

Studies of Water Demands in Middle Illinois Using Scenario Analysis

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Illinois Water 2016
October 26, 2016

Outline

- Introduction
- Scenario Analysis
- Effects of Future Climate
- Summary

Purpose and Scope

- To develop water demand scenarios (2015-2060) for all major user sectors for Middle Illinois Region:
(7 counties: LaSalle, Stark, Putnam, Marshall, Livingston, Woodford, and Peoria)
- To provide basis to identify potential water supply deficit for regional water supply planning



Analytical approach

- Translate the projections of population and economic (& agricultural) growth into associated water demand
- Account for current and historical water demand within each county (and PWS service areas)
- Develop water demand relationships and coefficients
- Develop demand scenarios

Major sectors of water users

- Public water supply
- Self-supplied domestic
- Thermoelectric power generation
- Self-supplied industrial and commercial
- Ag and environmental



Data sets

- ▶ Water use and explanatory variable data for PWS at system level
- ▶ Thermoelectric power generation data at facility level
- ▶ Self-supplied industrial/ commercial, ag/environmental, self-supplied domestic sectors at county level

Determinants of PWS water demand

- Median household income +0.122
- Water price -0.198
- Employment/population ratio +0.503
- Precipitation -0.060
- Max daily temperature +1.133
- Time trend -0.004

Other drivers

- Increasing trend in irrigated cropland -- 1.3% to 4.2%/year during 1987-2012
- Projected industrial growth (employment)
- Median household income expected to grow
- Prices of water are increasing
- Water efficiency in PWS is improving

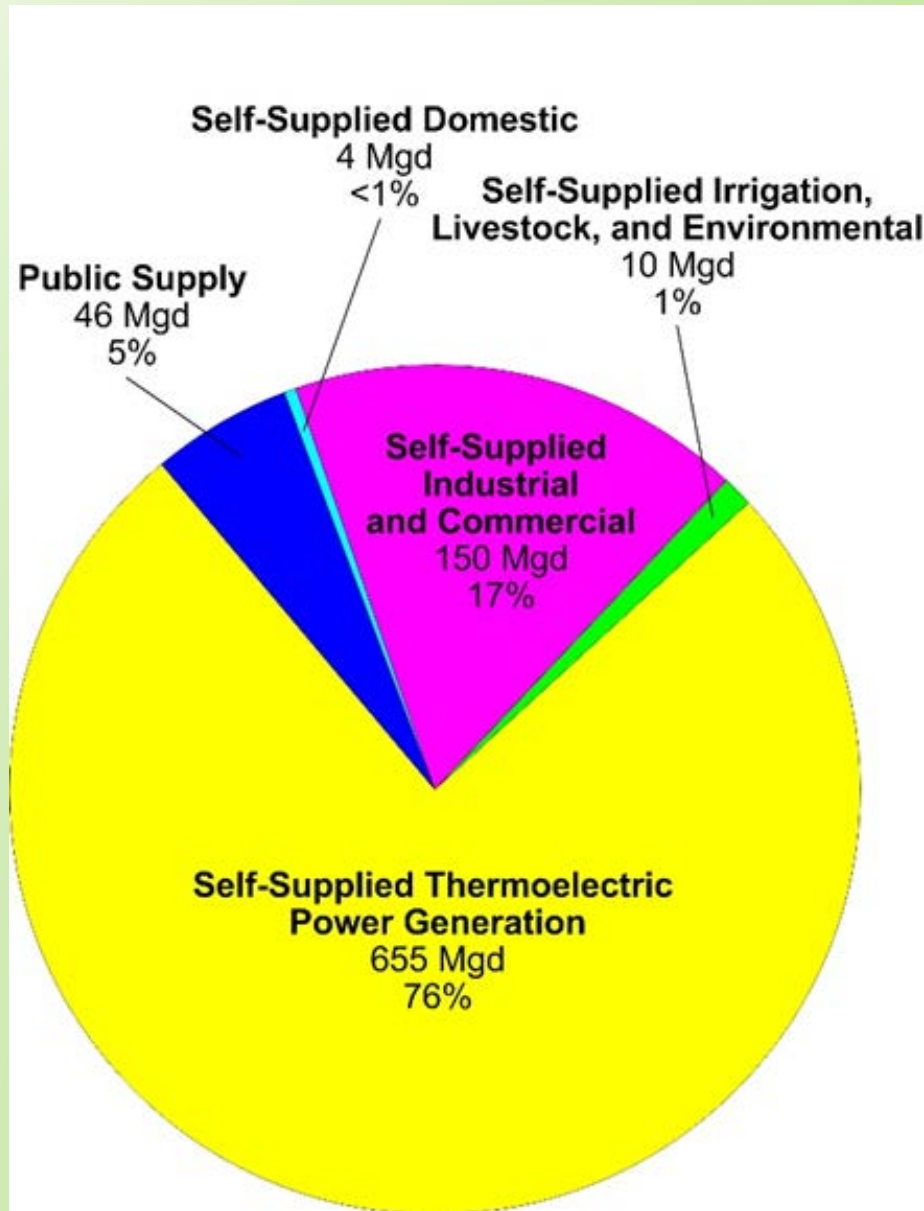
Scenarios

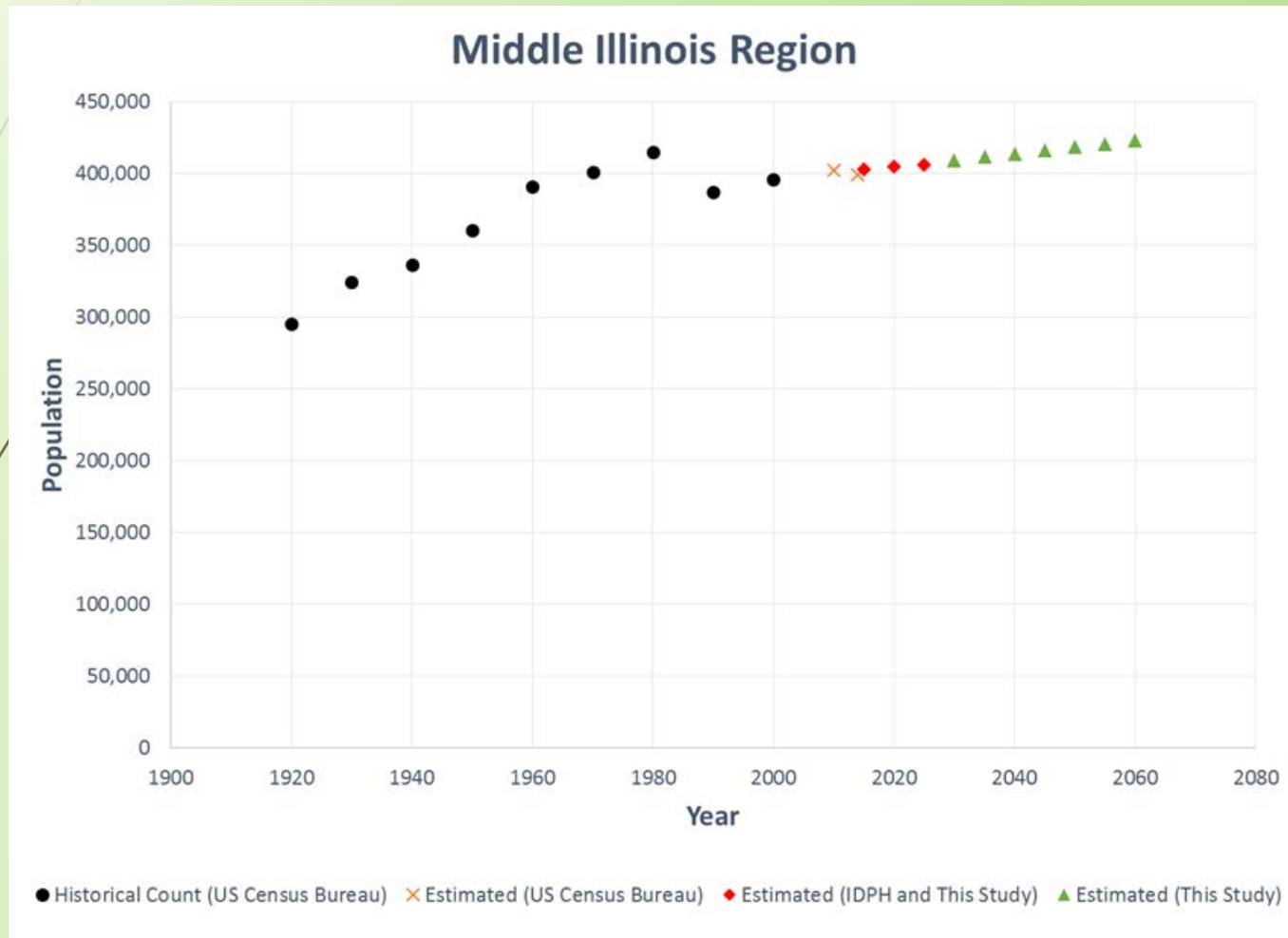
Developed 3 sets of scenario assumptions

- Scenario 1: Baseline
- Scenario 2: Low growth
- Scenario 3: High growth

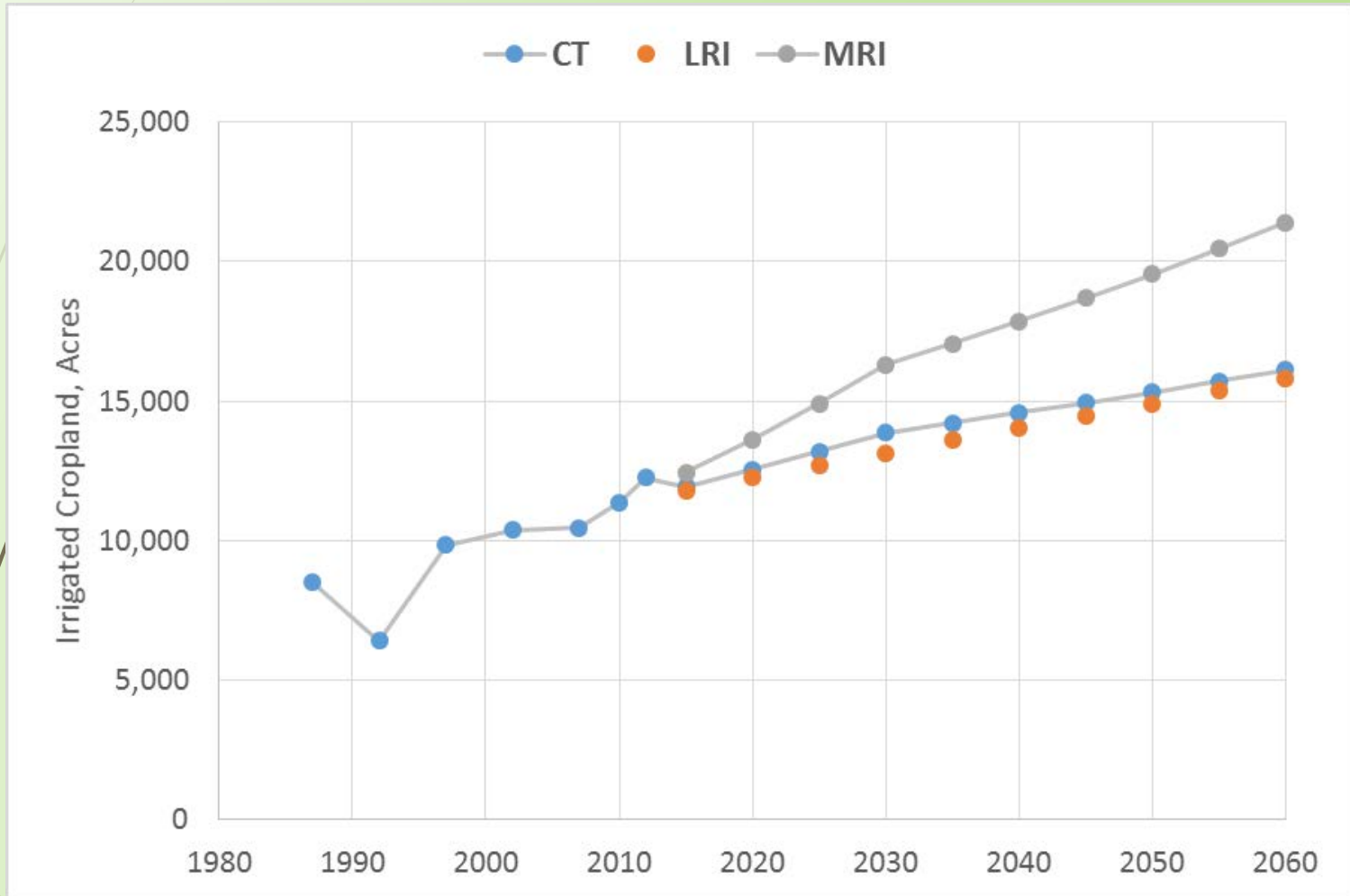
2010 Demand

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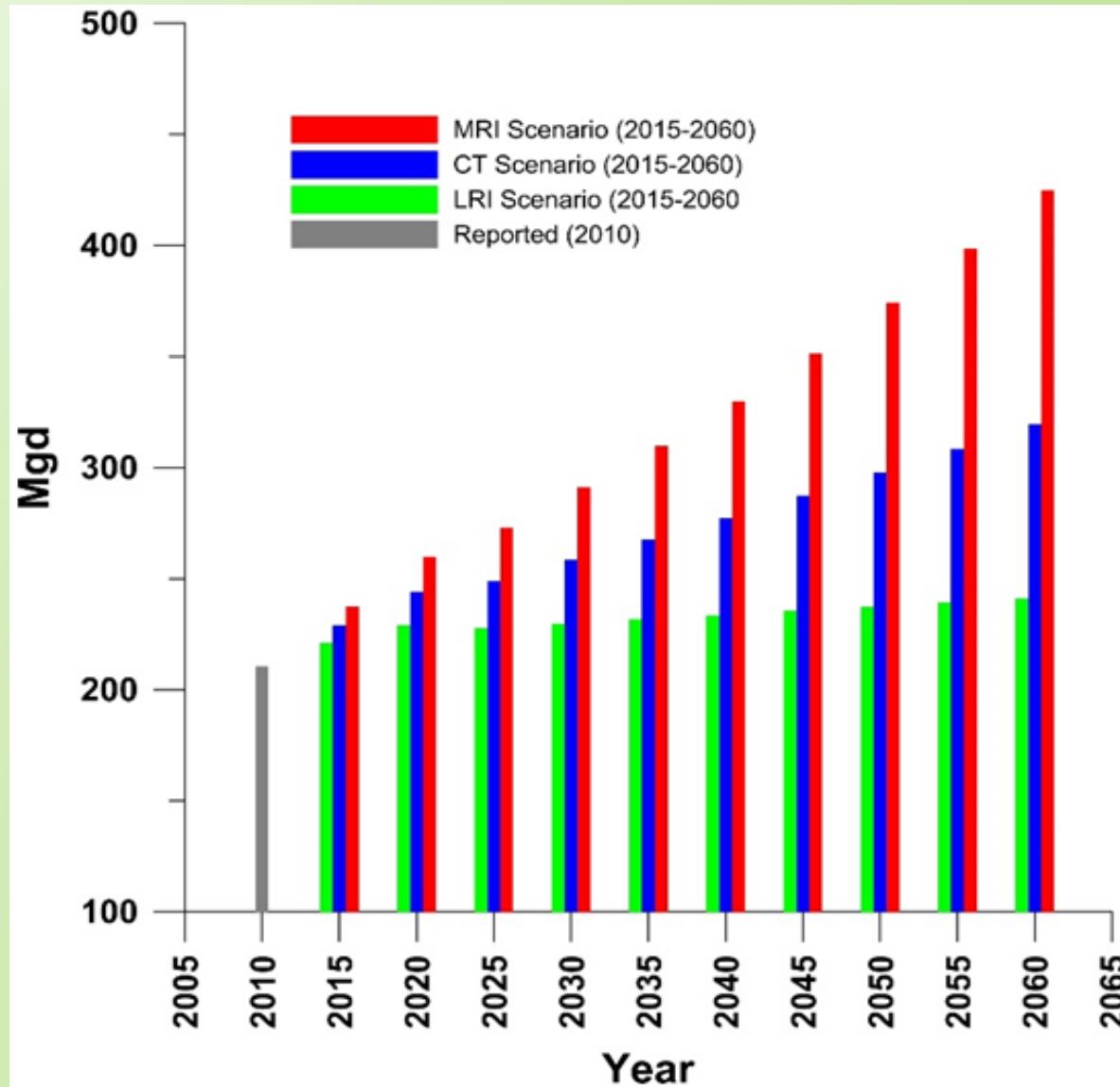


Irrigated cropland



Demand Scenarios (w/o thermoelectric)

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Sensitivity to climate & drought

► Current climate change predictions

Climate Parameter	2060 Period		
	Hot/Dry	Central	Warm/Wet
Change in Annual Average Temperature (°F)	6.4°	5.4°	4.7°
Change in Annual Precipitation (%)	-1.3%	5.8%	10.7%

► Drought: 40% deficit in growing season precipitation

Sensitivity to climate & drought

➤ Hot & Dry climate relative to baseline “normal” climate:

- Public supply: +9.1%
- Self-supplied domestic: +9.5%
- Cropland irrigation: +1.3%

➤ Drought year:

- Public supply: +12.4%
- Self-supplied domestic: +12.9%
- Cropland irrigation: +36.6%

Summary

- Total demand by 2060 increase from 213 Mgd in 2010 to:
 - Low Growth: 241 Mgd, 13% increase
 - Baseline :320 Mgd, 50% increase
 - High Growth: 425 Mgd, 99% increase.
- Under Baseline scenario, primary increase due to industrial demand and in Peoria County.
- Results could be adjusted based on inputs from Regional Water Supply Planning Groups
- Effects of future climate appear to be modest (<10% increase in demand)

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Thank you
Questions?