

Future Water Demand in Central Indiana

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INTERA
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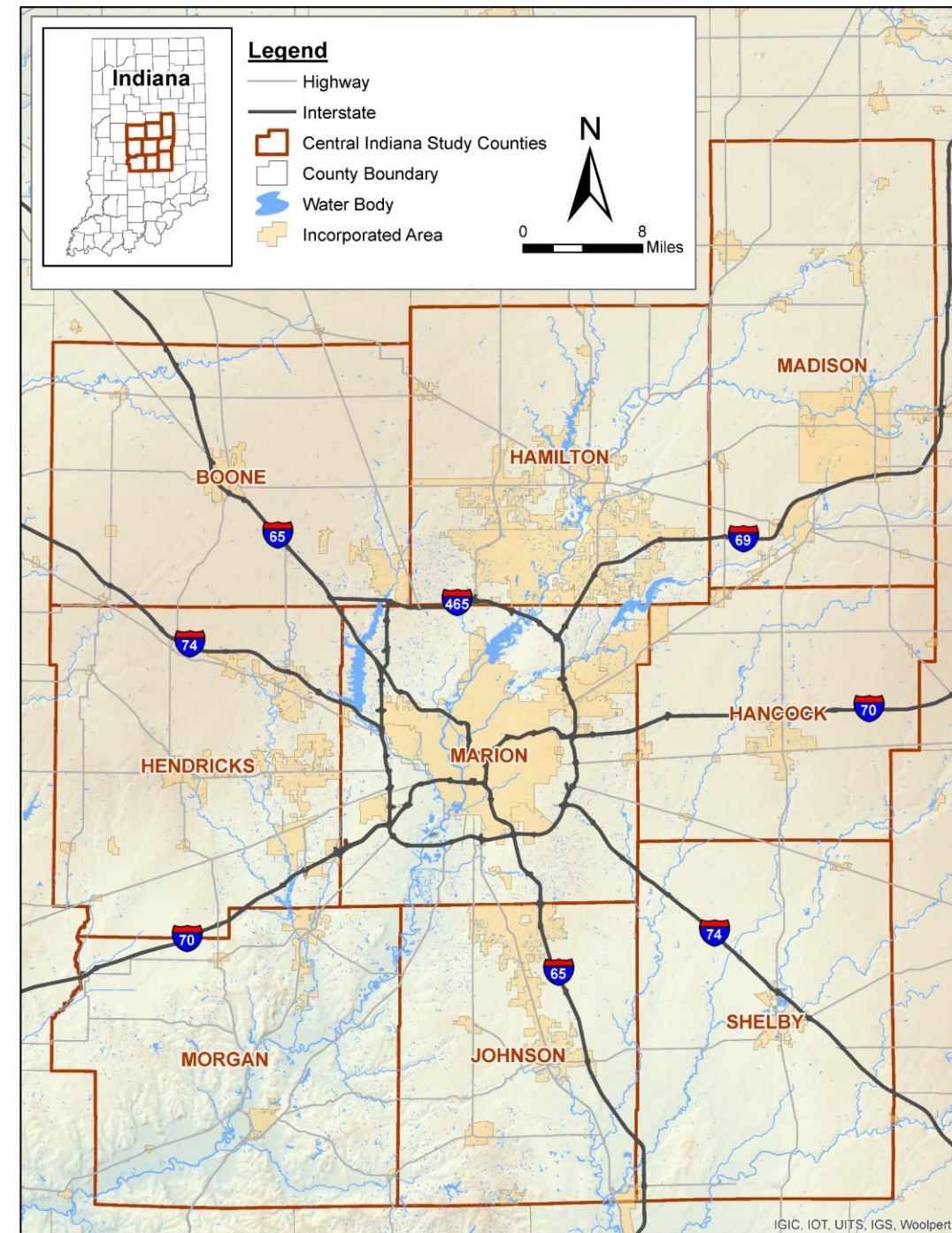
2020 Indiana Water Summit

Water Demand Forecast

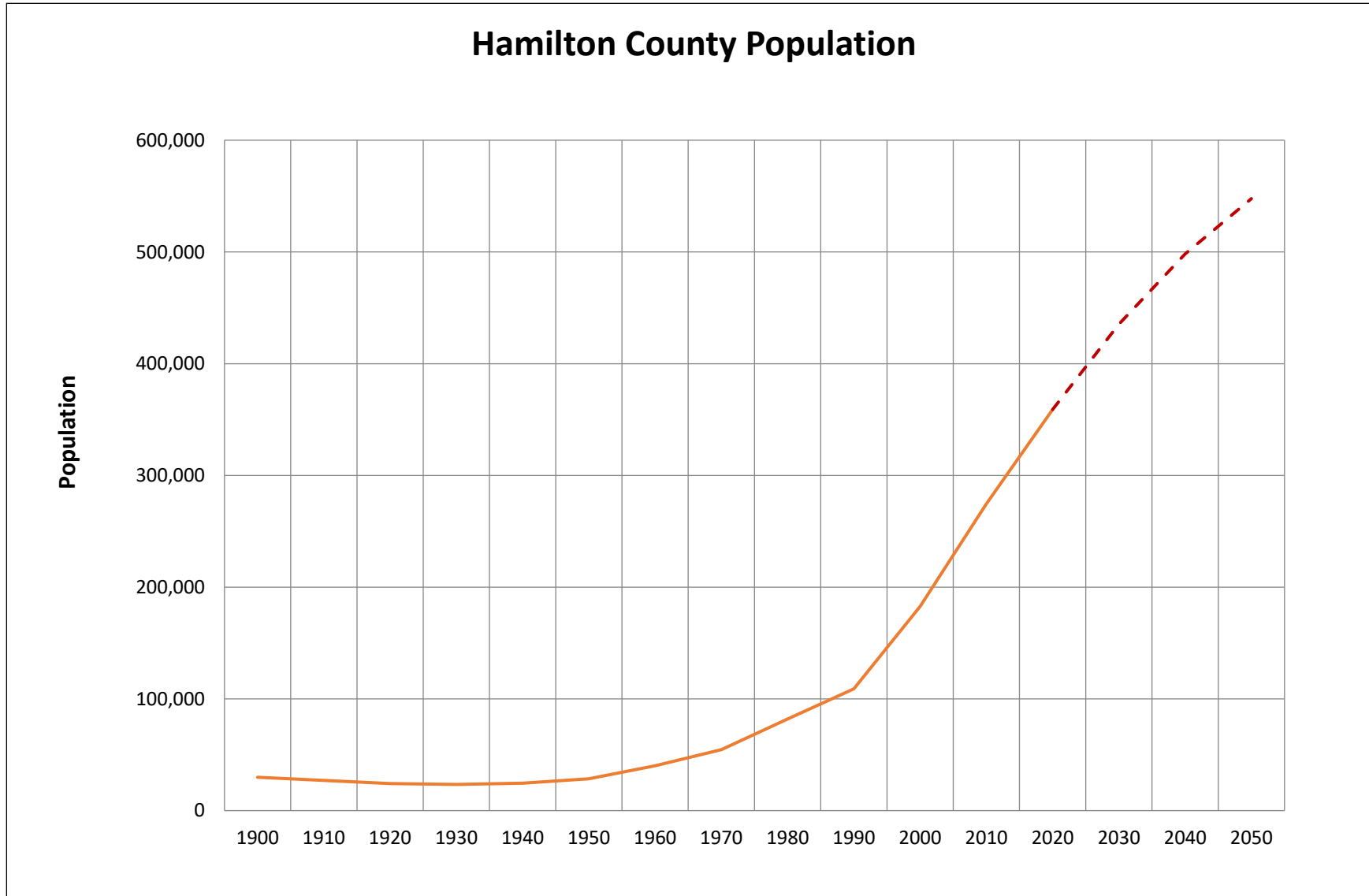
- How do we currently use water?
 - Location
 - Withdrawal rates
 - Source of water — lakes and rivers and aquifers
- Future water withdrawals?
 - How will use change?
 - Seasonal Patterns

Central Indiana Region

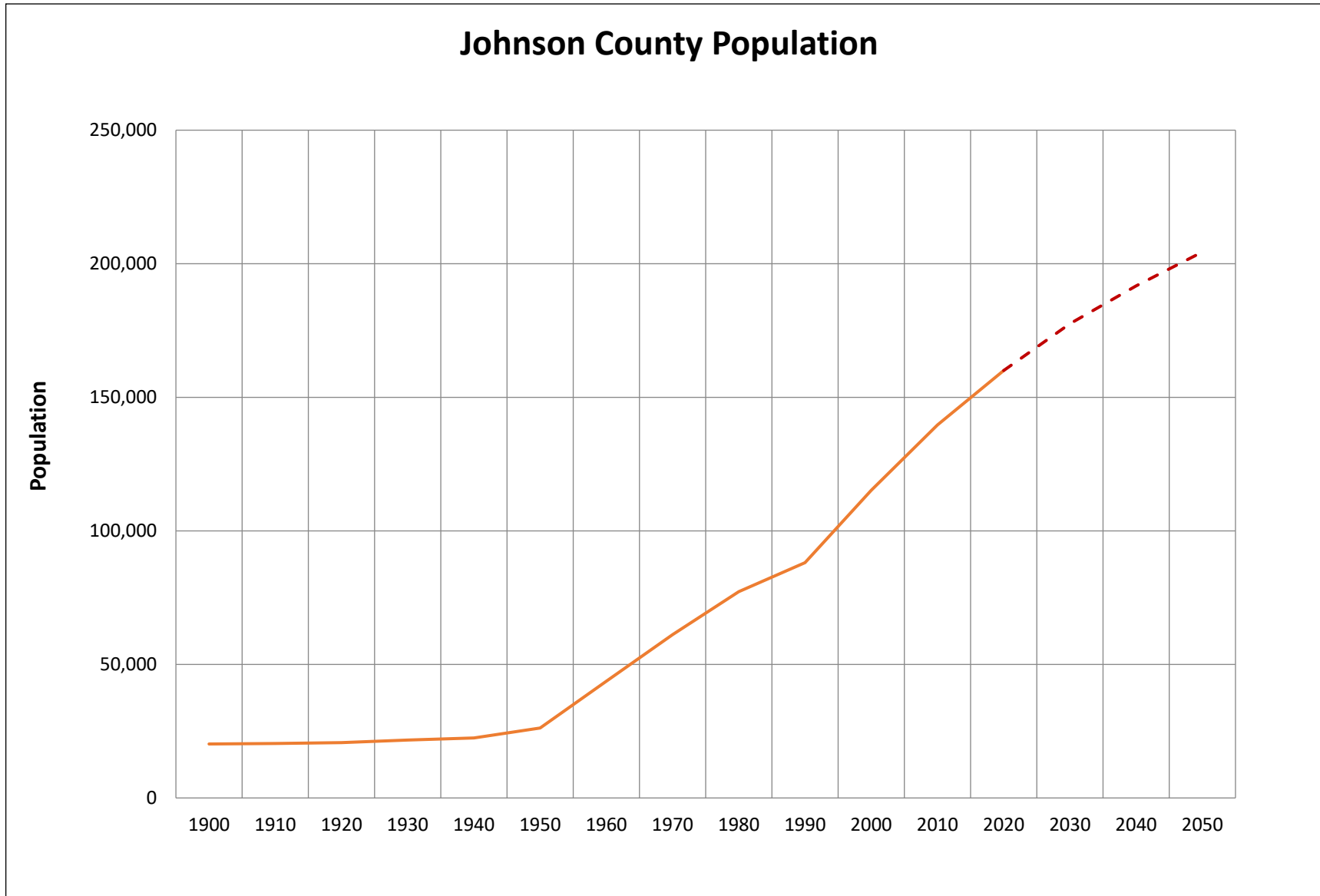
- 9-County Region
- Metro-counties surrounding Indianapolis
- Contains large portion of the Upper White River Watershed
- High population and economic growth
- Central Indiana Utility Collaborative already meeting and sharing data



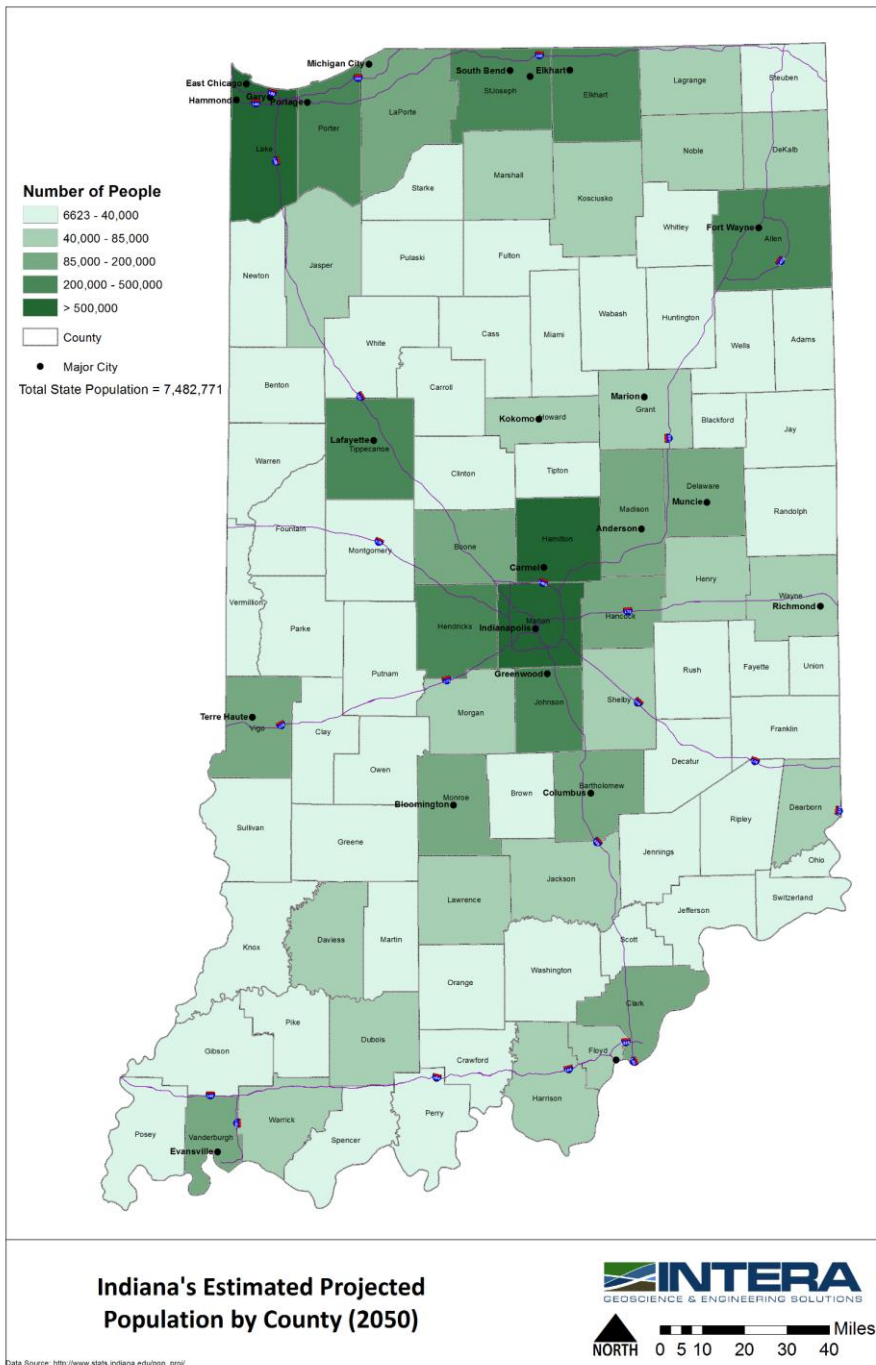
Rapid Growth in Counties



Rapid Growth in Counties



Estimated Population

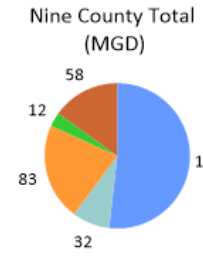


2018 Water Withdrawals

2018 Water Withdrawals

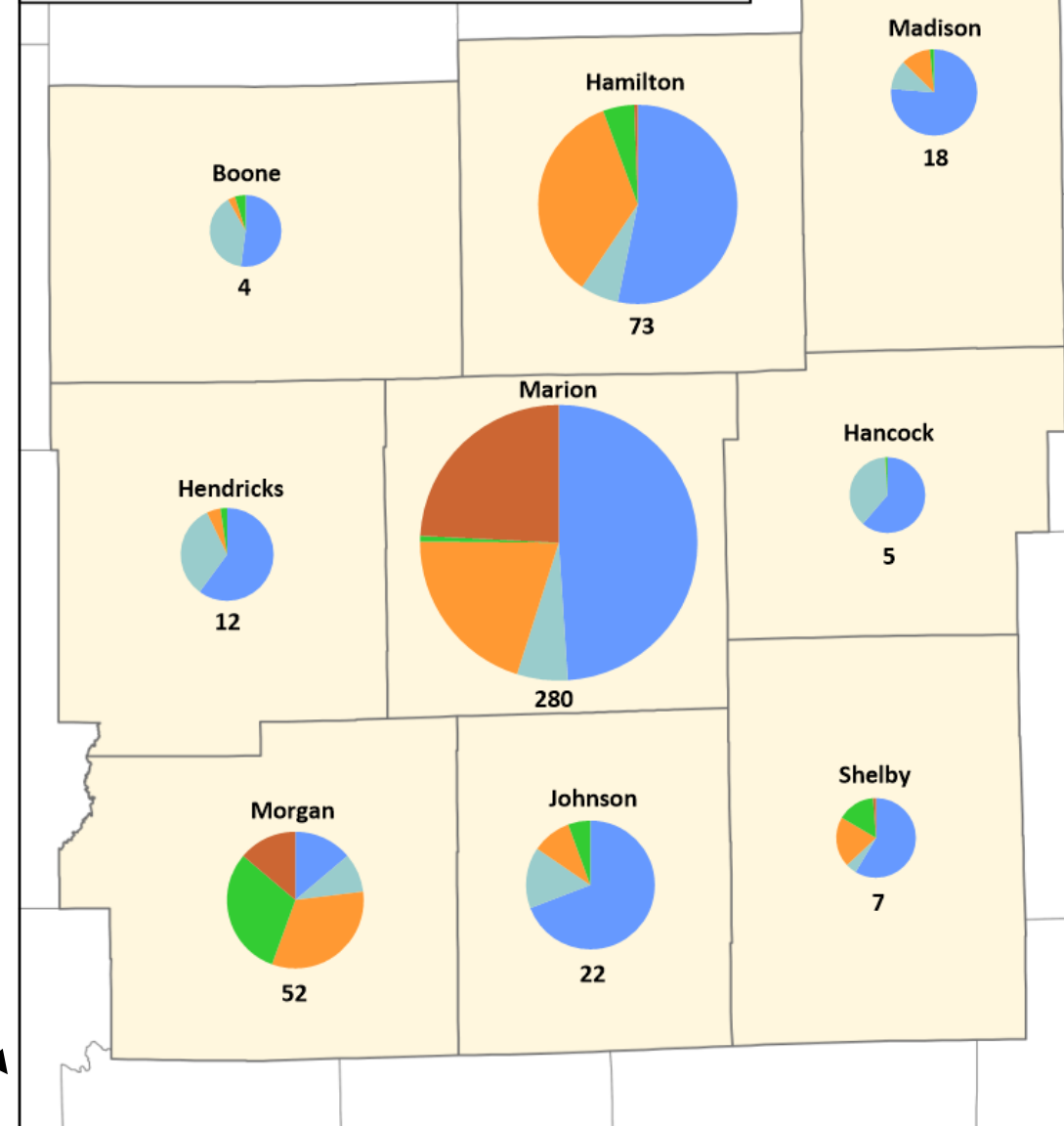
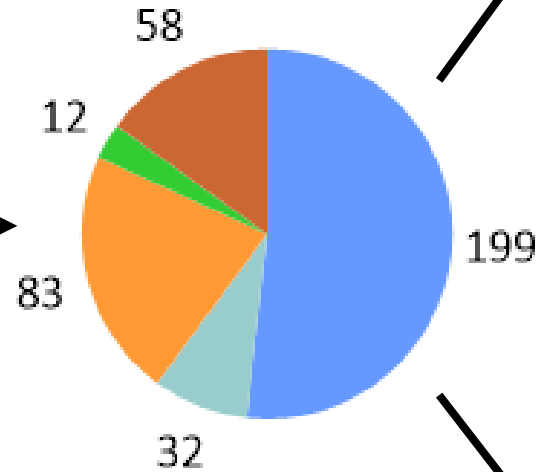
- Public Water Supply
- Domestic
- Industrial / Commercial
- Agriculture / Irrigation
- Power Generation

County Name
Total (MGD)



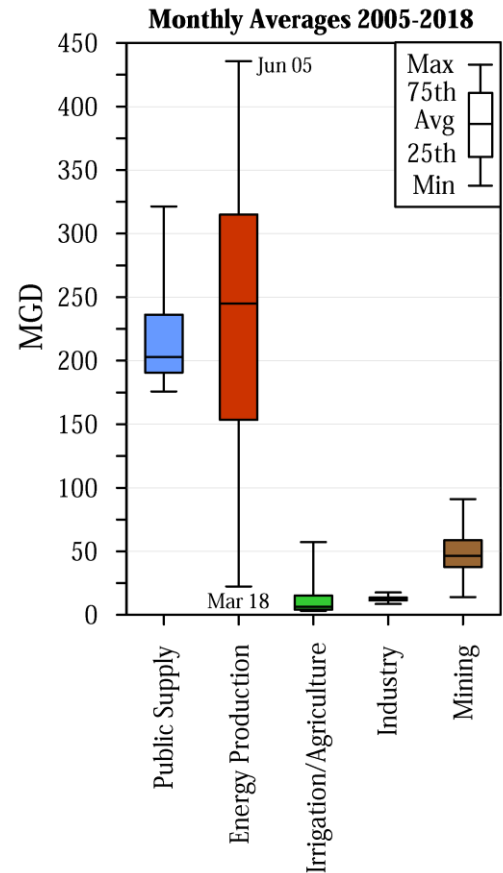
385 MGD

Nine County Total (MGD)

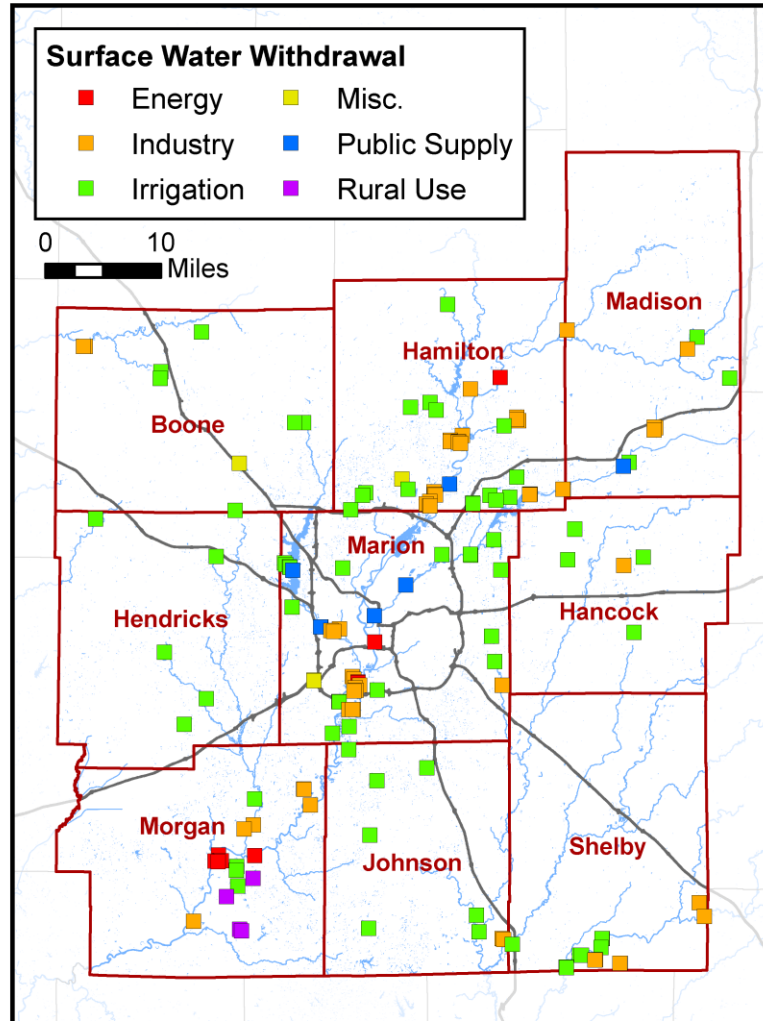


Location of 2018 Water Withdrawals

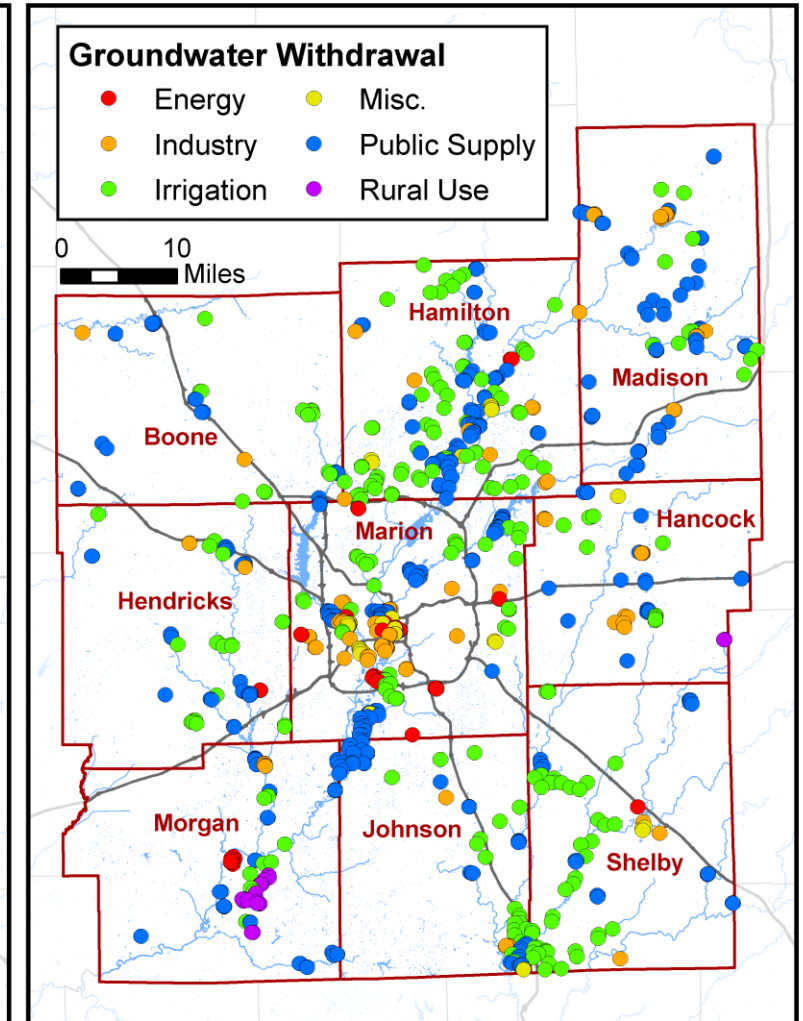
Illustration of Monthly Variation by Use



Streams and Reservoirs

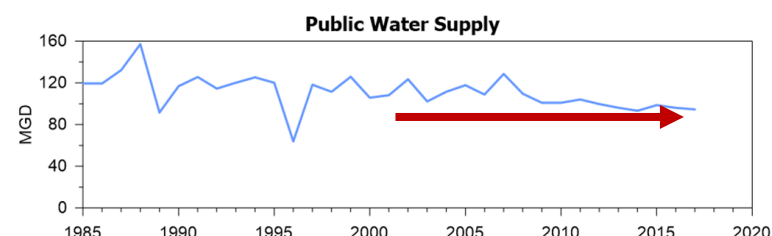
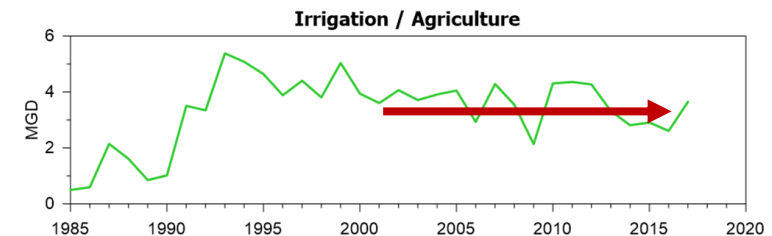
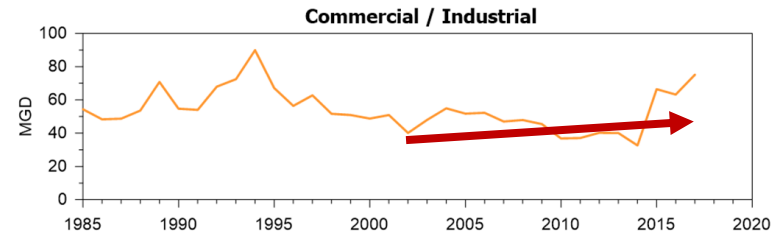
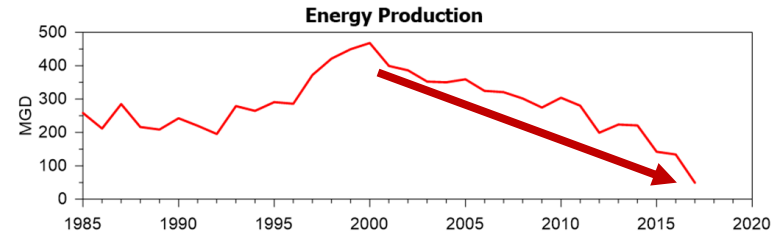
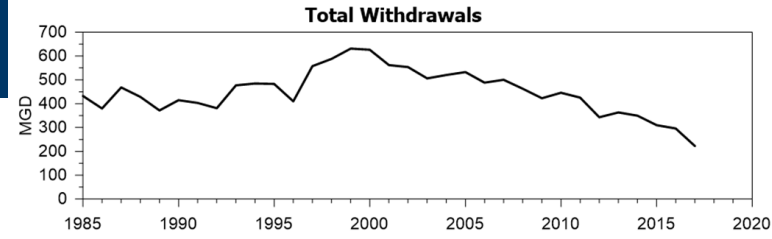


Aquifers

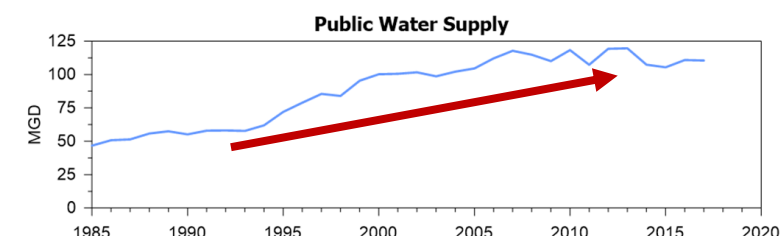
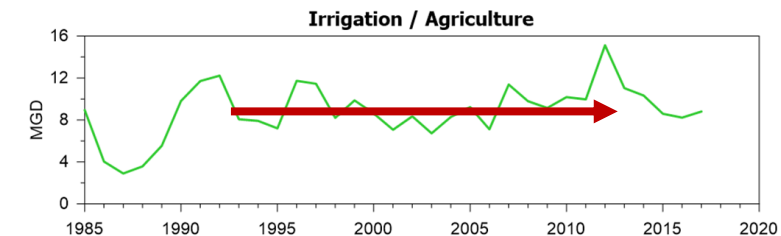
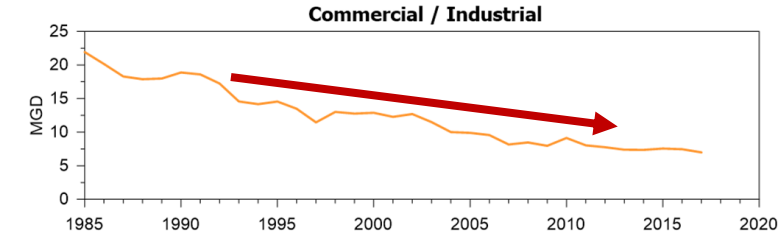
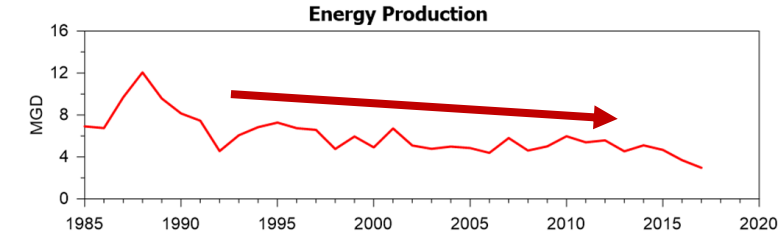
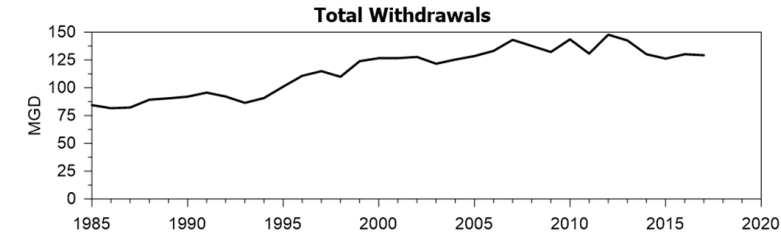


Trends in GW / SW Use

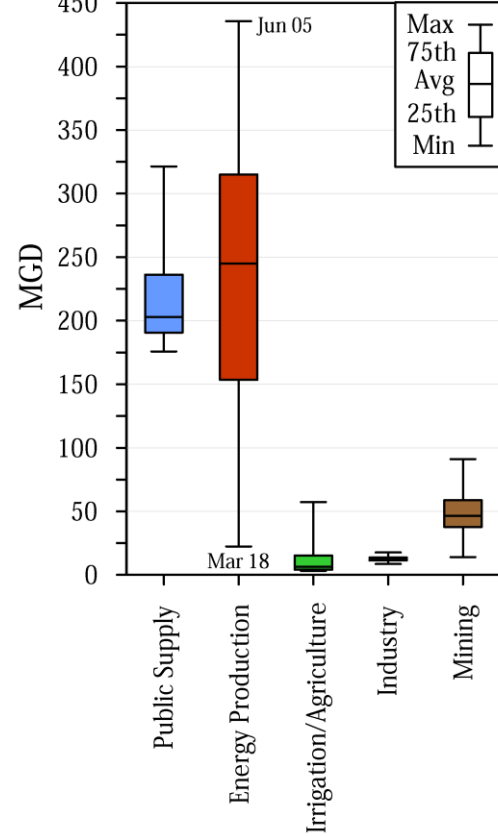
Surface Water



Groundwater

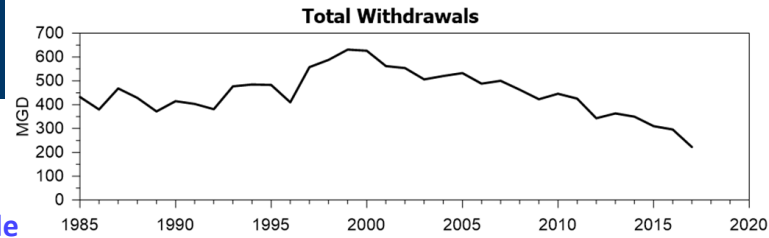


Monthly Averages 2005-2018

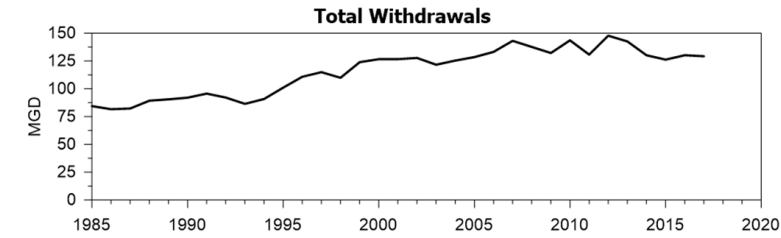


Trends in GW / SW Use

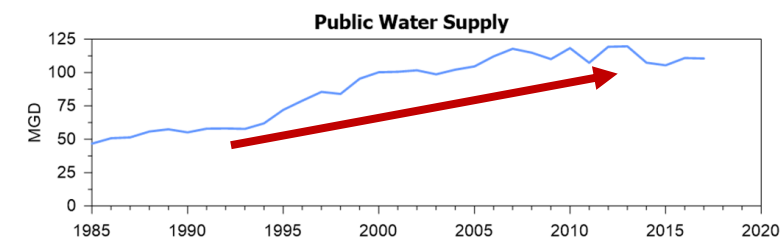
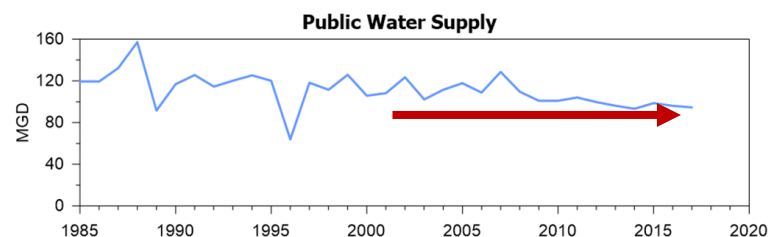
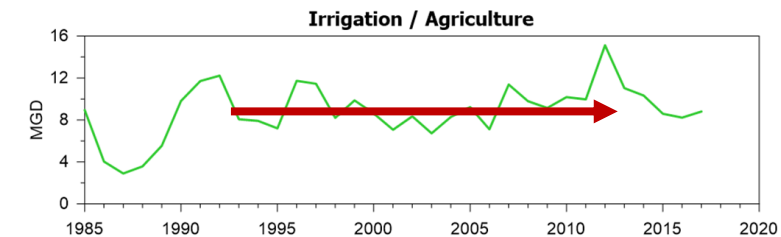
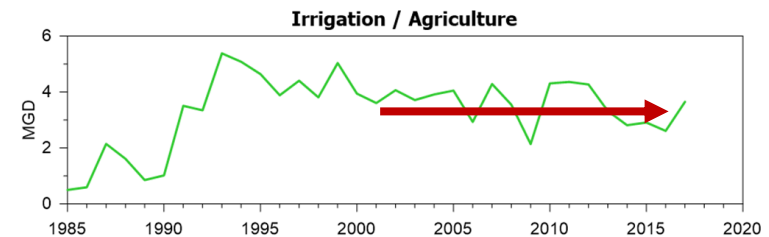
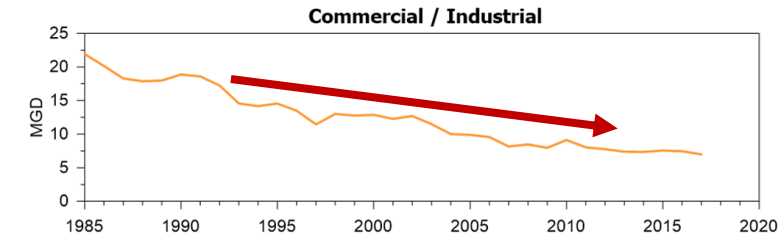
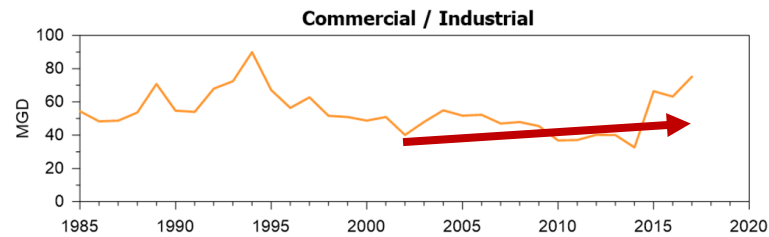
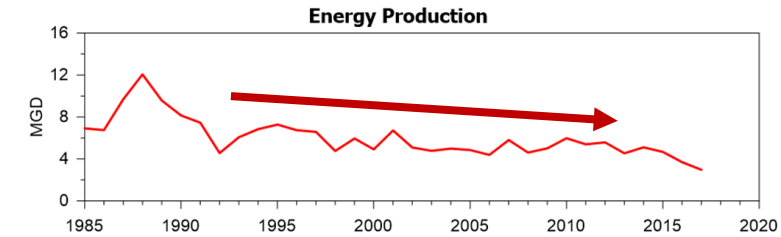
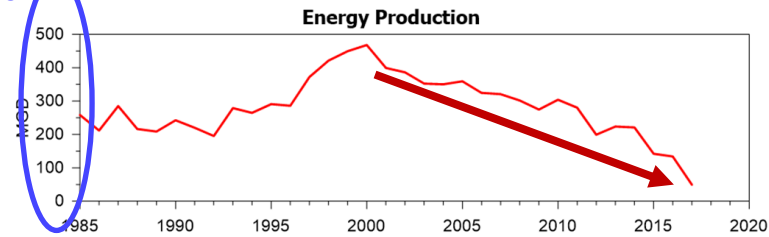
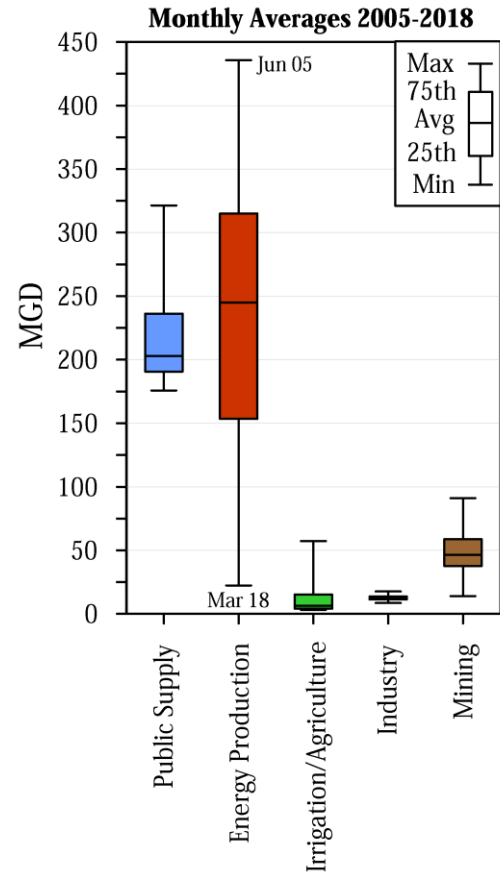
Surface Water



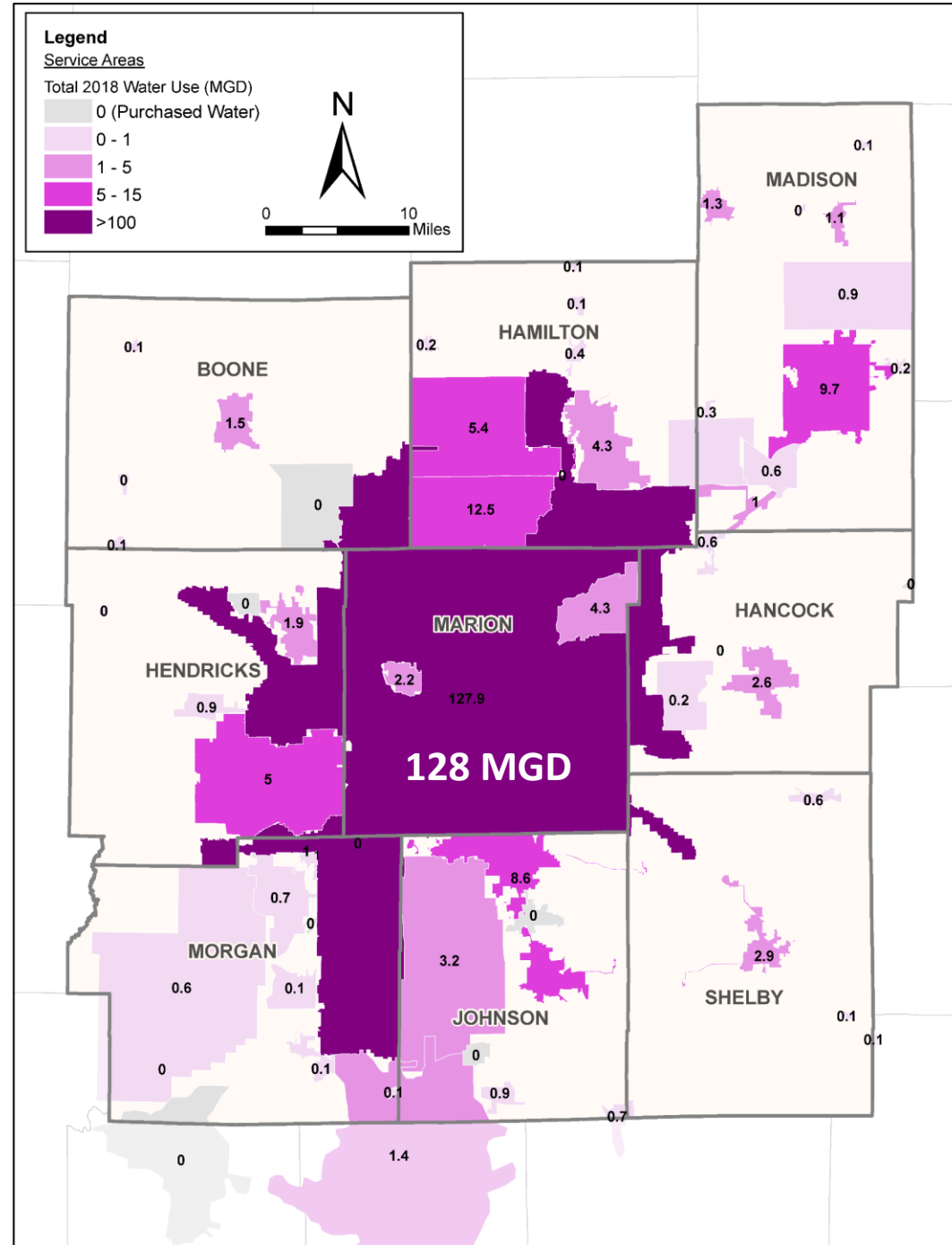
Groundwater



Order of magnitude decrease since 2000



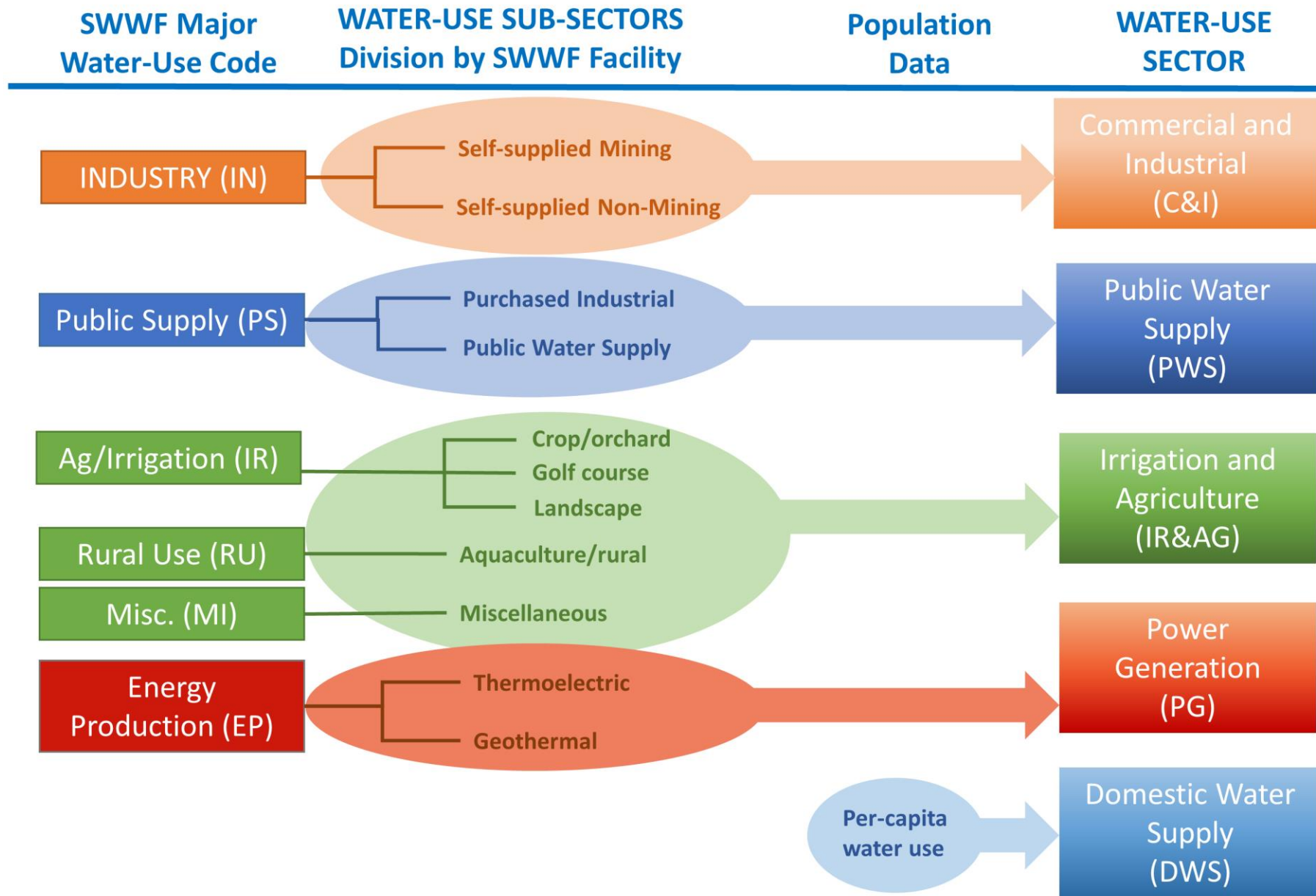
2018 PWS Withdrawals by Service Territory





Future Water Withdrawals

Data Sources



Water Forecast Methods

■ Unit-use method

- Commercial and Industrial and Mining — gallons per employee
- Power Generation — gallons per kilowatt hour
- Domestic Supply — gallons per capita

■ Historical trends

- Irrigation and Agriculture — trends from 2005-2017 withdrawals

■ Multiple Regression

- Public Water Supply — gallons per capita forecast with temp, ppt, and income

Water Forecast Summary*

Irrigation and Agriculture



3% of total withdrawals
Increase from 13 MGD to 19 MGD

Commercial / Industrial / Mining



22% of total withdrawals
Sector withdrawals are ~85% mining
Increase from 83 MGD to 96 MGD

Power Generation



15% of total withdrawals
Historical decrease due to fuel changes
Increase from 58 MGD to 87 MGD

Domestic



8% of total withdrawals
Increase from 32 MGD to 45 MGD

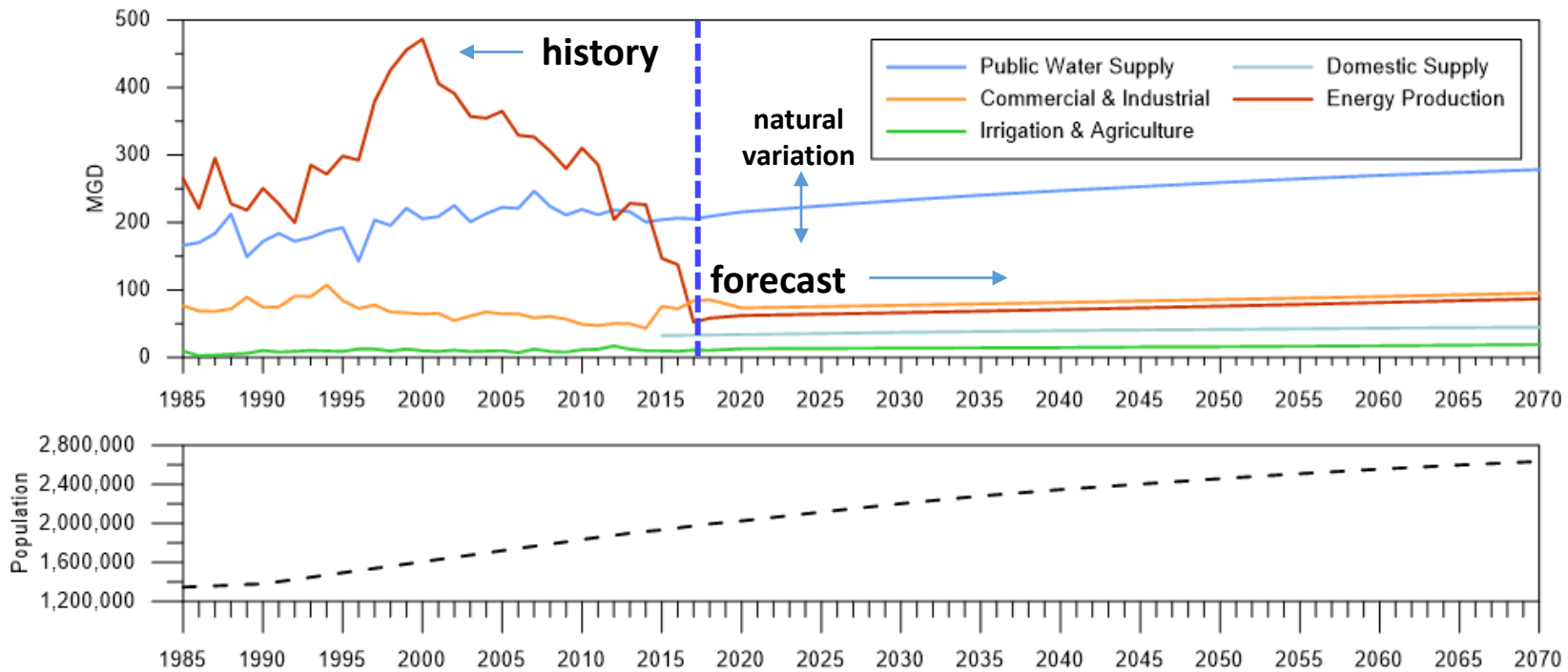
Public Water Supply



52% of total withdrawals
Largest sector / highest growth
Increase from 199 MGD to 250 MGD

*Percent withdrawals from 2018; Increases reported from 2018-2070

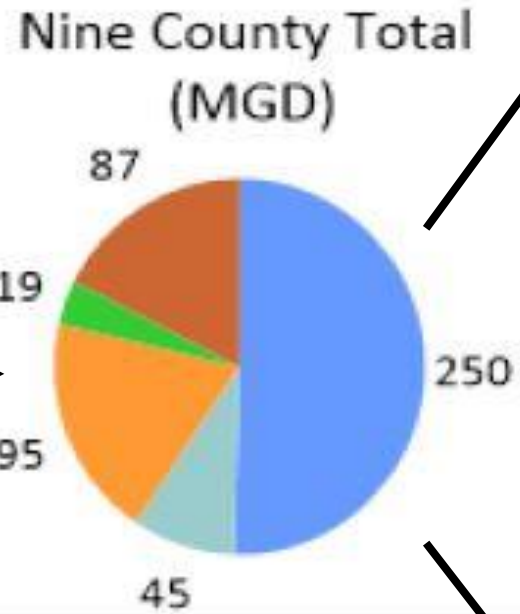
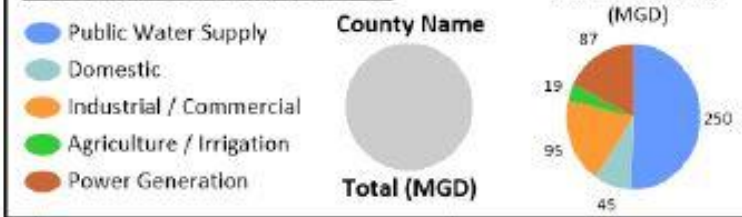
Forecast of Withdrawals by Sector



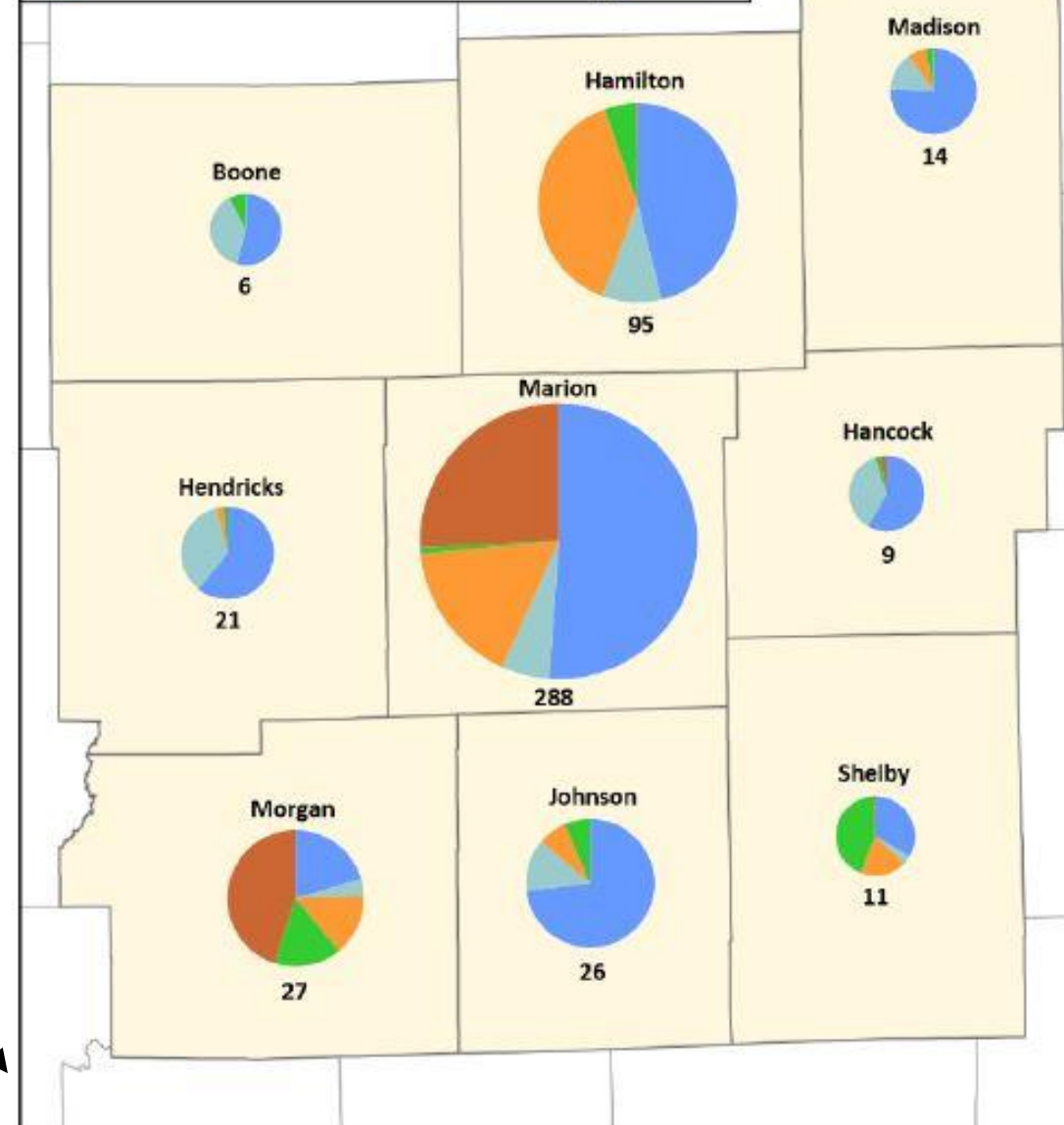
— Power Generation
 — Public Water Supply
 — Commercial & Industrial
 — Irrigation & Agriculture
 - - - Population

2070 Water Withdrawals

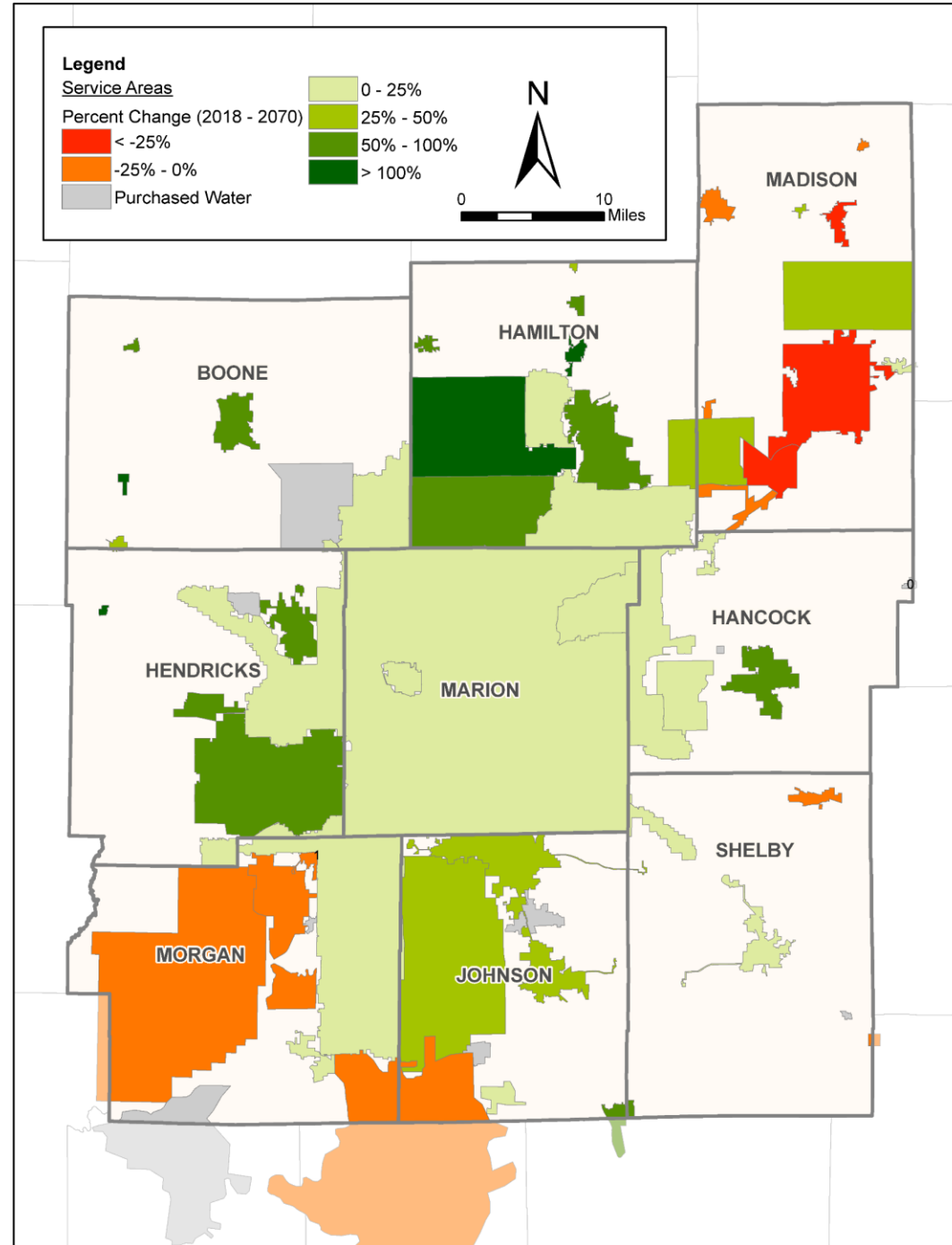
2070 Projected Water Use



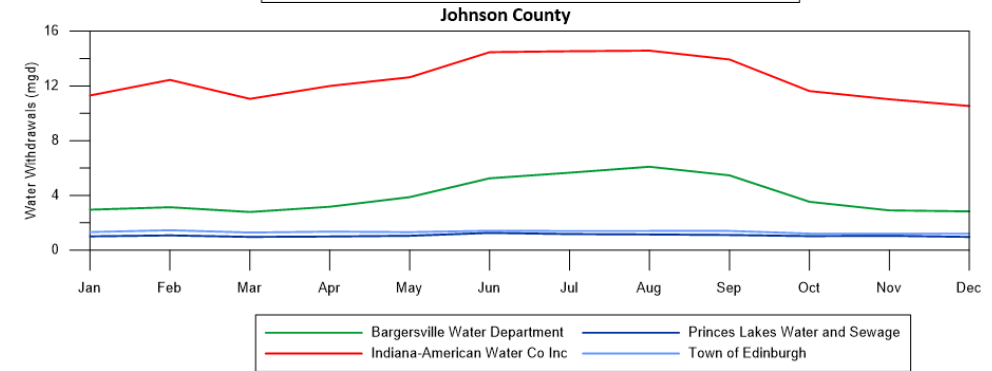
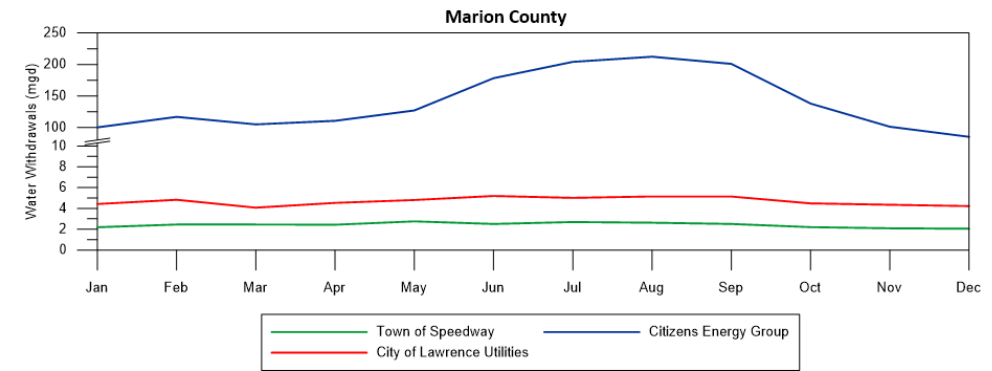
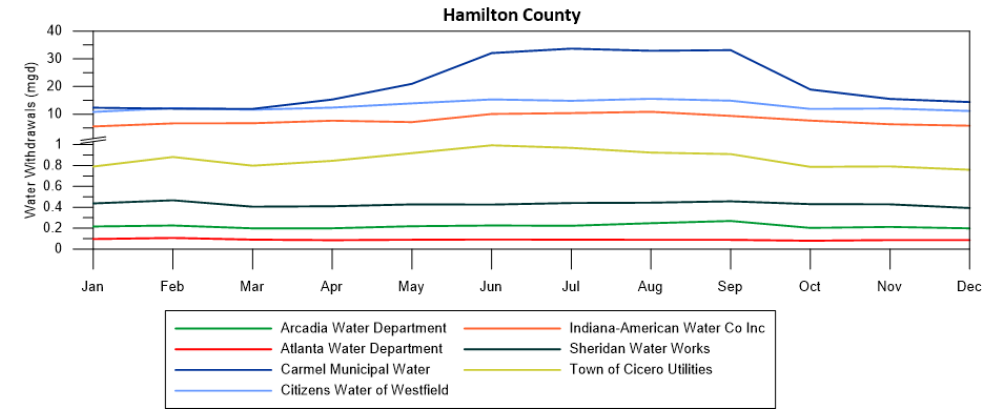
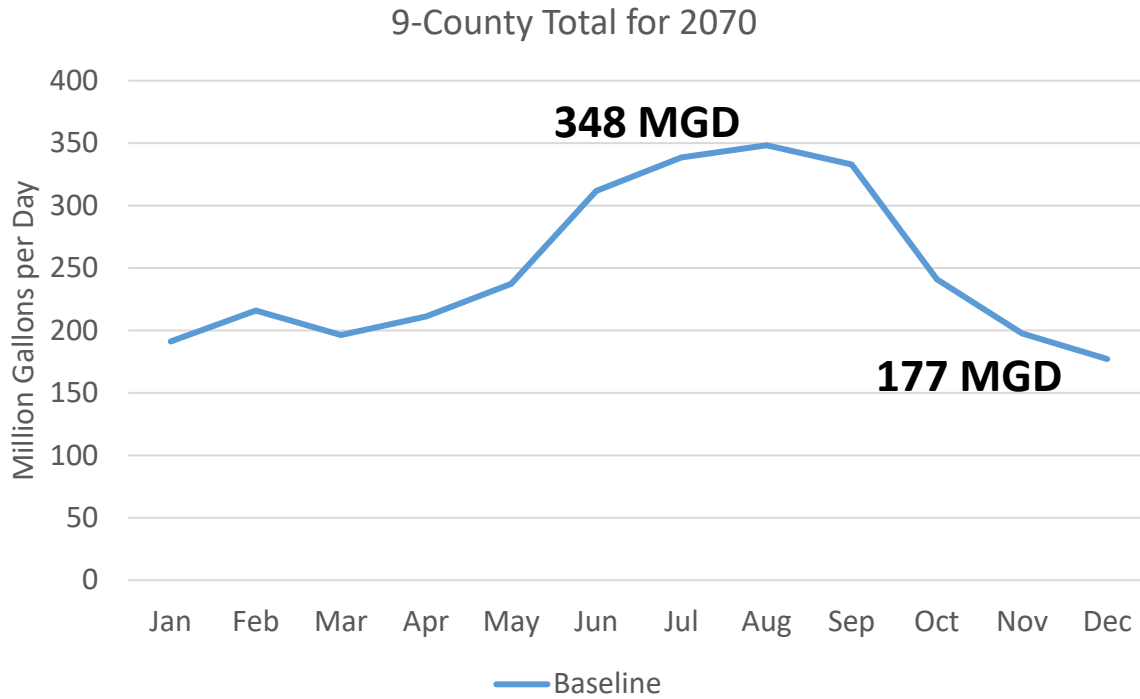
495 MGD



Public Water Supply Growth (%)



Forecasted monthly withdrawals — Seasonal Variation — PWS



Climate Change Scenarios

■ Hot / Dry

- Increase in temperature 3.1 – 3.2°F for 2035 and 6.0 – 6.2 °F in 2060
- Decrease in precipitation 0.3 – 0.6% in 2035 and 0.5 – 1.2 % in 2060

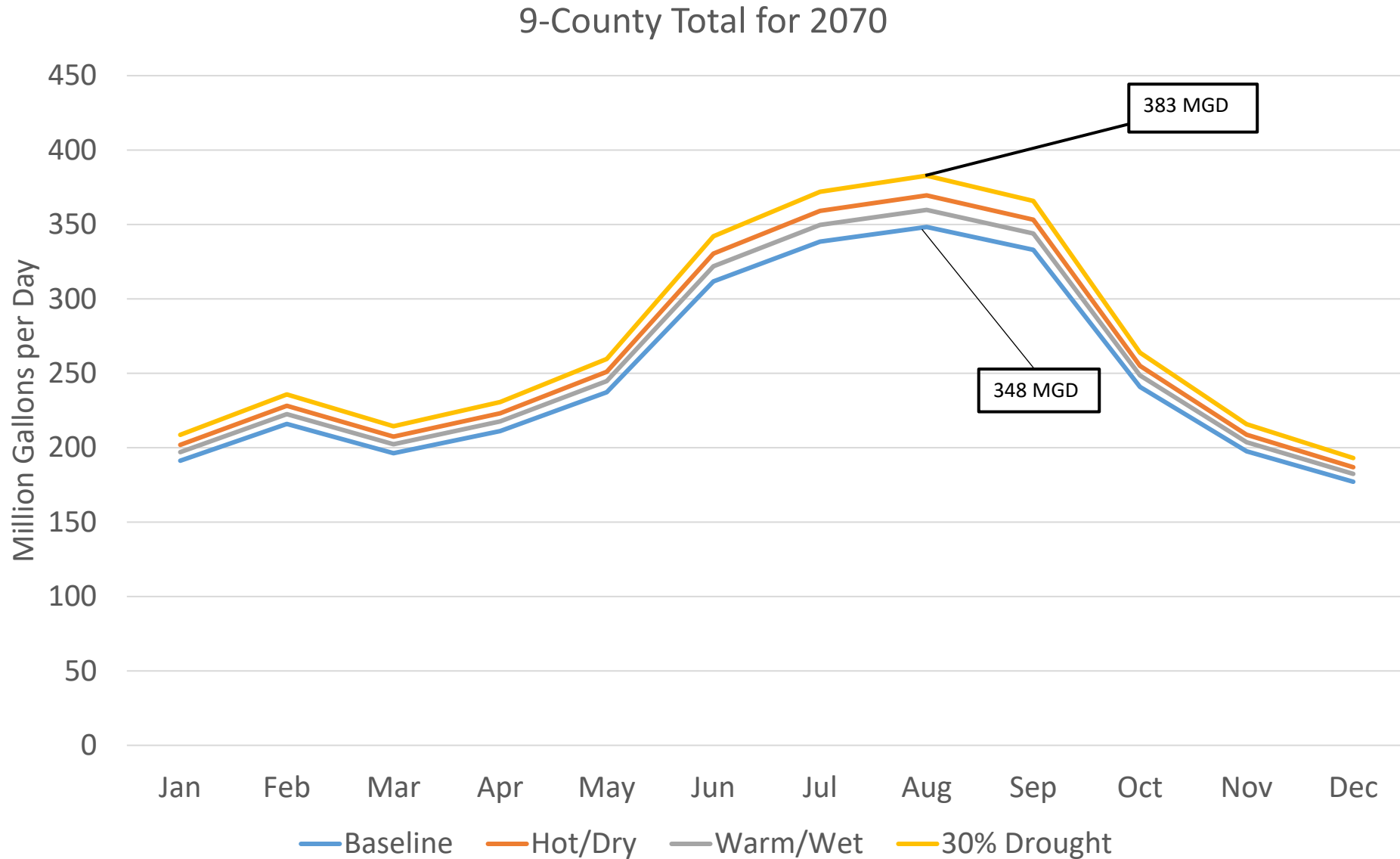
■ Warm / Wet

- Increase in temperature 2.3°F for 2035 and 4.4 – 4.5 °F in 2060
- Increase in precipitation 6.0 – 6.5% in 2035 and 11.7 – 12.6% in 2060

■ 30% Drought

- Increase in temperature 3.1 – 3.2°F for 2035 and 6.0 – 6.2 °F in 2060
- Decrease in precipitation 30% from Hot/Dry scenario

Public Water Supply Scenarios + 25 to 50 MGD





**Is there enough water in the region to
meet future demands?**

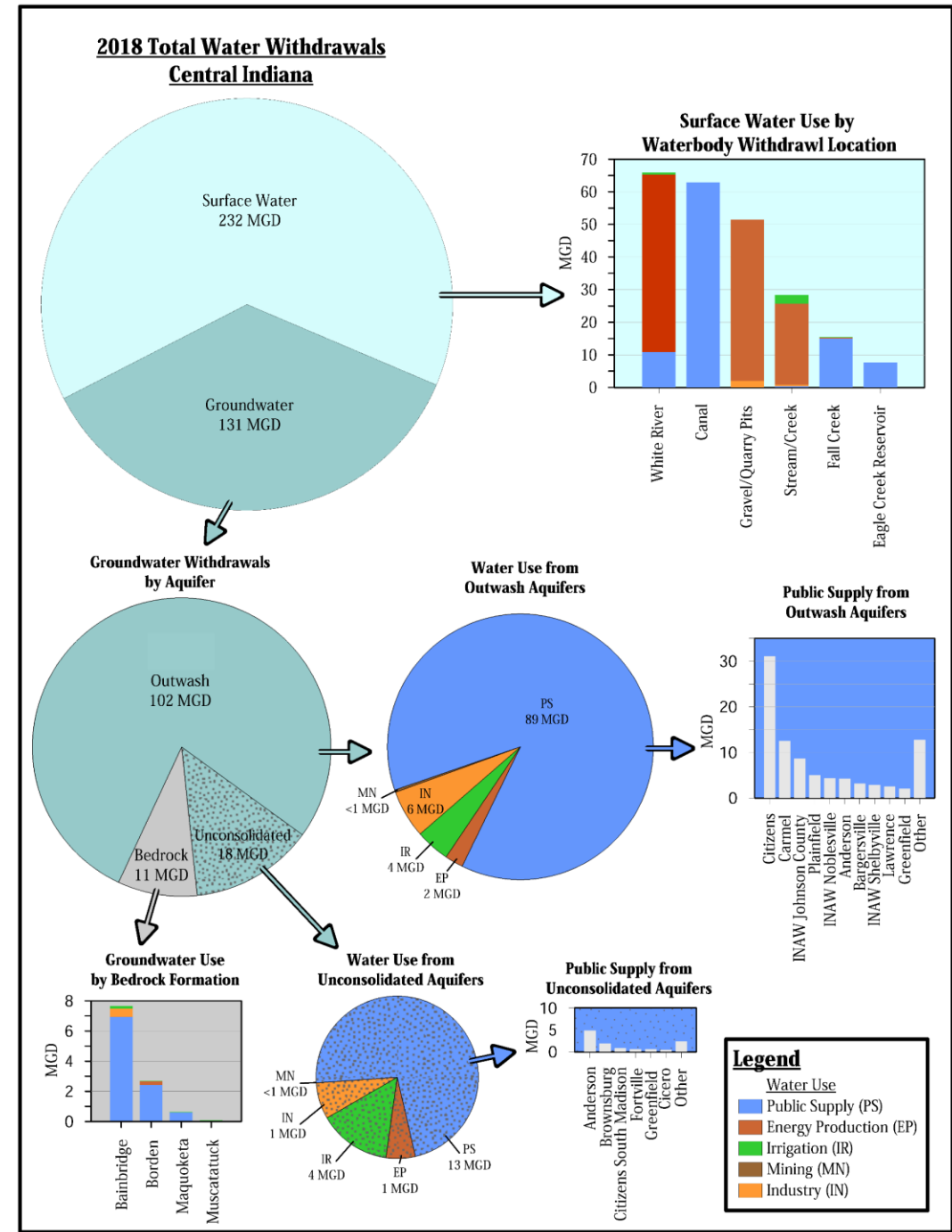
Water Resource Used in Region

2018

Surface water from the White River is used for Indianapolis drinking water as well as cooling water and mining.

Groundwater from the outwash aquifer is primarily used for municipal drinking water and other uses.

Deep Bedrock Aquifer also is used by municipal systems for drinking water and other uses.





QUESTIONS

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