

FINAL REPORT

Regional Water Study

Water Demand and Availability in the St. Joseph and Maumee River Basins
of the Northeast Indiana Region

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Executive Summary

The Northeast Indiana Region (**Figure ES- 1**), comprising the St. Joseph and Maumee River Basins faces a water future that is, overall secure, but with an intensifying *seasonal* risk profile for water availability. This study evaluated regional water demand and availability from 2020 - 2070 to determine whether the Region's water resources can meet the needs of its communities, farms, and industries, and to identify where targeted planning and investment are most needed.

This study was prepared for the Indiana Finance Authority (IFA), at the request of the Indiana Department of Natural Resources (IDNR), pursuant to Executive Order 25-63, to evaluate whether sufficient water resources exist within the Region to meet projected water supply needs through the year 2070. The results of this study are intended to support state and local decision-makers, public water utilities, and regional stakeholders in planning for reliable and sustainable water supplies across the Region.

Specific objectives of the study are to:

- Quantify current water withdrawals across the Region's major water-use sectors;
- Develop projections of future water demand for public water supply, industry, energy, and agricultural water sectors through 2070;
- Evaluate current surface water and groundwater availability;
- Estimate how availability may change under future climate conditions;
- Compare projected demand with available supplies to identify potential deficits or areas of limited availability; and
- Identify risks, constraints, and potential strategies to improve long-term water supply resilience.

Key Findings

- Land cover in Northeast Indiana Region is over 60% agriculture, with cultivated crops comprising 54% of total.
- Seventy-two out of 76 public water suppliers exclusively utilize groundwater as their source of supply.
- Current and Future water demand is dominated by irrigation and public water supply withdrawals.
- Regional annual average withdrawals are expected to increase 94 MGD from 197 MGD in 2020 to 291 MGD in 2070.
- Irrigation demand, driven by climate, is projected to rise from about 49 MGD in 2020 to about 121 MGD in 2070 and accounts for 77% of the region's projected total increase.
- Irrigation withdrawals dominate the St. Joseph Basin. These high consumptive use withdrawals are expected to increase in the future, causing rivers to drop below the minimum instream flow more often.
- In the Maumee Basin, annual water availability will only decrease slightly through 2070. More significant changes are expected seasonally, with significant decreases in winter availability and significant increases in Fall availability.

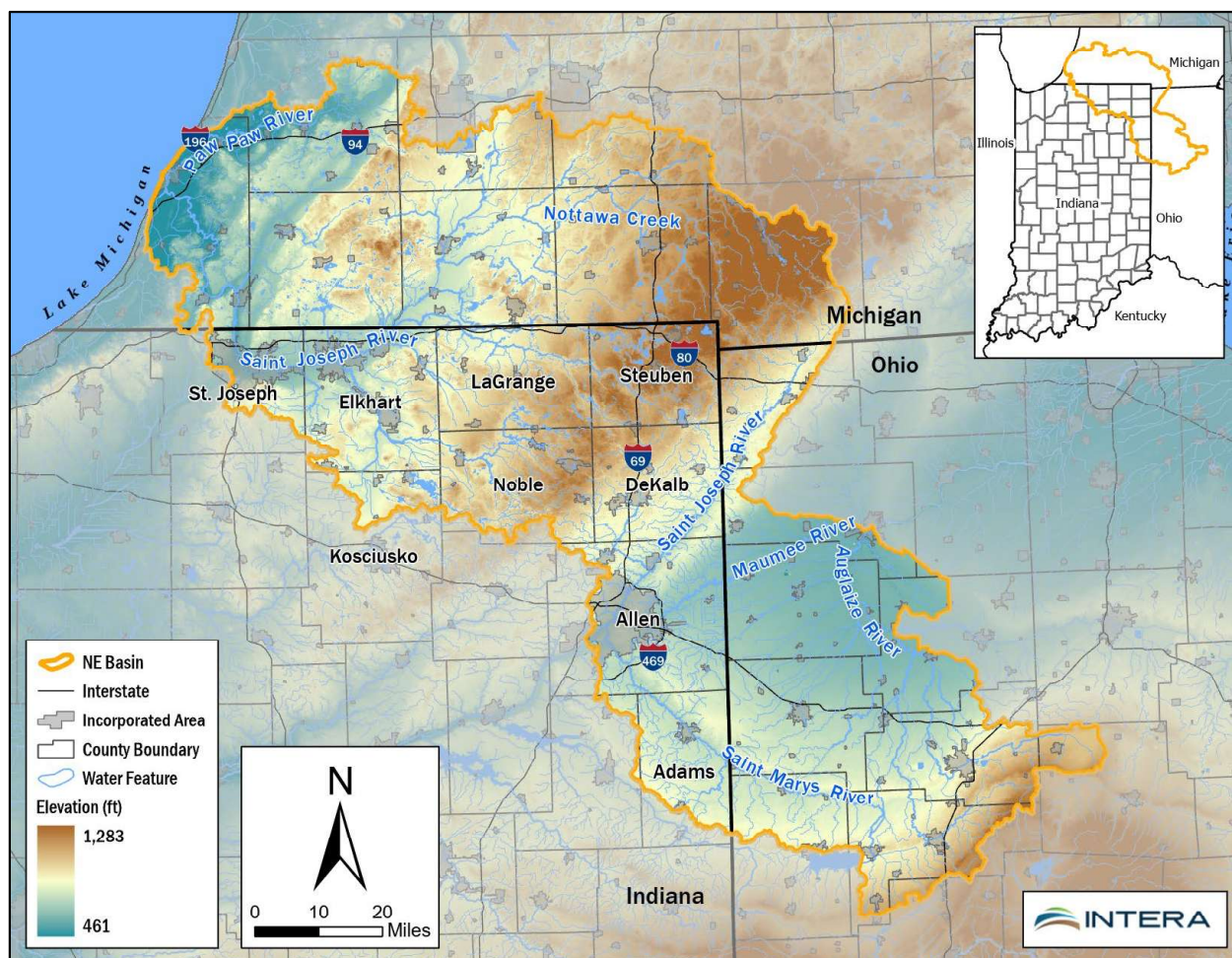


Figure ES- 1. Location of the Northeast Indiana Water Study Region (Region).

Approach

The study is structured around three major analytical components: 1) development of a forecast of regional water demand, 2) evaluation and forecasting of regional water availability, and 3) comparison of demand and availability to identify potential future water-supply gaps and opportunities for improved water management.

Water demand estimates were developed using population projections, economic trends, climate information, and other factors to forecast future demand through 2070. Water withdrawals were used as a proxy for demand, and both groundwater and surface water resources were evaluated to determine the capacity of regional resources to meet projected needs.

Water availability was evaluated using historical streamflow records, reported water withdrawals, return flows, and future climate projections to estimate how much water is likely to remain available under future conditions while maintaining minimum streamflow needed to support rivers and aquatic ecosystems.

Setting

The Northeast Indiana Region (**Figure ES- 1**) encompasses all or portions of nine counties spanning five Hydrologic Unit Code (HUC-8) watersheds across two major hydrologic systems. The St. Joseph River Basin, in the northwestern portion of the Region, is a low-relief, glaciated landscape with abundant natural lakes and wetlands that drains northward to Lake Michigan. The Maumee River Basin, occupying the central and eastern portion of the Region, drains eastward through Ohio to Lake Erie.

Population is concentrated in two primary centers: the South Bend–Elkhart–Mishawaka corridor in the St. Joseph Basin and the Fort Wayne metropolitan area, the Region’s largest single population center, in the Maumee River Basin.

Public water supply is provided by 76 municipal and community utilities serving more than 650,000 people; 72 of the 76 utilities rely exclusively on groundwater from productive unconsolidated aquifer systems. Fort Wayne City Utilities, the region’s largest system, is the only major utility relying on surface water, drawn from the St. Joseph River (Maumee Basin).

Northeast Indiana Region Fun Facts

- Covers parts of 9 Indiana counties
- 2 major river basins
 - St. Joseph River
 - Maumee River
- 5 HUC-8 watersheds
- 76 public water utilities
- 72 public utilities use groundwater
- Public water utilities serve over 650,000 residents
- Irrigation is the largest growing water use

Outside the urban corridors, land use is predominantly agricultural, with irrigation concentrated in the glacial outwash aquifers of the St. Joseph Basin, particularly in Elkhart, LaGrange, and Kosciusko counties.

Water Demand

Total regional water demand across all use sectors is projected to rise from approximately 197 MGD in 2020 to approximately 291 MGD in 2070, an increase of roughly 48 percent (**Figure ES- 2**). This growth is driven almost entirely by irrigation, projected to increase from about 49 MGD in 2020 to about 121 MGD in 2070 as warmer, drier projected growing seasons increase irrigation acreage and demand.

Irrigation demand is concentrated in the glacial outwash aquifers of Elkhart, LaGrange, and Kosciusko counties in the St. Joseph River Basin, and is both the largest source of projected growth and the most climate-sensitive, uncertain sector in the forecast.

Public water supply demand is projected to ease slightly, from about 75 MGD to about 74 MGD, as ongoing per-capita efficiency gains outpace modest population growth; self-supplied, residential, power generation, and commercial and industrial demand are each projected to remain essentially flat over the planning horizon.

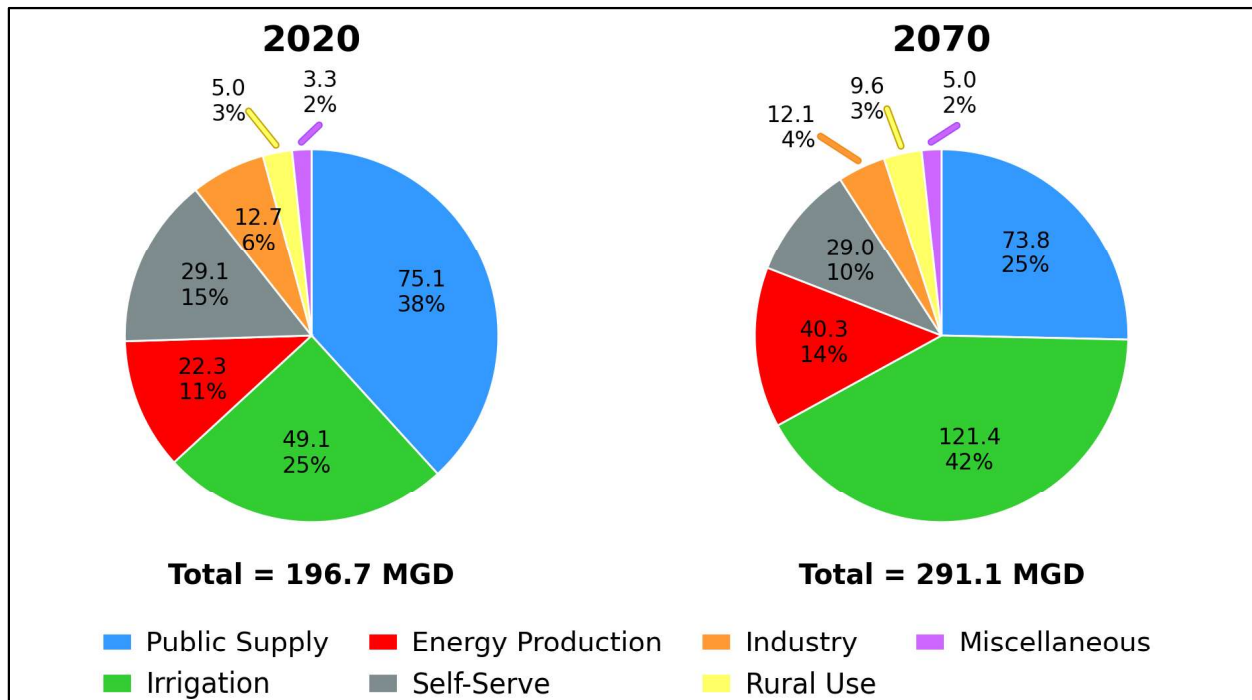


Figure ES- 2. Regional water withdrawals by water-use sector for the Northeast Indiana Region in 2020 and 2070.

Water Availability

Water availability is assessed on a sub-basin scale, with the Region divided into 18 sub-basins. Historical water availability, assessed for the period 2007–2023, is positive across most of the Region’s sub-basins on an annual and seasonal basis, indicating that existing water withdrawals are generally supported by naturally occurring streamflow after accounting for minimum instream flow targets. However, the two basins diverge sharply looking forward to future availability.

In the St. Joseph River Basin, rising irrigation demand is projected to coincide with declining seasonal availability producing increasingly frequent periods where streamflow falls below minimum instream flow targets by 2070.

In the Maumee River Basin, future consumptive use is projected to remain similar to historical levels, and while water availability is projected to decline in most sub-basins, particularly in Winter and Spring, Fall conditions are projected to improve in most sub-basins.

Consumptive Use

Consumptive use is the portion of water withdrawn from a source that is not returned and is effectively removed from the immediate water system.

Findings and Recommendations

The water demand and availability analysis indicate that the Northeast Indiana Region is not approaching a region-wide water deficit, but faces a clear and intensifying seasonal risk, concentrated in the irrigation-dependent St. Joseph River Basin.

The risk analysis classifies a sub-basin as at-risk if it experienced at least one seasonal occurrence of negative cumulative excess water availability, meaning the average seasonal streamflow dropped below a minimum streamflow (instream flow) target at least once within a given period. The instream flow target is a minimum flow necessary to maintain the water quality and ecological health of the stream. A negative seasonal cumulative excess water availability indicates a condition associated with stream degradation and the sub-basin it occurs in is therefore classified as at-risk.

The analysis shows that in the historical period (2007-2023), shown on the left of **Figure ES-3**, the St. Joseph River Basin has two sub-basins (Sub-Basins SJ2 and SJ7) with at least one season where the streamflow dropped below the instream flow target. The Maumee River Basin had zero occurrences of negative cumulative excess water availability in the historical period.

In the projected planning period (2024-2070), shown on the right of **Figure ES-3**, the analysis indicates that every sub-basin in the St. Joseph River Basin will have at least one occurrence of negative cumulative excess water availability in the future. The Maumee River Basin has one sub-basin at-risk in the future (Sub-Basin M2).

Instream Flow

Instream flow is a minimum streamflow target that protects the water quality, ecological health, and recreational uses of a stream. If the flow in a stream drops below the instream flow target for an extended period time, the health of the stream may be impacted. The Indiana Regional Water Studies have adopted two statistical measures of streamflow to define instream flow: the 7Q10 and the annual Q90.

The deficit in the St. Joseph River Basin is contextualized against much larger absolute flow volumes in this basin (instream flow values of 288 MGD and 606 MGD at the downstream ends of Sub-Basins SJ2 and SJ7, respectively), indicating substantially greater total water availability and consumptive use relative to the Maumee Basin.

Layered onto this seasonal water availability risk, are ongoing risks from climate, water quality, aging infrastructure, and emerging large-scale demand. Addressing these risks proactively, and with attention to the meaningful differences between the Region's two basins, will be essential to ensuring reliable, sustainable water supplies through 2070.

As regional planning progresses in the Northeast Indiana Region, the following specific target areas and subsequent recommendations will benefit the water resources:

1. **Irrigation and St. Joseph Basin availability** - Target irrigation efficiency, soil-moisture-based scheduling, and drought-contingency planning in Elkhart, LaGrange, Kosciusko, and St. Joseph Counties, where seasonal cumulative excess water availability is projected to fall below zero.
2. **Public water supply infrastructure** – Continue the Region-wide capital needs and condition-rating inventory for the 76 public water utilities, prioritizing state revolving fund/Indiana Finance Authority funding toward smaller systems with high per-connection project costs.

3. **Peak-day demand management** - Adopt local ordinances or incentive programs addressing discretionary Summer outdoor water use (watering schedules, turf reduction, increasing-block rates) to reduce peak-day demand and associated infrastructure sizing costs.
4. **Water quality protection** - Expand nitrate monitoring in the St. Joseph River Basin outwash aquifers and Maumee River Basin agricultural streams; continue Per- and poly- fluoroalkyl substances (PFAS) compliance support for utilities ahead of federal compliance deadlines; support continued combined sewer overflow separation planning.
5. **Data centers and emerging demand** - Establish a coordinated review of cumulative water withdrawals, associated power-generation cooling water, wastewater discharge, and wetland impacts from data center development in Allen and St. Joseph Counties (and others as they arise).
6. **Regional monitoring and data** - Continue and expand Significant Water Withdrawal Facility reporting compliance and biennial water loss audits; track peaking-factors and demand data across utilities to refine future planning updates to this study.

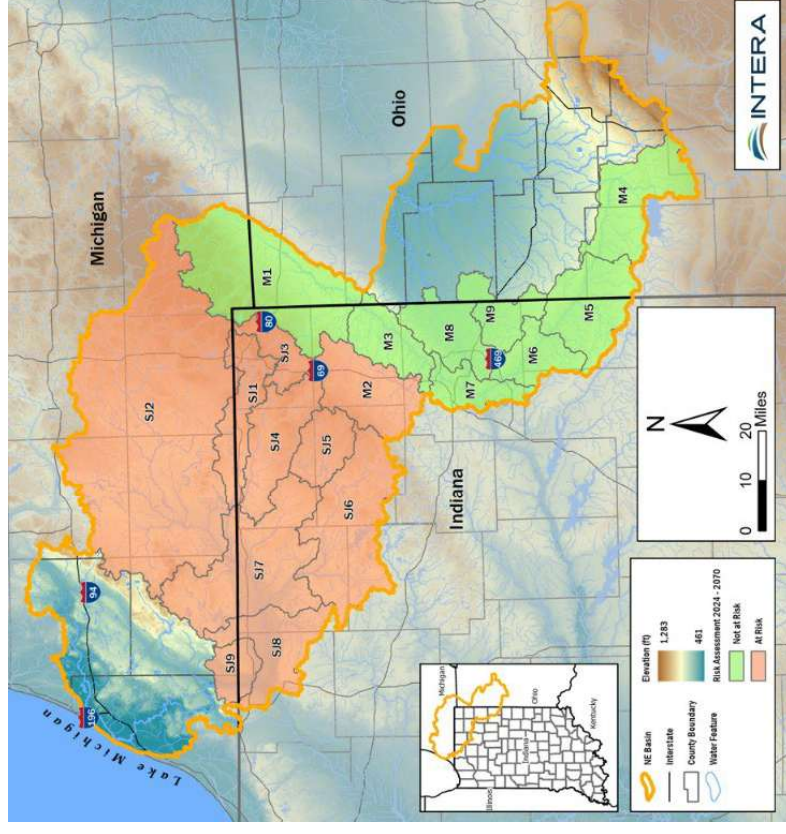
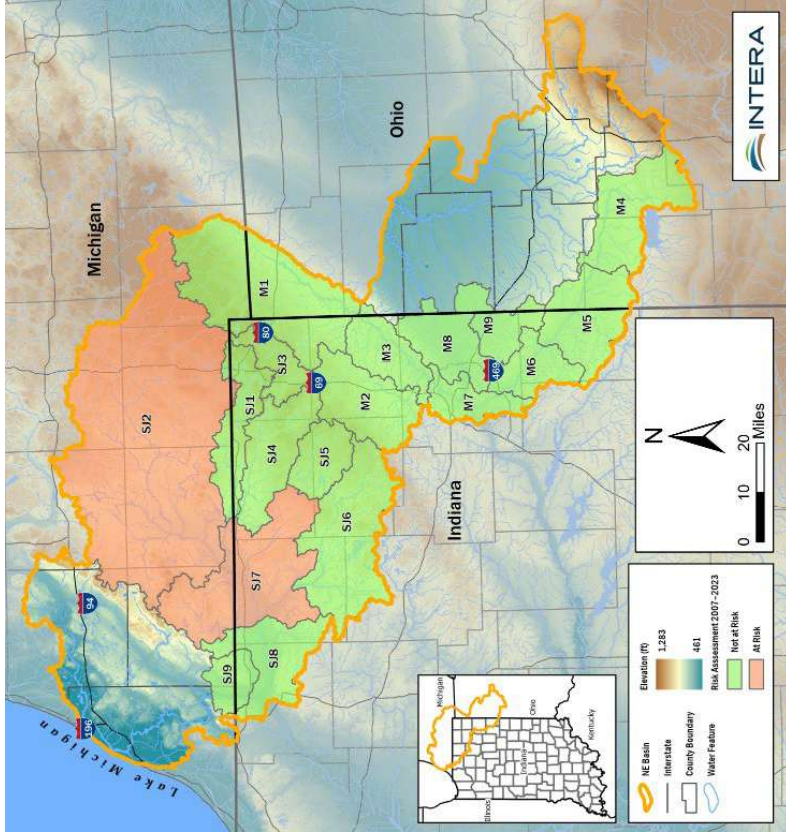


Figure ES- 3. Historical (left) and future (right) sub-basin risk based on water availability. Green represents basins that have not exceeded their seasonal cumulative excess water availability. Orange shows sub-basins that have dropped below the instream flow target at least once.