

Water Use

National Water Census
ACF Focus Area



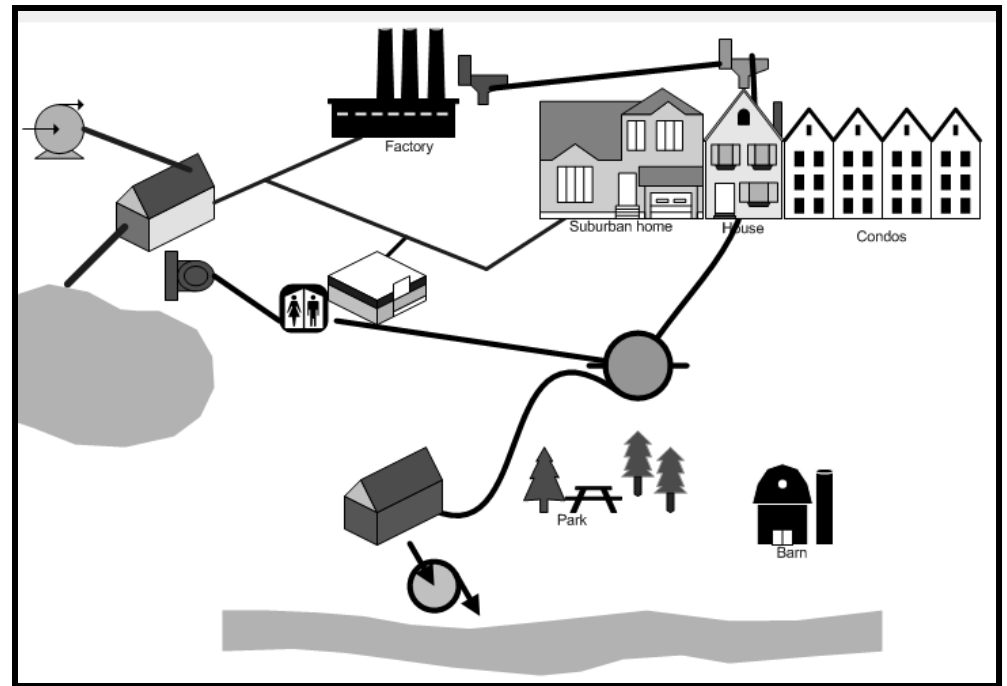
Stephen J. Lawrence, Hydrologist
Georgia Water Science Center

Background

- Since 1980, water withdrawals and water use data for each county in Georgia are compiled and published on a 5-year cycle.
- The 2010 compilation effort coincided with the need of the ACF Focus Area Study for site-specific water-use data.
 - Expanded to include years 2008, 2009, 2011, and 2012 for ACF focus
- The 2010 compilation was also the first time that site-specific water withdrawals, returns, transfers, and water use data were loaded into a site-specific water use data system (SWUDS)
- SWUDS compliments the USGS aggregate water-use data system (AWUDS), which contains water-use data aggregated by county, HUC-8, and major aquifer

Site-specific Water Use Data System (SWUDS)

- Part of National Water Information System (NWIS), also stores streamflow, groundwater levels, and water quality data
- A water accounting database, identifying water conveyances from withdrawal point to treatment/use to return location



Site-specific Water Use Data System (SWUDS)

- Prepare SWUDS for data
 - Create sites for wells and intakes with a withdrawal permit, facilities with a Safe Drinking Water permit, and outfalls with an NPDES permit
 - Assign each site several identifiers such site type (intake, outfall, treatment plant, etc), industrial classification, National Water Use Code, permit type and number, owner, HUC-8, and pop served by county and HUC-8
 - Create conveyance connections (amount of water from GW or SW to a facility, water from a facility to a SW outfall, sales and purchases of water among facilities.)

Compilation Methods

- Data Sources
 - Water Branch, GAEPD
 - Water withdrawals by permitted suppliers (>100k/day)
 - Drinking Water Program (withdrawals <100k/day)
 - Subdivisions, apartments, mobile home parks (<100k/day)
 - Population served data
 - Mail survey of municipal water systems
 - Questionnaires prepared and sent out by GAEPD
 - Requests a breakdown of water delivered to domestic, commercial, industrial, and wholesale accounts
 - Other sources
 - Comprehensive Financial Audit reports, planning documents, 2010 U.S. Census Block population, web pages, GA Power

2010 Water-use Questionnaire

WATER SUPPLY SYSTEMS IN GEORGIA - 2010

Water supply system:

County:

WSID:

Contact person:

Title:

Telephone number:

Email address:

Annual Average Water Withdrawal: _____ (mgd)**

Ground or Surface?

Estimated or Metered? (circle all that apply)

Do you purchase water from other water-supply systems? if additional space is needed please list on additional page:

Name*

Approximate amount (mgd)**

Number of connections: _____ Estimated Population served: _____

Percentage of water delivered and number of connections to these categories:

	<u>Percent</u>	<u>Connections</u>
Wholesale	_____ %	_____
Residential	_____ %	_____
Commercial	_____ %	_____
Industrial	_____ %	_____
Total	= 100%	

List wholesale customers supplied in 2010, if additional space is needed please list on additional page:

Name*

Approximate amount (mgd)**

List industries supplied in 2010 if additional space is needed please list on additional page:

Name*

Approximate amount (mgd)**

* Names of wholesale customers and industries will not be published

** Million gallons per day

Reverse for Instructions

Compilation Methods

- Domestic Use
 - Public Supplied
 - Withdrawals $>100\text{k/day}$
 - Pct of water delivered to residential accounts from water-use questionnaire or other sources
 - Withdrawals $<100\text{k/day}$
 - Subdivisions, apartments, mobile home parks
 - Population served times per capita use of 75 gpd
 - Self-supplied
 - $(\text{Total pop} - \text{pop served by public suppliers}) * 75 \text{ gpd}$



Compilation Methods

- Commercial and Industrial Use
 - Public Supplied
 - Withdrawals >100k/day
 - Pct of water delivered to commercial and industrial accounts from water-use questionnaire or other sources
 - Self-supplied
 - Withdrawals >100k/day
 - Permitted water withdrawals reported to GAEPD



Compilation Methods

- Mining Use
 - Water used during the extraction of minerals, not including dewatering, unless the water was used for dust control
 - Withdrawals >100k/day
 - Water Branch, GAEPD, Water withdrawal permit program
 - Withdrawals <100k/day
 - USGS-derived estimates based on mineral production data and water-use coefficients (Reference: Lovelace, J.K., 2009)



Compilation Methods

- Crop Irrigation
 - South Georgia
 - Geostatistical estimates using metered withdrawals from the Georgia Agricultural Water Conservation and Metering Program (Torak and Painter, 2011)
 - North Georgia
 - Agricultural water use estimates from the Georgia Water Plan
 - http://www.nespal.org/sirp/waterinfo/State/awd/AgWaterDemand_By_WPR.htm



Compilation Methods

- Golf Irrigation
 - Withdrawals >100k/day
 - Water Branch, GAEPD, Water withdrawal permit program
 - Agricultural water use estimates from the Georgia Water Plan
 - http://www.nespal.org/sirp/waterinfo/State/awd/AgWaterDemand_GolfCourses.htm



Compilation Methods

- Livestock and Aquaculture
 - Livestock
 - Agricultural water use estimates from the Georgia Water Plan
 - http://www.nespal.org/sirp/waterinfo/State/awd/AgWaterDemand_NonPrmt&Animal.htm
 - Aquaculture
 - USGS estimates
 - Lovelace, John K., 2009, Methods for estimating water withdrawals for aquaculture in the United States, 2005: U.S. Geological Survey Scientific Investigations Report 2009–5042, 13 p.



Compilation Methods

- Thermoelectric Power Generation
 - Water is used to produce electricity by its conversion to steam which turn turbine generators
 - Water-use data are subdivided by cooling type (once-through or recirculating) because the type of cooling determines the amount of consumptive use
 - Once-through and recirculating
 - Data Sources
 - Permitted water withdrawals reported to GAEPD
 - Industry



ACF Focus Area

- 2008-2012 dataset
 - Surface water intakes and outfalls, and facility sites are in SWUDS
 - Groundwater withdrawal sites are in SWUDS
 - Conveyances and conveyance amounts among the intakes, outfalls, GW, and facility sites are in SWUDS
 - This data has been given to Jacob LaFontaine for PRMS modeling and Elliott Jones for MODFLOW modeling
 - Populations served for each facility are in SWUDS and can be retrieved by county, HUC-8, and GA Water Planning Regions

ACF Focus Area

- Water Use in the ACF Basin
 - Surface water intakes and outfalls, and facility sites are in SWUDS
 - Groundwater withdrawal sites are in SWUDS
 - Conveyances and conveyance amounts among the intakes, outfalls, GW, and facility sites are in SWUDS
 - This data has been given to Jacob LaFontaine for PRMS modeling and Elliott Jones for MODFLOW modeling
 - Populations served for each facility are in SWUDS and can be retrieved by county, HUC-8, and GA Water Planning Regions

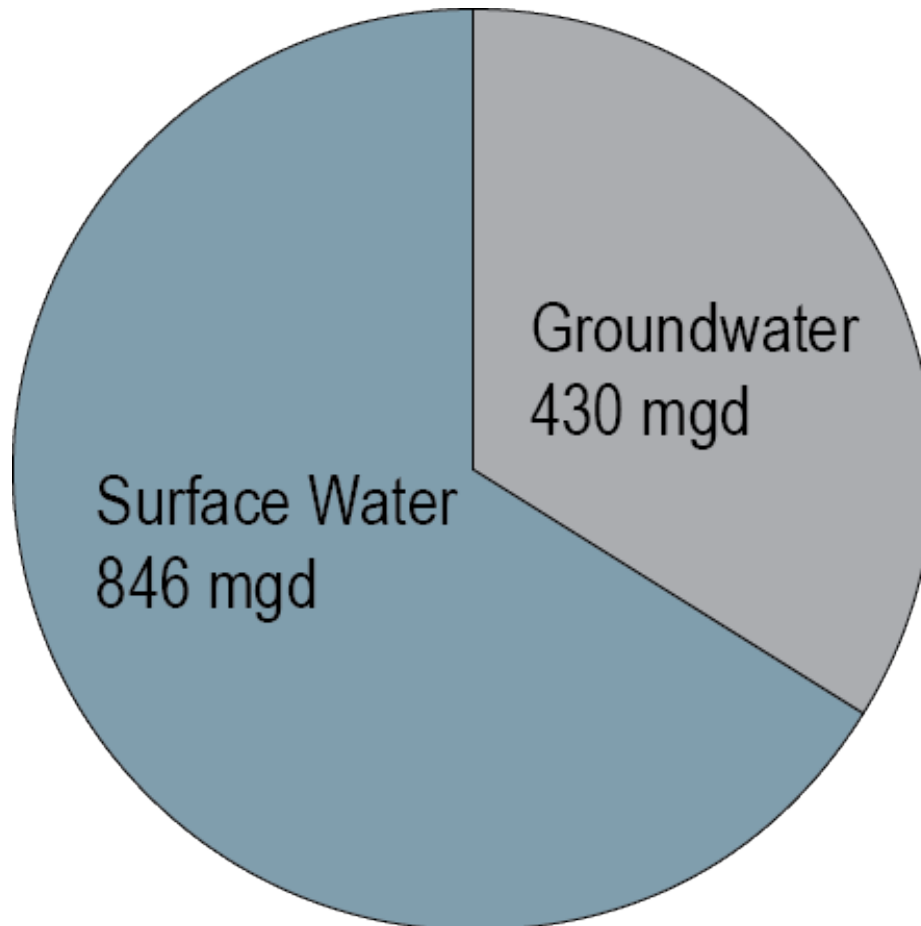
ACF Focus Area

Numbers of intakes, outfalls, GW, and facilities in the ACF Basin

Category	Facilities	Intakes	Outfalls	GW
Public Supply	347	67	--	292
Commercial	150	2	16	15
Industrial	62	2	36	44
Mining	19	5	27	1
Thermoelectric	8	9	9	2
Hydroelectric	13	4	1	--
Golf course irrig	18	16	0	2
Mun. Wastewater	143	--	155	--

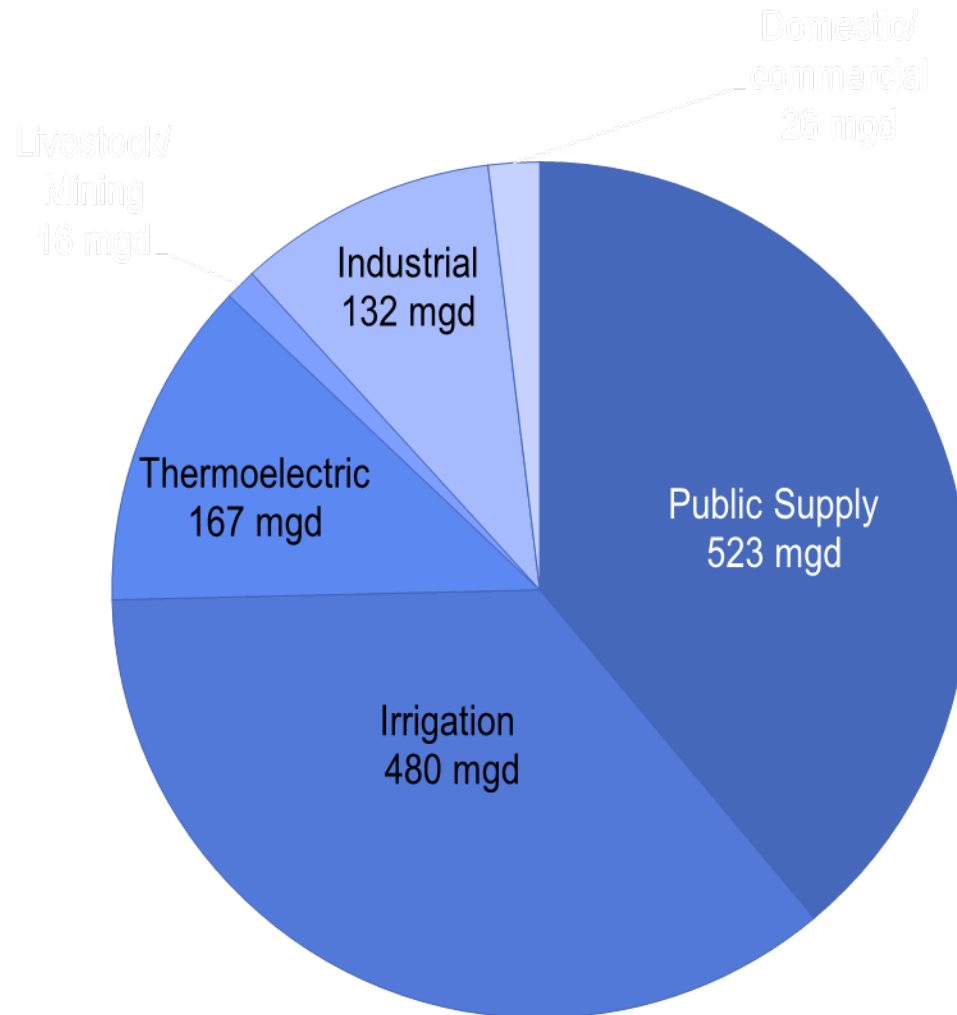
ACF Focus Area

Source and amount of water withdrawn in the ACF Basin



ACF Focus Area

Amount of water withdrawn and used by usage category in the ACF Basin



Publications

- Water Use in Georgia by County for 2010; and Water-use Trends, 1985-2010
- Monthly Water Withdrawals, Return Flows, and interbasin transfers in the Appalachicola-Chattahoochee-Flint River Basin, 2008-2012, using the National Hydrologic Dataset