



## Florida Onsite Sewage Treatment and Disposal Systems Inventory **Final Project Report**

**DEP Contract No. G0431**

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## TABLE OF CONTENTS

Section 0 - Executive Summary .....7

Section 1 - Background and Introduction.....8

    Introduction .....8

    History .....8

    Project Goal.....9

    Project Need.....9

    Project Benefits..... 10

    Purpose of Report ..... 10

    Glossary of Terms & Acronyms ..... 10

    Project Team Organization ..... 12

    Work Breakdown Structure..... 13

    Cooperating Partners ..... 13

Section 2 - Process Development ..... 15

    Project Business Processes ..... 15

Section 3 - Data Structure Development ..... 16

    Develop Data Dictionary..... 16

    Develop Geodatabase Framework ..... 18

Section 4 - Quality Management and Assurance ..... 19

    Develop Quality Management Plan ..... 19

    Perform Quality Audits..... 20

    Update Process Documents ..... 21

    Update Data Structure Elements ..... 21

Section 5 - Data Collection / Processing / Mapping ..... 21

    Project Phases ..... 21

        Phase 1..... 22

        Phase 2..... 23

        Phase 3..... 23

        Phase 4..... 24

    First Cycle Overview and Results..... 25

        Data Collection..... 25

        Data Processing..... 35

        Data Mapping ..... 36



Section 6 - Project Management..... 44

- Conduct Team Meetings ..... 44
- Develop and Publish Project Schedule ..... 44
- Develop and Maintain Project Task List ..... 44
- Collect Spending Data..... 45
- Develop and Maintain Project Budget..... 45
- Prepare Project Status Reports ..... 45
- Update Project Website ..... 46
- Develop and Publish Web Application..... 47
- Coordinate Outreach Efforts ..... 50
- Seek New Funding..... 50

Section 7 - Recommendations and Conclusions ..... 50

- Recommendations and Lessons Learned ..... 50
- Conclusions ..... 53

Section 8 - Acknowledgements ..... 56

Section 9 - References ..... 56

APPENDIX A – PROCESS DOCUMENTS ..... 57

- Contact Management..... 57
- County Health Department (CHD) Cooperation ..... 58
- Data Gathering ..... 58
- Data Processing ..... 59
- Geoprocessing ..... 60
- Mapping & Reporting ..... 61
- Tracking & Status..... 61

APPENDIX B – RESPONSE FROM DEP PERMITTED WASTEWATER TREATMENT FACILITIES AND PUBLIC WATER SYSTEMS..... 63

APPENDIX C – SUMMARIES BY COUNTY ..... 69

APPENDIX D –ESTIMATION METHODOLOGY..... 135

APPENDIX E –WASTEWATER RESULTS BY COUNTY ..... 143

APPENDIX F –DRINKING WATER RESULTS BY COUNTY..... 147

APPENDIX G –PROJECT SUMMARY REPORT ..... 151

APPENDIX H –LIST OF PAPERS AND PRESENTATIONS..... 153



## TABLE OF FIGURES

Figure 1. Project Team for the Florida Water Management Inventory ..... 12

Figure 2. Project Work Breakdown Structure..... 13

Figure 3. Workflow Diagram for the Florida Water Management Inventory ..... 16

Figure 4. GIS Database Diagram ..... 17

Figure 5. Phases of the Florida Water Management Inventory ..... 22

Figure 6. Data Sources and What Types of Data They Have ..... 26

Figure 7. Data Receipt Summary for all DEP Regulated Drinking Water and Wastewater Systems ..... 28

Figure 8. Percent of Population Served by Drinking Water and Wastewater Permitted Capacity Submitting GIS Data by Phase..... 33

Figure 9. Screenshot of Geocoding via Google Earth ..... 36

Figure 10. Inventory Geodatabase Diagram ..... 37

Figure 11. Sources for Drinking Water Information ..... 38

Figure 12. Screen Shot of Final Assigned Wastewater Value, Year Determination was Made, Type of Source, Source Name, and Method by Which the Source Coordinate was Derived ..... 40

Figure 13. Final Leon County Data Maps: a. Single Panel Map for Drinking Water b. Single Panel Map for Wastewater c. Four Panel Map for Drinking Water d. Four Panel Map for Wastewater ..... 41

Figure 13. Florida Water Management Inventory Final Map Results for Palm Beach County: Four Panel Map Showing Sewer, Septic, Unknown, and Not Applicable Parcels, and Single Panel Map Overlaying All Data ..... 42

Figure 14. Florida Water Management Inventory Final Map Results for Marion County: Four Panel Maps Showing Sewer, Septic, Unknown, and Not Applicable Parcels, and Single Panel Map Overlaying All Data..... 43

Figure 15. Example of Project Status Map Posted to Project Website and Sent in Weekly Status Updates ..... 45

Figure 16. Screenshot of the FTP Website where County-Specific Data and Maps Can Be Downloaded ..... 46

Figure 17. Example of the County Snapshot Webpage for Alachua County ..... 47

Figure 18. Screenshot of the Interactive Web Application ..... 48

Figure 19. Screen shot of the new OSTDS Septic Abandonment by Utility Mass Entry Screen ..... 49

Figure 20. Screen shot of the modified Application for Construction Permit screen to allow for entry of Abandonment By Utility ..... 49

Figure 21. Sample Map Book Page for Coastal Areas for Hurricane Matthew Disaster Response ..... 53

Figure 22. Results of Analysis of Flood-prone Areas with Private Wells During Hurricane Matthew ..... 54

Figure 23. Florida Water Management Inventory Results Clipped to Wakulla Priority Focus Area ..... 54



## TABLE OF TABLES

Table 1. Cooperating Partners .....	14
Table 2. Quality Management Plan Components .....	20
Table 7. Counties in Phase 1 and Reason for Inclusion in the Pilot Phase .....	23
Table 3. Summary of DEP Facility Data Collection Results.....	29
Table 4. Data sets available for mapping by project phase.....	31
Table 5. Summary of GIS Data Showing the Percentage of Facilities, Wastewater Capacity, and Drinking Water Population Served for Facilities That Did and Did Not Submit GIS Data .....	33
Table 6. First Cycle Data Gathered by Facility Size.....	35



## Section 0 - EXECUTIVE SUMMARY

Multiple state and local agencies across the state of Florida gather information about drinking water sources and wastewater treatment methods; however, historic data gathering methods have been fragmented. This results in the lack of readily accessible information to evaluate impacts to Florida's water quality and quantity. An inventory of parcel-specific drinking water and wastewater source information is necessary to accurately estimate the potential public health and environmental impact could occur when these systems fail. A comprehensive water and wastewater inventory for the approximate 6.9-million developed parcels in the state of Florida provides a vital tool in disaster preparedness and response activities, local planning evaluations, and environmental risk assessments. A coordinated effort was led by a small team at the Department of Health in the Onsite Sewage Program in the Bureau of Environmental Health. This small team compiled fragmented drinking water and wastewater data across Florida into a comprehensive electronic map showing the drinking water source and wastewater disposal method for all 9,000,000 parcels in Florida; providing vital information for disaster preparedness and response activities, local planning evaluations, and environmental risk assessments.

Collaboration with stakeholders was an essential part of this inventory project. Aside from the Department of Health state and county offices, participating stakeholders included public and private utilities; Florida Departments of Environmental Protection, Business and Professional Regulation, Emergency Management, and Agriculture and Consumer Services; Water Management Districts; Public Service Commission; various county and municipal governments; and many others.

The benefits resulting from this project include:

- Enhanced customer service, permitting, development review, and planning activities for state agencies, local government, utilities, citizens, and other interested parties through data sharing. Redundancies and information gaps are identified for future work.
- Improved disaster preparedness and response activities resulting in accurate estimates of impacts on public health and infrastructure during disasters.
- Enhanced resource for homeowners, home-buyers, realtors and other entities interested in potable water and wastewater services.
- Centralized web portal of maps and data as well as consolidated project results accessible to the public.

The Florida Water Management Inventory Project is unique across the United States. There is no other recorded inventory that can compare to the scale and magnitude of this project. It is the only data resource of its kind to exist on a statewide level, making this project truly unique and an example other states can model. This project is a tribute to the dedication and the commitment of the Department's goal to improve Florida's public and environmental health as well as provide superior disaster preparedness and response services.

Visit the project website (<http://www.floridahealth.gov/FLWMI>) to download data, access the interactive web application, and for an up-to-date status of this project.



## Section 1 - BACKGROUND AND INTRODUCTION

### Introduction

Nonpoint source pollutants from onsite sewage treatment and disposal systems (OSTDS) can have significant impacts on surface water and groundwater quality. Approximately thirty percent of Florida's population uses an OSTDS as their method of wastewater disposal (Florida Department of Health website). In Florida, OSTDS are regulated by the Florida Department of Health (Department) and cover wastewater from establishments that generate domestic sewage up to 10,000 gallons per day, or commercial strength sewage waste up to 5,000 gallons per day. Larger wastewater systems in the state are regulated by the Florida Department of Environmental Protection.

According to a 2015 survey done by the State Onsite Regulators Alliance, Florida has the largest population served by onsite sewage systems in the nation. Electronic permitting data records for OSTDS, which have been collected by the Department since the late 1990's, do not include a record for every OSTDS in the state (Hall and Clancy 2009). Systems are added to the statewide database when a new structure is constructed, a system is in failure and needs repair, a system modification is required, an existing system needs approval to proceed with state or local building requirements, or when an existing system is abandoned. Not having a comprehensive and updateable inventory utilizing best available information has made it difficult to assess the potential impacts from this nonpoint pollutant source.

### History

Through 1990, the United States Census form included a question on wastewater disposal. The Department has used the 1990 results as a baseline from which to estimate numbers of onsite sewage treatment and disposal systems by county based on permitting records. In some watersheds, interest in more precise data in the location or condition of onsite systems prompted local attempts at inventorying (Suwannee, Leon/Wakulla, Volusia).

The 2008-2009 Florida Legislature tasked the Department with providing a statewide inventory of onsite wastewater systems. The project was completed between January and June of 2009 (Hall and Clancy 2009). The project combined data obtained from utilities, the department, and other sources, with statistical estimation methods to assign a probability of OSTDS serving each parcel. The dataset has not been updated since that time.

The Department's Research Review and Advisory Committee (RRAC) put a high priority on further work on the inventory. Department staff looked for funding. In the process, drinking water was added to the scope as knowing that information can assist with wastewater estimations. A coordinated effort was needed between the Department, the DEP, county governments, and utility providers to bring this inventory up to date. The absence of a lead facilitator to direct this project led to a delay until 2014, when the Department started a project to update and maintain this inventory.

The project's initial financial support in April 2014 came from the Centers of Disease Control (CDC), through Florida Disaster Preparedness funds. Once those funds were expended in September 2014, the Department's Environmental Health trust funds were used until grant funds from the Section 319 Nonpoint Source Management Program from the U.S.



Environmental Protection Agency (USEPA) were secured through a contract with DEP's Nonpoint Source Management Section.

## Project Goal

The goal of the Florida Water Management Inventory (FLWMI) project is to link each built property in the state to information about the drinking water source type (public water or private well) and the wastewater treatment method (central sewer or OSTDS).

More detailed goals of the project include:

- 1) Document and map the Wastewater treatment method and the Drinking Water source for the more than 6 million built parcels in the state
- 2) Collect and maintain Data Contacts (who), Data Sources (where), and Data Sets (what) to support Geographic Information System (GIS) Mapping and Summary Reporting for the Inventory
- 3) Analyze and process collected Data Sets for standardization and readiness for GIS import
- 4) Collect, import, analyze, and maintain information in the GIS for all property parcels in the state
- 5) Create GIS Maps & Summary Reports for all 67 Florida counties
- 6) Create a publically accessible web site with GIS data, maps, and other project information
- 7) Conduct outreach activities for communication and education of stakeholders regarding the Inventory needs, benefits, and results
- 8) Provide regular status reporting to all project stakeholders at a level that is appropriate to their needs and/or their role in the project
- 9) Take all steps possible to position the FLWMI Project to continue as a recurring, annual Statewide Inventory

## Project Need

Information about drinking water sources and wastewater treatment methods are vital for environmental risk assessments, disaster preparedness and response activities, and local planning evaluations. These activities relate to environmental health and the protection of public health by detecting and preventing disease caused by natural and manmade factors in the environment.

Multiple state and local agencies across the state of Florida gather information about drinking water sources and wastewater treatment methods; however, historic data gathering methods have been fragmented. This results in the lack of readily accessible information to evaluate impacts to Florida's water quality and quantity.

One example for the need for this project arises in the context of water quality protection. As the Florida Department of Environmental Protection (DEP) works with stakeholders to develop Basin Management Action Plans (BMAPs) to reduce pollutant loadings to impaired waters, there is a need for a comprehensive inventory to help determine OSTDS impacts.



## Project Benefits

The FLWMI represents an effort from the Department to provide a centralized comprehensive GIS mapping tool to include drinking water sources and wastewater treatment methods in the same database. A comprehensive drinking water and wastewater inventory of the approximate 6.5 million developed parcels in the State of Florida provides many benefits including:

- Enhanced customer service, permitting, development review, and planning activities for state agencies, local government, utilities, citizens, and other interested parties through data sharing; it also identifies redundancies and information gaps for future work
- Improved disaster preparedness and response activities resulting in accurate estimates of impacts on public health and infrastructure during disasters
- Enhanced resources for homeowners, home-buyers, realtors, and other entities interested in potable water and wastewater services
- Centralized web portal of maps and data, consolidated project results, all accessible to the public

## Purpose of Report

The purpose of this report is to provide a comprehensive summary of the work completed for the FLWMI Project under DEP Contract Number G0431. This project was developed to be iterative, with each full mapping of the state considered a "cycle". This report covers the first cycle of the project, which consists of work started in April, 2014 and completed in September, 2016.

The FLWMI identifies and maps the location of all (OSTDS) in the state of Florida. GIS data and maps provide information facilitating statistical analyses necessary for the reduction of nonpoint source pollutant loads. Some examples include OSTDS regional density; OSTDS locations within known sewer service area boundaries; and OSTDS locations and density in or near biologically or geographically sensitive areas, such as springsheds, wetlands, and other protected water bodies or groundwater recharge areas. Another vital use of the GIS data and maps is to provide the location and density of OSTDS in floodplains or storm surge areas which aids in public health and environmental disaster preparedness and response planning and execution.

## Glossary of Terms & Acronyms

Some key terms used in this report are defined as follows:

**Built:** A built property is one that should generate wastewater. This is different from a property that is considered "improved" where the infrastructure may be built, but there is no structure that could be occupied.



**CHD:** County Health Department, 67 offices with interlocal agreements with county government for Department staff to operate at a county level.

**Conventional Septic System:** Standard septic tank and drainfield to treat wastewater on site that does not perform advanced treatment through an Aerobic Treatment Unit or Performance-Based Treatment System.

**DEP:** Florida Department of Environmental Protection

**DOACS:** Florida Department of Agriculture and Consumer Services

**DOH:** Florida Department of Health; the Florida Department of Health has a central office and 67 county offices that administer health programs

**DOR:** Florida Department of Revenue

**EH:** Environmental Health

**EHD:** Environmental Health Database; statewide web-based permitting database that the Department uses to keep track of Environmental Health program information (permits issues, facilities regulated, etc.)

**GIS Information:** Geographic Information System (GIS) information such as points, polygons, geodatabases, shapefiles, tables containing geocoded data, etc.

**Limited Use Well:** Public water systems which are not covered by the Safe Drinking Water Act; even though they may be managed by the Department, they are considered to be Public Water Systems; also referred to as LU well

**Local Government Sections:** Other municipal offices such as Property Appraiser, Environmental Management, Building Department, etc.

**OSTDS:** Onsite Sewage Treatment and Disposal System; also known as a septic system; regulated by the Florida Department of Health under Chapter 381.0065, *Florida Statutes*; includes both conventional septic systems and advanced systems

**Parcel / Property / Lot:** A parcel of land is considered to be the same as the term property, and a parcel of land could consist of multiple lots bound together in the property description

**PBTS:** Performance-Based Treatment System, a type of OSTDS that has been designed to meet specific performance criteria for certain wastewater constituents

**PID:** Unique Parcel Identification Number

**Private Onsite Well:** Private water system serving one to two owner-occupied private residences, one of which can be a rental unit; for purposes of this project this also includes multi-family water systems

**Public Utility:** The entity, regardless of ownership, which provides Drinking Water and/or Wastewater Treatment services to its customers; regulated by the Florida Department of Environmental Protection under Chapter 403, *Florida Statutes*

**PWS:** Public Water System; also synonymous with Potable Water Systems, Public Utility, Public Water, Central Water, and Offsite Water

**Service Area:** The geographic area in which the Public Utility operates and provides service to its customers

**Statewide Inventory:** The project undertaken to gather, analyze, report, and share information related to Florida Drinking Water and Wastewater sources, locations, and related information; also refers to the actual inventoried information once the initial project is completed

**Utility Customer:** The entity, be it public or private, which receives Drinking Water and/or Wastewater Treatment services from a regulated Public Utility

**WMD:** Water Management Districts; there are five Florida Department of Environmental Protection Water Management Districts in Florida responsible for managing the quality and quantity of water, including well construction and aquifer recharge/surface water management programs

**WWTF:** Wastewater Treatment Facility

## Project Team Organization

The project team organization for this project is shown in Figure 1.

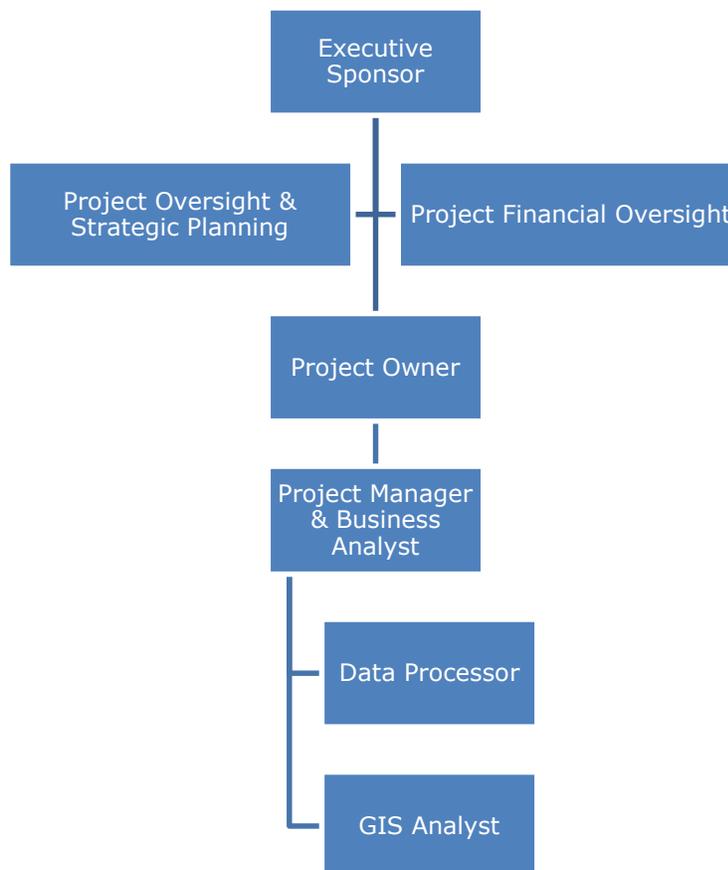


Figure 1. Project Team for the Florida Water Management Inventory

## Work Breakdown Structure

In order to effectively manage the work required to complete this project, it was subdivided into individual work packages. This allowed the Project Manager to more effectively manage the project’s scope as the project team worked on the tasks necessary for project completion. The project was broken down into five main components: process development, data structure development, quality management and assurance, data collection, and project management. Each of these components was then subdivided further down, see the work breakdown structure (WBS) in Figure 1. The sections that follow will provide information for each of the main components identified. This report satisfies project component 5.11 in Figure 2: Prepare Final Project Report.

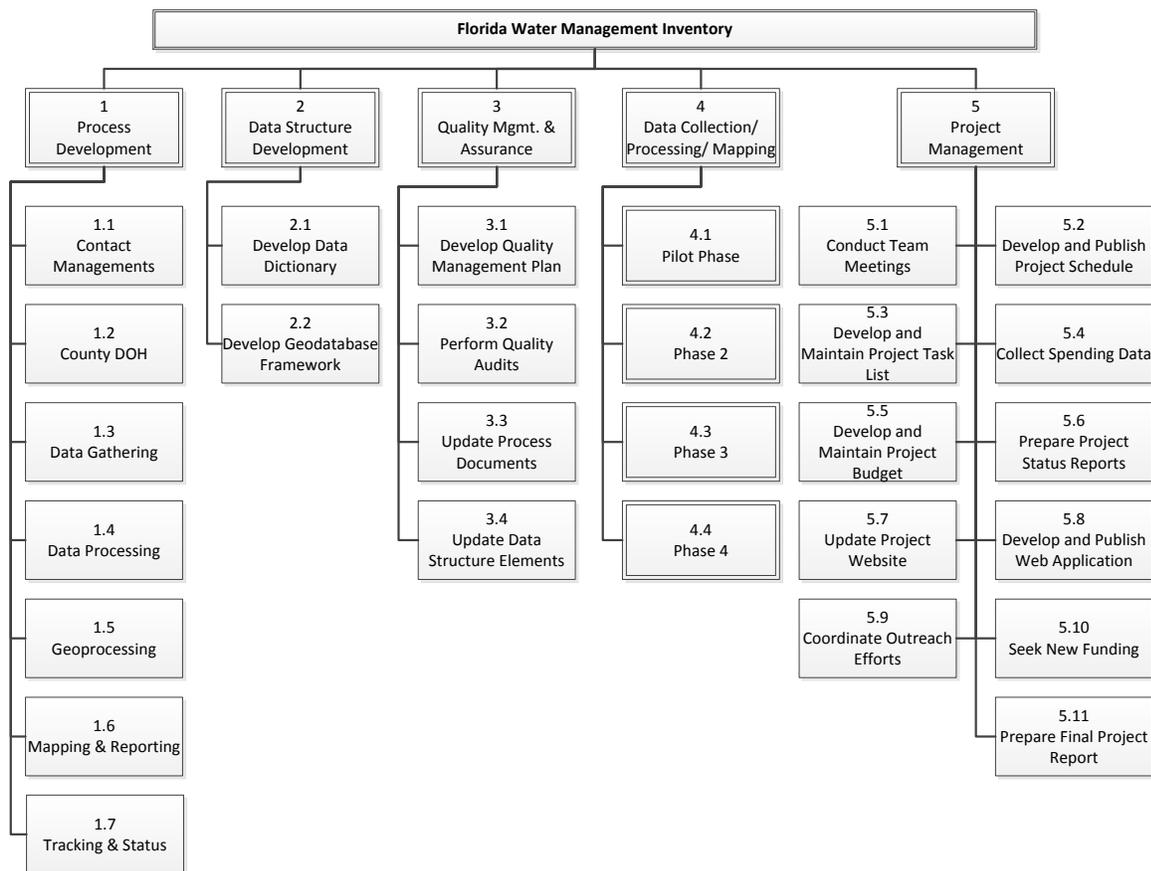


Figure 2. Project Work Breakdown Structure

## Cooperating Partners

Collaboration with stakeholders was an essential part of this inventory project. Aside from the Department’s state and county offices, participating stakeholders included public and private utilities; Florida Departments of Environmental Protection, Business and Professional



Regulation, Emergency Management, and Agriculture and Consumer Services; Water Management Districts; Public Service Commission; various county and municipal governments; and many others (**Error! Reference source not found.**).

Table 1. Cooperating Partners

Organization	Participation Level
Florida Department of Environmental Protection: Nonpoint Source Management Section	Sponsored project in 2016, total funded: \$390,800
Centers for Disease Control and Prevention	Sponsored project in 2014, total funded: \$106,500
Strategic Planning Oversight Team, Public Health and HealthCare Preparedness Cooperative Agreement	Provide funding allocations for CDC funds in 2014
Florida Division of Emergency Management: Florida State Emergency Response Team	Receive project information and coordinate incorporation into the Geospatial Assessment Tool for Operations and Response (GATOR)
Florida Department of Health, Division of Disease Control and Health Protection, Bureau of Environmental Health	Manage, plan, and execute project, responsible for deliverables, provide drinking water and wastewater data extracts from the statewide Environmental Health Database (EHD) and other Department programs, geodatabase design and implementation
Florida Department of Health, Division of Disease Control and Health Protection, GIS Section	Web mapping front end development (through a contract), ArcGIS REST endpoint, provide technical support for project
Florida Department of Health, Information Technology Office	Assist with publishing information to the Department's website, assist with data collection and integration
Florida Department of Health, Sixty-Seven County Offices	Assist with data collection efforts, provide contact information
Florida Department of Health, Research Review and Advisory Committee	Provide technical support, review project reports, public meeting forum for communication with key stakeholders and the public
Florida Department of Environmental Protection: Water Resource Management	Provide technical support, provide water and wastewater facility locations and contact information, provide GIS data, collaborate on contact letters, review project reports, assist with work plan development
Florida Department of Environmental Protection (multiple sections): Florida Geological Survey, Environmental Assessment and Restoration, Water Management Districts	Provide technical support, provide water and wastewater facility locations and contact information, provide data for domestic potable wells, provide GIS data
Florida Department of Business and Professional Regulation	Provide regulated facility locations
Florida Department of Agriculture and Consumer Services	Provide regulated facility locations



Organization	Participation Level
Florida County or City Government	Provide relevant information and indicate interest in dissemination of project information
Public and Private Drinking Water and Wastewater Facilities across Florida	Provide information on drinking water source and wastewater disposal for customers within service areas

## Section 2 - PROCESS DEVELOPMENT

### Project Business Processes

Overall, there are several guiding documents that provide background and an overview of the project as a whole. Each of these documents can be found in the Process Documents folder on the project FTP site:

<http://ww10.doh.state.fl.us/pub/bos/Inventory/ProcessDocuments/>.

The guiding documents are:

1. **Project Charter** – Developed prior to work began on the project, when the project was funded by Centers of Disease Control, through Florida Disaster Preparedness funds. The project charter defined the scope, objectives, and overall approach for the work to be completed. It is a critical element for initiating, planning, executing, controlling, and assessing the project. It should be the single point of reference on the project for project goals and objectives, scope, organization, estimates, work plan, and budget. In addition, it served as a contract between the Project Team and the Project Sponsors, stating what would be delivered according to the budget, time constraints, risks, resources, and standards agreed upon for the project.
2. **Project Management Plan** – The purpose of the project management plan (PMP) is to provide a comprehensive baseline of what has to be achieved by the project, how it is to be achieved, who will be involved, how it will be reported and measured, and how information will be communicated. The intended audience of the FLWMI PMP is all project stakeholders including the project sponsor, senior leadership, and the project team.
3. **Operational Work Plan** – This plan provides the basis for the consensus objectives and expectations of the Project Team and stakeholders related to project work for the time period from October, 2015 through September, 2016.
4. **Status Update** – Provides a snapshot of the current status of the project as of the date on the document.
5. **General Business Rules** – The Business Rules constitute ongoing documentation related to business process and procedural steps for different stages in the Inventory Workflow. The project’s formal Business Processes and Standard Operating Procedures are not static and are constantly being improved for accuracy and efficiency. Relevant Business Rules are captured, on an ongoing basis, within this document, until finalized documentation is completed.
6. **Frequently Asked Questions** – Document available on the project website to help address several frequently asked questions. This document is updated as needed to help provide clarity for areas where it is needed.

Figure 3 shows a diagram of the workflow for the FLWMI. This diagram outlines the major components of the business process documents that are outlined in Appendix A.

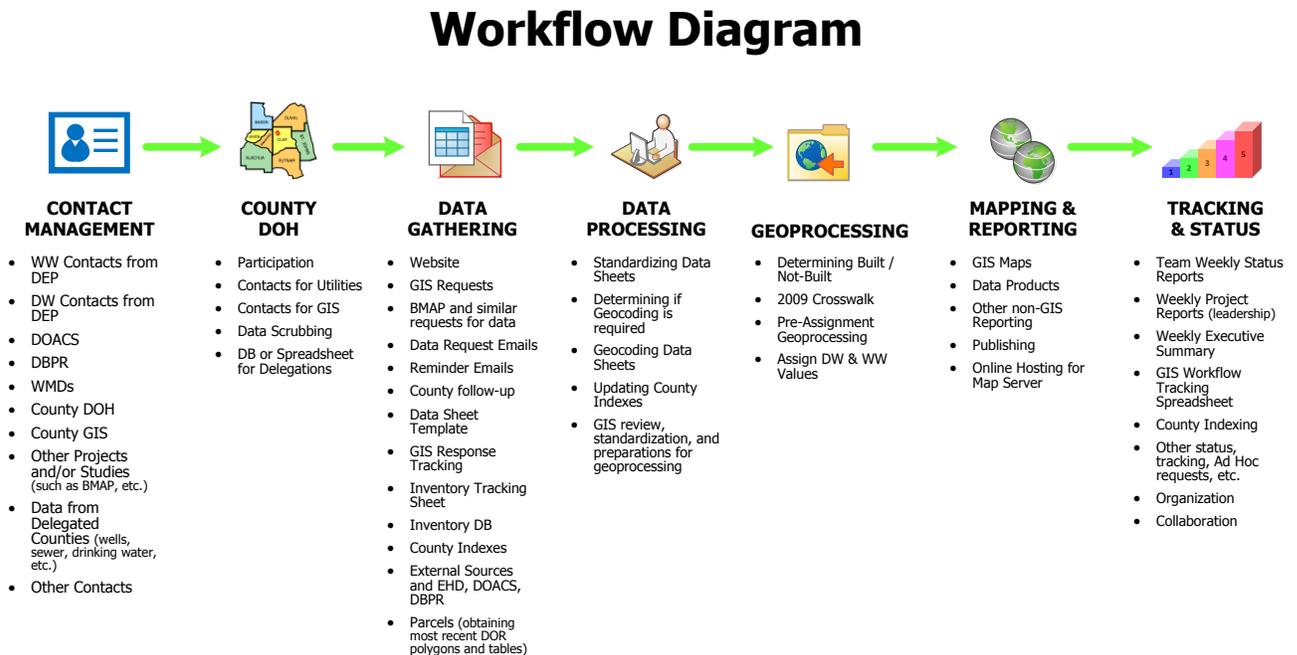


Figure 3. Workflow Diagram for the Florida Water Management Inventory

## Section 3 - DATA STRUCTURE DEVELOPMENT

### Develop Data Dictionary

The project data dictionary, as of November 25, 2015 can be found on this webpage: <http://ww10.doh.state.fl.us/pub/bos/Inventory/Deliverables/>. The data dictionary outlines the GIS Feature Classes and Tables for the FLWMI. Specifically, the project data dictionary shows the format for the project geodatabases. These include the layer names, layer descriptions, field names, field descriptions, and the lists of acceptable data values (domains). The contents of the final GIS dataset, the editing and development version hosted on the Department's website, and the primary feature classes and tables that were used in conducting the inventory are shown in Figure 4.

Florida Water Management Inventory GIS Database Diagram

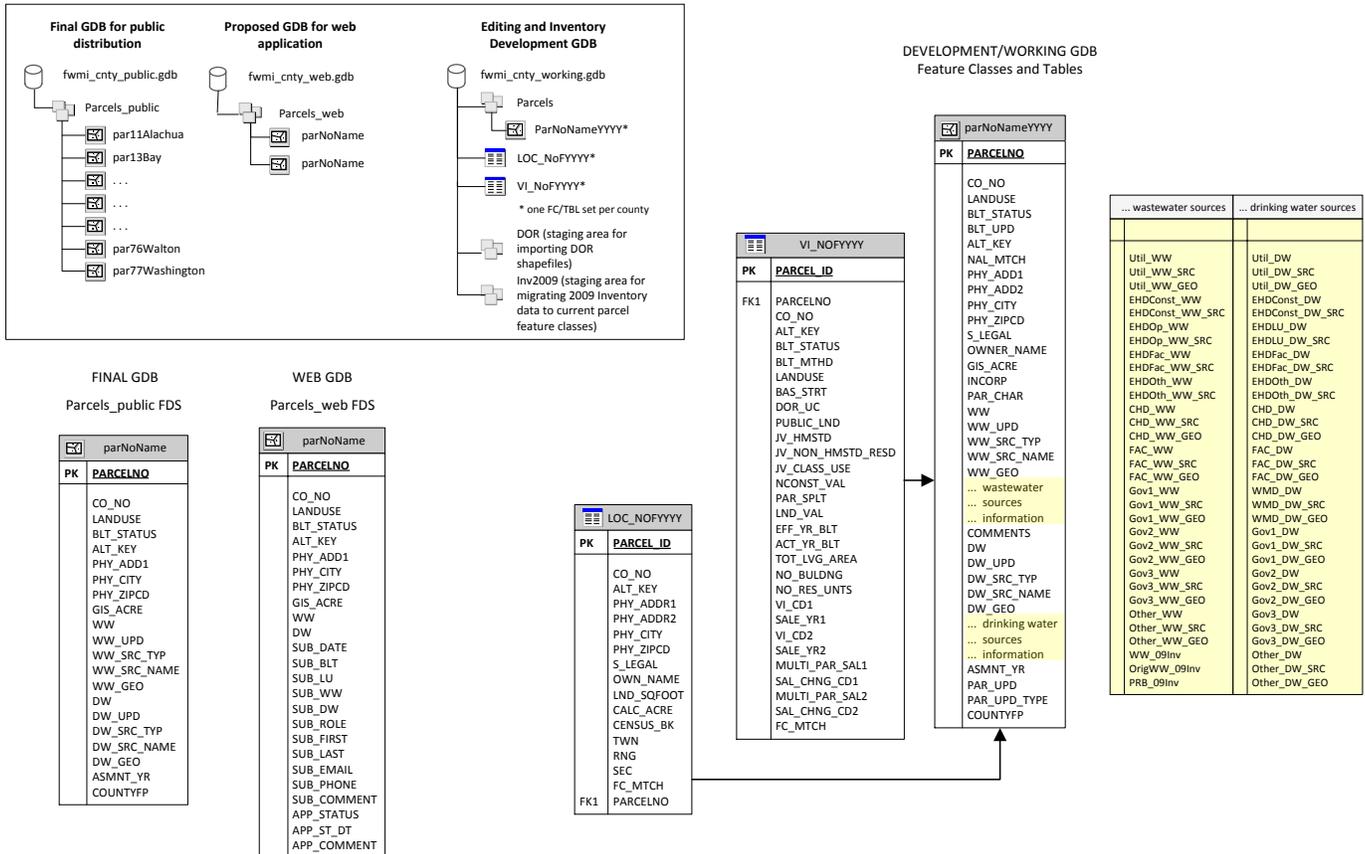


Figure 4. GIS Database Diagram

There are three different GIS geodatabase datasets: the final one for public distribution (fwmi\_cnty\_public.gdb), one that is used in the online web application (fwmi\_cnty\_web.gdb), and an editing and development geodatabase (fwmi\_cnty\_working.gdb). The parcel data were acquired from the Florida Department of Revenue (DOR). Data and other information relative to the drinking water and wastewater were obtained from various sources acquired through the data collection process.

The public geodatabase contains the feature classes of county parcels with inventoried drinking water and domestic wastewater information. The county feature classes of parcels are named according to the following concatenated values: "par", DOR County number, County Name (i.e. par11Alachua).

The web application geodatabase is hosted on the web with feature classes of county parcels containing inventoried drinking water and domestic wastewater information. The county feature classes of parcels are named according to the following concatenated values: "par", DOR County number, County Name (i.e. par11Alachua). Currently the web application allows for a user to select parcel polygon(s) by searching on the address or Parcel Number and export data. The feature classes allow for proposed edits to be submitted through the web application. This edit functionality has not been built, but the structure is there for future development. The conceptual process is that the user would be able to enter requested edits into a web-based form that will contain both mandatory and



optional fields for the Submitter's Role, First and Last Name, email, phone, and comments. The polygon(s) will be copied from the original feature class to the edit feature class, and those attributes with the 'SUB' prefix will be populated according to what the submitter provides. These changes will be reconciled back into the original after approval. The submitter fields are not included in the final feature class.

The editing and development geodatabase is the working geodatabase with feature classes and tables for county parcels with inventoried drinking water and domestic wastewater information. The county feature classes of parcels are named according to the following concatenated values: "par", DOR County number, County Name, Tax Assessment Year (i.e. par11Alachua2014). Note that the year suffix reflects the currency of the parcel geometry, and not necessarily the year in which the inventory was conducted.

Table VI\_NOFYYYY, in the editing and development geodatabase, includes fields to be used to determine Built status. This table is extracted from the DOR Real Property Name – Address – Legal (NAL) file. The majority of attributes are populated directly from the NAL file. Specific information about the data in the NAL file can be found in the DOR User's Guide (<http://dor.myflorida.com/dor/property/rp/dataformats/>). The BLT\_STATUS, BLT\_MTHD, LANDUSE attributes are populated as part of the inventory process. 'NO' in the title is the DOR county number and matches the number in the feature class.

Table LOC\_NOFYYYY, in the editing and development geodatabase, includes fields related to the location and size of the parcel. This table is extracted from the DOR Real Property Name – Address – Legal (NAL) file. The majority of attributes are populated directly from the NAL file. Specific information about the data in the NAL file can be found in the DOR User's Guide. 'NO' in the title is the DOR county number and matches the number in the feature class.

The wastewater sources and drinking water sources tables include information on the sources of data used to calculate the final drinking water and wastewater designation. These values are evaluated in the data model to help determine known, likely, somewhat likely, unknown, conflicting, and NA values for each parcel.

## Develop Geodatabase Framework

The geodatabase framework is the physical geodatabase templates which were created and documented in the data dictionary. The geodatabase framework can be found on this webpage: <http://ww10.doh.state.fl.us/pub/bos/Inventory/Deliverables/>. There are templates for each of the three different GIS geodatabase datasets: the final one for public distribution (fwmi\_cnty\_public.gdb), one that is used in the online web application (fwmi\_cnty\_web.gdb), and an editing and development geodatabase (fwmi\_cnty\_working.gdb).



## Section 4 - QUALITY MANAGEMENT AND ASSURANCE

### Develop Quality Management Plan

The quality management plan for this project provides the basis for the consensus objectives and expectations of the project team and sponsors as they relate to managing data quality for the FLWMI Project. The plan documents the data to assess, identifies quality objectives and metrics, and develops methods to reconcile assessment results. The quality management plan, as of September 28, 2016 can be found on this webpage: <http://ww10.doh.state.fl.us/pub/bos/Inventory/Deliverables/>.

The quality management plan for this project was initially outlined in June, 2014. As the project commenced and process documentation was developed, the quality management plan was adjusted. Section 5 - below describes how the project was split into phases to strategically implement the project. As Phase 3 of the project completed, the plan was fleshed out. Audits were performed throughout Phase 4 and continued after completion of Phase 4 to help develop the plan for the next project cycle. The quality management plan was updated after Phase 4 based on audit results.

The plan includes a list of the attributes to be managed and checked for those information items spelled out in each major project area. The plan also includes the audit schedule, which lists the frequency, responsible staff, and procedure for each information item. Table 2 outlines the major components of the Quality Management Plan.

Table 2. Quality Management Plan Components

Audit Group	Information Item
<b>Contact Management</b>	Public Water Systems Facilities & Contacts from DEP
	Wastewater Treatment Facilities & Contacts from DEP
	Water Management District Contacts
	CHD Contact List
<b>Data Gathering</b>	Parent Organization Grouping
	Inventory Database Tracking Sheet
	County Indexes
<b>Data Processing</b>	Standardization of Data Sheets
	Geocoded Spreadsheets (Google Earth or StreetMap for ArcGIS)
<b>GIS</b>	Status Map
	County Parcels
	Parcel Built Status
	Source Datasets
	Utility services encompassing multiple counties
	State-level source assignment to parcels
	County-level source assignment to parcels
	GIS Workflow Tracking Datasheet
	Environmental Health Database Queries
	Final Wastewater Disposal Method
	Final Drinking Water Source
	County Inventory Maps
	Public GIS dataset
Final GIS related products	
<b>Inventory Database (IDB)</b>	IDB
	Last Modification to Record in IDB
<b>Web</b>	Internal Map Server
	External Map Server
	Website Content

## Perform Quality Audits

Quality audits were performed throughout the project. Some processes include the audit procedures within the process itself; other audits occur at the start or end of a project phase or cycle; while still other audits occur on a set timeframe such as weekly, monthly, or quarterly. These are outlined in the audit schedule within the quality management plan.

## Update Process Documents

The process documents developed for this project, as described in Section 2 of this report, are evaluated and updated at the beginning of each project phase or as needed. New process documents are created when necessary. One of the major project strengths is the level of detail contained within the process documentation. This allows for replication of processes, streamlining efforts, and a high quality end product.

## Update Data Structure Elements

Data structure elements, such as the geodatabase framework described in Section 3 of this report, were carefully designed during the process development stage done during the Phase 1 (pilot phase) of the project. Once Phase 2 was complete, and a quality audit was done on the built/not-built parcels, the data structure elements were updated to standardize the format for all county datasets. Other data structure elements include the final project maps, the inventory database for tracking and reporting on the data gathering effort, and the frequency spreadsheets for each county. Elements were updated and added throughout the project as needed. For example, the shared public data includes an Excel spreadsheet of the attribute table in the final GIS maps. This was not one of the original data elements, but after a suggestion from someone who did not have GIS software and wanted to analyze the data, this element was added. Such enhancements allow for wider use of the end products.

## Section 5 - DATA COLLECTION / PROCESSING / MAPPING

### Project Phases

Florida was split into implementation phases to make this project more manageable and to allow for ongoing development and improvement of business processes and standard operating procedures and methodologies (Figure 5). The basic processes were to collect all relevant data available, compile, analyze, and finally map these data and make them available to the public.

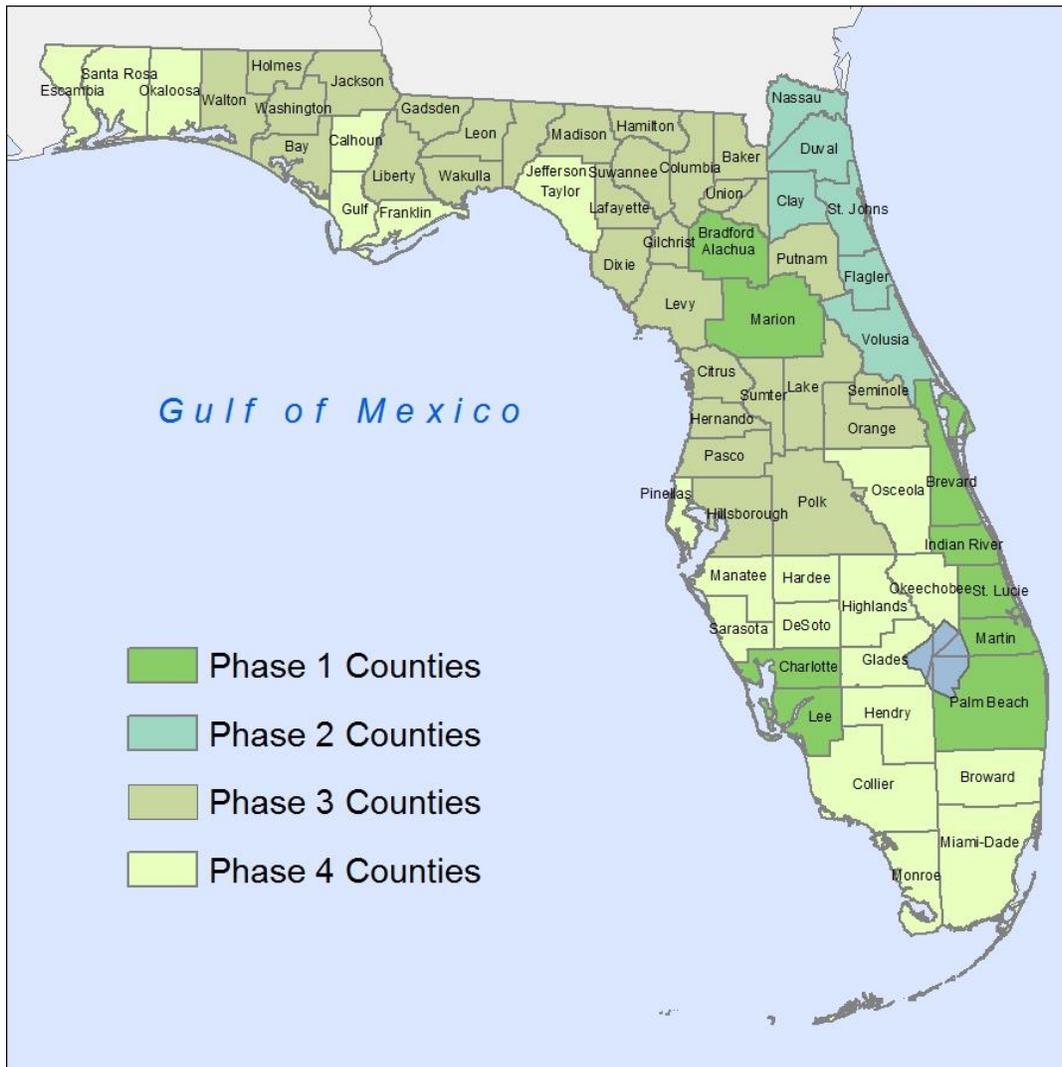


Figure 5. Phases of the Florida Water Management Inventory

### Phase 1

Phase 1 counties, also referred to as pilot counties, were selected based on several target criteria shown in **Error! Reference source not found.**



Table 3. Counties in Phase 1 and Reason for Inclusion in the Pilot Phase

County	Reason for Inclusion in the Pilot Phase
Alachua	Example of a mostly complete county from the 2009 inventory
Brevard	Indian River Lagoon county
Charlotte	County with numerous onsite wastewater treatment systems
Indian River	Indian River Lagoon county
Lee	County with numerous onsite wastewater treatment systems
Marion	Example of a mostly incomplete county from the 2009 inventory
Martin	Indian River Lagoon county
Palm Beach	County had interest in participation, letter of support received for CDC funding in 2014
St. Lucie	Indian River Lagoon county

## Phase 2

Phase 2 counties were selected to complete the northern part of the eastern coast of Florida. There was interest from the St. Johns River Water Management District in having a completed inventory for these counties, and assistance was provided in gathering support from DEP regulated facilities.

These are the counties included in Phase 2:

1. Clay
2. Duval
3. Flagler
4. Nassau
5. St. Johns
6. Volusia

## Phase 3

Phase 3 counties were selected based on whether they contained areas located in a DEP Basin Management Action Plan for springs areas. Counties on the following list with a "3A" after the name, were completed first based on a new process that identified efficiencies with contacting predominantly rural counties first and focusing efforts on obtaining GIS datasets from the remaining ones through a targeted email campaign.

- |                  |                    |                  |
|------------------|--------------------|------------------|
| 1. Baker – 3A    | 12. Holmes – 3A    | 23. Polk         |
| 2. Bay           | 13. Jackson        | 24. Putnam       |
| 3. Bradford      | 14. Jefferson – 3A | 25. Seminole     |
| 4. Citrus        | 15. Lafayette – 3A | 26. Sumter       |
| 5. Columbia      | 16. Lake           | 27. Suwannee     |
| 6. Dixie         | 17. Leon           | 28. Union – 3A   |
| 7. Gadsden       | 18. Levy           | 29. Wakulla – 3A |
| 8. Gilchrist     | 19. Liberty – 3A   | 30. Walton       |
| 9. Hamilton – 3A | 20. Madison – 3A   | 31. Washington   |
| 10. Hernando     | 21. Orange         |                  |
| 11. Hillsborough | 22. Pasco          |                  |



## Phase 4

Phase 4 was strategically planned and executed according to the following criteria:

1. Separate Phase 4 into individual, discreet sub-phases, as was done in Phase 3, grouping counties and facilities with similar characteristics to achieve the maximum results given the time constraints
2. Balance the workload and gathering tasks across these sub-phases in an effort to ensure a more continuous flow of data sets being requested and received
3. Ensure that there are data sets gathered and processed that are ready for geoprocessing, causing no lag in mapping and summary reporting between Phases 3 and 4

### COUNTY BREAKDOWN STRUCTURE

Phase 4 consisted of the following sub-phases and their corresponding counties:

#### PHASE 4A

Characteristics: 9 mostly-rural counties with little or no GIS and relatively low facility counts

1. Calhoun
2. Desoto
3. Franklin
4. Glades
5. Gulf
6. Hardee
7. Hendry
8. Okeechobee
9. Taylor

#### PHASE 4B

Characteristics: 9 counties with a mixture of metropolitan and suburban municipalities possessing moderate levels of GIS, with some of the counties consisting of very high facility counts and medium to high WW capacity and DW volumes

10. Collier
11. Escambia
12. Highlands
13. Manatee
14. Monroe
15. Okaloosa
16. Osceola
17. Santa Rosa
18. Sarasota



## PHASE 4C

Characteristics: 3 very dense, urban counties with a high likelihood of GIS data sets to be gathered and moderate facility counts, with the exception of Miami-Dade County, which has the second-largest number of facilities in Phase 4

- 19. Broward
- 20. Miami-Dade
- 21. Pinellas

## First Cycle Overview and Results

### Data Collection

At the beginning of the data collection effort, Department county environmental health offices were asked for their assistance in locating local contacts (i.e. organization names, email addresses, websites) that may have relevant information. The data collection effort was a two-step process, with an initial attempt to acquire GIS datasets, followed by other types of information and/or data. There were several counties that completed similar projects at the local level. The information and local knowledge from these projects have been a tremendous help. Additionally, many of the utilities have been able to provide GIS data representing addresses that receive public water and sewer service. Assistance at the local level has been invaluable.

Sources of information, as shown in Figure 6, included organizations and state agencies such as the Department, DEP, DBPR, DOACS, county and municipal governments, utilities, and water management districts. Data from onsite wastewater treatment system permits, utility customer address lists, and multiple other sources were compiled to link the drinking water source and wastewater disposal method to specific properties.

Property Appraisers & DOR	<ul style="list-style-type: none"> <li>Parcel Data</li> </ul>
DOH Central Office	<ul style="list-style-type: none"> <li>Environmental Health Database (EHD)</li> <li>EH Water Geodatabase and OSTDS Variance Database</li> </ul>
County DOH Offices	<ul style="list-style-type: none"> <li>Septic Tank Permitting Data</li> <li>Private Well Permitting Data (<i>Delegated Counties</i>)</li> </ul>
DEP	<ul style="list-style-type: none"> <li>Locations of Wastewater Treatment Facilities</li> <li>Location of Public Water Systems</li> </ul>
Utilities	<ul style="list-style-type: none"> <li>Locations/Addresses of Properties Served</li> <li>Water and Sewer Main Locations</li> <li>Utility Service Area Boundaries</li> </ul>
DBPR	<ul style="list-style-type: none"> <li>Limited Data on Licensed Businesses</li> </ul>
DACS	<ul style="list-style-type: none"> <li>Limited Data on Licensed Businesses</li> </ul>
Water Management Districts	<ul style="list-style-type: none"> <li>Private Well Permitting Data</li> <li>Public Water Service Area Boundaries</li> </ul>
Public Service Commission	<ul style="list-style-type: none"> <li>Limited Data on Utility Service Area Boundaries</li> </ul>

Figure 6. Data Sources and What Types of Data They Have

The main data sources were:

### 1. Parcel Information

A base parcel layer was acquired from the DOR. Parcel data are released annually by the DOR, which are a compilation of data submitted by the property appraiser for each county. A series of queries were developed to determine which parcels likely had a structure with the potential for using drinking water or generating wastewater.

### 2. Environmental Health Database

The Environmental Health Database (EHD) is a statewide web-based database, maintained by the Department, with information on environmental health permitting and inspections for facilities regulated by the Department. EHD has electronic permitting and inspection data for onsite wastewater treatment systems covering a period from the mid-1990s onward. The database was queried based on several criteria to develop variable levels of confidence (known, likely, or somewhat likely) related to the presence of a working onsite wastewater system. Some of the query conditions included permits with the following criteria:

- Construction permits for onsite wastewater systems:
  - Known sewer – abandonment permit applied for indicating sewer is available
  - Known septic – not known sewer and has construction/final approval data

- Private domestic well or public water – as indicated on the permit application
- Operating permits for commercial strength sewage waste, industrial or manufacturing zoned or equivalent usage, aerobic treatment units, or performance-based treatment systems:
  - Known septic if permit is not expired, or inspection was recently completed
  - Likely septic for all others

The EHD was also queried with data from other environmental health programs that record permitting and inspection information in the database. Some programs have information about water and wastewater infrastructure. These included: limited use water wells, public swimming pools, private domestic water wells, public water, mobile home parks, food hygiene facilities, group care facilities, migrant labor camps, and foster home programs. Information from any source that did not directly permit the drinking water source or wastewater disposal method was classified as likely or somewhat likely.

### **3. Other Sources within the Department**

GIS statewide inventory of onsite wastewater treatment systems that was completed by a private contractor in 2009 (Hall and Clancy 2009) was used. Also used were statewide Well Surveillance Program data collected by the Department's drinking water program.

Assistance was requested from Department offices within each county to collect well or onsite wastewater treatment system data not in EHD. Local offices also informed us about other professionals who might have similar data and let us know whether there were any planned onsite wastewater treatment to sewer conversions or utility expansions. County-level inspectors also have direct knowledge about environmental health regulated facilities inspected by the Department at the local level. This streamlined the process and resulted in us not having to contact several utilities and organizations. The local office provided assistance in contacting utility service providers who did not respond to repeated requests for data collection. Leveraging local knowledge, expertise, and relationships improved data acquisition and quality information.

### **4. Utility sources**

In Florida, DEP regulates larger public water systems and central sewer systems and collects data on the wastewater treatment plants under their jurisdiction such as the permitted capacity and sample results. They do not collect location information on sewer laterals or which properties contribute wastewater to the facility. This information was obtained directly from individual utilities and treatment plants.

DEP regulated facilities were compiled together in the project tracking database, and facilities that had similar contact information were grouped to minimize the total number of contacts needed. This process, which the team coined "Parent Org grouping" was an important step in the success of this process. Having a single point of contact for a large utility that handles multiple drinking water and wastewater facilities, ensured that the work was consistent across the utility and no effort was wasted.

DEP regulated facilities are also maintained as a GIS point dataset. These were downloaded from the DEP Geodata library and used to supplement data received from the Utilities. Additionally, the information for small Public Water Systems and Wastewater Treatment Plants were directly assigned to the intersecting parcel.

### 5. Other sources

In addition to collecting data at the local level, data are also collected at the state and sub-state levels. State level data include any available Florida DEP GIS coverages related to domestic wastewater facilities and public water systems, statewide information from DBPR and DOACS relative to licensed establishments with food service. Sub-state data have been provided by the water management districts and several large utility management companies.

When looking at the overall data gathering effort success rate for DEP regulated facilities, 48% of the facilities were either manually researched or assigned drinking water and wastewater values according to business rules that were established as the result of the manual research that was conducted throughout the project (Figure 7). Manual research was done for regulated facilities with a small treatment capacity, which often only serve one or two parcels. Examples of these types of facilities included apartment complexes, mobile home parks, bars, and convenience stores. These facilities provide drinking water for a very small population and treat very little wastewater (7% and <6% of the overall total) (Table 4). Where necessary, county property appraiser records were manually researched for the physical facility address and aerial maps were used to identify the number and locations of served parcels. These business rules were created to prevent making unnecessary contacts and DEP facility data were also utilized to improve efficiency.

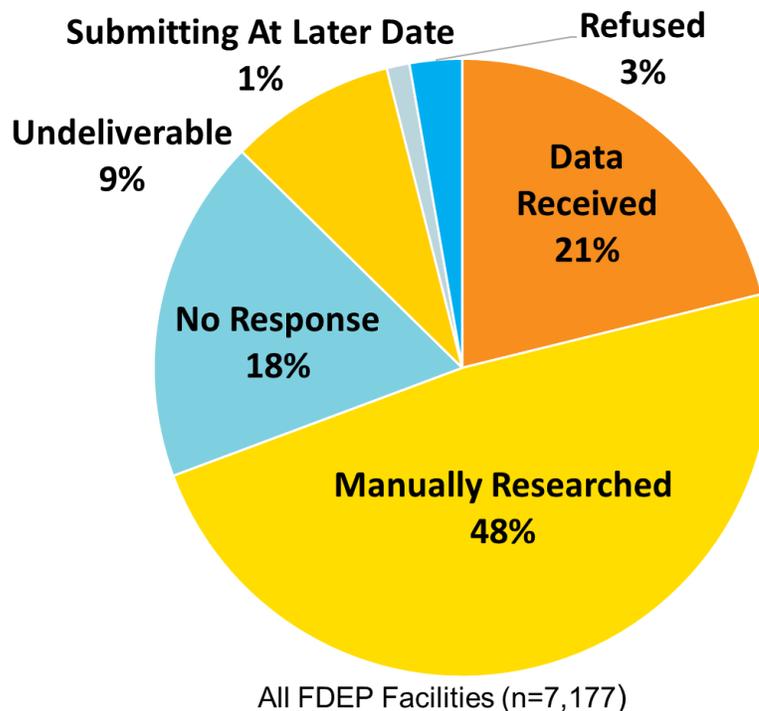


Figure 7. Data Receipt Summary for all DEP Regulated Drinking Water and Wastewater Systems



Table 4. Summary of DEP Facility Data Collection Results

	# of WW Facilities	# of DW Facilities	WW % <sup>1</sup>	DW % <sup>2</sup>
<b>Data Received</b>	647	871	77%	74%
<b>Manually Researched</b>	403	3,048	6%	7%
<b>No Response</b>	387	899	12%	13%
<b>Undeliverable</b>	316	309	2%	1%
<b>Submitting at Later Date</b>	19	67	1%	2%
<b>Refused</b>	51	145	2%	4%
<b>Subtotal</b>	1,823	5,339		
<b>Grand Total</b>	<b>7,162<sup>3</sup></b>		<b>100%</b>	

<sup>1</sup> Percent of the permitted wastewater treatment capacity in millions of gallons per day.

<sup>2</sup> Percent of the permitted population served by drinking water systems.

<sup>3</sup> The grand total number of facilities is not equal to the total number of DEP regulated facilities (7,177) because several wastewater treatment facilities do not have a permitted capacity listed.

Even though only 21% of the total number of facilities submitted data, this accounted for 77% of the treated wastewater and 74% of the population served by drinking water facilities. Those facilities that either refused or were unable to submit data were mainly privately owned utilities.



Table 5 shows the data sets that were available for mapping broken out by project phase. This also shows data by the permitted volume of treated wastewater and the population served by drinking water facilities. Phase 2 was the smallest phase in terms of overall permitting capacity/population, and Phase 4 was the largest. Phase 3, which was the phase with all the springs related basin management action plans, was the phase that received the lowest success rate for receiving data sets for the larger permitted DEP-regulated facilities.



Table 5. Data sets available for mapping by project phase

Data Sets Available for Mapping by Project Phase				
Project Phase	Wastewater Permitted Capacity (millions of gallons per day)	Drinking Water Population Served	WW % <sup>1</sup>	DW % <sup>2</sup>
<b>Phase 1</b>	<b>458.0</b>	<b>3,860,135</b>		
YES	428.4	2,869,827	94%	74%
NO	29.7	990,308	6%	26%
<b>Phase 2</b>	<b>251.9</b>	<b>1,774,688</b>		
YES	217.7	1,429,085	86%	81%
NO	34.2	345,603	14%	19%
<b>Phase 3</b>	<b>723.7</b>	<b>5,921,640</b>		
YES	572.4	4,101,553	79%	69%
NO	151.3	1,820,087	21%	31%
<b>Phase 4</b>	<b>1232.7</b>	<b>8,068,515</b>		
YES	1196.8	7,511,658	97%	93%
NO	35.9	556,857	3%	7%
<b>Total Data Available</b>	<b>2666.3</b>	<b>19,624,978</b>	<b>91%</b>	<b>81%</b>

<sup>1</sup> Percent of the permitted wastewater treatment capacity in millions of gallons per day.

<sup>2</sup> Percent of the permitted population served by drinking water systems.

Another method used for gathering county specific data was a centralized approach, where the local Environmental Health office coordinated meetings with county, municipal, and large utility entities. All GIS datasets were gathered and compiled by one centralized staff member, leveraging local knowledge and relationships. Two counties used this approach: Indian River and Leon. Duval County used a modified approach where they contacted all local entities and forwarded the provided data to the FLWMI project team.

Obtaining GIS datasets is one key to efficiency in data collection and for more robust, useful information. The project team gathered contacts for GIS resources within each county. Larger utilities, as well as county or city level governments, were the most frequent sources for GIS data. The GIS data varied across organizations, from coarse service area boundaries to detailed service representations directly linked to parcels.

GIS datasets for 488 facilities were collected in this first cycle of the project (



Table 6). While this represents a fairly low percentage of all facilities (7%), it represents 67% of the total wastewater capacity (millions of gallons per day) and 61% of the population served by public drinking water. It includes regional, county, city, municipal, and private utility providers. Figure 8 shows the breakdown of this by phase. These statistics reinforce the strategy to focus initial information gathering efforts on GIS data from larger facilities and organizations.

Table 6. Summary of GIS Data Showing the Percentage of Facilities, Wastewater Capacity, and Drinking Water Population Served for Facilities That Did and Did Not Submit GIS Data

GIS Data Sets Available?	Count of Facilities	% Facilities	% Wastewater Capacity	% Drinking Water Population Served
<b>Yes</b>	488	7%	67%	61%
<b>No</b>	6,689	93%	33%	39%

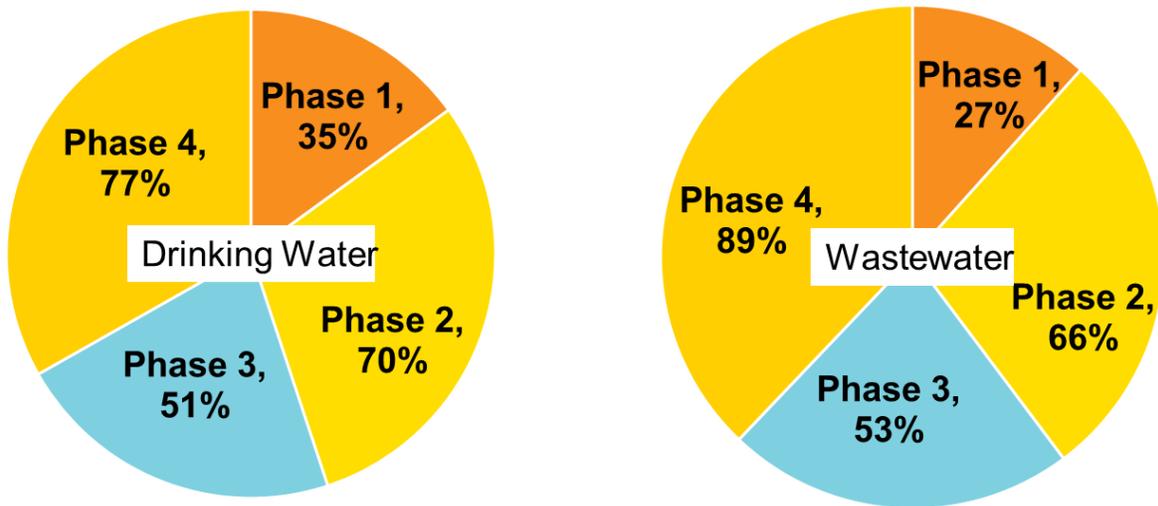


Figure 8. Percent of Population Served by Drinking Water and Wastewater Permitted Capacity Submitting GIS Data by Phase

Summary of data received by county is shown in Appendix B. Appendix C shows, for each county, a summary of the final parcel counts for wastewater and drinking water, the percent of DEP wastewater and drinking water where we received data, and a list of the large permitted facilities that did not submit data for incorporation into the project. For purposes of this analysis, large wastewater facilities are defined as having a permitted capacity of greater than 1 million gallons per day, and large drinking water facilities are defined as have a permitted population of more than 500.

When evaluating the data gathered by facility size (



Table 7), it becomes clear that the larger the facility, whether wastewater or drinking water, the more likely it becomes that the data is submitted. There was less success with smaller facilities, most likely because having electronic data in a readily exportable format is not a cost efficient option. This could be due to funding limitations, staffing size or experience, or because the facility utilizes a private company for maintenance and/or billing which is listed as the contact in the DEP facility data.

Table 7. First Cycle Data Gathered by Facility Size

1st Cycle Data Gathered by Facility Size		
Facility Size	Sizing Criteria	% of Facilities
<b>Giant Metro DW</b>	≥100k population	<b>83%</b>
<b>Giant Metro WW</b>	>50 MGD	<b>91%</b>
<b>Big DW</b>	≥10k population	<b>69%</b>
<b>Big WW</b>	>15 MGD	<b>84%</b>
<b>Mid-Size DW</b>	≥1k population	<b>54%</b>
<b>Mid-Size WW</b>	>2 MGD	<b>74%</b>
<b>Small DW</b>	≥100 population	<b>66%</b>
<b>Small WW</b>	>.05 MGD	<b>50%</b>
<b>Tiny DW (Single or Small # Parcel)</b>	≤ 99 population	<b>79%</b>
<b>Tiny WW (Single or Small # Parcel)</b>	≤ .05 MGD	<b>57%</b>
<i>*Does not include 2009 data that is available for mapping; only newly gathered data</i>		

## Data Processing

Data were requested in a standardized Excel format for those without GIS data. However, almost every spreadsheet submitted had some irregularity that required standardization. Key elements required to identify parcels being served were Parcel ID, latitude/longitude, or physical address. If valid parcel ID numbers or latitude and longitude information was not provided, physical addresses were geocoded and prepared for import into the project geodatabase. Not all geocoding programs were the same. Using a program that geocodes addresses to the street segment does not provide direct linkage to the parcel, and requires additional geoprocessing. Other geocoding programs place the point in the centroid of the property. This allowed for much greater accuracy when merging geocoded data with parcel data, and was the methods used with Google Earth Pro (initially) and StreetMap for ArcGIS (Phase 4) (Figure 9).

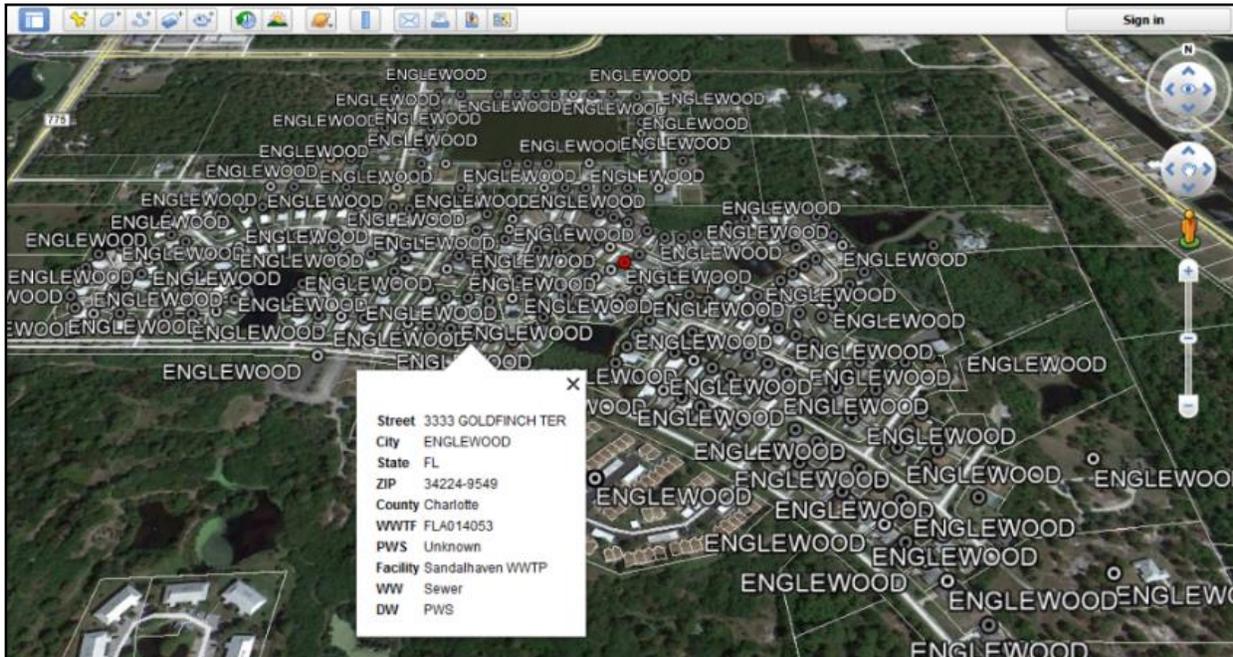
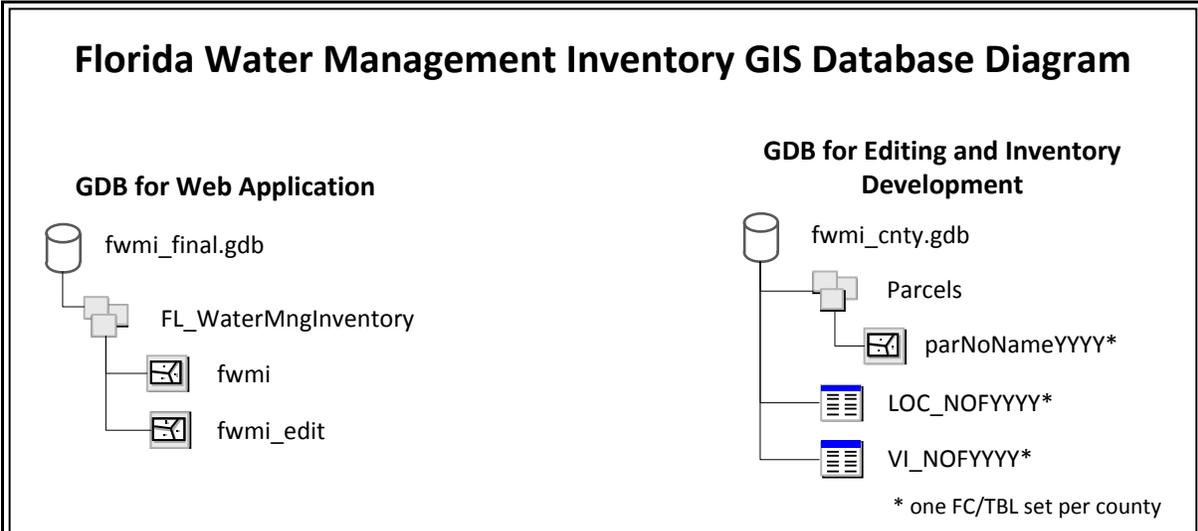


Figure 9. Screenshot of Geocoding via Google Earth

## Data Mapping

The geodatabase (Figure 10) was started with base parcel layers provided by the DOR. Within the geodatabase, each county is represented by one feature class and two tables for the most recent tax assessment year. Another geodatabase was developed for hosting the inventory results online. The online application provides a means by which the information for a parcel may be researched, along with a mechanism to submit corrections.



fwmi	
PK	<u>PARCELNO</u>
	CO_NO
	BLT_STATUS
	BLT_UPD
	LANDUSE
	GIS_ACRE
	DW
	DW_UPD
	DW_SRC_TYP
	DW_SRC_NAME
	DW_SRC_GEO
	WW
	WW_UPD
	WW_SRC_TYP
	WW_SRC_NAME
	WW_SRC_GEO
	ALT_KEY
	PHY_ADDR1
	PHY_CITY
	PHY_ZIPCD
	COUNTYFP
	COMMENTS

fwmi_edit	
PK	<u>PARCELNO</u>
	CO_NO
	BLT_STATUS
	LANDUSE
	DW
	WW
	ALT_KEY
	PHY_ADDR
	PHY_CITY
	PHY_ZIPCD
	SUB_DATE
	SUB_BLT
	SUB_LU
	SUB_DW
	SUB_WW
	SUB_ROLE
	SUB_FIRST
	SUB_LAST
	SUB_EMAIL
	SUB_PHONE
	SUB_COMMENT
	APP_STATUS
	APP_ST_DT
	APP_COMMENT

parNoNameYYYY	
PK	<u>PARCELNO</u>
	CO_NO
	BLT_STATUS
	BLT_UPD
	LANDUSE
	GIS_ACRE
	DW
	DW_UPD
	DW_SRC_TYP
	DW_SRC_NAME
	WW
	WW_UPD
	WW_SRC_TYP
	WW_SRC_NAME
	ALT_KEY
	PAR_UPD
	NAL_MTCH
	COUNTYFP
	COMMENTS

Figure 10. Inventory Geodatabase Diagram

A series of queries were developed to determine which parcels likely had a structure. These parcels have the potential for using drinking water or generating wastewater, and was the focus of the inventory. Information from the 2009 wastewater inventory was brought into the parcel feature classes. Drinking water and wastewater data were compiled, converted, imported and assigned to associated parcels within the geodatabase. The qualifiers "known", "likely", and "somewhat likely" were assigned, based on the relative confidence in the tabular

information. For example, utility account records would receive the qualifier “known”, while septic permits that were never inspected may receive the qualifier “likely”. A detailed summary of the estimation criteria used in this project can be found in Appendix D.

The method by which the source was imported into the GIS and assigned to a particular parcel is represented by the attribute values “spatial”, “geocode”, and “parcel”. “Parcel” represented a direct table import where the source data had a parcel identifier matching the parcel feature in the inventory feature class. These records may be assumed to have the highest level of horizontal accuracy. A value of “geocode” was assigned to records where the GIS feature was geocoded from address information provided by the source. “Spatial” was assigned where GIS data were provided by the source. One or more geoprocessing operations were performed in assigning the values for those records coded with “geocode” and “spatial”. These records will have varying levels of horizontal accuracy.

Figure 11 shows a small selection of the different source datasets that were received for Clay County specific to drinking water. The “EHD Construction” and “CHD Well Permits” points were geocoded from the addresses found in the respective databases. The “Utility Water Accounts” were directly imported into the GIS using Parcel Identifiers and/or coordinates. Other data depicted were provided in GIS format.

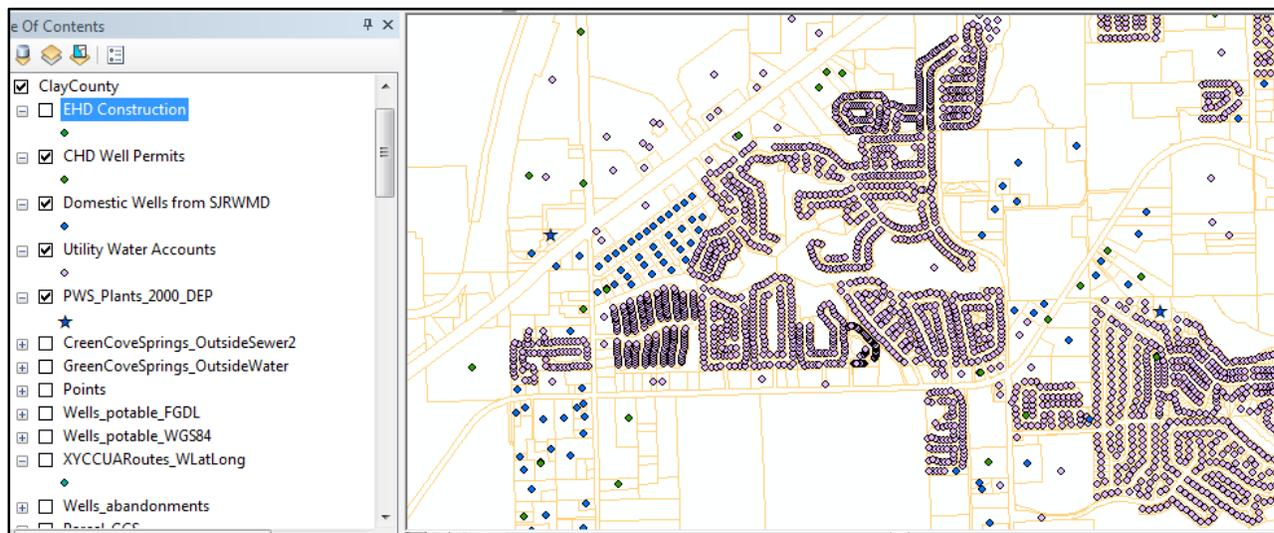


Figure 11. Sources for Drinking Water Information

The utility contacts we are working with may provide GIS or CAD data, formatted as points, lines, or polygons. The FLWMI project accepts these data “as-is” with the assumption that the data are accurate. However, when assigning any of these provided GIS datasets to the FLWMI parcels, varying levels of uncertainty are introduced. Polygon data corresponding to the specific parcels where utility service is provided has the least uncertainty and generally achieves a one-to-one match with the FLWMI parcels. These FLWMI parcels are assigned a value of “Known Sewer” or “Known Public Water”.

If the utility contact provided GIS line data for water or sewer laterals, the FLWMI parcels that were intersected by the lateral feature were assigned “Known Public Water” or “Known Sewer”. The lateral feature represents the line going from the main onto the property being served, so the level of uncertainty is relatively small. Utility GIS line data for water or sewer mains were assigned to the FLWMI parcels through a proximity analysis, with the

resulting parcels assigned values of “Likely Sewer” or “Likely Public Water” to reflect the uncertainty around the utility status of these parcels. The water or sewer main features are located within a Right-of-Way or easement and generally do not intersect the parcels. Additionally, the presence of a sewer or water main in close proximity to a property is no guarantee that the property has connected to the utility.

Many GIS point datasets were also used in the project. GPS collected point data has the highest locational accuracy; however, if the GPS points are for meters that are located in the right-of-way these points may not intersect a parcel polygon. Geocoding software creates points corresponding to addresses. Geocoded points generally fall within the center of the parcel (best match and location), or within the street right-of-way adjacent to the parcel (good match and location), but can also be assigned to the generalized location of the city (very poor match and location). Additional factors that will affect the quality of geocoded points relates to the addresses. Poorly formed addresses, newly constructed roads and developments, and roads with multiple common names are just a few examples where the geocoding software may fail to place points or may locate points in unexpected locations. A two-step analysis was used to assign point data to corresponding parcel polygons. FLWMI parcels that contained a geocoded point were assigned values of “Known Public Water” or “Known Sewer”. Those parcels that were very near to a GPS-point were also assigned values of “Known” if no other parcel polygon could be selected. The remaining utility points for water or sewer customers were assigned to the FLWMI parcels through a proximity analysis, with values of “Likely Sewer” or “Likely Public Water” to reflect the uncertainty around the point to parcel link. The level of uncertainty can vary widely with geospatial data, even within the same dataset. These potential errors must be taken into account when considering the overall data quality.

After all data sources for a county were compiled, the various drinking water and wastewater values were analyzed with final values assigned for each parcel (Figure 12). Generally, data from a utility took precedence over any other data source. Values that included the qualifier “known” had the next level of priority over any other data source with qualifier of “likely” or “somewhat likely”. Final values of “undetermined” or “unknown” were assigned where either two or more sources list equal opposing values, or no information was provided for a built parcel. Any parcel that was evaluated as being “not built” was assigned a value of “not applicable”, with a few exceptions detailed in the following business rule.

**Business Rule:** Not built parcel will receive a drinking water and wastewater value if the following conditions are true:

- The parcel has been identified as “Known Public” or “Known Sewer” by utility. This corresponds to areas that are not built-out with structures, but will have central sewer and/or public water when constructed.
- The parcel has been identified as “Known Public” or “Known Sewer” because of the presence of a WWTF or a PWS.
- Some parcels located in state parks may be coded as not-built but have a composting toilet (Likely Septic) with no potable water. These are identified based on DEP Parks GIS data.



BLT_STATUS	PARCELNO	PHY_ADD1	WW	WW_UPD	WW_SRC_TYP	WW_SRC_NAME	WW_GEO
NBLT	0622850710	171 BARBERRY LN	KnownSewer	2015	Utility	St Johns County Utilities - accounts	spatial
BLT	0622850810	181 WATER OAK DR	KnownSewer	2015	Utility	St Johns County Utilities - accounts	spatial
BLT	0622850820	182 WATER OAK DR	KnownSewer	2015	Utility	St Johns County Utilities - accounts	spatial
BLT	0622850830	183 WATER OAK DR	KnownSewer	2015	Utility	St Johns County Utilities - accounts	spatial
BLT	0622920000	TPC BLVD	KnownSewer	2015	Utility	St Johns County Utilities - accounts	spatial
BLT	0657400000	260 N ROSCOE BLVD	LikelySeptic	2009	<Null>	2009 Inventory Septic	spatial
NBLT	0657510000	N ROSCOE BLVD	NA	2015	<Null>	not built	<Null>
BLT	0657600000	270 N ROSCOE BLVD	KnownSeptic	2015	DOH-HQ	Centrax 55-SS-05666 EHDConst.sql OSTDS New	geocode
NBLT	0657600290	274 N ROSCOE BLVD	KnownSeptic	2015	DOH-HQ	Centrax 55-SS-03762 EHDConst.sql OSTDS Existing	geocode
NBLT	0657600300	276 N ROSCOE BLVD	KnownSeptic	2015	DOH-HQ	Centrax 55-SS-01124 EHDConst.sql OSTDS New	geocode
NBLT	0657600325	280 N ROSCOE BLVD	NA	2015	<Null>	not built	<Null>
NBLT	0657600330	N ROSCOE BLVD	NA	2015	<Null>	not built	<Null>
BLT	0657600340	288 N ROSCOE BLVD	LikelySeptic	2009	<Null>	2009 Inventory EstSeptic	spatial
BLT	0657700000	300 N ROSCOE BLVD	LikelySeptic	2009	<Null>	2009 Inventory EstSeptic	spatial
BLT	0888500000	525 STATE ROAD 16	KnownSewer	2015	Utility	St Johns County Utilities - accounts	spatial
BLT	0889000000	561 LAWRENCE AVE	LikelySeptic	2015	DOH-HQ	Centrax 55-SS-08876 EHDConst.sql OSTDS New	geocode
BLT	0889200001	2717 S COLLINS AVE	LikelySeptic	2009	<Null>	2009 Inventory EstSeptic	spatial
BLT	0889300000	521 LAWRENCE AVE	LikelySeptic	2009	<Null>	2009 Inventory EstSeptic	spatial

Figure 12. Screen Shot of Final Assigned Wastewater Value, Year Determination was Made, Type of Source, Source Name, and Method by Which the Source Coordinate was Derived

One observation is that that the number of drinking water parcels are not equal to the number of wastewater parcels. This discrepancy is brought about because several specific data sources provided information that indicated either wastewater or drinking water for a parcel that the model determined to be not-built. One example would be newer developments where a water utility provided addresses or parcel data where public water infrastructure and connection taps are present but not all properties within the development are constructed; all of these properties will have public water once built out. However, no sewage information was provided so the wastewater determination could not be made and was left as 'not applicable, not built'. Similarly, though less frequently, the same scenario applied where only a sewer utility provided information for a new development. Another example is the location of a stand-alone composting toilet or a potable water spigot in a state park with no other structures or development on that parcel. Finally, any parcel containing a wastewater treatment facility or a public water system facility were coded as sewer and public water respectively. For reporting purposes, we determined that these specific conditions warranted drinking water or wastewater information over that of the built/not-built determination.

Final data maps were designed to display a summary of the inventory results in an easy-to-read format. The color scheme and layout theme are consistent between all maps, with a green/brown palette for wastewater and a blue/purple palette for drinking water. For each county, a four panel wastewater and drinking water map was created that split out parcels showing the sewer, septic, unknown, and not applicable (i.e. not built) information. For each panel, the "Known" and "Likely" are shown. "Likely" groups both the likely and somewhat likely estimation results. A second single panel wastewater and drinking water map was created that layered all the information over each other to give an overall view of the inventory results for the county.

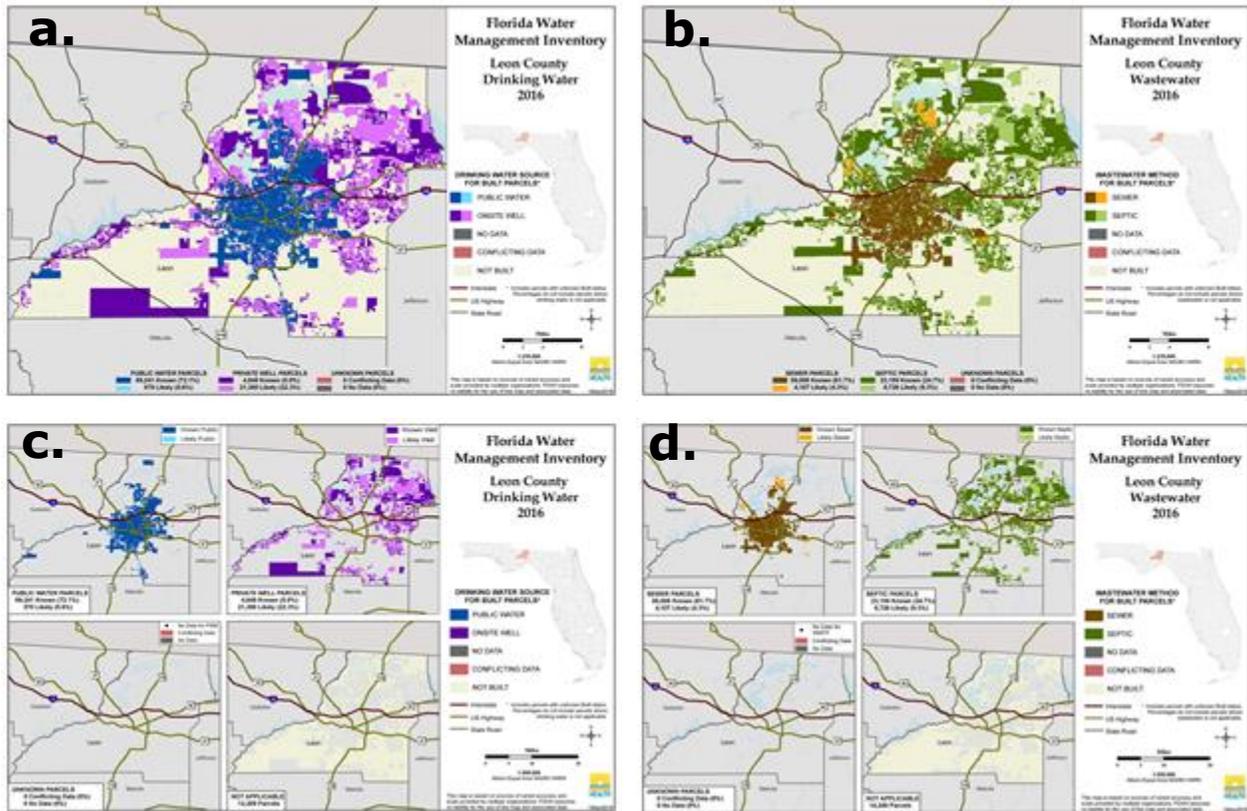


Figure 13. Final Leon County Data Maps: a. Single Panel Map for Drinking Water b. Single Panel Map for Wastewater c. Four Panel Map for Drinking Water d. Four Panel Map for Wastewater

When comparing two data maps, (Palm Beach County’s inventory results (Figure 14) and Marion County (Figure 15)), Palm Beach has a high number of seweried parcels (87% sewer) and Marion County has a high number of parcels on septic (73% septic). Unknown data, which includes parcels with no submitted data or with conflicting data, is a relatively small percentage of the overall map (2% for Palm Beach, 4% for Marion). Much of the unknown data are from utilities that did not respond to the data request. These utilities might be the focus for the next iteration of data gathering for these counties.

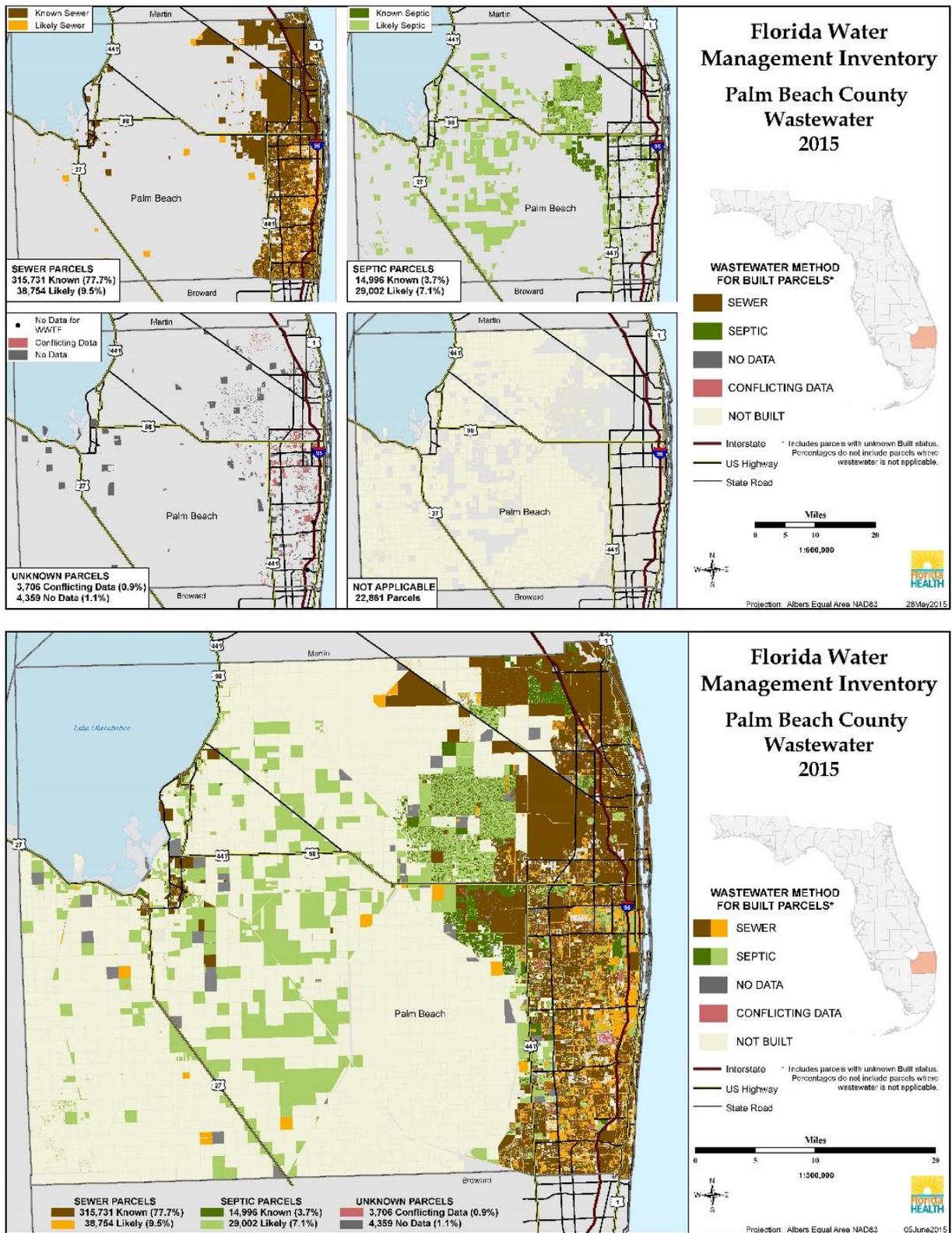


Figure 14. Florida Water Management Inventory Final Map Results for Palm Beach County: Four Panel Map Showing Sewer, Septic, Unknown, and Not Applicable Parcels, and Single Panel Map Overlaying All Data

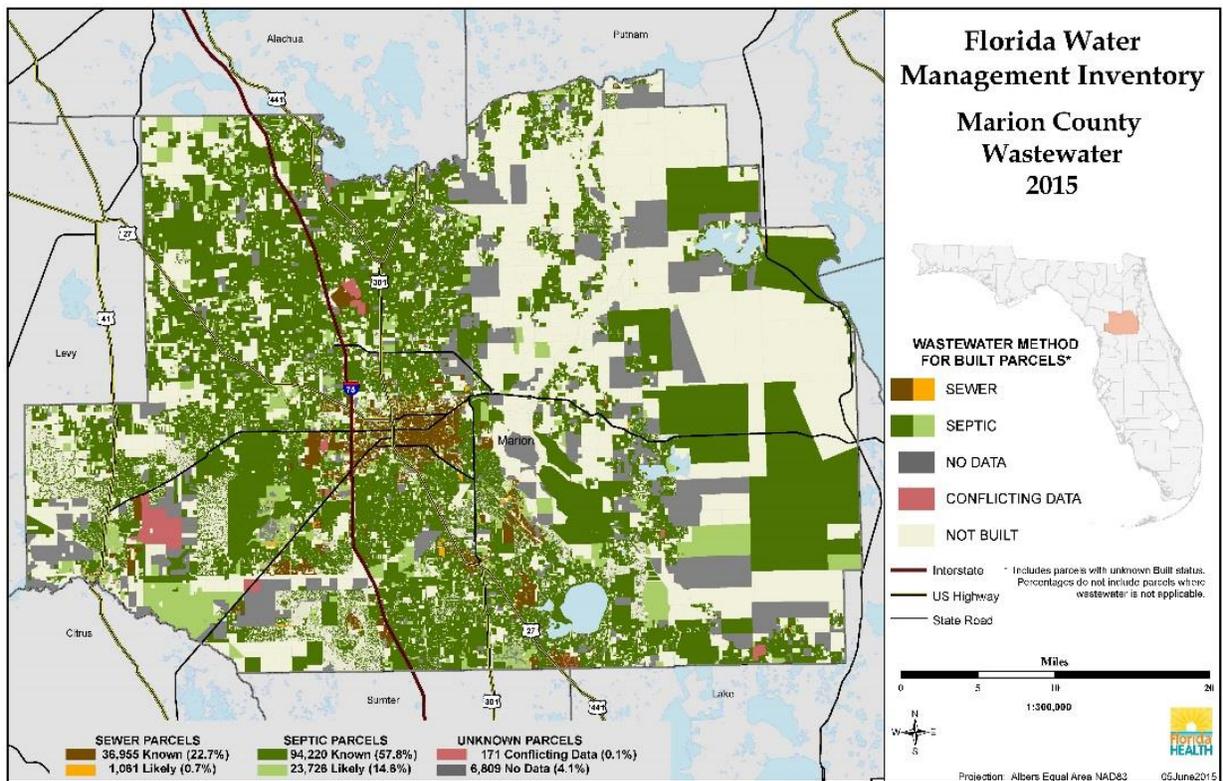
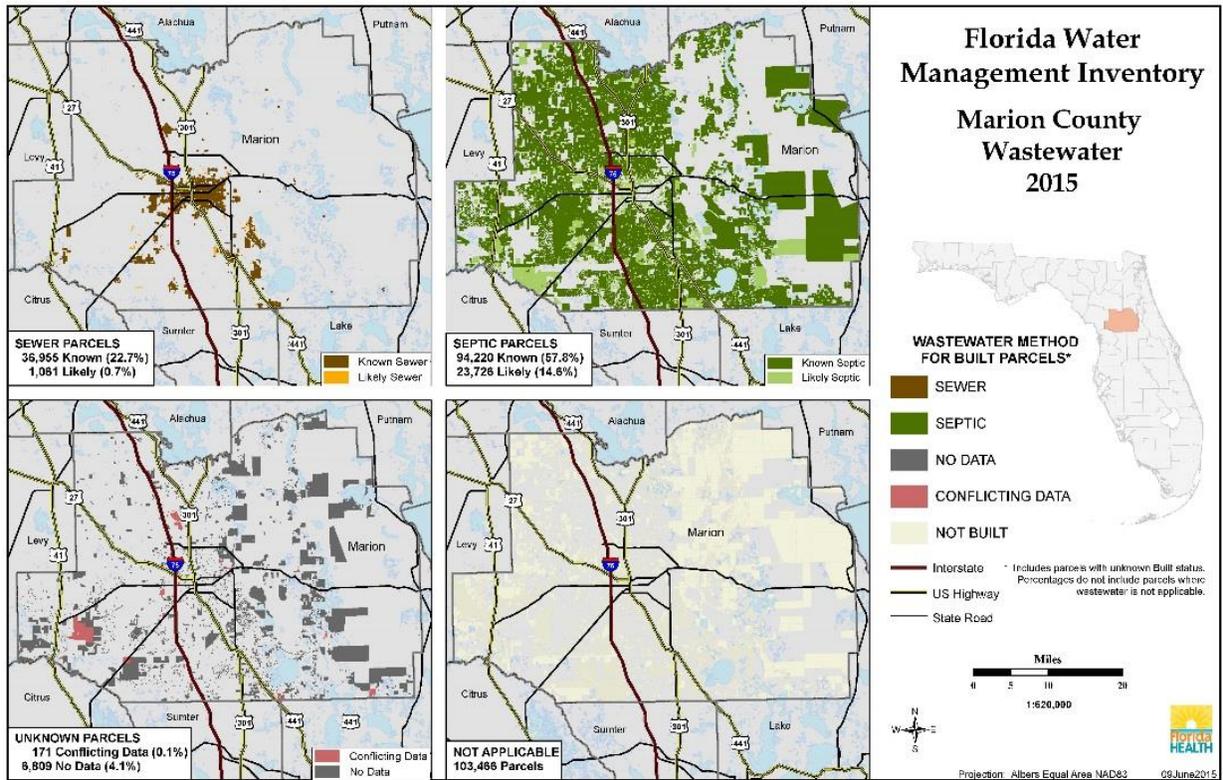


Figure 15. Florida Water Management Inventory Final Map Results for Marion County: Four Panel Maps Showing Sewer, Septic, Unknown, and Not Applicable Parcels, and Single Panel Map Overlaying All Data



Data maps and summary reports were created for each county based on the GIS data, posted on a public website (<http://floridahealth.gov/FLWMI>), and interested parties were notified via email. As of September 2016, mapping and summary reporting is completed in all 67 counties in Florida, and posted on the project website. A statewide web feature class was created combining all the county information.

Appendix E and Appendix F show summary tables for the wastewater results and drinking water results by county.

Attribute data for each county were imported into a SQL database. These data were combined into one comprehensive SQL table containing data for all parcels in the State of Florida. Once this was done, a comparison was made between the data in EHD and the FLWMI dataset. This dataset contains all the parcels with permitting data in EHD with the final determination of drinking water and wastewater from the FLWMI dataset.

## **Section 6 - PROJECT MANAGEMENT**

### **Conduct Team Meetings**

Team meetings were conducted on a biweekly schedule or as needed throughout the project. The team utilized several formats for the meetings, including in-person, conference call, and web-conference meetings.

### **Develop and Publish Project Schedule**

The project schedule was created at the beginning of the project and maintained throughout the project. Due to the start and stop of funding from 2014 through 2016, there were several delays that could have been avoided had there been consistent funding. The project team did meet the final deadline from the final funding source.

The contract initiation schedule, the schedule revision after the change order, and the final project schedule at the end of the contract can be viewed on the project ftp site: <http://ww10.doh.state.fl.us/pub/bos/Inventory/Deliverables/Task4-ProjectManagement/01ProjectScheduleBeginMiddleEnd.pdf>.

### **Develop and Maintain Project Task List**

The project schedule launched a more detailed project task list, which was maintained throughout the project. The task list outlined the various tasks, who they were assigned to, when they were due, and any deviations from the original due date along with related comments.

## Collect Spending Data

Spending data was collected at several key points through the project. Once the EPA Nonpoint Source funding was allocated to the project, a separate accounting code was created to assist with categorizing funds and simplifying reporting.

## Develop and Maintain Project Budget

The project budget was maintained throughout the project.

## Prepare Project Status Reports

Figure 16 shows the project status as of October 1, 2015 as an example of what the project status maps looked like. These maps were posted to the project website and sent regularly to key project contacts. Appendix G shows the final project summary update for the first cycle.

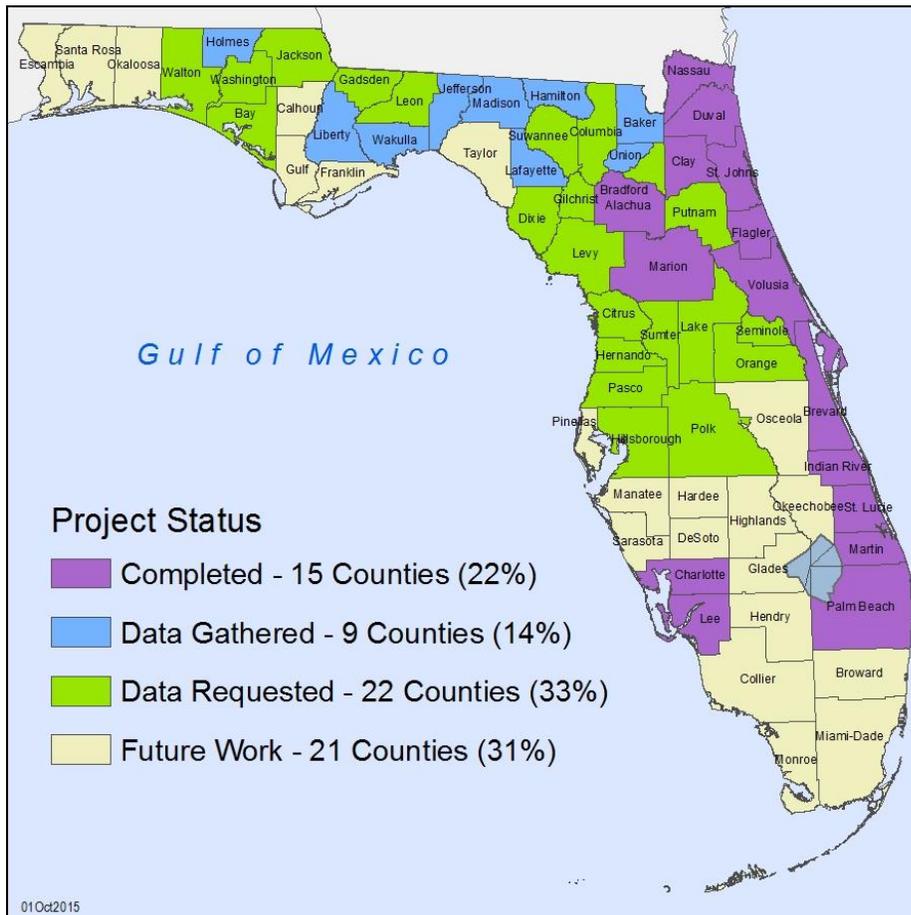


Figure 16. Example of Project Status Map Posted to Project Website and Sent in Weekly Status Updates

## Update Project Website

The project website (<http://floridahealth.gov/flwmi>) was maintained throughout the project to show the most up-to-date status and data available. The website has the following sections:

- Project Goal
- Maps and Data
- Project Need
- Expected Impact
- Purpose
- Benefits
- Status
- Data Gathering
  - Data Sets, Sources, and Contacts
  - Requested Data Sets
  - Data Fields & Formats (including a Data Sheet spreadsheet template to use for submitting the requested data)
  - Knowing What to Submit in Your Data Set
  - Submitting Your Data Set to the Project Team
- Thank You
- FAQ
- Contact Us

Development is ongoing to create a clickable interface which will allow individuals to click on the county within a statewide map and be directed to a webpage for detailed summary information. Figure 17 shows a screenshot of the project FTP site where the GIS maps, pdf maps, and spreadsheet data can be downloaded. Figure 18 shows an example of the project snapshot webpage for Alachua County.

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 <a href="#">Parent Directory</a>		-	
 <a href="#">Alachua_DW.pdf</a>	04-Dec-2015 10:02	2.4M	
 <a href="#">Alachua_DW_singlePanel.pdf</a>	04-Dec-2015 10:09	3.0M	
 <a href="#">Alachua_WW.pdf</a>	04-Dec-2015 10:19	1.4M	
 <a href="#">Alachua_WW_singlePanel.pdf</a>	04-Dec-2015 10:26	3.0M	
 <a href="#">FLWMI_Alachua.xlsx</a>	21-Apr-2016 14:25	12M	
 <a href="#">alachua_fe.xlsx</a>	07-Dec-2015 04:38	11K	
 <a href="#">alachua_public.zip</a>	07-Dec-2015 06:59	14M	

Figure 17. Screenshot of the FTP Website where County-Specific Data and Maps Can Be Downloaded

### Alachua County

The mapping for this county was completed on 5/1/2015.

[Download the project maps and data.](#)

[View data on our interactive web map.](#)

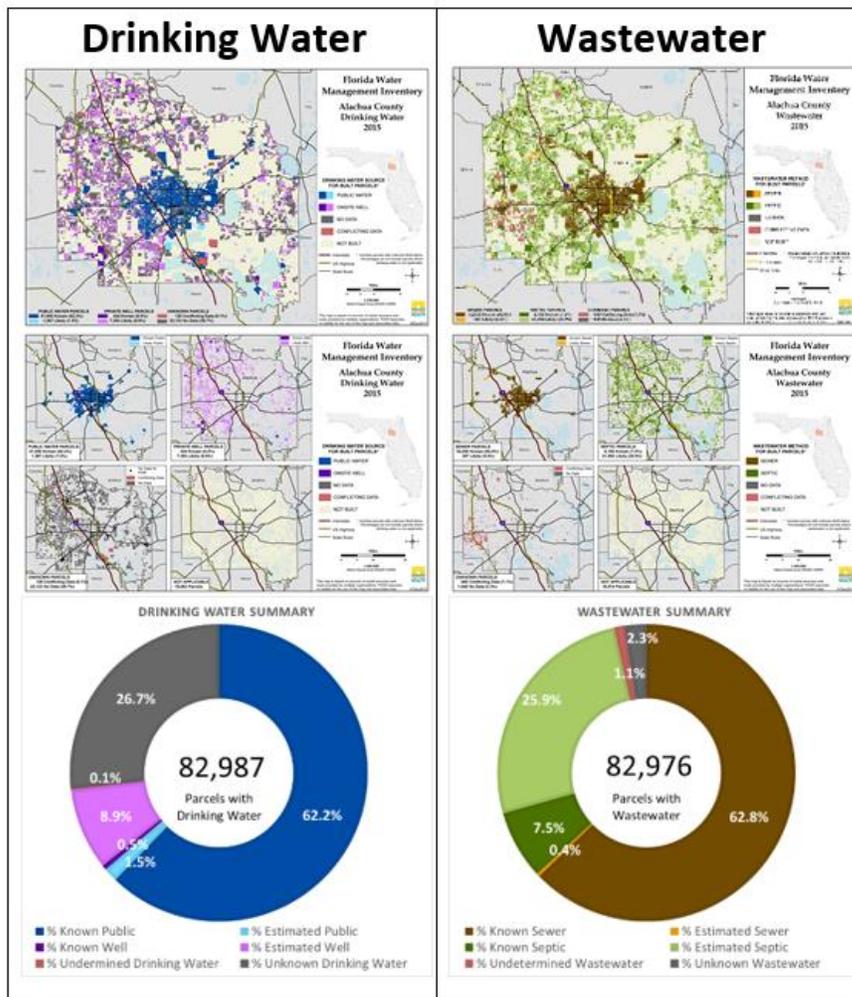


Figure 18. Example of the County Snapshot Webpage for Alachua County

## Develop and Publish Web Application

A web application was created and published at this site: <https://gis.flhealth.gov/FLWMI/>. Figure 19 shows a screenshot of the interactive web application that was developed for this project. This web application allows for searching by address, exporting data, and developing personal maps.

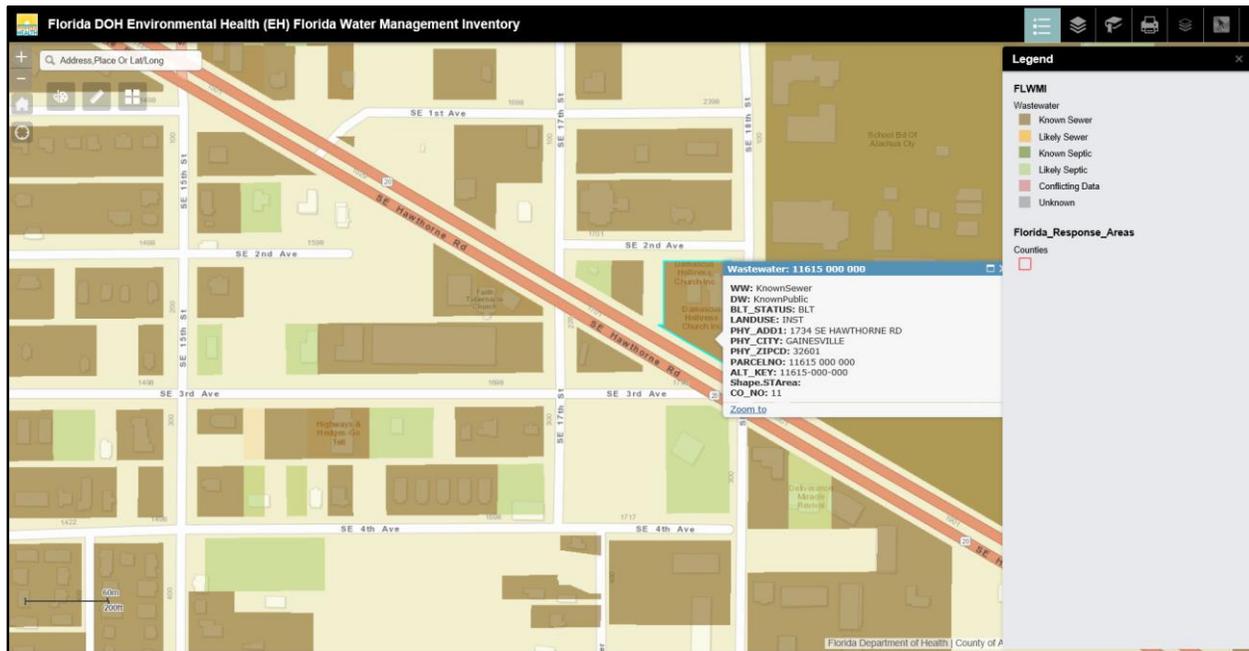


Figure 19. Screenshot of the Interactive Web Application

We researched, strategized, and developed several enhancements to the existing statewide web-based Environmental Health Database that would be beneficial to both the county health departments (CHD) and central office, and increase accuracy and expand data source collection options.

EHD Enhancement: Allow for mass upload of data for abandonment permits based on spreadsheet received from local utility or local plumbing authority per this rule: 64E-6.011 (3) The permitting provisions of paragraph 64E-6.011(2)(a), F.A.C., are not required if a local utility or local plumbing authority performs a system abandonment program which requires the completion of those steps listed in paragraphs 64E-6.011(2)(b), (c), (d), and (e), F.A.C. If the system abandonment is performed by a local utility or local plumbing authority, the local utility or local plumbing authority performing the abandonment program shall maintain a log of all inspections performed and shall forward the log to the CHD on a monthly basis.

Per Chapter 64E-6.011 (3), Florida Administrative Code, local utilities and plumbing authorities are permitted to perform a system abandonment program. A log of all inspections performed is to be sent to the CHDs on a monthly basis. Depending on the program, these are sent as paper or electronic documents and are not consistently captured in EHD. We developed a list of stakeholders for this project looking to streamline septic to sewer conversions, created a survey and sent it to the stakeholders to gather information from those that will benefit from the enhancement, analyzed the survey results, developed an implementation strategy with key stakeholders, and worked with a contracted developer to execute the strategy.

Several features in EHD have been added or modified to provide a clearer and more efficient way to record Septic Abandonments by Utility (ABU) in EHD. These ABUs can be recorded in EHD either through the existing OSTDS Application screen or through a newly created Septic abandonment mass update screen. The OSTDS Septic Abandonment Mass Entry screen (Figure 20) provides an interface to allow for quick data entry of multiple

abandonment records at one time. If there is an existing OSTDS Construction record that has the same address as an ABU being entered through the mass entry screen, the new record will be linked to the existing record through the old Centrax Permit Number (unique identifier for a single onsite sewage system) upon save. We also used the existing OSTDS Application For Construction page, and changed the functionality to allow a new application type of "Abandonment By Utility" (Figure 21). Also, "Abandonment by Utility" was added in Application type dropdown so the user can search for these systems.

OSTDS Home | Construction | Operating | Service | Billing | Search | Entity Search | Administration | Online Activities | View Contacts

### OSTDS Septic Abandonment Mass Entry

\*Name of Utility/Plumbing Authority  \*Application Date

Row No.	Copy Row	Street #	Pre Dir.	Street Name	Suffix	Post Dir.	Zipcode	Tank kept	Drainfield kept	PropertyID	Comments	DEL ?
1		<input type="text"/>										
<input type="button" value="Add Row"/>												

Figure 20. Screen shot of the new OSTDS Septic Abandonment by Utility Mass Entry Screen



State of Florida  
Department Of Health  
Onsite Sewage Treatment and Disposal System  
Application For Construction Permit

**Document# :**

**Date Paid :**

**Fee Paid :**

**Receipt # :**

**OSTDS #:**

**Permit # :**

---

**\*APPLICATION FOR:**  **SUB TYPE:**

Figure 21. Screen shot of the modified Application for Construction Permit screen to allow for entry of Abandonment By Utility

We also looked into a project to develop a private well module in EHD. Those counties that use EHD to record information for private wells currently use the Miscellaneous table to enter their data. This leads to several non-standardized fields that are difficult to query. Having a new module could be a beneficial enhancement for counties which are delegated and/or collect well sample information. This might also help with the Drinking Water Well Surveillance program and will improve the data quality for private well locations for the FLWMI project. A stakeholder list was created, a list of potential data fields was created, and a survey was drafted to send to the stakeholders. Continuation and completion of this project is dependent on future funding.



## Coordinate Outreach Efforts

Data was shared with multiple entities throughout the project.

During Hurricane Matthew, several maps were created and used to assist with the environmental response activities relating to flooded drinking water wells and onsite wastewater systems that were damaged by the storm.

We have collaborated with multiple public and private entities throughout the project. A list of these efforts is shown in Appendix H.

We utilized several Master of Public Health students at universities including the Florida Agricultural and Mechanical University, Nova Southeastern University, and the University of New England. These students completed an assortment of tasks that ultimately led to improvements to the project website and project results to increase outreach impacts.

## Seek New Funding

Funding for part of the second cycle has been secured through the EPA Nonpoint Source Protection program. Other efforts are ongoing to see if funds from CDC and other state sources can be secured so we can keep this project ongoing.

# Section 7 - RECOMMENDATIONS AND CONCLUSIONS

## Recommendations and Lessons Learned

Some planned improvements include:

- Online data accessibility
  - Developing standardized webpage for each county
  - Improvements to the interactive mapping tool
  - Integration with needs for other state programs
    - Public Health Dental Program and fluoridated drinking water systems
    - Environmental Public Health Tracking to improve reporting to CDC
    - Integration with the State Emergency Response Team (SERT) Geospatial Assessment Tool for Operations and Response (GATOR) system to improve disaster response
- Enhancements to EHD
  - Linking points back to EHD for better geo-spatial references
- Updating county data to fill in blanks and refine estimations
- Ground-truthing data

A detailed list of recommendations for improvements that was developed once this first cycle was completed is located here:

<http://ww10.doh.state.fl.us/pub/bos/Inventory/Deliverables/Task3-Phase4Counties/01Phase4RecommendationsFinal.pdf>.

There were many lessons-learned throughout this project. The recommendations for improvements list shows several areas where lessons were learned. Some of the higher-level lessons-learned are:

- The most predominant lesson that was learned is that almost everyone believes this data we are seeking is already collected and available; most respondents believe that DEP “already has” this data and that “we should get with them”
- Quality of data sets is of critical importance
- There is no direct correlation between the size of the organization and the quality of their data; some larger organizations, where you would expect ready access to the types of data we were requesting, presented distinct challenges
- The “water industry” in Florida, as a whole, has not embraced available technology for digital record keeping, billing, and similar business needs
- There are a number of the larger utility organizations that are beginning transitions to GIS capabilities where the systems will not be mature for another couple of years; it is reassuring, though, to see that their strategic planning indicates that GIS is “the way to go”
- Merely having GIS data does not mean that the data are totally accurate or able to be utilized for mapping purposes
- As permitting agencies, DEP, DOH, the Water Management Districts, and the Public Service Commission have opportunities to actively engage in more collaboration on data that is gathered and maintained and pursue efficiencies that may reduce time, cost, and overlap for all of the agencies
- PC configuration and capability is critical to the efficient processing of GIS parcel data and associated GIS source datasets; the lack of PC computational power forced the reworking of several GIS processes
- Switching to a different geocoding software package resulted in tremendous savings in time, and provided better results related to determining the locational accuracy of the points
- Complexities of the project require close collaboration and cooperation amongst all team members
- Attention to detail is very important for the data processing role
- Communication with stakeholders and data providers is paramount to getting the types of information that the project requires
- We need to simplify our message
- Managing the project related documents, business rules, and project workflows is very important in ensuring that the project proceeds smoothly
- Where organizations didn’t provide data or information relative to drinking water, the resulting inventory contained a lot of “Unknown” values; relative to wastewater, the resulting inventory contained many more “estimated” values from the 2009 inventory with unknown certainty and potential errors; these deficiencies should be addressed in the next iteration
- The information provided (tabular and GIS) varied widely with regards to format, accuracy, and usability, and there had to be some flexibility in accepting seemingly non-standard electronic data which could have resulted in many data providers not participating
- Time spent on getting information for small systems can be very intensive, and ultimately counter-productive; the project developed a good approach to address these types of systems through the use of other data, and additional measures are planned for the next iteration

- Where no GIS data is available, the physical address is the primary data artifact; addresses must be formed correctly to allow for geocoding and malformed addresses leave gaps in the geocoding output, resulting in less than optimal mapping
- The statutory requirement for licensed utility companies to provide their service area boundaries to the Public Service Commission is being met by only the narrowest of margins; having obtained available PDF maps from the PSC, we learned that many companies have resubmitted the same, outdated maps for decades with many of them being hand-drawn; the available maps are of very little use in a digital environment
- As envisioned during the initiation of this project, the maps and data products developed by the team are useful for disaster preparedness and recovery operations; the project's GIS maps and data were actively used during Hurricane Matthew in October 2016
- Information relating to wastewater and drinking water is not always where you may expect to find it or where you initially look for it; having access to "people who know other people" is critical, since the data is often fragmented between organizations or even between different sections within a single organization
- One of the more difficult lessons learned is that folks generally want a quick and easy answer to "just tell me what you want?"; the more information the team provided via the project website and within data request emails, the less it seemed that the respondents would take time to read and comprehend the information provided; less really is more in some situations
- Not having statutory or authority in the Florida Administrative Code to gather the data hindered some responses and provided the team with no leverage in asking organizations to take their time to provide the requested information
- Most respondents were pleasant to work with and forthcoming with information once they understood that what was being requested really was not as complicated as they perceived it to be
- There are often conflicts between contracted water operators and the permittee regarding who should supply the data being requested
- The team encountered a moderate level of resistance with respondents believing that this information is sensitive and tied to homeland security
- The data collected and mapped is useful to a wide array of end users; the team fielded dozens of requests from a diverse group of stakeholders
- Now that the first cycle of the inventory has been completed and there are maps for all 67 counties, there is a substantial need conduct additional outreach and inform the wide array of stakeholders of the available mapping and reporting products
- Unstable funding causes gaps in workflow, while "starting and stopping" leads to inefficiency in executing and controlling the project; as originally envisioned at the initiation of the project, this inventory should be cyclical and maintained to realize its full potential; sufficient, stable funding to support this ongoing, cyclical work is critical to the long term success of this project and the work products that have been produced

Next cycle, the project team will be fine-tuning our focus for missing data. The methods that will be used will be determined once that project is initiated. One consideration may be looking at a grouping based on the size of the DEP-regulated wastewater treatment facility. After an analysis of the first cycle data gathered by facility size, it looks like small wastewater treatment facilities serving between .05 million gallons per day and 2 million gallons per day were the facility types that were the least responsive, with only 49% responding.

## Conclusions

Collaboration with stakeholders was found to be an essential part of this inventory project. Working closely with local experts allowed for a more comprehensive and accurate final product.

There are several examples where the results from this project have benefitted other state programs, local governments, institutions of higher learning, non-profit organizations, and private businesses.

- The Department's Drinking Water Program Well Surveillance Section has used the inventory to limit and focus areas that a field sampler needs to search when doing a survey of drinking water wells that may be impacted by a contaminant. Time and resources are saved by excluding properties that are on central water.
- During Hurricane Matthew, a map book was created (Figure 22) to help strike teams respond appropriately to onsite wastewater systems that were damaged during the storm. A pre-landfall analysis of private well locations was also done to target testing in flooded areas (Figure 23).
- As DEP works to develop Basin Management Action Plans (BMAPs), the inventory has been used to validate loading estimates and pinpoint remediation areas (Figure 24).
- The project team provided data to researchers in the University of South Florida's Department of Civil & Environmental Engineering that were working on a grant from the U.S. Environmental Protection Agency to establish a national research center to research nutrient pollution management technologies from wastewater and stormwater runoff.
- Data was shared with an investment company looking for locations for business investments relating to the septic system industry.
- The City of Milton indicated that having access to the inventory data will increase their knowledge of which parcels are capable of being serviced by utilities, which will improve their permitting process.

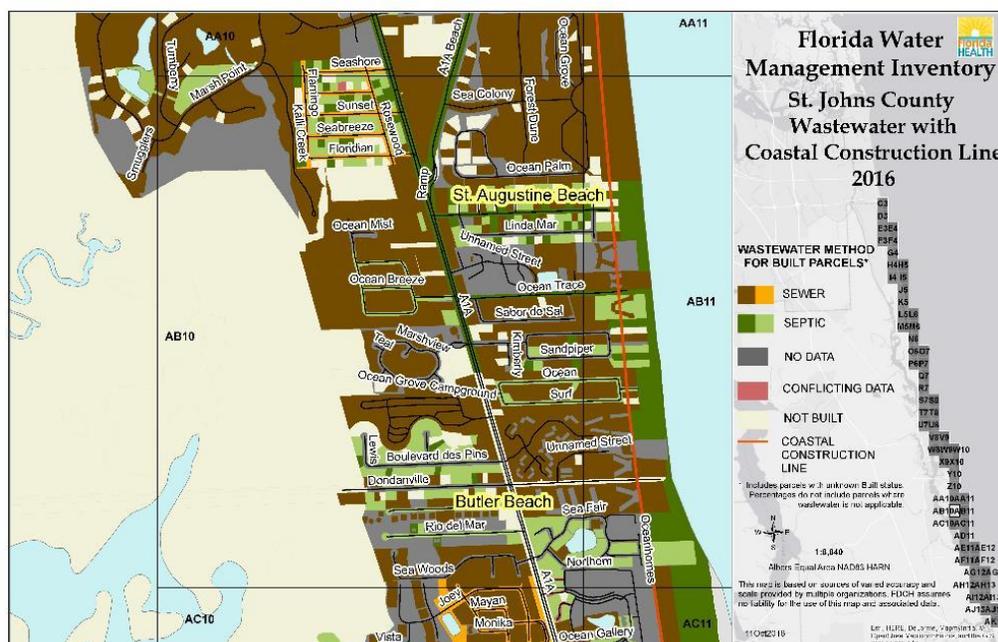


Figure 22. Sample Map Book Page for Coastal Areas for Hurricane Matthew Disaster Response

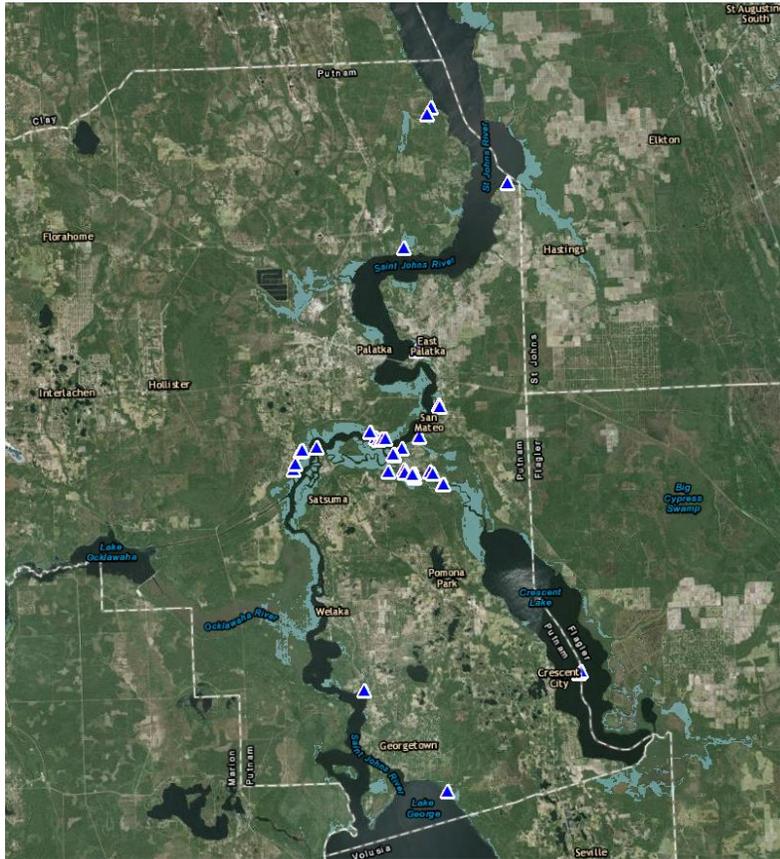


Figure 23. Results of Analysis of Flood-prone Areas with Private Wells During Hurricane Matthew

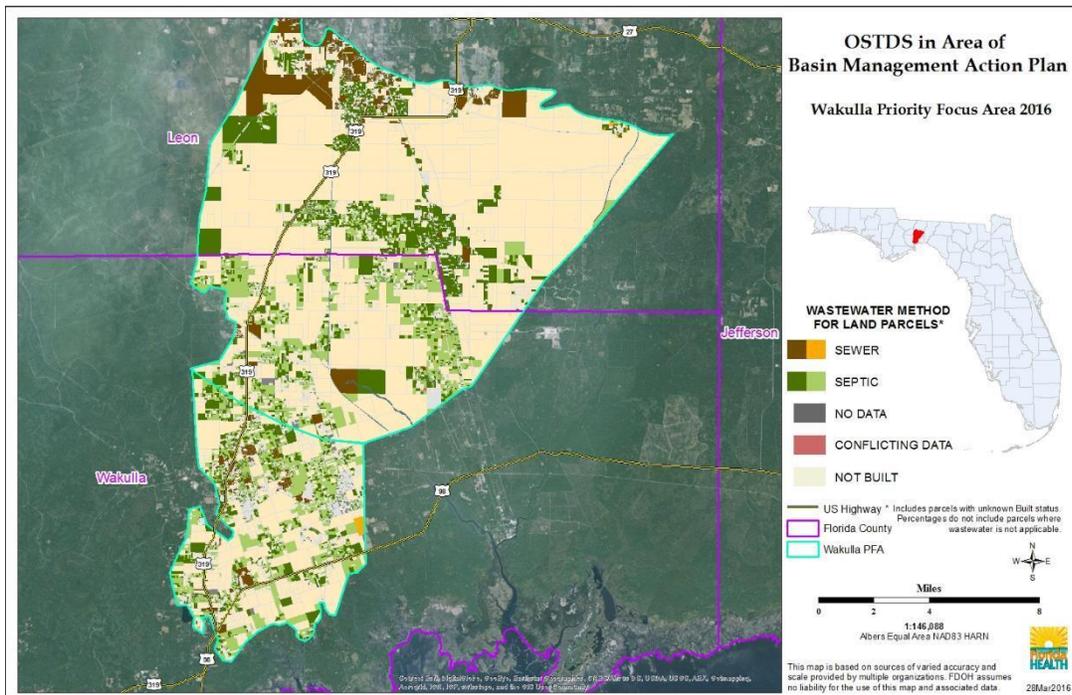


Figure 24. Florida Water Management Inventory Results Clipped to Wakulla Priority Focus Area



There is a great deal of interest in these results, and not having a dedicated funding source is a challenge. Developing and funding a plan for outreach and collaboration efforts via in-person meetings held throughout the state would facilitate an increased awareness of the maps, reports, and related data that is publically available to all stakeholders, while increasing the likelihood of long-term success, including the original project goal, documented in the Project Charter, that the inventory become an ongoing, cyclical effort. The Department has received approval to start work on the next cycle of data gathering through a grant with the Environmental Protection Agency's 319 Nonpoint Source Pollution Program administered by DEP.

When it comes to the total number of septic systems in the state, there are now two main data sources. One is our estimate based on historical census data and a cumulative total after adding new septic installations annually (<http://www.floridahealth.gov/environmental-health/onsite-sewage/ostds-statistics.html>). This total comes to 2.7-million systems. The other estimate comes from this newly completed spatially-based inventory, which has been the focus of the work described in this report. The total from the FLWMI, including Known Septic, Likely Septic, and Somewhat Likely Septic is 2.1-million parcels that have at least one onsite wastewater system.

The quality of the data is different by county. There are many factors that go into the decision as to which septic system estimation number is more accurate:

- The statistics page only lists new construction and does not remove systems once they are abandoned. If there was a significant septic to sewer conversion effort, that is not reflective in that number.
- We were reliant on utilities sending us data, so there may be areas shown as estimated septic that may actually be on sewer. This builds into the inventory a slight overestimation on the number of septic systems.
- Our query to determine which properties are built and not-built appears to be pretty accurate, but it is not 100%. It depends on the accuracy of the property appraiser data submitted to the Department of Revenue. There is no one field that is used to make this determination, it is a compilation of multiple fields. That being said, if there are true "built" properties listed as "not built" the number of septic systems could increase.

Having a comprehensive drinking water and wastewater inventory of the approximate 6.5 million developed parcels in Florida is extremely beneficial. It will help improve government customer service, permitting, development review, and planning activities. It is available at no charge to both the public and other entities. This project has improved disaster preparedness and response activities by providing accurate estimates of public health and infrastructure that may be impacted during disasters. The resulting data and associated map products are a resource that researchers can use to help evaluate connections between various public health and environmental factors. This is also be a great resource for homeowners, home-buyers, realtors and other entities interested in potable water and wastewater services. All of the maps and data are available in one place through a web portal, with the project results consolidated and accessible to the public.

Visit the project website (<http://www.floridahealth.gov/FLWMI>) to download data, access the interactive web application, and for an up-to-date status of this project.



## Section 8 - ACKNOWLEDGEMENTS

We would like to acknowledge the U.S. Centers for Disease Control and Prevention (CDC) and the Section 319 Nonpoint Source Management Program with the U.S. Environmental Protection Agency for providing funding support for this project. Several sections within the Florida Department of Environmental Protection have also provided administrative support. We also acknowledge the Department's Research Review and Advisory Committee which ranked this project as the number one priority for onsite sewage research efforts in Florida. This work would not have happened without the project team including Levi Owens and Liz Sabeff with Global Information Services, Inc. who provided project management, data analysis, and GIS administration for this project; Diane Hood and Alx Walter who provided data processing assistance with this project; Pranathi Gannapureddy with Brandt Information Services who developed a method to capture abandonments by utility in the Environmental Health Database; and all the Master in Public Health students that have provided assistance with data analysis and website content (Nicole Prichard, Thomas Troelstrup, Kai Butler, Marquena Boyd, Cindy Telfort, and Joanna Arthelus). As previously pointed out, collaboration with stakeholders was an essential part of this inventory project. Many professionals within the Department state and county offices provided unmeasurable amounts of support for this project. This project would not be possible without the help from participating stakeholders including public and private utilities; Florida Departments of Environmental Protection, Business and Professional Regulation, Emergency Management, and Agriculture and Consumer Services; Water Management Districts; Public Service Commission; various county and municipal governments; and many others. We have developed a webpage to thank all the public and private drinking water and wastewater facilities that contributed data to this project: <http://www.floridahealth.gov/environmental-health/onsite-sewage/research/FLWMI/thankyou.html>.

Some of this report includes text previously published at the proceedings of the 2015 National Onsite Wastewater and Recycling Association Onsite Wastewater Mega-Conference.

## Section 9 - REFERENCES

Florida Department of Health Onsite Sewage Programs Website.  
<http://www.floridahealth.gov/environmental-health/onsite-sewage/index.html>

Florida Department of Health Florida Water Management Inventory Website.  
<http://www.floridahealth.gov/flwmi>

Hall, Pamela and Stephen Clancy. 2009. Statewide Inventory of Onsite Sewage Treatment and Disposal Systems in Florida. Report to the Florida Department of Health. <http://www.floridahealth.gov/environmental-health/onsite-sewage/research/documents/research-reports/documents/inventory-report.pdf>

State Onsite Regulators Alliance. 2015. Email communication through listserv.

## APPENDIX A – PROCESS DOCUMENTS

Figure A- 1 shows a diagram of the workflow for the FLWMI. This diagram outlines the major components of the business process documents that are outlined below.

### Workflow Diagram

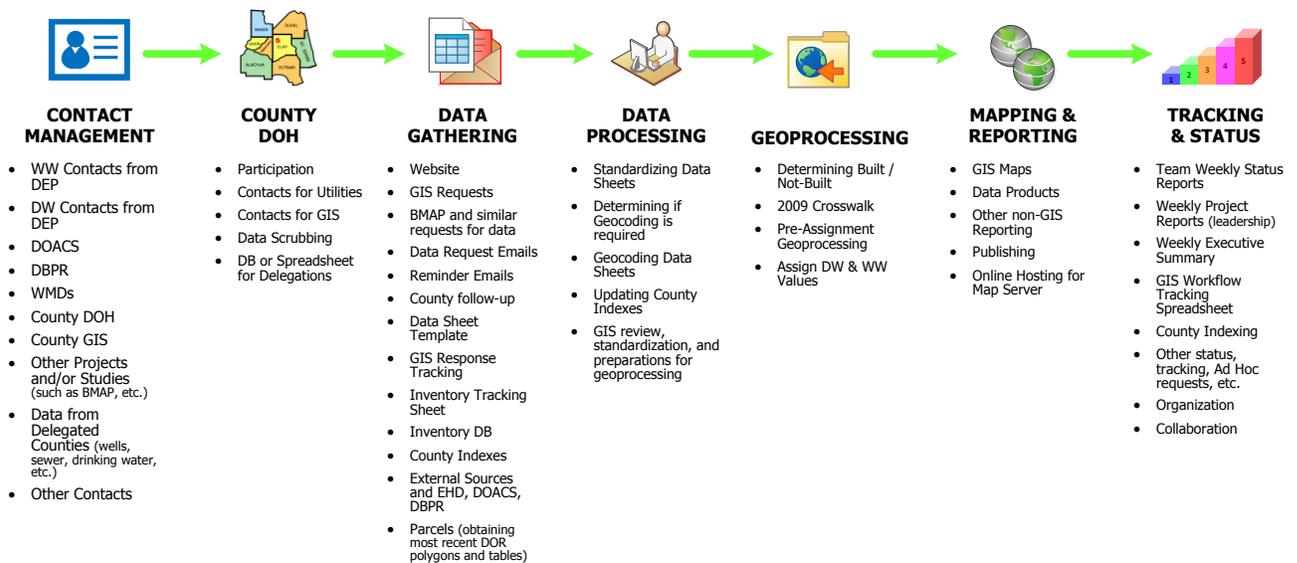


Figure A- 1. Workflow Diagram for the Florida Water Management Inventory

## Contact Management

Process documents relating to Contact Management are found on this webpage:

<http://ww10.doh.state.fl.us/pub/bos/Inventory/ProcessDocuments/1ContactManagement/>

The documents included are:

1. **Identifying and Maintaining Data Contacts** – this document addresses these primary business goals: (1) How to identify data contact information, (2) How to update data contact information, and (3) How to maintain data contact information.
2. **Data Sets Sources and Contacts** – A matrix of dataset tables that explain what types of information and data will be necessary to conduct the FLWMI on a cyclical, ongoing basis. For Parcels, Wastewater, and Drinking Water, each table explains the specific Data Set (what), the Data Source (where), and the Data Contacts (who) for obtaining the required information.
3. **Workflow Analysis and Improvement for Contacts** – A Strategic Planning activity was conducted for each of the main project components, where the project team listed the projects Strengths, Weaknesses, Opportunities, and Threats (SWOT). This document outlines the results of the SWOT analysis for the Contacts component.

## County Health Department (CHD) Cooperation

Process documents relating to County Health Department (CHD) cooperation are found on this webpage:

<http://ww10.doh.state.fl.us/pub/bos/Inventory/ProcessDocuments/2CountyDOH/>

The documents included are:

1. **Solicitation Email Example** – This document is an example of the solicitation emails that are sent to each CHD Director and Environmental Health Director when initiating a county.
2. **Orientation Sign Up Template** – This document is a template for recording individuals that sign up for an orientation meeting.
3. **Orientation Meetings Attendees Template** – This document is a template for recording individuals that attended an orientation meeting.
4. **Example Orientation Presentation** – This is an example of the Phase 3 orientation presentation.
5. **Workflow Analysis and Improvement for CHD** – A Strategic Planning activity was conducted for each of the main project components, where the project team listed the project's Strengths, Weaknesses, Opportunities, and Threats (SWOT). This document outlines the results of the SWOT analysis for the CHD component.

## Data Gathering

Process documents relating to Data Gathering are found on this webpage:

<http://ww10.doh.state.fl.us/pub/bos/Inventory/ProcessDocuments/3DataGathering/>

The documents included are:

1. **Requesting and Importing Data Sets** – This document addresses three primary business goals: (1) How to request data sets from data providers, (2) How to transmit data sets from data providers to the Department, and (3) How to store data sets on the Department's network.
2. **Data Sheet Template** – This document is a template for submitting data sets. There are two templates: one for smaller wastewater treatment plant or public water systems which serve only one single parcel (for example, a Mobile Home or RV Park, a small commercial or industrial building, a state or municipal park, etc.), then this would be a single record or just a single row in the spreadsheet template. If the facility(s) serves multiple parcels, then there would be multiple corresponding records (or rows). If, however, the facility(s) serves many property parcels and/or customer addresses (dozens, hundreds, or thousands), the second template for larger data set would be used, providing a list of all the customer properties served by the facility(s).
3. **MOVEit Instructions for Inventory Team** – Department's MOVEit DMZ application is utilized for secure transmission of large files (>8MB). Department's staff will create a secure "Package" within the MOVEit DMZ application and email the "Package" to the organization's contact person who is responsible for transmitting files. This document provides instructions for the inventory team on how to use this program.
4. **MOVEit Instructions for External Submitters** – Department's MOVEit DMZ application is utilized for secure transmission of large files (>8MB). Department's

staff will create a secure "Package" within the MOVEit DMZ application and email the "Package" to the organization's contact person who is responsible for transmitting files. This document provides instructions for anyone submitting data on how to use this program.

5. **Data Request Templates** – This is a folder containing templates for data requests to multiple stakeholders in multiple scenarios such as initial contacts to county municipal governments, DEP regulated facilities (both those that did respond to our 2009 request for data and those that did not), state agencies, and water management districts; and follow-up messages to DEP regulated facilities that did not respond to previous data requests.
6. **Template Script for Contacting Data Providers** – This process map shows an example of how a data request flows.
7. **Data Gathering Escalation Process** – This process map shows how to handle a DEP regulated facility that does not submit data.
8. **Workflow Analysis and Improvement for Data Gathering** – A Strategic Planning activity was conducted for each of the main project components, where the project team listed the projects Strengths, Weaknesses, Opportunities, and Threats (SWOT). This document outlines the results of the SWOT analysis for the Data Gathering component.

## Data Processing

Process documents relating to Data Processing are found on this webpage:

<http://ww10.doh.state.fl.us/pub/bos/Inventory/ProcessDocuments/4DataProcessing/>

The documents included are:

1. **Processing Inventory Data Sets** – This document addresses how to process Data Sets received from utility providers to prepare them for import, analysis, and reporting in GIS. This process and information is specific to the Department's FLWMI Project.
2. **Compiling Parcel Data**– This procedural document is utilized for compiling parcel data by receiving property records, importing the records into the Inventory Database, compiling all associated parcel information, and maintaining the parcel data.
3. **Compiling Wastewater and Drinking Water Data** – This procedural document is utilized for compiling data received from all data sources for assigning wastewater methods and drinking water sources to compiled parcel data.
4. **Estimation Methodology Procedure** –Some data gathered for parcels, drinking water sources, or wastewater treatment methods were not sufficient to make an exact designation. In those cases, estimation methods were utilized as defined within this procedure. The methods documented within this procedure were utilized to perform the first cycle of the FLWMI. Part of this process document is shown in Appendix D.
5. **Creating a County Index** – The purpose of a County Index is to provide a "road map" for where the Data Sets for each Parent Organization within each County is located. The Data Gatherer creates the County Index and the Data Processor populates and maintains the Data Set details for each listed Parent Organization. The GIS Database Analyst also refers to the Index when importing Data Sets into GIS.

6. **Environmental Health Database Data Extraction** – This document lists the queries used to pull data from the Environmental Health Database for incorporation into the Inventory.
7. **Steps for Small Facility Research** – This document lists the steps to go through when researching DEP regulated Wastewater Treatment Plan (WWTP) and Public Water System (PWS) that have a small flow or serve a small population. The likelihood of these facilities only serving one parcel is greater than for a large facility and following this process will reduce the need to contact these facilities.
8. **OSTDS Variance Database Data Extraction** – This document lists the queries used to pull data from the OSTDS Variance Database for incorporation into the Inventory.
9. **Steps to Update DEP Wastewater Treatment Facility (WWTF) and PWS Facilities** – This document lists the steps to take to update the contact tracking database with the latest DEP facility data.
10. **Steps to Update DOACS and DBPR Data Tables** – This document lists the steps to take to pull data received from DOACS and DBPR for incorporation into the Inventory.
11. **Process to Update Environmental Health Database (EHD) Datasets** – This document lists the steps to take to pull updated data from the EHD for incorporation into the Inventory.
12. **Workflow Analysis and Improvement for Data Processing** – A Strategic Planning activity was conducted for each of the main project components, where the project team listed the projects Strengths, Weaknesses, Opportunities, and Threats (SWOT). This document outlines the results of the SWOT analysis for the Data Processing component.

## Geoprocessing

Process documents relating to Geoprocessing are found on this webpage:  
<http://ww10.doh.state.fl.us/pub/bos/Inventory/ProcessDocuments/5Geoprocessing/>

The documents included are:

1. **GIS Source Data Processing Steps Outline** – This document outlines the steps to take for data processing in GIS for the project.
2. **GIS Process for Department's Parcel and Tax Roll Data** – This document details the initial GIS process to follow with GIS parcel datasets and tabular tax roll data from the Department of Revenue. The resulting GIS datasets are the basis for the remainder of all inventory related geoprocessing and include new fields categorizing land use and "Built Status". Subsequent work on the inventory will include additional steps where new parcel data is 'inserted' into the existing feature class where the parcel characteristics have changed over time. These changes would occur with parcel splits, parcel combines, parcel sales, new construction, demolition, redevelopment, and other such events.
3. **GIS Process for Source Data Processing and Assignment to Parcels** – The majority of source data (post data processing) is geoprocessed and assigned to parcels according to the model that was developed for that source. The models standardize the geoprocessing. This process document specifically addresses the rationale behind the processes used to cross-walk the 2009 wastewater inventory values to the current parcel dataset.

4. **Assignment of Inventory Values for Wastewater Method** – This document shows the historical background on assignment of inventory values for wastewater.
5. **Geocoding with Google Earth Pro** – This document outlines the steps taken to geocode source data with Google Earth Pro.
6. **Geocoding with Esri StreetMap** – This document outlines the steps taken to geocode source data with StreetMap for ArcGIS. The geocoding processes were migrated from Google Earth Pro to the StreetMap for ArcGIS product. StreetMap offers several advantages in geocoding large datasets.
7. **Quality Control for Geocoding** – This document outlines the quality control steps to take to verify geocoding performed with Google Earth Pro was done correctly. Similar quality control checks are performed using the StreetMap product as well.
8. **Workflow Analysis and Improvement for Geoprocessing** – A Strategic Planning activity was conducted for each of the main project components, where the project team listed the projects Strengths, Weaknesses, Opportunities, and Threats (SWOT). This document outlines the results of the SWOT analysis for the Geoprocessing component.

## Mapping & Reporting

Process documents relating to Mapping & Reporting are found on this webpage:

<http://ww10.doh.state.fl.us/pub/bos/Inventory/ProcessDocuments/6MappingAndReporting/>

The documents included are:

1. **Template for Single Panel Wastewater Map** – This document shows the colors and layout for the final reporting single panel wastewater map.
2. **Template for Multi Panel Wastewater Map** – This document shows the colors and layout for the final reporting multi panel wastewater map.
3. **Template for Single Panel Drinking Water Map** – This document shows the colors and layout for the final reporting single panel drinking water map.
4. **Template for Multi Panel Drinking Water Map** – This document shows the colors and layout for the final reporting multi panel drinking water map.
5. **Workflow Analysis and Improvement for Mapping and Reporting** – A Strategic Planning activity was conducted for each of the main project components, where the project team listed the projects Strengths, Weaknesses, Opportunities, and Threats (SWOT). This document outlines the results of the SWOT analysis for the Mapping and Reporting component.

## Tracking & Status

Process documents relating to Tracking & Status are found on this webpage:

<http://ww10.doh.state.fl.us/pub/bos/Inventory/ProcessDocuments/7TrackingAndStatus/>

The documents included are:

1. **Weekly Status Report Sample** – This document is used for team members to report the current status of the work they performed during the week.
2. **Weekly Project Status Report Template** – This document is put together by the project manager to provide a weekly update on the project to leadership.
3. **Workflow Analysis and Improvement for Tracking and Status** – A Strategic Planning activity was conducted for each of the main project components, where the



project team listed the projects Strengths, Weaknesses, Opportunities, and Threats (SWOT). This document outlines the results of the SWOT analysis for the Tracking and Status component.



## APPENDIX B – RESPONSE FROM DEP PERMITTED WASTEWATER TREATMENT FACILITIES AND PUBLIC WATER SYSTEMS

This table shows the data available by county for both wastewater and drinking water facilities permitted by DEP.

Column	Description
<b>County</b>	County name
<b>WW Facilities</b>	Count of the number of permitted DEP wastewater systems
<b>DW Facilities</b>	Count of the number of permitted DEP drinking water systems
<b>% of Total WW</b>	Sum of the permitted wastewater capacity, in millions of gallons per day converted to a percent of the total
<b>% of Total DW</b>	Sum of the population served converted to a percent of the total

Data Available by County				
County	WW Facilities	DW Facilities	% of Total WW	% of Total DW
<b>Alachua</b>				
YES	14	52	92.9%	91.5%
NO	4	11	7.1%	8.5%
<b>Baker</b>				
YES	3	12	98.5%	39.4%
NO	1	3	1.5%	60.6%
<b>Bay</b>				
YES	8	43	100.0%	54.1%
NO		6	0.0%	45.9%
<b>Bradford</b>				
YES	3	22	100.0%	43.7%
NO		4	0.0%	56.3%
<b>Brevard</b>				
YES	37	60	73.6%	71.4%
NO	18	25	26.4%	28.6%
<b>Broward</b>				
YES	17	55	100.0%	93.0%
NO		3	0.0%	7.0%
<b>Calhoun</b>				
YES	1	9	100.0%	84.0%
NO		2	0.0%	16.0%



County	WW Facilities	DW Facilities	% of Total WW	% of Total DW	
<b>Charlotte</b>					
	YES	21	19	85.6%	24.9%
	NO	5	12	14.4%	75.1%
<b>Citrus</b>					
	YES	24	119	37.4%	72.9%
	NO	31	52	62.6%	27.1%
<b>Clay</b>					
	YES	15	68	36.0%	13.0%
	NO	5	18	64.0%	87.0%
<b>Collier</b>					
	YES	17	47	99.2%	96.6%
	NO	3	4	0.8%	3.4%
<b>Columbia</b>					
	YES	17	45	53.9%	15.0%
	NO	4	16	46.1%	85.0%
<b>Desoto</b>					
	YES	13	47	41.4%	63.1%
	NO	4	2	58.6%	36.9%
<b>Dixie</b>					
	YES	2	19	23.5%	18.0%
	NO	1	10	76.5%	82.0%
<b>Duval</b>					
	YES	14	58	99.3%	94.4%
	NO	5	47	0.7%	5.6%
<b>Escambia</b>					
	YES	7	10	98.0%	93.5%
	NO	1	5	2.0%	6.5%
<b>Flagler</b>					
	YES	13	21	78.0%	100.0%
	NO	4	1	22.0%	0.0%
<b>Franklin</b>					
	YES	4	3	14.3%	2.0%
	NO	2	6	85.7%	98.0%
<b>Gadsden</b>					
	YES	6	13	49.8%	36.8%
	NO	4	12	50.2%	63.2%



County	WW Facilities	DW Facilities	% of Total WW	% of Total DW
<b>Gilchrist</b>				
YES	3	22	77.4%	98.7%
NO	2	2	22.6%	1.3%
<b>Glades</b>				
YES	14	10	77.6%	93.8%
NO	6	5	22.4%	6.2%
<b>Gulf</b>				
YES	5	11	100.0%	100.0%
<b>Hamilton</b>				
YES	7	13	29.2%	36.8%
NO	1	3	70.8%	63.2%
<b>Hardee</b>				
YES	8	32	96.4%	89.9%
NO	2	10	3.6%	10.1%
<b>Hendry</b>				
YES	12	36	91.2%	81.2%
NO	4	7	8.8%	18.8%
<b>Hernando</b>				
YES	21	115	98.2%	99.0%
NO	4	10	1.8%	1.0%
<b>Highlands</b>				
YES	49	65	70.5%	77.8%
NO	7	17	29.5%	22.2%
<b>Hillsborough</b>				
YES	64	463	98.3%	53.3%
NO	42	217	1.7%	46.7%
<b>Holmes</b>				
YES	2	12	6.2%	26.3%
NO	2	8	93.8%	73.7%
<b>Indian River</b>				
YES	11	22	100.0%	100.0%
<b>Jackson</b>				
YES	6	59	23.3%	40.6%
NO	3	11	76.7%	59.4%



County	WW Facilities	DW Facilities		% of Total WW	% of Total DW
<b>Jefferson</b>					
	YES	3	7	26.1%	28.1%
	NO	1	7	73.9%	71.9%
<b>Lafayette</b>					
	YES	2	10	100.0%	99.1%
	NO		1	0.0%	0.9%
<b>Lake</b>					
	YES	64	160	70.8%	59.5%
	NO	46	121	29.2%	40.5%
<b>Lee</b>					
	YES	46	52	94.7%	85.8%
	NO	18	18	5.3%	14.2%
<b>Leon</b>					
	YES	8	30	91.8%	87.6%
	NO	5	12	8.2%	12.4%
<b>Levy</b>					
	YES	5	44	18.1%	33.7%
	NO	8	21	81.9%	66.3%
<b>Liberty</b>					
	YES	1	7	52.8%	30.4%
	NO	1	8	47.2%	69.6%
<b>Madison</b>					
	YES	3	9	85.3%	78.0%
	NO	2	5	14.7%	22.0%
<b>Manatee</b>					
	YES	9	58	100.0%	98.5%
	NO		2	0.0%	1.5%
<b>Marion</b>					
	YES	84	367	91.8%	73.2%
	NO	32	175	8.2%	26.8%
<b>Martin</b>					
	YES	20	45	97.1%	76.2%
	NO	4	16	2.9%	23.8%
<b>Miami Dade</b>					
	YES	22	103	98.8%	94.1%
	NO	2	20	1.2%	5.9%



County	WW Facilities	DW Facilities	% of Total WW	% of Total DW
<b>Monroe</b>				
YES	79	1	39.9%	100.0%
NO	35		60.1%	0.0%
<b>Nassau</b>				
YES	8	39	89.9%	63.1%
NO	7	14	10.1%	36.9%
<b>Okaloosa</b>				
YES	13	15	74.1%	69.7%
NO	3	8	25.9%	30.3%
<b>Okeechobee</b>				
YES	10	37	88.4%	20.6%
NO	8	4	11.6%	79.4%
<b>Orange</b>				
YES	31	106	60.6%	98.4%
NO	13	34	39.4%	1.6%
<b>Osceola</b>				
YES	26	73	98.4%	97.2%
NO	8	10	1.6%	2.8%
<b>Palm Beach</b>				
YES	42	60	99.8%	71.7%
NO	5	22	0.2%	28.3%
<b>Pasco</b>				
YES	39	188	87.0%	62.6%
NO	29	56	13.0%	37.4%
<b>Pinellas</b>				
YES	19	13	99.8%	99.9%
NO	3	1	0.2%	0.1%
<b>Polk</b>				
YES	80	239	84.0%	50.8%
NO	65	193	16.0%	49.2%
<b>Putnam</b>				
YES	18	78	19.3%	29.4%
NO	9	35	80.7%	70.6%
<b>Santa Rosa</b>				
YES	9	19	98.8%	73.5%
NO	1	2	1.2%	26.5%

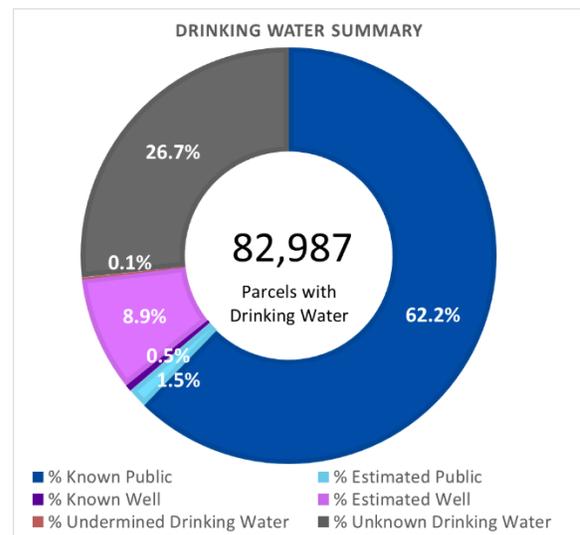
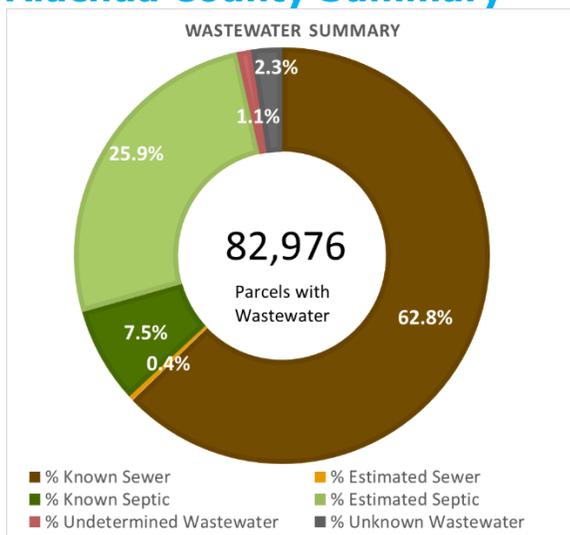


County	WW Facilities	DW Facilities	% of Total WW	% of Total DW
<b>Sarasota</b>				
YES	29	104	86.2%	94.6%
NO	8	17	13.8%	5.4%
<b>Seminole</b>				
YES	14	44	93.3%	61.1%
NO	7	25	6.7%	38.9%
<b>St. Johns</b>				
YES	26	60	100.0%	99.9%
NO		3	0.0%	0.1%
<b>St. Lucie</b>				
YES	21	36	92.1%	93.8%
NO	7	17	7.9%	6.2%
<b>Sumter</b>				
YES	24	74	94.1%	78.6%
NO	6	11	5.9%	21.4%
<b>Suwannee</b>				
YES	6	35	16.8%	9.3%
NO	2	13	83.2%	90.7%
<b>Taylor</b>				
YES	3	14	27.8%	36.8%
NO	2	4	72.2%	63.2%
<b>Union</b>				
YES		7	0.0%	40.8%
NO	1	4	100.0%	59.2%
<b>Volusia</b>				
YES	64	115	82.1%	77.5%
NO	32	36	17.9%	22.5%
<b>Wakulla</b>				
YES	4	10	98.0%	72.2%
NO	1	1	2.0%	27.8%
<b>Walton</b>				
YES	6	21	38.4%	44.2%
NO	5	8	61.6%	55.8%
<b>Washington</b>				
YES	4	18	86.9%	67.2%
NO	2	6	13.1%	32.8%

## APPENDIX C – SUMMARIES BY COUNTY

This appendix shows, for each county, a summary of the final parcel counts for wastewater and drinking water, the percent of DEP wastewater and drinking water where we received data, and a list of the large permitted facilities that did not submit data for incorporation into the project. Large wastewater facilities are defined as having a permitted capacity of greater than 1 million gallons per day. Large drinking water facilities are defined as have a permitted population of more than 500.

### Alachua County Summary

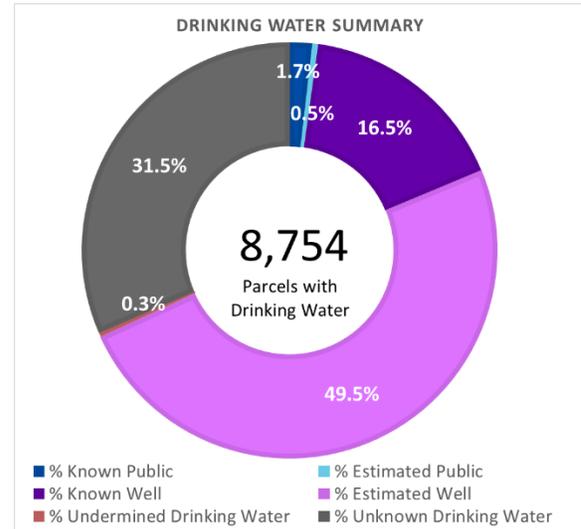
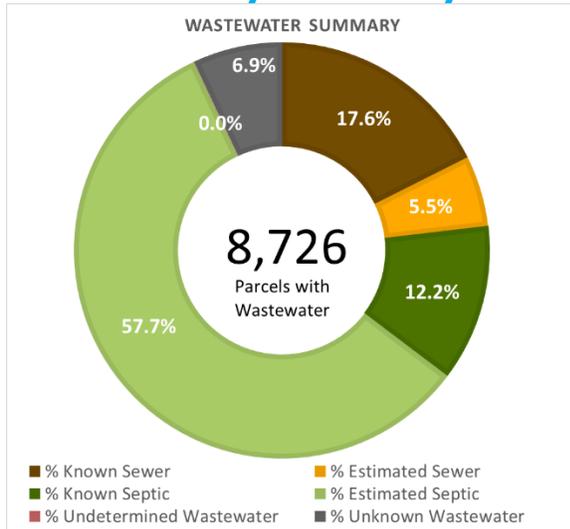


Received responses from 92.9% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 91.5% of all permitted drinking water in the county, with the following large facilities missing:

- Archer Water System
- City of Alachua
- City of Hawthorne
- High Springs WTP
- Kincaid Hills Water System
- Micanopy Water System

## Baker County Summary



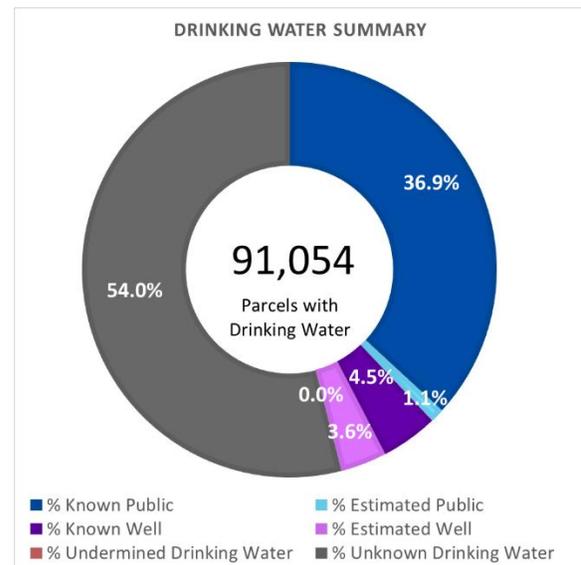
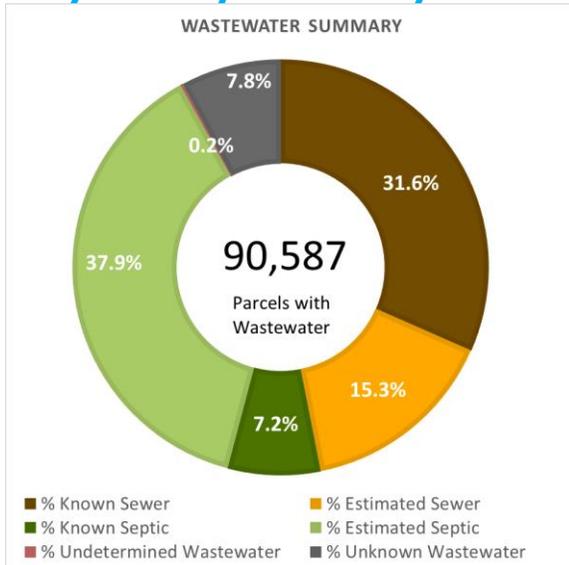
Using both data collected in 2009 and during 2014-2016, responses were received from 98.5% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Macclenny (submitted in 2009)

Received responses from 39.4% of all permitted drinking water in the county, with the following large facilities missing:

- City of Macclenny

## Bay County Summary



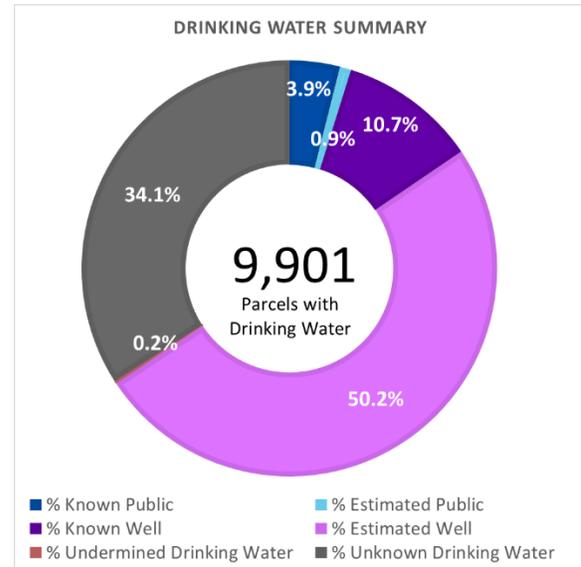
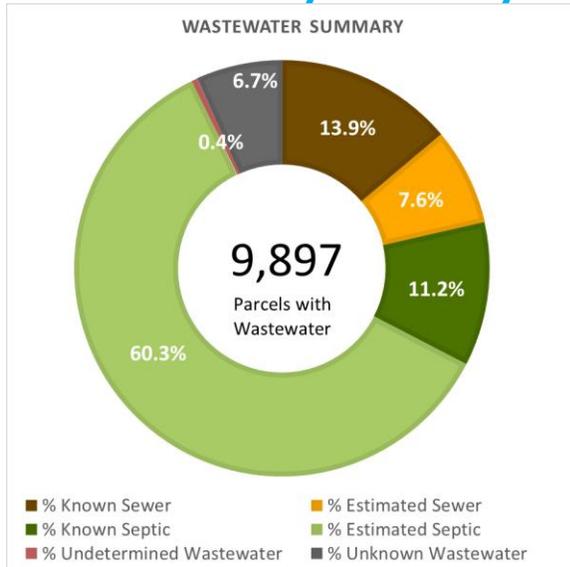
Using both data collected in 2009 and during 2014-2016, responses were received from 100.0% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- Panama City Beach WWTP#1 (submitted in 2009)

Received responses from 54.1% of all permitted drinking water in the county, with the following large facilities missing:

- City of Mexico Beach
- City of Panama City Beach
- City of Springfield
- Waller Elementary School

## Bradford County Summary



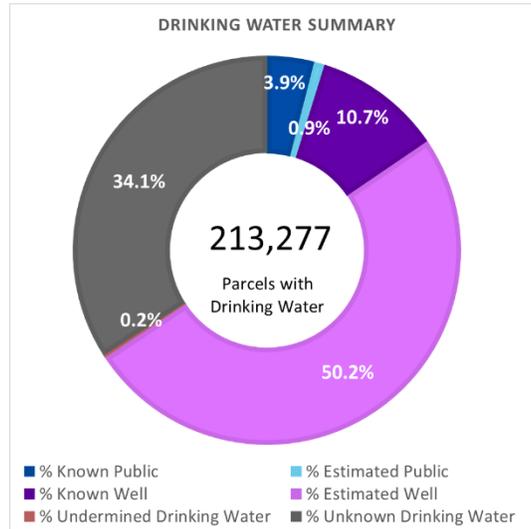
Using both data collected in 2009 and during 2014-2016, responses were received from 100.0% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- Starke WWTF (submitted in 2009)

Received responses from 43.7% of all permitted drinking water in the county, with the following large facilities missing:

- Brooker Water Department
- City of Lawtey
- City of Starke

## Brevard County Summary



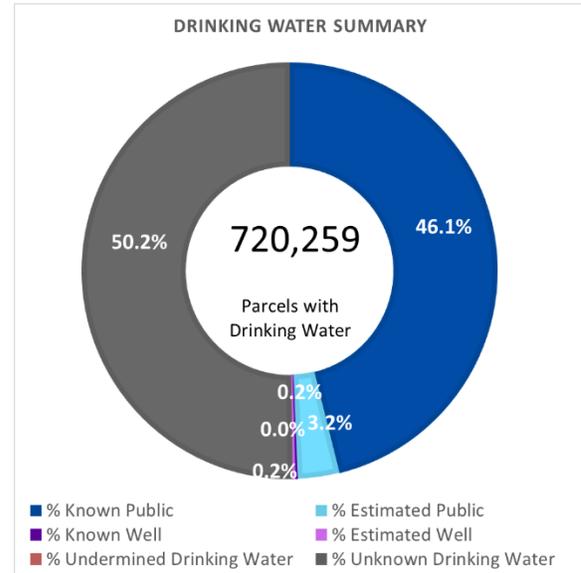
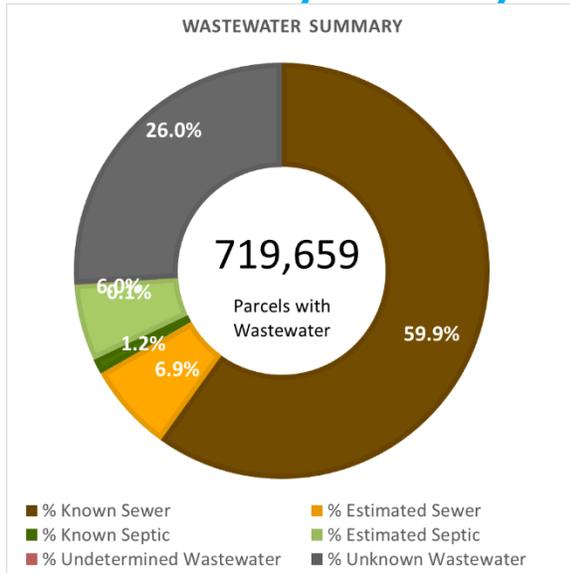
Using both data collected in 2009 and during 2014-2016, responses were received from 73.6% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Melbourne (submitted in 2009)
- City of Rockledge
- Cocoa Beach WRF (submitted in 2009)
- Cocoa Beach Reclamation Facility
- West Melbourne Water

Received responses from 71.4% of all permitted drinking water in the county, with the following large facilities missing:

- Aqua Utilities Florida Inc
- City of Melbourne
- South Brevard Water Co-Op
- South Shores Utility Association
- West Melbourne Water

## Broward County Summary



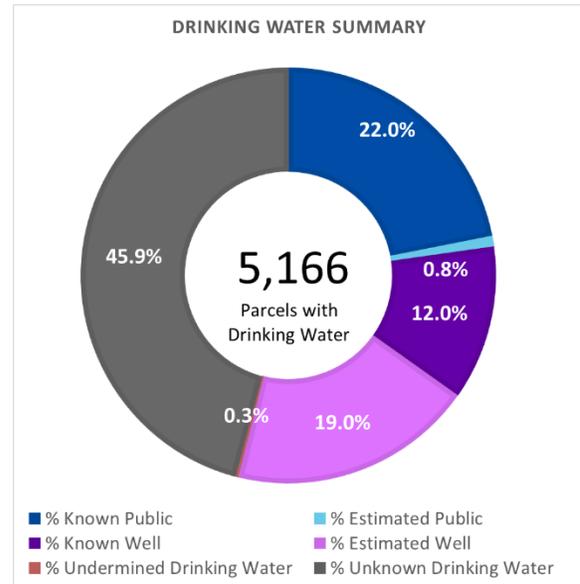
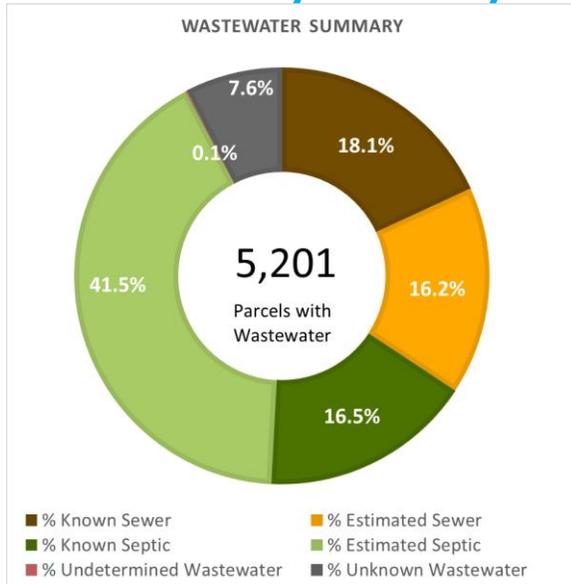
Using both data collected in 2009 and during 2014-2016, responses were received from 100.0% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Cooper City (submitted in 2009)
- Plantation Regional WWTP (submitted in 2009)

Received responses from 93.0% of all permitted drinking water in the county, with the following large facilities missing:

- City of Cooper City
- Ft Laud Assembly Hall-Jeh Witn
- Plantation East & Central
- Royal Utility Company

## Calhoun County Summary

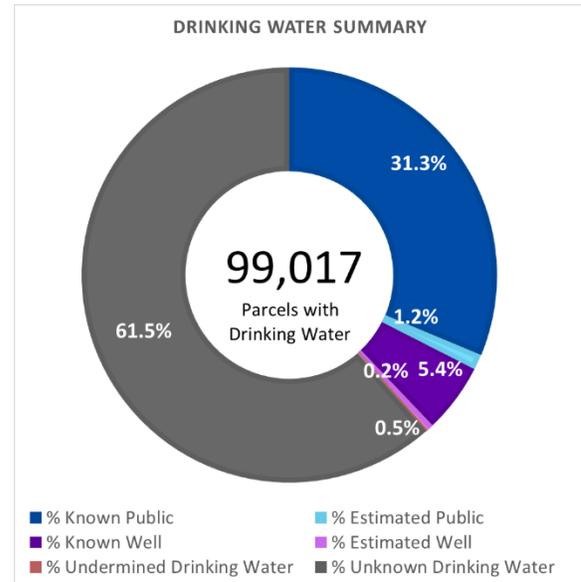
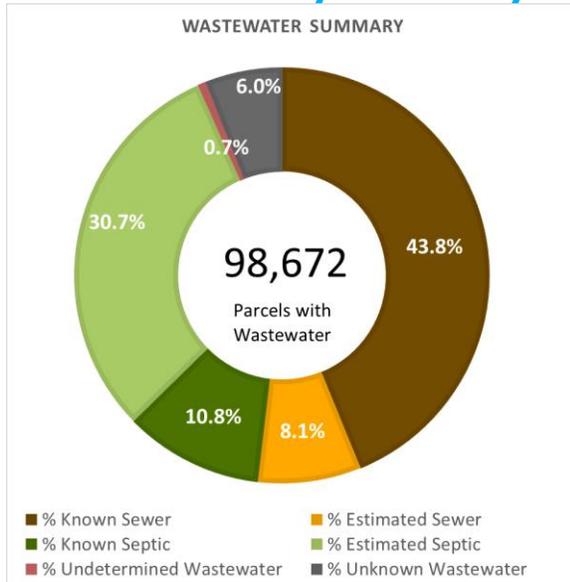


Received responses from 100.0% of all permitted wastewater in the county, with the following large facilities missing:

Received responses from 84.0% of all permitted drinking water in the county, with no large facilities missing.

- Town of Altha

## Charlotte County Summary



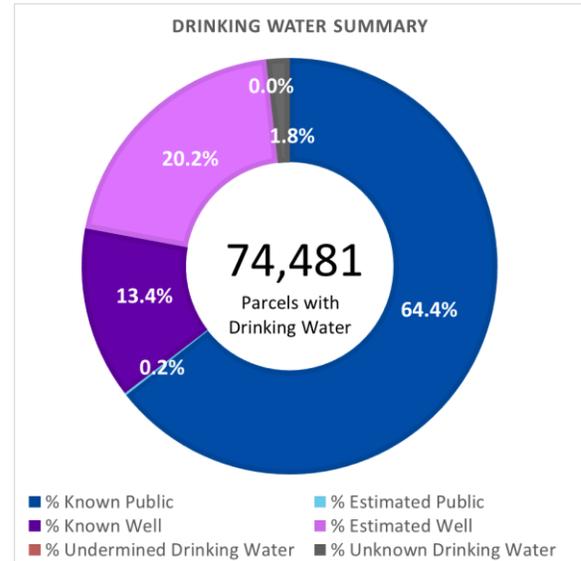
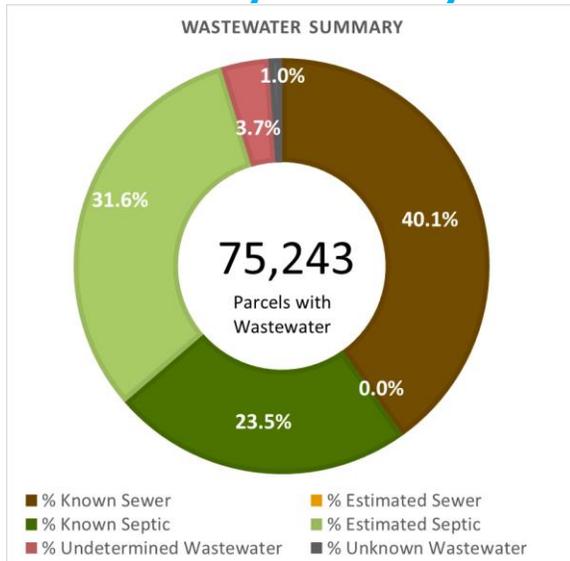
Using both data collected in 2009 and during 2014-2016, responses were received from 85.6% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- Charlotte County Utilities (submitted in 2009)

Received responses from 24.9% of all permitted drinking water in the county, with the following large facilities missing:

- Charlotte County Utilities
- El Jobean Water Association
- Knight Island Utilities Inc

## Citrus County Summary



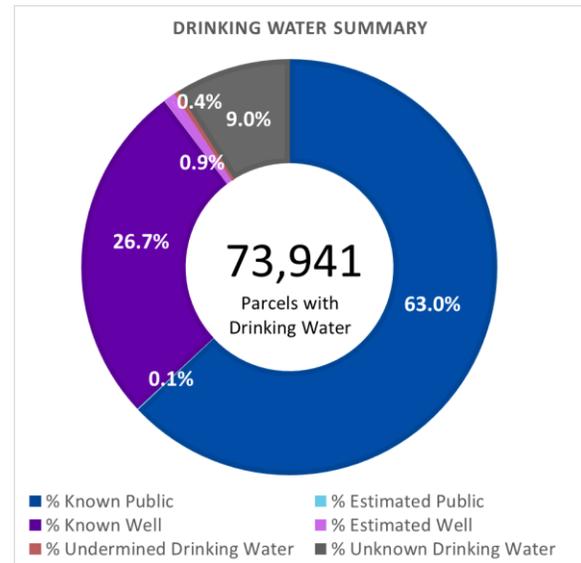
Using both data collected in 2009 and during 2014-2016, responses were received from 37.4% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Crystal River (submitted in 2009)

Received responses from 72.9% of all permitted drinking water in the county, with the following large facilities missing:

- American Land Lease
- Constate Utl/Hills of Avalon
- Falkner Groups
- Floral City Water Association
- Homosassa Special Water District
- Ozello Water Association

## Clay County Summary



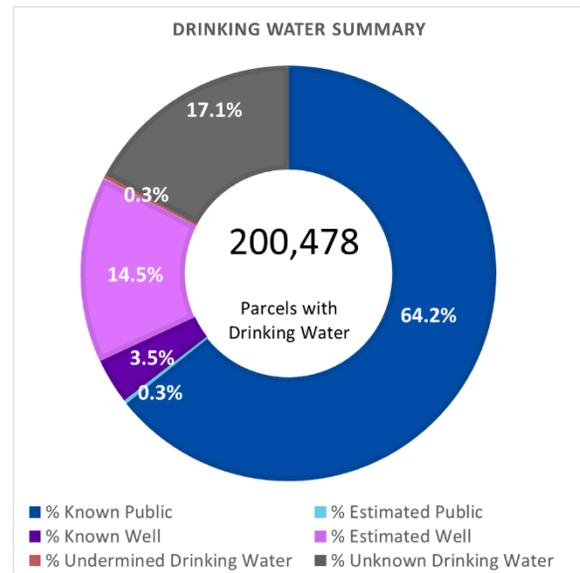
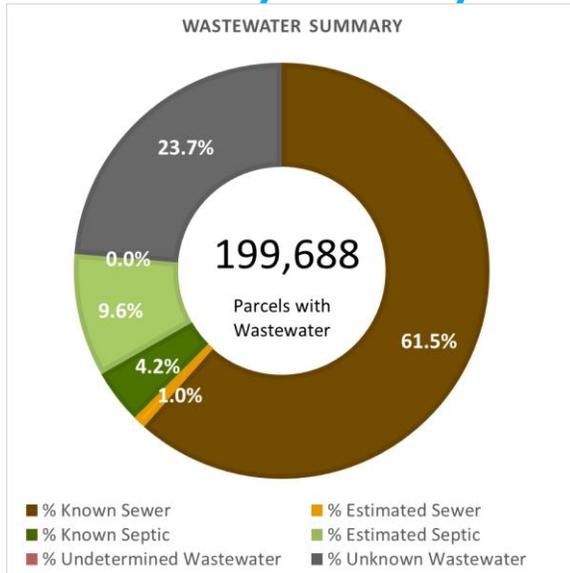
Using both data collected in 2009 and during 2014-2016, responses were received from 36.0% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- Clay County Utility Authority (submitted in 2009)

Received responses from 13.0% of all permitted drinking water in the county, with the following large facilities missing:

- Clay County Utility Authority (submitted in 2009)

## Collier County Summary

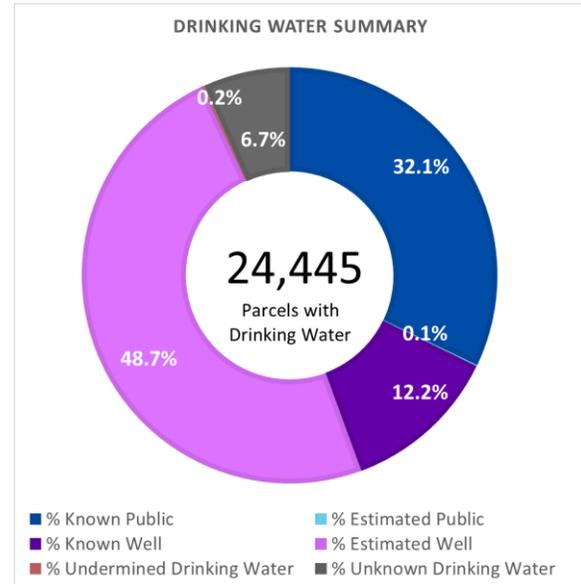
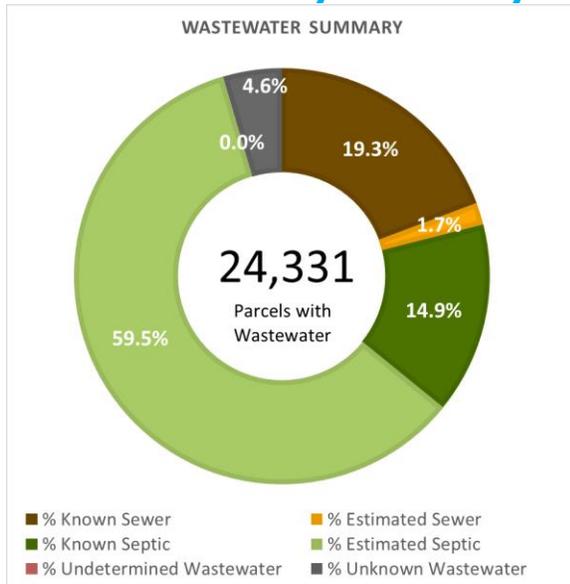


Received responses from 99.2% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 96.6% of all permitted drinking water in the county, with the following large facilities missing:

- Center Point Community Church
- City of Everglades
- Collier County School Board
- E'S Country Store
- FDOT
- Hakan Services Inc
- Orange Tree Utility Co Inc
- Port of the Islands
- US Water Corp

## Columbia County Summary



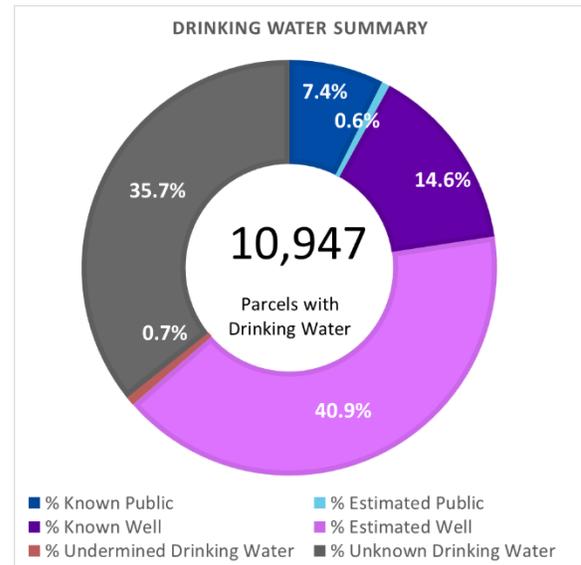
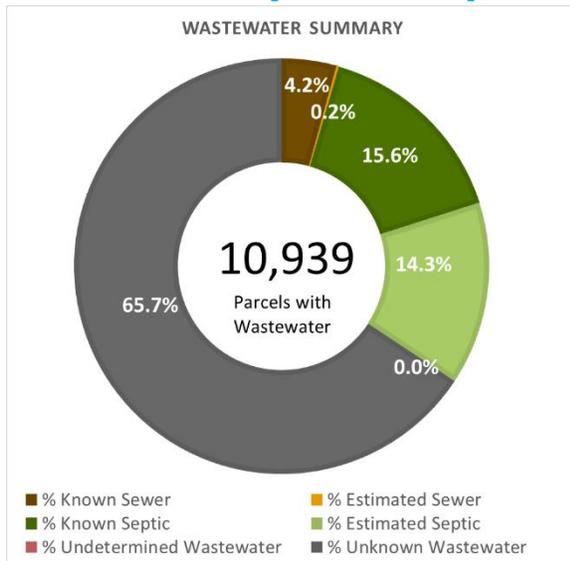
Using both data collected in 2009 and during 2014-2016, responses were received from 53.9% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Lake City (submitted in 2009)

Received responses from 15.0% of all permitted drinking water in the county, with the following large facilities missing:

- City of Lake City

## Desoto County Summary



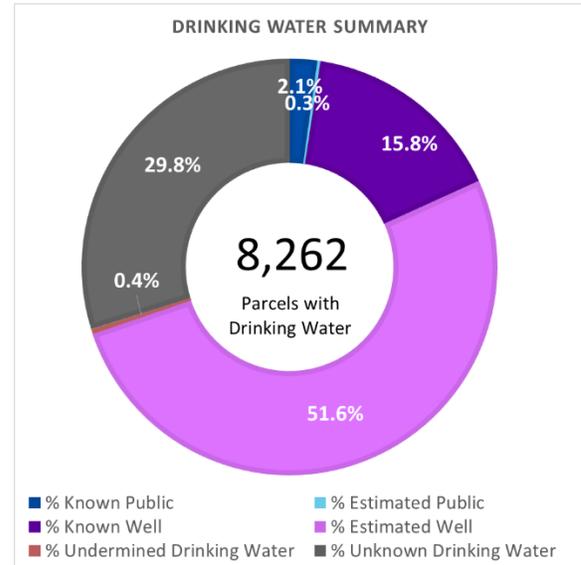
Received responses from 41.4% of all permitted wastewater in the county, with the following large facilities missing:

- City of Arcadia

Received responses from 63.1% of all permitted drinking water in the county, with the following large facilities missing:

- City of Arcadia
- Desoto County Utilities

## Dixie County Summary

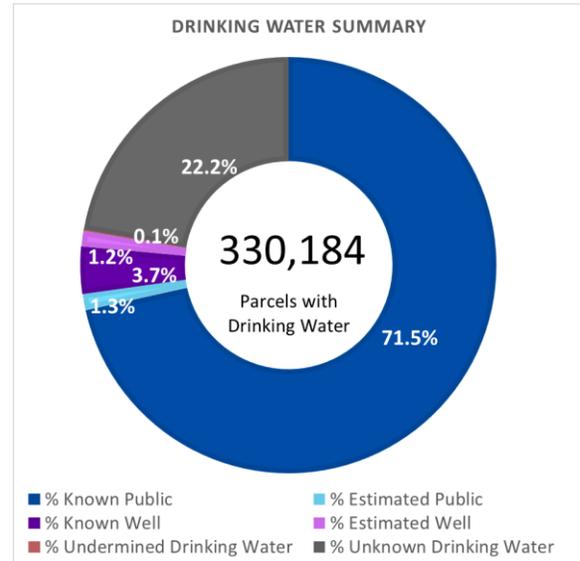
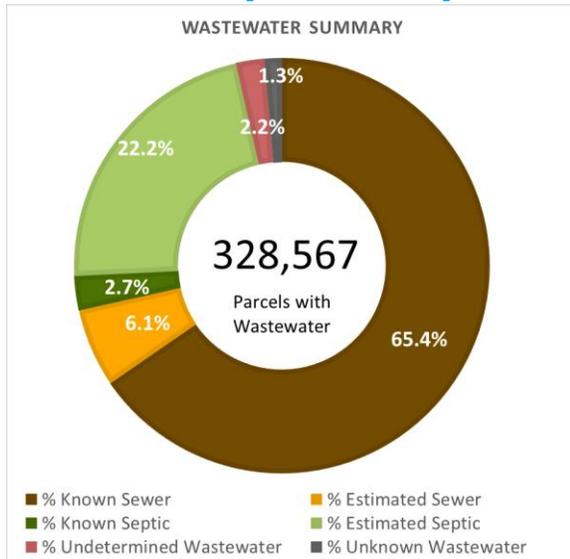


Received responses from 23.5% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 18.0% of all permitted drinking water in the county, with the following large facilities missing:

- City of Cross City
- Suwannee Water & Sewer District

## Duval County Summary



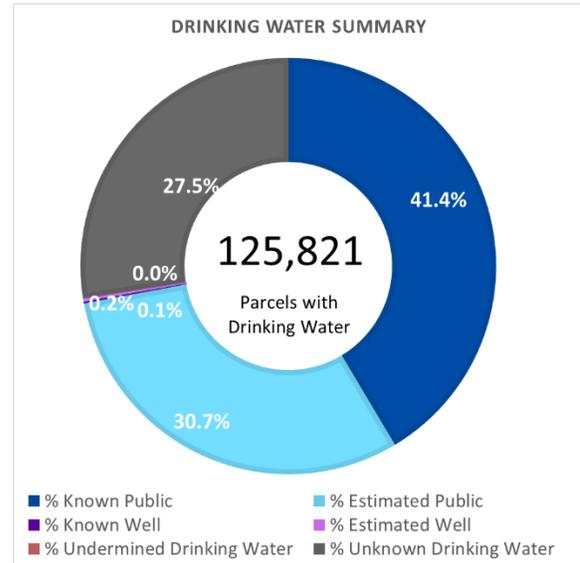
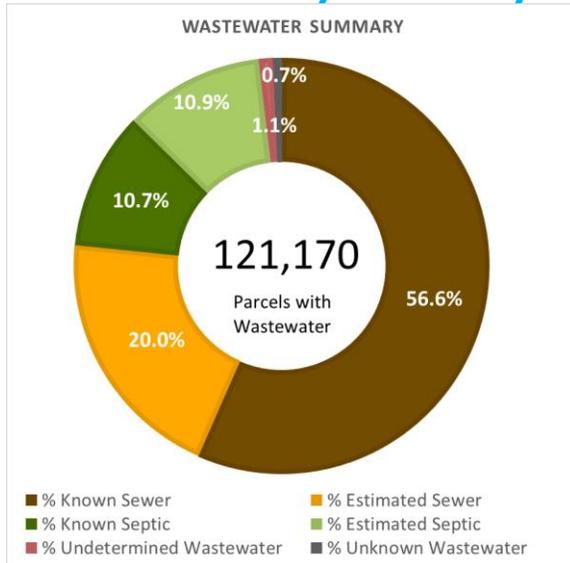
Using both data collected in 2009 and during 2014-2016, responses were received from 99.3% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Atlantic Beach
- City of Jacksonville Beach (submitted in 2009)
- Neptune Beach WWTF (submitted in 2009)
- Usn Mayport Naval Station WWTF (submitted in 2009)
- Usn Nas Jacksonville WWTF (submitted in 2009)

Received responses from 94.4% of all permitted drinking water in the county, with the following large facilities missing:

- Atlantic Beach Water System
- Baldwin Water System
- City of Jacksonville Beach
- Jacksonville University
- Montgomery Correctional Center
- Neighborhood Utility Inc
- Neptune Beach
- Normandy Village Utility Co

## Escambia County Summary

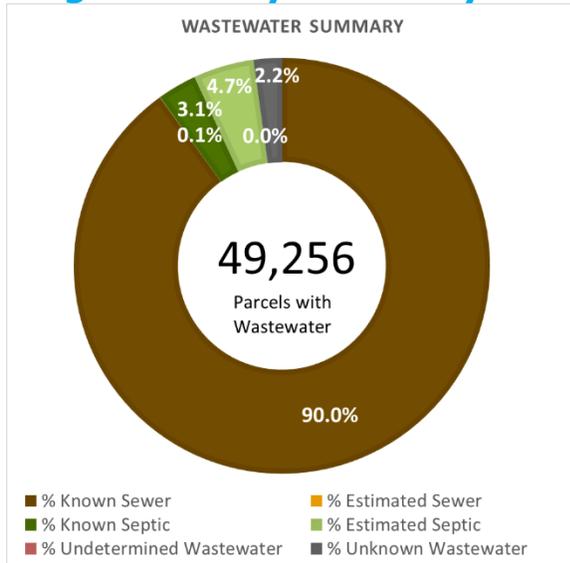


Received responses from 98.0% of all permitted wastewater in the county, with no large facilities missing.

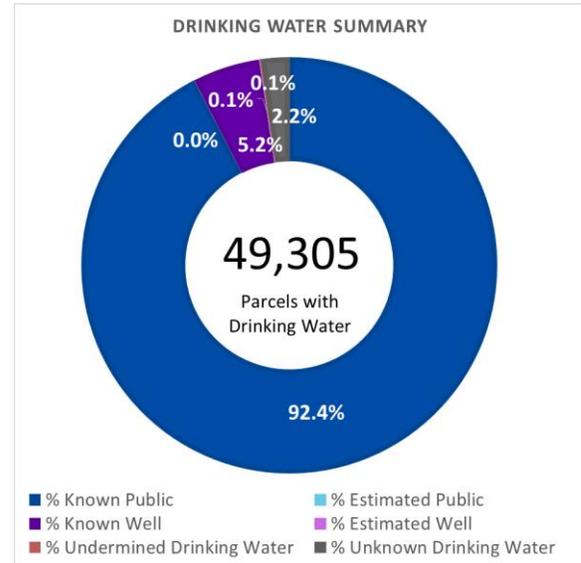
Received responses from 93.5% of all permitted drinking water in the county, with the following large facilities missing:

- Ascend Performance Materials (Solutia)
- Cottage Hill Water Works
- Farm Hill Utilities Inc
- Molino Utilities Inc
- Town of Century

## Flagler County Summary

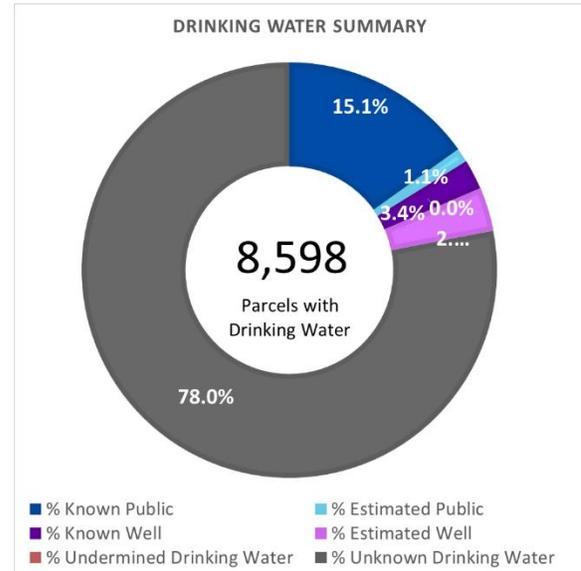
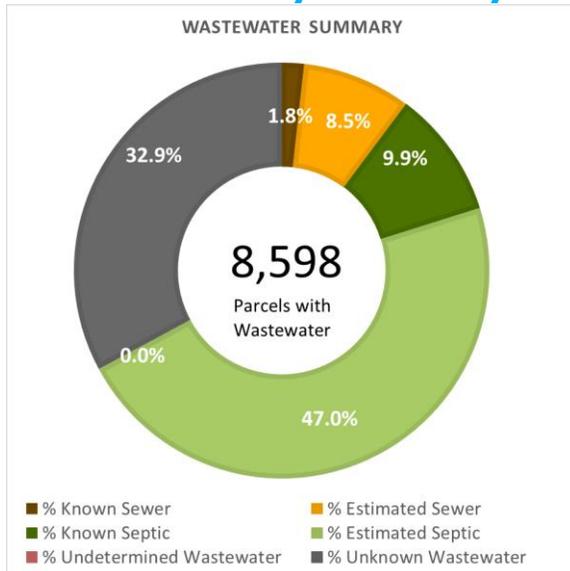


Received responses from 78.0% of all permitted wastewater in the county, with no large facilities missing.



Received responses from 100.0% of all permitted drinking water in the county, with no large facilities missing.

## Franklin County Summary



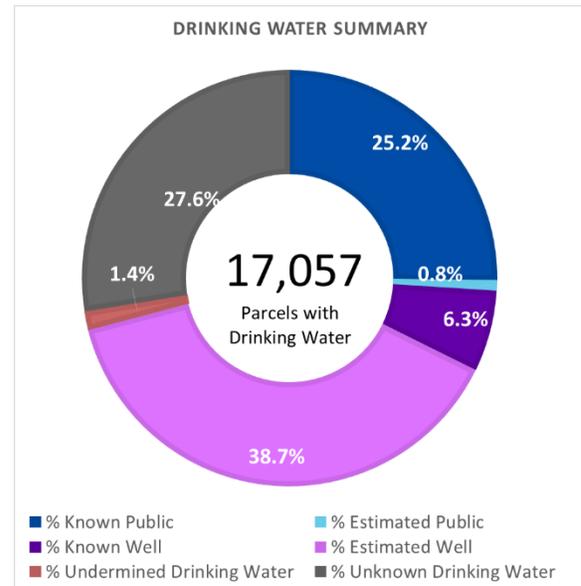
Received responses from 14.3% of all permitted wastewater in the county, with the following large facilities missing:

- City of Carrabelle

Received responses from 2.0% of all permitted drinking water in the county, with the following large facilities missing:

- City of Apalachicola
- City of Carrabelle
- Eastpoint Water & Sewer District
- Water Management Services Inc

## Gadsden County Summary



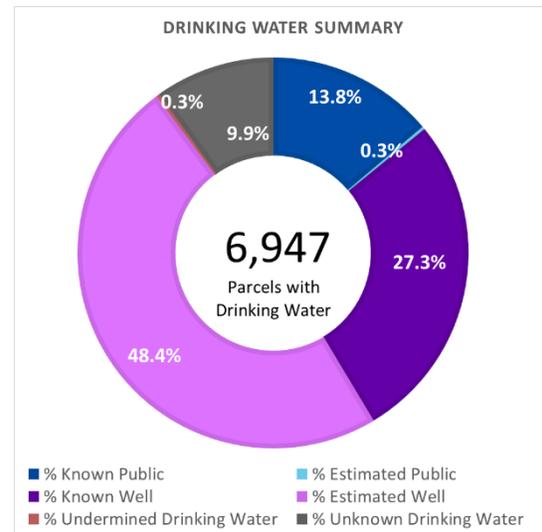
Received responses from 49.8% of all permitted wastewater in the county, with the following large facilities missing:

- Quincy WWTP

Received responses from 36.8% of all permitted drinking water in the county, with the following large facilities missing:

- 
- City of Gretna
- City of Quincy
- Talquin Electric Coop. Inc

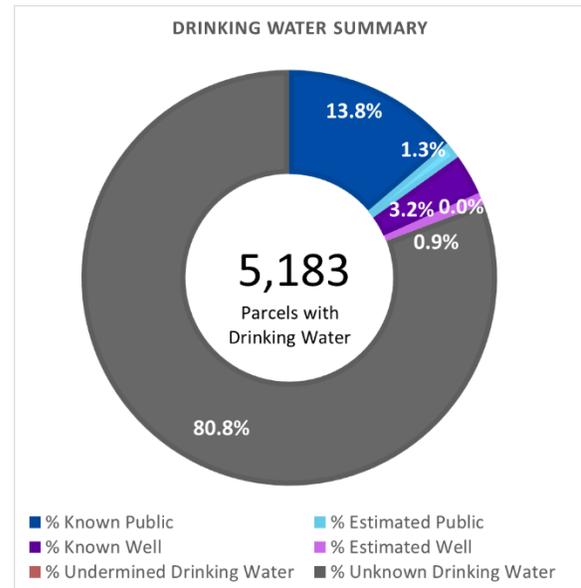
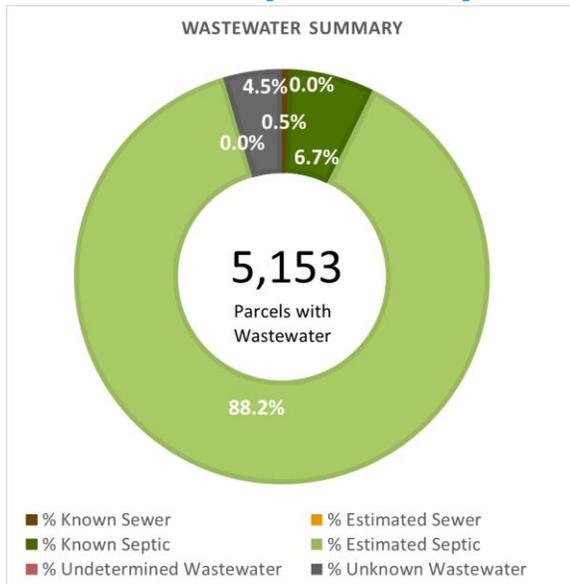
## Gilchrist County Summary



Received responses from 77.4% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 98.7% of all permitted drinking water in the county, with no large facilities missing.

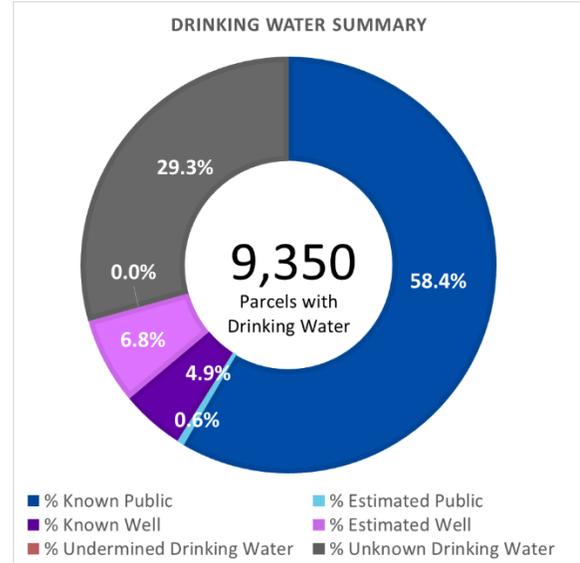
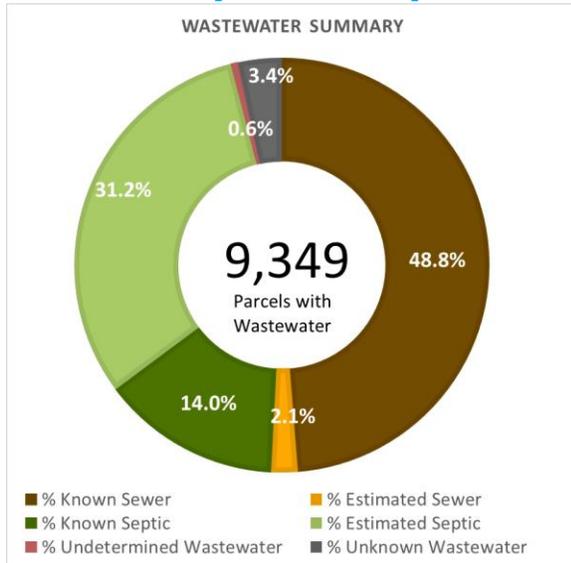
## Glades County Summary



Received responses from 77.6% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 93.8% of all permitted drinking water in the county, with no large facilities missing.

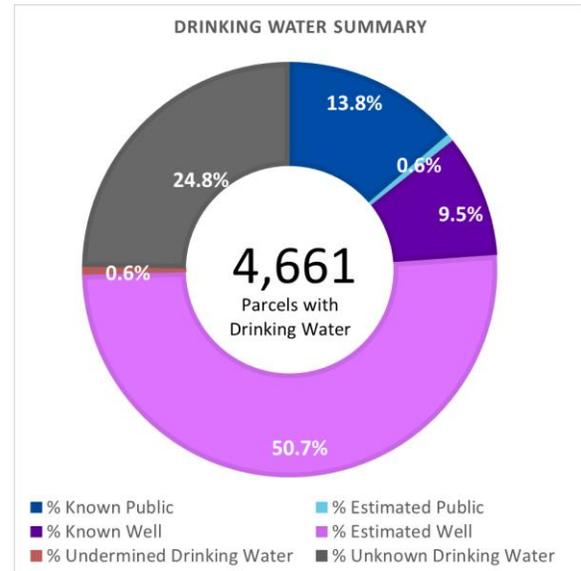
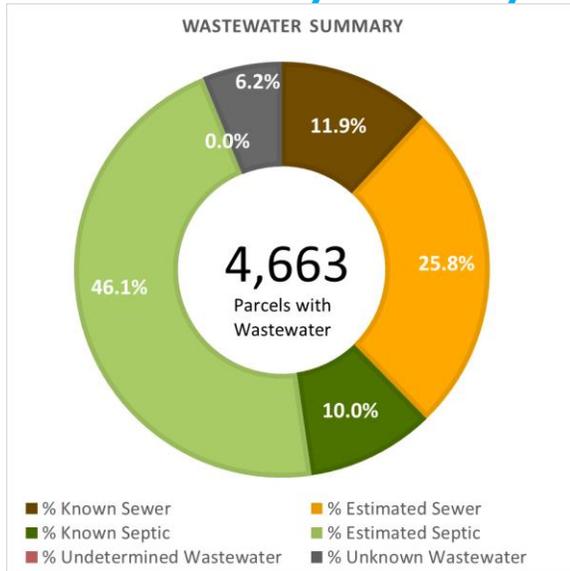
## Gulf County Summary



Received responses from 100.0% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 100.0% of all permitted drinking water in the county, with no large facilities missing.

## Hamilton County Summary



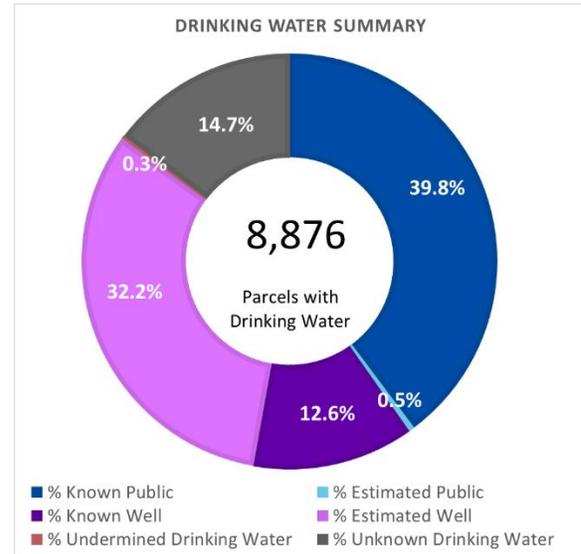
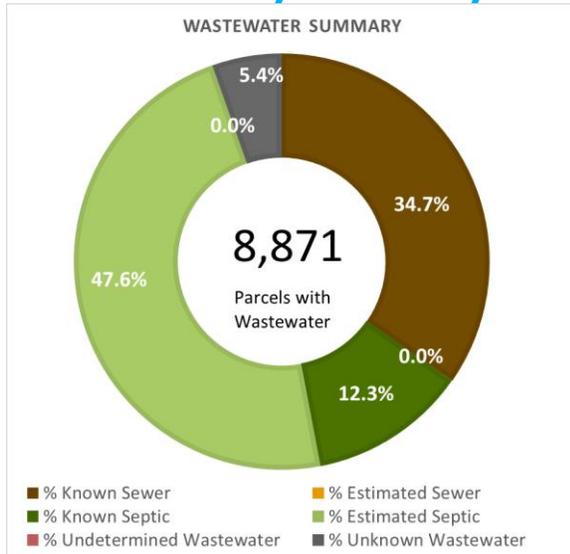
Received responses from 29.2% of all permitted wastewater in the county, with the following large facilities missing:

- Jasper Water Department

Received responses from 36.8% of all permitted drinking water in the county, with the following large facilities missing:

- Jasper Water Department

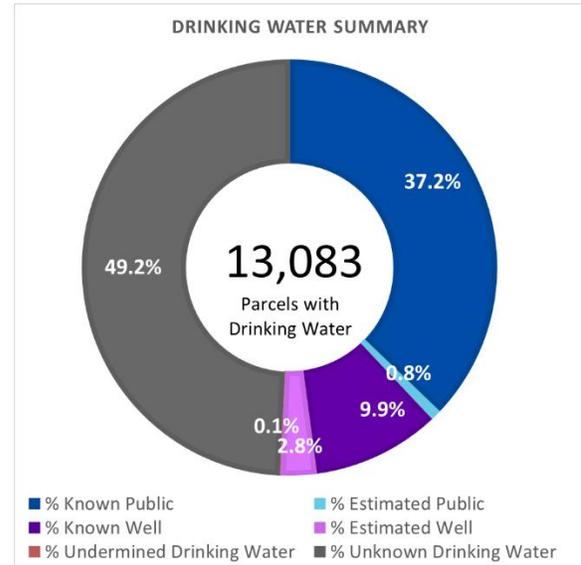
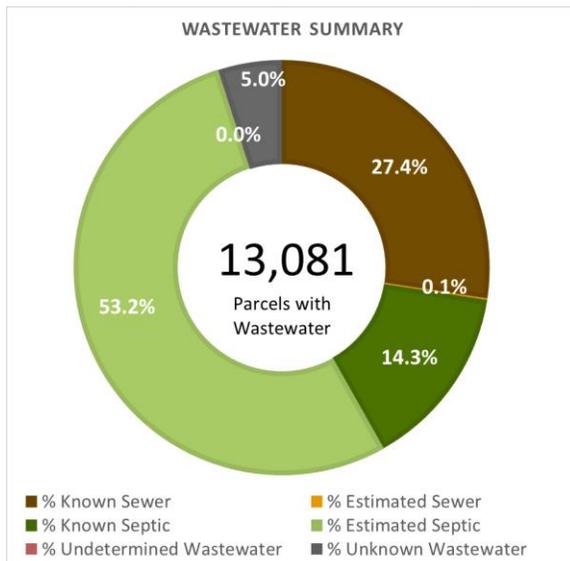
## Hardee County Summary



Received responses from 96.4% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 89.9% of all permitted drinking water in the county, with no large facilities missing.

## Hendry County Summary

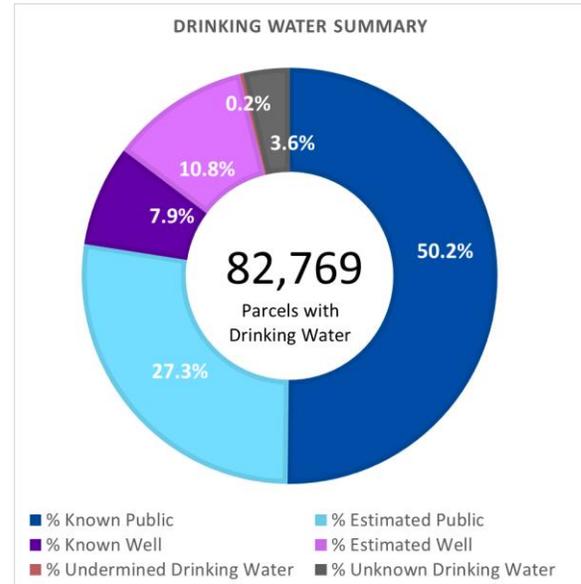


Received responses from 91.2% of all permitted wastewater in the county, with no following large facilities missing.

Received responses from 81.2% of all permitted drinking water in the county, with the following large facilities missing:

- Riverbend Motorcoach Resort
- South Shore Water Association Inc

## Hernando County Summary

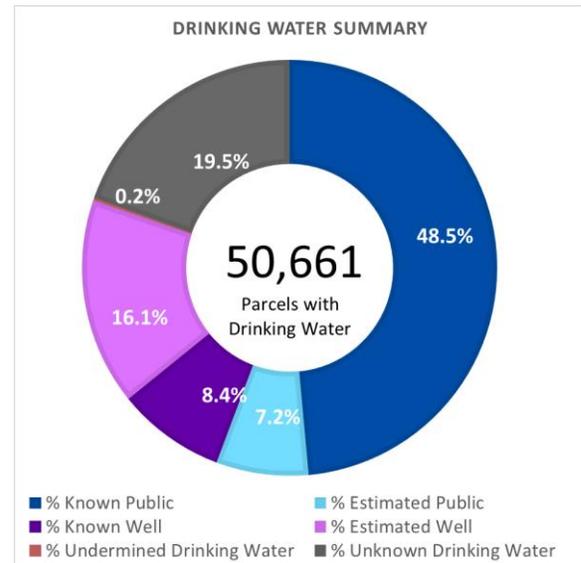
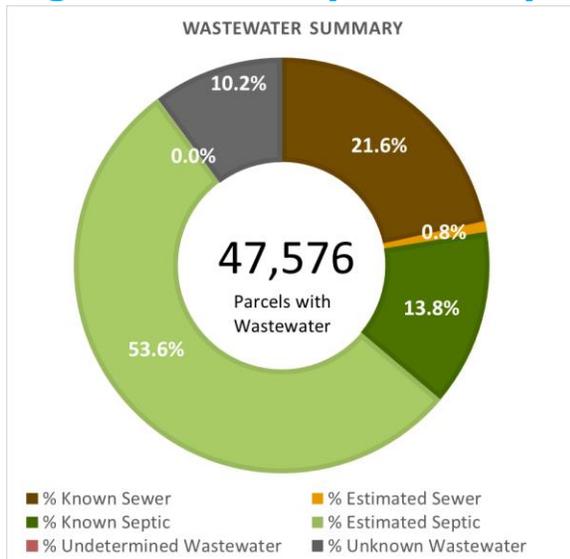


Received responses from 98.2% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 99.0% of all permitted drinking water in the county, with the following large facilities missing:

- BP Gas Station
- Division of Forestry

## Highlands County Summary



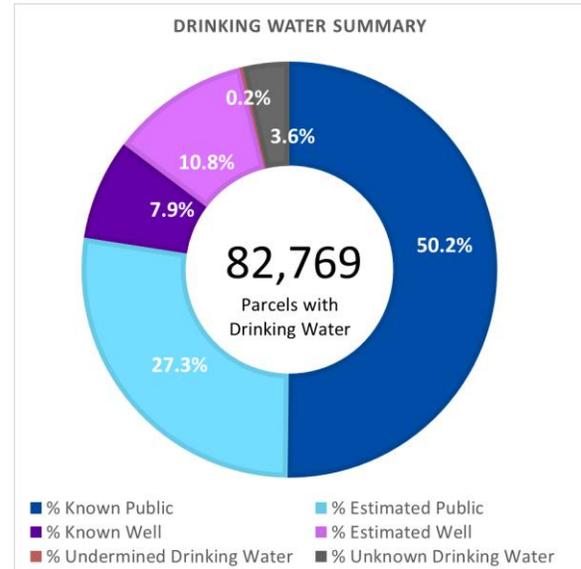
Received responses from 70.5% of all permitted wastewater in the county, with the following large facilities missing:

- City of Avon Park

Received responses from 77.8% of all permitted drinking water in the county, with the following large facilities missing:

- City of Avon Park
- Country Club Utilities
- Lake Bonnet Village
- Lake Placid Congregation of Jehovah's Witnesses
- US Water Corp

## Hillsborough County Summary



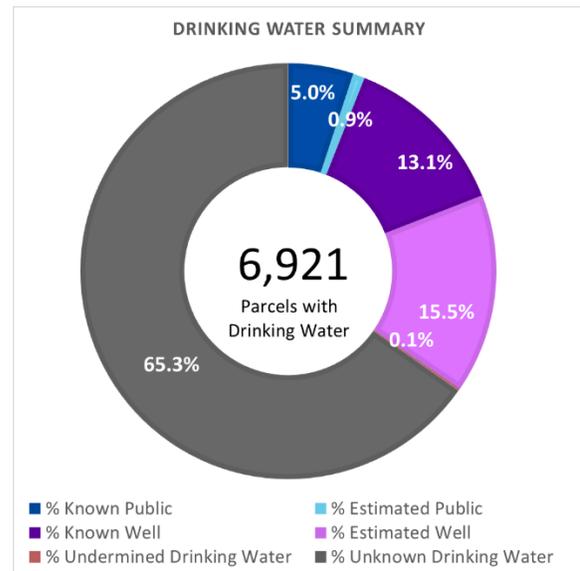
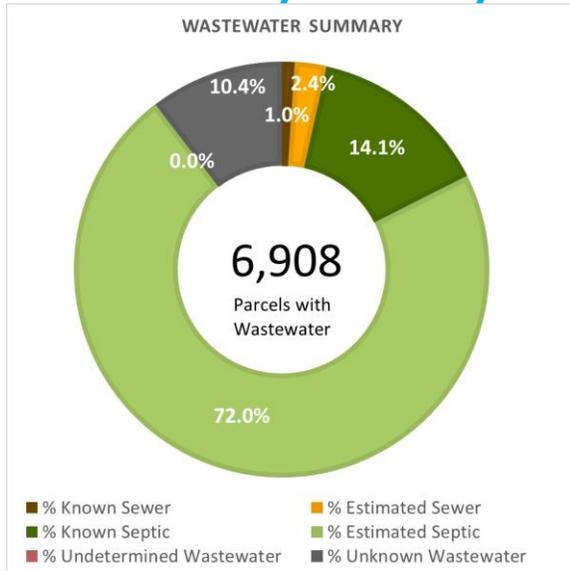
Using both data collected in 2009 and during 2014-2016, responses were received from 98.3% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Plant City (submitted in 2009)
- Hillsborough County Public Utilities (submitted in 2009)
- Macdill Afb WWTP

Received responses from 53.3.% of all permitted drinking water in the county, with the following large facilities missing:

- Cax Lakeshore Villas
- City of Plant City
- Davpam MHP
- Fishhawk Ridge Association Inc
- Hide-A-Way Campground
- Hillsborough County Public Utilities
- Independence Academy
- Jay Mar Villas
- Little Manatee Springs MHP
- Oaks of Thonotosassa MHP
- Paradise Village
- Plurisusa
- Riverside Golf Course Community
- Spanish Main Travel Resort
- Temple Terrace Utility

## Holmes County Summary



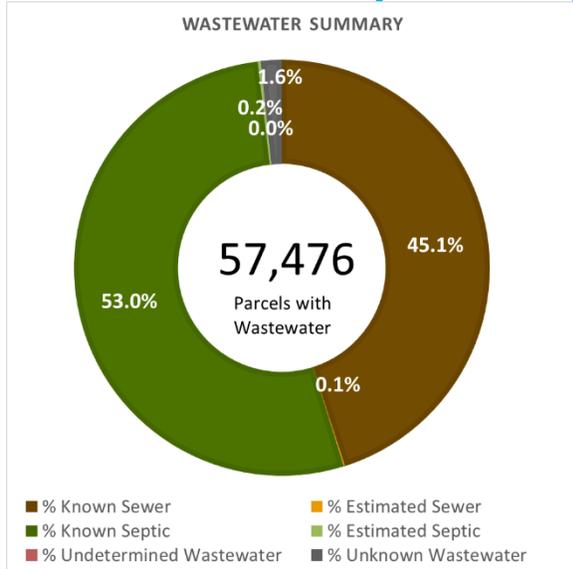
Received responses from 6.2% of all permitted wastewater in the county, with the following large facilities missing:

- Bonifay Public Works

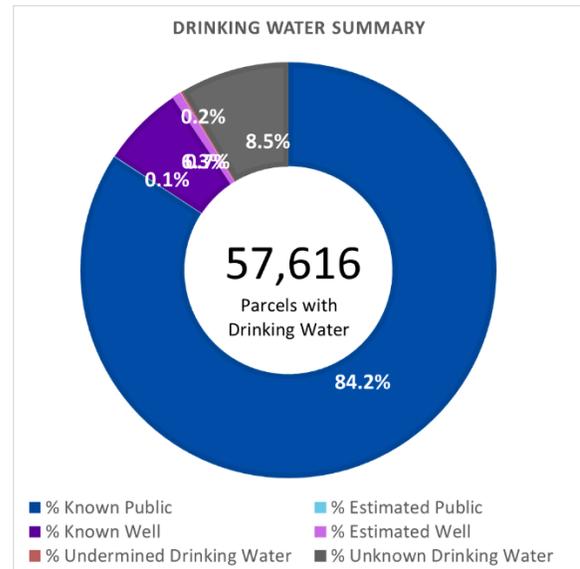
Received responses from 26.3% of all permitted drinking water in the county, with the following large facilities missing:

- Bonifay Public Works
- Town of Ponce De Leon

## Indian River County Summary

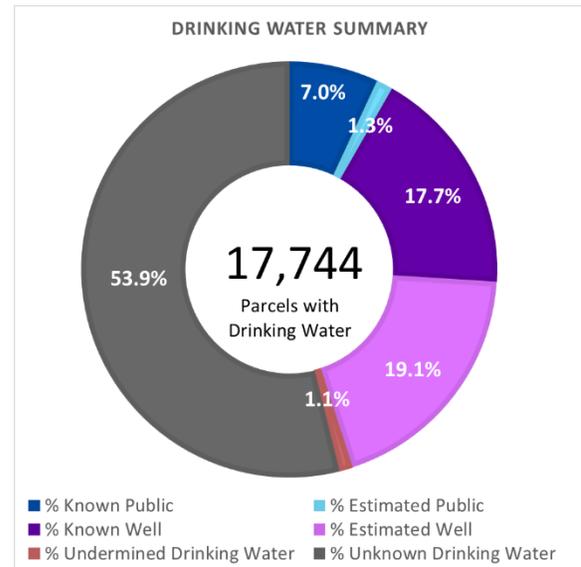


Received responses from 100.0% of all permitted wastewater in the county, with no large facilities missing.



Received responses from 100.0% of all permitted drinking water in the county, with no large facilities missing.

## Jackson County Summary



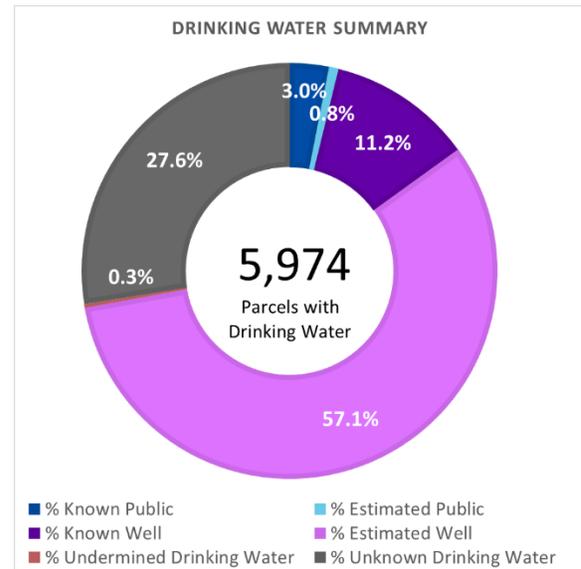
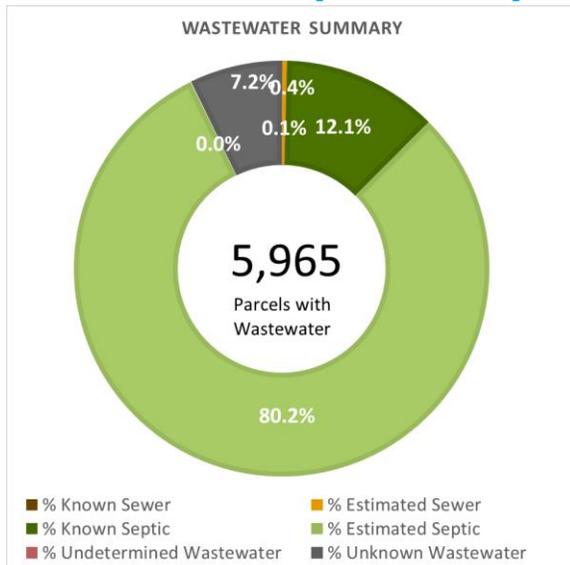
Using both data collected in 2009 and during 2014-2016, responses were received from 23.3% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Graceville
- City of Marianna
- Town of Sneads (submitted in 2009)

Received responses from 40.6% of all permitted drinking water in the county, with the following large facilities missing:

- City of Graceville
- City of Marianna
- Cottondale Water System
- Town of Sneads

## Jefferson County Summary

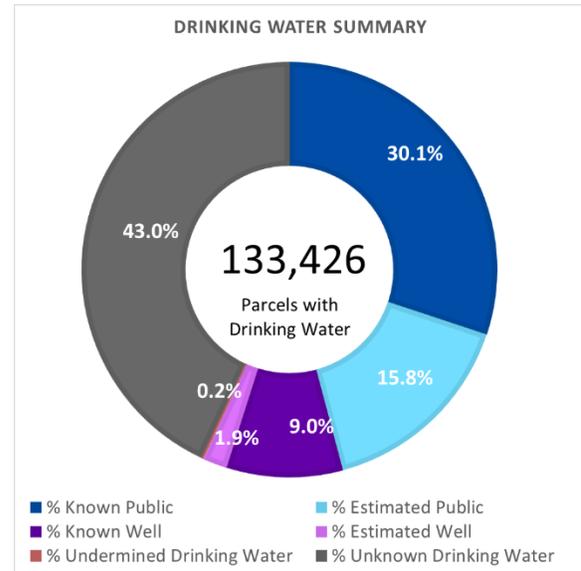
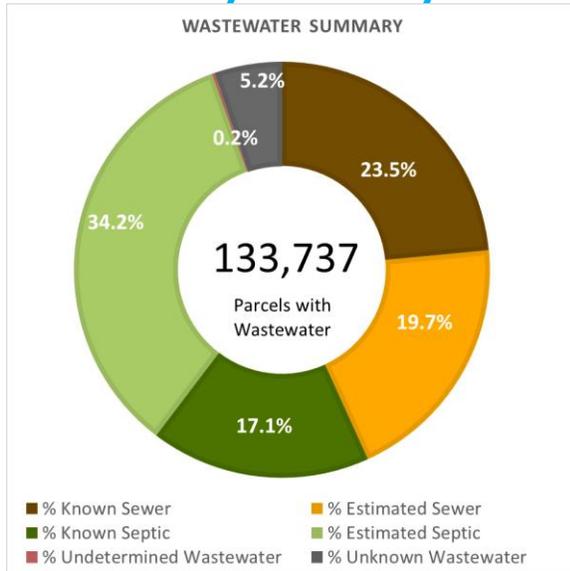


Received responses from 26.1% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 28.1% of all permitted drinking water in the county, with the following large facilities missing:

- City of Monticello
- Jefferson and Lamont Water System

## Lake County Summary



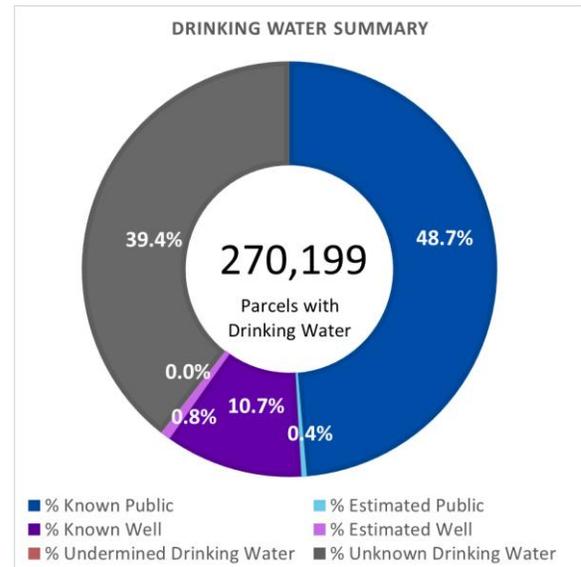
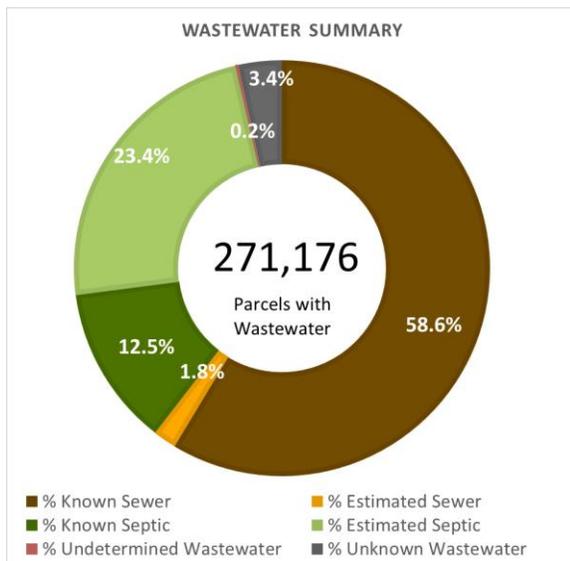
Received responses from 70.8% of all permitted wastewater in the county, with the following large facilities missing:

- Mount Dora WWTF
- Tavares/Woodlea Road WWTF

Received responses from 59.5% of all permitted drinking water in the county, with the following large facilities missing:

- City of Mount Dora
- City of Zephyrhills
- Holiday Travel Resort
- Howey In The Hills
- LCA
- Mascotte Water Department
- Minneola Water Department
- Oak Springs LLC MHP
- St. Johns River Utility Inc
- Sunlake Estates
- Tavares Water Department
- UI Water
- US Water Corp
- Water Oak Country Club Estates
- Wedgewood Subdivision

## Lee County Summary



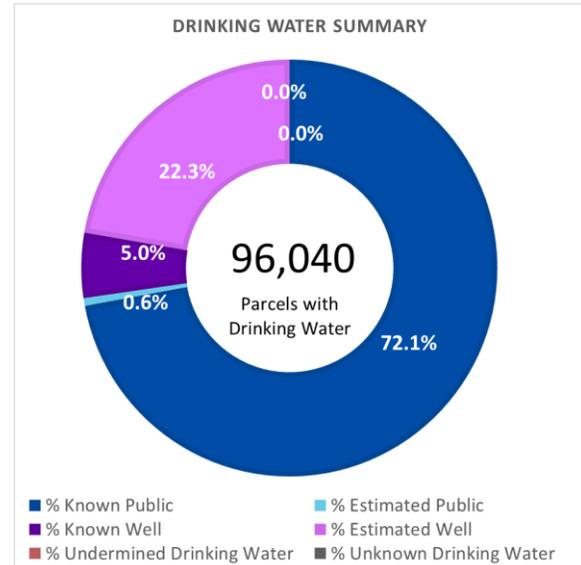
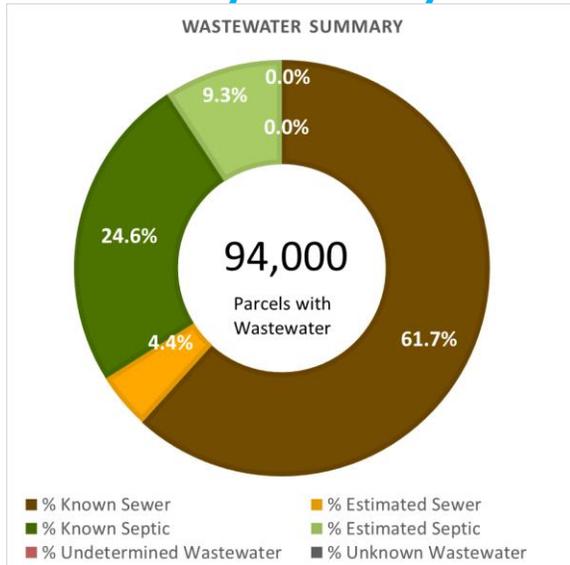
Using both data collected in 2009 and during 2014-2016, responses were received from 94.7% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- Donax Water Reclamation Facility (submitted in 2009)
- US Water Corp

Received responses from 85.8% of all permitted drinking water in the county, with the following large facilities missing:

- Citrus Park RV Resort
- Gateway Services District
- Greater Pine Island Water Association
- Island Water Association
- Old Bridge Village Mobile Home Park
- Raintree RV Resort
- Syngenta Flowers Inc
- Town of Fort Myers Beach
- US Water Corp

## Leon County Summary

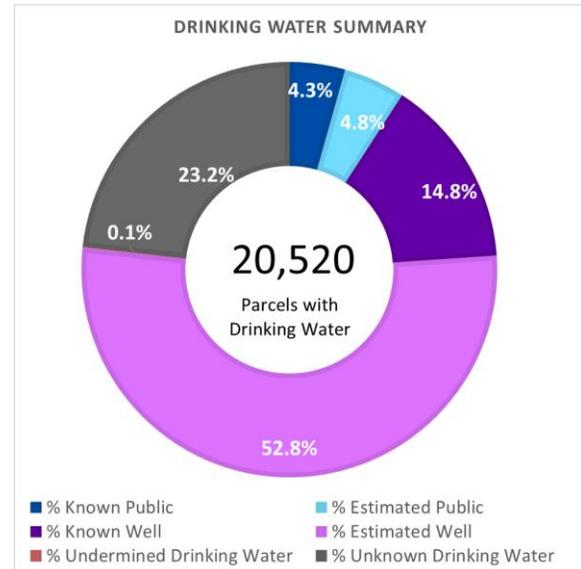
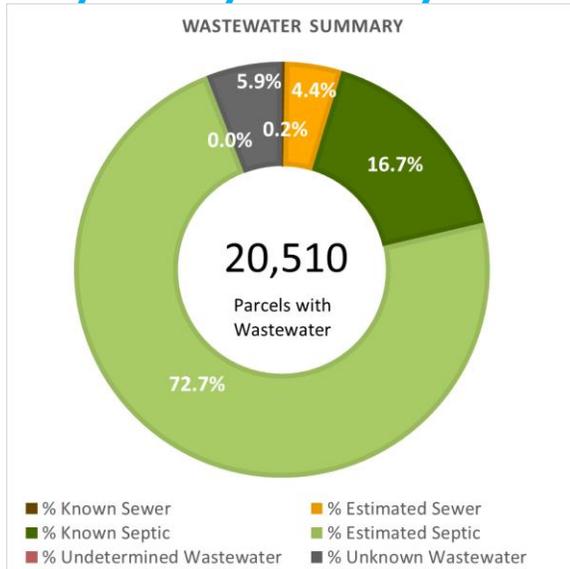


Received responses from 91.8% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 87.6% of all permitted drinking water in the county, with the following large facilities missing:

- Leon County Schools
- Talquin Electric Coop. Inc

## Levy County Summary

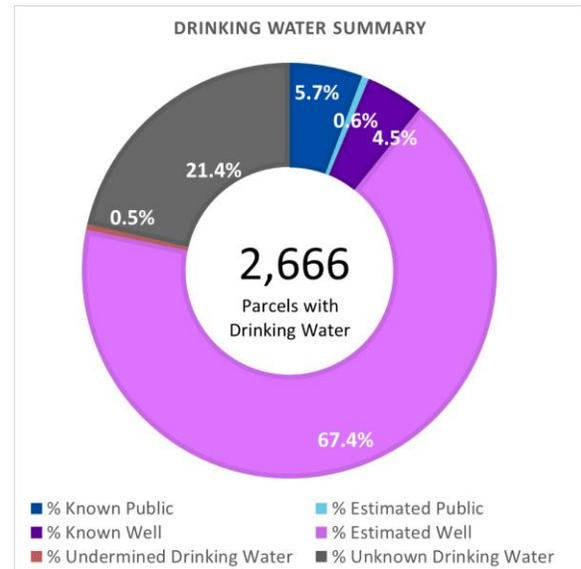
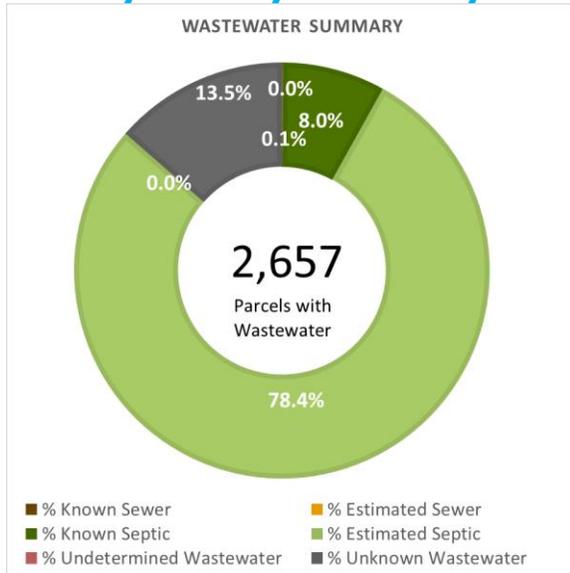


Received responses from 18.1% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 33.7% of all permitted drinking water in the county, with the following large facilities missing:

- Bronson WTP
- Fanning Springs Ws
- Inglis Water Department
- Town of Chiefland
- Williston City of
- Yankeetown Water Department

## Liberty County Summary

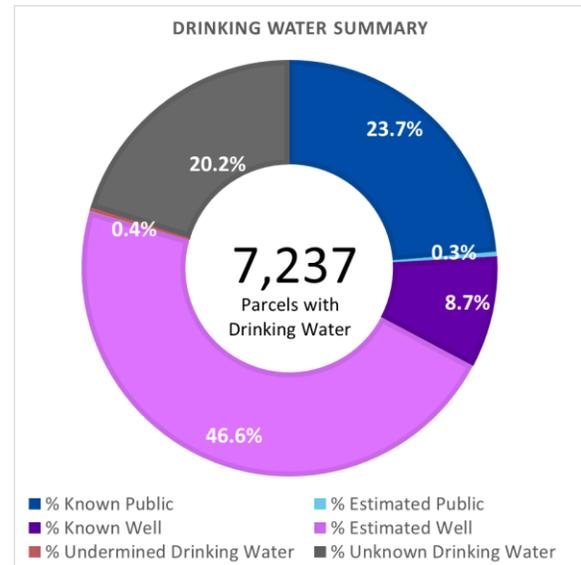
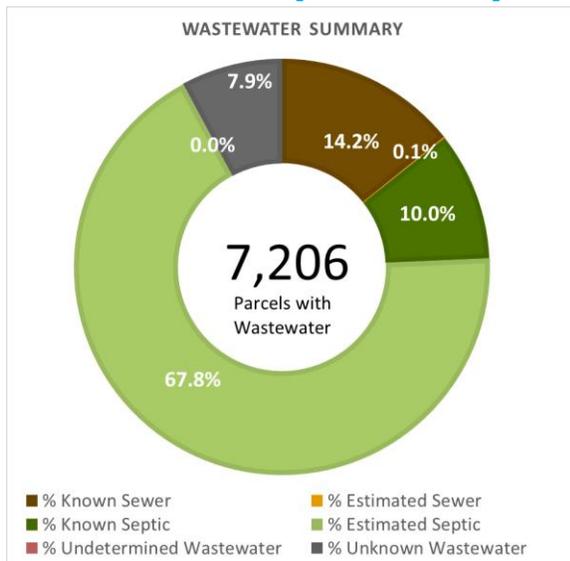


Received responses from 52.8% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 30.4% of all permitted drinking water in the county, with the following large facilities missing:

- City of Bristol
- Liberty County Water

## Madison County Summary

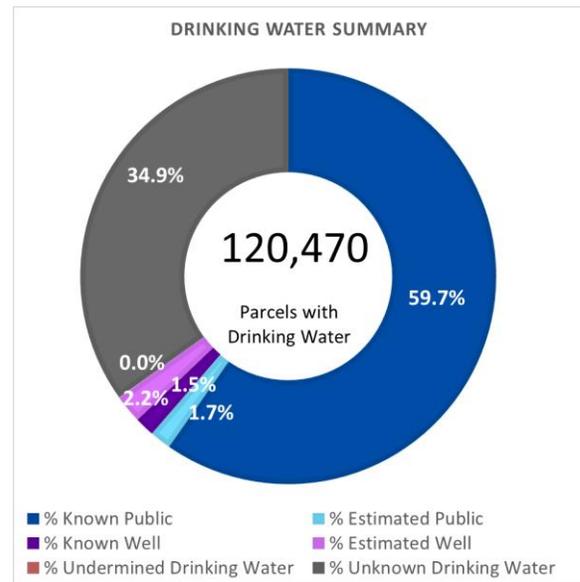
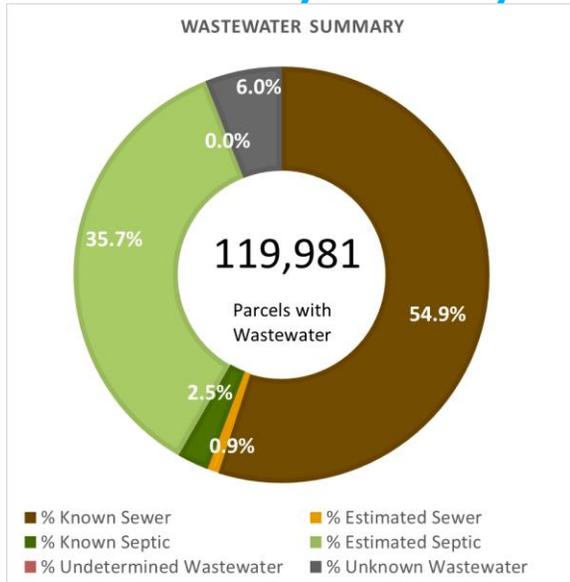


Received responses from 85.3% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 78.0% of all permitted drinking water in the county, with the following large facilities missing:

- Cherry Lake Utilities
- Greenville WTP

## Manatee County Summary

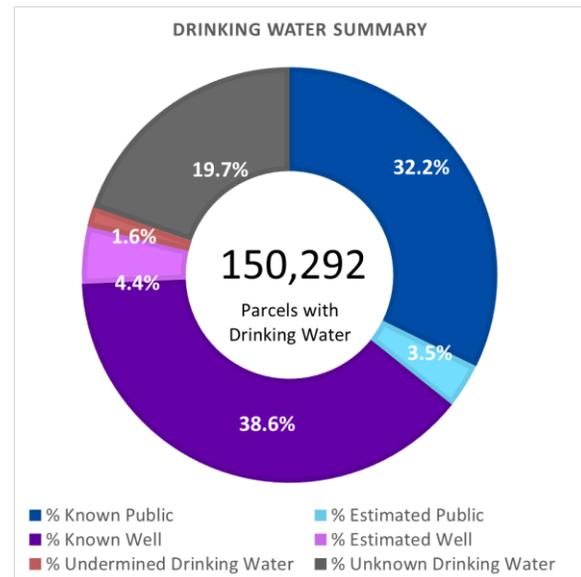
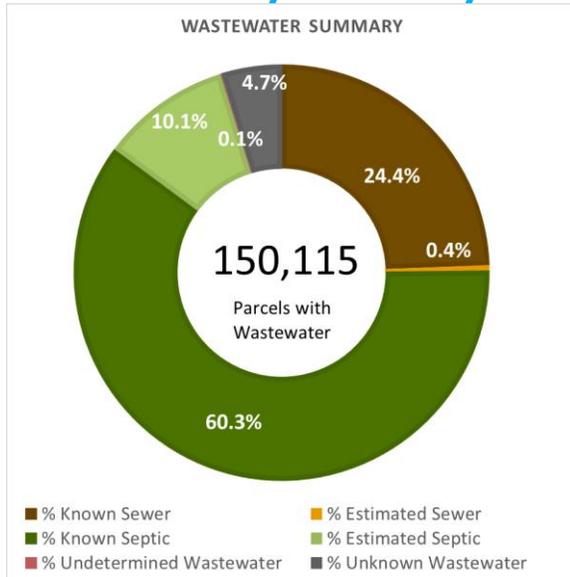


Received responses from 100.0% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 98.5% of all permitted drinking water in the county, with the following large facilities missing:

- Palmetto Pines Golf Course
- Town of Longboat Key

## Marion County Summary

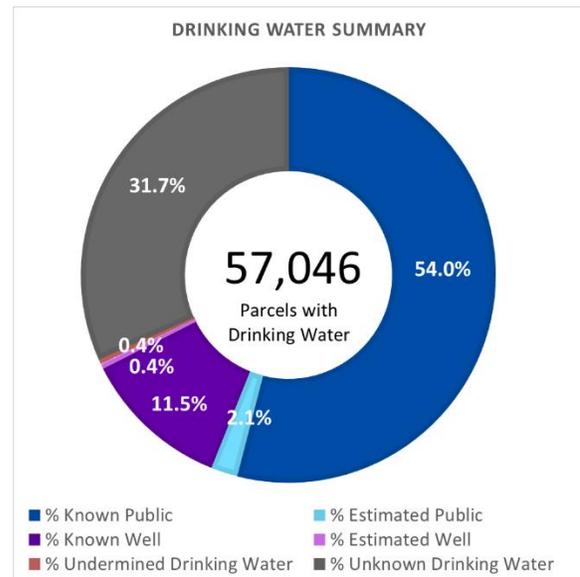
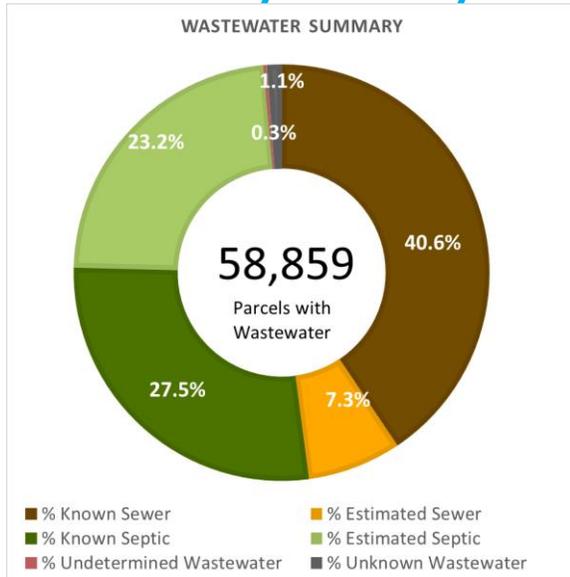


Received responses from 91.8% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 73.2% of all permitted drinking water in the county, with the following large facilities missing:

- City of Dunnellon
- Marion Landing
- Marion Utilities
- Ocala RV Camp Resort
- On Top of the World
- Rainbow Springs Cc Estates
- Saddle Oak Club MHP
- Spruce Creek Utility Co
- Sunshine Utilities of Central FL Inc
- US Water Corp
- Wilderness RV Park Estates

## Martin County Summary



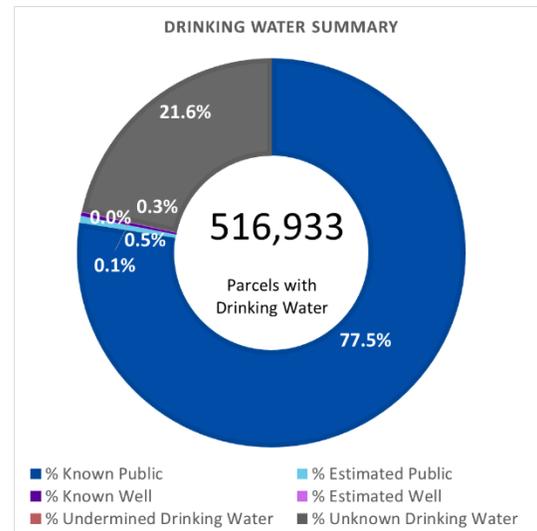
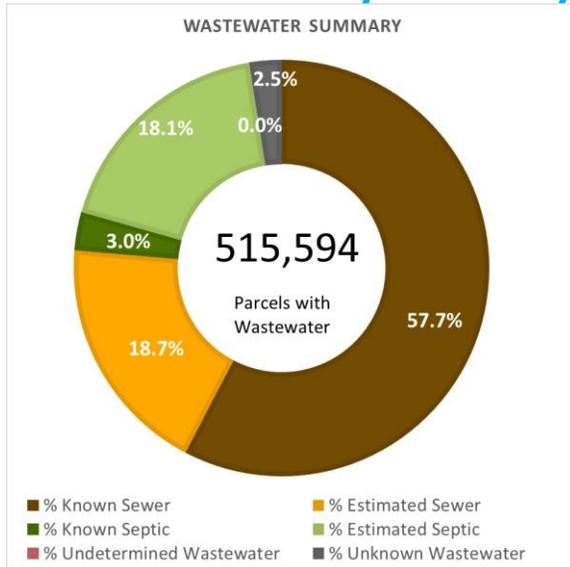
Using both data collected in 2009 and during 2014-2016, responses were received from 97.1% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- South Martin Regional Utilities (submitted in 2009)

Received responses from 76.2% of all permitted drinking water in the county, with the following large facilities missing:

- Indiantown Company Inc
- Sailfish Point
- South Martin Regional Utilities
- St. Lucie Mobile Village

## Miami Dade County Summary



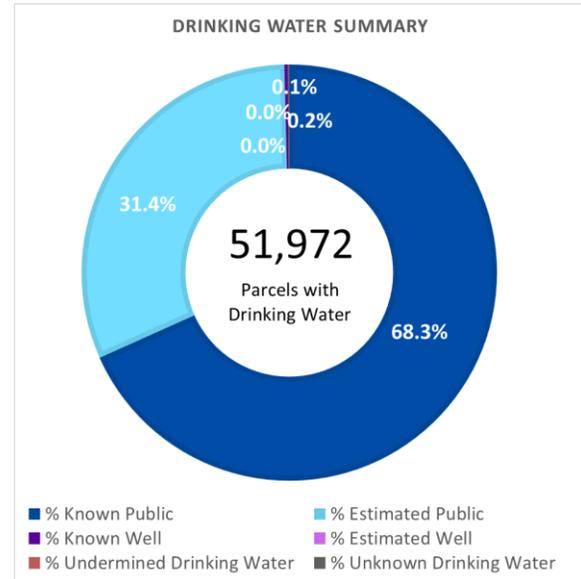
Received responses from 98.8% of all permitted wastewater in the county, with the following large facilities missing:

- Homestead City of

Received responses from 94.1% of all permitted drinking water in the county, with the following large facilities missing:

- American Village
- City of Miami Beach
- Homestead City of
- North Bay Village City of
- Opa Locka City of
- Surfside Town of
- Virginia Gardens Village of

## Monroe County Summary

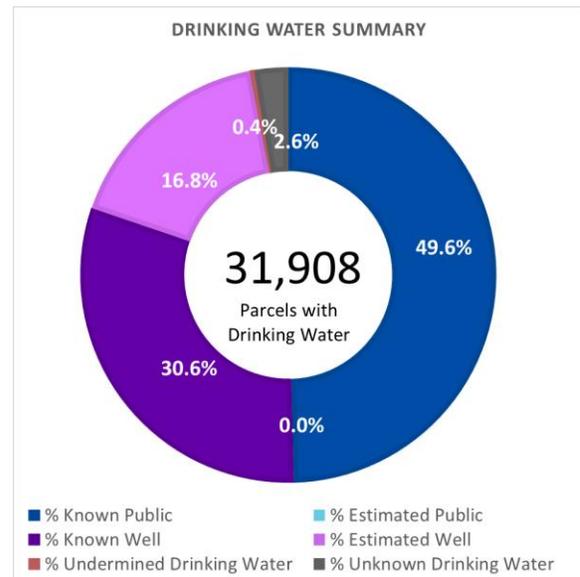
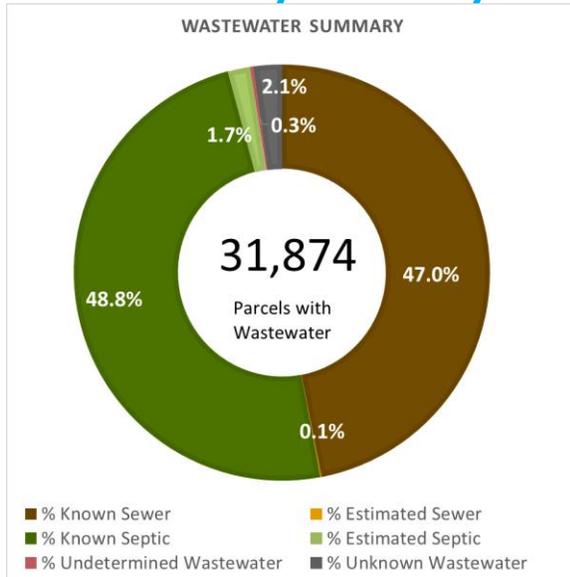


Received responses from 39.9% of all permitted wastewater in the county, with the following large facilities missing.

- Richard A Heyman WWTP-Key West

Received responses from 100.0% of all permitted drinking water in the county, with no large facilities missing.

## Nassau County Summary



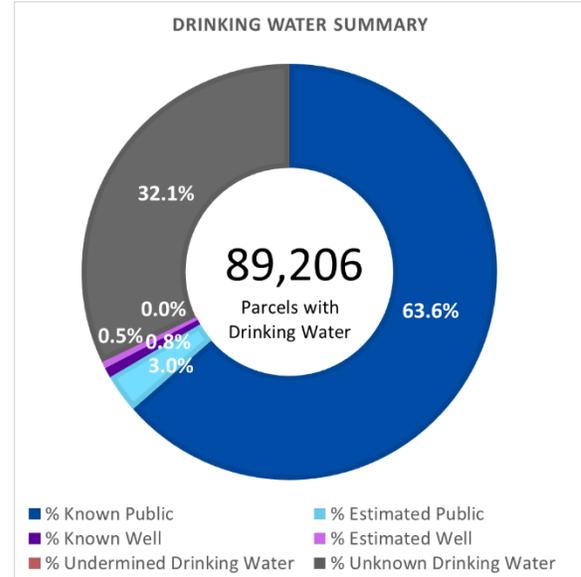
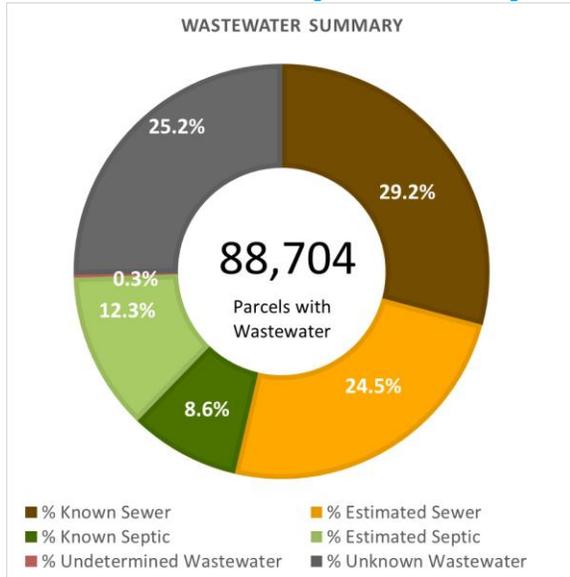
Using both data collected in 2009 and during 2014-2016, responses were received from 89.9% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- JEA (submitted in 2009)

Received responses from 63.1% of all permitted drinking water in the county, with the following large facilities missing.

- JEA
- Town of Callahan
- Town of Hilliard

## Okaloosa County Summary



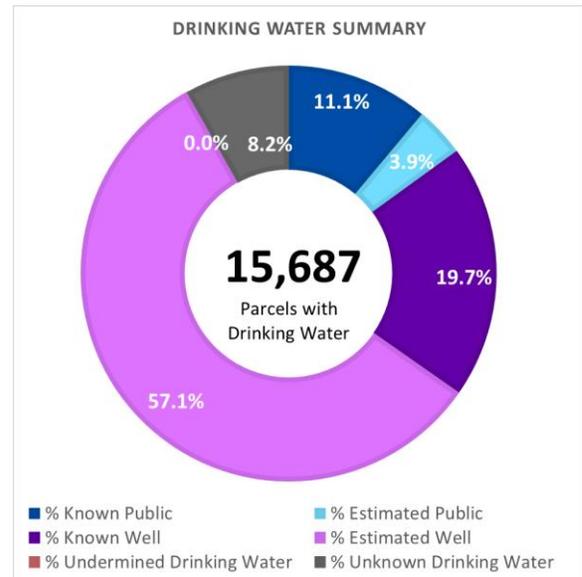
Received responses from 74.1% of all permitted wastewater in the county, with the following large facilities missing:

- City of Crestview
- Nv Regional WWTP

Received responses from 69.7% of all permitted drinking water in the county, with the following large facilities missing:

- Auburn Water System
- Blackman Community
- City of Crestview
- City of Laurel Hill
- City of Niceville
- FDOT
- Holt Water Works Inc
- Public Water30

## Okeechobee County Summary



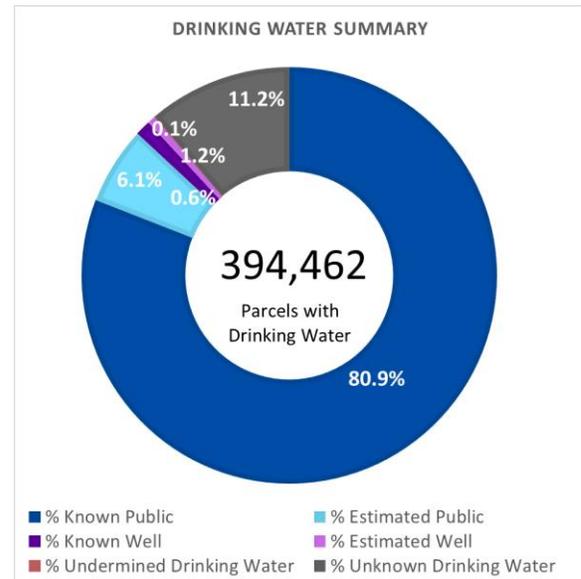
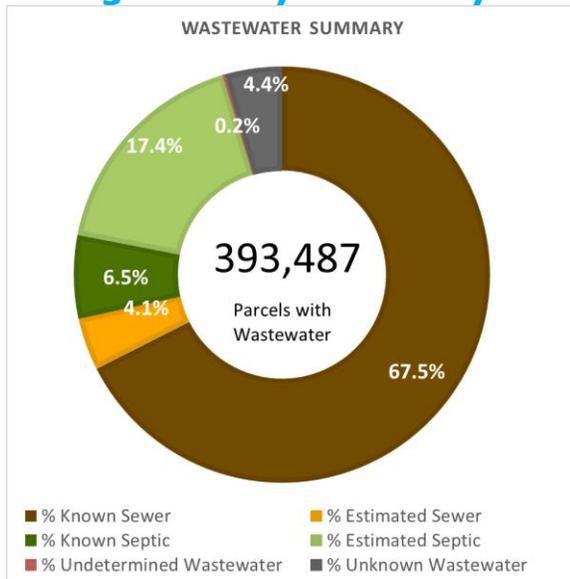
Received responses from 88.4% of all permitted wastewater in the county, with the following large facilities missing:

- Okeechobee Utility Authority

Received responses from 20.6% of all permitted drinking water in the county, with the following large facilities missing:

- Ancient Oaks RV Resort
- Okeechobee Utility Authority

## Orange County Summary



Received responses from 60.6% of all permitted wastewater in the county, with the following large facilities missing:

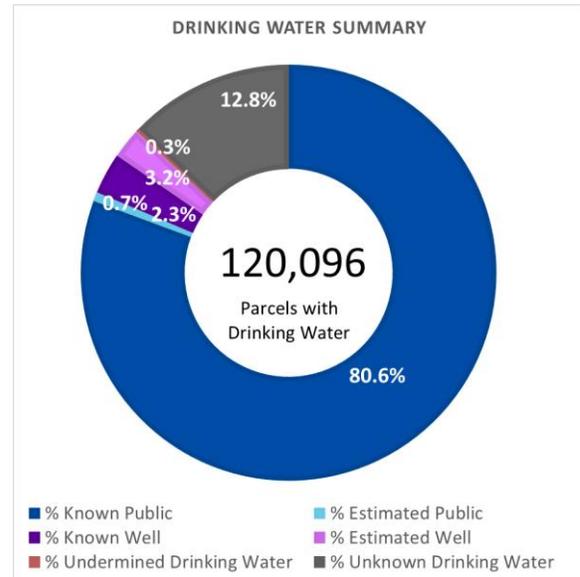
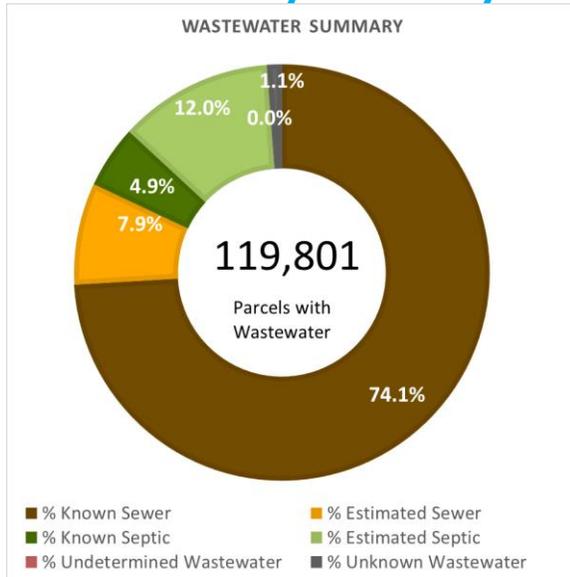
- Conserve II Distribution Center

Received responses from 98.4% of all permitted drinking water in the county, with the following large facilities missing:

- Biometric Utility Consultants Inc
- Central Florida Research Park
- Rock Springs MPH
- Silver Star Village
- Town of Eatonville
- UI Water
- US Water Corps



## Osceola County Summary

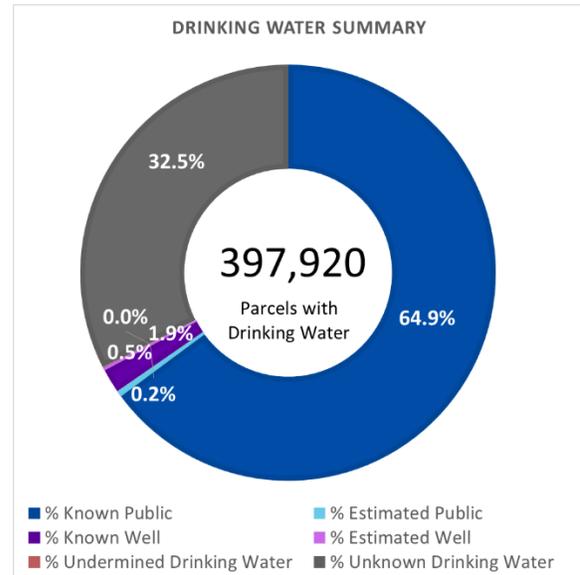


Received responses from 98.4% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 97.2% of all permitted drinking water in the county, with the following large facilities missing:

- Enterprise Cdd (Consecutive)

## Palm Beach County Summary



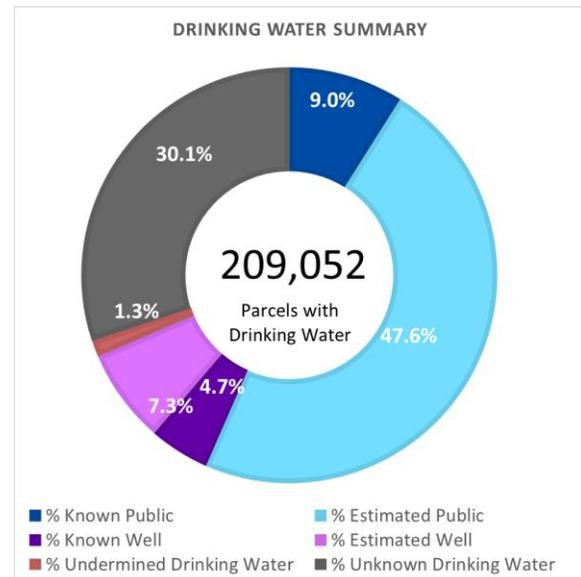
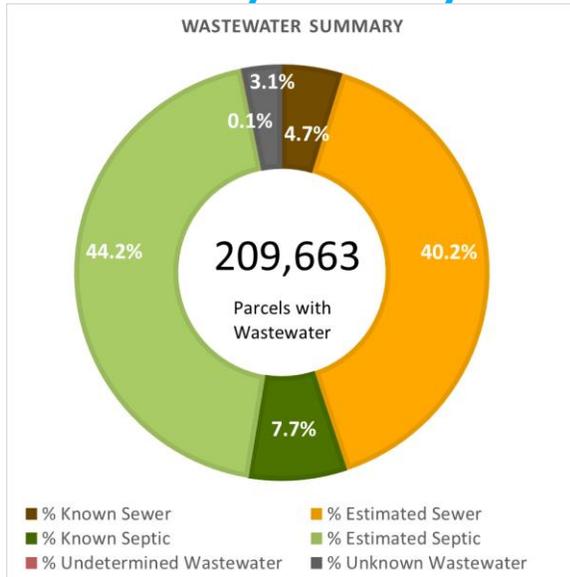
Using both data collected in 2009 and during 2014-2016, responses were received from 99.8% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Boca Raton (submitted in 2009)
- South Central Regional WWTP (submitted in 2009)

Received responses from 71.7% of all permitted drinking water in the county, with the following large facilities missing:

- Boynton Beach WTP
- City of Atlantis
- City of Boca Raton
- Delray Beach Water Department
- Golf Village of
- Gulfstream Town of
- Highland Beach Water Plant
- Lake Worth Utilities
- Manalapan WTP (Leroy C. Paslay)
- Mangonia Park Town of
- Palm Lake Estates
- Palm Springs Village of
- Tropical Breeze Estates
- US Water Corp

## Pasco County Summary



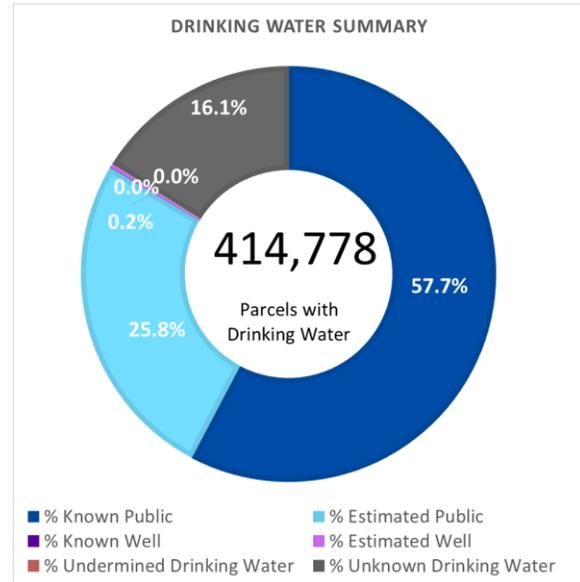
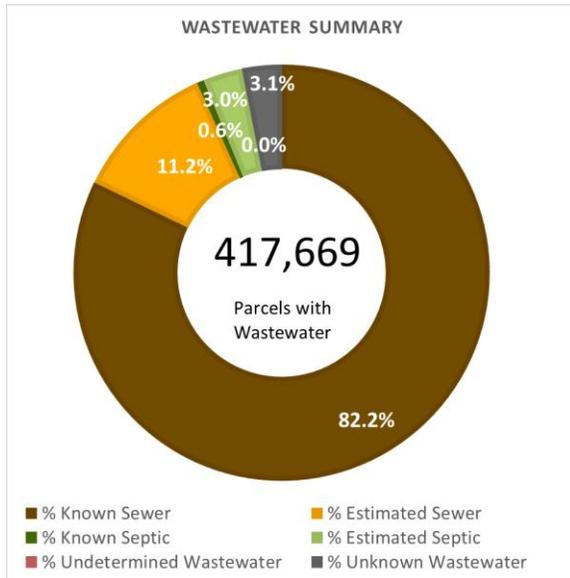
Received responses from 87.0 % of all permitted wastewater in the county, with the following large facilities missing:

- City of Zephyrhills
- US Water Corp
- Wesley Center Subregional WWTF

Received responses from 62.6% of all permitted drinking water in the county, with the following large facilities missing:

- Aqua Utilites
- Baker Acres RV Ranch
- City of San Antonio
- City of Zephyrhills
- Country Aire Village
- Dade City Water Dept
- Gardens Utilities
- Lakewood Villas Inc
- New Port Richey Water Dept
- Settlers Rest RV Park
- UI Water
- US Water Corp

## Pinellas County Summary

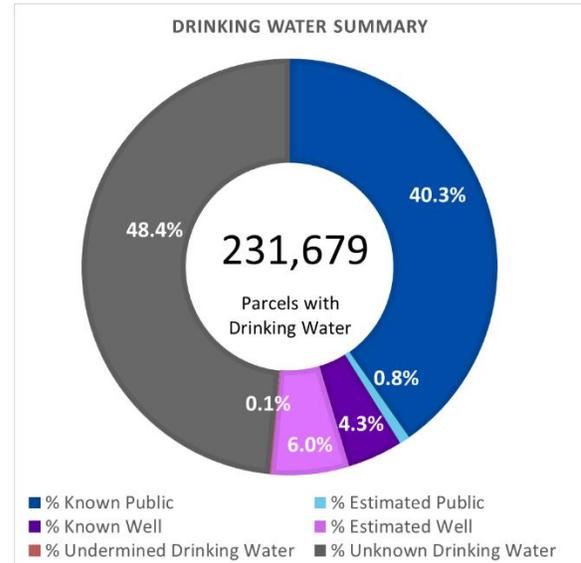
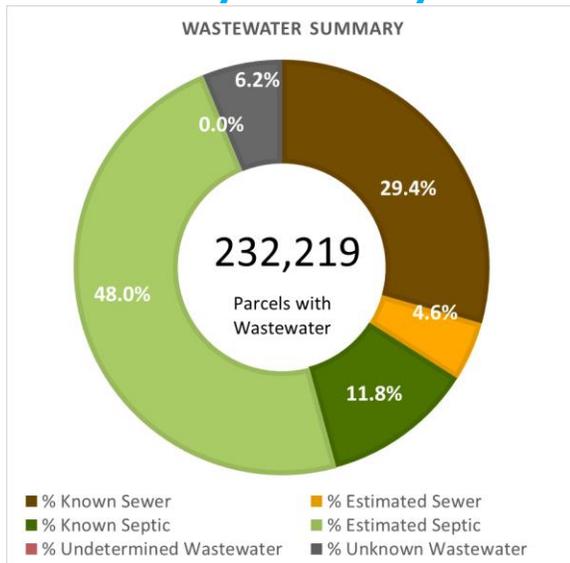


Received responses from 99.8% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 99.9% of all permitted drinking water in the county, with the following large facilities missing:

- UI Water

## Polk County Summary



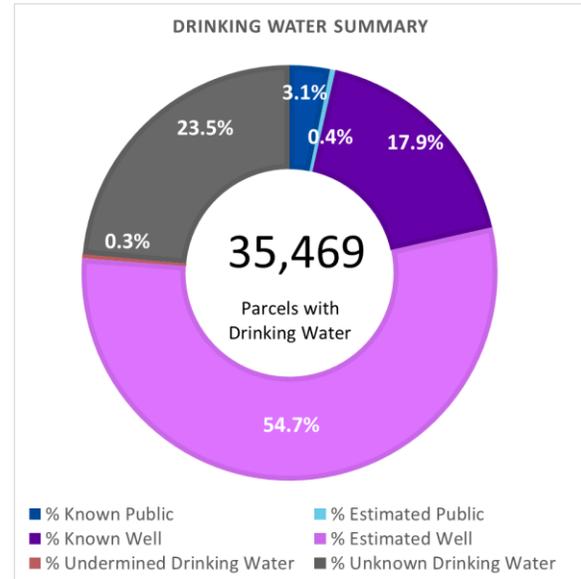
Using both data collected in 2009 and during 2014-2016, responses were received from 84.0% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Auburndale (submitted in 2009)
- City of Haines City
- City of Lake Wales
- Polk County Utilities (submitted in 2009)
- Southwest Regional WWTP (submitted in 2009)

Received responses from 50.8% of all permitted drinking water in the county, with the following large facilities missing:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Camp Inn Resorts</li> <li>• Carefree RV Subdivision</li> <li>• City of Auburndale</li> <li>• City of Davenport</li> <li>• City of Eagle Lake</li> <li>• City of Frostproof</li> <li>• City of Haines City</li> <li>• City of Lake Wales</li> <li>• City of Mulberry</li> <li>• Deer Creek RV Golf &amp; Country Club</li> <li>• Florida Camp Inn</li> <li>• Florida's Natural Growers</li> <li>• Four Lakes Golf Club</li> <li>• Gcp Plantation Landing</li> <li>• Gold Coast Utility</li> <li>• Lake Region Mobile Home Village</li> </ul> | <ul style="list-style-type: none"> <li>• Mosaic Fertilizer</li> <li>• Mouse Mountain RV &amp; Mobile Home Resort</li> <li>• Outdoor Resorts</li> <li>• Park Water Company</li> <li>• Polk County Utilities</li> <li>• Rainbow RV Resort</li> <li>• Saddlebag Lake Resort</li> <li>• Sunrise Utilities</li> <li>• Town of Dundee</li> <li>• Town of Lake Hamilton</li> <li>• UI Water</li> <li>• US Water Corp</li> <li>• Utility Message</li> <li>• Wg Resorts</li> <li>• Woodard Curran</li> </ul> |
|--|---|

## Putnam County Summary



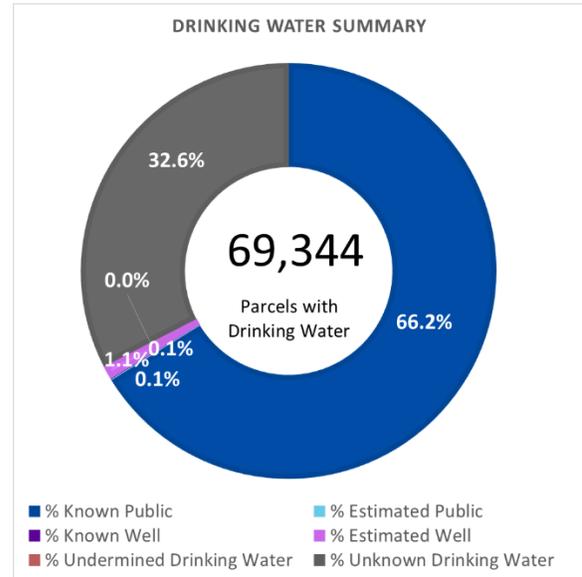
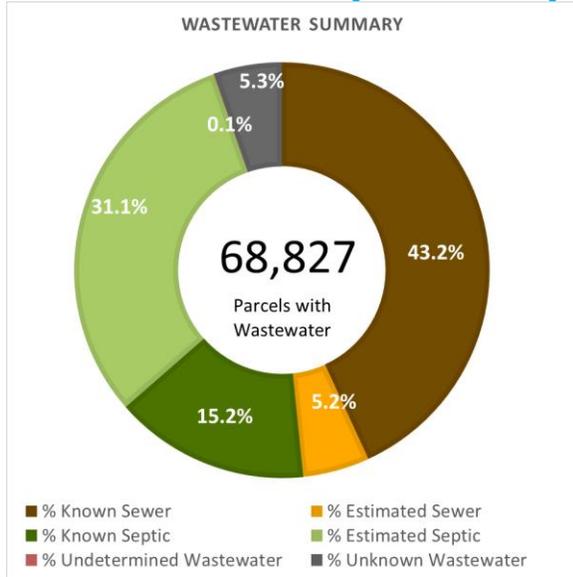
Received responses from 19.3% of all permitted wastewater in the county, with the following large facilities missing:

- City of Palatka

Received responses from 29.4% of all permitted drinking water in the county, with the following large facilities missing:

- City of Crescent City
- City of Palatka
- Interlachen WTP
- Port Buena Vista
- Town of Welaka
- US Water Corp

## Santa Rosa County Summary



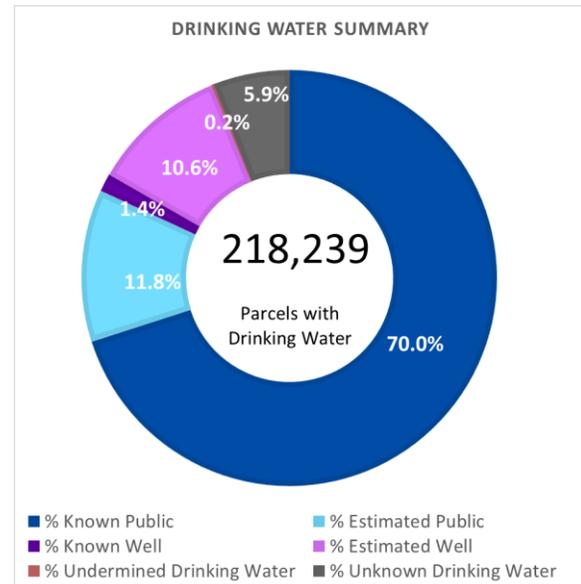
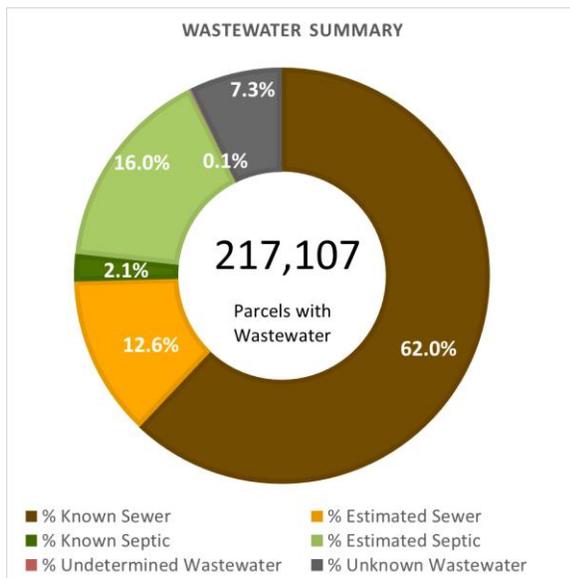
Using both data collected in 2009 and during 2014-2016, responses were received from 98.8% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- Holley-Navarre (submitted in 2009)

Received responses from 73.5% of all permitted drinking water in the county, with the following large facilities missing:

- Holley-Navarre

## Sarasota County Summary



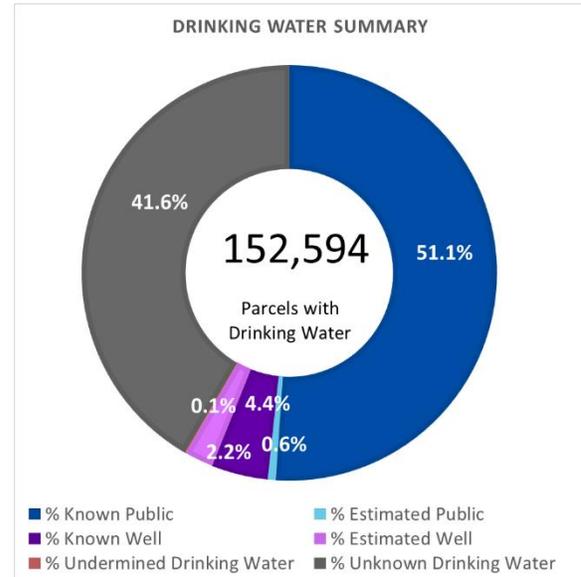
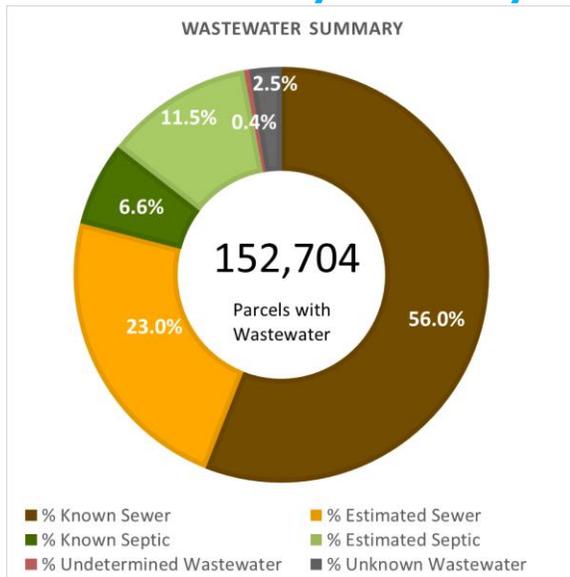
Using both data collected in 2009 and during 2014-2016, responses were received from 86.2% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- Fruitville Wastewater Treatment Facility
- Siesta Key Utilities Authority (submitted in 2009)

Received responses from 94.6% of all permitted drinking water in the county, with the following large facilities missing:

- Kings Gate Club
- Plurisusa

## Seminole County Summary



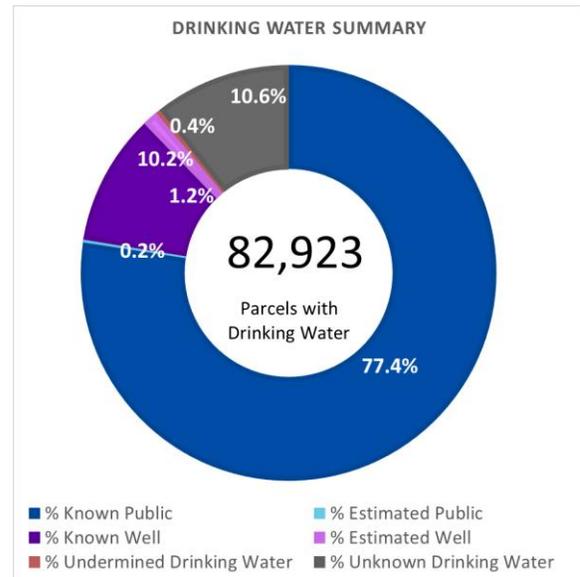
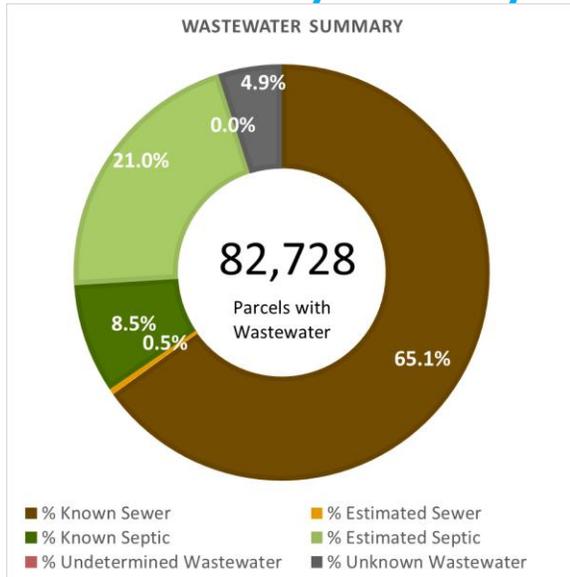
Using both data collected in 2009 and during 2014-2016, responses were received from 93.3% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Castleberry (submitted in 2009)
- UI Water (submitted in 2009)
- Winter Springs

Received responses from 61.1% of all permitted drinking water in the county, with the following large facilities missing:

- City of Castleberry
- City of Lake Mary
- City of Longwood
- City of Winter Springs
- Lake Harney Water Association
- Mullet Lake Water Association
- Midway Canaan Water Association
- Palm Valley MHP
- Seminole County School Board
- Seminole Woods
- UI Water
- US Water Corp

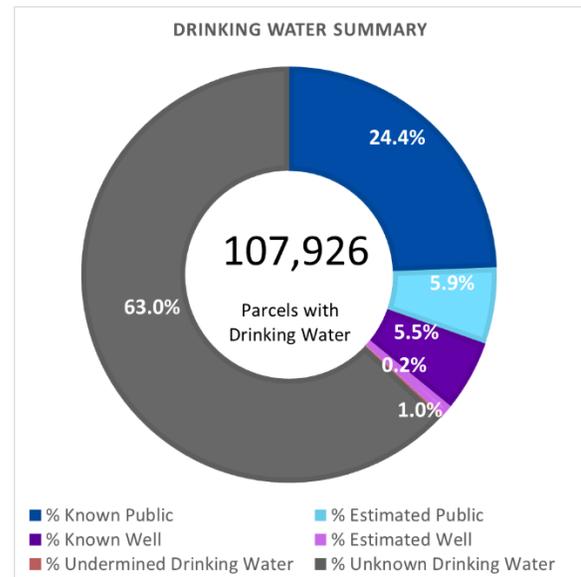
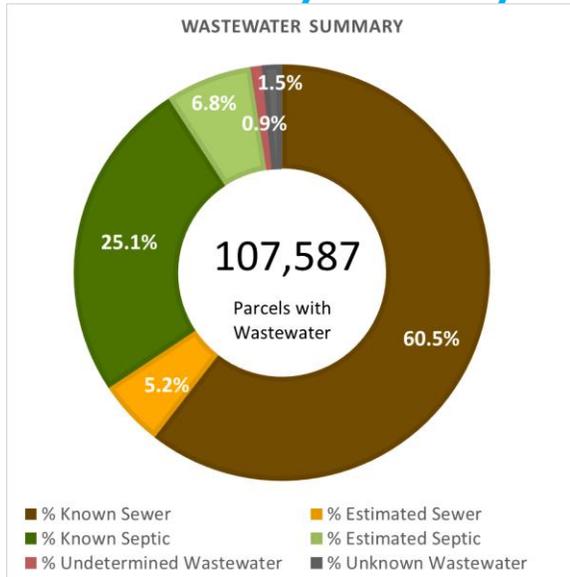
## St. Johns County Summary



Received responses from 100.0% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 99.9% of all permitted drinking water in the county, with no large facilities missing.

## St. Lucie County Summary



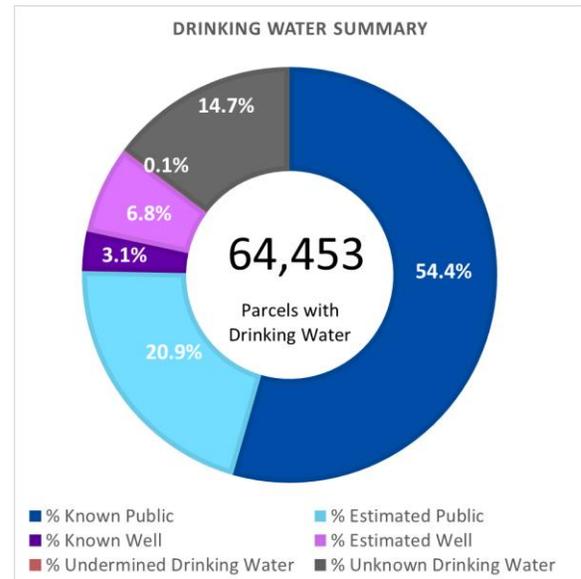
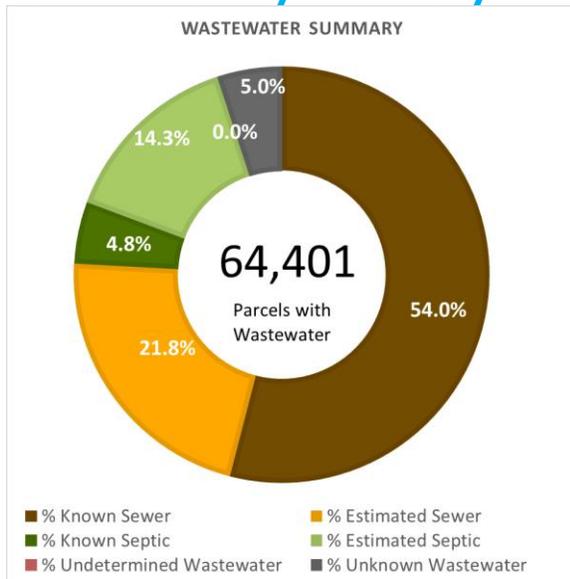
Received responses from 92.1% of all permitted wastewater in the county, with the following large facilities missing:

- SLCU

Received responses from 93.8% of all permitted drinking water in the county, with the following large facilities missing:

- Meadowood Community Association
- Pat Walsh Walsh Environmental
- Reserve Utilities
- SLCU

## Sumter County Summary



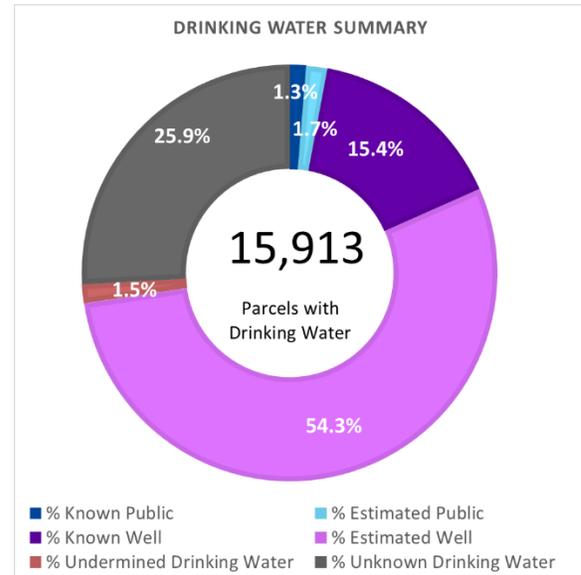
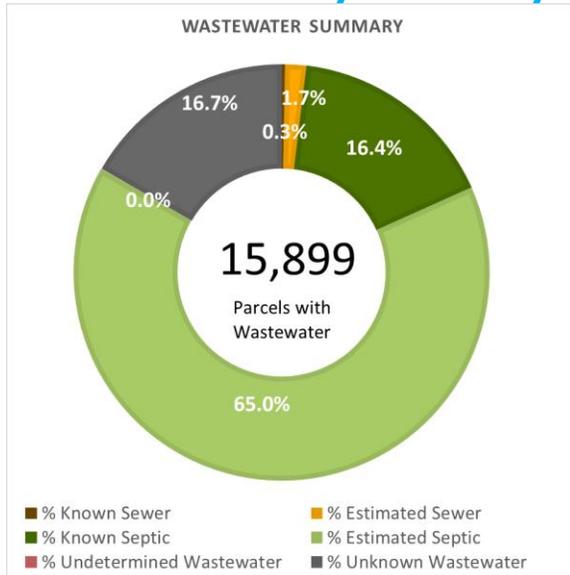
Using both data collected in 2009 and during 2014-2016, responses were received from 94.1% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Wildwood (submitted in 2009)

Received responses from 78.6% of all permitted drinking water in the county, with the following large facilities missing:

- City of Bushnell
- City of Center Hill
- City of Webster City
- City of Wildwood
- General Utilities
- Lake Panasoffkee Water Association

## Suwannee County Summary



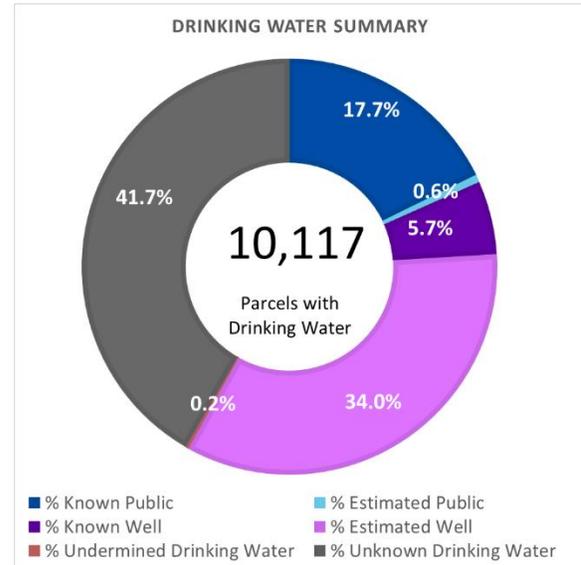
Received responses from 16.8% of all permitted wastewater in the county, with the following large facilities missing:

- City of Live Oak

Received responses from 9.3% of all permitted drinking water in the county, with the following large facilities missing:

- City of Live Oak
- Daryl Ball
- Pilgrims Pride WTP
- Town of Branford

## Taylor County Summary



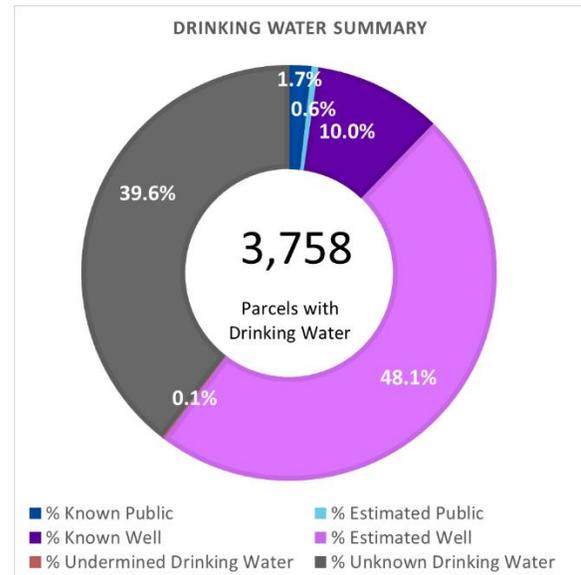
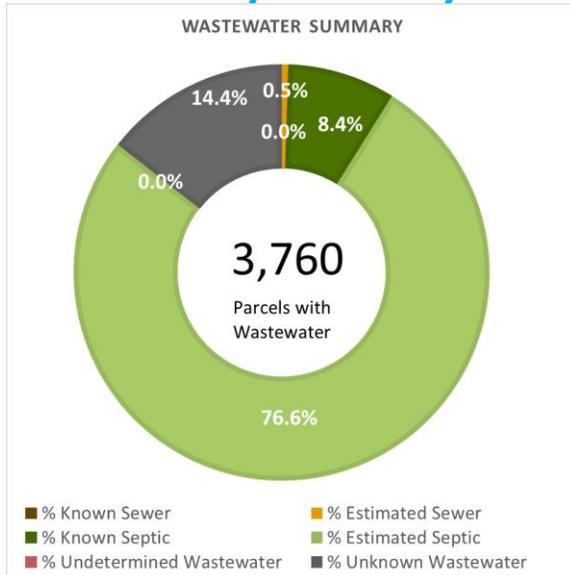
Received responses from 27.8% of all permitted wastewater in the county, with the following large facilities missing:

- City of Perry

Received responses from 36.8% of all permitted drinking water in the county, with the following large facilities missing:

- Perry Water System

## Union County Summary

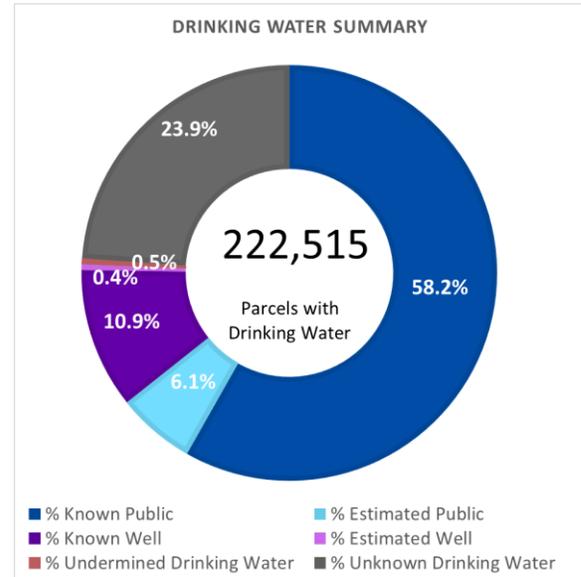
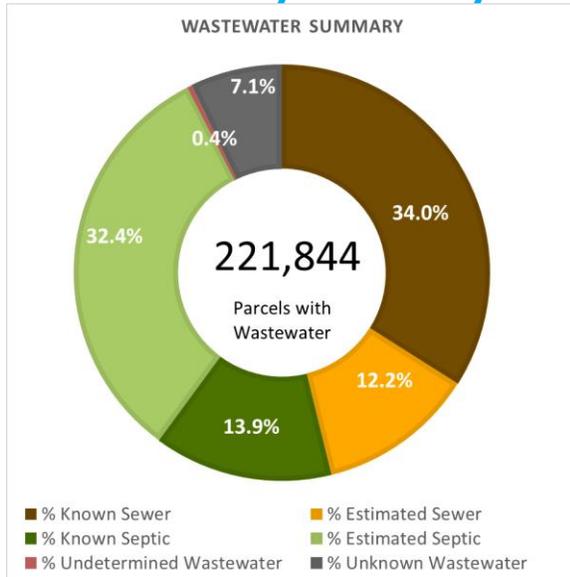


Received responses from 0.0% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 40.8% of all permitted drinking water in the county, with the following large facilities missing:

- Reception and Medical Center

## Volusia County Summary



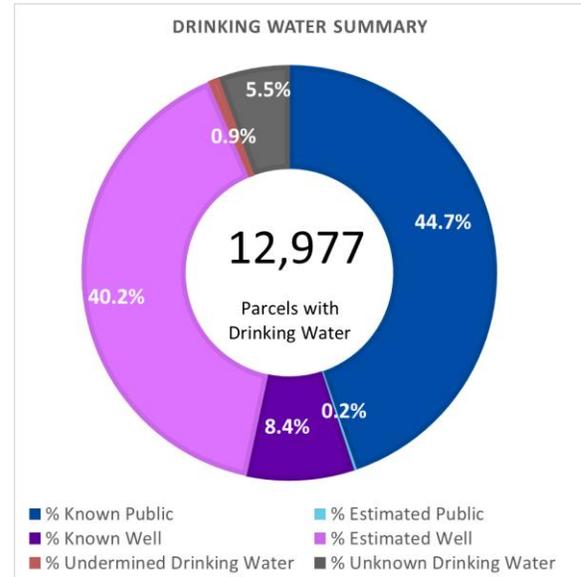
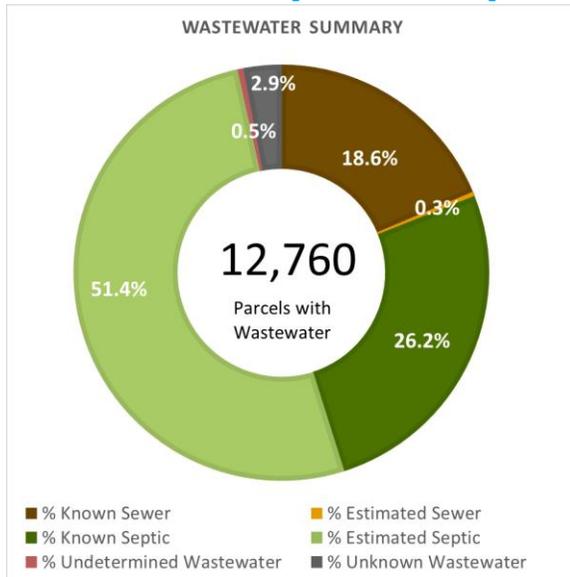
Received responses from 82.1% of all permitted wastewater in the county, with the following large facilities missing:

- City of Holly Hill
- Deland/ Wiley M. Nash Water Reclamation Facility
- Deltona Lakes

Received responses from 77.5% of all permitted drinking water in the county, with the following large facilities missing:

- City of Deltona
- City of Holly Hill
- City of Lake Helen
- Hestor Park/ Malloy School
- Kove Estates
- Lake Beresford
- Orange City Utilities
- Town of Pierson

## Wakulla County Summary

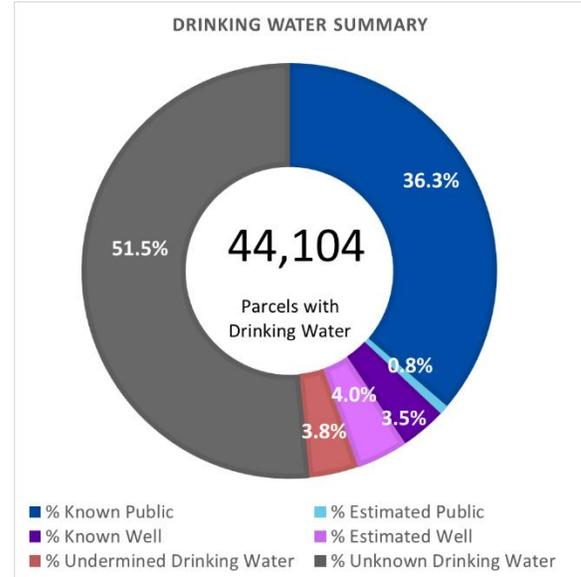
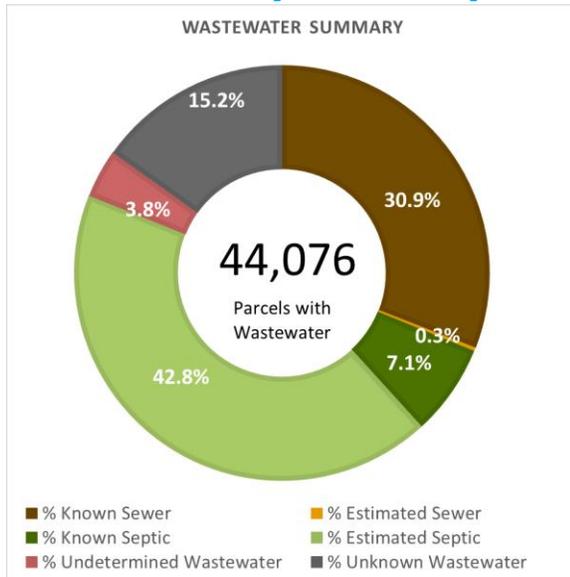


Received responses from 98.0% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 72.2% of all permitted drinking water in the county, with the following large facilities missing:

- Talquin Electric Group

## Walton County Summary



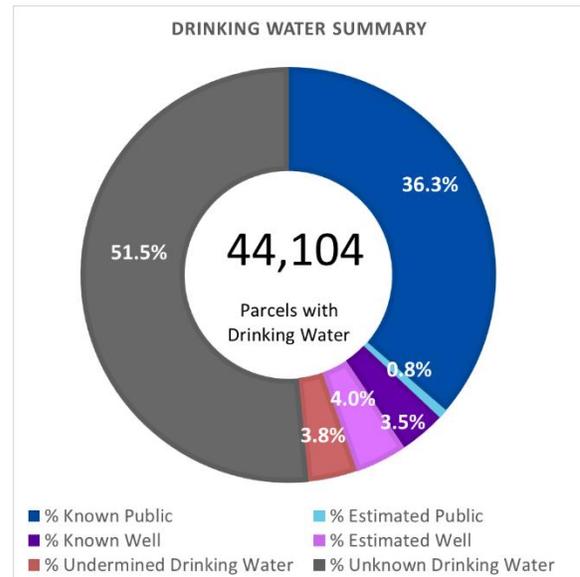
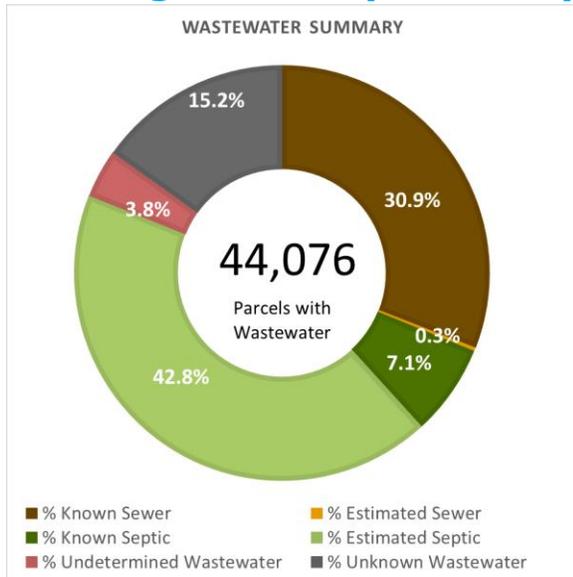
Using both data collected in 2009 and during 2014-2016, responses were received from 38.4% of all permitted wastewater in the county, with the following large facilities missing from the more recent data request:

- City of Defuniak Springs (submitted in 2009)
- Dewey Wilson
- Regional Utilities Water System

Received responses from 44.2% of all permitted drinking water in the county, with the following large facilities missing:

- City of Freeport
- Regional Utilities Water System
- Robert Barley
- Town of Mossy Head

## Washington County Summary



Received responses from 86.9% of all permitted wastewater in the county, with no large facilities missing.

Received responses from 67.2% of all permitted drinking water in the county, with the following large facilities missing:

- City of Vernon
- Town of Wausau
- US Water Corp
- Washington County Kennel Club

## APPENDIX D – ESTIMATION METHODOLOGY

For purposes of the FLWMI, some data gathered for parcels, wastewater treatment methods, or drinking water sources will not be sufficient to make an exact designation. In those cases, estimation methods will be utilized as outlined in this Appendix.

### PARCELS

The methods documented within will be utilized to perform the first iteration of the Statewide Inventory. It is acknowledged, and planned, as part of the project lifecycle, to refine these methods after the first iteration of parcel analysis.

#### Built Status Values Definitions

- **BUILT** – for inventory purposes, a built parcel is defined as a parcel that should have drinking water and domestic wastewater, and
- **NOT-BUILT** – for inventory purposes, a parcel that is not-built is defined as a parcel that has no requirement for drinking water and domestic wastewater
- **UNKNOWN** – for inventory purposes, parcels where drinking water and domestic wastewater requirements cannot be determined, most often due to conflicting data or the absence of data
- **WAT** – parcel polygon that is all or predominantly water
- **ROW** – parcel polygon that is a right-of-way, such as a road



## Built Status Values Queries

BLT_STATUS, BLT_MTHD, and Query used to select records	Notes
<p><b>BLT</b> <b>2014 new construction</b></p> <p>((ACT_YR_BLT &gt;= 2014 AND ACT_YR_BLT &lt; 2015 AND ACT_YR_BLT &gt;= EFF_YR_BLT) OR (ACT_YR_BLT IS NULL AND EFF_YR_BLT &gt;= 2014 AND EFF_YR_BLT &lt; 2015) OR (EFF_YR_BLT &gt;= 2014 AND EFF_YR_BLT &lt; 2015 AND EFF_YR_BLT &gt;= ACT_YR_BLT)) AND ((NO_RES_UNTS &gt; 0) OR (NO_BULDNG &gt; 0))</p>	<p>New construction for the 2014 assessment year. This query assumes that any 2014 or later build date is valid; regardless of sale code. Certain buildings may be constructed that do not have drinking water or wastewater (i.e. barn) – no attempt has been made to separate these buildings out from the selected set.</p> <p>** - the initial query was modified for each subsequent tax assessment year used in the inventory.</p>
<p><b>BLT</b> <b>2013 new construction</b></p> <p>((ACT_YR_BLT &gt;= 2012 AND ACT_YR_BLT &lt; 2014 AND ACT_YR_BLT &gt;= EFF_YR_BLT) OR (ACT_YR_BLT IS NULL AND EFF_YR_BLT &gt;= 2012 AND EFF_YR_BLT &lt; 2014) OR (EFF_YR_BLT &gt;= 2012 AND EFF_YR_BLT &lt; 2014 AND EFF_YR_BLT &gt;= ACT_YR_BLT)) AND ((NO_RES_UNTS &gt; 0) OR (NO_BULDNG &gt; 0)) AND ((VI_CD1 &lt;&gt; 'V' OR VI_CD1 IS NULL) AND (VI_CD2 &lt;&gt; 'V' OR VI_CD2 IS NULL ))</p>	<p>New construction from the 2013 assessment year. 2012/2013 construction with at least one residential unit or one building. If any of these parcels were identified as sold in the most recent assessment, they are not coded as 'vacant'.</p>
<p><b>BLT</b> <b>2008 - 2012 construction</b></p> <p>((ACT_YR_BLT &gt;= 2008 AND ACT_YR_BLT &lt; 2012 AND ACT_YR_BLT &gt;= EFF_YR_BLT) OR (ACT_YR_BLT IS NULL AND (EFF_YR_BLT &gt;= 2008 AND EFF_YR_BLT &lt; 2012)) OR (EFF_YR_BLT &gt;= 2008 AND EFF_YR_BLT &lt; 2012 AND EFF_YR_BLT &gt;= ACT_YR_BLT)) AND ((NO_RES_UNTS &gt; 0) OR (NO_BULDNG &gt; 0)) AND ((VI_CD1 &lt;&gt; 'V' OR VI_CD1 IS NULL) AND (VI_CD2 &lt;&gt; 'V' OR VI_CD2 IS NULL ))</p>	<p>Construction that occurred between the last inventory (2008 assessment year) and the start of the 2014 inventory with at least one building, or at least one residential unit. If any of these parcels are identified as sold in the most recent inventory, they are not coded as 'vacant'. These are parcels that could be expected to have been not-improved in the last inventory.</p>



BLT_STATUS, BLT_MTHD, and Query used to select records	Notes
<p><b>BLT building or residential unit is present</b></p> <p>((ACT_YR_BLT &lt; 2008 AND ACT_YR_BLT &gt;= EFF_YR_BLT) OR (ACT_YR_BLT IS NULL AND EFF_YR_BLT &lt; 2008) OR (EFF_YR_BLT &lt; 2008 AND EFF_YR_BLT &gt;= ACT_YR_BLT)) AND ((NO_RES_UNTS &gt; 0) OR (NO_BULDNG &gt; 0)) AND ((VI_CD1 &lt;&gt; 'V' OR VI_CD1 IS NULL) AND (VI_CD2 &lt;&gt; 'V' OR VI_CD2 IS NULL ))</p>	<p>Building is present on the parcel, and if the parcel is identified as sold in the most recent assessment, it is not coded as 'vacant'. These parcels should have been identified as improved in the last inventory.</p>
<p><b>BLT. other construction</b></p> <p>((EFF_YR_BLT &gt; 0 AND EFF_YR_BLT &lt; 2012) OR (ACT_YR_BLT &gt; 0 AND ACT_YR_BLT &lt; 2012)) AND NO_BULDNG IS NULL AND NO_RES_UNTS IS NULL AND ((VI_CD1 &lt;&gt; 'V' OR VI_CD1 IS NULL) AND (VI_CD2 &lt;&gt; 'V' OR VI_CD2 IS NULL ))</p>	<p>Parcel has construction date, but no listed building or residential units, sales code is null or not vacant</p> <p>Palm Beach, Charlotte counties only</p>
<p><b>NBLT values are null</b></p> <p>NO_BULDNG IS NULL AND NO_RES_UNTS IS NULL AND EFF_YR_BLT IS NULL AND ACT_YR_BLT IS NULL AND ((VI_CD1 = 'V' OR VI_CD1 IS NULL) AND (VI_CD2 IS NULL OR VI_CD2 = 'V'))</p>	<p>Parcel has no building, no residential units, no effective and no actual build date. If the parcel is identified as sold in the most recent assessment, it is coded as 'V'. This classification includes parcels with no building that could potentially have some improvements, such as water and sewer laterals.</p>
<p><b>NBLT values are null, sale code is improved, vacant</b></p> <p>NO_BULDNG IS NULL AND NO_RES_UNTS IS NULL AND EFF_YR_BLT IS NULL AND ACT_YR_BLT IS NULL AND (VI_CD1 = 'I' OR VI_CD2 = 'I') AND (DOR_UC = '000' OR DOR_UC = '010' OR DOR_UC = '040' OR DOR_UC = '070')</p> <p>** update the query for each county as needed where the Use Code data format varies</p>	<p>Parcel has no building, no residential units, no effective and no actual build date. At least one sales code is 'I'. The DOR Use Code indicates vacant property (e.g. 000, 010, 040, 070)</p> <p>** The specific values for the DOR_UC may need to be modified in the query depending on the format of the data for that county (i.e. '0' or '00' instead of '000')</p>



BLT_STATUS, BLT_MTHD, and Query used to select records	Notes
<p><b>UNK</b> <b>values are null, sale code is improved, non-vacant</b></p> <p>NO_BULDNG IS NULL AND NO_RES_UNTS IS NULL AND EFF_YR_BLT IS NULL AND ACT_YR_BLT IS NULL AND (VI_CD1 = 'I' OR VI_CD2 = 'I') AND DOR_UC &lt;&gt; '000' AND DOR_UC &lt;&gt; '010' AND DOR_UC &lt;&gt; '040' AND DOR_UC &lt;&gt; '070'</p> <p>** update the query for each county as needed where the Use Code data format varies</p>	<p>Parcel has no building, no residential units, no effective and no actual build date. At least one sales code is 'I'. The DOR Use Code indicates non-vacant property.</p> <p>** The specific values for the DOR_UC may need to be modified in the query depending on the format of the data for that county (i.e. '0' or '00' instead of '000')</p>
<p><b>UNK</b> <b>year built is present, sale code is vacant</b></p> <p>(VI_CD1 = 'V' OR VI_CD2 = 'V') AND (EFF_YR_BLT &lt; 2012 OR ACT_YR_BLT &lt; 2012)</p>	<p>Parcel identified as sold and vacant for the current assessment period, but the record has actual or effective built date &lt; 2012</p>
<p><b>ROW. right-of-way or easement, not built</b></p> <p>(BLT_STATUS is null OR BLT_STATUS = 'NBLT') AND (DOR_UC = '91' OR DOR_UC = '091' OR DOR_UC = '94' OR DOR_UC = '094')</p>	<p>Polygon features and records that are identified as right-of-way or easement by the property appraiser</p>
<p><b>WAT. Water</b></p> <p>(BLT_STATUS IS NULL OR BLT_STATUS = 'NBLT') AND (DOR_UC = '095' OR DOR_UC = '096')</p>	<p>Polygon features and records that are identified as water by the property appraiser. Values include water, waterways, canals, ditches, ocean, lakes, etc.</p>
<p><b>UNK</b> <b>unknown</b></p> <p>"BLT_STATUS" IS NULL</p>	<p><b>Run the query after all others are done.</b> These are records where the BLT_MTHD is "unknown" because of insufficient data. This category will also be assigned to any GIS features that do not have a corresponding record in the tax roll table.</p>

## WASTEWATER

The methods documented within will be utilized to perform the first iteration of the Statewide Inventory. It is acknowledged, and planned, as part of the project lifecycle, to refine these methods after the first iteration of parcel analysis.

Where there is insufficient data to determine an exact method (Known Central Sewer or Known Onsite Septic), an estimated designation will be assigned. All designations are applicable only for parcels that are coded with a Built Status as "Built" or "Unknown", with the exceptions noted in Section 5 of this report.

### 1. Known Septic:

- a) OSTDS Final inspection done at least once AND if no conflicting sewer information exists
- b) OSTDS Operating permit active, not expired AND if no conflicting sewer information exists
- c) 2009 inventory indicated the property was known septic AND if no conflicting sewer information exists
- d) CHD Inventory, Carmody, etc. AND if no conflicting sewer information exists

### 2. Likely Onsite Septic:

- a) 2009 inventory indicated the property was estimated septic (with a probability of  $> .8$ )
- b) OSTDS construction Permit is not an abandonment, temporary, or holding tank, sewer not available (checked "no" or left blank on application form), construction permit issued
- c) Operating permit active, expired
- d) Utility indicates the parcel is not sewer, but has public water
- e) Drinking water source is a DEP regulated PWS with 1 connection and no WWTF exists for the address
- f) DBPR, DOACS, or other State Agency indicate address is on a septic system
- g) Other EHD program info (e.g. MHP, group care) indicates it is septic
- h) Other data source (e.g. local government or utility) indicates it is septic

### 3. Somewhat Likely Septic:

- a) OSTDS Construction permit application exists, no permit issued, and sewer not available (checked "no" or left blank on application form)



- b) OSTDS Operating permit record exists, but marked as "inactive" or "closed"

**4. Unknown:**

- a) Parcel does not fit any of the requirements in any of the other categories (not enough data exists to make a determination or estimation)

**5. Undetermined:**

- a) One or more data sources indicate opposite values of equal weight (i.e. LikelySewer and LikelySeptic)

**6. Somewhat Likely Sewer:**

- a) 2009 inventory indicated the property was estimated sewer (with a probability of  $> .3 < .5$ )

**7. Likely Sewer:**

- a) 2009 inventory indicated the property was estimated sewer (with a probability of  $< .3$ )
- b) Sewer line located in front of property and no other data source is available
- c) DBPR, DOACS, or other State Agency indicate address is on sewer
- d) Other EHD program info (e.g. MHP, group care) indicates it is sewer
- e) Other data source (e.g. local government) indicates it is sewer
- f) Specific subdivision is identified by Utility, and Shapefile provided, as having sewer service, but we do not have complete address or parcel information

**8. Known Sewer:**

- a) Utility indicates property is on sewer
- b) Abandonment permit in EHD, AND sewer available
- c) 2009 inventory indicated the property was known sewer
- d) DBPR or DOACS indicate address is on sewer
- e) Other EHD program info (e.g. MHP, group care) indicates it is sewer
- f) Other data source (e.g. local government) indicates it is sewer

## DRINKING WATER

The methods documented within will be utilized to perform the first iteration of the Statewide Inventory. It is acknowledged, and planned, as part of the project lifecycle, to refine these methods after the first iteration of parcel analysis.

Where there is insufficient data to determine an exact method (Known Central Water or Known Onsite Well), an estimated designation will be assigned.

### 1. Known Onsite Well:

- a) Non-Limited Use Well permitting info (e.g. Indian River uses "miscellaneous" category for private well records) in EHD
- b) Domestic well permitting records from WMD or the delegated county AND not coded as "denied" or "withdrawn" AND we have sufficient information to correctly geocode the location
- c) Final inspection done at least once AND if no conflicting public water information exists
- d) If OSTDS Application indicates "Well" AND OSTDS Site Evaluation Form indicates 1,500 Gallons Per Day AND if no conflicting public water information exists

### 2. Likely Onsite Well:

- a) Domestic well permitting point dataset from WMD or the delegated county AND not coded as "denied" or "withdrawn"
- b) Utility indicates that public water is not available or that the property is not receiving available public water
- c) DBPR, DOACS, or other State Agency indicate address is an onsite well
- d) Other EHD program info (e.g. MHP, group care) indicates it is onsite well
- e) Other data source (e.g. local government) indicates it is onsite well
- f) If OSTDS Application indicates "Well" OR OSTDS Site Evaluation Form does not indicate 2,500 Gallons Per Day (or blank) AND if no conflicting public water information exists

### 3. Somewhat Likely Onsite Well:

- a) Criteria not defined



**4. Unknown:**

- a) Parcel does not fit any of the requirements in any of the other categories (not enough data exists to make a determination or estimation)

**5. Undetermined:**

- a) Two or more sources indicate opposing values of equal weight (i.e. KnownWell and KnownPublic)

**6. Somewhat Likely Central Water:**

- a) Not defined or used

**7. Likely Central Water:**

- a) Well abandonment permits AND central water is available
- b) All surrounding properties are known central water and Service Area is unknown
- c) A Limited Use Well that has been closed in EHD
- d) Sewer or drinking water line located in front of property and no other data source is available
- e) Sewage treatment source is "Known Sewer"
- f) DBPR, DOACS, or other State Agency indicate address is on central water
- g) Other EHD program info (e.g. MHP, group care) indicates it is on central water
- h) Other data source (e.g. local government) indicates it is on central water
- i) If OSTDS Application indicates "Public Water" OR OSTDS Site Evaluation Form does not indicate 2,500 Gallons Per Day (or blank)

**8. Known Central Water:**

- a) Utility indicates property is on central water
- b) If OSTDS Application indicates "Public Water" AND OSTDS Site Evaluation Form does not indicate 2,500 Gallons Per Day (or blank)
- c) Active Limited Use Well in EHD



## APPENDIX E – WASTEWATER RESULTS BY COUNTY

**Field Definitions:**

Field Name	Definition
<b>County</b>	Name of county
<b>Cumulative Total Onsite Wastewater From Census Data</b>	The Department has used the 1990 results as a baseline from which to estimate numbers of onsite sewage treatment and disposal systems by county based on permitting records. Data found on this webpage: <a href="http://www.floridahealth.gov/environmental-health/onsite-sewage/ostds-statistics.html">http://www.floridahealth.gov/environmental-health/onsite-sewage/ostds-statistics.html</a> .
<b>Total Parcels</b>	Total number of parcels from the FLWMI geodatabase
<b>Total Parcels with Wastewater Determination</b>	Sum of <b># Known Sewer</b> , <b># Estimated Sewer</b> , <b># Known Onsite Wastewater</b> , <b># Estimated Onsite Wastewater</b> , <b>Wastewater Conflicting Data</b> , and <b>Wastewater No Data</b> .
<b>Wastewater Not Applicable</b>	Difference between <b>Total Parcels</b> and <b>Total Parcels with Wastewater Determination</b> . These would be considered to be on a parcel not expected to generate wastewater.
<b># Known Sewer</b>	Number of parcels from the FLWMI geodatabase that were determined to be Known Sewer
<b># Estimated Sewer</b>	Sum of parcels labeled Likely Sewer and Somewhat Likely Sewer from the FLWMI geodatabase
<b># Known Onsite Wastewater</b>	Number of parcels from the FLWMI geodatabase that were determined to be Known Septic
<b># Estimated Onsite Wastewater</b>	Sum of parcels labeled Likely Septic and Somewhat Likely Septic from the FLWMI geodatabase
<b>Wastewater Conflicting Data</b>	Number of parcels from the FLWMI geodatabase that were determined to have conflicting data from two or more sources of similar weight.
<b>Wastewater No Data</b>	Number of parcels from the FLWMI geodatabase expected to generate wastewater with no data. These could be because the WWTF did not respond to the request for data, or parcels with no onsite wastewater data.
<b>Total Parcels Wastewater Not Estimated</b>	Sum of <b>Wastewater Conflicting Data</b> and <b>Wastewater No Data</b> fields.



Florida Water Management Inventory Project  
Final Project Report

County	Cumulative Total Onsite Wastewater From Census Data	Total Parcels	Total Parcels with Wastewater Determination	Wastewater Not Applicable	# Known Sewer	# Estimated Sewer	# Known Onsite Wastewater	# Estimated Onsite Wastewater	Wastewater Conflicting Data	Wastewater No Data	Total Parcels Wastewater Not Estimated
Alachua	41,434	101,050	82,976	18,074	52,092	307	6,195	21,492	945	1,945	2,890
Baker	7,844	12,145	8,726	3,419	1,538	480	1,064	5,035	4	605	609
Bay	36,482	114,279	90,587	23,692	28,608	13,881	6,539	34,302	169	7,088	7,257
Bradford	10,500	15,038	9,897	5,141	1,371	750	1,106	5,965	44	661	705
Brevard	91,641	287,810	214,094	73,716	106,919	10,878	35,687	55,993	181	4,436	4,617
Broward	107,384	750,826	719,659	31,167	431,038	49,666	8,528	42,951	390	187,086	187,476
Calhoun	5,609	10,735	5,201	5,534	943	841	860	2,159	5	393	398
Charlotte	43,243	213,318	98,672	114,646	43,239	7,946	10,639	30,308	652	5,888	6,540
Citrus	60,151	146,274	75,243	71,031	30,177	13	17,697	23,775	2,811	770	3,581
Clay	31,923	88,847	73,703	15,144	44,652	2,250	6,932	13,676	28	6,165	6,193
Collier	44,832	265,746	199,688	66,058	122,858	1,973	8,391	19,168	3	47,295	47,298
Columbia	25,125	36,307	24,331	11,976	4,695	414	3,618	14,487	4	1,113	1,117
Dade	215,793	561,672	515,594	46,078	297,346	96,424	15,440	93,411	76	12,897	12,973
DeSoto	10,594	19,437	10,939	8,498	463	26	1,706	1,559	-	7,185	7,185
Dixie	7,764	16,203	8,260	7,943	3	7	734	6,522	2	992	994
Duval	92,394	358,135	328,567	29,568	215,039	20,093	8,792	73,051	7,261	4,331	11,592
Escambia	70,012	150,972	121,170	29,802	68,559	24,268	13,001	13,175	1,349	818	2,167
Flagler	6,105	77,605	49,256	28,349	44,342	26	1,503	2,315	2	1,068	1,070
Franklin	5,431	17,701	8,598	9,103	151	729	853	4,039	-	2,826	2,826
Gadsden	17,297	27,179	17,039	10,140	2,081	311	2,985	8,420	2	3,240	3,242
Gilchrist	8,021	13,481	6,942	6,539	634	7	1,992	3,938	1	370	371
Glades	5,211	11,229	5,153	6,076	28	1	343	4,547	-	234	234
Gulf	6,919	33,880	9,349	7,591	4,559	193	1,307	2,919	53	318	371
Hamilton	4,188	12,870	4,663	8,207	554	1,205	466	2,148	1	289	290
Hardee	8,915	14,357	8,871	5,486	3,076	2	1,092	4,220	-	481	481
Hendry	10,553	35,418	13,081	22,337	3,578	19	1,876	6,959	-	649	649
Hernando	55,378	115,518	82,722	32,796	33,987	2,176	16,590	27,818	14	2,137	2,151
Highlands	36,731	226,496	47,576	65,672	10,271	391	6,547	25,499	16	4,852	4,868
Hillsborough	109,029	115,518	82,722	32,796	33,987	2,176	16,590	27,818	14	2,137	2,151



Florida Water Management Inventory Project  
Final Project Report

County	Cumulative Total Onsite Wastewater From Census Data	Total Parcels	Total Parcels with Wastewater Determination	Wastewater Not Applicable	# Known Sewer	# Estimated Sewer	# Known Onsite Wastewater	# Estimated Onsite Wastewater	Wastewater Conflicting Data	Wastewater No Data	Total Parcels Wastewater Not Estimated
Holmes	9,359	13,034	6,908	6,126	72	169	973	4,977	-	717	717
Indian River	37,152	76,371	57,476	18,895	25,923	45	30,457	117	2	932	934
Jackson	17,978	38,333	17,709	20,624	667	285	2,551	11,911	3	2,292	2,295
Jefferson	5,482	11,883	5,965	5,918	4	21	723	4,786	2	429	431
Lafayette	3,377	6,820	2,915	3,905	391	6	328	1,840	1	349	350
Lake	77,701	173,576	133,737	39,839	31,422	26,376	22,902	45,785	249	7,003	7,252
Lee	131,941	442,667	271,176	171,491	158,996	4,972	33,857	63,575	596	9,180	9,776
Leon	39,608	108,249	94,000	14,249	58,008	4,107	23,159	8,726	-	-	-
Levy	23,041	47,265	20,510	26,755	50	910	3,418	14,914	4	1,214	1,218
Liberty	3,112	5,621	2,657	2,964	2	1	212	2,082	-	360	360
Madison	7,708	15,757	7,206	8,551	1,026	8	718	4,885	2	567	569
Manatee	36,673	133,421	119,981	13,440	65,888	1,104	2,948	42,883	3	7,155	7,158
Marion	121,950	266,408	150,115	116,293	36,695	575	90,525	15,160	162	6,998	7,160
Martin	28,687	78,434	58,859	19,575	23,895	4,306	16,172	13,674	148	664	812
Monroe	25,804	89,553	53,727	35,826	35,815	394	160	16,647	29	682	711
Nassau	21,611	43,717	31,874	11,843	14,968	30	15,548	552	97	679	776
Okaloosa	33,861	105,803	88,704	17,099	25,861	21,701	7,642	10,908	225	22,367	22,592
Okeechobee	12,640	64,564	15,721	16,595	1,847	380	2,163	10,634	104	7,742	697
Orange	107,568	439,436	393,487	45,949	265,691	16,028	25,383	68,376	744	17,265	18,009
Osceola	25,057	149,906	119,801	30,105	88,743	9,477	5,846	14,396	5	1,334	1,339
Palm Beach	81,285	429,408	400,521	28,887	314,677	36,515	14,688	27,247	3,664	3,730	7,394
Pasco	71,247	258,008	209,663	48,345	9,924	84,241	16,122	92,705	105	6,566	6,671
Pinellas	23,949	434,439	417,669	16,770	343,193	46,696	2,328	12,631	17	12,804	12,821
Polk	119,919	356,996	232,219	124,777	68,216	10,790	27,307	111,446	54	14,406	14,460
Putnam	40,635	98,900	35,423	63,477	506	716	5,974	26,724	7	1,496	1,503
Santa Rosa	45,726	95,282	68,827	26,455	29,699	3,603	10,445	21,398	43	3,639	3,682
Sarasota	81,165	274,115	217,107	57,008	134,679	27,259	4,613	34,644	159	15,753	15,912
Seminole	40,410	171,933	152,704	19,229	85,477	35,148	10,009	17,618	683	3,769	4,452
St. Johns	29,991	103,192	82,728	20,464	53,815	390	7,030	17,405	21	4,067	4,088
St. Lucie	44,259	150,529	107,587	42,942	65,089	5,560	27,052	7,312	948	1,626	2,574
Sumter	20,002	74,510	64,401	10,109	34,795	14,058	3,111	9,201	7	3,229	3,236



Florida Water Management Inventory Project  
Final Project Report

County	Cumulative Total Onsite Wastewater From Census Data	Total Parcels	Total Parcels with Wastewater Determination	Wastewater Not Applicable	# Known Sewer	# Estimated Sewer	# Known Onsite Wastewater	# Estimated Onsite Wastewater	Wastewater Conflicting Data	Wastewater No Data	Total Parcels Wastewater Not Estimated
<b>Suwannee</b>	18,241	30,565	15,899	14,666	44	264	2,602	10,331	5	2,653	2,658
<b>Taylor</b>	8,968	18,322	10,100	8,222	800	8	755	8,078	1	458	459
<b>Union</b>	4,781	6,383	3,760	2,623	1	18	316	2,882	-	543	543
<b>Volusia</b>	99,710	284,266	221,844	62,422	75,332	27,081	30,888	71,943	818	15,782	16,600
<b>Wakulla</b>	11,206	24,692	12,760	11,932	2,379	43	3,337	6,564	61	376	437
<b>Walton</b>	22,655	79,276	44,076	35,200	13,601	130	3,123	18,873	1,669	6,680	8,349
<b>Washington</b>	10,665	43,033	9,811	33,222	1,457	11	2,450	5,395	-	498	498

## APPENDIX F – DRINKING WATER RESULTS BY COUNTY

### Field Definitions:

Field Name	Definition
<b>County</b>	Name of county
<b>Total Parcels</b>	Total number of parcels from the FLWMI geodatabase
<b>Total Parcels with Drinking Water Determination</b>	Sum of <b># Known Public</b> , <b># Estimated Public</b> , <b># Known Private Well</b> , <b># Estimated Private Well</b> , <b>Drinking Water Conflicting Data</b> , and <b>Drinking Water No Data</b> .
<b>Drinking Water Not Applicable</b>	Difference between <b>Total Parcels</b> and <b>Total Parcels with Drinking Water Determination</b> . These would be considered to be on a parcel not expected to consume potable drinking water.
<b># Known Public</b>	Number of parcels from the FLWMI geodatabase that were determined to be Known Public
<b># Estimated Public</b>	Sum of parcels labeled Likely Public and Somewhat Likely Public from the FLWMI geodatabase
<b># Known Private Well</b>	Number of parcels from the FLWMI geodatabase that were determined to be Known Private Well
<b># Estimated Private Well</b>	Sum of parcels labeled Likely Private Well and Somewhat Likely Private Well from the FLWMI geodatabase
<b>Drinking Water Conflicting Data</b>	Number of parcels from the FLWMI geodatabase that were determined to have conflicting data from two or more sources of similar weight.
<b>Drinking Water No Data</b>	Number of parcels from the FLWMI geodatabase expected to consume potable drinking water with no data. These could be because the PWS did not respond to the request for data, or parcels with no private well.
<b>Total Parcels Drinking Water Not Estimated</b>	Sum of <b>Drinking Water Conflicting Data</b> and <b>Drinking Water No Data</b> fields.



Florida Water Management Inventory Project  
Final Project Report

County	Total Parcels	Total Parcels with Drinking Water Determination	Drinking Water Not Applicable	# Known Public	# Estimated Public	# Known Private Well	# Estimated Private Well	Drinking Water Conflicting Data	Drinking Water No Data	# Drinking Water Not Estimated
Alachua	101,050	82,987	18,063	51,650	1,267	424	7,393	120	22,133	22,253
Baker	12,145	8,754	3,391	153	42	1,443	4,330	27	2,759	2,786
Bay	114,279	91,054	23,225	33,559	963	4,053	3,271	35	49,173	49,208
Bradford	15,038	9,901	5,137	389	88	1,058	4,969	22	3,375	3,397
Brevard	287,810	213,277	74,533	106,065	15,571	21,664	5,482	2,328	62,167	64,495
Broward	750,826	720,259	30,567	332,343	23,207	1,293	1,758	31	361,627	361,658
Calhoun	10,735	5,166	5,569	1,134	42	622	984	14	2,370	2,384
Charlotte	213,318	99,017	114,301	30,967	1,213	5,351	455	179	60,852	61,031
Citrus	146,274	74,481	71,793	47,959	135	9,956	15,081	12	1,338	1,350
Clay	88,847	73,941	14,906	46,571	55	19,707	662	314	6,632	6,946
Collier	265,746	200,478	65,268	128,750	635	7,090	29,012	646	34,345	34,991
Columbia	36,307	24,445	11,862	7,843	28	2,986	11,895	43	1,650	1,693
Dade	561,672	516,933	44,739	400,527	2,773	1,556	517	136	111,424	111,560
DeSoto	19,437	10,947	8,490	809	71	1,594	4,482	82	3,909	3,991
Dixie	16,203	8,262	7,941	177	22	1,307	4,260	31	2,465	2,496
Duval	358,135	330,184	27,951	236,145	4,146	12,087	3,938	469	73,399	73,868
Escambia	150,972	125,821	25,151	52,131	38,657	180	218	22	34,613	34,635
Flagler	77,605	49,305	28,300	45,572	11	2,570	30	46	1,076	1,122
Franklin	17,701	8,598	9,103	1,299	95	202	291	1	6,710	6,711
Gadsden	27,179	17,057	10,122	4,292	142	1,071	6,607	241	4,704	4,945
Gilchrist	13,481	6,947	6,534	962	18	1,898	3,362	21	686	707
Glades	11,229	5,183	6,046	714	69	166	48	-	4,186	4,186
Gulf	33,880	9,350	7,590	5,461	54	460	632	3	2,740	2,743
Hamilton	12,870	4,661	8,209	641	27	445	2,365	29	1,154	1,183
Hardee	14,357	8,876	5,481	3,531	40	1,117	2,861	24	1,303	1,327
Hendry	35,418	13,083	22,335	4,862	109	1,298	362	16	6,436	6,452
Hernando	115,518	82,769	32,749	41,523	22,590	6,498	8,973	198	2,987	3,185
Highlands	226,496	50,661	62,587	24,594	3,636	4,280	8,148	113	9,890	10,003
Hillsborough	115,518	82,769	32,749	41,523	22,590	6,498	8,973	198	2,987	3,185



Florida Water Management Inventory Project  
Final Project Report

County	Total Parcels	Total Parcels with Drinking Water Determination	Drinking Water Not Applicable	# Known Public	# Estimated Public	# Known Private Well	# Estimated Private Well	Drinking Water Conflicting Data	Drinking Water No Data	# Drinking Water Not Estimated
Holmes	13,034	6,921	6,113	349	65	907	1,073	9	4,518	4,527
Indian River	76,371	57,616	18,755	48,501	44	3,658	408	92	4,913	5,005
Jackson	38,333	17,744	20,589	1,234	229	3,147	3,384	192	9,558	9,750
Jefferson	11,883	5,974	5,909	182	46	672	3,412	16	1,646	1,662
Lafayette	6,820	2,913	3,907	427	3	345	1,876	7	255	262
Lake	173,576	133,426	40,150	40,141	21,054	12,058	2,476	302	57,395	57,697
Lee	442,667	270,199	172,468	131,559	1,055	29,017	2,051	62	106,455	106,517
Leon	108,249	96,040	12,209	69,241	570	4,849	21,380	-	-	-
Levy	47,265	20,520	26,745	891	987	3,029	10,827	24	4,762	4,786
Liberty	5,621	2,666	2,955	152	15	121	1,796	12	570	582
Madison	15,757	7,237	8,520	1,718	25	628	3,376	26	1,464	1,490
Manatee	133,421	120,470	12,951	71,952	2,003	1,828	2,605	39	42,043	42,082
Marion	266,408	150,292	116,116	48,461	5,246	57,998	6,670	2,349	29,568	31,917
Martin	78,434	57,046	21,388	30,789	1,199	6,562	215	219	18,062	18,281
Monroe	89,553	51,972	37,581	35,497	16,294	128	5	-	48	48
Nassau	43,717	31,908	11,809	15,812	5	9,779	5,358	121	833	954
Okaloosa	105,803	89,206	16,597	56,691	2,690	695	461	14	28,655	28,669
Okeechobee	64,564	15,687	16,561	950	331	1,683	4,877	1	696	7,846
Orange	439,436	394,462	44,974	319,186	23,905	4,718	2,292	269	44,092	44,361
Osceola	149,906	120,096	29,810	96,831	885	3,837	2,811	331	15,401	15,732
Palm Beach	429,408	397,920	31,488	258,290	1,901	7,430	932	159	129,208	129,367
Pasco	258,008	209,052	48,956	18,745	99,538	9,816	15,324	2,699	62,930	65,629
Pinellas	434,439	414,778	19,661	239,430	107,064	204	1,017	138	66,925	67,063
Polk	356,996	231,679	125,317	93,262	1,907	9,979	13,973	334	112,224	112,558
Putnam	98,900	35,469	63,431	1,117	154	6,343	19,384	119	8,352	8,471
Santa Rosa	95,282	69,344	25,938	45,922	59	38	747	2	22,576	22,578
Sarasota	274,115	218,239	55,876	152,868	25,750	3,136	23,155	455	12,875	13,330
Seminole	171,933	152,594	19,339	77,913	957	6,680	3,392	219	63,433	63,652
St. Johns	103,192	82,923	20,269	64,158	187	8,453	992	325	8,808	9,133
St. Lucie	150,529	107,926	42,603	26,351	6,415	5,932	1,048	191	67,989	68,180
Sumter	74,510	64,453	10,057	35,091	13,447	1,982	4,409	37	9,487	9,524



Florida Water Management Inventory Project  
Final Project Report

County	Total Parcels	Total Parcels with Drinking Water Determination	Drinking Water Not Applicable	# Known Public	# Estimated Public	# Known Private Well	# Estimated Private Well	Drinking Water Conflicting Data	Drinking Water No Data	# Drinking Water Not Estimated
<b>Suwannee</b>	30,565	15,913	14,652	203	265	2,456	8,639	233	4,117	4,350
<b>Taylor</b>	18,322	10,117	8,205	1,794	61	578	3,442	24	4,218	4,242
<b>Union</b>	6,383	3,758	2,625	64	21	374	1,808	4	1,487	1,491
<b>Volusia</b>	284,266	222,515	61,751	129,524	13,554	24,302	982	1,057	53,096	54,153
<b>Wakulla</b>	24,692	12,977	11,715	5,806	26	1,090	5,223	118	714	832
<b>Walton</b>	79,276	44,104	35,172	16,005	337	1,562	1,784	1,694	22,722	24,416
<b>Washington</b>	43,033	9,855	33,178	2,226	78	2,148	1,468	17	3,918	3,935



## **APPENDIX G –PROJECT SUMMARY REPORT**

# Florida Water Management Inventory

## September 2016 Update



### Project Need

Information about drinking water sources and wastewater treatment methods are vital for disaster preparedness and response activities, local planning evaluations, and environmental risk assessments. These activities relate to environmental health and the protection of public health by detecting and preventing disease caused by natural and manmade factors in the environment.

Multiple state and local agencies across the state of Florida gather information about drinking water sources and wastewater treatment methods; however, historic data gathering methods have been fragmented. This results in the lack of readily accessible information to evaluate impacts to Florida's water quality and quantity.

The Florida Department of Health (Department) has developed a centralized comprehensive mapping tool to provide Geographic Information System (GIS) data.

### Project Goal

The goal of the Florida Water Management Inventory project is to link each built property in the state to information about the drinking water source type (public water or private well) and the wastewater treatment method (central sewer or onsite sewage).

### Partnerships

Collaboration with stakeholders is an essential part of this inventory project. Aside from the Department of Health state and county offices, participating stakeholders include public and private utilities; Florida Departments of Environmental Protection, Business and Professional Regulation, Emergency Management, and Agriculture and Consumer Services; Water Management Districts; Public Service Commission; various county and municipal governments; and many others.

### Benefits to Florida

A comprehensive drinking water and wastewater inventory of the approximate 6.9-million developed parcels in the state of Florida will provide many benefits including:

- Enhanced customer service, permitting, development review, and planning activities for state agencies, local government, utilities, citizens, and other interested parties through data sharing. It will also identify redundancies and information gaps for future work.
- Improved disaster preparedness and response activities resulting in accurate estimates of impacts on public health and infrastructure during disasters.
- Enhanced resource for homeowners, home-buyers, realtors and other entities interested in potable water and wastewater services.
- Centralized web portal of maps and data as well as consolidated project results which will all be accessible to the public.

### Current Status

The project began in April 2014. As of September 2016, mapping and summary reporting is complete for all Florida counties and posted on the project website

<http://floridahealth.gov/flwmi>. This project collected data for 91% of the volume of DEP permitted wastewater, and 81% of the population served by DEP permitted drinking water in the state. The study results show that there are approximately 2.1-million onsite wastewater systems in Florida and 680,000 private drinking water wells in Florida. These numbers will be refined as this project continues to acquire and verify new data.



## APPENDIX H –LIST OF PAPERS AND PRESENTATIONS

### Awards

	Date	Awarding Organization	Title	To
1	May 24, 2016	FDOH	Silo Buster Award	FLWMI Project Team
2	July 8, 2016	Governor's Office	Letter from the Governor Congratulating the Team on the Public Interactive Webpage	FLWMI Project Team

### Conference Papers

	Date	Organization	Title	By
1	November 5, 2015	National Onsite Wastewater Recycling Association (NOWRA)	Mapping Wastewater: Florida's Water Management Inventory	Onsite Program Staff

### Conference Presentations

	Date	Organization	Title	By
1	September 10, 2015	American Planning Association - Florida Conference	Florida Onsite Sewage Nitrogen Reduction	Project Owner
2	November 5, 2015	National Onsite Wastewater Recycling Association (NOWRA)	Mapping Wastewater: Florida's Water Management Inventory	Project Owner
3	July 15, 2016	Florida Environmental Health Association	Recognizing the Role of Onsite Wastewater	Project Owner
4	June 30, 2016	Florida Association of Counties	2016 Annual Conference and Educational Exposition	Bureau Chief

**Public Education Meetings/Presentations/Seminars**

	<b>Date</b>	<b>Organization /Audience</b>	<b>Title/Topic</b>	<b>By</b>
<b>1</b>	February 3, 2015	Environmental Health Strike Team	FLWMI Overview	Project Owner
<b>2</b>	May 23, 2014	Division Update	Elke Ursin, Levi Owens, and Liz Sabeff with the Bureau of Environmental Health, Water and Onsite Sewage Section, continued to make considerable progress on a statewide parcel-based drinking water source and wastewater disposal method inventory	Project Owner
<b>3</b>	June 12, 2014	Division Update	The CDC funded Florida Water Management Inventory continues to make great progress as the end of fiscal year comes closer. The project goal is to create a geodatabase which will provide the drinking water source and wastewater treatment method for every parcel in the state of Florida	Project Owner
<b>4</b>	September 23, 2014	United States Environmental Protection Agency (USEPA)	The United States Environmental Protection Agency (USEPA) celebrated its second annual SepticSmart Week on September 22-26, 2014. Florida onsite sewage system research performed by the Bureau of Environmental Health, Onsite Sewage Program, was highlighted as one of six projects on the USEPA website ( <a href="http://water.epa.gov/infrastructure/septic/septic-Smart-Week.cfm">http://water.epa.gov/infrastructure/septic/septic-Smart-Week.cfm</a> ). Two current projects in particular were highlighted: the Onsite Sewage Nitrogen Reduction Strategies Study and the Florida Water Management Inventory.	Project Team
<b>5</b>	December 15, 2014	Division Update	Elke Ursin and her project team in the Bureau of Environmental Health, launched Phase 2 of the Florida Water Management Inventory project; a pilot program was successfully executed for nine Florida counties, and the Phase 2 work will include six more Florida counties	Project Owner

**Public Education Meetings/Presentations/Seminars (cont.)**

<b>6</b>	December 17, 2014	Division Update	Elke Ursin, Levi Owens, Liz Sabeff, and Diane Hood with the Bureau of Environmental Health, conducted orientation meetings with each of the Florida Department of Health environmental health offices for Phase 2 of the Florida Water Management Inventory	Project Owner
<b>7</b>	January 21, 2015	Environmental Health Directors	FLWMI Status Update - January 2015	Project Owner
<b>8</b>	January 22, 2015	Silver Springs BMAP	Elke Ursin, Onsite Sewage Research Program, presented to the Silver Springs Basin Management Action Plan Technical Discussion Group on the Florida Water Management Inventory	Project Owner
<b>9</b>	February 20, 2015	Division Update	Elke Ursin, Onsite sewage Program, and her staff working on the Florida Water Management Inventory, made data on septic system locations available to several interested stakeholders: Florida Department of Health in Indian River County, Indian River County Government, Orange County Government, and the Florida State University	Project Owner
<b>10</b>	February 27, 2015	Division Update	The Florida Water Management Inventory team in the Bureau of Environmental Health continues to make progress on mapping the drinking water source and wastewater treatment method for every built property in the state; some accomplishments for the week ending February 27, 2015, include development of automation methods to prepare contact emails and prepare data for geocoding and responding to requests for inventory data results	Project Owner

**Public Education Meetings/Presentations/Seminars (cont.)**

11	March 3, 2015	Research Review and Advisory Committee (RRAC)	Elke Ursin with the Bureau of Environmental Health moderated a meeting of the Research Review and Advisory Committee; the purpose of this meeting was to discuss and guide current, proposed, and potential future onsite sewage research projects; the focus of this meeting was to discuss the Department of Health's Nitrogen Reduction Strategies Study. An update on the Department's Florida Water Management Inventory was also presented	Project Owner
12	March 6, 2015	Division Update	The Florida Water Management Inventory team: Levi Owens, Liz Sabeff, Diane Hood, and Elke Ursin in the Bureau of Environmental Health made some significant accomplishments toward the effort to determine the drinking water source and wastewater treatment method for every built property in the state; the team completed data gathering for Phase 2 counties, sent out requests for participation to numerous county health departments to participate in Phase 3, geocoded and brought in multiple datasets into the project GIS map, and continued to provide the public with data and information about this important project	Project Owner
13	March 20, 2015	DOH Central Office	Elke Ursin, Bureau of Environmental Health, met with Kathy Franklin, Office of Communications, to discuss the Florida Water Management Inventory webpage	Project Owner
14	March 20, 2015	Division Update	Elke Ursin, Bureau of Environmental Health, participated in a teleconference with Todd Reinhold, the Environmental Health Director for the Florida Department of Health in Martin County; Mr. Reinhold has secured an intern that will assist with the Bureau's Florida Water Management Inventory to improve Martin County's emergency preparedness and response activities	Project Owner

**Public Education Meetings/Presentations/Seminars (cont.)**

15	April 27, 2015	FDEP	Elke Ursin with the Bureau of Environmental Health participated on a Department of Environmental Protection conference call to discuss the proposed nitrogen reduction strategies for wastewater in the Silver Springs Basin. Two ongoing Department of Health research projects will specifically assist with this effort: the onsite sewage nitrogen reduction strategies study and the Florida water management inventory	Project Owner
16	May 19, 2015	Universities of South Florida, Texas, and the U.S. Geographic Survey	Elke Ursin, Bureau of Environmental Health, assisted a research fellow with the non-profit organization Resources for the Future in understanding Florida environmental health (EH) wastewater data; this is a joint effort with the Universities of South Florida, Texas, and the U.S. Geographic Survey, to create an environmental model for nutrients from septic systems and estimate the environmental benefits of these systems; EH permitting and Florida Water Management Inventory property-specific data will help with this research effort	Project Owner
17	June 15, 2015	Annual Report for the FLWMI Project	An Analysis of GIS Data Gathering	Project Manager
18	June 17, 2015	DOH Central Office	Elke Ursin with the Bureau of Environmental Health, gave two presentations to Department staff on the topic of nutrient management and how a map could impact Florida's future; she discussed the Florida Water Management Inventory project and how the project aims to combine multiple data silos and make the information publicly accessible to improve the health and safety of the public and the environment	Project Owner

**Public Education Meetings/Presentations/Seminars (cont.)**

<b>19</b>	August 11, 2015	Quarterly conference call on TMDL/BMAPs	Eb Roeder, Onsite Sewage Programs, coordinated the quarterly conference call of the departmental interest group on Total Maximum Daily Loads and Basin Management Action Plans; Elke Ursin provided an update on the Florida Water and Wastewater Inventory project	Research Program Staff
<b>20</b>	October 9, 2015	DOH Central Office	Liz Sabeff and Elke Ursin, with the Bureau of Environmental Health, met with Chris Duclos, with the Division of Community Health Promotion, about how the Florida Water Management Inventory project could coordinate with current applications under development; this cross-division effort will allow for refined estimates for health data tied to drinking water and wastewater	Project Team
<b>21</b>	October 22, 2015	Santa Fe Springs Protection Forum	Elke Ursin, with the Bureau of Environmental Health, presented on the Department's Nitrogen Reduction Strategies Study and the Florida Water Management Inventory project at a public meeting of the Santa Fe Springs Protection Forum	Project Owner
<b>22</b>	January 13, 2016	Southwest Florida Water Management District	An Overview of The Florida Water Management Inventory - January 2016	SWFWMD & DOH
<b>23</b>	January 26, 2016	For General Distribution	FLWMI Project Summary - January 2016 Update	Project Team
<b>24</b>	January 28, 2016	Division Update	Levi Owens with the Bureau of Environmental Health, received updated data from the Department of Business and Professional Regulation and the Department of Agricultural and Consumer Services on the drinking water source and wastewater treatment method for regulated facilities; these data will update the Florida Water Management Inventory, to help identify drinking water and wastewater information for every property in Florida	Project Team

**Public Education Meetings/Presentations/Seminars (cont.)**

<b>25</b>	February 1, 2016	DOH Central Office	Elke Ursin submitted the Project Management Plan for the Florida Water Management Inventory, along with the schedule, operational work plan, spending plan, and other documentation artifacts to the Division IT office; this request is to comply with the Florida Information Technology Project Management and Oversight Standards as set forth by the Agency for State Technology for all state agencies	Project Owner
<b>26</b>	April 27, 2016	Wekiva Springs BMAP	Department of Health Onsite Sewage Efforts	Project Owner
<b>27</b>	May 17, 2016	Environmental Systems Research Institute (ESRI)	Elke Ursin with the Bureau of Environmental Health, submitted several images from the Florida Water Management Inventory for possible inclusion in plenary session presentation by the president of Environmental Systems Research Institute. Specifically, images related to drinking water and wastewater were requested.	Project Owner
<b>28</b>	May 20, 2016	Division Update	Liz Sabeff and Elke Ursin with the Bureau of Environmental Health, participated in user acceptance testing of a web application that will allow the public to search for, view, and download data from the Florida Water Management Inventory; this application will provide cost and time savings as well as improve customer satisfaction	Project Team
<b>29</b>	June 14, 2016	Weeki Wachee BMAP	Recognizing the Role of Onsite Wastewater	Project Owner
<b>30</b>	July 12, 2016	Division Update	Comparison Between Onsite Sewage Treatment and Disposal Systems (OSTDS) Counts by DOH FLWMI and DEP NSILT Tools	Project Owner
<b>31</b>	July 19, 2016	Kings Bay - Crystal River & Weeki Wachee Basin BMAP	Recognizing the Role of Onsite Wastewater	Project Owner

**Public Education Meetings/Presentations/Seminars (cont.)**

<b>32</b>	July 21, 2016	Wekiva River and Rock Springs Run Basin BMAP	FLWMI Searchable Web Application	Project Owner
<b>33</b>	August 19, 2016	Florida League of Cities	Dr. Kendra Goff presents to Florida League of Cities on Onsite Implementation Plans for the "Springs Protection Act"	Bureau Chief
<b>34</b>	August 29, 2016	Public Health Dental Program	Elke Ursin and Ed Bettinger with the Bureau of Environmental Health, met with the Public Health Dental Program to discuss a collaborative project. The Florida Water Management Inventory provides drinking water source information for all built properties across the state, which could be tied to fluoridated public water systems to provide a better picture of oral health throughout Florida	Bureau Staff
<b>35</b>	September 13, 2016	Division Update	Bureau of Environmental Health welcomes FAMU rotation student; Elke Ursin is her mentor and she will be working to develop summary statistics and county snapshot web pages for the Florida Water Management Inventory project	Project Owner
<b>36</b>	September 22, 2016	Division Update	Combined FLWMI data with EHD data	Project Owner
<b>37</b>	October 4, 2016	Division Update	Xueqing Gao incorporated FLWMI data from the remaining 11 counties into the EHD database, updated the combined EHD FLWMI attribute table to include data from all 67 counties, and extracted records that meet a given set of conditions in an effort to support DEP OSTDS remediation plan development	Research Program Staff
<b>38</b>	October 21, 2016	Research Review and Advisory Committee (RRAC)	The Onsite Sewage Program facilitated a Research Review and Advisory Committee meeting. Elke Ursin moderated the meeting, Xueqing Gao and Levi Owens presented, and Eberhard Roeder represented the Department. The focus of this meeting was to discuss statewide activities relating to onsite wastewater systems in areas sensitive to nitrogen loading and provide an overview and training for the Florida Water Management Inventory.	Research Program Staff

### **County DOH Presentations & Training**

	<b>Date</b>	<b>Organization</b>	<b>Title</b>	<b>By</b>
<b>1</b>	December 16, 2014	DOH County Offices	FLWMI Phase 2 Orientation	Project Team
<b>2</b>	December 17, 2014	DOH County Offices	FLWMI Phase 2 Orientation	Project Team
<b>3</b>	March 31, 2015	DOH County Offices	FLWMI Phase 3 Orientation	Project Team
<b>4</b>	April 2, 2015	DOH County Offices	FLWMI Phase 3 Orientation	Project Team
<b>5</b>	March 15, 2016	DOH County Offices	FLWMI Phase 4 Orientation	Project Team
<b>6</b>	March 17, 2016	DOH County Offices	FLWMI Phase 4 Orientation	Project Team

### **Executive Summaries**

	<b>Date</b>	<b>Organization</b>	<b>Title</b>	<b>By</b>
<b>1</b>	October 20, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary October 20 2015	Project Manager
<b>2</b>	October 27, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary October 27 2015	Project Manager
<b>3</b>	November 3, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary November 3 2015	Project Manager
<b>4</b>	November 10, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary November 10 2015	Project Manager
<b>5</b>	November 17, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary November 17 2015	Project Manager
<b>6</b>	November 24, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary November 24 2015	Project Manager
<b>7</b>	December 1, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary December 1 2015	Project Manager
<b>8</b>	December 8, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary December 8 2015	Project Manager
<b>9</b>	December 15, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary December 15 2015	Project Manager
<b>10</b>	December 22, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary December 22 2015	Project Manager
<b>11</b>	December 29, 2015	DOH Project Executive Sponsor	FLWMI Project Executive Summary December 29 2015	Project Manager
<b>12</b>	January 12, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary January 12 2016	Project Manager
<b>13</b>	January 19, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary January 19 2016	Project Manager
<b>14</b>	February 16, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary February 16 2016	Project Manager
<b>15</b>	April 8, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary August 8 2016	Project Manager



16	April 12, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary April 12 2016	Project Manager
17	April 19, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary April 19 2016	Project Manager
18	April 26, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary April 26 2016	Project Manager
19	April 30, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary August 30 2016	Project Manager
20	May 17, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary May 17 2016	Project Manager
21	May 25, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary May 25 2016	Project Manager
22	June 1, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary Jun 1 2016	Project Manager
23	June 7, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary June 7 2016	Project Manager
24	June 14, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary June 14 2016	Project Manager
25	June 21, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary June 21 2016	Project Manager
26	June 28, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary June 28 2016	Project Manager
27	July 26, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary July 26 2016	Project Manager
28	September 16, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary September 13 2016	Project Manager
29	September 20, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary September 20 2016	Project Manager
30	September 27, 2016	DOH Project Executive Sponsor	FLWMI Project Executive Summary September 27 2016	Project Manager