Key grass
Spartina patens	FACW	saltmeadow cordgrass
Spartina spartinae	OBL	Gulf cordgrass
Sporobolus virginicus	OBL	seashore dropseed
Fimbristylis castanea	OBL	fringerush

Vegetation Immediately Landward of the Wetland Boundary

Canopy

Coccolobba diversifolia	UPLAND	pigeon plum
Eugenia axillaris	UPLAND	white stopper
Eugenia foetida	UPLAND	Spanish stopper
Metopium toxiferum	FAC	poison wood
Psidium longipes	UPLAND	long-stalked stopper
Manilkara bahamensis	FACW	wild dilly
Manilkara zapota	UPLAND	sapodilla

Subcanopy

Coccolobba diversifolia	UPLAND	pigeon plum
Eugenia axillaris	UPLAND	white stopper
Eugenia foetida	UPLAND	Spanish stopper
Metopium toxiferum	FAC	poison wood
Psidium longipes	UPLAND	long-stalked stopper
Randia aculeata	FAC	indigo berry
Reynosia septentrionalis	UPLAND	darling plum
Manilkara zapota	UPLAND	sapodilla

Ground cover

Ernodea littoralis	FAC	golden creeper

Morinda royoc	FACW	Keys rhubarb

SOILS DESCRIPTION

USDA - NRCS Monroe County Soil Survey - Sheet 6

The wetland soil is mapped as Rock outcrop-Cudjoe complex, tidal (mapping unit #8). **The upland soil is mapped as Matecumbe muck, occasionally flooded** (mapping unit #3).

8 - Rock outcrop-Cudjoe complex, tidal is composed of:

60% - Rock outcrop	non-soil
40% - Cudjoe soil	hydric component

3 - Matecumbe muck, occasionally flooded is composed of:

95% - Matecumbe soil	non-hydric component
5% - Keylargo soil	hydric inclusion

Point 1: Marl soil

Typical Soil Profile Descriptions

Point 1. Waterward of the wetland delineation line.

Horizon	Depth (in)	
A	0-2	light brownish gray (10YR 6/2) marl
R	2+	limestone

Hydric soil: Yes
Hydric soil field indicators: presence of marl in the A horizon.

Point 2. Landward of the wetland delineation line.

Horizon	Depth (in)	
Oa1	0-3	black (5YR 2.5/1) muck (peat)
Oa2	3-5	black (5YR 2.5/1) gravelly muck
R	5+	limestone

Point 2: Folists soil

Hydric soil: No
Hydric soil field indicators: no hydric soil field indicators present.

Peck Lake Park

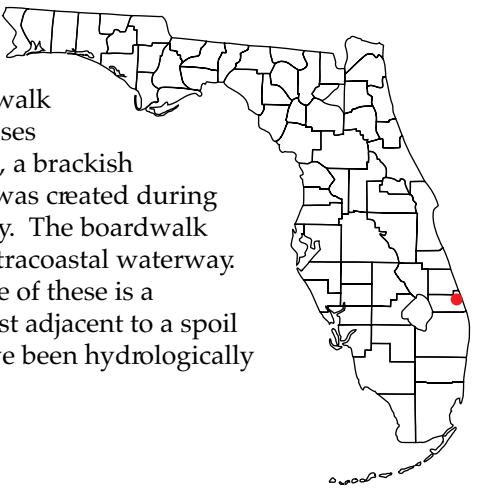
(Martin County)

HARDWOOD SWAMP AND MANGROVE SWAMP

Tidally influenced Australian Pines

LOCATION

Peck Lake Park is adjacent to the Hobe Sound National Wildlife Refuge and north of Jupiter Island. The park is owned and maintained by Martin County. There is a boardwalk through the park from the parking area out to the Intracoastal Waterway. The boardwalk begins at the edge of the mesic flatwoods and passes through a hardwood swamp, a mangrove swamp, a brackish slough, and onto a spoil island. The spoil island was created during the dredging of the Atlantic Intracoastal Waterway. The boardwalk ends on the other side of the spoil island at the intracoastal waterway. There are two reference sites within the park. One of these is a freshwater swamp, the second is a mangrove forest adjacent to a spoil island. All the wetlands observed in the park have been hydrologically altered.



ACCESS

From U.S. Highway 1, about 8 miles south of Stuart, turn east on Osprey Street and cross A1A (Dixie Highway). Turn north (left) onto Gomez Avenue and look for the park

entrance within about 1/4 mile. Parking and facilities are available in the park and access is free. The reference sites are easily observable from the boardwalk.

COMMUNITY CHARACTERIZATION - HARDWOOD SWAMP

The freshwater swamp at this site is dominated by a canopy of *Ilex cassine* (dahoon holly) and *Persea palustris* (swamp bay). The forest is growing in an interdunal swale adjacent to a pine flatwoods. The ecotone between the pine flatwoods and hardwood swamp is narrow, occurring within a zone dominated by *Serenoa repens* (saw palmetto) immediately landward of the swamp. The interior of the swamp has a ground cover dominated by *Blechnum serrulatum* (swamp fern).

DELINEATION PROCEDURE - HARDWOOD SWAMP

The wetland boundary established for this reference site lies between a freshwater swamp (interdunal swale) and a pine flatwoods. Proceeding from within the freshwater swamp, a wetland identifiable by direct application of the wetland definition, the dominance of wetland vegetation is followed landward, examining either the presence of hydric soil indicators or the presence of hydrologic indicators (subsections 62-340.300(2)(a) and (b), F.A.C.). Vegetative dominance is established using subsection 62-340.300(2)(a), F.A.C., within the canopy of the hardwood swamp and continues up to the ecotone, where vegetative dominance is lost. Here, there is an abrupt change from the hydrophytic canopy and ground cover species of the hardwood swamp to saw palmetto dominance. Within this ecotone, hydrologic indicators are present in the form of more than two inches of mucky texture in the upper soil profile. Using subsection 62-340.300(2)(d), F.A.C., the wetland boundary extends a short distance into the saw palmetto thicket until the hydrologic indicators in the soil are no longer present. The exclusion of fire from the surrounding flatwoods has allowed fire intolerant hydrophytic species such as dahoon holly and *Gordonia lasianthus* (loblolly bay) to reach subcanopy tree size within the flatwoods landward of the wetland boundary.

The following plant lists, with corresponding soils descriptions, were prepared during the December 1994 visit to the reference site. The common plant species in the freshwater swamp and pine flatwoods are listed below. Descriptions and photographs of soil samples are included from each location.

Vegetation of the Freshwater Swamp, Immediately Waterward of the Wetland Boundary.

Canopy

Gordonia lasianthus	FACW	loblolly bay
Ilex cassine	OBL	dahoon holly
Persea palustris	OBL	swamp bay

Subcanopy

Ilex cassine	OBL	dahoon holly

Ground cover

Blechnum serrulatum	FACW	swamp fern
Ilex cassine	OBL	dahoon holly
Myrica cerifera	FAC	wax myrtle
Persea palustris	OBL	swamp bay
Quercus laurifolia	FACW	swamp laurel oak
Serenoa repens	UPLAND	saw palmetto
Vitus rotundifolia	VINE	grape

Vegetation of the Pine Flatwoods, Immediately Landward of the Wetland Boundary.

Canopy

Gordonia lasianthus	FACW	loblolly bay
Pinus elliottii var. *densa*	UPLAND	south Florida slash pine
Quercus virginiana	UPLAND	live oak

Subcanopy

Ilex cassine	OBL	dahoon holly
Myrica cerifera	FAC	wax myrtle

Ground cover

Befaria racemosa	UPLAND	tar flower
Ilex glabra	UPLAND	gallberry
Lyonia fruticosa	UPLAND	fetterbush
Pteridium aquilinum	UPLAND	bracken fern
Rhus copallina	UPLAND	smooth sumac
Serenoa repens	UPLAND	saw palmetto
Vitus rotundifolia	VINE	grape

COMMUNITY CHARACTERIZATION - MANGROVE SWAMP

The mangrove community consists of a canopy composed of *Rhizophora mangle* (red mangrove), *Avicennia germinans* (black mangrove), *Laguncularia racemosa* (white mangrove), and the introduced *Schinus terebinthifolius* (Brazilian pepper). This is a hydrologically altered mangrove community as is evidenced by the spoil piles between the swamp and the Intracoastal Waterway. It might be best to consider this an overwash swamp that is frequently inundated by water from the Intracoastal Waterway. The spoil island adjacent to the mangrove swamp is naturalized with Brazilian pepper and *Casuarina litorea* (Australian pine).

DELINEATION PROCEDURE - MANGROVE SWAMP

The wetland boundary established for this reference site lies between a mangrove swamp and an Australian pine dominated spoil pile. Proceeding from within the mangrove swamp, a wetland identified by direct application of the wetland definition, the dominance of wetland vegetation is followed landward, examining either the presence of hydric soil indicators or the presence of hydrologic indicators (subsections 62-340.300(2)(a) and (b), F.A.C.). Supporting hydrologic indicators include pneumatophores from black mangrove and a well developed rack line. Within the canopy of the mangrove swamp, subsection 62-340.300(2)(a), F.A.C., is used up to the edge of the spoil pile where vegetative dominance by hydrophytic vegetation is no longer applicable. Proceeding past the canopy of mangroves, hydrologic indicators become the appropriate mechanism for establishing the wetland boundary (subsection 62-340.300(2)(d), F.A.C.). Pneumatophores are found beyond the rack lines, beneath the Australian pines. The soils of the spoil bank are disturbed, however hydric soil indicators have developed. Based on the hydrologic indicators and the use of reasonable scientific judgment, the wetland boundary is placed in the area where the pneumatophores end and the Australian pines begin to dominate the canopy.

The following plant lists, with corresponding soils descriptions, were prepared during the December 1994 visit to the reference site. The common plant species in the mangrove swamp and Australian pine dominated spoil pile are listed below. Descriptions and photographs of soil samples are included from each location.

Vegetation of the Mangrove swamp, Immediately Waterward of the Wetland Boundary.

Canopy

Avicennia germinans	OBL	mangrove, black
Laguncularia racemosa	OBL	mangrove, white
Rhizophora mangle	OBL	mangrove, red
Schinus terebinthifolius	FAC	pepper-tree, Brazilian
Casuarina litorea	UPLAND	Australian pine

Vegetation of the Australian Pine Dominated Spoil Pile, Immediately Landward of the Wetland Boundary.

Canopy

Casuarina litorea	UPLAND	Australian pine

Ground cover

Abrus precatorius	UPLAND	rosary pea
Cassia bicapsularis	VINE	climbing cassia
Habenaria odontopetala	FACW	rein orchid
Plumbago scandens	UPLAND	wild plumbago
Sabal palmetto	FAC	cabbage palm
Schinus terebinthifolius	FAC	Brazilian pepper

SOIL DESCRIPTIONS

Hardwood swamp.
USDA - NRCS Martin County Soil Survey - Sheet 26

The wetland soil is mapped as Okeelanta muck (mapping unit #22).
The upland soil is mapped as Salerno sand (mapping unit #35).

22 - Okeelanta muck is composed of:

100% - Okeelanta soil	hydric component

39 - Salerno sand is composed of:

70% - Salerno soil	non-hydric component
30% - Pineda soil	hydric inclusion

Soil Profile Descriptions

Point 1. Six feet waterward of the wetland boundary line (water table - 12 inches).

Horizon	Depth (in)	
Oi	1-0	dark reddish brown (5YR 2.5/2) litter; small amount of muck and mucky fine sand in the lower part of the horizon; many medium and fine roots
A1	0-3	dark gray (10YR 4/1) fine sand, with black (10YR 2/1) organic accretions;
A2	3-7	very dark gray (10YR 3/1) fine sand, with few medium distinct gray (10YR 5/1) mottles; common medium roots
E or C	7-15+	gray (10YR 5/1) fine sand; few medium roots

Hydric soil: Yes
Hydric soil field indicators: presences of organic accretions in the A1 horizon.

Point 1: Hardwood swamp

Mangrove swamp
USDA - NRCS Martin County Soil Survey - Sheet 26

The wetland soil is mapped as Okeelanta Variant muck (mapping unit #50).
The upland soil is mapped as Quartzipsamments, 0 to 8 percent slope (mapping unit #39).

50 - Okeelanta Variant muck is composed of:

100% - Okeelanta Variant soil hydric component

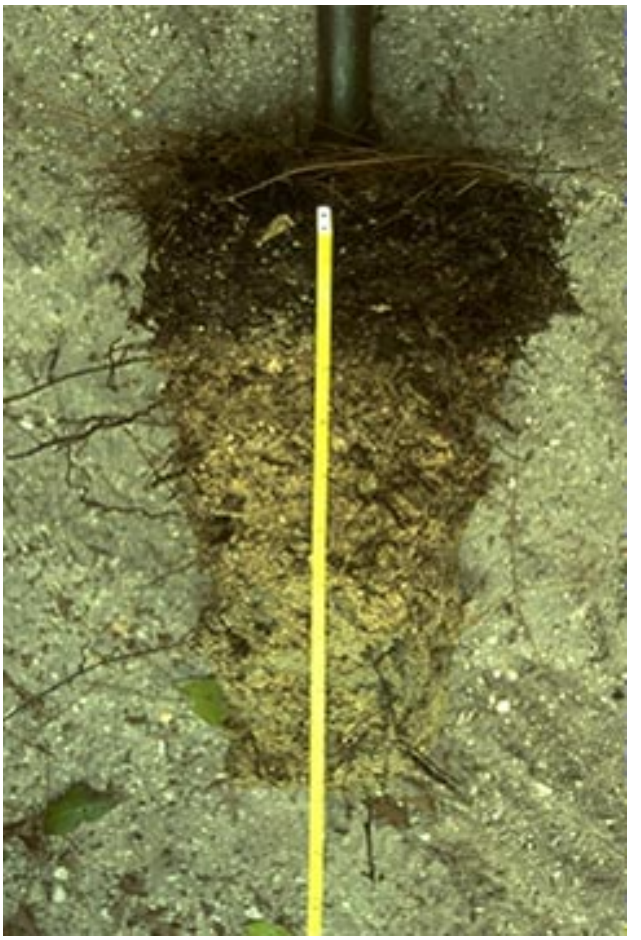
39 - Quartzipsamments, 0 to 8 percent slope is composed of:

5 to 20 feet thick deposits of mixed sand and shell materials

Soil Profile Descriptions

Point 1. Five feet waterward of the wetland boundary line (water table - 8 inches).

Horizon	Depth (in)	
Oi	3-0	black (10YR 2/1) litter; Australian pine needles
Oa	0-1	black (10YR 2/1) muck
C	1-9+	light gray (10YR 7/1) mixed sand and shell fragments; overburden materials from the dredging of the Intercoastal Waterway; few large, many medium and fine roots.



Hydric soil: Yes
Hydric soil field indicators: presence of 0.5 inches of muck in the Oa horizon.

Point 1: Hydric soil under Australian pine.

Point 2. Twenty feet waterward of the wetland boundary line (water table - 34 inches).

Horizon	Depth (in)	
Oi	3-0	black (5YR 2.5/2) litter; Australian pine neddles
C	0-9+	light gray (10YR 7/2) mixed sand and few shell fragments; common fine and medium roots.

Hydric soil: No
Hydric soil field indicators: no hydric soil field indicators present.

Purify Bay

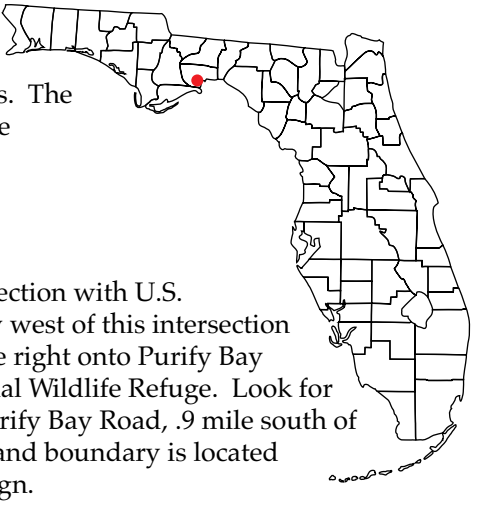
(Wakulla County)

BAYHEAD SWAMP

Looking into a bayhead wetland from the pine flatwoods

LOCATION

Purify Bay is located in southern coastal Wakulla County, within the St. Marks National Wildlife Refuge. In general this portion of the Refuge is characterized as poorly drained, low pine flatwoods containing numerous areas of irregularly shaped forested sloughs and flowways. The reference site is a bayhead community within pine flatwoods.



ACCESS

To visit the reference site, take U.S. 98 to its intersection with U.S. Highway 319 (Crawfordville Hwy.). Immediately west of this intersection (on Hwy. 98) take Hwy. 375 south, then stay to the right onto Purify Bay Road, which runs south into the St. Marks National Wildlife Refuge. Look for the Florida Trail marker along the west side of Purify Bay Road, .9 mile south of the entrance sign to the wildlife refuge. The wetland boundary is located approximately 100 feet west of the Florida Trail sign.

COMMUNITY CHARACTERIZATION

Purify Bay is an example of a bayhead wetland. Bayheads are peat-filled depressions that typically support evergreen hardwoods such as *Magnolia virginiana* var. *australis* (sweetbay magnolia), *Gordonia lasianthus* (loblolly bay) and *Cliftonia monophylla* (black titi). This reference site is located at the base of a very shallow slope. Moisture is provided from ground water and runoff from the surrounding pine flatwoods. Within the ecotone between the flatwoods and the deeper portion of the bayhead is a zone where the seepage of water from the uplands emerges from the mineral soil and maintains a saturated peat layer. Here, sphagnum moss and various evergreen shrubs grade into the taller evergreen hardwoods of the deeper portion of the bayhead. Within the interior of the bayhead is a small blackwater slough or shallow stream.

The structure of a bayhead is maintained by infrequent, periodic fire. Bayheads are rarely dry enough to burn. Fire may burn and kill the top most portion of the hardwoods at the edge of the bayhead and the typical domed appearance is due in part to this phenomenon.

The reference site is forested by a canopy composed of sweetbay magnolia, loblolly bay, *Nyssa sylvatica* var. *biflora* (swamp tupelo), and *Taxodium ascendens* (pond cypress). Pond cypress and swamp tupelo are dominant in deeper areas with sweetbay magnolia and loblolly bay more common on the edge. Black titi dominated the subcanopy and groundcover and in some areas become a canopy component. Soils are peaty and saturated, including the ecotone of the wetland. The center of the wetland is inundated except during droughts.

The pine-dominated upland, landward of the wetland, had recently burned. Stump sprouts of gordonia and black titi were found within the ecotone.

DELINEATION PROCEDURE

The wetland boundary lies within an ecotone between a pine flatwoods and a bayhead dominated by black titi, sweetbay magnolia, swamp tupelo, loblolly bay, and pond cypress. Beginning within the bayhead, a wetland identified by the use of the definition in subsection 62-340.200(19), F.A.C., the dominance of obligate and facultative wet vegetation is followed landward up to the ecotone between the bayhead and the flatwoods. At this point, subsections 62-340.300(2)(a) and(b), F.A.C., are no longer appropriate as dominance by hydrophytic species ends. Hydric soils and hydrologic indicators (greater than 2 inches of mucky texture) continue into the ecotone. The wetland boundary is established slightly landward of the limits of vegetative dominance using, subsection 62-340.300(2)(d), F.A.C., at the point where hydrologic indicators are not present.

The following plant lists with corresponding soils descriptions were prepared during the May 1995 visit to the reference site. The common plant species in the bayhead wetland and the flatwoods are listed below. Soil descriptions and photographs follow the vegetative list. Note: the subcanopy landward of the ecotone has been killed to the

ground by fire.

Wetland Vegetation List

Canopy

Cliftonia monophylla	FACW	buckwheat-tree
Gordonia lasianthus	FACW	bay, loblolly
Magnolia virginiana var. *australis*	OBL	magnolia, sweetbay
Nyssa sylvatica var. *biflora*	OBL	tupelo, swamp
Taxodium ascendens	OBL	cypress, pond

Subcanopy

Cliftonia monophylla	FACW	buckwheat-tree
Gordonia lasianthus	FACW	bay, loblolly
Nyssa sylvatica var. *biflora*	OBL	tupelo, swamp
Taxodium ascendens	OBL	cypress, pond

Ground cover

Aronia arbutifolia	FACW	red chokeberry
Clethra alnifolia	FACW	sweet pepper bush
Cyrilla racemiflora	FAC	cyrilla, swamp
Gordonia lasianthus	FACW	bay, loblolly
Ilex coriacea	FACW	holly, bay-gall
Ilex glabra	UPLAND	gallberry
Lyonia ligustrina	FAC	maleberry
Lyonia lucida	FACW	fetter-bush
Lyonia mariana	FACW	fetter-bush
Pteridium aquilinum	UPLAND	bracken fern
Rhododendron viscosum	FACW	azalea, swamp
Scleria spp.	FACW	nutrush
Serenoa repens	UPLAND	saw palmetto
Smilax laurifolia	VINE	bamboo vine
Sphagnum spp.	OBL	sphagnum moss
Vaccinium corymbosum	FACW	blueberry, highbush
Vitis rotundifolia	VINE	muscadine grape

Upland Vegetation List

Canopy

Planted Pine

Pinus elliottii	UPLAND	slash pine

Subcanopy
None, as the site had recently been burned and the subcanopy to the edge of the bayhead has been killed by fire.

Ground cover

Carphephorus paniculatus	FAC	deer-tongue
Clethra alnifolia	FACW	sweet pepper bush
Cyrilla racemiflora	FAC	cyrilla, swamp
Cuscuta sp.	VINE	dodder
Gaylussacia frondosa	FAC	dangleberry
Gordonia lasianthus	FACW	bay, loblolly
Hypericum drummondii	UPLAND	St. John's-wort, Drummond's
Ilex coriacea	FACW	holly, bay-gall
Ilex glabra	UPLAND	gallberry
Lyonia lucida	FACW	fetter-bush
Myrica cerifera	FAC	bayberry, southern
Pteridium aquilinum	UPLAND	bracken fern
Rhus copallina	UPLAND	winged sumac
Quercus minima	UPLAND	oak, dwarf live
Quercus pumila	UPLAND	oak, running
Scleria spp.	FACW	nutrush
Serenoa repens	UPLAND	saw palmetto
Sporobolus floridanus	FACW	dropseed, Florida
Vaccinium myrsinites	UPLAND	shiny blueberry
Vitis rotundifolia	VINE	muscadine grape

SOIL DESCRIPTIONS

USDA - NRCS Wakulla County Soil Survey - Sheet 30

Soil Profile Descriptions

Point 1-2a. One foot waterward of the wetland boundary line.

Horizon	Depth (in)	
Oe	1-0	dark brown (7.5YR 3/3) sand
A1	0-5	very dark gray (10YR 3/1) sand
A2	5-12	dark gray (10YR 4/1) sand
E	12-24	brown (10YR 5/2) sand
Bh	24+	black (10YR 2/1) sand

Hydric soil: Yes
Hydric soil field indicators: five inches of greater than 70% coatings on the sand grains (horizon A1).

Point 1-2a

Point 1-2b. One foot landward of the wetland boundary line.

Horizon	Depth (in)	
A1	0-4	black (10YR 2/1) sand with many fine roots
A2	4-8	black (10YR 2/1) sand with few fine roots
E	8-13	dark gray (10YR 4/1) sand
Bh	13+	black (10YR 2/1) sand

Hydric soil: No
Hydric soil field indicators: none - the A1 and A2 horizons were salt and pepper in appearance (50% coatings on the sand grains).

Point 1-2b

Point 1-3

Point 1-3. Twenty foot landward of the wetland boundary line.

Horizon	Depth (in)	
Oe	1-0	black (5YR 2.5/1) peat
A	0-3	black (10YR 2/1) sand
E1	3-9	gray (10YR 5/1)
E2	9-23	grayish brown (10YR 5/2) sand
Bh	23-34+	dark brown (7.5YR 3/2) sand

Hydric soil: No
Hydric soil field indicators: none

St. George Island State Park

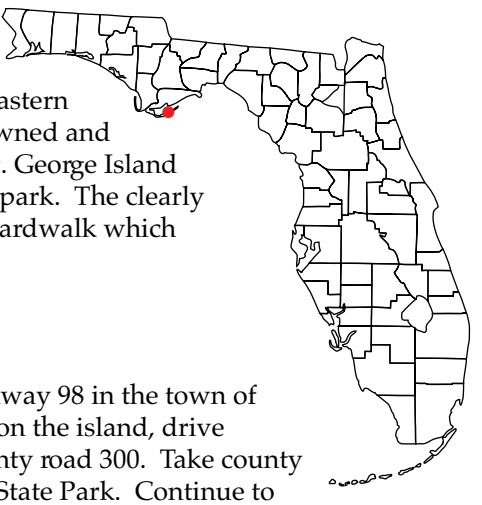
(Franklin County)

INTERDUNAL SWALE

Looking across the interdunal swale wetland boundary into pine flatwoods

LOCATION

St. George Island is a barrier island located directly south of the towns of Eastpoint and Apalachicola. It is part of a chain of barrier islands associated with Apalachicola River/ Apalachicola Bay estuary. The island is accreting on the western end and eroding at the eastern end. The western half of the island is privately owned and heavily developed, while the eastern half is the St. George Island State Park. The reference site is found within the park. The clearly defined wetland boundary is accessible from a boardwalk which crosses the wetland.



ACCESS

St. George Island may be reached from U. S. Highway 98 in the town of Eastpoint via the St. George Island Bridge. Once on the island, drive approximately 1/4 mile to the intersection of county road 300. Take county road 300 east to the entrance of St. George Island State Park. Continue to the parking lot of the first beach facility. The reference site is on the north side of the

road, adjacent to the boardwalk. The boardwalk leads over coastal dunes and through pine flatwoods to an interdunal swale wetland.

COMMUNITY CHARACTERIZATION

The reference site is an interdunal swale located within a pine flatwoods community on the Apalachicola Bay side of the island. The surrounding pine flatwoods are also interspersed with scrub communities. Interdunal swales are depressional wetland features in the pine flatwoods landscape. The topographic boundary, however, is often masked by vegetation, such as *Ilex glabra* (gallberry) and *Baccharis* spp. (saltbush) and is not always obvious. The reference site is dominated by a canopy of *Pinus elliottii* (slash pine) and a ground cover of *Cladium jamaicense* (saw grass). The interdunal swale of the reference site is a freshwater wetland immediately adjacent to tidal waters.

DELINEATION PROCEDURE

A distinct topographic break marks the boundary between the interdunal swale wetland and the pine flatwoods. This break is observable from the boardwalk. The wetland is characterized by a *Pinus elliottii* canopy with a *Cladium jamaicense* groundcover. The vegetative boundary between the wetland and pine flatwoods is also distinct but less obvious in that the pine canopy is contiguous with that of the pine flatwoods.

The interdunal swale is a wetland identified by using the definition in section 62-340.200(19), F.A.C. Moving landward from the central depression, the provisions of subsection 62-340.300(2)(a), F.A.C. are used in establishing the wetland boundary. Hydrologic indicators, in the form of algal mats and aufwuchs, are present. The wetland boundary is established at the point where hydrologic indicators and hydric soil indicators are no longer present (subsection 62-340.300(d), F.A.C). This is coincident with the topographic break that defines the depression and is dominated by a thin band of *Myrica cerifera* (wax myrtle) and *Ilex glabra* (gallberry). Because of the discrete change from wetland to upland conditions the provisions of subsection 62-340.300(1), F.A.C. could also be used to delineate this site.

The following plant lists with corresponding soils descriptions were prepared during the November 15, 1994 visit to the delineation site. The common plant species in the seepage slope community and the sandhill community are listed below. Descriptions and photographs of soil profiles are also provided from each location.

Vegetation Immediately Waterward of the Wetland Boundary

Canopy

Pinus elliottii	UPLAND	slash pine

Subcanopy

Baccharis angustifolia	FAC	groundsel tree
Baccharis halimifolia	FAC	salt bush

Ground cover

Andropogon glomeratus	FACW	bushy bluestem
Cladium jamaicense	OBL	sawgrass
Eupatorium mikanioides	FACW	semaphore
Hydrocotyle sp.	FACW	water pennywort
Ipomoea sagittata	VINE	glades morning glory
Juncus roemerianus	OBL	black needlerush
Panicum rigidulum	FACW	red topped panicum
Panicum virgatum	FACW	switch grass
Phyla nodiflora	FAC	frog-fruit
Pinus elliottii	UPLAND	slash pine
Rhynchospora microcarpa	OBL	southern beakrush
Rubus trivialis	VINE	trailing blackberry
Sagittaria lancifolia	OBL	lance-leaf sag
Setaria geniculata	FAC	bristle grass
Spartina bakeri	FACW	sand cordgrass
Toxicodendron radicans	VINE	poison ivy

Vegetation of scrubby flatwoods, landward of the Wetland Boundary Line

Canopy

Pinus elliottii	UPLAND	slash pine

Ground cover

Agalinis sp.	UPLAND	false foxglove
Cladonia sp.	UPLAND	deer moss
Conradina sp.	UPLAND	rosemary
Lechea sp.	UPLAND	pinweed
Schizachyrium maritimum	FAC	maritime bluestem
Smilax sp.	VINE	cat-briar
Uniola paniculata	UPLAND	sea oats

SOIL DESCRIPTIONS

USDA-NRCS Franklin County Soil Survey - Sheet 40

Soil Profile Descriptions

Point 1. Six feet waterward of the wetland boundary line (water table - one inch).

Oe	0.5-0	litter layer
Oa	0-1	black (10YR 2/1) muck
A1	1-3	black (10YR 2/1) mucky sand
A2	3-5	very dark gray (10YR 3/1) sand
E or C	5-11+	light brownish gray (10YR 6/2) sand with light gray (10YR 7/1) mottles

Hydric soil: Yes
Hydric soil field indicators: one inch of muck (horizon Oa), two inches of mucky texture (horizon A1).

Point 1

Point 2. Fifteen feet landward of the wetland boundary line (water table - 31 inches).

A	0-4	gray (10YR 6/1) sand
E or C	4-31+	white (10YR 8/1) sand

Hydric soil: No
Hydric soil field indicators: none

Point 2

Saint Marks National Wildlife Refuge

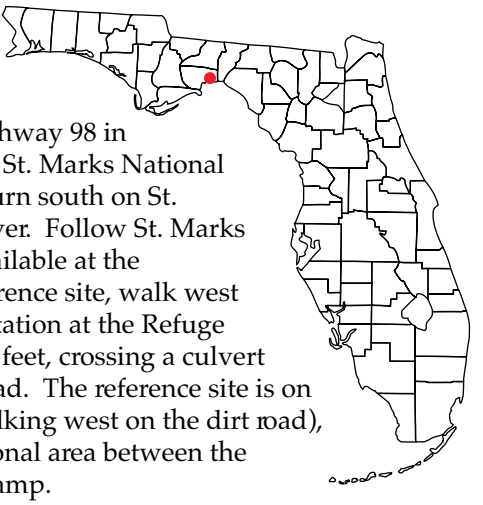
(Wakulla County)

STRAND SLOUGH

Hardwood strand

LOCATION

The St. Marks National Wildlife Refuge encompasses nearly all of coastal Wakulla and Jefferson Counties. The reference site is a hardwood strand swamp located just west of the Refuge headquarters in Wakulla County.



ACCESS

This reference site is easily reached from U.S. Highway 98 in the vicinity of the town of Newport. Signs for the St. Marks National Wildlife Refuge are conspicuous. From U.S. 98, turn south on St. Marks road, which is just east of the St. Marks River. Follow St. Marks road to the entrance of the Refuge. Parking is available at the headquarters near the entrance. To reach the reference site, walk west along the dirt road that is to the west of the pay station at the Refuge Headquarters. Continue west approximately 500 feet, crossing a culvert where a portion of the strand drains under the road. The reference site is on the west side of the strand swamp (on the left walking west on the dirt road), about 100 feet south of the grass road, in the ecotonal area between the flatwoods and the deep portion of the strand swamp.

COMMUNITY CHARACTERIZATION

A strand swamp is a shallow, forested, elongated, basin, dominated mostly by deciduous hardwoods such as *Acer rubrum* (red maple), *Nyssa sylvatica* var. *biflora* (swamp tupelo), and *Ulmus americana* var. *floridana* (Florida elm). Strand swamps form where there is a depression such that the downward flow of water generates a channel (Ewel *in* Ecosystems of Florida, 1991). At the reference site, the gradient from the surrounding pine flatwoods is gentle, even so, flowing water was observed in the deepest portion of this swamp. Moisture for the strand swamp is supplied by ground water and drainage from the surrounding poorly drained flatwoods. As with the cypress dome swamp and the bayhead, the largest trees are found in the interior of the strand swamp, where the peat soils are deepest and fire is least frequent. The wetland boundary is located at the landward edge of the ecotone between the strand swamp and the pine flatwoods. Fire is an important component in the maintenance of this plant community. Fire suppresses the hardwood trees typically associated with wetlands. The ecotone between the deep strand swamp and the pine flatwoods, although a wetland, is a creation of the limitation on the growth of hardwood hydrophytic vegetation caused by infrequent but periodic fire. As of May, 1995, fire suppression at the reference site has allowed tree species associated with the strand swamp to invade the *Pinus elliottii* (slash pine) and *Serenoa repens* (saw palmetto) dominated pine flatwoods.

DELINEATION PROCEDURE

The wetland boundary for this reference site lies at the landward edge of the ecotone between the strand swamp and the pine flatwoods. The strand swamp is dominated by red maple, swamp tupelo, *Magnolia virginiana* var. *australis* (sweetbay magnolia), and *Taxodium ascendens* (pond cypress). Beginning within the strand swamp, subsections 62-340.300(2)(a) and (b), F.A.C., are used to establish the wetland based upon the dominance of obligate and facultative wet vegetation and the presence of hydrologic indicators (*i.e.* elevated lichen lines and adventitious roots) and hydric soil indicators. Vegetative dominance extends landward into the fairly broad ecotone where it is lost. Hydrologic indicators (greater than 2 inches of mucky texture in the upper soil profile) and hydric soil indicators continue landward to the interface of the ecotone and the pine flatwoods. The wetland boundary is established where the soils have lost the organics necessary to support the hydrologic indicator. Some hydrophytic vegetation is found landward of the wetland boundary. This appears attributable to fire suppression.

The first list describes the vegetation found waterward of the wetland boundary. The second lists those species found landward of the wetland boundary. There are descriptions and photographs of soil samples from each location provided following the vegetation information.

Vegetation within the Wetland

Canopy

Acer rubrum	FACW	maple, red
Magnolia virginiana var. *australis*	OBL	magnolia, sweetbay
Nyssa sylvatica var. *biflora*	OBL	tupelo, swamp
Pinus elliottii	UPLAND	slash pine
Ulmus americana var. *floridana*	FACW	Florida elm
Taxodium ascendens	OBL	pond cypress

Subcanopy

Acer rubrum	FACW	maple, red
Magnolia virginiana var. *australis*	OBL	magnolia, sweetbay
Sabal palmetto	FAC	palm, cabbage
Ulmus americana var. *floridana*	FACW	Florida elm

Ground cover

Amphicarpum muhlenbergianum	FACW	blue maidencane
Campsis radicans	VINE	trumpet creeper
Carex spp.	FACW	sedges
Cladium jamaicense	OBL	sawgrass
Clematis crispa	UPLAND	leather flower
Hibiscus moscheutos	OBL	rosemallow, swamp
Hypericum hypericoides	FAC	St. Andrew's cross
Lycopus rubellus	OBL	bugleweed
Osmunda cinnamomea	FACW	fern, cinnamon
Osmunda regalis	OBL	fern, royal
Panicum dichotomum	FACW	panicum
Rhynchospora miliacea	OBL	beakrush, millet
Rhynchospora spp.	FACW	beakrush
Sabal palmetto	FAC	palm, cabbage
Sagittaria graminea	OBL	arrowhead
Saururus cernuus	OBL	lizard's tail
Smilax laurifolia	VINE	bamboo vine
Thelypteris spp.	FACW	shield fern
Toxicodendron radicans	UPLAND	poison ivy
Ulmus americana var. *floridana*	FACW	Florida elm

Vegetation Landward of the Wetland Boundary

Canopy

Pinus elliottii	UPLAND	slash pine

Subcanopy

Acer rubrum	FACW	maple, red
Pinus elliottii	UPLAND	slash pine

Ground cover

Acer rubrum	FACW	maple, red
Ampelopsis arborea	VINE	peppervine
Chasmanthium sessiliflorum	FAC	long-leaf Chasmanthium
Gaylussacia frondosa	FAC	dangleberry
Hypericum hypericoides	FAC	St. Andrew's cross
Hypericum microsepalum	UPLAND	St. John's-wort
Ilex cassine	OBL	holly, dahoon
Ilex glabra	UPLAND	gallberry
Lyonia ferruginea	UPLAND	fetter-bush
Myrica cerifera	FAC	bayberry, southern
Osmunda cinnamomea	FACW	fern, cinnamon
Parthenocissus quinquefolia	VINE	Virginia creeper
Pteridium aquilinum	UPLAND	bracken fern
Rhus copallina	UPLAND	winged sumac
Rubus spp.	FAC	blackberries
Serenoa repens	UPLAND	saw palmetto
Vitis aestivalis	VINE	summer grape

SOIL DESCRIPTIONS

USDA - NRCS Wakulla County - Sheet 22 Section 8
The wetland soil is mapped as Tooles-Nutall-Chaires fine sand (Mapping unit #29)
The upland soil is mapped as Chaires fine sand (Mapping unit #10)

29 - Tooles-Nutall-Chaires fine sand is composed of:

30%	- Tooles soil	non-hydric component
25%	- Nutall soil	hydric component
20%	- Chaires soil	hydric component
10%	- Chaires soil	non-hydric inclusion
5%	- Nutall soil	non-hydric inclusion
10%	- Tooles soil	hydric inclusion

10 - Chaires fine sand is composed of:

70%	- Chaires soil	non-hydric component
25%	- Chaires soil	hydric component
5%	- Tooles soil	hydric component

Soil Profile Descriptions

Point 1. Ten feet waterward of wetland delineation line.

Horizon	Depth (in)	
Oe	2-0	very dark gray brown (10YR 3/2) peat or litter
Oa	0-5	black (10YR 2/1) muck with many fine roots
A	5-10	very dark gray (10YR 3/1) fine sand
E or C	10-18+	dark gray (10YR 4/1) fine sand

Hydric soil: Yes
Hydric soil field indicators: five inches of muck

Point 2a. One foot waterward of the wetland delineation line.

Horizon	Depth (in)	
Oe	1-0	black (5YR 2.5/1) peat or litter
A	0-3	black (N/0) mucky fine sand
E1 or C1	3-5	grayish brown (2.5Y 5/2) fine sand with dark gray (10YR 4/1) mottles
E2 or C2	5-24+	brown (10YR 5/3) fine sand with yellowish brown (10YR 5/4) mottles

Point 2a

Hydric soil: Yes
Hydric soil field indicators: greater than two inches of mucky texture

Point 2b. One foot landward of the wetland delineation line.

Horizon	Depth (in)	
Oe	1-0	black (5YR 2.5/1) peat or litter
A1	0-1	black (N/0) mucky fine sand
A2	1-5	black(10Y 2/1) fine sand
AE	5-9	black(10Y 2/1) fine sand with gray (10YR 6/1) mottles
E or C	9-29+	gray (10YR 6/1) fine sand

Hydric soil: No
Hydric soil field indicators: none

Point 2b

Point 3. Fifteen feet landward of the wetland delineation line.

Horizon	Depth (in)	
Oe	1-0	black (5YR 2.5/1) peat or litter
A	0-3	black (10Y 2/1) fine sand
E1	3-7	dark gray (10YR 4/1) fine sand
E2	7-20	light brownish gray (10YR 6/2) fine sand
Bh	20+	very dark gray brown (10YR 3/2) fine sand

Hydric soil: No
Hydric soil field indicators: none

Little Talbot Island State Park

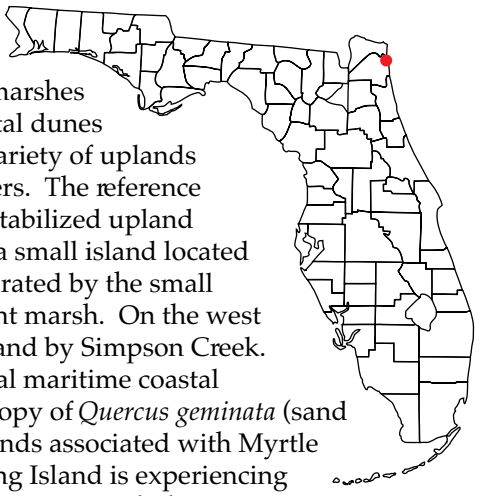
(Duval County)

SALT MARSH

Northeast view of the delineation site

LOCATION

Little Talbot Island State Park consists of coastal islands located north of the mouth of the St. Johns River in Duval County. The park is south of Amelia Island in Nassau County and Big Talbot Island in Duval, and north of Ft. George Island. The park is located between the marshes of the Fort George River to the west and the coastal dunes of the Atlantic Ocean to the east and includes a variety of uplands and tidally influenced wetlands and surface waters. The reference site represents the interface of a salt marsh with stabilized upland dune system. The barrier island, Long Island, is a small island located immediately west of Little Talbot Island and separated by the small intertidal waterway, Myrtle Creek, and its adjacent marsh. On the west side, Long Island is separated from Big Talbot Island by Simpson Creek. Uplands on Long Island are comprised of a typical maritime coastal hammock community with a well developed canopy of *Quercus geminata* (sand live oak) on a stabilized dune system. The wetlands associated with Myrtle Creek are inundated twice daily by the tides. Long Island is experiencing continued erosion due to the constant movement of sand with the tides.



Erosion is evident along the north side of Long Island where the roots of sand live oaks are exposed. This activity of nature is not expected to dramatically change the wetland boundary as described here for several years barring the effects of an extraordinary event.

ACCESS

The reference site is located on the west shoreline of Long Island approximately one thousand feet north of U.S. Highway A1A. Parking is available along the highway. Although the access is open, the site may be inundated, depending on tidal stage. The wetland boundary is marked by concrete monuments.

Salt marsh dominated by *Spartina alterniflora* (smooth cordgrass) and *Juncus roemerianus* (black needle rush)

COMMUNITY CHARACTERIZATION

The reference site is part of the Simpson Creek salt marsh, which is adjacent to a xeric-mesic coastal hammock on Long Island. Simpson Creek flows between Big Talbot Island and Long Island. The central area of the salt marsh, referred to as the low marsh, is dominated by *Spartina alterniflora* (smooth cordgrass) and *Juncus roemerianus* (black needle rush). As the elevation of the gentle sloping shoreline increases, the vegetative community shifts to a greater diversity of herbaceous plants including *Sesuvium maritima* (sea-purslane), *Sporobolus virginicus* (seashore dropseed), and *Spartina patens* (salt-meadow cordgrass). This area is generally referred to as the high marsh. The vegetative

Interior view of maritime hammock, note the *Quercus geminata* (sand live oak) and *Serenoa repens* (saw palmetto)

composition of the high marsh at its landward extent includes *Iva frutescens* (tall marsh elder) and *Ilex vomitoria* (yaupon). Landward of this point, the community abruptly shifts to an upland community dominated by mesic vegetation and then mixed mesic-xeric vegetation along the slopes of the dune. Similarly, the soil shows a quick transition from hydric to non-hydric conditions between the high marsh and the mesic coastal hammock community.

DELINEATION PROCEDURE

Beginning in the low marsh, a wetland identified by the use of the definition in subsection 62-340.200(19), F.A.C. The dominance of obligate and facultative wet vegetation is followed landward, examining the presence of either hydric soils or hydrologic indicators. The marsh vegetation is dominated by salt marsh species such as *Spartina alterniflora* (smooth cordgrass) and *Spartina patens* (salt meadow cordgrass). The provisions of subsections 62-340.300(2)(a) and (b), F.A.C., are used up to the ecotone between the high marsh and maritime hammock. The transition between these plant

communities is often abrupt. In addition to vegetative dominance by hydrophytic species and the presences of hydric soils, hydrologic indicators, in the form of fiddler crab burrows, are abundant throughout the high marsh. Through the use of subsection 62-340.300(2)(a), F.A.C., the wetland boundary is placed within the ecotone of high marsh and the coastal maritime hammock at the point where dominance by hydrophytic vegetation and the presence of hydric soil indicators ceases.

Because the reference site is a surface water body subjected to direct tidal effects, the provisions of section 62-340.600, F.A.C., need to be addressed with respect to the mean high water line (MHWL). Mean high water can represent the boundary of a surface water, but only when it extends beyond the provisions for wetland delineation. In other words, the MHWL is applicable only if the wetland boundary does not extend landward of the MHWL elevation. The MHWL is clearly located where the dominance shifts from *Spartina patens* to *Batis maritima*, and *Salicornia virginica*.

The following plant lists with corresponding soils descriptions were prepared during the visit to the delineation site on December 6, 1994. The common plant species observed waterward and landward of the wetland boundary are listed in the following tables. A note about cordgrass: *Spartina alterniflora* grows in a two forms, tall and short. The tall form grows close to the creek channels in the deepest portion of the salt marsh. The short form is observed more landward than the tall form.

Vegetation of the salt marsh, immediately waterward of the wetland boundary.

Ground cover

Aster tenuifolius	OBL	saltmarsh aster
Atriplex pentandra (= *A. arenaria*)	UPLAND	seabeach orach
Batis maritima	OBL	saltwort
Borrichia frutescens	OBL	sea oxeye
Fimbristylis castanea	OBL	saltmarsh fimbristylis
Juncus roemerianus	OBL	black needle rush
Lycium carolinianum	OBL	wolf-berry
Muhlenbergia capillaris	OBL	long-awn muhly
Salicornia virginica	OBL	glasswort
Sesuvium maritima	FACW	sea-purslane
Solidago sempervirens	FACW	seaside goldenrod
Spartina alterniflora	OBL	smooth cordgrass
Spartina patens	OBL	saltmeadow cordgrass
Sporobolus virginicus	OBL	seashore dropseed

Vegetation of the maritime hammock, immediately landward of the wetland boundary.

Canopy

Quercus geminata	UPLAND	sand live oak

Subcanopy

Quercus geminata	UPLAND	sand live oak
Quercus myrtifolia	UPLAND	myrtle oak
Myrica cerifera	FAC	wax myrtle

Ground cover

Fimbristylis sp.	FACW	fringe grass
Galactea elliottii	VINE	milk-pea
Ilex ambigua	UPLAND	Carolina holly
Ilex opaca	FAC	American holly
Ilex vomitoria	FAC	yaupon
Myrica cerifera	FAC	wax myrtle
Panicum ciliaris	FAC	panic grass
Persea borbonia	UPLAND	red bay
Pinus elliottii	UPLAND	slash pine
Quercus geminata	UPLAND	sand live oak
Quercus virginiana	UPLAND	live oak
Scleria triglomerata	FACW	nut-rush
Serenoa repens	UPLAND	saw palmetto
Smilax spp.	VINE	green briar
Solidago odora	UPLAND	woods goldenrod
Toxicodendron radicans	VINE	poison ivy

SOIL DESCRIPTIONS

USDA-NRCS Soil Survey of City of Jacksonville, Duval County - Sheet 20
The wetland soil is mapped as Tisonia mucky peat (mapping unit #34).

90%	- Tisonia soil	hydric component
5%	- Pamlico soil	hydric inclusion
5%	- Pottsburg soil	hydric inclusion

The upland soil is mapped as Kureb fine sand, 8 to 20 percent slope (mapping unit #15).

Soil Profile Descriptions

Point 1. Thirteen feet waterward of the wetland boundary line (water table - nine inches).

Horizon	Depth (in)	
A	0-7	very dark gray (10YR 3/1) fine sand, many fine and medium roots
C	7-15+	very dark gray (10YR 3/1) fine sand with gray (10YR 5/1) mottles, few fine roots

Hydric soil: Yes
Hydric soil field indicators: sulfidic odor in both the A and C horizons; oxidized rhizospheres in the A horizon.

Point 1: wetland soil

Point 2. Fifteen feet landward of the wetland boundary line (water table - 39 inches).

Horizon	Depth (in)	
Oi	1-0	litter
A	0-5	dark gray (10YR 4/1) fine sand with gray (10YR 6/1) mottles, common medium roots
E or C	5-15+	light gray (10YR 7/1) fine sand, few fine and large roots

Hydric soil: No
Hydric soil field indicators: none, the A horizon has a salt and pepper appearance.

Point 2: upland soil

Woods Ferry

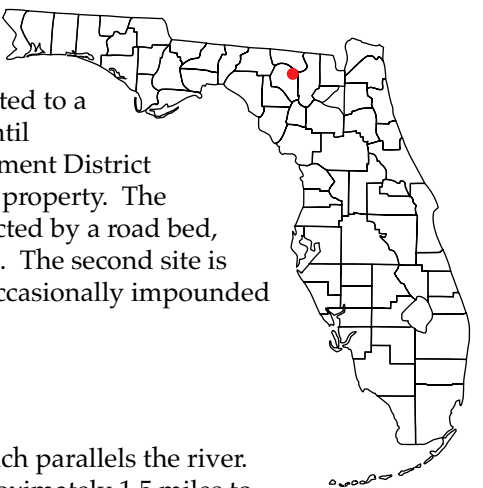
(Suwannee County)

SWAMP CUTOVER/FLATWOODS AND STREAM SEEPAGE SLOPE

Stream seepage slope

LOCATION

The Woods Ferry property is located adjacent to the Suwannee River approximately five miles northeast of Live Oak. The property historically consisted of long slopes of upland pine forest dominated by nearly pure stands of *Pinus palustris* (longleaf pine) intersected by several small streams running north to the Suwannee River floodplain. The area was converted to a pine plantation and has been managed as such until purchased by the Suwannee River Water Management District (SRWMD). Two reference sites are located on the property. The surficial flow through the first site has been restricted by a road bed, although the date of the road activity is unknown. The second site is located on a slope adjacent to a stream which is occasionally impounded by beavers.



ACCESS

The property may be reached from C.R. 136A which parallels the river. From I-10 take the U.S.129 exit and go north approximately 1.5 miles to S.R. 136A. Turn east on S.R.136A and travel approximately 5.5 miles to 57th road. Turn

on to 57th road and continue straight to the entrance of the Woods Ferry tract. The reference sites are not easy to locate without assistance. Individuals desiring to visit the sites should first contact either the DEP/Wetlands Evaluation and Delineation Section or the Suwannee River Water Management District.

COMMUNITY CHARACTERIZATION - SWAMP/CUTOVER FLATWOODS

The floodplain of the Suwannee River does not extend to this site, although the discharge from this wetland may flow into the Suwannee floodplain. The canopy of the wetland is dominated by *Nyssa sylvatica* var. *biflora* (swamp tupelo), *Acer rubrum* (red maple), and *Quercus laurifolia* (swamp laurel oak). The flatwoods surrounding the wetland were heavily impacted by silviculture operations.

DELINEATION PROCEDURE - SWAMP/CUTOVER FLATWOODS

The wetland is a mixed hardwood swamp and is identifiable by direct reference to the wetland definition. The wetland delineation begins at the edge of the swamp tupelo dominated portion of the swamp and extends landward following hydric soil indicators and a dominance of listed vegetation in the canopy (subsections 62-340.300(2)(a)and(b), F.A.C.). The vegetative community changes during the landward progression from swamp tupelo canopy to swamp laurel oak canopy to slash pine canopy. At the point where slash pine are encountered, the canopy is sparse. When the uppermost strata constitutes less than 10% cover, one of the remaining strata and not the upper most strata, is used for the evaluation of vegetative dominance. In this situation, the ground cover is the appropriate stratum to use. The ground cover under the slash pine is dominated by *Lyonia lucida* (fetterbush), *Cyrilla racemiflora* (titi), and *Andropogon glomeratus* (broomsedge). The groundcover includes several facultative species as conspicuous elements, which do not enter into the evaluation of vegetative dominance. Using the provisions of subsection 62-340.300(2)(b), F.A.C., the point where hydric soil indicators are no longer present is established as the wetland boundary.

Vegetation Immediately Waterward of Wetland Boundary.

Canopy

	Pinus elliottii	UPLAND	slash pine

Ground cover

**	*Andropogon glomeratus*	FACW	broomsedge
	Aronia arbutifolia	FACW	red chokeberry
	Boehmeria cylindrica	OBL	bog hemp
**	*Cyrilla racemiflora*	FAC	titi
	Eupatorium perfoliatum	FACW	boneset
	Euthamia sp.	FAC	flat-topped goldenrod

Ilex glabra	UPLAND	gallberry
Osmunda cinnamomea	FACW	cinnamon fern
Panicum dichotomum	FACW	panic grass
Persea palustris	OBL	swamp bay
Pluchea sp.	FACW	marsh fleabane
Rhexia nuttallii	FACW	meadow beauty
Serenoa repens	UPL	saw palmetto
Smilax glabra	VINE	glaucus cat-briar
Solidago fistulosa	FACW	marsh goldenrod

Vegetation Immediately Landward of the Wetland Boundary.

Canopy

Pinus elliottii	UPLAND	slash pine

Ground cover

	Andropogon glomeratus	FACW	broomsedge
	Cyrilla racemiflora	FAC	titi
**	*Ilex glabra*	UPLAND	gallberry
	Panicum dichotomum	FACW	panic grass
	Pinus elliottii	UPLAND	slash pine
**	*Serenoa repens*	UPLAND	saw palmetto

** Designates species which are overwhelmingly dominant.

COMMUNITY CHARACTERIZATION - STREAM SEEPAGE SLOPE

This site consists of a small blackwater stream, the associated floodplain, and the contributing hydric seepage slope. The stream is a surface water body pursuant to section 62-340.600, F.A.C. flowing through a floodplain swamp, a wetland identifiable by direct use of the wetland definition. Within the swamp forest, which is dominated by *Nyssa ogeche* (Ogeechee tupelo), *Taxodium distichum* (bald cypress), *Acer rubrum* (red maple), *Nyssa sylvatica* var. *biflora* (swamp tupelo), *Fraxinus caroliniana* (popash), and *Betula nigra* (river birch), numerous hydrologic indicators are present. These consist of obvious water marks, rafted debris, adventitious roots, buttresses and hummocks. Above the floodplain swamp is a hydric seepage slope forest dominated by a canopy of *Quercus laurifolia* (swamp laurel oak), *Liquidambar styraciflua* (sweetgum), and *Pinus elliottii* (slash pine) with a cinnamon fern dominated ground cover. Hydric seepage slopes are wetlands which seldom experience deep or sustained inundation, but which provide a long term discharge of near surface ground water to other vegetative communities, usually other wetland communities.

DELINEATION PROCEDURE - STREAM SEEPAGE SLOPE

The delineation of the wetland boundary begins at the edge of the floodplain swamp, which is identifiable as a wetland directly from the definition. Since the hydrologic indicators are so pronounced, attempting to establish the wetland boundary using subsection 62-340.300(2)(d), F.A.C., is an appropriate place to start. While an examination of the hydrologic indicators does not produce a consistent elevation, this is not unexpected for the small streams of the area, which are subject to frequent, short term, flooding events. Additionally, this stream has a history of periodic impoundment by beavers which also contributes to the variation in hydrologic indicators (reasonable scientific judgement). By comparing the use of hydrologic indicators with vegetative dominance (subsections 62-340.300(2)(a) and(b), F.A.C.), it is apparent that the vegetative dominance and the highest level of sustained inundation, as reflected by the hydrologic indicators observed, are very close in elevation. Because beavers may have influenced the expression of the hydrologic indicators, it is a reasonable scientific judgement to use the vegetative dominance and not the hydrologic indicators to establish the wetland boundary, although in this case the differences between the two approaches would be slight. Further support for this decision is: 1. the degree of slope, and 2.the nature of the vegetative dominance, which is more typical of sustained saturation and perhaps additionally only brief periods of shallow inundation. The deeper inundation evidenced by the most elevated of the hydrologic indicators is best attributed to the occasional alteration of stream characteristics caused by the beavers. Vegetative dominance on the slope is established using subsection 62-340.300(2)(b), F.A.C. Hydric soil indicators, however, do not extend to the limits of vegetative dominance, thus the wetland boundary is located where vegetation is no longer supported by the presence of hydric soils. As an additional note, SRWMD staff indicated that the ten-year flood elevation occurs above the wetland boundary in an area of dense saw palmetto.

Vegetation Immediately Waterward of the Wetland Boundary, Not Including the Stream Channel Floodplain Swamp

Canopy

Acer rubrum	FACW	red maple
Cyrilla racemiflora	FAC	titi
Liquidambar styraciflua	FACW	sweetgum
Nyssa sylvatica var. biflora	OBL	swamp tupelo
Pinus elliottii	UPLAND	slash pine
Quercus laurifolia	FACW	swamp laurel oak

Subcanopy

Acer rubrum	FACW	red maple
Cyrilla racemiflora	FAC	titi
Myrica cerifera	FAC	wax myrtle
Cyrilla racemiflora	FAC	titi

Ground cover

	Clethra alnifolia	FACW	sweet pepperbush
	Cyrilla racemiflora	FAC	titi
	Ilex glabra	UPLAND	gallberry
	Myrica cerifera	FAC	wax myrtle
**	*Osmunda cinnamomea*	FACW	cinnamon fern
	Osmunda regalis	OBL	royal fern
	Persea palustris	OBL	swamp bay
	Serenoa repens	UPLAND	saw palmetto
	Smilax glabra	VINE	glaucus cat-briar
	Vaccinium corymbosum	FACW	high bush blueberry

Vegetation Immediately Landward of the Wetland Boundary.

Canopy

Pinus elliottii	UPLAND	slash pine

Ground cover

	Clethra alnifolia	FACW	sweet pepperbush
	Osmunda cinnamomea	FACW	cinnamon fern
**	*Serenoa repens*	UPLAND	saw palmetto

** Designates species which are overwhelmingly dominant.

SOIL DESCRIPTIONS

Swamp/Cutover Flatwoods
USDA-NRCS Soil Survey of Suwannee County - Sheet 15

The wetland is associated with a pond in the below mentioned upland soil.
The upland soil is mapped as Leon fine sand, 0 to 2 percent slope (mapping unit #LfA)

LfA - Leon fine sand, 0 to 2 percent slope is composed of:

80% - Leon soil	non-hydric component
10% - Leon soil	hydric inclusion
10% - Pomello soil	non-hydric inclusion

Soil Profile Descriptions

Point 1. Landward Edge of Swamp (water table - 7 inch depth)

Horizon	Depth (in)	
Oe	1-0	dark reddish brown (5YR 2.5/2) peat and root mat
Oa	0-1	dark reddish brown (5YR 2.5/2) muck
A	1-5	black (N 2/0) fine sand
E	5-15	light brownish gray (10YR 6/2) fine sand

Hydric: Yes
Hydric soil field indicators: Accumulation of muck and/ or depth of dark topsoil

Point 2. Immediately Waterward of Wetland Boundary Line

Horizon	Depth (in)	
Oe	1-0	dark reddish brown (5YR 2.5/2) peat and root mat
A1	0-8	black (N 2/0) fine sand with approximately 20% of the sand grains uncoated with organics

Hydric: Yes
Hydric soil field indicators: depth of dark topsoil

Point 3. Immediately Landward of Wetland Boundary Line

Horizon	Depth (in)	
Oe	1-0	dark reddish brown (5YR 2.5/2) root mat
A1	0-2	black (N 2/0) fine sand
A2	2-8	black (N 2/0) with a salt and pepper appearance

Hydric: No
Hydric soil field indicators: none

Stream Seepage Slope
USDA-NRCS Soil Survey of Suwannee County - Sheet 6

The wetland soil is mapped as Alluvial land (mapping unit # Al)

Al - Alluvial land is composed of:

90% - Alluvial land	hydric component
10% - Plummer soil	non-hydric inclusion

The upland soil is mapped as Leon fine sand, 0 to 2 percent slope (mapping unit # LfA)

LfA - Leon fine sand, 0 to 2 percent slope is composed of:

80% - Leon soil	non-hydric component
10% - Leon soil	hydric inclusion
10% - Pomello soil	non-hydric inclusion

Soils where verified in the field, but the descriptions for the soils are missing.

Literature

Beever, James W. and Kimberley A. Dryden. 1992. Red-Cockaded Woodpeckers and Hydric Slash Pine Flatwoods. p. 693-700. *In* Trans. 57th North American Wildlife and Natural Resources Conference.

Breen, Ruth Schornherst. 1963. Mosses of Florida, an illustrated manual. University of Florida Press, Gainesville.

*Campbell, C. 1983. Systematics of the *Andropogon virginicus* Complex (GRAMINEAE). Journal of the Arnold Arboretum. 64:171-254.

Clewell, Andre F. 1985. Guide to the Vascular Plants of the Florida Panhandle. University Presses of Florida, Tallahassee.

*Correll, D. and H. 1982. Flora of the Bahama Archipelago. A.R. Gantner, Germany.

*Easley, Caroline M. and Walter S. Judd, 1993. Vascular Flora of Little Talbot Island, Duval County, Florida. Castanea 58(3): 162-177.

Ewel, Katherine C. 1991. Swamp. p. 281-323. *In* R.L.Myers and J.J. Ewel (ed.) Ecosystems of Florida. University of Central Florida Press, Orlando, Florida.

Florida Natural Areas Inventory and Department of Natural Resources. 1990. Guide to the Natural Communities of Florida. Tallahassee, Florida.

*Florida Soil Conservation Staff. 1992. Soil and Water Relationships of Florida's Ecological Communities. Gainesville, Florida.

*Godfrey, R. 1988. Trees, Shrubs and Woody Vines of Northern Florida and Adjacent Georgia & Alabama. Univ. Ga. Press, Athens.

*Godfrey, R. and J. Wooten. 1979. Aquatic and Wetland Plants of Southeastern United States: Monocotyledons. Univ. Ga. Press, Athens.

*Godfrey, R. and J. Wooten. 1979. Aquatic and Wetland Plants of Southeastern United States: Dicotyledons. Univ. Ga. Press, Athens.

*Hall, D. 1978. The Grasses of Florida. Doctoral Dissertation. Univ. of Fla., Gainesville.

Hull, Clark H., John M. Post, Jr., Manuel Lopez, and Robert G. Perry. 1989. Analysis of Water Level Indicators in Wetlands: Implications for the Design of Surface Water Management Systems. *In* Wetlands: Concerns and Successes. American Water Resources Association.

Kushlan, James A. 1991. Freshwater Marshes. p. 324-363. *In* R.L.Myers and J.J. Ewel (ed.) Ecosystems of Florida. University of Central Florida Press, Orlando, Florida.

*Lellinger, D. 1985. Ferns & Fern-Allies of the United States & Canada. Smithsonian Institution Press, Washington D.C.

Reese, William Dean. 1984. Mosses of the Gulf South. Louisiana State University Press, Baton Rouge.

Scurlock, J. Paul. 1987. Native Trees and Shrubs of the Florida Keys. Laurel Press, Inc., Bethel Park, Pennsylvania

*Soil Survey Staff. 1990. Keys to Soil Taxonomy, fourth edition. SMSS technical monograph no. 19. VPI&SU, Blacksburg, Virginia.

USDA - Soil Conservation Service. 1991. Hydric Soils of the United States. In cooperation with the National Technical Committee for Hydric Soils. USDA-SCS, Washington, DC.

Wunderlin, Richard P. 1982. Guide to the Vascular Plants of Central Florida. University Presses of Florida, Tampa.

* cited in the rule.

Chapter 62-340, F.A.C.

DELINEATION OF THE LANDWARD EXTENT OF WETLANDS AND SURFACE WATERS

62-340.100 Intent.

(1) This rule's intent is to provide a unified statewide methodology for the delineation of the extent of wetlands and surface waters to satisfy the mandate of section 373.421, F.S. This delineation methodology is intended to approximate the combined landward extent of wetlands as determined by a water management district and the Department immediately before the effective date of this rule. Before implementing the specific provisions of this methodology, the regulating agency shall attempt to identify wetlands according to the definition for wetlands in subsection 373.019 (17), F.S. and subsection 62-340.200 (19), F.A.C. below. The landward extent of wetlands shall be determined by the dominance of plant species, soils and other hydrologic evidence indicative of regular and periodic inundation or saturation. In all cases, attempts shall be made to locate the landward extent of wetlands visually by on site inspection, or aerial photointerpretation in combination with ground truthing, without quantitative sampling. If this cannot be accomplished, the quantitative methods in paragraph 62-301.400 (1) (c), F.A.C., shall be used unless the applicant or petitioner and regulating agency agree, in writing, on an alternative method for quantitatively analyzing the vegetation on site. The methodology shall not be used to delineate areas which are not wetlands as defined in subsection 62-340.200 (19) F.A.C., nor to delineate as wetlands or surface waters areas exempted from delineation by statute or agency rule.

(2) The Department shall be responsible for ensuring statewide coordination and consistency in the delineation of surface waters and wetlands pursuant to this rule, by providing training and guidance to the Department, Districts, and local governments in implementing the methodology.

Specific Authority: 373.421, F.S.
Law Implemented: 373.019, 373.421, F.S.
History: New 7-1-94, Formerly 17-340.100.

62-340.200 Definitions. When used in this chapter, the following terms shall mean:

(1) "Aquatic plant" means a plant, including the roots, which typically floats on

water or requires water for its entire structural support, or which will desiccate outside of water.

(2) "Canopy" means the plant stratum composed of all woody plants and palms with a trunk four inches or greater in diameter at breast height, except vines.

(3) "Diameter at Breast Height (DBH)" means the diameter of a plant's trunk or main stem at a height of 4.5 feet above the ground.

(4) "Facultative plants" means those plant species listed in subsection 62-340.450 (3) of this chapter. For the purposes of this rule, facultative plants are not indicators of either wetland or upland conditions.

(5) "Facultative Wet plants" means those plant species listed in subsection 62-340.450 (2) of this chapter.

(6) "Ground Cover" means the plant stratum composed of all plants not found in the canopy or subcanopy, except vines and aquatic plants.

(7) "Ground truthing" means verification on the ground of conditions on a site.

(8) "Hydric Soils" means soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile.

(9) "Hydric Soil Indicators" means those indicators of hydric soil conditions as identified in Soil and Water Relationships of Florida's Ecological Communities (Florida Soil Conservation ed. Staff 1992).

(10) "Inundation" means a condition in which water from any source regularly and periodically covers a land surface.

(11) "Obligate plants" means those plant species listed in subsection 62-340.450 (1) of this chapter.

(12) "Regulating agency" means the Department of Environmental Protection, the water management districts, state or regional agencies, local governments, and any other governmental entities.

(13) "Riverwash" means areas of unstabilized sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers or streams so frequently that they may support little or no vegetation.

(14) "Saturation" means a water table six inches or less from the soil surface for soils with a permeability equal to or greater than six inches per hour in all layers within the upper 12 inches, or a water table 12 inches or less from the soil surface for soils with a permeability less than six inches per hour in any layer within the upper 12 inches.

(15) "Seasonal High Water" means the elevation to which the ground and surface water can be expected to rise due to a normal wet season.

(16) "Subcanopy" means the plant stratum composed of all woody plants and palms, exclusive of the canopy, with a trunk or main stem with a DBH between one and four inches, except vines.

(17) "Upland plants" means those plant species, not listed as Obligate, Facultative Wet, or Facultative by this rule, excluding vines, aquatic plants, and any plant species not introduced into the State of Florida as of the effective date of this rule.

(18) "U.S.D.A.-S.C.S." means the United States Department of Agriculture, Soil Conservation Service.

(19) "Wetlands," as defined in subsection 373.019 (17), F.S., means those areas that are inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands

generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate hydrophytic macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce or persist in aquatic environments or anaerobic soil conditions. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps and marshes, hydric seepage slopes, tidal marshes, mangrove swamps and other similar areas. Florida wetlands generally do not include longleaf or slash pine flatwoods with an understory dominated by saw palmetto.

Specific Authority: 373.421, F.S.
Law Implemented: 373.019, 373.421, F.S.
History: New 7-1-94, Formerly 17-340.200.

62-340.300 Delineation of Wetlands. The landward extent (i.e., the boundary) of wetlands as defined in subsection 62-340.200 (19), F.A.C., shall be determined by applying reasonable scientific judgment to evaluate the dominance of plant species, soils, and other hydrologic evidence of regular and periodic inundation and saturation as set forth below. In applying reasonable scientific judgment, all reliable information shall be evaluated in determining whether the area is a wetland as defined in subsection 62-340.200 (19), F.A.C.

(1) Before using the wetland delineation methodology described below, the regulating agency shall attempt to identify and delineate the landward extent of wetlands by direct application of the definition of wetlands in subsection 62-340.200 (19), F.A.C., with particular attention to the vegetative communities which the definition lists as wetlands and non-wetlands. If the boundary cannot be located easily by use of the definition in subsection 62-340.200 (19), F.A.C., the provisions of this rule shall be used to locate the landward extent of a wetland. In applying the provisions of this rule, the regulating agency shall attempt to locate the landward extent of wetlands visually by on site inspection, or aerial photointerpretation in combination with ground truthing.

(2) The landward extent of a wetland as defined in subsection 62-340.200 (19), F.A.C., shall include any of the following areas:

(a) Those areas where the areal extent of obligate plants in the appropriate vegetative stratum is greater than the areal extent of all upland plants in that stratum, as identified using the method in section 62-340.400, F.A.C., and either:

1. the substrate is composed of hydric soils or riverwash, as identified using standard U.S.D.A.-S.C.S. practices for Florida, including the approved hydric soil indicators, except where the hydric soil is disturbed by a nonhydrologic mechanical mixing of the upper soil profile and the regulating agency establishes through data or evidence that hydric soil indicators would be present but for the disturbance;

2. the substrate is nonsoil, rock outcrop-soil complex, or the substrate is located within an artificially created wetland area; or

3. one or more of the hydrologic indicators listed in section 62-340.500, F.A.C., are present and reasonable scientific judgment indicates that inundation or saturation is present sufficient to meet the wetland definition of subsection 62-340.200 (19), F.A.C.

(b) Those areas where the areal extent of obligate or facultative wet plants, or combinations thereof, in the appropriate stratum is equal to or greater than 80% of all the plants in that stratum, excluding facultative plants, and either:

1. the substrate is composed of hydric soils or riverwash, as identified using standard U.S.D.A.-S.C.S. practices for Florida, including the approved hydric soil indicators, except where the hydric soil is disturbed by a nonhydrologic mechanical mixing of the upper soil profile and the regulating agency establishes through data or evidence that hydric soil indicators would be present but for the disturbance;

2. the substrate is nonsoil, rock outcrop-soil complex, or the substrate is located within an artificially created wetland area; or

3. one or more of the hydrologic indicators listed in section 62-340.500, F.A.C., are present and reasonable scientific judgment indicates that inundation or saturation is present sufficient to meet the wetland definition of subsection 62-340.200 (19), F.A.C.

(c) Those areas, other than pine flatwoods and improved pastures, with undrained hydric soils which meet, in situ, at least one of the criteria listed below. A hydric soil is considered undrained unless reasonable scientific judgment indicates permanent artificial alterations to the on site hydrology have resulted in conditions which would not support the formation of hydric soils.

1. Soils classified according to United States Department of Agriculture's Keys to Soil Taxonomy (4th ed. 1990) as Umbraqualfs, Sulfaquents, Hydraquents, Humaquepts, Histosols (except Folists), Argiaquolls, or Umbraquults.

2. Saline sands (salt flats-tidal flats).

3. Soil within a hydric mapping unit designated by the U.S.D.A.-S.C.S. as frequently flooded or depressional, when the hydric nature of the soil has been field verified using the U.S.D.A.-S.C.S. approved hydric soil indicators for Florida. If a permit applicant, or a person petitioning for a formal determination pursuant to subsection 373.421 (2), F.S., disputes the boundary of a frequently flooded or depressional mapping unit, the applicant or petitioner may request that the regulating agency, in cooperation with the U.S.D.A.-S.C.S., confirm the boundary. For the purposes of subsection 120.60 (2), F.S., a request for a boundary confirmation pursuant to this subparagraph shall have the same effect as a timely request for additional information by the regulating agency. The regulating agency's receipt of the final response provided by the U.S.D.A.-S.C.S. to the request for boundary confirmation shall have the same effect as a receipt of timely requested additional information.

4. For the purposes of this paragraph only, "pine flatwoods" means a plant community type in Florida occurring on flat terrain with soils which may experience a seasonal high water table near the surface. The canopy species consist of a monotypic or mixed forest of long leaf pine or slash pine. The subcanopy is typically sparse or absent. The ground cover is dominated by saw palmetto with areas of wire grass, gallberry, and other shrubs, grasses, and forbs, which are not obligate or facultative wet species. Pine flatwoods do not include those wetland communities as listed in the wetland definition contained in subsection 62-340.200 (19), which may occur in the broader landscape setting of pine flatwoods and which may contain slash pine. Also for the purposes of this paragraph only, "improved pasture" means areas where the dominant native plant community has been replaced with planted or natural recruitment of herbaceous species which are not obligate or facultative wet species and which have been actively maintained for livestock through mechanical means or grazing.

(d) Those areas where one or more of the hydrologic indicators listed in section 62-340.500, F.A.C., are present, and which have hydric soils, as identified using the U.S.D.A.-S.C.S. approved hydric soil indicators for Florida, and reasonable scientific judgment indicates that inundation or saturation is present sufficient to meet the wetland

definition of subsection 62-340.200 (19), F.A.C. These areas shall not extend beyond the seasonal high water elevation.

(3) (a) If the vegetation or soils of an upland or wetland area have been altered by natural or man-induced factors such that the boundary between wetlands and uplands cannot be delineated reliably by use of the methodology in subsection 62-340.300 (2), F.A.C., as determined by the regulating agency, and the area has hydric soils or riverwash, as identified using standard U.S.D.A.-S.C.S. practices for Florida, including the approved hydric soil indicators, except where the hydric soil is disturbed by a non hydrologic mechanical mixing of the upper soil profile and the regulating agency establishes through data or evidence that hydric soil indicators would be present but for the disturbance, then the most reliable available information shall be used with reasonable scientific judgement to determine where the methodology in subsection 62-340.300 (2), F.A.C., would have delineated the boundary between wetlands and uplands. Reliable available information may include, but is not limited to, aerial photographs, remaining vegetation, authoritative site-specific documents, or topographical consistencies.

(b) This subsection shall not apply to any area where regional or site-specific permitted activity, or activities which did not require a permit, under sections 253.123 and 253.124, F.S. (1957), as subsequently amended, the provisions of Chapter 403, F.S. (1983), relating to dredging and filling activities, Chapter 84-79, Laws of Florida, and Part IV of Chapter 373, F.S., have altered the hydrology of the area to the extent that reasonable scientific judgment, or application of the provisions of section 62-340.550, F.A.C., indicate that under normal circumstances the area no longer inundates or saturates at a frequency and duration sufficient to meet the wetland definition in subsection 62-340.200 (19), F.A.C.

(c) This subsection shall not be construed to limit the type of evidence which may be used to delineate the landward extent of a wetland under this chapter when an activity violating the regulatory requirements of sections 253.123 and 253.124, F.S. (1957), as subsequently amended, the provisions of Chapter 403, F.S. (1983), relating to dredging and filling activities, Chapter 84-79, Laws of Florida, and Part IV of Chapter 373, F.S., has disturbed the vegetation or soils of an area.

(4) The regulating agency shall maintain sufficient soil scientists on staff to provide evaluation or consultation regarding soil determinations in applying the methodologies set forth in subsections 62-340.300 (2) or (3), F.A.C. Services provided by the U.S.D.A.-S.C.S., or other competent soil scientists, under contract or agreement with the regulating agency, may be used in lieu of, or to augment, agency staff.

Specific Authority: 373.421, F.S.

Law Implemented: 373.019, 373.421, F.S.

History: New 7-1-94, Formerly 17-340.300.

62-340.400 Selection of Appropriate Vegetative Stratum. Dominance of plant species, as described in paragraphs 62-340.300 (2) (a) and 62-340.300 (2) (b), shall be determined in a plant stratum (canopy, subcanopy, or ground cover). The top stratum shall be used to determine dominance unless the top stratum, exclusive of facultative plants, constitutes less than 10 percent areal extent, or unless reasonable scientific judgment establishes that the indicator status of the top stratum is not indicative of the hydrologic conditions on site. In such cases, the stratum most indicative of on site hydrologic conditions, considering the seasonal variability in the amount and

distribution of rainfall, shall be used. The evidence concerning the presence or absence of regular and periodic inundation or saturation shall be based on in situ data. All facts and factors relating to the presence or absence of regular and periodic inundation or saturation shall be weighed in deciding whether the evidence supports shifting to a lower stratum. The presence of obligate, facultative wet, or upland plants in a lower stratum does not by itself constitute sufficient evidence to shift strata, but can be considered along with other physical data in establishing the weight of evidence necessary to shift to a lower stratum. The burden of proof shall be with the party asserting that a stratum other than the top stratum should be used to determine dominance. Facultative plants shall not be considered for purposes of determining appropriate strata or dominance.

Specific Authority: 373.421, F.S.
Law Implemented: 373.019, 373.421, F.S.
History: New 7-1-94, Formerly 17-340.400.

62-340.450 Vegetative Index.

(1) Obligate Species (**See Appendix B**)

(2) Facultative Wet Species (**See Appendix B**)

(3) Facultative Species (**See Appendix B**)

(4) Nomenclature. Use of plants in this rule is based solely on the scientific names. Common names are included in the above lists for information purposes only. The following references shall be used by the regulating agency to resolve any uncertainty about the nomenclature or taxonomy of any plant listed by a given scientific name in this section: R. Godfrey, Trees, Shrubs and Woody Vines of Northern Florida and Adjacent Georgia & Alabama (Univ. Ga. Press, Athens 1988) and D. Lellinger, Ferns & Fern-Allies of the United States & Canada (Smithsonian Institution Press, Washington D.C. 1985) for all species covered by these references. For all other listed scientific names the following references will be followed unless the species list in this section designates a different authority next to an individual species name: R. Godfrey & J. Wooten, Aquatic and Wetland Plants of Southeastern United States: Monocotyledons (Univ. Ga. Press, Athens 1979); R. Godfrey & J. Wooten, Aquatic and Wetland Plants of Southeastern United States: Dicotyledons (Univ. Ga. Press, Athens 1979); D. & H. Correll, Flora of the Bahama Archipelago (A.R. Gantner, Germany 1982). When the species list in this section designates a different authority next to an individual species name, the regulating agency shall resolve any ambiguity in nomenclature by using the name identified in D. Hall, The Grasses of Florida (Doctoral Dissertation, Univ. of Fla., Gainesville 1978); or C. Campbell, Systematics of the Andropogon Virginicus Complex (GRAMINEAE), 64 Journal of the Arnold Arboretum 171-254 (1983).

Specific Authority: 373.421, F.S.
Law Implemented: 373.019, 373.421, F.S.
History: New 7-1-94, Formerly 17-340.450.

62-340.500 Hydrologic Indicators. The indicators below may be used as evidence of inundation or saturation when used as provided in section 62-340.300, F.A.C. Several of the indicators reflect a specific water elevation. These specific water elevation indicators are intended to be evaluated with meteorological information, surrounding topography and reliable hydrologic data or analyses when provided, to ensure that such indicators reflect inundation or saturation of a frequency and duration sufficient to meet

the wetland definition in subsection 62-340.200 (19), F.A.C., and not rare or aberrant events. These specific water elevation indicators are not intended to be extended from the site of the indicator into surrounding areas when reasonable scientific judgment indicates that the surrounding areas are not wetlands as defined in subsection 62-340.200 (19), F.A.C.

(1) Algal mats. The presence or remains of nonvascular plant material which develops during periods of inundation and persists after the surface water has receded.

(2) Aquatic mosses or liverworts on trees or substrates. The presence of those species of mosses or liverworts tolerant of or dependent on surface water inundation.

(3) Aquatic plants. Defined in subsection 62-340.200 (1), F.A.C.

(4) Aufwuchs. The presence or remains of the assemblage of sessile, attached or free-living, nonvascular plants and invertebrate animals (including protozoans) which develop a community on inundated surfaces.

(5) Drift lines and rafted debris. Vegetation, litter, and other natural or manmade material deposited in discrete lines or locations on the ground or against fixed objects, or entangled above the ground within or on fixed objects in a form and manner which indicates that the material was waterborne. This indicator should be used with caution to ensure that the drift lines or rafted debris represent usual and recurring events typical of inundation or saturation at a frequency and duration sufficient to meet the wetland definition of subsection 62-340.200 (19), F.A.C.

(6) Elevated lichen lines. A distinct line, typically on trees, formed by the water-induced limitation on the growth of lichens.

(7) Evidence of aquatic fauna. The presence or indications of the presence of animals which spend all or portions of their life cycle in water. Only those life stages which depend on being in or on water for daily survival are included in this indicator.

(8) Hydrologic data. Reports, measurements, or direct observation of inundation or saturation which support the presence of water to an extent consistent with the provisions of the definition of wetlands and the criteria within this rule, including evidence of a seasonal high water table at or above the surface according to methodologies set forth in Soil and Water Relationships of Florida's Ecological Communities (Florida Soil Conservation Staff 1992).

(9) Morphological plant adaptations. Specialized structures or tissues produced by certain plants in response to inundation or saturation which normally are not observed when the plant has not been subject to conditions of inundation or saturation.

(10) Secondary flow channels. Discrete and obvious natural pathways of water flow landward of the primary bank of a stream watercourse and typically parallel to the main channel.

(11) Sediment deposition. Mineral or organic matter deposited in or shifted to positions indicating water transport.

(12) Vegetated tussocks or hummocks. Areas where vegetation is elevated above the natural grade on a mound built up of plant debris, roots, and soils so that the growing vegetation is not subject to the prolonged effects of soil anoxia.

(13) Water marks. A distinct line created on fixed objects, including vegetation, by a sustained water elevation.

Specific Authority: 373.421, F.S.

Law Implemented: 373.019, 373.421, F.S.

History: New 7-1-94, Formerly 17-340.500.

62-340.550 Wetland Hydrology. A wetland delineation using the methodology described above, can be refuted by either reliable hydrologic records or site specific hydrologic data which indicate that neither inundation for at least seven consecutive days, nor saturation for at least twenty consecutive days, occurs during conditions which represent long-term hydrologic conditions. Hydrologic records or site specific hydrologic data must be of such a duration, frequency, and accuracy to demonstrate that the records or data are representative of the long-term hydrologic conditions, including the variability in quantity and seasonality of rainfall. When sufficient amounts of either reliable hydrologic records or site specific hydrologic data are not available to prove that the wetland area of concern does not inundate or saturate as described above, a site-specific field-verified analytic or numerical model may be used to demonstrate that the wetland area no longer inundates or saturates regularly or periodically under typical long-term hydrologic conditions. Before initiating the use of a model to evaluate if a wetland delineation should be refuted based on hydrologic conditions, the applicant or petitioner shall first meet with the appropriate regulating agency and reach an agreement on the terms of study, including data collection, the specific model, model development and calibration, and model verification. If the data, analyses, or models are deemed inadequate based on the hydrologic conditions being addressed, the regulating agency shall provide a case-by-case review of the applicability of any data, analyses, or models and shall provide specific reasons, based on generally accepted scientific and engineering practices, why they are inadequate.

Specific Authority: 373.421, F.S.

Law Implemented: 373.019, 373.421, F.S.

History: New 7-1-94, Formerly 17-340.550.

62-340.600 Surface Waters.

(1) For the purposes of section 373.421, F.S., surface waters are waters on the surface of the earth, contained in bounds created naturally or artificially, including, the Atlantic Ocean, the Gulf of Mexico, bays, bayous, sounds, estuaries, lagoons, lakes, ponds, impoundments, rivers, streams, springs, creeks, branches, sloughs, tributaries, and other watercourses. However, state water quality standards apply only to those waters defined in subsection 403.031 (13), F.S.

(2) The landward extent of a surface water in the State for the purposes of implementing Section 373.414, F.S., shall be the more landward of the following:

(a) wetlands as located by section 62-340.300, F.A.C., of this chapter;

(b) the mean high water line elevation for tidal water bodies;

(c) the ordinary high water line for non-tidal natural water bodies;

(d) the top of the bank for artificial lakes, borrow pits, canals, ditches and other artificial water bodies with side slopes of 1 foot vertical to 4 feet horizontal or steeper, excluding spoil banks when the canals and ditches have resulted from excavation into the ground; or

(e) the seasonal high water line for artificial lakes, borrow pits, canals, ditches, and other artificial water bodies with side slopes flatter than 1 foot vertical to 4 feet horizontal along with any artificial water body created by diking or impoundment above the ground.

(3) Determinations made pursuant to paragraphs (2) (b) and (2) (c) shall be for regulatory purposes and are not intended to be a delineation of the boundaries of lands for the purposes of title.

Specific Authority: 373.421, F.S.
Law Implemented: 373.019, 373.421, 403.031 (13), F.S.
History: New 7-1-94, Formerly 17-340.600.

62-340.700 Exemptions for Treatment or Disposal Systems.

(1) Alteration and maintenance of the following shall be exempt from the rules adopted by the department and the water management districts to implement subsections 373.414 (1) through 373.414 (6), 373.414 (8) and 373.414 (10), F.S.; and subsection 373.414 (7), F.S., regarding any authority to apply state water quality standards within any works, impoundments, reservoirs, and other watercourses described in this subsection and any authority granted pursuant to section 373.414, F.S. (1991):

(a) Works, impoundments, reservoirs, and other watercourses constructed and operated solely for wastewater treatment or disposal in accordance with a valid permit reviewed or issued under sections 62-28.700, 62-302.520, F.A.C., Chapters 62-17, 62-600, 62-610, 62-640, 62-650, 62-660, 62-670, 62-671, 62-673, or 62-701, F.A.C., or section 403.0885, F.S., or rules implementing section 403.0885, F.S., except for treatment wetlands or receiving wetlands permitted to receive wastewater pursuant to Chapter 62-611, F.A.C., or section 403.0885, F.S., or its implementing rules;

(b) Works, impoundments, reservoirs, and other watercourses constructed solely for wastewater treatment or disposal before a construction permit was required under Chapter 403, F.S., and operated solely for wastewater treatment or disposal in accordance with a valid permit reviewed or issued under sections 62-28.700, 62-302.520, F.A.C., Chapters 62-17, 62-600, 62-610, 62-640, 62-650, 62-660, 62-670, 62-671, 62-673, or 62-701, F.A.C., or section 403.0885, F.S., or rules implementing section 403.0885, F.S., except for treatment wetlands or receiving wetlands permitted to receive wastewater pursuant to Chapter 62-611, F.A.C., or section 403.0885, F.S., or its implementing rules;

(c) Works, impoundments, reservoirs, and other watercourses of less than 0.5 acres in combined area on a project-wide basis, constructed and operated solely for stormwater treatment in accordance with a noticed exemption under chapter 62-25, F.A.C., or a valid permit issued under chapters 62-25 (excluding rule 62-25.042), 62-330, 40B-4, 40C-4, 40C-42 (excluding rule 40C-42.0265), 40C-44, 40D-4, 40D-40, 40D-45, or 40E-4, F.A.C., except those permitted as wetland stormwater treatment systems; or

(d) Works, impoundments, reservoirs, and other watercourses of less than 0.5 acres in combined area on a project-wide basis, constructed and operated solely for stormwater treatment before a permit was required under chapters 62-25, 40B-4, 40C-4, 40C-42, 40C-44, 40D-4, 40D-40, 40D-45, or 40E-4, F.A.C.

(2) Alteration and maintenance of the following shall be exempt from the rules adopted by the department and the water management districts to implement subsections 373.414 (1), 373.414 (2) (a), 373.414 (8), and 373.414 (10), F.S.; and subsections 373.414 (3) through 373.414 (6), F.S.; and subsection 373.414 (7), F.S., regarding any authority to apply state water quality standards within any works, impoundments, reservoirs, and other watercourses described in this subsection and any authority granted pursuant to section 373.414, F.S. (1991), except for authority to protect threatened and endangered species in isolated wetlands:

(a) Works, impoundments, reservoirs, and other watercourses of 0.5 acre or greater in combined area on a project-wide basis, constructed and operated solely for stormwater treatment in accordance with a noticed exemption under chapter 62-25,

F.A.C., or a valid permit issued under chapters 62-25 (excluding rule 62-25.042), 62-330, 40B-4, 40C-4, 40C-42 (excluding rule 40C-42.0265), 40C-44, 40D-4, 40D-40, 40D-45, 40E-4, except those permitted as wetland stormwater treatment systems; or

(b) Works, impoundments, reservoirs, and other watercourses of 0.5 acres or greater in combined area on a project-wide basis, constructed and operated solely for stormwater treatment before a permit was required under chapters 62-25, 40B-4, 40C-4, 40C-42, 40C-44, 40D-4, 40D-40, 40D-45, or 40E-4, F.A.C.

(3) The exemptions in subsections 62-340.700 (1) and (2) shall not apply to works, impoundments, reservoirs or other watercourses that

(a) are currently wetlands which existed before construction of the stormwater treatment system and were incorporated in it;

(b) are proposed to be altered through expansion into wetlands or other surface waters; or

(c) are wetlands created, enhanced, or restored as mitigation for wetland or surface water impacts under a permit issued by the Department or a water management district.

(4) Alterations and maintenance of works, impoundments, reservoirs, and other watercourses exempt under this subsection shall not be considered in determining whether any wetland permitting threshold is met or exceeded under part IV of chapter 373, F.S.

(5) Works, impoundments, reservoirs, and other watercourses exempt under this subsection, other than isolated wetlands in systems described in subsection 62-340.700 (2) above, shall not be delineated under section 373.421, F.S.

(6) This exemption shall not affect the application of state water quality standards, including those applicable to Outstanding Florida Waters, at the point of discharge to waters as defined in subsection 403.031 (13), F.S.

(7) As used in this subsection, "solely for " means the reason for which a work, impoundment, reservoir, or other watercourse is constructed and operated; and such construction and operation would not have occurred but for the purposes identified in subsections 62-340.700 (1) or subsection 62-340.700 (2), F.A.C. Furthermore, the phrase does not refer to a work, impoundment, reservoir, or other watercourse constructed or operated for multiple purposes. Incidental uses, such as occasional recreational uses, will not render the exemption inapplicable, so long as the incidental uses are not part of the original planned purpose of the work, impoundment, reservoir, or other watercourse.

However, for those works, impoundments, reservoirs, or other watercourses described in paragraphs 62-340.700 (1) (c) and 62-340.700 (2) (a), F.A.C., use of the system for flood attenuation, whether originally planned or unplanned, shall be considered an incidental use, so long as the works, impoundments, reservoirs, and other watercourses are no more than 2 acres larger than the minimum area required to comply with the stormwater treatment requirements of the district or department. For the purposes of this subsection, reuse from a work, impoundment, reservoir, or other watercourse is part of treatment or disposal.

Specific Authority: 373.414 (9), F.S.

Law Implemented: 373.414 (9), F.S.

History: New 7-1-94, Formerly 17-340.700.

62-340.750 Exemption for Surface Waters or Wetlands Created By Mosquito Control Activities.

Construction, alteration, operation, maintenance, removal, and abandonment of stormwater management systems, dams, impoundments, reservoirs, appurtenant works, or works, in, on or over lands that have become surface waters or wetlands solely because of mosquito control activities undertaken as part of a governmental mosquito control program, and which lands were neither surface waters nor wetlands before such activities, shall be exempt from the rules adopted by the department and water management districts to implement subsections 373.414 (1) through 373.414 (6), 373.414 (8), and 373.414 (10), F.S.; and subsection 373.414 (7), F.S., regarding any authority granted pursuant to section 373.414, F.S. (1991).

Activities exempted under this section shall not be considered in determining whether any wetland permitting threshold is met or exceeded under part IV of chapter 373, F.S. This exemption shall not affect the regulation of impacts on other surface waters or wetlands, or the application of state water quality standards to waters as defined in subsection 403.031 (13), F.S. including standards applicable to Outstanding Florida Waters.

Specific Authority: 373.414 (9), F.S.

Law Implemented: 373.414 (9), F.S.

History: New 7-1-94, Formerly 17-340.750.

The Vegetative Index

Botanical Name	Common Name	Wetland Status
Abildgaardia ovata	rush, flat-spike	FACW
Acacia auriculiformis	ear-leaved acacia	FAC
Acer negundo	box-elder	FACW
Acer rubrum	maple, red	FACW
Acer saccharinum	maple, silver	OBL
Acoelorraphe wrightii	palm, paurotis	OBL
Acrostichum spp.	leather fern	OBL
Aeschynomene indica	joint-vetch, India	FACW
Aeschynomene pratensis	joint-vetch, meadow	OBL
Agalinis aphylla	false-foxglove, scale-leaf	FACW
Agalinis linifolia	false-foxglove, flax-leaf	OBL
Agalinis maritima	false-foxglove, saltmarsh	OBL
Agalinis pinetorum (*A. pulchella*)	false-foxglove	FACW
Agalinis purpurea	false-foxglove, large purple	FACW
Agarista populifolia	hobble-bush	FACW
Agrostis stolonifera	redtop	FACW
Aletris spp.	colic-root	FAC
Alisma subcordatum	water-plantain, subcordate	OBL
Alnus serrulata	alder, hazel	OBL
Alopecurus carolinianus	foxtail, tufted	FAC
Alternanthera maritima	beach alternanthera	FACW - Keys only
Alternanthera paronychioides	smooth chaff-flower	FAC - Keys only
Alternanthera philoxeroides	alligator-weed	OBL
Alternanthera sessilis	alligator-weed, sessile	OBL
Amaranthus australis	amaranth, southern	OBL
Amaranthus cannabinus	amaranth, tidemarsh	OBL
Amaranthus floridanus	amaranth, Florida	OBL
Ammannia spp.	toothcup	OBL
Amorpha fruticosa	indigo-bush	FACW
Amphicarpum muhlenbergianum	blue maidencane	FACW
Amsonia rigida	slimpod, stiff	FACW
Amsonia tabernaemontana	slimpod, eastern	FACW
Anagallis pumila	pimpernel, Florida	FAC
Andropogon arctatus (Campbell)	bluestem, savannah	FAC
Andropogon brachystachys (Campbell)	bluestem, short-spike	FAC
Andropogon gerardii (Campbell)	bluestem, big	FAC
Andropogon glomeratus (Campbell)	bluestem, bushy	FACW
Andropogon liebmanii var. *pungensis* (Campbell) (*A. mohrii*)	bluestem, Mohr's	FACW
Andropogon perangustatus (Campbell)	bluestem, slim	FAC
Andropogon virginicus (Campbell)	broom-sedge	FAC

Botanical Name	Common Name	Wetland Status
Annona glabra	pond apple	OBL
Anthaenantia rufa	silky-scale, purple	FACW
Apteria aphylla	nodding nixie	FACW
Ardisia spp.	marlberry	FAC
Arenaria godfreyi	stitchwort, Godfrey's	FACW
Arisaema spp.	jack-in-the-pulpit; green-dragon	FACW
Aristida affinis	three-awn grass, long-leaf	OBL
Aristida purpurascens (s.l.)	three-awn grass, wand-like	FACW
Aristida rhizomophora	three-awn grass, rhizomatous	FAC
Aristida spiciformis	bottlebrush, three-awn	FAC
Aristida stricta	three-awn grass, pineland	FAC
Armoracia aquatica	lakecress	OBL
Arnoglossum diversifolium	indian-plantain, variable-leaf	FACW
Arnoglossum ovatum	indian-plantain, egg-leaf	FACW
Arnoglossum sulcatum	indian-plantain, Georgia	OBL
Aronia arbutifolia	red chokeberry	FACW
Arundinaria gigantea	giant cane	FACW
Arundo donax	reed, giant	FAC
Asclepias connivens	milkweed, large-flower	FACW
Asclepias incarnata	milkweed, swamp	OBL
Asclepias lanceolata	milkweed, fen-flower	OBL
Asclepias longifolia	milkweed, long-leaf	FACW
Asclepias pedicellata	milkweed, savannah	FACW
Asclepias perennis	milkweed, aquatic	OBL
Asclepias rubra	milkweed, red	OBL
Asclepias viridula	milkweed, southern	FACW
Aster carolinianus	aster, climbing	OBL
Aster chapmanii	aster, savannah	FACW
Aster dumosus	aster, bushy	FAC
Aster elliottii	aster, Elliott's	OBL
Aster eryngiifolius	aster, coyote-thistle	FACW
Aster lateriflorus	aster, calico	FACW
Aster spinulosus	aster, bog	FACW
Aster subulatus	aster, saltmarsh	OBL
Aster tenuifolius	aster, saltmarsh	OBL
Aster umbellatus	aster, flat-top white	FAC
Aster vimineus	aster, small white	FACW
Athyrium filix-femina	fern, subarctic lady	FACW
Atriplex patula	saltbush, halberd-leaf	FACW
Avicennia germinans	mangrove, black	OBL
Axonopus spp.	carpet grass	FAC
Baccharis angustifolia	false-willow	OBL
Baccharis dioica	false-willow, broom-bush	FAC
Baccharis glomeruliflora	groundsel tree	FAC
Baccharis halimifolia	false-willow, eastern	FAC
Bacopa spp.	water-hyssop	OBL
Balduina atropurpurea	honeycomb-head, purple	FACW

Botanical Name	**Common Name**	**Wetland Status**
Balduina uniflora	honeycomb-head, one-flower	FACW
Bartonia spp.	screwstem	FACW
Batis maritima	saltwort	OBL
Betula nigra	birch, river	OBL
Bidens bipinnata	Spanish needles	U
Bidens pilosa	beggar-ticks, white	FAC
Bidens spp.	beggar-ticks	OBL
Bigelowia nudata	golden-rod, rayless	FACW
Blechnum serrulatum	swamp fern	FACW
Boehmeria cylindrica	false-nettle, small-spike	OBL
Boltonia spp.	boltonia	FACW
Borrichia spp.	sea oxeye	OBL
Brachiaria purpurascens	paragrass	FACW
Bucida buceras	gregory wood	FAC
Bumelia celastrina	bumelia, coastal	FAC
Bumelia lycioides	bumelia, buckthorn	FAC
Bumelia reclinata	bumelia	FAC
Burmannia spp.	burmannia	OBL
Byrsonima lucida	locust-berry	FAC - Keys only
Cacalia suaveolens	indian-plantain, sweet-scent	FACW
Calamovilfa curtissii	Curtiss' reed grass	FACW
Callitriche spp.	water-starwort	OBL
Calopogon spp.	grass-pinks	FACW
Calycocarpum lyonii	cupseed	FACW
Campanula americana	bellflower, American	FAC
Campanula floridana	bellflower	OBL
Canna spp.	canna	OBL
Canna x generalis	canna, common	FAC
Caperonia spp.	caperonia	FACW
Capparis flexuosa	caper-tree	FACW
Cardamine bulbosa	bitter-cress	OBL
Cardamine pensylvanica	spring-cress	OBL
Carex atlantica	sedge, prickly bog	OBL
Carex comosa	sedge, bearded	OBL
Carex crinita	sedge, fringed	OBL
Carex crus-corvi	sedge, raven-foot	OBL
Carex decomposita	sedge, cypress-knee	OBL
Carex elliottii	sedge, Elliott's	OBL
Carex folliculata	sedge, long	OBL
Carex gigantea	sedge, large	OBL
Carex howei	sedge, Howe's	OBL
Carex hyalinolepis	sedge, shoreline	OBL
Carex leptalea	sedge, bristly-stalk	OBL
Carex louisianica	sedge, Louisiana	OBL
Carex lupulina	sedge, hop	OBL
Carex lurida	sedge, shallow	OBL
Carex spp.	sedges	FACW

Botanical Name	Common Name	Wetland Status
Carex stipata	sedge, stalk-grain	OBL
Carex walteriana	sedge, Walter's	OBL
Carphephorus carnosus	chaffhead, pineland	FACW
Carphephorus odoratissimus	vanilla plant	FAC
Carphephorus paniculatus	deer-tongue	FAC
Carphephorus pseudoliatris	chaffhead, bristle-leaf	FACW
Carpinus caroliniana	hornbeam, American	FACW
Carya aquatica	hickory, water	OBL
Casuarina spp.	casuarina	FAC
Cayaponia quinqueloba	cayaponia, five-lobe	FAC
Celtis laevigata	sugar-berry; hackberry	FACW
Centella asiatica	coinwort	FACW
Cephalanthus occidentalis	buttonbush	OBL
Cestrum diurnum	day jessamine	FAC
Chamaecyparis thyoides	cedar, Atlantic white	OBL
Chaptalia tomentosa	sunbonnet; pineland daisy	FACW
Chasmanthium latifolium	spanglegrass	FAC
Chasmanthium sessiliflorum	long-leaf Chasmanthium	FAC
Chasmanthium spp.	spanglegrass	FACW
Chiococca spp.	snowberry	FAC
Chrysobalanus icaco	cocoplum	FACW
Cicuta spp.	water-hemlock	OBL
Cirsium lecontei	thistle, Leconte's	FACW
Cirsium muticum	thistle, swamp	OBL
Cirsium nuttallii	thistle, Nuttall's	FACW
Cladium spp.	sawgrass	OBL
Cleistes divaricata	rosebud	OBL
Clethra alnifolia	sweet pepper bush	FACW
Cliftonia monophylla	buckwheat-tree	FACW
Colocasia esculenta	elephant's ear	OBL
Colubrina asiatica	snakewood, Asian	FAC
Commelina erecta	dayflower, sandhill	U
Commelina spp.	dayflower	FACW
Conocarpus erectus	buttonwood	FACW
Conoclinium coelestinum	mistflower	FAC
Coreopsis falcata	tickseed, sickle	FACW
Coreopsis floridana	tickseed, Florida	FACW
Coreopsis gladiata	tickseed, southeastern	FACW
Coreopsis integrifolia	tickseed, ciliate-leaf	FACW
Coreopsis leavenworthii	tickseed, Leavenworth's	FACW
Coreopsis linifolia	tickseed, Texas	FACW
Coreopsis nudata	tickseed, Georgia	OBL
Coreopsis tripteris	tickseed, tall	FAC
Cornus amomum	dogwood, silky	OBL
Cornus foemina	dogwood, swamp	FACW
Crataegus aestivalis	mayhaw	OBL
Crataegus marshallii	haw, parsley	FACW

Botanical Name	Common Name	Wetland Status
Crataegus viridis	haw, green	FACW
Crinum americanum	swamp-lily, southern	OBL
Croton elliottii	croton, Elliott's	FACW
Ctenitis submarginalis	fern, brown-hair comb	FACW
Ctenium spp.	toothache grass	FACW
Cupaniopsis anacardioides	carrotwood	FAC
Cuphea aspera	common waxweed	FACW
Cuphea carthagenensis	waxweed, Columbia	FAC
Cyperus alternifolius	flatsedge, alternate-leaf	OBL
Cyperus articulatus	flatsedge, jointed	OBL
Cyperus cuspidatus	flatsedge, coastal-plain	FAC
Cyperus difformis	flatsedge, variable	OBL
Cyperus distinctus	flatsedge, marshland	OBL
Cyperus drummondii	flatsedge	OBL
Cyperus entrerianus	flatsedge	OBL
Cyperus erythrorhizos	flatsedge, red-root	OBL
Cyperus esculentus	flatsedge	FAC
Cyperus filiculmis	flatsedge, sandhill	U
Cyperus giganteus	flatsedge	FAC
Cyperus globulosus	flatsedge, baldwin	FAC
Cyperus haspan	flatsedge, sheathed	OBL
Cyperus huarmensis	flatsedge, black knotty-root	FAC
Cyperus lanceolatus	flatsedge, epiphytic	OBL
Cyperus metzii	flatsedge	FAC
Cyperus ovularis	flatsedge	U
Cyperus papyrus	flatsedge, papyrus	OBL
Cyperus reflexus	flatsedge	U
Cyperus refractus	flatsedge	U
Cyperus retrofractus	flatsedge	U
Cyperus retrorsus	flatsedge	FAC
Cyperus rotundus	flatsedge, purple	FAC
Cyperus spp.	flatsedge	FACW
Cyperus tetragonus	flatsedge	U
Cypselea humifusa	panal	FAC
Cyrilla racemiflora	cyrilla, swamp	FAC
Decodon verticillatus	swamp-loosestrife	OBL
Dichondra caroliniensis	pony-foot	FAC
Dichromena colorata	white-top sedge, starbrush	FACW
Dichromena floridensis	white-top sedge, Everglades	FACW
Dichromena latifolia	white-top sedge, giant	OBL
Dicliptera brachiata	mudwort, wild	FACW
Digitaria pauciflora	everglades grass	FACW
Digitaria serotina	crabgrass, dwarf	FAC
Diodia virginiana	button-weed	FACW
Dionaea muscipula	Venus' flytrap	FACW
Diospyros virginiana	persimmon, common	FAC
Distichlis spicata	saltgrass, seashore	OBL

Botanical Name	Common Name	Wetland Status
Drosera brevifolia	sundew, dwarf	FACW
Drosera capillaris	sundew, pink	FACW
Drosera filiformis	sundew, thread-leaf	OBL
Drosera intermedia	sundew, spoon-leaf	OBL
Drosera tracyi	sundew, Gulf coast	OBL
Drymaria cordata	West Indian chickweed	FAC
Dryopteris ludoviciana	shield-fern, southern	FACW
Dulichium arundinaceum	sedge, three-way	OBL
Dyschoriste humistrata	dyschoriste, swamp	FACW
Echinochloa spp.	jungle-rice; cockspur grass	FACW
Echinodorus spp.	burhead	OBL
Eclipta alba	yerba de Tajo	FACW
Eleocharis spp.	spikerush	OBL
Elyonurus tripsacoides	balsam-scale, Pan-American	FACW
Elytraria caroliniensis	scaly-stem, Carolina	FAC
Equisetum hyemale	horsetail	FACW
Eragrostis spp.	lovegrass	FAC
Erechtites hieraciifolia	fireweed	FAC
Erianthus brevibarbis	plumegrass, short-beard	FACW
Erianthus giganteus	plumegrass, sugarcane	OBL
Erianthus strictus	plumegrass, narrow	OBL
Erigeron quercifolius	fleabane	FAC
Erigeron vernus	fleabane, early whitetop	FACW
Eriocaulon spp.	pipewort	OBL
Eriochloa spp.	cupgrass	FACW
Erithralis fruticosa	black torchwood	FAC
Ernodea littoralis	golden-creeper	FAC - Keys only
Eryngium aquaticum	corn snakeroot	OBL
Eryngium baldwinii	coyote-thistle, Baldwin's	FAC
Eryngium integrifolium	coyote-thistle, blue-flower	FACW
Eryngium prostratum	coyote-thistle, creeping	FACW
Eryngium yuccifolium	rattlesnake master	FACW
Erythrodes querceticola	erythrodes, low	FACW
Eulophia alta	coco, wild	FACW
Eupatoriadelphus fistulosus	joe-pye-weed	FACW
Eupatorium leptophyllum	marsh thoroughwort	OBL
Eupatorium leucolepis	thoroughwort, white-bract	FACW
Eupatorium mikanioides	thoroughwort, semaphore	FACW
Eupatorium perfoliatum	boneset	FACW
Eupatorium spp.	thoroughworts	FAC
Euphorbia humistrata (*Chamaesyce humistrata*)	broomspurge, spreading	FACW
Euphorbia inundata	spurge, Florida	FACW
Euphorbia polyphylla	spurge, many-leaved	FACW
Eustachys glauca (*Chloris glauca*)	fingergrass, saltmarch	FACW
Eustachys petracea	fingergrass	FAC
Eustoma exaltatum	prairie-gentian	FACW

Botanical Name	**Common Name**	**Wetland Status**
Euthamia spp.	bushy goldenrod	FAC
Evolvulus convolvuloides	evolvulus	FACW
Evolvulus sericeus	silky bindweed	FACW
Ficus aurea	fig, Florida strangler	FAC
Fimbristylis annua	fringe-rush, annual	FACW
Fimbristylis puberula	fringe-rush, Vahl's hairy	FACW
Fimbristylis spathacea	hurricane-grass	FAC
Fimbristylis spp.	fringe-rush	OBL
Flaveria bidentis	yellowtop	FAC
Flaveria floridana	yellowtop	FACW
Flaveria linearis	yellowtop	FACW
Flaveria trinervia	yellowtop	FAC
Forestiera acuminata	privet, swamp	FACW
Forestiera segregata	privet, Florida	FAC
Fothergilla gardenii	witch-alder, dwarf	FACW
Fraxinus americana	ash, white	U
Fraxinus spp.	ash	OBL
Fuirena spp.	umbrella-sedge	OBL
Galium tinctorium	bedstraw, stiff marsh	FACW
Gaylussacia dumosa	dwarf huckleberry	FAC
Gaylussacia frondosa	dangleberry	FAC
Gaylussacia mosieri	woolly-berry	FACW
Gentiana spp.	gentian	FACW
Gleditsia aquatica	water-locust	OBL
Gleditsia triacanthos	honey-locust	FACW
Glyceria striata	fowl mannagrass	OBL
Gordonia lasianthus	bay, loblolly	FACW
Gratiola hispida	hyssop, hispid	FAC
Gratiola spp.	hedgehyssop	FACW
Guapira discolor	blolly	FAC - Keys only
Habenaria spp	rein orchid	FACW
Halesia diptera	silver-bell	FACW
Harperocallis flava	Harper's beauty	FACW
Hartwrightia floridana	hartwrightia, Florida	FACW
Hedychium coronarium	ginger	FACW
Helenium amarum	sneezeweed, pasture	FAC
Helenium spp.	sneezeweed	FACW
Helianthus agrestis	sunflower, southeastern	FACW
Helianthus angustifolius	sunflower, swamp	FACW
Helianthus carnosus	sunflower, lakeside	FACW
Helianthus floridanus	sunflower, Florida	FAC
Helianthus heterophyllus	sunflower, wetland	FACW
Helianthus simulans	sunflower, muck	FACW
Heliotropium curassavicum	heliotrope, seaside	FAC
Heliotropium polyphyllum	heliotrope	FAC
Heliotropium procumbens	heliotrope, four-spike	FACW
Hemicarpha spp.	dwarf-bullrush	FACW

Botanical Name	Common Name	Wetland Status
Heteranthera reniformis	mud-plantain, kidney-leaf	OBL
Hibiscus aculeatus	rosemallow	FACW
Hibiscus coccineus	rosemallow, scarlet	OBL
Hibiscus grandiflorus	rosemallow, swamp	OBL
Hibiscus laevis	rosemallow, halberd-leaf	OBL
Hibiscus moscheutos	rosemallow, swamp	OBL
Hibiscus tiliaceus	rosemallow, sea	FAC
Hydrochloa caroliniensis	watergrass	OBL
Hydrocleis nymphoides	water-poppy	OBL
Hydrocotyle ranunculoides	pennywort, floating	OBL
Hydrocotyle spp.	pennywort	FACW
Hydrolea spp.	false-fiddle-leaf	OBL
Hygrophila spp.	hygrophila	OBL
Hymenachne amplexicaulis	trompetilla	OBL
Hymenocallis spp.	spider-lily	OBL
Hypericum chapmanii	St. John's-wort, Chapman's	OBL
Hypericum cumulicola	St. John's-wort, scrub	U
Hypericum drummondii	St. John's-wort, Drummond's	U
Hypericum edisonianum	St. John's-wort, Edison's	OBL
Hypericum fasciculatum	St. John's-wort, marsh	OBL
Hypericum gentianoides	pineweed	U
Hypericum hypericoides	St. Andrew's cross	FAC
Hypericum lissophloeus	St. John's-wort, smooth-bark	OBL
Hypericum microsepalum	St. John's-wort, small-sepal	U
Hypericum nitidum	St. John's-wort, Carolina	OBL
Hypericum prolificum	St. John's-wort, shrubby	U
Hypericum punctatum	St. John's-wort, dotted	U
Hypericum reductum	St. John's-wort, Atlantic	U
Hypericum spp.	St. John's-wort	FACW
Hypericum tetrapetalum	St. John's-wort, four-petal	FAC
Hypolepis repens	fern, bead	FACW
Hypoxis spp.	stargrasses, yellow	FACW
Hyptis alata	musky mint	FACW
Ilex amelanchier	holly, sarvis	OBL
Ilex cassine	holly, dahoon	OBL
Ilex coriacea	holly, bay-gall	FACW
Ilex decidua	holly, deciduous	FACW
Ilex myrtifolia	holly, myrtle	OBL
Ilex opaca var. *opaca*	American holly	FAC
Ilex verticillata	winterberry	OBL
Ilex vomitoria	yaupon holly	FAC
Illicium floridanum	anise, Florida	OBL
Illicium parviflorum	star anise	FACW
Impatiens capensis	touch-me-not, spotted	OBL
Iris spp.	iris	OBL
Iris verna	dwarf iris	U
Isoetes spp.	quillwort	OBL

Botanical Name	Common Name	Wetland Status
Itea virginica	virginia willow	OBL
Iva frutescens	marsh elder	OBL
Iva microcephala	little marsh elder	FACW
Jacquinia keyensis	joewood	FAC
Juncus marginatus	rush	FACW
Juncus spp.	rush	OBL
Juncus tenuis	rush	FAC
Justicia brandegeana	shrimp plant	U
Justicia spp.	water-willow	OBL
Kalmia latifolia	laurel, mountain	FACW
Kosteletzkya pentasperma	mallow, coastal	FAC
Kosteletzkya virginica	mallow, seashore	OBL
Lachnanthes caroliniana	redroot	FAC
Lachnocaulon anceps	bogbutton, white-head	FACW
Lachnocaulon beyrichianum	bogbutton, southern	FACW
Lachnocaulon digynum	bogbutton, pineland	OBL
Lachnocaulon engleri	bogbutton, Engler's	OBL
Lachnocaulon minus	bogbutton, Small's	OBL
Laguncularia racemosa	mangrove, white	OBL
Laportea canadensis	wood-nettle, Canada	FACW
Leersia spp.	cutgrass	OBL
Leitneria floridana	corkwood	OBL
Leptochloa spp.	sprangle-top	FACW
Leptochloa virgata	sprangle-top, tropic	FAC
Leucothoe spp.	dog-hobble	FACW
Liatris garberi	gayfeather, garber's	FACW
Liatris gracilis	blazing star	FAC
Liatris spicata	gayfeather, spiked	FAC
Lilaeopsis spp.	lilaeopsis	OBL
Lilium catesbaei	lily, southern red	FAC
Lilium iridollae	lily, panhandle	OBL
Limnobium spongia	frogbit	OBL
Limnophila spp.	marshweed	OBL
Limonium carolinianum	sea-lavender	OBL
Lindera benzoin	spicebush, northern	FACW
Lindera melissaefolia	spicebush, southern	OBL
Lindernia crustacea	false-pimpernel, Malayan	FAC
Lindernia spp.	false-pimpernel	FACW
Linum carteri	flax, Carter's	FACW
Linum floridanum	flax, Florida yellow	FAC
Linum medium	flax, stiff yellow	FAC
Linum striatum	flax, ridged yellow	FACW
Linum westii	flax, West's	OBL
Liparis elata (*L. nervosa*)	liparis, tall	OBL
Lipocarpha spp.	lipocarpha	FACW
Liquidambar styraciflua	sweetgum	FACW
Liriodendron tulipifera	tulip tree	FACW

Botanical Name	Common Name	Wetland Status
Listera spp.	twayblade	FACW
Litsea aestivalis	pondspice	OBL
Lobelia cardinalis	flower, cardinal	OBL
Lobelia floridana	lobelia, Florida	OBL
Lobelia spp.	lobelia	FACW
Lophiola americana	golden-crest	FACW
Ludwigia hirtella	seedbox, hairy	FACW
Ludwigia maritima	seedbox, seaside	FACW
Ludwigia spp.	ludwigia; water-primrose	OBL
Ludwigia suffruticosa	seedbox, headed	FACW
Ludwigia virgata	seedbox, savanna	FACW
Lycium carolinianum	Christmas berry	OBL
Lycopodium spp.	clubmoss	FACW
Lycopus spp.	bugleweed	OBL
Lyonia ligustrina	maleberry	FAC
Lyonia lucida	fetter-bush	FACW
Lyonia mariana	fetter-bush	FACW
Lysimachia spp.	loosestrife	OBL
Lythrum spp.	marsh loosestrife	OBL
Macbridea spp.	birds-in-a-nest	FACW
Macranthera flammea	flameflower	OBL
Magnolia virginiana var. *australis*	magnolia, sweetbay	OBL
Malaxis spicata	adder's-mouth, Florida	OBL
Manilkara bahamensis	wild dilly	FAC - Keys only
Manisuris cylindrica	jointgrass, pitted	FAC
Manisuris spp.	jointgrass	FACW
Marshallia graminifolia	barbara's-buttons, grass-leaf	FACW
Marshallia tenuifolia	barbara's-buttons, slim-leaf	FACW
Maxillaria crassifolia	orchid, hidden	OBL
Maytenus phyllanthoides	Florida mayten	FAC
Mecardonia spp.	mecardonia	FACW
Melaleuca quinquenervia	punk tree	FAC
Melanthera nivea	squarestem	FACW
Melanthium virginicum	bunchflower, Virginia	OBL
Melochia corchorifolia	chocolate-weed	FAC
Metopium toxiferum	poison wood	FAC
Micranthemum spp.	baby tears	OBL
Micromeria brownei (*Satureja brownei*)	savory, Brown's	OBL
Mimosa pigra	mimosa, black	FAC
Mimulus alatus	monkey-flower	OBL
Mitreola spp.	hornpod	FACW
Monanthochloe littoralis	keygrass	OBL
Morinda royoc	Keys rhubarb	FACW - Keys only
Morus rubra	mulberry, red	FAC
Muhlenbergia capillaris	muhly grass	OBL
Muhlenbergia expansa	cutover muhly	FAC

Botanical Name	**Common Name**	**Wetland Status**
Muhlenbergia schreberi	nimblewill	FACW
Murdannia spp.	dewflower	FAC
Myosurus minimus	mouse-tail, tiny	FAC
Myrica cerifera	bayberry, southern	FAC
Myrica heterophylla	bayberry, evergreen	FACW
Myrica inodora	bayberry, odorless	FACW
Myrsine guianensis	myrsine, guiana	FAC
Nasturtium spp.	water-cress	OBL
Nelumbo spp.	water-lotus	OBL
Nemastylis floridana	pleatleaf, fall-flowering	FACW
Nemophila aphylla	baby-blue-eyes, small-flower	FACW
Nephrolepis spp.	sword ferns	FAC
Neyraudia reynaudiana	reed, silk	FAC
Nuphar luteum	cow-lily, yellow	OBL
Nymphaea spp.	water-lily	OBL
Nymphoides spp.	floating-hearts	OBL
Nyssa aquatica	tupelo, water	OBL
Nyssa ogeche	tupelo, ogeechee	OBL
Nyssa sylvatica var. *biflora*	tupelo, swamp	OBL
Oldenlandia spp.	bluets, water	FACW
Onoclea sensibilis	fern, sensitive	FACW
Oplismenus setarius	grass, woods	FAC
Orontium aquaticum	golden club	OBL
Oryza sativa	rice, cultivated	FAC
Osmunda cinnamomea	fern, cinnamon	FACW
Osmunda regalis	fern, royal	OBL
Oxypolis spp.	water drop-wort	OBL
Panicum abscissum (Hall)	cut-throat grass	FACW
Panicum anceps	panicum, beaked	FAC
Panicum commutatum (Hall)	panicum	FAC
Panicum dichotomiflorum	panicum, fall	FACW
Panicum dichotomum	panicum	FACW
Panicum ensifolium	panic grass	OBL
Panicum erectifolium	witchgrass, erect-leaf	OBL
Panicum gymnocarpon	panicum, savannah	OBL
Panicum hemitomon	maiden-cane	OBL
Panicum hians	panicum, gaping	FAC
Panicum longifolium	panicum, tall thin	OBL
Panicum pinetorum	panicum	FACW
Panicum repens	grass, torpedo	FACW
Panicum rigidulum	panicum, red-top	FACW
Panicum scabriusculum	panicum, woolly	OBL
Panicum scoparium	panicum	FACW
Panicum spretum	panicum	FACW
Panicum strigosum	panicum	FAC
Panicum tenerum	panicum, bluejoint	OBL
Panicum tenue	panicum	FAC

Botanical Name	Common Name	Wetland Status
Panicum verrucosum	panicum, warty	FACW
Panicum virgatum	switchgrass	FACW
Parietaria spp.	pellitory	FAC
Parnassia spp.	grass-of-parnassus	OBL
Paspalidium geminatum	water panicum	OBL
Paspalum acuminatum	paspalum, brook	FACW
Paspalum boscianum	paspalum, bull	FACW
Paspalum conjugatum	paspalum, sour	FAC
Paspalum dilatatum	dallisgrass	FAC
Paspalum dissectum	paspalum, mudbank	OBL
Paspalum distichum	paspalum, joint	OBL
Paspalum fimbriatum	paspalum, Panama	FAC
Paspalum floridanum	paspalum, Florida	FACW
Paspalum laeve	paspalum, field	FACW
Paspalum monostachyum	paspalum, gulf	OBL
Paspalum plicatulum	paspalum, brown-seed	FAC
Paspalum praecox	paspalum, early	OBL
Paspalum pubiflorum	paspalum, hairy-seed	FACW
Paspalum repens	paspalum, water	OBL
Paspalum setaceum	paspalum, thin	FAC
Paspalum urvillei	grass, vasey	FAC
Pavonia spicata	mangrove mallow	FACW
Peltandra spp.	arum; spoon flower	OBL
Pennisetum purpureum	elephant ear grass	FAC
Penthorum sedoides	ditch stonecrop	OBL
Pentodon pentandrus	pentodon, Hall's	OBL
Persea palustris	bay, swamp	OBL
Phalaris spp.	grass, canary	FAC
Philoxerus vermicularis	silverhead	FACW
Phragmites australis	reed, common	OBL
Phyla spp.	frog-fruit	FAC
Phyllanthus caroliniensis	leaf-flower, Carolina	FACW
Phyllanthus liebmannianus	leaf-flower, Florida	FACW
Phyllanthus urinaria	leaf-flower, water	FAC
Physostegia godfreyi	dragon-head, Godfrey's	OBL
Physostegia leptophylla	dragon-head, slender-leaf	OBL
Physostegia purpurea	dragon-head, purple	FACW
Physostegia virginiana	dragon-head, false	FACW
Pieris phillyreifolia	fetter-bush, climbing	FACW
Pilea spp.	clearweed	FACW
Pinckneya bracteata (*P. pubens*)	fever-tree	OBL
Pinguicula spp.	butterwort	OBL
Pinus glabra	pine, spruce	FACW
Pinus serotina	pine, pond	FACW
Piriqueta caroliniana	piriqueta	FAC
Pisonia rotundata	pisonia	FAC - Keys only
Pithecellobium keyense	blackbead	FAC - Keys only

Botanical Name	Common Name	Wetland Status
Pithecellobium unguis-cati	catclaw	FAC - Keys only
Planera aquatica	planer tree	OBL
Platanthera spp.	orchid, fringed	OBL
Platanus occidentalis	sycamore	FACW
Pleea tenuifolia	rush-featherling	OBL
Pluchea spp.	camphor-weed	FACW
Pogonia ophioglossoides	pogonia, rose	OBL
Polygala cymosa	milkwort, tall	OBL
Polygala leptostachys	milkwort, sandhill	U
Polygala lewtonii	milkwort, scrub	U
Polygala polygama	milkwort, racemed	U
Polygala spp.	milkwort	FACW
Polygala verticillata	milkwort, whorled	U
Polygonum argyrocoleon	smartweed, silversheath	U
Polygonum spp.	smartweed	OBL
Polygonum virginianum	jumpseed	FACW
Polypogon spp.	grass, rabbit-foot	FAC
Polypremum procumbens	rustweed	FAC
Pontederia cordata	pickerelweed	OBL
Ponthieva racemosa	shadow-witch	FACW
Populus deltoides	cottonwood, eastern	FACW
Populus heterophylla	cottonwood, swamp	OBL
Proserpinaca spp.	mermaid-weed	OBL
Psidium cattleianun	guava, strawberry	FAC
Psilocarya spp.	baldrush	OBL
Psychotria spp.	wild coffee	FAC
Pteris tripartita	brake, giant	FACW
Ptilimnium capillaceum	mock bishop-weed	FACW
Pycnanthemum nudum	mountain-mint, coastal-plain	FACW
Quercus laurifolia	oak, laurel	FACW
Quercus lyrata	oak, overcup	OBL
Quercus michauxii	oak, swamp chestnut	FACW
Quercus nigra	oak, water	FACW
Quercus pagoda	oak, cherry-bark	FACW
Quercus phellos	oak, willow	FACW
Randia aculeata	box briar	FAC - Keys only
Ranunculus spp.	butter-cup	FACW
Reimarochloa oligostachya	grass, Florida reimar	FACW
Reynosia septentrionalis	darling plum	FAC - Keys only
Rhapidophyllum hystrix	palm, needle	FACW
Rhexia parviflora	meadow-beauty, white	OBL
Rhexia salicifolia	meadow-beauty, panhandle	OBL
Rhexia spp.	meadow-beauty	FACW
Rhizophora mangle	mangrove, red	OBL
Rhododendron viscosum	azalea, swamp	FACW
Rhodomyrtus tomentosus	downy rose myrtle	FAC
Rhynchospora cephalantha	beakrush, clustered	OBL

Botanical Name	Common Name	Wetland Status
Rhynchospora chapmanii	beakrush, Chapman's	OBL
Rhynchospora corniculata	beakrush, short-bristle	OBL
Rhynchospora decurrens	beakrush, swamp-forest	OBL
Rhynchospora divergens	beakrush, spreading	OBL
Rhynchospora grayi	beakrush, Gray's	U
Rhynchospora harperi	beakrush, Harper's	OBL
Rhynchospora intermedia	beakrush, pinebarren	U
Rhynchospora inundata	beakrush, horned	OBL
Rhynchospora macra	beakrush, large	OBL
Rhynchospora megalocarpa	beakrush, giant-fruited	U
Rhynchospora microcarpa	beakrush, southern	OBL
Rhynchospora miliacea	beakrush, millet	OBL
Rhynchospora mixta	beakrush, mingled	OBL
Rhynchospora oligantha	beakrush, few-flower	OBL
Rhynchospora spp.	beakrush	FACW
Rhynchospora stenophylla	beakrush, Chapman's	OBL
Rhynchospora tracyi	beakrush, Tracy's	OBL
Rorippa spp.	yellow-cress	OBL
Rosa palustris	rose, swamp	OBL
Rotala ramosior	toothcup	OBL
Roystonea spp.	palm, royal	FACW
Rubus spp.	blackberries	FAC
Rudbeckia fulgida	coneflower, orange	FACW
Rudbeckia graminifolia	coneflower, grass-leaf	FACW
Rudbeckia laciniata	coneflower, cut-leaf	FACW
Rudbeckia mohrii	coneflower, Mohr's	OBL
Rudbeckia nitida	coneflower, shiny	FACW
Ruellia brittoniana	wild-petunia, Britton's	FAC
Ruellia caroliniensis	wild-petunia	FAC
Ruellia noctiflora	wild-petunia, night-flowering	FACW
Rumex spp.	dock	FACW
Sabal minor	palmetto, dwarf	FACW
Sabal palmetto	palm, cabbage	FAC
Sabatia bartramii	rose-gentian, Bartram's	OBL
Sabatia calycina	rose-gentian, coast	OBL
Sabatia dodecandra	rose-gentian, large	OBL
Sabatia spp.	rose-gentian	FACW
Sacciolepis indica	grass, glenwood	FAC
Sacciolepis striata	cupscale, American	OBL
Sachsia polycephala	sachsia	FACW
Sagittaria spp.	arrowhead	OBL
Salicornia spp.	glasswort	OBL
Salix spp.	willow	OBL
Sambucus canadensis	elderberry	FAC
Samolus spp.	pimpernel, water	OBL
Sapium sebiferum	tallow-tree, Chinese	FAC
Sarracenia minor	pitcher-plant, hooded	FACW

Botanical Name	**Common Name**	**Wetland Status**
Sarracenia spp.	pitcher-plant	OBL
Saururus cernuus	lizard's tail	OBL
Schinus terebinthifolius	pepper-tree, Brazilian	FAC
Schizachyrium spp.	bluestem	FAC
Schoenolirion croceum	sunny bells	FACW
Schoenolirion elliottii	sunny bells	FACW
Schoenus nigricans	black-sedge	FACW
Scirpus spp.	bulrush	OBL
Scleria spp.	nutrush	FACW
Sclerolepis uniflora	hardscale, one-flower	FACW
Scoparia dulcis	sweet broom	FAC
Scutellaria floridana	skullcap	FAC
Scutellaria integrifolia	skullcap, rough	FAC
Scutellaria lateriflora	skullcap, blue	OBL
Scutellaria racemosa	skullcap	OBL
Sebastiana fruticosa	sebastian-bush, gulf	FAC
Selaginella apoda	spike-moss, meadow	FACW
Senecio aureus	ragwort, golden	OBL
Senecio glabellus	butterweed	OBL
Sesbania spp.	rattle-bush	FAC
Sesuvium spp.	sea-purslane	FACW
Setaria geniculata	grass, bristle	FAC
Setaria magna	foxtail	OBL
Seymeria cassioides	black senna	FAC
Sisyrinchium atlanticum	blue-eye-grass, eastern	FACW
Sisyrinchium capillare	blue-eye-grass	FACW
Sisyrinchium mucronatum	blue-eye-grass, Michaux's	FACW
Sium suave	water-parsnip	OBL
Solanum bahamense	canker-berry	FACW
Solanum erianthum	nightshade, shrub	FACW
Solidago elliottii	golden-rod, Elliott's	OBL
Solidago fistulosa	golden-rod, marsh	FACW
Solidago leavenworthii	golden-rod, leavenworth's	FACW
Solidago patula	golden-rod, rough-leaf	OBL
Solidago rugosa	golden-rod, wrinkled	FAC
Solidago sempervirens	golden-rod, seaside	FACW
Solidago stricta	golden-rod, willow-leaf	FACW
Sophora tomentosa	coast sophora	FACW
Sparganium americanum	burreed	OBL
Spartina alterniflora	cordgrass, saltmarsh	OBL
Spartina bakeri	cordgrass, sand	FACW
Spartina cynosuroides	cordgrass, big	OBL
Spartina patens	cordgrass, saltmeadow	FACW
Spartina spartinae	cordgrass, gulf	OBL
Spergularia marina	sandspurry, saltmarsh	OBL
Spermacoce glabra	button-plant, smooth	FACW
Sphagnum spp.	sphagnum moss	OBL

Botanical Name	Common Name	Wetland Status
Sphenoclea zeylandica	chicken-spike	FACW
Sphenopholis pennsylvanica	wedgescale, swamp	OBL
Sphenostigma coelestinum	ixia, Bartram's	FACW
Spigelia loganioides	pink-root	FACW
Spilanthes americana	spotflower, creeping	FACW
Spiranthes spp.	ladies'-tresses	FACW
Sporobolus floridanus	dropseed, Florida	FACW
Sporobolus virginicus	dropseed, seashore	OBL
Stachys lythroides	hedgenettle	OBL
Staphylea trifolia	bladdernut, American	FACW
Stenandrium floridanum	stenandrium	FACW
Stenanthium gramineum	feather-bells, eastern	FACW
Stillingia aquatica	corkwood	OBL
Stillingia sylvatica var. *tenuis*	queen's-delight, marsh	FAC
Stipa avenacioides	grass, Florida needle	FACW
Stokesia laevis	stokesia	FACW
Strumpfia maritima	strumpfia	FACW - Keys only
Styrax americana	snowbell; storax	OBL
Suaeda spp.	sea-blite	OBL
Suriana maritima	bay-cedar	FAC
Syngonanthus flavidulus	bantam-buttons	FACW
Syzygium spp.	Java plum	FAC
Taxodium ascendens	cypress, pond	OBL
Taxodium distichum	cypress, bald	OBL
Teucrium canadense	germander, American	FACW
Thalia geniculata	thalia; fire flag	OBL
Thalictrum spp.	meadow-rue	FACW
Thelypteris spp.	shield fern	FACW
Thespesia populnea	seaside mahoe	FAC
Thrinax radiata	Florida thatch palm	FAC - Keys only
Tilia americana	American basswood	FACW
Tofieldia racemosa	false-asphodel, coastal	OBL
Toxicodendron vernix	poison sumac	FACW
Trachelospermum difforme	climbing-dogbane	FACW
Tradescantia fluminensis	trailing spiderwort	FAC
Trema spp.	trema	FAC
Trepocarpus aethusae	trepocarpus, aethusa-like	FACW
Triadenum spp.	St. John's-wort, marsh	OBL
Trianthema portulacastrum	horse-purslane	FACW
Tridens ambiguus	tridens, savannah	FACW
Tridens strictus	tridens, long-spike	FACW
Triglochin striata	arrow-grass	OBL
Triphora spp.	pogonias, nodding	FACW
Tripsacum dactyloides	grass, eastern gama	FAC
Typha spp.	cattail	OBL
Ulmus rubra	elm, slippery	U
Ulmus spp.	elm	FACW

Botanical Name	**Common Name**	**Wetland Status**
Urechites lutea	allamanda, wild	FACW
Utricularia spp.	bladderwort	OBL
Uvularia floridana	bellwort, Florida	FACW
Vaccinium corymbosum	blueberry, highbush	FACW
Vaccinium elliottii	blueberry, Elliott	FAC
Verbena scabra	vervain, sandpaper	FACW
Verbesina chapmanii	crownbeard, Chapman's	FACW
Verbesina heterophylla	crownbeard, diverse-leaf	FACW
Verbesina virginica	crownbeard, white	FAC
Vernonia angustifolia	ironweed, narrow-leaf	U
Vernonia spp.	ironweed	FACW
Veronica anagallis-aquatica	speedwell, water	OBL
Veronicastrum virginicum	culver's-root	FACW
Viburnum dentatum	arrow-wood	FACW
Viburnum nudum	viburnum, possum-haw	FACW
Viburnum obovatum	viburnum, walter	FACW
Vicia acutifolia	vetch, four-leaf	FACW
Vicia floridana	vetch, Florida	FACW
Vicia ocalensis	vetch, Ocala	OBL
Viola affinis	violet, Leconte's	FACW
Viola esculenta	violet, edible	FACW
Viola lanceolata	violet, lance-leaf	OBL
Viola primulifolia	violet, primrose-leaf	FACW
Websteria confervoides	water-meal	OBL
Wedelia trilobata	creeping ox-eye	FAC
Woodwardia aereolata	chainfern	OBL
Woodwardia virginica	chainfern	FACW
Xanthorhiza simplicissima	yellow-root, shrubby	FACW
Xanthosoma sagittifolium	elephant ear	FACW
Xyris caroliniana	yellow-eyed grass, Carolina	FACW
Xyris jupicai	yellow-eyed grass, tropical	FACW
Xyris spp.	yellow-eyed grass	OBL
Yeatesia viridiflora	yeatesia, green-flower	FACW
Zephyranthes atamasco	lily, atamasco	FACW
Zigadenus densus	crow poison	FACW
Zigadenus glaberrimus	deathcamas, atlantic	FACW
Zizania aquatica	wildrice	OBL
Zizaniopsis miliacea	wildrice, southern	OBL

Agency Addresses

State of Florida

FDEP

Florida Department of Environmental Protection
Wetland Evaluation and Delineation Section
Division of Environmental Resource Permitting
2600 Blair Stone Rd
Tallahassee, FL 32399-2400
(904) 921-2992

STATE PARKS

Jonathan Dickinson State Park
16450 Southeast Federal Highway
Hobe Sound, FL 33455
(407) 744-9814

St. George Island State Park
H.C.R. Box 62
St. George Island, FL 32328
(904) 927-2111

Talbot Islands GEOpark
11435 Ft. George Road East
Fort George, FL 32226
(904) 251-2323

WILDLIFE MANAGEMENT AREA

Cecil Webb Wildlife Management Area
c/o Florida Game and Fresh Water Fish Commission
3900 Drane Field Road
Lakeland, FL 33811
(941) 638-1531 Cecil Webb Wildlife Management Area office
(941) 648-3205 Lakeland office

Water Management Districts

Northwest Florida Water Management District
Route 1 Box 3100
Havana, FL 32333
(904) 539-5999

St. Johns River Water Management District
P. O. Box 1429
Palatka, FL 32178-1429
(904) 329-4500

South Florida Water Management District
Natural Resource Management Division
P. O. Box 24680
3301 Gun Club Road
West Palm Beach, FL 33416
(407) 686-8800

Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34609-6899
(904) 796-7211

Suwannee River Water Management District
US 90 & Hwy 49
Route 3 Box 64
Live Oak, FL 32060
(904) 362-1001

National Parks - Refuge

National Key Deer Refuge
P. O. Box 430510
Big Pine Key, FL 33043-0510
(305) 872-2239

Naval Live Oaks Area
National Seashore
1801 Gulf Breeze Parkway
Gulf Breeze, FL 32561
(904) 934-2600

St. Marks National Wildlife Refuge
P. O. Box 68
St. Marks, FL 22355
(904) 925-6121

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DEPARTMENT OF ENVIRONMENTAL PROTECTION
FLORIDA

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
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