

System Operations to Support Lake Sturgeon Spawning at Locks and Dams on the Mississippi River

Sustainable Rivers Program



Lake sturgeon, Lock and Dam 25 tailwater - MDC photo

Prepared by:

Ryan Swearingin, Kyle Bales, and Steven Clark
U.S. Army Corps of Engineers
and
Sarah Peper and Travis Moore
Missouri Department of Conservation
2360 Hwy D
St. Charles, MO 63304

September 2025



**US Army Corps
of Engineers®**



Abstract

During 2024, we convened a team of biologists, lock and dam operators, and water management engineers from state and federal agencies to assess and rank locks and dams based on operational and ecological potential to improve lake sturgeon *Acipenser fulvescens* (LKSG) spawning habitat and success on the Upper Mississippi River (UMR). Intentional dam gate manipulations to achieve target tailwater velocities in support of LKSG spawns has been demonstrated at Melvin Price Locks and Dam (Mel Price) near Alton, Illinois in 2022, 2023, and 2024. This review of all 27 locks and dams suggests that over half possess conditions similar to Mel Price and may warrant consideration of operational changes to manage flows for LKSG spawning. Additionally, our team captured six LKSG in the Lock and Dam 25 (LD25) tailwater. We implanted five of the fish with acoustic transmitters and tracked them throughout the spring. These observations suggest that LKSG utilize the LD25 tailwater which strengthens our belief that suitable spawning conditions may be attainable at that site. This report serves as a 2024 summary of cooperative work by the Missouri Department of Conservation (MDC), Illinois Department of Natural Resources (ILDNR), Iowa Department of Natural Resources (IADNR), Minnesota Department of Natural Resources (MDNR), Wisconsin Department of Natural Resources (WDNR), U.S. Geological Survey (USGS), U.S. Fish and Wildlife Service (USFWS), and U.S. Army Corps of Engineers (USACE) to promote LKSG conservation on the UMR.

Introduction

The LKSG is a charismatic fish species, unique due to its longevity and size. They can reach eight feet long, weigh more than 200 pounds (lbs), and live over 100 years. LKSG are designated as a state endangered species in Illinois, Missouri, and ten other states. In 1984, MDC began species recovery efforts through reintroduction of juvenile LKSG. Loss of spawning habitat has been identified as a limiting factor to LKSG population growth. In 2015, LKSG were confirmed spawning in the Mel Price tailwater along the right descending bank. This was the first confirmed LKSG spawn in Missouri in recent times (decades). More recently, LKSG have been observed spawning below Mel Price in 2022, 2023, and 2024 during periods of intentional gate manipulations intended to create suitable spawning conditions. These observations led our team to believe that this approach, modifying gage operations to improve habitat conditions, could be implemented at other locks and dams on the UMR, specifically for LKSG spawning.

Although it is a common occurrence for LKSN to spawn in dam tailwaters in Minnesota and Wisconsin, spawning below locks and dams on the Mississippi River has rarely been observed. It is known that water temperature, time of year, water velocity, and substrate are critical to spawning. Knowledge gained from these spawning events were utilized to assess all locks and dams on the Upper Mississippi River. The USACE St. Louis (MVS), Rock Island (MVR), and St. Paul (MVP) districts coordinated with federal and state natural resource agency staff to identify and review locks and dams tailwaters as potential spawning locations. Factors such as habitat quality, ability to manage flows, lake sturgeon presence, and ability to access and monitor a site were considered to determine viability of a given site. These efforts could lead to the expansion of efforts like those at Mel Price for implementation at other locks and dams.

Lock and Dam 25 (LD25) is one such lock and dam that may possess suitable habitat and the ability to manage tailwater velocities to encourage LKSG to spawn on the site. LD25 is a dam and single lock

located at river mile (rm) 241, river kilometer (rkm) 388, of the UMR (measuring from its confluence with the Ohio River), about 35 miles (57 km) northwest of St. Louis, Missouri. LD25 is operated by (MVS) for the primary purpose of facilitating navigation. For the purposes of this project, our team monitored LD25 tailwater for presence and movements of LKSG.

The two objectives of this project were to: 1) conduct an assessment and rank locks and dams based on operational and ecological potential to improve LKSG spawning habitat and success on the UMR and 2) to monitor LD25, a structure that has been identified as potentially possessing suitable habitat with the ability to manage tailwater velocities for the creation of LKSG spawning habitat.

This project was funded by the SRP. SRP is a nation-wide initiative and partnership between the USACE and The Nature Conservancy (a global environmental nonprofit) that seeks to enhance the environment by modifying the operations of USACE water resources infrastructure. The SRP began in 2002, as an effort to find more sustainable ways to manage river infrastructure to maximize benefits for people and nature. The focus of the SRP is determining unique flow requirements for rivers and then creating operating plans for dams that achieve environmental flows to revive and sustain critical ecological functions and habitat for species. This is the fourth year MVS has partnered with MDC in conjunction with assistance provided by SRP for the conservation of LKSG (Swearingin, Chen, and Peper 2024; Swearingin and Errett 2023; MVS 2021a; MVS 2021b).

Assessment of all Locks and Dams

The UMR is best described as the stretch of the river from St. Paul, Minnesota, to the confluence of the Mississippi and Missouri rivers. In the late 19th and early 20th centuries, this stretch of the river was unreliable for navigation purposes. During common periods of low water, the UMR had a shallow and swift current, rock ledges, small waterfalls, uncharted shoals and sandbars. These hazards made the river too treacherous to navigate safely.

In 1930, Congress authorized the Corps of Engineers to create and maintain a 9-foot (2.7 meter) navigation channel on the UMR through the construction of the slack-water navigation system. As a result, the USACE constructed a series of locks and dams on the UMR. Today there are a total of 27 locks and dams on the Mississippi River. These structures, in essence, form an aquatic staircase some 670 miles (1,078 km) long from St. Paul to St. Louis.

Recent efforts to create target velocities suitable for LKSG spawning have resulted in successful spawns in 2022, 2023, and 2024 at Mel Price. Knowing LKSG range over much of the UMR suggests that there may be opportunities to replicate efforts at Mel Price elsewhere in the river system. We convened an interdisciplinary team consisting of lock and dam operators, hydraulic engineers, and natural resources biologists to conduct a rapid assessment of all LDs in the UMR for their potential to adjust operations to improve spawning conditions (Table 1). We felt this team was broad enough to offer local perspectives for each LD. The goal was to develop a list of assessment criteria for which the team could input their ratings into a ranking matrix. The matrix would provide a cumulative score for each lock and dam's potential for creating spawning conditions (Table 2). These cumulative scores will serve as a basis for a prioritized list of LDs for which future, in-depth evaluations could occur using hydraulic modeling, fish sampling, fish tracking, substrate mapping, and/or velocity trials.

Table 1. Interagency team that provided input on the LD rankings.

2024 UMR Systemic Lake Sturgeon Spawning - Project Development Team		
Name	Agency	Ranking Team
Kyle Bales	USACE	MVR
Royce Bowman	Iowa DNR	MVR/MVP
Dustin Broaddus	USGS	MVS/MVR
CJ Brooks	USACE	MVR
Steve Clark	USACE	MVP
Carrie Elliott	USGS	MVS/MVR
Dan Fasching	USACE	MVP
Justin Garrett	USACE	MVS
Tyler Goble	USACE	MVS
Kevin Haupt	USFWS	MVS/MVR
Annie Hentschke	Missouri Department of Conservation	MVS/MVR
Ryan Hupfeld	Iowa DNR	MVR
Brian Johnson	USACE	MVS
Patrick Kroboth	USGS	MVS/MVR
Rebecca Krogman	Iowa DNR	MVR/MVP
Matt Mangan	USFWS	MVS
Nerissa McClelland	Illinois DNR	MVS/MVR
Travis Moore	Missouri Department of Conservation	MVS/MVR
Elizabeth Nelson	USACE	MVP
Matt O'Hara	Illinois DNR	MVS/MVR
Sarah Peper	Missouri Department of Conservation	MVS
Tom Rohrer	USACE	MVP
Neil Rude	Minnesota DNR	MVP
Nick Schlessler	Minnesota DNR	MVP
Patrick Short	Wisconsin DNR	MVP
Ryan Swearingin	USACE	MVS
Joel Stiras	Minnesota DNR	MVP
Chris Trefry	USACE	MVR
Jason Tidwell	USACE	MVP
Liam Wallace	USACE	MVS
Jordan Weeks	Wisconsin DNR	MVP

Assessment Criteria

The intent of the assessment was to develop a prioritized list of sites where it may be feasible to manage tailwater velocities for lake sturgeon spawning habitat. This list has the potential to focus future efforts at individual LDs, which may include: LKSG monitoring, habitat analysis, hydro surveys, hydraulic modeling, implementation of velocity trials, and/or identify sites for habitat enhancement.

The authors of this document formulated a small team to develop criteria judged to be important for LKSG spawning. It was important that the criteria could quickly be evaluated and values assigned without intense quantitative analysis. This assessment resulted in the following six criteria:

1. **Lake sturgeon present at site?**
 - a. Is there evidence that lake sturgeon utilize the LD tailwater?
 - i. Locally present (**3 pts**) - Presence data available from partner agencies
 - ii. Likely present (**2 pts**) - Evidence of angler catches
 - iii. May be present (**1 pt**) - Unknown/no available data to verify
2. **Spawning substrate present?**
 - a. Definition – stable rocky substrate in close proximity to the dam tailwater
 - i. Suitable habitat present (**3 pts**)
 - ii. None currently exists, but there is potential to enhance or create habitat (**2 pts**)
 - iii. No habitat exists, unlikely potential to create habitat/unknown with current information (**1 pt**)
3. **Ability to regulate/manage velocities**
 - a. Ability to make gate adjustments to manipulate tailwater velocities within current operational parameters (no impact to navigation).
 - i. High potential (**3 pts**) - Can manage velocities along shoreline or prospective habitat
 - ii. Low potential (**2 pts**) - Can manage velocities on off-bank habitat
 - iii. No potential (**1 pt**) - Very limited ability to manage velocities
4. **Ability to monitor site**
 - a. Ease of vehicular or boat access makes monitoring and spawning confirmation more feasible. Travel distance for those monitoring should be considered here.
 - i. Easy (**2 pts**) - Road access to site and/or boat ramp in nearby proximity to tailwater
 - ii. Difficult (**1 pt**) - No road access to site and/or boat ramp multiple miles away or would require lockage
5. **Agency interest in particular location**
 - a. Note: Resource agency priorities or interest in a specific lock and dam will help increase enthusiasm and ability to confirm if spawning is occurring.
 - i. Yes (**2 pts**) - Priority for management agency to manage/monitor at a LD
 - ii. No (**1 pt**) - Agency indifference for the site
6. **Percentage of time is L&D at open river**
 - a. Defined as percentage time L&D is at open river using historical data (all months included in this analysis; 2004-present)
 - b. We recognize that open river may be advantageous to lake sturgeon but for this project we are viewing time in which we are able to manage velocities as important. Some L&D's have much higher propensity for open river conditions than others.
 - i. Rarely (**3 pts**) - <10% of time
 - ii. Sometimes (**2 pts**) - 10-20% of time
 - iii. Frequently (**1 pt**) - >20%-99% of time
 - iv. Lock only (**0 pt**) - No transition between pool and open river
7. **Notes:** Important to capture nuance about each site. This can include anecdotal observations, point to additional data resources, substrate descriptions, etc. Describe site data needs that would help evaluate the LD for further investigation.

Table 2. Ranking Matrix - LKSN spawn ranking scores for all locks and dams on the Upper Mississippi. Green = MVP; Blue = MVR; Orange = MVS.

Lock and Dam #	Nearest City	Criteria						Cumulative Score
		Lake Sturgeon Present?	Spawn habitat/substrate present?	Ability to regulate/manage velocities?	Ability to monitor site?	Agency interest in particular location?	Percentage of time the dam is at Open River?	
1	Minneapolis, MN	3	1	1	2	1	0	8
2	Hastings, MN	3	1	1	2	2	3	12
3	Redwing, MN	3	1	1	2	2	1	10
4	Alma, WI	3	2	2	2	1	3	13
5	Whitman, MN	3	2	2	2	2	3	14
5A	Fountain City, WI	1	1	1	1	1	1	6
6	Trempealeau, WI	3	1	1	2	1	2	10
7	LaCrescent, MN	2	1	1	2	2	3	11
8	Genoa, WI	2	1	2	2	2	3	12
9	Harpers Ferry, IA	1	1	2	1	1	1	7
10	Guttenberg, IA	3	3	2	2	2	1	13
11	Dubuque, IA	3	3	2	2	2	3	15
12	Bellevue, IA	3	3	2	2	2	1	13
13	Fulton, IL	3	3	2	2	2	3	15
14	LeClaire, IA	3	3	2	2	2	3	15
15	Rock Island, IL	3	3	1	2	2	3	14
16	Muscatine, IA	3	3	2	2	2	1	13
17	New Boston, IL	3	3	2	2	2	1	13
18	Gladstone, IL	3	3	2	2	2	2	14
19	Keokuk, IA	3	3	3	2	2	1	14
20	Canton, MO	3	2	1	2	2	1	11
21	Quincy, IL	3	2	1	2	2	1	11
22	Saverton, MO	3	2	1	2	2	1	11
24	Clarksville, MO	3	3	2	2	2	1	13
25	Winfield, MO	3	2	2	2	2	1	12
26	Alton, IL	3	3	3	2	2	2	15
27	Granite City, IL	3	3	1	1	1	0	9

Ranking Notes

Notes for individual LDs were gathered during the rankings meetings and are captured here:

LD2 - Long rock substrate shoreline several hundred yards downstream and a lot of gates to adjust flows with. No fishing float or private property impacts known. Does not have great access for personnel. Riprap on left descending is present but not sure about slope of riprap and whether that would be good or not. Instream habitat unknown.

LD3 - Short rock substrate directly downstream, no fishing floats, and possible candidate for future rock placement. Only 4 gates to adjust flows with and does not have great access for personnel. However, if high flows are the target, this site would achieve higher flows ahead of other sites due to the narrowness of the dam. There are a series of wing dams present below LD3 that may provide rocky substrate, at least at their crest. LTRM also samples YOY shovelnose sturgeon in the tailwater with some regularity. Recent captures of small (<10" minimum of 7") LKSG during October sampling periods are indicative of successful reproduction occurring in the system.

LD4 - There is some type of rock/gravel shoal below the dam not far from the fishing float. Comes up to a point where you can hit it with boat and it is evident on systemic bathymetry data. Dan Dieterman (retired) observed fish exhibiting spawning behavior in the spring on the MN side on the rocks just below the farthest west gates.

LD5 - Rock shoreline long ways upstream with easy road access and ~100 yards downstream of the storage yard. Lots of gates to adjust flow with. No fishing float or adjacent private property. Possible opportunity for future placement. There used to be a rocky shoal on the WI side below the dam (not sure of spawning quality), but that has turned into a significant sandbar in recent years. Dan Dieterman (retired) observed fish exhibiting spawning behavior in the spring on the WI along rocks just below farthest gate towards Wisconsin.

LD10 - WI side would probably be the best place for a sturgeon spawning habitat manipulation.

LD11 - Gate manipulation - Will not know impacts to navigation without further investigation (modeling) or trying it in the field.

LD12 - Gate manipulation - Will not know impacts to navigation without further investigation (modeling) or trying it in the field.

LD13 - Gate manipulation - Will not know impacts to navigation without further investigation (modeling) or trying it in the field.

LD14 - Gate manipulation - Will not know impacts to navigation without further investigation (modeling) or trying it in the field.

LD15 - Davenport floodwall on the Iowa side - Lock is on the Illinois side.

LD16 - Potential habitat construction downstream of the dam along the right side (Iowa side), Hog Island

LD17 - Potential habitat construction downstream of dam along right side (Iowa side), Otter Island

LD18 - Potential habitat construction downstream of dam along right side (Iowa side) and there is a small island.

LD19 - Lock is owned and operated by USACE - Dam is owned and operated by Ameren Missouri - There are 15 hydropower turbines and 109 crest gates on a spillway perched several feet above the river. Current rock piles below flow gates, but also opportunities to add habitat on the IL side, upstream of the railroad bridge.

LD20 - Opportunity at the head of the island on the IL side and for submerged beds below gates.

LD21 - Not much of a right descending bank along the MO side opposite the lock - overflow spillway section. Potential for submerged beds. Potential flow challenges here. Dam has few gates, which could be a constraint.

LD22 - Not much of a left descending bank along the IL side opposite the lock - overflow spillway section. Fish passage construction may create suitable habitat inside and outside the structure. High interest due to high sturgeon numbers.

LD24 - Potential for LKSG habitat enhancement via Clarksville Island NESP ECO project. LD staff must manually adjust gates vs. automated gates at Mel Price.

LD25 - LKSG captures in tailwater in 2024. LD staff must manually adjust gates vs. automated gates at Mel Price. Construction of 1,200-foot (366-meter) lock could introduce constraints;

LD26 - Mel Price - Automated gates, suitable substrate on right descending bank; successful LKSG spawns in 2015, 2022, 2023, and 2024.

LD27 - No ability to manage flows since LD27 only has locks. The low head dam is constructed from rock therefore no ability to adjust flows there either. Suitable habitat and LKSG in the area.

Rankings Results

Teams were organized by USACE district boundaries for MVS, MVR, and MVP; some members participated on two district assessment teams. The ranking occurred during July and August 2024. Discussions focused on the criteria and expectations for rankings process. Mel Price (LD26) was used as an example for building context surrounding the criteria. Point values were assigned for each criterion for each LD. Cumulative values were computed using the following formula: $A + B + C + D + E + F = \text{“Site potential for managing for LKSG spawning” score}$. Site potential has a minimum score of 5 and a maximum score of 16. Criteria 4 and 5 were less broad in scoring range (1 or 2) and therefore carried less weight. It is also worth noting that two facilities received a score of zero for criteria six (time spent at open river). This was due to the inability to manage a pool, as these projects only have locks and are unable to transition from a managed pool to open river. Originally zero was not an allowed score for criteria six, however it was determined that a lock and dam with no ability to manage pool is effectively lowest priority where intentional flow modification is the focus. Once district teams completed their assessments, all of the rankings were compiled. A final full team meeting was held to discuss the findings on August 29, 2024. The final rankings are in Table 2.

With a potential range of 5-16, there were 12 possible score outcomes. Breaking the scores into 3 equal categories of low (scores 5-8), medium (scores 9-12), and high (scores 13-16) resulted in 3 dams (11%) with a low score, 10 dams (38%) with a medium score; and 14 dams (52%) with a high score (Figure 1). 21 of 27 dams (78%) achieved a score in the upper half of possible scores (score >10).

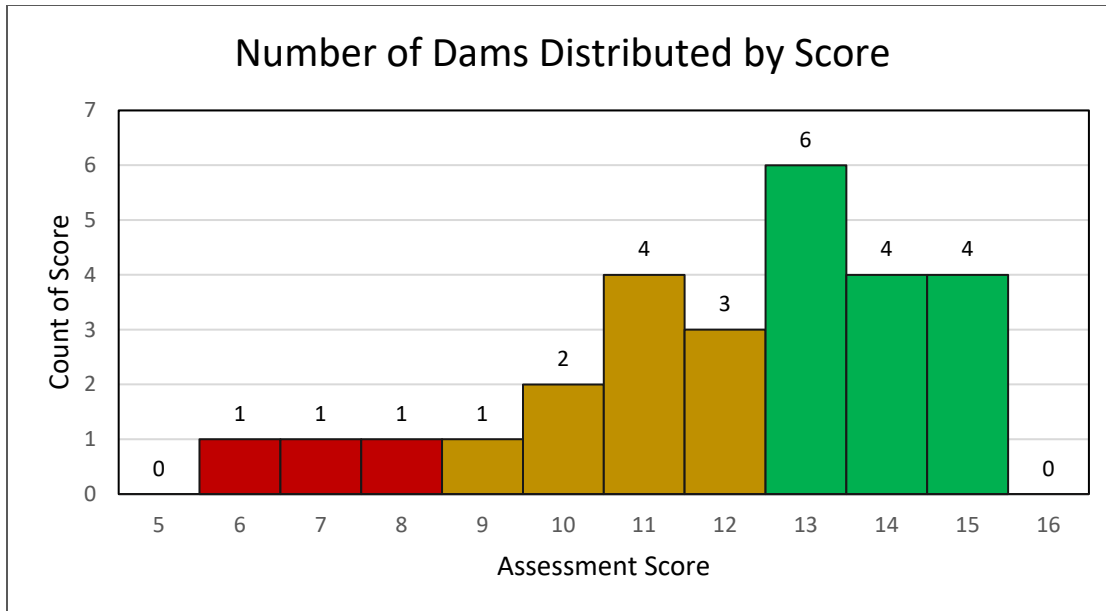


Figure 1. Lock and dam assessment scores for LKSG spawning potential. Colors show facilities scored as having low (red), medium (orange), and high (green) potential to adjust operations to improve lake sturgeon spawning habitat.

Ranking Discussion

Most of the dams received scores in the higher range of outcomes, suggesting that there may be great potential for intentionally managing dam gates to achieve target velocities over suitable substrate to encourage LKSG spawning success. The objective of this systemic UMR review was to design and apply a formulation process that would allow for comparison of all lock and dams equally. However, it is possible that district teams interpreted criteria differently, which would affect scoring for individual criterion and the overall site potential. The presence of spawning substrate was likely once such example as evidenced by discrepancies across each districts' scores for that criterion. While this may complicate comparisons across districts, we feel the ranking effort and associated data compiled and scorings will be valuable information to help guide future work, especially as selection of individual dams for future projects will likely be done at a USACE district or state agency level.

Another consideration is that this ranking effort is based on current conditions and may need to be revisited in the future as site conditions change. Ecosystem restoration opportunities, agency priorities and staffing, LKSG knowledge, as well as construction at the locks and dams could alter the potential to create spawning conditions.

Overall, we feel this project was a worthwhile initial assessment and that the within-district evaluations are more accurate than cross-district evaluations due to possible differences in interpreting criteria. Potentially the greatest value of this work was bringing a multi-disciplinary group of fisheries biologists, water managers, and dam operators together to discuss opportunities and constraints for enhancing LKSG throughout the UMR. We hope this effort will carry forward conservation momentum for the species and strengthen a community for further collaboration and partnerships.

2024 L&D25 Monitoring

MDC crews assisted by USACE conducted targeted (non-random) sampling in the LD25 tailwater (rm 241.4-238.9; rkm 388.5-384.5) using trotlines (Figure 2). Lake sturgeon over 3.3 ft (1,000 mm) in fork length were implanted with Vemco V16-6x acoustic transmitters. Movements and habitat use of tagged fish were monitored via active and passive telemetry methods. This is the first year of cooperative monitoring at LD25 for LKSG.



Figure 2. Lock and Dam 25 located at Winfield, Missouri.

Targeted sampling occurred March 1st through April 25, 2024 (Table 3). Ten-hook trotlines baited with nightcrawlers were deployed when river and weather conditions permitted. Lines were set for zero to three nights per week. Set locations were as far as 1.2 rm (2.0 rkm) downstream from LD25. Six LKSG were captured during 11 nights of sampling (1,070 total hook-nights).

Table 3. Lock and Dam 25 trotline sampling effort and LKSG catch data, 2024.

Year	# Hook Nights	# Sample Nights	Date Range	Water Temp Range, °C (°F)	River Stage, m (ft) Mel Price lower gage	# LKSG Caught (Tagged)
2024	1,070	11	3/1 - 4/25	5.7 - 12.7 (42.3 - 54.9)	4.4 - 6.2 (14.5 - 20.2)	6 (5)

Captured LKSG ranged in fork length from 673 to 1,336 mm (Table 4). Five LKSG greater than 1,000 mm in fork length were surgically implanted with Vemco V16-6x acoustic transmitters (Figure 3). These tags typically have a battery life of six to seven years. Note that in previous years, we and other telemetry researchers have tagged LKSG in the Mississippi River Basin, resulting in possible detections of those fish during our monitoring efforts. All six LKSG were caught along the Missouri shoreline, immediately downstream from the lock chamber (Figure 4). Similarly to Mel Price, LKSG appear to prefer the slack water habitat below the lock chamber during the pre-spawn period. This silty, off-channel habitat is likely rich in benthic invertebrates and may offer prime foraging ground for LKSG.

Table 4. Lake sturgeon capture data from Lock and Dam 25 tailwater near Winfield, MO, 2024.

Species	Catch Date	Fork Length mm (ft)	Weight grams (lbs)	Transmitter implant?	Catch Location
LKSG	3/7/2024	1,325 (4.3)	18,000 (39.7)	Yes	Winfield tailwaters
LKSG	3/13/2024	1,232 (4.0)	18,000 (39.7)	Yes	Winfield tailwaters
LKSG	3/15/2024	1,228 (4.0)	14,000 (30.9)	Yes	Winfield tailwaters
LKSG	3/20/2024	673 (2.2)	-	No	Winfield tailwaters
LKSG	3/20/2024	1,336 (4.4)	16,300 (35.9)	Yes	Winfield tailwaters
LKSG	4/10/2024	1,265 (4.2)	22,000 (48.5)	Yes	Winfield tailwaters

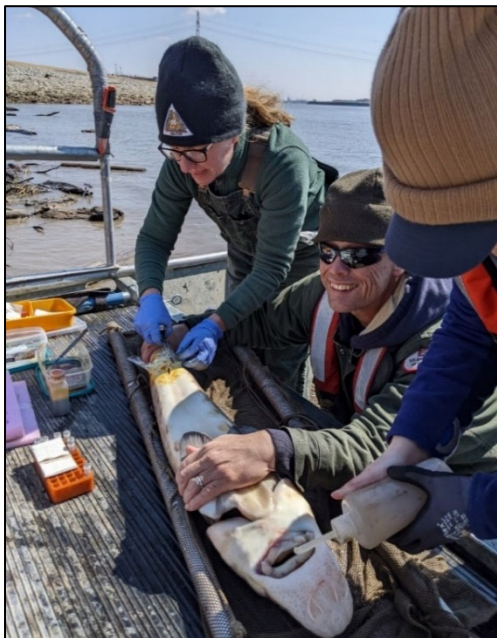


Figure 3. Left to right, Sarah Peper, Rob Cosgriff, and Kiersten Schellhammer implant a transmitter for a lake sturgeon (USACE photo).



Figure 4. Area at Lock and Dam 25 where lake sturgeon were captured, February - March 2024.

Acoustic Telemetry Monitoring

Passive tracking was accomplished using Vemco VR2 acoustic receivers. VR2s are hydrophone data loggers deployed under the water surface for extended periods of time. The hydrophone passively “listens” for tagged fish and logs those detections for subsequent downloading and analysis. Three VR2s were deployed in the study area, one on the IL shoreline 0.2 miles (0.3 km) downstream from LD25, the second on the IL shoreline along a rocky bluff wall 1.5 miles (2.4) km downstream and the third on the Missouri shoreline 1.6 miles (2.6 km) downstream of LD25 (Figure 5).

The three VR2s collectively detected sixteen LKSG present in the study area from March to May 2024. Eight LKSG – all five of the fish tagged plus three others – are known to have been on site through the presumed spawn window (using spawn dates observed at Mel Price). Furthermore, all eight were detected during that timeframe by the VR2 nearest the dam where suitable spawn substrate is believed to exist. All stayed at LD25 through March and April and then traveled upstream in late April to early May during a period of high water. They were next detected at LD24 (Clarksville, MO), after which some continued north to Pool 20.

VR2 data suggests that during March LKSG spent much of their time about 1.2 mi (2.0 km) downstream of LD25. In April, as spawning temperatures approached, they moved closer to the dam, using the tailwaters more frequently than downstream habitats during the dates that spawning was observed at Mel Price. By May, detections dropped substantially as tagged LKSG moved through the dam toward upstream habitats (Figure 4). Two caveats to our observations are that VR2s only provide positive detections (we have no way of knowing where they went when not detected) and each unit has limited and differing detection ranges based on conditions at the placement location.

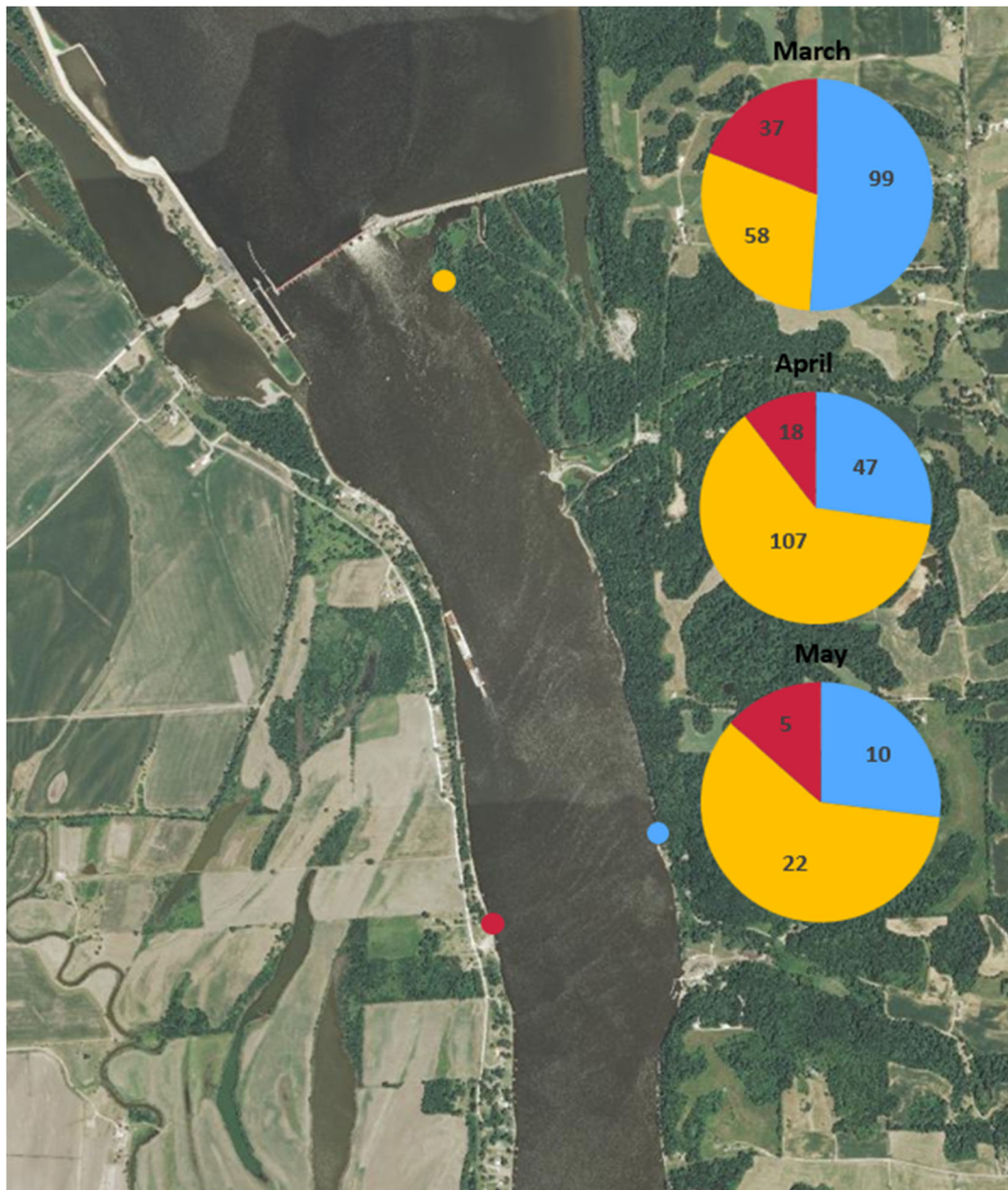


Figure 5. VR2 locations at LD25 with lake sturgeon detections at each VR2 by month. Detections were normalized to one detection per day per fish. Numbers denote total normalized detections per VR2.

Conclusion

This effort suggests that over half of the locks and dams on the UMR have or could be enhanced to have conditions similar to Mel Price and warrant further investigations into intentionally managing flows for LKSG spawning. When evaluating LD assessment scores, it is likely most valuable to compare dams within each USACE district. This assessment effort is based on current conditions and may need revisited in the future as site conditions change. We hope this effort will carry forward conservation momentum for the species and strengthen a community for further collaboration and partnerships.

At LD25, we have been able to confirm LKSG presence in the dam tailwater. The tagged LKSG showed preference for areas temporally, specifically the area closest to the dam when water temperatures were optimal and where suitable substrate may exist for spawning conditions. Continuing in FY25, we will be pursuing completion of a hydraulic model for LD25, further LKSG tagging and tracking, and if conditions allow will attempt to evaluate substrate and implement velocity trials in the tailwater.

This report serves as the 2024 summary of successful cooperation between Missouri Department of Conservation (MDC), Illinois Department of Natural Resources (ILDNR), Iowa DNR (IADNR), Minnesota DNR (MDNR), Wisconsin DNR (WDNR), U.S. Geological Survey (USGS), U.S. Fish and Wildlife Service (USFWS) and U.S. Army Corps of Engineers (USACE) to promote LKSG conservation on the Upper Mississippi River (UMR).

Acknowledgements

A special thanks to the interdisciplinary team listed in Table 1, your time and participation were crucial to this effort. Additionally, significant contributions were made by many USACE and MDC staff including those at Rivers Project Office, Lock and Dam 25 and 26, District Water Control, and District team (Sarah Holder, Josh Pierce, Lane Richter, Joan Stemler, Dave Busse, Joel Asunskis, Anthony Arroyo Soto, and Brian Johnson). Lastly, we would like to thank SRP which has provided financial support for LKSG conservation on the UMR since 2021. This funding has allowed for holding stakeholder meetings, construction of hydraulic models, shoreline monitoring and tracking of LKSG, and operationalizing of environmental flows.

Literature Cited

MVS (St. Louis District). 2021a. Lake Sturgeon Spawning at Mel Price Locks and Dam. U.S. Army Corps and Engineers. Sustainable Rivers Program. 18 pp.

<https://www.hec.usace.army.mil/sustainableivers/publications/docs/Mississippi%20-%20Lake%20sturgeon%20spawning%20summary.pdf>

MVS (St. Louis District). 2021b. Mel Price Locks and Dam Hydraulic Assessment of Conditions Surrounding the 2015 Lake Sturgeon Spawn. U.S. Army Corps and Engineers. Sustainable Rivers Program. 30 pp.

<https://www.hec.usace.army.mil/sustainableivers/publications/docs/Mississippi%20-%20Lake%20sturgeon%20spawning%20modeling.pdf>

Swearingin, R., C. Chen, and S. Peper. 2024. 2023 Lake Sturgeon Spawning at Melvin Price Locks and Dam - Mississippi River. U.S. Army Corps and Engineers and Missouri Department of Conservation. Sustainable Rivers Program. 26 pp.

<https://www.hec.usace.army.mil/sustainableivers/publications/docs/Mississippi%20-%20Lake%20sturgeon%20spawning%20summary%20-%202023.pdf>

Swearingin, R., and R. Errett. 2023. 2022 Lake Sturgeon Spawning at Melvin Price Locks and Dam. U.S. Army Corps and Engineers. Sustainable Rivers Program. 18 pp.

<https://www.hec.usace.army.mil/sustainableivers/publications/docs/Mississippi%20-%20Lake%20sturgeon%20spawning%20summary%20-%202022.pdf>