



Alternative Financing Evaluation

Upper Mississippi River Inland Waterway Summary Report

Iowa Department of Transportation

Ames, Iowa

April 2019





Executive Summary

Background & Objectives

In April 2013, the Iowa Department of Transportation (Iowa DOT) U.S. Inland Waterway Modernization Reconnaissance Study (Reconnaissance Study) was completed. Since publication of this 2013 study, significant legislation, study, and discussion have occurred involving the inland waterway system, along with five additional years of U.S. Army Corps of Engineers' (USACE) operation and maintenance of the waterway. Several recommendations of the Reconnaissance Study have come to fruition, including passage of the Water Resources Reform and Development Act (WRRDA) bills and the Water Infrastructure Improvements for the Nation Act of 2016 (WIIN).

The Iowa DOT continues to collaborate with USACE to enhance the performance of the Upper Mississippi River (UMR) lock and dam (L&D) system. As part of this ongoing collaboration, the Iowa DOT conducted this Alternative Financing Evaluation of the UMR Inland Waterway infrastructure to (1) develop a long-term vision for the waterway that serves stakeholders' needs and (2) identify feasible investment strategies for the waterway that recognize the opportunities created by WRRDA 2014 and WIIN 2016. Of special interest are the revised contributed funds programs for USACE water resources projects, such as the UMR Inland Waterway's L&D system.

This study provides an update to support a long-term vision document that informs UMR Inland Waterway stakeholders of the purpose, direction, and benefits of (1) improving the reliability of the existing L&Ds through ongoing maintenance and rehabilitation and (2) undertaking new capital improvements such as mooring cells and new 1,200-foot locks to upgrade the system's ability to successfully meet the waterborne transportation needs of the UMR region into the foreseeable future.

This study discusses three L&D system upgrade pilot projects for improving the efficiency, reliability, and capacity of the existing system and investigates the implementation of alternative financing scenarios. The alternative financing scenarios include: (1) revenue that provides full project funding or (2) offsetting funds to existing cost-sharing methods that provide a new source of funds. The recent Water Resources Development Act (WRDA) bills and pending federal infrastructure program initiatives have and will likely include provisions for enhanced non-federal stakeholder cost-sharing on federally authorized water resource civil works projects.

Pilot Project Scenarios

Micro Upgrade (Efficiency). An example of a small-scale navigation efficiency improvement (micro upgrade) to the UMR Inland Waterway that is a stand-alone pilot project and can easily be replicated at one or more sites is a mooring cell. A mooring cell is a more efficient and environmentally friendly place for tows approaching an L&D to moor (tie-off) while waiting for the lock to become available when another tow occupies the lock or navigation approach channel.



The Micro Upgrade pilot project scenario for this study consists of a mooring cell at Lock 14 that will provide notable time savings for upbound towboats at a design and construction cost of approximately \$2 million.

System Reliability Improvements. A system reliability improvement pilot project would reset the design life and enhance the reliability of the lock chambers across the UMR system. The Major Rehabilitation Program is currently underfunded on the UMR and consists of reliability or efficiency improvements costing over \$21 million that focus on facility life extensions, which are critical for system recapitalization and the long-term durability and sustainability of the facility.

The System Reliability pilot project scenario for this study includes major rehabilitation of 27 L&Ds across the UMR system, at a design and construction cost of \$45 million each or approximately \$1.22 billion for all 27 L&Ds.

Large-scale Upgrade. A large-scale navigation capacity and efficiency improvement project on the UMR Inland Waterway would expand lock capacity and improve lock efficiency. The Navigation and Environmental Sustainability Program (NESP) authorization includes several projects that meet this objective. A Large-scale Upgrade could construct one or more of the five UMR 1,200-foot locks that are authorized by WRDA 2007, and lock processing and delay times would be reduced with the elimination of double cut lockages,

Implementation of the USACE NESP authorization or components of NESP would be considered a Large-scale Upgrade for purposes of this study. In Fiscal Year 2019 (FY 2019), USACE is performing an economic update for NESP focusing on engineering reliability, forecasted barge traffic demands, barge transportation demand elasticity, transportation rates, and lock performance characteristics. Given the near term availability of this in-depth economic update of NESP, evaluation of a Large-scale Upgrade pilot project scenario was not included in this report.

Economic Analyses

The UMR Inland Waterway system contributes substantially to the economy of the five-state UMR area that includes Iowa, Illinois, Minnesota, Wisconsin, and Missouri, as well as the broader nation. The waterway system supports the movement of several different commodities, with corn and soybean shipments accounting for more than half of the goods moved by weight.

The economic impact of the inland waterway system is greater than just the commodities shipped. The analysis conducted for this study suggests that the waterway system currently supports more than 66,000 direct, indirect, and induced jobs in the five-state region. This contribution is expected to grow over 2.5 times by 2060, when the inland waterway system will contribute to more than 175,000 jobs in the region. Longer term, rising incomes around the world are likely to drive demand for more corn and soybean exports, which will lead to growth in shipments along the inland waterway system. The IEG analysis forecasts 2.3 percent growth in shipments annually over the next 40 years assuming stable trade policies and climate trends. In its current state, the UMR Inland Waterway system will be unable to support this growth. Long-term deferred maintenance has left the system in need of repair and improvement.



All three improvement scenarios exceed or are expected to break even at a 3 percent discount rate, which is similar to the current rate that USACE uses for economic analysis. The Micro Upgrade (mooring cell improvement) provides the highest return on investment, with a benefit-cost ratio of nearly 6.0 at a 3 percent rate (or 3.5 at a 7 percent discount). The System Reliability improvements have a lower benefit-cost ratio, but generate the highest benefits, with \$2.1 billion in net benefits at a 3 percent discount rate (and nearly \$1.5 billion at a 7 percent discount rate). While detailed evaluation is not included in this report, a Large-scale Upgrade scenario that is bundled with other improvements (as demonstrated in the USACE NESP authorization) is anticipated to break even at a 3 percent discount rate. The forthcoming USACE FY 2019 economic update for NESP will provide additional economic details regarding NESP, which would be considered a Large-scale Upgrade for purposes of this study.

While the benefit-cost analysis compared scenarios based on their project costs and generated benefits, the economic impact analysis provides an economic assessment of specific effects under various metrics such as employment, output, labor income, and gross regional product (value added). Across all metrics, the System Reliability improvements rank the highest because of the project scale and the value they provide to users system-wide. The Micro Upgrade generates a relatively small economic impact because it is an individual, small improvement (single mooring cell). Specific evaluation is not included in this report for a Large-scale Upgrade, and economic impacts would vary depending upon the breadth of potential Large-scale Upgrade improvements. If a small number of locks are improved compared to the System Reliability scenario, economic impacts would be expected to be less than the System Reliability scenario and less than if Large-scale Upgrades are bundled with other improvements as demonstrated in the USACE NESP authorization. USACE studies indicate that increasing large-scale improvements to five locks and bundling with other improvements offers overall positive benefits to the economy.

Governance and Financing Alternatives

Under current federal and state law, the inland navigation system is the primary responsibility of the federal government, with the responsibility of the system residing within USACE. Alternative governance and financing structures were evaluated to identify potential opportunities to enhance the engagement of project stakeholders to finance and construct improvements to the inland waterway system. The two most likely frameworks under existing authorities that could be used to implement UMR Inland Waterway system projects are:

- 1) Establishing a project partnership agreement using a contributed funds memorandum of agreement.
- 2) Constructing a project under Section 408 approvals with turn back to USACE.

Under existing authorities, Iowa DOT has the necessary authority to enter a project partnership agreement with USACE. In short, an agreement would be reached between Iowa DOT and USACE to implement a specific project or suite of projects. Iowa DOT would transfer funding to USACE to implement the requirements of the project partnership agreement. Planning, engineering, design, and construction of the project would be accomplished by USACE.



As an alternative, Iowa DOT could chose to make the navigation improvements. This can be accomplished by receiving a Section 408 approval from USACE. The Section 408 approval documents would describe the project requirements for alteration of a federal navigation project. Iowa DOT may have to provide some funds to USACE for its review and participation in the process. Iowa DOT would implement the project and then turn it back to USACE for incorporation into the navigation system.

Study Recommendations

A stakeholder engagement workshop was conducted for review of study results. Participants were asked to rank their preference for different performance factors. Overall, stakeholders prioritized efficiency and reliability over capacity improvements. In addition, stakeholders expressed interest in seeing separable elements of NESP implemented while funding is sought for the overall program.

The benefit-cost analysis demonstrated that relatively low-cost improvements with very high BCRs could improve the efficiency and reliability of the system when compared with new 1,200-foot lock construction. Additionally, the system reliability improvements demonstrated a positive BCR in the study.

The results of the study and stakeholder engagement have identified recommendations to continue to focus on and drive improvements to the UMR system. Recommendations are described below:

Action	Benefits
<i>Specific Recommendations for Iowa</i>	
Use a State-Federal P2 project partnership agreement (PPA) and/or contributed funds to implement the Micro Upgrade scenario of a mooring cell at L&D 14. While not necessary, this agreement could be completed as a pilot project under Section 5014 under WRRDA 2014, should USACE complete the necessary guidance.	Demonstrates progress on implementing navigation system improvements and the importance of non-federal/federal partnerships in moving these improvements forward, provides high return on minimal investment (high BCR), and can be easily replicated.
Establish a regional cooperative working group with other UMR states to expand and promote the Micro Upgrade scenario concepts across the UMR region.	Leverages additional small investments in a low cost and environmentally beneficial way to improve the efficiency of the UMR waterway.
Update State of Iowa port authority statutes to provide the ability to enter into USACE partnership agreements and develop financing tools for navigation system improvements.	Provides the opportunity to create a special purpose unit of government that is inherently vested in promoting an improved navigation system.
Evaluate an additional economic scenario that focuses on new markets, technologies, and innovation in the uses for transporting goods on the UMR, such as container traffic or new commodities.	Current economic analysis focuses on expansion of existing commodities only. Consideration of the potential new uses could potentially improve the benefit cost ratios or modify the desired improvements.



Action	Benefits
<i>Federal/Regional Recommendations</i>	
Encourage Congress, the Administration, and USACE to fund and complete necessary implementation guidance for WRRDA 2014 Section 2004a, Inland Waterways Construction Bonds Study; Section 2004b, Potential Revenue Sources for Inland and Intracoastal Waterways Infrastructure; and Section 5014, Water Infrastructure Public Private Partnership Program.	Provides the necessary study and recommendations to Congress to move forward with the previously authorized programs for using new sources of revenue and partnerships on USACE related water resource programs.
Explore implementation of portions of NESP as separable elements or a split delivery model, specifically the first increment of mooring cells identified in NESP alternative 4.	Allow NESP to gain traction and move forward on navigation and environmental improvements. The use of the split delivery model has proven successful in moving forward USACE flood risk reduction programs such as the Fargo-Moorhead Diversion project.
Engage with regional stakeholders to consider establishment of a broader UMR port or navigation authority to promote UMR navigation improvements.	Provides for an Upper UMR commission or authority to advocate for navigation improvements, similar to the Mississippi River Commission which is responsible for inspecting and reporting to Congress on the condition of the of the lower river.