



Opportunities for Improving Indiana's Water Management: Learning from the LEAP Project

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As a Purdue Extension Specialist, I work mainly in agricultural drainage, watershed management, and water quality.



I also respond to state needs related to water.



INDIANA SCIENCE ASSESSMENT



The proposal to withdraw up to 100 million gallons per day from the Wabash River to supply the LEAP district has drawn much concern.

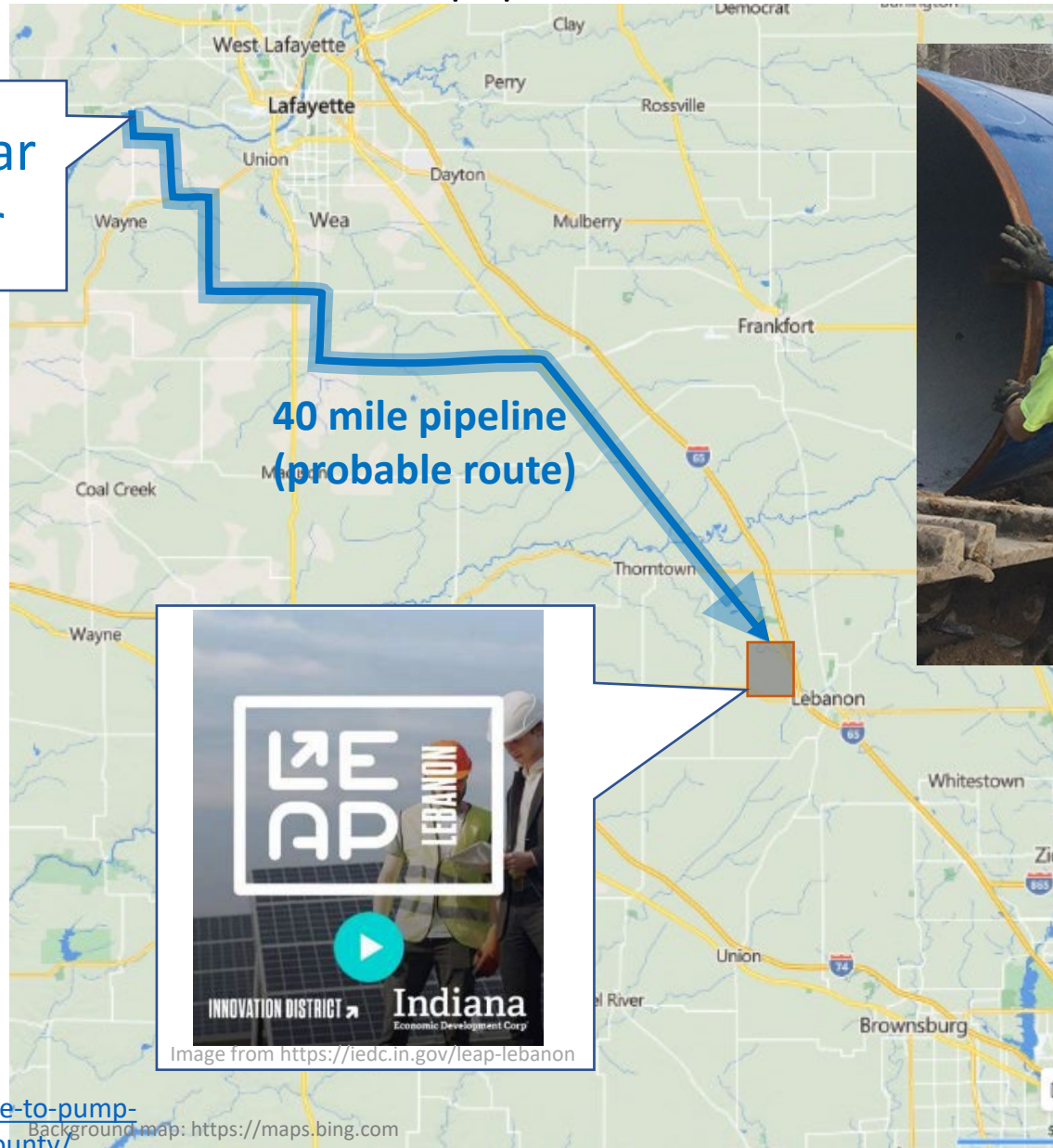
LEAP= Limitless Expansion/ Advanced Pace



Many in Tippecanoe County are calling it a “water steal”.

The LEAP district in Lebanon lacks water, so the Indiana Economic Development Commission proposed a 40-mile pipeline from the Wabash River.

Proposed wells near the Wabash River



Similar size pipe
<https://undergroundinfrastructure.com/magazine/2016/april-2016-vol-71-no-4/features/contractor-installs-large-diameter-pipeline-aimed-at-alleviating-flint-crisis-with-long-term-solution>

Pipeline location from
<https://www.clintoncountytoday.com/state-to-pump-water-through-clinton-county-to-boone-county/>

Background map: <https://maps.bing.com>

Indiana's water resources are generally plentiful, available to all at no cost. But priceless for supporting all of life...

Wabash River



Well for public water supply



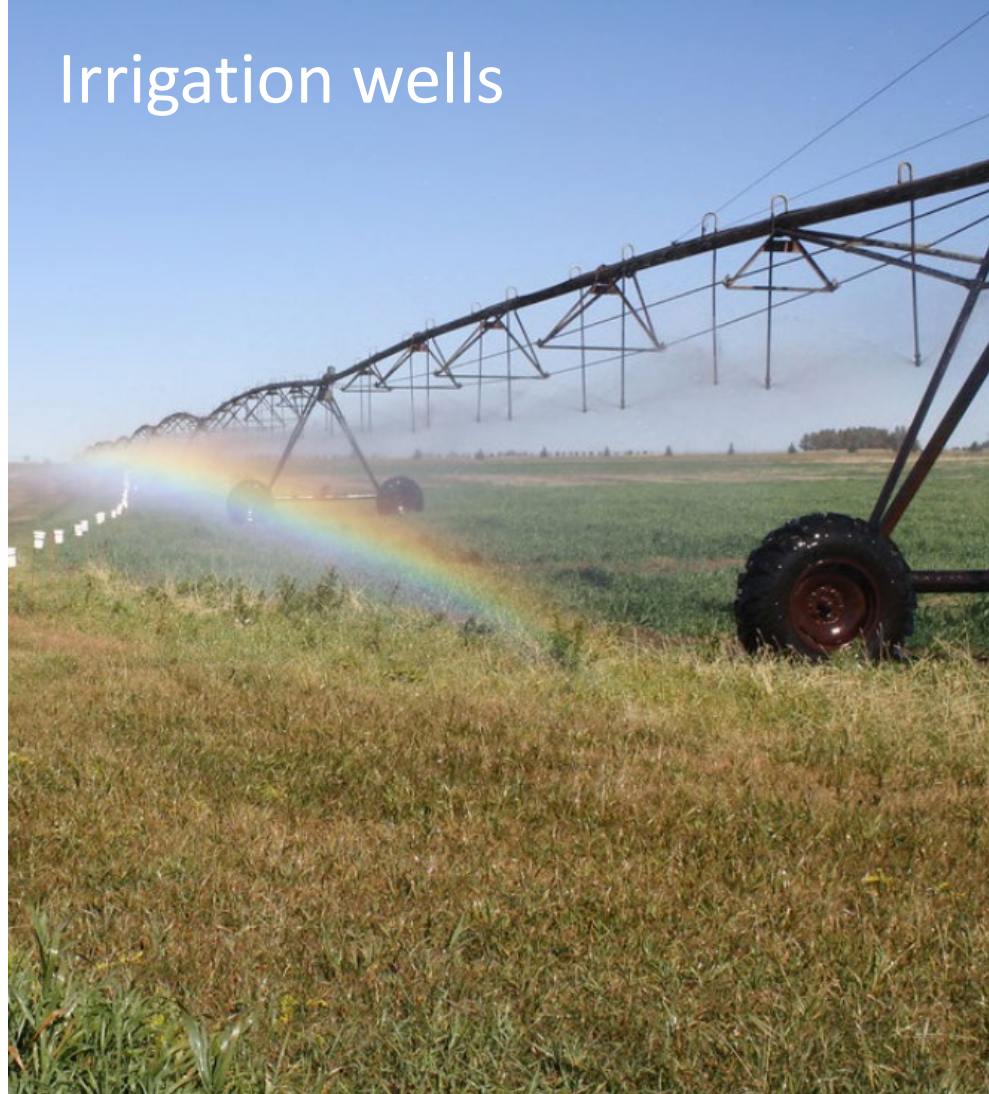
Image from <https://www.lafayette.in.gov/1081/Waters-Path-to-You>

Indiana's water resources are generally plentiful, available to all at no cost. But priceless for supporting all of life...

Home wells



Irrigation wells



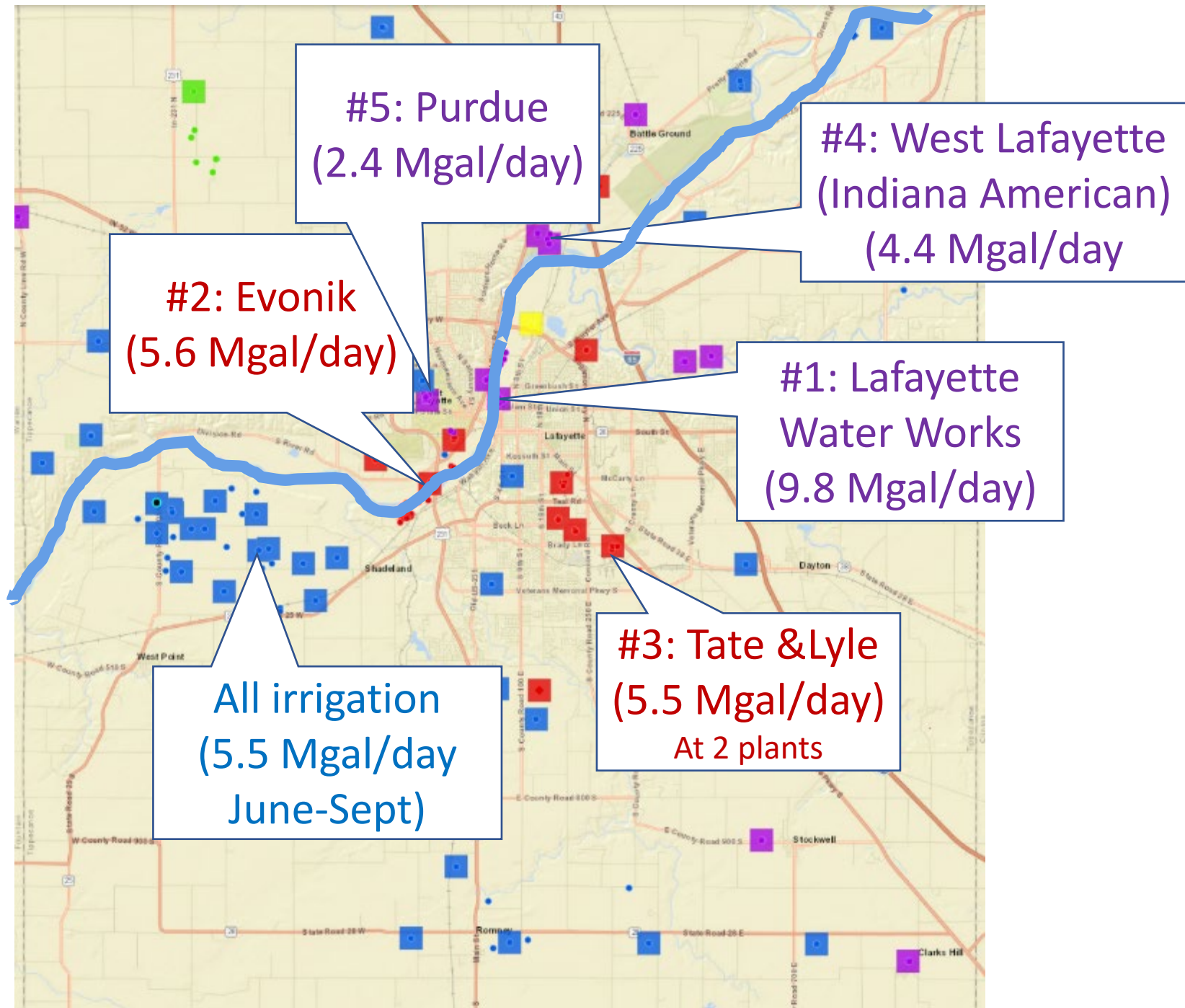
Industry wells



There are many significant users currently in Tippecanoe County.

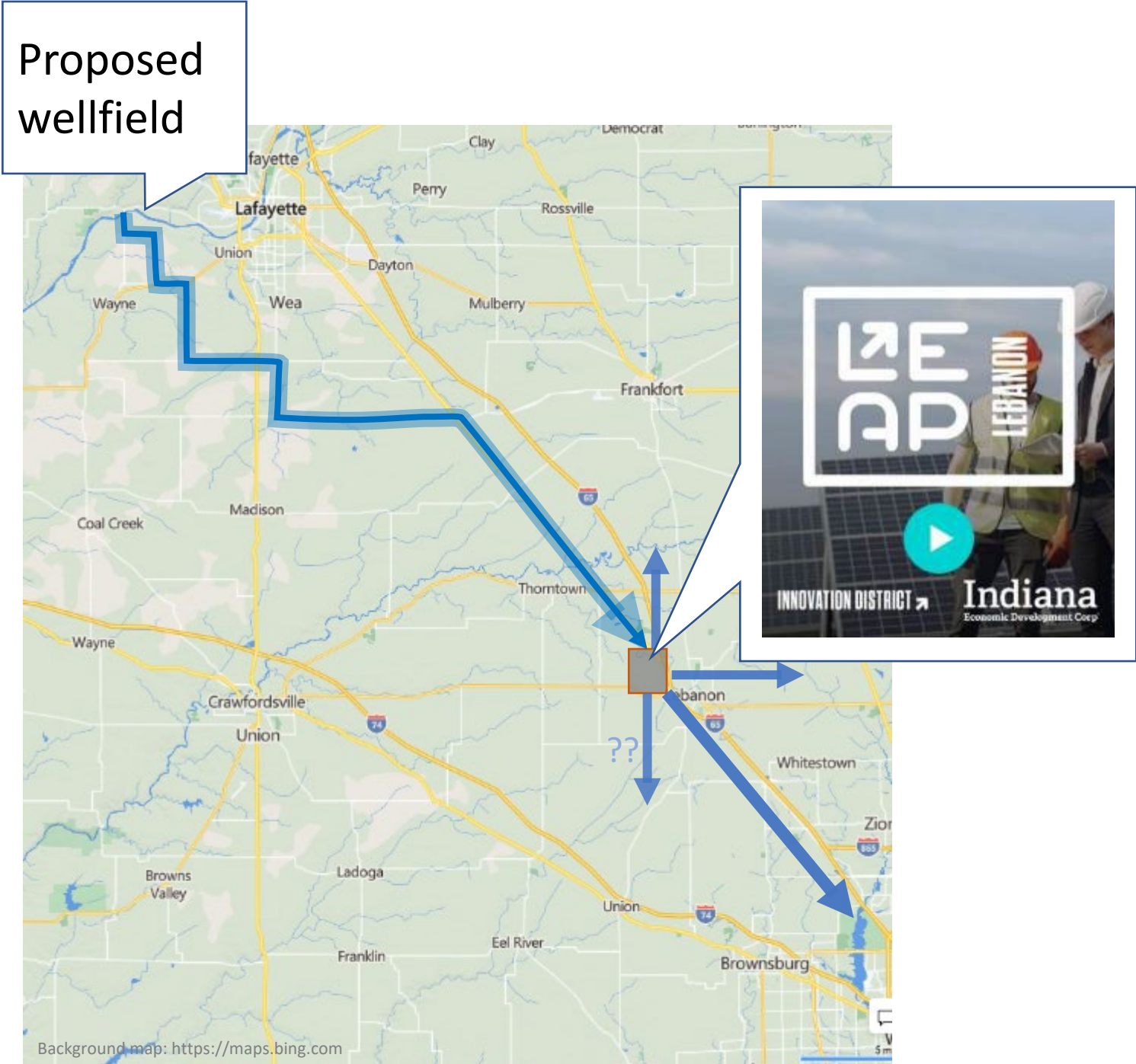
Irrigation water is mostly consumed, but other users withdraw water, use it, and return the wastewater into the Wabash.

-  Industry (self-supplied)
-  Irrigation
-  Public Supply
-  Rural Use
-  Miscellaneous



The proposal to send water to LEAP Lebanon will withdraw water and send it to another basin.

- This is called a **water transfer** or **water diversion**.
- It would have more effect on the Wabash River than the **non-consumptive** current users.



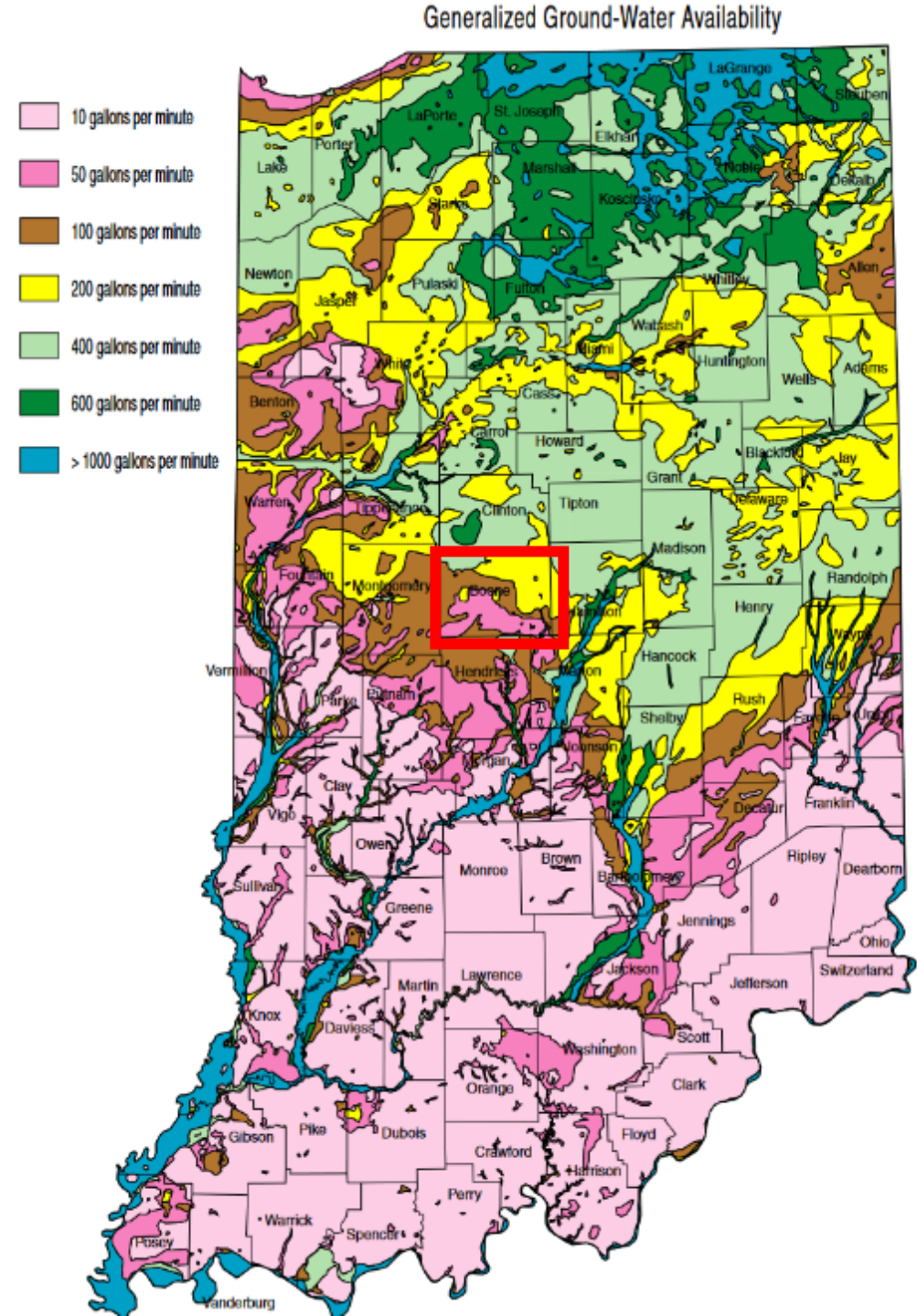
It has been known for decades that water is scarce in Boone County.

IEDC did not consider water availability in selecting the site for economic development.

Why not?

They viewed water as just another utility.

“Extending utilities is something we do regularly”



Is water just another utility?



Public domain;
<https://www.rawpixel.com/image/6031308>

Electricity



<https://www.nwtc.edu/academics-and-training/gas-utility-construction-and-service>

Gas



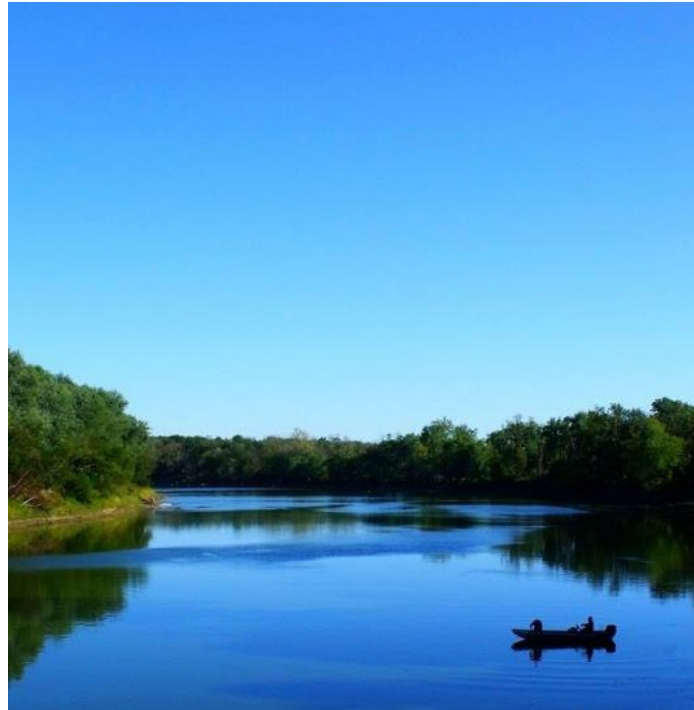
Water? <https://www.nwpipe.com/projects/willamette-water-supply-program/>

Hoosiers I talk with feel that **water is different; it is NOT just a utility.**

(1) The supply is finite, and (2) it is valued for many reasons.

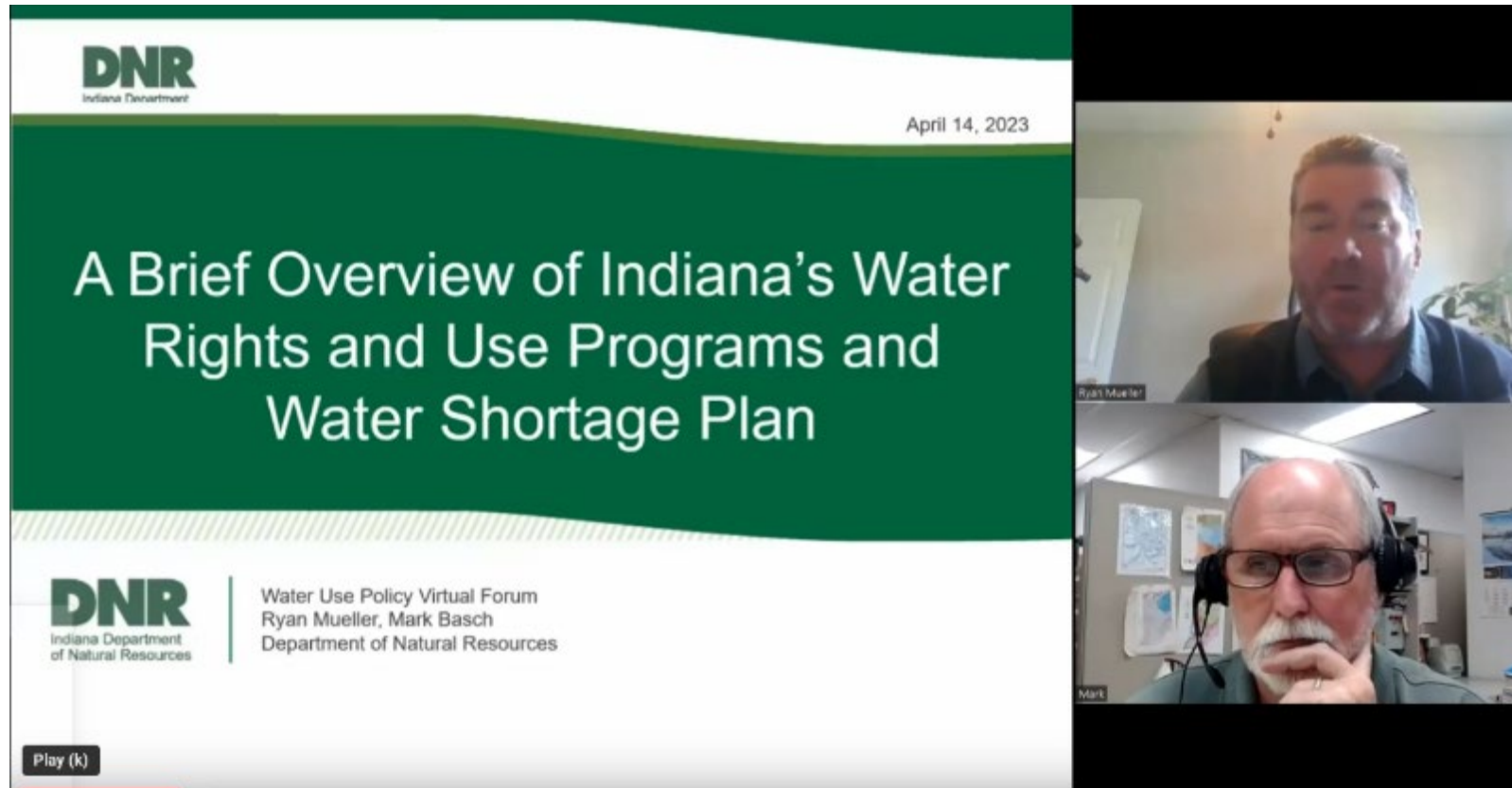


Policies that currently protect our water rights and water resources in Indiana



Water rights are addressed at the state level. What Indiana regulations might apply?

- The Indiana Department of Natural Resources (DNR) staff responsible for water rights and use presented the laws that might be relevant.



The image shows a screenshot of a virtual forum. On the left is a presentation slide with a green header and footer. The header contains the DNR logo and the date "April 14, 2023". The main title of the slide is "A Brief Overview of Indiana's Water Rights and Use Programs and Water Shortage Plan". The footer contains the DNR logo, the text "Water Use Policy Virtual Forum", and the names "Ryan Mueller, Mark Basch" and "Department of Natural Resources". A "Play (k)" button is visible in the bottom left corner of the slide. On the right side of the screenshot are two video feeds. The top feed shows a man with short hair, wearing a dark shirt, with a name tag that says "Ryan Mueller". The bottom feed shows an older man with a white beard and glasses, wearing a headset and a light-colored shirt, with a name tag that says "Mark".

Recorded virtual forum at <https://research.purdue.edu/isf/events/index.php?view=5334>

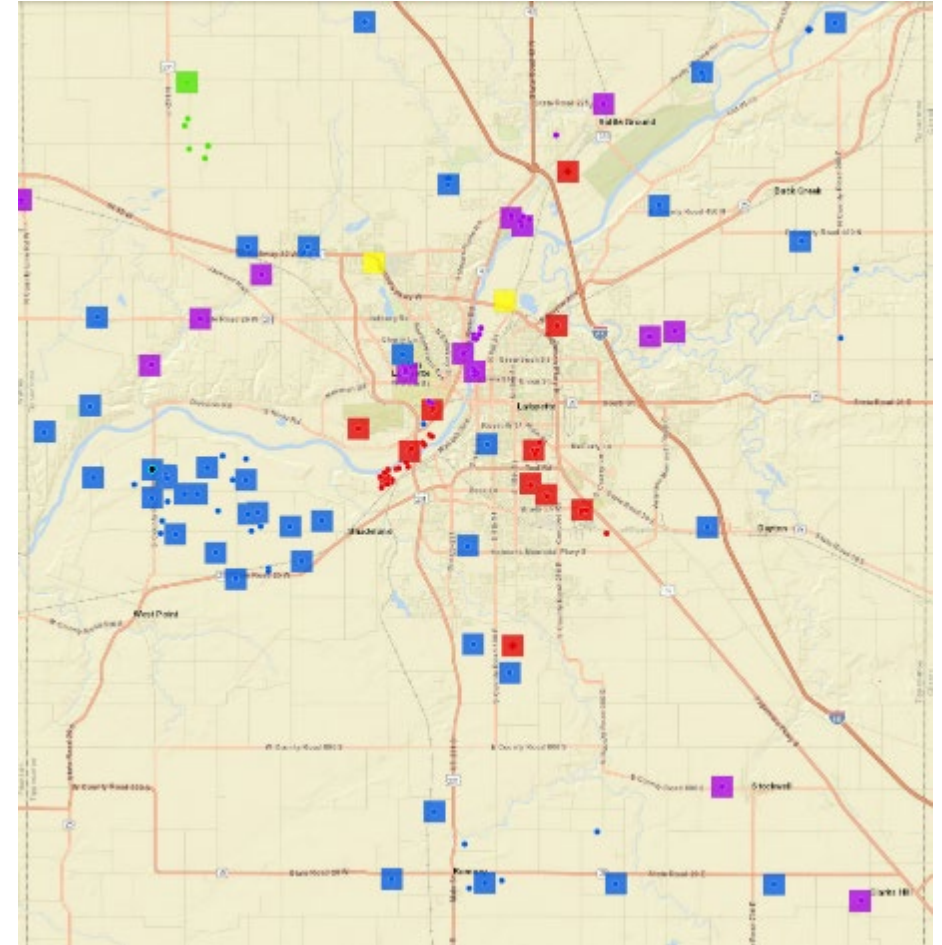
1. Indiana Code 14-25-7: Water Resources Management Act

- Enacted in 1983
- Requires **registration** of all Significant Water Withdrawal Facilities (greater than 100,000 gallons/day capability)
- Annual water use **reporting**

Note: This is the reason we know who is using how much water in Tippecanoe County.

But it does not require advance notification or a permit.

There is no procedure for addressing whether it is too much.



2. Indiana Code 14-25-4: Emergency Regulation of Groundwater Rights

- Provides for “Timely and Reasonable Compensation” to owners of **small capacity wells** affected by high-capacity groundwater pumping.
- Provides for restrictions on high-capacity groundwater pumping **upon the declaration of a groundwater emergency** under certain conditions

Note: There has been only one ground water emergency declared, in 1988 in Jasper and Newton Counties



3. Indiana Code 14-25-5 Emergency Regulation of Surface Water Rights

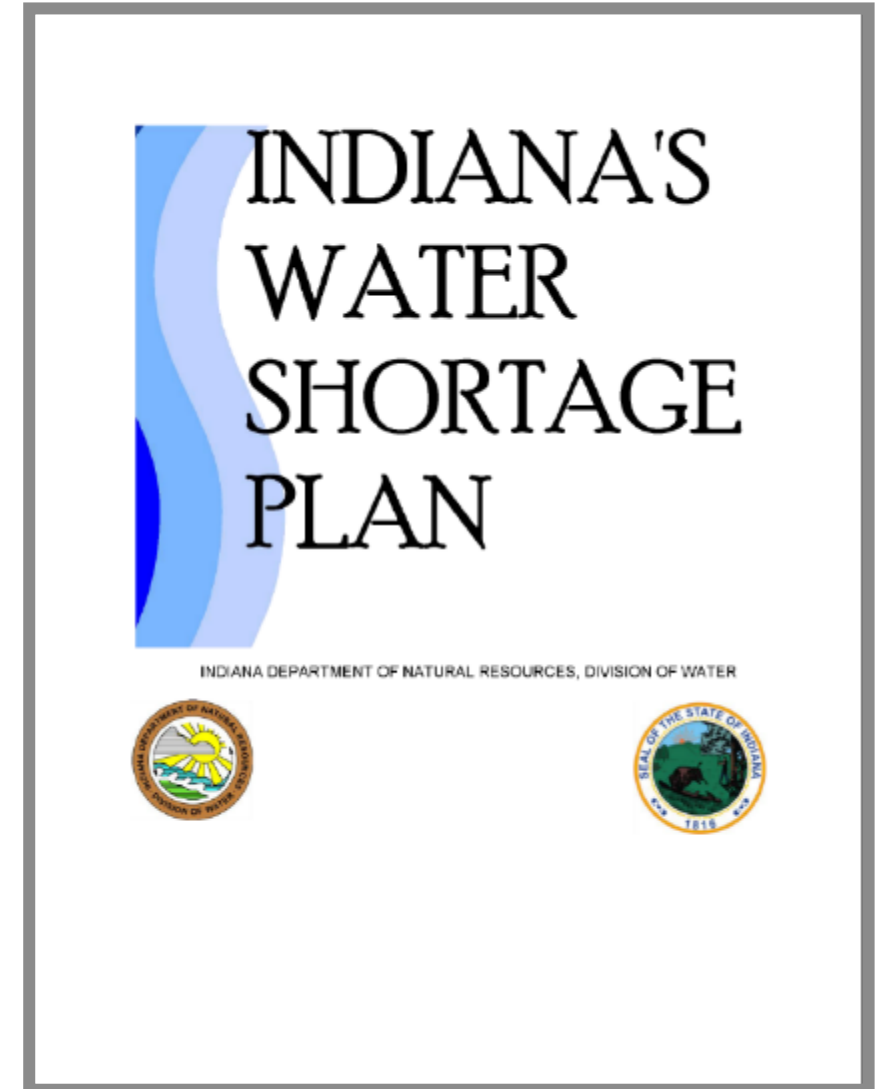


Applies only to freshwater **lakes with area at least 10 acres** at the normal level.

4. Water Shortage Plan (2015)

- Coordinated response to water shortage conditions
- **Voluntary** conservation to avoid or reduce shortages
- Resources and tools (e.g. model ordinance)
- Priority water uses

Voluntary plan, does not address impacts of proposed withdrawals



Conclusion from these laws:

What we have is the
“Law of the Biggest Pump”

Or “The biggest straw wins”

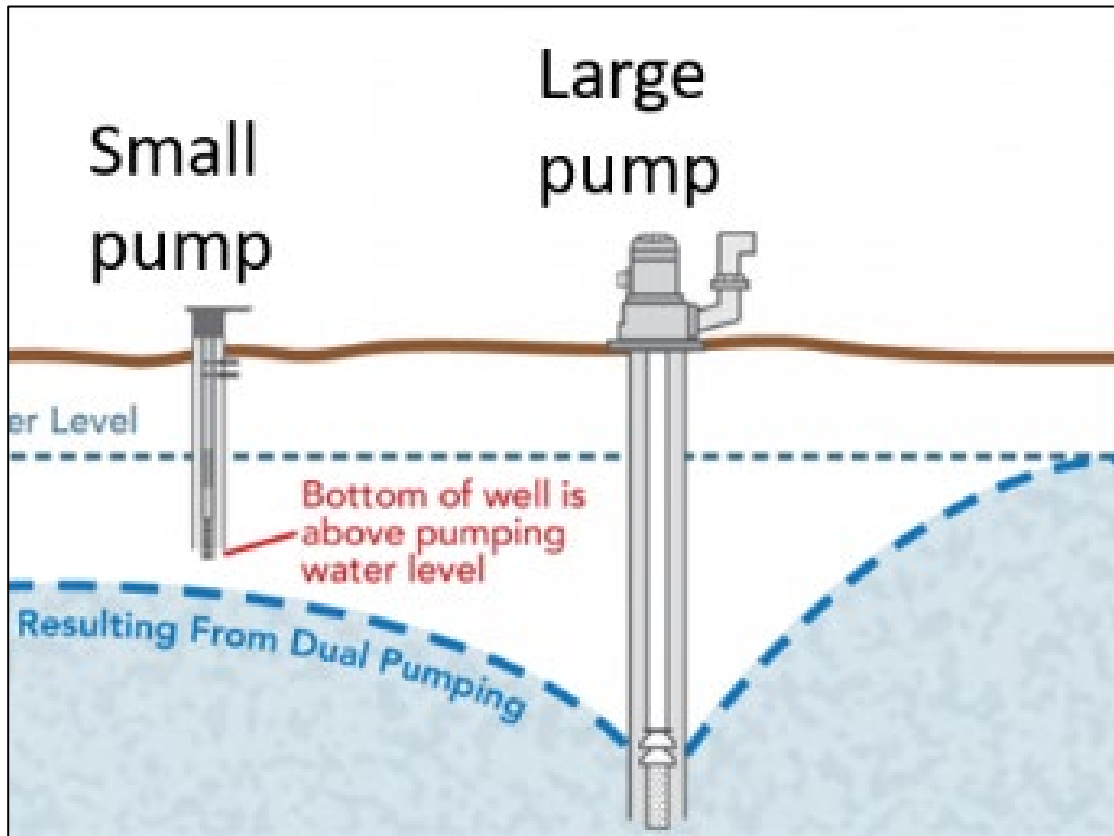


Image from <https://dnr.mo.gov/print/document-search/pub3001>

Generated by Microsoft AI

Study released last week

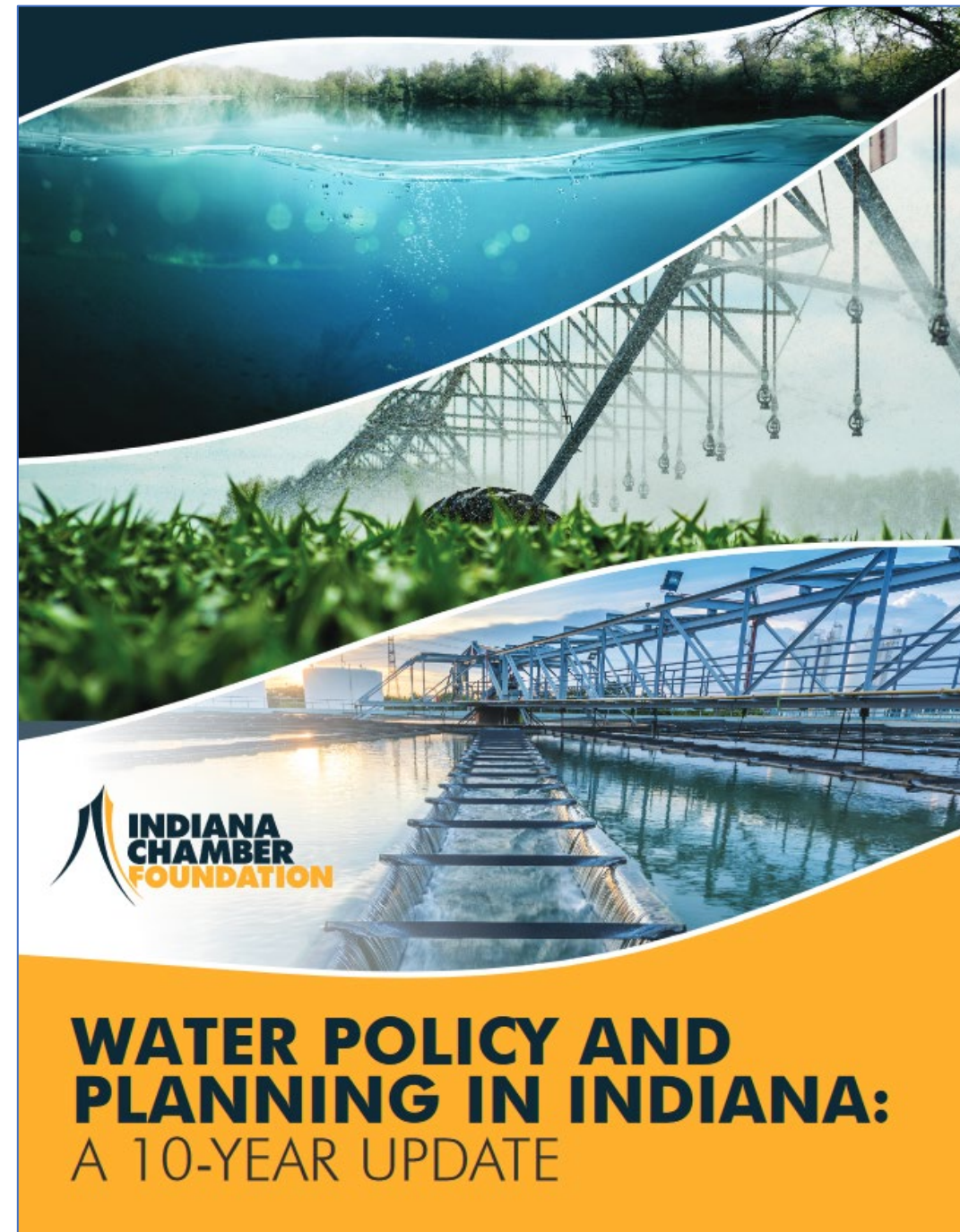
LEAP

“In Indiana, there are no water use limits if a person wants to use water. Historically, we did not need these rules. In the past we only used a small fraction of the resource.”

“Recent experience highlighted the weaknesses of management when there are few rules. Current state practice indicates that, when there is “reasonable use,” there is no limit imposed by the state for any withdrawals.

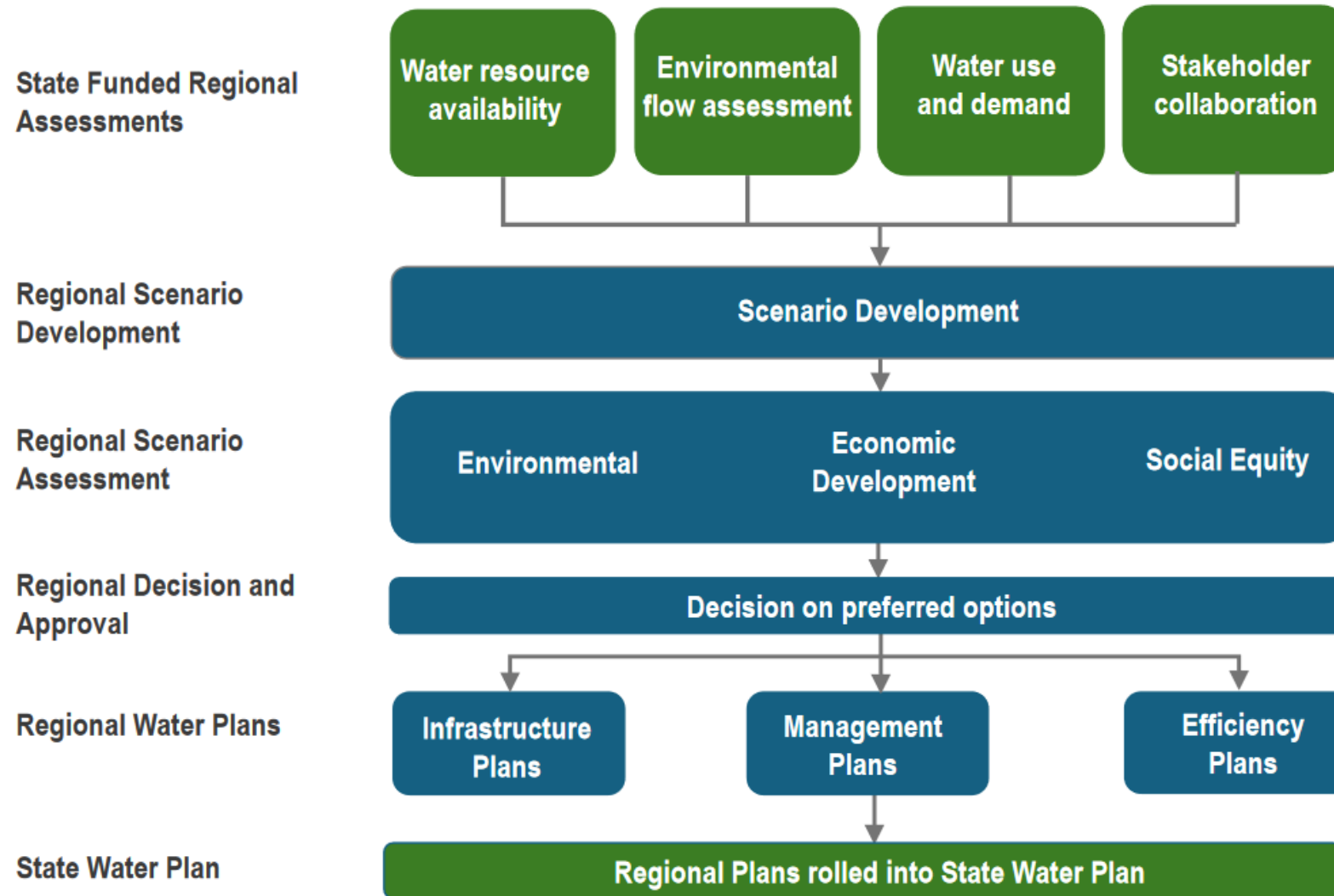
There are no provisions requiring conservation or water reuse during droughts.

There is also no evaluation of how new withdrawals could affect the natural ecosystem or downstream water users.



**WATER POLICY AND
PLANNING IN INDIANA:**
A 10-YEAR UPDATE

Proposes a suite of assessments and regional water planning





Potential effects of the water withdrawal: What we do and do not know



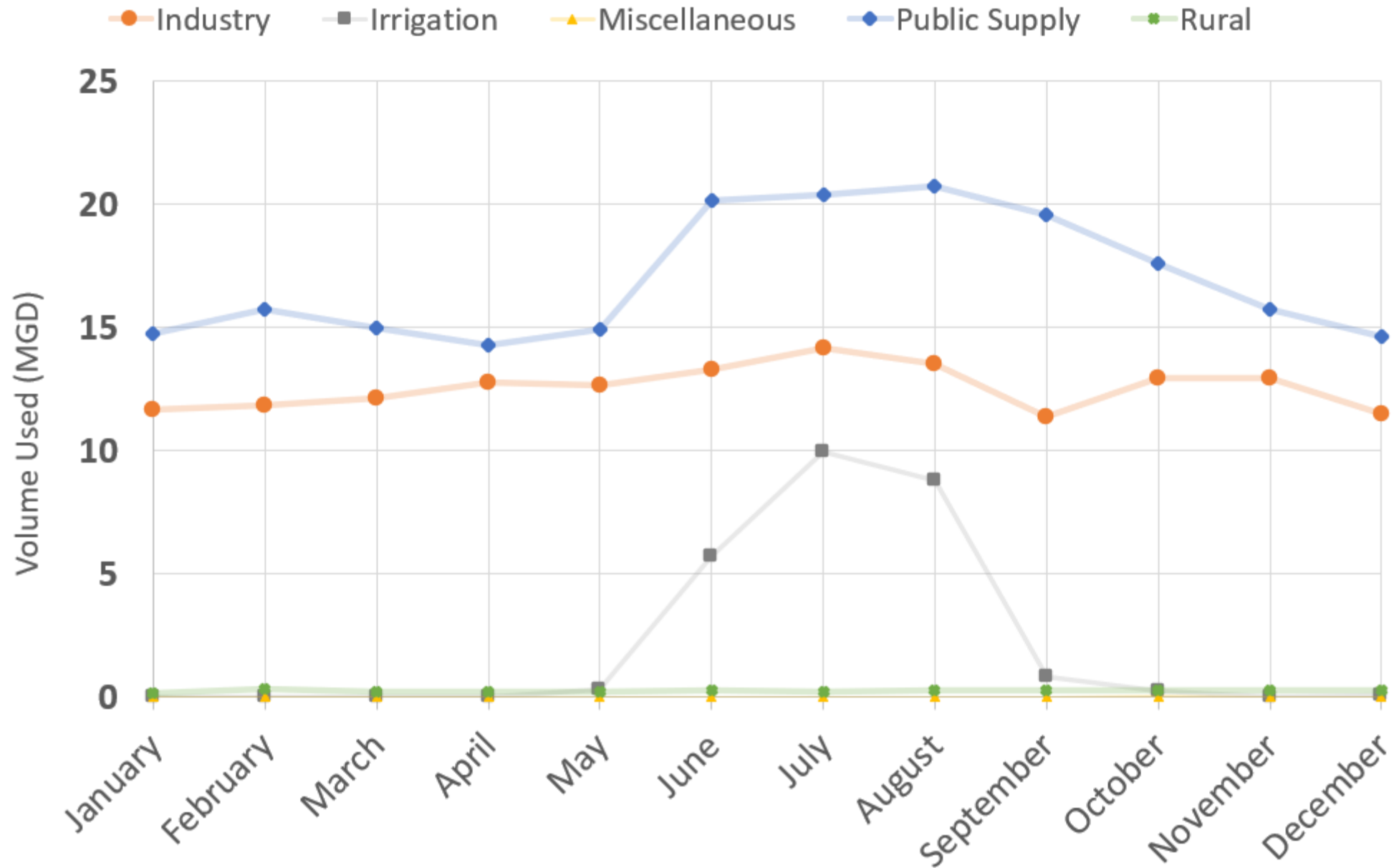
What effects of 100 MGD withdrawal are likely on...

- Ground water and those who use it?
- The Wabash River and its aquatic life?
- Potential future economic development?
- Downstream communities?
- Protected and sensitive land?



Average Monthly Water Use in Tippecanoe Co., 2020-2022

From IDNR Significant Water Withdrawal Database

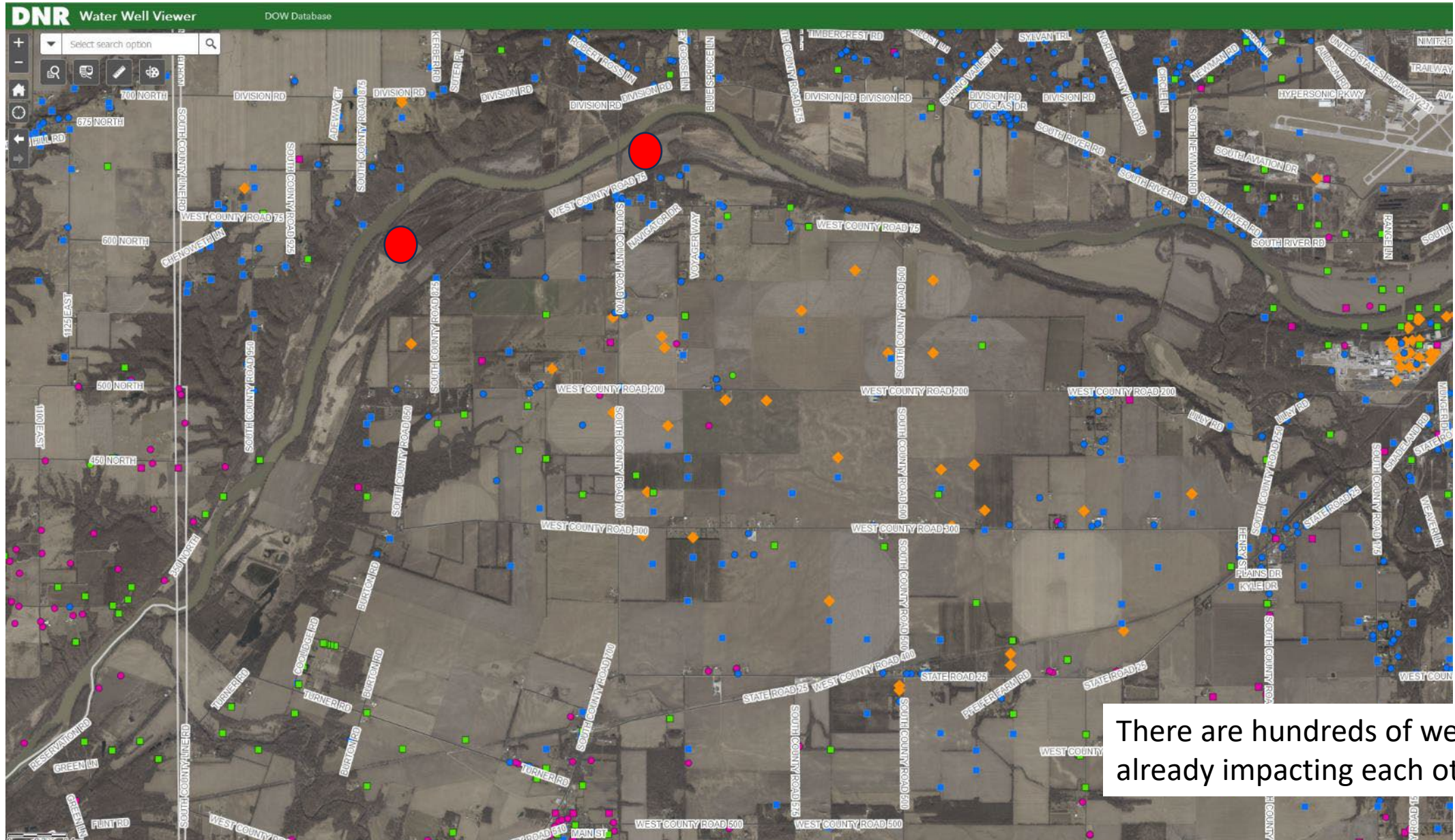


What effects of 100 MGD withdrawal on groundwater and neighboring home wells and irrigation wells?



Indiana DNR Water Well Records Viewer shows the location of all the wells

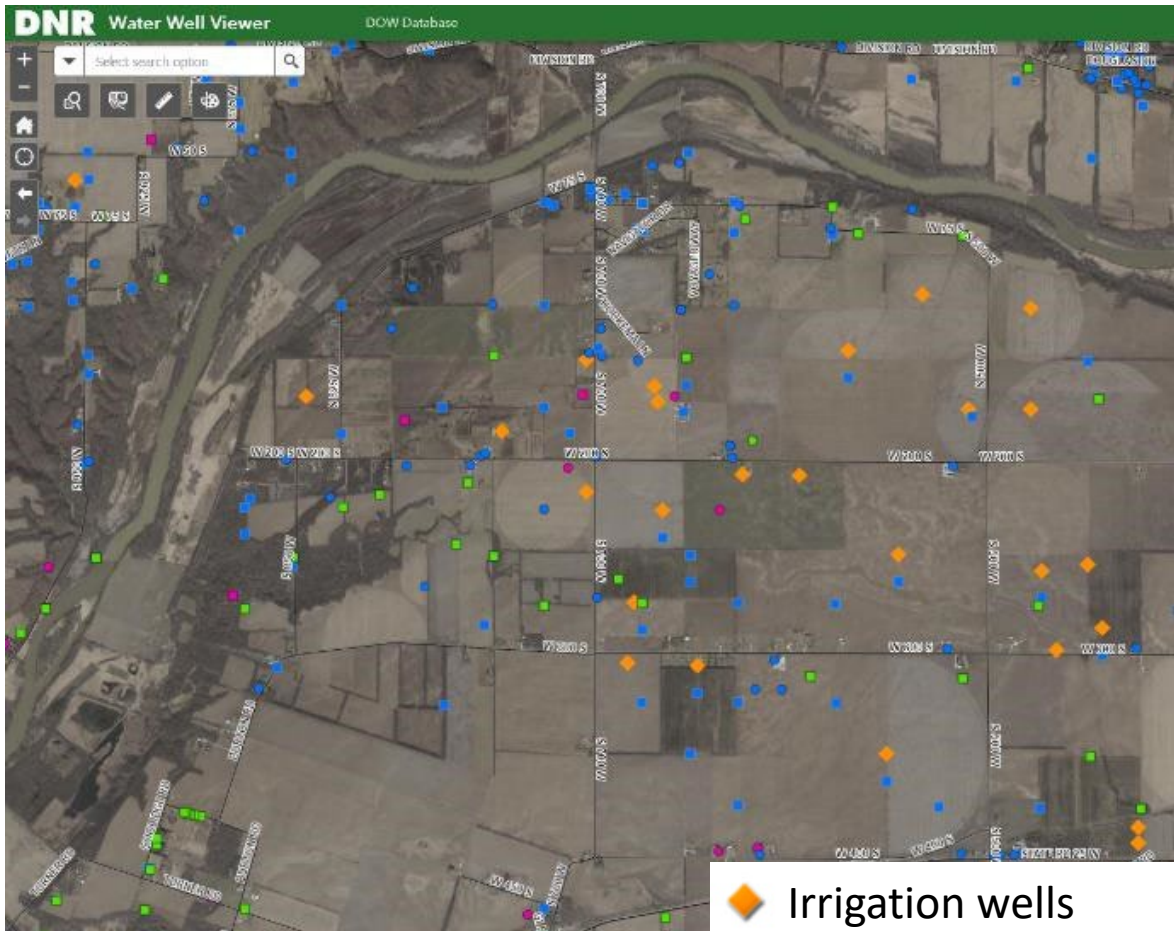
◆ Significant withdrawal wells (usually irrigation in this area)



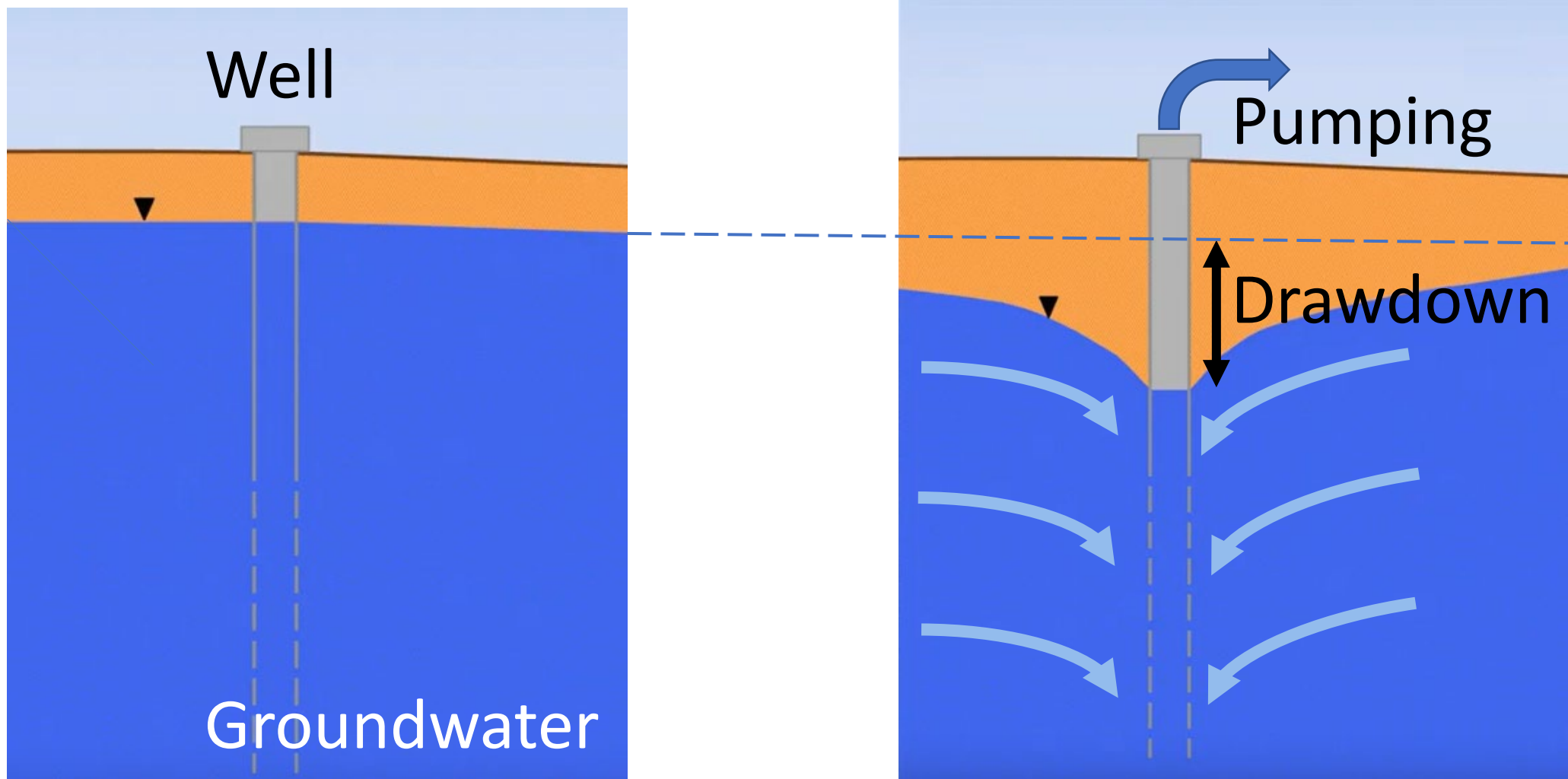
There are hundreds of wells, already impacting each other.

This includes several dozen irrigation wells within a few miles

- Irrigators are nervous, and not protected by Indiana's groundwater regulation.



All wells draw down the water table when pumped. Effect on aquifer is shown by the depth of drawdown.

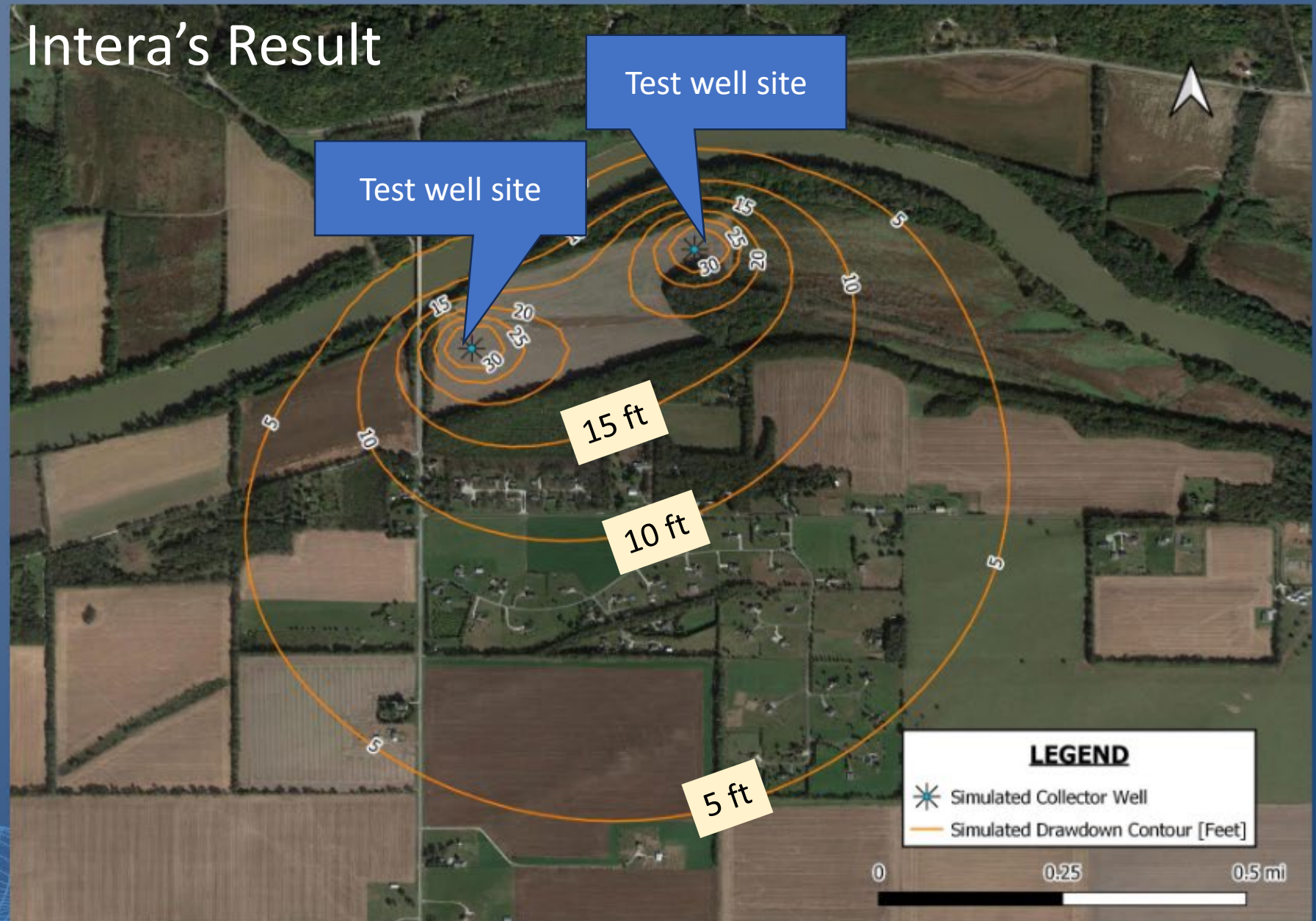


Maximum Drawdown Scenario

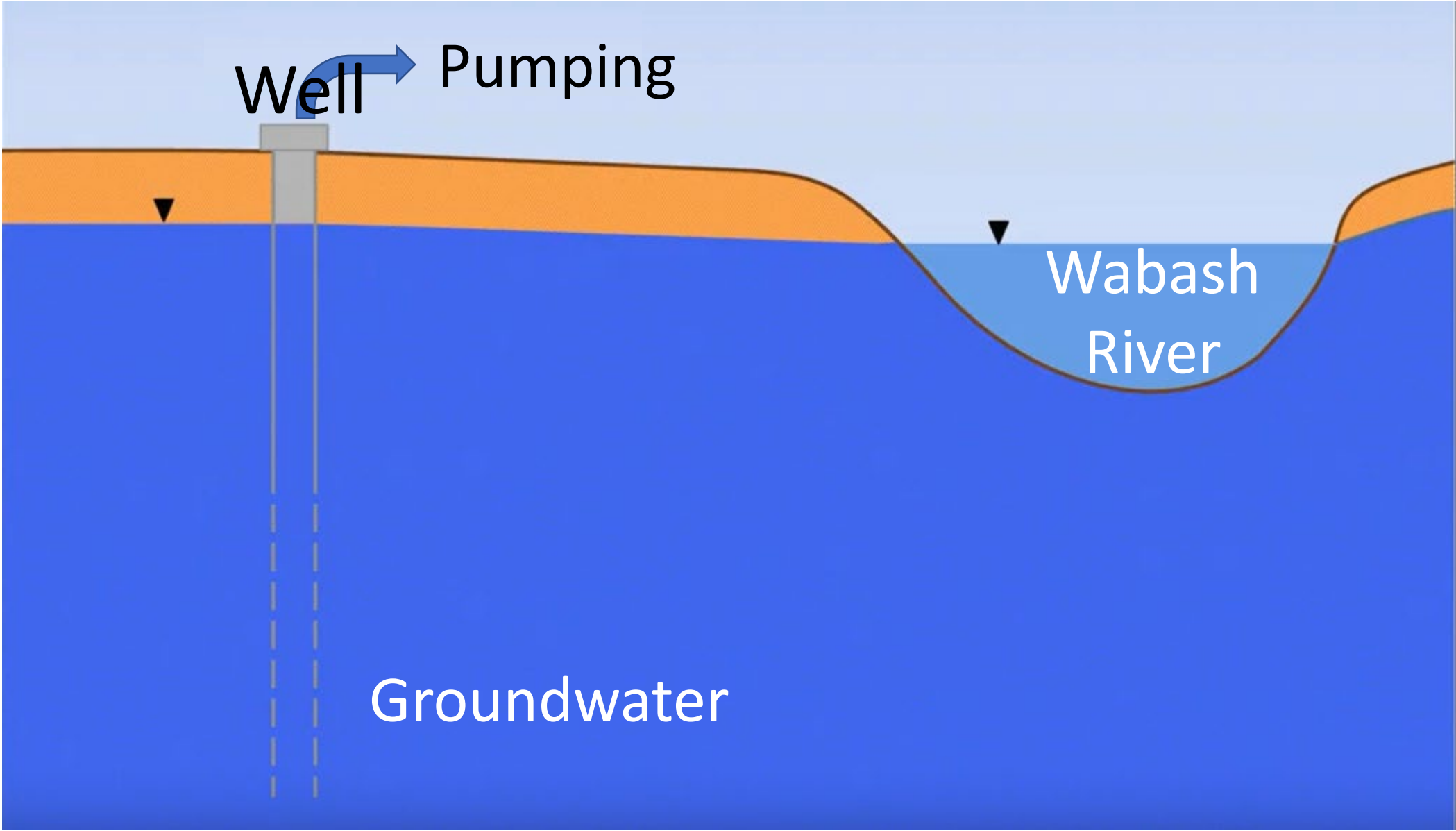
45 MGD
Combined
Pumping Rate

Is this too much?
It depends on the
depth of standing
water in the wells
currently.

Intera's Result

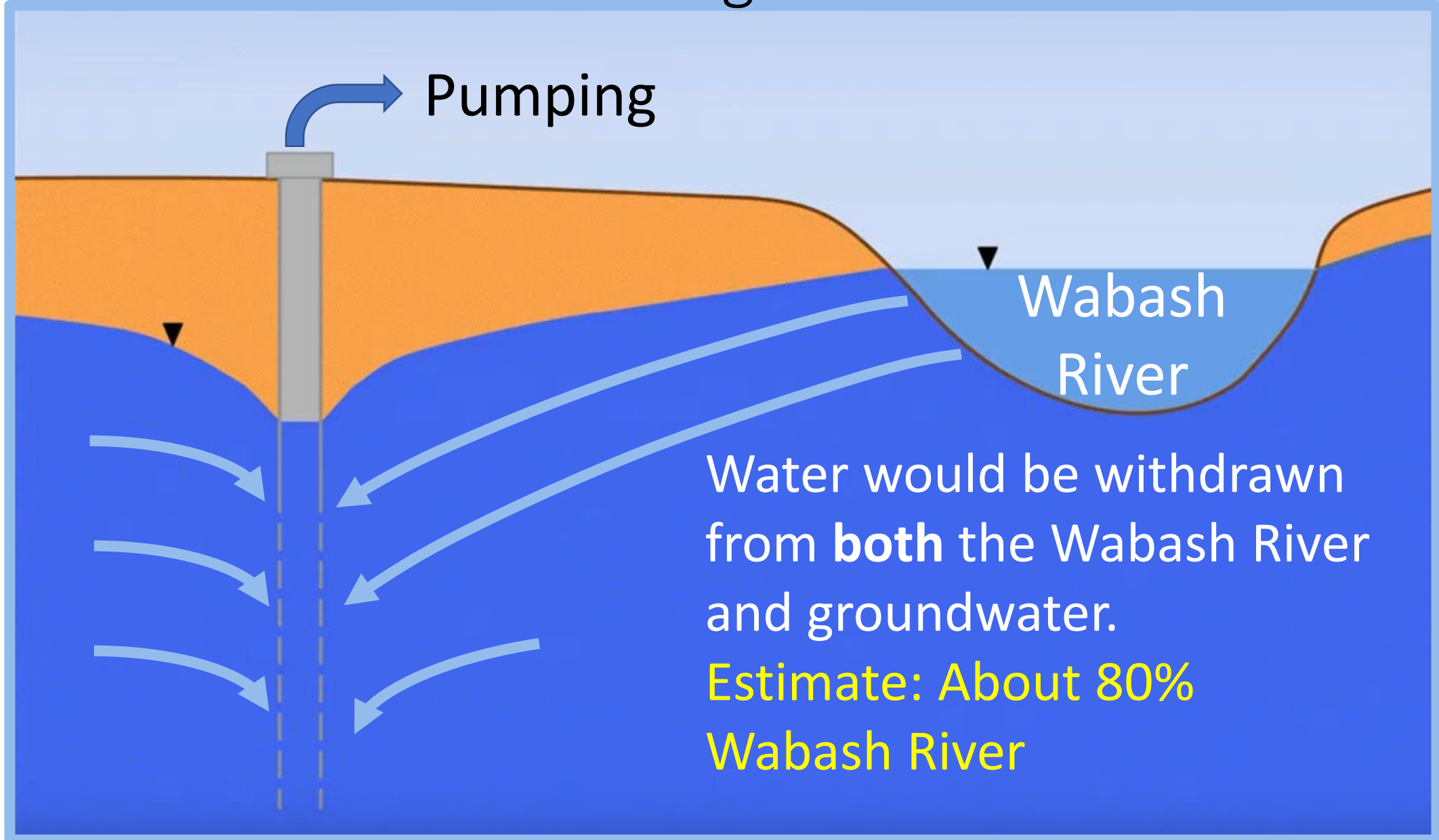


Riverbank Filtration – Draws from a well **near** the river



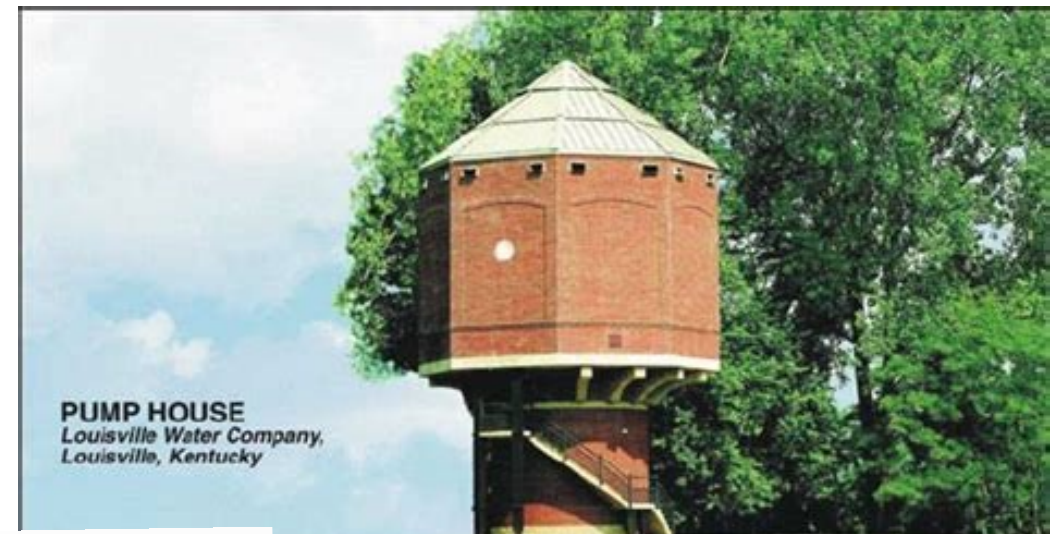
Adopted from Division of Water Sciences, University of Applied Sciences Dresden, Germany, <https://www.youtube.com/watch?v=83cjs6q8Xz0>

Riverbank Filtration – Uses groundwater + river water



They are proposing to us Ranney Collector Wells

- Horizontal “fingers” extend horizontally from the main well



ORDINANCE NO. 2023-26-CM

HIGH VOLUME WATER EXPORT AND RADIAL COLLECTOR WELL MORATORIUM

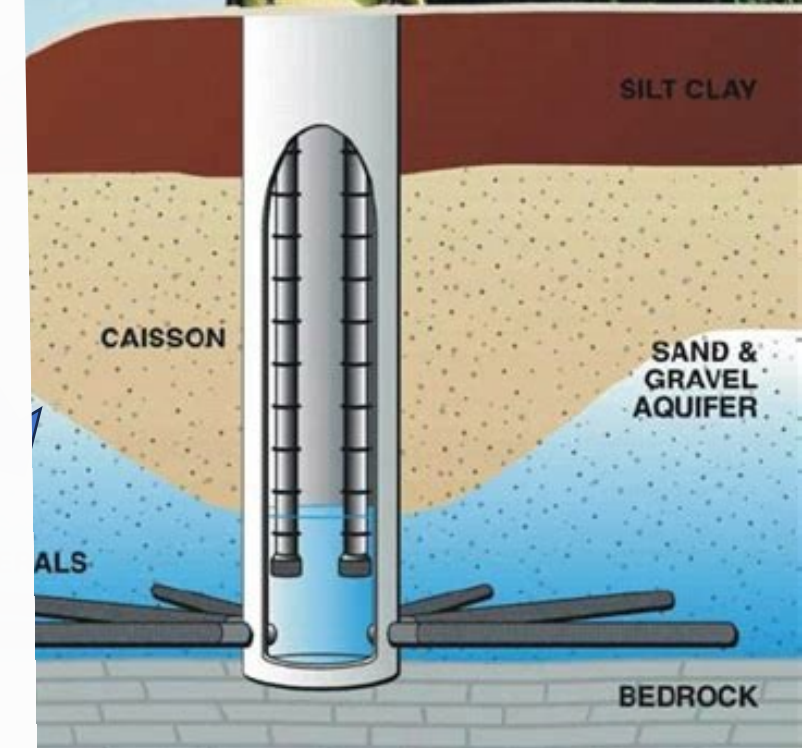
WHEREAS, the General Assembly has granted Home Rule authority to Tippecanoe County to exercise powers necessary for the effective government as to local affairs including such powers necessary or desirable in the conduct of its affairs (IC 36-1-3); and

WHEREAS, the County has authority to regulate excavation, drilling, and other movement of earth below ground level (IC 36-7-2-6); and

WHEREAS, the County may promote economic development (IC 36-7-2-7); and

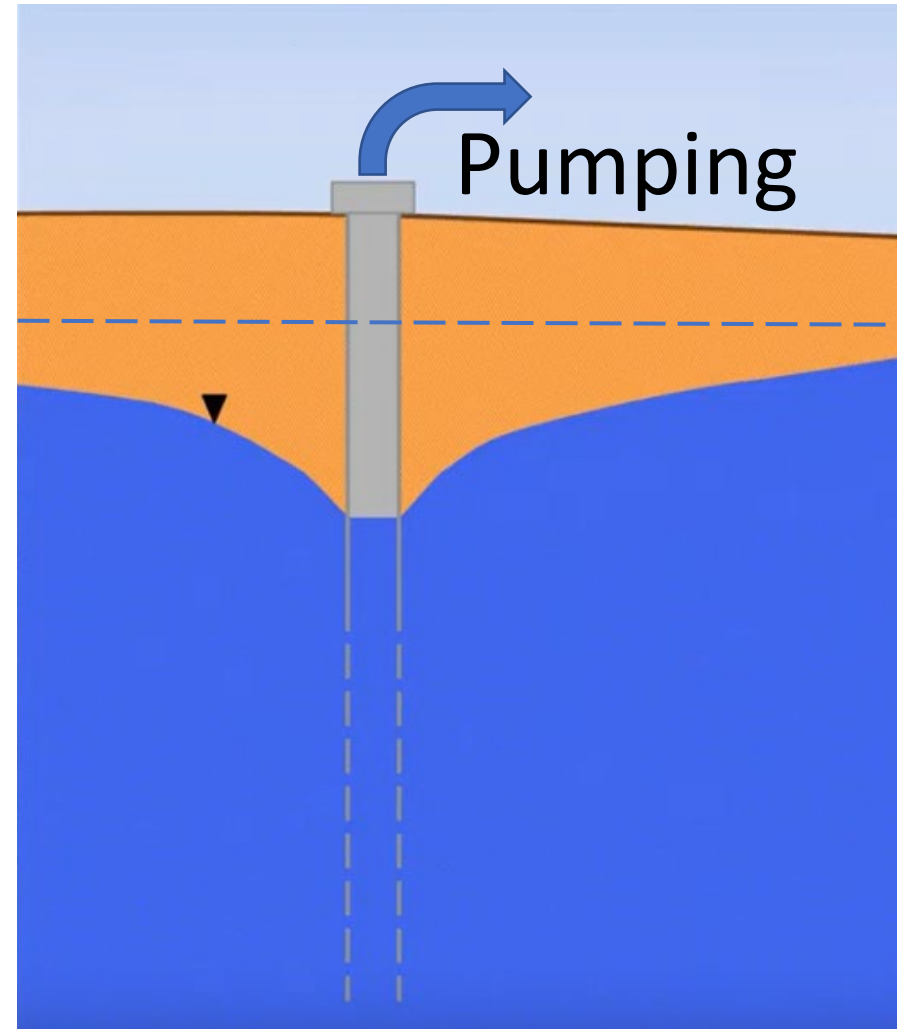
WHEREAS, the County may regulate conduct or use or possession of property that might endanger the public health, safety or welfare (IC 36-8-2-4); and

WHEREAS, the County may regulate any business use of a watercourse (IC 36-8-2-7);
and



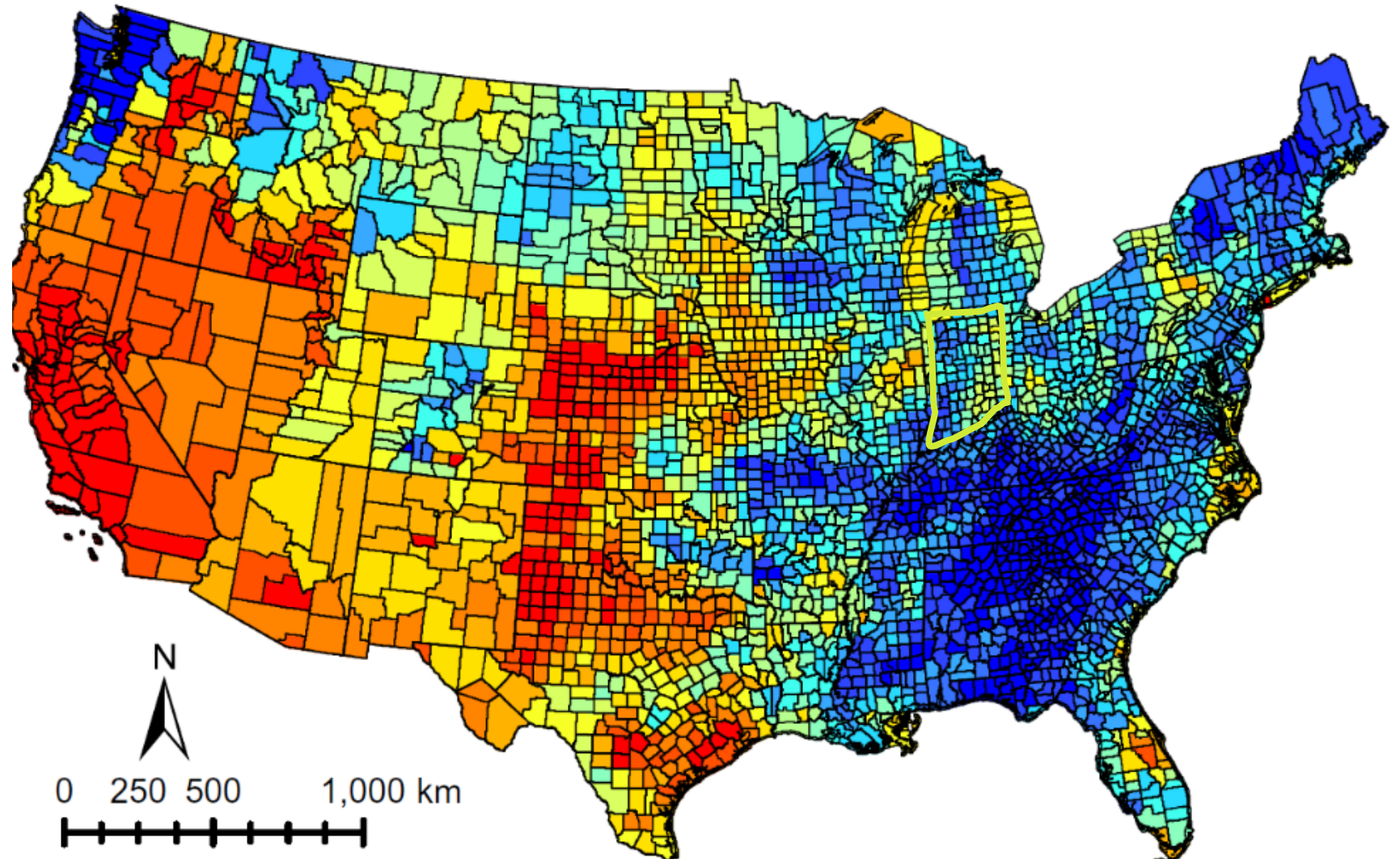
e Christensen, Missimer, 2009

Regional, long-term
question:
Could this withdrawal damage
the aquifer long-term, by
withdrawing more than recharge
-- as is the reality in the western
states?

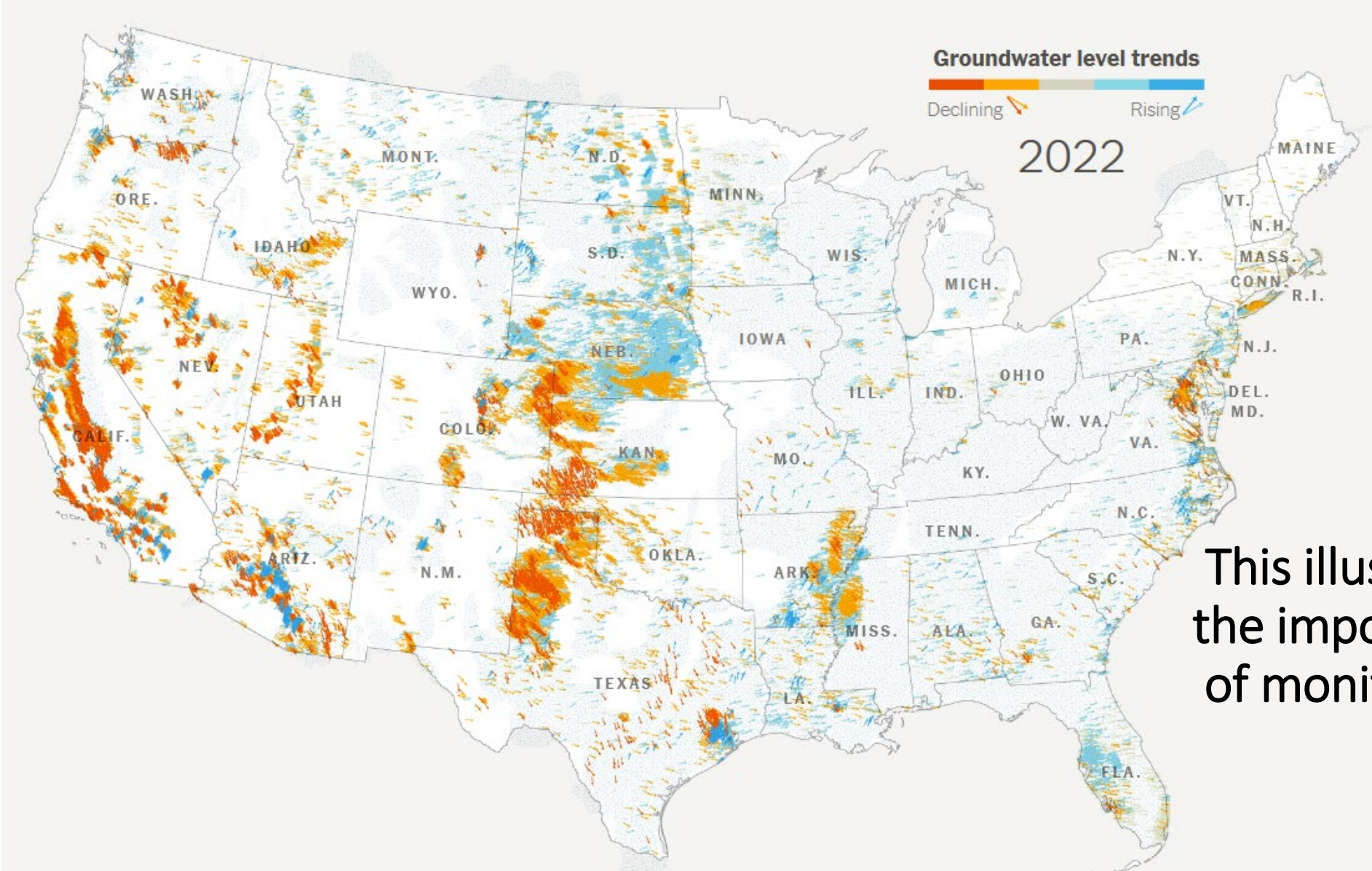


Aquifer recharge is generally greater than withdrawal in Indiana

**Annual Recharge
minus
Annual Withdrawal**



Water well levels are not generally going down.

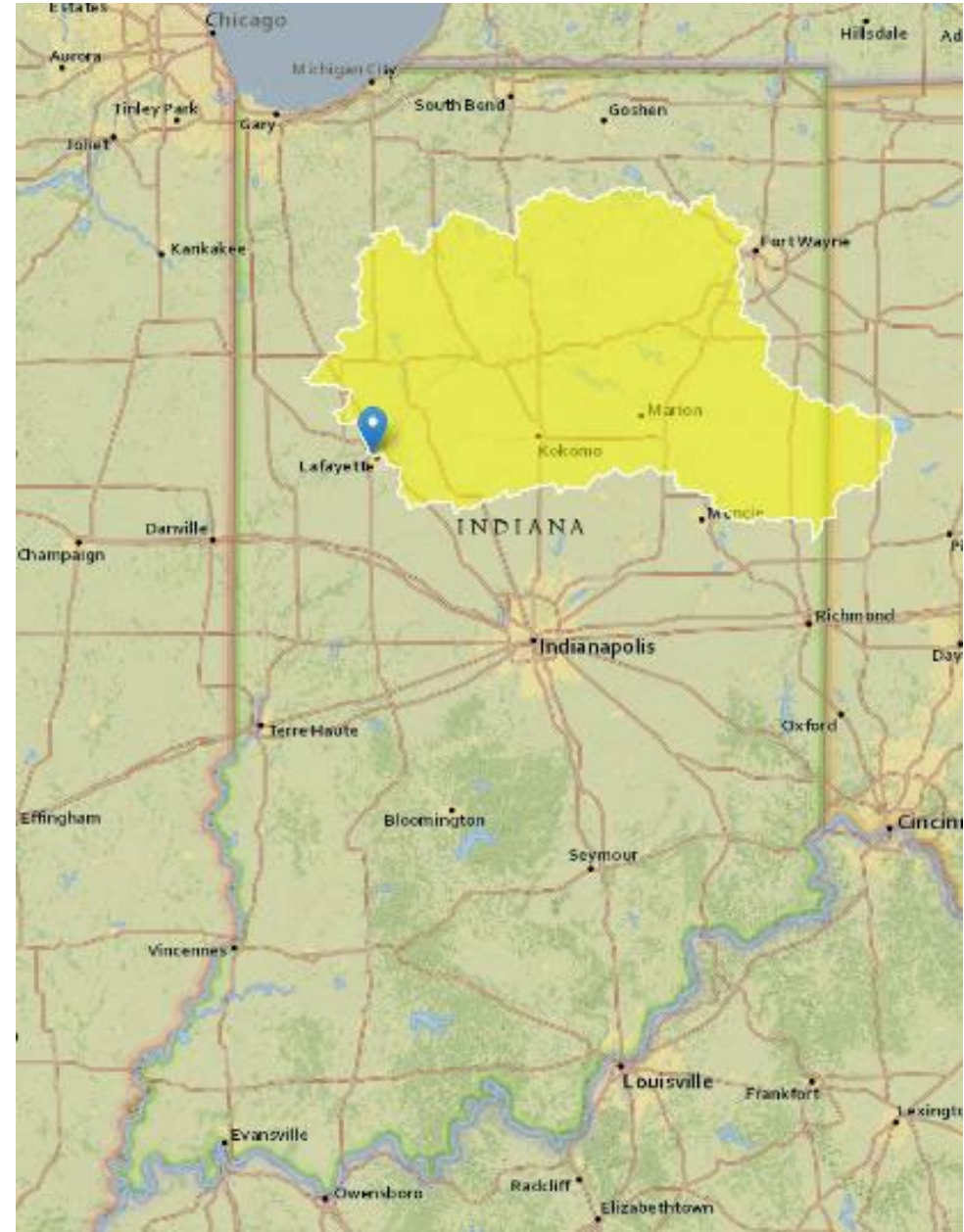


This illustrates the importance of monitoring.

What is the effect on the Wabash River?

The Wabash River at Lafayette is fed by a 6275 square mile watershed.

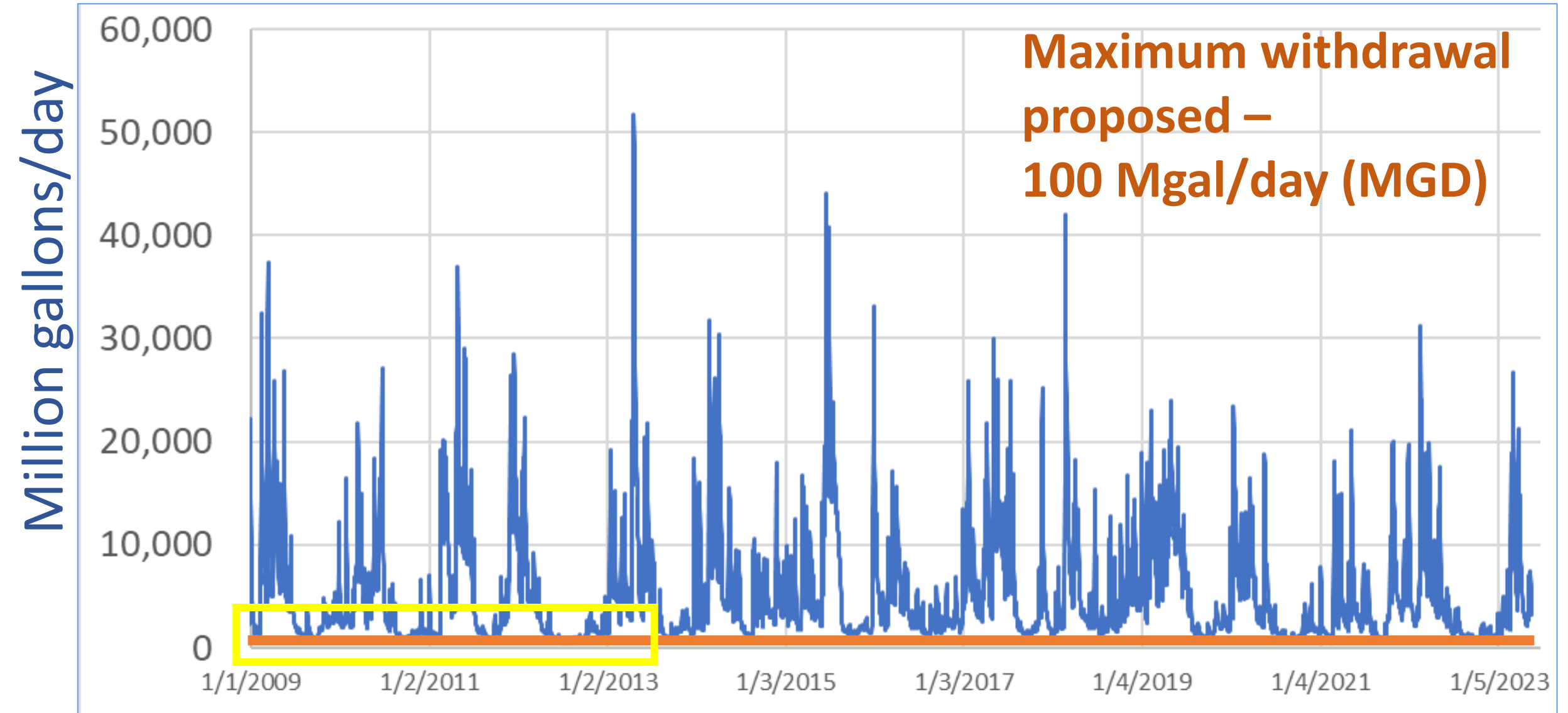
Average flow is **4,055 million gallons/day (MGD)**



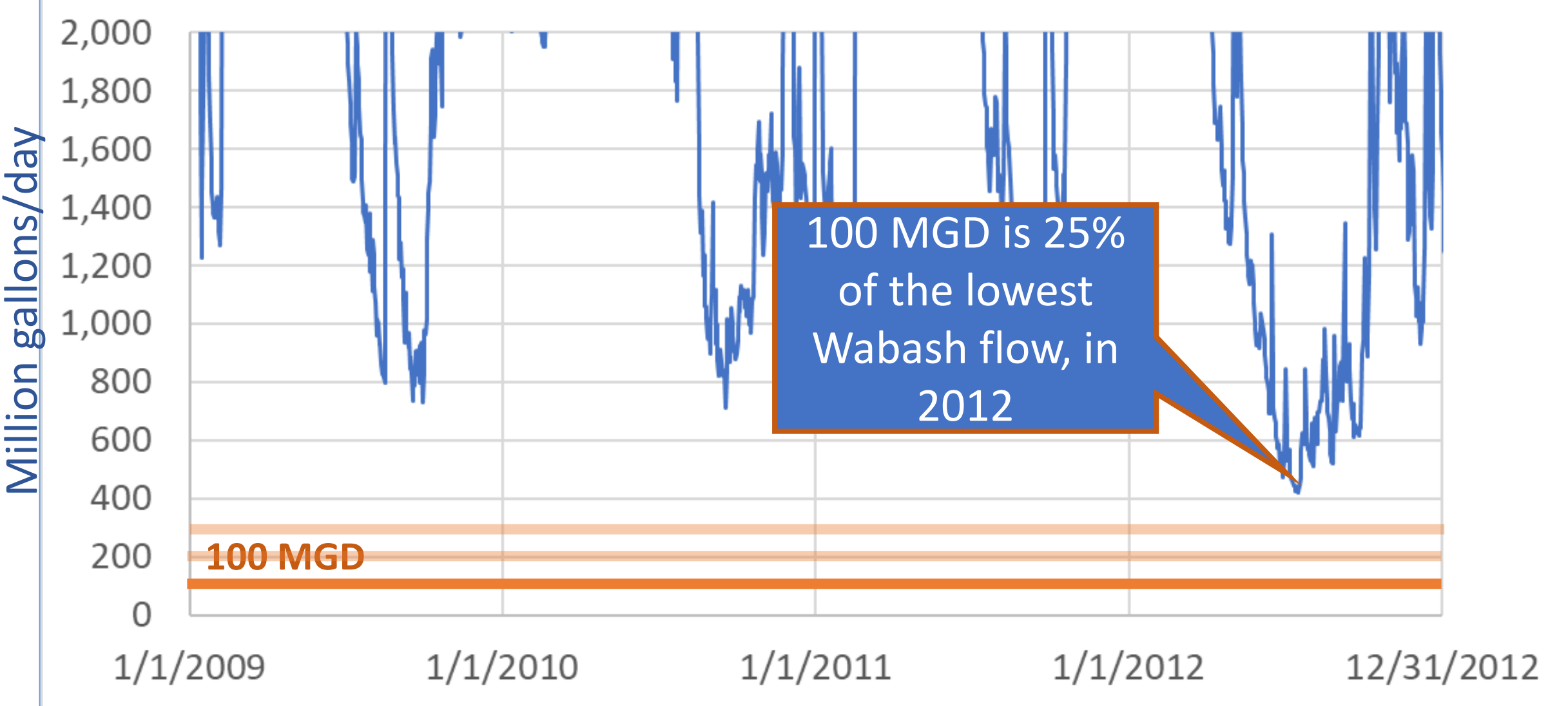
IMAGES | PHOTOGRAPHY



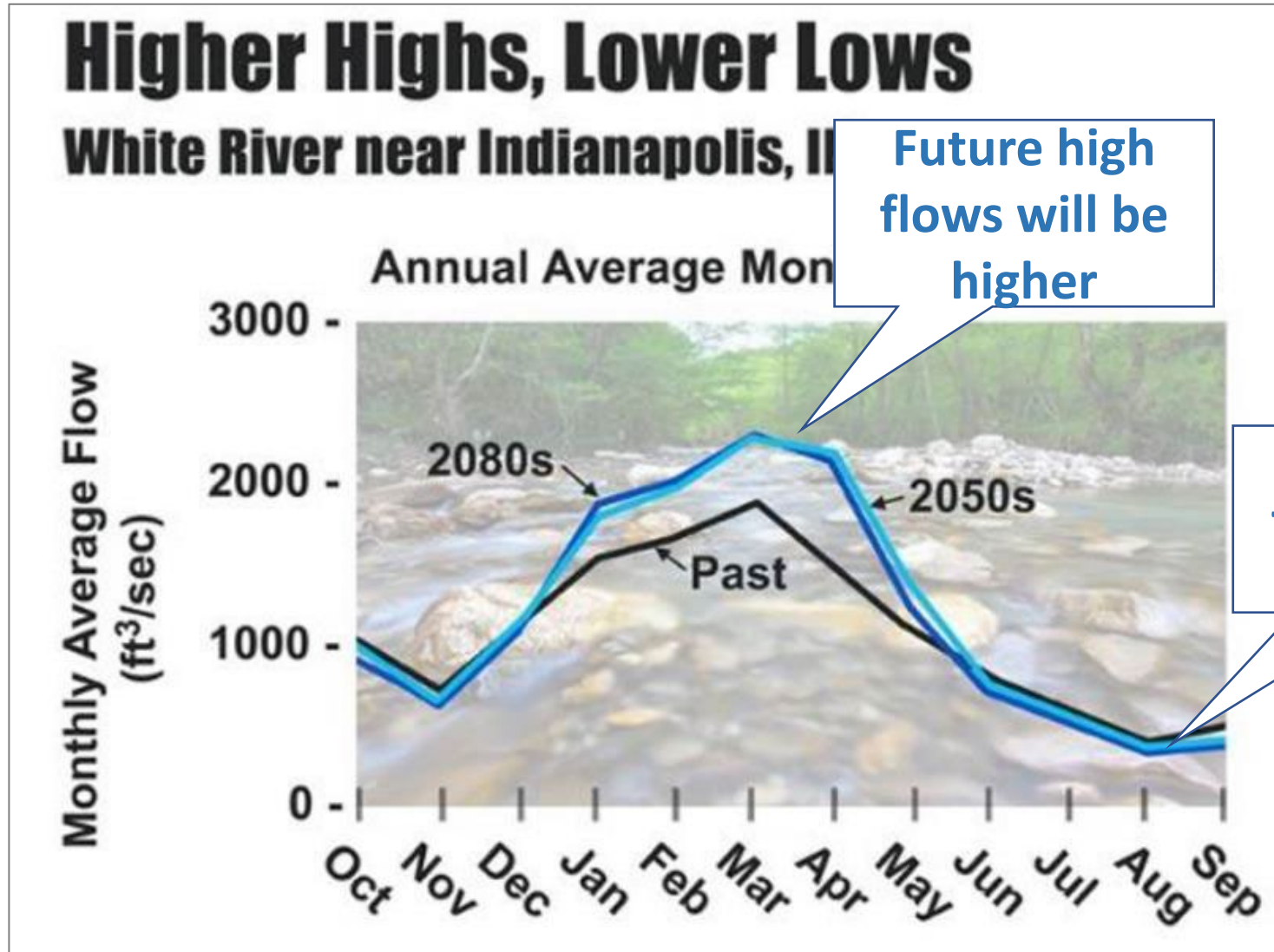
Wabash River flow at Lafayette in Mgal/day, 2009-2023



Wabash River flow at Lafayette in Mgal/Day, 2009-2012

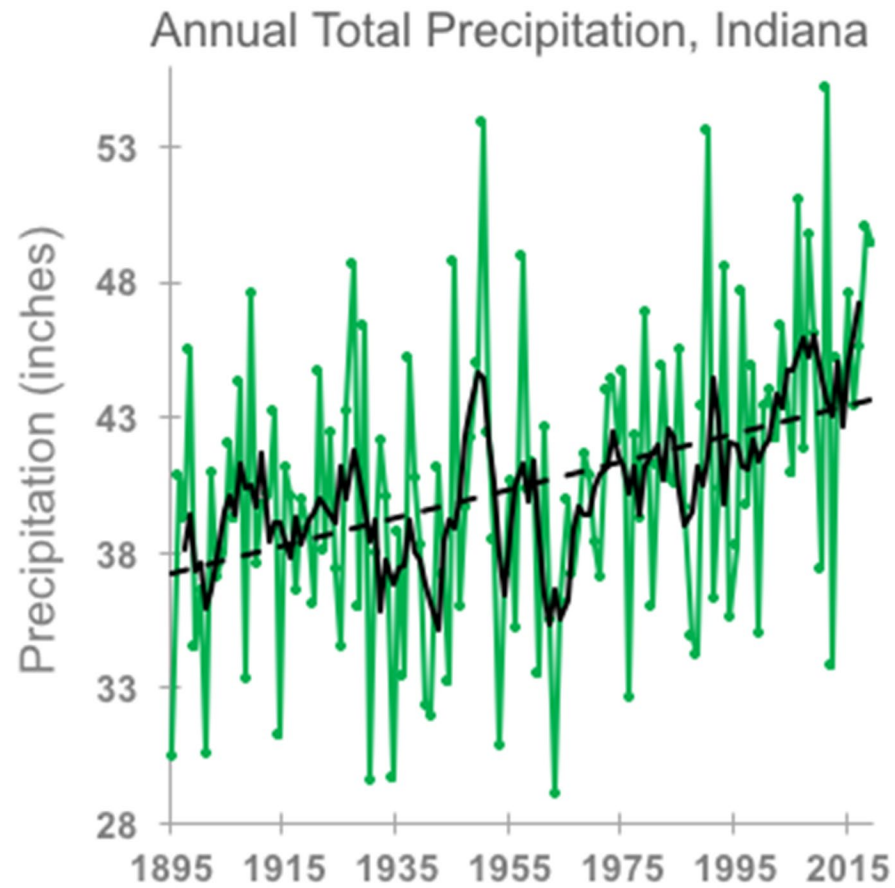


Climate change will make the flow more extreme

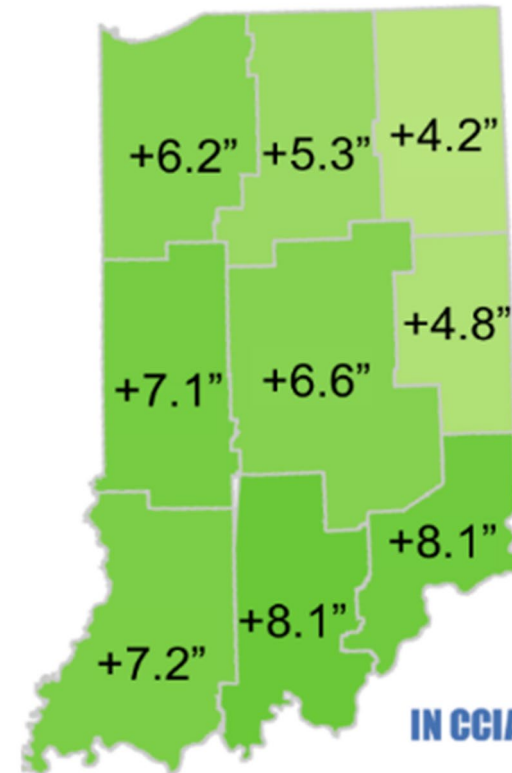


IN CCIA
Indiana Climate Change
Impacts Assessment

Average Annual Total Precipitation Change



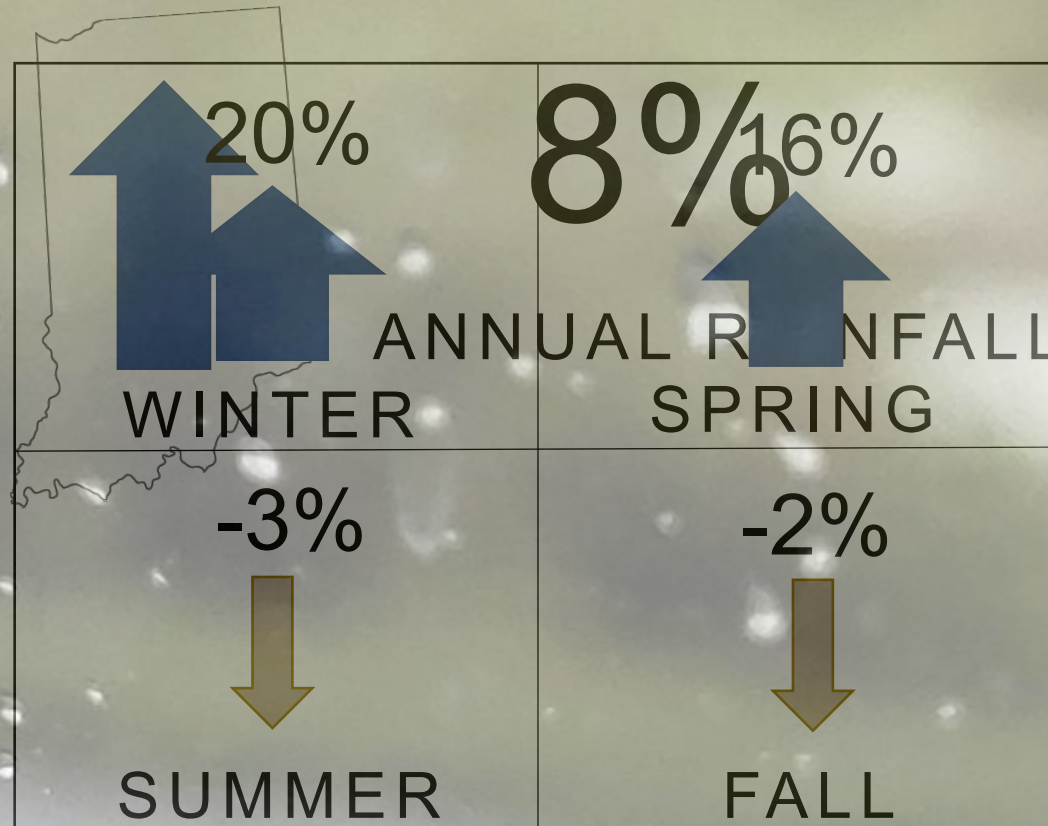
Trend = 0.52 in/decade



Change in annual average precipitation
based on linear trend between 1895 to 2019

2050

Relative to
1971-2000 average



Statewide Average
Widhalm et al. (2018)

*Future data based on high
emissions scenario, 2050*

Low flow impact:

What is the impact of 25% lower flow during low flows in the Wabash River?

- **Fish:** Can move to deeper pools, but smaller pools likely to be warmer and therefore lower dissolved oxygen.
- **Mussels:** Mostly sedentary, may be stranded or lose their food sources.



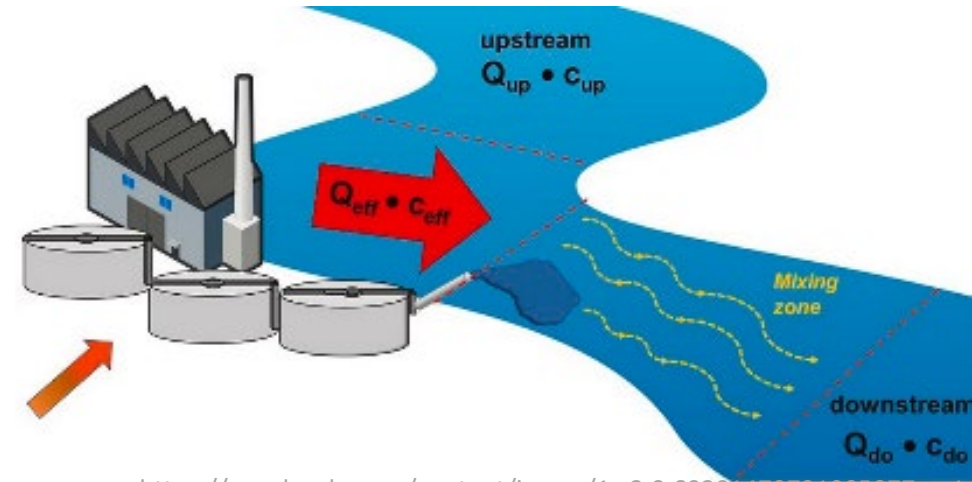
Dr. Reuben Goforth, Purdue Fisheries Biologist
(Purdue University photo)



Low flow impact:

What is the impact of 25% lower flow during low flows in the Wabash River?

- Wastewater permits in downstream communities may be affected by lower flow.
- No community uses the Wabash River as a water source, but many industries do.
- Other impacts should be studied.



https://ars.els-cdn.com/content/image/1-s2.0-S0301479721005077-ga1_lrg.jpg

Low flow impact:

What is the impact of 25% lower flow during low flows in the Wabash River?

- Could it make other industries less likely to invest in the Lafayette area, since water supply becomes less reliable?



The water will eventually return to the Wabash River



Transfer of study to the Indiana Finance Authority may help, as they will be asking broader questions water availability questions.



North Central Water Study

Directed by the Indiana Finance Authority

PROJECT PURPOSE

The primary goal of the North Central Water Study is to provide a better understanding of the supply and demand of water resources in Benton, Cass, Carroll, Clinton, Fountain, Howard, Montgomery, Parke, Tippecanoe, Tipton, Vermillion, Warren and White counties.

PROJECT VISION

When complete, the project will provide a data-driven foundation for collaborative decision making on shared water needs, challenges, and opportunities.

PROJECT STRATEGIES



Inventory and Build Upon Current Knowledge

- Identify data gaps
- Inventory the water resources of North Central Indiana
- Upgrade monitoring networks to address data gaps



Collaborate Across Many Partners

- Consult with utilities and industry to better understand current and future needs
- Establish productive partnerships among water-resources agencies



Evaluate Future Water Demand

- Quantify current water use and forecast future demand
- Include water conservation, population and economic growth, and historical droughts



Understand Available Supply

- Examine regional water availability
- Explore the impact of groundwater quality on availability
- Investigate surface water and groundwater interactions
- Build a regional water-resources model based on water budgets and geology
- Utilize the model to investigate potential regional water supply limitations and/or surpluses



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IFA / REGIONAL WATER STUDIES / NORTH CENTRAL INDIANA WATER STUDY

North Central Indiana Water Study

Overview

The primary goal of the IFA's North Central Indiana Water Study is to improve the understanding of estimated future groundwater and surface water demand and availability within the public water utility sector so that a gap analysis can be conducted. The questions the study is looking to answer include: How much water is currently available? Will there be enough water to meet the 50-year Public Water Supply needs?

The study will examine the 50-year demand and supply availability in the watersheds, which are primarily located in Boone, Clinton, Fountain, Fulton, Howard, Kosciusko, Montgomery, Parke, Pulaski, Tippecanoe, Tipton, Vermillion, Vigo, Warren, and White counties.

It is important to note, this study is not a continuation of any water related investigations that may have been conducted in the region. However, all relevant data will be evaluated for the inclusion in the IFA's final report.

The IFA has retained Stantec Consulting Services, Inc. and Jacobs Engineering Group, Inc. to complete the study.

Updates will be made available periodically as information becomes available and the final report is anticipated to be released in December 2024.



How can we improve water policy to protect water in the future?

- Is this an opportunity to improve water information in the state, and develop sensible oversight to be able to better manage water for future generations?

Tippecanoe County elected officials are united in seeking legislation for state oversight of large water withdrawals.



Photos: Journal and Courier – From meeting at the National Guard Armory with approximately 500 citizens (Deery, Negele, Alting, Klinker, Campbell)

Sen. Deery and Rep. Negele introduced identical bills, but they were not heard in the 2024 legislature.

House Bill 1305

Major ground water withdrawal facilities.

Introduced House Bill (H)

Authored by: [Rep. Sharon Negele](#).

Co-Authored by: [Rep. Mark Genda](#), [Rep. Mike Aylesworth](#), [Rep. Heath VanNatter](#).

Senate Bill 249

Major ground water withdrawal facilities.

Introduced Senate Bill (S)

Authored by: [Sen. Spencer Deery](#), [Sen. Ron Alting](#), [Sen. Ed Charbonneau](#).

Co-Authored by: [Sen. Susan Glick](#), [Sen. Blake Doriot](#).

Summary

Major ground water withdrawal facilities. Defines a facility as a "major ground water withdrawal facility" if: (1) the facility includes one or more wells that have the capability of withdrawing at least 10,000,000 gallons of ground water from one or more aquifers in one day; and (2) the facility is connected, or plans provide for the facility to be connected, to pipeline facilities through which at least 10,000,000 gallons of ground water withdrawn by the facility's well or wells could be transported in one day to a destination located at least 20 miles from the facility. Provides that, after June 30, 2024, a person may not establish a major ground water withdrawal facility if the ground water withdrawn by the facility will be used primarily for: (1) commercial purposes; (2) industrial purposes; or (3) a combination of commercial purposes and industrial purposes; unless the person has obtained a permit from the natural resources commission (commission).

Establishes the following prerequisites to the commission's issuance of a permit: (1) Public notice of the permit

Proposed Bill (was not heard)

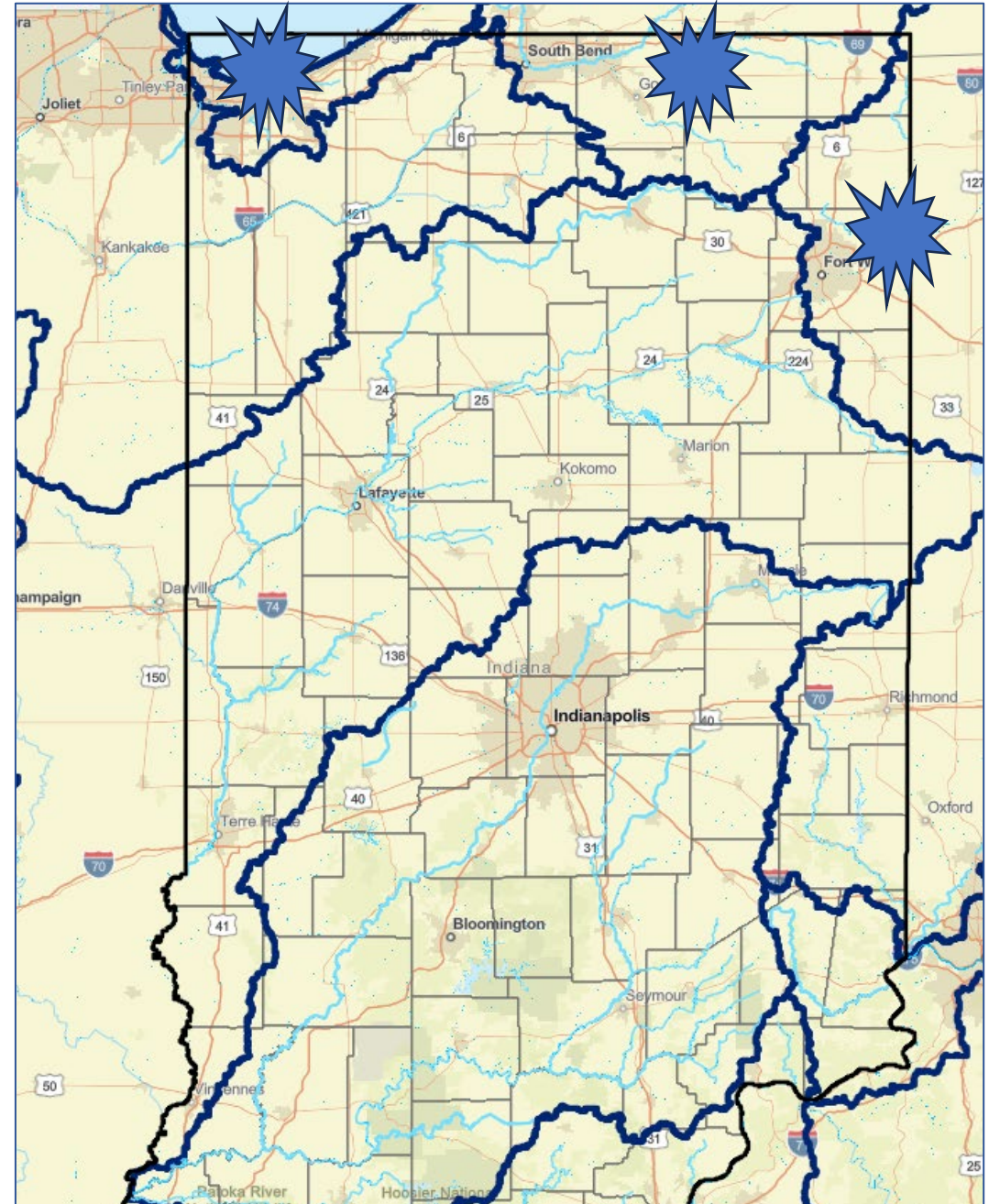
- **Defines a major groundwater withdrawal facility.** Pumps 10 million gallons per day and connected to a pipeline that could take water 20 miles or more.
- **A permitting process.** Requires public notice of permit applications through the Department of Natural Resources website and by mail to county and city leaders, and a written, peer-reviewed feasibility study.
- **Permit approval requirements.** The Natural Resources Commission would determine whether the facility **“will fulfill the health, economic, environmental and other needs of present and future generations of Indiana citizens.”**
- **Maximum draws.** The bill would allow permits to limit the maximum amount a major groundwater withdrawal facility may take and transfer each year.
- **Agricultural protections.** The bills would offer compensation to irrigators within 10 miles of a major groundwater withdrawal facility determined to have caused problems.

Other policy ideas/models:

Great Lakes Basin

Indiana already has much stricter oversight in a small part of the state.

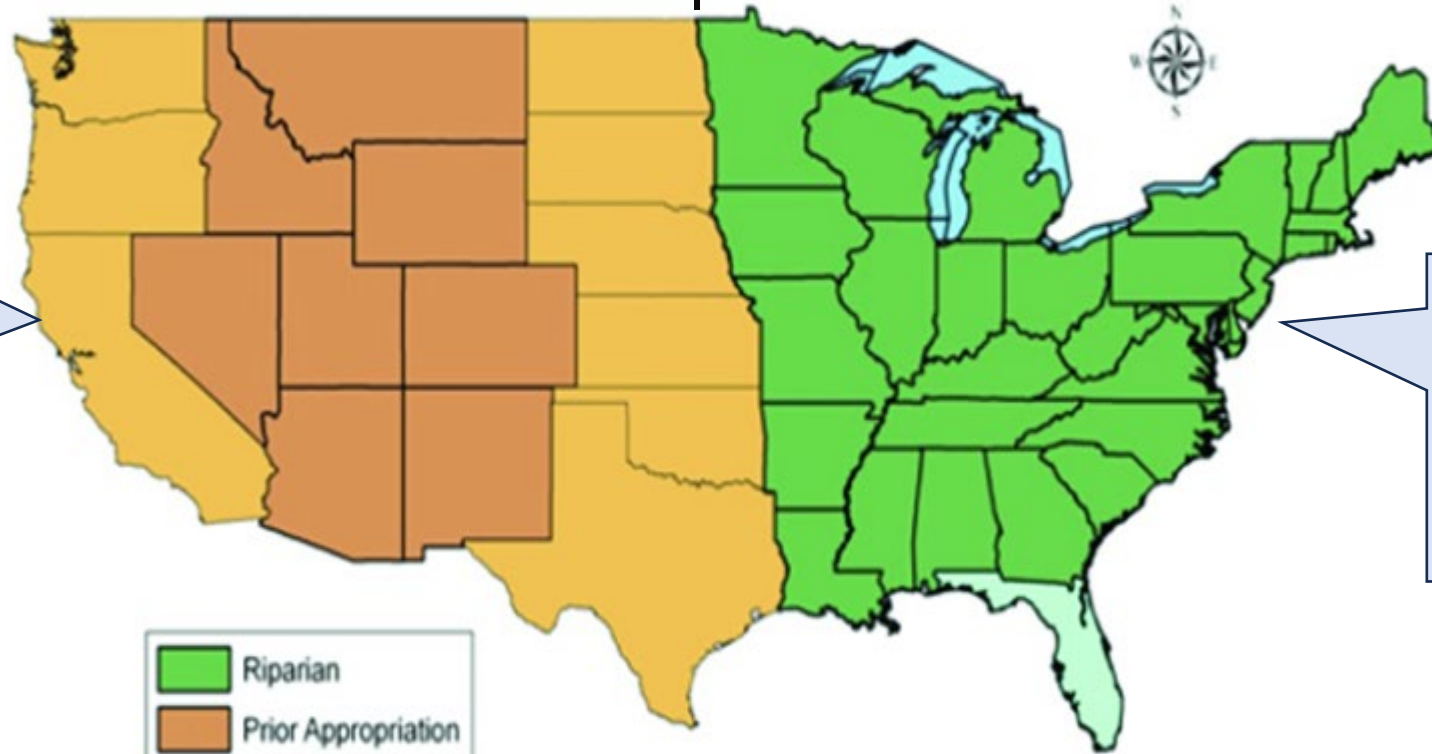
- No diversion out of the Basin
- General permit required for withdrawals more than 1 MGD
- Individual permit required for any withdrawal that averages 5 MGD for 90 days.



What do other states do?

Prior Appropriation

Riparian or Regulated Riparian



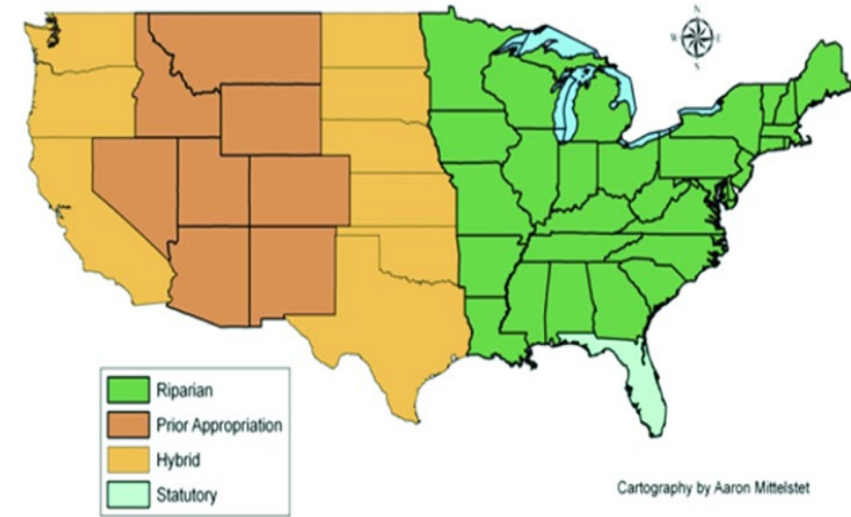
Too different to be relevant to Indiana

Policies relevant to Indiana



Many states require a permit for large water withdrawals or transfers

- **No permit:** Missouri, Illinois, **Indiana**
- **Permit Required:** Iowa, Ohio, Michigan (Registration), Minnesota, Kentucky, New York, Connecticut

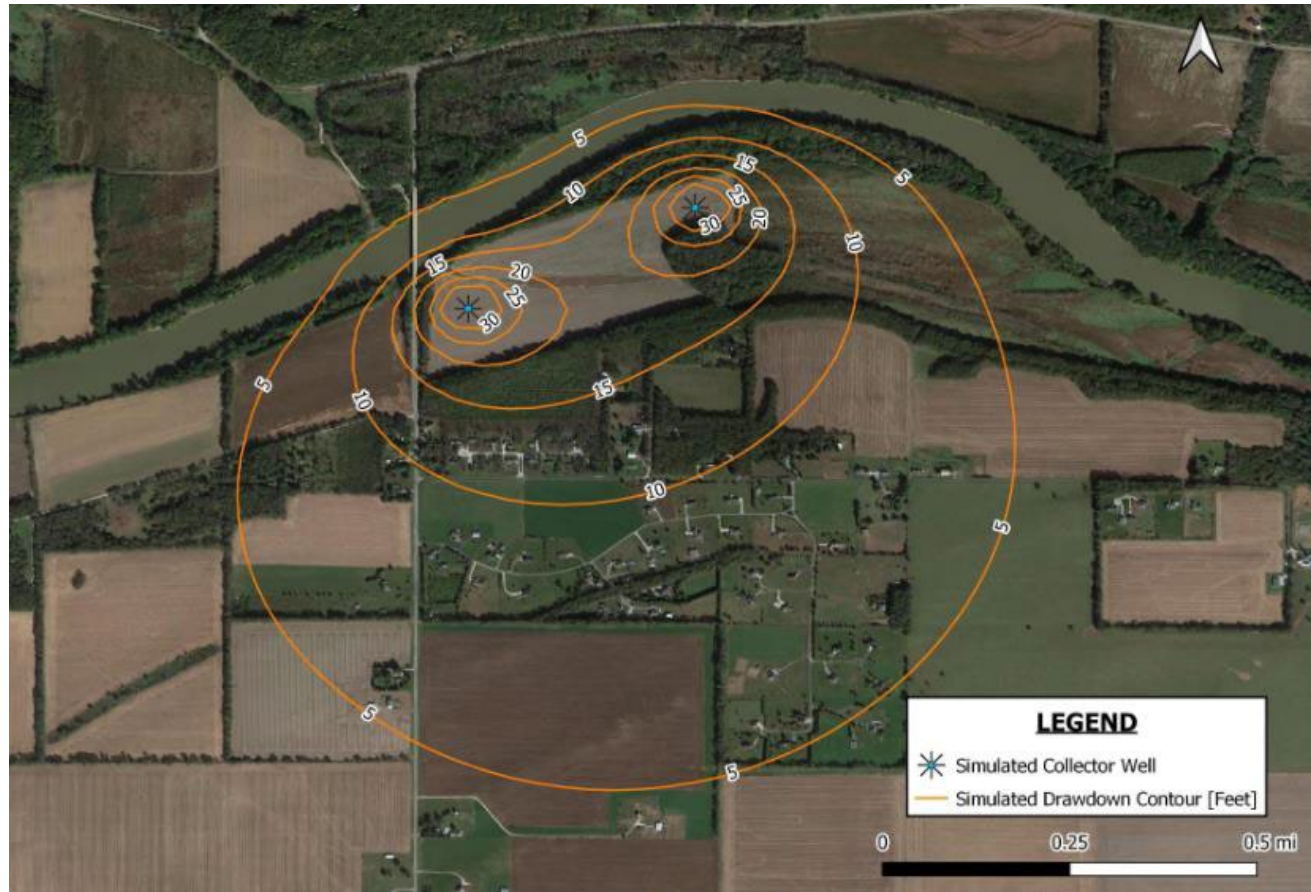


Many choices need to be made in a permit system. Minimum threshold for requiring permit:

- < 100,000 gal/day: Minnesota, Kentucky, Iowa, Connecticut, New York
- 5 MGD over 90 days: Indiana Great Lakes Basin
- 2 MGD consumptive use – Ohio (2.2 MGD irrigation; 20 MGD industry)

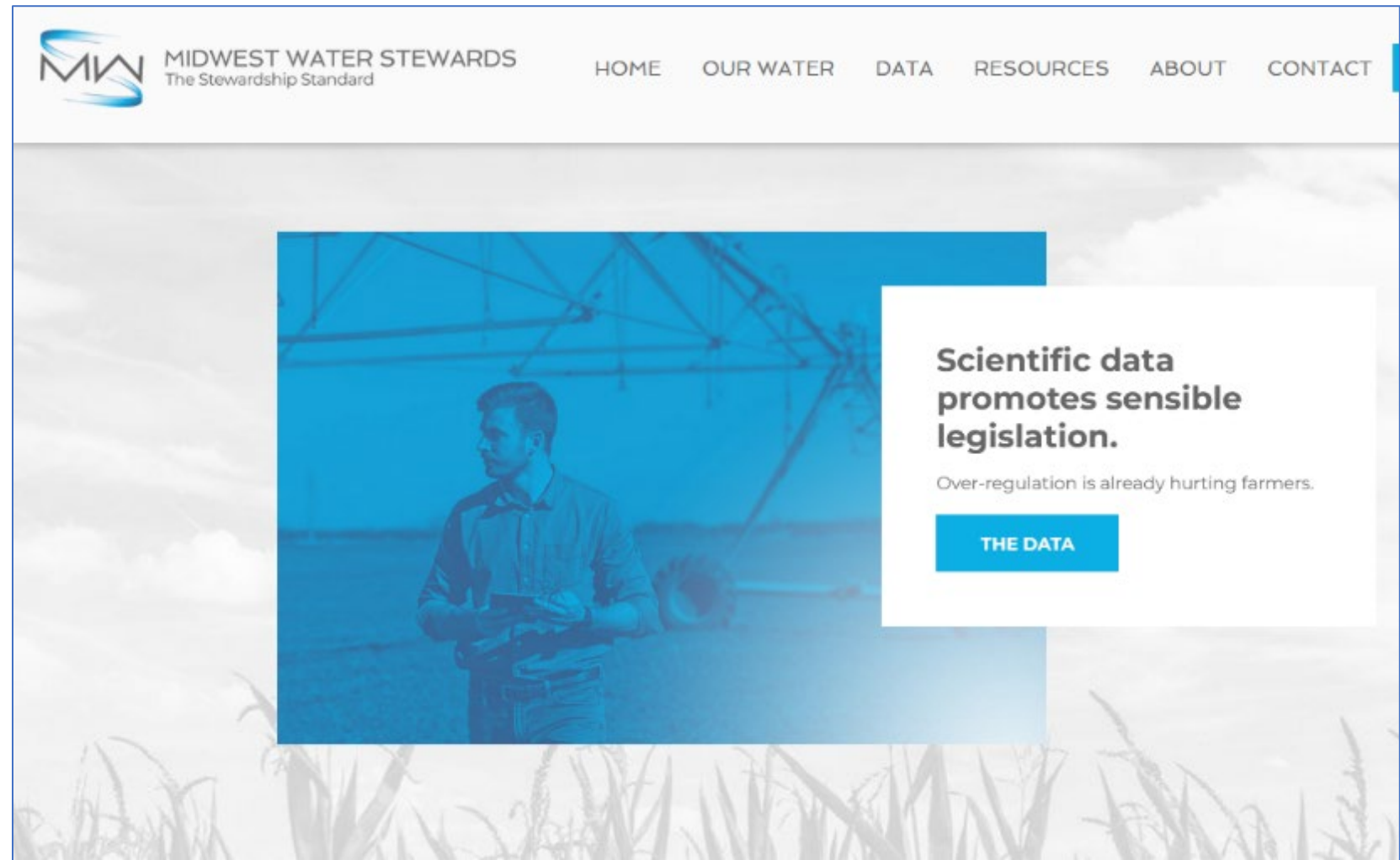
Concern from water resources professionals

- Staffing increase would be needed for a new regulatory program.
- We don't have enough data/information to analyze each application properly.



Could monitoring of ground water levels after pumping begins be a way to minimize fear, and better prepare the state for the future at the same time?

- Midwest Water Stewards in northern Indiana and Michigan.
- Farmer-funded effort
- Data only available to those who participate and fund it.



The screenshot shows the homepage of the Midwest Water Stewards website. The header features the MW Stewards logo on the left, the text "MIDWEST WATER STEWARDS The Stewardship Standard" in the center, and a navigation menu on the right with links for "HOME", "OUR WATER", "DATA", "RESOURCES", "ABOUT", and "CONTACT". The main content area has a blue-tinted background image of a man in a field. A white text box on the right contains the headline "Scientific data promotes sensible legislation." followed by the subtext "Over-regulation is already hurting farmers." and a blue button labeled "THE DATA".

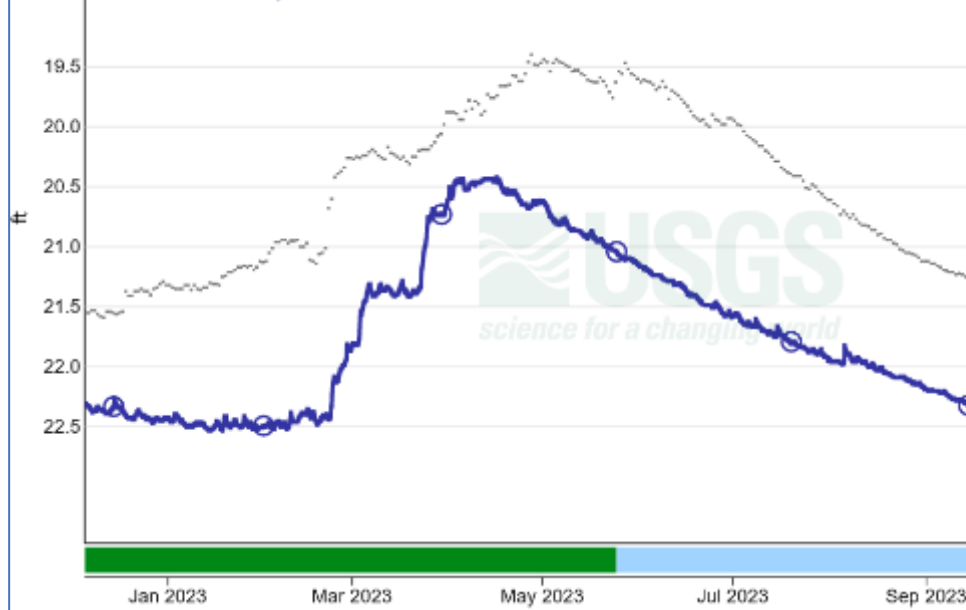
US Geological Survey monitors at limited locations and provides data in real time. (~20K/year)

Tippecanoe 18 (Tc 18) - 402734087033402

December 5, 2022 - December 5, 2023

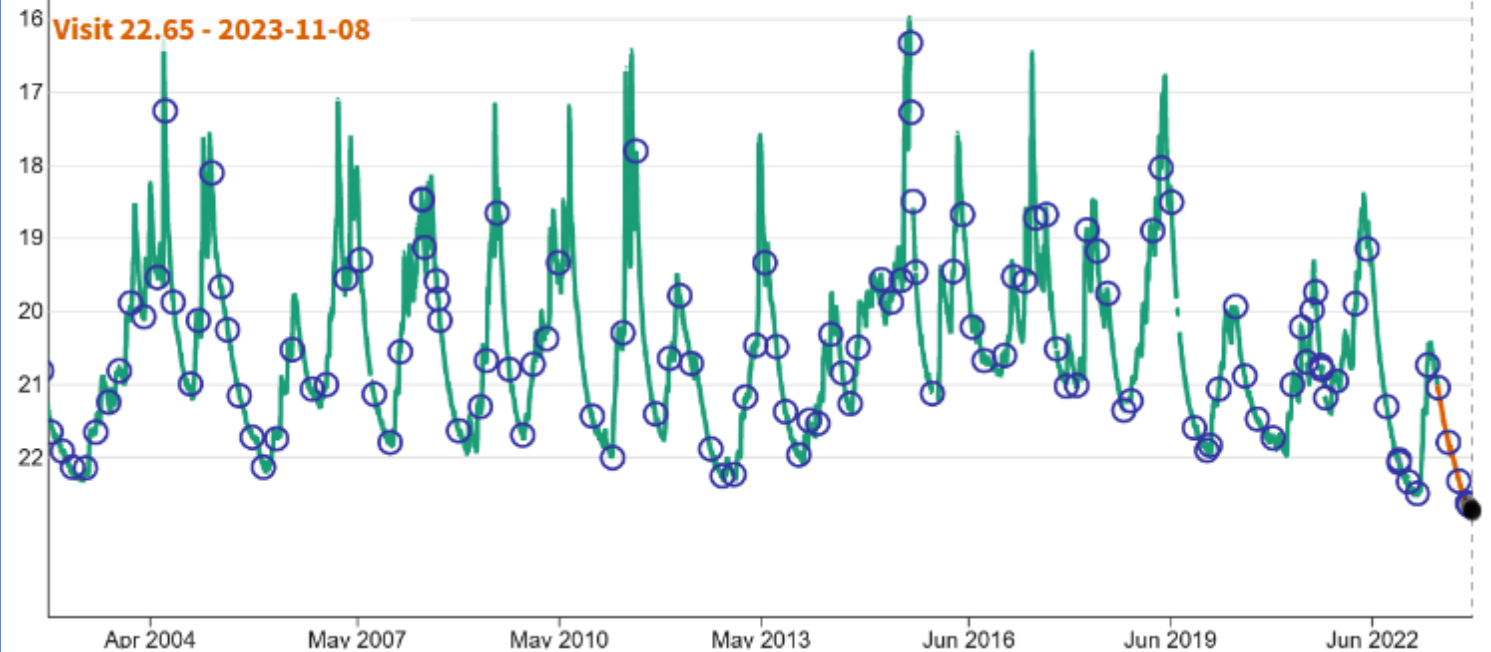
Depth to water level, feet below land surface

22.78 ft - Nov 28, 2023 04:30:00 PM EST
22.65 ft - Nov 08, 2023 10:43:00 AM EST



Depth to water level, ft below land surface, ft

Min 22.70 ft - 2023-11-26
Mean 22.72 ft - 2023-11-26
Max 22.75 ft - 2023-11-26
Visit 22.65 - 2023-11-08



Will Indiana seize the moment to improve data collection and develop sensible oversight to be able to better manage water for future generations?

