Ecosystem Monitoring in Upper Wabash River Watershed Begins Ahead of Spring E-Flows



The J.E. Roush Dam on the Upper Wabash River at sunrise (Photo by Dayla Dillon)

Implementation of the Sustainable Rivers Program's (SRP) Project on the Upper Wabash River began in fall 2024 with water quality and fish and habitat monitoring

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The upper Wabash River has a long history of regular flooding. The Great Flood of 1913 devasted much of the Midwest, including communities on the Wabash where multiple people were killed and hundreds lost their homes and businesses. Major floods also occurred in 1930, 1943, 1950, and 1959. To reduce the impacts from these devastating and recurring floods, the U.S. Army Corps of Engineers (USACE) constructed three reservoirs in the upper Wabash River watershed between 1961 and 1969: the J.E. Roush Lake on the Wabash River, Salamonie Lake on the Salamonie River, and Mississinewa Lake on the Mississinewa River.

While construction of the three reservoirs was effective at reducing floods, it also had unintentional hydrologic consequences. The reservoirs have increased minimum flows,

increased fall rates, decreased summer monthly flows, and decreased high pulse size and frequency as compared to pre-dam flows. The hydrologic regime of a stream has a cascading effect on almost all other ecological aspects of that stream. The magnitude, timing, duration, and frequency of floods, high flows, and low flows each have implications for the structure of the stream channel and its floodplain, water quality, and habitat. The life histories of aquatic plants and animals have evolved over time along with the natural hydrologic regimes of streams and rivers in their native habitat. Several studies on the Wabash River recommend that restoration of historical natural hydrologic patterns downstream of the dams would improve habitat and species diversity.

SRP at the Upper Wabash

As part of the SRP process, a state of the science report was completed in 2023, which explored the existing literature on the upper

Wabash River and detailed existing conditions for the study area. Following completion of the science report, an environmental flows (eflows) workshop was held with stakeholders from USACE, the Nature Conservancy (TNC), Indiana Department of Natural Resources (IDNR) and other local resource agencies, and academia to develop e-flow recommendations for the upper Wabash River. Among recommended strategies was creating moderately sized e-flows from upper Wabash reservoirs during critical spring fish and mussel fertilization and reproduction periods when flows from the upper Wabash reservoirs are usually reduced to accommodate filling of the reservoirs to summer pool water levels.

Implementation Begins

With a better understanding of the watershed and recommendations on how to restore a more natural hydrology, USACE will begin implementing e-flows in the upper Wabash watershed. The first step is in this process involved collecting baseline data on habitat, fish and mussels, and water quality ahead of eflow implementation.



USACE staff identify and measure fish captured in the Upper Wabash River (Photo by Dayla Dillon)

In November 2024, USACE staff from the District and Upper Wabash Project offices conducted fish and habitat assessments at eight sites in the upper Wabash watershed. Three sites were on the Wabash River below the J.E. Roush Dam, two sites were on the Salamonie tailwaters, and three sites were on Mississinewa tailwaters. A total of 1,896 fish were caught over the three-day sampling period, across 51 species. The five species with the highest individual counts were Bluntnose Minnow, Green Sunfish, Bluegill, Shorthead Redhorse, and Central Stoneroller. Fish and habitat sampling will occur again in spring and summer of 2025.



A rainbow darter collected from the Mississinewa River by USACE staff (Photo by Dayla Dillon)

USACE staff also deployed water quality monitoring devices below the dams that measured dissolved oxygen (DO) and water temperature during the fall drawdown. These devices will be redeployed in each of the three tailwaters during spring and will capture changes to DO and water temperature before, during, and after e-flows on the Mississinewa River.



USACE staff deploy water quality loggers on the Mississinewa River ahead of the fall drawdown (Photo by Andrew J. Miller)

A third component of the SRP effort in the upper Wabash watershed is a partnership between the IDNR, USACE, and TNC to assess mussel growth and survivability in the upper Wabash watershed. IDNR collected female pocketbook mussels in November 2024 and their offspring are being reared in a hatchery for placement in silos in the upper Wabash watershed in spring 2025. The mussel silos will be monitored throughout spring and summer to assess their survival and growth rates. This data, in conjunction with the water quality data, will help resource managers identify ideal and suboptimal locations within the watershed for mussel populations and factors that distinguish the two.



Female pocketbook mussels collected by IDNR for propagation of juvenile mussels to be placed in silos in the Upper Wabash watershed (Photo by Brant Fisher, IDNR)

Next Steps

USACE is working to finalize a deviation request from its existing Water Control Manual (WCM) to allow for e-flows in the Mississinewa River this spring. Deviation requests to the WCM are a critical step in the process of implementing e-flows as it is where USACE must balance e-flow implementation with project authorizations such as flood risk management and recreation. The proposed WCM deviation would allow for two moderate magnitude e-flows occurring in early-March and early-April and, if hydrologic conditions allow, a third pulse in late-April.

The pulses are expected to provide environmental benefits such as flushing of algae and sediment from spawning gravels, increasing DO to promote healthy fertilization for mussels and fish, promotion of migratory and spawning cues for fish, and inducing habitat formation through movement of sediments and large woody debris. The water quality and biological data collected as part of this implementation will be critical in understanding the effect of the spring e-flows and how they may be implemented in the tailwaters below J.E. Roush and Salamonie Reservoirs for further ecological benefits.

For more information on the Sustainable Rivers Program, please visit

https://www.hec.usace.army.mil/sustainablerivers/.