Upper Mississippi River Restoration

A PROVEN SUCCESS: SAVING OUR ICONIC NATIONAL TREASURE

The mighty Mississippi River is a treasured part of our national heritage. The future of this iconic but endangered ecosystem depends on continued collaborative efforts through the Upper Mississippi River Restoration (UMRR) Program.

The Upper Mississippi River ecosystem is healthier and more resilient because of UMRR

UMRR has improved critical fish and wildlife habitat on 102,000 acres through 55 projects, with more than 50 percent of the Corps' reported wetland acres restored nationally between 2005 and 2015! These areas provide protection, nesting, and feeding areas for a highly diverse set of fish, birds, mussels, reptiles and amphibians, and mammals, including a number of rare and endangered species.

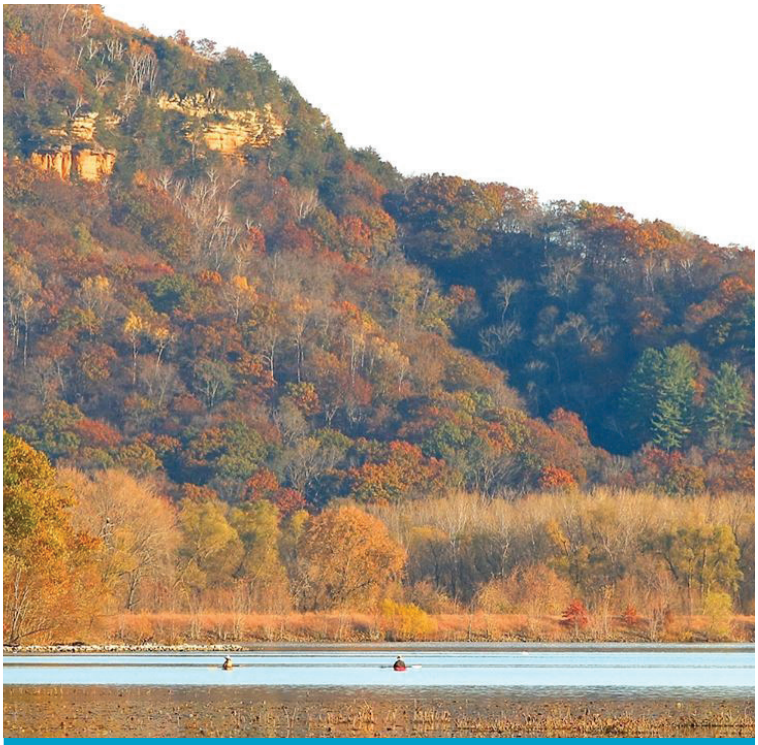
UMRR is a national leader and pioneer in large-river restoration, mimicking natural processes and restoring mosaics of wetlands, channels, and forests. UMRR's restoration techniques are tested and proven to address the most significant degrading influences to the ecosystem by:

- Protecting riverine wetlands and lakes from fluctuating water levels and high sedimentation.
- Recreating islands to provide refuge and food for many species of fish and wildlife.
- Restoring natural diversity of water velocities and depths to improve fish habitat.
- Restoring forest health and diversity, creating homes for turtles, deer, and birds.
- Reviving aquatic food webs of microorganisms, bugs, amphibians, mammals, fish, and birds, having far-reaching influences beyond immediate project sites that enhance the overall sustainability of ecological functions and processes.

Degrading influences persist

Despite significant successes, we are working against time in fighting ecosystem stressors.

- Many of the natural islands are gone, allowing stronger waves to further reduce habitat availability and quality.
- Levees and other structures disconnect the main channel from the river's floodplain habitat and filtering capacities.
- Sediment is filling in wetlands, lakes, and channels, and excess nutrients are depleting the water of oxygen needed for fish.
- Invasive species, such as Asian carp, outcompete native fish and wildlife for food sources and limited habitat.



A healthy Upper Mississippi River ecosystem is incredibly valuable for providing many economic and social benefits. Wetlands and forests filter pollutants, trap carbon, and absorb rains, keeping the river clean for swimming, boating, and fishing, mitigating climate change, and lessening flood impacts. The Upper Mississippi River generates $24.6 billion in the tourism and recreation industry.

Work Remains

Without the UMRR, the Upper Mississippi River ecosystem will degrade at an accelerated rate. Degrading stressors must be outpaced in order to sustain habitat abundance and diversity. This must include furthering our understanding of what is occurring in the Upper Mississippi River ecosystem and how best to address the most challenging causes of degradation. Investing in the river's ecosystem strengthens the nation's economy – habitat restoration enhances important ecological services and uses, such as improved water quality, benefiting municipalities, manufacturers, and renewable energy sources.

Key UMRR Accomplishments 2011-2016

Enhancing River Ecosystem Health and Resilience

- **UMRR increases habitat quantity, quality, and diversity through seven newly constructed habitat projects, directly benefiting 26,610 acres since 2011.** These projects restore natural water velocities and depths, improve vital sediment transport and distribution, create islands of varying elevations to restore natural floodplain features, and provide capabilities to mimic natural water level conditions. Collectively, these processes support a wide-range of fish and wildlife while improving the river's overall ecological integrity.
- **UMRR's interdisciplinary partnerships build smart projects.** Informed by leading professionals in a diverse suite of disciplines, UMRR's habitat project designs are comprehensive solutions to address complex habitat and ecosystem restoration needs, ultimately having enduring benefits to fish and wildlife. Teams include engineers, biologists, statisticians, mappers, and the public.
- **UMRR is getting it right – designing projects for optimal benefit.** Based upon research and 30 years of experience, we know that islands with the right topography restore healthy hardwood forests by keeping the trees drier, winter habitat for fish increases their abundance and body conditions, and mimicking natural water levels promotes wetland plant growth.

Innovating Restoration Solutions

- **UMRR develops critical tools** to understand complex relationships among riverine processes. These tools increase knowledge for determining the most pressing habitat needs, targeting the most promising restoration opportunities, and adding certainty to restoration success.
- **UMRR received the 2014 Chief of Engineers Environmental Award** in recognition of the innovation and designs of the Batchtown habitat project. This is one of many awards UMRR has received for effective and innovative restoration success, an accolade of its adaptive approach of incorporating learned insights into each successive project.

Fish are tracked using radio telemetry to observe their movement throughout UMRR's habitat projects.

Understanding the Complex and Dynamic River Ecosystem

- **Vegetation is key to getting it right!** Fish and wildlife are resilient when there is sufficient vegetation for refuge, food, spawning, and resting. And, vegetation – wetland plants and floodplain forests – requires a healthy ecosystem to support its establishment and growth. Loss of vegetation indicates a degraded system with less quality habitat to support fish and wildlife.
- **The northern portion of Upper Mississippi River has shifted to a healthier, more resilient ecosystem with more abundant vegetation.** Everywhere else, most of the river's fundamental characteristics have remained degraded but relatively stable since 2010.
- **Asian carp are drastically altering native fish communities where present, sedimentation is filling in important fish habitat and degrading water quality, and prolonged high water levels are devastating floodplain forests.** The Upper Mississippi River ecosystem will continue to face a myriad of degrading stressors, requiring ongoing restoration.
- **UMRR quantifies the resilience of the Upper Mississippi River ecosystem to remain healthy** – its capacity to absorb disturbances and sustain its fundamental ecological characteristics to support abundant and diverse habitat.




Strategic UMRR Actions for 2017-2022

Enhancing River Ecosystem Health and Resilience

- **Increase the quality, quantity, and diversity of habitat available for a wide range of fish and wildlife** through nine projects restoring 23,330 acres, while also improving the river's overall ecological integrity and sustainability. In addition, UMRR will plan for restoration opportunities using the best science available and experience from past projects.

Innovating Restoration Solutions

- **Develop indicators of ecosystem resilience** to identify locations where management intervention is needed to maintain a healthy, productive ecosystem.
- **Finalize the second comprehensive Habitat Needs Assessment,** incorporating vast amounts of learned information about how key drivers affect the river's ability to support fish and wildlife habitat as well as ecosystem health and resilience.
- **Select the next generation of habitat projects** using the Habitat Needs Assessment to identify the most pressing restoration needs and determine where restoration projects will have the greatest benefit to ecosystem health and resilience.
- **Pursue opportunities to leverage resources and information** with key decision-makers, the public, and key watershed programs and projects to improve the Upper Mississippi River ecosystem's health and resilience.

Understanding the Complex and Dynamic River Ecosystem

- **Increase knowledge of complex dynamics and interactions among various ecosystem characteristics and watershed drivers, and the influence of habitat projects on the Upper Mississippi River ecosystem's resilience**. This will include evaluating constructed projects and utilizing adaptive management analyses to better understand how the ecosystem responds to certain restoration techniques and approaches.
- **Assess and detect changes in the key components of the Upper Mississippi River ecosystem** through continued systemic monitoring and research, providing a broad baseline context for understanding the outcomes of UMRR's habitat projects.

Preserving the Upper Mississippi River Ecosystem

- **Without the UMRR Program, the Upper Mississippi River ecosystem will degrade at an accelerated rate and the progress that has been made to preserve this treasure for future generations will be lost.**

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THE MAKING OF A UMRR HABITAT PROJECT

Engineers, biologists, scientists, and the public examine restoration opportunities using UMRR's monitoring information to address important habitat needs.

The Upper Mississippi River (not including Illinois Waterway) generates $24.6 billion annually in tourism and recreation, supporting 420,000 jobs. UMRR improves quality of life for many river communities.

Engineers and project partners study the river's complex environment and design restoration techniques to create the desired habitat that will withstand constant degrading forces.

Despite the complexity of the high-energy system, UMRR plans, designs, and constructs habitat projects that successfully generate the intended ecological benefits at an impressively low average cost of $3,000 per acre.

Habitat quickly becomes available post-construction! Wetland vegetation provides waterfowl habitat in just a few years. Fish populations increase from new winter habitat in less than five years with newly established populations in under 10 years.

This picture shows high-schoolers helping to plant nut-producing trees that are important for bird survival. Habitat projects provide STEM-related education opportunities for K-12 at many local schools.

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