

Ohio River and Southeast Indiana Regional Water Study

ISSUE BRIEF

The purpose of the Ohio River and Southeast Indiana Regional Water Study is to better understand the 50-year water demand and supply availability in southeastern and southern Indiana watersheds, which are primarily located in Clark, Crawford, Dearborn, Fayette, Floyd, Franklin, Gibson, Harrison, Jefferson, Ohio, Orange, Perry, Posey, Ripley, Scott, Spencer, Switzerland, Union, Vanderburgh, Warrick, Washington, and Wayne counties (**Figure 1, left**). The study area is subdivided into the Ohio River and the Southeast Regions (**Figure 2, right**). A watershed, also called a drainage basin, is an area of land where all precipitation, surface water runoff, and groundwater drain downhill into a common outlet, such as a river or lake.

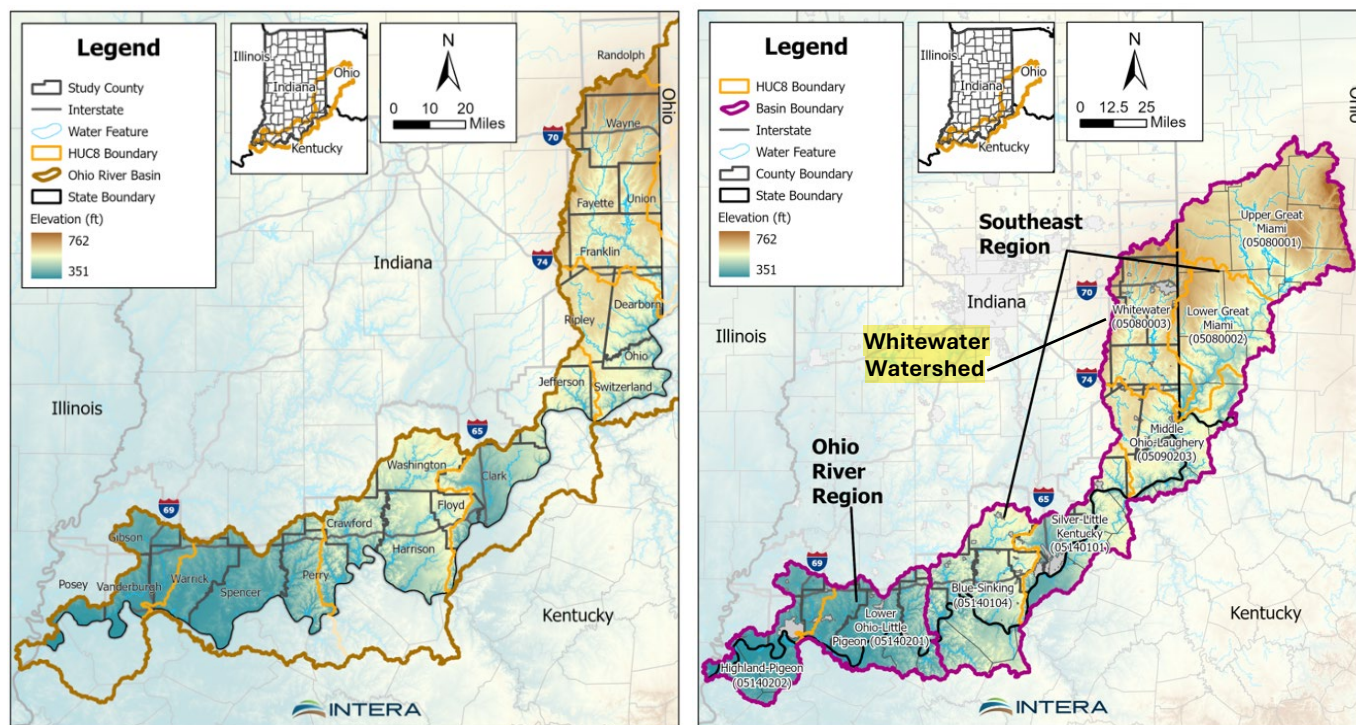


Figure 1. Location of the Ohio River and Southeast Indiana Water Study Region. Counties are shown on the left; regions and watersheds are shown on the right. Note the Whitewater River watershed, which is located primarily in Wayne, Fayette, Union and Franklin Counties.

Key Findings

- Public water suppliers predominantly utilize groundwater as their source of supply.
- Current and Future water demand is dominated by power generation and public water supply withdrawals.
- Regional annual average withdrawals are expected to decrease from 2,013 MGD in 2020 to 761 MGD in 2070, mostly due to decreases in power generation withdrawals.
- In the Whitewater River watershed, annual water availability will decrease slightly by 2070. However, larger seasonal decreases are expected.
- Outside of the Whitewater River watershed, future water availability is expected to be stable, with continued low availability.

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Water Demand

Water demand is defined as amount of water being used. Total regional water demand across all use sectors is projected to decrease sharply, from 2,013 million gallons per day (MGD) in 2020 to 761 MGD in 2070, a decline of roughly 62 percent (**Figure 2**). This decline is driven almost entirely by the retirement of the Region's once-through coal-fired power plants. Power generation withdrawals, which dominate the regional total, are projected to fall from 1,881 MGD in 2020 to 619 MGD in 2070, with nearly all the decline occurring in Jefferson County.

Among the remaining sectors, industrial withdrawals, such as a manufacturing plant, are projected to grow slightly, from about 44 MGD to about 46 MGD; public water supply demand is projected to rise modestly through the mid-2020s from about 80 MGD to about 84 MGD by 2070; and irrigation, while a small share of total withdrawals, is projected to grow the fastest in percentage terms, from about 1.6 MGD to more than 6.1 MGD, concentrated in Spencer, Posey, and Vanderburgh counties.

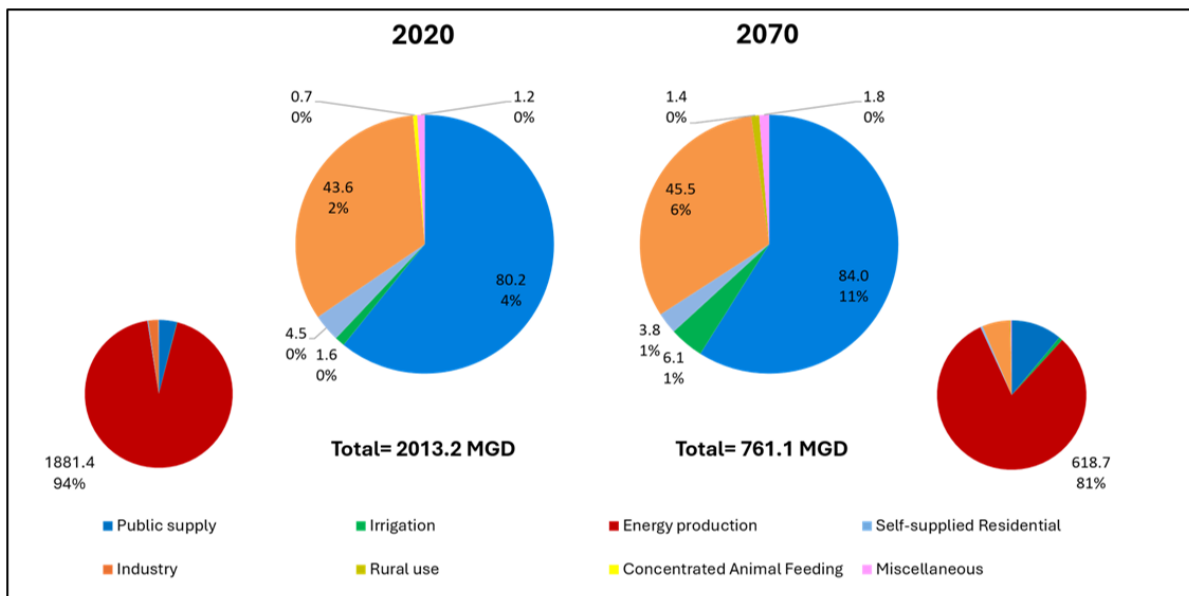


Figure 2. Regional water withdrawals by water-use sector in 2020 and 2070. Note: The small pie charts include power generation, which is the largest water use sector. The large pie charts have power generation removed to make the relative water demand for the smaller sectors visible.

Water Availability

Water availability is defined as the amount of water that exists and can be used. Water availability is assessed on a basin scale, with the study area divided into 11 sub-basins (**Figure 3**) and by season (e.g., Winter, Spring, Summer, Fall). Historical water availability, assessed for the period 2007–2023, indicates that nearly all sub-basins maintained enough water to meet their instream flow targets. An instream flow target is the minimum flow necessary to maintain water quality and ecological stream health. If the flow drops below the target for an extended period of time, the health of the stream may be impacted. Dropping below the instream flow target means that a stream may be at risk.

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(Water Availability continued)

In the past, only one sub-basin, Sub-Basin 6, experienced a single season (Fall) with streamflow below its minimum instream flow target (**Figure 3, left**). Sub-basins along the Ohio River and its outwash deposits (Sub-Basin 11) have water availability one to two orders of magnitude greater than the Region's other sub-basins, reflecting the much larger flow volumes of the Ohio River itself.

Assessing future water availability, the Whitewater River watershed and the rest of the Region diverge sharply. In the Whitewater watershed (Sub-Basins 1 through 5), projected water availability declines and becomes unable to meet instream flow targets, with occurrences concentrated in the Fall season (**Figure 3, right**). Outside the Whitewater watershed, future conditions are more stable. Sub-Basins 6 through 11 meet instream flow targets throughout the planning horizon, although the Ohio River itself is expected to see reduced streamflow in the Fall by 2070.

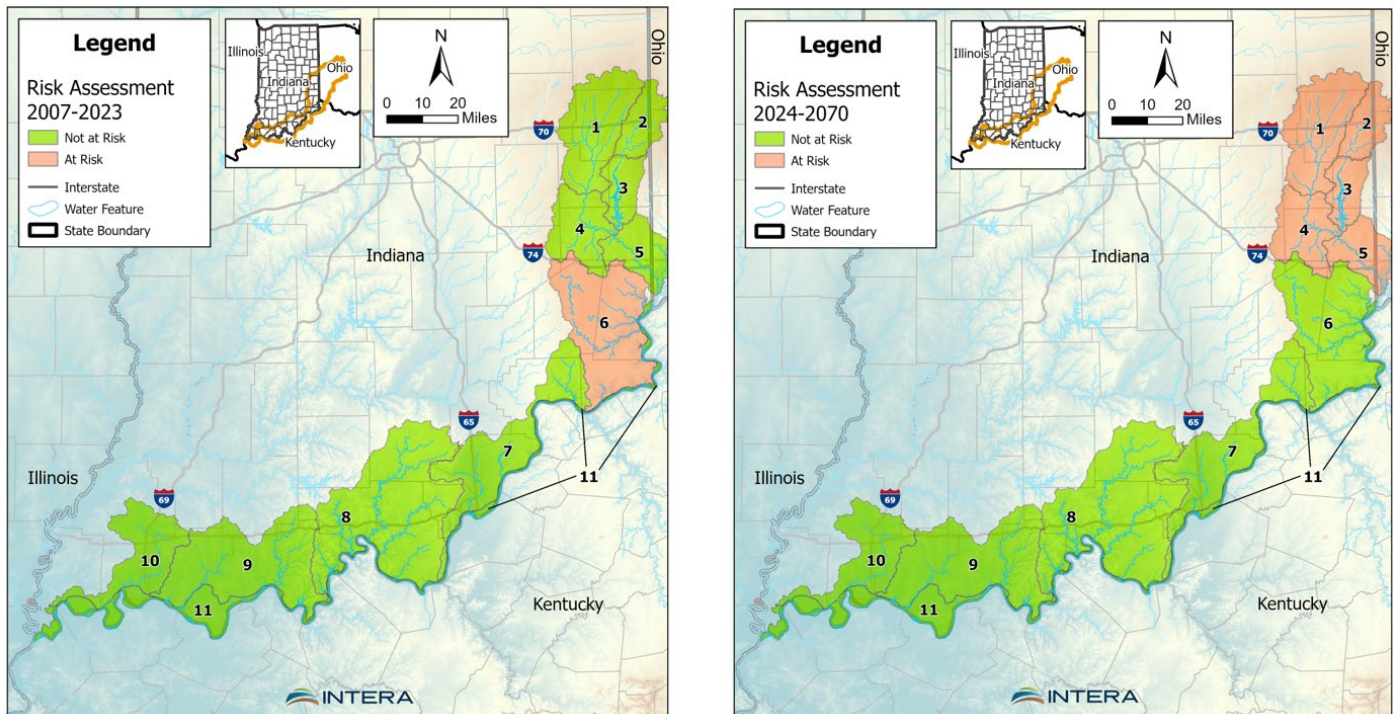


Figure 3. Historical (left) and future (right) sub-basin risk based on water availability. Green represents basins that have not dropped below the instream flow target. Orange shows basins that have dropped below the target at least once or are predicted to in the future.

The water demand and availability analysis indicates that the Ohio River and Southeast Indiana Region is not approaching a region-wide water deficit, but the Whitewater River sub-basin faces a growing and increasingly frequent seasonal risk to streamflow availability, particularly in the Fall season, even as total regional demand declines overall due to power plant retirements. Addressing risks proactively will be essential to ensuring reliable, sustainable water supplies through 2070.