The UMRCC Newsletter

Spring 2021

This Newsletter is a publication of the Upper Mississippi River Conservation Committee (UMRCC) but does not necessarily represent the official views of the UMRCC. Suggestions or comments regarding its content should be directed to the Chairperson, 292 San Diego Rd, Carbondale, IL, 62901 please contact the Coordinator by e-mail (neal_jackson@fws.gov) or phone (618.579.3129) and visit our website at http://www.umrcc.org/

Chairperson's Letter

Hello River Rats!

I'd like to start off with a big THANK YOU to Iowa for organizing and hosting an excellent virtual meeting in March. I've participated now in several virtual conferences over the past year and our meeting has been the most enjoyable (maybe I am biased). The limited technical difficulties, smoothness of speaker transitions, time management, social hours - everything worked well and was made possible by the hard work of the team in Iowa. Although some time has passed, they are still deserving of many thanks.

It's hard to believe that it has been well over a year now since we have been able to meet in person. There seems to be light at the end of the tunnel, so hopefully we can get back together soon. In the meantime, get outside and enjoy the summer! I spent last night catching fireflies with my son. (Do those of you farther north call them fireflies or lightning bugs?) Lately the numbers of fireflies had seemed disturbingly low, we would only see a handful each night. In my childhood memories the fireflies were like constellations and catching a jar full was easy work. Last night the constellation had returned, and my son quickly went from his first solo catch without a net to a true firefly wrangler.

I don't know why there were so many fireflies out last night, maybe it was the twelve inches of rain we had a week ago or maybe the 4th of July fireworks attracted them. Regardless, it was a great way to spend a summer evening (even if we stayed up much later than a four-year-old should).

Matt Vitello

UMRCC Chairperson

UMR News

Upper Mississippi River National Wildlife and Fish Refuge and Trempealeau National Wildlife Refuge Celebrate Annual World Migratory Bird Day and Live Your Wild Campaign

This year's annual World Migratory Bird Day event took some creative adapting to meet COVID-19 guidelines, but that opened the door to new ideas and some really successful events that took place over the course of two weeks! Events kicked off at Trempealeau Refuge on May 3-14 with signs set up at five of the best birding sites. These locations are hotspots where birdwatchers can see some of the most unique birds found at the refuge. Informational brochures provided site descriptions for visitors who were encouraged to explore on their own. On Friday, May 7, Friends of Trempealeau Refuge sponsored author and naturalist Stan Tekiela's Zoom presentation titled, "Bird Migration: The Incredible Journeys of North American Birds." Based on Tekiela's new book, Tekiela shared magnificent photographs of migrating birds along with interesting facts that helped shed some light on the secrets of bird migration. Over 75 people attended virtually. On Saturday, May 8, visitors were invited to sign up for a limited number of guided bird hikes at the refuge. With staggered start times and using different trail locations, 50 participants enjoyed the advice of experienced birders. Hike leaders reported seeing 30-45 species of birds on each of their outings and hikes drew both first-time and return visitors. In addition to these wonderful events, the Upper Miss Refuge offered guided bird hikes on May 4 and May 6 to students at the Univer-

sity of Wisconsin-La Crosse. Part of the national communications branch's "Live Your Wild" event campaign, the hikes aimed to spark an interest in birding among young adults ages 18-34 years old while building awareness of the national wildlife refuge system. Billed as an opportunity to "take a break with the birds," students had the chance to win a free pair binoculars and received a reusable water bottle with the Live Your Wild campaign sticker. The majority of students who attended were new to the refuge, and all of whom graciously attended during the week before final exams! We are so proud of our staff and partners' creative efforts to offer outreach during a pandemic and grateful to celebrate these amazing natural resources and the work that we do!

MNDNR Commissioner's Award for Natural Resources Conservation 2020

Megan Moore was one of six individuals to receive a MN DNR Commissioner's Award for Natural Resources Conservation, 2020. Each year, the Commissioner's Awards program provides an opportunity for peers to honor the exceptional accomplishments of fellow DNR staff at all levels and across all disciplines. These awards recognize the efforts that stand above all others, and acknowledge employees whose performance and behavior on the job reflects the DNR's mission and values. In the Natural Resources Conservation Category, the award is given to individual's whose work meaningfully contributed to our efforts to conserve and enhance the state's waters, natural lands, and diverse fish and wildlife habitats.

Assistant Commissioner Barb Naramore presented the award to Megan, saying, "In 2020, Megan was a true natural resource leader and champion for the upper Mississippi River. Megan has consistently gone way above and beyond to be a true champion for the river's amazingly diverse and important animal and plant community, while really understanding and living how our habitat and resource management efforts fit into the bigger picture of this internationally important interjurisdictional resource that is managed for a whole host of purposes.

Not surprisingly, on receiving the award, Megan thanked the leadership from the MN DNR Mississippi River Team past retirees and current field staff for the work they do on the Mississippi every day.

DRIFTLESS AREA BIRD CONSERVATION
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PRESS RELEASE

Current field research on Red-shouldered Hawk nesting along the Upper Mississippi River is revealing stark changes in forest and wetland health in the Driftless Region. During surveys co-sponsored by Driftless Area Bird Conservation and the Raptor Resource Project and also supported by Upper Iowa Audubon Chapter and by Iowa Audubon, researchers are finding that Red-shouldered Hawks (RSHA) are currently absent from nesting sites along the main stem of the Upper Mississippi River. This is significant since Red-shoulder activity had been documented in several of these sites for each of the previous 37 years. Jon Stravers of Driftless Area Bird Conservation is the primary investigator and has coordinated RSHA investigations that began in 1983; investigations continued each year since then.

We are not certain of all the causes that might be contributing to this down-swing in RSHA populations. Reproductive success at the known RSHA nesting sites in 2019 and 2020 was lower than average, and in some cases due to increase in an infestation of Black Flies.

We feel some of this down turn may be related to long periods of extreme flooding that has occurred on the Upper Mississippi River during the previous decade. Many of the wetland habitats that RSHA depend on have been inundated for extended periods during previous nesting seasons. These longer periods of flooding, especially during late summer and even during the autumn have also caused significant tree mortality in portions of the Upper Mississippi River National Fish & Wildlife Refuge.

Although the previous RSHA nesting sites along the main stem of the Mississippi River are currently inactive, we have found that RSHA nesting along the various tributaries, such as Paint Creek and Yellow River in Allamakee County in Iowa, remain active. This may be a hint that the RSHA are shifting from Mississippi River habitats, which may not be as reliable as they were in the previous decades, to more upland forest tracts.

More work is needed to better understand this current situation with RSHA. Research and monitoring on bird populations within the Sny Magill Complex in Pool 10 sponsored by the McGregor District of the U.S. Fish & Wildlife Service will continue through the nesting season into mid-June. For questions or comments please contact Jon Stravers.

Evaluation of Asian carp use of a steeppass fish ladder on the La Grange Reach of the Illinois River

Kristopher Maxson, Kara Phelps, Jim Lamer, Janine Bryan, Nate Hamm, Paul Henwood, Dan Schneider, Paul Svrek, Doug Blodgett, Kevin Irons

The invasive Asian carps, particularly Bighead and Silver carps (hereafter referred to as bigheaded carps), continue to be a persistent threat in the Illinois and Mississippi rivers, and additional methods that aid their management, control, and removal are being explored. In addition, as various barriers are put in place to limit the spread of bigheaded carps, impacts on native fish passage is also a concern. Many fish species are attracted by water flow for upstream movements and spawning. To evaluate if this behavior can be exploited for removal of bigheaded carps, we assessed passage of both nonnative and native fish using a Whooshh Innovations fishway installed at The Nature Conservancy Emiquon Preserve's water control structure near Lewistown, IL on the La Grange Reach of the Illinois River (Figure 1).

The fishway consists of several parts: an Alaskan steeppass, flow box, and false weir. Water from the Emiquon pump station is gravity fed through the system and the outflow attracts fish up the steeppass, through the flow box that regulates water discharge, and over the false weir. An additional component, the FishL™ Recognition system (hereafter referred to as the scanner), is an imaging system that takes 18 photos of each fish, calculates dimension measurements in real-time and logs the date and time of fish passage. The high-definition images enable species identification. Ultimately, the goal is to have the system recognize invasive carps and sort the carps to a harvest location while allowing native fish to pass through the system returning them to the river safely (Whooshh Passage Portal: https://www.youtube.com/watch?v=F3FffKLEr9s&t=22s.)

In Fall 2020, we operated the fishway without installing the scanner for 3 days. Fish passage through the fishway was monitored using 2 outdoor WYZE wifi security cameras. The chute after the false weir deposited fish into a holding pool at the back of the Emiquon control structure, which we had cleared of fish prior to the trial. We collected a suite of water chemistry and plankton samples pre, during, and post operation (Figure 2). Both phytoplankton and zooplankton concentrations increased

Figure 1. WHOOSHH steeppass fish ladder installed at the Nature Conservancy's Emiquon water control structure near Lewistown, IL.

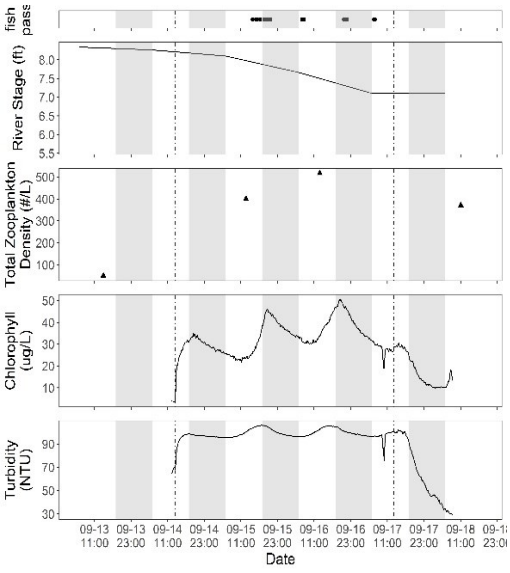

Figure 2. Chemical and biological parameters collected from fishway outflow during trial. Dotted lines show start and stop times of Emiquon water pumps. Shaded/unshaded regions indicate alternating 12-hour time intervals starting at 6 AM.

significantly in the fishway's outflow area during operation, demonstrating the plankton rich waters of Emiquon compared to the river. This nutrient rich water may serve as an additional attractant for planktivorous fishes like the bigheaded carps. We collected 76 fish from the holding pool at the conclusion of the trial (61 Gizzard Shad, 9 Grass Carp, 1 Common Carp, 2 Freshwater Drum, 1 Warmouth, 2 Bluegill, and 1 Bigmouth Buffalo). Due to the limitations of the WYZE cameras (e.g. low frame rate), we only detected 30 of these fish on the footage. Environmental conditions (e.g. low water levels) and depth of the steeppass opening may have also influenced fish usage and passage.

We conducted additional trials in Spring 2021 with system optimization adjustments. The end of the steeppass was elevated off the riverbed to allow fish a plunge pool to utilize for entering the steeppass, and the scanner was installed after the false weir to document fish passage. The study is on-going, however, so far we have operated the system a total of 12 days (trial 1 = 3 days; trial 2 = 4 days; trial 3 = 5 days). To date, 1,702 scans have been recorded (1,704 Gizzard Shad, 3 Grass Carp, 2 Bigmouth Buffalo, and 1 Northern Water Snake). The average total length of Gizzard Shad that used the fishway was 304mm (range 196-437mm). Most fish crossed during trial 3 (n=1,438) when water temperatures had risen above the 17°C known to be the onset of bigheaded carps spawning behavior (Figure 3). Some sources report the onset of Gizzard Shad spawning behavior at temperatures below this threshold, which may partially explain the greater Gizzard Shad activity.

Moving forward, we plan to conduct additional trials later in the Spring as water temperatures warm closer to the optimum for bigheaded carps spawning activity (23-24°C). For now, at the time of writing this article, we are in holding pattern as the scanner has been disconnected and elevated to avoid the current flood levels and we hope to avoid another record-breaking flood year!

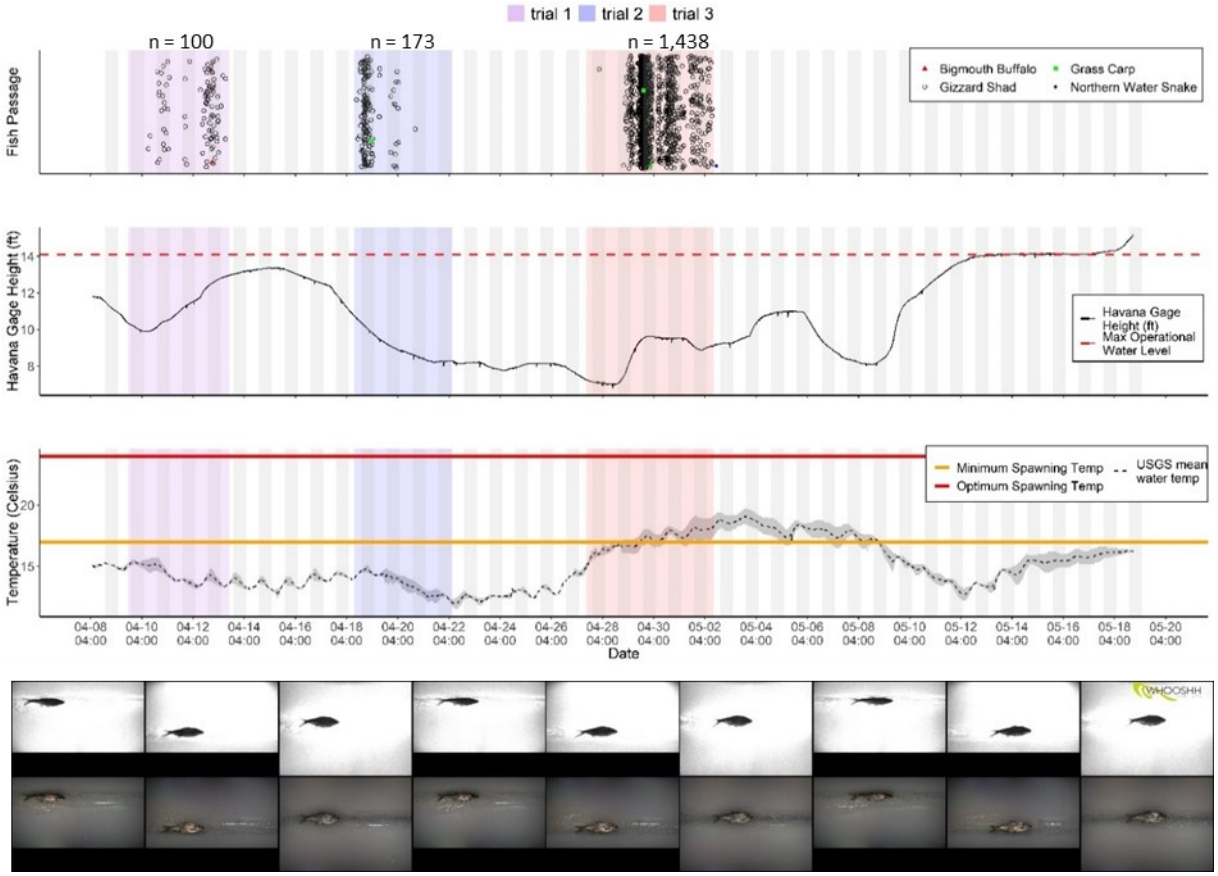

Figure 3. (top figure) Panel plot showing individual fish passage events by species; Havana, IL river stage with the maximum operational level (i.e. the point at which the scanner required removal); Main channel water temperature data, averaged from USGS gage data at Henry and Florence, IL. Minimum and optimum spawning temperatures for bigheaded carps are indicated by horizontal lines. (bottom figure) Images of a single Gizzard Shad captured by the Whooshh scanner.

DNR taking aggressive action in Mississippi River, other waters on invasive carp

34 silver carp captured in recent multi-agency operation

The Minnesota Department of Natural Resources, in partnership with the Wisconsin Department of Natural Resources, the U.S. Geological Survey and the U.S. Fish and Wildlife Service, is taking further action following the capture of 34 silver carp in Pool 8 of the Mississippi River near La Crosse, Wis. during a recent Modified Unified Method operation.

Next steps include increased commercial netting operations, tracking tagged carp, and perhaps another Modified Unified Method operation in the Mississippi River.

The USGS-developed Modified Unified Method combines netting and herding techniques to drive and concentrate invasive carp from a large area of water into a small zone for removal. Thirty-one silver carp were captured during the five-day operation earlier this month and three more were captured during follow-up work.

“This innovative multi-agency approach was the first time the Modified Unified Method was used anywhere as an early detection and rapid response technique,” DNR invasive species program supervisor Heidi Wolf said. “It worked so well that we’re already talking about perhaps doing this again next year.”

The Mississippi River in Minnesota has healthy populations of native fish and the removal of invasive carp helps to protect those native populations. Any native fish that were incidentally caught in the carp collection efforts were immediately released.

The DNR also continues to track several invasive carp that were previously captured in the Mississippi River, fitted with tracking devices and returned to the river to learn more about their movements and habits. The agency maintains working relationships with commercial fishing operations that assist in the monitor-

Photo Credit: MNDNR

ing and detection of invasive carp in the Mississippi River.
Invasive carp have been progressing upstream since escaping into the Mississippi River in Arkansas in the 1970s. These large fish compete with native species and pose a threat to rivers and lakes. No spawning populations have been detected in Minnesota waters to date.
Individual invasive carp have been caught as far upstream as Pool 2 of the Mississippi, near the Twin Cities (bighead, grass, and silver), the King Power Plant on the St. Croix River by Oak Park Heights (bighead), and just downstream of Granite Falls in the Minnesota River (bighead).
The DNR is actively engaged with several other prevention efforts:

- The DNR is an active partner in the Upper Mississippi River Invasive Carp Workgroup. The group includes representatives from Minnesota, Wisconsin, Iowa, Illinois, Missouri, and several federal agencies.
- In partnership with the DNR, the Minnesota Aquatic Invasive Species Research Center at the University of Minnesota is testing and evaluating carp deterrents in Mississippi River locks and dams.
- The DNR's Fish and Wildlife Division leads a program to monitor fish population changes and impacts of management actions.

The DNR is designing a process to work closely with stakeholders on updating the Minnesota Invasive Carp Action Plan.
The DNR is helping to plan an upcoming statewide Invasive Carp Forum hosted by the Stop Carp Coalition.
State funding sources, including the Environmental and Natural Resources Trust Fund and Outdoor Heritage Fund, have provided key funding for deterrent actions and the DNR invasive carp detection and response program.
Invasive carp captures must be reported to the DNR immediately by calling 651-587-2781 or emailing invasivecarp.dnr@state.mn.us. Take a photo and transport the carp to the nearest DNR fisheries office or make arrangements for it to be picked up by a DNR official. Do not release captured invasive carp.

Photo Credit: MNDNR

20 Years of Mussel Cleaning at Cordova

Submitted by Joe Jordan, USACE

This year marks the 20th year the U.S. Army Corps of Engineers, St. Paul District and other resource agencies on the Upper Mississippi River take a day and clean native mussels free from zebra mussels. No, they do not use scrub brushes, soap, and water, just a little elbow grease. Between 1998 and 2000, the St. Paul District and the U.S Fish and Wildlife Service were involved in formal consultation under the Endangered Species Act, Section 7. This consultation focused on the Higgins eye Pearlymussel and impacts from operation and maintenance of the existing 9-foot channel project for another 50 years. Zebra mussels, transported by towboats and other large craft to upstream areas on the Upper Mississippi River using the federal navigation system, were a primary concern because they harm native mussels by effectively smothering them and interfering with respiration, feeding and reproduction. As a result, in its April 2000 Biological Opinion (BiOp), FWS determined the continued operation and maintenance of the navigation project would jeopardize the existence of the federally endangered Higgins eye pearly mussel. In order to avoid jeopardy, FWS recommended USACE establish new populations of Higgins eye pearly mussels within the species' historic range in areas with no or few zebra mussels and implement a zebra mussel control program.

The Mussel Coordination Team (MCT) was formed to assist USACE in complying with the terms and conditions of the 2000 BiOp. The team includes malacologists from the USACE St. Paul and Rock Island districts, FWS, U.S. Geological Survey, National Park Service, state departments of natural resources, universities, and nongovernmental organizations. Over the years, the MCT has evolved from an oversight group into an award winning team dedicated to freshwater mussel conservation on the Upper Mississippi River. Since 2000, the

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St. Paul District has spent over $8 million on a variety of mussel relocation activities with assistance from the MCT. This involved propagating Higgins eye pearly mussel and placing them into waters not infested with zebra mussels.

The plan used a combination of five propagation and relocation methods at 10 sites to reach the goal of at least five new populations over 10 years that would become self-reproducing and viable long term. For the propagation efforts, the MCT used three sites for collecting gravid (egg release condition) females and glochidia (mussel parasitic life stage): Lower St. Croix River at Hudson, Wisconsin; Pool 11 at Cassville, Wisconsin; and Pool 14 at Cordova, Illinois. These sites were chosen for their Higgins eye pearly mussel genetic variability and availability of individuals.

In the summer of 2001, this relocation was accomplished as part of a mussel workshop conducted by the Illinois Chapter of the American Fisheries Society. As part of the collection of gravid Higgins eye pearly mussels, the group hand-rubbed off any zebra mussels attached to the mussels prior to relocation. Additional processing techniques were used prior to laboratory and relocation activities. Any unused Higgins eye pearly mussels were placed in two specific stockpile sites within the Cordova bed for future propagation efforts. Prior to their placement at these stockpile sites, "cleaning" zebra mussels off the live mussels became a common practice. As with any relocation, the stockpile sites diminish over time based on escape, burrowing and natural mortality. The MCT began to replenish the site with mussels found within the mussel bed, encompassing approximately a 3-mile river reach along the Illinois bank.

One of the most interesting discoveries was the abundance of adult Higgins eye pearly mussels found in shallow wa-

ter areas where previous studies have shown that they're usually associated with deeper water. In 2002, the MCT collected 371 adult Higgins eye pearly mussels from the Cordova Higgins eye Essential Habitat Area (EHA); of which most came from shallow water by wading (pollywogging).

The Cordova EHA is one of 14 EHAs in the Upper Mississippi River's two tributaries, the St. Croix and Wisconsin rivers, which are used to guide the Higgins eye Recovery Team to recovery efforts of the species. Since 2002, the multiagency and academic groups have come together for a one-day Cordova Mussel Cleaning event to restock the stockpile sites using shallow water dwelling mussels. During the event, every mussel is identified, cleaned of any zebra mussels, and returned to the water. All Higgins eye are returned to the stockpile sites for future propagation and all zebra mussels are destroyed and properly disposed. Upwards of 75 people usually attend and collect several thousand mussels representing over 25 live species.

This year, the annual event will be held August 4.

UMR Publications

Robinson, L. 2020 Four-Band Aerial Imagery Testing and Acquisition for 2020 Land Cover/Land Use Mission. A completion report submitted to the U.S. Army Corps of Engineers' Upper Mississippi River Restoration Program from the U.S. Geological Survey, LTRM-2018CAM4. 17 pp.

Prior to planned systemic aerial acquisition in the summer of 2020, the new four-band aerial camera was assessed for image quality at various resolutions and compared to the camera used for the 2010/2011 collection. Systemic aerial imagery has been acquired, and vegetation datasets derived from that imagery, by the Upper Mississippi River Restoration Program's Long Term Resource Monitoring element on a decadal basis beginning in 1989 and follow-up imagery missions in 2000 and 2010/2011. Remote sensing and geographic information system technology has changed dramatically during this time, transitioning from a workflow based on 9-inch by 9-inch aerial film-based cameras to today's 80-megapixel four-band digital camera. In addition to the camera testing, this report also provides historical information of previous aerial imagery acquisition efforts and how that process has continued to advance in the 30 years

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Carhart, A. M., J. E. Kalas, J. T. Rogala, J. J. Rohwder, D. C. Drake, and J. N. Houser, 2021, Understanding Constraints on Submersed Vegetation Distribution in a Large, Floodplain River: the Role of Water Level Fluctuations, Water Clarity and River Geomorphology: Wetlands, 41:57, https://doi.org/10.1007/s13157-021-01454-1.

Aquatic vegetation is a key component of large floodplain river ecosystems. In the Upper Mississippi River System (UMRS), there is a long-standing interest in restoring aquatic vegetation in areas where it has declined or disappeared. To better understand what constrains vegetation distribution in large river ecosystems and inform ongoing efforts to restore submersed aquatic vegetation (SAV), we delineated areas in ~1200 river km of the UMRS where the combined effects of water clarity, water level fluctuation, and river geomorphology appeared suitable for establishment and persistence of SAV based on a 22-year dataset for total suspended solids (TSS), water surface elevation, and aquatic vegetation distribution. We intentionally focused on a subset of suitability conditions—those related to light and potential for dewatering—because these are known physical limitations on aquatic vegetation and any areas unsuitable because of these criteria are areas where establishment and growth are very unlikely. In the context of river restoration and management, these are areas where actions to establish vegetation are unlikely to succeed. Areas that meet the suitable criteria, but do not currently support vegetation, need to be further assessed regarding other limiting factors including current velocity, herbivory, and bioturbation. These are areas where management actions to re-establish vegetation may succeed if other limiting factors can be addressed.

To improve our understanding of how changing river conditions may affect SAV distribution, changes in suitable area associated with hypothetical improvements in water clarity were assessed systemically. A hypothetical scenario of 75% reduction in TSS resulted in only minor increases in suitable area in the southern portion of the UMRS, indicating limitations by water level fluctuation and/or bathymetry (i.e., limited shallow area). These results improve our understanding of the structure and function of large river systems by illustrating how water clarity, fluctuations in water level, and river geomorphology interact to create complex spatial patterns in habitat suitability for aquatic species and may help to identify locations most and least likely to benefit from management and restoration efforts.

The data are published and available online at https://doi.org/10.5066/P9TWZXVZ and can be viewed spatially within the Upper Mississippi River System – Systemic Spatial Data Viewer (https://umesc.usgs.gov/management/dss/umrs_land_cover_viewer.html).

UMR Publications

Interactive Climate Change Vulnerability Dashboard (UMESC)
John Delaney and Kristen Bouska have released an interactive watershed vulnerability online dashboard that they created in collaboration with the U.S. Fish and Wildlife Service. The tool allows users to create custom spatial vulnerability assessments for the Midwest by selecting and weighting the importance of 15 climate change indicators and five indicators of adaptive capacity. The Watershed-based Midwest Climate Change Vulnerability Assessment Tool is available at https://www.usgs.gov/apps/CC_Vulnerability. For more information contact John Delaney at jDelaney@usgs.gov (Ecosystems).

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The Upper Mississippi River Conservation Committee (UMRCC) was established in 1943 with the goal to: "Promote the preservation and wise utilization of the natural and recreational resources of the Upper Mississippi River and to formulate policies, plans, and programs for conducting cooperative studies".

UMRCC Digital Library

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