

Technical Memorandum

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Through: Tammy Bader, Technical Program Manager, Water Use Planning Bureau
Subject: Estimating and Projections Sub-County Water Use for Georgia and South Carolina
Date: June 27, 2016

Introduction

To address potential recharge within the North Florida Southeast Georgia groundwater flow model boundary, St. Johns River Water Management District (SJRWMD) modeling staff requested that the Bureau of Water Supply Planning and Assessment distribute historic water use for Georgia and South Carolina from 1992-2014 and projected water demand for Georgia and South Carolina from 2015-2035. In addition, the data request required that the historic water use and future water demand projections identify estimates used for outdoor irrigation. This technical memorandum details the source and development of the dataset.

Tasks Completed

- 1) Times series of county-level water use estimates for the period 1990 through 2012.
 - a. Time series to cover Georgia and South Carolina
 - b. Estimates for the following water use categories/sectors:
 - i. Public Supply (PS)
 - ii. Domestic Self-Supply (DSS)
 - iii. Commercial/Industrial/Institutional & Mining/Dewatering (CII/MD)
 - iv. Golf Courses (GC)
 - v. Power Generation (PG)
- 2) 1992-2014 daily water use estimates spatially distributed to census blocks (PS, DSS, and CII/MD), golf courses and power plants.
- 3) 2015-2040 water demand projections spatially distributed to census blocks, golf courses and power plants in Georgia and South Carolina.

Historic Dataset

The United States Geological Service (USGS) publishes annual county-level water use every 5 years. Data for the years 1990, 1995, 2000, 2005, and 2010 is available via the USGS website.

- <http://ga.water.usgs.gov/publications/pubswu.html>
- <http://sc.water.usgs.gov/>
- <https://www2.usgs.gov/water/>

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

As data is only published in 5-year increments, it was necessary to estimate the interim years. Growth rates were calculated in excel using the RATE formula. The growth rates were then applied to generate data for the interim years as follows:

- a. 1992-1994 estimates are based on growth rates from USGS data for the years 1990 and 1995
- b. 1996-1999 estimates are based on growth rates from USGS data for the years 1995 and 2000
- c. 2001-2004 estimates are based on growth rates from USGS data for the years 2000 and 2005
- d. 2006-2009 estimates are based on growth rates from USGS data for the years 2005 and 2010
- e. 2011 and 2012 estimates are based on growth rates from USGS data for the years 2005 and 2010. USGS has not yet published data for 2015.

The layouts of the USGS tables and variable names have changed in the publications over the course of the last 20 years. Table 1, below, lists the variables used for the different sectors and years. In the case of golf course irrigation, USGS does not list separate estimates in the years 1990, 1995 and 2000. Thus, it was necessary to calculate separate estimates as the average share of golf course irrigation for the years 2005 and 2010 multiplied times the total irrigation. Below is an example using Chatham County, Georgia:

1990 Irrigation, Total self-supplied withdrawals, fresh, in million gallons per day (mgd) = 2.55 mgd

2005 Share of Golf Course irrigation = 100%

2010 Share of Golf Course irrigation = 78.57%

Average 2005 and 2010 Share of Golf Course irrigation = $(100\% + 78.57\%) / 2 = 89.3\%$

Updated 1990 Irrigation-Golf withdrawals, fresh, = $2.55 \text{ mgd} * 89.3\% = 2.28 \text{ mgd}$

Water use published by USGS for power generation included all quantities, both nonconsumptive and consumptive. Nonconsumptive is defined by SJRWMD as any use of water that does not reduce the water supply from which it is withdrawn or diverted. For further clarification, consumptive use is defined by SJRWMD as any use of water that reduces the supply from which it is withdrawn or diverted. Published power generation values for the years 2000, 2005 and 2010 were adjusted to reflect only consumptive use, 2% of the total reported water use for power generation.

Location of Working Files:

- <H:\rm\WSM\NFRWSP\Data\AL Interpolating County Level 19921994 19961999 20012004 20062009 20112012 Using USGS 1990 1995 2000 2005 2010.xlsx>
- <H:\rm\WSM\NFRWSP\Data\GA Interpolating County Level 19921994 19961999>

- [20012004 20062009 20112012 Using USGS 1990 1995 2000 2005 2010.xlsx](#)
[H:\rm\WSM\NFRWSP\Data\SC Interpolating County Level 19921994 19961999 20012004 20062009 20112012 Using USGS 1990 1995 2000 2005 2010.xlsx](#)

2015-2040 Water Demand Projections

Detailed methodology for development of the water demand projections can be found in the technical memorandum titled *Generating AL GA SC Block Level Population Water Use Projections*. Below is a brief synopsis of how the water demand projections were developed.

- Estimated the share of the 2015 through 2040 Woods and Poole county-level population projections for census blocks in Georgia and South Carolina.
- Calculated per capita gallons per day by county by source by category from the published 2010 USGS water use data.
- Multiplied the population share by the per capita gallons per day to obtain block-level water use projections by source by category.

The block level projections were then aggregated by county and imported into the Statistical Analysis System (SAS).

Distribution of Water Demand Projections

The distribution of water demand projections was done in SAS. The same SAS program for updating historic water use was employed. Comparisons tables and graphs were created in Excel using data exported from SAS.

Location of SAS program used:

- [H:\rm\WSM\NFRWSP\Data\Incorporating 1990 1995 2010 USGS Data into Nonagricultural Reshaped Tables GAALSC.sas](#).

Share of Total County Water Use

Allocations were based on share of total county water use and indoor vs. outdoor. These shares were calculated from Jones Edmunds' historical non-agricultural water use data. For details see the technical memorandum titled [Review and Update of 1992 to 2012 Non Agricultural Data Water Use Time Series](#) and the SAS program referenced above.

Table 1. USGS Variables Used in Generating Non-Agricultural Water Use Time Series

USGS Publication Year	Water Use	Variable Name	Variable Description
1990	Public Supply	Not available	Public Supply self-supplied groundwater withdrawals, fresh, in mgd
1990	Public Supply	Not available	Public Supply self-supplied surface-water withdrawals, fresh, in mgd
1995	Public Supply	Not available	Public Supply total self-supplied withdrawals, groundwater, in mgd
1995	Public Supply	Not available	Public Supply total self-supplied withdrawals, surface water, in mgd
2000	Public Supply	PS-WGWF _r	Public supply, groundwater withdrawals, fresh, in mgd
2000	Public Supply	PS-WSWF _r	Public supply, surface-water withdrawals, fresh, in mgd
2005	Public Supply	PS-WGWT _o	Public Supply, groundwater withdrawals, total, in mgd
2005	Public Supply	PS-WSWT _o	Public Supply, surface-water withdrawals, total, in mgd
2010	Public Supply	PS-WGWT _o	Public Supply, groundwater withdrawals, total, in mgd

Table 1. USGS Variables Used in Generating Non-Agricultural Water Use Time Series

USGS Publication Year	Water Use	Variable Name	Variable Description
2010	Public Supply	PS-WSWTo	Public Supply, surface-water withdrawals, total, in Mgd
1990	Domestic Self-Supply	Not available	Domestic self-supplied groundwater withdrawals, fresh, in mgd
1990	Domestic Self-Supply	Not available	Domestic self-supplied surface-water withdrawals, fresh, in mgd
1995	Domestic Self-Supply	Not available	Domestic total self-supplied withdrawals, groundwater, in mgd
1995	Domestic Self-Supply	Not available	Domestic total self-supplied withdrawals, surface water, in mgd
2000	Domestic Self-Supply	DO-WGWFr	Domestic, ground-water self-supplied withdrawals, fresh, in mgd
2000	Domestic Self-Supply	DO-WSWFr	Domestic, surface-water self-supplied withdrawals, fresh, in mgd
2005	Domestic Self-Supply	DO-WGWFr	Domestic, self-supplied groundwater withdrawals, fresh, in mgd
2005	Domestic Self-Supply	DO-WSWFr	Domestic, self-supplied surface-water withdrawals, fresh, in mgd

Table 1. USGS Variables Used in Generating Non-Agricultural Water Use Time Series

USGS Publication Year	Water Use	Variable Name	Variable Description
2010	Domestic Self-Supply	DO-WGWFr	Domestic, self-supplied groundwater withdrawals, fresh, in mgd
2010	Domestic Self-Supply	DO-WSWFr	Domestic, self-supplied surface-water withdrawals, fresh, in mgd
1990	Commercial/Industrial/Institutional & Mining Dewatering	Not available	Commercial self-supplied groundwater withdrawals, fresh, in mgd + Industrial total self-supplied withdrawals, groundwater, in mgd
1990	Commercial/Industrial/Institutional & Mining Dewatering	Not available	Commercial self-supplied surface-water withdrawals, fresh, in mgd + Industrial total self-supplied withdrawals, surface water, in mgd
1995	Commercial/Industrial/Institutional & Mining Dewatering	Not available	Commercial total self-supplied withdrawals, groundwater, in mgd + Industrial total self-supplied withdrawals, groundwater, in mgd

Table 1. USGS Variables Used in Generating Non-Agricultural Water Use Time Series

USGS Publication Year	Water Use	Variable Name	Variable Description
1995	Commercial/Industrial/Institutional & Mining Dewatering	Not available	Commercial total self-supplied withdrawals, surface water, in mgd + Industrial total self-supplied withdrawals, surface water, in mgd
2000	Commercial/Industrial/Institutional & Mining Dewatering	IN-WGWT _o + MI-WGWT _o	Industrial, ground-water self-supplied withdrawals, total, in mgd + Mining ground-water withdrawals, total, in mgd
2000	Commercial/Industrial/Institutional & Mining Dewatering	IN-WSWT _o + MI-WSWT _o	Industrial, surface-water self-supplied withdrawals, total, in mgd + Mining surface-water withdrawals, total, in mgd
2005	Commercial/Industrial/Institutional & Mining Dewatering	IN-WGWT _o + MI-WGWT _o	Industrial, self-supplied groundwater withdrawals, total, in mgd + Mining, groundwater withdrawals, total, in mgd
2005	Commercial/Industrial/Institutional & Mining Dewatering	IN-WGWT _o + MI-WGWT _o	Industrial, self-supplied groundwater withdrawals, total, in mgd + Mining, groundwater withdrawals, total, in mgd

Table 1. USGS Variables Used in Generating Non-Agricultural Water Use Time Series

USGS Publication Year	Water Use	Variable Name	Variable Description
2010	Commercial/Industrial/Institutional & Mining Dewatering	IN-WGWT _o + MI-WGWT _o	Industrial, self-supplied groundwater withdrawals, total, in mgd + Mining, groundwater withdrawals, total, in mgd
2010	Commercial/Industrial/Institutional & Mining Dewatering	IN-WSWT _o + MI-WSWT _o	Industrial, self-supplied surface-water withdrawals, total, in mgd + Mining, surface-water withdrawals, total, in mgd
1990	Golf	Not available	Estimated as a share of Irrigation, Total self-supplied groundwater withdrawals, fresh, in mgd
1990	Golf	Not available	Estimated as a share of Irrigation, Total self-supplied surface-water withdrawals, fresh, in mgd
1995	Golf	Not available	Estimated as a share of Irrigation, Total self-supplied groundwater withdrawals, fresh, in mgd
1995	Golf	Not available	Estimated as a share of Irrigation, Total self-supplied surface-water withdrawals, fresh, in mgd

Table 1. USGS Variables Used in Generating Non-Agricultural Water Use Time Series

USGS Publication Year	Water Use	Variable Name	Variable Description
2000	Golf	IT-WGWFr	Irrigation, ground-water withdrawals, fresh, in mgd
2000	Golf	IT-WSWFr	Irrigation, surface-water withdrawals, fresh, in mgd
2005	Golf	IG-WGWFr	Irrigation-Golf, groundwater withdrawals, fresh, in mgd
2005	Golf	IG-WSWFr	Irrigation-Golf, surface-water withdrawals, fresh, in mgd
2010	Golf	IG-WGWFr	Irrigation-Golf, groundwater withdrawals, fresh, in mgd
2010	Golf	IG-WSWFr	Irrigation-Golf, surface-water withdrawals, fresh, in mgd
1990	Power Generation	Not available	Total Thermoelectric Power consumptive use, fresh, in mgd
1995	Power Generation	Not available	Total Thermoelectric Power consumptive use, fresh, in mgd
2000	Power Generation	Not available	Estimated as 2% of Thermoelectric, surface-water withdrawals, total, in mgd
2005	Power Generation	Not available	Estimated as 2% of Thermoelectric, surface-water withdrawals, total, in mgd

Table 1. USGS Variables Used in Generating Non-Agricultural Water Use Time Series

USGS Publication Year	Water Use	Variable Name	Variable Description
2010	Power Generation	Not available	Estimated as 2% of Thermoelectric, surface-water withdrawals, total, in mgd

Example of Estimating Block-level Public Supply Monthly Water Use

Example provided for April 2001 block-level public supply water use for Block ID # 131759502011001 in Laurens County, Georgia:

- 1) Data elements:
 - a. Countywide 2001 public supply groundwater water use = 1.178 mgd
 - i. This value was interpolated from USGS water use estimates for the years 2000 and 2005
 - b. Countywide 2001 public supply surface water use = 3.112 mgd
 - i. This value was interpolated from USGS water use estimates for the years 2000 and 2005
 - c. Monthly share of water use for April = 0.00096%
 - d. Indoor share of water use = 42.5%
 - e. Outdoor share of water use = 57.5%
- 2) April 2001 block-level public supply water use estimate:
 - a. Indoor groundwater = $(1.178 * 1,000,000 * 365) * 0.00096\% * 42.5\% = 1,754$ gallons
 - b. Outdoor groundwater = $(1.178 * 1,000,000 * 365) * 0.00096\% * 57.5\% = 2,167$ gallons
 - c. Indoor surface water = $(3.112 * 1,000,000 * 365) * 0.00096\% * 42.5\% = 4,634$ gallons
 - d. Outdoor surface water = $(3.112 * 1,000,000 * 365) * 0.00096\% * 57.5\% = 5,725$ gallons

Table 2 and Figure 1 show the 2001 monthly public supply water use estimates for this block. Table 3 lists the variables in the data files and their definitions.

Table 2. Calculating Public Supply Water Use for Census Block ID # 131759502011001 in Laurens County, Georgia

Month	Days	Annual Groundwater Use (mgd)	Monthly Share of Groundwater	Indoor Groundwater Use as Percent of Groundwater Use	Outdoor Water Use as Percent of Groundwater Use	Block-Level Estimated Indoor Groundwater Use (gallons)	Block-Level Estimated Outdoor Groundwater Use (gallons)	Annual Surface Water Use	Block-Level Estimated Indoor Surface water Use (gallons)	Block-Level Estimated Outdoor Surface Water Use (gallons)
January	31	1.178	0.00087%	46.84%	53.16%	1,745	1,980	3.112	4,609	5,230
February	29	1.178	0.00081%	50.07%	49.93%	1,745	1,740	3.112	4,609	4,596
March	31	1.178	0.00086%	47.37%	52.63%	1,745	1,939	3.112	4,609	5,121
April	30	1.178	0.00096%	42.48%	57.52%	1,745	2,363	3.112	4,609	6,241
May	31	1.178	0.00101%	40.34%	59.66%	1,745	2,581	3.112	4,609	6,817
June	30	1.178	0.00101%	40.06%	59.94%	1,745	2,611	3.112	4,609	6,897
July	31	1.178	0.00090%	45.04%	54.96%	1,745	2,129	3.112	4,609	5,624
August	31	1.178	0.00089%	45.82%	54.18%	1,745	2,063	3.112	4,609	5,450
September	30	1.178	0.00090%	45.16%	54.84%	1,745	2,119	3.112	4,609	5,597
October	31	1.178	0.00090%	45.19%	54.81%	1,745	2,116	3.112	4,609	5,590
November	30	1.178	0.00088%	46.16%	53.84%	1,745	2,035	3.112	4,609	5,376
December	31	1.178	0.00091%	44.38%	55.62%	1,745	2,187	3.112	4,609	5,776

Note: Differences between numbers calculated in the example and the numbers presented in this table are attributable to rounding.

Figure 1. Estimated Public Supply Monthly Use in gallons Census Block ID # 131759502011001 in Laurens County, Georgia

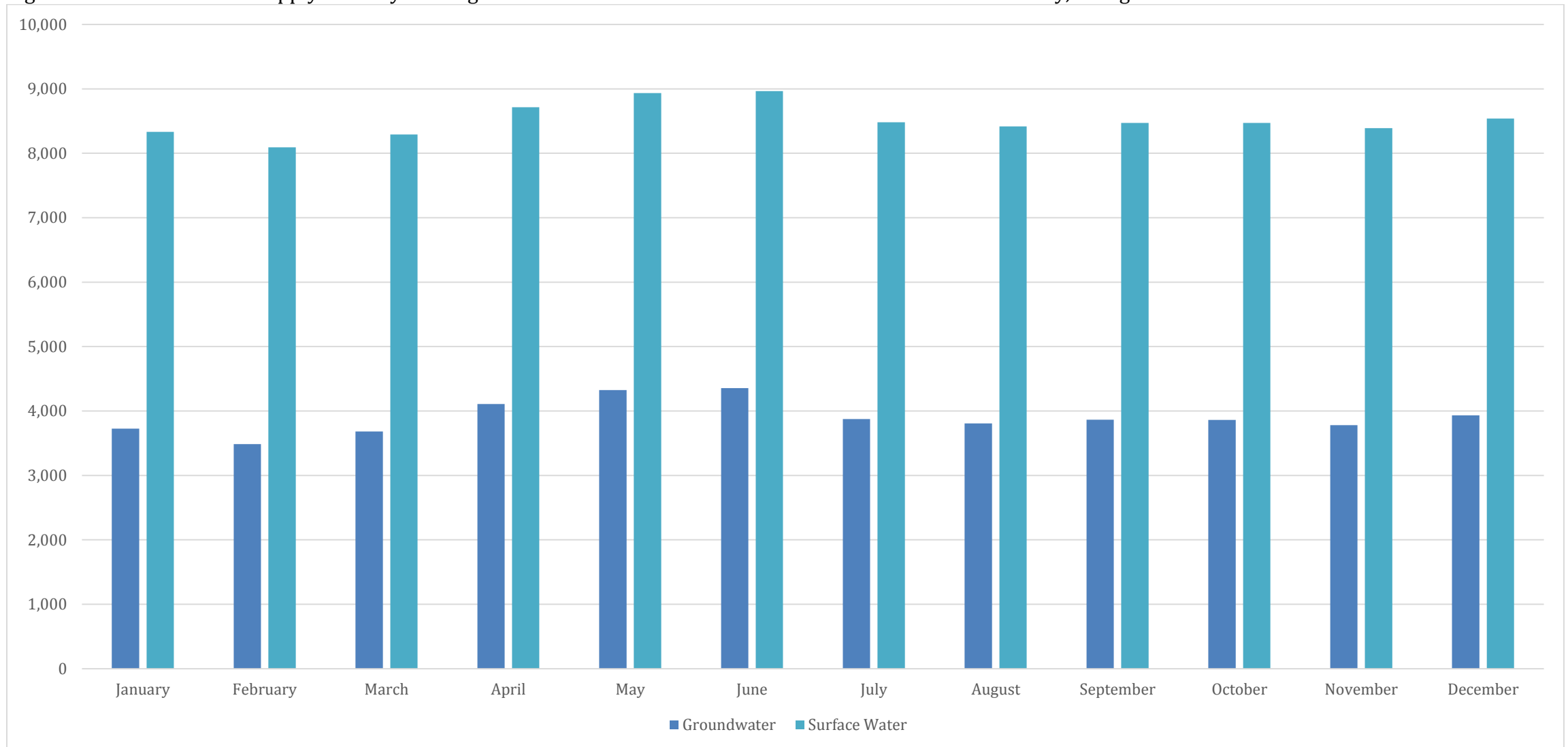


Table 3. Variables in file *New 19922012 Block Level PS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
OBJECTID_1	Unique ID for each block from the GIS layer. If BLOCKID_TXT does not work, then this variable may be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
OBJECTID	Block ID variable. This is not unique to each block.	Not applicable
STATEFP10	State FIPS Code in text format. For example, '01' denotes census blocks in Alabama.	Not applicable
COUNTYFP10	County FIPs in text format.	Not applicable
TRACTCE10	Tract in text format.	Not applicable
BLOCKCE	Block in text format.	Not applicable
BLOCKID10_TXT	Unique ID for 2010 Block. This is the variable to be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
COUNTYFP10_NUM	County FIPS	Not applicable
STATEFP10_NUM	State FIPS	Not applicable
CAL_YEAR_DS C	Year	Not applicable
MONTH_LONG_DSC	Month Name	Not applicable
MONTH_KEY	Month Key	Not applicable
MONTH_YEAR	Month and Year	Not applicable
DAYS	Days in Month	Not applicable
INDOOR_GW_GALL	Original estimate of block-level indoor groundwater use in gallons	Gallons
OUTDOOR_GW_GALL	Original estimate of block-level outdoor groundwater use in gallons	Gallons
TOTAL_GW_GALL	Indoor groundwater use plus outdoor groundwater use	Gallons

Table 3. Variables in file *New 19922012 Block Level PS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
PS_GW_MGD	USGS countywide groundwater use in mgd	Millions of Gallons per Day
SHARE_PS_GW	Share of total block-level public supply water use that is groundwater	Percent
SHARE_PS_GW_IN	Share of block-level groundwater that is used indoors	Percent
SHARE_PS_GW_OUT	Share of block-level groundwater that is used outdoors	Percent
NEW_PS_GW_IN_GALL	It was calculated as $NEW_PS_GW_IN_GALL = PS_GW_MGD * SHARE_PS_GW * SHARE_PS_GW_IN$	Gallons
NEW_PS_GW_OUT_GALL	It was calculated as $NEW_PS_GW_OUT_GALL = PS_GW_MGD * SHARE_PS_GW * SHARE_PS_GW_OUT$	Gallons
INDOOR_SW_GALL	Original estimate of block-level indoor surface water use in gallons	Gallons
OUTDOOR_SW_GALL	Original estimate of block-level outdoor surface water use in gallons	Gallons
TOTAL_SW_GALL	Indoor surface water use plus outdoor surface water use	Gallons
SHARE_PS_SW	Share of total block-level public supply water use that is surface water	Percent
SHARE_PS_SW_IN	Share of block-level groundwater that is used indoors	Percent
SHARE_PS_SW_OUT	Share of block-level groundwater that is used outdoors	Percent
NEW_PS_SW_IN_GALL	It was calculated as $NEW_PS_SW_IN_GALL = PS_SW_MGD * SHARE_PS_SW * SHARE_PS_SW_IN$	Gallons
NEW_PS_SW_OUT_GALL	It was calculated as $NEW_PS_SW_OUT_GALL = PS_SW_MGD * SHARE_PS_SW * SHARE_PS_SW_OUT$	Gallons

Distributing Public Supply Projections

Provided below is an example of how updated public supply water demand projections were generated for Census Block ID # 131759502011001 in Laurens County, Georgia.

- 1) Projected 2035 public supply water demand:
 - a. 2035 countywide public supply groundwater demand = 2,709,923 gallons
 - b. 2035 countywide public supply groundwater demand = 2,233,177 gallons
- 2) From historical data, we calculated the following shares:
 - a. Monthly share of water use for April = 0.00096%
 - b. Indoor share of groundwater use = 42.5%
 - c. Outdoor share of groundwater use = 57.5%
- 3) Projected April 2035 public supply groundwater demand:
 - a. Public supply groundwater demand =
 $2,709,923 * 0.00096\% * 365 \text{ days} = 9,425 \text{ gallons}$
 - b. Public supply indoor groundwater demand share =
 $9,425 \text{ gallons} * 42.5\% = 4,035 \text{ gallons}$
 - c. Public supply outdoor groundwater demand share =
 $9,425 \text{ gallons} * 57.5\% = 5,419 \text{ gallons.}$
- 4) Projected April 2035 public supply groundwater demand:
 - a. Public supply groundwater use =
 $2,233,177 * 0.00096\% * 365 \text{ days} = 7,825 \text{ gallons}$
 - b. Public supply indoor groundwater demand share =
 $7,825 \text{ gallons} * 42.5\% = 3,325 \text{ gallons}$
 - c. Public supply outdoor groundwater demand share =
 $7,825 \text{ gallons} * 57.5\% = 4,499 \text{ gallons.}$

Tables 4a and 4b, below, and Figures 2a and 2b, provide the examples of annual and monthly water demand projections.

Location of block-level projections:

- <H:\rm\WSM\NFRWSP\Data\Projected 20152040 Block Level PS Water Use GAALSC.csv>.

See Table 5 for variable definitions and units.

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 4a. Projected Indoor Use in gallons for Block ID # 13175950201 in Laurens County, Georgia

Month	Indoor Use						
	2010	2015	2020	2025	2030	2035	2040
January	5,766	6,003	6,329	6,655	6,975	7,286	7,590
February	5,766	6,003	6,329	6,655	6,975	7,286	7,590
March	5,766	6,003	6,329	6,655	6,975	7,286	7,590
April	5,766	6,003	6,329	6,655	6,975	7,286	7,590
May	5,766	6,003	6,329	6,655	6,975	7,286	7,590
June	5,766	6,003	6,329	6,655	6,975	7,286	7,590
July	5,766	6,003	6,329	6,655	6,975	7,286	7,590
August	5,766	6,003	6,329	6,655	6,975	7,286	7,590
September	5,766	6,003	6,329	6,655	6,975	7,286	7,590
October	5,766	6,003	6,329	6,655	6,975	7,286	7,590
November	5,766	6,003	6,329	6,655	6,975	7,286	7,590
December	5,766	6,003	6,329	6,655	6,975	7,286	7,590

Table 4b. Projected Outdoor Use in gallons for Block ID # 13175950201 in Laurens County, Georgia

Month	Outdoor Use						
	2010	2015	2020	2025	2030	2035	2040
January	6,543	6,812	7,182	7,553	7,916	8,268	8,614
February	5,750	5,986	6,311	6,636	6,955	7,265	7,568
March	6,408	6,671	7,033	7,396	7,751	8,096	8,435
April	7,808	8,129	8,570	9,012	9,445	9,866	10,278
May	9,865	10,270	10,828	11,386	11,933	12,465	12,986
June	7,546	7,856	8,283	8,710	9,129	9,535	9,934
July	7,036	7,325	7,722	8,121	8,511	8,890	9,262
August	6,819	7,099	7,484	7,870	8,248	8,616	8,976
September	7,003	7,290	7,686	8,083	8,471	8,848	9,218
October	7,546	7,856	8,283	8,710	9,129	9,535	9,934
November	6,726	7,002	7,382	7,763	8,136	8,498	8,854
December	7,226	7,523	7,932	8,341	8,742	9,131	9,512

Figure 2a. Public Supply Water Use Projections in Gallons in April for Block ID # 13175950201 in Laurens County, Georgia

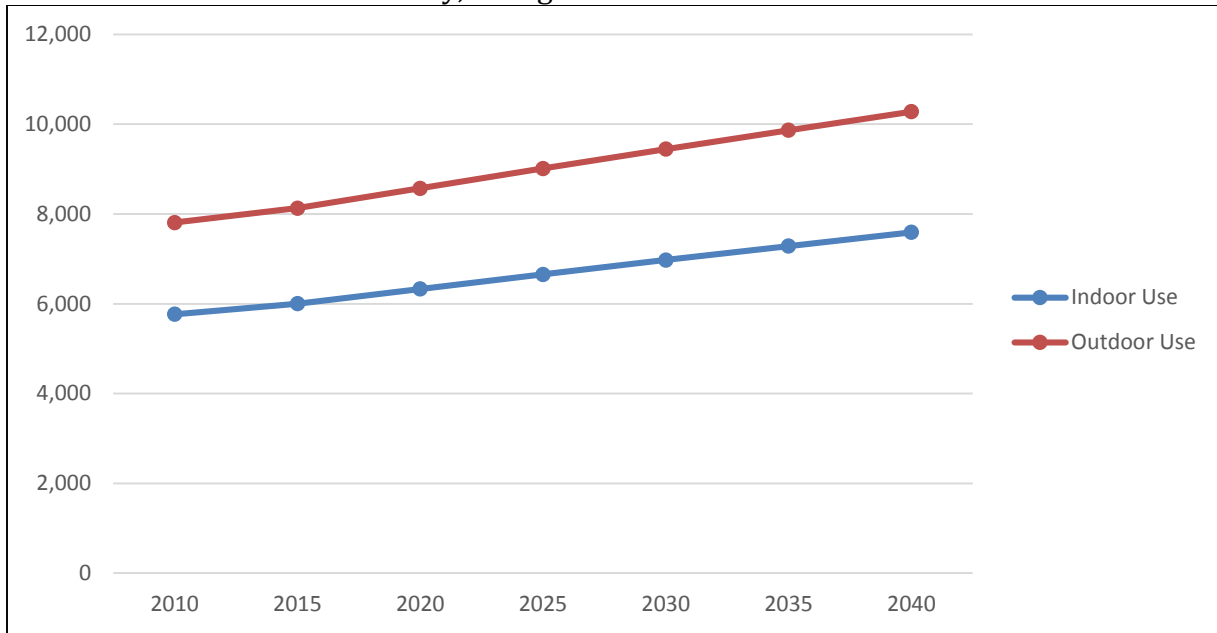
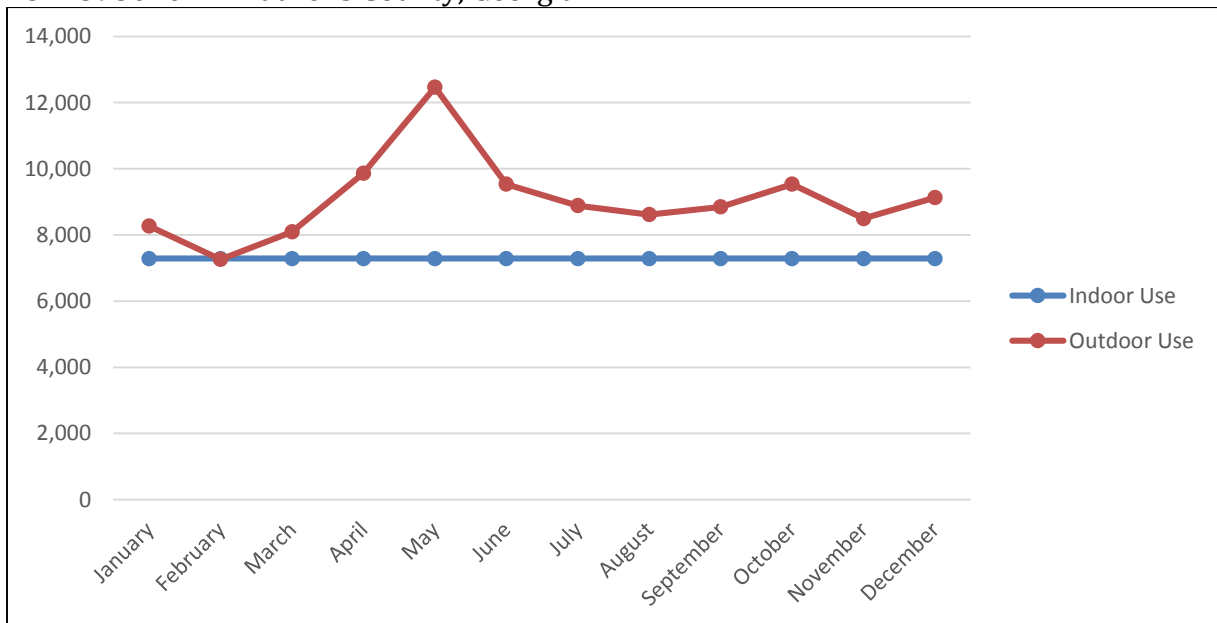


Figure 2b. 2035 Public Supply Water Use Projections in Gallons for Block ID # 13175950201 in Laurens County, Georgia



Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 5. Variables in file *Projected 20152040 Block Level PS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
OBJECTID_1	Unique ID for each block from the GIS layer. If BLOCKID_TXT does not work, then this variable may be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
OBJECTID	Block ID variable. This is not unique to each block.	Not applicable
STATEFP10	State FIPS Code in text format. For example, '01' denotes census blocks in Alabama.	Not applicable
COUNTYFP10	County FIPs in text format	Not applicable
TRACTCE10	Tract in text format	Not applicable
BLOCKCE	Block in text format	Not applicable
BLOCKID10_TXT	Unique ID for 2010 Block. This is the variable to be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
COUNTYFP10_NUM	County FIPS	Not applicable
STATEFP10_NUM	State FIPS	Not applicable
CAL_YEAR_DSC	Year	Not applicable
MONTH_LOADING_DSC	Month Name	Not applicable
MONTH_KEY	Month Key	Not applicable
MONTH_YEAR	Month and Year	Not applicable
DAYS	Days in Month	Not applicable
INDOOR_GW_GALL	Original estimate of block-level indoor groundwater demand in gallons	Gallons
OUTDOOR_GW_GALL	Original estimate of block-level outdoor groundwater demand in gallons	Gallons
TOTAL_GW_GALL	Indoor groundwater use plus outdoor groundwater demand	Gallons
PS_GW_MGD	USGS countywide groundwater demand in mgd	Millions of Gallons per Day
SHARE_PS_GW	Share of total block-level public supply water demand that is groundwater	Percent

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 5. Variables in file *Projected 20152040 Block Level PS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
SHARE_PS_GW_IN	Share of block-level groundwater that is used indoors	Percent
SHARE_PS_GW_OUT	Share of block-level groundwater that is used outdoors	Percent
NEW_PS_GW_IN_GALL	It was calculated as $NEW_PS_GW_IN_GALL = PS_GW_MGD * SHARE_PS_GW * SHARE_PS_GW_IN$	Gallons
NEW_PS_GW_OUT_GALL	It was calculated as $NEW_PS_GW_OUT_GALL = PS_GW_MGD * SHARE_PS_GW * SHARE_PS_GW_OUT$	Gallons
INDOOR_SW_GALL	Original estimate of block-level indoor surface water demand in gallons	Gallons
OUTDOOR_SW_GALL	Original estimate of block-level outdoor surface water demand in gallons	Gallons
TOTAL_SW_GALL	Indoor surface water use plus outdoor surface water demand	Gallons
SHARE_PS_SW	Share of total block-level public supply water demand that is surface water	Percent
SHARE_PS_SW_IN	Share of block-level groundwater that is used indoors	Percent
SHARE_PS_SW_OUT	Share of block-level groundwater that is used outdoors	Percent
NEW_PS_SW_IN_GALL	It was calculated as $NEW_PS_SW_IN_GALL = PS_SW_MGD * SHARE_PS_SW * SHARE_PS_SW_IN$	Gallons
NEW_PS_SW_OUT_GALL	It was calculated as $NEW_PS_SW_OUT_GALL = PS_SW_MGD * SHARE_PS_SW * SHARE_PS_SW_OUT$	Gallons
COUNTY_Proj_PS_WGW_To_2015	County-level 2015 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WGW_To_2020	County-level 2020 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WGW_To_2025	County-level 2025 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WGW_To_2030	County-level 2030 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WGW_To_2035	County-level 2035 groundwater demand projections	Millions of Gallons per Day

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 5. Variables in file *Projected 20152040 Block Level PS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
COUNTY_Proj_PS_WGWTo_2040	County-level 2040 groundwater demand projections	Millions of Gallons per Day
PS_GW_IN_2015	It was calculated as $PS_GW_IN_2015 = COUNTY_Proj_PS_WGWTto_2015 * SHARE_PS_GW * SHARE_PS_GW_IN * 1,000,000 * 365$	Gallons
PS_GW_IN_2020	It was calculated as $PS_GW_IN_2020 = COUNTY_Proj_PS_WGWTto_2020 * SHARE_PS_GW * SHARE_PS_GW_IN * 1,000,000 * 365$	Gallons
PS_GW_IN_2025	It was calculated as $PS_GW_IN_2025 = COUNTY_Proj_PS_WGWTto_2025 * SHARE_PS_GW * SHARE_PS_GW_IN * 1,000,000 * 365$	Gallons
PS_GW_IN_2030	It was calculated as $PS_GW_IN_2030 = COUNTY_Proj_PS_WGWTto_2030 * SHARE_PS_GW * SHARE_PS_GW_IN * 1,000,000 * 365$	Gallons
PS_GW_IN_2035	It was calculated as $PS_GW_IN_2035 = COUNTY_Proj_PS_WGWTto_2035 * SHARE_PS_GW * SHARE_PS_GW_IN * 1,000,000 * 365$	Gallons
PS_GW_IN_2040	It was calculated as $PS_GW_IN_2040 = COUNTY_Proj_PS_WGWTto_2040 * SHARE_PS_GW * SHARE_PS_GW_IN * 1,000,000 * 365$	Gallons
PS_GW_OUT_2015	It was calculated as $PS_GW_OUT_2015 = COUNTY_Proj_PS_WGWTto_2015 * SHARE_PS_GW * SHARE_PS_GW_OUT * 1,000,000 * 365$	Gallons
PS_GW_OUT_2020	It was calculated as $PS_GW_OUT_2020 = COUNTY_Proj_PS_WGWTto_2020 * SHARE_PS_GW * SHARE_PS_GW_OUT * 1,000,000 * 365$	Gallons
PS_GW_OUT_2025	It was calculated as $PS_GW_OUT_2025 = COUNTY_Proj_PS_WGWTto_2025 * SHARE_PS_GW * SHARE_PS_GW_OUT * 1,000,000 * 365$	Gallons
PS_GW_OUT_2030	It was calculated as $PS_GW_OUT_2030 = COUNTY_Proj_PS_WGWTto_2030 * SHARE_PS_GW * SHARE_PS_GW_OUT * 1,000,000 * 365$	Gallons
PS_GW_OUT_2035	It was calculated as $PS_GW_OUT_2035 = COUNTY_Proj_PS_WGWTto_2035 * SHARE_PS_GW * SHARE_PS_GW_OUT * 1,000,000 * 365$	Gallons
PS_GW_OUT_2040	It was calculated as $PS_GW_OUT_2040 = COUNTY_Proj_PS_WGWTto_2040 * SHARE_PS_GW * SHARE_PS_GW_OUT * 1,000,000 * 365$	Gallons

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 5. Variables in file *Projected 20152040 Block Level PS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
COUNTY_Proj_PS_WSWTo_2015	County-level 2015 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WSWTo_2020	County-level 2020 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WSWTo_2025	County-level 2025 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WSWTo_2030	County-level 2030 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WSWTo_2035	County-level 2035 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PS_WSWTo_2040	County-level 2040 surface water demand projections	Millions of Gallons per Day
PS_SW_IN_2015	It was calculated as $PS_SW_IN_2015 = COUNTY_Proj_PS_WSWTo_2015 * SHARE_PS_SW * SHARE_PS_SW_IN * 1,000,000 * 365$	Gallons
PS_SW_IN_2020	It was calculated as $PS_SW_IN_2020 = COUNTY_Proj_PS_WSWTo_2020 * SHARE_PS_SW * SHARE_PS_SW_IN * 1,000,000 * 365$	Gallons
PS_SW_IN_2025	It was calculated as $PS_SW_IN_2025 = COUNTY_Proj_PS_WSWTo_2025 * SHARE_PS_SW * SHARE_PS_SW_IN * 1,000,000 * 365$	Gallons
PS_SW_IN_2030	It was calculated as $PS_SW_IN_2030 = COUNTY_Proj_PS_WSWTo_2030 * SHARE_PS_SW * SHARE_PS_SW_IN * 1,000,000 * 365$	Gallons
PS_SW_IN_2035	It was calculated as $PS_SW_IN_2035 = COUNTY_Proj_PS_WSWTo_2035 * SHARE_PS_SW * SHARE_PS_SW_IN * 1,000,000 * 365$	Gallons
PS_SW_IN_2040	It was calculated as $PS_SW_IN_2040 = COUNTY_Proj_PS_WSWTo_2040 * SHARE_PS_SW * SHARE_PS_SW_IN * 1,000,000 * 365$	Gallons
PS_SW_OUT_2015	It was calculated as $PS_SW_OUT_2015 = COUNTY_Proj_PS_WSWTo_2015 * SHARE_PS_SW * SHARE_PS_SW_OUT * 1,000,000 * 365$	Gallons

Table 5. Variables in file *Projected 20152040 Block Level PS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
PS_SW_OUT_2020	It was calculated as $PS_SW_OUT_2020 = COUNTY_Proj_PS_WSWTo_2020 * SHARE_PS_SW * SHARE_PS_SW_OUT * 1,000,000 * 365$	Gallons
PS_SW_OUT_2025	It was calculated as $PS_SW_OUT_2025 = COUNTY_Proj_PS_WSWTo_2025 * SHARE_PS_SW * SHARE_PS_SW_OUT * 1,000,000 * 365$	Gallons
PS_SW_OUT_2030	It was calculated as $PS_SW_OUT_2030 = COUNTY_Proj_PS_WSWTo_2030 * SHARE_PS_SW * SHARE_PS_SW_OUT * 1,000,000 * 365$	Gallons
PS_SW_OUT_2035	It was calculated as $PS_SW_OUT_2035 = COUNTY_Proj_PS_WSWTo_2035 * SHARE_PS_SW * SHARE_PS_SW_OUT * 1,000,000 * 365$	Gallons
PS_SW_OUT_2040	It was calculated as $PS_SW_OUT_2040 = COUNTY_Proj_PS_WSWTo_2040 * SHARE_PS_SW * SHARE_PS_SW_OUT * 1,000,000 * 365$	Gallons

Estimating Block-level Domestic Self-Supply Monthly Water Use

Provided below is an example of how the April 2001 block-level domestic self-supply water use for Block ID # 131759502021001 in Laurens County, Georgia was estimated.

- 1) Data elements:
 - a. Countywide 2001 domestic self-supply groundwater water use = 1.178 mgd
 - i. This value was interpolated from USGS water use estimates for the years 2000 and 2005
 - b. There was no reported domestic self-supply surface water use
 - c. Monthly share of water use for April = 0.002%
 - d. Indoor share of water use = 42.5%
 - e. Outdoor share of water use = 57.5%
- 2) April 2001 block-level domestic self-supply supply water use estimate:
 - a. Indoor groundwater = $(1.543 * 1,000,000 * 365) * 0.002\% * 42.5\% = 4,787$ gallons
 - b. Outdoor groundwater = $(1.543 * 1,000,000 * 365) * 0.002\% * 57.5\% = 6,476$ gallons

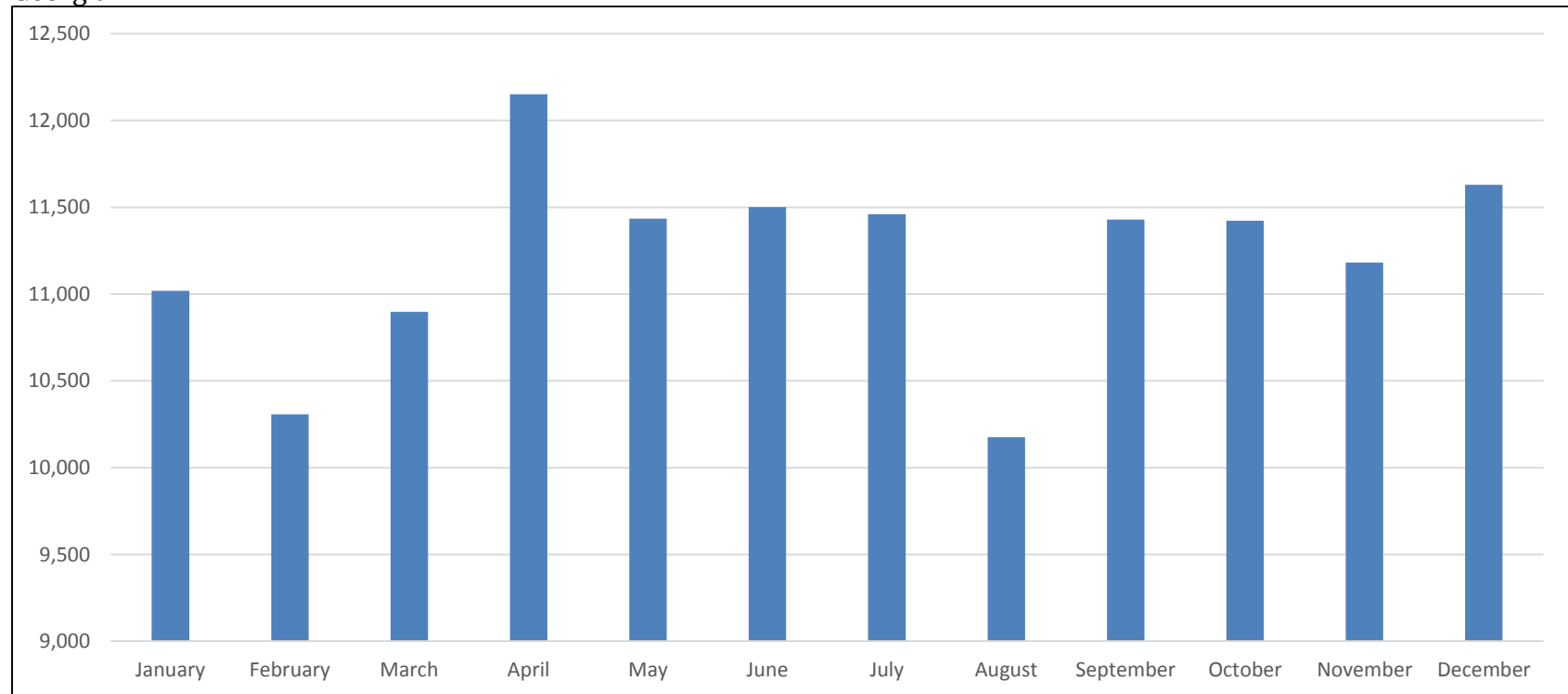
Table 6 and Figure 3 show the 2001 monthly domestic self-supply water use estimates for this block. Table 7 lists the variables in the data files and their definitions.

Table 6. Calculating Domestic Self-Supply Water Use for Census Block ID # 131759502021001 in Laurens County, Georgia

Month	Days	Annual Groundwater Use (mgd)	Monthly Share of Groundwater	Indoor Groundwater Use as Percent of Groundwater Use	Outdoor Water Use as Percent of Groundwater Use	Block-Level Estimated Indoor Groundwater Use (gallons)	Block-Level Estimated Outdoor Groundwater Use (gallons)
January	31	1.543	0.001956%	42.48%	57.52%	5,162	5,857
February	29	1.543	0.001830%	45.82%	54.18%	5,162	5,147
March	31	1.543	0.001935%	44.38%	55.62%	5,162	5,736
April	30	1.543	0.002157%	50.07%	49.93%	5,162	6,989
May	31	1.543	0.002030%	46.84%	53.16%	5,162	6,273
June	30	1.543	0.002042%	45.04%	54.96%	5,162	6,340
July	31	1.543	0.002034%	40.06%	59.94%	5,162	6,298
August	31	1.543	0.001807%	47.37%	52.63%	5,162	5,015
September	30	1.543	0.002029%	40.34%	59.66%	5,162	6,268
October	31	1.543	0.002028%	46.16%	53.84%	5,162	6,261
November	30	1.543	0.001985%	45.19%	54.81%	5,162	6,021
December	31	1.543	0.002065%	45.16%	54.84%	5,162	6,469

Note: Differences between numbers calculated in the example and the numbers presented in this table are attributable to rounding.

Figure 3. Estimated Domestic Self-Supply Monthly Use in Gallons Census Block ID # 131759502011001 in Laurens County, Georgia



Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 7. Variables in file *New 19922012 Block Level DSS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
OBJECTID_1	Unique ID for each block from the GIS layer. If BLOCKID_TXT does not work, then this variable may be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
OBJECTID	Block ID variable. This is not unique to each block.	Not applicable
STATEFP10	State FIPS Code in text format. For example, '01' denotes census blocks in Alabama.	Not applicable
COUNTYFP10	County FIPs in text format.	Not applicable
TRACTCE10	Tract in text format.	Not applicable
BLOCKCE	Block in text format.	Not applicable
BLOCKID10_TXT	Unique ID for 2010 Block. This is the variable to be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
COUNTYFP10_NUM	County FIPS	Not applicable
STATEFP10_NUM	State FIPS	Not applicable
CAL_YEAR_DSC	Year	Not applicable
MONTH_LONG_DSC	Month Name	Not applicable
MONTH_KEY	Month Key	Not applicable
MONTH_YEAR	Month and Year	Not applicable
DAYS	Days in Month	Not applicable
INDOOR_GW_GALL	Original estimate of block-level indoor groundwater use in gallons	Gallons
OUTDOOR_GW_GALL	Original estimate of block-level outdoor groundwater use in gallons	Gallons
TOTAL_GW_GALL	Indoor groundwater use plus outdoor groundwater use	Gallons
DSS_GW_MGD	USGS countywide groundwater use in MGD	Millions of Gallons per Day
SHARE_DSS_GW	Share of total block-level domestic self-supply water use that is groundwater	Percent

Table 7. Variables in file *New 19922012 Block Level DSS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
SHARE_D SS_GW_IN	Share of block-level groundwater that is used indoors	Percent
SHARE_D SS_GW_O UT	Share of block-level groundwater that is used outdoors	Percent
NEW_DSS _GW_IN_G ALL	It was calculated as $NEW_DSS_GW_IN_GALL = DSS_GW_MGD * SHARE_DSS_GW * SHARE_DSS_GW_IN$	Gallons
NEW_DSS _GW_OUT _GALL	It was calculated as $NEW_DSS_OUT_IN_GALL = DSS_GW_MGD * SHARE_DSS_GW * SHARE_DSS_GW_OUT$	Gallons

Distributing Domestic Self-Supply Projections

Provided below is an example of how domestic-self supply 2035 projections were distributed to Block ID # 131759502011010 in Laurens County, Georgia:

- 1) Projected December 2035 domestic self-supply water demand:
 - a. 2035 countywide domestic self-supply groundwater demand = 1.98 mgd
 - b. There is no reported surface water use for domestic self-supply in Laurens County, GA.
- 2) From Jones Edmunds' historical data, the following shares were calculated:
 - a. Block-level share of annual groundwater use for April = 0.005%
 - b. Indoor share of monthly groundwater use = 42.5%
 - c. Outdoor share of monthly groundwater use = 57.5%
- 3) Projected December 2035 public supply water demand:
 - a. Domestic self-supply groundwater use = $1.98 * 1,000,000 * 365 \text{ days} * 0.005\% = 36,135 \text{ gallons}$
 - b. Domestic self-supply indoor groundwater use share = $36,135 \text{ gallons} * 42.5\% = 15,383 \text{ gallons}$
 - c. December 2012 domestic self-supply outdoor groundwater use share = $36,135 \text{ gallons} * 57.5\% = 20,777 \text{ gallons}$.

Tables 8a and 8b and Figures 4a and 4b, below provide annual and monthly water demand projections. Block-level projections are located in <H:\rm\WSM\NFRWSP\Data\Projected 20152040 Block Level DSS Water Use GAALSC.csv>. See Table 9 for variable definitions and units.

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 8a. Projected Indoor Use in gallons Block ID # 131759502011010 in Laurens County, Georgia

Month	Indoor Use						
	2010	2015	2020	2025	2030	2035	2040
January	12,631	15,779	16,636	17,494	18,335	19,151	19,952
February	12,631	15,779	16,636	17,494	18,335	19,151	19,952
March	12,631	15,779	16,636	17,494	18,335	19,151	19,952
April	12,631	15,779	16,636	17,494	18,335	19,151	19,952
May	12,631	15,779	16,636	17,494	18,335	19,151	19,952
June	12,631	15,779	16,636	17,494	18,335	19,151	19,952
July	12,631	15,779	16,636	17,494	18,335	19,151	19,952
August	12,631	15,779	16,636	17,494	18,335	19,151	19,952
September	12,631	15,779	16,636	17,494	18,335	19,151	19,952
October	12,631	15,779	16,636	17,494	18,335	19,151	19,952
November	12,631	15,779	16,636	17,494	18,335	19,151	19,952
December	12,631	15,779	16,636	17,494	18,335	19,151	19,952

Table 8b. Projected Outdoor Use in gallons Block ID # 131759502011010 in Laurens County, Georgia

Month	Outdoor Use						
	2010	2015	2020	2025	2030	2035	2040
January	14,334	17,907	18,878	19,853	20,807	21,733	22,641
February	14,334	15,734	16,588	17,444	18,282	19,096	19,894
March	14,334	21,367	22,527	23,689	24,828	25,933	27,017
April	14,334	21,367	22,527	23,689	24,828	25,933	27,017
May	14,334	26,996	28,461	29,930	31,368	32,764	34,134
June	14,334	19,254	20,299	21,346	22,372	23,368	24,345
July	14,334	19,254	20,299	21,346	22,372	23,368	24,345
August	14,334	18,660	19,672	20,687	21,681	22,647	23,593
September	14,334	19,163	20,203	21,246	22,266	23,258	24,230
October	14,334	20,651	21,771	22,895	23,995	25,063	26,111
November	14,334	18,406	19,404	20,406	21,386	22,338	23,272
December	14,334	19,775	20,848	21,924	22,978	24,001	25,004

Figure 4a. Domestic Self-Supply Water Use Projections in Gallons in April for Block ID # 131759502011010 in Laurens County, Georgia

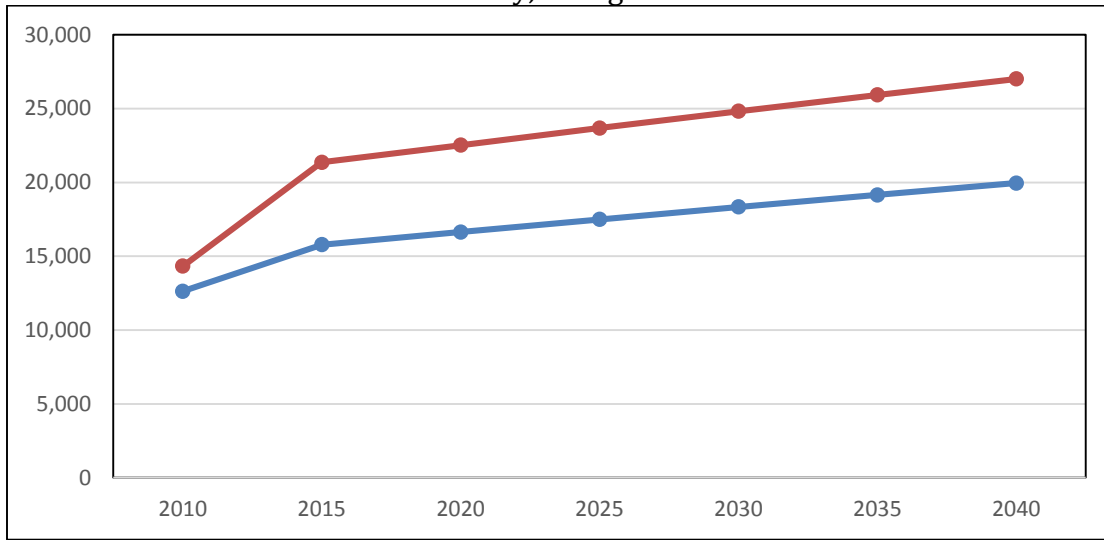
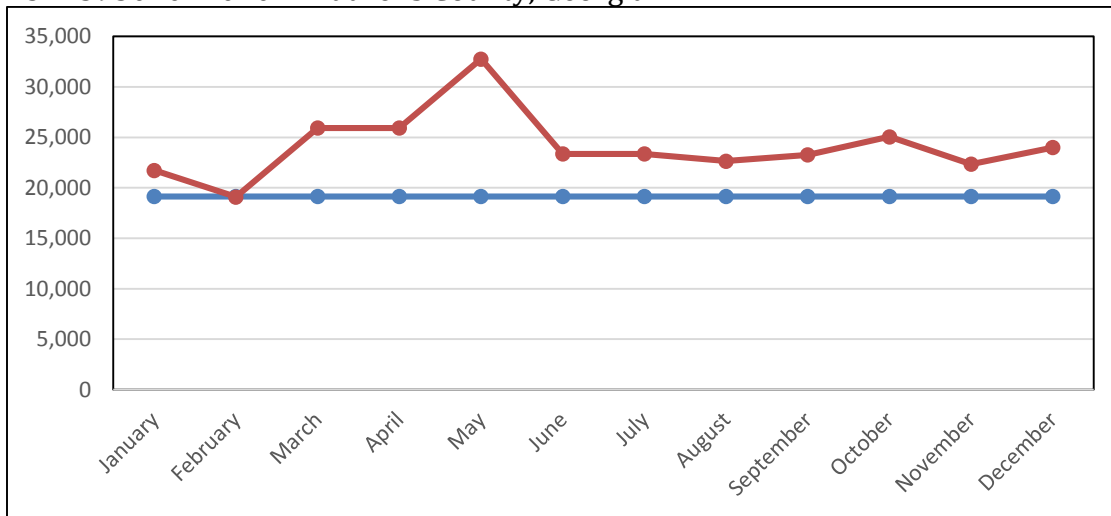


Figure 4b. 2035 Domestic Self-Supply Water Use Projections in Gallons for Block ID # 131759502011010 in Laurens County, Georgia



Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 9. Variables in file *Projected 20152040 Block Level DSS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
OBJECTID_1	Unique ID for each block from the GIS layer. If BLOCKID_TXT does not work, then this variable may be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
OBJECTID	Block ID variable. This is not unique to each block.	Not applicable
STATEFP10	State FIPS Code in text format. For example, '01' denotes census blocks in Alabama.	Not applicable
COUNTYFP10	County FIPs in text format.	Not applicable
TRACTCE10	Tract in text format.	Not applicable
BLOCKCE	Block in text format.	Not applicable
BLOCKID10_TXT	Unique ID for 2010 Block. This is the variable to be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
COUNTYFP10_NUM	County FIPS	Not applicable
STATEFP10_NUM	State FIPS	Not applicable
CAL_YEAR_DSC	Year	Not applicable
MONTH_LONG_DSC	Month Name	Not applicable
MONTH_KEY	Month Key	Not applicable
MONTH_YEAR	Month and Year	Not applicable
DAYS	Days in Month	Not applicable
INDOOR_GW_GALL	Original estimate of block-level indoor groundwater use in gallons	Gallons
OUTDOOR_GW_GALL	Original estimate of block-level outdoor groundwater use in gallons	Gallons
TOTAL_GW_GALL	Indoor groundwater use plus outdoor groundwater use	Gallons
DSS_GW_MGD	USGS countywide groundwater use in MGD	Millions of Gallons per Day
SHARE_DSS_GW	Share of total block-level domestic self-supply water use that is groundwater	Percent

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 9. Variables in file *Projected 20152040 Block Level DSS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
SHARE_DSS_GW_IN	Share of block-level groundwater that is used indoors	Percent
SHARE_DSS_GW_OUT	Share of block-level groundwater that is used outdoors	Percent
NEW_DSS_GW_IN_GALL	Calculated as $NEW_DSS_GW_IN_GALL = DSS_GW_MGD * SHARE_DSS_GW * SHARE_DSS_GW_IN$	Gallons
NEW_DSS_GW_OUT_GALL	Calculated as $NEW_DSS_OUT_IN_GALL = DSS_GW_MGD * SHARE_DSS_GW * SHARE_DSS_GW_OUT$	Gallons
COUNTY_Proj_DSS_WG_WFr_2015	County-level 2015 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_DSS_WG_WFr_2020	County-level 2020 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_DSS_WG_WFr_2025	County-level 2025 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_DSS_WG_WFr_2030	County-level 2030 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_DSS_WG_WFr_2035	County-level 2035 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_DSS_WG_WFr_2040	County-level 2040 groundwater demand projections	Millions of Gallons per Day
DSS_GW_IN_2015	Calculated as $PS_GW_IN_2015 = COUNTY_Proj_DSS_WG_WFr_{2015} * SHARE_DSS_GW * SHARE_DSS_GW_IN * 1,000,000 * 365$	Gallons
DSS_GW_IN_2020	Calculated as $PS_GW_IN_2020 = COUNTY_Proj_DSS_WG_WFr_{2020} * SHARE_DSS_GW * SHARE_DSS_GW_IN * 1,000,000 * 365$	Gallons
DSS_GW_IN_2025	Calculated as $PS_GW_IN_2025 = COUNTY_Proj_DSS_WG_WFr_{2025} * SHARE_DSS_GW * SHARE_DSS_GW_IN * 1,000,000 * 365$	Gallons
DSS_GW_IN_2030	Calculated as $PS_GW_IN_2030 = COUNTY_Proj_DSS_WG_WFr_{2030} * SHARE_DSS_GW * SHARE_DSS_GW_IN * 1,000,000 * 365$	Gallons

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

Table 9. Variables in file *Projected 20152040 Block Level DSS Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
DSS_GW_IN_2035	Calculated as $PS_GW_IN_2035 = COUNTY_Proj_DSS_WGWT_{o_2035} * SHARE_DSS_GW * SHARE_DSS_GW_IN * 1,000,000 * 365$	Gallons
DSS_GW_IN_2040	Calculated as $PS_GW_IN_2040 = COUNTY_Proj_DSS_WGWT_{o_2040} * SHARE_DSS_GW * SHARE_DSS_GW_IN * 1,000,000 * 365$	Gallons
DSS_GW_OUT_T_2015	Calculated as $PS_GW_OUT_2015 = COUNTY_Proj_DSS_WGWT_{o_2015} * SHARE_DSS_GW * SHARE_DSS_GW_OUT * 1,000,000 * 365$	Gallons
DSS_GW_OUT_T_2020	Calculated as $PS_GW_OUT_2020 = COUNTY_Proj_DSS_WGWT_{o_2020} * SHARE_DSS_GW * SHARE_DSS_GW_OUT * 1,000,000 * 365$	Gallons
DSS_GW_OUT_T_2025	Calculated as $PS_GW_OUT_2025 = COUNTY_Proj_DSS_WGWT_{o_2025} * SHARE_DSS_GW * SHARE_DSS_GW_OUT * 1,000,000 * 365$	Gallons
DSS_GW_OUT_T_2030	Calculated as $PS_GW_OUT_2030 = COUNTY_Proj_DSS_WGWT_{o_2030} * SHARE_DSS_GW * SHARE_DSS_GW_OUT * 1,000,000 * 365$	Gallons
DSS_GW_OUT_T_2035	Calculated as $PS_GW_OUT_2035 = COUNTY_Proj_DSS_WGWT_{o_2035} * SHARE_DSS_GW * SHARE_DSS_GW_OUT * 1,000,000 * 365$	Gallons
DSS_GW_OUT_T_2040	Calculated as $PS_GW_OUT_2040 = COUNTY_Proj_DSS_WGWT_{o_2040} * SHARE_DSS_GW * SHARE_DSS_GW_OUT * 1,000,000 * 365$	Gallons

Estimating Block-level Commercial/Industrial/Institutional Monthly Water Use

Below is an example of how the 2001 monthly block-level commercial/industrial/institutional water use for Block ID # 131759502011063 in Laurens County, Georgia was estimated:

- 1) Data elements:
 - a. Countywide 2001 commercial/industrial/institutional groundwater water use = 0.966 mgd
 - i. This value was interpolated from USGS water use estimates for the years 2000 and 2005
 - b. Countywide 2001 commercial/industrial/institutional groundwater water use = 15.435 mgd
 - i. This value was interpolated from USGS water use estimates for the years 2000 and 2005
 - c. Block's share of countywide water use = 0.0031%
- 2) Monthly 2001 block-level commercial/industrial/institutional supply water use estimate:
 - a. Groundwater = $(0.966 * 1,000,000 * 365) * 0.0031\% = 10,930$ gallons
 - b. Surface water = $(15.435 * 1,000,000 * 365) * 0.0031\% = 174,647$ gallons
- 3) Estimated monthly 2001 water us $10,930 + 174,647 = 185,577$ gallons per month.

See Table 10 below for variables names in the data file and definitions.

Table 10. Variables in file *New 19922012 Block Level CII Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
OBJECTID_1	Unique ID for each block from the GIS layer. If BLOCKID_TXT does not work, then this variable may be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
OBJECTID	Block ID variable. This is not unique to each block.	Not applicable
STATEFP10	State FIPS Code in text format. For example, '01' denotes census blocks in Alabama.	Not applicable
COUNTYFP10	County FIPs in text format.	Not applicable
TRACTCE10	Tract in text format.	Not applicable
BLOCKCE	Block in text format.	Not applicable
BLOCKID10_TXT	Unique ID for 2010 Block. This is the variable to be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
COUNTYFP10_NUM	County FIPS	Not applicable
STATEFP10_NUM	State FIPS	Not applicable
CAL_YEAR_DSC	Year	Not applicable
MONTH_LONG_DSC	Month Name	Not applicable
MONTH_KEY	Month Key	Not applicable
MONTH_YEAR	Month and Year	Not applicable
DAYS	Days in Month	Not applicable
INDOOR_GW_GALL	Original estimate of block-level indoor groundwater use in gallons	Gallons
SHARE_CII_GW_IN	Share of block-level groundwater that is used indoors	Percent
INDOOR_SW_GALL	Original estimate of block-level indoor surface water use in gallons	Gallons
SHARE_CII_SW_IN	Share of block-level surface water that is used indoors	Percent
NEW_CII_GW_IN_GALL	It was calculated as $NEW_CII_GW_IN_GALL = SHARE_CII_GW_IN * CII_GW_MGD * 1,000,000 * 365$	Gallons

Table 10. Variables in file *New 19922012 Block Level CII Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
NEW_CII_SW_IN_G ALL	It was calculated as NEW_CII_SW_IN_GALL = SHARE_CII_SW_IN * CII_GW_MGD * 1,000,000 * 365	Gallons

Distributing Commercial/Industrial/Institutional & Mining/Dewatering (C/I/I & M/D) Water Demand Projections

Below is an example of how the C/I/I & M/D 2035 water demand projections were distributed to Block ID # 131759502011063 in Laurens County, Georgia:

- 1) Projected April 2035 water use:
 - a. 2035 countywide CII & M/D groundwater demand = 2,509,188 gallons
 - b. 2035 countywide CII & M/D surface water demand = 17,702,319 gallons
- 2) From Jones Edmunds' historical data, the following shares were calculated:
 - a. Block-level share of total groundwater use in county = 0.0031%
 - i. There is no indoor/outdoor breakdown for commercial groundwater use. All of the water is assumed to be used for industrial processes.
 - b. Block-level share of total surface water use in county = 0.0031%
 - i. There is no indoor/outdoor breakdown for commercial groundwater use. All of the water is assumed to be used for industrial processes.
- 3) Projected December 2035 water demand:
 - a. CII & M/D groundwater demand =
2,509,188 gallons * 0.0031% * 365 days = 28,391 gallons
 - b. CII & M/D surface water demand =
17,702,319 gallons * 0.0031% * 365 days = 200,302 gallons

See Table 11 and Figure 5, below, for annual projections. There is no month-to-month or seasonal variation in C/I/I & M/D water demand projections. Block-level projections are found in <H:\rm\WSM\NFRWSP\Data\Projected 20152040 Block Level CII Water Use GAALSC.csv>. See Table 12 for variable definitions and units.

Table 11. April Projected Water Demand in gallons for Block ID # 131759502011063 in Laurens County, Georgia

Source	Indoor Use						
	2010	2015	2020	2025	2030	2035	2040
Groundwater	22,974	23,749	25,037	26,330	27,595	28,823	30,028
Surface Water	162,977	167,541	176,633	185,749	194,674	203,341	211,840

Figure 5. C/I/I & M/D Water Demand Projections in Gallons for Block ID # 131759502011063 in Laurens County, Georgia

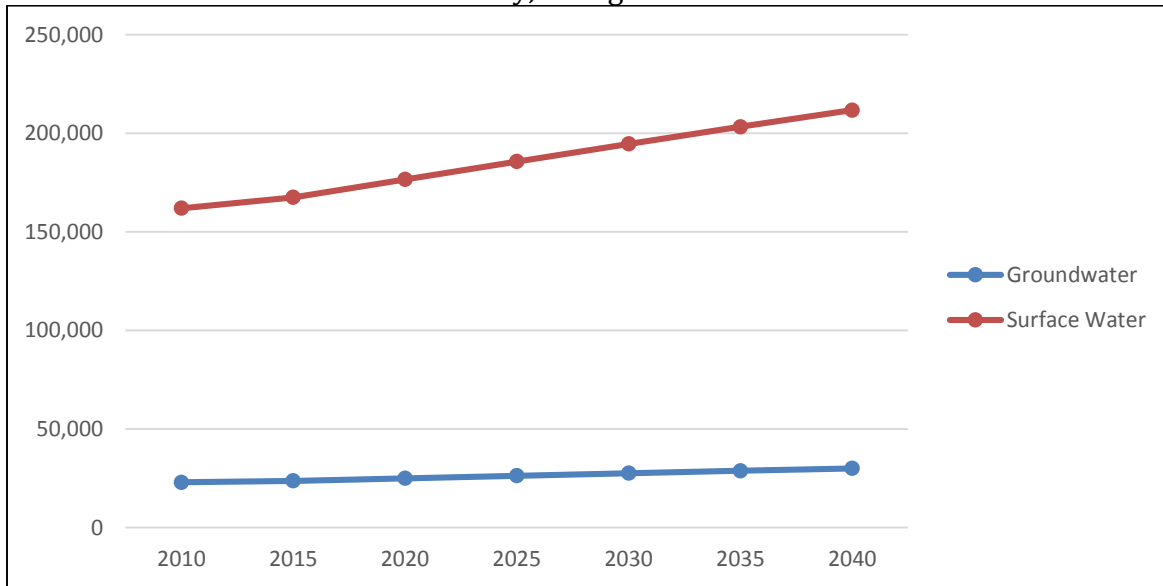


Table 12. Variables in file *Projected 20152040 Block Level C/I/I Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
OBJECTID_1	Unique ID for each block from the GIS layer. If BLOCKID_TXT does not work, then this variable may be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
OBJECTID	Block ID variable. This is not unique to each block.	Not applicable
STATEFP10	State FIPS Code in text format. For example, '01' denotes census blocks in Alabama.	Not applicable
COUNTYFP10	County FIPs in text format.	Not applicable
TRACTCE10	Tract in text format.	Not applicable
BLOCKCE	Block in text format.	Not applicable
BLOCKID10_TXT	Unique ID for 2010 Block. This is the variable to be used to join this table to the <i>Census2010_Blocks</i> layer.	Not applicable
COUNTYFP10_NUM	County FIPS	Not applicable
STATEFP10_NUM	State FIPS	Not applicable
CAL_YEAR_DSC	Year	Not applicable
MONTH_LONG_DSC	Month Name	Not applicable
MONTH_KEY	Month Key	Not applicable
MONTH_YEAR	Month and Year	Not applicable
DAYS	Days in Month	Not applicable
INDOOR_GW_GALL	Original estimate of block-level indoor groundwater use in gallons	Gallons
SHARE_CII_GW_IN	Share of block-level groundwater that is used indoors	Percent
INDOOR_SW_GALL	Original estimate of block-level indoor surface water use in gallons	Gallons
SHARE_CII_SW_IN	Share of block-level surface water that is used indoors	Percent
NEW_CII_GW_IN_GALL	Calculated as $NEW_CII_GW_IN_GALL = SHARE_CII_GW_IN * CII_GW_MGD * 1,000,000 * 365$	Gallons
NEW_CII_SW_IN_GALL	Calculated as $NEW_CII_SW_IN_GALL = SHARE_CII_SW_IN * CII_GW_MGD * 1,000,000 * 365$	Gallons

Table 12. Variables in file *Projected 20152040 Block Level C/I/I Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
COUNTY_Proj_INMI_WGWTto_2015	County-level 2015 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WGWTto_2020	County-level 2020 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WGWTto_2025	County-level 2025 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WGWTto_2030	County-level 2030 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WGWTto_2035	County-level 2035 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WGWTto_2040	County-level 2040 groundwater demand projections	Millions of Gallons per Day
CII_GW_IN_2015	Calculated as $CII_GW_IN_2015 = COUNTY_Proj_INMI_WGWTto_2015 * SHARE_CII_GW * SHARE_CII_GW_IN * 1,000,000 * 365$	Gallons
CII_GW_IN_2020	Calculated as $CII_GW_IN_2020 = COUNTY_Proj_INMI_WGWTto_2020 * SHARE_CII_GW * SHARE_CII_GW_IN * 1,000,000 * 365$	Gallons
CII_GW_IN_2025	Calculated as $CII_GW_IN_2025 = COUNTY_Proj_INMI_WGWTto_2025 * SHARE_CII_GW * SHARE_CII_GW_IN * 1,000,000 * 365$	Gallons
CII_GW_IN_2030	Calculated as $CII_GW_IN_2030 = COUNTY_Proj_INMI_WGWTto_2030 * SHARE_CII_GW * SHARE_CII_GW_IN * 1,000,000 * 365$	Gallons
CII_GW_IN_2035	Calculated as $CII_GW_IN_2035 = COUNTY_Proj_INMI_WGWTto_2035 * SHARE_CII_GW * SHARE_CII_GW_IN * 1,000,000 * 365$	Gallons
CII_GW_IN_2040	Calculated as $CII_GW_IN_2040 = COUNTY_Proj_INMI_WGWTto_2040 * SHARE_CII_GW * SHARE_CII_GW_IN * 1,000,000 * 365$	Gallons
COUNTY_Proj_INMI_WSWTo_2015	County-level 2015 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WSWTo_2020	County-level 2020 surface water demand projections	Millions of Gallons per Day

Table 12. Variables in file *Projected 20152040 Block Level C/I/I Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
COUNTY_Proj_INMI_WSWTo_2025	County-level 2025 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WSWTo_2030	County-level 2030 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WSWTo_2035	County-level 2035 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_INMI_WSWTo_2040	County-level 2040 surface water demand projections	Millions of Gallons per Day
CII_SW_IN_2015	Calculated as $CII_SW_IN_2015 = COUNTY_Proj_INMI_WSWTo_2015 * SHARE_CII_SW * SHARE_CII_SW_IN * 1,000,000 * 365$	Gallons
CII_SW_IN_2020	Calculated as $CII_SW_IN_2020 = COUNTY_Proj_INMI_WSWTo_2020 * SHARE_CII_SW * SHARE_CII_SW_IN * 1,000,000 * 365$	Gallons
CII_SW_IN_2025	Calculated as $CII_SW_IN_2025 = COUNTY_Proj_INMI_WSWTo_2025 * SHARE_CII_SW * SHARE_CII_SW_IN * 1,000,000 * 365$	Gallons
CII_SW_IN_2030	Calculated as $CII_SW_IN_2030 = COUNTY_Proj_INMI_WSWTo_2030 * SHARE_CII_SW * SHARE_CII_SW_IN * 1,000,000 * 365$	Gallons
CII_SW_IN_2035	Calculated as $CII_SW_IN_2035 = COUNTY_Proj_INMI_WSWTo_2035 * SHARE_CII_SW * SHARE_CII_SW_IN * 1,000,000 * 365$	Gallons
CII_SW_IN_2040	Calculated as $CII_SW_IN_2040 = COUNTY_Proj_INMI_WSWTo_2040 * SHARE_CII_SW * SHARE_CII_SW_IN * 1,000,000 * 365$	Gallons

Estimating Golf Water Monthly Water Use

Below is an example of how updated golf course water use estimates were generated for Green Acres Golf and Recreation Club (GC_ID = 313) in Laurens County, Georgia:

- 1) Calculated District-wide monthly average golf course use:

Table 13. Monthly Share of Districtwide Golf Course Water Use

Month	2010	2011	2012	2013	2014	Average
January	3.67%	4.41%	7.40%	6.39%	5.20%	5.41%
February	2.81%	4.76%	6.97%	7.52%	5.02%	5.42%
March	4.12%	6.52%	9.79%	8.76%	7.69%	7.38%
April	7.68%	8.91%	11.98%	9.20%	9.98%	9.55%
May	9.46%	14.14%	11.12%	9.90%	12.52%	11.43%
June	9.75%	10.61%	7.91%	9.13%	10.96%	9.67%
July	14.14%	13.68%	9.42%	6.74%	8.17%	10.43%
August	8.75%	8.77%	6.93%	9.49%	9.07%	8.60%
September	9.72%	7.82%	6.82%	9.36%	7.40%	8.22%
October	10.70%	7.08%	7.46%	9.53%	8.97%	8.75%
November	10.30%	7.35%	8.53%	8.54%	7.80%	8.51%
December	8.92%	5.95%	5.68%	5.81%	7.21%	6.71%

Source: Calculated from data in the 2010-2014 Annual Water Use Report supporting spreadsheets.

- 2) Calculated estimated water use based on golf course acreage:
 - a. The three golf courses in Laurens County, Georgia, cover 28 acres.
 - b. Average groundwater applied per acre in 2001 = $(0.5 \text{ mgd} * 1,000,000 * 365) / 28 = 6,517,857$ gallons
 - c. Green Acres Golf and Recreation Club covers 5 acres.
 - d. April 2001 estimate = $6,547,857 \text{ gallons} * 5 * 9.55\% = 3,112,277$ gallons

See Table 14, below, for the 2001 groundwater water use estimates for this golf course and Table 15, for the list of variables in the data file.

Table 14. Calculating Monthly Water Use for Green Acres Golf and Recreation Club (GC_ID = 313) in Laurens County, Georgia

Month	Days	Annual Groundwater Use (mgd)	Monthly Share of Groundwater	Block-Level Estimated Indoor Groundwater Use (gallons)
January	31	0.5	5.41%	1,585,840
February	29	0.5	5.42%	1,586,472
March	31	0.5	7.38%	2,160,919
April	30	0.5	9.55%	2,797,713
May	31	0.5	11.43%	3,347,335
June	30	0.5	9.67%	2,833,049
July	31	0.5	10.43%	3,055,390
August	31	0.5	8.60%	2,519,801
September	30	0.5	8.22%	2,408,815
October	31	0.5	8.75%	2,562,129
November	30	0.5	8.51%	2,491,385
December	31	0.5	6.71%	1,966,208

Note: Differences between numbers calculated in the example and the numbers presented in this table are attributable to rounding.

Figure 6. 2001 Monthly Water Use Estimates for Green Acres Golf and Recreation Club (GC_ID = 313) in Laurens County, Georgia

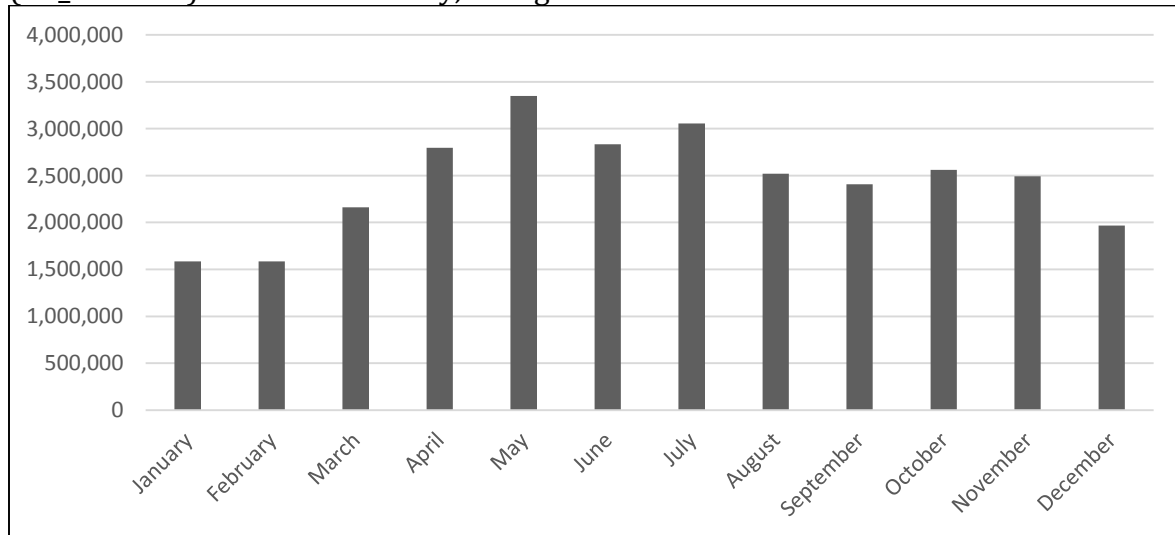


Table 15. Variables in file *New 19922012 Course Level Golf Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
GC_ID	Unique ID for Golf Course. This is the variable that should be used to join this table to the <i>Expanded_Non_FL_Golf_Courses</i> layer	Not applicable
NAME	Golf course name	Not applicable
STATE	State abbreviation	Not applicable
STATEFIPS	State FIPS	Not applicable
STATEFIPS_NUM	State FIPS	Not applicable
COUNTYFIPS	County FIPS	Not applicable
COUNTYFIPS_NUM	County FIPS	Not applicable
STATECOUNTY	Combined State FIPS and county FIPS	Not applicable
GC_COUNT	Number of golf courses in County	Not applicable
CAL_YEAR_DSC	Year	Not applicable
MONTH_LONG_DSC	Month Name	Not applicable
MONTH_KEY	Month Key	Not applicable
MON_YR	Month and Year	Not applicable
DAYS	Days in Month	Not applicable
GW_GALL	Original estimate of course-level groundwater use in gallons	Gallons

Table 15. Variables in file *New 19922012 Course Level Golf Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
SW_GALL	Original estimate of course-level surface water use in gallons	Gallons
NEW_GOLF_GW_GALL	Calculated as $NEW_GOLF_GW_IN_GALL = (GOLF_GW_MGD * 1,000,000 * 365 * AVERAGE) / GC_COUNT$	Gallons
NEW_GOLF_SW_GALL	Calculated as $NEW_GOLF_SW_IN_GALL = (GOLF_SW_MGD * 1,000,000 * 365 * AVERAGE) / GC_COUNT$	Gallons
APPLIED_GALL_GW_ACRE	Calculated as $APPLIED_GALL_GW_ACRE = (GOLF_GW_MGD * 1,000,000 * 365) / GOLF_COUNTY_ACRES$	Gallons
APPLIED_GALL_SW_ACRE	Calculated as $APPLIED_GALL_SW_ACRE = (GOLF_SW_MGD * 1,000,000 * 365) / GOLF_COUNTY_ACRES$	Gallons
GOLF_COUNTY_ACRES	Total golf course acres by county	Acres
ALT_GOLF_GW_GALL	Calculated as $ALT_GOLF_GW_GALL = APPLIED_GALL_GW_ACRE * ACRES * AVERAGE$. Where, ACRES is equal to the area of the golf course in acres and AVERAGE is the average percent of annual water use that is consumed on that month.	Gallons
ALT_GOLF_SW_GALL	Calculated as $ALT_GOLF_SW_GALL = APPLIED_GALL_SW_ACRE * ACRES * AVERAGE$. Where, ACRES is equal to the area of the golf course in acres and AVERAGE is the average percent of annual water use that is consumed on that month.	Gallons

Distributing Golf Water Demand Projections

Below is an example of how golf water demand projections to Green Acres Golf and Recreation Club (GC_ID = 313) were distributed in Laurens County, Georgia:

- 1) Projected April 2035 golf course water demand:
 - a. 2035 projected golf course countywide groundwater demand = 200,735 gallons
 - b. 2035 projected golf course countywide surface water demand = 100,367 gallons
- 2) County total was assigned based on golf course acreage:
 - a. The three golf courses in Laurens County, Georgia, cover 28 acres.
 - b. Green Acres Golf and Recreation Club covers 5 acres.
 - c. Projected gallons of groundwater to be applied per acre in 2035 = $(200,735 * 365 \text{ days}) / 28 = 2,616,724$ gallons
 - d. April 2035 groundwater projection = $(2,616,724 \text{ gallons} * 5 * 9.55\%) / 30 = 41,650$ gallons
 - e. Projected gallons of surface water to be applied per acre in 2035 = $(100,367 * 365 \text{ days}) / 28 = 1,308,356$ gallons
 - f. April 2035 surface water projection = $(1,308,356 \text{ gallons} * 5 * 9.55\%) / 30 = 20,825$ gallons

See Tables 16a and 16b and Figures 7a and 7b, below, for monthly and annual projections. Course-level projections are found in <H:\rm\WSM\NFRWSP\Data\Projected 20152040 Block Level Golf Water Use GAALSC.csv>. See Table 17 for variable definitions and units.

Table 16a. Projected Groundwater Use in gallons Based on Green Acres Golf and Recreation Club (GC_ID = 313) in Laurens County, Georgia

	Groundwater Projections Based Acreage and Monthly Share						
Month	2010	2015	2020	2025	2030	2035	2040
January	18,212	18,826	19,848	20,872	21,875	22,849	23,804
February	20,171	20,851	21,983	23,117	24,228	25,307	26,365
March	24,816	25,653	27,045	28,441	29,807	31,134	32,436
April	33,200	34,320	36,182	38,049	39,877	41,653	43,394
May	38,441	39,737	41,894	44,056	46,172	48,228	50,244
June	33,620	34,753	36,639	38,530	40,381	42,179	43,942
July	35,088	36,272	38,240	40,213	42,145	44,022	45,862
August	28,938	29,913	31,537	33,164	34,758	36,305	37,823
September	28,585	29,549	31,153	32,760	34,334	35,863	37,362
October	29,424	30,416	32,066	33,721	35,341	36,915	38,458
November	29,565	30,562	32,220	33,883	35,511	37,092	38,643
December	22,580	23,341	24,608	25,878	27,121	28,329	29,513

Table 16b. Projected Groundwater Use in gallons Based on Green Acres Golf and Recreation Club (GC_ID = 313) in Laurens County, Georgia

Groundwater Projections Based Acreage and Monthly Share							
Month	2010	2015	2020	2025	2030	2035	2040
January	9,106	9,413	9,924	10,436	10,937	11,424	11,902
February	10,086	10,426	10,991	11,559	12,114	12,653	13,182
March	12,408	12,826	13,523	14,220	14,904	15,567	16,218
April	16,600	17,160	18,091	19,025	19,939	20,826	21,697
May	19,221	19,869	20,947	22,028	23,086	24,114	25,122
June	16,810	17,377	18,320	19,265	20,191	21,089	21,971
July	17,544	18,136	19,120	20,107	21,073	22,011	22,931
August	14,469	14,957	15,768	16,582	17,379	18,153	18,911
September	14,293	14,775	15,576	16,380	17,167	17,931	18,681
October	14,712	15,208	16,033	16,861	17,671	18,457	19,229
November	14,783	15,281	16,110	16,942	17,756	18,546	19,321
December	11,290	11,671	12,304	12,939	13,561	14,164	14,757

Figure 7a. 2035 Water Use Projections for Green Acres Golf and Recreation Club (GC_ID = 313) in Laurens County, Georgia

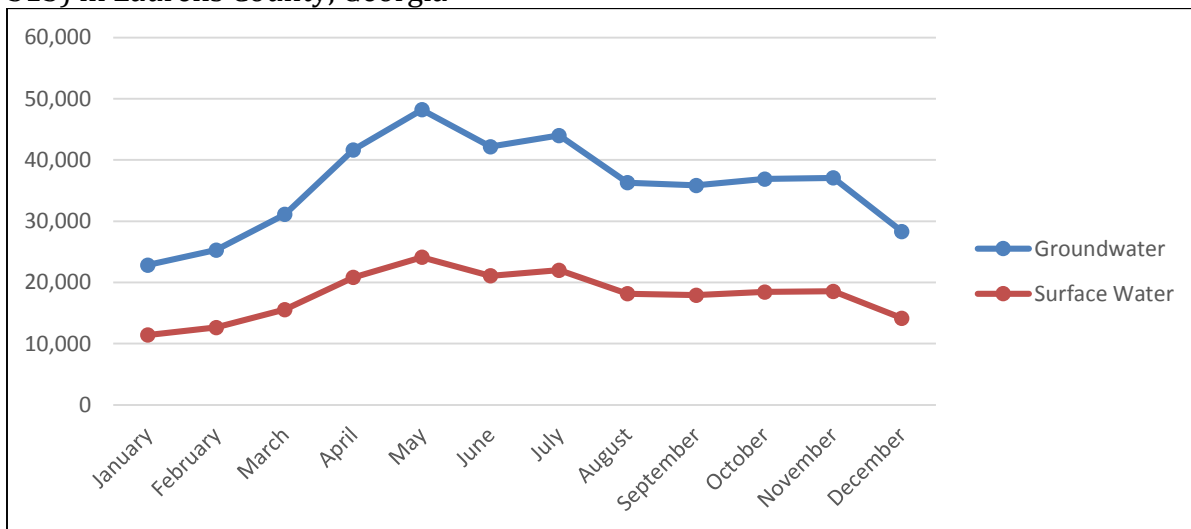


Figure 7b. December Water Use Projections for Green Acres Golf and Recreation Club (GC_ID = 313) in Laurens County, Georgia

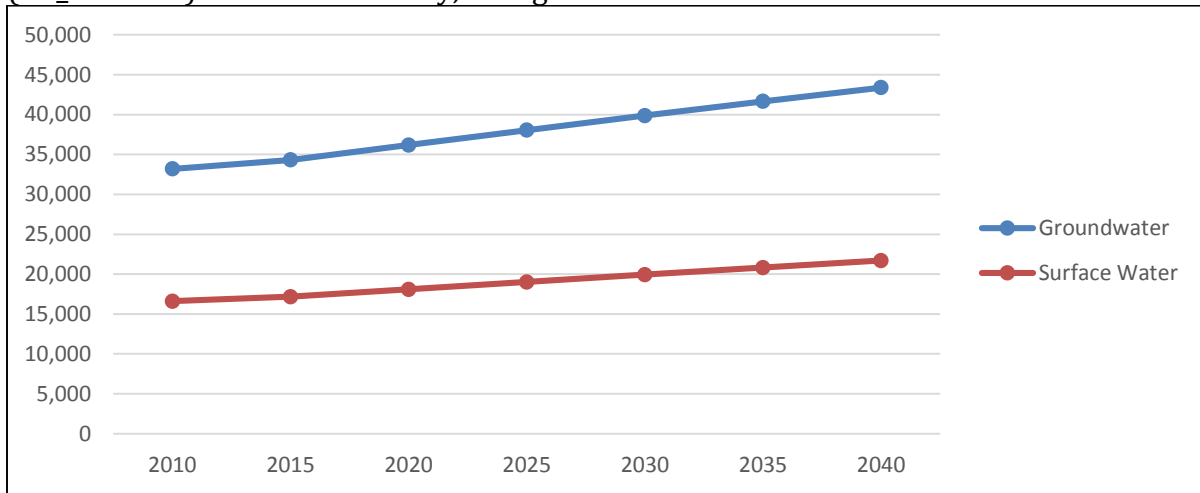


Table 17. Variables in file *Projected 20152040 Block Level Golf Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
GC_ID	Unique ID for Golf Course. This is the variable that should be used to join this table to the <i>Expanded_Non_FL_Golf_Courses</i> layer	Not applicable
NAME	Golf course name	Not applicable
STATE	State abbreviation	Not applicable
STATEFIPS	State FIPS	Not applicable
STATEFIPS_NUM	State FIPS	Not applicable
COUNTYFIPS	County FIPS	Not applicable
COUNTYFIPS_NUM	County FIPS	Not applicable
STATECOUNTY	Combined State FIPS and county FIPS	Not applicable
GC_COUNT	Number of golf courses in County	Not applicable
CAL_YEAR_DSC	Year	Not applicable
MONTH_LONG_DSC	Month Name	Not applicable
MONTH_KEY	Month Key	Not applicable
MON_YR	Month and Year	Not applicable
DAYS	Days in Month	Not applicable
GW_GALL	Original estimate of course-level groundwater use in gallons	Gallons
SW_GALL	Original estimate of course-level surface water use in gallons	Gallons
NEW_GOLF_GW_GALL	Calculated as $NEW_GOLF_GW_IN_GALL = (GOLF_GW_MGD * 1,000,000 * 365 * AVERAGE) / GC_COUNT$	Gallons
NEW_GOLF_SW_GALL	Calculated as $NEW_GOLF_SW_IN_GALL = (GOLF_SW_MGD * 1,000,000 * 365 * AVERAGE) / GC_COUNT$	Gallons
APPLIED_GALL_GW_ACRE	Calculated as $APPLIED_GALL_GW_ACRE = (GOLF_GW_MGD * 1,000,000 * 365) / GOLF_COUNTY_ACRES$	Gallons
APPLIED_GALL_SW_ACRE	Calculated as $APPLIED_GALL_SW_ACRE = (GOLF_SW_MGD * 1,000,000 * 365) / GOLF_COUNTY_ACRES$	Gallons
GOLF_COUNTY_ACRES	Total golf course acres by county	Acres

Table 17. Variables in file *Projected 20152040 Block Level Golf Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
ALT_GOLF_GW_GALL	Calculated as $ALT_GOLF_GW_GALL = APPLIED_GALL_GW_ACRE * ACRES * AVERAGE$. Where, ACRES is equal to the area of the golf course in acres and AVERAGE is the average percent of annual water use that is consumed on that month.	Gallons
ALT_GOLF_SW_GALL	Calculated as $ALT_GOLF_SW_GALL = APPLIED_GALL_SW_ACRE * ACRES * AVERAGE$. Where, ACRES is equal to the area of the golf course in acres and AVERAGE is the average percent of annual water use that is consumed on that month.	Gallons
COUNTY_Proj_IG_WGWF_r_2015	County-level 2015 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WGWF_r_2020	County-level 2020 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WGWF_r_2025	County-level 2025 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WGWF_r_2030	County-level 2030 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WGWF_r_2035	County-level 2035 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WGWF_r_2040	County-level 2040 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WSWF_r_2015	County-level 2015 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WSWF_r_2020	County-level 2020 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WSWF_r_2025	County-level 2025 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WSWF_r_2030	County-level 2030 surface water demand projections	Millions of Gallons per Day

Table 17. Variables in file *Projected 20152040 Block Level Golf Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
COUNTY_Proj_IG_WSWFr_2035	County-level 2035 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_IG_WSWFr_2040	County-level 2040 surface water demand projections	Millions of Gallons per Day
PROJ_GOLF_GW_2015	Calculated as $(\text{COUNTY_Proj_IG_WGWFr}_{2015} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_GW_2020	Calculated as $(\text{COUNTY_Proj_IG_WGWFr}_{2020} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_GW_2025	Calculated as $(\text{COUNTY_Proj_IG_WGWFr}_{2025} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_GW_2030	Calculated as $(\text{COUNTY_Proj_IG_WGWFr}_{2030} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_GW_2035	Calculated as $(\text{COUNTY_Proj_IG_WGWFr}_{2035} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_GW_2040	Calculated as $(\text{COUNTY_Proj_IG_WGWFr}_{2040} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_SW_2015	Calculated as $(\text{COUNTY_Proj_IG_WSWFr}_{2015} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_SW_2020	Calculated as $(\text{COUNTY_Proj_IG_WSWFr}_{2020} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_SW_2025	Calculated as $(\text{COUNTY_Proj_IG_WSWFr}_{2025} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_SW_2030	Calculated as $(\text{COUNTY_Proj_IG_WSWFr}_{2030} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_SW_2035	Calculated as $(\text{COUNTY_Proj_IG_WSWFr}_{2035} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year
PROJ_GOLF_SW_2040	calculated as $(\text{COUNTY_Proj_IG_WSWFr}_{2040} * 365 * \text{AVERAGE}) / \text{GC_COUNT}$	Gallons per year

Table 17. Variables in file *Projected 20152040 Block Level Golf Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
APPLIED_GALL_GW_2015	$(\text{COUNTY_Proj_IG_WGWF}_{2015} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_GW}_{2015}$	Gallons per month
APPLIED_GALL_GW_2020	$(\text{COUNTY_Proj_IG_WGWF}_{2020} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_GW}_{2020}$	Gallons per month
APPLIED_GALL_GW_2025	$(\text{COUNTY_Proj_IG_WGWF}_{2025} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_GW}_{2025}$	Gallons per month
APPLIED_GALL_GW_2030	$(\text{COUNTY_Proj_IG_WGWF}_{2030} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_GW}_{2030}$	Gallons per month
APPLIED_GALL_GW_2035	$(\text{COUNTY_Proj_IG_WGWF}_{2035} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_GW}_{2035}$	Gallons per month
APPLIED_GALL_GW_2040	$(\text{COUNTY_Proj_IG_WGWF}_{2040} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_GW}_{2040}$	Gallons per month
APPLIED_GALL_SW_2015	$(\text{COUNTY_Proj_IG_WSWF}_{2015} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_SW}_{2015}$	Gallons per month
APPLIED_GALL_SW_2020	$(\text{COUNTY_Proj_IG_WSWF}_{2020} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_SW}_{2020}$	Gallons per month
APPLIED_GALL_SW_2025	$(\text{COUNTY_Proj_IG_WSWF}_{2025} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_SW}_{2025}$	Gallons per month
APPLIED_GALL_SW_2030	$(\text{COUNTY_Proj_IG_WSWF}_{2030} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_SW}_{2030}$	Gallons per month
APPLIED_GALL_SW_2035	$(\text{COUNTY_Proj_IG_WSWF}_{2035} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_SW}_{2035}$	Gallons per month
APPLIED_GALL_SW_2040	$(\text{COUNTY_Proj_IG_WSWF}_{2040} * 365 * \text{AVERAGE}) / \text{GC_COUNT} = \text{PROJ_GOLF_SW}_{2040}$	Gallons per month
ALT_PROJ_GOLF_GW_GALL_2015	$(\text{CALCULATED APPLIED_GALL_GW}_{2015} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_GW_GALL}_{2015}$	Gallons per month
ALT_PROJ_GOLF_GW_GALL_2020	$(\text{CALCULATED APPLIED_GALL_GW}_{2020} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_GW_GALL}_{2020}$	Gallons per month

Table 17. Variables in file *Projected 20152040 Block Level Golf Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
ALT_PROJ_GOLF_GW_GALL_2025	$(\text{CALCULATED APPLIED_GALL_GW_2025} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_GW_GALL_2025}$	Gallons per month
ALT_PROJ_GOLF_GW_GALL_2030	$(\text{CALCULATED APPLIED_GALL_GW_2030} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_GW_GALL_2030}$	Gallons per month
ALT_PROJ_GOLF_GW_GALL_2035	$(\text{CALCULATED APPLIED_GALL_GW_2035} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_GW_GALL_2035}$	Gallons per month
ALT_PROJ_GOLF_GW_GALL_2040	$(\text{CALCULATED APPLIED_GALL_GW_2040} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_GW_GALL_2040}$	Gallons per month
ALT_PROJ_GOLF_SW_GALL_2015	$(\text{CALCULATED APPLIED_GALL_SW_2015} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_SW_GALL_2015}$	Gallons per month
ALT_PROJ_GOLF_SW_GALL_2020	$(\text{CALCULATED APPLIED_GALL_SW_2020} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_SW_GALL_2020}$	Gallons per month
ALT_PROJ_GOLF_SW_GALL_2025	$(\text{CALCULATED APPLIED_GALL_SW_2025} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_SW_GALL_2025}$	Gallons per month
ALT_PROJ_GOLF_SW_GALL_2030	$(\text{CALCULATED APPLIED_GALL_SW_2030} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_SW_GALL_2030}$	Gallons per month
ALT_PROJ_GOLF_SW_GALL_2035	$(\text{CALCULATED APPLIED_GALL_SW_2035} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_SW_GALL_2035}$	Gallons per month
ALT_PROJ_GOLF_SW_GALL_2040	$(\text{CALCULATED APPLIED_GALL_SW_2040} * \text{ACRES} * \text{AVERAGE}) / \text{DAYS} = \text{ALT_PROJ_GOLF_SW_GALL_2040}$	Gallons per month

Estimating Power Generation Monthly Water Use

Below is an example of how 2001 power generation water use was estimated for International Paper – Savannah Mill (ORISPL# 50398) in Chatham County, Georgia:

- 1) Using USGS reported values we estimated that 2.1 mgd of surface water was used consumptively in 2001 by the power generation sector in Chatham County
- 2) Water use cooling water data was estimated from Form 923 of the Energy Information Agency (EIA):
 - a. According to the EIA, there are two active power generation plants in Chatham, Georgia:
 - i. Georgia Power Co. – Kraft (ORISPL # 732)
 1. Only reported net consumption of water use in 2009.
 - ii. International Paper – Savannah Mill (ORISPL # 50398)
 1. Has reported net consumption of cooling water since 2010
 - iii. Using 2008-2014 data reported by International Paper – Savannah Mill (ORISPL # 50398), an average net consumption per month was calculated:

Table 18. Estimated Average Share of Annual Consumptive Water Use by International Paper – Savannah Mill (ORISPL # 50398)

Month	Share of Annual Net Consumption
January	7.06%
February	7.27%
March	7.98%
April	8.12%
May	7.70%
June	8.85%
July	9.41%
August	9.57%
September	8.64%
October	9.13%
November	8.29%
December	8.01%

Source: Form 923. Energy Information Agency.

<http://www.eia.gov/electricity/data/eia923/>

b. $2.16 \text{ mgd} * 1,000,000 * 365 * 8.12\% = 64,018,080 \text{ gallons}$

Table 19 shows 2001 monthly water use estimates. Table 20 lists variables in the power generation water use data file.

Table 19. Calculating Updated 2012 Water Use Estimates International Paper – Savannah Mill (ORISPL # 50398) in Chatham County, Georgia

Month	Annual Groundwater Use (mgd)	Monthly Share of Groundwater	Block-Level Estimated Indoor Groundwater Use (gallons)
January	2.16	7.06%	58,668,597
February	2.16	7.27%	27,410,585
March	2.16	7.98%	66,304,213
April	2.16	8.12%	65,287,794
May	2.16	7.70%	63,984,532
June	2.16	8.85%	71,180,532
July	2.16	9.41%	78,192,578
August	2.16	9.57%	79,545,725
September	2.16	8.64%	69,496,893
October	2.16	9.13%	75,872,897
November	2.16	8.29%	66,690,827
December	2.16	8.01%	66,594,173

Figure 8. 2001 Monthly Water Use Estimates for International Paper – Savannah Mill (ORISPL # 50398) in Chatham County, Georgia

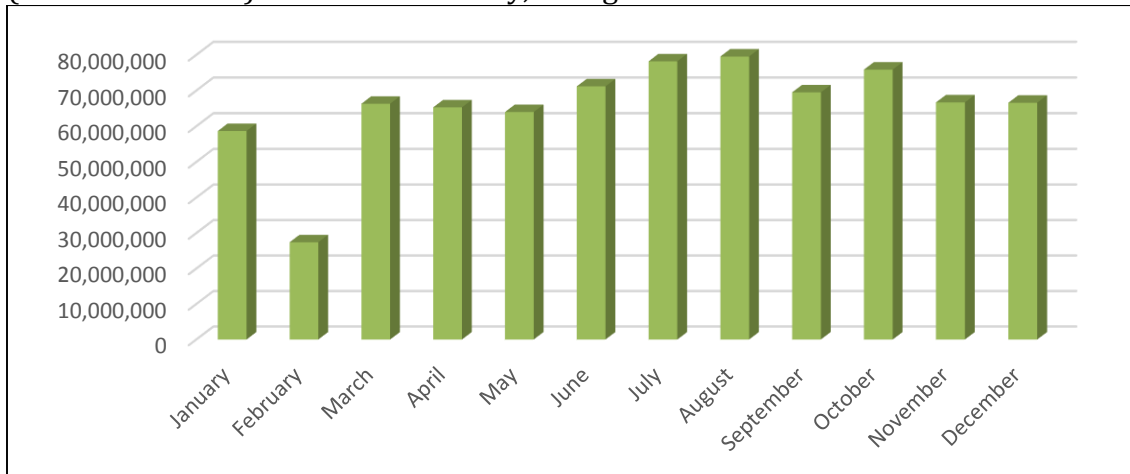


Table 20. Variables in file *New 19922012 Plant Level PG Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
OBJECTID	Unique ID carried over from the GIS layer	Not applicable
SEQPLT09	Sequential plant ID from GISD layer	Not applicable
PSTATABB	State abbreviation	Not applicable
PNAME	Plant Name	Not applicable
ORISPL	Unique ID for power Plant. This is the variable that should be used to join this table to the <i>PG_Points_with_Annual_GW_SW_Use</i> layer.	Not applicable
OPRNAME	Operator Name	Not applicable
OPRCODE	Operator Code	Not applicable
UTLSRVNM	Utility Service Area Name	Not applicable
UTLSRVID	Utility Service Area ID	Not applicable
PCANAME	Power Control Area Name	Not applicable
PCAIID	Power Control Area ID	Not applicable
NERC	NERC Region	Not applicable
SUBRGN	NERC Sub-region	Not applicable
SRNAME	Region Name	Not applicable
FIPSST	State FIPS	Not applicable
FIPSCNTY	County FIPS	Not applicable
CNTYNAME	County Name	Not applicable
LAT	Latitude	Not applicable
LON	Longitude	Not applicable
FP10_ST_CO	State and County FIPs Combination	Not applicable
PlantCount	Number of plants in county	Not applicable
COUNTYFP10_NUM	County FIPS	Not applicable
STATEFP10_NUM	State FIPS	Not applicable

Table 20. Variables in file *New 19922012 Plant Level PG Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
CAL_YEAR_D SC	Year	Not applicable
MONTH_LO NG_DSC	Month Name	Not applicable
MONTH_KE Y	Month Key	Not applicable
MONTH_YE AR	Month and Year	Not applicable
INDOOR_GW _GALL	Original estimate of plant-level indoor groundwater use in gallons	Gallons
INDOOR_SW _GALL	Original estimate of plant-level indoor surface water use in gallons	Gallons
PG_GW_MGD	USGS countywide groundwater used by power generators	Millions of Gallons per Day
Average	Average share of annual total used in that specific month	Percent
NEW_PG_G W_GALL	Calculated as $((PG_GW_MGD * AVERAGE * 1,000,000 * 365) / PLANTCOUNT) =$ NEW_PG_GW_GALL. This the 2010 estimate.	Gallons
PG_SW_MGD	2010 USGS countywide surface water used by power generators	Millions of Gallons per Day
NEW_PG_SW _GALL	Calculated as $((PG_SW_MGD * AVERAGE * 1,000,000 * 365) / PLANTCOUNT) =$ NEW_PG_SW_GALL. This the 2010 estimate.	Gallons
REPORT_CO OLING	This variable serves to identify those power generators that reported consumptive use to the Energy Information Administration (EIA).	Gallons
ENERGYSOU RCE1	This variable identifies the energy source for the plant.	Gallons
YEAR_SHAR E	This variable serves to identify how much of the yearly reported consumptive use is attributable to this specific plant.	Acres

Table 20. Variables in file *New 19922012 Plant Level PG Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
MONTH_SH ARE	This variable serves to identify how much of the monthly reported consumptive use is attributable to this specific plant.	Gallons
ALT_PG_GW _GALL	This is the 2010 groundwater use estimate distributed only amongst those plants that reported water use for cooling to the EIA.	Gallons
ALT_PG_SW_ GALL	This is the 2010 surface water use estimate distributed only amongst those plants that reported water use for cooling to the EIA.	

Distributing Power Generation Water Demand Projections

Below is an example of how power generation water demand projections were distributed to International Paper – Savannah Mill (ORISPL # 50398) in Chatham County, Georgia:

- 1) Projected December 2035 water demand:
 - a. 2035 projected countywide power generation groundwater demand = 32,175 gallons
 - i. Assuming that only 2% is consumed = $32,175 * 2\% = 643$ gallons
 - b. 2035 projected countywide power generation surface water demand = 4,706,828 gallons
 - c. Assuming that only 2% is consumed = $4,706,828 * 2\% = 94,137$ gallons
- 2) It is assumed that only those power plants that reported consumptive cooling to the EIA use water consumptively. In that case, all the reported power generation water use for Chatham County, Georgia (i.e., 180,540 gallons) will be allocated to International Paper – Savannah Mill (ORISPL # 50398).

See Tables 21a and 21b and Figures 9a and 9b, below, for monthly and annual projections. Plant-level projections are found in <H:\rm\WSM\NFRWSP\Data\Projected 20152040 Block Level Golf Water Use GAALSC.csv>. See Table 22 for variable definitions and units. Please remember to divide these projected numbers by 365 days to obtain gallons.

Table 21a. Projected Groundwater Demand in gallons Allocated Solely to International Paper – Savannah Mill (ORISPL # 50398) in Chatham County, Georgia.

	All Groundwater Use Allocated to Plants Reporting Consumptive Use to EIA						
Month	2010	2015	2020	2025	2030	2035	2040
January	2,081	2,185	2,248	2,305	2,353	2,392	2,422
February	972	1,021	1,050	1,077	1,099	1,117	1,132
March	2,352	2,469	2,541	2,605	2,659	2,703	2,738
April	2,316	2,431	2,502	2,565	2,619	2,662	2,696
May	2,270	2,383	2,452	2,514	2,566	2,609	2,642
June	2,525	2,651	2,728	2,797	2,855	2,902	2,939
July	2,774	2,912	2,996	3,072	3,136	3,188	3,228
August	2,822	2,962	3,048	3,125	3,191	3,243	3,284
September	2,466	2,588	2,663	2,731	2,788	2,833	2,869
October	2,692	2,825	2,907	2,981	3,043	3,093	3,133
November	2,366	2,483	2,556	2,620	2,675	2,719	2,754
December	2,363	2,480	2,552	2,617	2,671	2,715	2,750

Note: This is the only plant in this county that reported consumptive use of cooling water to the Energy Information Administration.

Table 21b. Projected Surface Water Demand in gallons Allocated Solely to International Paper – Savannah Mill (ORISPL # 50398) in Chatham County, Georgia.

All Surface Water Use Allocated to Plants Reporting Consumptive Use to EIA							
Month	2010	2015	2020	2025	2030	2035	2040
January	304,483	319,598	328,872	337,212	344,241	349,889	354,347
February	142,257	149,320	153,652	157,549	160,833	163,472	165,554
March	344,110	361,193	371,674	381,099	389,044	395,427	400,464
April	338,835	355,656	365,976	375,257	383,080	389,365	394,325
May	332,072	348,557	358,671	367,766	375,433	381,593	386,454
June	369,418	387,757	399,009	409,127	417,656	424,508	429,916
July	405,810	425,956	438,315	449,431	458,800	466,327	472,267
August	412,832	433,327	445,900	457,208	466,739	474,397	480,440
September	360,680	378,586	389,571	399,450	407,777	414,468	419,747
October	393,771	413,319	425,312	436,098	445,189	452,493	458,257
November	346,117	363,300	373,841	383,322	391,312	397,733	402,799
December	345,615	362,773	373,299	382,766	390,745	397,156	402,215

Note: This is the only plant in this county that reported consumptive use of cooling water to the Energy Information Administration.

Figure 9a. 2035 Water Demand Projections for International Paper – Savannah Mill (ORISPL # 50398) in Chatham County, Georgia

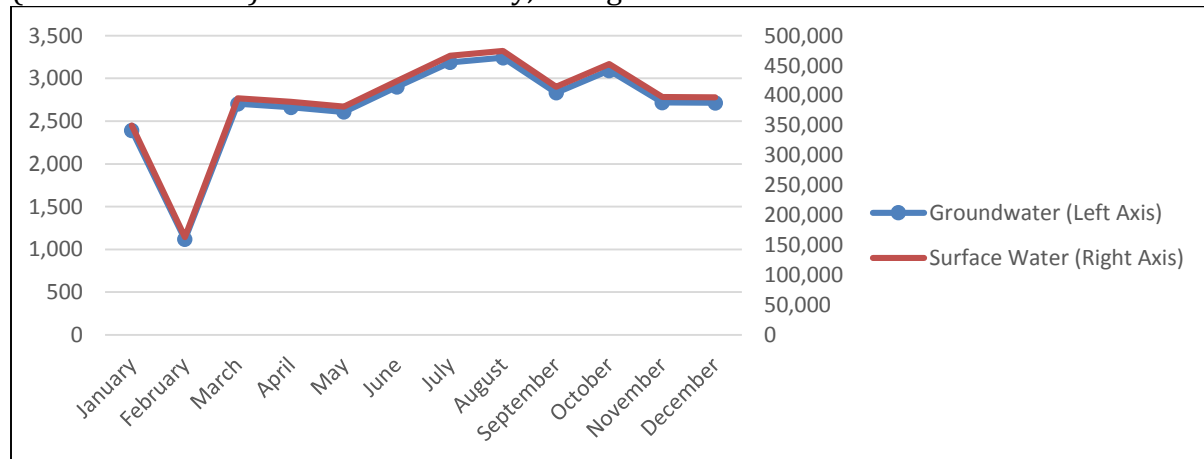


Figure 9b. April Water Use Projections for International Paper – Savannah Mill (ORISPL #

Subject: Technical Memorandum - Estimating and Projections Sub-County Water Use for Georgia and South Carolina

50398) in Chatham County, Georgia

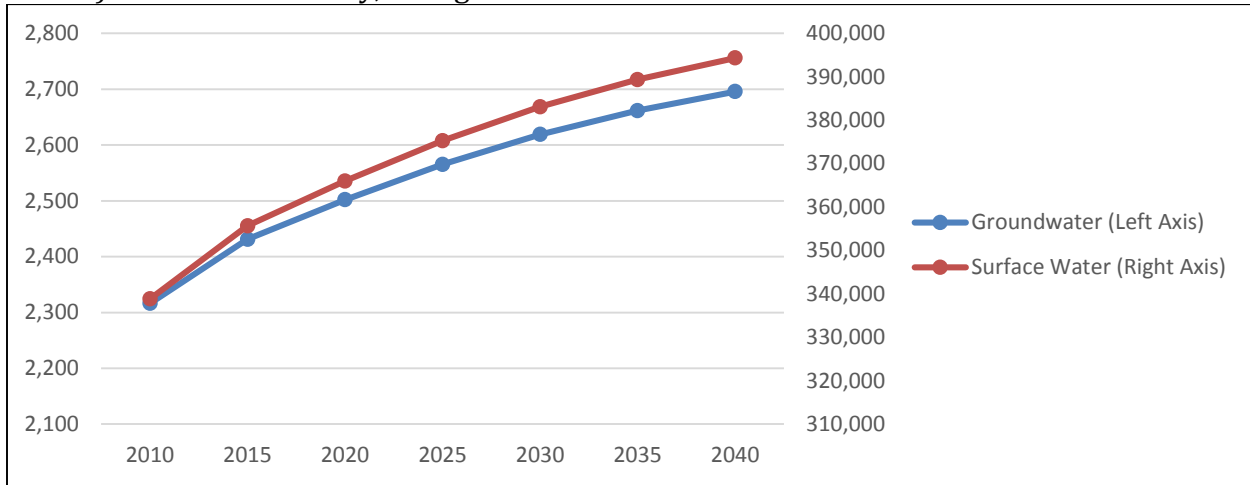


Table 22. Variables in file *Projected 20152040 Block Level PG Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
OBJECTID	Unique ID carried over from the GIS layer	Not applicable
SEQPLT09	Sequential plant ID from GISD layer	Not applicable
PSTATABB	State abbreviation	Not applicable
PNAME	Plant Name	Not applicable
ORISPL	Unique ID for power Plant. This is the variable that should be used to join this table to the <i>PG_Points_with_Annual_GW_SW_Use</i> layer.	Not applicable
OPRNAME	Operator Name	Not applicable
OPRCODE	Operator Code	Not applicable
UTLSRVNM	Utility Service Area Name	Not applicable
UTLSRVID	Utility Service Area ID	Not applicable
PCANAME	Power Control Area Name	Not applicable
PCAIID	Power Control Area ID	Not applicable
NERC	NERC Region	Not applicable
SUBRGN	NERC Sub-region	Not applicable
SRNAME	Region Name	Not applicable
FIPSST	State FIPS	Not applicable
FIPSCNTY	County FIPS	Not applicable
CNTYNAME	County Name	Not applicable
LAT	Latitude	Not applicable
LON	Longitude	Not applicable
FP10_ST_CO	State and County FIPs Combination	Not applicable
PlantCount	Number of plants in county	Not applicable
COUNTYFP10_NUM	County FIPS	Not applicable
STATEFP10_NUM	State FIPS	Not applicable
CAL_YEAR_DSC	Year	Not applicable
MONTH_LONG_DSC	Month Name	Not applicable

Table 22. Variables in file *Projected 20152040 Block Level PG Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
MONTH_KEY	Month Key	Not applicable
MONTH_YEAR	Month and Year	Not applicable
INDOOR_GW_GALL	Original estimate of plant-level indoor groundwater use in gallons	Gallons
INDOOR_SW_GALL	Original estimate of plant-level indoor surface water use in gallons	Gallons
PG_GW_MGD	USGS countywide groundwater used by power generators	Millions of Gallons per Day
Average	Average share of annual total used in that specific month	Percent
NEW_PG_GW_GALL	Calculated as $((PG_GW_MGD * AVERAGE * 1,000,000 * 365) / PLANTCOUNT) = NEW_PG_GW_GALL$. This the 2010 estimate.	Gallons
PG_SW_MGD	2010 USGS countywide surface water used by power generators	Millions of Gallons per Day
NEW_PG_SW_GALL	Calculated as $((PG_SW_MGD * AVERAGE * 1,000,000 * 365) / PLANTCOUNT) = NEW_PG_SW_GALL$. This the 2010 estimate.	Gallons
REPORT_COOLING	This variable serves to identify those power generators that reported consumptive use to the Energy Information Administration (EIA).	Gallons
ENERGYSOURCE1	This variable identifies the energy source for the plant.	Gallons
YEAR_SHARE	This variable serves to identify how much of the yearly reported consumptive use is attributable to this specific plant.	Acres
MONTH_SHARE	This variable serves to identify how much of the monthly reported consumptive use is attributable to this specific plant.	Gallons
ALT_PG_GW_GALL	This is the 2010 groundwater use estimate distributed only amongst those plants that reported water use for cooling to the EIA.	Gallons
ALT_PG_SW_GALL	This is the 2010 surface water use estimate distributed only amongst those plants that reported water use for cooling to the EIA.	
COUNTY_Proj_PT_WGWTto_2015	County-level 2015 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WGWTto_2020	County-level 2020 groundwater demand projections	Millions of Gallons per Day

Table 22. Variables in file *Projected 20152040 Block Level PG Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
COUNTY_Proj_PT_WGWTto_2025	County-level 2025 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WGWTto_2030	County-level 2030 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WGWTto_2035	County-level 2035 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WGWTto_2040	County-level 2040 groundwater demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WSWTo_2015	County-level 2015 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WSWTo_2020	County-level 2020 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WSWTo_2025	County-level 2025 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WSWTo_2030	County-level 2030 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WSWTo_2035	County-level 2035 surface water demand projections	Millions of Gallons per Day
COUNTY_Proj_PT_WSWTo_2040	County-level 2040 surface water demand projections	Millions of Gallons per Day
PROJ_PG_GW_2015	Calculated as COUNTY_Proj_PT_WGWTto_2015 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_GW_2015	Gallons per year
PROJ_PG_GW_2020	Calculated as COUNTY_Proj_PT_WGWTto_2020 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_GW_2020	Gallons per year
PROJ_PG_GW_2025	Calculated as COUNTY_Proj_PT_WGWTto_2025 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_GW_2025	Gallons per year
PROJ_PG_GW_2030	Calculated as COUNTY_Proj_PT_WGWTto_2030 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_GW_2030	Gallons per year

Table 22. Variables in file *Projected 20152040 Block Level PG Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
PROJ_PG_GW_2035	Calculated as COUNTY_Proj_PT_WGWTto_2035 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_GW_2035	Gallons per year
PROJ_PG_GW_2040	Calculated as COUNTY_Proj_PT_WGWTto_2040*365*AVERAGE)/PLANTCOUNT = PROJ_PG_GW_2040	Gallons per year
PROJ_PG_SW_2015	Calculated as COUNTY_Proj_PT_WSWTo_2015 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_SW_2015	Gallons per year
PROJ_PG_SW_2020	calculated as COUNTY_Proj_PT_WSWTo_2020 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_SW_2020	Gallons per year
PROJ_PG_SW_2025	Calculated as COUNTY_Proj_PT_WSWTo_2025 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_SW_2025	Gallons per year
PROJ_PG_SW_2030	Calculated as COUNTY_Proj_PT_WSWTo_2030 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_SW_2030	Gallons per year
PROJ_PG_SW_2035	Calculated as COUNTY_Proj_PT_WSWTo_2035 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_SW_2035	Gallons per year
PROJ_PG_SW_2040	Calculated as COUNTY_Proj_PT_WSWTo_2040 * 365 * AVERAGE) / PLANTCOUNT = PROJ_PG_SW_2040	Gallons per year
ALT_GALL_GW_2015	Calculated = COUNTY_Proj_PT_WGWTto_2015 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_GW_2015	Gallons per month
ALT_GALL_GW_2020	Calculated = COUNTY_Proj_PT_WGWTto_2020 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_GW_2020	Gallons per month
ALT_GALL_GW_2025	Calculated = COUNTY_Proj_PT_WGWTto_2025 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_GW_2025	Gallons per month
ALT_GALL_GW_2030	Calculated = COUNTY_Proj_PT_WGWTto_2030 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_GW_2030	Gallons per month
ALT_GALL_GW_2035	Calculated = COUNTY_Proj_PT_WGWTto_2035 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_GW_2035	Gallons per month
ALT_GALL_GW_2040	Calculated = COUNTY_Proj_PT_WGWTto_2040 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_GW_2040	Gallons per month

Table 22. Variables in file *Projected 20152040 Block Level PG Water Use GAALSC.csv* with definitions and units

Variable	Definition	Units
ALT_GALL_SW_2015	Calculated = COUNTY_Proj_PT_WSWTo_2015 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_SW_2015	Gallons per month
ALT_GALL_SW_2020	Calculated = COUNTY_Proj_PT_WSWTo_2020 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_SW_2020	Gallons per month
ALT_GALL_SW_2025	Calculated = COUNTY_Proj_PT_WSWTo_2025 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_SW_2025	Gallons per month
ALT_GALL_SW_2030	Calculated = COUNTY_Proj_PT_WSWTo_2030 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_SW_2030	Gallons per month
ALT_GALL_SW_2035	Calculated = COUNTY_Proj_PT_WSWTo_2035 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_SW_2035	Gallons per month
ALT_GALL_SW_2040	Calculated = COUNTY_Proj_PT_WSWTo_2040 * YEAR_SHARE * MONTH_SHARE = ALT_GALL_SW_2040	Gallons per month