

*Technology-Based Benchmarking for Efficient Water  
Use and Conservation in Southwest Georgia:  
Implementing the Farmer Portal*

**FINAL REPORT**

## **Introduction and Overview**

During the FY 2003 legislative session, the Georgia legislature established a mandate for the metering of agricultural water use. By 2004 meters were being installed across the state based upon the Department of Natural Resources Georgia Environmental Protection Division agricultural permit database. It became evident that the data collected from the metering program offered analyses of agricultural water use that could benefit many from policy makers to state agencies and certainly individual farm operators. For example, agricultural water use can be summarized and reported based on crop type, soil type, tillage practice or other agronomic factors as well as by county, watershed or other geographic region. Over time, these data can be helpful in forecasting potential water needs under varying climatic conditions. For farmers, the ability to verify irrigation application depth and accurately track seasonal usage will aid in water conservation. Further, many agricultural producers view the metering program as a state-sanctioned means of documenting their “reasonable use” should water conflicts escalate to the point of rationing.

While the output described above will yield useful tools for everyone, the value-added data (crops, soils, seed type, BMP implementation, etc...) must first be collected and managed before analyses can take place. The Georgia Farmer Portal (Portal) was designed to perform this task. During FY 2005 and 2006, with financial assistance provided by the U.S. Department of Agriculture (USDA) and the State of Georgia, the Georgia Water Planning and Policy Center (Center) at Albany State University (ASU) initiated the Portal as a data collection program designed to develop a data set that would allow for meaningful analysis of water use data generated by the state metering program coupled with farmer provided data that producers find useful in their efforts to improve the management of water resources used for irrigation.

At its core, the Portal is a data collection system with a web-based interface designed to capture farmer input and link it directly to water use data collected on a field-by-field, meter-by-meter basis. Creation of the Portal framework required a significant amount of field work and secondary Geographic Information Systems (GIS) analysis to establish the geographic basis for which the farmer data would be housed. Data collected by the Center for these purposes included specific information such as soil texture, source of water (ground or surface, and if

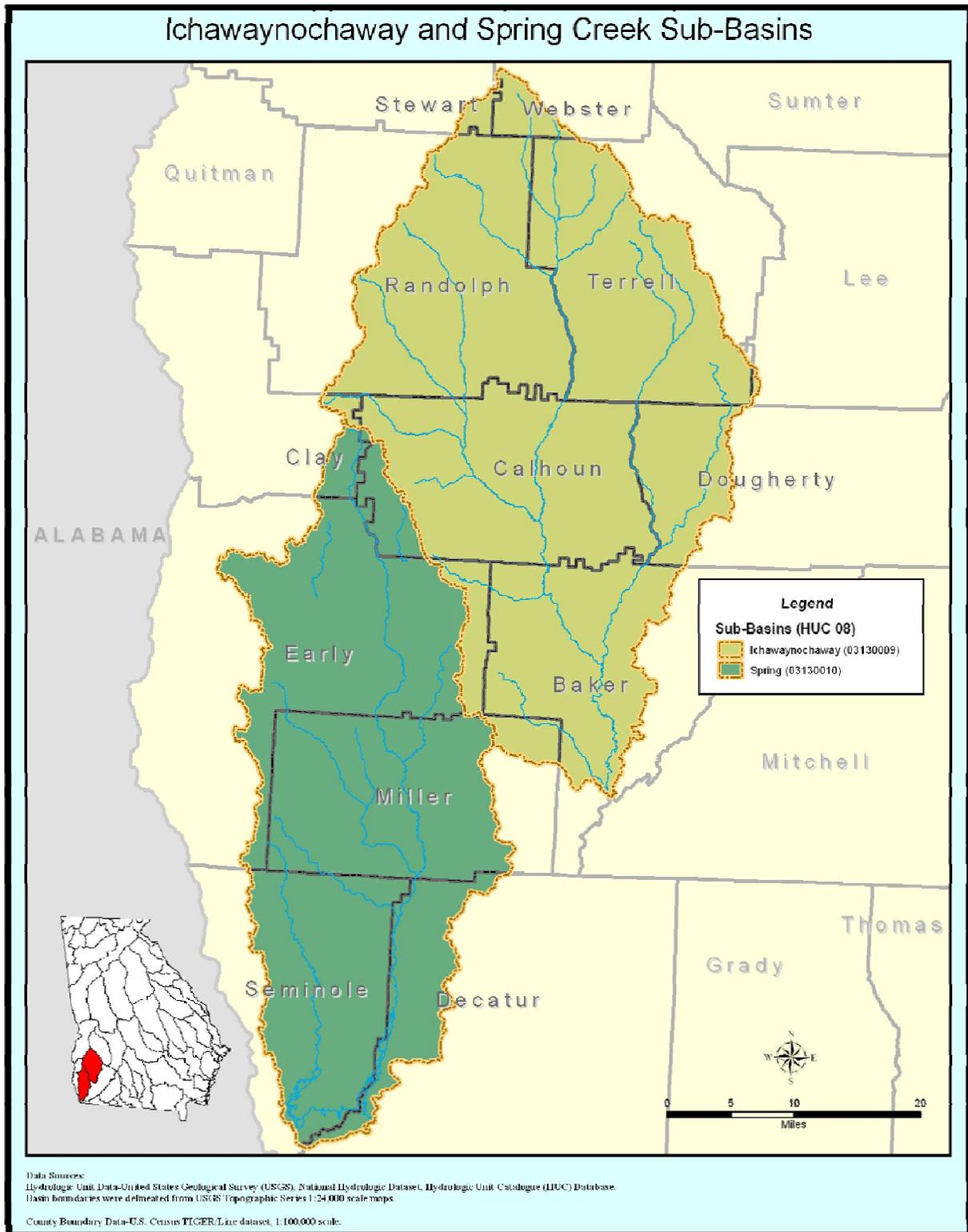
surface, whether or not the source was a perennial stream or a non-perennial stream or pond, rainfall, crops planted and harvested (by acreage and field) and yields. The true value of the Portal, however, lies in the analysis engine designed to report water use information on a wide range of user-defined criteria. Georgia law prohibits making farmer specific data available to the public, thus, access to secure data is protected by requiring unique identification and passwords that are provided to farmers upon request. Methods detailing Portal construction and analyses of initial data trials are reported in our Water Policy Working Papers #2005-006 and #2006-011 available in the Research section at <http://www.h2opolicycenter.org>. A sample of screenshots from the Portal are included in Appendix 1, and the Portal site may be accessed by visiting <https://www.gafarmerportal.org>.

In FY 2008, the Center was awarded a USDA-NRCS Conservation Innovation Grant to promote the use of the Portal to local farm operators. This multi-year project was designed to secure farmer participation in the Portal in two heavily irrigated sub-basins in Southwest Georgia's Lower Flint River Basin (Figure 1). This is an area where water conservation is a primary concern, not just for individual farmers, but in a larger context due to issues with endangered species and as a piece of the litigation between Georgia, Florida and Alabama. For producers, it has been demonstrated that conservation adoption is more likely when potential adopters understand their performance relative to others. The Portal provides such relative performance data to encourage the adoption of conservation practices. After entering data, users can access reports that provide feedback on their production and water use against benchmark averages from the data of other farmers growing similar crops under similar conditions. These reports can be queried by county, watershed, or statewide, but do not reveal confidential individual farmer data. The Portal also provides farmers access to information on water conservation practices and related government programs.

### **Project Objectives**

The primary objective of this project was *to recruit participants to adopt the Farmer Portal as a tool for production management and water conservation on at least 40,000 acres of irrigated farmland*. By achieving this objective, our aim was to:

Figure 1: Target Area



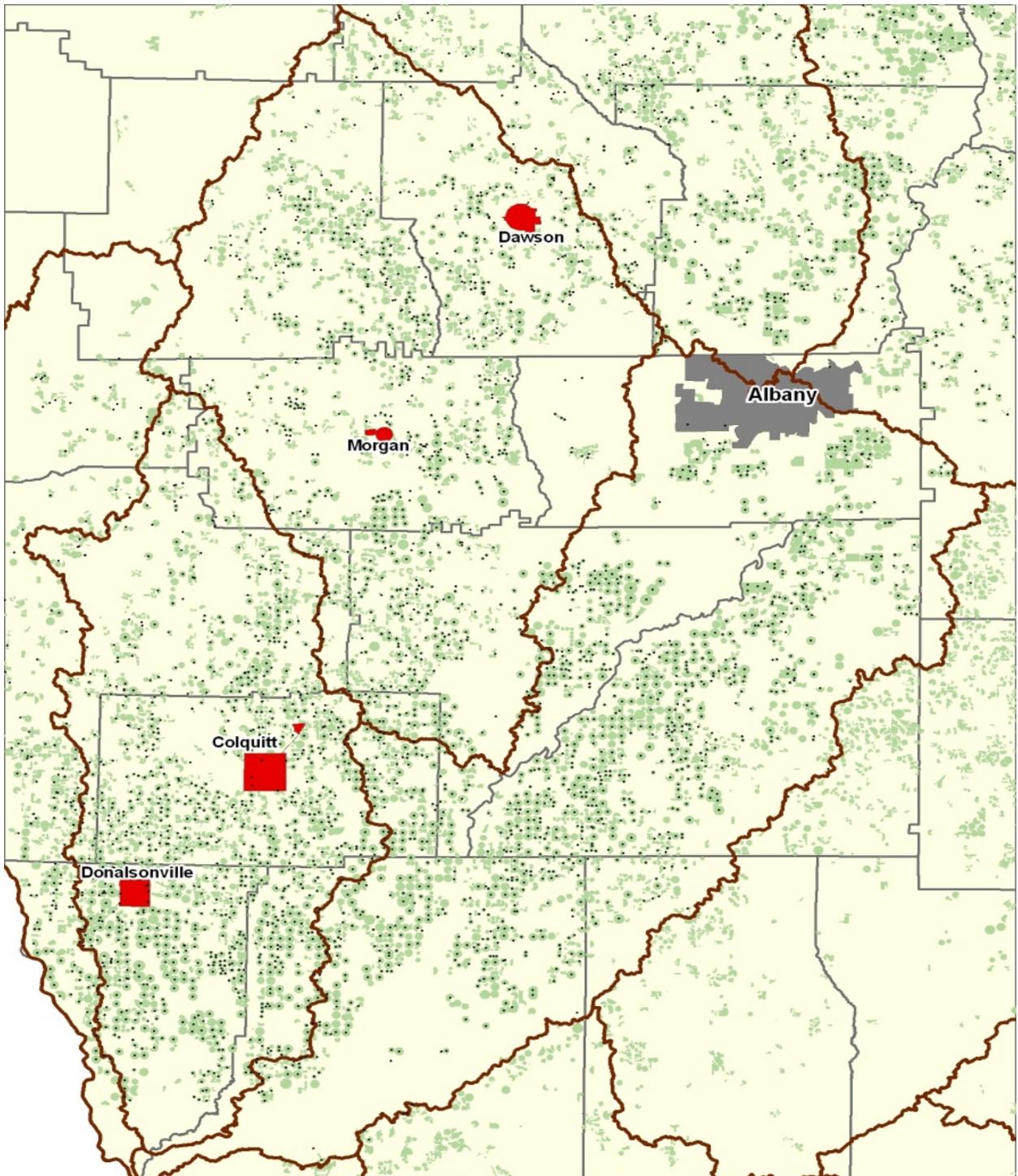
- (a) accelerate producer interest in use of the Portal;
- (b) demonstrate the cost-savings and knowledge delivery benefits of the Portal;
- (c) adjust the Portal, if necessary, to meet user needs;
- (d) increase the agricultural community's contribution to water conservation in two water-stressed sub-basins of Georgia;
- (e) build participation to the level necessary to support a reliable database; and
- (f) provide results transferable to the rest of Georgia as well as to other states.

### **Methods**

As discussed above, the Portal was fully functioning at the start of the CIG so from the outset our focus was on awareness and outreach. To induce participation, the Center initiated several notification programs to present the existence and encourage participation in the Portal. First, a mass mailing was sent to each permit holder in the two target sub-basins. This correspondence informed producers about the Portal, let them know eligibility requirements and informed them about the incentive payments made available as a result of the CIG grant. A copy of the letter can be viewed in Appendix 2. A subsequent mailing provided a means for additional follow-up. The Center also relied on several private partner organizations to assist in project implementation, including the Flint River Regional Water Council, the Georgia Cotton Commission, the Georgia Peanut Producers Association and the Georgia Farm Bureau. These organizations assisted by identifying potential participants, recruiting participants and distributing outreach materials. The Georgia Farm Bureau provided print and television media including features on the *Georgia Farm Monitor*.

Operators were also invited to a series of evening workshops held throughout the target area where attendees were introduced to the Portal. For those without Internet access, kiosks were installed at key locations within the cropping region including University of Georgia Extension offices at Dawson, Morgan, and Donalsonville, and the Farm Bureau office in Colquitt (Figure 2). A computer with internet access was setup in each office with a default connection to the Center's Portal web site.

Figure 2: Kiosk locations in Southwest Georgia.



Once an account was established, the operator could then access the account and claim a meter using the meter serial number. The operator would then associate a meter with a field or fields. Each field would then have its own records as to irrigation hardware, crop, seed, plant/harvest date, irrigation amounts/dates, rainfall amounts/dates, and conservation practices. Once the information was entered, the operator could then evaluate their efficiencies against regional averages calculated with data from other users. It was intended that this information would provide a measure that the operator could use to better agricultural efficiency. The Center employed the services of a field agent whose sole task was to aid in the creation of accounts and data entry. This person acted as liaison between the Center and cooperating farmers.

### **Results and Discussion**

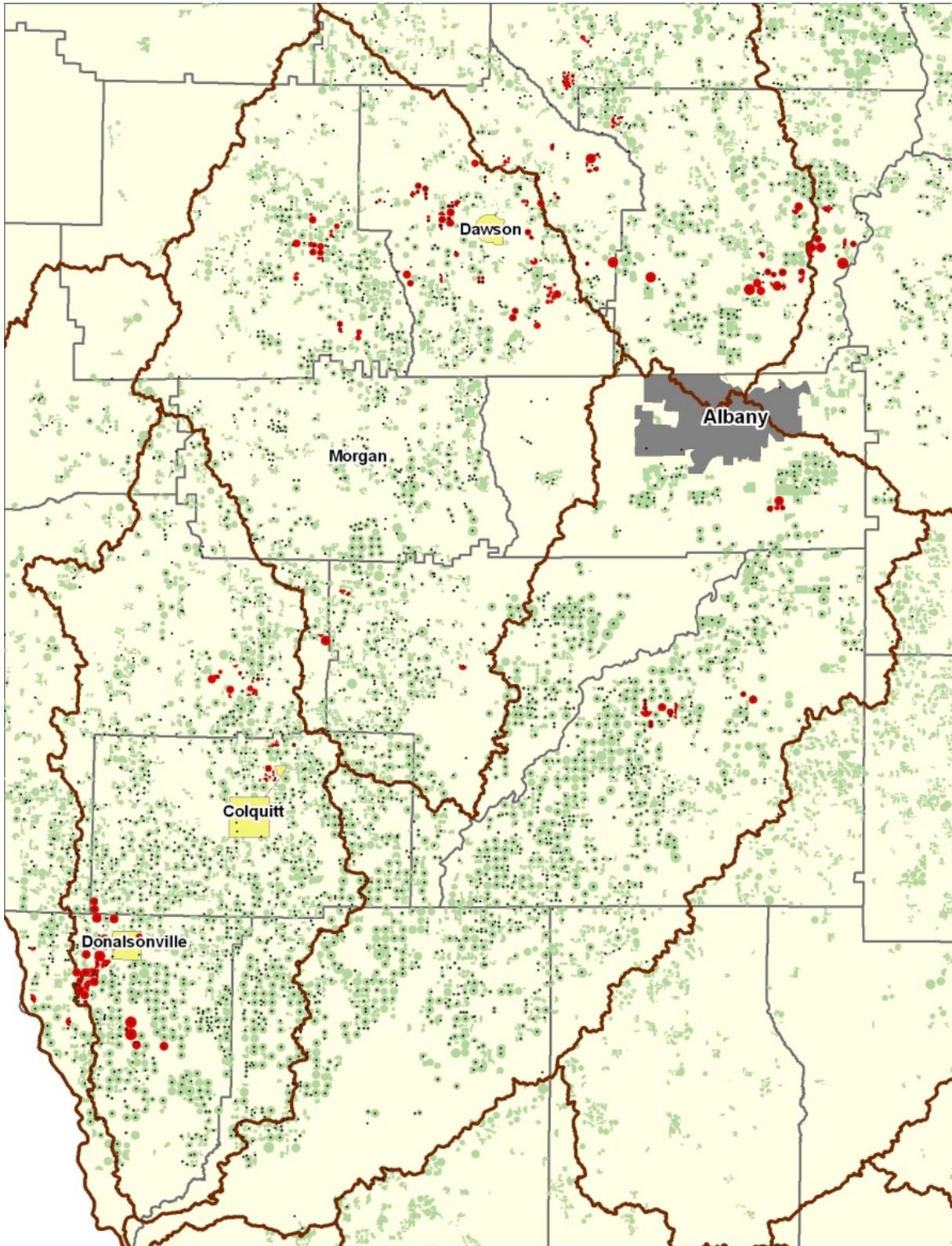
The first, and perhaps most logical, way to evaluate the success of this project is by a measure of participation. Unfortunately, participation numbers were not as desired or expected, as expressed in the objectives. In total, the Portal gained eight new accounts from which there was full participation and four additional accounts from which there was partial participation. A list of operators receiving incentive payments can be found in Appendix 3. These accounts included 191 meters, 221 fields; for a total of 19,125 acres (Figure 3). The list of operations range from single meter, single field farms to large operators managing dozens of meters and fields. While the experiences of each operator with the Portal were different, it was found that the smaller operations were more complete in providing data than the larger operations. This was not unexpected given that some large operations had as many as four dozen meters. Entering data for each field for each year was a task

that turned out to be more difficult than expected. Errors were made in data entry that required later clarification. As these clarifications were made the averages became more stable. Table 1 shows the average crop production over a two year period.

Table 1: Average crop production

<b>Crop</b>	<b>Acres</b>	<b>Yield (avg/acre)</b>
Corn	987	185 bu/acre
Cotton	1745	3191 lb/acre
Forage	53	≈ 5 bales
Peanuts	669	4705 lb/acre
Soybean	223	38 bu/acre

Figure 3: Participating field locations



In an effort to alleviate some of the initial anxiety shown by farmers in entering data over the web, the Center created a hard copy form for them to record the necessary data (Appendix 4). Our field personnel would then visit the farmer on-site or at one of the kiosk locations and walk through data entry via the Portal.

Linked to the 191 meters for which data was collected, 15,524 acres were from groundwater sources, 3,641 acres from surface water and 2,260 acres from well to pond sources. From an agricultural water management standpoint, such numbers are not insignificant. Many of these meters are in environmentally sensitive areas where surface water reduction, either by direct pumping or indirect ground source, is an issue. While our sample size did not allow for any definitive statements on water savings as a result of using the Portal, we did have several farmers provide anecdotal evidence of savings. As an example, a crop consultant who oversees a large number of meters found that one farmer had a single field with 25 inches of water applied over what should have averaged roughly 14 inches. In some instances poor irrigation management was discovered, and some farmers even found previously undetected breaks in the delivery system.

Overall, we sought to evaluate the Portal through the farmer interaction afforded by this CIG grant in the following five areas:

- Efficient means for data collection and storage
- Regional information for crop and water use
- Comparative efficiencies for individual operators
- Excellent means to update existing data
- Provides an environment from which useful results can be extracted

The following sections look at each of these areas in detail and discuss both successes and ways in which the Portal can be improved.

#### *Efficient means for data collection and storage*

The ideal of centralizing all water use and crop data proved to be beneficial in that it provided efficient means of storage making all database management activities more simple and secure. The Portal offers a framework in which data from multiple state agencies and myriad individual

farmers can be housed in one location. For the first time, permit data from the Georgia EPD, meter data from the Georgia Soil and Water Conservation Commission and crop data from the farmers were all compiled into one comprehensive database focused on agricultural water use. Utilizing the web as a means of collecting the farmer data is far more efficient than field visits or surveys. The design of the Portal simplified changes and addition of meters and fields by presenting the operator with the latest available imagery of the area in question. This proved to be an extremely desirable aspect based on feedback from cooperators.

One of the primary concerns with the Portal, however, is the fact that the data gleaned from its use is primarily self-reported. Many take issue with self-reporting in that it leads to errors in the system and the reliability of information may be suspect. Of course, to achieve anything like cost-effectiveness in data collection on such a large scale, self-reporting must be part of the solution. Errors associated with this type of system will occur but thorough documentation can minimize erroneous data from biasing results. A concern we heard from several farmers was the method of actually entering data on individual fields was somewhat cumbersome. Many farmers are entering the same types of data for other applications such as irrigation scheduling. The Center is presently working to try and integrate our design with others such that farmers need only enter data once. Also, we have been working with researchers on incorporating data collected via telemetry (rainfall, meter reading, soil moisture) which would virtually eliminate errors from data entry. Finally, from a data management standpoint, the volume and type of information being collected, processed and served to users requires specialized training in GIS, database management and web design. The costs associated with keeping such a system up and running are significant.

#### *Regional information for crop and water use*

As discussed previously, one of the functions of the Portal was to present regional averages of crop production and water use. These values were mostly geared toward researchers and state agency officials for regional water planning. This grant did not specifically target these officials as users though the Center always recognized the value to them. However, we were able to utilize data retrieved during this process as a benchmark to compare crop water numbers being used in modeling to support development of the Statewide Water Management Plan. Further,

these sums and averages were an integral part of the comparative efficiencies for producers discussed below.

A significant drawback to the regional data compiled is it is only as good as the number and quality of entries in a given region. Unfortunately, we had too few data points to make definitive statements on water use by crop in each of our target basins. However, data collected via this project and that collected by the GSWCC during the project years were comparable at the mean. It became clear that the incentive offered as part of this CIG (\$100 per meter) was not significant enough to prompt wide-spread participation. Some farmers did not view the benefit of using the Portal worth the time, cost and “headache” of entering data. Others viewed the program as duplicative with reporting requirements associated with the USDA Farm Service Agency and, although totally voluntary, as yet another layer of “bureaucracy.”

#### *Comparative efficiencies for individual operators*

Comparative efficiencies with applicable results was one of the selling points of the Portal and likely the most significant way in which true water conservation will be realized. Operators liked the idea of being presented with both field totals and the ability to compare with regional (county, basin, state, etc...) averages. It let them gain some insight as to how their operations compared to regional statistical averages, and that perhaps better practices could result in more efficiencies. However, while sound in theory, farmers recognized the limitations of this information based on the small sample size of this pilot project. It was believed that there simply was not enough data collected to provide meaningful analyses. Over time, we still feel this functionality will be the greatest benefit to individual producers.

#### *Excellent means to update existing data*

The Portal was found by cooperators to be an excellent method for collecting and updating cropping information, both current and historical. Farmers liked the ability to customize meter sites and field names to be consistent with other applications. The Center received its most positive feedback on functionality that allowed farmers to modify their fields via a GIS tool. For example, as new meters or irrigation systems are added, producers can pan, zoom and select new fields visually which are immediately added to their account. During this project, 12 new fields

were added for 577 acres and seven new meters were added for an additional 378 acres. These changes do not include modifications to existing irrigation systems and configurations. By giving farmers this ability, the Center was able to fix problems in our own database and pass corrections on to EPD or GSWCC.

*Provides an environment from which useful results can be extracted*

The data presentation in the Portal provided our operators with a summation of the data entered. The idea of having all their agronomic information, both current and historical, on a field-by-field basis at the operator's fingertips was appealing. The ability to modify historical data and generate reports was also attractive. We have discussed the benefits to the state at large, but it is worth repeating here that the Portal offers the most efficient way of linking together all the pieces necessary for meaningful agricultural water management. The sheer size and scope of information related to water use by agriculture has hindered decision makers as they craft policies to manage our water resources. The Portal also could provide federal and state agencies that offer other conservation incentives an efficient means of benchmarking success. In brief, the Portal is the best chance we have to reach the holders of the true information needed for meaningful water planning, the individual farmer.

### **Conclusion and Transferability**

The capabilities of the Georgia Farmer Portal are many. It offers advantages in data collection and storage, user provided data not available elsewhere, comparative measures of water use for conservation, regional agricultural water statistics and the ability to update and enhance agricultural data in general. Results and reaction from cooperators engaged during this CIG process generally support these statements. However, to fully realize the range of potential benefits from the Portal at both the individual and regional level, much more farmer adoption must take place.

We see the benefits of Portal adoption readily transferable to other regions outside the target area or even to other states with large agricultural water use. The Portal framework was built to be easily updated with new data and can be readily applied to any geographic region. Thus far, we have only been able to generate interest and use via incentive payments and other grant

sponsored outreach. The Center has incorporated suggestions from users to improve the Portal approach and structure, especially from a data entry perspective. As technology develops around remote data collection and irrigation scheduling, we intend to incorporate that functionality as well. We do recognize, however, that widespread adoption will only come through significantly higher incentive payments or as a result of mandated reporting requirements from federal or state entities.

# APPENDIX 1

## The Farmer Portal

The Georgia Water Planning and Policy Center recently introduced a new tool that helps farmers track their water use and other farm data. This new tool, the Farmer Portal, is free and available on the Internet at: <https://www.gafarmerportal.org/> The Portal gives farmers an easy way to track water use against real-time benchmarks based on data from other Georgia farms. The Portal provides a wealth of information to farmers, including the ability to create instant reports that compare their water and crop data with averages for other farmers in their county or watershed. Farmers can also use the Portal to access information about water-saving practices and current agricultural news. All data entered into the Portal is confidential.

Hal Haddock of Early County was the first farmer to log-in to the Portal. As the founding Chairman of the Flint River Regional Water Council, Mr. Haddock is a leader in Georgia on water resource management. He sees the Portal as an important tool for farmers. “As a businessman and farmer, I need practical and timely information regarding one of my most important resources – water. The web site is easy to use, confidential, and contains links to weather information, government programs, and agricultural news,” said Hal Haddock.

The Georgia Water Planning and Policy Center encourages farmers to use the Farmer Portal to manage water use, to evaluate their own operations, and to access agricultural news. The Center is exploring ways to expand the Portal’s use by involving the USDA and other agencies and organizations. For example, the Portal has the potential to streamline management of conservation programs by allowing for home-based registration and reporting.



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*The following four pages are screen shots from the Farmer Portal that demonstrate how participants use this tool.*

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By giving farmers useful and timely information, the Portal can help farmers to achieve goals for crop yields and water use. They can evaluate their own practices with real-time data from other farmers. “The Farmer Portal is easy to use. I’ll be able to use it to track my whole operation field by field with just a few clicks,” said Jimmy Webb, a Calhoun County farmer. “It can show me how I’m doing compared to others and give me a record of my water use should I need it. Pumping water is costly - this system will help me use water wisely - and save money.”





### Login Information

Please enter your User ID and password to access the Farmer Portal.

User ID:

Password:

**Login**

[Create a new user account](#)

[Forgot User ID or password?](#)

Issues in what has become known as the tri-state water wars, a dispute with neighboring Alabama and Florida over how to manage the Alabama-Coosa-Tallapoosa and the Apalachicola-Chattahoochee-Flint river basins.

Georgia Gov. Sonny Perdue and Alabama Gov. Bob Riley said Monday that they had decided to work out a compromise separately for the Alabama-Coosa-Tallapoosa basin, but would continue negotiations with Florida on the Apalachicola-Chattahoochee-Flint basin.



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#### Quotes

Corn - CBT		
	Last	Chg
Dec	2484	6
Mar	2620	4
May	2694	6

Soybeans - CBT		
	Last	Chg
Nov	5510	-20
Jan	5636	-20
Mar	5754	-14

Wheat - CBT		
	Last	Chg
Dec	4076	122
Mar	4256	126

Ethanol - e-CBOT - CME		
	Last	Chg
Oct	2.07	0.00
Nov	2.18	0.00
Dec	2.22	0.00

Cotton - #2 - NYBOT		
	Last	Chg
Oct	5015	-96
Dec	5225	-123
Mar	5585	-145

All quotes are delayed snapshots  
 Click here for info on Exchange delays

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#### DTN Top Stories

Wheat futures jumped higher in early trade, with Chicago up 11 1/2 cents. Corn and soybean futures were steady to firm. See DTN: Newsom's Quick Takes.

Cattle futures were lower and lean hogs were mostly higher in early trade. Cash hog prices are generally steady to \$.50 lower. Asking prices for cattle are around \$91 to \$92, with trade not expected before Thursday or later. See DTN Before the Bell Livestock Comments.

The U.S. and South Korea begin talks today aimed at setting a bone fragment tolerance level for U.S. shipments of beef. See DTN Ag News.

Australia's 2006/2007 wheat crop is expected to be 35 percent smaller than the previous year due to a serious lack of moisture. See DTN Ag News.

Trade officials from 18 ag nations

- the Cairns Group
- meet in Australia this week for their 20th anniversary meeting and talks are expected to center around jump-starting stalled WTO talks. See DTN Ag News.

#### My Market Watch

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#### Commodities

Corn ( Dec 06 )	2484	6	10:22A	CBT
Soybeans ( Nov 06 )	5510	-20	10:20A	CBT
Wheat ( Dec 06 )	4076	122	10:22A	CBT
Oats ( Dec 06 )	2032	20	10:21A	CBT

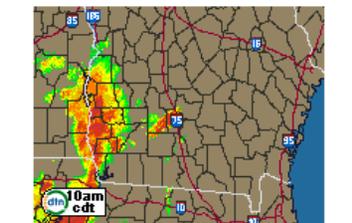
#### Stocks

MICROSOFT CORP	26.85	0.06	10:28A	NASDAQ
WAL MART STORES	48.29	0.19	10:32A	NYSE
YAHOO! INC				NASDAQ

#### Local Radar

**Albany, GA**

Chg Zip Code:  **GO**



[View complete Local Weather](#)

#### Local Conditions

**Albany, GA**

Chg Zip Code:  **GO**

Temp: **81°F** Feels Like: **87°F**  
 Humid: **79%** Dew Pt: **74°F**  
 Barom: **29.93** Wind Dir: **W**  
 Cond: **Partly Cloudy** Wind Spd: **7 mph**  
 Sunrise: **7:23** Sunset: **7:37**  
 As reported at ALBANY, GA at 11:00 AM

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#### Local Forecast

**Albany, GA**

Change Zip:  **GO**

Tuesday	Wednesday	Thursday
Hi: <b>83°F</b>	Hi: <b>81°F</b>	Hi: <b>84°F</b>
Lo: <b>73°F</b>	Lo: <b>59°F</b>	Lo: <b>53°F</b>

[View complete Local Weather](#)

### My Meters

Meter: 04-09882-6	Select	Remove
Meter: 04-09923-8	Select	Remove
Meter: 3713	Select	Remove

### Add Meter

Please enter the serial number for your meter.  
(The serial number is located on your meter. Example: 04-00123-4)

Serial Number:

### Reports

### My Account

### Log Out

### Meter Number: 04-09882-6

Field 1



#### General Field Information:

Field Alias:	<input type="text"/>
Irrigation Acres:	36
Soil Texture:	Sandy Loam
County:	Terrell
Basin:	Ichawaynochaway
Source:	GROUND
Withdraw Type:	
Aquifer:	Floridan <input type="button" value="v"/>

Legend: ▲ Meters ● Selected Meter ○ Claimed Fields ● Selected Field ○ Unclaimed Fields

Hardware

Irrigation

Rainfall

Crops

### Crop Data:

To enter detailed cropping information for this field, fill in the spaces to the left. You may enter Harvest Date and Yield at a later time. If a field has more than one crop, enter the information for the first crop and select the Add button. Repeat for any additional crops.

Crop Type:

Crop Year:

Irrigated Area: (Acres)

Plant Date:



Harvest Date:



Seed Type:

Tillage:

Yield:

Did you irrigate this crop?



Yes



No

Add

Crop Type: COTTON

Water Use

Edit

Remove

Plant Date: 5/26/2006

Acres Planted: 60

Harvest Date:

Crop Irrigated: Yes

Seed Type: DPL 555 BG/RR

Irrigation: (Inches) 3.25

Tillage: Conventional

Rainfall: (Inches) 3.1

Yield: 0

### Report Options

Please Select a Region:

State Wide  Basin  County

Ichawaynochaway

Please Select a Crop:

Cotton

Please Select a Year:

2006

Please Select a Report Type:

Water Use

Show Report

#### REPORT: WATERUSE (COTTON - 2006)

##### MY FIELDS: COTTON

Acres	Average Yield	Average Rainfall (Inches)	Average Irrigation (Inches)	Total Irrigation (Acre-Inches)
620	940	3.2	11.8	7316

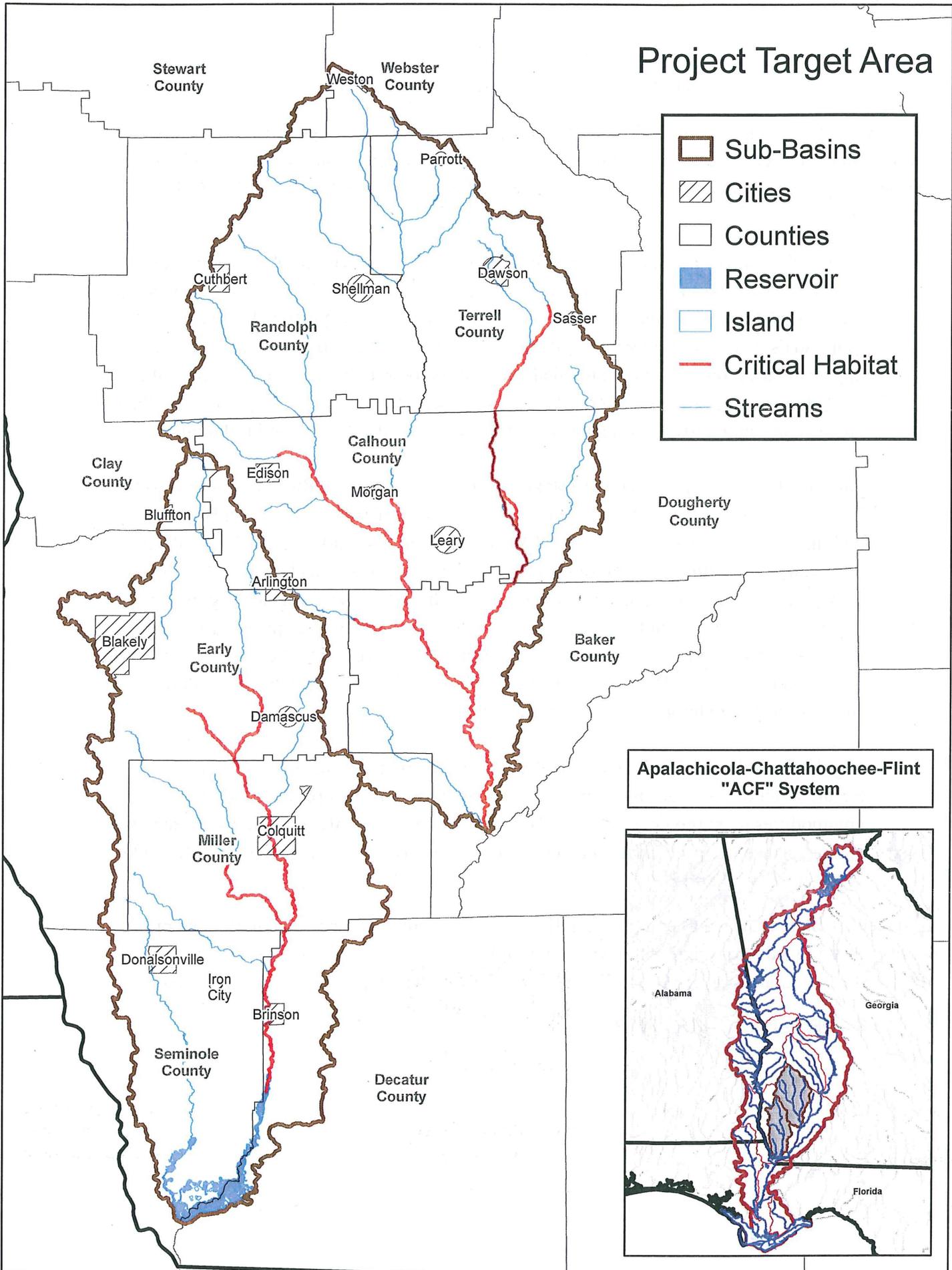
##### BASIN ICHAWAYNOCHAWAY: COTTON

Acres	Average Yield	Average Rainfall (Inches)	Average Irrigation (Inches)	Total Irrigation (Acre-Inches)
60180	887	4.1	12.5	752250

Printer Friendly Report

Reports page allows farmers to query dataset to compare their production to that of others with similar circumstances. For example, a farmer may compare his Georgia Green peanut yield on sandy loam soil to the county average. In the above example, a farmer compares his water use on cotton to the average water use on cotton in the Ichaway Basin. Reports are displayed in table or graph format depending on the query and "printer friendly" reports are available.

# Project Target Area



Apalachicola-Chattahoochee-Flint "ACF" System

