

# Agricultural Water Demand Forecasts for Georgia

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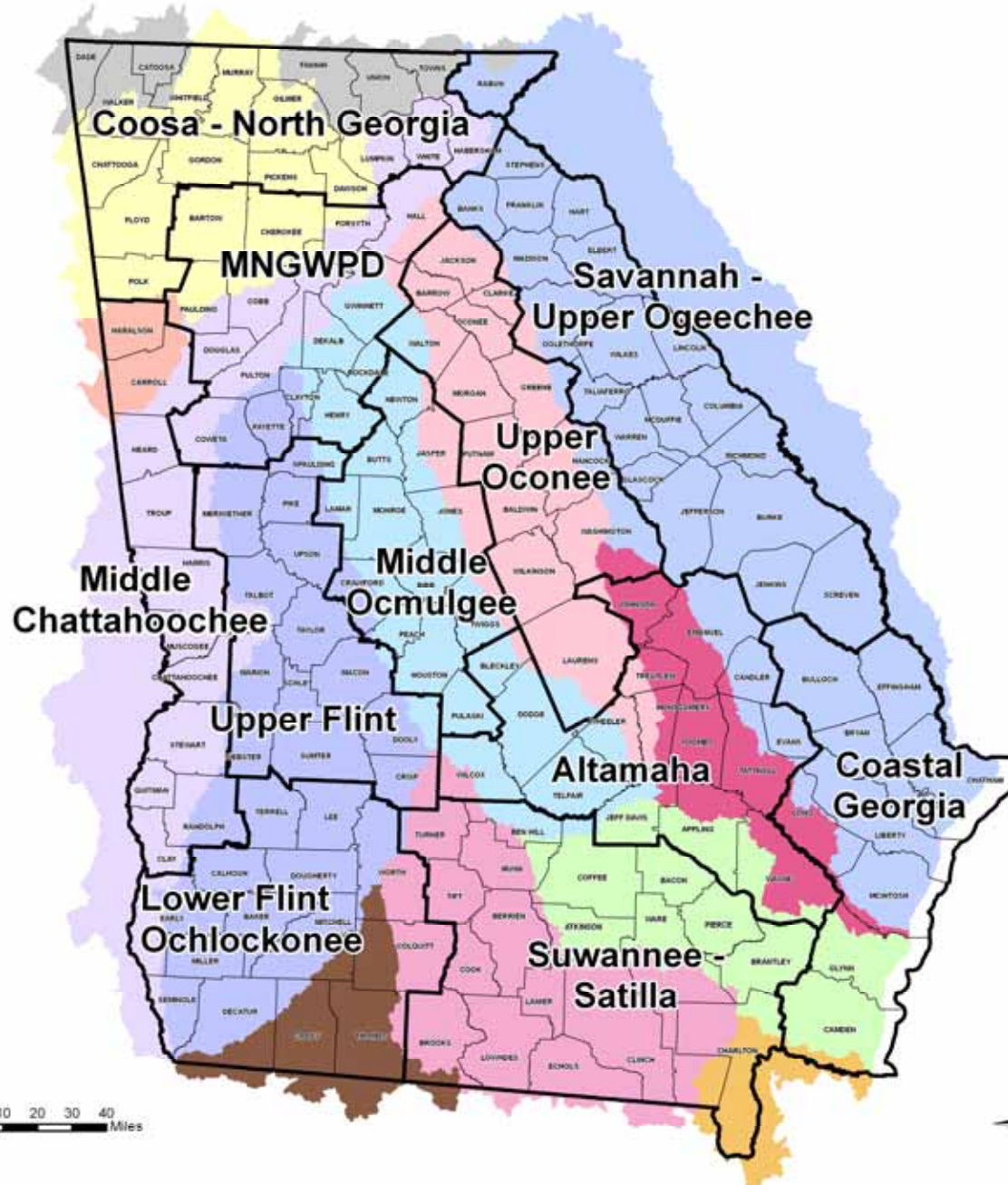
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# Background

- Georgia undertaking comprehensive water planning
  - 2004 HB 237 authorizes planning
  - 2008 Statewide water plan adopted
  - 2011 Regional water plans implemented
    - 1988 Ag Water Withdrawal Permits
    - 2009 Ag Water Metering Implemented

# Water Planning Regions



## Regional Approach

Resource Assessments by  
EPD

Regional Water Planning  
Councils

Water Development and  
Conservation Plans  
Needs and Gaps

# Project Objectives

- Estimate water withdrawals that may be required to meet Georgia Agricultural Production needs during the next 40 years.
  - Estimate range of monthly water needs
    - By supply source
    - By county

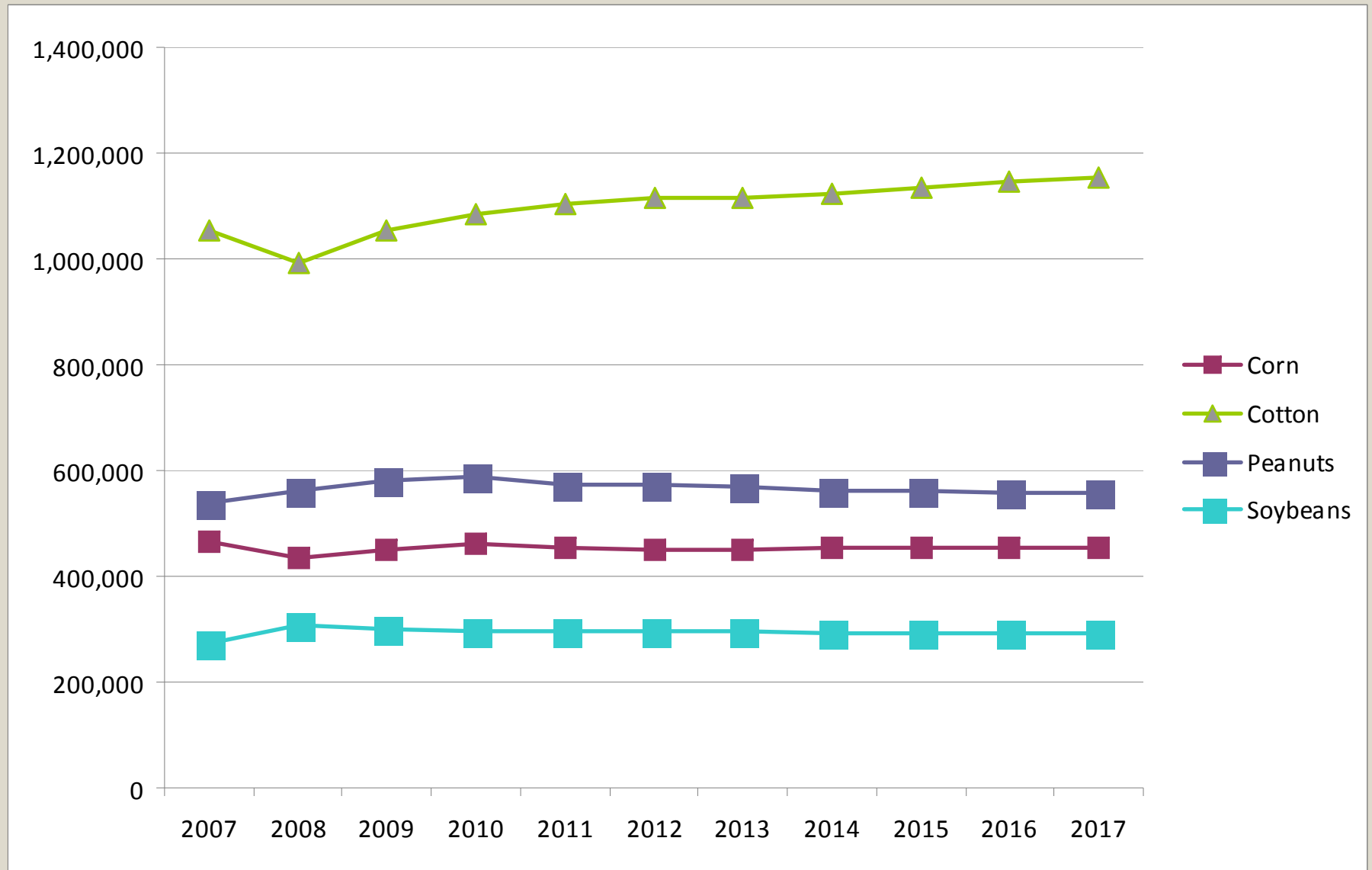
# Approach

- Project planting intentions of Georgia farmers
- Estimate water needs of each crop
- Disaggregate into counties, months, and water sources
- Outline next steps

# Project planting intentions

- Economic drivers set future plantings for commodities
- Relies upon NASS Census of Agriculture, FRIS, and USDA forecasts of major commodities
  - Corn, cotton, soybean, wheat
  - Peanut & tobacco
  - Fruit & Nuts
  - Fresh and Process Vegetables
- State surveys and data on for commodities and CES Irrigation Surveys
- Project near term and long range changes in planted area by crop

# Project planting intentions



# Project planting intentions

## Cotton acreage projections by county

Harvested Acreage Projections										
Growth Rate	-0.058252	0.061856	0.029126	0.018868	0.009259	0	0.009174	0.009091	0.009009	0.008929
County	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Appling	20247.57	21500	22126.21	22543.69	22752.43	22752.43	22961.17	23169.9	23378.64	23587.38
Atkinson	4659.767	4948	5092.117	5188.194	5236.233	5236.233	5284.272	5332.311	5380.35	5428.388
Bacon	11065.53	11750	12092.23	12320.39	12434.47	12434.47	12548.54	12662.62	12776.7	12890.78
Baker	21660.19	23000	23669.9	24116.5	24339.81	24339.81	24563.11	24786.41	25009.71	25233.01
Baldwin	0	0	0	0	0	0	0	0	0	0
Banks	0	0	0	0	0	0	0	0	0	0
Barrow	0	0	0	0	0	0	0	0	0	0
Bartow	872.0583	926	952.9709	970.9515	979.9417	979.9417	988.932	997.9223	1006.913	1015.903
Ben_Hill	7323.029	7776	8002.485	8153.476	8228.971	8228.971	8304.466	8379.961	8455.456	8530.951

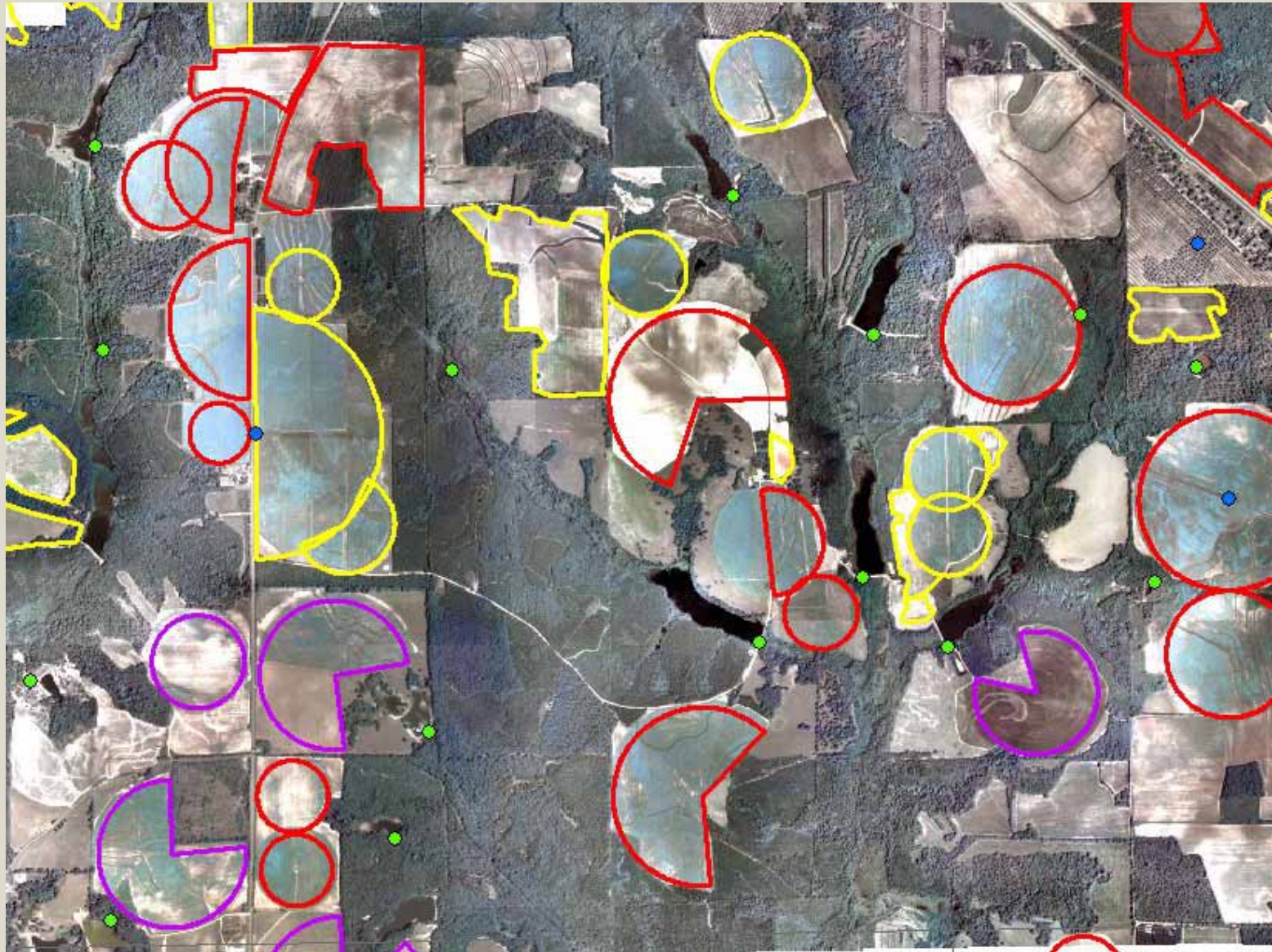
# Project planting intentions

- Estimate portion of each crop to be produced with irrigation
  - Retain ratio irrigated to non-irrigated as based on 2002 or 2008 data
  - Assume all growth will be in irrigated acres & shrinkage in non-irrigated
- Disaggregate state totals into county areas by crop
  - Farmers will tent to continue crops where they have experience and infrastructure to support the commodity
  - Soils and climate limit where some crops may be produced
- After distributing acres among existing irrigated area, project counties where irrigation may expand into new irrigated fields
- Specify assumptions

# Irrigation locations and water sources

- Map existing irrigation fields and hardware
  - Irrigation will continue where investments & experience
  - Map soils found in irrigated fields
  - Identify Class I-III land available for conversion to irrigation
- Distribute existing surface and groundwater withdrawals as per known
  - Permitting and metering has improved understanding of sources
- Summarize irrigated area by counties and water sources
- Specify Assumptions

Past mapping efforts associated with water withdrawal permitting and water metering have identified many of the fields.



We are filling in additional irrigated areas using NAIP and Google Earth imagery

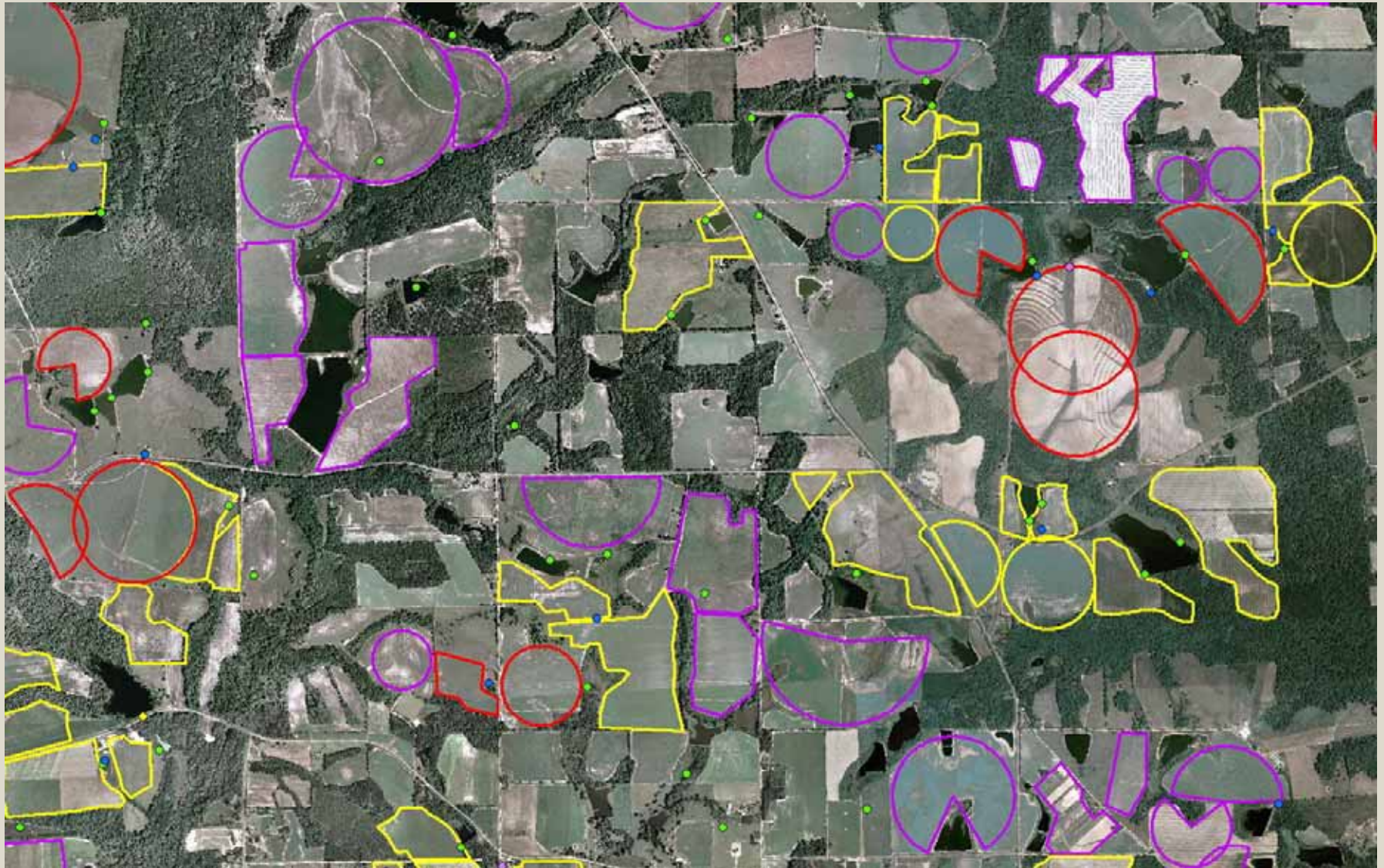








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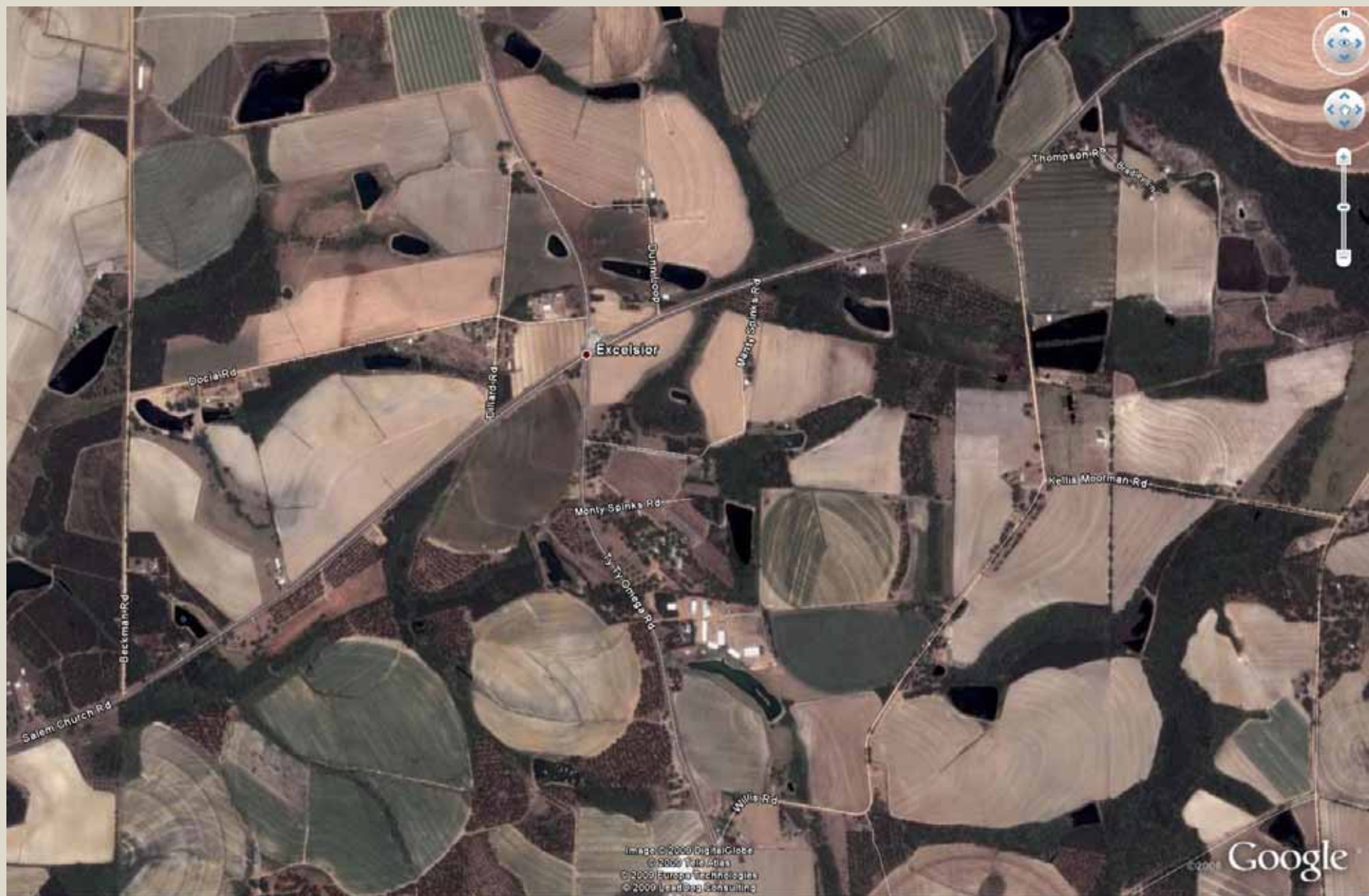


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Google



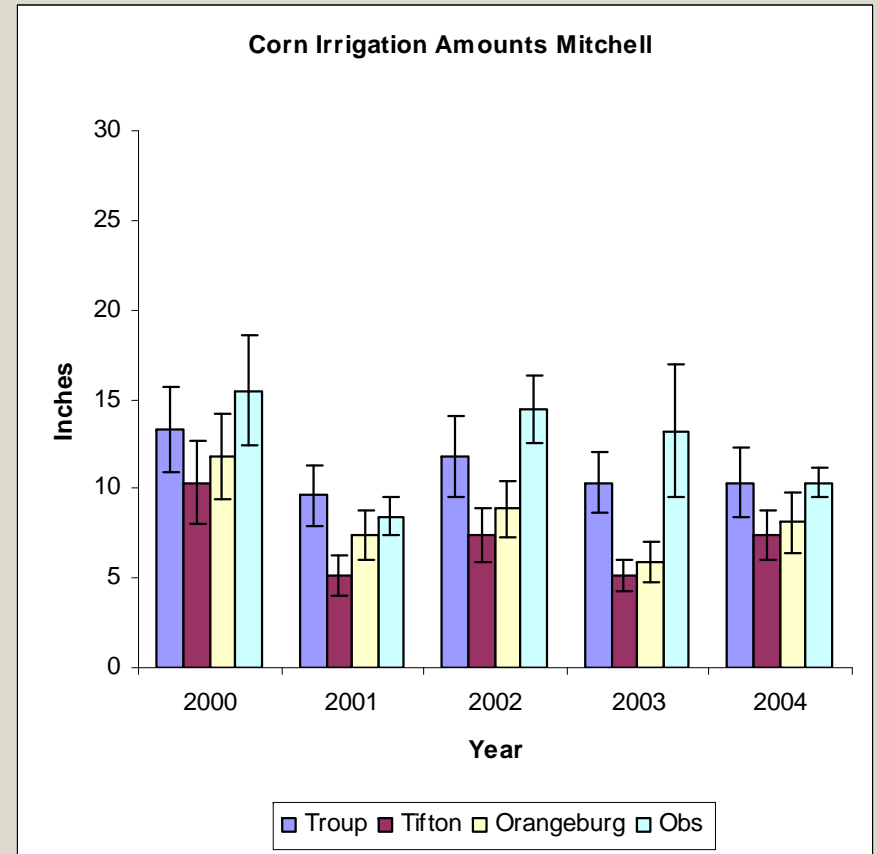
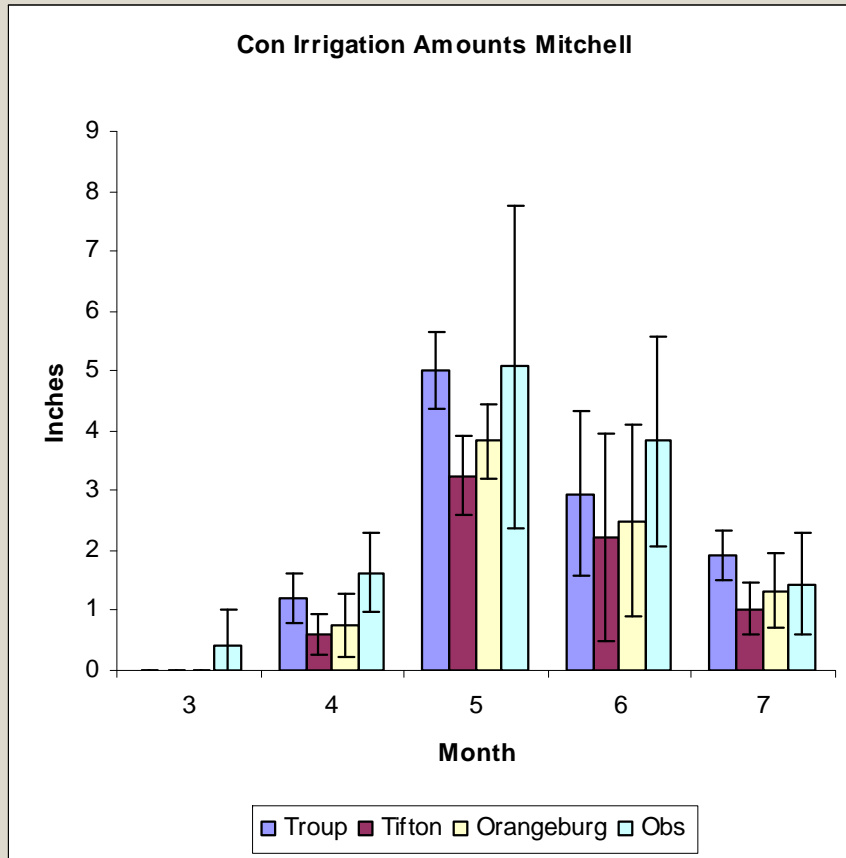
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# Irrigation depth by crop

- Crop growth and water use models
  - DSSAT, FAO56, and observed
- Climate record 1950 to 2007
  - Daily record set for every county
- For counties where crop has been produced
  - 3 most important soils on which irrigation occurs
  - Average planting date for county or region
  - Project daily water application as soil dries, sum by month.
- For each county, crop, & month
  - 10, 25, 50, 75 and 90 %tiles for irrigation application depths
  - Irrigation for wet years, average years, and dry years
- Specify Assumptions

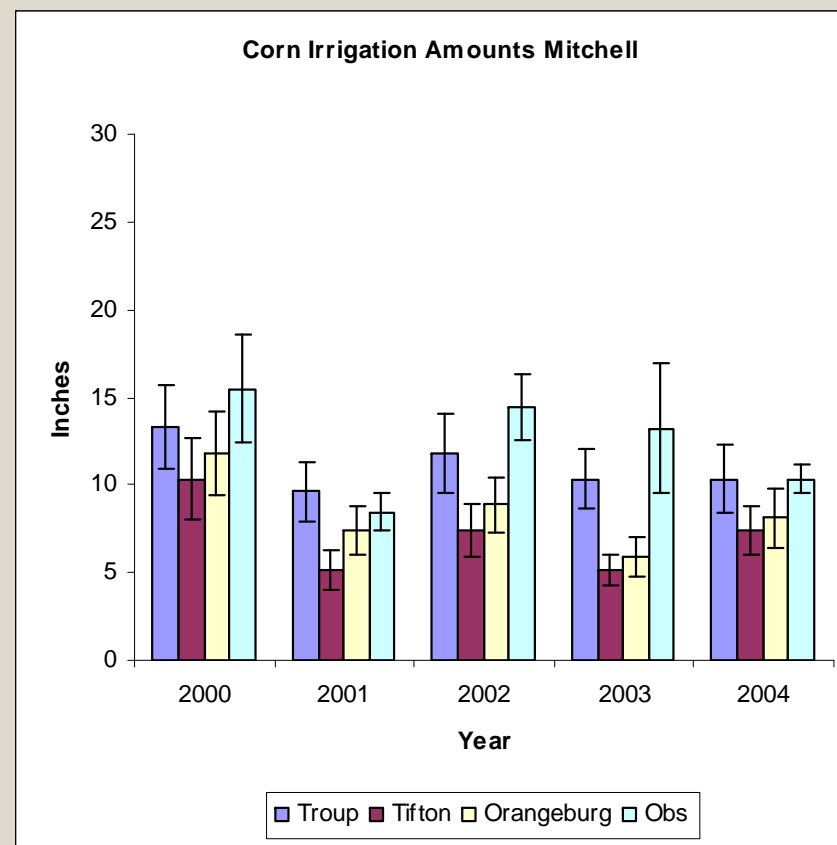
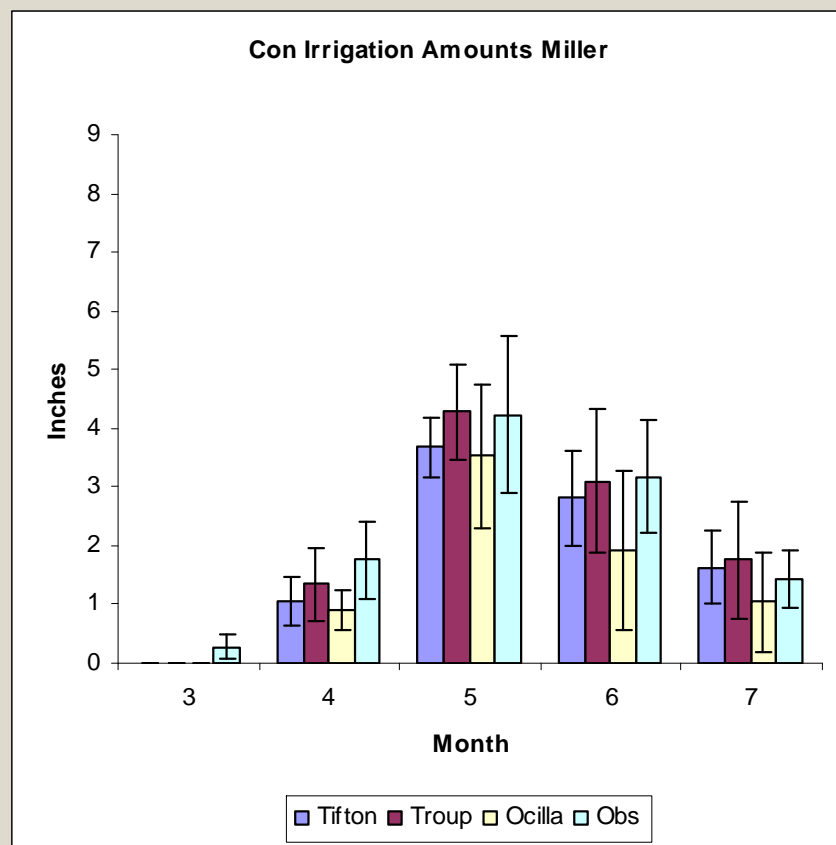
# Irrigation depth by crop

Model validation – selected soils, Mitchell co.



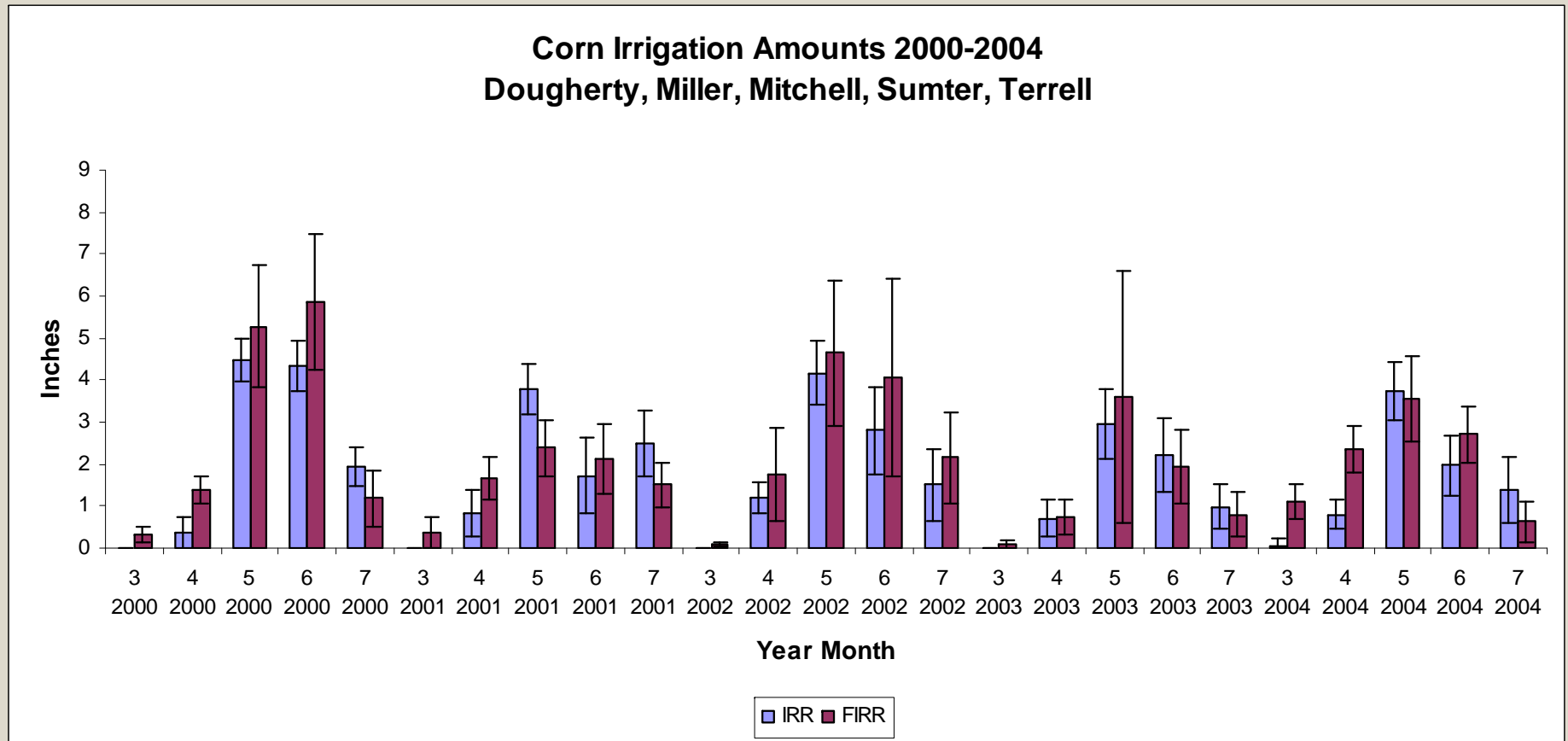
# Irrigation depth by crop

Model validation – Selected soils; Miller Co.



# Irrigation depth by crop

Model validation – all soils, 5 counties (FIRR = observed AWP)



# Sample County Projection: Monthly Irr - June

Crop	Irr Area		Wet Year	Ave Year	Dry Year
	ac		in	in	in
Corn	12,500		1.3	2.4	3.8
Cotton	23,200		0.5	1.6	2.0
Peanut	9,000		0.7	1.3	2.6
Pecan	2,300		1.4	2.2	4.5
Vegetable	1,350		2.5	4.0	6.2
Total	48,350				

# Sample County Projection: Monthly Irr - June

Crop	Irr Area		Wet Year	Ave Year	Dry Year
	ac		ac-in	ac-in	ac-in
Corn	12,500		16,250	30,000	47,500
Cotton	23,200		11,600	37,120	46,400
Peanut	9,000		6,300	11,700	23,400
Pecan	2,300		3,220	5,060	10,350
Vegetable	1,350		3,375	5,400	8,370
Total	48,350		40,800	89,300	136,000

# Project Completion

- March 31, 2009
  - Estimate range of monthly water withdrawals
    - By supply source
    - By county
  - List assumptions and data sources used
- June 30, 2009
  - Guidance documents of future refinements and data collection needs
    - Climate Change
    - Water supply limitations