

Water and Economic Development in Indiana

Michiana Irrigation Association Meeting

December 15, 2014

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Questions

- Where do we have water?
- How are we using water?
- Is current and future use sustainable?
- Why is this a concern for Indiana?
- What are other states doing?
- Does this affect the interests of the Michiana Irrigators Association?

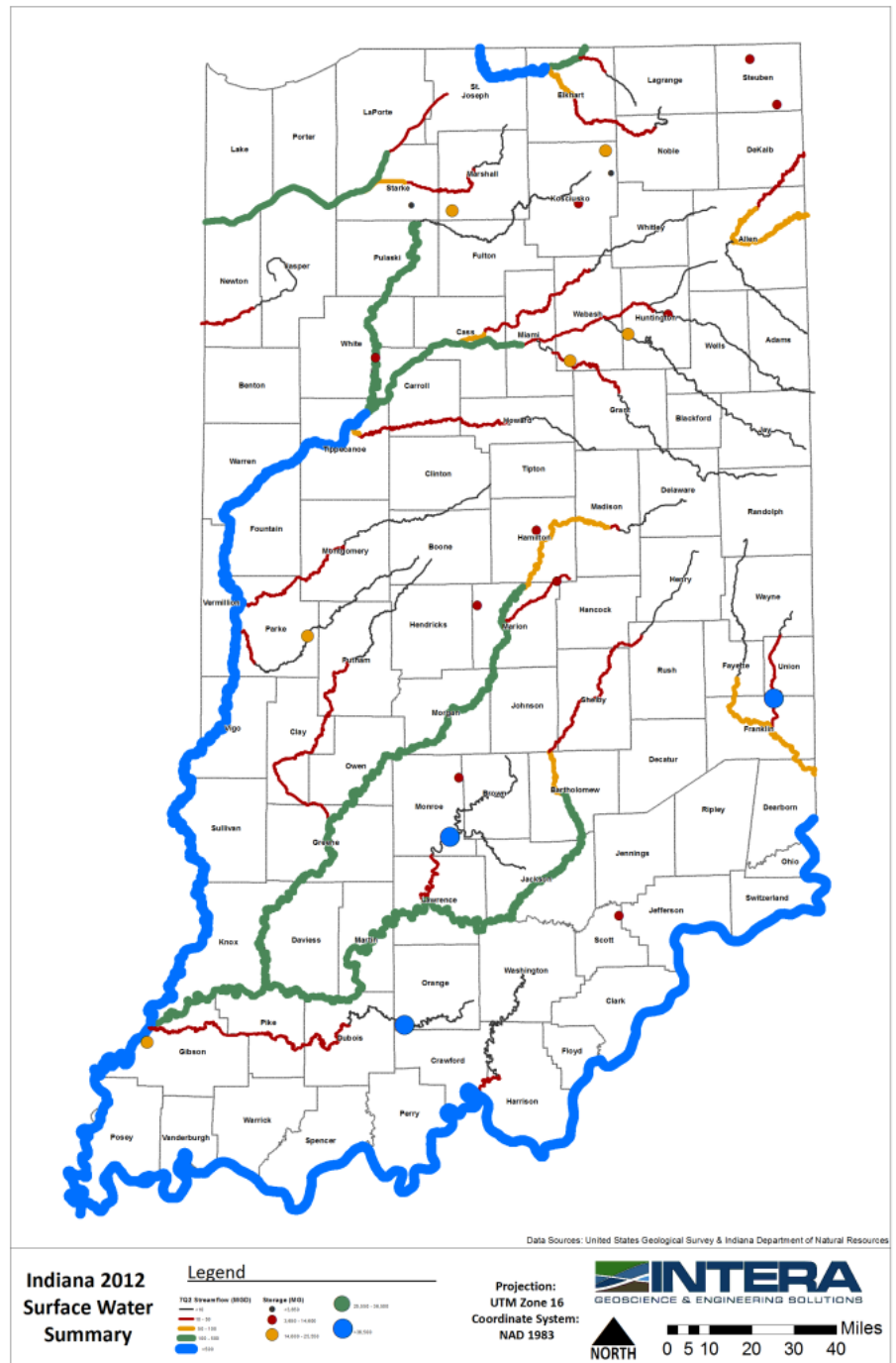
The Geography of the Resource

WHERE DO WE HAVE WATER?

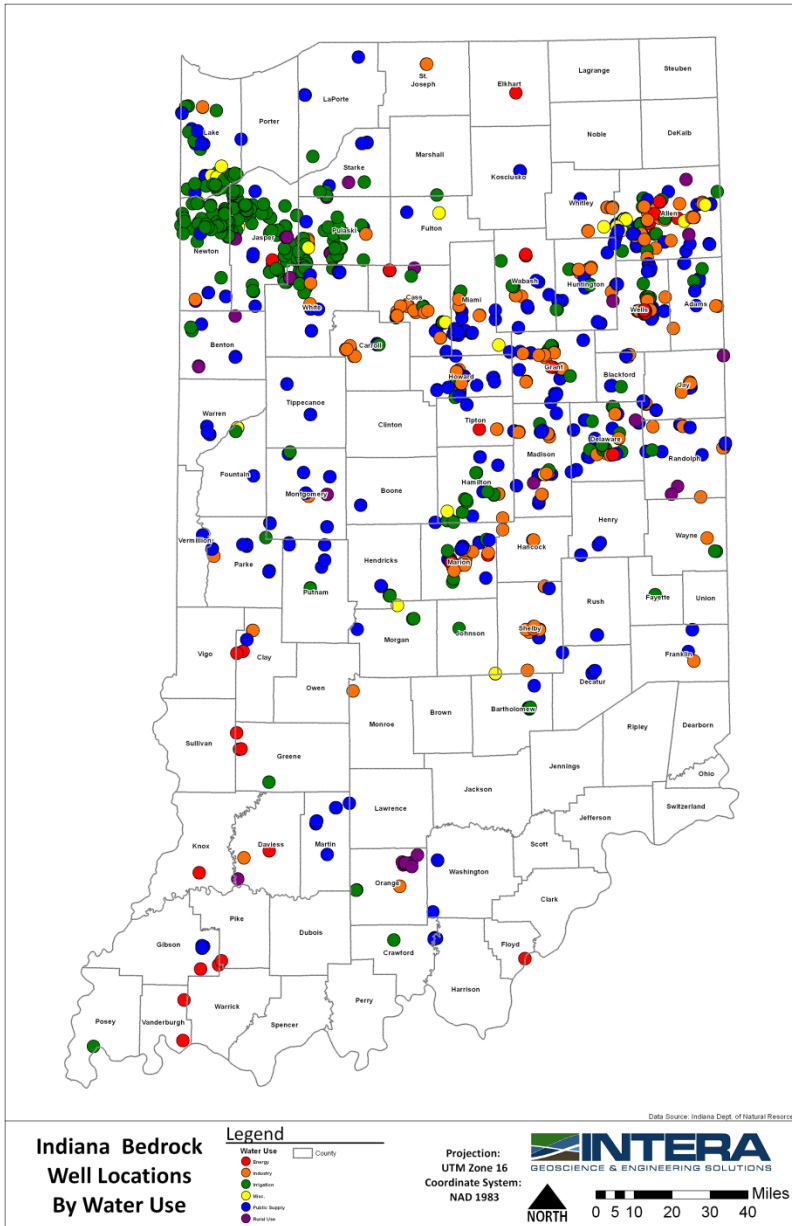
Available Surface Water

7Q2 - Stream Flows - major streams

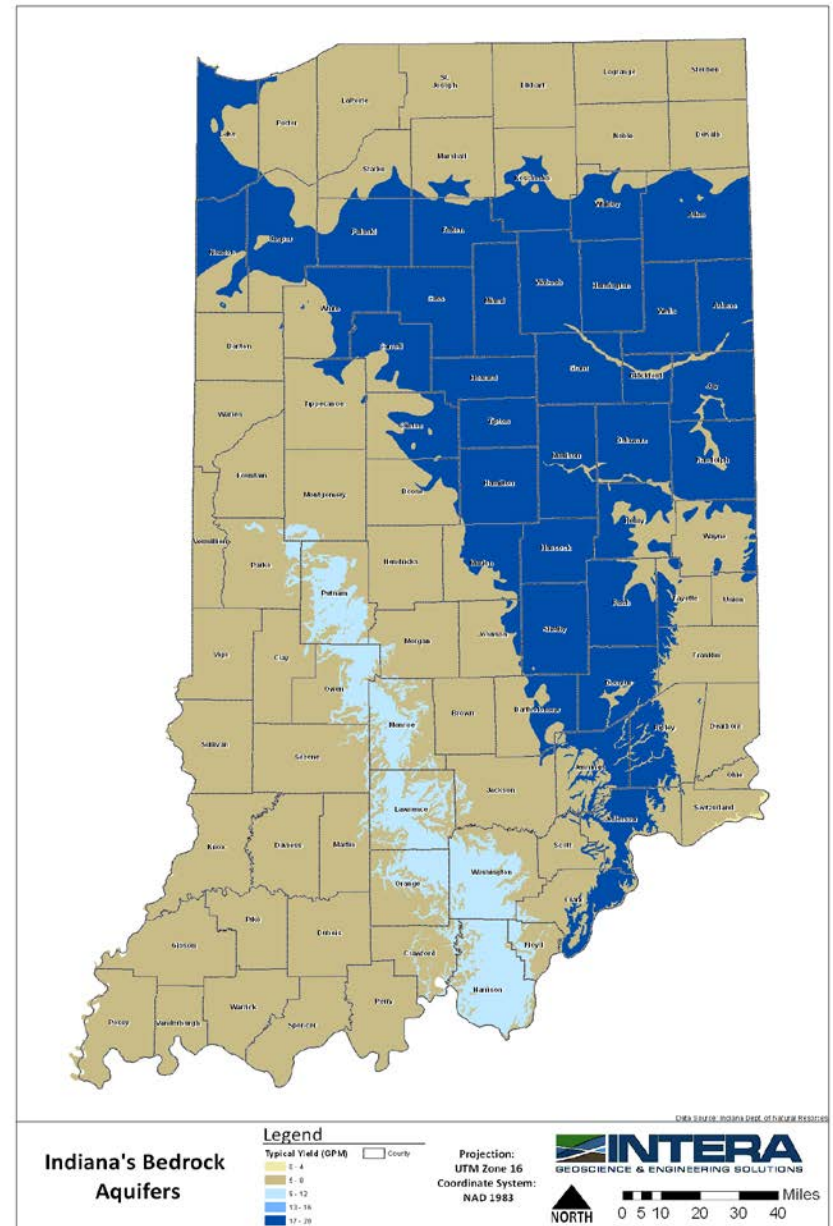
Reservoir Storage (dots)



Bedrock Well Locations

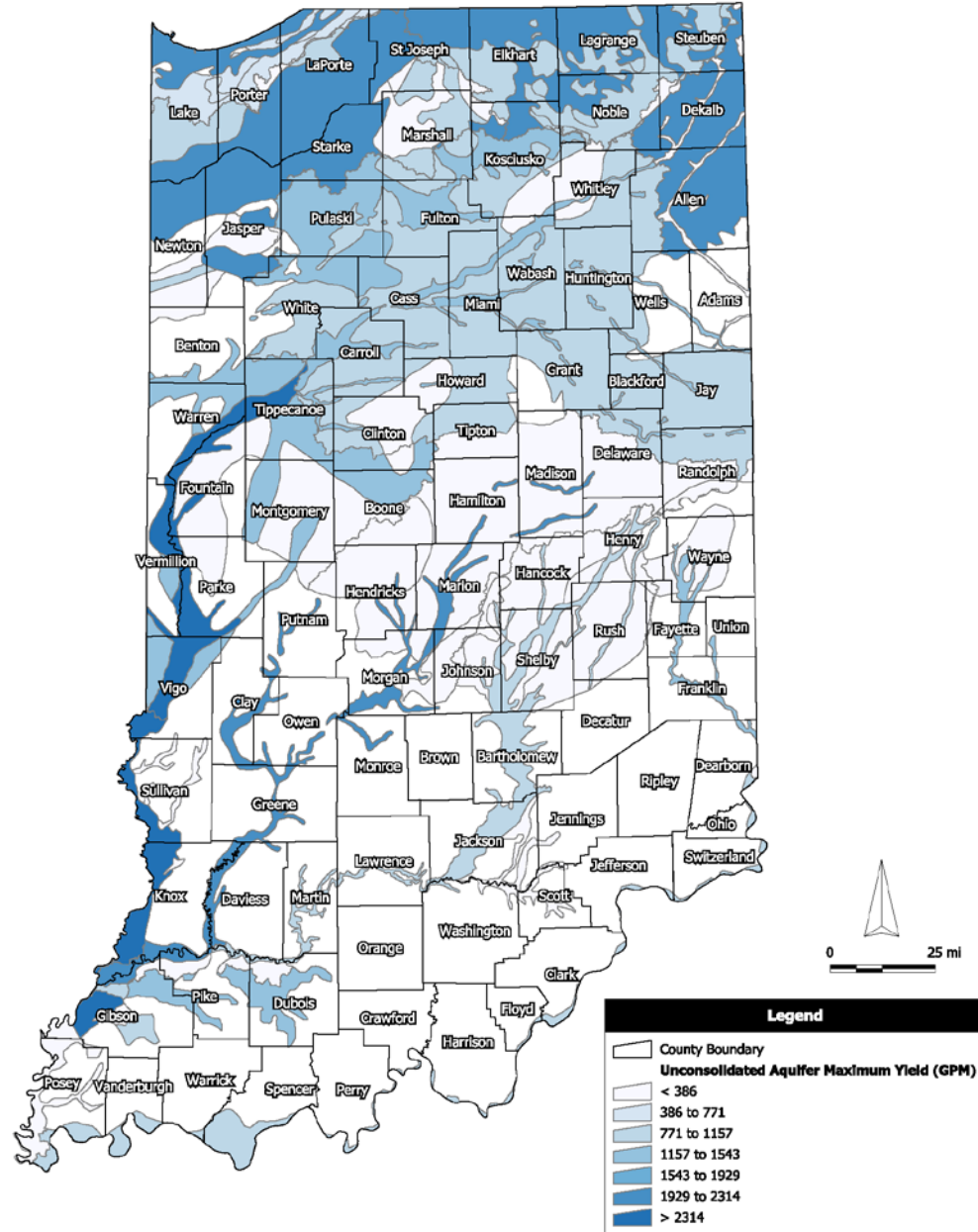


Bedrock Aquifers

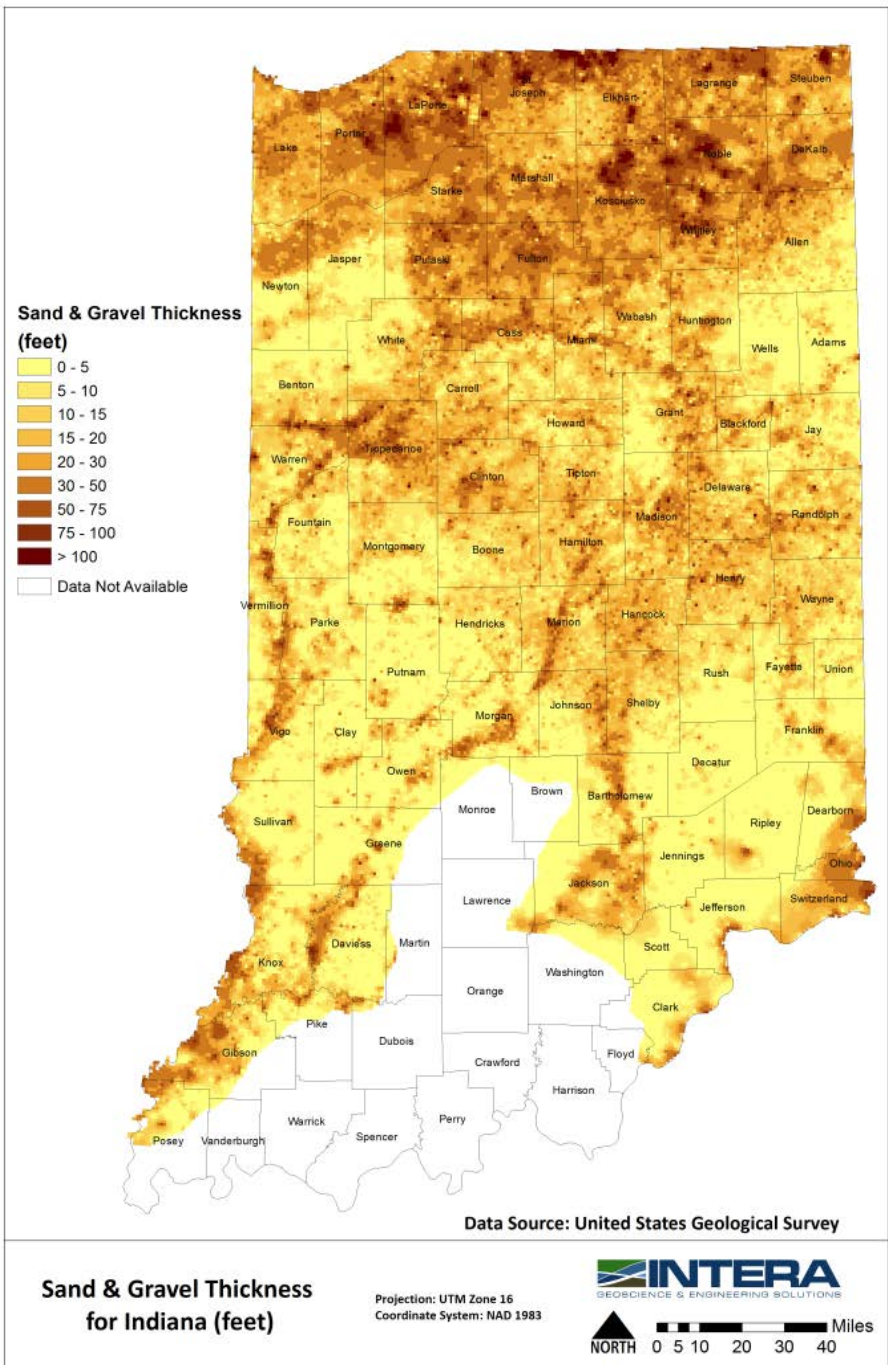


Unconsolidated Aquifer Maximum Yield

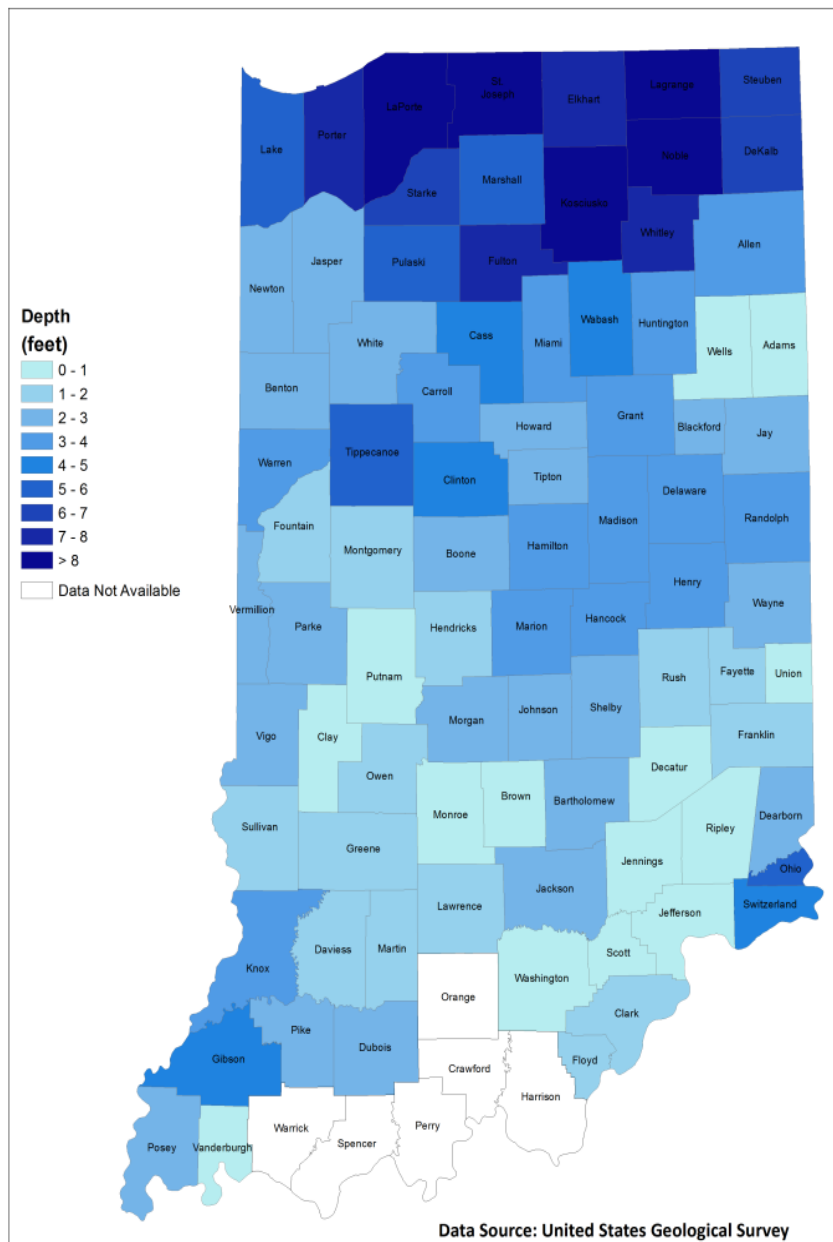
Maximum Yield from
Unconsolidated Aquifers
For individual wells



Estimated Groundwater Storage

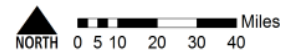


Equivalent Depth of Groundwater Storage by County



**Equivalent Depth of Storage
in Sand & Gravel Layer
by County (MG)**

Projection: UTM Zone 16
Coordinate System: NAD 1983



Where are we using water and for what purpose?

HOW ARE WE USING WATER?

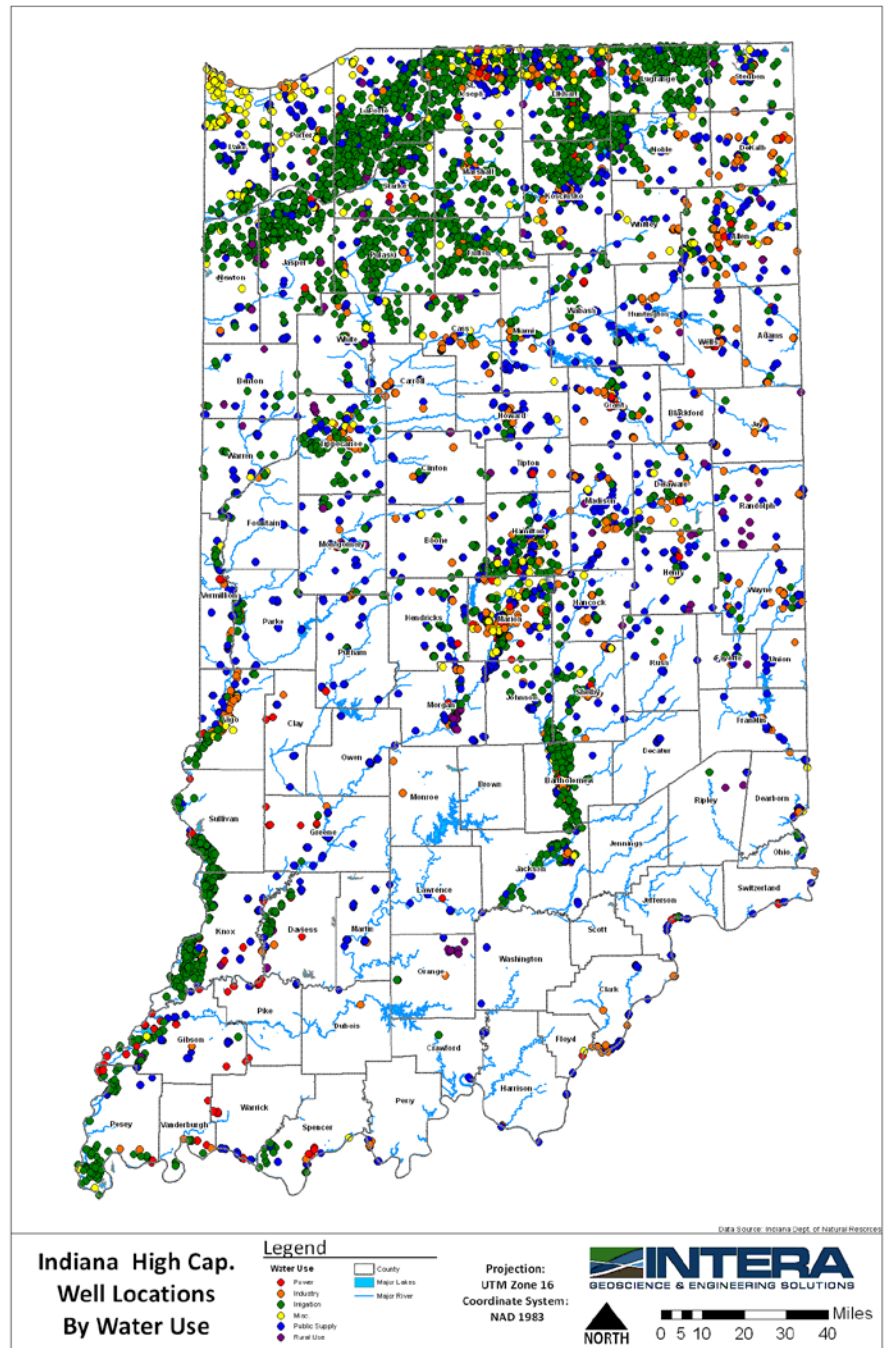
Groundwater Users

Agriculture

Industrial

Public Supply

Mining and Power



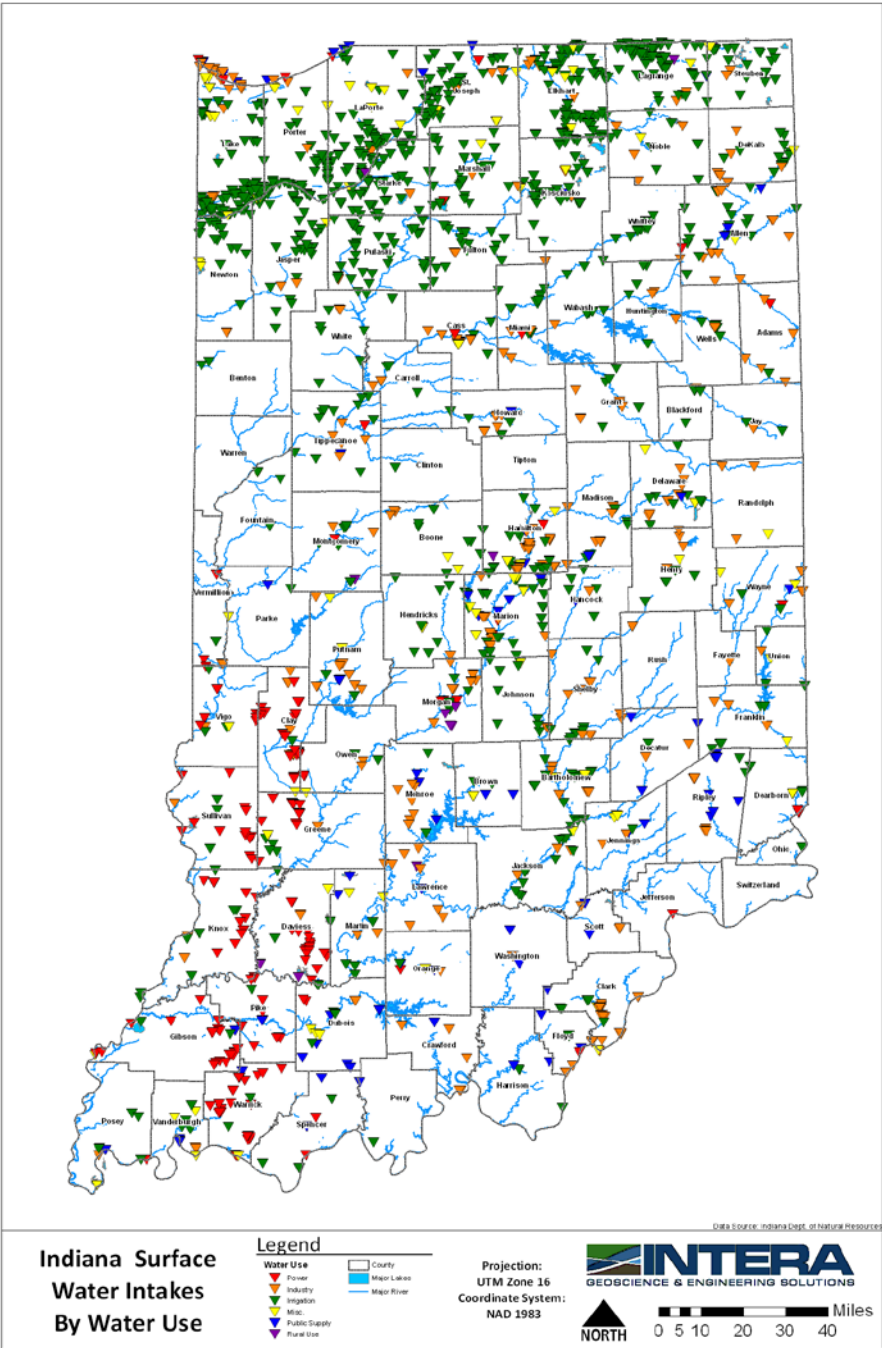
Surface Water Users

Agriculture

Industrial

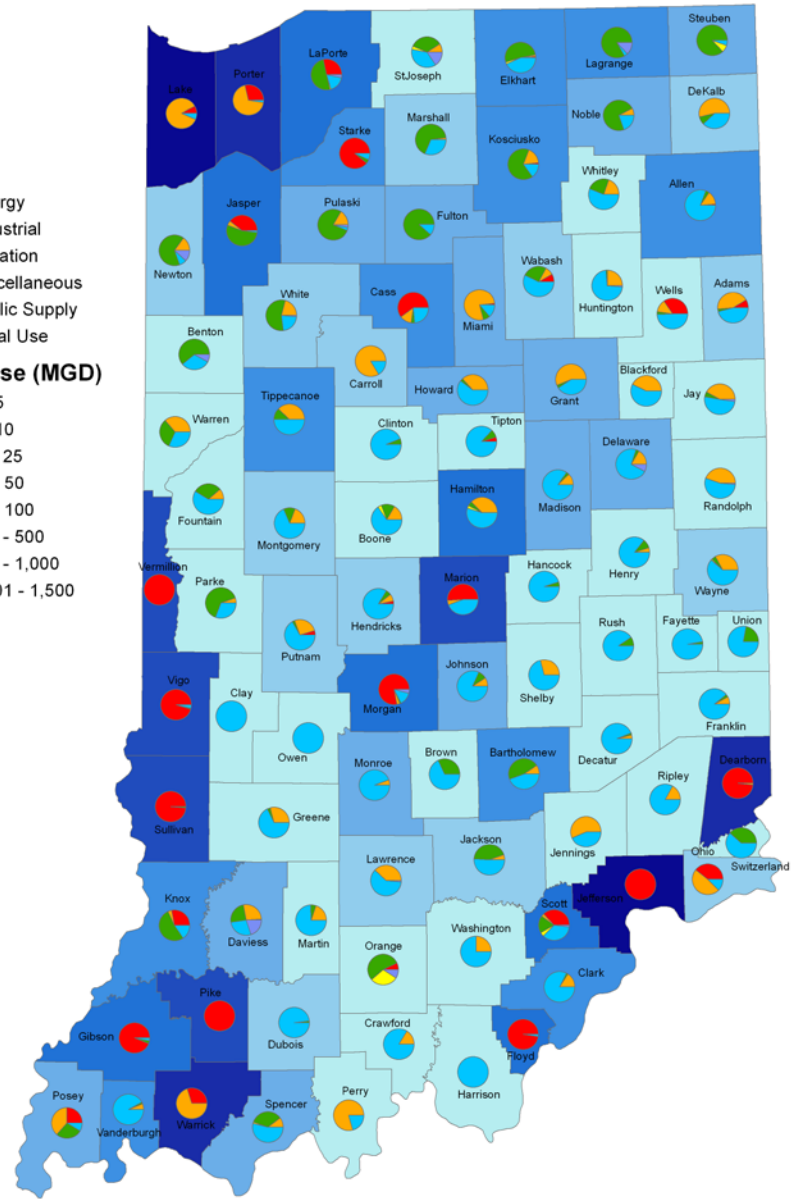
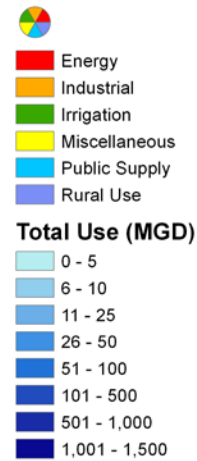
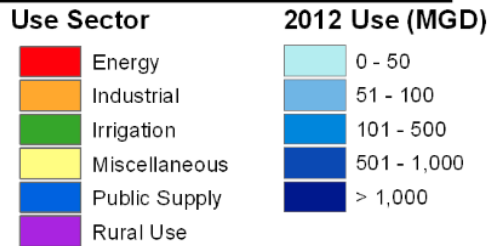
Public Supply

Mining and Power



Total Water Use by County

Legend



Data Source: Indiana Department of Natural Resources

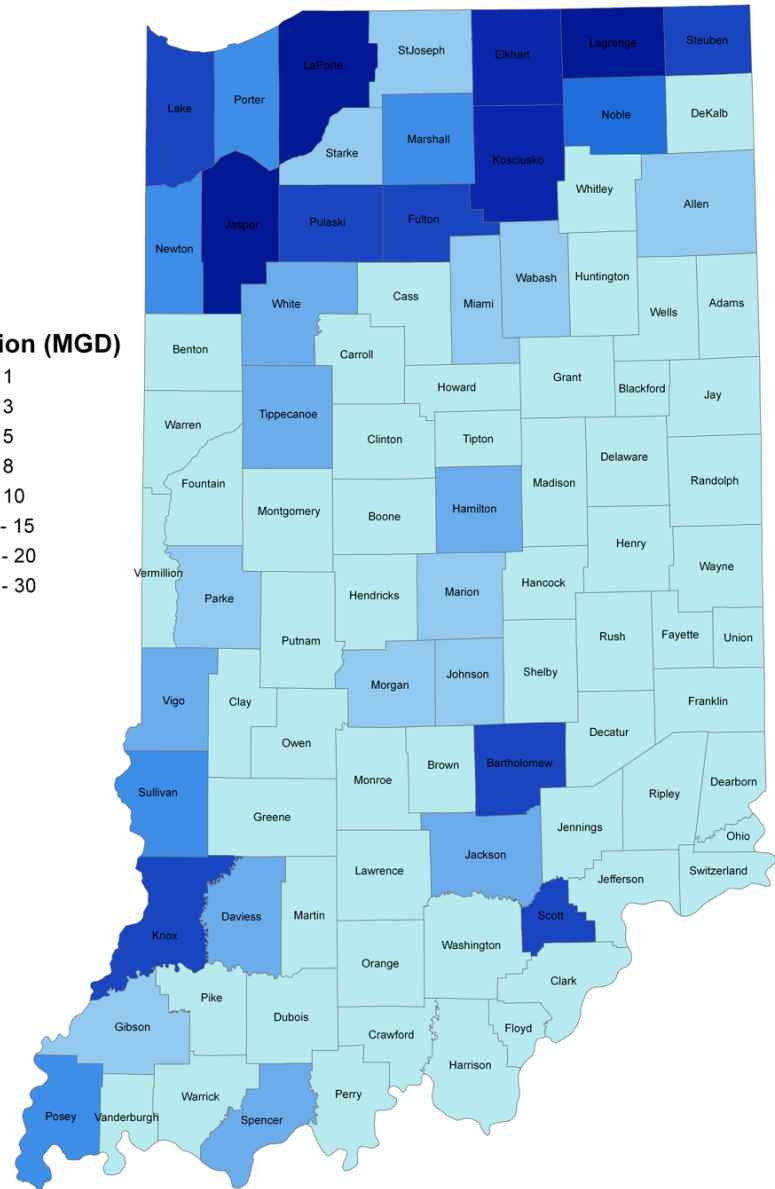
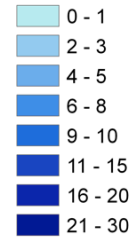
2012 Indiana Water Use
By County and Sector

Projection: UTM Zone 16
Coordinate System: NAD 1983



Irrigation Water Use by County

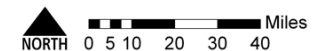
Irrigation (MGD)



Data Source: Indiana Department of Natural Resources

2012 Indiana Irrigation Water Use by County

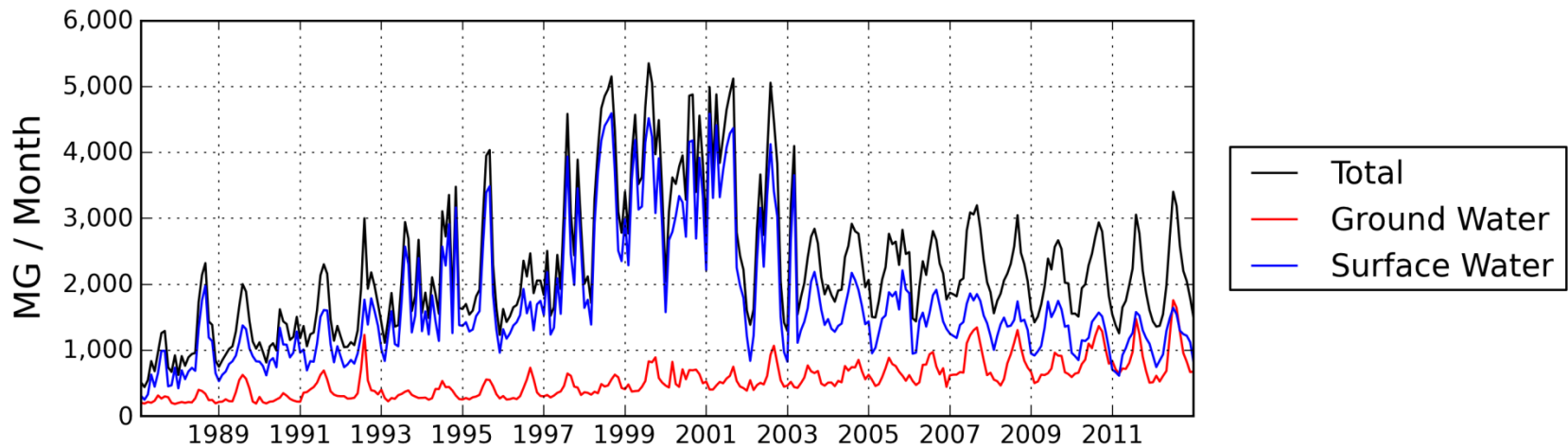
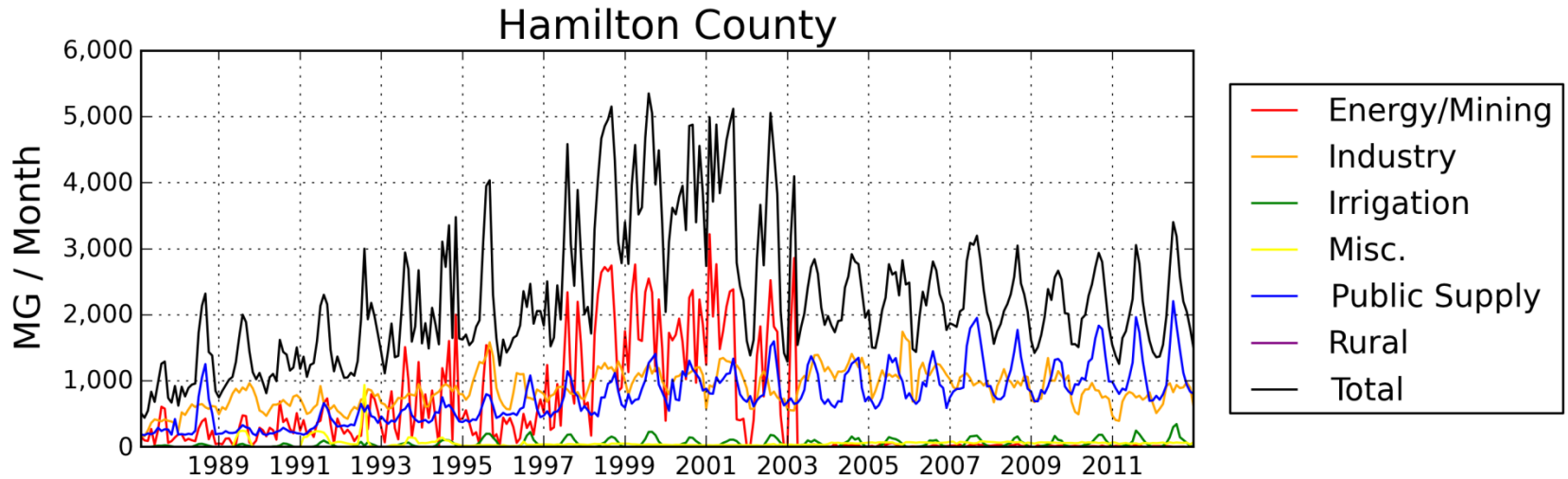
Projection: UTM Zone 16
Coordinate System: NAD 1983



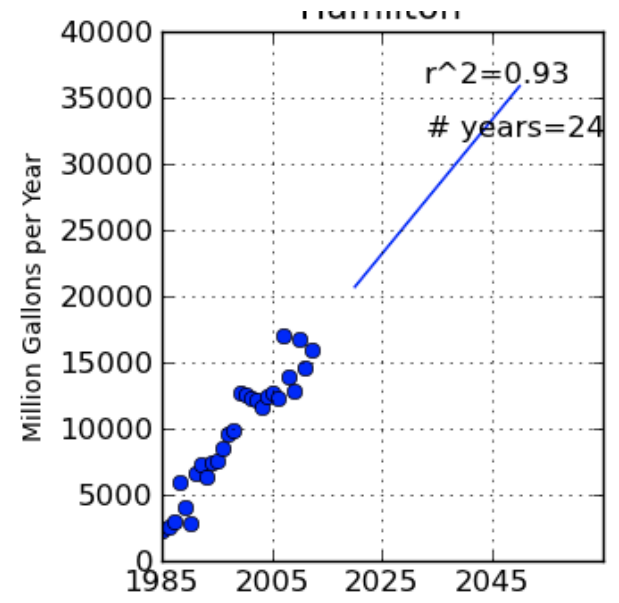
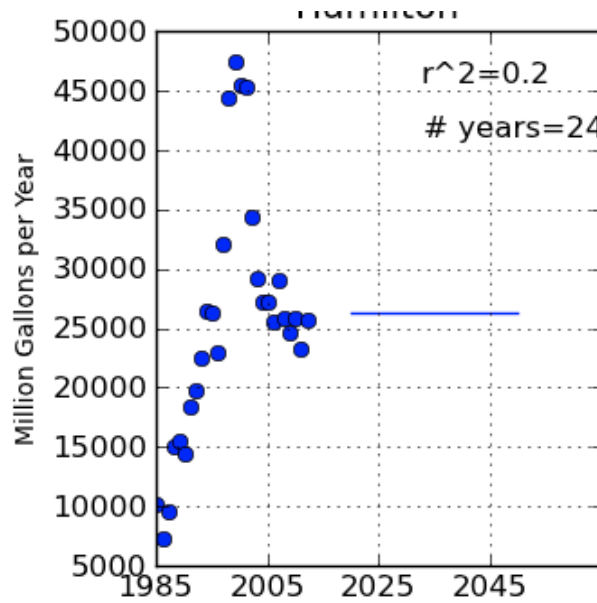
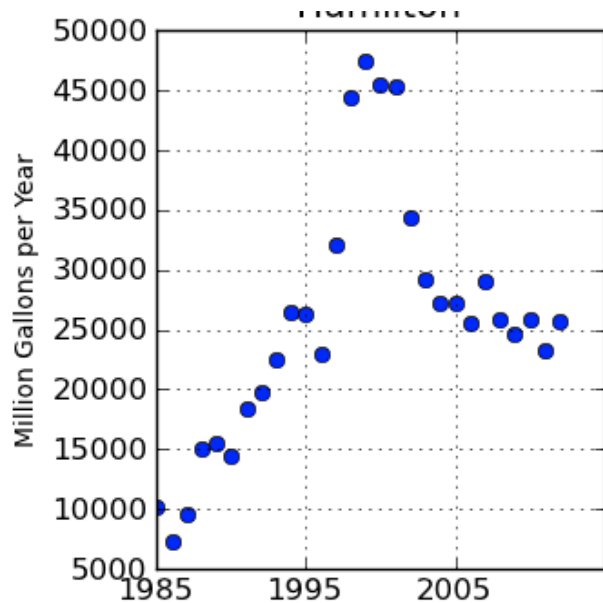
How much will we need where?

FORECASTING FUTURE USE

Hamilton County Example



Hamilton



Annual Withdrawal Data

Annual Total w/ Forecast

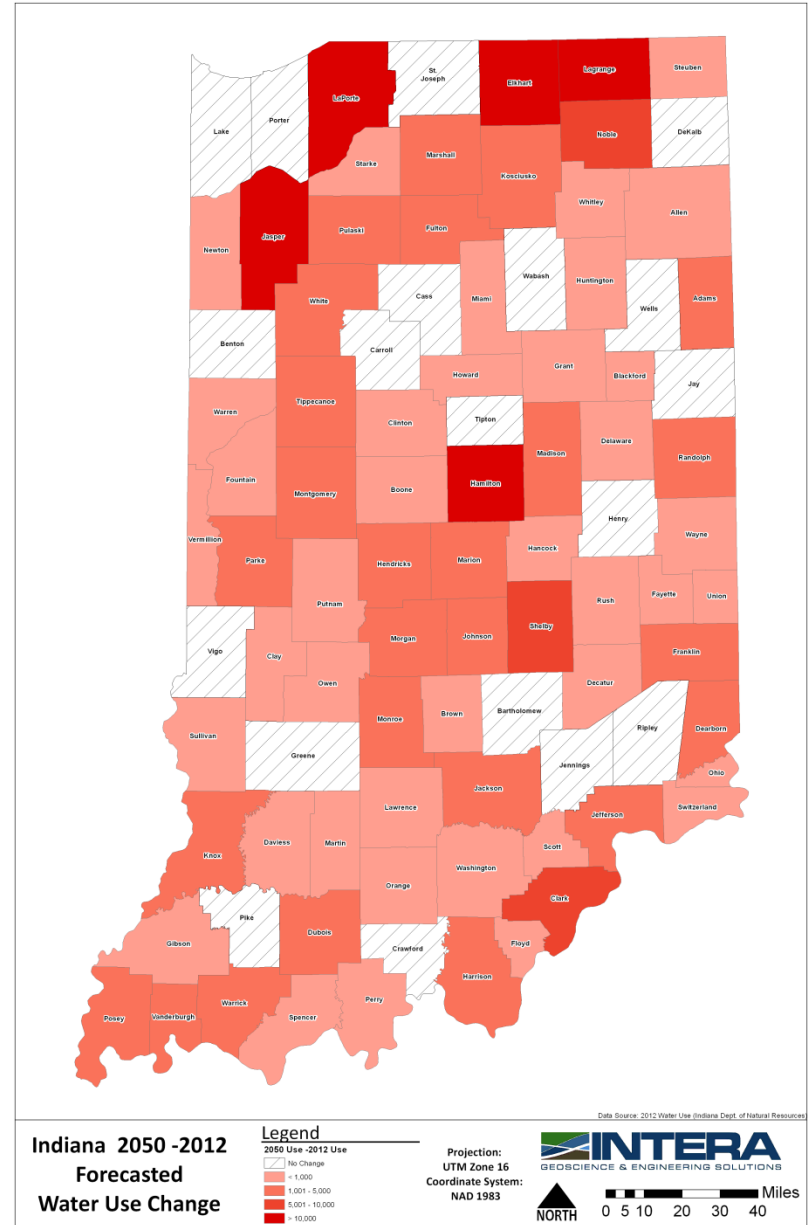
Annual Total (without Energy or Industrial Uses)

County	Energy	Industry	2012	2020	2030	2040	2050
Hamilton	1,000	11,000	28,000	33,000	38,000	43,000	48,000

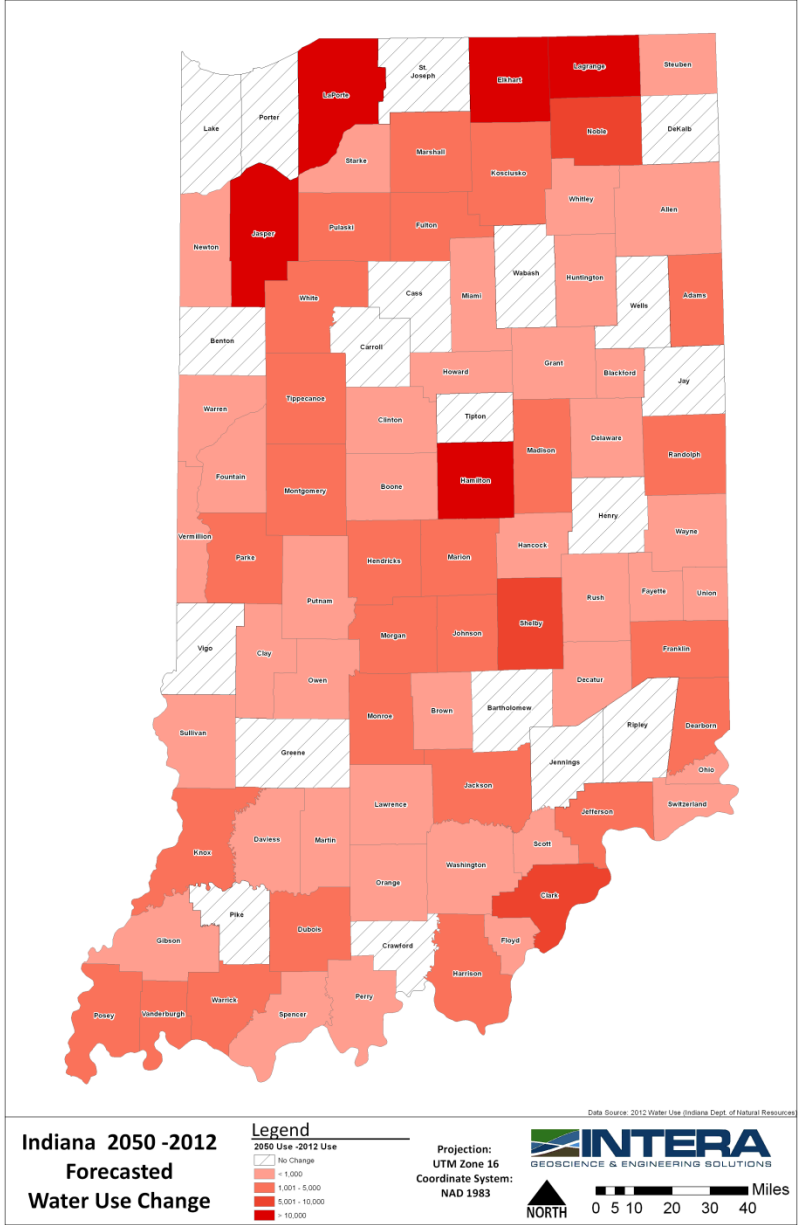
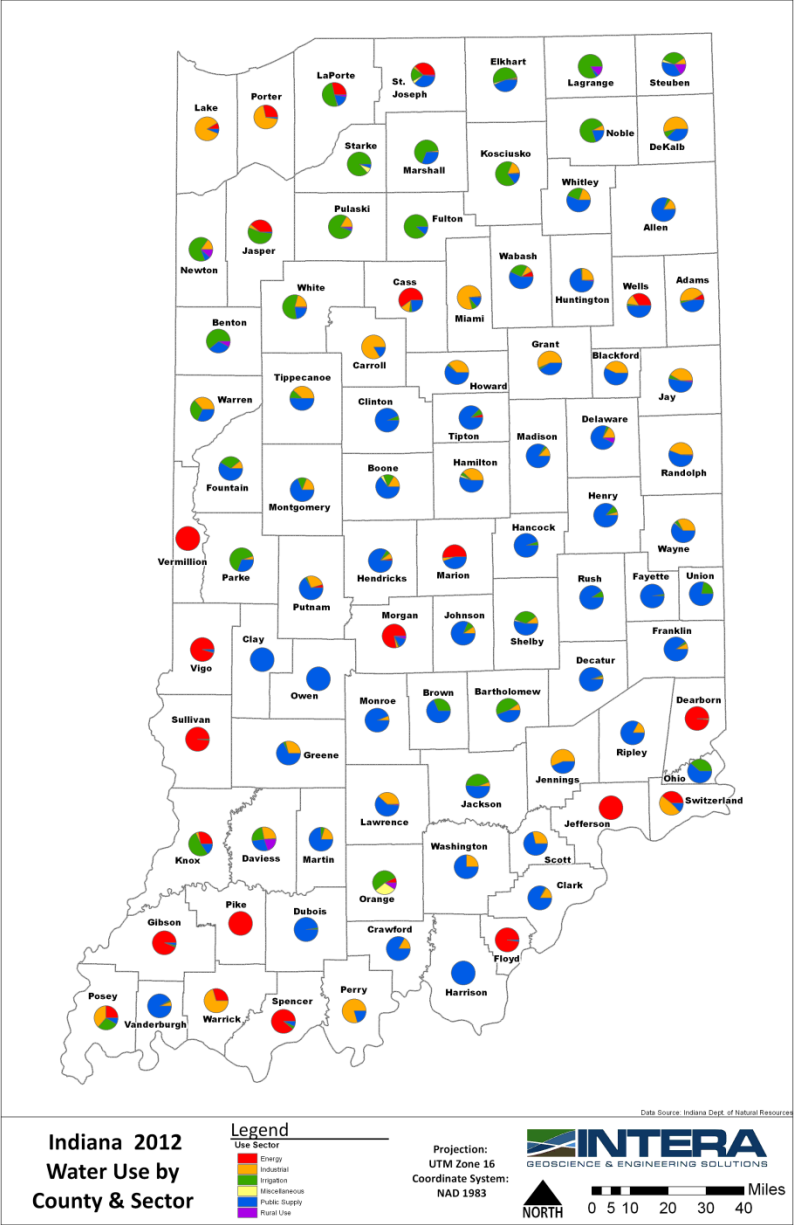
*values are in Million Gallons per Year

2050 Water Demand MG/yr

2050 Use -2012 Use



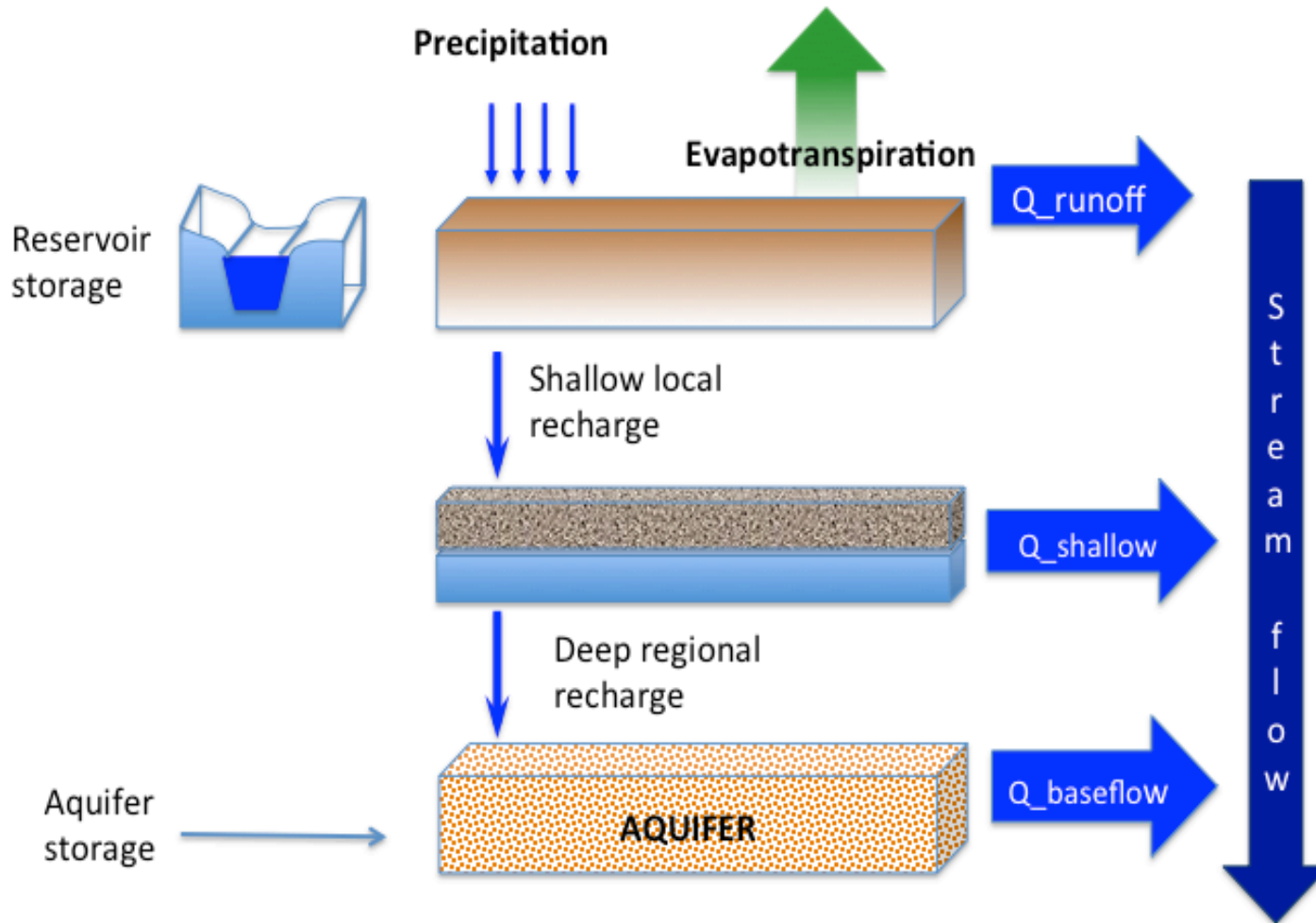
What drives future demand?



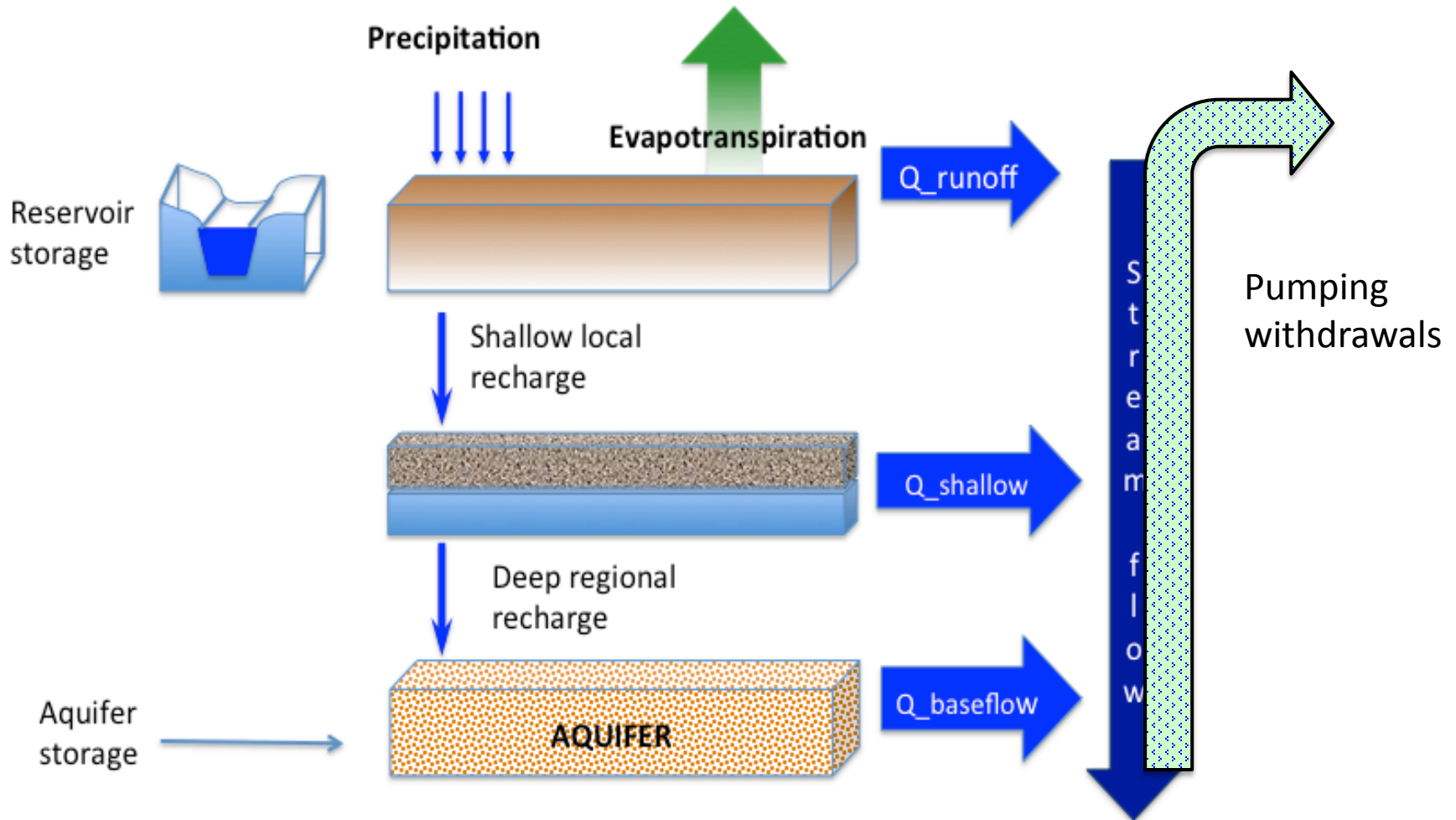
Are we using more than is available?

IS WATER USE SUSTAINABLE?

WATER AVAILABILITY



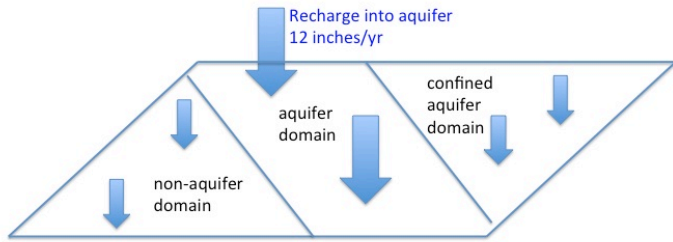
WATER AVAILABILITY



GW Recharge Map

County regional recharge rate estimation

North – confined aquifer = 0.5 aquifer
 Middle – confined aquifer = 0.25 aquifer
 South – confined aquifer = 0.1 aquifer
 Non-aquifer = 0.05 aquifer

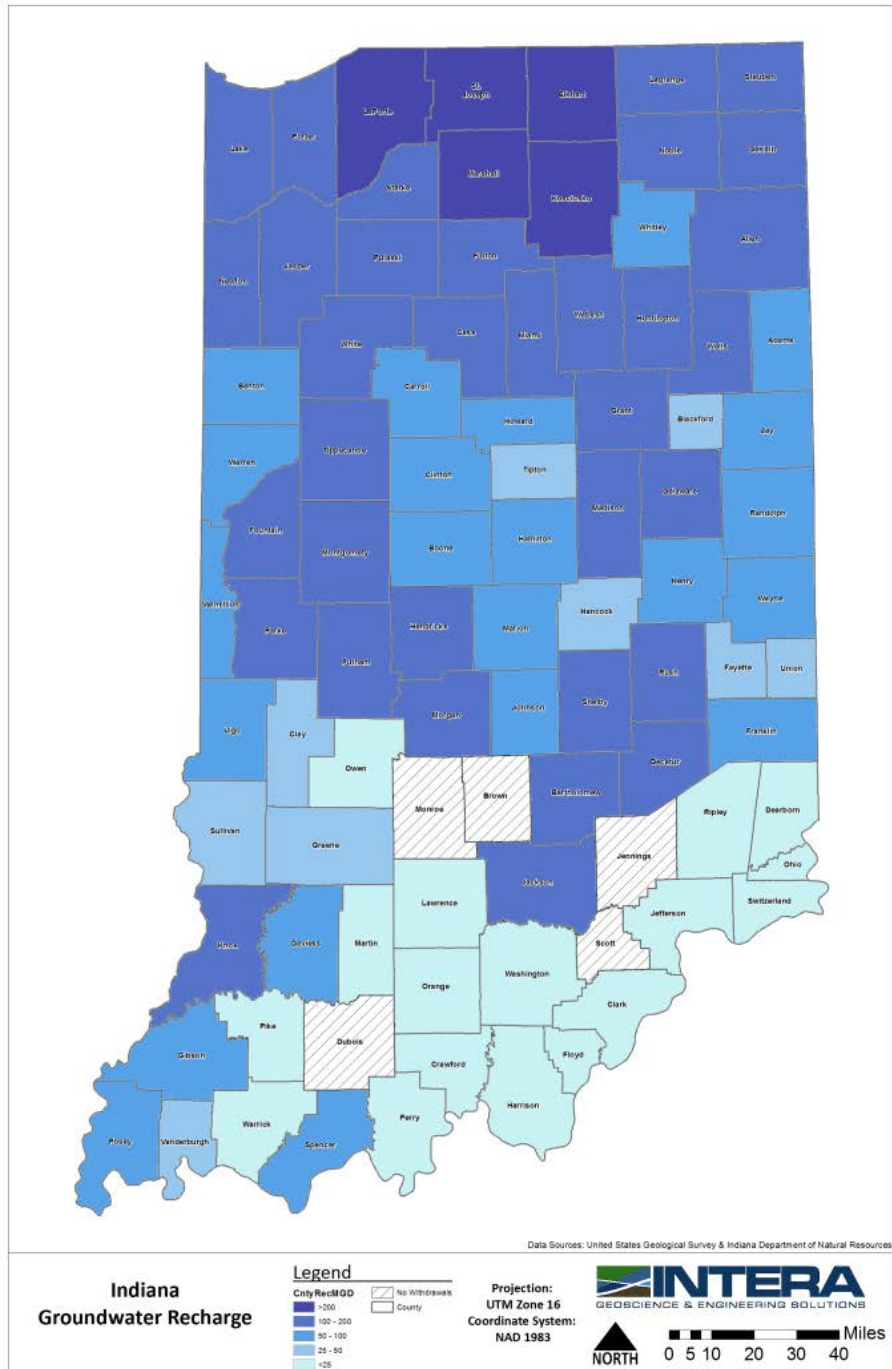


Legend

Recharge (MGD)

- >200
- 100 - 200
- 50 - 100
- 25 - 50
- <25

- No Withdrawals
- County



Data Sources: United States Geological Survey & Indiana Department of Natural Resources

Indiana
Groundwater Recharge

Legend

- Only Recharge >200
- 100 - 200
- 50 - 100
- 25 - 50
- <25
- No Withdrawals
- County

Projection:
UTM Zone 16
Coordinate System:
NAD 1983

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

NORTH 0 5 10 20 30 40 Miles

2014

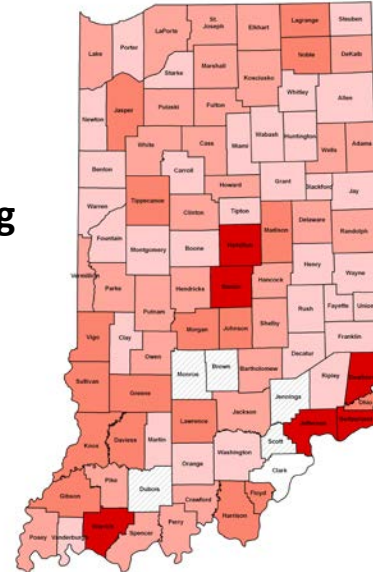
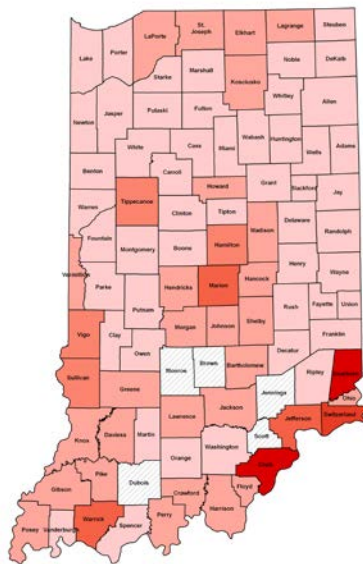


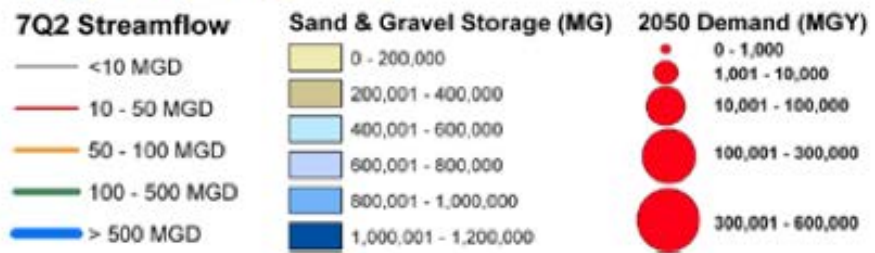
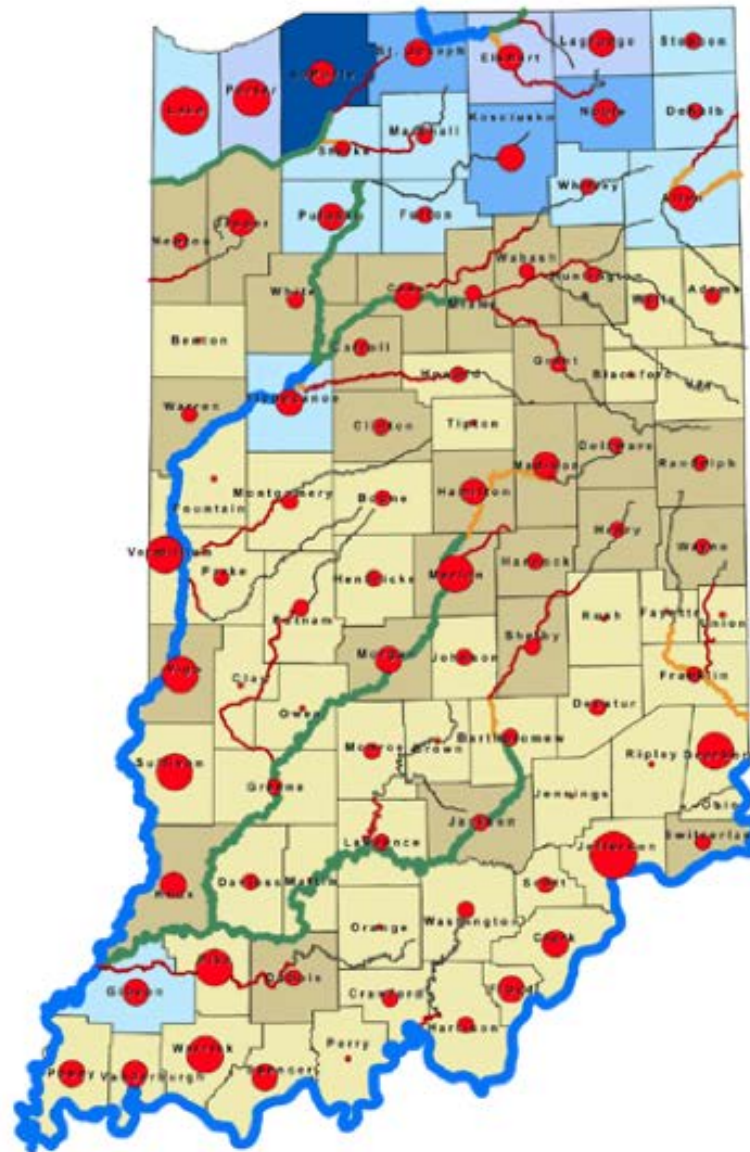
Withdrawals

2050



Recharge/ Future pumping





Is this a problem?

WHY SHOULD WE CARE?

Rosaen, Alex L. 2014. Innovating for the Blue Economy: Water Research at the URC. Commissioned by the University Research Corridor. Report by the Anderson Economic Group, May, 2014. 38 p.

WHAT ARE OTHER STATES DOING?

	2013 Population	2012 GDP	Funding Source and Amount	Responsibility	GDP growth
Texas <u>drought</u>	26,060,000	\$1.397 T	<ul style="list-style-type: none"> • \$539 M • Conservation fees • Utility water sales tax • Water rights fees • New development impact fee 	TWDB	4.8%
Minnesota <u>impacts</u>	5,380,000	\$295 B	<ul style="list-style-type: none"> • \$60 M • 0.125% sales tax • Clean Water Fund 	University Existing Agencies	3.5%
Florida <u>impacts</u> <u>storms</u>	19,310,000	\$777 B	<ul style="list-style-type: none"> • \$1 B • ad valorem taxes • state appropriations • (~3,000 employees) 	Water Management Districts	2.4%
West Virginia <u>quality</u>	1,850,000	\$69 B	<ul style="list-style-type: none"> • \$200 K • no state funding anticipated • (~5 people federally funded) 	WV DEP	3.3 %
Kentucky <u>drought</u>	4,395,000	\$173 B	<ul style="list-style-type: none"> • \$1 M • water shortage response plans (county scale) 	KY DNR Infrastructure Authority	3.4%
Virginia <u>impacts</u>	8,185,000	\$446 B	<ul style="list-style-type: none"> • \$2 M • state appropriations • (~15 employees) 	VA DEQ	1.1%
Georgia <u>impacts</u>	9,992,000	\$374 B	<ul style="list-style-type: none"> • \$10 M • state funding of regions 	GA EPD	2.1 %
Indiana	6,570,000	\$298 B	<ul style="list-style-type: none"> • none 		3.3%

Why worry about
water resources?

Growth

- Municipalities
- Manufacturing
- Agriculture

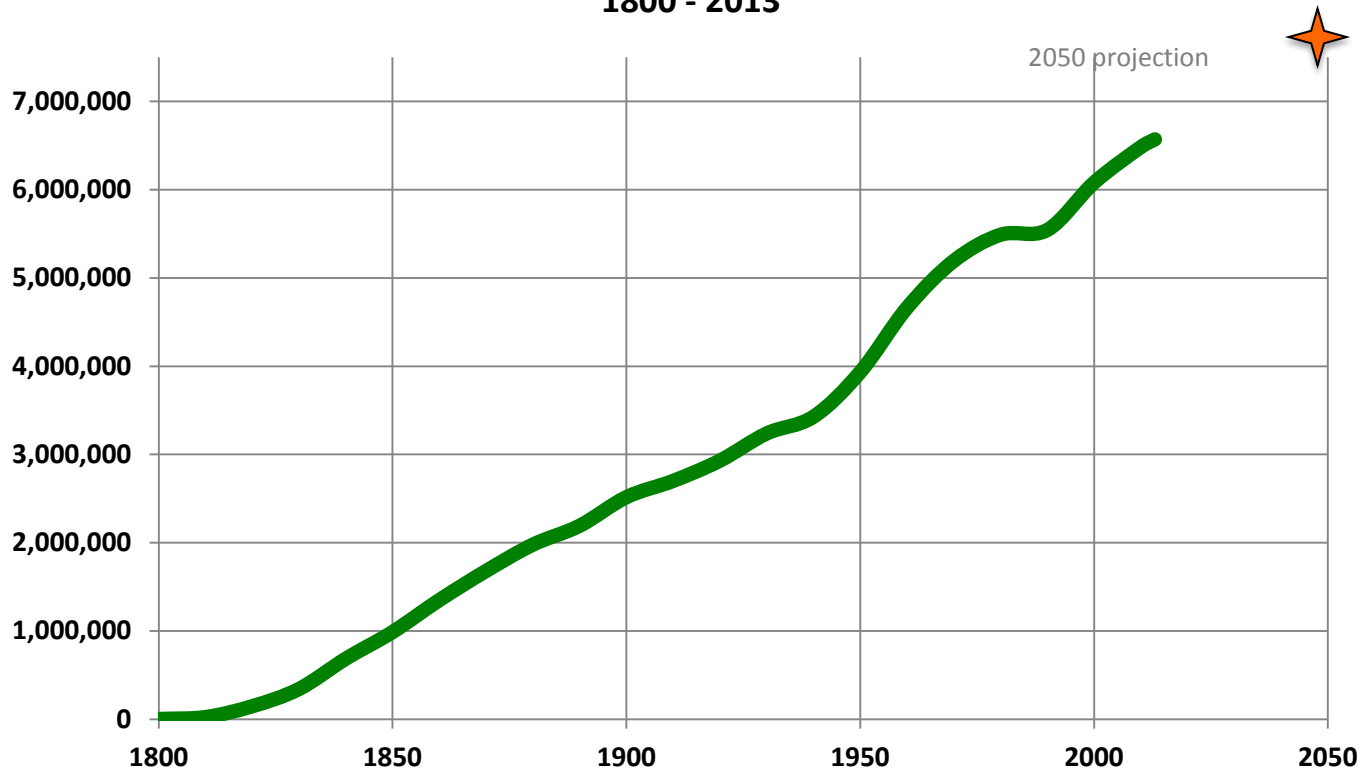


Indianapolis population surging since 2010

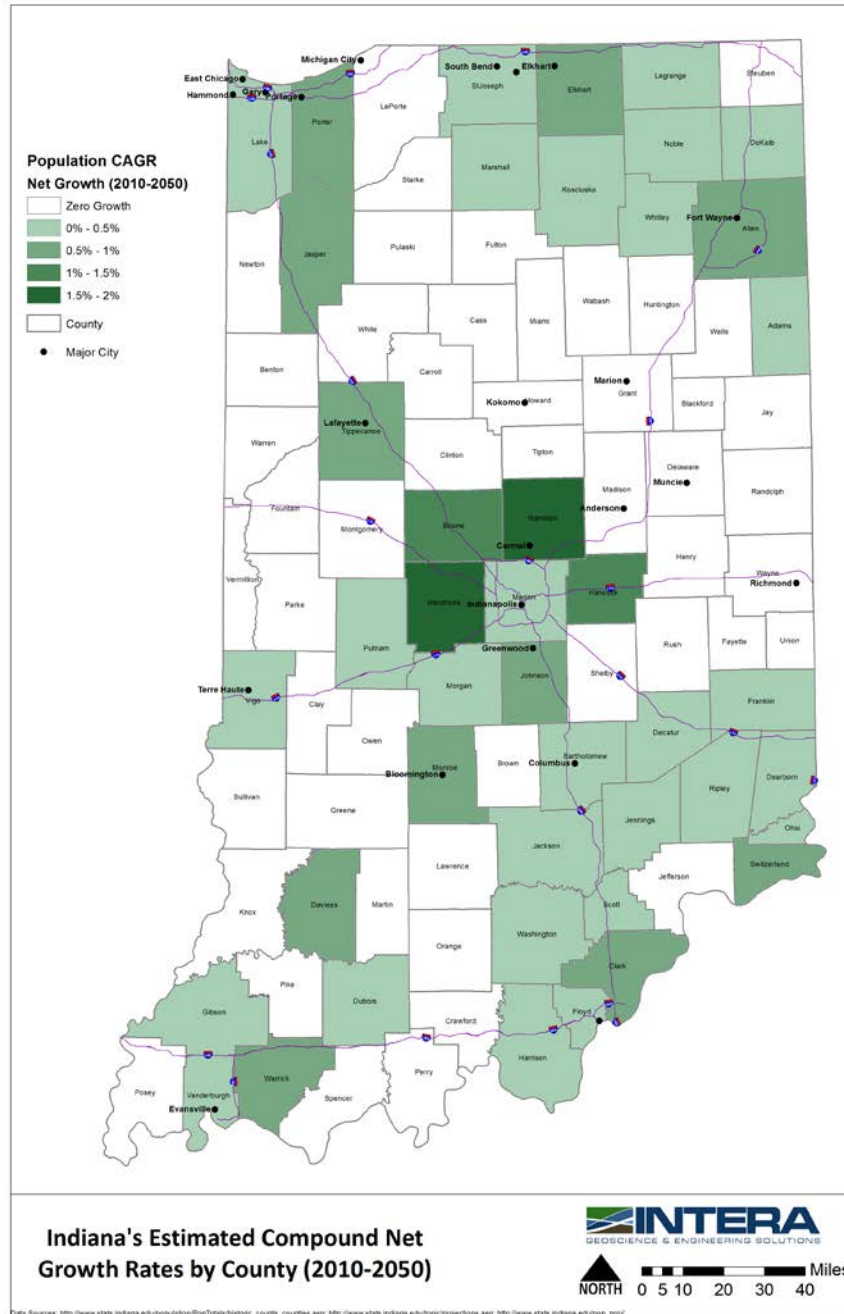
Associated Press, @ap 8:02 a.m. EDT May 22, 2014



Indiana Population 1800 - 2013



GROWTH 2010 - 2050



What about us?

**DOES THIS AFFECT THE MICHIANA
IRRIGATION ASSOCIATION?**

Irrigation needs to be understood in order to plan and advocate.

- Create awareness for the need for Irrigation
- Develop methods and data to manage the aquifers
- Reduce conflict
- Identify possible impacts
- Time withdrawals

CONTACT

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