



# Inland Waterways





## **EXECUTIVE SUMMARY**

The Mississippi River and its tributaries, as well as the Columbia, Sacramento, and San Joaquin Rivers on the West Coast make up nearly 12,000 miles of navigable waterways — the U.S. freight network's "water highway." Inland waterway infrastructure includes locks and dams as well as navigation channels. Investing in this infrastructure helps move agricultural exports and relieves strain on other transportation modes. One barge can move as many tons as 70 tractor trailers.<sup>1</sup> Recent boosts in federal investment and an increase in user fees have begun to reverse decades of declining lock and dam conditions, with unscheduled lock closures reaching a 20-year low in 2017.<sup>2</sup> While this is encouraging, the system still reports a \$6.8 billion backlog<sup>3</sup> in construction projects and ongoing lock closures — totaling 5,000 hours between 2015 and 2019 — harming the industries that rely on the waterways to get their goods to market. The U.S. Department of Agriculture estimates delays cost up to \$739 per hour for an average tow, or \$44 million per year.<sup>4</sup>

## **CONDITION & CAPACITY**

The waterway network is comprised of approximately 12,000 miles of inland navigation channels as well as an additional 11,000 of intracoastal waterways owned and operated by the U.S. Army Corps of Engineers (USACE).<sup>5</sup> Most of the mileage of USACE's inland network is comprised of the Mississippi River and connecting waterways. Additional navigable waterways include the Columbia River that makes up the border between Washington and Oregon and the Sacramento and San Joaquin Rivers in California.

Inland waterways are an important part of the multimodal freight network, and nearly 830 million tons of cargo are moved on the inland waterways system annually.<sup>6</sup> The network is especially crucial for our agricultural industry, which relies on waterways to cost-effectively<sup>78</sup> move and export wheat, soybeans, and other goods to domestic and international markets. One barge on the inland waterways can move as many tons as 70 tractor trailers or 16 train cars.<sup>9</sup> The U.S. Department of Agriculture (USDA) estimates that farm products moved via barge save farmers between \$7 and \$9 billion annually as compared to other modes of transportation.<sup>10</sup> In addition to food products, the inland waterways move raw materials, manufactured goods, chemicals, coal, petroleum products, and more.

Infrastructure on inland waterways is comprised of locks and dams as well as navigation channels. Attempts are made to dredge channels to ensure a minimum depth and width needed to support commercial barge traffic. However, the current USACE budget does not provide adequate funding to keep all channels consistently opened to the authorized levels. As a result, some rivers are deemed low use and are a lower dredging priority for USACE, forcing system users to alter their shipping methods, which in turn perpetuates the "low use" river designation. Additionally, the growing severity and frequency of flooding is pushing more sediment into the navigation channels, meaning more frequent dredging is necessary to keep the Mississippi River and its tributaries navigable. Locks and dams act as a stairway for cargo ships, enabling easier navigation during uneven and inconsistent water levels. When a ship reaches a lock, a gate opens, and the ship enters the lock chamber. Once the ship is inside the chamber, the gate closes, and water either fills or empties from the lock chamber. Once the ship is level with the water on the other side of the opposite gate, the opposite gate opens for the ship to proceed.



In total, there are 218 lock chambers at 176 sites on the USACE waterways.<sup>11</sup> Most of the locks and dams are well past their 50-year design life. Locks constructed on the Upper Mississippi, Illinois, and Tennessee Rivers were built in the 1930s, while those on the Ohio River were generally constructed in the 1950s.<sup>12</sup> However, it is very important to note that age does not necessarily correlate with the condition of a lock. Regular maintenance, rehabilitation, and appropriate applications of technological advancements by USACE can considerably extend the lifespan of a lock.

#### National Lock Portfolio Service Trends Main Chamber Mechanical Unavailable Hours (Events Longer Than One Day)



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LA GRANGE LOCK AND DAM ON THE ILLINOIS WATERWAY

Inadequate funding for maintenance and rehabilitation activities can cause lock deterioration, which leads to unplanned system outages. Shippers using the inland waterway system experience extraordinary losses from unplanned outages when they can't plan for these in advance and reroute or reschedule their shipments accordingly. For example, when the LaGrange Lock and

Dam in Beardstown, Illinois, experiences an unplanned closure, manufacturers, farmers, and other system users in 135 counties in 18 states are immediately impacted. Each unplanned closure at the LaGrange Lock and Dam contributes to nearly \$1.7 billion annually in additional transport charges and a \$2.1 billion loss in farm-dependent incomes.<sup>13</sup> Another study shows that failure of Lock and Dam 25 in Winfield, Missouri, could result in 12 million tons of agricultural products diverted to over 500,000 truckloads between St. Louis and the Twin Cities

over nine months (the average shipping season).<sup>14</sup> Such a closure would ultimately require shippers to spend \$283 million in trucking costs and add nearly 22,000 tons of  $CO_2$  to the atmosphere. On average across the country, the USDA estimates that delays cost up to \$739 per hour for an average tow, or \$44 million per year.

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Congress has increased appropriations for inland waterways, resulting in improved system performance, as measured by unscheduled lock closures. After peaking in 2010, unscheduled lock closures reached a 20-year low in 2017.<sup>15</sup> From 2010 to 2014, the system experienced nearly 18,000 hours of unscheduled closures, while the years 2015 to 2019 only saw 5,000

> hours of unscheduled maintenance closures.<sup>16</sup> While this is an improvement from previous years, 5,000 hours of unscheduled delay is still indicative of an aging system that has, for too many years, lacked adequate and consistent maintenance and capital investments.

> Scheduled delays, while not necessarily desired, are set to conduct much needed capital construction and major rehabilitation projects. This type of delay lets shippers plan for outages, minimizing the impact to their operations. Thanks

to increased funding from Congress, today USACE is scheduling closures and reducing system inefficiencies. The planning and foresight that is being introduced to the system is resulting in higher reliability for shippers.

#### **FUNDING & FUTURE NEED**

Traditionally, 50% of a major rehabilitation or new construction project is paid for with support from the U.S. General Fund, and 50% is supported with revenue from the Inland Waterways Trust Fund (IWTF) account.

The IWTF collects money from a 29-cents-per-gallon tax on barge fuel paid by shippers using the navigation channels. In 2015, a much sought-after increase to the barge fuel tax was signed into law, which now raises approximately \$25 million in additional annual funds and has helped cut down on the backlog of maintenance projects.

Supplemental appropriations made by Congress for the Olmsted Locks and Dam, a megaproject on the Ohio River in Illinois, helped accelerate the long-delayed project, and construction was completed in August 2018. Olmsted was a new construction, but the \$3 billion megaproject proved to be too expensive for the typical

For every \$1 invested in infrastructure, between \$2 and \$3 is generated in economic activity around the U.S. over time.

50/50 cost share agreement between the General Fund and the IWTF. Congress ultimately ended up paying for 85% of the project, which resulted in Olmsted coming

> online four years earlier and freeing up IWTF revenue for other projects. Congress has since agreed to pay more than 50% for the Chickamauga Lock project in Nashville.

> These additional appropriations by Congress help expedite the modernization of the nation's locks and dams, improve efficiency along the system, and realize economic benefits earlier. For example, Olmsted began contributing \$640 million annually in economic benefits as

soon as it was finished.<sup>18</sup> In general, projects along the inland waterways system yield a substantial return on investment. For every \$1 of investment in infrastructure, between \$2 and \$3 is generated in economic activity around the U.S. over time.<sup>19</sup>



#### Annual Construction Funding from the Inland Waterways Trust Fund

Source: USACE Inland Waterways Annual Reports, Nos. 24-3217

#### **OPERATIONS & MAINTENANCE**

Regular operations and maintenance needs, such as minor lock repairs and dredging, are paid for with appropriations from the General Fund. Project costs are authorized through the Water Resources Reform and Development Act (WRDA) and appropriated by the Energy and Water Appropriations Act. In recent years, Congress has not only regularly passed WRDA legislation, but inland waterways have been the beneficiary of robust appropriations, which have spurred investment along the system and increased reliability for its users. USACE allocates appropriated operations and maintenance funding to inland waterway projects based on risk and economic benefits to help prioritize limited dollars. However, the agency lacks a definition of deferred maintenance, and as a result there are different estimates of how much deferred maintenance exists on the system.<sup>20</sup> The USACE backlog of authorized projects that are waiting for appropriations funding is \$6.8 billion. The agency reports a navigation backlog of \$2.7 billion annually in unmet maintenance work activities.



#### Annual Funding for Operations and Maintenance



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#### **PUBLIC SAFETY & RESILIENCE**

The inland waterway network is very safe to operate. According to USDA, on a million-ton-mile basis, there are 21.9 rail fatalities and 79.3 truck fatalities for every one fatality on the waterways system.<sup>21</sup>

A changing climate is contributing to less predictable water levels and impacting the efficiency of the waterway system. When water levels are too high or too low, a river shuts down for barge traffic, and shippers are forced to utilize other modes of transport to get goods to market. Traditionally, flood and drought periods were more predictable, but today's extreme weather incidents are more frequent and more severe. For example, the Mississippi River in Baton Rouge was flooded for 67 days during 2018, which in turn forced hundreds of barges to offload and shippers had to put their goods on trucks.<sup>22</sup> The inland waterways are also susceptible to natural disasters. For example, a major seismic event in California could cause a breach or failure of one of the levees that channel the state's rivers. The results would be incredibly costly and difficult to recover from, both from a budgetary and environmental perspective, particularly for the neighboring farming communities.

Some waterways, like the Sacramento Deep Water Shipping Channel, need funding for modernization so vessels can safely maneuver in inclement weather. Modernization projects on the Sacramento and San Joaquin Rivers include navigation improvements and additional structural assessments.<sup>23</sup>



A GRAIN BARGE TRAVELS UNDERNEATH A BRIDGE ON THE MISSISSIPPI RIVER.

#### INNOVATION

Federal funding for new and existing federal navigation projects; designations of high-, medium-, and low-use waterways; and private investment decisions all hinge on tonnage reporting. Traditionally, shippers reported tonnage based on national inland port boundaries rather than geopolitical boundaries. For example, the municipality of Helena, Arkansas, denotes their port by one set of boundaries, while legislation designates different boundaries, and shippers have operated under a third geographic area. This contributes to incorrect tonnage reporting as goods move through these inland ports. To obtain more accurate tonnage reporting, USACE is creating a Geographic Information System (GIS) to prepare enterprise-wide statistical port boundaries. Utilization of geospatial data will improve public reporting and, in turn, create a more accurate data map for policymakers to use when making funding decisions.<sup>24</sup>

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#### **RECOMMENDATIONS TO RAISE THE GRADE**

- Give USACE the authority to manage a project from start to finish and ensure sufficient and timely appropriations from Congress to avoid costly stop-and-start of construction that has traditionally taken place.
- Develop and implement a standardized measurement for delays on the system.
- Fund waterways projects at the authorized levels and do so consistently, passing a Water Resources Development Act on a two-year cycle.
- Ensure that full use of the Inland Waterways Trust Fund continues to be appropriated.
- Increase the amount spent on operations and maintenance of the inland waterways each year by providing more robust appropriations and consider a prioritization method that can more strategically direct limited funds to needy projects.
- Modify the cost sharing for future spending on construction and major rehabilitation projects to require 25% of the project cost to be paid for by the IWTF and the remaining 75% to be derived from the General Fund.

#### **DEFINITIONS**

- DREDGE To excavate or deepen the bed of a harbor, river, or other area of water by scooping out sediment and moving it to a different location. This technique is often used to keep waterways navigable.
- LOCK CHAMBERS An enclosure consisting of a section of canal that can be closed to control the water level. It is used to raise or lower vessels that pass through it.
- TOW Barges can be lashed together to form a "tow." A tow may consist of anything from four to six barges on smaller waterways to over 40 barges lashed together on deeper and larger portions of the waterway system.

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