12.10 FWC Apiary Policy

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

Apiary Policy

Division of Habitat and Species Conservation

Issued by:
Terrestrial Habitat Conservation and Restoration Section
9/1/2010

Enclosed is the HSC/THCR Apiary Policy for all Florida Fish and Wildlife Conservation Commission's Wildlife Management Areas and Wildlife and Environmental Areas.

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DIVISION OF HABITAT AND SPECIES CONSERVATION POLICY

Issued September 2010

SUBJECT: APIARY SITES ON FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION WILDLIFE MANAGEMENT AREAS AND WILDLIFE AND ENVIRONMENTAL AREAS

STATEMENT OF PURPOSE: It is the intent of this policy to determine which Florida Fish and Wildlife Conservation Commission (FWC) Wildlife Management Areas or Wildlife and Environmental Areas (WMA/WEA) may have apiary sites, and provides direction on site location, management and administration of said apiaries.

Definitions

Apiary – A place where bees and beehives are kept, especially a place where bees are raised for their honey.

Apiary Site – An area set aside on a WMA/WEA for the purpose of allowing a beekeeper to locate beehives in exchange for a fee as established by contract between the beekeeper and FWC.

Apiary Wait List – An apiary wait list will be maintained by the Terrestrial Habitat Conservation and Restoration (THCR) Section Leader's Office based on applications received from interested beekeepers. Only qualified apiarists will be added to the list. To become qualified the new apiarist must submit an application form and meet the criteria below under the section titled "Apiary Wait List and Apiary Application."

Beekeeper/Apiarist – A person who keeps honey bees for the purposes of securing commodities such as honey, beeswax, pollen; pollinating fruits and vegetables; raising queens and bees for sale to other farmers and/or for purposes satisfying natural scientific curiosity.

Best Management Practices – The Florida Department of Agriculture & Consumer Services (FDACS; Division of Plant Industry (DPI), Apiary Inspection Section, P.O. Box 147100, Gainesville, FL 332614-1416) provides Best Management Practices (BMP) for maintaining European Honey Bee colonies and FWC expects apiarists to follow the BMP.

Hive/Colony – Means any Langstroth-type structure with movable frames intended for the housing of a bee colony. A hive typically consists of a high body hive box with cover, honey frames, brood chambers and a bottom board and may have smaller super hive boxes stacked on top for the excess honey storage. A hive/colony includes one queen, bees, combs, honey, pollen and brood and may have additional supers stacked on top of a high body hive box.

Establishment of Apiary Sites on WMA/WEA

During the development of an individual WMA/WEA Management Plan, apiaries will be considered under the multiple-use concept as a possible use to be allowed on the area. "Approved" uses are deemed to be in concert with the purposes for state acquisition, with the Conceptual State Lands Management Plan, and with the FWC agency mission, goals, and objectives as expressed in the agency strategic plan and priorities documents. Items to consider when making this determination can also include:

- Were apiaries present on the area prior to acquisition?
- Are there suitable available sites on the WMA/WEA?
- Will the apiary assist in pollination of an onsite FWC or offsite (adjacent landowner) citrus grove or other agricultural operation?

For those WMA/WEAs that have not considered apiaries in their Management Plan, upon approval of this policy Regional Staff will work with the Conservation Acquisition and Planning (CAP) staff and THCR Section leadership to determine if apiaries are an approved use on the area. If apiaries are considered an approved use then a request will be made to the Division of State Lands to allow this use as part of an amended Management Plan. This request will be made through the THCR's Section Leader's office and coordinated by the CAP.

Determination of apiary site locations on WMA/WEAs should be done using the following guidelines:

- Apiary sites should be situated so as to be at least one-half mile from WMA/WEA property boundary lines, and at least one mile from any other known apiary site. Exceptions to this requirement must be reviewed by the Area Biologist and presented to the THCR Section Leader for approval.

- Site should be relatively level, fairly dry, and not be prone to flooding when bees would normally be present.

- Site should be accessible by roads which allow reasonable transfer of hives to the site by vehicle.

- If a site is to be located near human activity, such as, an agricultural field, food plot, wildlife opening, campsites, etc., or if the site may be manipulated by machinery at a time when bees would be present, then the apiary site should be located at a minimum of 150 to 200 yards from the edge of that activity. This will ensure minimal disturbance to the bees and minimize incidents with anyone working in the area.

- It is preferable to have apiary sites located adjacent to or off roads whenever possible. If traditional apiary sites were located on roads and the Area Biologist determines that the site will not impact use of the road by visitors then it will be allowed.

- FWC Area Biologist shall select apiary site(s) and the site(s) selected should not require excessive vegetation clearing (numerous large trees, dense shrubs) or ground disturbance (including fill).

WMA/WEA Staff Responsibilities

Area Biologist on WMAs/WEAs with approved apiary sites will forward a GIS shapefile depicting all the apiary site polygon(s), including a name or number with coordinates for each apiary site, to the THCR Contract Manager.

Area Biologist will monitor each apiary site no less than once a year to determine if the beekeeper is abiding by the contract requirements. If violations are noted, staff should bring them to the attention of the beekeeper for correction. If violations continue staff should notify the THCR Contract Manager who will determine if or what additional action is warranted.

Area Biologist will establish and maintain firelines around the apiary site to ensure the apiary site is ready when a planned burn is scheduled.

Area Biologist will advise the beekeeper of burn plans, road work, gate closures, or other site conditions and management activities that may affect the beekeeper's ability to manage or access the apiary site.

Area Biologist is not responsible to ensure access roads are in condition suitable for beekeepers to access their hives with anything other than a four wheeled drive vehicle. (The site of the apiary may be high and dry, but the roads accessing them may be difficult to impossible to get a two wheeled drive vehicle into during extreme weather, e.g., heavy rainfall events.)

Apiary Wait List and Apiary Application

An electronic waiting list for apiary sites will be maintained by the THCR's Contract Manager for each WMA/WEA. To be placed on the waiting list an interested beekeeper must submit an apiary application form to the contract manager (See Enclosed Application Form). Each applicant will be considered based on the following criteria:

- Proof of a valid registration with the FDACS/DPI.
- Proof of payment of outstanding special inspection fees for existing sites.
- A validated history of being an apiary manager.
- Three references that can attest to the applicant's beekeeping experience.

If an apiary site is becomes available on a WMA/WEA and there are beekeepers on the waiting list interested in that particular area, those individuals meeting the criteria above will be given preference. If there is more than one beekeeper meeting the criteria with their name on the list then a random drawing will be held by the THCR Contract Manager to determine who will receive the site. Beekeepers on the waiting list will be notified in writing of the random drawing's date/location and will be invited to attend. The individual's name selected during this drawing will be awarded the contract.

Apiary agreements are non-transferable. Each agreement serves as a contract between a specific individual or company and FWC, and the rights and responsibilities covered by an individual agreement cannot be transferred.

Contracts

Apiary contracts are for five (5) years and renewals are contingent upon a satisfactory performance evaluation by Area Biologist and concurrence of the THCR Section Leader. Approval is based on apiarist performance, adherence to rules and regulations and general cooperation. If an Area Biologist decides an apiarist whose contract is expiring is unacceptable he may recommend not approving the new contract. If this transpires then the wait list process using random selection will be used. If there is no apiarist on a current wait list then the apiarists who are in good standing with existing contracts will be notified to see if any want to be put on the wait list for the drawing. If none are interested then the site will be put on hold pending a valid request.

Pricing of Apiary Site(s)

Cost of each apiary site will be $40 annually which will include up to 50 beehives. Additional beehives will be charged at the rate of $40 per 50 beehives.

Pricing examples:

- A beekeeper is leasing 2 apiary sites with up to 100 beehives - the fee per year is $80.
- A beekeeper is leasing 3 apiary sites with up to 200 beehives - the fee per year is $160.

Note: The maximum number of hives/colonies allowed on an apiary site will be at the discretion of the apiarist. However, the apiarist is strongly recommended to follow the BMP as recommended by the FDACS/DPI. In addition to providing the BMP, FDACS/DPI's management has recommended 50 hives per site in pineland communities and no more than 100 hives per site in areas with bountiful resources. However, FWC will not dictate the number of hives on a site unless they create land management issues.

Bear Depredation Control at Apiary Site(s)

Beekeepers are required to consult with the WMA/WEA Area Biologist to see if electric fencing is required for their apiary sites. If the Area Biologist requires electric fencing then the

Beekeeper shall construct and maintain electric fences for each apiary site. Numerous electric fence designs have been used to varying success and FWC as a courtesy provides an electric fence technical information bulletin with each Agreement. This bulletin is attached in order to assist the Beekeeper and/or provide a design that has been proven to be reasonable effective.

SUBJECT MATTER REFERENCES

Apiary Inspection Law - Chapter 586, Florida Statutes (see http://www.leg.state.fl.us/Statutes/), Rule Chapter 5B-54, Florida Administrative Code (see www.flrules.org).

The Board of Trustees of the Internal Improvement Trust Fund – Recommended Apiary Agreement Guidelines For Apiaries & Revisions to an Agreement for Apiary Activities on State Lands on September 23, 1986
S:\HSC\THCR\APIARY.BACKUP.POLICY\dlissupport@dos.state.fl.us_20100903_111446.pdf

Senate Resolution 580, September 21, 2006: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:sr580ats.txt.pdf

Attachments

Sample Apiary Agreement W/Attachments (Map Placeholder & Electric Fence Bulletin)

Sample Apiary Site Application Form W/Mission Statement

Best Management Practices for Maintaining European Honey Bee Colonies

Sample of Random Selection Process Procedure

APPROVED:

____

Division Director or Designee

DATE: ____________________________

APIARY AGREEMENT

AGREEMENT FOR APIARY ACTIVITIES ON STATE LANDS

THIS AGREEMENT is made by and between the Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Tallahassee, FL 32399-1600, hereinafter known as "the COMMISSION," and (Insert Name and Address of Apiarist Here), telephone number (Insert Phone Number of Apiarist Here), hereinafter known as "the USER."

WITNESSETH

In consideration of the mutual promises to be kept by each and the payments to be made by the USER, the parties agree as follows:

1. TERM: This Agreement will begin (Insert date here) or the date signed by both parties, whichever is later, and will end five (5) years from the date of execution. Issuance of a new five (5) year Agreement is contingent upon satisfactory performance evaluation by the Area Biologist and approval of the THCR Section Leader.

2. The COMMISSION Agrees:

   a. To provide apiary sites on state lands, which will be identified by the COMMISSION staff and located on the property identified in (4)(f) below.

   b. To provide technical assistance for bear-proofing, if required by Area Biologist, of sites made available under this Agreement.

   c. To allow the USER to place a total number of (insert number of hive boxes here) hive boxes on the COMMISSION-managed property at the apiary site(s).

3. The USER Agrees:

   a. To pay (Insert Total Dollars Here) on or before the execution date of this Agreement and each year thereafter on or before anniversary date of the original contract execution date, with check or money order payable to the Florida Fish and Wildlife Conservation Commission. All payments shall be remitted to The Florida Fish and Wildlife Conservation Commission, Finance and Budgeting, Accounting Section, PO Box 6150, Tallahassee, FL 32399-6150, and a copy of the check to The Florida Fish and Wildlife Conservation Commission, Terrestrial Habit Conservation and Restoration Section, Attn: Section Leader, 620 South Meridian Street, Tallahassee, Florida 32399-1600.

b. To have no more than (Insert Number of Hive boxes here) hive boxes on the property at one time.

c. To comply with the Florida Honey Certification and Honeybee Law, Chapter 586, Florida Statutes, and Rule 5B-54, Florida Administrative Code, and all other applicable federal, state, or local laws, rules or ordinances.

d. To not damage, cut or remove any trees in the course of preparing for or conducting operations under this Agreement.

e. To repair within 30 days of occurrence any damage to roads, trails, fences, bridges, ditches, or other public property caused by USER'S operations under this Agreement based on discretion of the COMMISSION to ensure the WMA/WEA management goals are met. All repairs will be coordinated with the Area Biologist to ensure management goals are met. If USER does not comply within the 30 day requirement, then the COMMISSION may use a third party to perform the repairs and charge the USER accordingly.

f. To report any forest fires observed and to prevent forest fires during the course of operations under this Agreement.

g. To abide by all WMA/WEA rules and regulations in addition to items in this Agreement.

h. To notify the Area Biologist within 24 hours when a bear depredation event occurs.

i. To post their name in an agreed upon location at each site covered by this Agreement or otherwise use an identifying system that is approved by the Area Biologist.

j. To furnish proof of general liability insurance prior to starting apiary activities on state property or within 30 days of execution of this Agreement, whichever is earlier, and proof of annual renewal of the general liability insurance policy prior to or upon expiration date of the policy. The USER shall maintain continuous general liability insurance throughout the term of this Agreement for no less than $300,000 for bodily injury and $100,000 for property damage for each occurrence. Such a policy shall name the COMMISSION as the Certificate Holder. The USER's current certificate of insurance shall contain a provision that the insurance will not be canceled for any reason during the term of this Agreement except after thirty (30) days written notice to the COMMISSION.

k. To be liable for all damage to persons or property resulting from operations under this Agreement, and to release, acquit, indemnify, save and hold harmless the COMMISSION, its officers, agents, employees and representatives from any and all claims, losses, damages, injuries and liabilities whatsoever, whether for personal injury or otherwise, resulting from, arising out of or in any way connected with activities under this Agreement or activities occurring from any other source not under this Agreement and the USER further agrees to assume all risks of loss and liabilities incidental to any natural or artificial condition occurring on state lands cover by this Agreement.

l. To construct and maintain electric fences, if required by the Area Biologist at the Area Biologist's discretion, to provide protection of apiaries from black bear depredation consistent with the technical information bulletin attached to this agreement, and, if so required, to maintain an open buffer around the fencing of five (5) feet or more. (See Attachment 1)

m. To remove all personal property from the site within thirty (30) days of termination or expiration of this Agreement. The USER understands that after this time, all the USER'S personal property remaining on the WMA/WEA shall be deemed abandoned and become the property of the COMMISSION, which will be utilized or disposed of at the sole discretion of the COMMISSION, and that reasonable storage and/or disposal fees and/or costs may be charged to the USER.

4. The parties mutually agree:

a. This Agreement is not transferable.

b. The USER's failure to submit payment by the due date established herein may result in cancellation of the Agreement by the COMMISSION.

c. The USER's failure to submit proof of general liability insurance or proof of annual renewal in compliance with (3) (j) above may result in cancellation of this Agreement by the COMMISSION.

d. This Agreement shall be in effect for a period of five (5) years and issuance of a new agreement will be contingent upon a satisfactory performance evaluation and approval of the Area Biologist and THCR Section Leader.

e. Each apiary site shall be situated so as to be at least one-half (1/2) mile inward from state property lines and there shall be at least one (1) mile separation between sites. Exceptions to this rule must be reviewed by Area Biologist presented to and approved by the Terrestrial Habitat Conservation and Restoration Section Leader.

f. The property covered by this Agreement is described as follows: That the property sites (Insert Area Name) Wildlife Management Area are represented by Attachment 2.

g. In accordance with Section 287.134, Florida Statutes, an entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid, proposal or reply on a contract to provide goods or services to any public entity; may not submit a bid, proposal or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant with any public entity; and may not transact business with a public entity.

h. As part of the consideration of this Agreement, the parties hereby waive trial by jury in action brought by either party pertaining to any matter whatsoever arising out of or in any way connected with this Agreement. Exclusive venue for all judicial actions pertaining to this Agreement is in Leon County, Florida.

i. This Agreement may be terminated by the COMMISSION upon thirty (30) days written notice to the USER in the event the continuation of the apiary activities are found to be incompatible with the COMMISSION'S management plans or for any other reason at the sole discretion of the COMMISSION.

This Area Intentionally Left Blank

IN WITNESS WHEREOF, the parties have executed this Agreement on the day and year last below written.

________________________________	FLORIDA FISH AND WILDLIFE
USER SIGNATURE	CONSERVATION COMMISSION
Date: ____________________________	____________________________
________________________________	Mike Brooks, Section Leader Terrestrial Habitat Conservation and Restoration
Witness	
________________________________	Date: ______________________
Witness	
	Approved as to form and legality
	____________________________
	Commission Attorney
	Date: ______________________

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AGREEMENT
ATTACHMENT 1

Use of Electric Fencing to Exclude Bears And Prevent Property Damage

Florida Fish and Wildlife Conservation Commission
Technical Information Bulletin (2001)

Electric fencing has proven effective in deterring bears from entering landfills, apiaries (beehives), livestock pens, gardens, orchards, and other high-value properties. Numerous electrical fence designs have been used with varying degrees of success. Design, quality of construction, and proper maintenance determine the effectiveness of an electric fence. The purpose of this technical bulletin is to assist the property owner in understanding and implementing electrical fencing as a tool to exclude and prevent damage caused by black bears.

Understanding Electric Fencing

Electric fencing provides an electrical shock when an animal comes into contact with the electrically charged wires of the fence. People unfamiliar with electric fencing often are afraid that it will injure, permanently damage, or kill an individual or pet that contacts the fence. **This is not true!** A properly constructed electric fence is safe to people, pets, and bears.

Components of Electric Fencing

An electric fence is composed of four main elements: a charger, fence posts, wire, and the ground rod.

Fence Charger. On a small scale electric fence (like that typically needed for bear exclusion), the largest cost is normally the fence charger. A fence charger's job is to send an electrical pulse into the wire of the fence. Contrary to popular belief, there is not a continuous charge of electricity running through the fence. Instead the charger emits a short pulse or burst of electricity through the fence. The intensity and duration of the electrical pulse varies with the type of charger or controller unit. Chargers with a high-voltage, short duration burst capacity are the best because they are harder to ground out by tall grass and weeds. These types are also the safest, because, even though the voltage is high (5 kilovolts) the duration of the burst is very short (2/10,000 of a second) (FitzGerald, 1984).

Two basic energy sources for chargers are batteries (12-volt automotive type) and household current (110 volt). Battery-type chargers are typically cheaper to purchase but require more maintenance because of the necessity of charging the battery. The advantage of a battery powered charger is that it can be used in a remote location where 110-volt current is not available. Most units that are powered by a fully charged 12-volt deep-cycle batteries can last three weeks before needing a charge. Addition of a solar trickle charger will help prolong the duration of effective charge in 12-volt batteries.

Fence Posts. On small scale fences, the posts are normally the second largest expense involved in construction. Therefore, when planning an electric fence it is a good idea to utilize existing fencing in order to save money. If no existing fence is available, posts will need to be placed around the area needing protection. Posts may be wood, metal, plastic, or fiberglass. Wood and metal posts will need to have plastic insulators attached to them which prevent the electric wire from touching the post causing it to ground out. Plastic and fiberglass posts do not need insulators, the wire may be affixed directly to these posts. Wood and metal posts are typically more expensive and require the added expense of insulators, however, they are more durable and generally require less maintenance.

Wire. Fourteen to seventeen gauge wire is the most common size range used in electric fencing. Heavier wire (a lower gauge number) is more expensive but carries current with less resistance and is more durable (FitzGerald, 1984).

The two most common types of wire are galvanized and aluminum. Galvanized wire is simply a steel wire with a zinc coating to prevent rust, which makes the wire last longer. Some wire is more galvanized than others. The degree or amount of zinc coating that is around the core steel wire is measured in three classes. A class I galvanization means the wire has a thinner coating of zinc than a class II galvanization. Class III galvanized wire has the heaviest zinc coating and will last longer than the class I and class II wire (FitzGerald, 1984). In general, the cost of galvanized wire increases as the class or amount of galvanization increases.

Aluminum wire is typically more expensive than the galvanized wire. Some advantages of aluminum wire are: it will not rust, it conducts electricity four times better, and it weighs one-third less than steel wire.

The Ground Rod. The ground is an often overlooked, but critical part of an electric fence. Without a good ground, electricity will not flow through the wire. When an animal touches a charged wire, the body of the animal completes the electrical circuit and the animal feels the “shock”. The current must travel from the charger through the wire to the animal and then back through the ground to the charger if the animal is to feel the shock. The soil acts as the return “wire” (ground) in the circuit. However, if a

bird was to land on a charged wire without touching the soil the bird would not complete the circuit and would be unaffected (FitzGerald, 1984). Some fence configurations use actual grounded wires within the fence to enhance the grounding system.
The ground may be a commercial ground rod or a copper tube or pipe driven six to eight feet in moist soil. Copper is expensive, so a copper coated steel pipe or any other good conducting metal pipe will work also. Very dry soil can effect the ability to create a good ground and has sometimes been a problem during drought conditions. Pipe may be a better choice than a solid rod during drought conditions, because water may be poured down the ground pipe to improve the ground. Some fence configurations use wires as the grounding system, rather than relying solely on the soil as a ground.

Recommended Electric Fence to Deter Black Bears

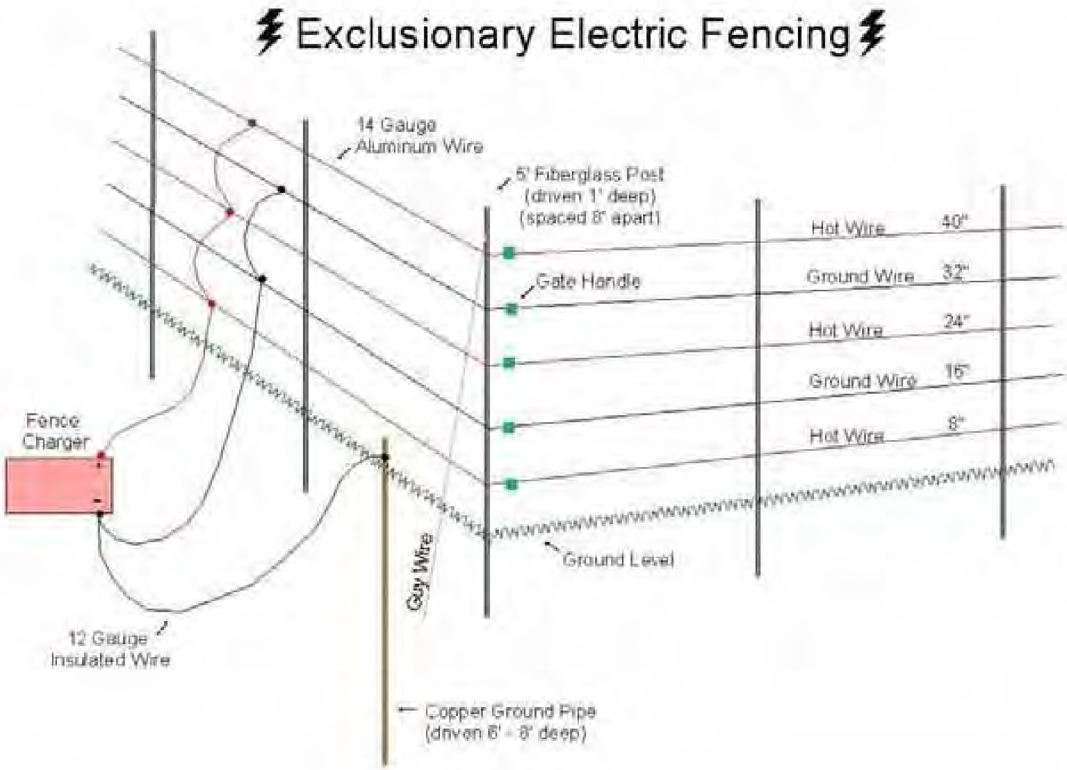
Conditions at fence sites will vary and will determine what the most effective fence configuration will be. Commission biologists welcome the opportunity to visit sites and provide custom tailored advice on constructing an effective electric fence. The following recommendation will cover most situations with low to moderate pressure from black bears. Use a five strand aluminum wire fence that is 40 inches high with wire spacing every eight inches apart using the previously mentioned wired grounding system (see Figure 1). The wire closest to the ground level (the lowest wire) should be a charged or “hot” wire. The second wire should be grounded. The third wire should be hot. The fourth wire should be grounded and the fifth wire should be hot. If using metal or wood posts, insulators must be used to keep the hot wires from grounding out. The cost of this type of electric fence utilizing fiberglass posts and a 110 volt fence charger is approximately $200 for a 40' x 40' area (160 linear feet of fence).

Materials:
1 - 1, 312 foot roll (1/4 mile) 14 gauge aluminum electric fence wire
1 - 50 foot roll 12 gauge insulated wire
20 - 5 foot 5/8 inch dia fiberglass fence posts
5 - plastic gate handles
1 - 110 volt fence charger
1 - 10 foot ground pipe
4 - plastic electric fence signs

Installation. These instructions are for a square shape fence exclusion, but the process would be very similar for other applications. Drive 4 corner posts 1-foot deep into ground and stake with guy wires. Clip, rake, and keep clear any vegetation in a 15-inch wide strip under the fence and apply herbicide. Attach and stretch the aluminum wire at 8-inch increments starting 8 inches from ground level. A loop of wire should be left on each wire at the first corner post. Once the wire has been stretched around the outside of all the corner posts back to the first post a plastic gate handle should be attached to each wire and the gate handles should be attached to each corresponding loop on the first corner post. Drive in the remaining 16 posts to the same depth at 8-foot intervals between corner posts. Secure each of the five wires to each of the posts with additional wire. Attach four plastic electric fence signs (one on each side) to the top wire of the fence. Attach a 12-gauge strand of insulated wire to the positive terminal of the fence charger and attach it to the first, third, and fifth wires of the fence. Attach another 12 gauge insulated wire to the negative terminal of the charger and attach this wire to the ground pipe which has been driven into the ground 6 to 8-feet deep. Attach another 12 gauge insulated wire from the negative terminal of the charger to the second and fourth wires on the fence. Plug the charger into a 110 volt power supply and the fence is in operation.

Tips to improve the effectiveness of your electric fence to deter black bears:

1. If using a 12-volt fence charger, ensure that the battery is charged; check every two weeks.
2. Make sure terminals on the charger and battery are free of corrosion.
3. Make sure hot wires are not being grounded out by tall weeds, fallen tree branches, broken insulators, etc.
4. If fence wires have been broken and repaired, make sure wires are corrosion free where they have been spliced together. Also, tighten the fence at each corner post as wires that have been spliced and are loose make poor connections.
5. Be sure to rake vegetation from under and around the outside of the fence as this may act as an insulator.
6. To improve the ground around the perimeter of the fence add a piece of 24 inch chicken wire laying on the ground around the outside of the fence. This should be connected to ground.
7. During periods of drought pour water down the ground pipe and around the ground pipe to improve the ground. Digging a 6 inch deep 6 inch diameter hole around the ground pipe and back filling with rock salt will also improve the ground. Additional ground pipes may also be added to portions of the fence farthest from the charger.
8. To ensure that the bear solidly contacts the charged portion of the fence, a bait like bacon strips, a can of sardines, or tin foil with peanut butter may be attached to one of the top hot wires. Make sure these do not contact the ground, thus shorting out the fence.
9. When protecting a specific structure (like a shed or rabbit hutch), the fence should be placed 3 to 5 feet away from the structure (rather than on it) so that the bear encounters the fence before reaching the attractant.
10. Protect the fence charger from the elements by covering it with a plastic bucket or a wooden box.
11. Place plastic electric fence signs around the perimeter of your fence to improve visibility and to warn other people.



Exclusionary Electric Fencing
14 Gauge Aluminum Wire
5' Fiberglass Post (driven 1' deep) (spaced 8' apart)
Hot Wire 40"
Gate Handle
Ground Wire 32"
Hot Wire 24"
Ground Wire 16"
Hot Wire 8"
Fence Charger
Ground Level
Guy Wire
12 Gauge Insulated Wire
Copper Ground Pipe (driven 6' - 8' deep)

AGREEMENT
ATTACHMENT 2

Place Holder for Map

Of

Apiary Locations

At

WMA/WEA

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APIARY SITE APPLICATION FORM

Florida Fish and Wildlife
Conservation Commission

RETURN TO: The Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Tallahassee, FL 32399-1600. Please print or type all information. Attach additional sheets if necessary.

Name ______________________________ Telephone Number ____________________

Mailing Address ____

City or Town__________________________ County _______________ Zip Code _____________

Physical Address (If Different from Mailing Address) ____

Company Name: ____

Email Address ____

Requested Wildlife Management or Wildlife and Environmental Area(s)(see attached list of WMA/WEAs with apiary sites):

WMA/WEA ______________________ County_______________ # of Sites________

WMA/WEA ______________________ County_______________ # of Sites________

WMA /WEA______________________ County_______________ # of Sites________

WMA /WEA______________________ County_______________ # of Sites________

Planned Number of Hives Per Site: _________ Permanent: ____ Seasonal: _____

Member of Beekeepers Association: Yes____ No____

Number of Years a Member______

Name of Beekeepers Association:_____________________________________

Are you registered with Florida Department of Agriculture and Consumer Services/Division of Plant Industry (FDACS/DPI):_______Yes _______No _______N/A If yes, please provide proof.

Are you current with any and all special inspection fees:______Yes _______No _______N/A. If yes, please provide proof.

Do you follow all recommended Best Management Practices from FDACS/DPI?:______Yes _______No

If no, then please explain on a separate piece of paper.

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Please provide below a chronological history of your beekeeping experience. If you need more space, please provide additional sheets:

References: If a new apiary contractor, please provide on a separate piece of paper at least 3 references who can verify your apiary experience. Provide each reference's name, address, phone number and email address (if applicable). Please attach reference sheet to this document and submit.

MISSION STATEMENT

Management

Of

Florida Fish and Wildlife Conservation Commission's

Wildlife Management Areas

And

Wildlife and Environmental Areas

The mission of the Florida Fish and Wildlife Conservation Commission (FWC) is to manage fish and wildlife resources for their long-term well-being and the benefit of the people. To aid in accomplishing this mission, one of FWC's management goals is to manage fire-adapted natural communities on our Wildlife Management and Environmental Areas (WMA/WEA) to support healthy populations of the plants and animal's characteristic of each natural community. In order to achieve this goal various habitat management techniques are used. These include prescribed burning, applications of herbicides and mechanical treatment of vegetation. These management efforts will take place at various times and locations on each of the FWC's WMA/WEAs. Staff on each WMA/WEA will work with and make users aware of these activities when necessary. Users must be aware and accept that these activities are necessary for the proper management of the area.

Note: This document is included as an attachment with each Application and executed Contract.

FDACS/DPI's BMP

Florida Department of Agriculture & Consumer Services

BEST MANAGEMENT PRACTICES FOR

MAINTAINING EUROPEAN HONEY BEE COLONIES

1. Beekeepers will maintain a valid registration with the Florida Department of Agriculture and Consumer Services/Division of Plant Industry (FDACS/DPI), and be current with any and all special inspection fees.

2. A Florida apiary may be deemed as European Honey Bee with a minimum 10% random survey of colonies using the FABIS (Fast African Bee Identification System) and/or the computer-assisted morphometric procedure (i.e., Universal system for the detection of Africanized Honey Bees (AHB) (USDA-ID) or other approved methods by FDACS on a yearly basis or as requested.

3. Honey bee colony divisions or splits should be queened with production queens or queen cells from EHB breeder queens following Florida's Best Management Practices.

4. Florida beekeepers are discouraged from collecting swarms that cannot be immediately re-queened from EHB queen producers.

5. Florida Beekeepers should practice good swarm-prevention techniques to prevent an abundance of virgin queens and their ready mating with available AHB drones that carry the defensive trait.

6. Maintain all EHB colonies in a strong, healthy, populous condition to discourage usurpation (take over) swarms of AHB.

7. Do not allow any weak or empty colonies to exist in an Apiary, as they may be attractive to AHB swarms.

8. Recommend re-queening with European stock every six months unless using marked or clipped queens and having in possession a bill of sale from an EHB Queen Producer.

9. Immediately re-queen with a European Queen if previously installed clipped or marked queen is found missing.

10. Maintain one European drone source colony (250 square inches of drone comb) for every 10 colonies in order to reduce supercedure queens mating with AHB drones.

11. To protect public safety and reduce beekeeping liability, do not site apiaries in proximity of tethered or confined animals, students, the elderly, general public, drivers on public roadways, or visitors where this may have a higher likelihood of occurring.

12. Treat all honey bees with respect.

RANDOM

SELECTION PROCESS

FOR VACANT APIARY SITE

When an apiary site becomes available the following procedure is used to randomly select the next apiarist (beekeeper) for an available apiary site on a WMA or WEA. Only those who have been evaluated and deemed qualified to be an apiarist on a WMA/WEA through the Apiary Application process will be eligible for this selection process. The steps below will be followed by the THCR Contract Manager when a site becomes available to be filled by a qualified apiarist:

1. The THCR Contract Manager will maintain an "Apiary Wait List Folder" on the THCR SharePoint for each WMA/WEA with apiary sites.
2. A wait list is either created or updated when an Apiary Application(s) is received by the THCR Contract Manager from a qualified apiarist.
3. Upon receipt of an apiary site application, the THCR Contract Manager will review the WMA/WEA folder to see if there is an "Apiary Wait List".
4. If a list exists then the qualified applicant will be added to the list.
5. When an apiary site becomes available if there are more than one qualified apiarist then these apiarists will be contacted by certified letter to determine their interest.
6. The letter will request a response within 10 working days to make them eligible for the random drawing.
7. If there is no response or is negative then that apiarist will not be included in the random drawing and the name will be removed from the waiting list*.
8. If only one apiarist responds positively to the certified letter then the available site will be awarded to that interested apiarist.
9. If there are no apiarists on a wait list or all responses are negative then apiarists who currently have site(s) under Agreement and where not on the waiting list will be contacted to see if any have interest in the available site. If more than one responds then the random drawing process will be used to determine who will be awarded the site.

10. Steps to be performed by the THCR Contract Manager to execute the random selection for an available apiary site are listed below:

    a. The names of each interested apiarist will be noted on a 1" X 2" piece of paper and folded in half.

    b. The pieces of paper will be inserted into a "black film canister" which has a snap top and placed into a container and stirred up prior to the selection.

    c. A non-biased person will be selected to reach into the bowl (which will be held above the selection person's eyesight) and randomly select one of the canisters.

    d. The canister will be opened by the person performing the selection and the name is read aloud for those in attendance. Everyone in attendance will sign a witness sheet.

    e. The apiarist whose name is selected will be awarded the available site.

    f. A new Agreement will be developed by the THCR Contract Manager.

*A new apiary application must be submitted once requestor's name is removed from a waiting list.

12.11 Hydrological Assessment and Conceptual Restoration Plan

Florida Fish & Wildlife Conservation Commission

HYDROLOGY ASSESSMENT AND CONCEPTUAL RESTORATION PLAN

LAFAYETTE FOREST WILDLIFE ENVIRONMENTAL AREA

Lafayette County, Florida

FDEP Contract No: PL074

WRS Project No: 32-44-100003

Submitted by:

WRS Infrastructure & Environment, Inc.

HYDROLOGY ASSESSMENT AND CONCEPTUAL RESTORATION PLAN FOR THE LAFAYETTE FOREST WILDLIFE AND ENVIRONMENTAL AREA

Lafayette County, Florida
WRS Project No. 32-44-100003

Submitted to:

Scott Johns
District Wildlife Biologist
Florida Fish and Wildlife Conservation Commission
Lake City Regional Office
3377 E. US Hwy 90
Lake City, FL 32055

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June 2010

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1.0 INTRODUCTION

1.1 Purpose

WRS Infrastructure & Environment, Inc. (WRS) was authorized by the Florida Fish and Wildlife Conservation Commission (FFWCC) under Florida Department of Environmental Protection (FDEP) Contract Number PL074 to perform a hydrology assessment and produce a conceptual hydrology restoration plan for the Lafayette Forest Wildlife And Environmental Area (WEA) located within Lafayette County, Florida. The objective of this report is to provide a comprehensive plan that identifies anthropogenic impacts to site hydrology and to restore natural water regimes to the extent practical. Specific objectives of this hydrology assessment and conceptual hydrology restoration plan are to

- Provide site-specific information regarding the historical and current drainage pathways,
- Identify current and historical drainage divide locations,
- Identify existing anthropogenic structures or features that have altered basin hydrology, and
- Propose changes to the existing drainage structures or features that restore the hydrology to natural conditions.

1.2 Site Setting

The Lafayette Forest WEA encompasses 2,148 acres in the southeastern portion of Lafayette County, approximately 0.4 miles north of Dixie County Line and approximately three miles west of the town of Hatchbend, Florida. Mallory Swamp Wildlife Management Area borders the western edge of the property and State Road 349 lies to the east. The Lafayette Forest WEA lies within the Hatchbend and Mallory Swamp SE 7.5-minute topographic quadrangle maps (United States Geologic Survey [USGS]). The location of Lafayette Forest WEA in reference to the surrounding region is illustrated in **Figure 1**. Photographs of site are provided in **Appendix A**.

1.3 Site History and Land Use

Although it appears likely that prehistoric indigenous Native Americans lived in this area due to the presence of abundant game, a search of the area in the Florida Division of Historical Resources Master Site File did not indicate that any archaeological or historical sites had been identified in the area. The earliest historical reference identified were historical maps from 1839 (Mackay and Blake, 1839) showing Fort Downing, which is a frontier fort constructed during the Second Seminole War. Additional information about the fort's location and history was found through an internet website that referenced a record that could not be located in the Florida Master Site File; however, this record appears to show a bridge associated with the fort that corresponds with current location of the unnamed stream that drains water from the St. Regis Ditch.

A review of historic maps appear to indicate that there may have been a community established at or near the fort up until at least 1932 known as Fort Downing and later just Downing. Later maps, starting in 1936, show that most of the population in this area was to east of the WEA, closer to Hatchbend (Florida Center for Instructional Technology [FCIT], 2010). Based on the historical maps it appears that the area in the WEA and the surrounding area likely had a significantly larger population in the past. Graves in the southeastern portion of the WEA were identified dating from 1893 to 1918. In addition, a cattle dip likely from around the 1920's was identified in the northern area of the WEA that indicates that livestock operations were conducted on the property. Historical aerial photographs from 1944 show pastures on the northeastern portions of the WEA.

More recent land uses include silviculture and recreational use. A pine plantation was located in the northeastern portion of the property on land that was formerly used for pastures. Outside of the WEA, land to the north east and south continues to be used for agricultural and livestock. None of past or present land use practices appears to have had impact current hydrology except for the construction of roads, ditches, and stream channel modifications.

1.4 Summary of Site Activities

In order to assess the historical and current drainage patterns and produce a conceptual hydrology restoration plan, the following tasks were performed:

- Topographic maps dating from 1954 were evaluated and maps that are more recent were scanned and geo-referenced. Aerial photographs dating back as far as 1944 were analyzed to provide additional details of historical conditions. In addition, historical maps were evaluated, since while not as accurate, the location of the unnamed stream on the property is shown due to its proximity to Fort Downing.
- Historical drainage patterns were assessed using the natural communities present in aerial photographs from 1944 based on, field observations, and inferred changes in topography.
- WRS personnel conducted on-site surveys to confirm the location and status of existing structures, define current flow directions (where possible), determine ecologic conditions, and locate previously unidentified structures. Photographs were taken of various drainage structures and natural features – **Appendix A**
- Historical hydrological data and information was researched including water levels in nearby wells, historical impacts on drainage and flow, and
- Ten soil boring were augered and logged to evaluate soil drainage properties.
- Three sets of stream flow measurements were made at eight locations and evaluated.
- Restoration structures, drainage structure repairs, and road maintenance activities are recommended and prioritized.
- Twelve populated shape files with metadata were produced for the Lafayette Forest WEA (**Appendix E**):
    - Borehole Locations
    - Flow Measurement Station Locations
    - Drainage Segment Loss/Gain
    - Current Basins
    - Historic Basins
    - Natural Waterways
    - Current Flow
    - Historic Flow
    - Ditches
    - Roadways

  - Existing Structures
  - Recommended Structures
- Six associated tables were produced:
  - Basin and subbasin delineation (polygon) – **Table 1**
  - Natural Drainage Ways (streams, polyline) – **Table 2**
  - Current Conveyance Structures and Flow Direction (polyline) – **Table 3**
  - Flow Measurements and Water Balance (point/polyline) – **Table 4**
  - Existing water control structures (point) – **Table 5**
  - Recommended water control structures (point) – **Table 6**

Between March and April 2010, WRS personnel mobilized to the site to perform the on-site surveys. During the on-site survey, WRS personnel confirmed the location and classification of the points on the previous survey. Field Surveys were performed using a Panosonic Toughbook® Tablet PC with ESRI ArcPad software linked to an external Garmin Global Positioning System (GPS) receiver with differential correction technology. The use of a larger field computer allowed aerial maps to be displayed as data was collected and improve field evaluations.

2.0 STUDY AREA CHARACTERIZATION

2.1 Climate

The typical mean maximum temperature in Suwannee River basin in the summer months (June, July, and August) is 91° Fahrenheit (F) and the mean minimum temperature is 72° F. In the winter months (December, January, and February), the mean maximum temperature is 70° F and the mean minimum temperature is 48° F in the southern part of the basin (Crane, 1986). The average annual rainfall in the Suwannee River Basin is approximately 53.4 inches but increases spatially from 46 inches in the northern part of the basin to over 60 inches closer to the Gulf coast (SRWMD, 2005b).

2.2 Topography

Karst topography is present at Lafayette Forest WEA due to the underlying Ocala Limestone, which is consistent with other areas in Suwannee River Basin. The overall topography is very flat and the elevation is generally between 48 and 62 feet above mean sea level (MSL). The higher elevations are associated with sand hills scattered throughout the property. Local variations appear to be the result of stream erosion, vegetation, Karst depressions, limestone outcroppings, silviculture activities, and road and ditch construction. Anthropogenic alterations to the topography appear to be primarily limited to the effects of road construction.

Lafayette County, including the Lafayette Forrest WEA, lies entirely in a Gulf Coastal Lowland physiographic region, which is described as a flat, sandy plain incised by river and stream valleys (Arthur, 1991). Florida's physiography is frequently delineated further using topographic elevation zones based on ancient marine terraces. Five marine terraces are found in the lower Suwannee basin (Crane, 1986). Healy (Healy, 1975) identified most of Lafayette County including most of the Lafayette Forest WEA as part of the Wicomico Terrace, which typically ranges in elevation between 70 and 100 feet above MSL. However, elevations in the area are more consistent with the Penholoway Terrace (42 to 72 feet above MSL).

2.3 Geologic Characteristics

2.3.1 Site Geology

The site geology and hydrogeology have significant impacts on the surface water hydrology in the Lafayette Forrest WEA due to the interactions between surface water and groundwater and geologic features that affect drainage, surface topography, and stream flow. Although no geologic data was identified within the boundaries of the WEA such as drilling logs or geological surveys, the geology can be inferred from nearby data from similar geomorphic areas to the north and south within the Lower Suwannee River Basin and regional studies of the area. The Florida Geological Survey (Crane, 1986) evaluated a number of wells to develop cross sections of the area. Based on this data and other resources, it appears that the surficial geology consists of sand clayey sand and clay underlain by Ocala Limestone (Ocala Group). The Ocala Limestone dips to east towards Suwannee River, as does surficial groundwater, which constitutes an unconfined portion of the Floridan Aquifer. The lower lithologic units do not appear to have an impact on surface water hydrology or the surficial aquifer hydrogeology. Based on available information, the Suwannee Limestone that is present west of the WEA, does not appear to be present in this area and has likely eroded away.

Due to the underlying Ocala Limestone, the topography, hydrology, and hydrogeology of the WEA are heavily influenced by a type of limestone erosion known as Karst. Karst Topography is created by the dissolution of carbonates like the Suwannee Limestone. Karst features include sinkholes, springs, seeps, caves, losing surficial streams, natural bridges, and underground streams (United States Geological Survey [USGS], 20010a). In some Karst environments, there is reduced surface water flow due to subterranean drainage.

Due to soil characteristics, the depth to the Floridan Aquifer, and the presence of sinkholes and Karst depressions, an understanding of the subsurface geology and hydrogeology is imperative to understanding the surface hydrology of the Lafayette Forrest WEA. The underlying Ocala Limestone affects surface water hydrology in a number of ways including:

- The formation of sinkholes, which affect both above and below the surface;
- The formation of Karst depressions, which can retain surface water flow;
- The depth of groundwater; and
- Groundwater-surface water interactions associated with streams and ditches within the WEA.

2.3.2 Soil Characteristics

Based on a preliminary evaluation of soil data in the area, it became clear that the distribution and physical properties of the surficial soil had a major influence on the site hydrology.

2.3.2.1 Soil Characterization Boreholes

To assess soil properties in the WEA, ten soil borings were placed in areas of interest as shown on **Figure 2**. All of the borings were installed using a 3.25-inch hand auger down to the top of the water table (vadose zone) based on soil saturation, refusal, or to the greatest extent that the equipment was capable of. None of the borings was advanced into the water table due to Suwannee River Water Management District permit requirements. Moisture content, organic, grain size and sorting, color, soil lithology, and the soil classification in accordance to the Unified Soil Classification System (USCS) were observed and recorded. The soil boring logs are provided in **Appendix B**.

The soil borings indicated that the upper 4-6 feet were predominantly fine and medium sand. Soil within the upper six inches of the surface tended to be more humic. Limestone was encounter at about 5.3 feet bls is Soil Boring SB-3 on the southern end of the WEA. Clayey sand was encountered in SB-1, below five feet bls. Overall, the soil observations were relatively consistent with soil series identified by the Natural Resources Conservation Service (NRCS) as described below.

2.3.2.2 Soil Distribution

Twenty soil series compromising fifteen map units (soil taxonomy classifications) were identified at the Subject Property based on a review of the Soil Survey of Lafayette County, Florida, USDA NRCS published in 1998 (USDA, 1998). **Figure 2** shows the soil distribution with the WEA. A brief description of the soil series is provided below:

Albany – The Albany series consists of very deep, somewhat poorly drained, moderate to slowly permeable soils on terraces and low uplands of the Southern Coastal plain. They formed in marine deposits of sandy material underlain by loamy sediments.

Blanton – The Blanton series consist of very deep, somewhat excessively drained to moderately well drained, moderately to slowly permeable soils on uplands and steams terraces in the Coastal Plain. They formed in sandy and loamy marine or eolian deposits. Slopes range from 0-45 percent. This series is mostly used for cropland, improved pasture, and hayland.

Chaires – The Chaires series consists of deep and very deep, poorly drained and very poorly drained, moderately slow to slowly permeable soils on flatwoods and in depressions on the Lower Coastal Plain. They formed in sandy and loamy marine sediments. Slopes range from 0 to 2 percent.

Clara – The Clara series consists of very deep, poorly drained and very poorly drained, rapidly permeable soils in flats, sloughs, flood plains, and depressions on the lower Coastal Plain. They formed in sandy marine sediments. Near the type location, the mean annual temperature is about 68 degrees F., and the mean annual precipitation is bout 55 inches. Slopes are less than 2 percent.

Dorovan – The Dorovan series consists of very poorly drained, moderately permeable soils on densely forested flood plains, hardwood swamps, and depressions in the Atlantic Coast Flatwoods, Eastern Gulf Coast Flatwoods, and Southern Coastal Plain Major Land Resource Areas. They formed in highly decomposed acid-organic materials. Slopes are less than 1 percent.

Harbeson – The Harbeson series consists of very deep, very poorly drained, moderately slowly permeable soils in depressions and poorly defined drainage ways. They formed in thick beds of sandy and loamy marine sediments. Slopes range from 0 to 1 percent.

Hurricane – The Hurricane series consists of very deep soil that is somewhat poorly drained These soils are moderately rapid permeable soils found on broad areas that are slightly higher than the adjacent flats of the Lower Coastal Plain. They formed in sandy marine sediments. Slopes range from 0 to 5 percent.

Leon – The Leon soils consists of poorly drained, moderately permeable or moderately rapidly permeable, nearly level soils that formed in sandy marine sediments. These soils are found on broad flats in the flatwoods and on knolls or low ridges in the titi bogs. Slopes generally range from 0 to 2 percent.

Lynn Haven – The Lynn Haven series consists of very deep, poorly and very poorly drained, moderate or moderately rapid permeable soils in low areas and depressions the Gulf Coast and Atlantic Flatwoods. They formed in thick deposits of sandy marine sediments. Near the type location, the mean annual temperature is about 68 degrees F., and the mean annual precipitation is about 55 inches. Slopes range from 0 to 5 percent.

Meadowbrook – The Meadowbrook series consists of very deep, poorly drained and very poorly drained, moderately slowly permeable soils on flats and small stream flood plains of the Southern Coastal Plain and the Atlantic and Gulf Coast Flatwoods. They formed in thick beds of sandy and loamy marine sediments. Near the type location, the mean annual temperature is about 68 degrees F., and the mean annual precipitation is about 55 inches. Slopes range from 0 to 5 percent.

Ortega – The Ortega series consists of very deep, moderately well drained soils that formed in a sandy deposit on marine terraces. These soils are on nearly level to strongly sloping upland landscapes. Slopes range from 0 to 12 percent.

Otela – The Otela series consists of very deep, moderately well drained, moderately slowly to slowly permeable soils on broad uplands. They formed in sandy and loamy marine sediments over limestone on Karst topography. Slopes range from 0 to 8 percent.

Ousley – The Ousley soils consist of very deep, somewhat poorly drained, rapidly permeable soils on terraces and flood plains of the Coastal Plain. They formed in sandy fluvial sediments. Near the type location, the mean annual temperature is about 68 degrees F., and the mean annual precipitation is about 49 inches. Slopes range from 0 to 5 percent.

Pamlico – The Pamlico series consists of very poorly drained soils that formed in decomposed organic material underlain by dominantly sandy sediment. These soils are found on nearly level flood plains, bays, and depressions of the Coastal Plain. The slopes of these soils are less than 1 percent.

Penney – The Penney series consists of very deep, excessively drained, rapidly permeable soils on uplands. They formed in thick beds of sandy eolian or marine deposits. Near the type location, the mean annual temperature is about 69 degrees F., and the mean annual precipitation is about 52 inches. Slopes range from 0 to 25 percent.

Plummer – The Plummer soils consist of very poorly drained, rapidly permeable, nearly level soils that formed in sandy marine sediments. These soils are found in depressions and poorly defined drainage ways and on flood plains. Slopes are generally 0 to 1 percent.

Ridgewood – The Ridgewood series consists of very deep, somewhat poorly drained soils on uplands. They formed in beds of sandy marine deposits. Slopes range from 0 to 8 percent. These soils are rapidly permeable with slow runoff. It is below a depth of 40 inches when extremely dry. Most areas of Ridgewood soils are in natural vegetation. Natural vegetation is a forest of slash and longleaf pine, water, laurel, and live oaks, and scattered turkey oak. The understory consists of wax myrtle, bluestems, sumac, blue maidencane, blackberry, gallberry, scattered saw palmetto, some wiregrass, and other grasses. Some areas have been cleared and are in pasture.

Shadeville – The Shadeville series consist of moderately well drained soils that are deep to fractured porous limestone bedrock. They are slowly permeable soils that formed in sandy and loamy marine deposits. These soils are on broad, nearly level to gently undulating low uplands and broad knolls within the flatwoods and Karst topography of the Lower Coastal Plain. Slopes range from 0 to 5 percent.

Surrency – The Surrency soils consist of very poorly drained, moderately slow to moderately permeable, nearly level soils that formed in marine and fluvial sediments of the lower Coastal Plain. These soils are found in depressions, flats and swamps. Slopes are generally 0 to 1 percent.

Wesconnett – The Wesconnett series consists of very deep, very poorly drained sandy soils that formed in sandy deposits on marine terraces. These soils are in depressions and on flood plains. Slope ranges from 0 to 2 percent.

Detailed descriptions of each of the soil series identified within or near the WEA are included in **Appendix C**.

2.3.2.2 Soil Properties

A key to understanding surface water hydrology is an understanding of the vertical permeability of surficial soils and geomorphology of the ponds that have formed in the Karst depressions scattered across the WEA. Given the predominance of sandy soil that typically is well drained, it would be anticipated that the depressions would not hold water; however, significant amounts of organic material have likely accumulated creating muck soil that is poorly drained. As shown in **Figure 2**, the soil in the depressions on the west side of the WEA are generally Wesconnett and Lynn Haven series or Pamlico and Dorovan series soils, which are all organic- rich poorly drain soils associated with depressions. Ponds on the eastern side and southern end of the subject property are associated with the Meadowbrook and Harbeson soils, which are also poorly drained loamy sands that form in marine sediments.

Based on the borehole data and the soil series identified by the NRCS, that the soil in depression at lower elevations is poorly drained and that there significant difference in drainage class between soil at higher elevations on the west side of the WEA in comparison to the east side. **Figure 3** illustrates the drainage class based NRCS soil identification. **Figure 4** illustrates shows the NRCS ponding frequency class for the WEA. It should be noted that although a considerable amount of ponding occurs at the site and the underlying soils are poorly drained, a significant amount of the water in these ponds is lost through either evapotranspiration or infiltration into subsurface soil layers, which have higher vertical permeability.

2.3.3 Site Hydrogeology

As previously noted, the underlying aquifer is the Floridan, which is unconfined due to the permeability surficial soils. The regional flow appears to be west towards the Suwannee River. Although no wells appear to be present within the WEA, groundwater wells in the area indicate that the water table elevation on the west side of the site are relatively shallow with an elevation of approximately 60 feet above MSL and are within 10 feet below land surface (bls). To the east of the WEA, the water table elevation drops off about 40 feet (SRWMD, 2005). Borehole data appears to confirm this with wet soil encounter at 4 to seven feet bls on the west side of the WEA. The soil was dry down to 12 feet bls on the east side. Flow within the WEA is likely to the southeast towards the unnamed creek and the Suwannee River. Based on soil characteristics, surface water hydrology, and field observations, most of the surface water that is no lost through evapotranspiration or flows offsite through the unnamed creek infiltrates into Floridan Aquifer, much of it likely daylighting in springs along the Suwannee.

2.4 Natural Communities and Vegetation

The concept of ecological communities is based on the awareness that a specific soil type commonly supports a specific vegetation community, which in turn provides the habitat needed by a specific wildlife species. These ecological communities are classified by their distinct and reoccurring assemblage of populations of plants, animals, fungi and microorganisms naturally associated with each other and their physical environment. The Florida Natural Areas Inventory (FNAI) has established a classification for each of Florida's eighty-one unique ecological communities. These classifications are defined in FNAI's Guide to the Natural Communities of Florida established in 1990. Natural communities observed at the Subject Property include upland hardwood forest, upland mixed forest, bottomland forest, dome swamp, floodplain swamp, basin marsh, depression marsh, marsh lake, floodplain lake, blackwater stream, wet prairie, and wet flatwoods.

Large portions of the Subject Property have been impacted by current and historic silviculture; existing as large stands of planted pines or previously cleared areas of planted pine and swampland where invasive/opportunistic vegetation has been allowed to grow. These portions of the Subject Property cannot be classified as any particular natural community according to FNAI classifications. Analysis of historical aerial imagery, topography, soils, and existing vegetation suggests that much of the area impacted by silviculture was historically vegetated by longleaf pine-turkey oak sandhill community, a preferred habitat of the gopher tortoise (*Gopherus polyphemus)*. Historical aerial analysis also revealed that many of the areas that currently exhibit a more marsh-like appearance had once been dominated by dome swamp or cypress-dominated basin swamp communities, and presumably were logged out several decades ago.

The natural communities that were identified on the Subject Property were fairly representative of their given FNAI classifications. The most intact natural communities were observed throughout the wetlands associated with the creek system, where silviculture activities have presumably been minimal over the past several decades. Natural communities that were observed more isolated within the silviculture areas typically did show some signs of disturbance due to historic logging, primarily in the dome swamps. Lack of a regular fire regime was also evident, with dense shrub layers occurring in many of the natural communities.

It was also observed that many of the depression marsh and basin marsh communities located on the western portion of the Subject Property were exhibiting a higher prevalence of mesophytic species, suggesting that over time the hydroperiod has been shortened. A shortened hydroperiod is likely a result of the altered hydrologic regime on the Subject Property, largely influenced by the St. Regis Ditch. In order to maintain or restore natural conditions within these marsh communities, natural hydrology must be re-established on the Subject Property.

As mentioned previously, it is likely that a large area of the Subject Property was historically vegetated by a longleaf pine – turkey oak sandhill community, a preferred habitat of the gopher tortoise (*G. polyphemus)*. Although very little, if any, intact sandhill community was observed on the Subject Property, conditions were favorable enough in many areas to support a significant population of gopher tortoises. Most of the gopher tortoise burrows observed were located over the eastern portion of the Subject Property where depth to groundwater was not a limiting factor. Some burrows were observed on the western portion of the Subject Property where depth to groundwater was much shallower, however they were only observed along roadsides and in road embankments where the higher elevations of the roads allowed the gopher tortoises sufficient vertical movement.

3.0 SITE HYDROLOGY

3.1 Regional Hydrology

The entire Lafayette Forest WEA lies in the Suwannee River Basin. The Suwannee river originates in the Okefenokee Swamp in South Georgia and flows generally south-southwest along a meandering path to the Gulf of Mexico. Three large tributaries flow into Suwannee River, the Alapaha, the Withlacoochee, and the Santa Fe Rivers. All of the surficial water flow in southeast Lafayette County is captured by the Suwannee River; however, it appears much of the flow either infiltrates to groundwater or flows into sinkholes and daylights in a number of springs that feed the river.

The USGS has divided the watersheds in the United States into successively smaller hydrologic units, which were classified into four levels: regions, sub-regions, accounting units, and cataloging units. The smallest hydrologic units in this system are the cataloging units. Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits depending on its level of classification in the hydrologic unit system (USGS, 1987). The Lafayette Forest WEA is completely within the Lower Suwannee Watershed Hydrologic Cataloging Unit (HCU), which is identified as USGS HUC 03110205 (USGS, 2010b).

3.2 Drainage and Stream Flow

3.2.1 Drainage

Drainage patterns and basin delineation are difficult to determine in the Lafayette forest WEA, due to the lack of vertical relief. In addition, some areas of the subject property have little to no surface water flow, particularly on the east side of the site due to the topography and higher infiltration rates into the sandy soils present. The overall drainage pattern within the Lafayette Forrest is to the east for most of the property towards the Suwannee River; however, localized surface water flows in a number of directions due to the relatively flat topography and a less pronounced drainage structure. A stream that traverses the WEA is the primary drainage pathway. This stream has no name associated with it and for the purposes of this assessment is referred to as the "Unnamed Stream".

Surface water flow in Lafayette Forrest WEA is typical of an extremely low gradient system, which has both low potential and kinetic energy flow. This type of flow system is typified by meandering streams as evidenced by meanders in both the Unnamed Stream on the subject property and Suwannee River. Other evidence that was observed during site walks was ponded areas, which likely exist because the Unnamed Stream lacks the kinetic energy to cut a channel through erosion through existing depressions. At the Lafayette Forest WEA, stream energy and flow is further reduced by flow losses through soil infiltration.

Although low energy drainage system produced meandering streams and other patterns induced by a low hydraulic gradient, the lack energy in this system causes these changes to occur slowly due to reduced bank and channel erosion. In addition, the dense vegetation present further reduces erosional development. As such, little in the way of natural changes in the drainage pattern on the subject property have occurred over time and the location of the Unnamed Stream and other surface water bodies are relatively similar to present conditions, except where there has been anthropogenic impacts. In particular, there have been significant impacts associated with roads on the property and those induced by roads and land drainage activities outside the property boundaries.

Anthropogenic structures affecting drainage in the Lafayette Forest WEA include roads and elevated surfaces, ditches, swales, culverts, and low-water crossings. All roads within the study area are unpaved; however, a southeast portion of the property borders State Road 349. No rail lines or other types of transportation structures other than roads were identified. The roadways are generally elevated above the surrounding grade, preventing flow across roadway surfaces. A few roads either are washed out, cross ephemeral ponds, or convey water over the road surface. Many roads appear to be constructed from fill dredged along the roadside and to a lesser extent, from pits throughout the unit. Consequently, many roads within the property are elevated above natural land surface and flanked by intermittent ditches or ponds. Features identified along roadways included washouts, low water crossings, culverts, bridges, ditches (intermittent and continuous), and swales. For clarification, the parameters used to define each observed feature are as follows:

- Washout - an area where surface water crosses or forms large pools on the road
- Improved water crossing – an area where the roadway was improved to allow passage through an existing stream or drainage way or any washout that had been improved through the use of large gravel or logs
- Culverts – surface water conveyance structures of various shape and construction material
- Bridge – a man-made structure spanning a surface water feature
- Ditch – a man-made depression, typically having well defined edges, which conveys or retains water
- Swale – a wide but shallow man-made ditch or shallow depression that may convey surface water, typically completely covered with grass or vegetation
- Ditch Plug – a blockage within a ditch, consisting of earth or vegetative debris

During site walks, WRS evaluated both natural and artificial drainage features and structures, including evaluation of flow, stream gain and losses flow direction, structure condition, ponding, and other hydrologic characteristics. Ditches were more prevalent than swales within the property boundaries. Based on field observations, there was a distinct difference between ditches that were clearly created to convey water and intermittent depressions along roadsides that were likely excavated for the road base. As such, these intermittent depressions were identified as swales during field mapping.

Additionally, many culverts intended to allow flow beneath the roadways are in poor condition. As a result, natural drainage patterns have been disrupted and, in some cases, surface water flow is impeded. Another factor impeding natural surface flow is the intermittent ditches and swales within the unit. In some areas, these ditch features do not improve drainage, as they typically did not provide a path for water to flow. Instead, these features offer artificial surface water storage, reducing the amount of surface flow adjacent areas would normally receive.

3.2.2 Basin Delineation

A drainage basin is defined as a region or an area bounded by a drainage divide and occupied by a drainage system. Typically, this drainage system will be a surface stream or river. Drainage basins tend to cover large areas and area typically controlled by topography. A subbasin is a subset of a drainage basin is defined as the area bounded by a drainage divide for a tributary of the stream or river that defines a basin. Because of their size, basins are frequently divided into subbasins.

As previously noted, the USGS has divided the watersheds in the United States into hydrologic units, of which, the Lafayette Forest WEA is completely within the Lower Suwannee Watershed HCU identified as USGS HUC 03110205. The FDEP Division of Water Resource Management has small planning units that are broken down further into smaller units with unique Waterbody Identification (WBID) numbers (FDEP, 2003). The Lafayette Forrest WEA appears to be completely within WBID 3624 indentified as an unnamed slough. However, the southernmost portion of the WEA was determined to be part of a separate subbasin, which is likely part of WBID 3463 (also an unnamed slough). For the purposes of this assessment, these two subbasins were identified as the Hunt Club Basin and Ward Lake Basin, although technically these are subbasins of the Suwannee River Basin. The Hunt Club Basin encompasses most of the WEA. The Ward Lake Basin was named after a lake system within the subbasin.

3.2.2.2 Current Basin Delineation

The most of the surface water flow off-site is through the Unnamed Stream and this basin encompasses most of the site. A smaller portion in the south is part of the Ward Lake Basin. **Figure 5** shows the extent and flow directions of streams, ditches, and swales within the current basin. The location of the basin divide is approximate because elevation differences in this area are subtle. Furthermore, some of the ponds in the area do not appear to flow into any streams or other ponds. Additional information on the basins evaluated is also provided in **Table 1**. Additional information on identified streams, ditches and swales are presented in **Table 2** and **Table 3**.

The Hunt Club Basin encompasses approximately 2,042.2 acres within the WEA and as shown on **Figure 5**, encompasses almost the entire property. The flow direction within the unit is generally towards the Unnamed Stream. The Ward Lake basin encompasses approximately 143.0 acres and is limited to only the southern tip of the WEA. The flow direction in this basin is generally to the south.

3.2.2.1 Historical Basin Delineation

There is very little difference in basin delineation between the current and historical basins. **Figure 6** shows the extent and flow directions of the historical basin. Drainage flow lines are generalized and representative of overall flow within each basin or subbasin. They do not represent specific flow patterns. The historical size of the Hunt Club Basin is approximately 2,038.7 and the Ward Lake basin is approximately 146.7 acres in the WEA. The basin divide has changed in a small area to the south due to additional flow captured by the St. Regis Road ditch. In comparison with the current basins area, this represents a change of only approximately 3.7 acres within the WEA. Flow patterns have changed within the basins due to road and ditch construction.

3.2.2 Stream and Ditch Flow Measurement

To evaluate stream and ditch flow, USGS methods were used as described in the USGS Water Supply Paper 2175, *Measurement And Computation Of Streamflow, Volume 1, Measurement Of Stage And Discharge* (USGS, 1982). Specifically, the two-tenths method using current meters, which is a velocity-area method, was used. This method was modified due to the nature of the equipment used and the physical dimensions of the stream or ditch. Initially, ten flow measurement stations were established; however, two stations (Stations 1 and 2) were rejected because they were north of WEA on two side streams and did not provide relevant information for the hydrology assessment. All measurements were made at two-tenths of the total channel depth at set intervals or segments across the channel width. Measurements were collected on March 30, April 13, and May 5, 2010. All measurements were transcribed to velocity/discharge data forms, which are provided in **Appendix D**.

3.2.3 Stream and Ditch Hydrology

Based on the stream and ditch flow measurements, flow loss and gain could be calculated. **Table 4** and **Figure 7** show the flow measurements and the stream and ditch segments that are losing or gaining water. As shown in **Figure 7**, a significant amount of surface water is flowing through the St. Regis ditch from the area north of the property. Although a portion of this flow originates in the Hunt Club Basin, most of it appears to be from subbasins to the north, which the ditch is capturing and diverting into Hunt Club Basin.

Flow Station 8 represents the combined flow from the upper segment of the Unnamed Stream and flow from both the southern and northern portions of the St. Regis Ditch. Based on the upstream flow measurement stations, the water balance for these three segments indicates a net loss. Based on their location relative to shallow groundwater, their length, and other characteristics, it is believed that most if not all of these losses are occurring in segment of St. Regis Ditch to the north. Furthermore, it appears likely that these losses are due to infiltration although some minor losses are likely occurring from evapo-transpiration. It should be noted that the length of ditch segment between Flow Station 4 and Flow Station 8 is relatively long and portions of the ditch segment could be gaining water, as water loss is more likely to occur where the water table is deeper than the trench bottom or where there is less runoff.

To the south, the flow in the St. Regis ditch is significantly less; however, some flow is being diverted from the Ward Lake Basin into the ditch. The ditch is shallower in this area and is probably not intercepting the water table, but rather collecting runoff and surface water flow from depression marshes and other water sources. Two additional ditches were observed in Ward Lake Basin that interconnect ponds. Although these ditches have likely had an impact on these ponds, due to elevation differences and the size of the ponds, the flow through these ditches is likely significantly less than other ditches on the property.

Losses in flow were also calculated for the segment of the Unnamed Stream between Station 5 and Station 10. As can be seen in Figure 3, surficial soil on the east side of the property drain significantly better, resulting in less surface water flow. In addition many of surface water bodies on the east side of the property are not interconnected and do not contribute to flow in the Unnamed Stream, as with portions of the St. Regis Ditch it appears that most of the water loss occurring is due to infiltration through the sandy soils that are predominant in this area.

Although the Unnamed Stream is natural surface water feature whose course has been altered little over a number of centuries, it appears that the site hydrology has been altered by increased flow in the Unnamed Stream because of flow from the St. Regis Ditch and other smaller ditches. The resulting effect is that the stream is part of the conduit that is draining surface water and possibly groundwater from other areas of the site. However, flow modifications to the stream itself are not recommended, but rather modifications to anthropogenic structures that are increasing flow upstream should be made.

3.3 Surface Water/Groundwater Interactions

The interactions between surface water and groundwater are a key concern for this WEA. The ditches and streams at this site appear likely to lose surface water through infiltration or gain surface water by intercepting groundwater or by draining ponds and depressed march and swamp areas. The ponds on the property have lower infiltration rates due to a build up of organic material, which reduces vertical permeability. This can allow more access to water for hydric vegetation and ecology communities. Because streams and ditches are moving water bodies, more of the organic material moves downstream and underlying soils tend to be more permeable and induce greater surface water infiltration and possibly creating more xeric natural communities.

3.3.1 Stream and Ditch Interactions

In the initial evaluation, the depth of northern portion of St. Regis Ditch was a primary concern since it could be intercepting the groundwater table and affecting surrounding vegetation and other surface water bodies. There is insufficient groundwater elevation data to determine whether this occurring or to quantify it. It is known that the water table on the eastern portion of the site is relatively close to the elevation of the bottom of the ditch and that this may be occurring.

3.3.2 Subterranean Stream Flow

As noted above, the Unnamed Stream that runs through the property is a disappearing stream and was observed to flow into two sinkholes in the Ocala Limestone to the east of the subject property. Given the projected depth of groundwater in this area, the geomorphology, the observed nature of the sinkhole, and depth of limestone, it appears very likely that the stream is flows through a subterranean cave and eventually discharges to the Suwannee River through one or more springs. The location of these sinkholes is approximately 0.5 miles east of the southeastern corner of the WEA property boundary. Photographs 15 and 18 show the primary sinkhole through which the stream flows. It is believed that most of the water flows into this sinkhole except during high flow events, when additional flow runs into the second sinkhole.

3.3.3 Springs

No natural springs were identified within the WEA; however as noted above, flow from the Unnamed Stream and other subsurface flow from the site likely flows into Suwannee River through one or possible springs along its west bank. The two most likely candidates are pair of Magnitude 2 springs that are east and southeast of the Subject Property. Turtle Spring is east of the property and has a discharge rate of 36.38 cubic feet per minute. Pothole Spring is to the southeast in Dixie county and has a discharge rate of 31.64 cubic feet per second (SRWMD, 1998). Given the general trending of the Unnamed Stream and the location of the sinkholes, it appears more likely that this stream feeds Pothole Spring, which is closer to the site. This is speculative and cannot be discerned based on available data. Regardless of the outfall location, both springs feed the Suwannee River and any modifications within the WEA are not likely to affect Suwannee River flow rates.

3.4 Current Flow Control Structures

During site walks, existing flow control structures were evaluated both on and off the Subject Property. **Figure 8** shows the location of current drainage control structures as well as field observations that assisted in the development of this assessment. Structure type, flow direction, condition (good, fair, poor), and comments are presented in **Table 5**. This information is also included as attributes associated with each shape file. All data collected in the field and evaluated in the office are provided in **Appendix E** on compact disks. Condition of the flow structures ranged from poor to good. Fifteen culverts and two low water crossings were identified on or near the WEA. In addition, three bridges were identified that all appear to be in good condition.

4.0 RECOMMENDATIONS

In evaluating the restoration of the site to natural and/or historic hydrologic conditions, the following considerations were weighed:

- Impacts to existing roads;
- Impacts to and from offsite properties;
- The effects on local regional groundwater and surface water flow; and
- Impacts to vegetation, wildlife, and ecological communities

Recommended drainage control modifications are shown in **Figure 9** and are described in detail below. In addition, **Table 6** provides further details and locations of proposed drainage structure modifications.

4.1 Hunt Club Basin

4.1.1 St. Regis Road and Associated Ditches

The St. Regis Road runs on near the western border of the WEA and in some places, crosses into the Mallory Swamp Wildlife Management Area. The most significant impairments to the hydrology of the site appear to be associated with this road and ditch system. As previously noted, significant amounts of water are flowing from offsite areas to the north in the ditch on the west side of the road. In addition, based on available water table elevation information and flow measurements, the ditch may be intercepting the water table in some areas and infiltrating additional water to the groundwater system in other areas. There is not sufficient data to determine where this is occurring at this time and it is recommended that additional stream flow measurement be made and that piezometers be installed to evaluate the ditch. Possible modifications include ditch blocks, raising the bottom of the ditch elevation, and installation of additional culverts or other drainage control structures. Although significant flow has been redirected through the St. Regis Road ditch from the north, it is not recommended that a ditch block be placed in this area due to potential damage to private property, roads, and other offsite effects.

As shown in **Figure 9**, recommendations have been made culverts along the St. Regis Road. During site walks, three culverts and three bridges were identified along the St. Regis Road (see **Figure 8**). All of the existing culverts and bridges were found to be in good condition. Based on historical aerial photographs, it appears that a ditch was cut to the east of the northern portion of the St. Regis Road and it is believed that another culvert may have been or currently is in place in this location. If the culvert is still present, it may have been obscured by vegetation or sediments. Regardless, a new culvert is recommended for this location, as shown on Figure 9. In addition, three additional new culverts are recommended to carry flow from the ditch on the east side of road to natural drainage areas. Two of these are to restore flow in Ward Lake Basin including one that is outside the property boundaries, lying within the Mallory Swamp Wildlife Management Area. It is recommended that culvert modifications be delayed until further recommendations are evaluated for the ditch itself, since these may change water levels, culvert elevation, or the road elevation.

4.1.2 Area West of the St. Regis Road

Two culverts on unnamed roads were identified in the area west of the St. Regis Road, both of which were in fair or poor condition. It is recommended that both of these culverts be replaced.

4.1.3 Northern Portion of the Hunt Club Basin

Four culverts that are associated with unnamed roads were identified in the northern portion of the Hunt Club Basin east of the St. Regis Road. In addition, a number of washouts and a low water crossing were observed in this area. It is recommended that all four of the culverts be replaced and the low water crossing be upgraded to a hardened low water crossing to reduce sediment loading and prevent erosion. Furthermore, it is recommended that four new culverts be installed in this area, two of which are in washout locations.

4.1.4 Southeast Meadowlark Road

On the map, Southeast Meadowlark Road enters the property on the east side, circles thorough the private hunting lodge area in the center of the WEA, and exits through the southeast corner of the Subject Property. Based on field observations, it appears that the portion of the road crossing the Unnamed Stream is not in use due to stream flow and ponding in this area. It is believed that an adjacent road, which crosses the stream, is used instead. Three culverts were identified along this road, two of which are recommended for replacement. No other modifications were identified for drainage control structures along this road.

4.1.5 Southern Portion of the Hunt Club Basin

Two culverts were identified on roads adjacent to the St. Regis Ditch Road that are recommended for replacement. A third culvert, just outside of the property near the southeastern corner of the WEA, is also recommended for replacement. Although this culvert may be on private property or the right-of-way for State Road 349, it is in poor condition and very close to the Subject Property border.

4.2 Ward Lake Basin

In addition to the two St. Regis ditch culverts mentioned above, there is a low water crossing in this basin that should be upgraded to a hardened low water crossing. A new culvert is also recommended on Southeast Manatee Road as shown on Figure 9. Two ditches were identified in this area that appear to serve no purpose other than draining the ponds. Due to the low elevation grade, it is recommended that no maintenance be performed in this area and that these ditches be allowed to deteriorate to natural conditions.

5.0 CONCLUSIONS

A summary of the recommended improvements is as follows. Locations identified are shown on **Table 6** and **Figure 9**.

- Install four new culverts along the St. Regis Road including one in the Mallory Swamp Wildlife Management Area.
- Replace the two culverts west of St. Regis Road.
- Replace four culverts on unnamed roads on the northern portion of the WEA.
- Install four new culverts on unnamed roads on the northern portion of the WEA.
- Upgrade the low-water crossing to a hardened low water crossing on an unnamed road on the northern portion of the WEA.
- Replace two culverts on Southeast Meadowlark Road.
- Replace three culverts in the southern portion of the Hunt club Basin including one offsite.
- Upgrade the low water crossing in the Ward Lake Basin to a hardened low water crossing.
- Install a new culvert on Southeast Manatee Road.

In addition, routine maintenance of ditches, swales, roads, and existing drainage control structures should continue.

A phased approach is recommended for the Lafayette Forest WEA. The strategy of using a phased approach is to ensure that initial improvements do not affect other improvements.

The recommended order of priority is as follows:

1) Implement drainage control structure modifications in all areas except for along the St. Regis Road
2) Install piezometers near the St. Regis ditch to evaluate the ditch elevation
3) Collect additional stream flow measurements to evaluate loss and gain in the St. Regis ditch
4) Evaluate additional recommendations for the St. Regis Road and associated ditches
5) Install new culverts and perform any additional modifications to the St. Regis Road and ditches.

Note that the first three items do not need to be necessarily performed in the order shown; however, these activities should be performed before any modifications are made to St. Regis Road ditch and drainage control structures.

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Tables

Table 1
Current and Historic Basin Delineation
Lafayette Forest Wildlife And Environmental Area

Basin or Subbasin Designation	Current Size		Historic Size		Difference (Acres)
	Square Feet	Acres	Square Feet	Acres	
Hunt Club Basin	88,967,709	2042.4	88,806,277	2038.7	3.71
Ward Lake Basin	6,229,249	143.0	6,390,673	146.7	-3.71

Notes:
All area measurements reported are basin dimensions within the Lafayette Forest WEA and not the actual basin size.

Table 2
Natural Drainage Ways
Lafayette Forest Wildlife And Environmental Area

ID	Description	Length (feet)
1	Unnamed Stream	22096.1

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Table 3
Current Conveyance Structures and Flow Direction
Lafayette Forest Wildlife And Environmental Area

ID	TYPE	FLOW	Length (feet)
1	Ditch	SE	1740.76
2	Ditch	SE	1677.25
3	Ditch	SW	157.92
4	Ditch	SSE	180.73
5	Ditch	SSE	1829.42
6	Ditch	SE	2881.59
7	Ditch	N	5326.22
8	Ditch	N	1945.40
9	Ditch	N	2434.11
10	Ditch	NA	5764.55
11	Ditch	NA	808.84
12	Swale	NA	1920.83
13	Ditch	NA	1793.75
14	Ditch	NA	1811.64
15	Ditch	NA	1717.12
16	Ditch	NA	4692.45
17	Ditch	NA	2062.28
18	Swale	NA	813.01
19	Ditch	E	559.14
20	Ditch	NA	459.51
21	Ditch	S	3992.51
22	Swale	NA	1159.79
23	Ditch	N	2350.19
24	Swale	NA	1716.72
25	Swale	NA	763.19
26	Swale	NA	281.99
27	Swale	NA	573.43
28	Swale	NA	2161.13
29	Swale	NA	526.27
30	Ditch	S	444.90
31	Swale	S	819.97
32	Ditch	S	1558.18
33	Ditch	N	1822.16
34	Ditch	NA	3604.28
35	Ditch	NA	1405.23
36	Ditch	NA	1868.47
37	Swale	NA	2753.01
38	Ditch	NA	1352.08
39	Ditch	NA	2300.63
40	Swale	NA	1792.80
41	Ditch	NA	4351.32
42	Ditch	NA	713.96
43	Ditch	NA	2047.93
44	Swale	S	1489.05
45	Swale	NA	762.51
46	Ditch	ESE	1424.50

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Table 3
Current Conveyance Structures and Flow Direction
Lafayette Forest Wildlife And Environmental Area

ID	TYPE	FLOW	Length (feet)
47	Ditch	SE	1013.07
48	Swale	NA	1268.10
49	Ditch	ENE	295.49
50	Ditch	NW	2005.04
51	Swale	NA	1859.97
52	Ditch	NA	740.25
53	Swale	NA	1517.91
54	Swale	NA	1223.19
55	Swale	NA	2471.10
56	Swale	NA	763.19
57	Swale	NA	274.47
58	Swale	NA	586.20
59	Swale	NA	2217.84
60	Swale	NA	761.19
61	Ditch	S	434.26
62	Swale	S	939.73
63	Ditch	SSW	1073.88
64	Ditch	SSW	1848.99
65	Ditch	NE	1185.44
66	Swale	SE	192.08
67	Ditch	S	935.87
68	Swale	NA	747.72
69	Ditch	NA	2466.25
70	Ditch	NA	950.54
71	Ditch	NA	1477.95
72	Ditch	NA	145.83
73	Swale	NA	1556.98
74	Ditch	E	358.02
75	Swale	S	453.79
76	Swale	NA	944.02
77	Berm	NA	1768.63
78	Berm	NA	2487.98
79	Berm	NA	485.33
80	Berm	NA	2031.23
81	Berm	NA	1837.17
82	Berm	NA	1835.97

NA = Not Applicable, flow direction could not be determined in the field due to dry conditions

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Table 4
Flow Measurements and Water Balance
Lafayette Forest Wildlife And Environmental Area

FLOW MEASUREMENTS

Station ID	Date			Coordinates	
	3/30/2010	4/13/2010	5/5/2010	Latitude	Longitude
Station 3	6.43	No Data (1)	No Data (1)	29° 51' 53.68" N	82° 59' 53.56" W
Station 4	8.94	4.27	10.63	29° 51' 37.49" N	83° 00' 00.68" W
Station 5	13.80	6.95	23.22	29° 50' 41.47" N	82° 59' 20.93" W
Station 6	1.10	No Data (1)	No Data (1)	29° 50' 34.27" N	83° 00' 00.69" W
Station 7	2.64	0.65	No Data (1)	29° 50' 58.21" N	83° 00' 01.67" W
Station 8	9.07	3.56	18.40	29° 51' 03.47" N	82° 59' 54.22" W
Station 9	5.96	0.74	17.34	29° 51' 6.059" N	82° 59' 55.80" W
Station 10	11.07	2.95	11.98	29° 50' 27.87" N	82° 58' 2.49" W

(1) No data could be collected due to aquatic vegetation or low flow conditions

WATER BALANCE

Stream/Ditch Segment	Loss/Gain (Cubic Feet Per Second)		
	3/30/2010	4/13/2010	5/5/2010
Station 3 to Station 4	2.51	N/A	N/A
Stations 4, 7, and 9 to Station 8	-8.47	-2.10	N/A
Station 6 to Station 7	1.54	N/A	N/A
Station 8 to Station 5	4.73	3.39	4.82
Station 5 to Station 10	-2.73	-4.00	-11.24

Table 5
Existing Water Control Structures
Lafayette Forest Wildlife And Environmental Area

STRUCTURE	DIAMETER (inches)	HEIGHT (feet above water)	WIDTH (feet)	LENGTH (feet)	MATERIAL	FLOW DIRECTION	CONDITION	COMMENT	LATITUDE	LONGITUDE
Bridge		6	12	20	concrete	South	good		29° 51' 54.00" N	82° 59' 53.65" W
Culvert	60			30	metal	South	good	Flow Station 4 - collected south of culvert outflow	29° 51' 37.70" N	83° 0' 1.03" W
Culvert	60			30	asphalt covered aluminum	East	new - good	Flow Station 5	29° 50' 42.36" N	82° 59' 21.60" W
Culvert	36			30	metal	North	good	Flow Station 6	29° 50' 34.02" N	83° 0' 1.07" W
Bridge		6	16	30	concrete	North	good - fair	Flow Station 7	29° 50' 58.85" N	83° 0' 1.57" W
Culvert	60			30	metal	East	good - fair	flow Station 8	29° 51' 2.64" N	82° 59' 55.06" W
Bridge		4	16	30	concrete	South	good - fair		29° 51' 21.63" N	82° 59' 49.38" W
Bridge		11	20 feet total culverts	83	concrete	East	good	Flow Station 10	29° 50' 28.06" N	82° 58' 3.10" W
Culvert	18			23	metal	North	fair		29° 50' 23.83" N	82° 58' 5.46" W
Culvert	18			40	metal	South	poor - old	earth berm on the north side of the culvert	29° 50' 29.14" N	82° 59' 47.47" W
Low Water Crossing					earth and logs	South	poor	area is connecting to heads - ponded on both sides	29° 50' 1.02" N	83° 0' 2.23" W
Culvert	unknown			15 - 20	metal	East	poor	completely crushed and filed with sand	29° 50' 52.49" N	82° 59' 17.03" W
Culvert	18 inches each			25	metal	South	fair - poor	very old culverts - the south side is filled with sand	29° 50' 55.82" N	82° 58' 53.42" W
Culvert	20			25	metal	East	poor		29° 51' 30.47" N	82° 58' 56.66" W
Culvert	20			25	metal	East	poor	ponded in swamp to the west	29° 51' 13.00" N	83° 0' 4.72" W
Culvert	20			25	metal	East	fair		29° 50' 36.62" N	82° 59' 53.55" W
Culvert	20			28	metal	South	fair		29° 51' 46.24" N	83° 0' 11.31" W
Low Water Crossing									29° 51' 32.25" N	82° 59' 34.65" W
Culvert	20			30	metal	West	fair		29° 51' 32.41" N	82° 59' 31.81" W
Culvert	20			25	metal	South	fair	approximately half of the diameter of the culvert has vegetation and soil blocking the flow	29° 51' 44.85" N	82° 59' 0.70" W
Culvert	20			25	metal	East	poor		29° 51' 46.20" N	82° 58' 59.37" W

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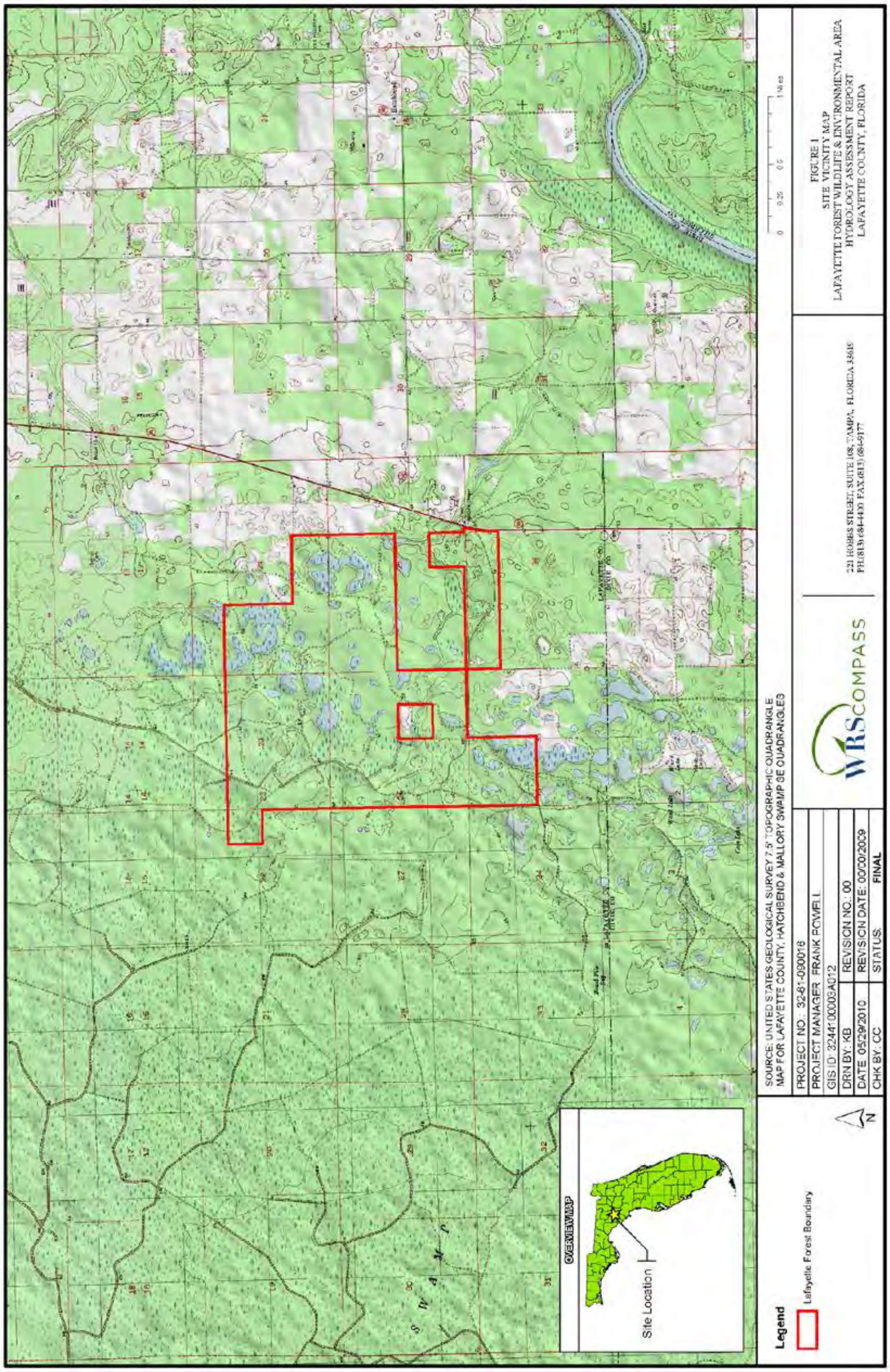
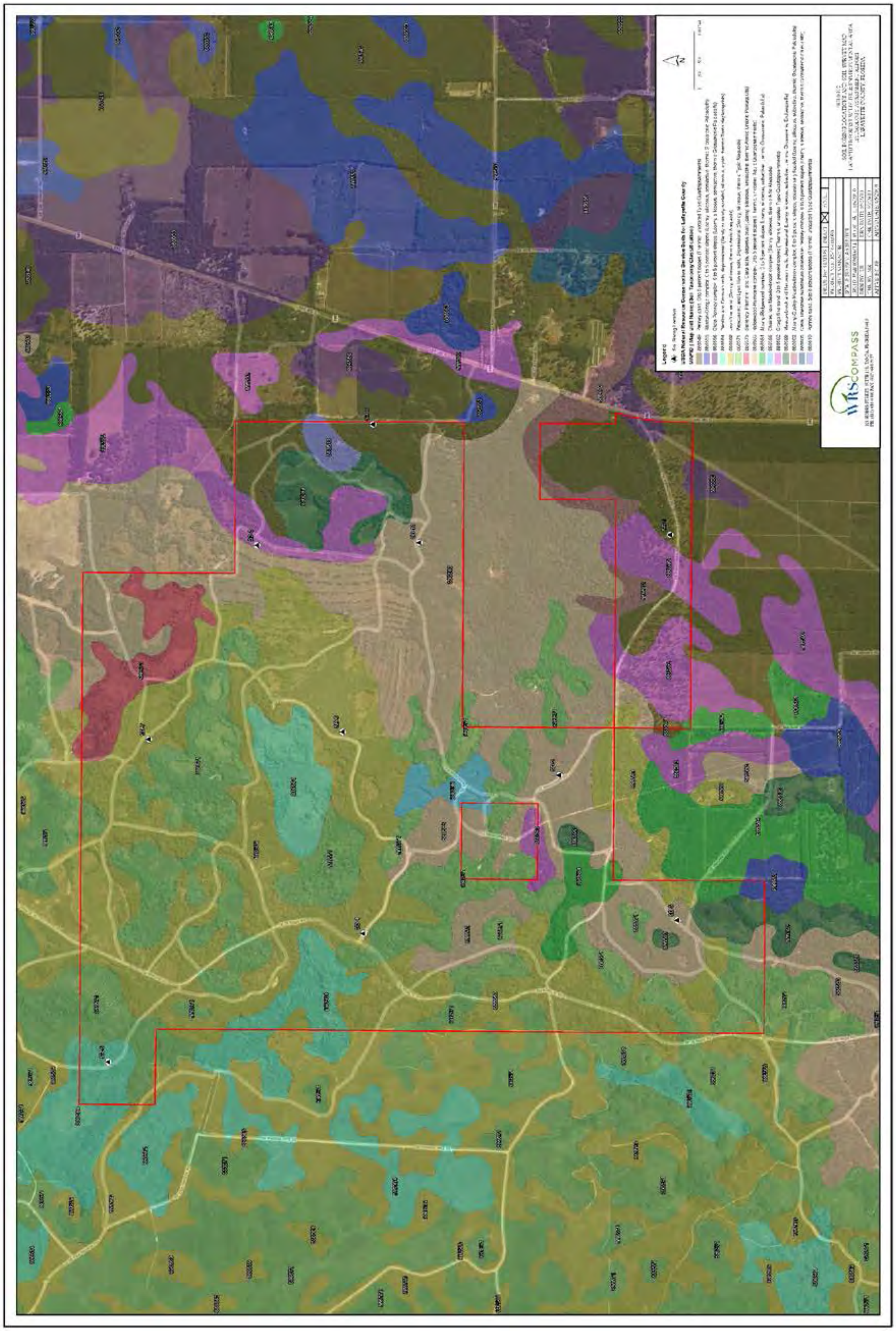
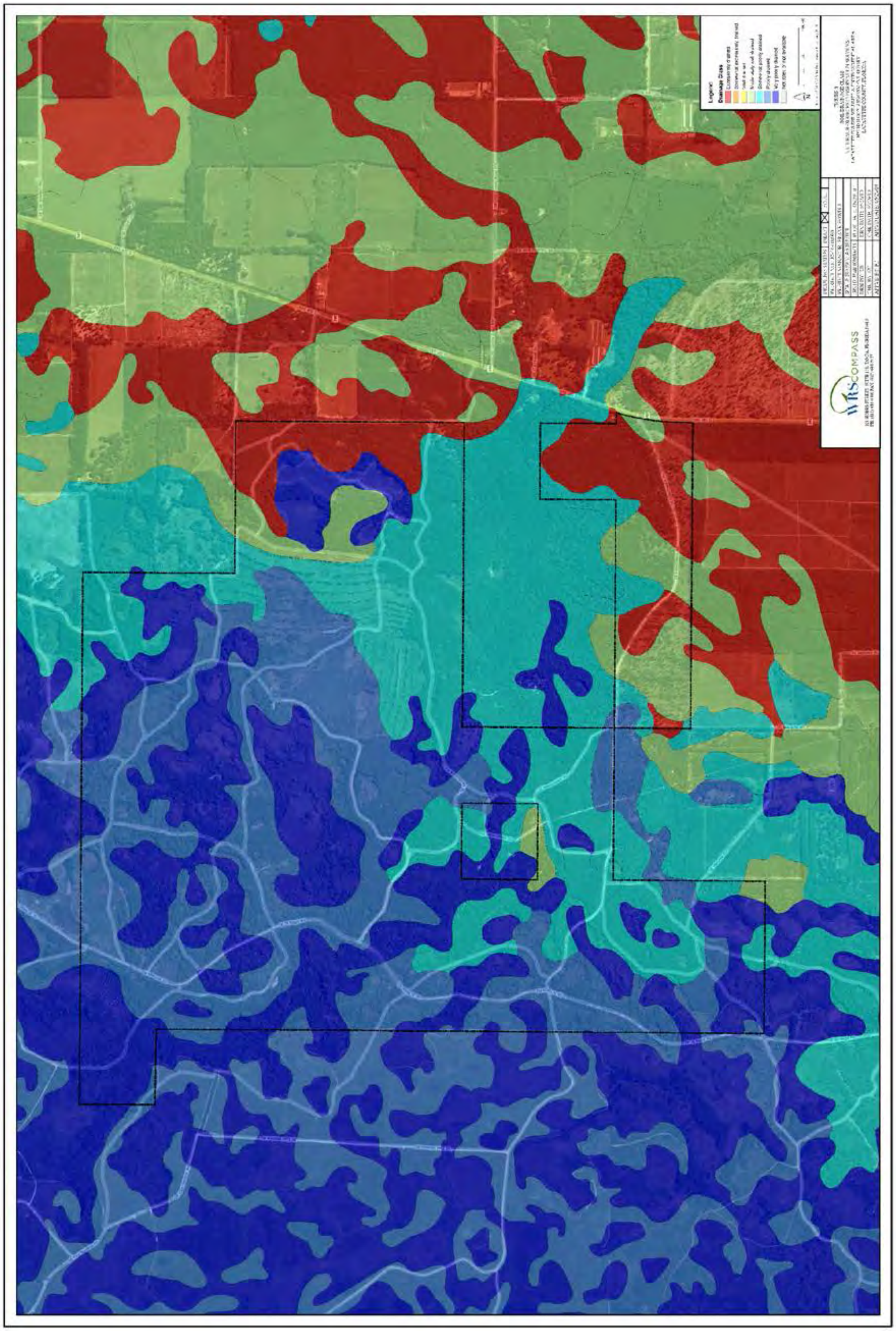
Table 6
Recommended Water Control Structures
Lafayette Forest Wildlife And Environmental Area

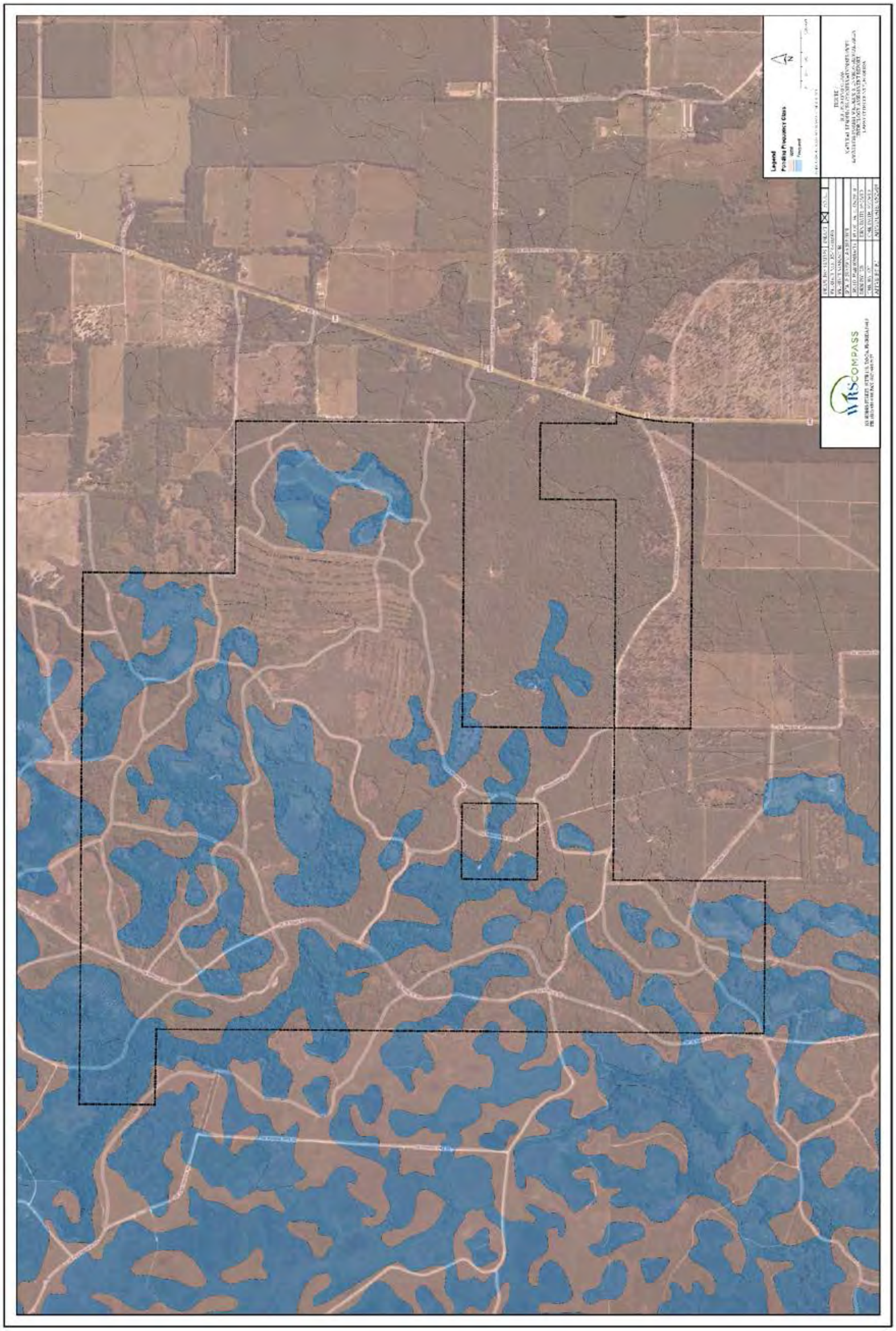
ID	Structure	Latitude	Longitude
1	Replace Culvert	29° 51' 46.20" N	82° 58' 59.37" W
2	Replace Culvert	29° 51' 44.85" N	82° 59' 0.70" W
3	New Culvert	29° 51' 45.11" N	82° 59' 12.62" W
4	New Culvert	29° 51' 50.57" N	82° 59' 29.98" W
5	Replace Culvert	29° 51' 30.47" N	82° 58' 56.68" W
6	New Culvert	29° 51' 25.71" N	82° 59' 15.77" W
7	Replace Culvert	29° 51' 32.41" N	82° 59' 31.81" W
8	Upgrade to Hardened Low Water Crossing	29° 51' 32.25" N	82° 59' 34.66" W
9	Replace Culvert	29° 50' 55.82" N	82° 58' 53.42" W
10	Replace Culvert	29° 50' 52.49" N	82° 59' 17.03" W
11	New Culvert	29° 51' 32.39" N	82° 59' 44.64" W
12	Replace Culvert	29° 51' 46.15" N	83° 0' 11.12" W
13	Replace Culvert	29° 51' 13.00" N	83° 0' 4.72" W
14	New Culvert	29° 51' 14.77" N	82° 59' 46.90" W
15	Replace Culvert	29° 50' 23.83" N	82° 58' 5.46" W
16	Replace Culvert	29° 50' 29.14" N	82° 59' 47.47" W
17	Replace Culvert	29° 50' 36.62" N	82° 59' 53.56" W
18	Upgrade to Hardened Low Water Crossing	29° 50' 1.02" N	83° 0' 2.23" W
19	New Culvert	29° 50' 7.26" N	83° 0' 9.60" W
20	New Culvert	29° 50' 20.98" N	83° 0' 4.96" W
21	New Culvert	29° 50' 6.95" N	82° 59' 41.50" W
22	New Culvert	29° 51' 44.54" N	82° 59' 57.56" W

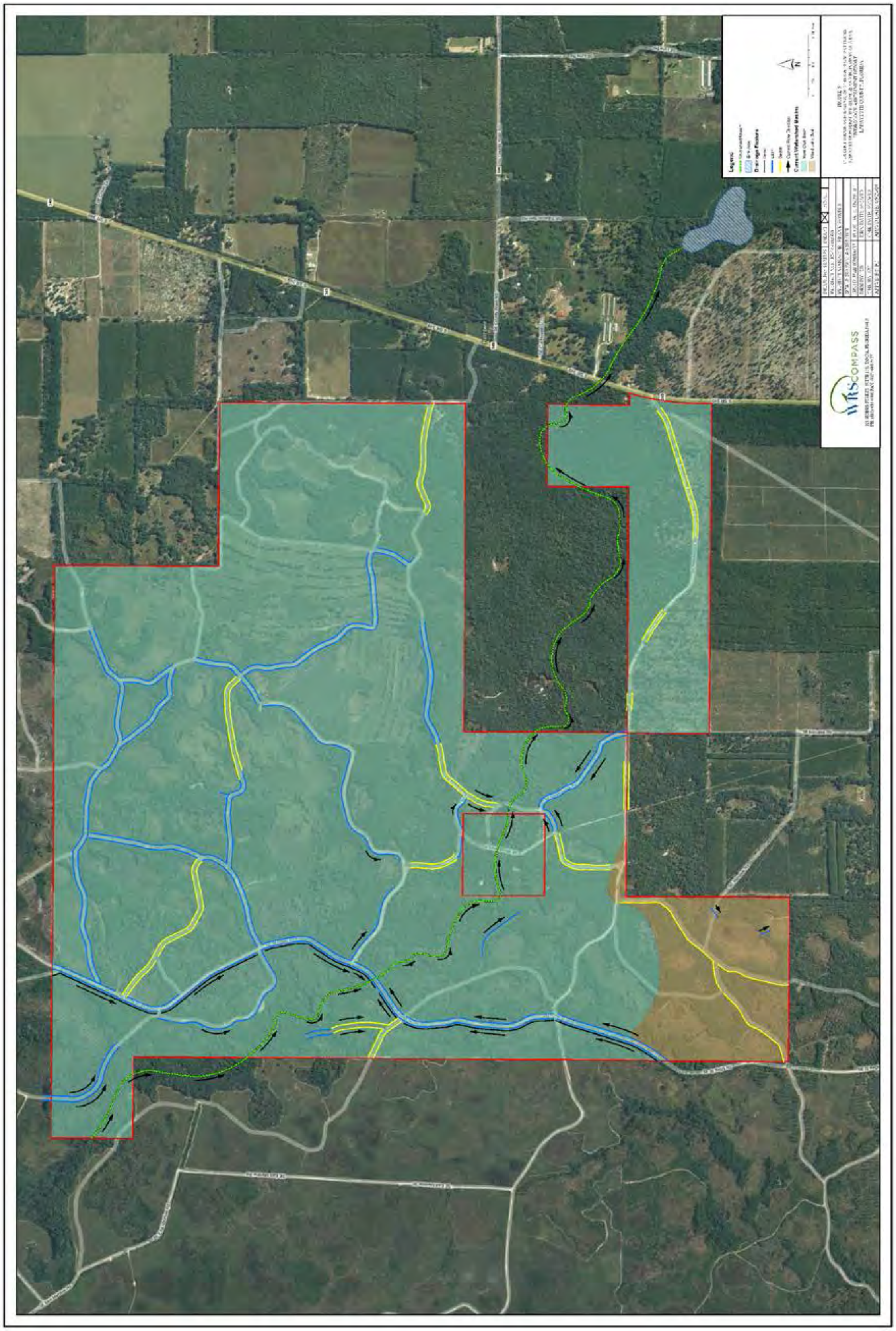
Figures

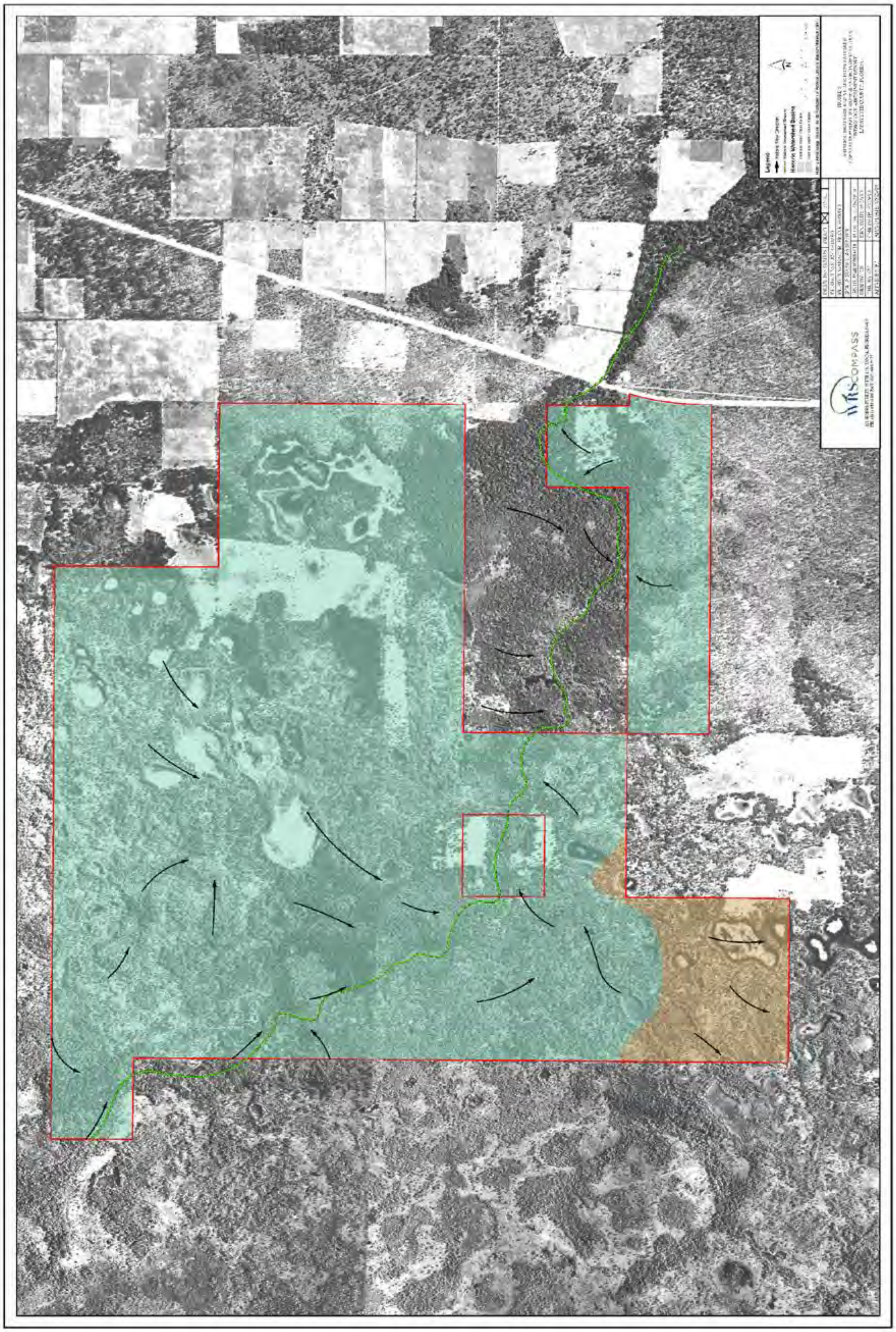

Legend
Lafayette Forest Boundary
OVERVIEW MAP
Site Location
N
SOURCE: UNITED STATES GEOLOGICAL SURVEY 7.5' TOPOGRAPHIC QUADRANGLE
MAP FOR LAFAYETTE COUNTY, HATCHBEND & MALLORY SWAMP SE QUADRANGLES
PROJECT NO.: 32-61-090016
PROJECT MANAGER: FRANK POWELL
GIS ID: 32441'00003A012
DRN BY: KB
REVISION NO.: 00
DATE: 05/29/2010
REVISION DATE: 00/00/2009
CHK BY: CC
STATUS: FINAL
WRS COMPASS
221 HOBBS STREET, SUITE 108, TAMPA, FLORIDA 33619
PH.(813) 684-4400 FAX (813) 684-9177
0 0.25 0.5 1 Miles
FIGURE 1
SITE VICINITY MAP
LAFAYETTE FOREST WILDLIFE & ENVIRONMENTAL AREA
HYDROLOGY ASSESSMENT REPORT
LAFAYETTE COUNTY, FLORIDA

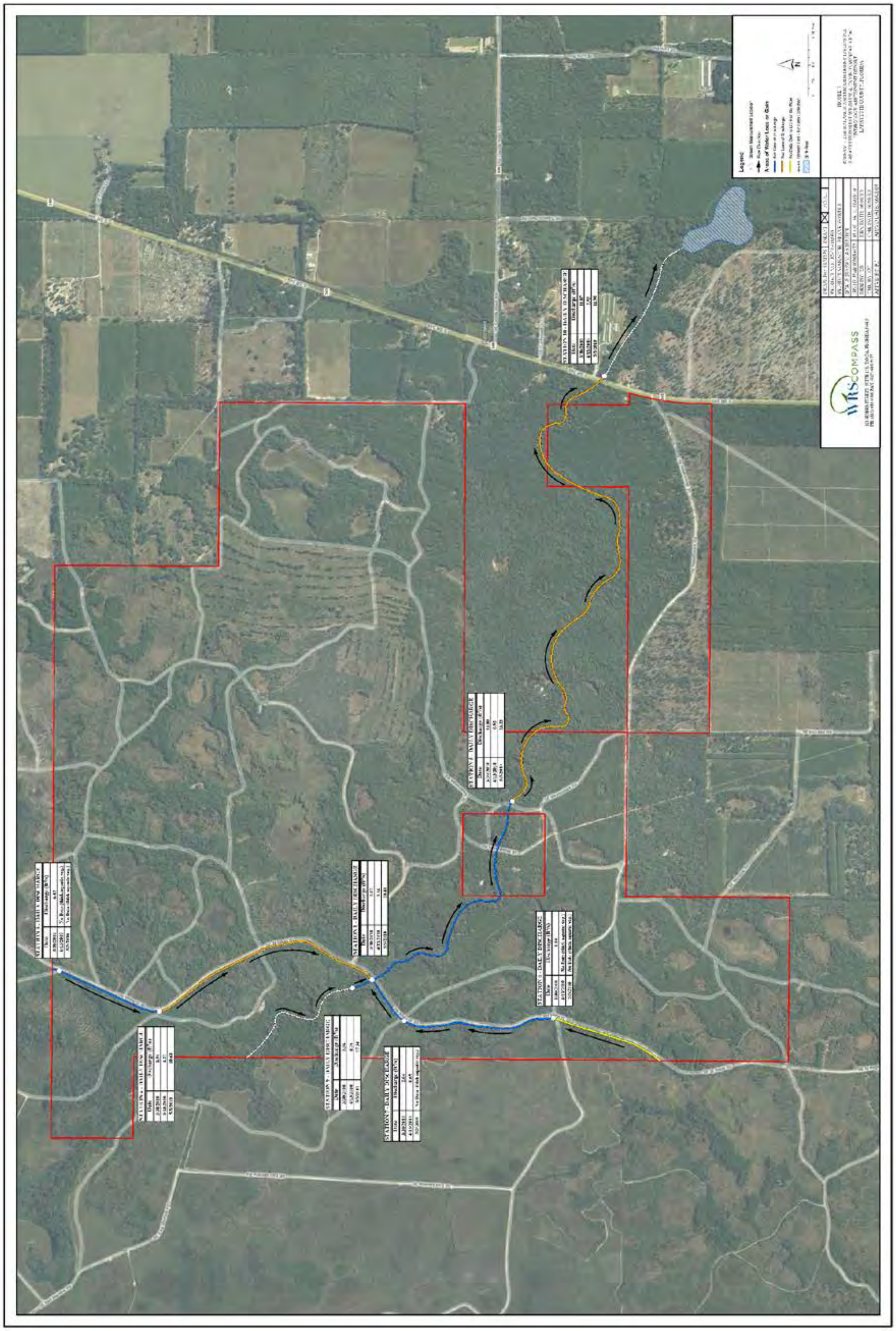


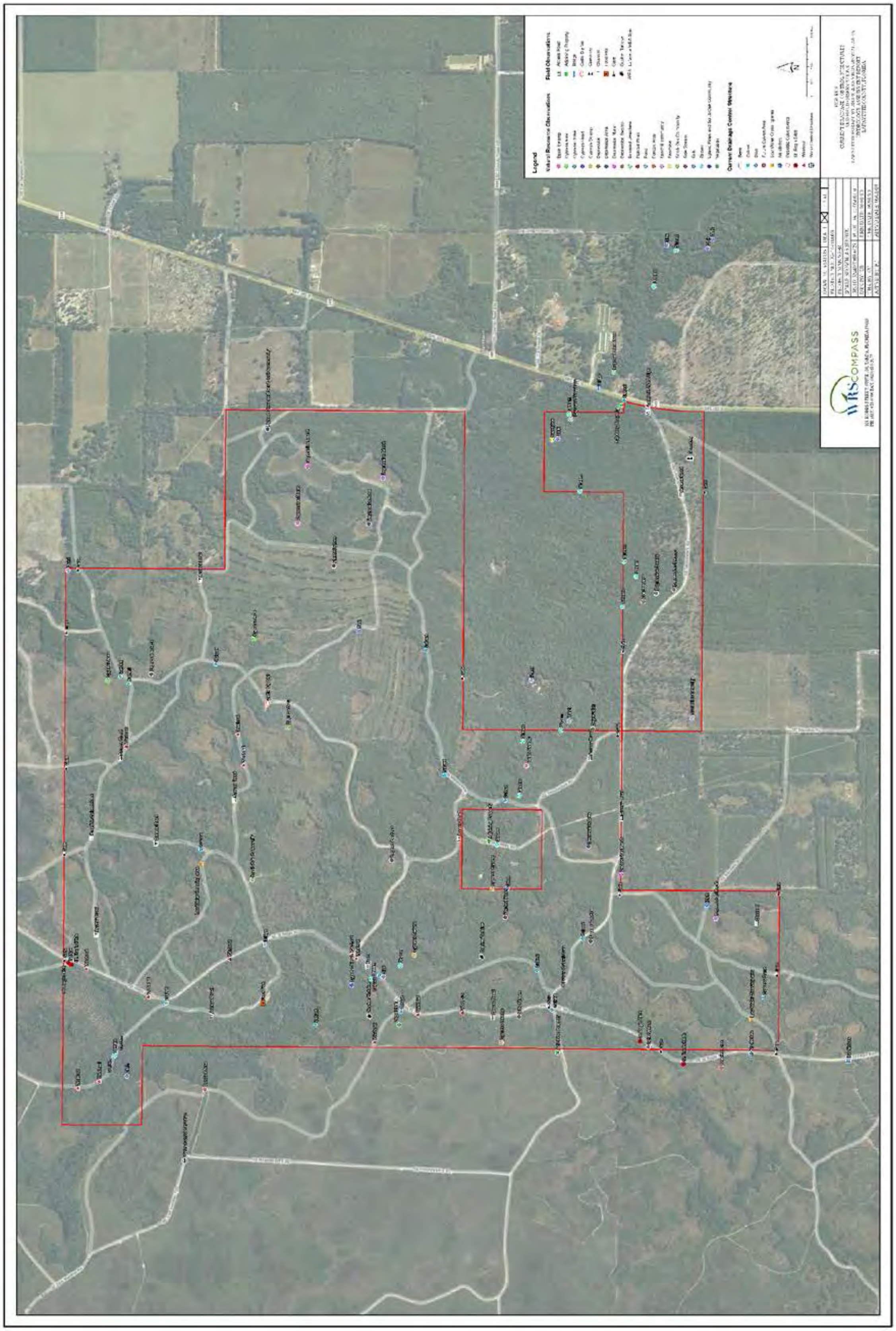


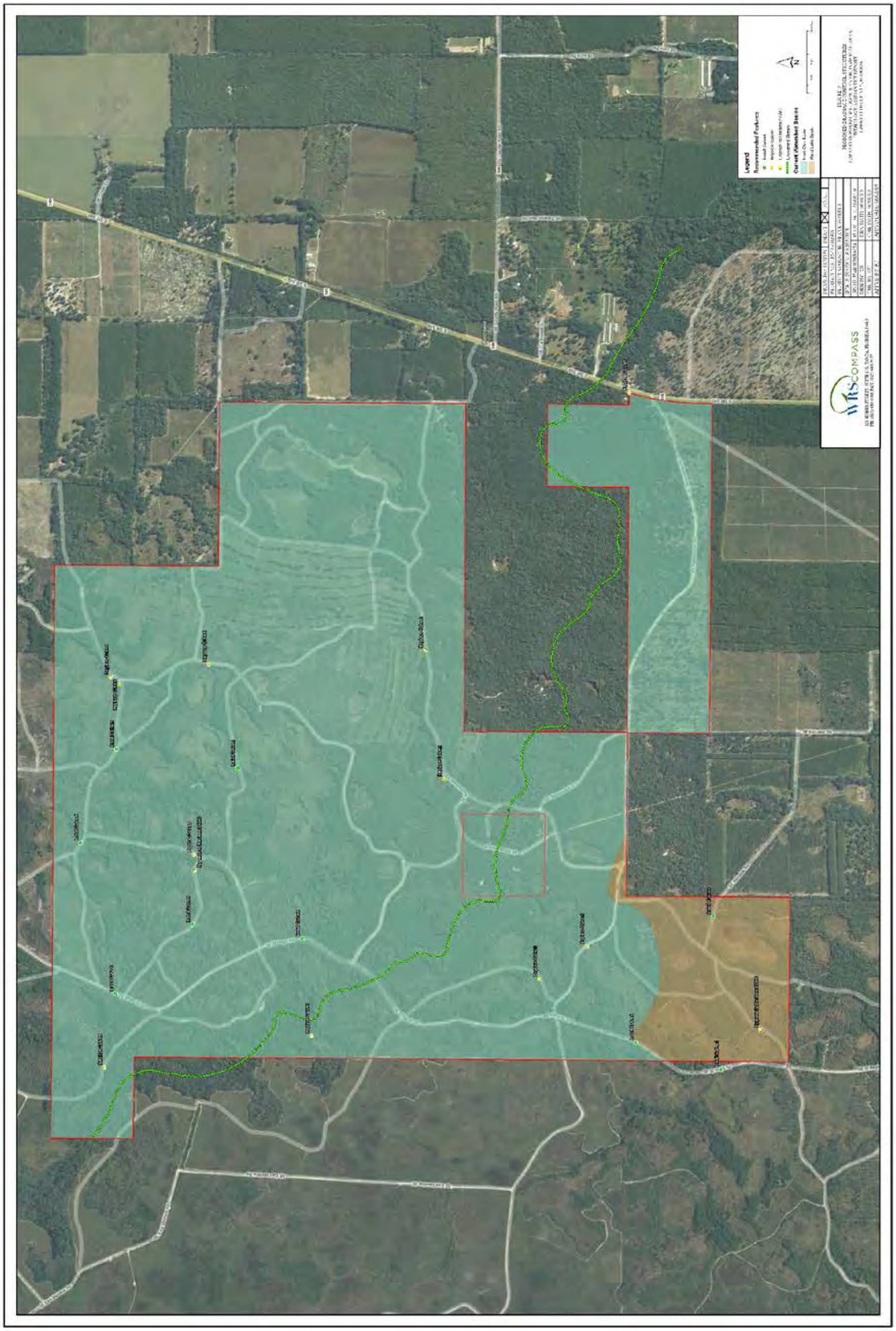












Appendices

Appendix A

Site Photographs

Photograph 1: A typical inflow into St. Regis Ditch from Mallory Swamp observed at the Subject Property.

Photograph 2: A concrete bridge spanning the St. Regis Ditch near the northern boundary of the Subject Property.

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SITE PHOTOGRAPHS **1 & 2**
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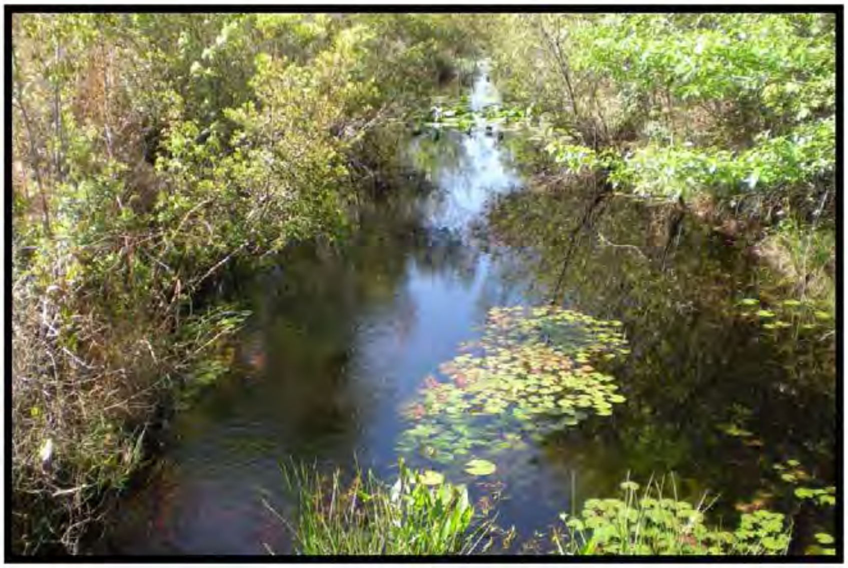
LAFAYETTE COUNTY, FLORIDA
WRS PROJECT NO.: 32-44-100003



Photograph 3: Overview of the St. Regis Ditch observed at the Subject Property.

Photograph 4: Overview of the St. Regis Ditch passing through a five-foot diameter steel culvert located at the Subject Property.

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SITE PHOTOGRAPHS **3 & 4**
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LAFAYETTE COUNTY, FLORIDA
WRS PROJECT NO.: 32-44-100003

Photograph 5: Overview of a newly installed 5 ft. diameter metal culvert with easterly flow observed at the Subject Property.

Photograph 6: Overview of a 36 inch diameter metal culvert in good condition located at the St. Regis Ditch on Subject Property. A northerly flow was observed.

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Photograph 7: A concrete bridge spanning the St. Regis Ditch observed at the Subject Property.

Photograph 8: Overview of a 5-foot diameter metal culvert in good condition under St. Regis Road at the Subject Property. Flows from three directions converged at this location to flow in a easterly direction.

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SITE PHOTOGRAPHS **7 & 8**
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LAFAYETTE COUNTY, FLORIDA
WRS PROJECT NO.: 32-44-100003

Photograph 9: Overview of the convergence point at St. Regis Road, looking downstream (east).

Photograph 10: Overview of a stream flowing southeast through a floodplain swamp on the Subject Property, located west of the convergence point at St. Regis Road.

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SITE PHOTOGRAPHS **9 & 10**
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LAFAYETTE COUNTY, FLORIDA
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Photograph 11: A concrete bridge spanning the St. Regis Ditch observed at the Subject Property.

Photograph 12: Overview of the St. Regis Ditch, flowing north, observed at the Subject Property.

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SITE PHOTOGRAPHS **11 & 12**
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LAFAYETTE COUNTY, FLORIDA
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Photograph 13: Overview of a typical access gate observed at the Subject Property.

Photograph 14: Overview of the St. Regis Ditch with no flow observed at the Subject Property.

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SITE PHOTOGRAPHS **13 & 14**
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Photograph 15: Sinkhole that the Unnamed Stream flows into east of the Subject Property

Photograph 16: Overview of a depression marsh observed at the Subject Property.

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Photograph 17: Overview of double box culverts in good condition at County Road 349 east of the Subject Property, flowing east.

Photograph 18: Overview of stream flowing underground into a sink area, located approximately ½ mile east of the Subject Property.

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SITE PHOTOGRAPHS **17 & 18**
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LAFAYETTE COUNTY, FLORIDA
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Photograph 19: Overview of a stream flowing east through the eastern portion of the Subject Property.

Photograph 20: Swamp area and ponding of stream observed on the Subject Property.

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Photograph 21: Overview of stream and bottomland forest observed at the Subject Property.

Photograph 22: Floodplain swamp observed on the Subject Property.

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SITE PHOTOGRAPHS **21 & 22**
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LAFAYETTE COUNTY, FLORIDA
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Photograph 23: Overview of floodplain swamp observed at the Subject Property.

Photograph 24: Overview of a depression observed on the Subject Property.

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SITE PHOTOGRAPHS **23 & 24**
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LAFAYETTE COUNTY, FLORIDA
WRS PROJECT NO.: 32-44-100003

Photograph 25: Overview of an 18 inch diameter metal culvert in poor condition observed at the Subject Property. Presumed flow direction is northerly.

Photograph 26: Overview of typical road-side swales observed at the Subject Property.

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Photograph 27: Overview of a typical access gate observed at the Subject Property.

Photograph 28: Overview of a typical access gate observed at the Subject Property.

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SITE PHOTOGRAPHS **27 & 28**
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LAFAYETTE COUNTY, FLORIDA
WRS PROJECT NO.: 32-44-100003

Photograph 29: A previously logged cypress dome observed at the Subject Property.

Photograph 30: Overview of an 18 inch diameter metal culvert in poor condition observed at the Subject Property. Presumed flow direction is southerly.

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SITE PHOTOGRAPHS **29 & 30**
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LAFAYETTE COUNTY, FLORIDA
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Photograph 31: Overview of typical access gate observed at the Subject Property.

Photograph 32: Overview of typical access gate observed at the Subject Property.

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SITE PHOTOGRAPHS **31 & 32**
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LAFAYETTE COUNTY, FLORIDA
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Photograph 33: Overview of typical access gate observed at the Subject Property.

Photograph 34: Overview of typical access gate observed at the Subject Property.

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SITE PHOTOGRAPHS **33 & 34**
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LAFAYETTE COUNTY, FLORIDA
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Photograph 35: Overview of typical access gate observed at the Subject Property.

Photograph 36: Overview of buried metal culverts in poor condition observed at the Subject Property.

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SITE PHOTOGRAPHS **35 & 36**
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LAFAYETTE COUNTY, FLORIDA
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Photograph 37: Overview of double 18 inch culverts in fair condition observed at the Subject Property.

Photograph 38: Overview of a 18 inch culvert in fair condition observed at the Subject Property.

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SITE PHOTOGRAPHS **37 & 38**
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LAFAYETTE COUNTY, FLORIDA
WRS PROJECT NO.: 32-44-100003

Photograph 39: Overview of a cattle dip vat observed at the Subject Property.

Photograph 40: Overview of a 18 inch culvert in fair condition observed at the Subject Property.

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SITE PHOTOGRAPHS **39 & 40**
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Photograph 41: Overview of a 18 inch culvert in fair condition observed at the Subject Property.

Photograph 42: Overview of a gopher tortoise burrow observed at the Subject Property.

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SITE PHOTOGRAPHS **41 & 42**
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Photograph 43: Overview of typical access road observed at the Subject Property.

Photograph 44: Overview of a 18 inch culvert in good condition observed at the Subject Property.

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SITE PHOTOGRAPHS **43 & 44**
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LAFAYETTE COUNTY, FLORIDA
WRS PROJECT NO.: 32-44-100003

Photograph 45: Overview of a 18 inch culvert in fair condition observed at the Subject Property.

Photograph 46: Overview of typical access road observed at the Subject Property.

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SITE PHOTOGRAPHS 45 & 46
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LAFAYETTE COUNTY, FLORIDA
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Photograph 47: Overview of a 18 inch culvert in poor condition observed at the Subject Property.

Photograph 48: Overview of a 18 inch culvert in fair condition observed at the Subject Property.

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SITE PHOTOGRAPHS **47 & 48**
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LAFAYETTE COUNTY, FLORIDA
WRS PROJECT NO.: 32-44-100003

Appendix B

Soil Borehole Logs

BORING LOG

Boring/Well Number: SB-1	Permit Number: N/A	FDEP Facility Identification Number: N/A	
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM	
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:	
Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 12
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): >12	Measured Well DTW (in feet after water recharges in well): N/A	OVA (list model and check type): N/A ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)		Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0-1"	1	Organic sand, very fine sand, gray/black, roots, subrounded, non-plastic, dry, poorly graded	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	1"-4'	2	Very fine sand, dry, loose, light brown, non-plastic, subrounded, poorly graded	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	4'-5.6'	3	Color changes to lighter brown white sand	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	5.6'-6.6'	4	Clayey sand, brown, slightly cohesive, roots, medium grain sand, subrounded sand, soft	SC	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	6.6'-8.2'	5	Medium grain sand, white, dry, loose, poorly graded, subrounded	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	8.2'-12'	6	Sandy clay, brown, slightly plastic, well graded, subangular, fine to medium grain sand, cohesive, sand pockets, orange sand veins, damp, medium stiff	SC	M	N/A
								7	*** Maximum depth 12' due to limited auger extentions.**			
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: SB-2	Permit Number: N/A	FDEP Facility Identification Number: N/A
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:
Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25 / Borehole Depth (feet): 5
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): 5 / Measured Well DTW (in feet after water recharges in well): N/A	OVA (list model and check type): N/A ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)		Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0-6"	1	Gray sand, loose, dry, organics (roots), non-cohesive, fine grained, poorly graded	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	6"-4.2'	2	White sand, fine to medium grained, loose, poorly graded, non-cohesive, moist, subrounded grains	SM	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	4.2'-5'	3	White sand, fine to medium grained, loose, poorly graded, non-cohesive, wet, subrounded grains	SM	W	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	>5'	4	Saturated	SC	S	N/A
								5				
								6				
								7				
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: SB-3	Permit Number: N/A	FDEP Facility Identification Number: N/A
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: AM PM End Time: AM PM
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:

Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 5.4
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): 5.4	Measured Well DTW (in feet after water recharges in well): N/A	OVA (list model and check type): N/A FID PID

Disposition of Drill Cuttings [check method(s)]: Drum Spread Backfill Stockpile Other

(describe if other or multiple items are checked):

Borehole Completion (check one): Well Grout Bentonite Backfill Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA		Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0-6"	1	Organic rich fine grained sand, loose, dry, poorly graded, gray, roots	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	6"-4'	2	Organic rich fine grained sand, loose, dry, poorly graded, gray, no roots	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	4'-5.4'	3	sandy clay, moist, fine to medium grained sand, sub-angular, cohesive, slightly plastic, light brownish red	SM	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	5.4'	4	Auger refusal (limerock), saturated	SC	S	N/A
								5				
								6				
								7				
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings
Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Page 1 of 1

Boring/Well Number: SB-4	Permit Number: N/A	FDEP Facility Identification Number: N/A
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:
Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25
Borehole Depth (feet): 4.5		
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): 4.5	Measured Well DTW (in feet after water recharges in well): N/A
OVA (list model and check type): N/A ☐ FID ☐ PID		

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA		Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0-4"	1	Organic rich sand, poorly graded, roots, gray/black, fine grained, subrounded	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	4"-3'	2	Organic rich sand, poorly graded, no roots, light brown, fine grained, subrounded	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	3'-3.5'	3	Organic rich sand, poorly graded, no roots, light brown, fine grained, subrounded	SM	W	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	4.5'	4	Organic rich sand, poorly graded, no roots, light brown, fine grained, subrounded	SC	S	N/A
								5				
								6				
								7				
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings
Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: SB-5	Permit Number: N/A	FDEP Facility Identification Number: N/A
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: AM PM; End Time: AM PM
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:
Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25
		Borehole Depth (feet): 5.0
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): 5.0	Measured Well DTW (in feet after water recharges in well): N/A
OVA (list model and check type): N/A	FID PID	

Disposition of Drill Cuttings [check method(s)]: Drum Spread Backfill Stockpile Other

(describe if other or multiple items are checked):

Borehole Completion (check one): Well Grout Bentonite Backfill Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)		Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0-8"	1	Highly organic rich sand, fine grained, black, poorly graded	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	8"-1.5'	2	Gray sand, poorly graded, fine grained, damp	SM	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	1.5'-2.7'	3	Brown sand with gravel inclusions (red), well graded, very fine grained, moist, loose, non plastic, non cohesive	SM	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	2.7'-5'	4	Light brown, fine grain sand, wety, poorly graded, non cohesive, non plastic	SC	W	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	5'+	5	Sand becomes darker brown and saturated	SC	S	N/A
								6				
								7				
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings
Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: SB-6	Permit Number: N/A	FDEP Facility Identification Number: N/A
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:

Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 3.5
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): 3.5	Measured Well DTW (in feet after water recharges in well): N/A	OVA (list model and check type): N/A ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other
(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)		Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0-4"	1	Oranic rich sand, black/gray, poorly graded, fine grain, non-cohesive, non-plastic, loose, subrounded	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	4"-2.5'	2	Dark brown sand, poorly graded, fine grain, non-cohesive, non-plastic, loose, subrounded	SM	W	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	2.5' - 3.5'	3	Light brown sand, poorly graded, fine grain, non-cohesive, non-plastic, loose, subrounded	SM	W	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	3.5' +	4	Soil becomes saturated at 3.5'	SC	S	N/A
								5				
								6				
								7				
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings
Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: SB-7	Permit Number: N/A	FDEP Facility Identification Number: N/A
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:

Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 3.6
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): 3.6	Measured Well DTW (in feet after water recharges in well): N/A	OVA (list model and check type): N/A ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other
(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA		Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0-5"	1	Oranic rich sand, fine grain, subrounded, non-cohesive, non-plastic	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	5"-1.2'	2	Dark brown sand, fine grain, poorly graded, non-cohesive, non-plastic, subrounded	SM	W	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	1.2' - 3.6'	3	Light brown sand, medium grain, poorly graded, non-cohesive, non-plastic, subrounded	SM	W	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	3.6'+	4	Soil becomes saturated at 3.6'	SC	S	N/A
								5				
								6				
								7				
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings
Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

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Boring/Well Number: SB-8	Permit Number: N/A		FDEP Facility Identification Number: N/A
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM	
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard		Environmental Technician's Name:
Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 8.0
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): 8.0	Measured Well DTW (in feet after water recharges in well): N/A	OVA (list model and check type): N/A ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA		Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0-.5"	1	Organic rich sand, black/gray fine sand, poorly graded, non-cohesive, non-plastic, subrounded, dry, loose	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	5"- 1.5'	2	Fine grained sand, brown, poorly graded, subrounded, non-cohesive, non-plastic, loose	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	1.5' - 5.5'	3	Medium grained sand, light brown to white, poorly graded, subrounded, non-cohesive, non-plastic, loose, moist	SM	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	5.5' - 7'	4	Medium grained sand, dark brown, poorly graded, subrounded, non-cohesive, non-plastic, loose, wet	SC	W	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	8'+	5	Soil becomes saturated at 8'	SC	S	N/A
								6				
								7				
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings
Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Page 1 of 1

Boring/Well Number: SB-9	Permit Number: N/A	FDEP Facility Identification Number: N/A
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:

Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 12.0
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): >12.0	Measured Well DTW (in feet after water recharges in well): N/A	OVA (list model and check type): N/A ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

(describe if other or multiple items are checked):

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)		Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0 - 3"	1	Organic rich sand, fine grained, black/gray, poorly graded, loose, dry, non-cohesive, non-plastic	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	3"- 6"	2	Drak brown sand, fine grained, poorly graded, loose, dry, non-cohesive, non-plastic	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	6" - 5.5'	3	Light brown to white, medium grained sand, loose, non-plastic, non-cohesive, dry	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	5.5' - 8'	4	Dark orange, medium grained sand, loose, non-plastic, non-cohesive, moist	SC	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	8' - 8.5'	5	Orange course grained sand, well graded, non-cohesive, non-plastic, moist	SC	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	8.5' - 12'	6	White course grained sand, well graded, non-cohesive, non-plastic, moist	SC	M	N/A
								7	*** Did not have additional auger extentions to go deeper**			
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings
Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: SB-10	Permit Number: N/A	FDEP Facility Identification Number: N/A	
Site Name: Lafayette Forest WEA	Borehole Start Date: 04/06/10 End Date: 04/06/10	Borehole Start Time: AM PM End Time: AM PM	
Environmental Contractor: WRS Infrastructure & Environment	Geologist's Name: Melissa Ballard	Environmental Technician's Name:	
Drilling Company: N/A	Pavement Thickness (inches): N/A	Borehole Diameter (inches): 3.25	Borehole Depth (feet): 9.0
Drilling Method(s): Hand Auger	Apparent Borehole DTW (in feet from soil moisture content): 9.0	Measured Well DTW (in feet after water recharges in well): N/A	OVA (list model and check type): N/A FID PID

Disposition of Drill Cuttings [check method(s)]: Drum Spread Backfill Stockpile Other

(describe if other or multiple items are checked):

Borehole Completion (check one): Well Grout Bentonite Backfill Other (describe)

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)		Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
HA	N/A	N/A	N/A	N/A	N/A	N/A	0 - 6"	1	Organic rich sand, gray, loose, fine grained, dry, non-cohesive, non-plastic	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	6"-2'	2	Brown sand, fine grained, dry, non-cohesive, non-plastic, loose	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	2' - 6.5'	3	Light tan to white sand, medium grained, dry, non-cohesive, non-plastic, loose	SM	D	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	6.5' - 8'	4	Light brown sand, medium grained, moist, non-cohesive, non-plastic, loose	SC	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	8' - 9.0'	5	Dark brown sand, medium grained, moist, non-cohesive, non-plastic, loose	SC	M	N/A
HA	N/A	N/A	N/A	N/A	N/A	N/A	9.0' +	6	Soil saturated at 9.0'	SC	S	N/A
								7				
								8				
								9				
								10				
								11				
								12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings
Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

Appendix C

Custom Soil Resource Report for Lafayette County Florida
Lafayette Forest WEA

United States Department of Agriculture

NRCS

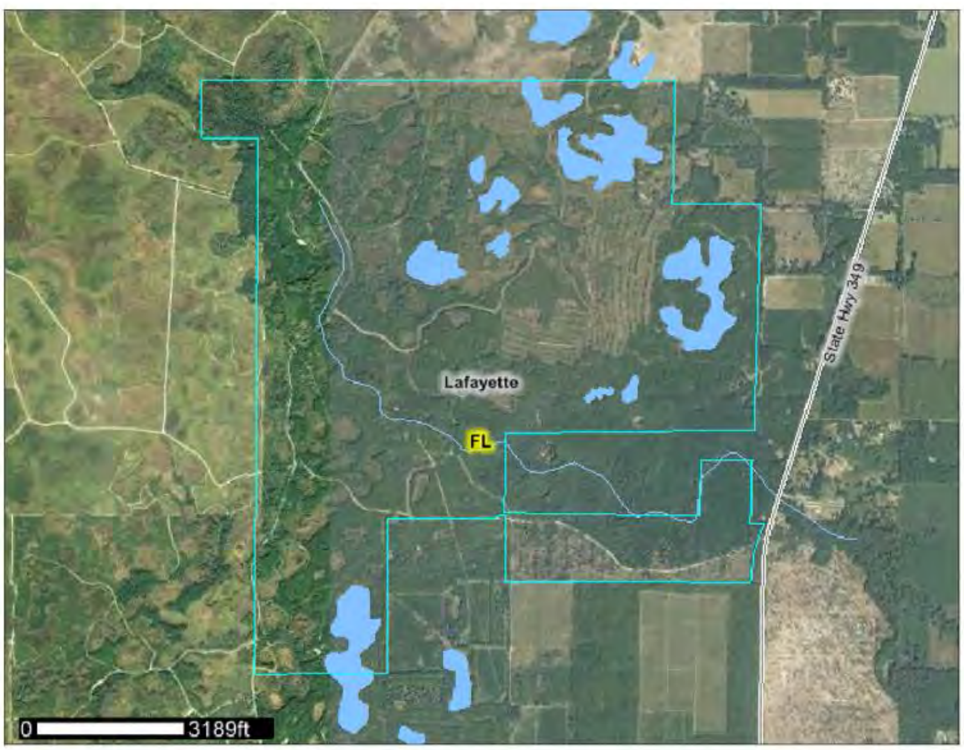
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Lafayette County, Florida

Lafayette Forest WEA



May 11, 2010

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

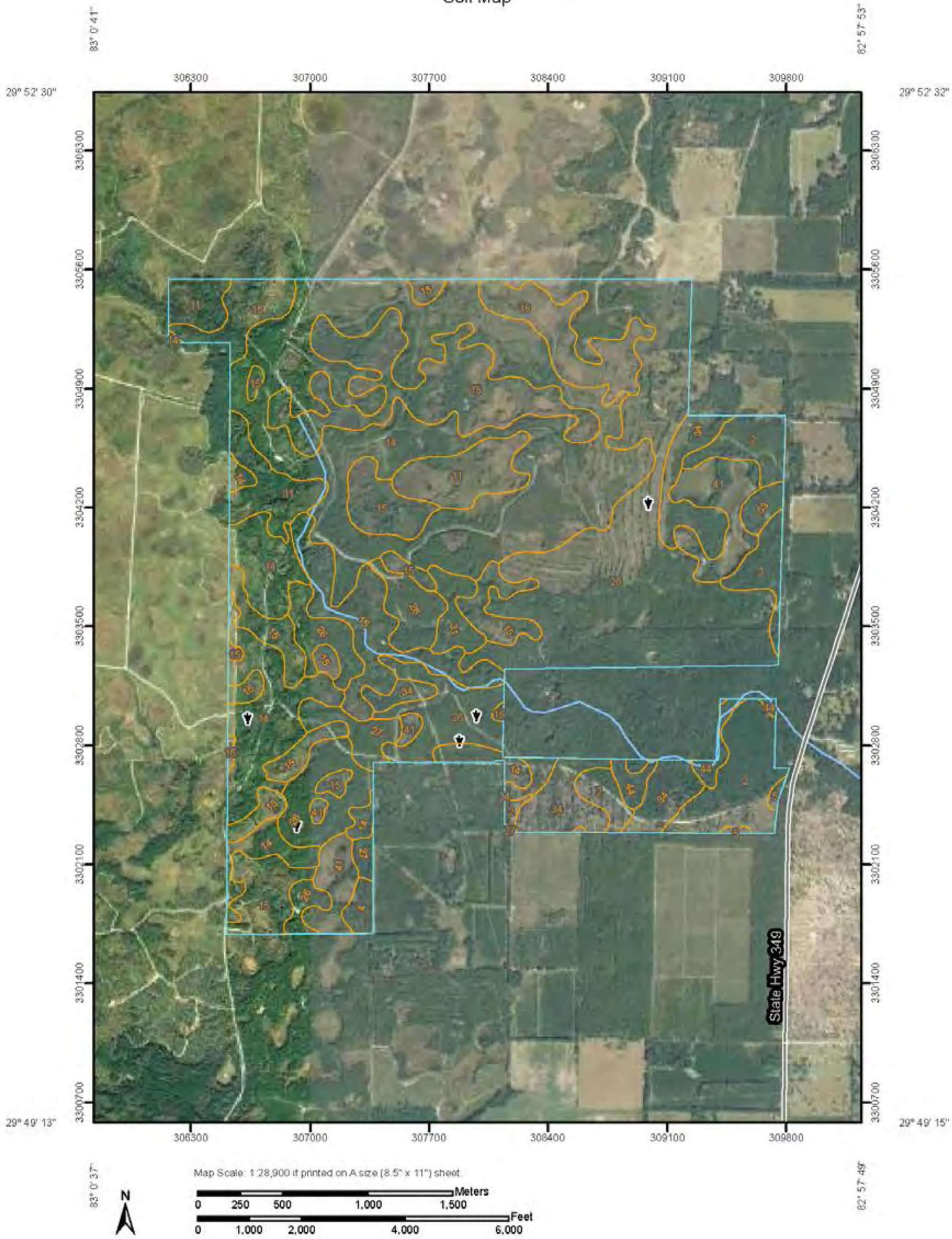
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

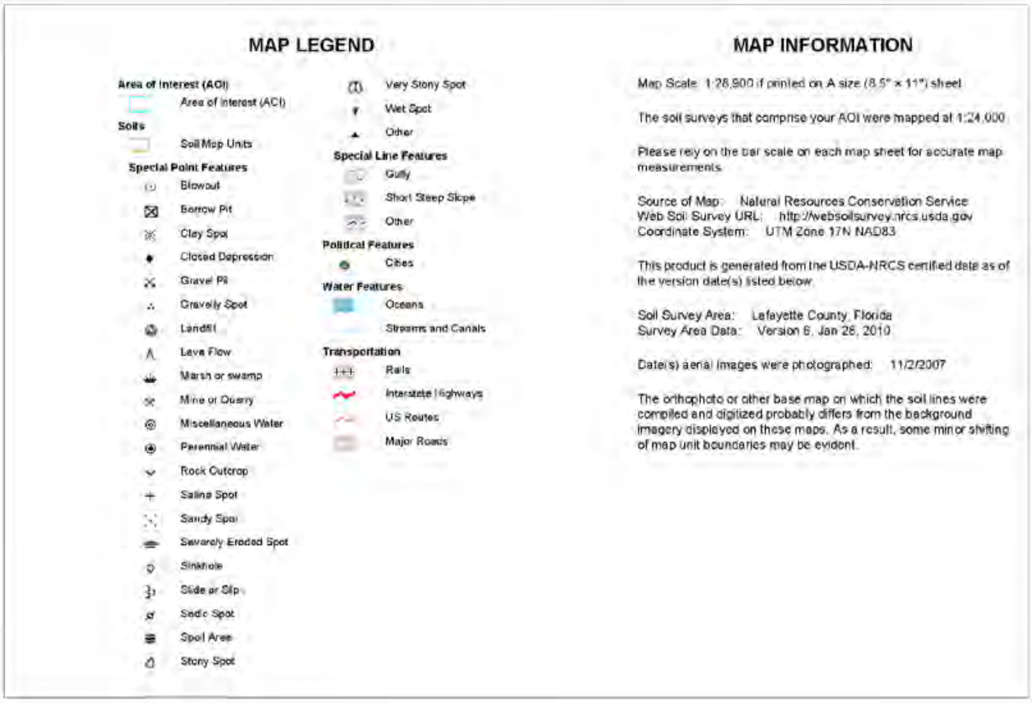
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map





MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Cities

Water Features

Oceans

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

MAP INFORMATION

Map Scale: 1:28,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Lafayette County, Florida (FL067)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
2	Penney sand, 0 to 5 percent slopes	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	121.3	5.1%
14	Leon fine sand	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	32.9	1.4%
31	Chaires, low-Meadowbrook complex	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	12.3	0.5%
Totals for Area of Interest		**2,398.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lafayette County, Florida

2—Penney sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 50 to 250 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Penney and similar soils: 90 percent
Minor components: 10 percent

Description of Penney

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 72 to 84 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability (nonirrigated): 4s

Typical profile

0 to 7 inches: Sand
7 to 55 inches: Sand
55 to 80 inches: Fine sand

Minor Components

Blanton

Percent of map unit: 5 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear

Ortega

Percent of map unit: 5 percent
Landform: Rises on marine terraces

Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

4—Blanton-Ortega complex, 0 to 5 percent slopes

Map Unit Setting
Elevation: 20 to 350 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition
Blanton and similar soils: 55 percent
Ortega and similar soils: 26 percent
Minor components: 19 percent

Description of Blanton

Setting
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 42 to 66 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 4.3 inches)

Interpretive groups
Land capability (nonirrigated): 3s

Typical profile
0 to 6 inches: Fine sand
6 to 44 inches: Fine sand
44 to 80 inches: Sandy clay loam

Description of Ortega

Setting
Landform: Rises on marine terraces

Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 48 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 3.1 inches)

Interpretive groups
Land capability (nonirrigated): 3s

Typical profile
0 to 6 inches: Fine sand
6 to 80 inches: Fine sand

Minor Components

Albany
Percent of map unit: 7 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear

Penney
Percent of map unit: 6 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Ridgewood
Percent of map unit: 6 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

5—Otela-Penney complex, 0 to 5 percent slopes

Map Unit Setting

Elevation: 20 to 250 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Otela and similar soils: 55 percent
Penney and similar soils: 43 percent
Minor components: 2 percent

Description of Otela

Setting

Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Typical profile

0 to 6 inches: Fine sand
6 to 60 inches: Fine sand
60 to 75 inches: Sandy loam
75 to 80 inches: Sandy clay loam

Description of Penney

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 72 to 84 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Land capability (nonirrigated): 4s

Typical profile

0 to 7 inches: Sand
7 to 60 inches: Sand
60 to 80 inches: Fine sand

Minor Components

Blanton

Percent of map unit: 1 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Ortega

Percent of map unit: 1 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

11—Pamlico and Dorovan soils, depressional

Map Unit Setting

Elevation: 0 to 130 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Pamlico, depressional, and similar soils: 55 percent
Dorovan, depressional, and similar soils: 43 percent
Minor components: 2 percent

Description of Pamlico, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy marine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very high (about 12.7 inches)

Interpretive groups

Land capability (nonirrigated): 7w

Typical profile

0 to 22 inches: Muck
22 to 80 inches: Fine sand

Description of Dorovan, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over sandy marine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very high (about 13.3 inches)

Interpretive groups

Land capability (nonirrigated): 7w

Typical profile

0 to 57 inches: Muck
57 to 80 inches: Sand

Minor Components

Lynn haven

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Surrency, depressional

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

14—Leon fine sand

Map Unit Setting

Elevation: 0 to 450 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Leon and similar soils: 90 percent
Minor components: 10 percent

Description of Leon

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups
Land capability (nonirrigated): 4w

Typical profile
0 to 4 inches: Fine sand
4 to 10 inches: Fine sand
10 to 17 inches: Fine sand
17 to 63 inches: Fine sand
63 to 80 inches: Fine sand

Minor Components

Lynn haven
Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Sapelo, low
Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Wesconnett
Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

15—Wesconnett and Lynn Haven soils, depressional

Map Unit Setting
Elevation: 0 to 130 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition
Wesconnett and similar soils: 55 percent
Lynn haven and similar soils: 43 percent

Minor components: 2 percent

Description of Wesconnett

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Moderate (about 8.2 inches)

Interpretive groups

Land capability (nonirrigated): 7w

Typical profile

0 to 14 inches: Mucky fine sand
14 to 28 inches: Fine sand
28 to 45 inches: Fine sand
45 to 61 inches: Fine sand
61 to 80 inches: Fine sand

Description of Lynn Haven

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability (nonirrigated): 7w

Typical profile

0 to 13 inches: Mucky fine sand
13 to 19 inches: Fine sand
19 to 27 inches: Fine sand
27 to 52 inches: Fine sand
52 to 80 inches: Fine sand

Minor Components

Pamlico, depressional

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Dorovan, depressional

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Concave
Across-slope shape: Concave

18—Surrency, Plummer, and Clara soils, depressional

Map Unit Setting

Elevation: 10 to 400 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Surrency, depressional, and similar soils: 34 percent
Clara, depressional, and similar soils: 24 percent
Plummer, depressional, and similar soils: 23 percent
Minor components: 19 percent

Description of Surrency, Depressional

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Moderate (about 7.0 inches)

Interpretive groups
Land capability (nonirrigated): 6w

Typical profile
0 to 10 inches: Mucky fine sand
10 to 28 inches: Fine sand
28 to 45 inches: Sandy loam
45 to 80 inches: Sandy clay loam

Description of Clara, Depressional

Setting
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Moderate (about 6.8 inches)

Interpretive groups
Land capability (nonirrigated): 6w

Typical profile
0 to 9 inches: Mucky fine sand
9 to 29 inches: Fine sand
29 to 45 inches: Fine sand
45 to 80 inches: Fine sand

Description of Plummer, Depressional

Setting
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability (nonirrigated): 6w

Typical profile

0 to 8 inches: Fine sand
8 to 50 inches: Fine sand
50 to 72 inches: Sandy clay loam

Minor Components

Dorovan, depressional

Percent of map unit: 10 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Concave
Across-slope shape: Concave

Pamlico, depressional

Percent of map unit: 9 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

26—Ridgewood-Hurricane complex, 0 to 5 percent slopes

Map Unit Setting

Elevation: 10 to 350 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Ridgewood and similar soils: 65 percent
Hurricane and similar soils: 26 percent

Minor components: 9 percent

Description of Ridgewood

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Typical profile

0 to 6 inches: Fine sand
6 to 80 inches: Fine sand

Description of Hurricane

Setting

Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 5.0 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 5 inches: Fine sand
5 to 51 inches: Fine sand

51 to 80 inches: Fine sand

Minor Components

Blanton

Percent of map unit: 2 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Albany

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear

Mandarin

Percent of map unit: 2 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Talf, rise
Down-slope shape: Convex
Across-slope shape: Linear

Leon

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear

Ortega

Percent of map unit: 1 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

27—Albany-Ridgewood complex, 0 to 5 percent slopes

Map Unit Setting

Elevation: 10 to 350 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Albany and similar soils: 66 percent
Ridgewood and similar soils: 30 percent

Minor components: 4 percent

Description of Albany

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very low (about 1.8 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 6 inches: Fine sand
6 to 64 inches: Fine sand
64 to 80 inches: Sandy clay loam

Description of Ridgewood

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability (nonirrigated): 3w

Typical profile

0 to 6 inches: Fine sand
6 to 80 inches: Fine sand

Minor Components

Blanton

Percent of map unit: 1 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear

Ortega

Percent of map unit: 1 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Mandarin

Percent of map unit: 1 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Talf, rise
Down-slope shape: Convex
Across-slope shape: Linear

Leon

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear

31—Chaires, low-Meadowbrook complex

Map Unit Setting

Elevation: 10 to 130 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Chaires, low, and similar soils: 55 percent
Meadowbrook and similar soils: 35 percent
Minor components: 10 percent

Description of Chaires, Low

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability (nonirrigated): 4w

Typical profile

0 to 6 inches: Fine sand
6 to 23 inches: Fine sand
23 to 32 inches: Fine sand
32 to 46 inches: Fine sand
46 to 80 inches: Sandy clay loam

Description of Meadowbrook

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 4w

Typical profile

0 to 7 inches: Fine sand
7 to 45 inches: Fine sand
45 to 70 inches: Fine sandy loam
70 to 80 inches: Sandy clay loam

Minor Components

Leon

Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear

Mouzon

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Tooles

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear

34—Ortega fine sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 20 to 350 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Ortega and similar soils: 80 percent
Minor components: 20 percent

Description of Ortega

Setting

Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 48 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability (nonirrigated): 3s

Typical profile

0 to 6 inches: Fine sand
6 to 80 inches: Fine sand

Minor Components

Blanton

Percent of map unit: 10 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear

Albany

Percent of map unit: 10 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear

41—Meadowbrook and Harbeson soils, depressional

Map Unit Setting

Elevation: 10 to 100 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Meadowbrook and similar soils: 65 percent
Harbeson and similar soils: 25 percent
Minor components: 10 percent

Description of Meadowbrook

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability (nonirrigated): 7w

Typical profile

0 to 6 inches: Mucky fine sand
6 to 45 inches: Fine sand
45 to 80 inches: Sandy clay loam

Description of Harbeson

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability (nonirrigated): 7w

Typical profile

0 to 12 inches: Mucky fine sand
12 to 63 inches: Fine sand
63 to 80 inches: Sandy clay loam

Minor Components

Dorovan, depressional

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Concave
Across-slope shape: Concave

Pamlico, depressional

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

44—Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded

Map Unit Setting

Elevation: 10 to 350 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Albany, occasionally flooded, and similar soils: 45 percent
Ousley and similar soils: 25 percent
Meadowbrook, occasionally flooded, and similar soils: 15 percent
Minor components: 15 percent

Description of Albany, Occasionally Flooded

Setting

Landform: Stream terraces on flood plains on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very low (about 2.5 inches)

Interpretive groups
Land capability (nonirrigated): 3w

Typical profile
0 to 4 inches: Fine sand
4 to 53 inches: Fine sand
53 to 80 inches: Sandy clay loam

Description of Ousley

Setting
Landform: Stream terraces on flood plains on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy alluvium

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very low (about 2.6 inches)

Interpretive groups
Land capability (nonirrigated): 3w

Typical profile
0 to 4 inches: Fine sand
4 to 80 inches: Fine sand

Description of Meadowbrook, Occasionally Flooded

Setting
Landform: Depressions on flood plains on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Occasional
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 4.8 inches)

Interpretive groups
Land capability (nonirrigated): 7w

Typical profile
0 to 6 inches: Fine sand
6 to 45 inches: Fine sand
45 to 80 inches: Sandy loam

Minor Components

Blanton
Percent of map unit: 4 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear

Mandarin
Percent of map unit: 4 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Talf, rise
Down-slope shape: Convex
Across-slope shape: Linear

Leon
Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear

Ortega
Percent of map unit: 3 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

53—Penney sand, 5 to 8 percent slopes

Map Unit Setting

Elevation: 50 to 250 feet
Mean annual precipitation: 51 to 59 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 244 to 274 days

Map Unit Composition

Penney and similar soils: 90 percent
Minor components: 10 percent

Description of Penney

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 72 to 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Very low (about 2.6 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 4 inches: Sand
4 to 55 inches: Sand
55 to 80 inches: Fine sand

Minor Components

Blanton

Percent of map unit: 5 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Side slope, interfluve

Down-slope shape: Convex
Across-slope shape: Linear

Ortega

Percent of map unit: 5 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit

This rating indicates the proportion of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is designated as "all hydric," "partially hydric," "not hydric," or "unknown hydric," depending on the rating of its respective components.

"All hydric" means that all components listed for a given map unit are rated as being hydric, while "not hydric" means that all components are rated as not hydric. "Partially hydric" means that at least one component of the map unit is rated as hydric, and at least one component is rated as not hydric. "Unknown hydric" indicates that at least one component is not rated so a definitive rating for the map unit cannot be made.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part

(Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

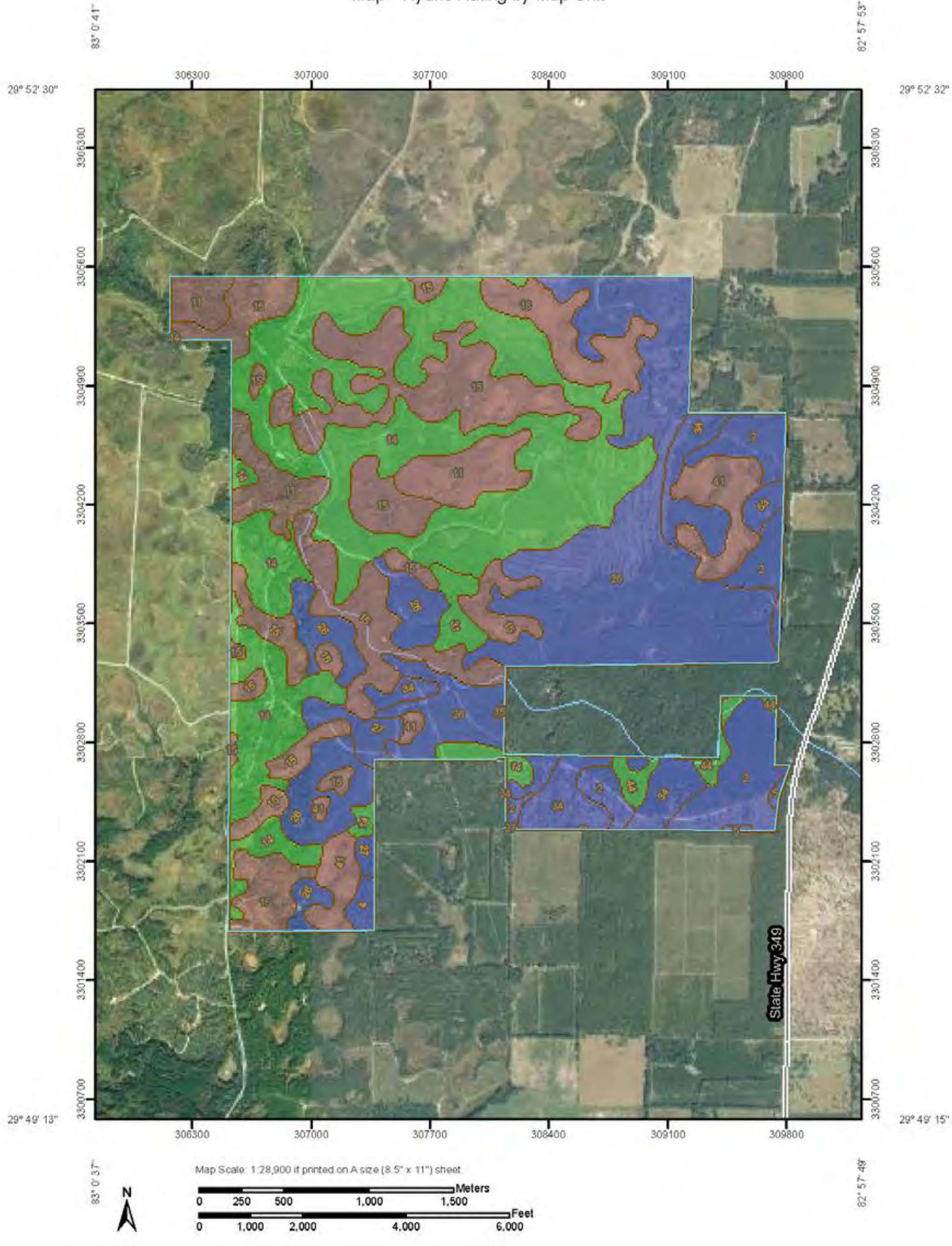
Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Custom Soil Resource Report
Map—Hydric Rating by Map Unit



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- All Hydric
- Partially Hydric
- Not Hydric
- Unknown Hydric
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:28,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Lafayette County, Florida				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	Not Hydric	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	Not Hydric	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	Not Hydric	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	All Hydric	121.3	5.1%
14	Leon fine sand	Partially Hydric	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	All Hydric	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	All Hydric	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	Not Hydric	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	Not Hydric	32.9	1.4%
31	Chaires, low-Meadowbrook complex	Partially Hydric	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	Not Hydric	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	All Hydric	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	Partially Hydric	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	Not Hydric	12.3	0.5%
Totals for Area of Interest			2,398.2	100.0%

Rating Options—Hydric Rating by Map Unit

Aggregation Method: Absence/Presence

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Absence/Presence" returns a value that indicates if, for all components of a map unit, a condition is always present, never present, partially present, or whether the condition's presence or absence is unknown. The exact phrases used for a particular attribute may vary from what is shown below.

"Always present" means that the corresponding condition is present in all of a map unit's components.

"Never present" means that the corresponding condition is not present in any of a map unit's components.

"Partially present" means that the corresponding condition is present in some but not all of a map unit's components, or that the presence or absence of the corresponding condition cannot be determined for one or more components of the map unit.

"Unknown presence" means that for components where presence or absence can be determined, the corresponding condition is never present, but the presence or absence of the corresponding condition cannot be determined for one or more components.

The result returned by this aggregation method quantifies the degree to which the corresponding condition is present throughout the map unit.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Water Management

Water Management interpretations are tools for evaluating the potential of the soil in the application of various water management practices. Example interpretations include pond reservoir area, embankments, dikes, levees, and excavated ponds.

Embankments, Dikes, and Levees

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. The soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the suitability of the undisturbed soil for supporting the embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

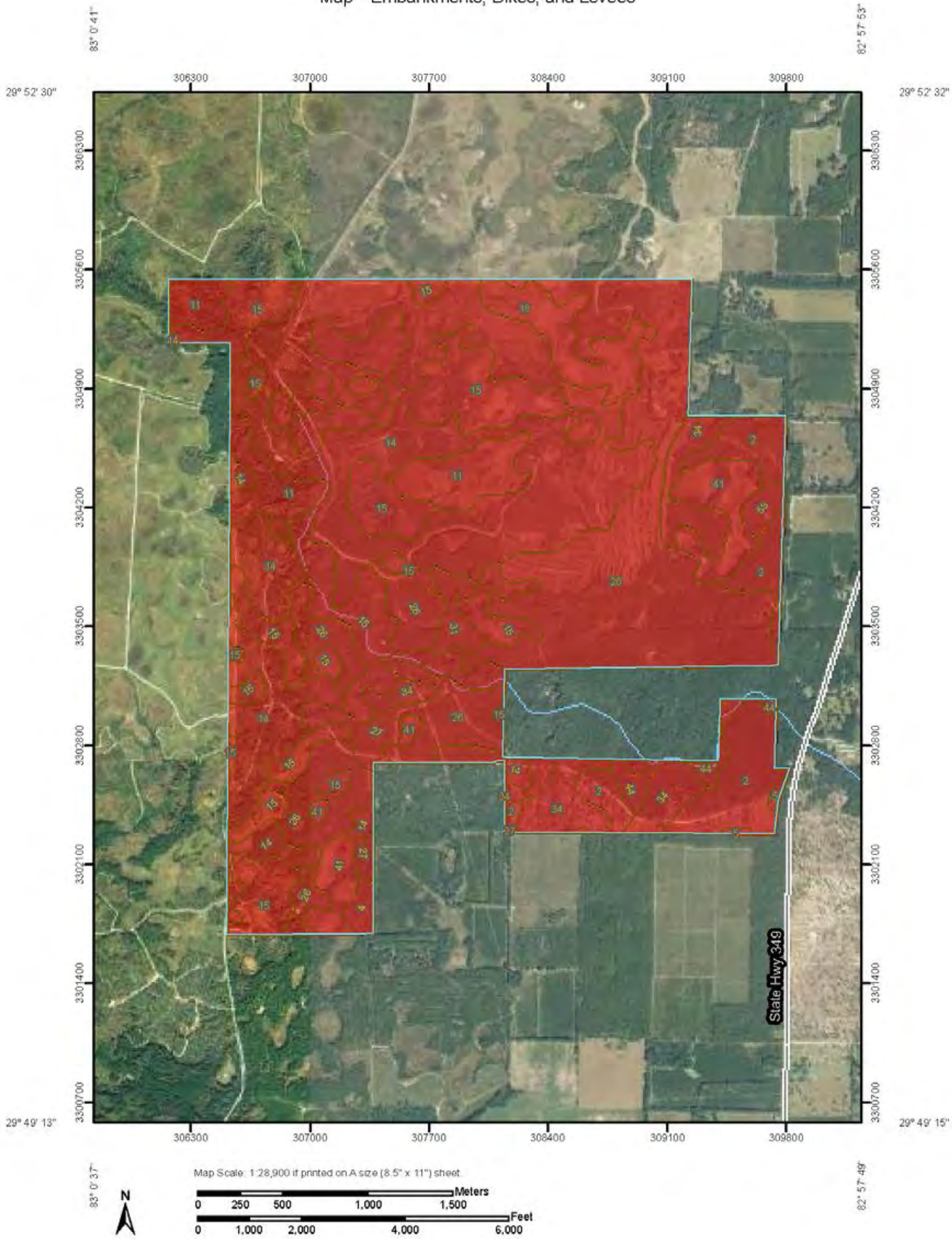
The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Custom Soil Resource Report
Map—Embankments, Dikes, and Levees



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Embankments, Dikes, and Levees

Embankments, Dikes, and Levees— Summary by Map Unit — Lafayette County, Florida						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	Very limited	Penney (90%)	Seepage (1.00)	152.7	6.4%
			Blanton (5%)	Seepage (1.00)		
				Depth to saturated zone (0.03)		
			Ortega (5%)	Seepage (1.00)		
4	Blanton-Ortega complex, 0 to 5 percent slopes	Very limited	Blanton (55%)	Seepage (1.00)	10.9	0.5%
				Depth to saturated zone (0.03)		
			Ortega (26%)	Seepage (1.00)		
			Albany (7%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
			Ridgewood (6%)	Seepage (1.00)		
				Depth to saturated zone (0.99)		
			Penney (6%)	Seepage (1.00)		
5	Otela-Penney complex, 0 to 5 percent slopes	Very limited	Otela (55%)	Seepage (1.00)	4.1	0.2%
			Penney (43%)	Seepage (1.00)		
			Blanton (1%)	Seepage (1.00)		
				Depth to saturated zone (0.03)		
			Ortega (1%)	Seepage (1.00)		

Embankments, Dikes, and Levees— Summary by Map Unit — Lafayette County, Florida						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
11	Pamlico and Dorovan soils, depressional	Very limited	Pamlico, depressional (55%)	Depth to saturated zone (1.00)	121.3	5.1%
				Seepage (1.00)		
				Ponding (1.00)		
			Dorovan, depressional (43%)	Organic matter content (1.00)		
				Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Hard to pack (1.00)		
				Ponding (1.00)		
			Lynn Haven (1%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		
			Surrency, depressional (1%)	Depth to saturated zone (1.00)		
				Ponding (1.00)		
				Seepage (0.92)		
14	Leon fine sand	Very limited	Leon (90%)	Depth to saturated zone (1.00)	678.6	28.3%
				Seepage (1.00)		
			Lynn Haven (4%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		
			Sapelo, low (3%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
			Wesconnett (3%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		

Embankments, Dikes, and Levees— Summary by Map Unit — Lafayette County, Florida						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
15	Wesconnett and Lynn Haven soils, depressional	Very limited	Wesconnett (55%)	Depth to saturated zone (1.00)	470.4	19.6%
				Seepage (1.00)		
				Ponding (1.00)		
			Lynn Haven (43%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		
			Pamlico, depressional (1%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		
			Dorovan, depressional (1%)	Organic matter content (1.00)		
				Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Hard to pack (1.00)		
				Ponding (1.00)		
18	Surrency, Plummer, and Clara soils, depressional	Very limited	Surrency, depressional (34%)	Depth to saturated zone (1.00)	67.9	2.8%
				Seepage (1.00)		
				Ponding (1.00)		
			Clara, depressional (24%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		
			Plummer, depressional (23%)	Depth to saturated zone (1.00)		
				Ponding (1.00)		
				Seepage (0.79)		
			Dorovan, depressional (10%)	Organic matter content (1.00)		
				Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Hard to pack (1.00)		
				Ponding (1.00)		
			Pamlico, depressional (9%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		

Embankments, Dikes, and Levees— Summary by Map Unit — Lafayette County, Florida						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	Very limited	Ridgewood (65%)	Seepage (1.00)	594.7	24.8%
				Depth to saturated zone (0.98)		
			Hurricane (26%)	Seepage (1.00)		
				Depth to saturated zone (0.98)		
			Blanton (2%)	Seepage (1.00)		
				Depth to saturated zone (0.03)		
			Albany (2%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
			Mandarin (2%)	Seepage (1.00)		
				Depth to saturated zone (0.89)		
			Leon (2%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
			Ortega (1%)	Seepage (1.00)		
27	Albany-Ridgewood complex, 0 to 5 percent slopes	Very limited	Albany (66%)	Depth to saturated zone (1.00)	32.9	1.4%
				Seepage (1.00)		
			Ridgewood (30%)	Seepage (1.00)		
				Depth to saturated zone (0.89)		
			Blanton (1%)	Seepage (1.00)		
				Depth to saturated zone (0.03)		
			Ortega (1%)	Seepage (1.00)		
			Mandarin (1%)	Seepage (1.00)		
				Depth to saturated zone (0.89)		
			Leon (1%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		

Embankments, Dikes, and Levees— Summary by Map Unit — Lafayette County, Florida						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
31	Chaires, low-Meadowbrook complex	Very limited	Chaires, low (55%)	Depth to saturated zone (1.00)	23.2	1.0%
				Seepage (1.00)		
			Meadowbrook (35%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
			Leon (4%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
			Mouzon (3%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
			Tooles (3%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Thin layer (0.11)		
34	Ortega fine sand, 0 to 5 percent slopes	Very limited	Ortega (80%)	Seepage (1.00)	117.9	4.9%
			Blanton (10%)	Seepage (1.00)		
				Depth to saturated zone (0.03)		
			Albany (10%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
41	Meadowbrook and Harbeson soils depressional	Very limited	Meadowbrook (65%)	Depth to saturated zone (1.00)	89.6	3.7%
				Seepage (1.00)		
				Ponding (1.00)		
			Dorovan, depressional (5%)	Organic matter content (1.00)		
				Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Hard to pack (1.00)		
				Ponding (1.00)		
			Pamlico, depressional (5%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		

Embankments, Dikes, and Levees— Summary by Map Unit — Lafayette County, Florida						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	Very limited	Albany, occasionally flooded (45%)	Depth to saturated zone (1.00)	21.7	0.9%
				Seepage (1.00)		
			Ousley (25%)	Seepage (1.00)		
				Depth to saturated zone (0.99)		
			Meadowbrook, occasionally flooded (15%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
				Ponding (1.00)		
			Blanton (4%)	Seepage (1.00)		
				Depth to saturated zone (0.03)		
			Mandarin (4%)	Seepage (1.00)		
				Depth to saturated zone (0.89)		
			Leon (4%)	Depth to saturated zone (1.00)		
				Seepage (1.00)		
			Ortega (3%)	Seepage (1.00)		
53	Penney sand, 5 to 8 percent slopes	Very limited	Penney (90%)	Seepage (1.00)	12.3	0.5%
			Blanton (5%)	Seepage (1.00)		
				Depth to saturated zone (0.03)		
			Ortega (5%)	Seepage (1.00)		
Totals for Area of Interest					**2,398.2**	**100.0%**

Embankments, Dikes, and Levees— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Very limited	2,398.2	100.0%
Totals for Area of Interest	**2,398.2**	**100.0%**

Rating Options—Embankments, Dikes, and Levees

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

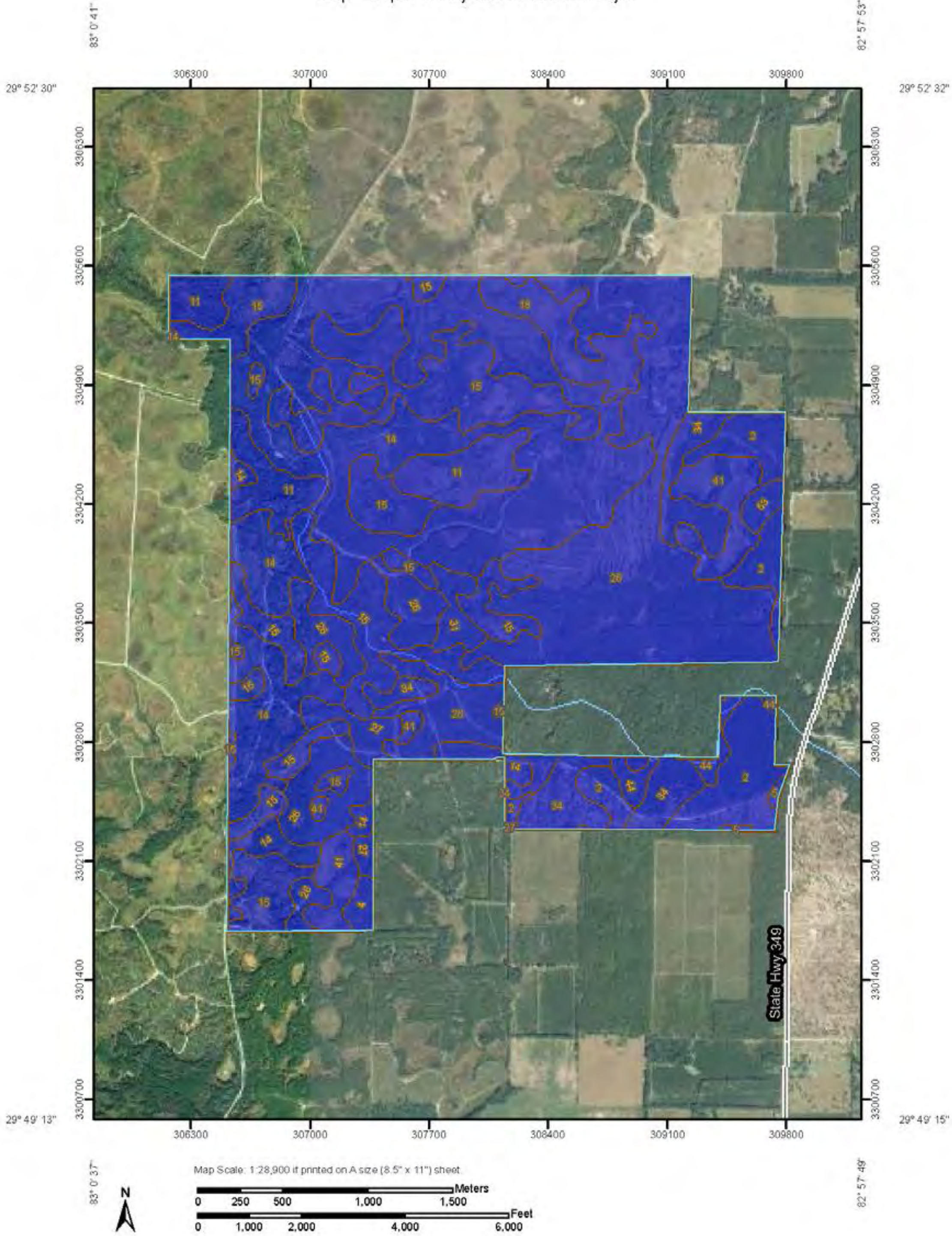
Depth to Any Soil Restrictive Layer

A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

This theme presents the depth to any type of restrictive layer that is described for each map unit. If more than one type of restrictive layer is described for an individual soil type, the depth to the shallowest one is presented. If no restrictive layer is described in a map unit, it is represented by the "> 200" depth class.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Depth to Any Soil Restrictive Layer



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Depth to Any Soil Restrictive Layer

Depth to Any Soil Restrictive Layer— Summary by Map Unit — Lafayette County, Florida				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	>200	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	>200	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	>200	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	>200	121.3	5.1%
14	Leon fine sand	>200	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	>200	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	>200	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	>200	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	>200	32.9	1.4%
31	Chaires, low-Meadowbrook complex	>200	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	>200	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	>200	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	>200	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	>200	12.3	0.5%
Totals for Area of Interest			2,398.2	100.0%

Rating Options—Depth to Any Soil Restrictive Layer

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: *None Specified*

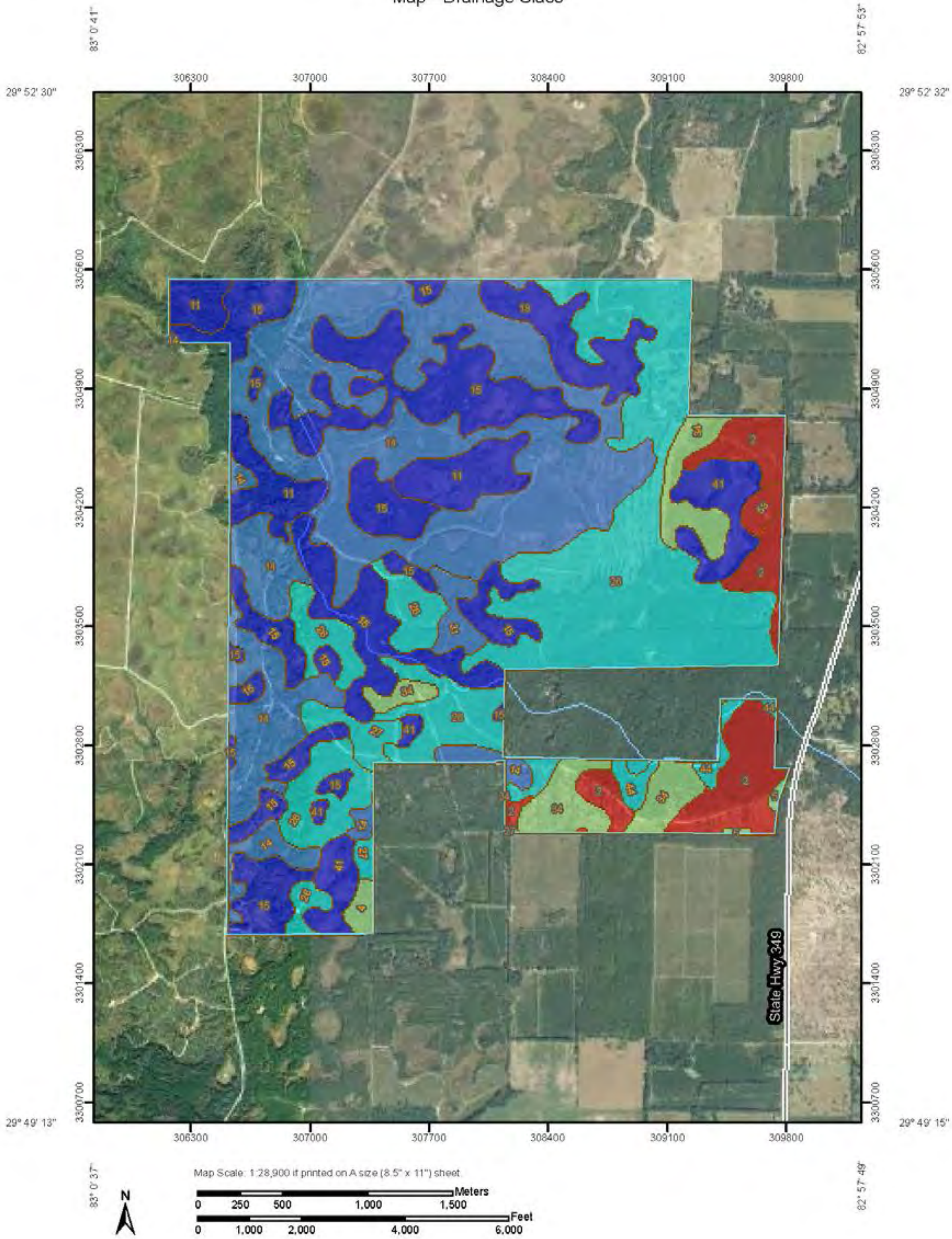
Tie-break Rule: Lower

Interpret Nulls as Zero: No

Drainage Class

"Drainage class (natural)" refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."

Custom Soil Resource Report
Map—Drainage Class



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Drainage Class

Drainage Class— Summary by Map Unit — Lafayette County, Florida				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	Excessively drained	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	Moderately well drained	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	Moderately well drained	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	Very poorly drained	121.3	5.1%
14	Leon fine sand	Poorly drained	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	Very poorly drained	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	Very poorly drained	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	Somewhat poorly drained	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	Somewhat poorly drained	32.9	1.4%
31	Chaires, low-Meadowbrook complex	Poorly drained	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	Moderately well drained	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	Very poorly drained	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	Somewhat poorly drained	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	Excessively drained	12.3	0.5%
Totals for Area of Interest			2,398.2	100.0%

Rating Options—Drainage Class

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

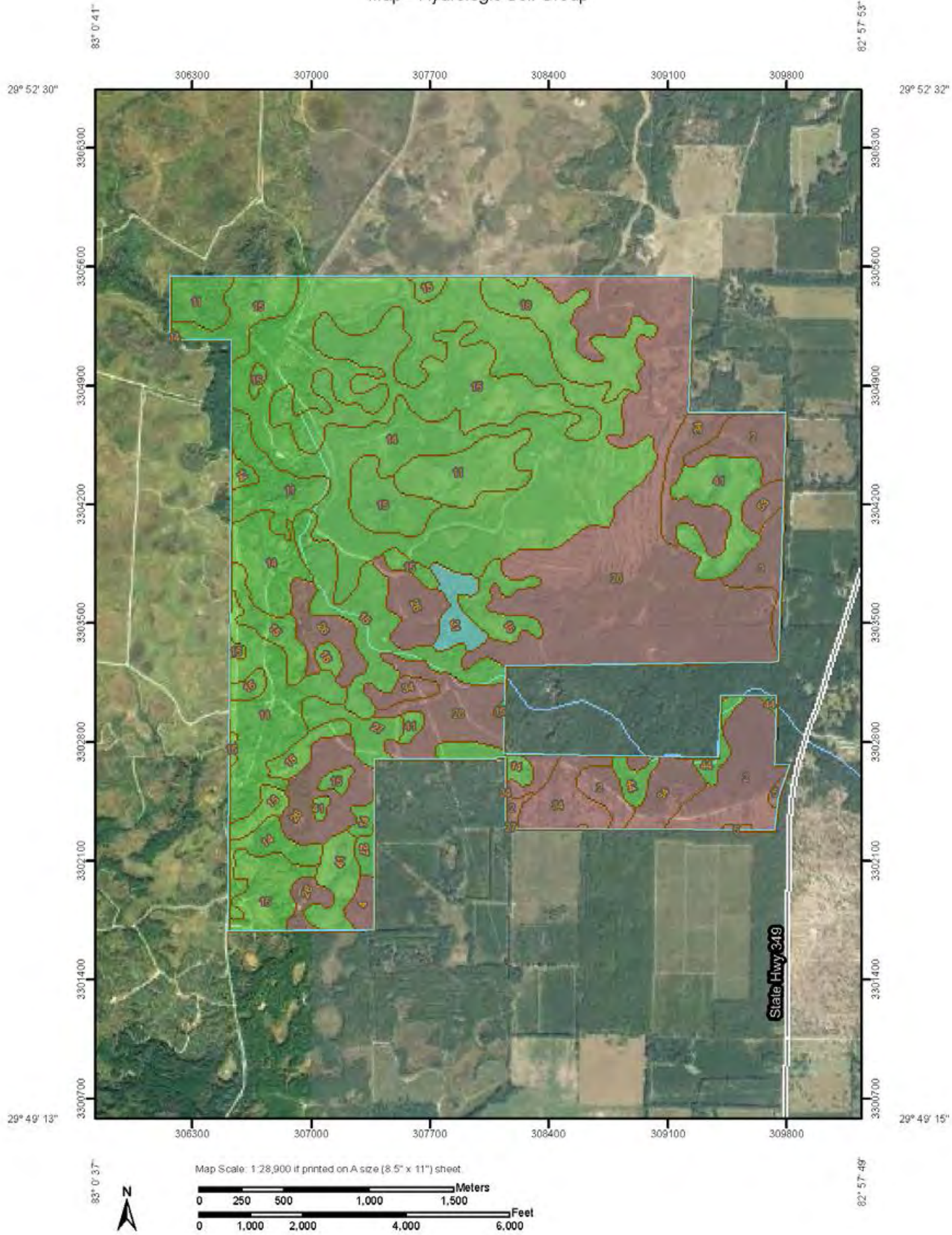
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Lafayette County, Florida				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	A	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	A	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	A	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	A/D	121.3	5.1%
14	Leon fine sand	A/D	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	A/D	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	A/D	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	A	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	A/D	32.9	1.4%
31	Chaires, low-Meadowbrook complex	B/D	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	A	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	A/D	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	A/D	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	A	12.3	0.5%
Totals for Area of Interest			**2,398.2**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

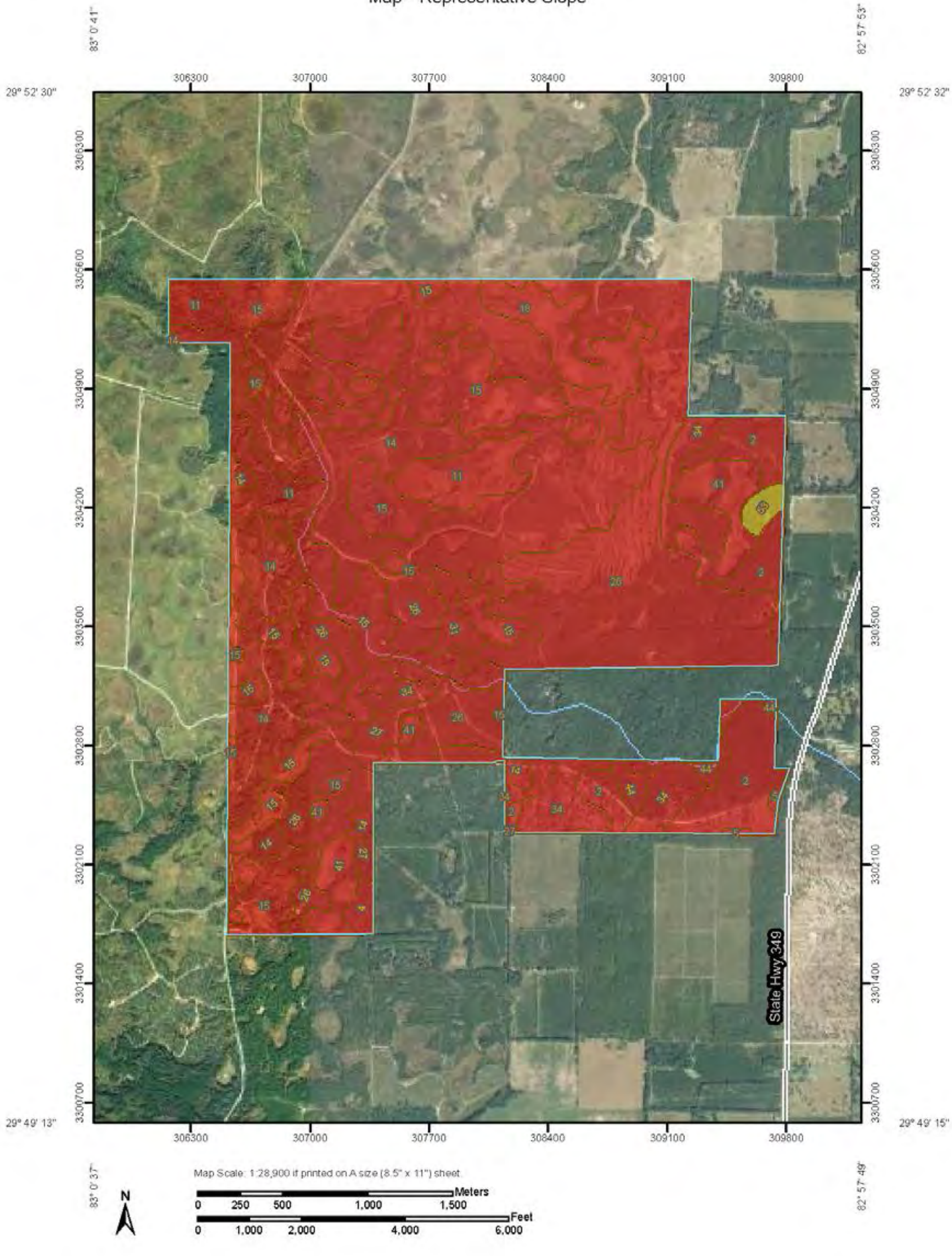
Tie-break Rule: Lower

Representative Slope

Slope gradient is the difference in elevation between two points, expressed as a percentage of the distance between those points.

The slope gradient is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Representative Slope



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- 0 - 5
- 5 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

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Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

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Table—Representative Slope

Representative Slope— Summary by Map Unit — Lafayette County, Florida				
Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	3.0	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	3.0	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	3.0	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	0.5	121.3	5.1%
14	Leon fine sand	1.0	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	0.5	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	0.5	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	3.0	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	3.0	32.9	1.4%
31	Chaires, low-Meadowbrook complex	1.0	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	3.0	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	0.5	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	3.0	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	7.0	12.3	0.5%
Totals for Area of Interest			**2,398.2**	**100.0%**

Rating Options—Representative Slope

Units of Measure: percent

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Water Features

Water Features include ponding frequency, flooding frequency, and depth to water table.

Ponding Frequency Class

Ponding is standing water in a closed depression. The water is removed only by deep percolation, transpiration, or evaporation or by a combination of these processes. Ponding frequency classes are based on the number of times that ponding occurs over a given period. Frequency is expressed as none, rare, occasional, and frequent.

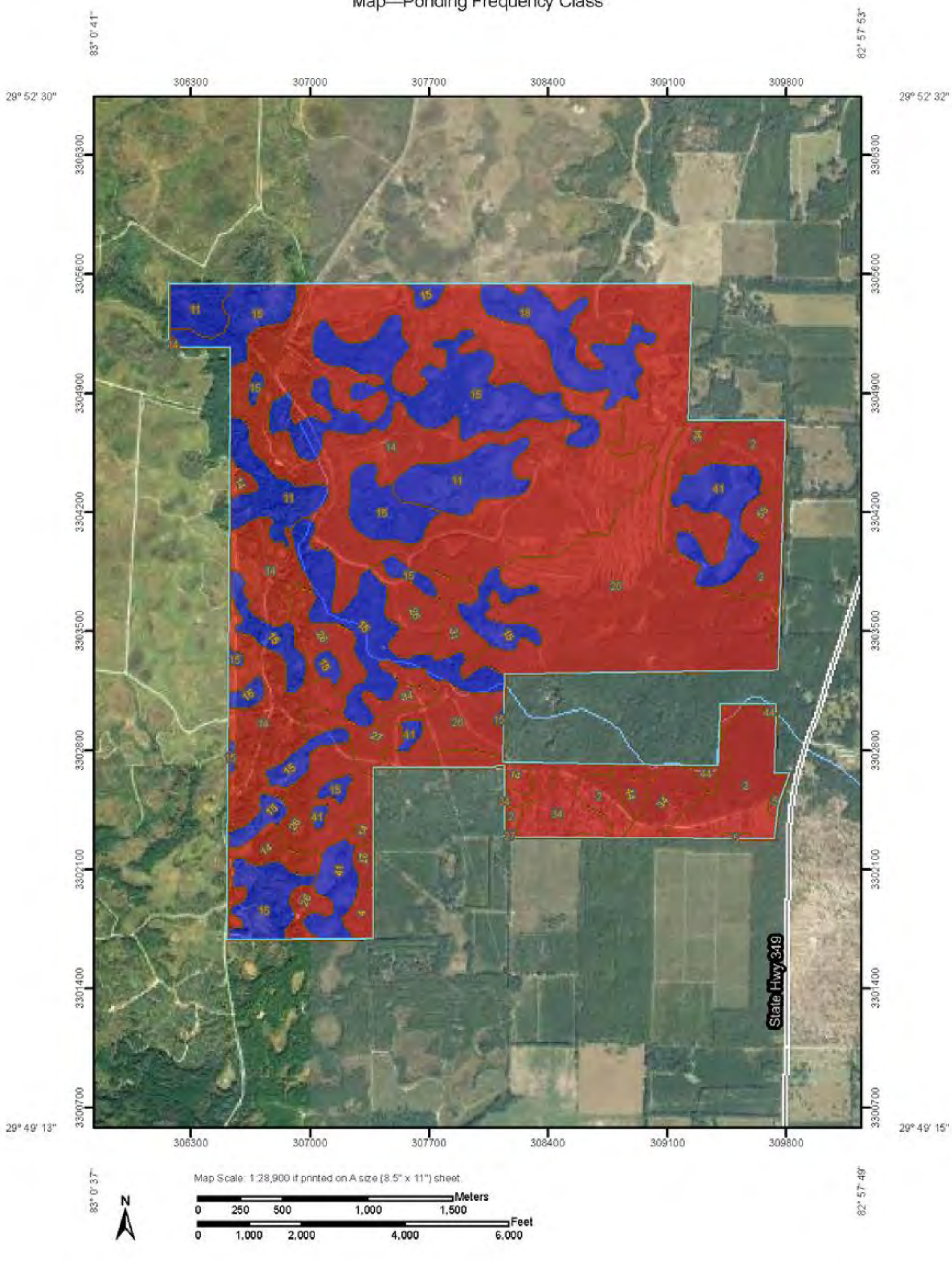
"None" means that ponding is not probable. The chance of ponding is nearly 0 percent in any year.

"Rare" means that ponding is unlikely but possible under unusual weather conditions. The chance of ponding is nearly 0 percent to 5 percent in any year.

"Occasional" means that ponding occurs, on the average, once or less in 2 years. The chance of ponding is 5 to 50 percent in any year.

"Frequent" means that ponding occurs, on the average, more than once in 2 years. The chance of ponding is more than 50 percent in any year.

Custom Soil Resource Report
Map—Ponding Frequency Class



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- None
- Rare
- Occasional
- Frequent

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

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Date(s) aerial images were photographed: 11/2/2007

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Table—Ponding Frequency Class

Ponding Frequency Class— Summary by Map Unit — Lafayette County, Florida				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	None	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	None	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	None	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	Frequent	121.3	5.1%
14	Leon fine sand	None	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	Frequent	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	Frequent	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	None	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	None	32.9	1.4%
31	Chaires, low-Meadowbrook complex	None	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	None	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	Frequent	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	None	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	None	12.3	0.5%
Totals for Area of Interest			**2,398.2**	**100.0%**

Rating Options—Ponding Frequency Class

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: More Frequent

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Beginning Month: January

Ending Month: December

Flooding Frequency Class

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent.

"None" means that flooding is not probable. The chance of flooding is nearly 0 percent in any year. Flooding occurs less than once in 500 years.

"Very rare" means that flooding is very unlikely but possible under extremely unusual weather conditions. The chance of flooding is less than 1 percent in any year.

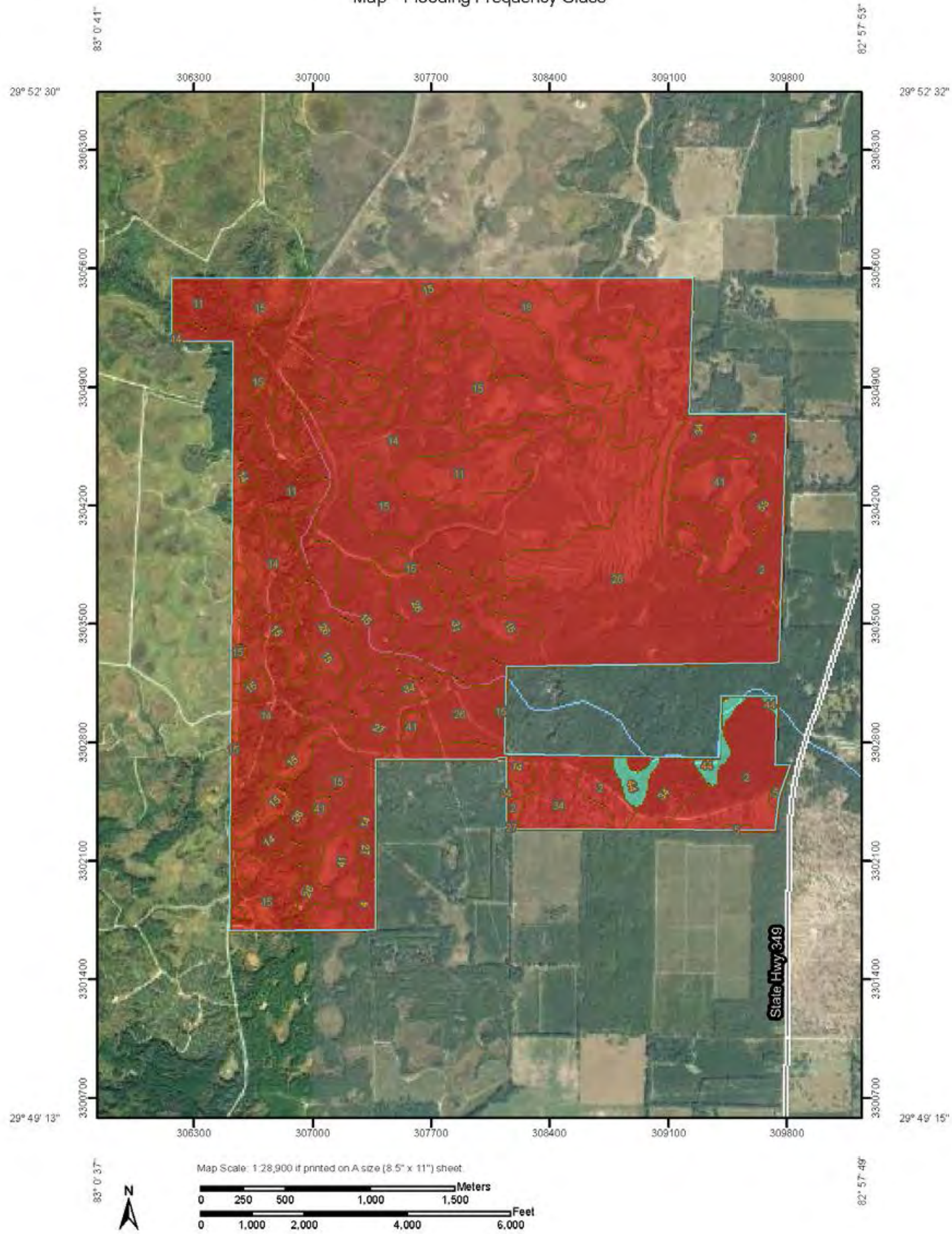
"Rare" means that flooding is unlikely but possible under unusual weather conditions. The chance of flooding is 1 to 5 percent in any year.

"Occasional" means that flooding occurs infrequently under normal weather conditions. The chance of flooding is 5 to 50 percent in any year.

"Frequent" means that flooding is likely to occur often under normal weather conditions. The chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year.

"Very frequent" means that flooding is likely to occur very often under normal weather conditions. The chance of flooding is more than 50 percent in all months of any year.

Custom Soil Resource Report
Map—Flooding Frequency Class



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Flooding Frequency Class

Flooding Frequency Class— Summary by Map Unit — Lafayette County, Florida				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	None	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	None	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	None	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	None	121.3	5.1%
14	Leon fine sand	None	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	None	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	None	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	None	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	None	32.9	1.4%
31	Chaires, low-Meadowbrook complex	None	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	None	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	None	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	Occasional	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	None	12.3	0.5%
Totals for Area of Interest			2,398.2	100.0%

Rating Options—Flooding Frequency Class

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: More Frequent

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Beginning Month: January

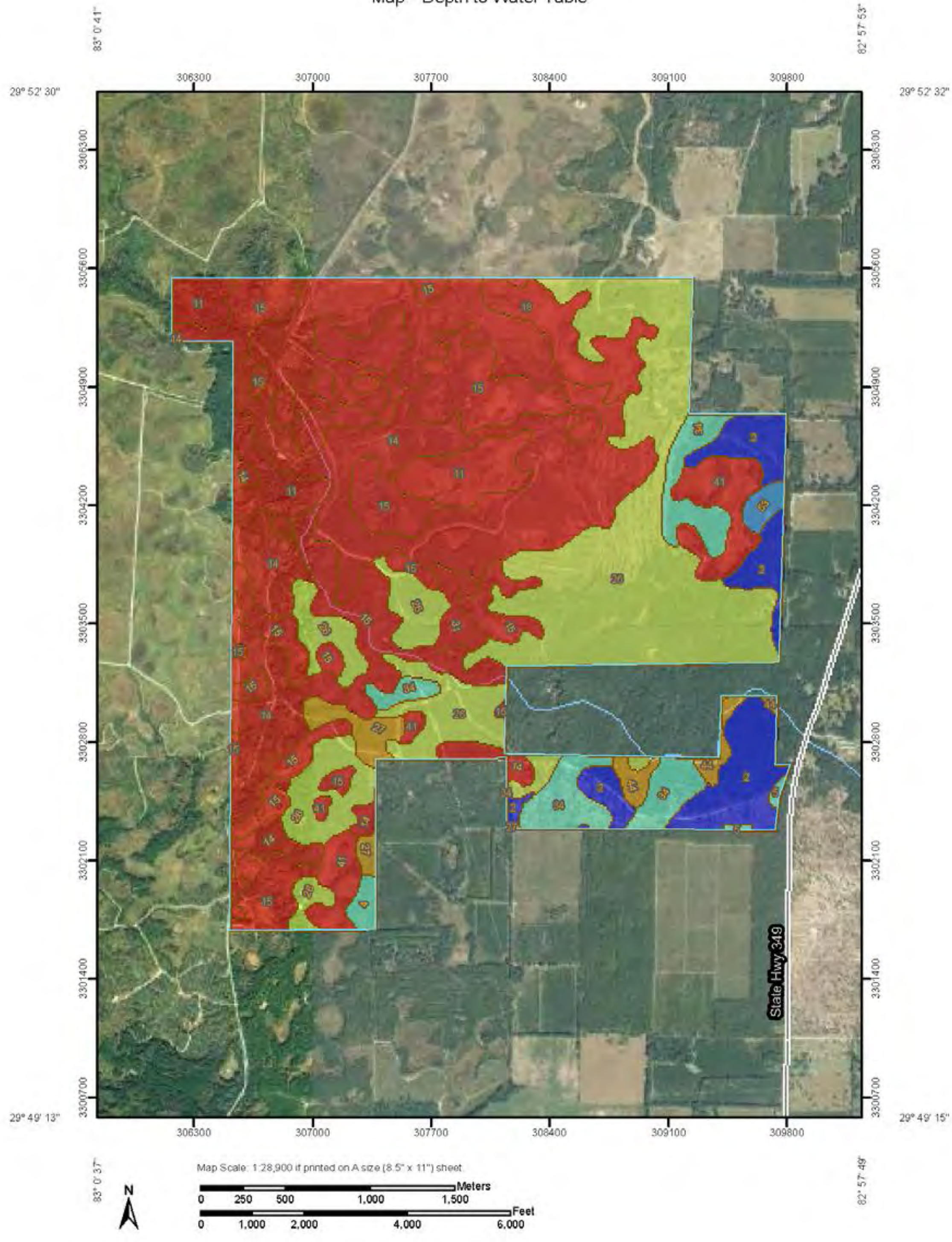
Ending Month: December

Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Depth to Water Table



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:26,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

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Soil Survey Area: Lafayette County, Florida
Survey Area Data: Version 6, Jan 28, 2010

Date(s) aerial images were photographed: 11/2/2007

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Table—Depth to Water Table

Depth to Water Table— Summary by Map Unit — Lafayette County, Florida				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
2	Penney sand, 0 to 5 percent slopes	203	152.7	6.4%
4	Blanton-Ortega complex, 0 to 5 percent slopes	112	10.9	0.5%
5	Otela-Penney complex, 0 to 5 percent slopes	122	4.1	0.2%
11	Pamlico and Dorovan soils, depressional	0	121.3	5.1%
14	Leon fine sand	20	678.6	28.3%
15	Wesconnett and Lynn Haven soils, depressional	0	470.4	19.6%
18	Surrency, Plummer, and Clara soils, depressional	0	67.9	2.8%
26	Ridgewood-Hurricane complex, 0 to 5 percent slopes	66	594.7	24.8%
27	Albany-Ridgewood complex, 0 to 5 percent slopes	46	32.9	1.4%
31	Chaires, low-Meadowbrook complex	8	23.2	1.0%
34	Ortega fine sand, 0 to 5 percent slopes	132	117.9	4.9%
41	Meadowbrook and Harbeson soils, depressional	0	89.6	3.7%
44	Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded	46	21.7	0.9%
53	Penney sand, 5 to 8 percent slopes	183	12.3	0.5%
Totals for Area of Interest			**2,398.2**	**100.0%**

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Component" returns the attribute value associated with the component with the highest percent composition in the map unit. If more than one component shares the highest percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher attribute value should be returned in the case of a percent composition tie.

The result returned by this aggregation method may or may not represent the dominant condition throughout the map unit.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Interpret Nulls as Zero: No

This option indicates if a null value for a component should be converted to zero before aggregation occurs. This will be done only if a map unit has at least one component where this value is not null.

Beginning Month: January

Ending Month: December

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Soils

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil

Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2B3). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, or Andic, Cumulic, Pachic, or Vitrandic subgroups that:
    A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
    B. are poorly drained or very poorly drained and have either:
        i. a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
        ii. a water table at a depth of 0.5 foot or less during the growing season if saturated hydraulic conductivity (Ksat) is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
        iii. a water table at a depth of 1.0 foot or less during the growing season if saturated hydraulic conductivity (Ksat) is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

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Report—Hydric Soils

Hydric Soils– Lafayette County, Florida				
Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric criteria
11—Pamlico and Dorovan soils, depressional				
	Pamlico, depressional	55	Depressions on marine terraces	1, 3
	Dorovan, depressional	43	Depressions on marine terraces	1, 3
	Lynn haven	1	Depressions on marine terraces	2B1, 3
	Surrency, depressional	1	Depressions on marine terraces	2B1, 3
14—Leon fine sand				
	Lynn haven	4	Depressions on marine terraces	2B1, 3
	Sapelo, low	3	Flats on marine terraces	2B1
	Wesconnett	3	Depressions on marine terraces	2B1, 3
15—Wesconnett and Lynn Haven soils, depressional				
	Wesconnett	55	Depressions on marine terraces	2B1, 3
	Lynn haven	43	Depressions on marine terraces	2B1, 3
	Pamlico, depressional	1	Depressions on marine terraces	1, 3
	Dorovan, depressional	1	Depressions on marine terraces	1, 3

Hydric Soils– Lafayette County, Florida				
Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric criteria
18—Surrency, Plummer, and Clara soils, depressional				
	Surrency, depressional	34	Depressions on marine terraces	2B1, 3
	Clara, depressional	24	Depressions on marine terraces	2B1, 3
	Plummer, depressional	23	Depressions on marine terraces	2B1, 3
	Dorovan, depressional	10	Depressions on marine terraces	1, 3
	Pamlico, depressional	9	Depressions on marine terraces	1, 3
31—Chaires, low-Meadowbrook complex				
	Chaires, low	55	Flats on marine terraces	2B1
	Meadowbrook	35	Flats on marine terraces	2B1
	Mouzon	3	Flats on marine terraces	2B3
41—Meadowbrook and Harbeson soils, depressional				
	Meadowbrook	65	Depressions on marine terraces	2B1, 3
	Harbeson	25	Depressions on marine terraces	2B1, 3
	Dorovan, depressional	5	Depressions on marine terraces	1, 3
	Pamlico, depressional	5	Depressions on marine terraces	1, 3
44—Albany-Ousley-Meadowbrook complex, 0 to 5 percent slopes, occasionally flooded				
	Meadowbrook, occasionally flooded	15	Depressions on flood plains on marine terraces	2B1, 3

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Appendix D

Lafayette Forest WEA - Velocity/Discharge Data Forms

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 3 - St. Regis Ditch
Date: 3/30/2010
Start Time: 1120
End Time: 1147
Personnel: Larson / Powell

Obs #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.0	0	0.2	0	0	0	0.00
	Notes: REW		0.6				
			0.8				
2	0.5	2.1	0.2	432	1.37408384	2.885576064	1,864,996.53
	Notes:		0.6				
			0.8				
3	1.5	2	0.2	281	0.95111472	1.90222944	1,229,443.00
	Notes:		0.6				
			0.8				
4	2.5	0.7	0.2	339	1.11357968	0.779505776	503,807.74
	Notes:		0.6				
			0.8				
5	3.5	0.7	0.2	221	0.78304752	0.548133264	354,267.78
	Notes:		0.6				
			0.8				
6	4.5	0.5	0.2	167	0.63178704	0.31589352	204,167.32
	Notes:		0.6				
			0.8				
7	7.0	0	0.2	0	0	0	0.00
	Notes: LEW		0.6				
			0.8				
					DAILY TOTALS:	**6.431338064**	**4,156,682.37**

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 4 - St. Regis Ditch
Date: 3/30/2010
Start Time: 1155
End Time: 1210
Personnel: Larson / Powell

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.0	0	0.2	0	0	0	0.00
	Notes:		0.6				
			0.8				
2	0.5	1.4	0.2	115	0.4861288	0.68058032	439,870.55
	Notes:		0.6				
			0.8				
3	1.0	1.5	0.2	225	0.794252	1.191378	770,007.72
	Notes:		0.6				
			0.8				
4	1.5	1.5	0.2	478	1.50293536	2.25440304	1,457,058.75
	Notes:		0.6				
			0.8				
5	2.0	1.3	0.2	500	1.56456	2.033928	1,314,562.01
	Notes:		0.6				
			0.8				
6	2.5	0.9	0.2	539	1.67380368	1.506423312	973,626.82
	Notes:		0.6				
			0.8				
7	3.0	0.5	0.2	494	1.54775328	0.77387664	500,169.54
	Notes:		0.6				
			0.8				
8	3.2	0	0.2	0	0	0	0.00
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	8.440589312	5,455,295.37

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 5 - St. Regis Ditch
Date: 3/30/2010
Start Time: 1155
End Time: 1210
Personnel: Larson / Powell

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.5	0.5	0.2	532	1.65419584	0.82709792	534,567.35
	Notes:		0.6				
			0.8				
2	1.0	1.1	0.2	581	1.79145072	1.970595792	1,273,629.33
	Notes:		0.6				
			0.8				
3	1.5	1.3	0.2	726	2.19761312	2.856897056	1,846,460.80
	Notes:		0.6				
			0.8				
4	2.0	1.4	0.2	744	2.24803328	3.147246592	2,034,118.61
	Notes:		0.6				
			0.8				
5	2.5	1.2	0.2	689	2.09397168	2.512766016	1,624,043.10
	Notes:		0.6				
			0.8				
6	3.0	1	0.2	631	1.93150672	1.93150672	1,248,365.40
	Notes:		0.6				
			0.8				
7	3.5	0.4	0.2	434	1.37968608	0.551874432	356,685.76
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	13.79798453	8,917,870.35

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 6 - St. Regis Ditch
Date: 3/30/2010
Start Time: 1355
End Time: 1405
Personnel: Larson / Powell

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.5	0.15	0.2	564	1.74383168	0.261574752	169,060.18
	Notes:		0.6				
			0.8				
2	1.0	0.2	0.2	795	2.3908904	0.47817808	309,054.57
	Notes:		0.6				
			0.8				
3	1.5	0.15	0.2	799	2.40209488	0.360314232	232,877.17
	Notes:		0.6				
			0.8				
4	2.0	0	0.2	0	0	0	0.00
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	**1.100067064**	**710,991.92**

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 8 - St Regis Ditch Convergance Culvert
Date: 3/30/2010
Start Time: 1515
End Time: 1525
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	1.0	1.3	0.2	407	1.30405584	1.695272592	1,095,683.30
	Notes:		0.6				
			0.8				
2	2.0	2.25	0.2	313	1.04075056	2.34168876	1,513,472.98
	Notes:		0.6				
			0.8				
3	3.0	2.35	0.2	347	1.13598864	2.669573304	1,725,390.30
	Notes:		0.6				
			0.8				
4	4.0	1.9	0.2	385	1.2424312	2.36061928	1,525,708.09
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	**9.067153936**	**5,860,254.67**

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 9 - Stream that leads into St Regis Ditch
Date: 3/30/2010
Start Time: 1550
End Time: 1600
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	1.0	1.9	0.2	162	0.61778144	1.173784736	758,636.89
	Notes:		0.6				
			0.8				
2	3.0	2.4	0.2	171	0.64299152	1.543179648	997,383.06
	Notes:		0.6				
			0.8				
3	5.0	2.3	0.2	231	0.81105872	1.865435056	1,205,662.17
	Notes:		0.6				
			0.8				
4	7.0	1.48	0.2	168	0.63458816	0.939190477	607,014.66
	Notes:		0.6				
			0.8				
5	9.0	0.85	0.2	125	0.51414	0.437019	282,452.76
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	**5.958608917**	**3,851,149.54**

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 10 - CR 349 Bridge (Box Culverts)
Date: 3/30/2010
Start Time: 0830
End Time: 0845
Personnel: Larson / Powell

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	1.0	0.35	0.2	420	1.3404704	0.46916464	303,229.03
	Notes:		0.6				
			0.8				
2	2.0	0.65	0.2	512	1.59817344	1.038812736	671,402.21
	Notes:		0.6				
			0.8				
3	3.0	0.65	0.2	570	1.7606384	1.14441496	739,654.71
	Notes:		0.6				
			0.8				
4	4.0	0.65	0.2	602	1.85027424	1.202678256	777,311.26
	Notes:		0.6				
			0.8				
5	5.0	0.65	0.2	620	1.9006944	1.23545136	798,493.07
	Notes:		0.6				
			0.8				
6	6.0	0.65	0.2	556	1.72142272	1.118924768	723,179.97
	Notes:		0.6				
			0.8				
7	7.0	0.65	0.2	816	2.44971392	1.592314048	1,029,139.45
	Notes:		0.6				
			0.8				
8	8.0	0.65	0.2	840	2.5169408	1.63601152	1,057,381.87
	Notes:		0.6				
			0.8				
9	9.0	0.65	0.2	570	1.7606384	1.14441496	739,654.71
	Notes:		0.6				
			0.8				
10	9.0	0.3	0.2	530	1.6485936	0.49457808	319,654.16
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	11.07676533	7,159,100.44

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 3 - St. Regis Ditch (Low Flow - No Data)

Date: 4/13/2010

Start Time:

End Time:

Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1			0.2				
	Notes:		0.6				
			0.8				
2			0.2				
	Notes:		0.6				
			0.8				
3			0.2				
	Notes:		0.6				
			0.8				
4			0.2				
	Notes:		0.6				
			0.8				
5			0.2				
	Notes:		0.6				
			0.8				
6			0.2				
	Notes:		0.6				
			0.8				
7			0.2				
	Notes:		0.6				
			0.8				
8			0.2				
	Notes:		0.6				
			0.8				
9			0.2				
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	0	0.00

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 4 - St. Regis Ditch
Date: 4/13/2010
Start Time: 1215
End Time: 1225
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft^3/s)	Volume (gal/day)
1	0.5	1.3	0.2	0	0	0	0.00
	Notes: Low Flow		0.6				
			0.8				
2	1.0	1.4	0.2	74	0.37128288	0.519796032	335,952.95
	Notes:		0.6				
			0.8				
3	1.5	1.4	0.2	184	0.67940608	0.951168512	614,756.27
	Notes:		0.6				
			0.8				
4	2.0	1.2	0.2	370	1.2004144	1.44049728	931,017.71
	Notes:		0.6				
			0.8				
5	2.5	0.8	0.2	350	1.144392	0.9155136	591,711.90
	Notes:		0.6				
			0.8				
6	3.0	0.4	0.2	340	1.1163808	0.44655232	288,614.30
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	**4.273527744**	**2,762,053.13**

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 5
Date: 4/13/2010
Start Time: 1035
End Time: 1050
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.5	0.5	0.2	150	0.584168	0.292084	188,778.82
	Notes:		0.6				
			0.8				
2	1.0	0.9	0.2	234	0.81946208	0.737515872	476,668.96
	Notes:		0.6				
			0.8				
3	1.5	1.1	0.2	236	0.82506432	0.907570752	586,578.30
	Notes:		0.6				
			0.8				
4	2.0	1.4	0.2	404	1.29565248	1.813913472	1,172,362.90
	Notes:		0.6				
			0.8				
5	2.5	1.3	0.2	432	1.37408384	1.786308992	1,154,521.66
	Notes:		0.6				
			0.8				
6	3.0	1.15	0.2	292	0.98192704	1.129216096	729,831.43
	Notes:		0.6				
			0.8				
7	3.5	0.5	0.2	142	0.56175904	0.28087952	181,537.18
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	**6.947488704**	**4,490,279.24**

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 6 - Low Flow (No Data)
Date: 4/13/2010
Start Time:
End Time:
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1			0.2				
	Notes:		0.6				
			0.8				
2			0.2				
	Notes:		0.6				
			0.8				
3			0.2				
	Notes:		0.6				
			0.8				
4			0.2				
	Notes:		0.6				
			0.8				
5			0.2				
	Notes:		0.6				
			0.8				
6			0.2				
	Notes:		0.6				
			0.8				
7			0.2				
	Notes:		0.6				
			0.8				
8			0.2				
	Notes:		0.6				
			0.8				
9			0.2				
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	0	0.00

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 7 - Stream Flow split into two small channels in ditch
Date: 4/13/2010
Start Time: 1110
End Time: 1120
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.5	0.6	0.2	192	0.70181504	0.421089024	272,156.95
	Notes:Channel 1		0.6				
			0.8				
2	1.0	0.6	0.2	75	0.374084	0.2244504	145,066.08
	Notes:Channel 1		0.6				
			0.8				
3	1.5	0.6	0.2	0	0	0	0.00
	Notes:Channel 1- No Flow		0.6				
			0.8				
4	0.5	0.4	0.2	0	0	0	0.00
	Notes:Channel 2 - No Flow		0.6				
			0.8				
					DAILY TOTALS:	0.645539424	417,223.03

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 8 - Convergance Culvert
Date: 4/13/2010
Start Time: 1120
End Time: 1130
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	1.0	1.1	0.2	152	0.58977024	0.648747264	419,296.31
	Notes:		0.6				
			0.8				
2	2.0	1.8	0.2	114	0.48332768	0.869989824	562,289.11
	Notes:		0.6				
			0.8				
3	3.0	1.9	0.2	118	0.49453216	0.939611104	607,286.52
	Notes:		0.6				
			0.8				
4	4.0	1.8	0.2	160	0.6121792	1.10192256	712,191.15
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	**3.560270752**	**2,301,063.10**

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 9 - Stream that leads into St. Regis Ditch
Date: 4/13/2010
Start Time: 1150
End Time: 1205
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	1.0	1.35	0.2	0	0	0	0.00
	Notes: Low Flow		0.6				
			0.8				
2	3.0	1.9	0.2	26	0.23682912	0.449975328	290,826.65
	Notes:		0.6				
			0.8				
3	5.0	1.1	0.2	36	0.26484032	0.291324352	188,287.85
	Notes:		0.6				
			0.8				
4	7.0	1.2	0.2	0	0	0	0.00
	Notes: Low Flow		0.6				
			0.8				
					DAILY TOTALS:	0.74129968	479,114.50

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 10 - CR 349 Bridge
Date: 4/13/2010
Start Time: 1015
End Time: 1030
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	1.0	0.3	0.2	316	1.04915392	0.314746176	203,425.77
	Notes:		0.6				
			0.8				
2	2.0	0.3	0.2	336	1.10517632	0.331552896	214,288.23
	Notes:		0.6				
			0.8				
3	3.0	0.3	0.2	362	1.17800544	0.353401632	228,409.44
	Notes:		0.6				
			0.8				
4	4.0	0.3	0.2	390	1.2564368	0.37693104	243,616.89
	Notes:		0.6				
			0.8				
5	5.0	0.3	0.2	380	1.2284256	0.36852768	238,185.66
	Notes:		0.6				
			0.8				
6	6.0	0.3	0.2	374	1.21161888	0.363485664	234,926.92
	Notes:		0.6				
			0.8				
7	7.0	0.3	0.2	398	1.27884576	0.383653728	247,961.88
	Notes:		0.6				
			0.8				
8	8.0	0.3	0.2	234	0.81946208	0.245838624	158,889.65
	Notes:		0.6				
			0.8				
9	9.0	0.3	0.2	192	0.70181504	0.210544512	136,078.47
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	**2.948681952**	**1,905,782.93**

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 3 - St. Regis Ditch (Low Flow - No Data)
Date: 5/5/2010
Start Time:
End Time:
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1			0.2				
	Notes:		0.6				
			0.8				
2			0.2				
	Notes:		0.6				
			0.8				
3			0.2				
	Notes:		0.6				
			0.8				
4			0.2				
	Notes:		0.6				
			0.8				
5			0.2				
	Notes:		0.6				
			0.8				
6			0.2				
	Notes:		0.6				
			0.8				
7			0.2				
	Notes:		0.6				
			0.8				
8			0.2				
	Notes:		0.6				
			0.8				
9			0.2				
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	0	0.00

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 4 - St. Regis Ditch
Date: 5/5/2010
Start Time: 1210
End Time: 1220
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.5	1	0.2	618	1.89509216	1.89509216	1,224,830.06
	Notes:		0.6				
			0.8				
2	1.0	1.6	0.2	574	1.77184288	2.834948608	1,832,275.15
	Notes:		0.6				
			0.8				
3	2.0	1.9	0.2	550	1.704616	3.2387704	2,093,271.99
	Notes:		0.6				
			0.8				
4	3.0	1.5	0.2	422	1.34607264	2.01910896	1,304,984.21
	Notes:		0.6				
			0.8				
5	3.5	0.8	0.2	226	0.79705312	0.637642496	412,119.11
	Notes:		0.6				
	REW 4.0		0.8				
6		0	0.2	0	0.164	0	0.00
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	10.62556262	6,867,480.52

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 5
Date: 4/13/2010
Start Time: 1035
End Time: 1050
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.5	0.9	0.2	530	1.6485936	1.48373424	958,962.49
	Notes:		0.6				
			0.8				
2	1.0	1.45	0.2	860	2.5729632	3.73079664	2,411,276.86
	Notes:		0.6				
			0.8				
3	2.0	2	0.2	1062	3.13878944	6.27757888	4,057,305.21
	Notes:		0.6				
			0.8				
4	3.0	2	0.2	990	2.9371088	5.8742176	3,796,606.01
	Notes:		0.6				
			0.8				
5	4.0	1.45	0.2	916	2.72982592	3.958247584	2,558,282.24
	Notes:		0.6				
			0.8				
6	4.5	0.9	0.2	694	2.10797728	1.897179552	1,226,179.17
	Notes:		0.6				
			0.8				
7	5.0	0	0.2	0	0.164	0	0.00
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	23.2217545	15,008,611.98

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 6 - Low Flow (No Data)
Date: 5/5/2010
Start Time:
End Time:
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1			0.2				
	Notes:		0.6				
			0.8				
2			0.2				
	Notes:		0.6				
			0.8				
3			0.2				
	Notes:		0.6				
			0.8				
4			0.2				
	Notes:		0.6				
			0.8				
5			0.2				
	Notes:		0.6				
			0.8				
6			0.2				
	Notes:		0.6				
			0.8				
7			0.2				
	Notes:		0.6				
			0.8				
8			0.2				
	Notes:		0.6				
			0.8				
9			0.2				
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	0	0.00

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 7 - No Data (flow blocked by aquatic vegetation)
Date: 5/5/2010
Start Time:
End Time:
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.5	0.6	0.2				
	Notes:Channel 1		0.6				
			0.8				
2	1.0	0.6	0.2				
	Notes:Channel 1		0.6				
			0.8				
3	1.5	0.6	0.2				
	Notes:Channel 1- No Flow		0.6				
			0.8				
4	0.5	0.4	0.2				
	Notes:Channel 2 - No Flow		0.6				
			0.8				
					DAILY TOTALS:	0	0.00

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 8 - Convergance Culvert
Date: 5/5/2010
Start Time: 1135
End Time: 1145
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	0.5	0.85	0.2	730	2.2088176	1.87749496	1,213,456.69
	Notes:		0.6				
			0.8				
2	1.0	1.65	0.2	604	1.85587648	3.062196192	1,979,149.10
	Notes:		0.6				
			0.8				
3	2.0	2.45	0.2	470	1.4805264	3.62728968	2,344,378.56
	Notes:		0.6				
			0.8				
4	3.0	2.45	0.2	608	1.86708096	4.574348352	2,956,478.57
	Notes:		0.6				
			0.8				
5	4.0	1.65	0.2	674	2.05195488	3.385725552	2,188,251.59
	Notes:		0.6				

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 9 - Stream that leads into St. Regis Ditch

Date: 5/5/2010

Start Time: 1150

End Time: 1205

Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	1.0	1.8	0.2	166	0.62898592	1.132174656	731,743.59
	Notes: Low Flow		0.6				
			0.8				
2	2.0	2.1	0.2	222	0.78584864	1.650282144	1,066,605.21
	Notes:		0.6				
			0.8				
3	3.0	2.1	0.2	286	0.96512032	2.026752672	1,309,924.47
	Notes:		0.6				
			0.8				
4	4.0	2.4	0.2	428	1.36287936	3.270910464	2,114,044.66
	Notes:		0.6				
			0.8				
5	5.0	2.4	0.2	490	1.5365488	3.68771712	2,383,433.83
	Notes:		0.6				

LAFAYETTE WEA - VELOCITY / DISCHARGE DATA FORM

Sample Location: Station 10 - CR 349 Bridge
Date: 3/5/2010
Start Time: 1020
End Time: 1040
Personnel: Larson / Parker

Obs. #	Distance Out (ft)	Depth (ft)	Column Depth	Counts/Min	Velocity (ft/s)	Volume (ft³/s)	Volume (gal/day)
1	1.0	0.65	0.2	580	1.7886496	1.16262224	751,422.38
	Notes:		0.6				
			0.8				
2	2.0	0.65	0.2	610	1.8726832	1.21724408	786,725.40
	Notes:		0.6				
			0.8				
3	3.0	0.65	0.2	656	2.00153472	1.300997568	840,856.69
	Notes:		0.6				
			0.8				
4	4.0	0.65	0.2	654	1.99593248	1.297356112	838,503.16
	Notes:		0.6				
			0.8				
5	5.0	0.65	0.2	650	1.984728	1.2900732	833,796.09
	Notes:		0.6				
			0.8				
6	6.0	0.65	0.2	702	2.13038624	1.384751056	894,987.99
	Notes:		0.6				
			0.8				
7	7.0	0.65	0.2	720	2.1808064	1.41752416	916,169.80
	Notes:		0.6				
			0.8				
8	8.0	0.65	0.2	726	2.19761312	1.428448528	923,230.40
	Notes:		0.6				
			0.8				
9	9.0	0.65	0.2	758	2.28724896	1.486711824	960,886.95
	Notes:		0.6				
			0.8				
					DAILY TOTALS:	11.98572877	7,746,578.86

Appendix E

Meta-Data (Compact Disks)

12.12 Operation Plan Fiscal Year 2012 – 2013

Lafayette Forest WEA Operational Planning

Fiscal year 2012 Projects: 1214

Activity	Title	Man Days	Salary	Fuel Cost	Other	Total	Units
100	Administration	0.00	$0.00	$0.00	$0.00	$0.00	0
101	Project inspection	15.00	$3,006.60	$198.60	$0.00	$3,205.20	0
182	Data management	5.00	$1,002.20	$66.20	$292.62	$1,361.02	0
185	GIS	5.00	$1,002.20	$66.20	$0.00	$1,068.40	0
200	Resource Management	5.00	$1,002.20	$66.20	$13,740.00	$14,808.40	0
202	Timber management	0.00	$0.00	$0.00	$0.00	$0.00	0
203	Tree and shrub planting	0.00	$0.00	$0.00	$0.00	$0.00	0
204	Resource planning	1.00	$200.44	$13.24	$8,500.00	$8,713.68	0
205	Burning	11.00	$2,204.84	$145.64	$7,500.00	$9,850.48	300
208	Firebreaks	15.00	$3,006.60	$198.60	$7,165.00	$10,370.20	20
216	Dams, dikes, levees	0.00	$0.00	$0.00	$0.00	$0.00	0
217	Canals	0.00	$0.00	$0.00	$0.00	$0.00	0
235	Vegetation and plant surveys	0.00	$0.00	$0.00	$0.00	$0.00	0
251	Animal investigations/monitoring	0.00	$0.00	$0.00	$0.00	$0.00	0
289	Native vegetation management (mechanical)	15.00	$3,006.60	$198.60	$5,731.00	$8,936.20	360
290	Native vegetation management (chemical)	0.00	$0.00	$0.00	$0.00	$0.00	0
311	Boundary signs	4.00	$801.76	$52.96	$500.00	$1,354.72	13
312	Informational signs	4.00	$801.76	$52.96	$1,000.00	$1,854.72	2
342	Public use administration (non-hunting)	1.00	$200.44	$13.24	$375.00	$588.68	0
913	New construction -- trails	0.00	$0.00	$0.00	$0.00	$0.00	0
914	New construction -- fences	0.00	$0.00	$0.00	$0.00	$0.00	0
923	FEM -- vehicles/equipment	1.00	$200.44	$13.24	$3,660.00	$3,873.68	0
926	FEM -- roads/bridges	25.00	$5,011.00	$331.00	$25,000.00	$30,342.00	25
928	FEM -- fences	0.00	$0.00	$0.00	$0.00	$0.00	0
All totals		**107.00**	**$21,447.08**	**$1,416.68**	**$73,463.62**	**$96,327.38**	**720**

12.13 Arthropod Control Plan

CHARLES H. BRONSON
COMMISSIONER

Florida Department of Agriculture and Consumer Services
Division of Agricultural Environmental Services

ARTHROPOD MANAGEMENT PLAN - PUBLIC LANDS

Chapters 388.4111, F.S. and 5E-13.042(4)(b), F.A.C.
Telephone: (850) 922-7011

For use in documenting an Arthropod control plan for lands designated by the State of Florida or any political subdivision thereof as being environmentally sensitive and biologically highly productive therein.

Name of Designated Land:
Lafayette Forest Wildlife & Environmental Area

Is Control Work Necessary: ☐ Yes ☒ No

Location:

Lafayette Forest WEA, 7886 South SR 349, Branford, FL 32008

Land Management Agency:
Florida Fish & Wildlife Conservation Commission

Are Arthropod Surveillance Activities Necessary? ☐ Yes ☒ No
If "Yes", please explain:

Which Surveillance Techniques Are Proposed?
Please Check All That Apply:

☐ Landing Rate Counts ☐ Light Traps ☐ Sentinel Chickens

☐ Citizen Complaints ☐ Larval Dips ☐ Other

If "Other", please explain:

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Page 1 of 4

Arthropod Species for Which Control is Proposed:
None

Proposed Larval Control:
None

Proposed larval monitoring procedure:

Are post treatment counts being obtained: ☐ Yes ☒ No

Biological Control of Larvae:

Might predacious fish be stocked: ☐ Yes ☒ No

Other biological controls that might be used:

None

Material to be Used for Larvaciding Applications:

(Please Check All That Apply:)

☐ Bti

☐ Bs

☐ Methoprene

☐ Non-Petroleum Surface Film

☐ Other, please specify:

Please specify the following for each larvacide:

Chemical or Common name:

☐ Ground ☐ Aerial

Rate of application:

Method of application:

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Proposed Adult Mosquito Control:

Aerial adulticiding ☐ Yes ☒ No

Ground adulticiding ☐ Yes ☒ No

Please specify the following for each adulticide:

Chemical or common name:

Rate of application:

Method of application:

Proposed Modifications for Public Health Emergency Control: Arthropod control agency may request special exception to this plan during a threat to public or animal health declared by State Health Officer or Commissioner of Agriculture.
No modification will be needed.

Proposed Notification Procedure for Control Activities:
Contact: Florida Fish & Wildlife Conservation Commission, North Central Regional Office, 3377 E. US Hwy. 90, Lake CIty, FL 32055

Records:

Are records being kept in accordance with Chapter 388, F.S.:

☐ Yes ☒ No

Records Location: We have no arthropod control measures in place and therefore no records to maintain at this time

How long are records maintained:
We are not maintaining any records because there are no arthropod control measures implemented or proposed.

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Vegetation Modification:

What trimming or altering of vegetation to conduct surveillance or treatment is proposed?
None.

Proposed Land Modifications:

Is any land modification, i.e., rotary ditching, proposed:
No.

Include proposed operational schedules for water fluctuations:
None.

List any periodic restrictions, as applicable, for example peak fish spawning times.
None

Proposed Modification of Aquatic Vegetation:
None.

Land Manager Comments:
There are no arthropod control measures needed for this property.

Arthropod Control Agency Comments:

s/ Christopher Tucker	5/08/2012
Signature of Lands Manager or Representative	Date
Signature of Mosquito Control Director / Manager	Date

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Page 4 of 4

12.14 FNAI Data Usage Letter

FLORIDA
Natural Areas
INVENTORY

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

April 11, 2014

David Alden
Land Conservation & Planning
Florida Fish and Wildlife Conservation Commission
Tallahassee, FL

Dear David,

By virtue of this letter we are updating and continuing our agreement that it is unnecessary for your office to request FNAI element occurrence data for each land management plan you prepare, under the following conditions:

- FNAI will continue to provide our Florida Element Occurrence GIS database to FWC on a quarterly update basis;
- The FNAI GIS data will be available to FWC staff for reference and incorporation as required in management plan review and preparation.

Our database manager, Frank Price, currently provides this update via ftp to FWC staff on a quarterly basis. Current FWC contacts for the quarterly update are Beth Stys and Ted Hoehn. We are pleased to continue this beneficial collaboration with the Florida Fish and Wildlife Conservation Commission.

Sincerely,

Gary Knight
Director
Florida Natural Areas Inventory

Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

Tracking Florida's Biodiversity

12.15 Lafayette County Letter of Compliance with Local Government Comprehensive Plan

LAFAYETTE COUNTY

Board of County Commissioners

P.O. BOX 88 $ MAYO, FL 32066

(386) 294-1600

FAX (386) 294-4231

Lance Lamb - Dist. 1
Gail Garrard- Dist. 2
Curtis O. Hamlin - Dist. 3

T. Jack Byrd - Dist. 4
Earnest L. Jones - Dist. 5

September 23, 2013

Florida Fish and Wildlife Conservation Commission
Division of Habitat and Species Conservation
Land Conservation and Planning
620 South Meridian Street
Tallahassee, FL 32399-1600

RE: Lafayette Forest Wildlife and Environmental Area Management Plan
Consistency with the Lafayette County Comprehensive Plan

Dear Sir/Madam:

The Conservation Element of the County's Comprehensive Plan contains a goal, objectives and policies that promote the conservation, use and protection of the County's natural resources.

The Lafayette Forest Wildlife and Environmental Area, which encompasses approximately 2,148 acres in the southeastern portion of the County, provides habitat for a wide diversity of wildlife species and aids in conserving a corridor for wildlife movement. The plan to manage the Lafayette Forest Wildlife and Environmental Area for the conservation and protection of natural and historical resources, as well as, to provide certain types of resource-based public outdoor recreation aligns with the goals, objectives and policies of the Conservation Element and Recreation and Open Space Element of the Comprehensive Plan.

The plans for restoring and maintaining natural communities within the Lafayette Forest Wildlife and Environmental Area in a condition that sustains ecological processes and conserves biological diversity, as well as the plans for protecting and managing threatened and endangered species within the Lafayette Forest Wildlife and Environmental Area are all consistent with the goal, objectives and policies of the County's Conservation Element of the Comprehensive Plan.

Additionally, the plan to develop a Recreation Master Plan for the Lafayette Forest Wildlife and Environmental Area in order to develop additional public access and recreational opportunities will result in an increase in resource-based recreation facilities use by the general public, thus work to help further the goal, objectives and policies of the County's Recreation and Open Space Element of the Comprehensive Plan.

Therefore, based upon the County's review of the Lafayette Forest Wildlife and Environmental Area Management Plan, the County Local Planning Agency has determined that said Management Plan is consistent with the County's Comprehensive Plan.

If you have any questions concerning this matter, please do not hesitate to contact Robert E. Johnson, Land Development Regulation Administrator at 386.294.3611.

Sincerely,

Lance Lamb
Chairman
Local Planning Agency