

Georgia Irrigation Data 1970 to 2010

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Census of Agriculture - NASS

- 1927 – 2007 every 5 years
- Survey of “irrigated farms”
- Irrigated acres in farms – county-by-county
- Underreports irrigated acreage of Georgia by 35 to 50%
- <http://www.agcensus.usda.gov/>

Farm and Ranch Irrigation Survey -NASS

- 1998 – 2008 every 5 years
- 1998 was the first to include Georgia details
- Includes acreage and other details in follow-up survey of “irrigated farms” as reported in Census
- Retains underreported irrigated acreage.
- Very general irrigation amount data
- [http://www.nass.usda.gov/Surveys/Guide to NASS Surveys/Farm and Ranch Irrigation/index.asp](http://www.nass.usda.gov/Surveys/Guide%20to%20NASS%20Surveys/Farm%20and%20Ranch%20Irrigation/index.asp)

CES Irrigation Surveys

- 1972 – 2008 every 3-4 years
- Survey of Ag Agents creating one report per county.
- Estimates irrigation acres by crop and irrigation depth by crop, reporting year.
- Details system types, water sources, power sources
- <http://www.nespal.org/sirp/agwateruse/facts/survey/default.asp>
- County-level details lost for 1970 to 1990. For later surveys detailed county data can be downloaded here:
- http://www.nespal.org/sirp/agwateruse/facts/survey/1992-2008.Irr_Surveys_Copy.zip

EPD-GS Survey of Irrigation

- 1980
- Bill McLemore, EPD-GS
- Details of sources, acres, location
- Not digitized
- unpublished

EPD Withdrawal Permits

- 1988 (1991) to current
- Required by law for most withdrawals > 100,000 gpd (ponds, small wells??)
- Emphasis on water source sources
- Permit gpm; max rate; (farmer est.)
- Planned annual irrigation acres (farmer est.)

EPD Withdrawal Permits

- 75% of current permits were grandfathered
- Well/Pump install date (farmer est.)
- Annual irrigation depth (farmer est.) – 40 in./y average

EPD Withdrawal Permits

- Recent changes:
 - Mapping of exact withdrawal location
 - On-site verification
 - Wait on meter verification – huge backlog
 - <http://www.nespal.org/sirp/apu/>

EPD/UGA GIS mapping

- 2000 to 2010 - In-county mapping
- Current emphasis – withdrawal point locations
- Irrigated field area tied to permit (reported by farmer)
- Link of withdrawal locations and application area
- http://www.nespal.org/sirp/waterinfo/state/awd/AgWaterDemand_IrrArea_Detail.htm
- Also earlier GIS efforts
- <http://cms.ce.gatech.edu/gwri/uploads/proceedings/2001/HookJ-01.pdf>
- <http://www.crms.uga.edu/articles/irrigation.pdf>

Irrigation Metering

- 2004 (selected) to 2009
- Law requires all (permitted) withdrawals metered by 2009
- SWCC received responsibility
- Started in one basin 2004, statewide? In 2009
- Excludes North Ga, about 60-65% of active fields metered.
- Excludes GW used to refill sources

Irrigation Metering

- Started in one basin 2004, statewide? In 2009
- Active irrigation area (field verified)
- Associated withdrawal points (field verified)
- Measured annual withdrawal at surface distribution point by GFC.
- ? Crop, multiple crops
- Selected 1% real-time meters
- <http://gaswcc.georgia.gov/portal/site/SWCC/menuitem.2f54fa407984c51e93f35eeado3036ao/?vgnextoid=a26531d3boc45210VgnVCM10000obfo1020aRCRD>

Ag Water Pumping

- 1999 to 2004 research by UGA & CES – EPD funded
- 2 to 6% sample, randomly selected;
- 800 irrigated fields
- Monthly withdrawal amounts
- Irrigated area
- Crop type, including sub-field areas
- Various system & other data
- Data and project peer reviewed
- <http://www.nespal.org/sirp/awp/>

USGS Water Use Surveys

- 1995 to 2005
- County-by-county withdrawal amounts, by sources
- Georgia's Ag Data is derivative of CES Irrigation Survey
- <http://pubs.usgs.gov/sir/2009/5002/>

NRCS ACT-ACF Projections

- 1992-1996 projections to 2030
- Major crop acres and withdrawals amounts
- Derivative of CES Irrigation Surveys
- USDA/NRCS (U.S. Department of Agriculture/Natural Resources Conservation Service): 1995, ACT/ACF River Basins Comprehensive Study: *Agricultural Water Demand*. Soil Conservation Service, Washington, DC.

Farm Gate Survey

- 1990 to 2009 annual
- UGA Center for Agribusiness & CES
- Commodity based economics survey, county by county, CES Agents
- Some irrigation information
 - <http://www.caed.uga.edu/FarmGate/>

Farm Service Agency (ASCS)

- 1950's – present, annual
- Detailed farm data by county & commodity
- Participants in Farm Bill programs and crop insurance
- Irrigation records field by field (acres & crop, not amount)
- Protected Records

Ag Water Demand Projection

- 2009 Projections for 2011 to 2050
- UGA research funded by EPD
- Irrigated crop acres and withdrawals amounts by county by source by month
 - (Used county by county irrigation depth each month 1950 to 2007 for major crops)
 - <http://www.nespal.org/SIRP/waterinfo/State/AWD/AgWaterDemand.htm>
- Also done by watersheds, LDA's, aquifers
 - http://www.nespal.org/SIRP/waterinfo/State/AWD/AgWaterDemand_by_LDA.htm

GoogleEarth

- Multi-year NAIP images
- Ground level pictures

“Projecting backwards”

Approach

- Requires:
 - Irrigated acres by commodity
 - Irrigation depths (monthly)
 - Withdrawals by source

Irrigated acres by commodities

- UGA CES Surveys – by county borders
 - Limitations one estimate per county
 - Advantages long consistent record, local knowledge, breakdown by commodity, some estimate of annual irrigation depth
 - For 1992 to 2008 could break out watersheds by proportional areas within counties
 - Can be used to supply crop types

Irrigated acres 1980 to 2008

- Current 2008 irrigated acres by mapped location
 - Limitations – assumption that current irrigation areas represents what was irrigated in the past
 - Advantage – locations by farmable, irrigatable soils
 - Water source preferences generally known

Irrigated acres 1980 to 2008

- Back projection
 - Start with 2008 base locations and sources
 - Use CES estimates to reduce acres for past years
 - e.g. $(2004 \text{ CES ac} / 2008 \text{ CES ac}) \times 2008 \text{ map acres}$
 - Doing this county by county gives development preference
 - Dooly vs Mitchell counties
 - Use ratios of crops in CES surveys to estimate what was grown on those calculated acres

Monthly Irrigation Depths

- Hoogenboom DSSAT model runs
 - 3 soils, county-by-county weather 1950 to 2007
 - 5 (7) commodities
 - Daily time step, monthly summaries
 - Gives you strong feedback from actual monthly weather
 - Normal & irrigation patterns in Ga
 - Location differences induced by weather and crop preferences
 - Some verification (AWP)
 - Assign water use after break our commodity to a drainage area or aquifer

Withdrawals by source

- EPD/SWCC assignments
 - Tied to specific fields during mapping of irrigated areas
 - Proportional breakout by county averages for unknown source fields

Product

- Monthly irrigation withdrawals by source for any HUC10 or larger area.
- Separate GW vs SW withdrawals
- Based on current irrigation practices and likely irrigation depths
- Could further refine
 - 1980 EPD-GS map
 - Correct by system based on AWP observations
 - FSA data
 - Florida – monthly withdrawals for vegetable crops