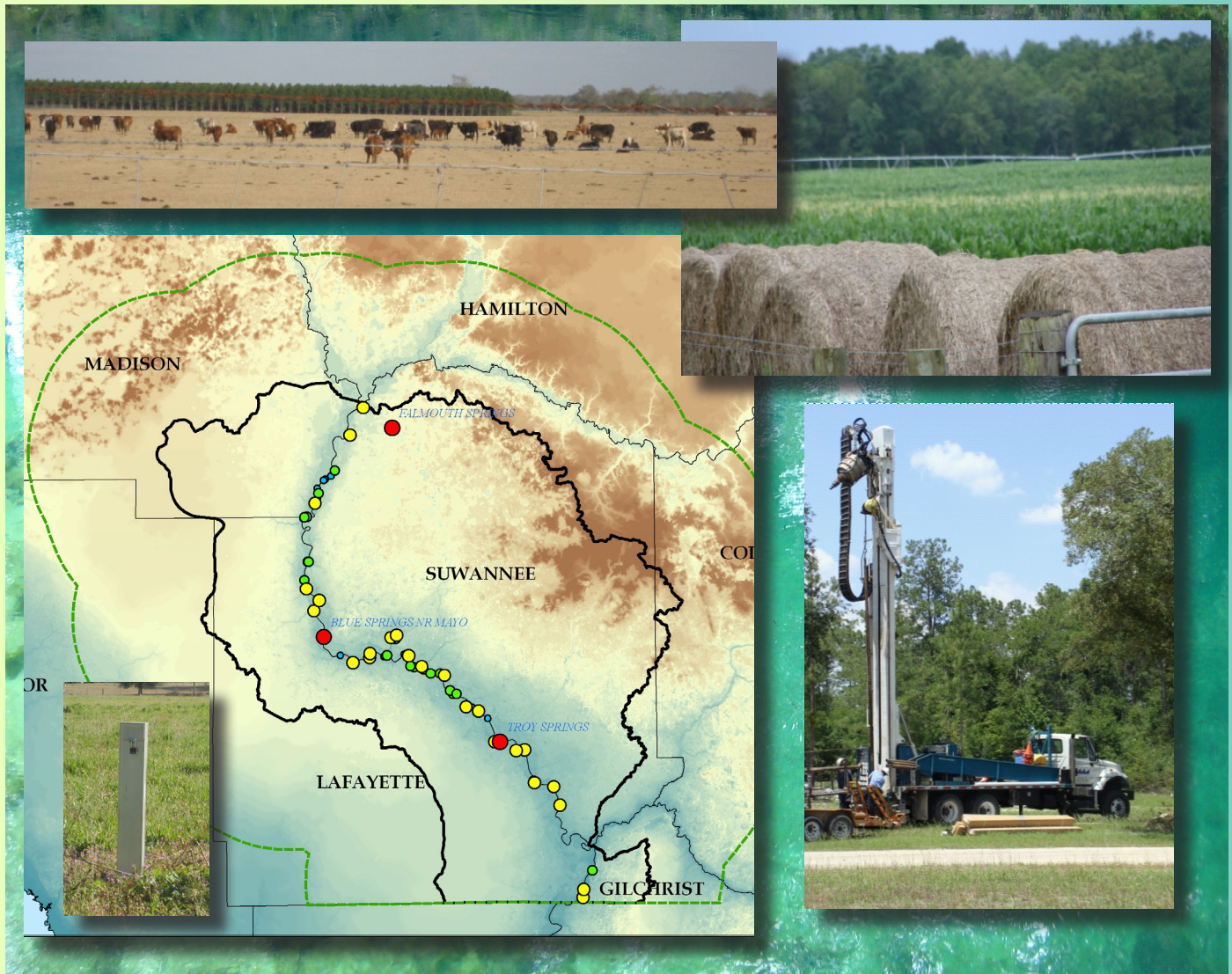


# *Middle Suwannee Springshed Delineation Project Update FY '08-'09*



**Florida Geological Survey  
Florida Department of Environmental Protection  
June 30, 2009**



903 W. Tennessee St., MS 720  
Tallahassee, Florida 32304  
<http://www.dep.state.fl.us/geology/>



## Summary

- The Florida Geological Survey is conducting a springshed delineation study in the Middle Suwannee basin. This project will lead to a better understanding of the potentiometric surface of the Floridan aquifer system. Springshed maps will be generated for approximately 63 Middle Suwannee springs.
- Eight employees were hired for this project:
  - Office Staff
    - James McClean, Project Data Manager
    - Alexandra Walrath, GIS Technician
  - Field Crew (Environmental Specialists I)
    - James Bobrycki
    - John Carroll
    - Caitlin Cerame
    - Jacob Mast
    - Melinda Spall
    - Eric Thomas
- Employees received the following training:
  - Required FDEP training:
    - New Employee Orientation
    - Harassment Is...
    - Diversity in the Real World
    - DEP Code of Ethics
    - DEP Public Records
  - Basic First Aid and CPR for Adults and Children
  - FDEP Purchasing Card Training
  - FDEP SOP Sampling Training for Groundwater, Surface Water and Wastewater
  - FDEP Snorkeling/Skin Diving Training
- The field crew visited and accessed 527 homeowner wells in the study area.
- An informational brochure was mailed to every homeowner contacted by the field crew.
- Sixteen new monitoring wells were installed in the study area.
- For the 2008-2009 fiscal year the project was awarded \$347,695. Total expenditures amounted to \$241,985.71. The difference between the amount awarded and the total expenditures is largely due to a delay in the staff hiring process and an inability to purchase GPS surveying units during this past fiscal year.

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## Introduction:

Working cooperatively with the Florida Springs Initiative, the Florida Geological Survey (FGS) is conducting a four-year springshed delineation project (Figure 1). Delineating springsheds for the springs along the Suwannee River in an area known as the “Middle Suwannee” is the priority. The

Middle Suwannee springshed delineation project is expected to take approximately two years to complete, including eighteen months of fieldwork. Next, refinements in the springshed boundary between Rainbow and Silver Springs are scheduled. The delineation of the boundary between Rainbow and Silver Springs is expected to take approximately twenty months. Lastly, springshed delineations for Morrison, Ponce de Leon and Werner-Boyce Springs are to be completed. Delineation of the springsheds for Morrison, Ponce de Leon and Werner-Boyce is expected to take nine to twelve months. Each of these delineations could be completed as a stand-alone project. So far we have completed approximately five months of fieldwork for the Middle Suwannee springshed delineation project.

Springshed delineation, or springshed mapping, is a relatively new and evolving science. Groundwater level maps called potentiometric surface maps are used to delineate springsheds. These maps look like topographic maps with contour lines, but they represent the groundwater levels under the land surface. Other springshed delineation techniques include dye tracing and the analysis of water chemistry domains, contaminant loadings, and discharge/recharge rates.

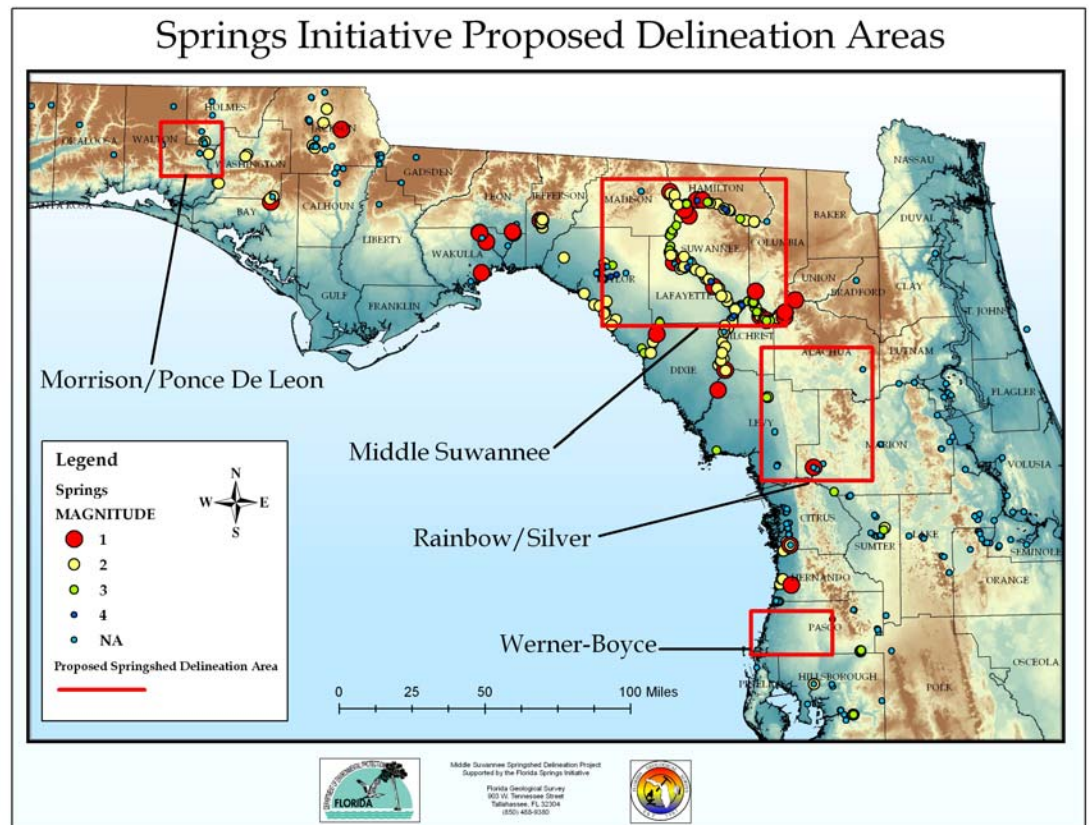


Figure 1

The FGS's approach to delineating springsheds in the Middle Suwannee is as follows:

1. Compile information including existing springshed maps and historic water chemistry/discharge data.
2. Locate existing wells within the study area and obtain permission to use them as monitoring wells.
3. Identify gaps in our well network and install new monitoring wells as needed.
4. Survey the wells within our network.
5. Collect water levels and water chemistry samples from the wells.
6. Use these water level and water chemistry data to generate potentiometric surface maps and delineate springsheds.
7. Provide a written report and springshed maps.

## **Study Area Description:**

For descriptive purposes our study area has been named the Middle Suwannee River Basin, being a subset of the larger hydrologic unit known as the Lower Suwannee River Basin. This hydrologic unit code (HUC) encompasses 620,800 acres (970 square miles). Our study area includes a ten mile buffer around the upper portion of the Lower Suwannee River hydrologic unit encompassing a total area of 1,539,200 acres (2,405 square miles). This section is bounded on the north by the confluence of the Withlacoochee River and at the southern end is bounded by the confluence with the Santa Fe River. See Figure 2 showing both the hydrologic unit code boundary and the ten mile buffer zone. This study area contains portions of and/or entirely encompasses the following counties: Taylor, Madison, Suwannee, Lafayette, Hamilton, Columbia, and Gilchrist. Within this reach of the Middle Suwannee River Basin are a total of 63 documented springs, listed in Table 1 of Appendix A. These include the following first magnitude springs: Lafayette Blue Spring, Falmouth Spring and Troy Spring. Falmouth Spring is known to be a karst window and not technically a spring in that the flow of water reverses direction depending upon the stage of the Suwannee River.

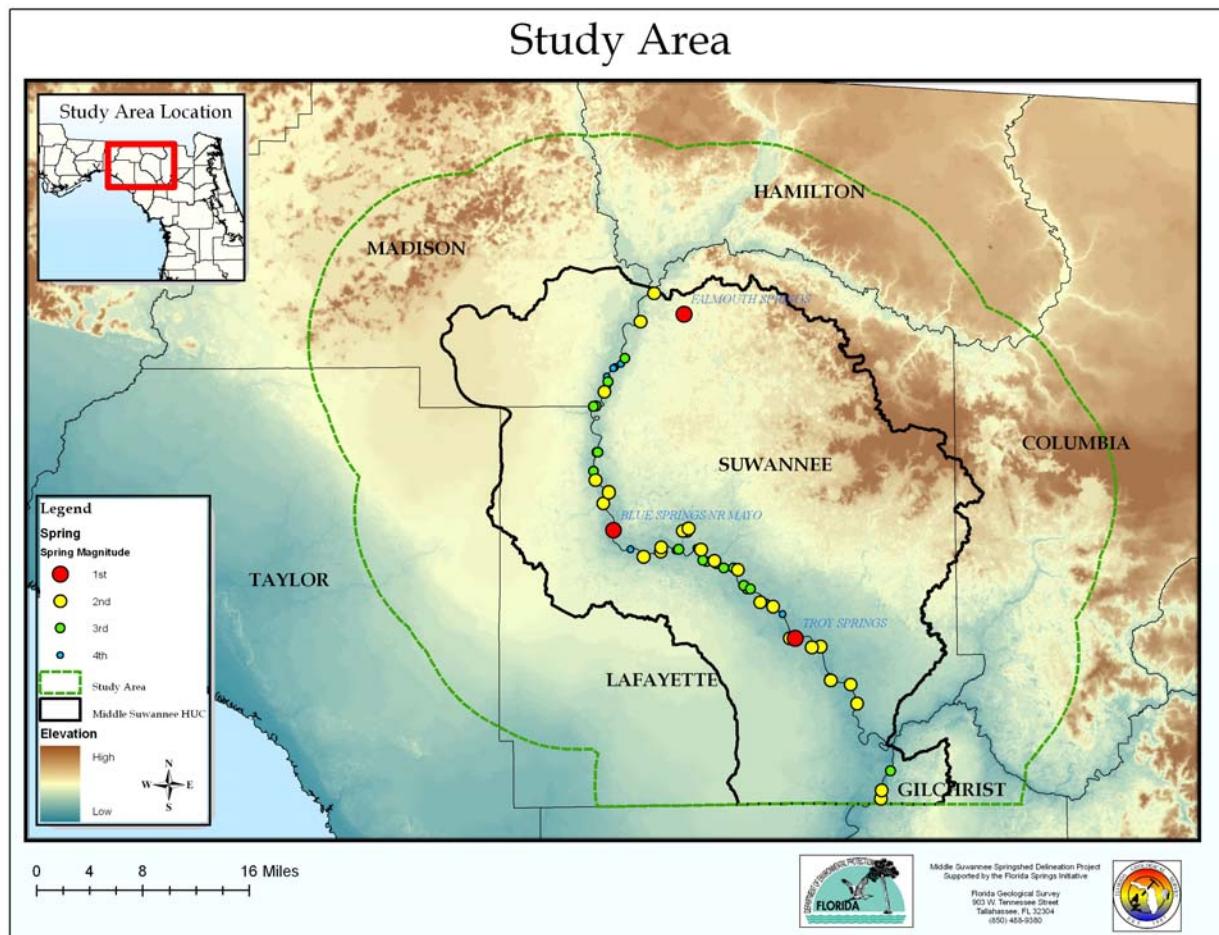


Figure 2

## Field Data Set Development:

The Suwannee River Water Management District (SRWMD) has provided the Florida Geological Survey with a database containing over 15,000 wells that are located within the water management district. Using Geographic Information System (GIS) software we have filtered this data set to identify approximately 6,600 wells within our defined study area (Figure 3). Of these wells, 6,188 are privately owned. The remaining 436 wells that are on state property have been used in previous scientific studies.

The accuracy of our potentiometric surface maps will depend in part on the positional accuracy of our well network. With this in mind we analyzed our data set to identify high precision points (Figure 4). These points include wells and benchmarks for which we already have accurate locations. We identified 526 wells within the study area that have been professionally surveyed. We also identified wells that are monitored by the SRWMD either continuously or on a monthly basis. Our network of high precision points also includes 908 benchmarks used in the National Geodetic Survey.



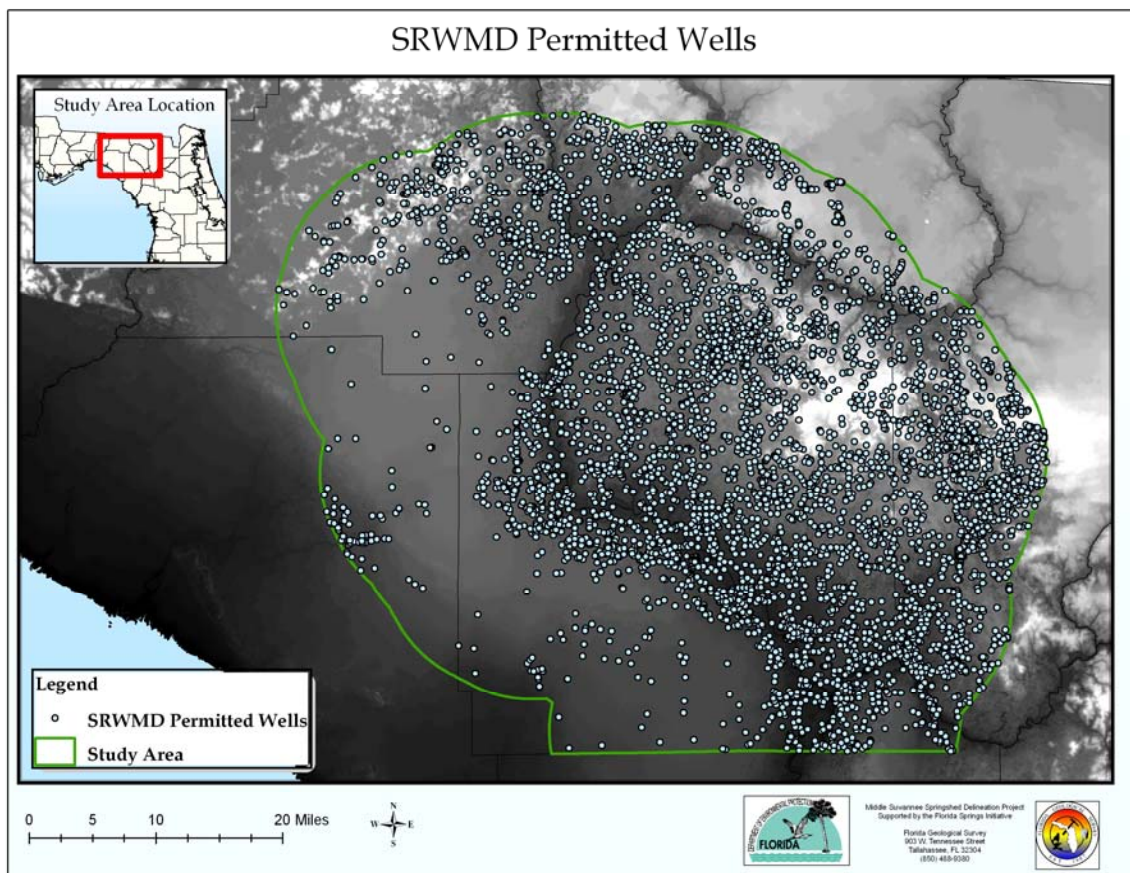


Figure 3

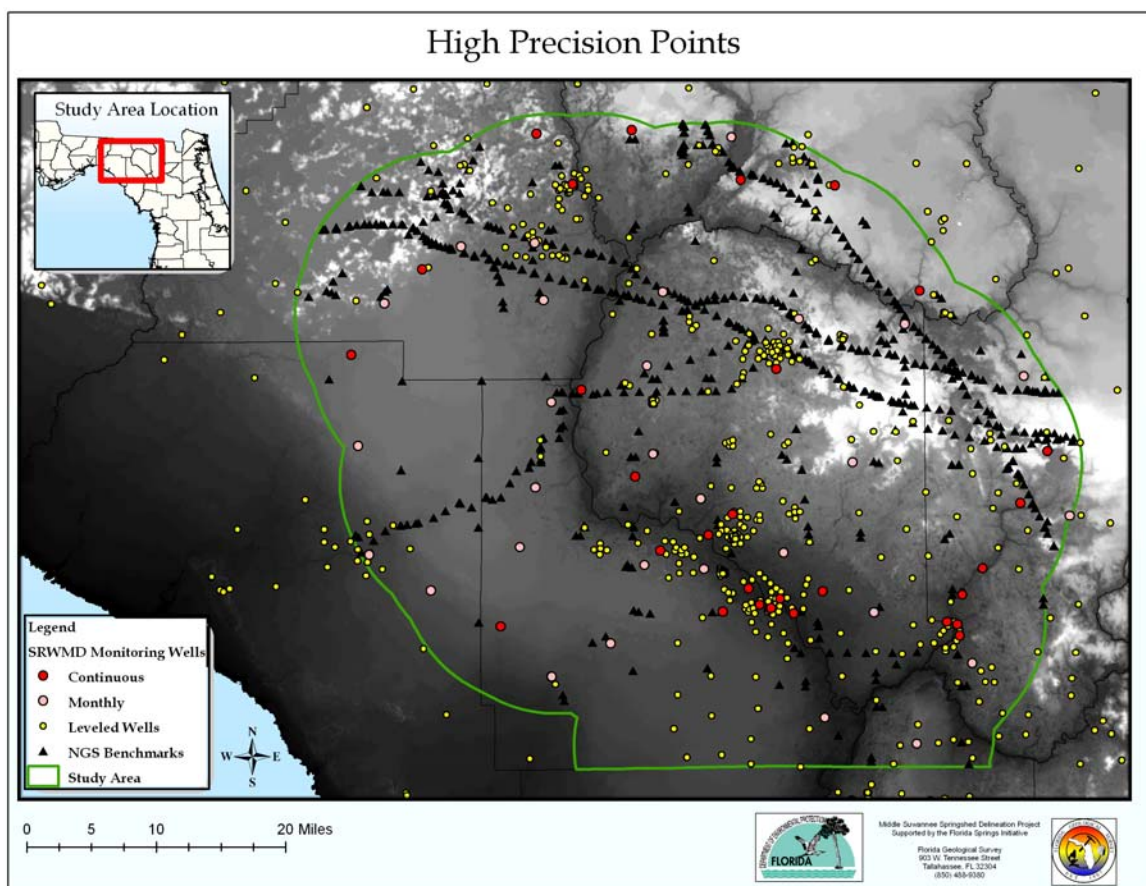


Figure 4

## **Data Collection Methods:**

The primary objective of this past fiscal year has been to establish a network of wells suitable for water level measurements and groundwater chemistry sampling throughout the study area. The data set provided to us by the SRWMD includes an abundance of wells. However, not all of these wells are suitable for this study. Most of the wells in our data set are private homeowner wells, not monitoring wells. Many of these homeowner wells cannot accommodate a water level meter. Also, not all homeowners are willing to allow their wells to be sampled.

We hired a field crew to canvass the study area, searching for usable wells and obtaining site access permission from landowners. Our field team consists of six employees hired in February 2009 to conduct site evaluations and to secure landowner permission to access and sample selected wells. The field crew was dispatched in three teams of two persons to canvass homeowners to secure their cooperation with our sampling plans.

To streamline integration of this growing data set into our GIS databases, an interactive Well Attribute Form was created using Adobe Acrobat Professional (Form 1, Appendix B). Field data parameters are recorded in log books by each field team and then transposed into the data set by means of electronic data entry by typing the relevant data into the fillable form back in the office. Each form created is then stored as an Extensible Markup Language (xml) file which can then be read by a wide variety of software packages. At the end of several weeks, these forms are then combined in a batch process within Adobe Acrobat Professional which generates a tabular database file readable in Microsoft Excel. The resulting table of well attributes is then output as Shapefiles for use in Environmental Science Research Institute (ESRI) ArcGIS software. These Shapefiles form the backbone of our geographic databases.

## **Summary of Project Year to Date Accomplishments:**

### **Hiring**

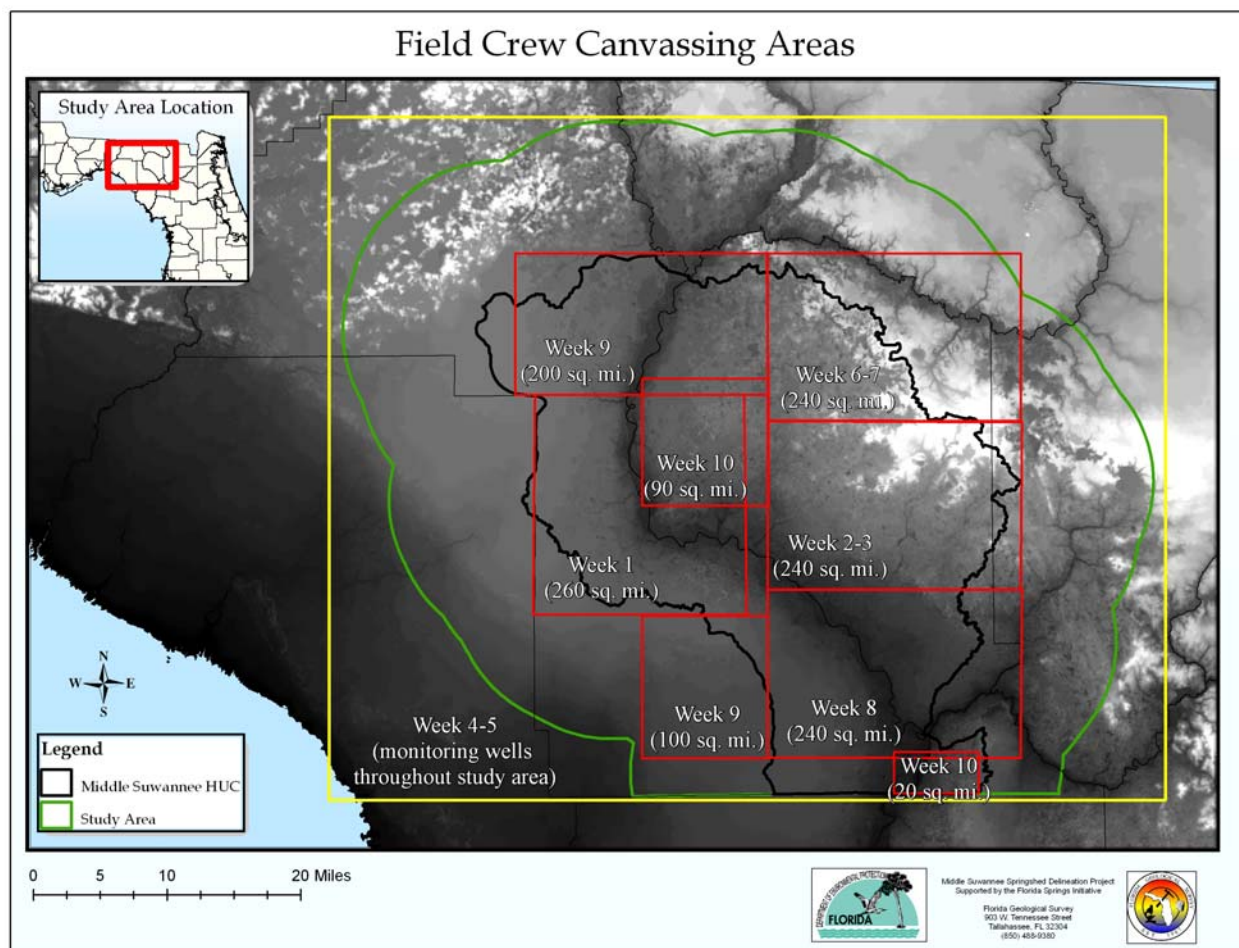
Two office staff and six field crew were hired for this project. Mr. James McClean, a former FGS employee, was hired in December 2008 as the project data manager and functions as the assistant project manager. Office space was cleared and organized in early December in the Florida Geological Survey Gunter Building for the use of project staff. Three computer work stations were established in addition to a previously established workstation, for a total of four computer stations for staff use. In early January Ms. Alexandra Walrath was hired as the project GIS technician. Mr. McClean and Ms. Walrath have their own computer workstations with GIS and publication software loaded for their regular full time use. During February 2009 the following six personnel were hired as Environmental Specialists I: Mr. James Bobrycki, Mr. John



Carroll, Ms. Caitlin Cerame, Mr. Jacob Mast, Ms. Melinda Spall and Mr. Eric Thomas. These six staff members serve as the project's field crew. The field crew rotates use of the remaining two computer work stations at the beginning and end of each week to submit travel related documents, complete data entry assignments and input time cards. Usually the field crew spends Tuesday-Thursday in the study area. The entire springshed delineation team gathers in the office on Mondays and Fridays to complete paperwork and attend project staff meetings.

## Training

Project timelines and objectives were outlined throughout the months of December and January including the development of the well database. The month of February was devoted to new employee orientation and training in compliance with FDEP hiring regulations (New Employee Orientation, Harassment Is...Government Version, Diversity in the Real World, DEP Code of Ethics, DEP Public Records). Staff also received classroom instruction and certification in Basic First Aid and CPR for Adults and Children during the month of February. In March staff completed training on the use of state purchasing cards. In April the springshed delineation team attended a one-day workshop on FDEP SOP Sampling Training for Groundwater, Surface Water and Wastewater at the University of Florida's TREEO Center. Skin diving/snorkeling training is scheduled for July.



**Figure 5**

## Well Location and Site Access

Field work began in February, 2009. Over the course of ten weeks the field crew visited landowners throughout the study area. Before dispatching the field crew, we overlaid a ten mile grid on the study area. Using this grid we divided the study area into blocks of approximately 250 square miles, focusing on the Middle Suwannee HUC (the central portion of our study area). Each week the field crew was assigned one of these 250 square mile blocks (Figure 5). The field crew received maps of each block showing the locations of wells in our data set. We also provided the crew with contact information for each well's owner based on cadastral records. In the fourth and fifth weeks of field work we experimented with a different strategy, sending the field crew to locate existing monitoring wells throughout the entire study area. See Table 2 of Appendix A for weekly totals of wells accessed by the field crew.

Armed with well maps and contact information, the field crew visited as many wells as possible. In addition to visiting the wells marked on their maps, the crew also looked for wells that were not included in our data set. During this first phase of fieldwork the crew photographed each well they visited, collected preliminary well location data using handheld GPS units, and obtained verbal permission from landowners to access the wells. Each two-person field crew team kept detailed field notes describing daily activities (see Example of Field Notes, Appendix C). For every well visited, the field crew filled out a Well Attribute Form detailing relevant information (Form 1, Appendix B). As discussed above, these forms are electronically input into our well database. The database currently includes 527 wells visited by the field crew (Figure 6).

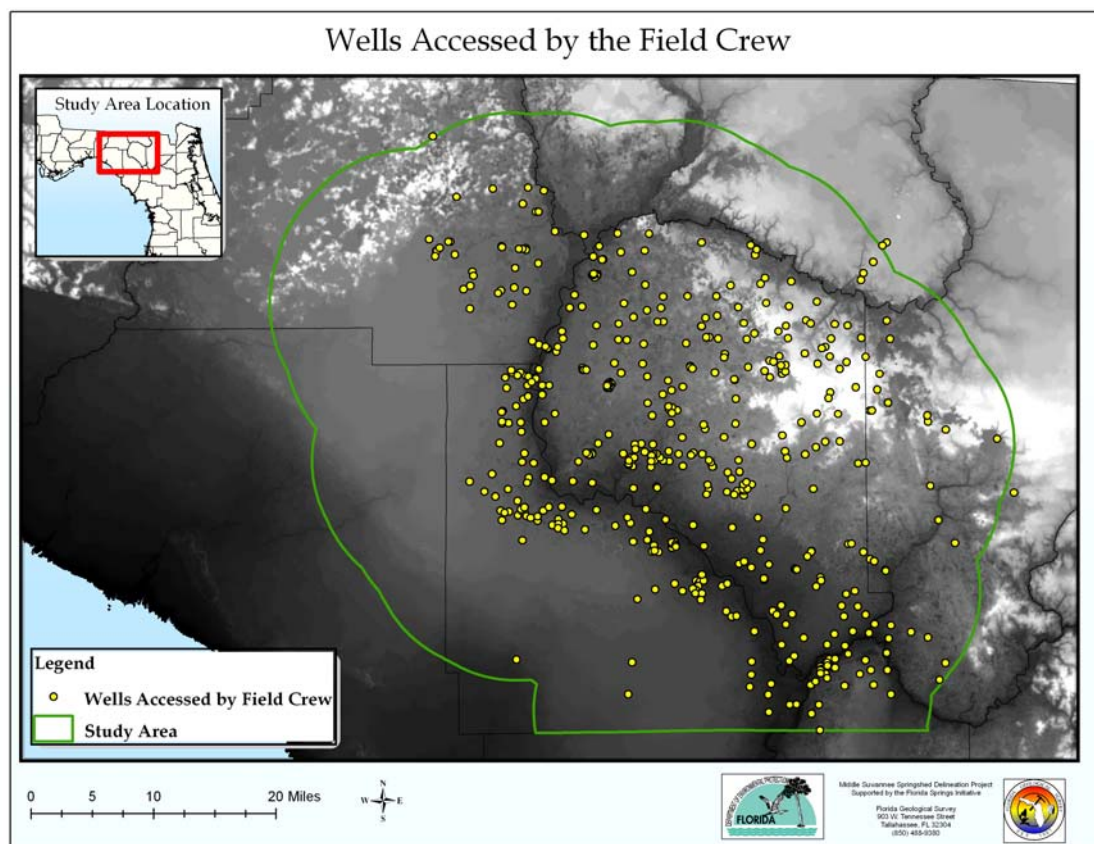


Figure 6



### Informational Brochure

At the request of the Florida Farm Bureau and the Suwannee River Partnership, we produced a brochure on the Middle Suwannee springshed delineation project (see Informational Brochure, Appendix D). The brochure introduces readers to springshed delineation and describes the scope of our project. After being reviewed by the FGS and the FDEP's Communications Department, the brochure was mailed to every landowner contacted by the field crew. Additional copies of the brochure are available to other interested parties upon request.

### Monitoring Well Installation

After ten weeks of field work we analyzed the project database of 527 wells and looked for gaps in the well coverage. Between May 25 and June 1, 2009 sixteen new monitoring wells were installed to fill these gaps (Figure 7).

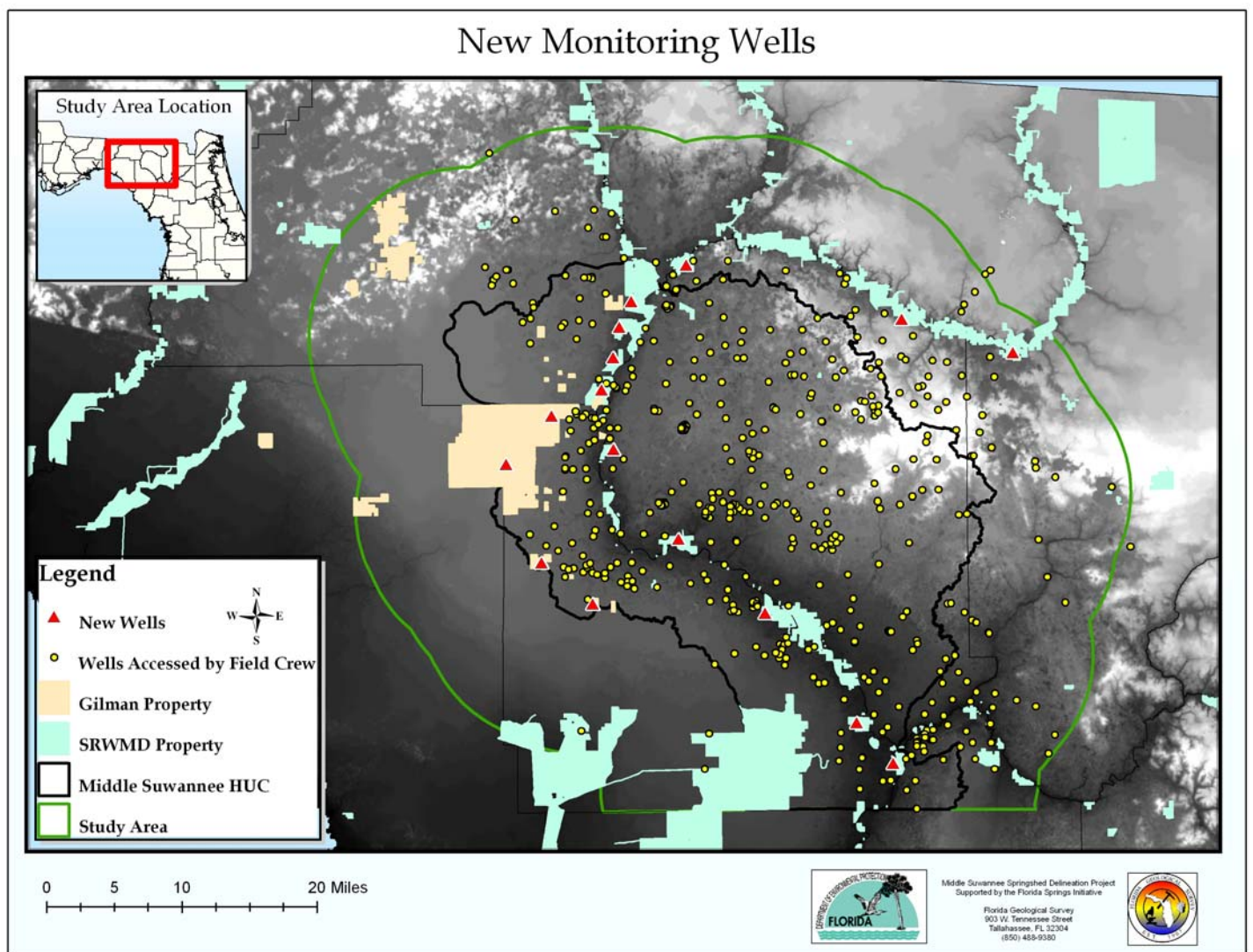


Figure 7

When searching for potential new well sites, we focused on property owned by two of the largest landholders in the study area: the SRWMD and the Gilman family trust. The SRWMD owns approximately 67,800 acres of land in the study area, while the Gilman family trust owns approximately 41,700 acres of land in the study area. Representatives of the SRWMD and the Gilman family signed a legally binding form granting the FGS permission to install monitoring wells and collect water levels and water quality samples on their property (Form 2, Appendix B). The FGS is guaranteed access to these wells for the next two years, after which time ownership of the wells will revert to the landholders. Each well is permitted by the SRWMD (see Example of Well Permit, Appendix E). Twelve of the sixteen new monitoring wells were drilled on SRWMD property, with the remaining four on Gilman property.

Monitoring well installation was administered under the FDEP's contract with URS Southern Corporation (URS). URS selected and contracted a drilling contractor, Groundwater Protection, Inc. (GPI) to install and develop the wells. Drilling was completed by GPI with oversight by three URS staff members (a Florida licensed geologist, a geologist, and a senior scientist). The springshed delineation field crew was also onsite to oversee well installation. Two additional wells were installed by FGS staff.

Three teams of drillers worked simultaneously during the two-week period of well installation. Eight wells were installed by GPI's sonic rotary rig, six wells were installed by GPI's hollow stem auger/mud rotary rig, and two wells were installed by the FGS's mobile core drilling rig. Wells were installed to depths from 29 to 90 feet below land surface. Lithologic logs of each borehole were prepared by describing the drill cuttings at five-foot intervals. The wells were constructed of polyvinyl chloride (PVC) casing with twenty feet of well screen. Seven wells have four inch diameters, and the remaining nine wells have two inch diameters. Each well was fitted with a locking protective casing (Figure 8). After completing the well installation, URS provided the FGS with a report summarizing the construction details, location, and lithologic log of each monitoring well (see Selections from URS Report, Appendix F).



**Figure 8**

Grant: 10609			Summary	
CATEGORY ALLOTMENTS		Grant Funds or Matching Funds?	TOTAL EXPENDITURES	TOTAL REMAINING
<b>Total Grant Amount</b>	<b>\$ 355,092.00</b>			
OPS Salary	\$ 140,195.00	Grant Funds	\$ 120,337.96	\$ 19,857.04
FTE Salary (Match)	\$ -	Matching Funds	\$ -	\$ -
EXPENSE--Purchases/Perquisites	\$ -	Grant Funds	In "Travel Expense"	In "Travel Expense"
EXPENSE--Travel	\$ 38,100.00	Grant Funds	\$ 35,881.10	\$ 2,218.90
EXPENSE--Drilling	\$ -	Matching Funds	\$ -	\$ -
OCO	\$ -	Grant Funds	\$ -	\$ -
CONTRACTUAL SERVICES	\$ 165,400.00	Grant Funds	\$ 81,766.65	\$ 83,633.35
OVERHEAD/INDIRECT	\$ 4,000.00	<b>From budget sheets</b>	\$ 4,000.00	\$ -
<b>TOTAL</b>	<b>\$ 347,695.00</b>	<b>TOTAL</b>	<b>\$ 241,985.71</b>	<b>\$ 105,709.29</b>

**Figure 9**

**Budget summary as tracked by FGS personnel. This table is up to date as of the last week of June and therefore does not account for an additional eight (8) days of OPS salary expense from the last pay period of FY 08-09.**

## **Budget Narrative:**

Our project budget is comprised of three general spending categories: OPS Salary, Travel Expense and Contracted Services (Figure 9).

OPS Salary funds were used to pay the salaries of the two office support staff and six field personnel. The Travel Expense funds were used to pay for field work expenses related to this project such as meals, per diem and lodging. Each of the eight employees hired for this project was issued a State of Florida Purchasing Card through the Division of Environmental Assessment and Restoration (DEAR). Travel authorization forms were submitted to and authorized by FGS administrative staff for the purpose of tracking employee travel and project use of FGS vehicles. However, fiscal management of project funds remains in the hands of DEAR personnel. Ms. Linda Quinn-Godwin is assigned as our P-Card "Watcher" who is responsible for tracking and approving P-Card usage and travel expenses for this project. While we track all expenses in house and maintain triple redundancy in our paperwork records, ultimate fiscal accountability lies with the Division of Environmental Assessment and Restoration. We believe that the above documented budget summary is a true representation of actual project expenses for this past fiscal year based upon the allotment values stated to us by the Florida Springs Initiative.

The Contractual Services funds allocation was used to contract with Ground Water Protection Incorporated through URS Incorporated of Tallahassee, Florida for the installation of fourteen monitoring wells on both SRWMD and privately owned land parcels within the study area. The cost of installing these wells was \$81,766.65.



An additional \$75,000 of these funds were earmarked for a contractual lease agreement to obtain use of a high precision survey grade GPS real time kinematic base station and rover system to facilitate vertical elevation measurements of these and other wells to be used to meet our project's data collection objectives. Leasing this equipment with a long term buy out option would enable the project to survey in hundreds of wells for a mere fraction of what it would cost to contract a professional surveyor charging \$5,000 per well to accomplish the same goals. Our intention was to establish a contractual lease agreement with a local vendor to provide access to the required surveying equipment for a three year period. Unfortunately this request was curtailed by Finance and Accounting as being an incompatible use of funds designated for Contractual Services. As such there exists an excess of at least the \$75,000 earmarked for a three year lease of a Trimble R8 GNSS surveying system at the end of our budget year. A delay in the staff hiring process accounts for much of the remaining excess. According to the Florida Springs Initiative Coordinator a portion of these excess funds will be used to support other Initiative projects.

In addition to the use of the above outlined funds, project financial support was received from the Florida Geological Survey in the form of vehicle usage and payment of vehicle expenses accrued by project field staff using vehicles loaned to us for use throughout the term of the project by the Division of Water Resource Management. Our Springshed Delineation Project has been loaned the use of DEP 3999 and DEP 4549, a Ford F-250 with tool storage topper and a Jeep Cherokee respectively. The Voyager Fleet card for the purchase of fuel and periodic preventative maintenance for DEP 3999 has been assigned to the Florida Geological Survey, while those costs associated with DEP 4549 are being paid for from the Springshed Delineation Travel Expense budget. To date FGS has contributed \$1099.06 for fuel and vehicle maintenance to support our project. Vehicle expenses for DEP4549 are accounted for in the above budget summary.

## **Goals for Next Year:**

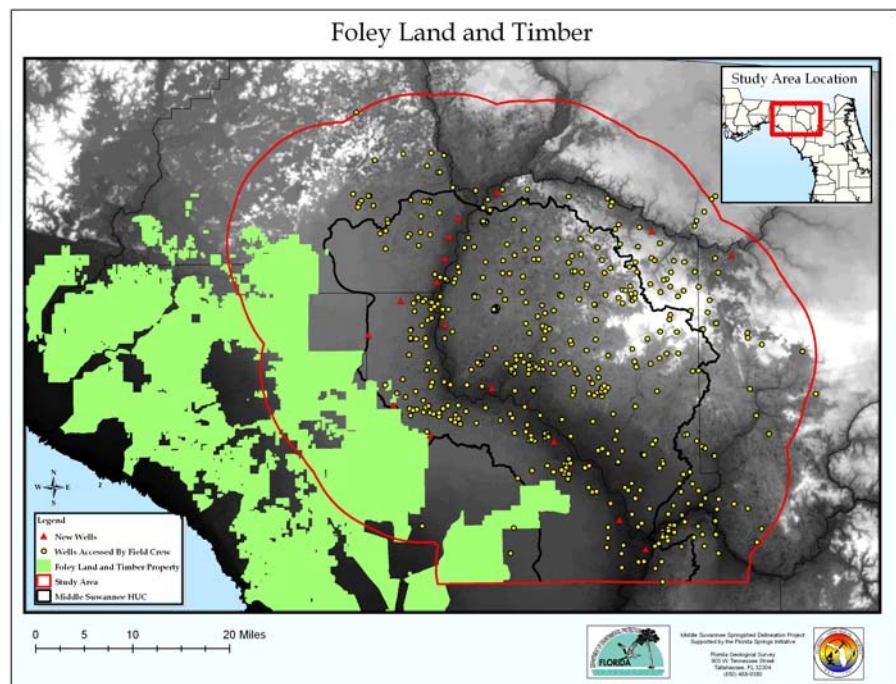
### **Refine the Well Network**

Our next step is to identify wells in the project database that are suitable for water levels and water sampling. The field crew photographed each well that they visited while canvassing the study area. Based on these photographs we will isolate wells that can accommodate water level meters and sampling equipment. Once the usable wells have been identified, the field crew will obtain written permission from landowners to access these wells (Form 3, Appendix B).

### **Install Additional Monitoring Wells**

Additional monitoring wells will be installed on property owned by Foley Land and Timber. The largest landholder in the study area, Foley Land and Timber owns approximately 186,700 acres within the study area (Figure 10). Foley representatives have already granted us tentative permission to install wells on their property.

We will finalize our agreement with Foley and complete well installation in the next fiscal year.



**Figure 10**

### **Survey the Wells**

Once our well network has been finalized, we will survey each well in the network. One of the major expenses for previous springshed delineations has been surveying the wells used in the generation of potentiometric maps. In order to map the potentiometric surface, it is important to obtain accurate surface elevations for every well used to generate the potentiometric surface. The surface elevation of the well must be compared to the water level in the well with a high degree of accuracy. The FGS proposes to acquire survey grade GPS units to accomplish this task. The GPS vendor will train springshed delineation staff on the use of the GPS equipment.

### **Water Levels, Water Sampling, and Springshed Delineation**

We expect to obtain two sets of water levels and water chemistry samples from the wells in our network. Sampling is tentatively scheduled for October, 2009 and May, 2010. Water conditions permitting, the crew will also obtain water chemistry samples from approximately 35 of the study area's 63 springs. These water levels and water chemistry samples will be used to create new potentiometric maps of the study area. Given the density of our well network, we expect that these potentiometric maps will be more refined than previous efforts. Based on potentiometric maps and water chemistry analysis we will delineate springsheds for the springs in the study area. We anticipate that multiple small springs will be grouped into single springsheds. After completing the springshed delineation we will produce springshed maps and a final written report.

## *Appendices*

*Appendix A: Table 1: Middle Suwannee Springs*

*Table 2: Wells Accessed by the Springshed Delineation Field Crew*

*Appendix B: Form 1: Well Attribute Form*

*Form 2: Well Installation/Water Level/Sampling Permission Form*

*Form 3: Well Water Level/Sampling Permission Form*

*Appendix C: Example of Field Notes*

*Appendix D: Informational Brochure*

*Appendix E: Example of Well Permit*

*Appendix F: Selections from URS Report*

*Summary of Well Installation*

*Table of Well Locations*

*Example of Boring Log*

*Example of Well Completion Report*

*Example of Well Completion Log*

## *Appendix A*

*Table 1: Middle Suwannee Springs*

Spring ID Code	Spring Name	Magnitude
LBS010C1	BLUE SPRINGS NR MAYO	1
FAM010C1	FALMOUTH SPRINGS	1
TRY010C1	TROY SPRINGS	1
AMP010C1	ALLEN MILL POND	2
ANS010C1	ANDERSON SPRING IN SUWANNEE RIVER	2
BON010C1	BONNET SPRINGS	2
BRA010C1	BRANFORD SPRINGS	2
BTS010C1	BATH TUB SPRINGS	2
CHS010C1	CHARLES SPRINGS	2
LAF718971	UN-NAMED SPRING	2
LAF718972	UN-NAMED SPRING	2
LAF924971	UN-NAMED SPRING	2
LAF929973	UN-NAMED SPRING	2
LRS010C1	LITTLE RIVER SPRINGS	2
ELL010C1	ELLAVILLE SPRINGS	2
GIL84971	UN-NAMED SPRING	2
MAD922977	FARA SPRINGS	2
MEA010C1	MEARSON SPRINGS	2
ORG010C1	ORANGE GROVE SPRING	2
OWN010C1	OWENS SPRINGS	2
PER010C1	PERRY SPRINGS	2
RLS010C1	RUTH/LITTLE SULFUR SPRINGS	2
RUN010C1	RUNNING SPRINGS	2
SBL010C1	SUWANNEE BLUE SPRINGS	2
SHN010C1	SHINGLE SPRINGS	2
TEL010C1	TELFORD SPRINGS	2
TUR010C1	TURTLE SPRINGS	2
CON010C1	CONVICT SPRING	3
LAF57981	UN NAMED SPRING	3
LAF57982	UN NAMED SPRING	3
LAF919972	UN-NAMED SPRING	3
LAF922975	UN-NAMED SPRING	3
LAF922976	UN-NAMED SPRING	3
LAF929971	UN-NAMED SPRING	3

Spring ID Code	Spring Name	Magnitude
LAF929972	UN-NAMED SPRING	3
LAF93971	UN-NAMED SPRING	3
GIL917972	UN-NAMED SPRING	3
LUR010C1	LURAVILLE SPRINGS	3
PEA010C1	PEACOCK SPRING	3
ROY010C1	ROYAL SPRINGS	3
SHY010C1	SHIRLEY SPRINGS	3
SUW718971	UN-NAMED SPRING	3
SUW725971	UN-NAMED SPRING	3
SUW919971	UN-NAMED SPRING	3
SUW919973	UN-NAMED SPRING	3
SUW922971	UN-NAMED SPRING	3
SUW922973	UN-NAMED SPRING	3
LAF710981	UN-NAMED SPRING	4
LAF919971	UN-NAMED SPRING	4
LAF922977	UN-NAMED SPRING	4
LAF924972	UN-NAMED SPRING	4
GIL917973	UN-NAMED SPRING	4
MAD922971	UN-NAMED SPRING	4
MAD922972	UN-NAMED SPRING	4
MAD922973	UN-NAMED SPRING	4
MAD922974	UN-NAMED SPRING	4
MAD922975	UN-NAMED SPRING	4
MAD922976	UN-NAMED SPRING	4
SUW106971	UN-NAMED SPRING	4
SUW919972	UN-NAMED SPRING	4
SUW919974	UN-NAMED SPRING	4
SUW922972	UN-NAMED SPRING	4
SUW922974	UN-NAMED SPRING	4



*Table 2: Wells Accessed by the Field Crew*

<b>Wells Accessed by Springshed Delineation Field Crew</b>		
<b>Month</b>	<b>Week</b>	<b>Number of Wells</b>
February	Week 1: 02/23/09-02/27/09	52
March	Week 2: 03/02/09-03/06/09	55
	Week 3: 03/09/09-03/13/09	21
	Week 4: 03/16/09-03/20/09	60
	Week 5: 03/23/09-03/27/09	36
April	Week 6: 03/30/09-04/03/09	48
	Week 7: 04/06/09-04/10/09	31
	Week 8: 04/13/09-04/17/09	109
	Week 9: 04/20/09-04/24/09	66
	Week 10: 04/27/09-05/01/09	49
<b>Total</b>		<b>527</b>

# Appendix B

## Form 1: Well Attribute Form



### Florida Department of Environmental Protection

Florida Geological Survey  
903 West Tennessee Street Gunter Building  
Tallahassee, FL 32304-7716  
Phone: (850) 488-4191 Fax: (850) 488-8086



Charlie Crist  
Governor

Jeff Kottkamp  
Lt. Governor

Michael W. Sole  
Secretary

## Suwannee River Springshed Delineation Project

### Well Attribute Survey

Please take a moment to fill in this form and return to our field samplers or mail to the address above,  
attention James McClean, Suwannee River Springshed Delineation Project.

Landowner Name:	<input type="text"/>	Telephone:	<input type="text"/>
Physical Address:	<input type="text"/>		
City/Town:	<input type="text"/>	County:	<input type="text"/>
State:	<input type="text" value="FL"/>	Zip Code:	<input type="text"/>
		Well Type:	<input type="text"/>

#### Mailing Address (if different from above)

Address:	<input type="text"/>			Mobile Phone:	<input type="text"/>
City/Town:	<input type="text"/>				
State:	<input type="text"/>	Zip Code:	<input type="text"/>	E-Mail:	<input type="text"/>

#### Check applicable answers:

Is Landowner willing to sign Well Access Permission Form?	<input type="text"/>	Allow Water Level?	<input type="text"/>	Allow Water Sample?	<input type="text"/>
Is well accessible for level measurement?	<input type="text"/>	Is area clear of canopy for GPS survey?	<input type="text"/>		

#### Please fill in the following well construction details:

Well ID:	<input type="text"/>	Permit #:	<input type="text"/>
Depth of Well (ft):	<input type="text"/>	Well Diameter (in):	<input type="text"/>
Casing Depth (ft):	<input type="text"/>		
Max Daily Production (Millions Gallons/Day): [Pump Capacity x 24 hours]	<input type="text"/>	Depth of Screen (ft):	<input type="text"/>
		Type of Pump:	<input type="text"/>

Latitude DD:	<input type="text"/>	Latitude MM:	<input type="text"/>	Latitude SS.ssss:	<input type="text"/>	Location Method:	<input type="text"/>
Longitude DD:	<input type="text"/>	Longitude MM:	<input type="text"/>	Longitude SS.ssss:	<input type="text"/>	Date of Location (YYYY-MM-DD):	<input type="text"/>

Land Surface Elevation (ft):	<input type="text"/>	Method of Levelling:	<input type="text"/>
Measure Point Elevation (ft):	<input type="text"/>	Name of Surveyor:	<input type="text"/>
Date of Sample (YYYY-MM-DD):	<input type="text"/>	Water Level Depth (ft):	<input type="text"/>
Field Crew Names:	<input type="text"/>	Water Quality Sample:	<input type="text"/>
Date of Sample (YYYY-MM-DD):	<input type="text"/>	Water Level Depth (ft):	<input type="text"/>
Field Crew Names:	<input type="text"/>	Water Quality Sample:	<input type="text"/>

#### Comments:

E-Mail form

## Form 2: Well Installation/Water Level/Sampling Permission Form



### Florida Department of Environmental Protection

Florida Geological Survey  
903 West Tennessee Street • Gunter Building  
Tallahassee, FL 32304-7716  
Phone: (850) 488-4191 Fax: (850) 488-8086

Charlie Crist  
Governor

Jeff Kottkamp  
Lt. Governor

Michael W. Sole  
Secretary

#### PERMISSION TO ENTER PROPERTY

1. The undersigned property owner, **Charles E. Gilman III, Sondra Gilman Gonzalez-Falla, as Trustee of Article 3 Trust, and Celso Gonzalez-Falla, as Trustee of Article 3 Trust**, ("undersigned"), hereby gives permission to the State of Florida, Department of Environmental Protection ("Department") and its agents and contractors to enter the undersigned's property ("the property") located within Jefferson, Lafayette, Madison, & Taylor Counties.
2. This permission is specifically limited to the following activities that may be performed by the Department, its agents or contractors: The Department's Florida Geological Survey shall have access "the property" for the installation of monitoring wells, obtaining well elevations and the collection water levels and water quality samples on approved sites.
3. The Department will provide notice to undersigned of the scope and location of the Department's activity at least 48 hours prior to accessing the property.
4. The undersigned will have the right to have a representative present while the Department is on the undersigned's property.
5. The granting of this permission by the undersigned is not intended, nor should it be construed, as an admission of liability on the part of the undersigned or the undersigned's successors and assigns for any contamination discovered on the property.
6. The Department, its agents or contractors may enter the property during normal business hours and may also make arrangements to enter the property at other times after agreement from the undersigned.
7. The undersigned shall not be liable for any injury, damage or loss on the property suffered by the Department, its agents or employees not caused by the negligence or intentional acts of the undersigned's agents or employees.
8. The Department acknowledges and accepts its responsibility under applicable law (Section 768.28, Florida Statutes) for damages caused by the acts of its employees while on the property.
9. The Department assumes all financial and regulatory responsibilities (including, without limitation, any permitting or reporting obligations).
10. The undersigned will be provided an insurance certificate by any company performing services for the Department on the undersigned's property, naming the undersigned as an additional insured party.

## Form 2: Well Installation/Water Level/Sampling Permission Form

11. The Department will provide the undersigned with a copy of any analysis summaries, reports, surveys, or other published data in a timely manner.
12. At the conclusion of the authorized activity, the Department will return the key provided for access to the undersigned's property and will grant the undersigned ownership of their choice of the monitoring wells installed for this project and properly abandoned the rest.
13. This permit will expire on August 31, 2011.

\_\_\_\_\_  
Signature of Undersigned (Property Owner)

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Undersigned (Property Owner)

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Undersigned (Property Owner)

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

Accepted by the State of Florida Department of Environmental Protection by the following authorized agent.

\_\_\_\_\_  
Signature of Department Representative

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Date

### Example of Field Notes

[illegible]



# Example of Field Notes

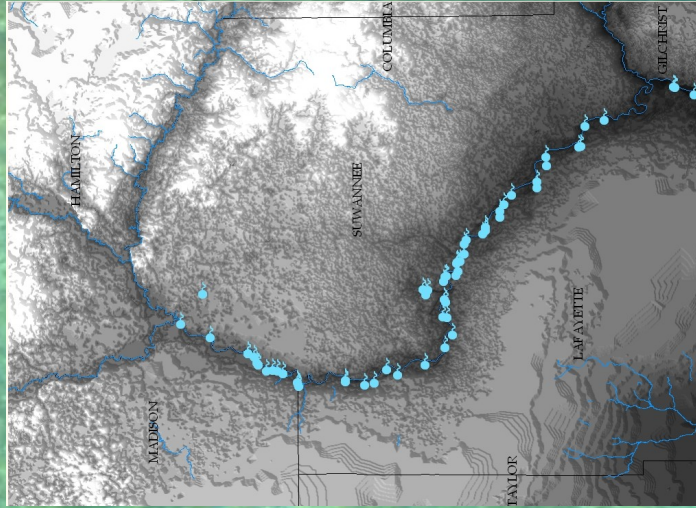
12:00 Jack Tower  
5833 CR 251  
386-294-1546  
2 cow udders on property  
Pic # 51 30'-50' off 251  
200 yds N of House  
Pic # 52 In shed South of  
House  
1400 Barry Beakes Across  
From Physics There  
24141 114TH Ave  
386-688-4900  
Behind Jiffy Store  
on 250 (Downing Park)  
Pic # 54  
1500  
11695 231ST Rd  
No More udders  
1600 Pilgrims Pride Chicken  
Farm  
Michael H. Denver

No One came out  
Big Sheppard w/ Dead  
Chicken in his mouth  
Returned to  
HQ 10:15am  
2/27/09

# Appendix D

## Informational Brochure

### Middle Suwannee Springshed Delineation Project



FLORIDA GEOLOGICAL SURVEY  
903 W. TENNESSEE STREET  
TALLAHASSEE, FL 32304  
(850) 488-4191  
[www.dep.state.fl.us/geology](http://www.dep.state.fl.us/geology)

Florida Geological Survey  
903 W. Tennessee St.  
Tallahassee, FL 32304

#### How long will the project last?

The Middle Suwannee Springshed Delineation Project will take approximately two years to complete. The project includes eighteen months of fieldwork (locating wells, getting permission to sample, installing wells, sampling/water levels, and data analysis). Our field teams may contact you for permission to measure your well's water level and water chemistry.

#### Where can I get more information?

If you have questions about the Middle Suwannee Springshed Delineation Project, please contact Tom Greenhalgh of the FDEP/FGS at (850) 488-4191.



Figure 3: The FGS springshed delineation team. From left to right: Jim Bobrycki, Eric Thomas, Alexandra Walrath, Caitlin Cerame, Melinda Spall, John Carroll, Jake Mast, Tom Greenhalgh (Photo by James McClean, FDEP/FGS).



## Project Description

The Middle Suwannee Springshed Delineation Project is a study of springsheds, or spring drainage basins, along the Middle Suwannee River. Some of the rainwater that falls to the ground recharges the underlying aquifer. After traveling underground through the aquifer, some of the groundwater resurfaces through springs. There are sixty-three known springs along the Middle Suwannee (Figure 1), each of which drains an area of land. However, at this point we are not sure where the water in each spring comes from. The purpose of this study is to identify the land area that drains to each of the sixty-three springs. In some cases, we anticipate that several springs will share the same land area.

## Who is conducting the project?

The Florida Department of Environmental Protection/Florida Geological Survey (FDEP/FGS) is conducting this study with funding from the Florida Springs Initiative through the FDEP. The Suwannee River Water Management District (SRWMD) and the Suwannee River Partnership (SRP) are also sharing data and resources with the FDEP/FGS.

## What is springshed delineation?

Springshed delineation, or springshed mapping, is a relatively new and evolving science. Groundwater level maps called potentiometric surface maps are used to delineate springsheds. These maps look like topographic maps with contour lines, but they represent the groundwater levels under the land surface. Other springshed delineation techniques include dye tracing and water chemistry analysis. For this project, the FGS will first compile water level and water chemistry data in coop-

eration with the SRWMD, the SRP and the United States Geological Survey. We will then locate existing wells to collect water-level data that can be sampled for water quality, drill additional wells as needed and create new potentiometric surface maps.

## Who is being asked to participate?

Field teams from the FDEP/FGS are visiting landowners throughout the study area and asking permission to sample their wells. For the most part, field teams visit wells that have already been sampled at some point by the SRWMD.

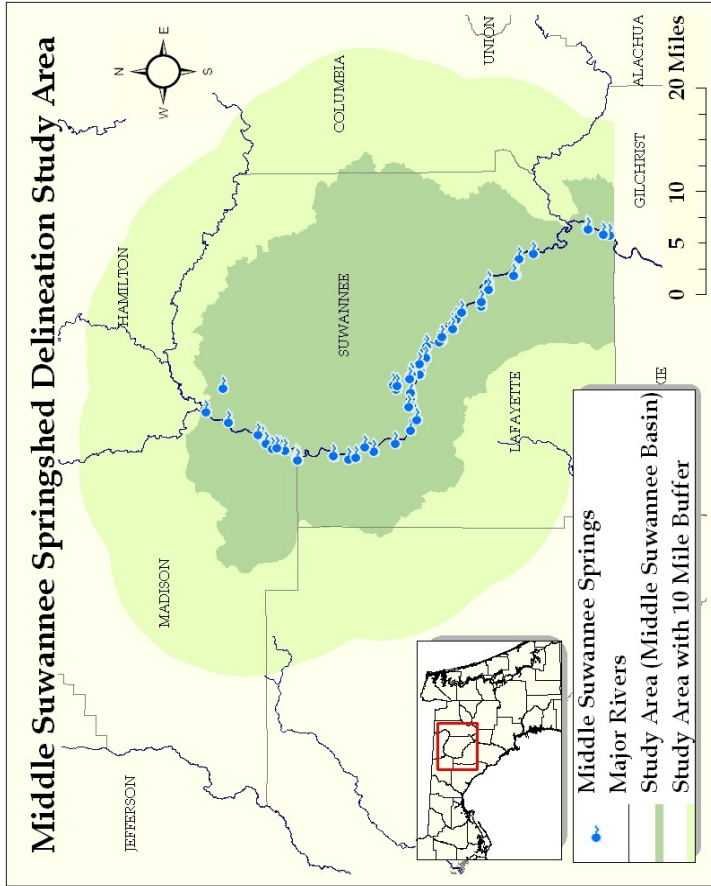


Figure 1: Study area and springs

some wells in an attempt to match water chemistry in the aquifer to that of individual springs. The parameters analyzed will probably be the same as those the SRWMD and others are collecting from their sample networks or springs monitoring.

## How will the data be used?

The FDEP/FGS will use the data to create potentiometric surface maps and delineate springsheds. Data will also be shared with other divisions of the FDEP, the Natural Resources Conservation Service and other researchers to support their efforts and activities in the Middle Suwannee River Basin.

## What data are being collected?

Field teams record the location of each well using a GPS (Global Positioning System) unit so they can find the well again, assessing the well's suitability for use in this study (for example, teams make sure that the well casing is large enough to accommodate a water-level meter). Water chemistry samples will be collected from




Figure 2: Monitoring well (Photo by Melinda Spall, FDEP/FGS)



# Appendix E

## Example of Well Permit

No. 0155 P. 2  
99160



**STATE OF FLORIDA PERMIT APPLICATION TO CONSTRUCT, REPAIR, MODIFY, OR ABANDON A WELL**

☐ Southwest  
☐ Northwest  
☐ St. Johns River  
☐ South Florida  
☐ Suwannee River

THIS FORM MUST BE FILLED OUT COMPLETELY.

This water well contractor is responsible for completing this form and forwarding the permit to the appropriate delegated county where applicable.

CHOOSE ONE FOR APPROPRIATE COUNTY ADDRESS ON BACK OF PERMIT FORM

Permit No. **99160**

Florida Unique I.D. \_\_\_\_\_

Permit Specifications Required (See attached)

GS-534 Quad # \_\_\_\_\_ Direction # \_\_\_\_\_

CUPWUP Application No. \_\_\_\_\_

**1. SRWMD 9225 CR 49 Live Oak, FL 32060 386-8631**

**2. WOODS Ferry** Address City Zip Telephone Number

**3. Charles Bucher** Well Drilling Contractor License No. **9417** Telephone No. **407 426-7885**

**2300 Silver Star Rd** Address City State Zip **Orlando FL 32804**

**4. SE 1/4 of SE 1/4 of Section 36** Indicate your location on chart Range **14E**

**5. Suwannee** County Subdivision Name Lot Block Unit

**7. Number of proposed wells: 1** Check the use of well: (see back of permit for additional details) Domestic Monitor (type) **Water Level Chemistry**

**8. Application for: X New Construction** Description of facility **Feature** Estimated start of construction date **6/2/09**

**9. Estimated: Well Depth 75'** Casing Depth **50'** Screen Interval from **20'** to **75'**

**10. If applicable: Proposed** From **0** to **45** Casing Diameter **2"** Seal Material **Grout**

**Grouting Interval** From **45** to **50** Seal Material **Grout**

**11. Telescope Casing or Liner (check one) Diameter** **2"** Other (specify) \_\_\_\_\_

**12. Method of Construction: Rotary Cable Tool X Combination**

**13. Indicate total No. of wells on site 2** List number of unused wells on site **2**

**14. Is this well or any other well or water withdrawn on the owner's contiguous property covered under a Consumptive Water Use Permit (CUPWUP) or CUPWUP Application? No Yes**

**15. District well I.D. No. Latitude 30°21'0.2" Longitude 82°52'24.9"**

**16. Date obtained from GPS X or map or survey (map date) NAD 27 NAD 83 X**

**17. I hereby certify that I am in compliance with the provisions of this Act, Florida Administrative Code and that a valid use permit or sufficient mortgage exists, if needed, has been or will be obtained prior to commencing construction of well construction. I further certify that all information provided on this application is accurate and that I will obtain necessary approval from other federal, state, or local agencies and departments before commencing construction of the well. I will submit a written report to the District within 60 days of completion of the well construction.**

**18. I certify that I am the owner of the property, that the information provided is accurate, and that I am aware of my responsibilities under Chapter 375, Florida Statutes, to maintain or properly abandon the well; or, I certify that I am not the owner of the property, that the information provided is accurate, and that I have informed the owner of his responsibilities as stated herein. Great thanks to personnel of the State of a representative present to the well site.**

**Charles Bucher** Signature of Contractor License No. **9417** Date **6/1/09**

**Calvin Thel** Owner's or Agent's Signature Date **6/1/09**

Approval Granted By: **[Signature]** Issue Date: **6-1-09** Hydrological Approval: **[Signature]**

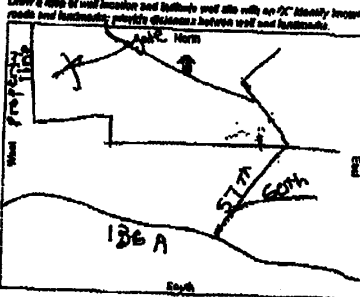
Owner Number: **[Signature]** Fee Received: \$ **40** Receipt No.: **149188** Check No.: \_\_\_\_\_

**THIS PERMIT NOT VALID UNTIL PROPERLY SIGNED BY AN AUTHORIZED OFFICER OR REPRESENTATIVE OF THE WMD. IT SHALL BE AVAILABLE AT THE WELL SITE DURING ALL DRILLING OPERATIONS. This permit is valid for 90 days from the date of issue.**

FORM 41-10 - 610 (1) REV/08

WHITE: ORIGINAL FILE  
YELLOW: DRILLING CONTRACTOR  
PINK: OWNER

RECEIVED  
JUN 01 2009



# Appendix F

## Selections from URS Report

### Summary of Well Installation



June 12, 2009

Sent via email: [Richard.w.hicks@dep.state.fl.us](mailto:Richard.w.hicks@dep.state.fl.us)

Mr. Richard Hicks, PG, Administrator  
Florida Department of Environmental Protection  
Ground Water Protection Section  
Bureau of Watershed Management  
2600 Blair Stone Road, MS 3575  
Tallahassee FL 32399-2400

**Subject: Report of Monitor Well Construction in Suwannee and Lafayette  
Counties, Florida, Florida Department of Environmental Protection Task  
Assignment WM946-2**

Dear Mr. Hicks:

URS Corporation Southern (URS) has prepared this letter report describing the installation of 14 monitoring wells in Suwannee and Lafayette Counties, Florida. The work was performed under Task Assignment WM946-2 to the Florida Department of Environmental Protection (FDEP) WM-946 contract with URS. The well locations are shown on **Figure 1** and were selected by the Florida Geologic Survey (FGS).

#### WELL CONSTRUCTION

Groundwater Protection, Inc. (GPI) was retained by URS to install the monitor wells. The wells were installed during the weeks of May 25, 2009 and June 1, 2009. Eight of the wells were installed by the sonic rotary (sonic) method and six of the wells were installed by the Hollow Stem Auger/Mud Rotary (HSA/rotary) method. A lithologic log of each borehole installed by the HSA/rotary method was prepared by describing the drill cuttings on 5-foot intervals. A lithologic core was collected from each well installed by the sonic method. The cores were described to develop a lithologic log of those boreholes and the cores were then provided to FGS. The lithologic logs and Field notes of each borehole are provided as **Attachment A**.

The construction details of the wells installed by GPI are presented in **Table 1**. The wells ranged from 44 to 90 feet (ft) deep. All of the wells except the Hatch Bend well were completed in the limestone underlying the unconsolidated surficial deposits. Limestone was not encountered to a

URS Corporation  
1625 Summit Lake Drive  
Tallahassee, FL 32317  
Tel: 850.574.3197  
Fax: 850.576.3676

S:\FDEP Dye Tracer\20 MW Install Suwannee\_Lafayette\Deliverables\Letter Report of Well Construction Suwannee and Lafayette Cty\_061009.doc

## *Selections from URS Report*

### *Summary of Well Installation*



Mr. Richard Hicks, P.G.  
Florida Department of Environmental Protection  
June 12, 2009  
Page 2


depth of 75 ft in the Hatch Bend borehole and the well was completed in the unconsolidated deposits to a depth of 75 ft at the request of FGS. Nine of the wells were constructed of 2-inch diameter (dia.) polyvinyl chloride (PVC) casing and screen. Five wells were constructed of 4-inch dia. PVC casing and screen. Each well was fitted with 20 ft of No. 10 slot PVC well screen. A filter sand pack of 20/30 size silica sand was placed around the screen to a depth 2 ft above the top of the screen. A two foot thick seal of 30/65 size silica sand was then placed on top of the filter sand pack. A two foot thick seal of bentonite was then placed on top of the 30/65 silica sand and the remaining annular space was grouted to land surface.


Water for well construction was obtained from an irrigation well at the Harrell property location arranged by FDEP and at the City of Live Oak Fire Station (arranged by GPI).

At the request of FGS, all wells installed by GPI were developed prior to inserting the bentonite seal and grout seal in the annular well space to allow for the sand filter pack to settle. Each 2-inch dia. well was developed by pumping for at least ½ hour with a submersible pump. The 4-inch dia. wells were developed by pumping the well with a combination of the submersible pump and a centrifugal pump. Development of some wells was extended up to an hour to reduce the turbidity of the purge water. Each well was completed with an above ground locking protective casing. Well permits and well completion reports are provided as **Attachment B**. All drill cuttings and development water were disposed of in the vicinity of each well.

URS appreciates the opportunity to assist the FDEP with this project. Please contact either of us at 850-574-3197 if you have any questions regarding this information.

Sincerely,

  
Sid O'Neal  
Senior Scientist

  
William H. Colona III, PG  
Senior Project Geologist

Attachments

Table of Well Locations

**TABLE 1**  
**Floridan Aquifer Monitoring Well Construction Information**  
**Suwannee River Watershed Project**  
**Suwannee and Lafayette Counties, Florida**

WELL ID	DATE INSTALLED	INSTALLATION METHOD	TOTAL WELL DEPTH (FT)	SCREENED INTERVAL (FT BLS)	WELL DIAMETER (IN)	Latitude/Longitude
Harrell	6/3/2009	Rotosonic	90	70-90	4	N 30° 24' 36.7" / W 83° 08' 24.8"
Ellaville	5/27/2009	Mud Rotary	44	24-44	2	N 30° 22' 16.996" / W 83° 12' 30.899"
Black River Road	5/27/2009	Rotosonic	46	26-46	2	N 30° 20' 37.5" / W 83° 13' 24.8"
Mill Creek North	5/28/2009	Mud Rotary	45	25-45	2	N 30° 18' 40" / W 83° 13' 54.6"
Mill Creek South	5/27/2009	Rotosonic	40	20-40	2	N 30° 16' 34.8" / W 83° 14' 45.4"
Christian Path	5/28/2009	Rotosonic	50	30-50	2	N 30° 12' 44.9" / W 83° 13' 54.4"
Peacock Slough	5/29/2009	Rotosonic	55	35-55	2	N 30° 6' 58.4" / W 83° 9' 7.6"
Hatch Bend	5/29/2009	Mud Rotary	70	50-70	2	N 29° 52' 22.9" / W 82° 53' 20.3"
Woods Ferry	6/2/2009	Mud Rotary	75	55-75	2	N 30° 21' 02" / W 82° 52' 24.9"
Gar Pond	6/3/2009	Rotosonic	80	60-80	2	N 30° 18' 46.2" / W 82° 44' 9.3"
Big Horn	6/4/2009	Mud Rotary/HSA	44	24-44	4	N 30° 14' 55.6" / W 83° 18' 29.4"
Camp "p"	6/5/2009	Rotosonic	80	60-80	4	N 30° 11' 48.9" / W 83° 21' 53.2"
Yellow Jacket	6/5/2009	Mud Rotary/HSA	60	40-60	4	N 30° 05' 29.8" / W 83° 19' 19.1"
Byrd 700	6/6/2009	Rotosonic	70	50-70	4	N 30° 02' 49.2" / W 83° 15' 30.8"

HSA = Hollow Stem Auger

FT BLS = Feet Below Land Surface

IN = Inches

All wells constructed with threaded coupling polyvinyl chloride (PVC) screen and riser pipe



# Selections from URS Report

## Example of Boring Log

Florida Department of Environmental Protection - Division of Waste Management - Bureau of Petroleum Storage Systems

### BORING LOG

Page 1 of 1

Boring/Well Number: Mill Creek South		Permit Number: 99129		FDEP Facility Identification Number:	
Site Name: Suwannee River Watershed		Borehole Start Date: 05/27/09	Borehole Start Time: 1431	<input type="checkbox"/> AM <input checked="" type="checkbox"/> PM	
		End Date: 05/27/09	End Time: 1737	<input type="checkbox"/> AM <input checked="" type="checkbox"/> PM	
Environmental Contractor: URS		Geologist's Name: Deborah C. Hilton		Environmental Technician's Name:	
Drilling Company: Groundwater Protection		Pavement Thickness (inches): 0	Borehole Diameter (inches): 6	Borehole Depth (feet): 40	
Drilling Method(s): Sonic	Apparent Borehole DTW (in feet from soil moisture content): ~19	Measured Well DTW (in feet after water recharges in well): ~21	OVA (list model and check type): <input type="checkbox"/> FID <input type="checkbox"/> PID		
Disposition of Drill Cuttings [check method(s)]: (describe if other or multiple items are checked): FGS collected sleeved cores					
Borehole Completion (check one): <input checked="" type="checkbox"/> Well <input type="checkbox"/> Grout <input type="checkbox"/> Bentonite <input type="checkbox"/> Backfill <input type="checkbox"/> Other (describe)					

Sample Type	Sample Depth Interval (feet)	Sample Recovery (feet)	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)
SC	0-5	~3					5	Light brown-orange fine sand		D	
SC	5-10	~3					10	Light brown-orange fine sand with clay		D	
SC	10-15	~4					15	Light brown fine sand with little clay		D	
SC	15-20	~5					20	Tan-white limestone with clay		W	
SC	20-30	~10					30	~4'tan-white clayey sand, ~3' tan-white sand with little clay, ~3' limestone with clay		W	
SC	30-40	~7					40	~2' orange brown limestone, clay, fine sand, ~5' tan white limestone with varying amounts of clay & sand		W	
								Lithologies taken through plastic sleeve			

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

# Selections from URS Report

## Example of Well Completion Report

### WELL COMPLETION REPORT (Please complete in black ink or type.)

PERMIT # 99178 CUP# WUP# DID # 9 1

If permit is for multiple wells, indicate the number of wells drilled 1

Indicate remaining wells to be cancelled 0

WATER WELL CONTRACTOR'S SIGNATURE *Charles E. Baker* License # 9417

I certify that the information provided in this report is accurate and true.

Grout	No. of Bags	From (Ft.)	To (Ft.)
Neat Cement:	5	36'	0
Bentonite:	27	38'	36'

WELL LOCATION: County Lafayette  
NE 1/4 of SE 1/4 of Section 33 Twp: 04 Rge: 10

Latitude Longitude

DATE STAMP Sketch of well location on property *N*

Official Use Only

CHEMICAL ANALYSIS WHEN REQUIRED

Iron: \_\_\_\_\_ ppm Sulfate: \_\_\_\_\_ ppm

Chlorides: \_\_\_\_\_ ppm

[ ] Lab Test [ ] Field Test Kit

Pump Type

[ ] Centrifugal [ ] Jet [ ] Submersible [ ] Turbine

Horsepower Capacity

Pump Depth \_\_\_\_\_ Ft. Intake Depth \_\_\_\_\_ Ft.

Give distances from septic tank and house or other reference points

Driller's Name: Kevin Valentino - GPI WO 509007 Yellow Jacket 01

Form 41.10-410(2) Rev. 8/96

OWNER'S NAME Gilman Trust/DEP/Cumberland

COMPLETION DATE 06/04/2009 Florida Unique I.D. \_\_\_\_\_

WELL USE: DEP/Public \_\_\_\_\_ Irrigation \_\_\_\_\_ Domestic \_\_\_\_\_

Monitor ☒ HRS Limited \_\_\_\_\_ 62-524 \_\_\_\_\_ Other \_\_\_\_\_

DRILL METHOD [ ] Rotary [ ] Cable Tool ☒ Combination

[ ] Jet [ ] Auger Other \_\_\_\_\_

Measured Static Water Level	After _____ Hours at _____ G.P.M.	Measuring Pt. (describe):	Measured Pumping Water Level
Which is _____ Ft. [ ] Above [ ] Below Land Surface			
Casing: [ ] Black Steel [ ] Galv. <input checked="" type="checkbox"/> PVC Other _____			
Depth (Ft.)	From	To	DRILL CUTTINGS LOG Examine cuttings every 20 ft. or at formation changes. Note cavities, depth to producing zones.
[ ] Open Hole [ ] Screen			
Casing Diameter & Depth (Ft.)			
Diameter 4"	0	18'	White Fine Sand
From 0	18'	34'	Clay with Sand Limestone
To 40'	34'	60'	Cavernous Limestone with Sand
Diameter			
From			
To			
Liner [ ] or Casing [ ]			
Diameter			
From			
To			
			20' of Screen



# Selections from URS Report

## Example of Well Completion Log

### WELL COMPLETION LOG

Water Mgmt. Dist.:  
Permit Number:

Work Order: 509007  
Type of Well: MW  
Well Number: Yellow Jacket 01  
Method Used: 6" 25 H.S.A. / 6" TCR  
Borehole Diaz: 10.25" - 25' / 6" - 60'

#### Site Information:

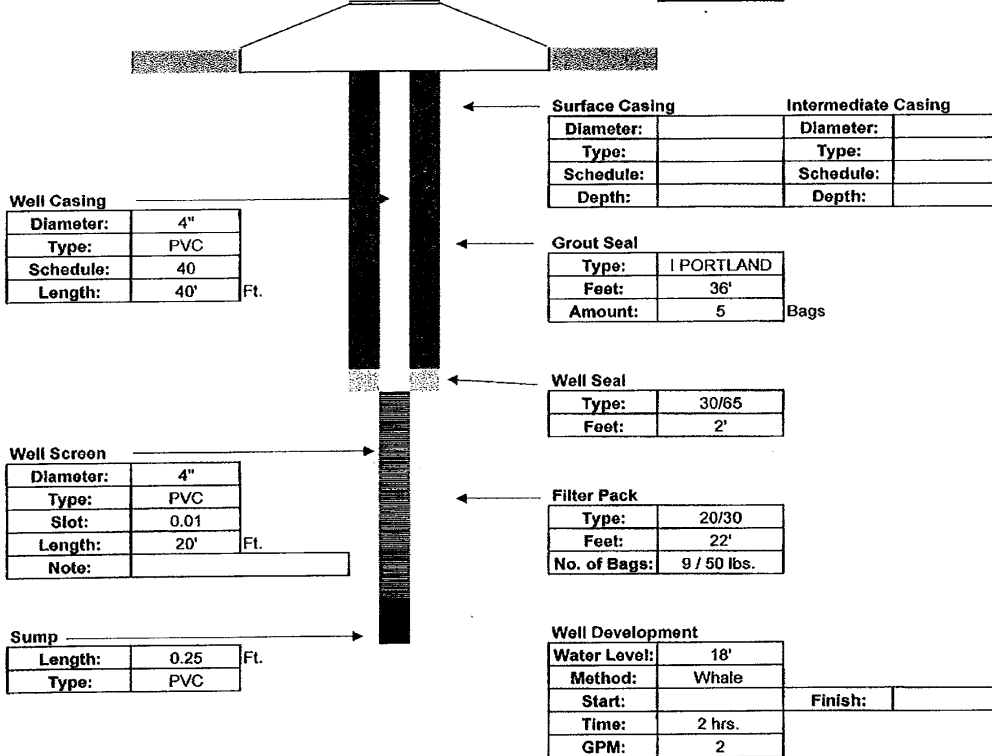
Name: Yellow Jacket  
Address:  
C,S,Z: Suwannee, FL  
S/T/R:

#### Client / Consultant Information

Consultant: URS  
Field Rep: Sid O'Neil

Well Diameter	Well Type	Well Depth	Screen Length	Casing Length	Bags Grout	Sand Bags/Weight	Filter Type	Well Seal
4"	PVC	60'	20'	40'	5	9 / 50 lbs.	20/30	30/65
40	← Schedule	Slot Size: →	0.01		36'	← Feet →	22'	2'

Surface Completion  
6" AGP 2 x 2



#### Contractor Information

Contractor #:	9417
Completion:	6/4/2009
Driller:	Kevin Valentino
Lead Hand:	Theron Stanford
3rd Man:	Ricky Cisneros
Drill Rig:	D120A

Company: Groundwater Protection, Inc.  
Address: 2300 Silver Star Road  
C,S,Z: Orlando, Florida 32804-3310  
Phone/FAX: (407) 426-7885 / (407) 426-7586