The Great Freight Connection:

Expanding Cargo Flows Between the Great Lakes and the Inland River System

Prepared for:

American Great Lakes Ports Association

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Foreword

The Great Lakes and inland waterway systems are among North America's most important freight transportation assets. Together, they connect producers, manufacturers, and consumers to domestic and global markets, support critical industries, and provide the capacity needed to move the nation's economy. While these systems have long been recognized for the value they provide individually, less attention has been given to the opportunities that exist between them.

This study was undertaken through funding from the Great Lakes St. Lawrence Seaway Development Corporation, Ports of Indiana – Burns Harbor, Illinois International Port District – Port of Chicago, and Port Milwaukee to better understand those opportunities. By examining existing freight flows, engaging stakeholders across both systems, and evaluating potential trade lanes, the study explores how the Great Lakes and inland waterways can work together to support more resilient, efficient, and competitive supply chains. Importantly, it demonstrates that cross-system freight movements are not merely a future possibility; they are already occurring today and can provide value when market demand, transportation assets, and business needs align.

This work would not have been possible without the support and participation of the many organizations that contributed their time, expertise, and perspectives. We extend our sincere appreciation to the ports, terminal operators, vessel operators, shippers, industry associations, and public-sector partners who shared their insights throughout the study. We are particularly grateful to the study's funding partners and ports for their leadership and commitment to advancing the understanding of cross-system freight opportunities.

The findings presented in this report are intended to serve as a starting point for continued collaboration, discussion, and market development. By working together to identify commercially viable opportunities, strengthen industry partnerships, and raise awareness of the capabilities that already exist across both systems, stakeholders can unlock new freight movements, increase utilization of existing maritime assets, and support a stronger and more resilient freight network for the future.

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Acronyms/Abbreviations

AGLPA	American Great Lakes Ports Association
BH	Ports of Indiana – Burns Harbor
BNSF	Burlington Northern Santa Fe Railroad
BTS	Bureau of Transportation Statistics
CBO	Congressional Budget Office
GLS	Great Lakes St. Lawrence Seaway Development Corporation
IIPD	Illinois International Port District
IL	Illinois
IRPT	Inland Rivers, Ports and Terminals
LPMS	Lock Performance Monitoring System
MARAD	United States Maritime Administration
MKE	Port Milwaukee
NB	Northbound
NEC	Not Elsewhere Classified
NW	Northwest
Ro/Ro	Roll-on/Roll-off
SB	Southbound
SWOT	Strengths, Weaknesses, Opportunities, and Threats
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDOT	United States Department of Transportation

Executive Summary

The Great Lakes and Mississippi River inland water systems function as two of North America's most important freight networks, yet they largely operate as separate systems. The lack of efficient cross-loading and cargo transfer capabilities between them creates a missed opportunity to improve supply chain resilience, expand market access, and increase utilization of existing maritime assets.

The Great Lakes and Inland Waterways are vital assets to the movement of goods across the Midwest and entire nation, connecting the central US with coastal and international markets and providing critical capacity for shippers along either system. Both systems support critical American industries, including manufacturing, agriculture, construction, and energy, among other sectors. While commodities move efficiently within both the Great Lakes and the inland waterway systems, transferring cargo between these networks can be challenging. Movements often require additional handling events, truck or rail transfers, and specialized terminal capabilities, increasing costs and reducing the economic competitiveness of cross-system shipments. As a result, many potential freight movements are not currently viable despite the extensive reach of the combined waterway network.

This study finds that the opportunity lies not in physically connecting the systems, but in better leveraging existing assets to support commercially viable cross-system freight movements. By identifying the commodities, industries, and trade lanes where water transportation creates value, stakeholders can improve supply chain resilience, expand market access, and increase utilization of existing maritime infrastructure.

What is the connection between the Great Lakes and Inland Waterways Today?

Despite their physical connection through Chicago and the many industries they serve in common, the Great Lakes and inland waterways largely function as distinct freight networks. The Great Lakes system is primarily oriented toward intra-lake trade and commerce with Canada, while the Illinois Waterway and Mississippi River largely serve agricultural exports and farm input movements between the Midwest and Gulf Coast.

5%

of outbound Illinois Waterway tonnage flowed to the Great Lakes in 2023

<1%

of outbound Great Lakes tonnage flowed to the Illinois Waterway in 2023

More than 138m tons

moved on the Illinois Waterway and Great Lakes in 2023

Although freight flows between the two systems remain limited, cross-system movements do occur today. Steel, project cargo, liquid bulk, and other commodities move between the Great Lakes and inland waterways on a case-by-case basis, demonstrating that the connection is both operational and commercially viable. Consistent bi-directional traffic through the T.J. O'Brien Lock and periodic barge movements on the Great Lakes provide evidence that cross-system shipping can occur today and may present opportunities for growth where market demand and transportation economics align.

What benefits and challenges exist for shippers?

Stakeholders identified several advantages to utilizing the Great Lakes and inland waterways, including lower transportation costs, improved sustainability, enhanced safety, and access to domestic and international markets. Many also highlighted the value of water transportation as a flexible supply chain option that can provide redundancy during periods of truck or rail congestion, service disruptions, or rising transportation costs.

At the same time, stakeholders identified challenges that can limit cross-system freight movements. The most frequently cited barriers were a lack of awareness of cross-system opportunities, established supply chain practices, and limited familiarity with water transportation among shippers and logistics providers. Operational constraints – including bridge clearances, lock delays, seasonal conditions, vessel restrictions, and industrial land availability – were also identified as factors that can affect the efficiency and competitiveness of certain freight movements.

Why do shippers use the system?

- System redundancy when landside modes are disrupted
- Lowest per ton-mile cost of any mode
- Lower per ton-mile emissions compared to landside modes
- Positive safety record and low incident rate
- Proximity to major markets on the lakes and river while avoiding coastal hub traffic
- Federal support for funding and marketing the maritime system and potential cross-system movement

What's preventing maritime and cross-system growth?

- Lack of awareness and communication of cross-system and maritime shipping benefits
- Hesitancy to upend existing supply chains and operations due to established relationships and lack of guidance on beginning to ship on water
- System closures caused by seasonal operational conditions and lock disruptions limit what can be shipped year-round and create uncertainty for shippers each year
- Bridge height restrictions on the waterways limit the size and weight of cargo that can be transported, particularly as water levels fluctuate

What potential benefits could be realized through increased cross-system freight movements?

Stakeholders across both systems were engaged throughout the study to identify commodity groups and market opportunities with the greatest potential to support expanded cross-system freight movements. Consultees were also asked what challenges this type of connection could help address within their supply chains. Stakeholders consistently identified opportunities to lower transportation costs, improve supply chain efficiency and sustainability, increase utilization of existing port infrastructure, and reduce reliance on truck and rail transportation.

These opportunities are most evident among industries and commodities already served by both the Great Lakes and inland waterways. Grain, metals and steel, automotive parts, project cargo, hazardous materials, aggregates, and liquid bulk are among the commodities regularly moved on both systems. By better understanding the economic and operational benefits of moving these goods through cross-system routings, stakeholders can build a stronger business case for all-water supply chain alternatives and expand utilization of the combined waterway network.

To evaluate these opportunities, four representative trade lanes centered on the study's three focus ports were analyzed. The trade lanes were selected based on stakeholder input, existing or recent commodity flows, and the presence of facilities and market conditions that support the potential for future cross-system freight movements.

Selected Trade Lane Preview

Trade Lane	Commodity	Baseline	Origin/Destination
1	Grain & Bulk Agricultural Products	Rail	Southbound Milwaukee to the Gulf
2	Steel Products	Truck	Southbound from Burns Harbor to Peoria
3	Liquid Bulk	Rail	Northbound from Joliet to Milwaukee
4	Salt/Aggregate	Rail	Northbound from the Gulf to IIPD

Summary of Benefits by Lane (at 100k tons diverted)

Benefits	Lane 1: Grain and Bulk Ag Exports (SB)	Lane 2: Steel (SB)	Lane 3: Liquid Bulk (NB)	Lane 4: Salt (NB)
Est. cost savings/ton	~$4.5	~$20.7 (Peoria), ~$34.4 (St. Louis)	~$1.8	~$19.1
Truck/rail trips removed at 100,000 tons	~1,000 rail cars	~5,100 truck trips	~1,000 rail cars	~1,000 rail cars
Primary resiliency value	Bypasses Upper Miss. low water & Chicago rail bottleneck	Supply chain diversification; heavy-haul truck removal	Hazmat safety; mode redundancy for heating fuel	Assured seasonal salt supply
CO_2 impact /ton	+ 5%	-87%	+6%	+1.7%

Ultimately, benefits to cross-system shipping are found in each of the scenarios, even when varying in magnitude. Key findings by benefit area include:

- **Environmental**: All-water routes remove truck trips as well as rail cars from the landside network. For lanes where the baseline is truck-dominant (and especially where lanes involve long-haul trucking), this can result in significant emissions benefits. Even when there is a neutral or slight increase in emissions, there may be a compelling resilience/safety argument for all-water routes given risk reduction from shifting certain products (like hazmat) away from rail and truck movements through populated areas.

- **Economic:** All-water routes have the potential to increase economic benefits, but the overall competitiveness of these routes will depend on factors like seasonality, equipment availability, volume commitments, congestion/reliability constraints, and other factors. Even where the all-water option is cost-neutral, qualitative feedback suggests that these routes may deliver value as alternatives to the Chicago rail hub at certain times.

- **Resiliency/safety:** All-water routes provide important resilience benefits when shipping by truck or rail is uneconomical or when there are disruptions or constraints to these modes. Resiliency benefits can result from cross-system flow contributions to supply chain diversification, mode redundancy, and hazmat safety. Cross-system shipping can also provide a buffer to fuel price spikes and alternatives to either system as water levels fluctuate.

Next Steps and Action Plan

Recommendations were developed for collaborative action among AGLPA, IIPD, Port Milwaukee, and Ports of Indiana–Burns Harbor and are organized into four categories: Market Development and Partnerships, Priority Industries and Commodities, Policy and Regulatory Coordination, and Strategic Infrastructure Improvements. By identifying actionable steps to market and integrate the systems now, AGLPA and its partners can capitalize on existing system strengths, market the system while industry and federal buy-in is present, and address existing and emerging supply chain concerns for stakeholders across both systems.

Market Development and Partnerships

1. Engage shippers directly at association meetings and conferences to understand needs and how cross-system transloading can meet certain needs.
2. Encourage ports to engage with terminal owners to compile site-level documentation of utilities, permitting status, and other infrastructure details for joint marketing to potential customers.
3. Establish a database of terminal operators and contacts on both systems for shipper reference.

4. Position the system as a “relief valve” during disruptions

Priority Industries and Commodities

5. Promote backhauls for increased container usage across systems
6. Initiate outreach to industry associations in the manufacturing, steel, agricultural, and energy industries
7. Identify commodities that are conducive to disaggregation, aggregation, and distribution

Policy and Regulatory Coordination

8. Support expanded collection of data on water levels, disruptions, and clearances on the river system
9. Monitor USCG changes in load line policy and exemptions
10. Support stakeholder grant applications to national and statewide maritime funding opportunities like the Marine Highway Program
11. Protect existing industrial land along the waterways for manufacturing, distribution, and terminals.

Strategic Infrastructure Improvements

12. Coordinate with shipbuilders to support the expansion of lake-capable barge fleets
13. Coordinate with USACE to maintain navigable depths on the Illinois Waterway and create dredged material disposal plans.
14. Work with inland river terminal operators and stakeholders to develop more support services along the waterway, including vessel or container cleaning and repair.
15. Establish a regular dialogue with BNSF to explore options for raising the height clearance of rail bridges on the Illinois Waterway

The findings and recommendations of this study demonstrate that meaningful opportunities exist to expand freight movements between the Great Lakes and inland waterways. While infrastructure and regulatory challenges remain, stakeholders have identified practical actions that can begin building awareness, fostering partnerships, and supporting commercially viable freight movements today.

The opportunity lies not in physically connecting the systems, but in identifying the commodities, industries, and trade flows for which cross-system movements can create value. By better understanding where market demand aligns with existing transportation assets, stakeholders can unlock new freight opportunities and make more effective use of North America's interconnected marine transportation network.

1 The Importance of the Great Lakes and Inland Waterways

The Great Lakes and Mississippi River inland water systems are freight powerhouses, each year moving millions of tons of goods across the country and internationally. Their individual roles and shared strengths shape how we can better take advantage of their physical connection, leveraging their assets as one connected system.

The Great Lakes maritime transportation system is one of the nation's most significant freight gateways, handling millions of tons of domestic and international cargo each year. Its importance is amplified by its connection to the inland waterway network, including the Illinois and Mississippi Rivers, which together form one of North America's most extensive freight corridors (Figure 1).

Given the economic importance of these systems, a key question emerges:

Why are so few commodities moving between them?

While cargo moves efficiently within both the Great Lakes and inland waterway networks, cross-system movements often require additional handling, truck or rail transfers, and specialized terminal capabilities. These added costs can limit the economic viability of moving goods between the two systems, leaving the full potential of the combined network underutilized.

The opportunity is not necessarily to build new connections, but to better leverage existing ones. By identifying the commodities, industries, and trade flows best suited for cross-system movements, stakeholders can unlock new market opportunities and make more effective use of North America's interconnected marine transportation network.

Figure 1: Great Lakes and Inland Waterway System



1.1 The Systems

The Role of the Great Lakes

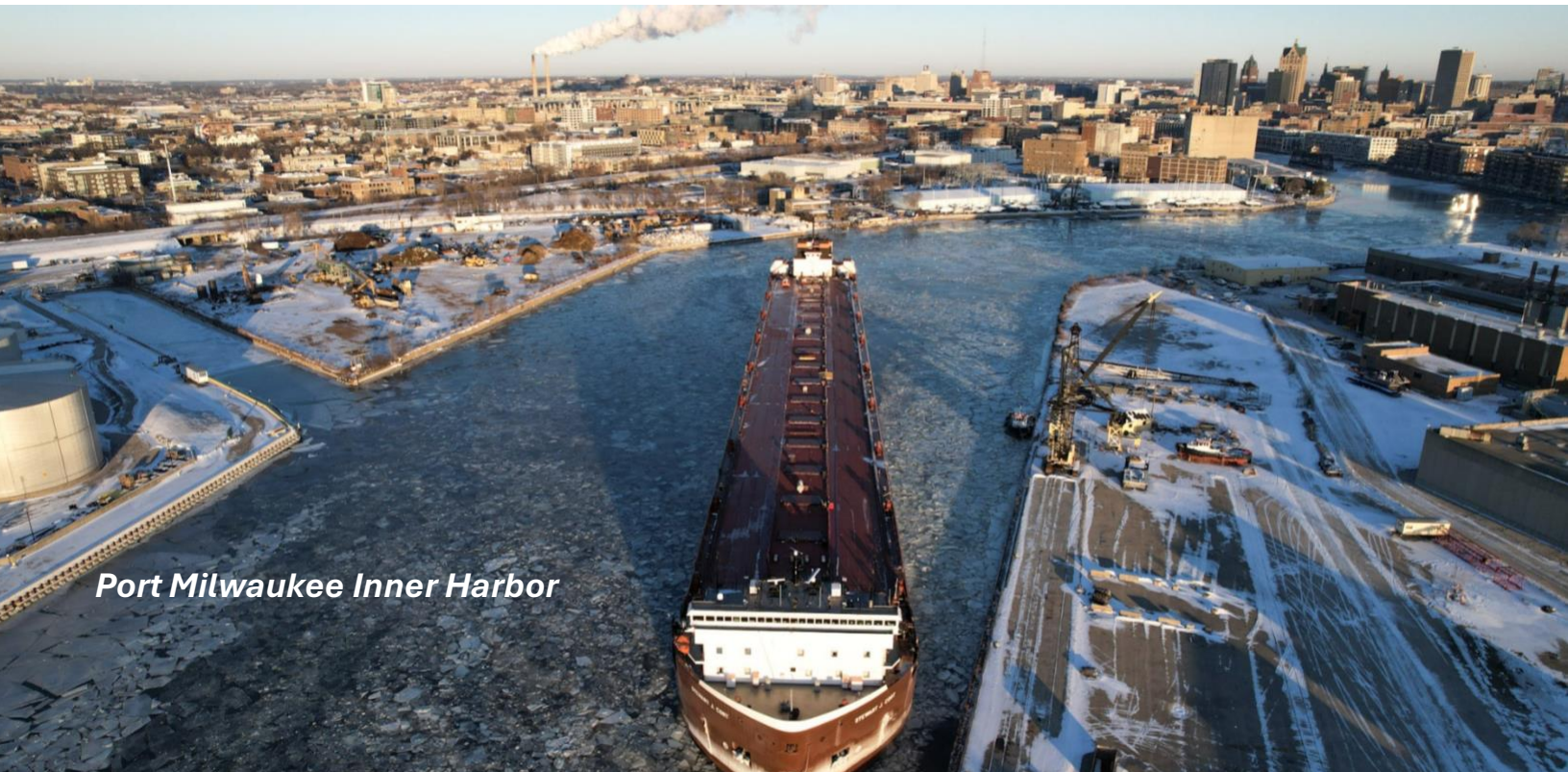
The USACE defines the Great Lakes area as including all maritime movement on the Great Lakes, St. Lawrence Seaway, and New York State waterways. Cargo shipped outbound from the Great Lakes primarily serves an internal/intra-lake network of ports with bulk goods (Figure 2). Outside of intralake flow, roughly 16 percent of Great Lakes commodities are destined for Canada and an additional 2 percent for other international destinations.

Distribution among US inland waterways is more limited. Flows on the Illinois Waterway originating on the Great Lakes system total 558 thousand tons (less than 1% of total outbound flows), slightly exceeded by goods destined for the Lower Mississippi Basin (which includes the Port of New Orleans and other South Louisiana ports). The Ohio River, Upper Mississippi Basin, and other US waterways see similar volumes each year.

Commodity flows inbound to the Great Lakes are similar in volume and distribution (Figure 3). In 2023, 95.7M tons flowed into the Great Lakes, 78.4M of which were between Great Lakes ports. Again, Canada is the largest source of inbound traffic at 13.5M tons, followed by other overseas origins and the Lower Mississippi Basin.

These regional flows emphasize that today, the Great Lakes maritime system is industry-serving and largely self-contained, with some international flows via Canada and the St. Lawrence Seaway.

Despite being connected to the nation's inland waterways, the Great Lakes maritime system remains largely focused on intralake and international trade, with only a small share of cargo moving into the US inland waterway network.



Port Milwaukee Inner Harbor

Figure 2: Great Lakes Regional Outbound Flows, 2023 (Thousands of Tons)

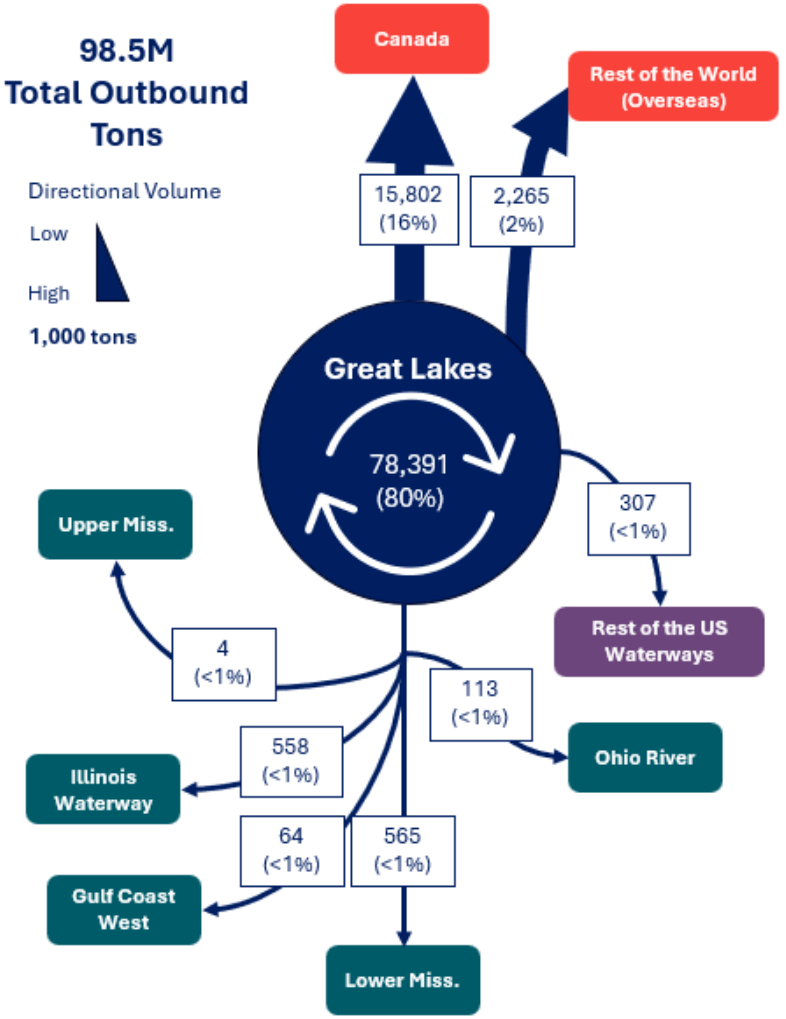
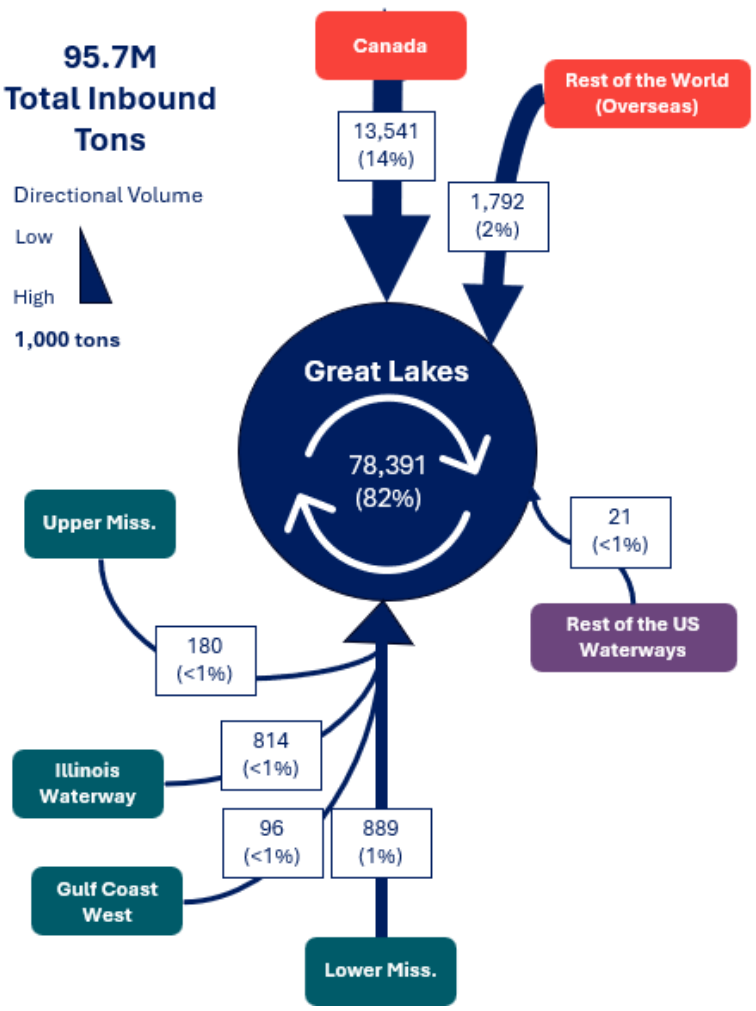


Figure 3: Great Lakes Regional Inbound Flows, 2023 (Thousands of Tons)



Source: USACE Region to Region Commodity Tonnages Public Domain Database

The Role of the Inland Waterways

The Illinois Waterway serves as the only direct connection between the Great Lakes and the Mississippi River. The opportunity for connecting the two major systems, then, relies on the capacity and infrastructure of the Illinois Waterway. Illinois Waterway flows are majority outbound, having shipped 17.3M tons in 2023, received 9.1M tons, and shipped 3M tons internally (see Figure 4).

Today, the Illinois Waterway is fundamentally an export corridor to the Lower Mississippi and Gulf for agricultural goods. 65 percent of the outbound Illinois Waterway flow is destined for the Lower Mississippi. Inbound flows are also dominated by southern systems, though made up of goods like fertilizer, petroleum, and bulk industrial inputs (see Figure 5). Roughly 5 to 6 percent of Illinois Waterway flows to and from the Great Lakes, though much of this – as confirmed by consultees – stops in Chicago to then be transloaded onto landside modes for distribution.

As the sole maritime link between the Great Lakes and Mississippi River systems, the Illinois Waterway serves primarily as an agricultural export corridor rather than a conduit for cross-system freight movements.



Barge on the Illinois Waterway near Peoria

Figure 4: Illinois Waterway Outbound Tonnage, 2023 (Thousands)

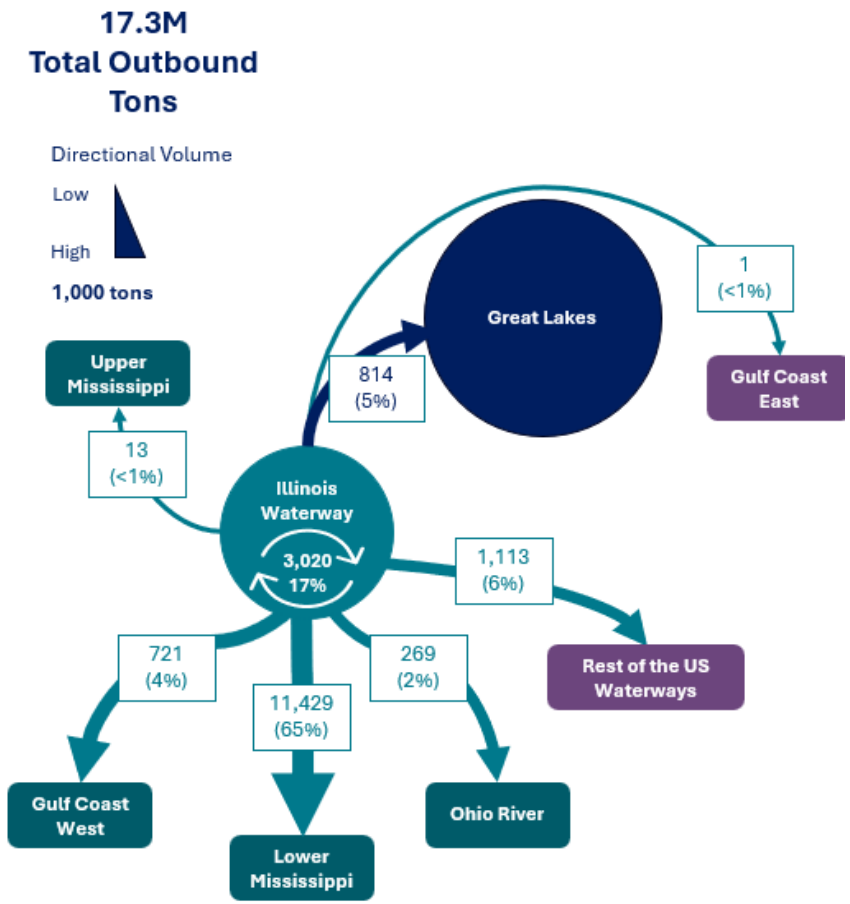
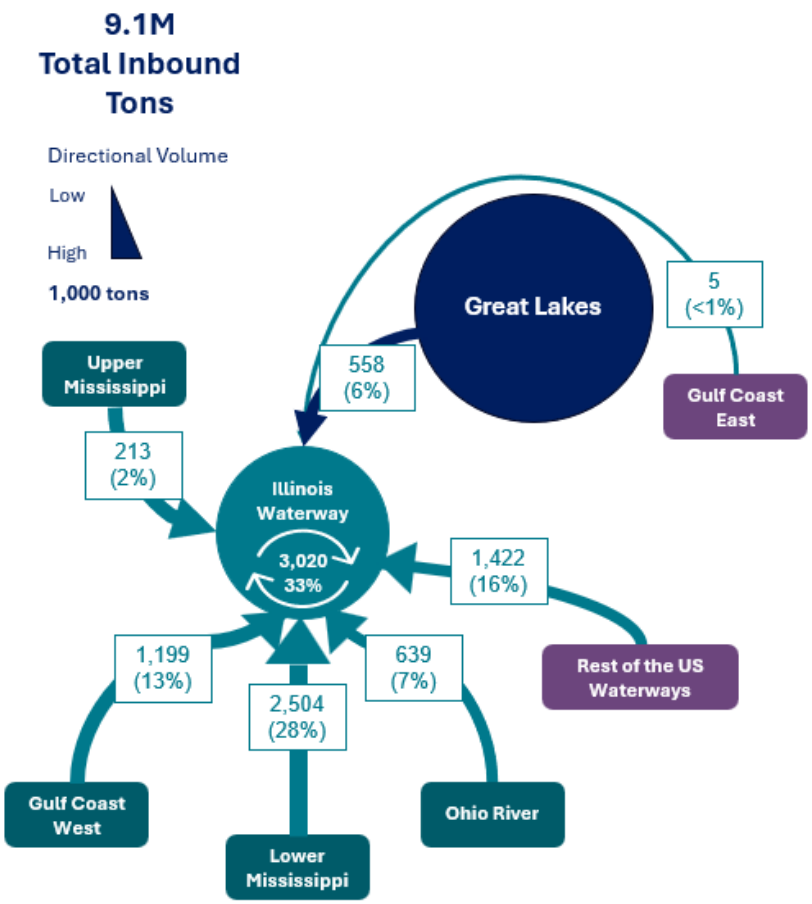


Figure 5: Illinois Waterway Inbound Tonnage, 2023 (Thousands)



Source: USACE Region to Region Commodity Tonnages Public Domain Database

1.2 The Challenge: Unlocking Cross-System Opportunities

Despite their connection through the Chicago region, relatively little freight moves between the Great Lakes and inland waterway systems. The Great Lakes maritime network is primarily oriented toward intralake trade and international movements through Canada and the St. Lawrence Seaway, while the Illinois Waterway and Mississippi River system largely function as corridors for agricultural exports and farm input imports. As a result, freight movements between the two systems remain limited, with many cargoes originating or terminating in the Chicago region rather than continuing by water between the Great Lakes and inland waterways.

Several factors have historically constrained greater cross-system utilization, including the costs associated with multiple cargo handling events, limited awareness of potential market opportunities, operational challenges such as weather delays and lock closures, and physical constraints including bridge clearances. Together, these factors can reduce the economic competitiveness of cross-system movements, even where a physical water connection exists.

At the same time, the two systems are not entirely separate. Steel, project cargo, liquid bulk, and other specialized commodities currently move between the Great Lakes and inland waterways, often on a case-by-case basis to meet specific shipper needs. Consistent traffic through the T.J. O'Brien Lock and limited barge activity on the Great Lakes demonstrate that cross-system movements are both feasible and commercially viable under the right circumstances.

Cross-system freight movements already occur today; the opportunity is understanding where they can occur more often and at greater scale.

This Great Lakes–Inland Waterways transload study examines the current state of cross-system freight movements and seeks to identify where additional opportunities may exist. Rather than focusing solely on infrastructure connections, the study explores the commodities, industries, and trade flows for which transloading and cross-system movements may create economic value, improve supply chain flexibility, and make better use of North America's interconnected marine transportation network.

2 Unlocking Opportunities Between Connected Systems

Exploring opportunities for cross-system freight movements can help better leverage existing Great Lakes and inland waterway assets, expand market opportunities for key industries, and strengthen the role of maritime transportation within North American supply chains.

Growth in cross-system maritime trade has the potential to better leverage the combined economic strength of the Great Lakes and Mississippi River systems, increase freight activity at Great Lakes and inland river ports, and generate broader benefits such as reduced transportation costs, greater supply chain flexibility, and decreased reliance on landside modes. While the two systems play distinct roles within North American supply chains, they share many characteristics that suggest opportunities for greater freight integration. Both serve similar industries and move many of the same commodities, including grain, metals and steel, project cargo, hazardous materials, aggregates and road salt, and liquid bulk. The systems also share terminal operators, stevedores, and barge operators with firsthand experience moving cargo between waterways and understanding the conditions under which such movements can be successful.

> "I can avoid dealing with Class I railways and related prices. This takes rail and trucks off the road"
>
> *- Great Lakes Logistics Provider*

> "Diversity. To open up new channels in case of a business disruption"
>
> *- Great Lakes Port Authority*

Ports, terminal operators, barge operators, port tenants, and federal maritime stakeholders were engaged throughout the study process (see **Appendix A**) to validate the relationship between the two systems and identify opportunities to expand cross-system freight movements. Consultees ranged from organizations with extensive experience moving cargo between the Great Lakes and inland waterways to those who had never considered such movements a viable option. When asked what challenges cross-system movements could address, stakeholders provided the perspectives and examples highlighted throughout this chapter.

While stakeholders identified challenges affecting current and future freight movements, they also pointed to meaningful opportunities for growth. Several consultees noted that awareness of successful cross-system movements remains limited and that demonstrating viable use cases could help build confidence among potential users. As one Great Lakes shipbuilder observed, "One point-to-point movement can open up an entire

industry." Opening dialogues with interested parties, sharing examples of successful movements, and pursuing targeted "easy wins" may help unlock additional freight opportunities and encourage broader utilization of both systems.

> "Moving by water on either system gets me closer to my destination."
>
> *- Great Lakes and river terminal operator*

If the Great Lakes and inland waterways continue to operate largely as separate freight markets, opportunities to leverage existing maritime assets and expand waterborne freight movements may remain unrealized. By identifying commercially viable cargoes, strengthening industry relationships, and building on proven examples of cross-system trade, stakeholders can capitalize on existing capacity and infrastructure while expanding the role of maritime transportation within North American supply chains.

With an emphasis on cargo handled at the Illinois International Port District (IIPD), Port Milwaukee, and Ports of Indiana – Burns Harbor (Figure 6), this study seeks to identify those opportunities, evaluate the barriers that currently limit cross-system movements, and provide practical actions that AGLPA, GLS, and the three ports can take to expand economically viable freight flows between the Great Lakes and inland waterways.

The Great Lakes and inland waterways already serve many of the same commodities and industries; the opportunity is better connecting those markets through cross-system freight movements.

Figure 6: Study area and focus ports



2.1 Why Shippers Choose Water Transportation

While the Great Lakes and inland waterways serve different roles within North American supply chains, stakeholders consistently identified a common set of benefits that make water transportation attractive to shippers. Ports, terminal operators, carriers, shippers, and federal stakeholders highlighted cost-effectiveness, supply chain resilience, sustainability, and network redundancy as key advantages of both systems.

These shared strengths, combined with the unique capabilities of each network, suggest opportunities to expand freight movements between the Great Lakes and inland waterways where market conditions align.

Stakeholders emphasized that cross-system freight movements must provide a clear value proposition to shippers. While individual commodities and supply chains differ, three themes emerged consistently throughout stakeholder discussions: supply chain flexibility, cost competitiveness, and expanded market access. Together, these benefits help explain why certain commodities and industries may be well positioned to take advantage of cross-system maritime transportation.

Top Benefits

Supply Chain Flexibility and Redundancy

Perhaps the strongest argument for cross-system freight movements is the flexibility they can provide within a broader supply chain. Stakeholders noted that water transportation does not need to replace existing truck or rail routings; rather, it can serve as an additional option when landside transportation becomes constrained, unreliable, or cost-prohibitive. Given recurring congestion on major highway and rail corridors serving the Great Lakes and inland waterways, water transportation can provide shippers with additional routing choices and greater resilience during service disruptions.

River stakeholders also highlighted the strong communication and coordination that exists among ports and operators throughout the inland waterway network. During disruptions such as lock closures, weather events, or operational delays, ports frequently work together to identify alternative loading and unloading locations, helping shippers maintain continuity and minimize bottlenecks. This flexibility can be particularly valuable for supply chains that depend on predictable delivery schedules and efficient terminal operations.

Cost Competitiveness

Cost was consistently identified as the primary factor influencing transportation decisions. Manufacturers, logistics providers, vessel operators, and terminal operators all emphasized that any expansion of cross-system freight movements will ultimately depend on whether a compelling economic case can be demonstrated.

Water transportation offers the lowest cost per ton-mile of any freight mode and is particularly well suited for moving large volumes of bulk commodities over long distances. A single barge can carry the equivalent of approximately 70 truckloads while consuming significantly less fuel per ton-mile. For commodities that can absorb an additional handling event while still benefiting from the low operating costs of water transportation, cross-system routings may offer a competitive alternative to truck or rail. As trucking costs, rail rates, congestion, and service variability continue to influence supply chain decisions, all-water routes may become increasingly attractive for select freight movements.

Expanded Market Access

Stakeholders consistently identified market access as one of the most compelling opportunities associated with cross-system freight movements. While the Great Lakes and inland waterways serve many of the same industries, each system provides access to distinct domestic and international markets. The Great Lakes support trade throughout the Midwest, Canada, and overseas markets via the St. Lawrence Seaway, while the inland waterways connect producers and manufacturers to the Lower Mississippi River, Gulf Coast ports, and global export markets.

By leveraging both systems, shippers may be able to expand their geographic reach and access new customers, suppliers, and trade routes. Several terminal and barge operators noted that stronger cross-system connections could support freight movements between Great Lakes ports in the United States and Canada and international markets served through Gulf Coast gateways. Others pointed to opportunities to better connect Midwest manufacturers, agricultural producers, and industrial shippers with destinations that are currently served primarily by truck or rail.

The strategic location of both systems further strengthens this opportunity. Great Lakes and inland waterway ports are located near major population centers, industrial hubs, agricultural production regions, and multimodal freight corridors. For shippers whose supply chains span both networks, cross-system movements may provide access to a broader range of markets while leveraging the scale and efficiency of water transportation.

The opportunity is not simply to move freight between waterways, but to provide shippers with more options, lower costs, and access to new markets.

Supporting Advantages

Safety

Safety is a significant advantage of maritime transportation. Limited interaction with passenger traffic, reduced congestion, and stringent operating requirements contribute to a strong safety record for both Great Lakes and inland waterway freight movements. Compared to landside modes, maritime transportation experiences substantially fewer incidents and injuries. For every one barge-related injury, there are 96 injuries related to

rail and 1,145 injuries related to trucking.[1] Similarly, barges record less than half the number of spills associated with trucking and roughly one-third of those associated with rail transportation.[2] For shippers moving bulk commodities, hazardous materials, or high-value cargoes, these safety advantages can provide both operational and reputational benefits.

Sustainability

Maritime transportation is among the most environmentally efficient freight modes available. River barges typically produce approximately 80 percent fewer carbon emissions per ton-mile than truck transportation, while also consuming significantly less fuel.[3] The large carrying capacity of barges and vessels allows substantial freight volumes to be moved with comparatively low environmental impact. Beyond direct emissions reductions, shifting freight from truck or rail to water can help reduce roadway congestion and associated environmental impacts. As shippers, ports, and communities increasingly prioritize sustainability, these environmental benefits may strengthen the business case for cross-system freight movements.

Federal Support and Buy-In

Engagement throughout this study revealed strong support among federal agencies, industry organizations, ports, and operators for increased utilization of both the Great Lakes and inland waterway systems. In addition to funding this study, GLS is dedicated to promoting the efficiency, utilization, and economic development of the Great Lakes maritime system. Through marketing initiatives, research, and industry outreach, GLS actively works to identify opportunities to expand freight flows and strengthen the role of Great Lakes ports within North American supply chains.

At the federal level, MARAD continues to support increased freight movement on the nation's waterways through grants, technical assistance, and programs such as the Marine Highway Program. Workforce development, vessel construction, and port investment have also been key areas of focus in recent years, reflecting broader efforts to strengthen domestic maritime transportation capacity. Beyond federal agencies, Inland Rivers, Ports and Terminals (IRPT) has advanced shipper education initiatives designed to increase awareness of inland waterway transportation and encourage greater consideration of waterways in supply chain planning and decision-making.

Collectively, these efforts demonstrate a favorable environment for exploring and advancing cross-system freight opportunities. The support of GLS, MARAD, IRPT, AGLPA, and the three focus ports provides a strong foundation for communicating the benefits of cross-system movements, engaging potential users, and building momentum around new freight opportunities.

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[1] Waterways Council, Barge Transportation Wins Out Over Truck and Rail, 2022.
[2] Ibid.
[3] Searoutes, Sea vs. Air Freight, Truck vs. Rail: How to Track and Reduce Carbon Emissions in Freight – transport modes compared, 2025.

2.2 What's Limiting Cross-System Freight Movements?

Despite the physical connection between the Great Lakes and inland waterways, relatively little freight moves between the two systems today. Stakeholder interviews revealed that the barriers to greater cross-system utilization are often more commercial than physical.

Many shippers remain unaware that cross-system movements occur today, while others lack the information, relationships, or confidence needed to evaluate water transportation as part of their supply chain.

Operational constraints, infrastructure limitations, and long-term system risks can affect the reliability and competitiveness of certain movements. Understanding these challenges is critical to identifying opportunities for future growth. While some barriers will require long-term investment and coordination, others can be addressed through education, marketing, relationship-building, and demonstration of successful freight movements. Together, these efforts can help expand awareness of cross-system opportunities and support greater utilization of both networks.

Top Challenges

Awareness and Communication

Awareness emerged as the most frequently cited barrier to increased maritime utilization and cross-system freight movements. Nearly every stakeholder interviewed noted that many shippers remain unfamiliar with the advantages of water transportation and unaware that freight currently moves between the Great Lakes and inland waterways. Several manufacturers, terminal operators, and logistics providers indicated that they had never considered cross-system movements as a viable supply chain option despite operating in industries served by both networks.

For many stakeholders, this study represented the first time cross-system freight movements had been discussed as a meaningful opportunity. Stakeholders consistently emphasized that improved communication, marketing, and shipper education could help address this challenge. While cost, safety, sustainability, and reliability are all factors that influence

Where can this be addressed/prioritized?

Each of the three focus ports noted that while they were aware of limited existing cross-system activity, there had been relatively few opportunities in the past to explore how those movements might be expanded. This finding highlights an important opportunity for ports to play a greater convening and market development role by bringing together tenants, carriers, logistics providers, and shippers to identify potential cross-system freight opportunities.

Future efforts should expand outreach efforts, share successful case studies, and increase engagement with manufacturers, logistics providers, and shippers to help build awareness and encourage greater consideration of water transportation within supply chain planning.

transportation decisions, these benefits are often not well understood outside the maritime industry.

Established Supply Chains

Beyond awareness, established supply chain practices present another significant barrier to increased maritime utilization and cross-system freight movements. Many shippers, freight forwarders, and logistics providers have longstanding relationships with truck and rail carriers, and existing transportation routings are often deeply embedded within business operations. For smaller businesses in particular, transportation decisions may be influenced by logistics providers or customers, limiting their ability to explore alternative routing options.

When truck or rail service experiences delays, congestion, or price fluctuations, these challenges are often viewed as known and manageable risks. By comparison, shifting freight to a less familiar mode can introduce uncertainty, making many organizations hesitant to alter established practices. There is a common "if it isn't broken, don't fix it" approach to supply chain management, where the perceived risks of change outweigh the potential benefits of exploring new transportation options.

Several stakeholders also have uncertainty about how to initiate waterborne shipments or evaluate whether maritime transportation could be a viable option for their supply chain. As a result, the challenge is often not demonstrating that water transportation can move freight, but helping shippers understand when and where it can provide value. Providing clear guidance, successful case studies, and practical examples of cross-system movements may help reduce perceived risk and encourage greater consideration of maritime transportation.

Where can this be addressed/prioritized?

Several stakeholders noted that increasing cross-system freight movements will require more than simply raising awareness; potential users must also have access to practical information that helps them evaluate and pursue opportunities. One barge operator with operations on both the Great Lakes and inland waterways suggested that attracting new users would be easier if shippers had a centralized resource to identify terminal and port contacts, understand available services and capabilities, and evaluate the business case for cross-system freight movements.

Examples discussed during stakeholder interviews included online directories of terminal operators and port services (similar to resources currently provided by GLS for Great Lakes stakeholders), accessible guides highlighting successful cross-system use cases, and step-by-step information outlining how shippers can begin incorporating water transportation into their supply chains. Stakeholders noted that these types of resources could help reduce uncertainty, lower barriers to entry, and provide potential users with a clearer pathway for evaluating and implementing cross-system freight movements.

Bridge Clearance Restrictions

While stakeholder interviews identified awareness and market development as the primary barriers to increased cross-system freight movements, several consultees also noted that bridge clearances can create operational constraints on portions of the Calumet, Illinois, and Mississippi River systems. Depending on bridge type, clearance, tow configuration, and water levels, barges may be required to break apart tows, increasing transit times and operating costs. During periods of high water, some bridges may temporarily restrict vessel movements altogether.

Although these constraints do not prevent cross-system freight movements, they can affect the efficiency and economic competitiveness of certain routes and commodities. Addressing bridge clearance limitations can require significant investment and coordination among multiple stakeholders. In some cases, low-clearance rail bridges present additional challenges, requiring collaboration with railroad owners to implement potential improvements.

Where can this be addressed/prioritized?

While bridge clearance can become an issue along the river as water levels fluctuate, **one bridge in particular is the sticking point** for most barge operators and shippers. Great Lakes and river ports and barge operators both specifically cited a lower-clearance BNSF rail bridge on the Chicago Sanitary and Ship Canal in Lemont that requires tugs to be positioned on either side to move individual barges. Larger barges instead stop travelling northbound at terminals near Channahon before reaching Lemont. This bridge represents the most major physical disconnect between the two systems, and if resolved, could significantly expand the carrying capacity and efficiency of vessels transiting the two systems.



BNSF bridge in Lemont

System Constraints and Risks

Seasonality and Extreme Weather

Seasonal conditions and extreme weather affect the reliability of both the Great Lakes and inland waterway systems. Ice, fluctuating water levels, flooding, and drought can create delays, closures, and operational challenges that influence freight movements throughout the year. On the Great Lakes, winter closures can last two to three months or longer depending on ice conditions. On the inland waterways, freezing conditions and low water levels on the Upper Mississippi can similarly disrupt barge operations for extended periods. Although freezing on the Illinois Waterway is less common, ice conditions can still affect movements between IIPD, Ports of Indiana–Burns Harbor, and Port Milwaukee.

In addition to seasonal disruptions, waterways are becoming increasingly vulnerable to extreme weather events. Droughts and flooding throughout the Mississippi River Basin can affect navigability and vessel operations, while maintaining sufficient channel depth on the Illinois Waterway depends on regular dredging activities. Stakeholders noted that as confined disposal facilities near Chicago approach capacity, identifying alternative solutions for dredged material management will become increasingly important to maintaining navigable depths and supporting efficient barge operations.

Where can this be addressed/prioritized?

Barge operators with experience on both systems identified tow-size restrictions between IIPD, Ports of Indiana–Burns Harbor, and Port Milwaukee as a key operational constraint. US Coast Guard policies generally limit movements to three-barge tows, with additional restrictions often imposed during high winds or ice conditions. Stakeholders noted that these limitations can create vessel queues at IIPD, increasing delays and demurrage costs for shippers.

Opportunities exist to improve operational efficiency through coordination with the US Coast Guard on tow-size and load-line policies, as well as collaboration with vessel operators and shipbuilders to ensure cross-system equipment can safely navigate both Great Lakes and inland waterway operating environments. While these actions would not eliminate all operational challenges, they could help reduce delays, improve reliability, and support more efficient cross-system freight movements.

Lock Closures and Delays

Outside of seasonal and planned maintenance closures, aging lock infrastructure on the Illinois Waterway and Mississippi River presents growing reliability concerns for ports, carriers, and shippers. Mechanical failures, electrical issues, and emergency repairs can result in temporary disruptions that affect vessel schedules and supply chain performance. For cargo moving between the Illinois Waterway and Gulf Coast markets, vessels must transit 10 locks and dams, including eight on the Illinois Waterway, making system reliability particularly important for maintaining efficient freight flows.

In 2024, temporary lock closures on the Illinois Waterway and Upper Mississippi were largely unscheduled, disrupting movements for periods ranging from several hours to multiple days.[4] As many locks and dams continue to operate beyond their original design life, stakeholders expressed concern that aging infrastructure and maintenance backlogs could result in more frequent outages and reduced system reliability, increasing uncertainty for waterway users.

Where can this be addressed/prioritized?

Delays and interruptions to shipping on the river like these not only create additional costs for existing carriers but also erode trust and confidence in the system for future users. Consultees at IIPD specifically noted that the unexpectedly extended closure of the Lockport lock and dam on the Illinois Waterway - closed in 2025 from January to June - resulted in multiple shippers moving back to truck and rail, with little likelihood of returning to shipping by water once the waterway reopened. Prolonged lock closures like these, particularly when unscheduled, may encourage shippers to find alternative modes and risk they never return to shipping on the waterway. Ports, in collaboration with AGLPA and GLS, can make a concerted effort in communicating the benefits of moving on water, even if as a seasonal alternative to ensure that modal shift during system disruptions is not permanent. Beyond this, coordination with USACE is critical to ensure Illinois Waterway locks and dams operate efficiently and the river is dredged regularly to maintain navigable depths to ensure that even scheduled closures are not prolonged and disruptions are minimized.



Lockport Lock and Dam during Scheduled Maintenance

[4] USACE, Annual Lock Closure Report, 2026.

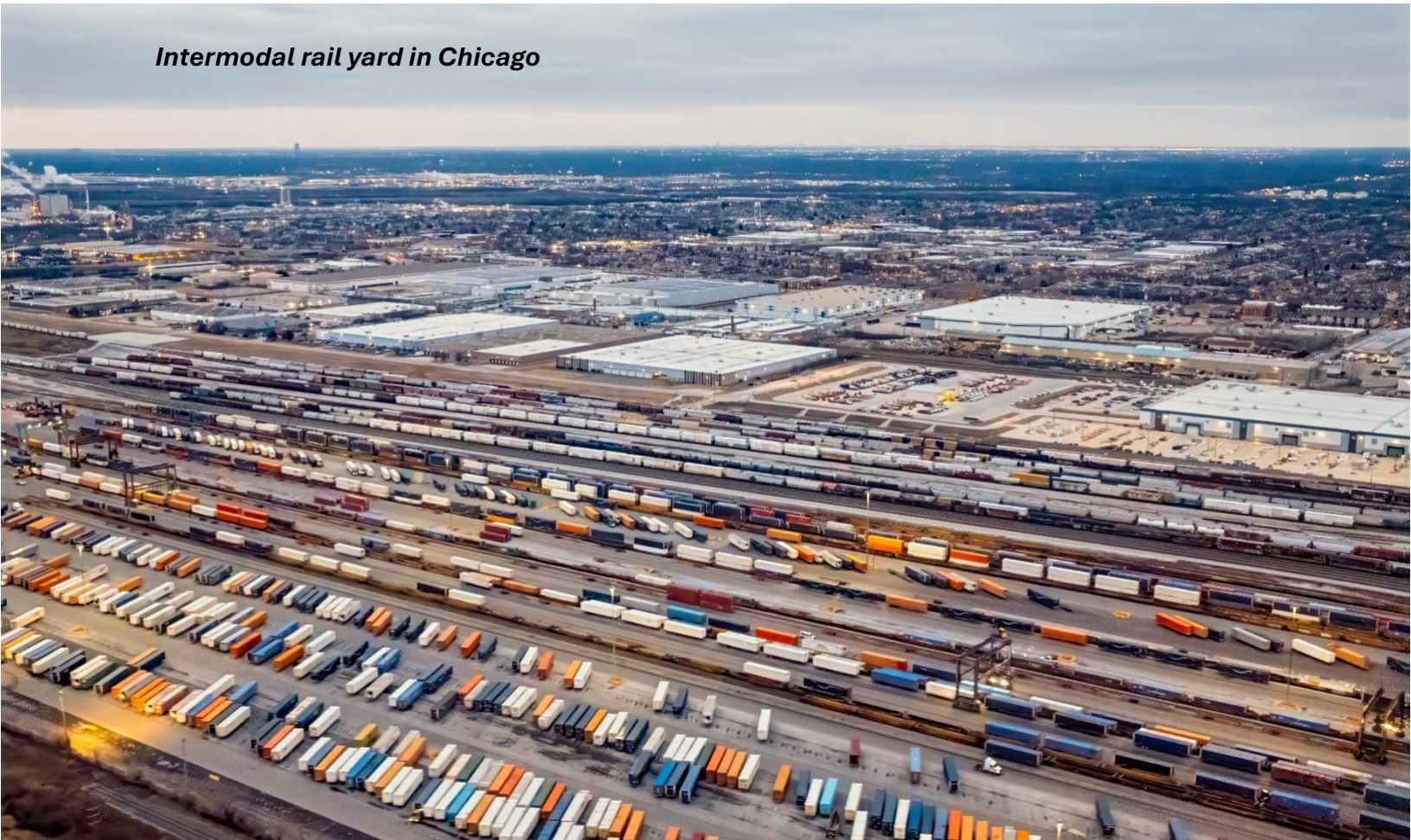
Great Lakes Vessel Restrictions

Consultees noted that differences in vessel requirements and operating conditions between the Great Lakes and inland waterways can affect the feasibility of certain cross-system freight movements. For example, the US Coast Guard requires barges calling on Port Milwaukee to be ten years old or newer. At the same time, the inland barge fleet is aging, with the average river barge reaching approximately 21 years of age in 2023. Together, these factors can influence the number of barges available to support cross-system movements at specific facilities.

Additional operational constraints, including US Coast Guard restrictions on northbound travel by river barges on Lake Michigan, can further affect how and where cross-system freight movements occur. While these factors do not prevent cross-system trade, they may influence the ports, vessels, and operating arrangements best suited to facilitate future growth in cross-system freight activity.

Where can this be addressed/prioritized?

Despite these regulatory and operational constraints, a Great Lakes shipbuilder emphasized that vessels capable of operating on both systems can be designed and built today. The challenge is not technical feasibility, but identifying the initial freight movements and commercial partners needed to justify investment. Stakeholders noted that a single successful partnership or demonstration project could help establish the business case for purpose-built cross-system vessels and encourage broader market adoption over time.



Intermodal rail yard in Chicago

Industrial Land Availability

The long-term growth of both the Great Lakes and inland waterway systems depends on the availability of waterfront industrial land. These lands support not only port terminals, but also manufacturers, processors, warehouses, and other industries that rely on waterways to receive raw materials and distribute finished products. Without access to appropriately located industrial sites, opportunities for future freight growth and cross-system trade become increasingly limited.

Stakeholders, particularly in larger urban areas, noted growing pressure on industrial waterfront properties from competing land uses. In some cases, industrial parcels with expiring leases have been converted to recreational or mixed-use development despite the continued presence of commercial maritime activity. As demand for waterfront redevelopment increases, preserving strategically located industrial land will be important to maintaining port operations, supporting maritime-dependent industries, and enabling future growth in waterborne freight transportation.

Where can this be addressed/prioritized?

This issue was particularly evident among stakeholders in and around Chicago, where competition for waterfront and industrial land continues to intensify. Several consultees noted that industrial properties are facing increasing redevelopment pressure, while others expressed concern over rising property values and lease costs that can make it more difficult for terminal operators and maritime-dependent businesses to remain competitive. These trends can affect the ability of ports and their tenants to expand operations, attract new investment, and accommodate future cross-system freight opportunities.

Addressing these challenges will require continued engagement among ports, terminal operators, local governments, and economic development organizations to communicate the value of maritime industrial uses and preserve strategically located waterfront properties. Collaborative efforts to identify, protect, and develop industrial land suitable for freight and maritime activity may help maintain capacity and support future growth in cross-system freight movements.

3 Where the Systems Connect: Trade Lane Analysis and Market Potential

Common commodities, shared industries, and existing cross-system movements demonstrate that opportunities already exist to expand freight flows between the Great Lakes and inland waterways.

The previous chapters demonstrated that the Great Lakes and inland waterways serve many of the same industries and commodities and that cross-system freight movements can provide value through supply chain flexibility, cost competitiveness, and expanded market access. Existing cross-system movements further demonstrate that these opportunities are not theoretical; they are already occurring today. The next question is where additional opportunities may exist and which freight movements are best positioned for growth.

To evaluate the business case for cross-system shipping, four representative all-water trade lanes are compared against existing supply chain alternatives. The trade lanes were selected based on stakeholder input and a data-driven assessment of commodity flows, market demand, and existing system capabilities. While focused on the study's participating ports, the examples are intended to illustrate broader opportunities throughout the Great Lakes and inland waterway systems.

The methodology is detailed in **Appendix B,** and can be applied to other commodities, origins, destinations, and trade lanes across both networks.

3.1 Trade Lane Analysis

Four representative trade lanes were identified through stakeholder consultations conducted during Phases 1 and 2 of the study. Each route utilizes the T.J. O'Brien Lock, the only navigable connection between the Great Lakes and the Illinois Waterway. For each trade lane, an all-water routing is compared against a baseline scenario representing how the commodity is most likely transported today. Benefits are estimated using a per-unit analytical framework based on published emissions factors, cost-per-ton-mile benchmarks, and illustrative freight diversion scenarios.

Physical connectivity alone does not create freight demand. The greatest opportunities exist where commodity flows, market needs, and transportation economics align to create a compelling business case for cross-system shipping.

Figure 7: Selected Trade Lane Preview

Trade Lane	Commodity	Baseline	Origin/Destination	Rationale
1	Grain and Bulk Agricultural products	Rail	Southbound Milwaukee to the Gulf	Past activity (barging to the Gulf), active infrastructure investment (expanded silos at the MKE ag terminal), and shippers with potential interest.
2	Steel Products	Truck	Southbound from Burns Harbor to Peoria	The vast majority of steel products from Burns Harbor are currently trucked out, partially to IL destinations, even a small diversion to barge represents significant truck-trip reduction & emissions savings.
3	Liquid Bulk	Rail	Northbound from Joliet to Milwaukee	The origin (Joliet, IL area refineries), the route (Illinois Waterway northbound through T.J. O'Brien), and the destination (Port Milwaukee) are all identified by stakeholders.
4	Salt/Aggregate	Rail	Northbound from the Gulf to IIPD	Midwest Salt's distribution and barging operations in IIPD, as well as existing northbound flows of salt and aggregate northbound from suppliers in the Gulf, were verified by stakeholders.

All tonnage figures presented in this chapter are illustrative scenarios (25,000, 50,000, and 100,000 tons annually) intended to demonstrate the potential scale of benefits at varying levels of freight diversion. While the analysis draws on stakeholder input, published emissions factors, and industry cost benchmarks, it is intended to illustrate relative opportunities rather than predict actual freight volumes or investment outcomes.

The analysis should not be considered investment-grade. Tonnage assumptions are not based on committed volumes from consulted shippers, and proprietary factors such as individual handling, transloading, storage, and contractual costs were not available for evaluation. As a result, actual costs, savings, and operational considerations may vary by shipper, commodity, and trade lane. A detailed discussion of methodology, assumptions, and limitations is provided in **Appendix B.**

Lane 1: Grain & Bulk Agricultural Exports (Port Milwaukee to Gulf)

In this scenario, grain or other bulk agricultural goods are moved southbound from agricultural export terminals at Port Milwaukee to port facilities in the Gulf for regional distribution or to be loaded onto ocean-going vessels for international export.

Trade Lane 1 Benefits

~$4.5	Alternative Export Route	~1,000
Savings per ton	Bypasses Upper Mississippi low water and Chicago rail bottleneck	Rail cars avoided at 100,000 tons

Economic Benefits

Lane 1's economic value proposition is best understood as an *order-of-magnitude* comparison of linehaul costs compared against a likely rail baseline chosen based on recent precedent. Figure 9 shows the potential economic benefits on a per-ton basis. The all-water route could save around $4.5 per ton versus the rail baseline. The all-water route travels substantially farther (1,472 miles vs. 982 by rail), but barge's much lower cost per ton-mile largely offsets the added distance, and the lake segment adds only 127 miles.

Because rail is already highly cost-efficient for bulk grain, the all-water route is not guaranteed to be cheaper in every market condition; competitiveness will depend on seasonality, equipment availability, volume commitments, and congestion or reliability constraints in the Chicago rail hub. The comparison reflects linehaul benchmarks and does not fully quantify loading/unloading, storage, and handling costs at origin/destination. In addition, the Great Lakes navigation season and schedule frequency can affect inventory carrying costs and service suitability for time-sensitive movements.

Figure 8: Trade Lane 1 route and baseline



Figure 9: Lane 1 Economic Benefits (Per Ton)

Route	Distance	Rate Range ($/ton-mile)	Est. Cost/Ton	vs. Baseline
Baseline	982 mi	Rail: $0.03–$0.04	$30.5–$41.3	—
All-water	1,472 mi	Lake: $0.03–$0.034 Barge: $0.02–$0.024	$26.7–$36.2	~ ↓ $4.5

The annual savings (Figure 10) represent approximate linehaul cost savings, not guaranteed net savings. Actual economics will depend on terminal handling and storage costs, service frequency, inventory requirements, and the availability of lake-rated tug-and-barge capacity throughout the year, as reflected in the cost sensitivity range. Even where the all-water option is cost-neutral, stakeholders noted that it can still provide value as a seasonal or operational alternative to the Chicago rail hub.

Figure 10: Lane 1 Economic Savings at Illustrative Tonnages

Tonnage Diverted	Approximate Cost Savings per Year	Sensitivity Range
25k tons	$112,000	$95,000 – $129,000
50k tons	$224,000	$190,000 - $257,000
100k tons	$447,000	$380,000 - $514,000

Resiliency Benefits

Lane 1 also offers significant resiliency benefits. The all-water Great Lakes routing provides a redundant export pathway to the Gulf that is less dependent on Upper Mississippi River water levels. During periods of low water, grain moving through upstream river elevators may face delays, draft restrictions, or costly rerouting. By accessing the Mississippi system via the Illinois River, the Great Lakes–Illinois Waterway route can help mitigate some of these constraints while also providing modal diversification away from the Chicago-area rail hub, a bottleneck consistently identified by stakeholders.

Environmental Benefits

On a per-ton CO_2 basis, the all-water and rail routings for Lane 1 produce very similar emissions, with rail slightly more efficient (Figure 11). Rail is already an energy-efficient mode on a per-ton-mile basis; the water route's per-ton-mile efficiency advantage is offset by its 50% greater distance (1,472 mi vs. 982 mi). The net result is roughly neutral on carbon, with a slight per-ton increase for the all-water route.

Figure 11: Lane 1 Emissions Comparison (Per Ton)

Route	Distance	kg CO_2 / ton	vs. Baseline
Baseline	982 mi	21.2	—
All-water (lake + barge)	1,472 mi	22.2	~ ↑4.8%

Lane 2: Steel Products (Burns Harbor to Peoria, IL / St. Louis)

In this scenario, steel products manufactured and refined at the steel hub of Ports of Indiana – Burns Harbor are towed by barge to IIPD to then move by barge down the Illinois Waterway and Mississippi River to Peoria and St. Louis.

Trade Lane 2 Benefits

~$20	No Permits	~5,100
Savings per ton	Water bypasses the state DOT's overweight permitting for steel	Truck trips removed at 100,000 tons

Economic Benefits

The cost differential for Lane 2 is substantial, driven by a truck-dominant baseline that is replaced almost entirely by lower-cost waterborne ton-miles. Benchmarks are sourced from flatbed spot rates and a steel-specific 19.54-ton payload.

For the Peoria destination, the baseline truck move costs imply an order-of-magnitude gross linehaul savings on the order of ~$20.7 per ton, driven primarily by replacing long-haul trucking with lower-cost waterborne ton-miles. Across both destination options, the results scale approximately linearly with tonnage, and the St. Louis case produces larger totals because more truck miles are displaced.

In addition to shipper transportation savings, diverting Lane 2 steel from truck to the all-water route reduces heavy-truck mileage on highways, in turn reducing pavement wear borne by state and local agencies. The implied pavement benefit scales with the number of truck-miles removed. These pavement effects are included as qualified estimates rather than precise maintenance savings.

Figure 12: Trade lane 2 route and baseline

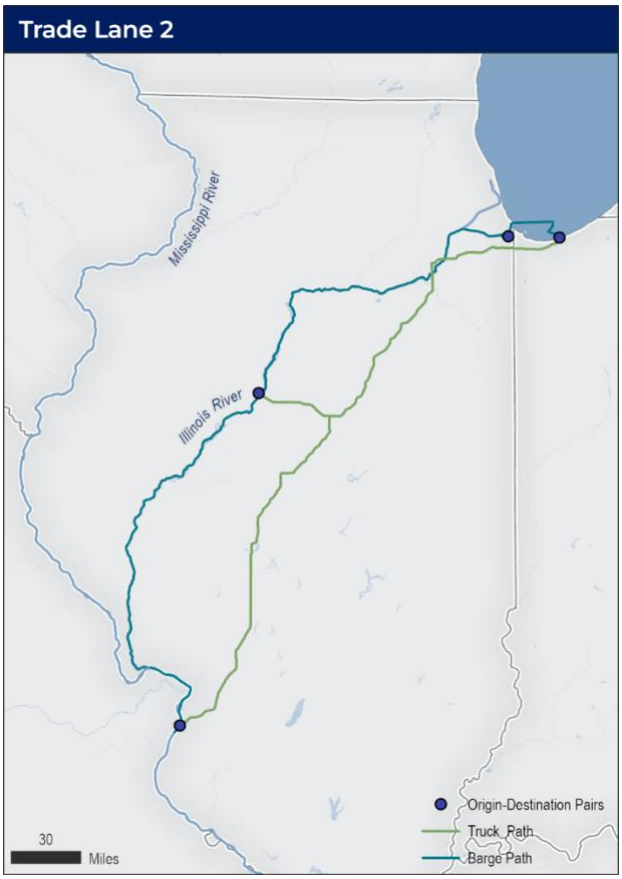


Figure 13: Lane 2 Economic Benefits (Per Ton, to Peoria, IL)

Route	Distance	Rate Range ($/ton-mile)	Est. Cost/Ton	vs. Baseline Cost/Ton
Baseline	182 mi	Truck: $0.12 – $0.16	$21.6–$29.3	—
All-water	202 mi	Lake: $0.03–$0.034 Barge: $0.02–$0.03	$4.1–$5.5	~ ↓ $20.7

Figure 14 shows an even larger cost differential for the St. Louis destination because the truck baseline covers a longer distance. Baseline trucking is estimated at roughly $37.1–$39.5 per ton, yielding a gross linehaul savings on the order of ~$34.4 per ton. The increase in savings with distance underscores that Lane 2's economic case strengthens as truck miles are displaced.

Figure 14: Lane 2 Economic Benefits (Per Ton, to St. Louis)

Route	Distance	Rate Range ($/ton-mile)	Est. Cost/Ton	vs. Baseline Cost/Ton
Baseline	312 mi	Truck: $0.12 – $0.16	$37.1–$50.2	—
All-water	401 mi	Lake: $0.03–$0.034 Barge: $0.02–$0.03	$7.9–$10.7	~ ↓$34.4

Figure 15: Lane 2 Economic Savings at Illustrative Tonnages

Tonnage Diverted	Approximate Cost Savings to Peoria, IL*	Approximate Cost Savings to St. Louis*
25k tons	$609,000	$1,017,000
50k tons	$1,217,000	$2,034,000
100k tons	$2,428,000	$4,057,000

* Includes qualified pavement savings estimates at $0.39 per truck-mile.

Resiliency Benefits

Stakeholders across industries identified supply chain diversification and redundancy as the primary advantages of cross-system routing, noting that opening new modal channels protects against business disruption. For steel specifically, the all-water route offers two distinct resiliency advantages:

- **Weight limit constraints.** Steel coils and slabs frequently exceed standard truck payload limits. The waterway route bypasses highway weight restrictions and related costs to a large extent.
- **Fuel cost exposure.** Stakeholders noted that periods of low fuel prices can make trucking appear more competitive on this corridor. All modes in this lane are exposed to diesel, but trucking costs can be more sensitive to fuel-price volatility and are incurred per vehicle-mile. As waterborne moves spread fuel use over higher

payloads, shifting a portion of volume to the all-water route can reduce overall exposure to diesel-price spikes.

Environmental Benefits

Lane 2 presents the strongest environmental case of the four lanes. The baseline is overwhelmingly truck-dependent, and the all-water route replaces long-haul trucking with a combination of a short lake crossing and an inland barge. As shown in Figure 16 and Figure 17 this mode shift drives large per-ton CO_2 reductions for both destination options.

Figure 16: Lane 2 Emissions Comparison (Per Ton, to Peoria, IL)

Route	Distance	kg CO_2 / ton	vs. Baseline
Baseline (truck Burns Harbor→Peoria)	182 mi	25.6	—
All-water (lake + barge)	202 mi	3.0	↓22.6 (↓88%)

Figure 17: Lane 2 Emissions Comparison (Per Ton, to St. Louis)

Route	Distance	kg CO_2 / ton	vs. Baseline
Baseline (truck Burns Harbor→StL)	312 mi	43.9	—
All-water (lake + barge)	401 mi	6.2	↓37.7 (↓86%)

At 100,000 tons diverted to Peoria, IL, the all-water route would eliminate about 1 million truck-miles from the regional road network, avoiding approximately 2,300 metric tons of CO_2 annually (Figure 18). For St. Louis, the all-water route would eliminate about 1.6 million truck-miles from the regional road network, avoiding approximately 3,800 metric tons of CO_2 annually (Figure 19).

Figure 18: Lane 2 Emissions Savings and Truck Trips Removed (to Peoria, IL)

Tonnage Diverted	CO_2 Saved (metric tons)	Truck Trips Removed	Truck-Miles Removed
25k tons	600	1,300	236,600
50k tons	1,100	2,600	473,200
100k tons	2,300	5,100	928,200

Figure 19: Lane 2 Emissions Savings and Truck Trips Removed (to St. Louis)

Tonnage Diverted	CO_2 Saved (metric tons)	Truck Trips Removed	Truck-Miles Removed
25k tons	900	1,300	405,600
50k tons	1,900	2,600	811,200
100k tons	3,800	5,100	1,591,200

Lane 3: Liquid Bulk (Joliet / Lemont → Port Milwaukee)

In this scenario, liquid bulk like petroleum or non-fuel resources are moved northbound from refineries in Joliet and Lemont by barge through IIPD, then onto the lakes to Port Milwaukee for regional and international distribution.

Trade Lane 3 Benefits

~$2	Fewer Incidents	~1,000
Savings per ton	Barges have <1/2 the spills of trucks and ~1/3 of rail	Rail cars avoided at 100,000 tons

Economic Benefits

The benchmark-based analysis indicates that the all-water option could reduce costs for Lane 3 from approximately $5.4–$7.3 per ton under the rail baseline to approximately $3.9–$5.3 per ton by shifting the movement to barge and a short lake leg (Figure 21). The implied difference is relatively small because rail is already a relatively low-cost mode for liquid bulk over this distance; however, the result suggests there is still an identifiable cost advantage available from replacing rail ton-miles with waterborne ton-miles, particularly when volumes are sufficient to support efficient barge and lake-vessel utilization.

Figure 20: Trade Lane 3 route and baseline

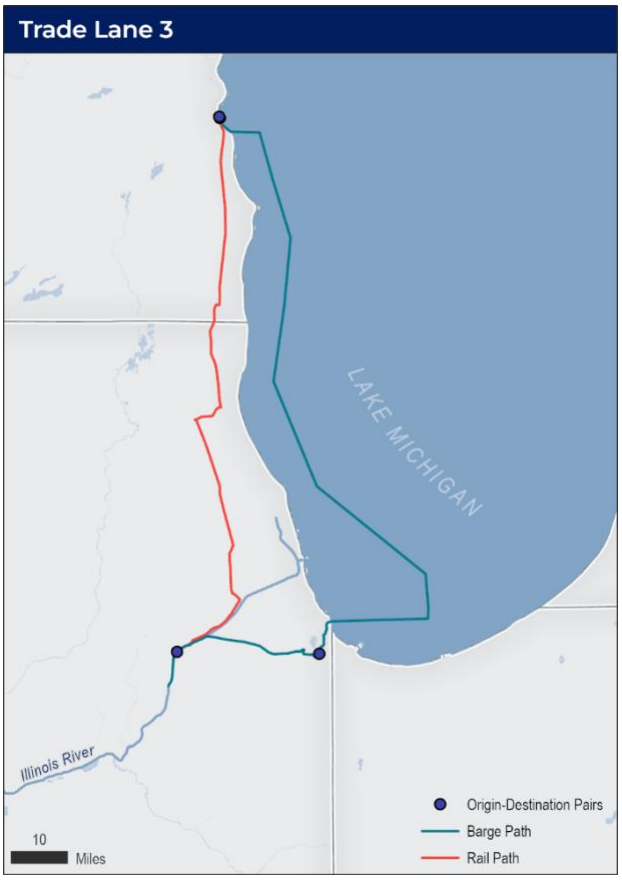


Figure 21: Lane 3 Economic Benefits (Per Ton)

Route	Distance	Rate Range ($/ton-mile)	Est. Cost/Ton	vs. Baseline Cost/Ton
Baseline	106 mi	Rail: $0.05–$0.07	$5.4–$7.3	—
All-water	162 mi	Lake: $0.03–$0.034 Barge: $0.02–$0.03	$3.9–$5.3	~ ↓$1.8

Figure 22 translates this per-ton differential into annualized savings. In practice, realized savings will be most sensitive to the degree of rail rate discounting available to the shipper and to the fixed/variable cost structure of barge and terminal operations.

Figure 22: Lane 3 Economic Savings at Illustrative Tonnages

Tonnage Diverted	Approximate Cost Savings
25k tons	$44,000
50k tons	$89,000
100k tons	$178,000

For liquid bulk, net economics depend on the specific terminal configuration at both ends, including loading/unloading rates, storage requirements, product segregation, and any incremental costs associated with switching between rail-served and dock-served tanks. That said, stakeholders indicate much of the required infrastructure is already in place (refinery access on the Illinois Waterway and an established liquid bulk terminal at Port Milwaukee), which improves the likelihood that linehaul savings can translate into a competitive delivered cost for shippers.

Beyond direct shipper cost, the Lane 3 shift to a barge-to-lake-vessel routing can generate broader economic benefits for the corridor. Increased liquid bulk throughput at Port Milwaukee supports terminal utilization, marine services, and associated employment, while also helping diversify the port's cargo mix. In addition, creating a viable waterborne alternative can improve shipper leverage and supply chain optionality, which has economic value even when the all-water option is only cost-neutral in certain periods. Finally, to the extent that diverting product from rail reduces exposure to rail congestion, service variability, and hazardous-materials incident risk, it can reduce disruption-related costs borne by shippers and the public sector.

Resiliency Benefits

Lane 3's resiliency case centers on the hazardous materials safety advantage. Moving petroleum products by barge and lake vessel through the waterway system rather than by rail through densely populated areas represents a meaningful reduction in public safety risk.

According to the Waterways Council, the risk of injury is significantly lower with barges compared to other transport modes.[5] Additionally, barges experience fewer than half the number of spills compared to trucking, and only about one-third as many as rail.[6] Port Milwaukee stakeholders also noted that their liquid cargo pier is one of the fastest-discharging facilities on the Great Lakes, supporting efficient turnaround for liquid bulk vessels. The existence of a barge-to-lake vessel route for petroleum products also provides modal redundancy for a commodity where supply disruptions have direct consumer impact.

Environmental Benefits

Figure 23 shows that Lane 3 delivers a marginal per-ton CO_2 increase relative to the rail-based baseline. On a per-ton basis, the two routings produce very similar emissions due to longer distances travelled on water.

However, the overall environmental and public-benefit rationale for Lane 3 is more compelling when the modest CO_2 outcome is considered alongside risk reduction from shifting petroleum products away from rail movements through populated areas. As shown in Figure 24 even at illustrative diversion levels, the all-water option can displace a meaningful number of tank car moves. While Figure 24 also presents truck equivalents only as contextual benchmarks; it helps convey the scale of hazardous-materials exposure removed from land-based corridors when volumes shift to barge and lake vessels.

Figure 23: Lane 3 Emissions Comparison (Per Ton)

Route	Distance	kg CO_2 / ton
Baseline (rail)	106 mi total	~2.29
All-water (barge + lake vessel)	162 mi	~2.44

Figure 24: Lane 3 Environmental Benefits at Illustrative Tonnages

Tonnage Diverted	Rail Cars Avoided*	Truck Equiv.**
25k tons	250	1,200
50k tons	500	2,400
100k tons	1,000	4,700

* Rail car equivalents assume ~100 tons per loaded tank car.

** Truck equivalents are shown for additional context (20 tons/truck) even though the baseline is rail.

[5] Waterways Council, Barge Transportation Wins Out Over Truck and Rail, April 2022, retrieved from https://waterwayscouncil.org/file/422/MarineLogInlandwaterways_Apr_ML.pdf, accessed April 2026.

[6] National Waterways Foundation, Highlights of "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2019", A study by the Texas Transportation Institute, Center for Ports and Waterways, October 2021, retrieved from https://www.nationalwaterwaysfoundation.org/file/47/NWF%202022NewStudyInserts_FINAL.pdf, accessed April, 2026

Lane 4: Salt/Aggregate (Gulf → IIPD)

In this scenario, salt and other dry bulk aggregate are moved from sourcing facilities and warehouses at ports in the Gulf up to regional distribution facilities currently located in Lake Calumet in IIPD.

Trade Lane 4 Benefits

~$19	Replenishes regional salt and aggregate supplies during seasonal closures	~1,000
Savings per ton	Resiliency benefits	Rail cars avoided at 100,000 tons

Economic Benefits

Lane 4 carries a clear per-ton cost advantage, around $19 savings per ton (Figure 26). Although the all-water route is roughly 45% longer than the rail route (1,297 mi vs. 892 mi), barge's substantially lower cost per ton-mile more than offsets the added distance. This is the classic profile for a low-value, high-density bulk commodity like salt, where minimizing cost per ton dominates routing decisions.

Figure 25: Trade Lane 4 route and baseline



Figure 26: Lane 4 Economic Benefits (Per Ton)

Route	Distance	Rate Range ($/ton-mile)	Est. Cost/Ton	vs. Baseline Cost/Ton
Baseline	892 mi	Rail: $0.04–$0.06	$38.9–$52.6	—
All-water	1,297 mi	Barge: $0.02–$0.024	$22.6–$30.6	~ ↓$19

Figure 27: Lane 4 Economic Savings at Illustrative Tonnages

Tonnage Diverted	Approximate Cost Savings
25k tons	$477,000
50k tons	$954,000
100k tons	$1,907,000

Resiliency Benefits

Salt supply reliability is a public-safety issue in its own right: Midwest municipalities and DOTs depend on assured winter de-icing salt, and shortfalls or price spikes have direct consequences for road safety. The all-water route gives IIPD and regional buyers a modal alternative to rail for replenishing salt stockpiles, reducing exposure to rail-car availability constraints and Chicago-area rail congestion during the pre-winter build-up period. Because salt is stockpiled seasonally rather than consumed just-in-time, the longer transit time of the barge route is not a meaningful disadvantage as deliveries can be scheduled well ahead of winter demand, which aligns naturally with the navigation season.

Environmental Benefits

On a per-ton CO_2 basis, the all-water and rail routings for Lane 4 are essentially neutral, with the barge route marginally higher (+1.7%) because its 45% greater distance just offsets barge's per-ton-mile efficiency advantage over rail. This is not a carbon-savings lane; its case rests on cost and resiliency.

Figure 28: Lane 4 Emissions Comparison (Per Ton)

Route	Distance	kg CO_2 / ton	Vs. baseline
Baseline	892 mi	19.23	-
All-water	1,297 mi	19.56	~↑1.7%

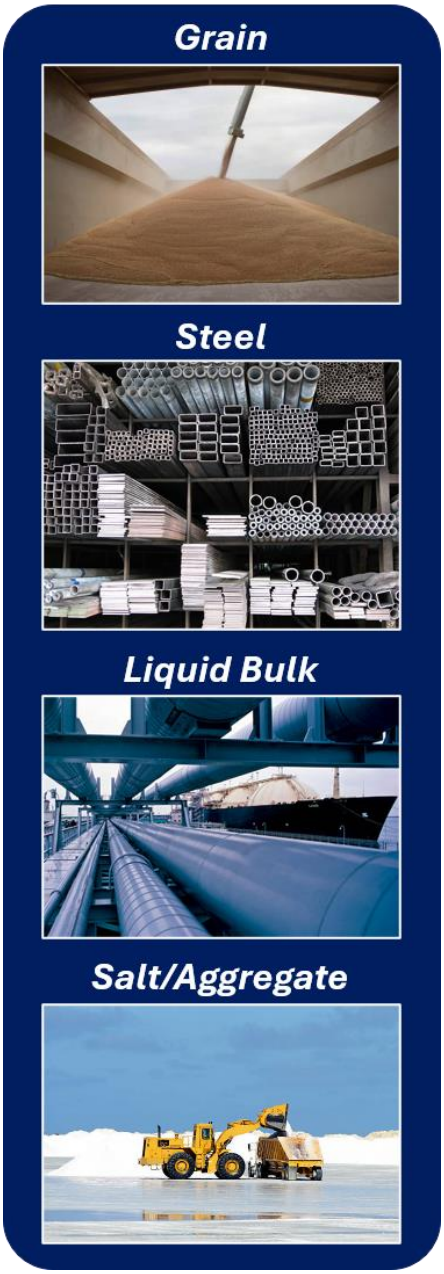
Figure 29: Lane 4 Environmental Benefits at Illustrative Tonnages

Tonnage Diverted	Rail Cars Avoided	Truck-Trip Equivalents Avoided
25k tons	250	800
50k tons	500	1,600
100k tons	1,000	3,200

Summary Comparison

These four trade lanes represent just the beginning of potential routes and commodities that could be moved cross-system, demonstrating that commodities that the lakes and river share have quantifiable and qualified impacts on improving supply chain efficiency and cost reduction.

More specifically, these four trade lanes provide measurable benefits to moving grain, steel, liquid bulk, and aggregate between lake and river destinations, giving AGLPA and its partners a starting point for identifying and engaging with high-potential and high-impact industries first and most prominently.



Existing waterborne shipments of steel, grain, and salt between the two systems were used to verify these trade lanes, allowing them to be showcased as an example of cross-system feasibility and impact grounded in reality. Each of the four lanes demonstrates a benefit to moving some of the most major commodity groups on the Great Lakes and inland waterways. Movement then does not have to be restricted to port-to-port or the specific locations identified in these trade lanes, but to any number of facilities or intermediate destinations along the two systems within these high-potential commodity groups.

When targeting marketing efforts industry by industry, multiple benefits and potential routes could be emphasized to garner buy-in. For example, with cost being the foremost concern for most shippers, any number of dry or break bulk commodities (like those shown in lanes 1, 2, and 4) could experience significant cost savings by shipping cross-system, whether measured against a truck or rail baseline. For liquid bulk, trade lane 3 offers shippers, refineries, and pipeline owners located on either system meaningful benefits like more efficient movement and reduced safety risk. As road salt volumes grow on the Great Lakes, the seasonality of movement could be overcome by regular and efficient bulk shipments by barge to storage facilities.

More technically, Figure 30 highlights the quantified benefits by lane. At 100,000 tons diverted, Lane 2 produces the largest combined economic and environmental gains by displacing a truck-dominant baseline. Lane 1 shows moderate potential linehaul savings and a modest increase in emissions given rail's already-efficient baseline. Lane 3 similarly

yields modest per-ton cost savings and essentially no CO_2 advantage, while still reducing rail car trips substantially, supporting the lane's safety and resiliency narrative. Lane 4 fits the same pattern as Lane 1: the all-water route delivers a modest but real cost advantage and a meaningful resiliency benefit.

Figure 30: Summary of Benefits by Lane (at 100,000 tons diverted)

Benefits	Lane 1: Grain and Bulk Ag Exports (SB)	Lane 2: Steel (SB)	Lane 3: Liquid Bulk (NB)	Lane 4: Salt (NB)
Est. cost savings/ton	~$4.5	~$20.7 (Peoria), ~$34.4 (St. Louis)	~$1.8	~$19.1
Truck/rail trips removed	~1,000 rail cars	~5,100 truck trips	~1,000 rail cars	~1,000 rail cars
Primary resiliency value	Bypasses Upper Miss. low water & Chicago rail bottleneck	Supply chain diversification; heavy-haul truck removal	Hazmat safety; mode redundancy for heating fuel	Assured seasonal salt supply
CO_2 impact/ton	+ 5%	-87%	+6%	+1.7%

Ultimately, benefits to cross-system shipping are found in each of the scenarios, even when varying in magnitude. Key findings by benefit area include:

- **Environmental**: All-water routes remove truck trips from the road network. For lanes where the baseline is truck-dominant (and especially where lanes involve long-haul trucking), this can result in significant emissions benefits. Even when there is a neutral or slight increase in emissions, there may be a compelling resilience/safety argument for all-water routes given risk reduction from shifting certain products (like hazmat) away from rail movements through populated areas.
- **Economic:** All-water routes have the potential to increase economic benefits, but the overall competitiveness of these routes will depend on factors like seasonality, equipment availability, volume commitments, congestion/reliability constraints, and other factors. Even where the all-water option is cost-neutral, qualitative feedback suggests that these routes may deliver value as alternatives to the Chicago rail hub at certain times.
- **Resilience/safety:** All-water routes provide important resilience benefits when shipping by truck or rail is uneconomical or when there are disruptions or constraints to these modes. Resiliency improvements can be attributed to cross-system flow contributions to supply chain diversification, mode redundancy, hazmat safety, serving as a buffer to fuel price spikes, and providing alternatives to either system as water levels fluctuate.

4 Promoting Cross-System Growth

Cross-system integration has the potential to combine the strengths and assets of the two systems, creating a more unified and efficient maritime system at the heart of the nation. Making this a reality relies on the action and support of planners, ports, and industry associations across both systems, but can be achieved through a series of realistic first steps.

Recommendations were developed for collaborative action among AGLPA, IIPD, Port Milwaukee, and Ports of Indiana–Burns Harbor. While regulatory constraints, operational limitations, and existing supply chain practices present challenges to expanding cross-system freight movements, stakeholder consultations consistently identified awareness, market development, and industry engagement as the most immediate opportunities for growth. As a result, the recommended actions focus primarily on strengthening partnerships, increasing outreach to potential users, and building the business case for cross-system shipping, while also advancing longer-term regulatory and infrastructure improvements.

Recommendations are organized into four categories: Market Development and Partnerships, Priority Industries and Commodities, Policy and Regulatory Coordination, and Strategic Infrastructure Improvements.



Market Development and Partnerships

1. Engage shippers directly at association meetings and conferences to understand needs and how cross-system transloading can meet certain needs.
2. Encourage ports to engage with terminal owners to compile site-level documentation of utilities, permitting status, and other infrastructure details for joint marketing to potential customers.
3. Establish a database of terminal operators and contacts on both systems for shipper reference, helping demonstrate the system's possibilities.
4. Position the system as a "relief valve" during disruptions.



Priority Industries and Commodities

5. Promote backhauls as an opportunity for increased container usage across systems.

6. Initiate outreach to industry associations in the manufacturing, steel, agricultural, and energy industries.
7. Identify commodities that are conducive to disaggregation, aggregation, and distribution.

Policy and Regulatory Coordination

8. Support expanded collection of data on water levels, disruptions, and clearances on the river system.
9. Monitor USCG changes in load line policy and exemptions.
10. Support stakeholder grant applications to national and statewide maritime funding opportunities like the Marine Highway Program.
11. Protect existing industrial land along the waterways for manufacturing, distribution, and terminals.

Strategic Infrastructure Improvements

12. Encourage barge owners and shipbuilders to expand lake-capable barge fleets.
13. Coordinate with USACE to maintain navigable depths on the Illinois Waterway and create dredged material disposal plans.
14. Work with inland river terminal operators and stakeholders to develop more support services along the waterway, including vessel or container cleaning and repair.
15. Establish a regular dialogue with BNSF to explore options for raising the height clearance of rail bridges on the Illinois Waterway.



Bulk carrier vessel in the Calumet River

4.1 Action Plan

The following actions provide a framework for AGLPA, GLS, IIPD, Port Milwaukee, and Ports of Indiana–Burns Harbor to coordinate efforts, engage potential users, strengthen communication across both systems, and work with public and private partners to address barriers to cross-system freight movements. By taking action now, these organizations can capitalize on existing momentum and stakeholder interest while positioning the Great Lakes and inland waterways to address emerging supply chain challenges and support future freight growth.

Market Development and Partnerships



The success of cross-system freight movements ultimately depends on demonstrating where they create value for shippers. While infrastructure and regulatory constraints remain, stakeholder interviews consistently identified awareness, market development, and industry engagement as the most immediate opportunities for growth. By communicating successful use cases, strengthening relationships across both systems, and providing potential users with practical information, stakeholders can build confidence in cross-system shipping and encourage greater utilization of existing maritime assets. The following actions provide a starting point for advancing these efforts.

1. Engage shippers directly at association meetings and conferences to understand needs and how cross-system transloading can meet certain needs.

Rather than depending on shippers to attend conferences held by AGLPA or the ports, shippers should be engaged at their own meetings or events. This allows the message on Great Lakes-inland waterway movement to be tailored to their needs and ensures their questions can be answered.

2. Encourage ports to engage with terminal owners to compile site-level documentation of utilities, permitting status, and other infrastructure details for joint marketing to potential customers.

Landlord ports with several private terminal operators should coordinate to document port resources in better detail. This not only assists with port awareness of capacity and potential cross-system opportunities but may also be used as a resource for attracting new users to the system who are unsure if port facilities are the correct fit for their needs.

3. Establish a database of terminal operators and contacts on both systems for shipper reference.

To ease the transition for system non-users or shippers that only rely on either the lake or the river, AGLPA should collaborate with the three supporting ports and their terminal operators to assemble a database of contacts and port resources for shipper reference. Information could include terminal operator contacts, commodities handled, and services offered, among other details. This could be expanded through collaboration with IRPT

members, ensuring shippers have access to information on both systems and helping them identify opportunities for cross-system movement.

4. Position the system as a "relief valve" during disruptions.

The messaging when marketing cross-system use is just as crucial as engaging the right stakeholders. Given shipper hesitance to upend their existing supply chain routings, cross-system shipping should be positioned as a "relief valve" or additional option for shippers to consider when other modes' reliability falters. Increased use of the lakes and rivers does not rely on a year-round or permanent mode shift from entire industries. Instead, individual businesses that test and verify the ease and benefits of shipping on water can encourage more shippers to regularly consider moving goods on the two systems as an option.

Priority Industries and Commodities



Stakeholder consultations identified several commodities and industries that already utilize both systems or have the potential to do so based on market demand and existing infrastructure. The following recommendations focus on opportunities directly identified by stakeholders and are intended to help AGLPA, GLS, and the participating ports prioritize outreach efforts, target high-potential markets, and generate near-term interest in cross-system freight movements.

5. Promote backhauls for increased container usage across systems.

As Burns Harbor begins to offer container services and other ports handle inbound truck and rail traffic, high volumes of empty containers are leaving the port unutilized. At the same time, other ports expressed a need for more backhaul containers for their outbound commodities during peak shipping season. As minimal reprocessing and cleaning would be needed to leverage these containers for backhaul, ports and terminal operators alike should advertise this as a service and opportunity for new customers where applicable.

6. Initiate outreach to industry associations in the manufacturing, steel, agricultural, and energy industries.

Just as potential users of the Great Lakes-inland waterway connection can be reached and marketed to at their respective conferences and meetings, workforce associations in the identified target industries for this movement can be engaged directly in the interim to discuss next steps and how best to reach their members. This keeps an open dialogue between AGLPA, the ports, and private industry members on advancing this initiative and allows efforts to be more individualized towards the potential user. Industry and workforce associations for outreach could include:

- Great Lakes Bay Manufacturers Associations
- Specialty Soya and Grains Alliance
- Illinois Manufacturers Association
- Indiana Manufacturers Association
- Indiana Fabricators Association
- Wisconsin Corn Growers Association

7. Identify commodities that are conducive to disaggregation, aggregation, and distribution.

While rehandling of cargo adds cost to using the combined Lakes and River system, consultees identified some opportunities where the overall transportation cost savings are great enough to allow for this. To attract a wider variety of shippers, AGLPA and the three ports should market to shippers of commodities that are conducive to aggregation, disaggregation, and distribution. This could include commodity groups like liquid bulks that arrive in the Gulf by ocean-going vessels, transfer to river barges, and move up the Mississippi. These could then be aggregated in any of the three ports for final distribution within the Great Lakes, whether on a barge or laker.

Policy and Regulatory Coordination

Federal support has been instrumental in advancing discussions around increased utilization of the Great Lakes and inland waterway systems and exploring opportunities for cross-system freight movements. Stakeholder consultations revealed a shared interest among industry associations, federal agencies, ports, and private-sector partners in expanding the efficient use of both networks. This alignment creates an opportunity to address regulatory and policy challenges through coordinated action and collaboration.

The following recommendations focus on improving coordination among stakeholders and ensuring that policies, regulations, and funding programs support the safe, efficient, and commercially viable movement of freight between the two systems.

8. Support expanded collection of data on water levels, disruptions, and clearances on the river system.

More advanced notice and accessible information on system disruptions, particularly on the river, could make a significant difference in system efficiency, as well as providing shippers with expectations for reliability. Transparency could give shippers new to the system reassurance that disruptions can be planned for or accommodated using facilities along their route.

9. Monitor USCG changes in load line policy and exemptions.

Though the load line policy enforced by the Coast Guard is fairly limiting in the weather conditions and size of tows needed for Great Lakes barge movement, small changes in the policy could permit significantly more volume to be transported between Chicago, Burns Harbor, and Milwaukee. AGLPA should continue to monitor USCG policy regarding barges permitted on the lakes and discuss opportunities for expanded safe movement of lake-capable barges.

This could include a discussion on allowing larger tows between the three ports when weather permits. Currently, tows are limited to three barges at a time during good weather, creating queues at IIPD of barges and shippers paying costly demurrage while they wait during weather closure. Allowing larger tows during good weather periods could buffer against delays and the related increased costs during weather delays.

10. Support stakeholder grant applications to national and statewide maritime funding opportunities like the Marine Highway Program.

As the level of federal support grows for greater interaction between the two systems, AGLPA and the three ports should aim to take advantage of any funding opportunities available to grow volumes on the Great Lakes and rivers. This could include programs that support port development, data collection, or shipbuilding, among other topics. Terminal operators, smaller ports, or shippers may be unaware of these funding sources or lack the resources to put together an application, making AGLPA and port assistance crucial to accessing these funds. AGLPA and the three ports should also consider providing letters of support for grant and other funding requests from other ports and operators in the system, when those included enhancements could benefit cross-system shipping.

11. Protect existing industrial land along the waterways for manufacturing, distribution, and terminals.

Ports should collaborate with their cities to the extent possible to preserve land currently zoned for industrial use while working within the regulatory parameters of protecting the surrounding environment. While there may be several acres of developable land on the river or lakefront, its use and capacity rely on the goals and interests expressed by major port tenants supported by their port authority.

Strategic Infrastructure Improvements



In addition to working with stakeholders to address regulatory challenges, AGLPA, GLS, and the participating ports can collaborate with infrastructure owners and operators to reduce physical constraints that affect cross-system freight movements. The following recommendations focus on targeted improvements that can enhance system efficiency, reliability, and long-term growth opportunities.

12. Coordinate with shipbuilders to support the expansion of lake-capable barge fleets.

A clear business case and demonstrated demand for vessels that can navigate both systems are the biggest key to starting the build of lake-capable barges. Shipbuilders highlighted the importance of a guaranteed contract and business partnership to pursue new builds. This can be supported by efforts by AGLPA and federal organizations to market cross-system movement and advertise its benefits. Demonstrated interest and connecting shipbuilders with potential customers will be the first step to building the appropriate fleet.

13. Coordinate with USACE to maintain navigable depths on the Illinois Waterway and create dredged material disposal plans.

As IIPD's and other ports' confined disposal facilities for dredged material reach capacity, ports must work with the Corps to explore expanded facility capacity or alternative disposal options to ensure regular maintenance dredging can occur. Specifically, developing and updating the federally required dredged material disposal plan for the next several years should be part of this effort.

14. Work with inland river terminal operators and stakeholders to develop more support services along the waterway, including vessel or container cleaning and repair.

To support opportunities that can service several types of commodities, like potential cross-system container service, container services should be accessible at multiple locations on the lakes and rivers. AGLPA can work with IRPT and its members, among other stakeholders, to develop more support services for vessels and containers, thereby increasing the marketability of the two systems and increasing redundancy for added reliability.

15. Establish a regular dialogue with BNSF to explore options for raising the height clearance of rail bridges on the Illinois Waterway.

As the BNSF bridge in Lemont marks the point of physical disconnect between larger barges traveling in either direction from the two systems, resolving that bridge's low clearance could singularly address one of the major challenges for cross-system movement. Though under BNSF's control, AGLPA and the ports could open a dialogue with the rail operator to explore options for raising its height clearance in the near future.

The opportunity to expand cross-system freight movements is not constrained by a lack of assets; it is driven by a need for awareness, collaboration, and market development.

Appendix A Stakeholders Engaged

The following stakeholders were engaged throughout the study to provide input on system opportunities and challenges, as well as verify existing findings.

Company/Organization	Stakeholder Type
Illinois International Port District	Port
Ports of Indiana - Burns Harbor	Port
Port Milwaukee	Port
Port of Peoria	Port
Inland Rivers, Ports and Terminals	Industry Association
US Maritime Administration	Federal Organization
US Coast Guard	Federal Organization
Great Lakes St. Lawrence Seaway Development Corporation	Federal Organization
US Army Corps of Engineers	Federal Organization
Illinois DOT	State DOT
DeLong	Shipper
QSL (Nasco)	Terminal Operator
Interlake Steamship	Barge Operator
Tata Steel	Shipper
Middle River Marine	Terminal Operator
Metro Ports	Terminal Operator
Michels	Shipper
Frick Services	Terminal Operator
Soya	Industry Association
Fraser Shipyards	Shipbuilder
Northern Marine	Barge Operator
Logistec	Terminal Operator

Appendix B Trade Lane Analysis Methodology

Overview

This section documents the methodology and preliminary results for quantifying and qualifying the economic, environmental, and resiliency benefits of utilizing an all-water route through the Great Lakes and Inland Waterway system for four trade lanes.

Four trade lanes were identified through stakeholder consultations conducted during Phase 1 and Phase 2, each routed through the T.J. O'Brien Lock, which is the sole navigable connection between the Great Lakes and the Illinois Waterway. For each lane, the analysis compares the all-water routing against a lane-specific baseline reflecting how each commodity most likely moves today based on recent precedent or active movements identified by stakeholders. Benefits are estimated using a per-unit analytical framework grounded in published emission factors, cost-per-ton-mile benchmarks, and illustrative diversion tonnage scenarios.

Analytical Approach

This analysis is intended for illustrative purposes only and should not be considered investment-grade. It is designed to demonstrate the relative scale and direction of potential benefits under a set of simplified assumptions, rather than to support investment decisions without further due diligence.

This analysis is designed to be defensible but lean. We do not have shipper-committed volumes, so tonnage scenarios are illustrative (25,000 / 50,000 / 100,000 tons). The trade lanes were selected to work within known system constraints identified in Chapters 1 and 2, not to eliminate them. The resulting benefit estimates serve a dual purpose: making the case for the current system's value while justifying investment to address identified weaknesses.

Trade Lane Definitions

Each trade lane is defined by an origin, destination, commodity, direction of flow, the all-water routing, and a baseline comparison reflecting how the commodity most likely moves today. Baselines are grounded in stakeholder evidence rather than generic modal split assumptions.

Lane 1: Southbound Grain & Bulk Agricultural Exports - Port Milwaukee to Gulf

Lane 1 estimates the potential benefits of shipping grain southbound from Port Milwaukee, using the port's new agricultural export terminal, to facilities on the Gulf that may distribute domestically or load onto an ocean vessel for international shipment.

Figure B-1: Grain and Bulk Agricultural Export Trade Lane Details

Attribute	Detail
Origin	Port Milwaukee
Destination	Lower Mississippi / Gulf export terminals
Direction	Southbound (export)
Commodity	Grain and bulk agricultural products
All-Water Route	Tug + barge from Port Milwaukee → T.J. O'Brien Lock → towboat + barge Illinois Waterway → Mississippi River → Gulf
Baseline Comparison	Rail: stakeholder consultations noted that bulk ag cargo at Port Milwaukee ag terminal shipped south via rail through Chicago to Gulf export terminals in recent years, though no longer active
Rationale	Recent precedent, active infrastructure investment (expanded silos at Port Milwaukee ag terminal), identified shipper interest, and seasonal alternative when Upper Mississippi levels are low.

Notes on upstream movements per-ton analysis framework: The analysis assumes that upstream movements (truck/rail from origin farms or processors to Port Milwaukee) are the same under the baseline and all-water route alternative and are therefore outside the lane scope. The per-ton analytical framework is weight-normalized (emission factors and costs are expressed per ton-mile), so differences in bulk density of ag products do not affect the calculations.

Lane 2: Southbound Steel Products - Burns Harbor to IL River Ports/St. Louis

Lane 2 explores the benefits of shipping steel products from the manufacturing hub of the Ports of Indiana – Burns Harbor southbound to various river ports, here specified as Peoria or St. Louis, for regional distribution.

Figure B-2: Steel Products Trade Lane Details

Attribute	Detail
Origin	Ports of Indiana – Burns Harbor
Destination	Illinois River ports (e.g., Peoria)/St. Louis
Direction	Southbound
Commodity	Steel coils, slabs, finished steel
All-Water Route	Tug + barge from Burns Harbor → T.J. O'Brien Lock → towboat + barge Illinois Waterway → IL River ports or St. Louis
Baseline Comparison	Primarily by truck: stakeholder consultations indicate 90% of steel products from Burns Harbor are currently trucked to NW Indiana and Illinois destinations.

Attribute	Detail
Rationale	Overwhelmingly truck-dependent baseline means even a small percentage diversion to barge yields significant truck-trip reduction and emissions savings.

Lane 3: Northbound Liquid Bulk - Joliet / Lemont Refineries to Port Milwaukee

Lane 3 explores opportunities for movement of liquid bulk based on existing inbound flow from Port Milwaukee and refineries in Joliet and Lemont.

Figure B-3: Liquid Bulk Trade Lane Details

Attribute	Detail
Origin	Joliet / Lemont refineries
Destination	Port Milwaukee
Direction	Northbound
Commodity	Propane, butane, petroleum products
All-Water Route	Tank barge from Joliet → Illinois Waterway northbound → T.J. O'Brien Lock → Great Lakes-rated tank barge Lake Michigan → Port Milwaukee
Baseline Comparison	Primarily rail: petroleum products currently move from the Joliet/Lemont area to Port Milwaukee and Green Bay by rail, with some truck
Rationale	Origin (Joliet, IL area refinery), route (Illinois Waterway northbound), and destination (Port Milwaukee) are all specifically identified by stakeholders as a potential barge-lake movement.

Note on baseline selection: The baseline for Lane 3 is rail, not pipeline. While pipeline is generally the lowest-cost mode for petroleum product distribution, stakeholders at Port Milwaukee confirmed that US Venture's terminal currently receives product by rail and truck from Illinois and by barge from Ontario.

Note on vessel requirements: 46 CFR Part 45 Subpart E prohibits liquid cargoes on load-line-exempted river barges on Lake Michigan; a fully Great Lakes-rated tank barge is required for the lake segment.

Lane 4: Northbound Salt: New Orleans / Gulf to Lake Calumet (IIPD)

Lane 4 analyzes the benefits of moving road salt northbound from sourcing origins and warehouses in the Gulf to regional distribution points in Lake Calumet.

Figure B-4: Northbound Salt Trade Lane Details

Attribute	Detail
Origin	New Orleans / Gulf import terminals
Destination	Lake Calumet, Illinois International Port District (IIPD)
Direction	Northbound

Attribute	Detail
Commodity	Bulk salt (de-icing / industrial)
All-water route	Continuous inland towboat + barge from Gulf import terminals up the Mississippi River and Illinois Waterway to Lake Calumet at IIPD
Baseline comparison	Rail: bulk salt currently moves from Gulf terminals to the Chicago / Lake Calumet area by rail in covered hoppers (891.7 mi)
Rationale	Salt is a high-volume, low-value bulk commodity for which transportation cost is a large share of delivered price; the seasonal de-icing demand at Midwest destinations is well matched to barge economics, and IIPD has existing bulk-handling capability at Lake Calumet.

Note on routing. Unlike the lake-and-river lanes through Port Milwaukee or Ports of Indiana - Burns Harbor, Lane 4 is a single continuous inland-waterway movement: there is no separate Great Lakes vessel segment. The barge travels the full Mississippi–Illinois Waterway corridor from the Gulf to Lake Calumet, which sits at the head of the Illinois Waterway within the Chicago port complex. This makes Lane 4 a pure barge-vs-rail comparison.

Methodology

The analytical framework applies three categories of benefits (environmental, economic, and resiliency) to each trade lane. Environmental and selected economic benefits are quantified using a per-unit approach; other economic benefits and all resiliency benefits are qualified through narrative assessment grounded in stakeholder evidence and published research.

Economic Benefits (Quantified and Qualified)

Shipping Cost Differentials (Quantified)

Cost savings are estimated using published cost-per-ton-mile benchmarks for each mode. Each benchmark is a single point estimate derived from current published market data, with a ±15% sensitivity band to reflect normal market variation. These provide order-of-magnitude comparisons rather than exact rate quotes, which vary by contract, season, and commodity.

Figure B-5: Cost-per-Ton-Mile Benchmarks

Mode	Point ($/ton-mi)	Sensitivity (±15%)	Primary source
Truck (flatbed)	$0.140	$0.12 – $0.16	DAT National Flatbed Rates, recent 12-month moving avg
Truck (dry van)	$0.089	$0.08 – $0.10	DAT National Van Rates, recent 12-month moving avg
Truck (tank)	$0.110	$0.09 – $0.13	ATRI 2024 Marginal Cost
Rail (bulk grain)	$0.037	$0.03 – $0.04	STB 2024 2-Digit STCC Summary Statistics Report (Farm Products / Grain)

Mode	Point ($/ton-mi)	Sensitivity (±15%)	Primary source
Rail (petroleum products)	$0.060	$0.05 – $0.07	STB 2024 2-Digit STCC Summary Statistics Report (Petroleum and Coal Products)
Rail (salt)	$0.051	$0.04 – $0.056	STB 2024 2-Digit STCC Summary Statistics Report (Nonmetallic Minerals)
Inland barge (long-haul, Gulf-bound)	$0.021	$0.017 – $0.024	USDA AMS GTR Figure 10, Illinois River origin, recent 12-month moving avg
Inland barge (short-haul)	$0.023	$0.019 – $0.026	USDA AMS GTR Figure 10, Illinois River origin, recent 12-month moving avg, short-haul adjustment
Lake vessel	$0.030	$0.026 – $0.035	Set as the midpoint between the inland barge ($0.020) and rail ($0.040) benchmarks in this table, consistent with the modal cost hierarchy (barge < lake < rail < truck). Cross-checked against stakeholder comments received during consultations.

Sources: DAT national flatbed spot rate data; DAT national van rates data; ATRI Operational Costs of Trucking 2025 Update (2024 data, Table 4); STB Office of Economics, Two-Digit STCC Summary Statistic Report (April 2026 update); USDA AMS Grain Transportation Report, Table 9 (Weekly barge freight rates: Southbound only).

For each lane, we apply the midpoint of the relevant range to the route distance to produce an indicative cost-per-ton for each alternative, and the difference yields the estimated savings. The point estimate per row is applied to lane segment distances; the band is an order-of-magnitude sensitivity, not a statistical confidence interval.

Pavement and Infrastructure Savings (Qualified)

Each truck trip removed from the road network reduces wear on public infrastructure. While precise per-trip pavement cost estimates vary by road type and condition, the Congressional Budget Office estimated in 2015 that each heavy truck ton-mile imposes approximately $0.013 in pavement maintenance costs on public agencies.[7] This pavement cost figure is applied to truck-trip reductions for context, but is presented as a qualified estimate rather than precise calculations.

Port Economic Activity Impacts (Qualified)

Increased cargo volumes through the three focus ports generate direct economic activity in the form of port employment, stevedoring, terminal operations, and ancillary services. Existing economic impact

[7] Congressional Budget Office, Pricing Freight Transport to Account for External Costs (2015), assuming a 60,000-pound average load. Retrieved from https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/workingpaper/50049-Freight_Transport_Working_Paper-2.pdf, accessed April 2026. The pavement damage cost of $0.009/ton–mile in 2009; consultant'sescalation to 2025$ using a GDP Implicit Price Deflator of 1.43.

studies, including the Wisconsin DOT's Economic Impact of Wisconsin's Commercial Ports[8] and The Local and Regional Economic Impacts of the Ports of Indiana[9], provide useful takeaways on how port activity translates into jobs and local spending. These findings are included as qualified context to illustrate the types of economic effects associated with port throughput, rather than as original economic modeling or multiplier-based estimates applied in this analysis.

Resiliency Benefits (Qualified)

Resiliency benefits are assessed qualitatively for each lane, drawing on stakeholder consultations, SWOT findings, and published safety and reliability data. Three dimensions are evaluated:

- **Supply chain diversification.** An all-water route provides shippers with a modal alternative when truck or rail service is disrupted, constrained, or uneconomical. Stakeholders at Ports of Indiana - Burns Harbor identified supply chain diversification as the number-one advantage of the cross-system routing. For Lane 1 (grain), the all-water route provides a critical alternative export path when Upper Mississippi River levels restrict direct barge access from river terminals.
- **Mode redundancy during disruptions.** Rail service reliability was cited repeatedly in consultations as a concern. Rail delays, congestion at Chicago-area rail yards, and growing rates were identified as push factors encouraging shippers to explore waterway alternatives. The existence of a viable all-water option creates competitive pressure on other modes and provides operational flexibility.
- **Hazardous materials safety.** Particularly relevant for Lane 3 (liquid bulk/petroleum products). Maritime transportation has a significantly stronger safety record than truck or rail for hazardous materials. Per the Waterways Council, for every one barge-related injury, there are 96 rail injuries and 1,145 truck injuries.[10] Barges also record less than half the total spills of trucking and only a third of rail spills.[11] Moving petroleum products by barge-to-lake-vessel through an inland waterway corridor rather than by rail through populated areas represents a meaningful safety improvement.

Environmental Benefits (Quantified)

CO_2 Emissions Reductions

The core environmental metric is CO_2 emissions avoided per ton of cargo diverted from the baseline mode to the all-water route. The calculation follows a segment build-up approach consistent with the

[8] Wisconsin Department of Transportation, Economic Impact of Wisconsin's Commercial Ports, April 2024, retrieved from https://wisconsindot.gov/Documents/travel/water/ports-report.pdf, accessed April 2026.

[9] Ports of Indiana, The Local and Regional Economic Impacts of the Ports of Indiana, September 2023, retrieved from https://www.portsofindiana.com/wp-content/uploads/2022-POI-Economic-Impact-Report-Final_091323.pdf, accessed April 2026.

[10] Waterways Council, Barge Transportation Wins Out Over Truck and Rail, April 2022, retrieved from https://waterwayscouncil.org/file/422/MarineLogInlandwaterways_Apr_ML.pdf, accessed April 2026.

[11] National Waterways Foundation, Highlights of "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2019", A study by the Texas Transportation Institute, Center for Ports and Waterways, October 2021, retrieved from https://www.nationalwaterwaysfoundation.org/file/47/NWF%202022NewStudyInserts_FINAL.pdf, accessed April, 2026.

methodology CPCS developed for the Duluth Seaway Port Authority's Trade Lane Emission and Travel Time Calculator:

- Define the segments and distances for the all-water and the baseline routes
- Apply mode-specific emission factors (g CO_2 per ton-mile) to each segment
- Sum segment emissions to produce total route emissions for each alternative
- Calculate the difference as CO_2 savings per ton moved
- Multiply by illustrative tonnage scenarios (25,000; 50k; and 100k tons) to estimate total annual CO_2 reductions

Figure B-6 shows the emission factors used in this analysis.

Figure B-6: Emission Factors by Mode

Mode	g CO_2 / ton-mile	Ton-Miles per Gallon
Truck	140.70	151
Rail	21.57	472
Inland towing	15.08	675

Source: Kruse, C.J., Farzaneh, R., Glover, B., Warner, J.E., Steadman, M., Jaikumar, R. and Lee, D., 2021. A modal comparison of domestic freight transportation effects on the general public: 2001–2019.[12]

[12] Kruse, C.J., Farzaneh, R., Glover, B., Warner, J.E., Steadman, M., Jaikumar, R. and Lee, D., 2021. A modal comparison of domestic freight transportation effects on the general public: 2001–2019., retrieved from https://nationalwaterwaysfoundation.org/file/28/TTI%202022%20FINAL%20Report%202001-2019%201.pdf, accessed April 2026.

Truck-Trip Equivalents Removed

For lanes where the baseline is truck-dominant (particularly Lane 2: Steel), we calculate the number of equivalent truck trips removed from the road network. The analysis uses a payload of 19.54 tons per loaded truck for typical steel coil/slab loads; 28.43 tons per loaded truck for cereal grain; and 21.11 tons per loaded truck for liquid bulk.[13] The calculation is: tons diverted divided by the payload factors.

Segment Distances

Figure B-7 shows the segment distances used during the analysis. Distance sources included truck distances from Google Maps with the shortest-distance routing. Rail and water route distances were sourced from the BTS National Transportation Atlas Database rail and waterway linework.

Figure B-7: Segment Distances by Lane (Mile)

Segment	Mode	Lane 1	Lane 2	Lane 3	Lane 4
All-Water Route Distance (mi)					
Port Milwaukee→ T.J. O'Brien (lake)	Lake vessel	127	—	—	—
Ports of Indiana - Burns Harbor → T.J. O'Brien (lake)	Lake vessel	—	35	—	—
Joliet/Lemont → T.J. O'Brien	Barge	—	—	35	—
T.J. O'Brien → IL River ports (Peoria)	Barge	—	167	—	—
T.J. O'Brien → St. Louis	Barge	—	366	—	—
T.J. O'Brien → Gulf	Barge	1,345	—	—	—
T.J. O'Brien → Port Milwaukee (lake)	Lake vessel	—	—	127	—
Gulf → IIPD	Barge	—	—	—	1,297
Baseline Route Distance (mi)					
Port Milwaukee→ Gulf	Rail	982	—	—	—
Ports of Indiana - Burns Harbor → IL River ports (Peoria, IL)	Truck	—	182	—	—
Ports of Indiana - Burns Harbor → St. Louis	Truck	—	312	—	—
Joliet/Lemont → Port Milwaukee	Rail	—	—	106	—

[13] FHWA Research, Development, and Application of Methods to Update Freight Analysis Framework Out-of-Scope Commodity Flow Data and Truck Payload Factors, Chapter 10, Existing Freight Analysis Framework 4 Truck Payload Factors Methods, Table 32, April 2020, retrieved from https://ops.fhwa.dot.gov/publications/fhwahop20011/chap10.htm and Chapter 13, Bundling of Commodities and Implementation, Table 50, April 2020, retrieved from https://ops.fhwa.dot.gov/publications/fhwahop20011/chap13.htm, accessed April 2026 and October 2026.

Segment	Mode	Lane 1	Lane 2	Lane 3	Lane 4
Gulf → IIPD (rail)	Rail	—	—	—	892

Limitations

This trade lane analysis is intended to be illustrative of potential benefits of using these shipping routes for the identified goods. However, given restrictions in data availability, proprietary business cost information, and limits in the scope of this study, the following limitations should be considered when applying these findings to other potential goods and industries.

Limitations

- Tonnage scenarios are illustrative. We do not have shipper-committed volumes for any lane.
- Cost benchmarks are industry averages, not contract-specific rates. Actual transportation costs vary significantly by shipper, commodity, season, and contract terms.
- Emission factors represent fleet-wide averages. Individual vessel, truck, or train emissions may differ.
- Transloading costs (loading/unloading at origin and destination) are not fully quantified in this analysis. These costs can significantly affect the net economic advantage of the all-water route and are reflected in sensitivity ranges, though exact costs are variable by shipper and route and are unknown.