

# **An Analysis of the Illinois Maritime Transportation System**

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## **Illinois Maritime Transportation System**

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Illinois has 1,118 miles of navigable waterways passing through or bordering the state. From a commercial transportation perspective, these navigable rivers and Lake Michigan, which make up the Illinois Maritime Transportation System, are primarily used for the carriage of freight. Passenger travel on these waters is most often for recreation.

As IDOT continues to affirm the importance of multimodal transportation infrastructure, to include all existing modes, Illinois' ports and waterways should be incorporated into IDOT planning and programming efforts. IDOT proposes regaining a role of promotion and support for Illinois ports and inland waterways relative to maritime freight transportation. As such, IDOT will re-engage port and inland waterway stakeholders to include them in planning efforts that support multimodal opportunities, identify major issues, and advocate usage of maritime transportation. The inclusion of ports and inland waterways into overall IDOT planning, development, and implementation programs ensures a truly comprehensive transportation system in Illinois.

Waterways included in the Illinois Maritime Transportation System are equally important environmental resources and IDOT will continue to work with the Illinois Department of Natural Resources (IDNR) and the Illinois Environmental Protection Agency (IEPA) with regard to preservation and protection efforts. Additionally, IDOT will continue to work with IDNR and the IEPA to coordinate with the US Army Corps of Engineers (Corps) in supervision of the waterways included in the Illinois Maritime Transportation System. The jurisdictional authority of the Corps over the nation's rivers was established in 1899<sup>86</sup> and the Corps' involvement continues. The Corps rebuilt lock and dam 26 (now called Melvin Price Lock and Dam) at Alton to eliminate a major bottleneck in 1980. IDOT will continue to partner with the IDNR Office of Water Resources Division of Resource Management and work with the Corps to ensure that the waterways remain navigable, while the IEPA is still primarily concerned with water quality.

Ports and their associated facilities are critical to economic activity along the Illinois Maritime Transportation System. The Illinois General Assembly creates public port districts through legislation; which become independent, municipal corporations. On issues related to economic development of ports and maritime freight transportation, IDOT will work in coordination with Illinois Department of Commerce and Economic Opportunity (DCEO). In time, IDOT anticipates providing financial, technical and operating assistance to port districts relative to maritime freight transportation and associated infrastructure. .

### **Waterways that Comprise the Illinois Maritime Transportation System**

Illinois' navigable waterways include Lake Michigan, the Illinois River and canal system, and the Kaskaskia River and connects with both the Ohio and Mississippi rivers which border Illinois. Illinois' inland waterway system consists of 336 miles of water and links the Atlantic Ocean and the Gulf of Mexico via the St. Lawrence Seaway and the Great Lakes. Illinois has nineteen port districts. A number

of these public port districts currently have access to multimodal connections such as rail, air, and interstate highways, including US DOT Maritime Highways.. A series of eight locks within the Illinois control the flow of water from Lake Michigan to the Mississippi. The northern Great Lakes section of the Illinois Waterway is referred to as the “Chicago Area Waterway System (CAWS) and hosts three of Illinois’ nineteen ports. Commercial traffic within the Illinois Waterway is almost exclusively bulk freight carrying agricultural products, chemicals, petroleum products and coal along with other goods such as iron and steel products.<sup>1</sup>

The direction of waterborne freight within Illinois is predominantly North to South from the Great Lakes to the Mississippi along the Illinois Waterway. The Ohio and Mississippi Rivers move major quantities of freight along their Illinois borders, and the Kaskaskia River also carries a significant tonnage. In 2011, waterborne freight flows through Illinois totaled 109.6 million tons, but subsequently have a fallen to just under 94 million tons in 2015, representing a fourteen percent drop, according to the Waterborne Commerce Statistics Center.

Table 1 shows the volumes for inbound and outbound freight along the major segments of Illinois Maritime System in 2010 along with projected tonnage for 2040. The weight data are not current, but the table presents the relative importance of specific segments of the Illinois system in moving freight.

**Table 1: Inbound and Outbound Freight Tonnage by Waterway**

| Waterway                   | Outbound<br>2010<br>('000) | Percent of<br>Outbound | Outbound<br>2040<br>('000) | Inbound<br>2010<br>('000) | Percent<br>of<br>Inbound | Inbound<br>2040<br>('000) | Projected<br>Growth |
|----------------------------|----------------------------|------------------------|----------------------------|---------------------------|--------------------------|---------------------------|---------------------|
| Lake/Illinois River        | 12,989                     | 12%                    | 15,123                     | 9,024                     | 52%                      | 12,115                    | 24%                 |
| Illinois/Mississippi River | 48,008                     | 46%                    | 55,152                     | 6,175                     | 36%                      | 8,289                     | 17%                 |
| Mississippi River Only     | 1,755                      | 2%                     | 1,815                      | 421                       | 2%                       | 565                       | 9%                  |
| Mississippi/Ohio River     | 41,470                     | 40%                    | 47,640                     | 1,771                     | 10%                      | 2,377                     | 16%                 |
| <b>Total</b>               | <b>104,222</b>             | <b>100%</b>            | <b>119,730</b>             | <b>17,391</b>             | <b>100%</b>              | <b>23,347</b>             | <b>18%</b>          |

Source: Transearch, 2010

The Illinois River to the Mississippi River route carries the largest total volume of freight, carrying 46% of all outbound freight and 36% of all inbound freight. The Mississippi to Ohio River route carries the next largest tonnage. Directionally, outbound freight moves both south down the Mississippi and northeast up the Ohio.

Inbound freight travels along the Illinois River from both directions, with the Lake/Illinois segment carrying 52% of all inbound tonnage and the Illinois/Mississippi segment carrying 36% of inbound freight. Overall projected growth in inbound and outbound tonnage is 18%, with the Illinois/Mississippi route projected to gain the most tonnage. However the projected growth rate for Lake/Illinois is the highest at 24%. The Illinois River is clearly an important connector for all Illinois waterborne freight, both inbound and outbound.

Intrastate freight movements were not assigned to specific routes. However, at 13.6 million tons, intrastate freight captured 10% of total Illinois freight tonnage in 2010. These internal freight

<sup>1</sup> [https://en.wikipedia.org/wiki/Illinois\\_Waterway](https://en.wikipedia.org/wiki/Illinois_Waterway)

shipments will also depend heavily on the Illinois River, as well as the Kaskaskia and other Illinois inland waterways.

### *Freight Movements within the Illinois River System*

Waterborne freight moving through Illinois accounted for 11% of the total Illinois freight volume in 2010. Although total waterborne tonnage was expected to increase by 10% between 2010 and 2040, the waterborne freight mode share was projected to fall to from 11% to 9% due to even greater growth in truck freight tonnage (Illinois Freight Mobility Plan).

Table 2 shows the tonnage and value of Illinois freight according to the FAF 4 state summary tables for Illinois. The values in Table 2 represent freight with either an origin or destination within Illinois, including intrastate (within) shipments, and therefore represent only a portion of total tonnage traveling within the Illinois Maritime System, when the Mississippi and Ohio River segments are included. The tonnage of this inland Illinois waterborne freight increased between 2012 and 2015 for each direction given, while dollar values fell slightly. However, by 2045, the value of intrastate and outbound freight is projected to nearly triple, and to be evenly divided at around 48%.

The tonnage for intrastate and outbound freight is projected to increase at a slower rate than the value, such that intrastate shipments represent only 30% of total tonnage, while capturing over 48% of the value projected for 2045. Outbound tonnage is projected to grow more slowly than intrastate, decreasing from nearly 64% in 2015 to only 55.4% of total weight by 2045. Inbound tonnage for Illinois freight is projected to increase at a greater rate than its value, representing 14.6% of all Illinois freight tonnage in 2045, but falling to just 3.3% of total value. (Table 2).

**Table 2: Illinois Waterborne Freight by Dollar Value and Weight 2012, 2015 and 2045**

| Dollar Value    | 2012          |                       | 2015            |                       | 2045           |                       |
|-----------------|---------------|-----------------------|-----------------|-----------------------|----------------|-----------------------|
|                 | \$ Millions   | Percent of Waterborne | \$ Millions     | Percent of Waterborne | \$ Millions    | Percent of Waterborne |
| <b>Within</b>   | 13,847        | 39.9%                 | 13,230          | 39.1%                 | 49,365         | 48.4%                 |
| <b>Outbound</b> | 19,328        | 55.7%                 | 18,792          | 55.5%                 | 49,194         | 48.3%                 |
| <b>Inbound</b>  | 1,549         | 4.5%                  | 1,843           | 5.4%                  | 3,377          | 3.3%                  |
| <b>Total</b>    | <b>34,724</b> | <b>100.0%</b>         | <b>33,866</b>   | <b>100.0%</b>         | <b>101,936</b> | <b>100.0%</b>         |
| Weight          | 2012          |                       | 2015            |                       | 2045           |                       |
|                 | Tons (000's)  | Percent of Waterborne | Tons(000's)     | Percent of Waterborne | Tons (000's)   | Percent of Waterborne |
| <b>Within</b>   | 6,141.2       | 23.3%                 | 6,395.5         | 22.2%                 | 12,400         | 30.0%                 |
| <b>Outbound</b> | 16,597.2      | 62.9%                 | 18,321.4        | 63.7%                 | 22,928         | 55.4%                 |
| <b>Inbound</b>  | 3,654.4       | 13.8%                 | 4,043.7         | 14.1%                 | 6,022          | 14.6%                 |
| <b>Total</b>    | <b>26,393</b> | <b>100.0%</b>         | <b>28,760.6</b> | <b>100.0%</b>         | <b>41,350</b>  | <b>100.0%</b>         |

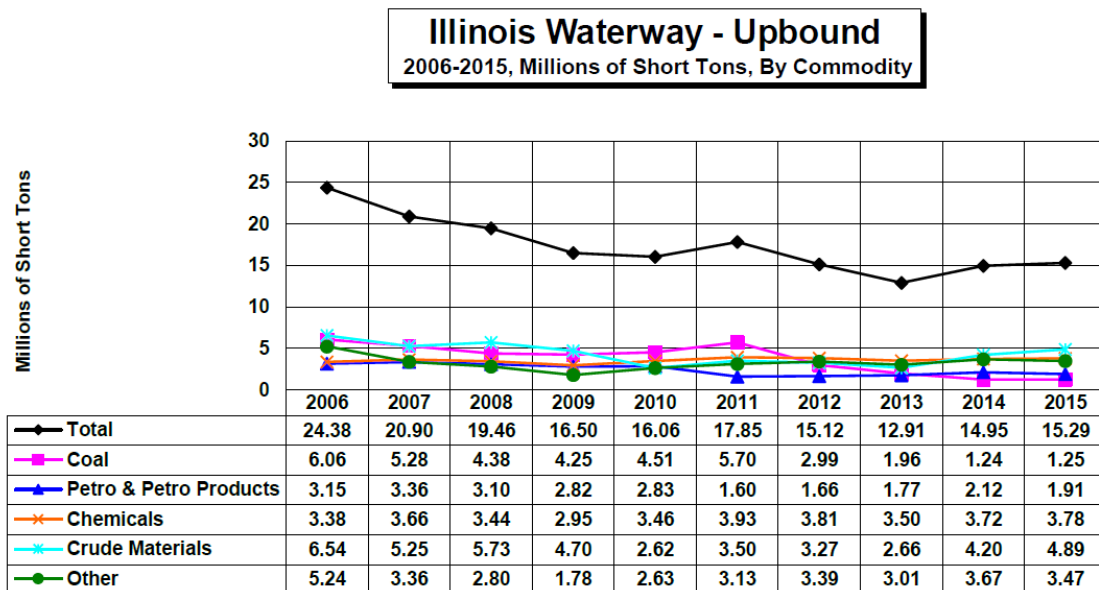
**Source: Freight Analysis Framework 4.**

\*These State Profile Tables were generated using total flows moved between domestic origins and destinations and include both domestic and foreign shipments. Foreign shipments include flows between the State of entry and the destination State for imported shipments and flows between the origin State and the State of exit for exported shipments. Modes of transportation provided in these tables are the modes used within and between domestic states.

Tables 3 and 4 show Illinois River System commodity tonnage for upbound and downbound commodities from 2006 to 2015. These data are provided by the U.S. Army Corps of Engineers through the Waterborne Commerce Statistics Center. The Army Corps utilizes a different commodity classification system from the FAF, so the data are not directly comparable between the two sources.

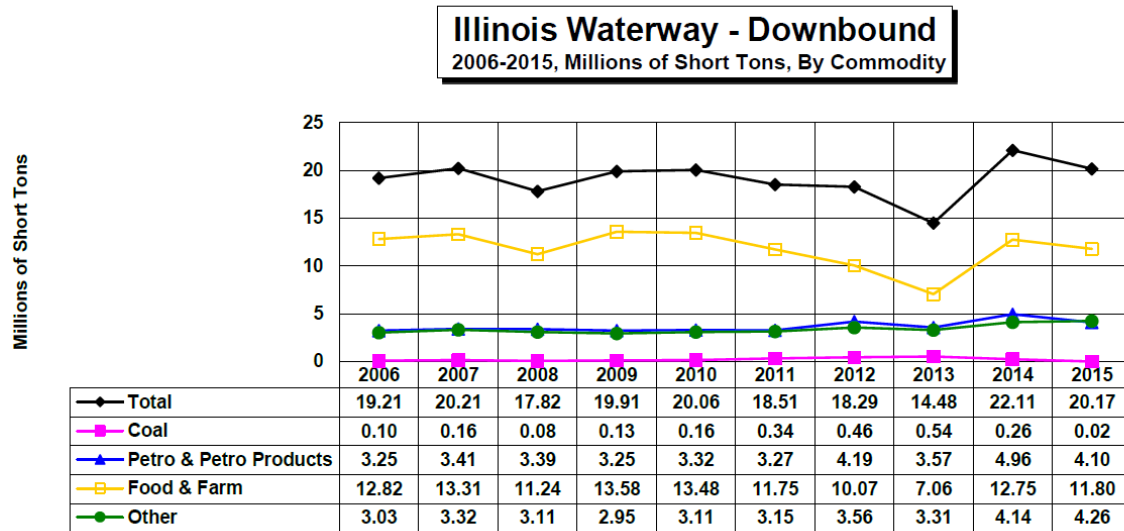
Upbound short tons totaled 15.2 million, compared with 20.17 million downbound short tons in 2015, as shown in Tables 3 and 4. Upbound commodities have fallen by about 9 million tons between 2006 and 2015, with drops in tonnage for all commodities excepting chemicals.

**Table 3: Upbound Illinois River System Commodities 2006-2015**



Source: US Army Corps of Engineers, Waterborne Commerce Statistics Center. Accessed June 2017

**Table 4: Downbound Illinois River System Commodities 2006-2015**



Source: US Army Corps of Engineers, Waterborne Commerce Statistics Center. Accessed June 2017

Not surprisingly, food and farm products are the largest commodity shipped downstream, making up over half of the total downstream tonnage. Although food and farm product tonnage has fallen between 2006 and 2015, it remains the largest commodity by volume of any other shipped in either direction.

The volume of all waterborne freight fell substantially in 2013, with a loss of around 2 million tons in upbound tonnage and another 4 million ton loss in downbound volumes. Although most commodities have rebounded since 2013, coal shipments have not. Coal volumes have fallen by 80% for both upbound and downstream shipments between 2006 and 2015.

It is important to note that the numbers presented in Tables 2, 3 and 4 represent only a portion of commodities shipped that have a direct economic impact on Illinois. The Illinois River System serves as a major connector for waterborne freight shipments originating from and destined for Illinois as well as other locations that feed into it. However this does not account for freight shipped along the Illinois portions of the Mississippi and Ohio Rivers that do not traverse the Illinois River System. These additional freight shipments have a huge impact on the Illinois economy in terms of employment, infrastructure within ports and the demand for intermodal facilities and multimodal connections with air, rail and highway transportation systems. These are factors that have a great importance to IDOT in its management role over the Illinois Maritime System. A more detailed understanding of this impact requires additional disaggregate data representing activity at the ports within the Illinois Maritime System as well as the multimodal freight network that connects to them.

### *Importance of Maritime Freight to Illinois Economy*

The U.S. Chamber of Commerce and the Waterways Council, Inc. reports that in 2013, “Waterways and ports support 48,195 Illinois jobs and directly contribute \$6.4 billion to our state’s economy.” The 6.4 billion included 3.4 billion in direct business revenues, 2.5 billion in personal income, and another

470 million in local purchases.<sup>2</sup> These impressive numbers are a direct measurement of the importance of the Illinois Maritime System to the national and global freight markets that utilize the U.S inland waterway system. Additionally, Illinois' position with respect to rail and truck modes for these markets creates an opportunity for IDOT to undertake the strategic management of a larger intermodal system.

The Illinois Maritime System retains a cost competitive advantage for lower value-to-weight goods including grain and crude materials such as gravel and sand due to the fuel economy offered by inland waterways. In 2015 Illinois ranked 8<sup>th</sup> nationally among the states in total tonnage of waterborne freight, and third in domestic tonnage (behind Louisiana and Texas).

Table 5 shows waterborne tonnage data for Illinois in 2015, as reported by the Waterborne Commerce Statistics Center. Outbound domestic shipments make up over two thirds of all tonnage moving through the Illinois Maritime System. Inbound domestic shipments make up another 19% of the total tonnage, and intrastate shipments another 8%.

**Table 5: 2015 Illinois Waterborne Freight Tonnage (000's)**

| Shipping |         | Receiving |         | Intrastate | Total         |
|----------|---------|-----------|---------|------------|---------------|
| Domestic | Foreign | Domestic  | Foreign |            |               |
| 66,212   | 86      | 18,128    | 1,947   | 7,620      | <b>93,994</b> |

Source: US Army Corps of Engineers, Waterborne Commerce Statistics Center. Accessed June 2017

Louisiana led the states in total tonnage at over 535 million tons in 2015, consisting of mostly corn and grains destined for export. Louisiana also shipped the largest tonnage to Illinois, sending over 9.8 million tons of goods, including chemicals, fertilizers, metal products, and crude materials. Table 6 shows the top six commodities sent upbound from Louisiana to Illinois, which includes 96% of the 9.88 million tons shipped.

**Table 6: Waterborne Shipments from Louisiana to Illinois**

| Commodity                                  | Tons             |
|--------------------------------------------|------------------|
| Chemical Fertilizers                       | 2,767,613        |
| Chemicals excluding Fertilizers            | 1,402,904        |
| Primary Metal Products                     | 2,208,088        |
| Sand, Gravel, Shells, Clay, Salt, and Slag | 1,736,228        |
| Petroleum Products                         | 936,480          |
| Food and Food Products                     | 414,770          |
| <b>Total</b>                               | <b>9,466,083</b> |

Source: US Army Corps of Engineers, Waterborne Commerce Statistics Center. Accessed June 2017

### *Environmental and Safety Benefits of Waterborne Freight*

The United States inland waterway system contains 12,000 miles of navigable waterways intersecting 38 states. This system carried 565 million tons of freight valued at \$214 billion in 2012 (National Waterways

<sup>2</sup> <http://waterwayscouncil.org/wp-content/uploads/2013/09/Illinois.pdf>

Foundation, 2014). “U.S. waterways transport more than 60 percent of the nation’s grain exports, about 22 percent of domestic petroleum and petroleum products and 20 percent of the coal used in electricity generation. Over the next 20 years economists estimate that inland navigation will increase by more than 35 percent” (ASCE). The strategic management of specific commodities and the growth in freight on inland waterways offers an opportunity to reduce road congestion and lower shipping costs within the intermodal freight system.

Additional benefits if the inland waterway system include cost savings due to fuel efficiency, reduced emissions and safety. Tables 7-12 are data provided by a 2017 report from the Texas A&M Transportation Institute giving a detailed comparison between freight modes in the United States. Railroad and Truck modes are compared with Inland Towing (Texas A&M).

Table 7 shows the estimated ton-miles/gallon by mode. Inland towing (barges) achieved 35% more ton-miles per gallon than railroad, and over four times the ton-miles of trucks in 2014.

**Table 7: Fuel Efficiency by Mode (2014)**

| Mode          | Ton-Miles/Gallon |
|---------------|------------------|
| Inland Towing | 647              |
| Railroads     | 477              |
| Trucks        | 145              |

Table 8 shows a summary of emissions in grams/ton-mile for each mode. Railroads and Inland Towing have comparably low emissions, although Inland Towing is lower. Trucking produces emissions at a scale of five-to eight times that of the other two modes, and up to ten times that of Inland Towing for CO<sub>2</sub>.

**Table 8: Emission Comparisons by Mode, 2014**

| Emissions (grams/ton-mile) |                           |       |                 |       |                 |
|----------------------------|---------------------------|-------|-----------------|-------|-----------------|
|                            | HC<br>(VOC for<br>trucks) | CO    | NO <sub>x</sub> | PM    | CO <sub>2</sub> |
| <b>Inland Towing</b>       | 0.009                     | 0.041 | 0.209           | 0.006 | 15.62           |
| <b>Railroads</b>           | 0.013                     | 0.056 | 0.283           | 0.008 | 21.19           |
| <b>Trucks</b>              | 0.080                     | 0.270 | 0.940           | 0.050 | 154.08          |

Table 9 shows the estimated Ton-Miles/Metric Ton of Greenhouse Gases emitted by each mode in 2014. Similar to fuel efficiency, Inland Towing achieves about 35% more Ton-Miles per Metric-Ton of GHG emitted than Railroads as a mode, and about ten times that of the Truck mode.

**Table 9: Ton-Miles per Metric Ton of GHG by Mode, 2014**

| Mode          | Ton-Miles/Metric<br>Ton GHG |
|---------------|-----------------------------|
| Inland Towing | 64,034                      |
| Railroads     | 47,029                      |
| Trucks        | 6,490                       |

Table 10 shows fatalities by mode and Table 11 injuries by mode between 2001 and 2014. Trucking activity causes over 6500 times the injuries and 700 times the fatalities occurring due to inland towing activity on average. The railroad freight mode has nearly 500 times the average annual injuries and over 130 times the average annual fatalities of inland towing.

Table 12 shows gallons of spilled hazmat per million ton-miles for each mode between 2001 and 2014. Railroads and trucks are about even at approximately 6 gallons spilled per million ton-miles. Inland towing activity has about one third of that, at 2.12 gallons spilled per million ton-miles.

**Table 10: Fatalities by Mode 2001-2014**

| Mode          | Annual Ton-miles*<br>(million) | Total Fatalities |          |
|---------------|--------------------------------|------------------|----------|
|               |                                | Annual Average*  | Rate**   |
| Trucks        | 2,552,197                      | 4,452            | 0.001744 |
| Railroads     | 1,677,800                      | 807              | 0.000481 |
| Inland Towing | 272,600                        | 6                | 0.000022 |

\*14-year average \*\* Per Million Ton-Miles

**Table 11: Injuries by Mode 2001-2014**

| Mode          | Annual Ton-miles*<br>(million) | Total Injuries  |          |
|---------------|--------------------------------|-----------------|----------|
|               |                                | Annual Average* | Rate**   |
| Trucks        | 2,552,197                      | 104,286         | 0.040861 |
| Railroads     | 1,677,800                      | 7,962           | 0.004746 |
| Inland Towing | 272,600                        | 16              | 0.000059 |

\*14-year average \*\* Per Million Ton-Miles

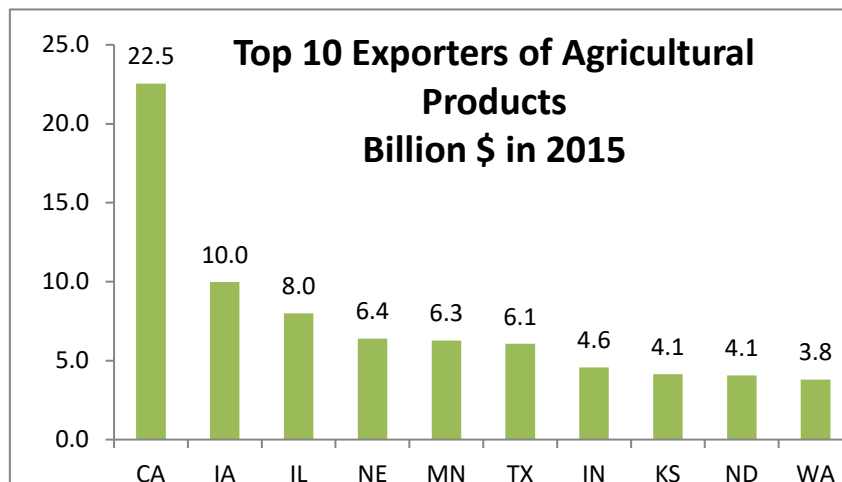
**Table 12: Hazmat Spills in Gallons per Million Ton-Miles 2001-2014**

| Mode          | Gallons per Million Hazmat Ton-Miles |
|---------------|--------------------------------------|
| Inland Towing | 2.12                                 |
| Railroads     | 5.95                                 |
| Trucks        | 6.04                                 |

## Agricultural Exports and the Illinois Maritime System

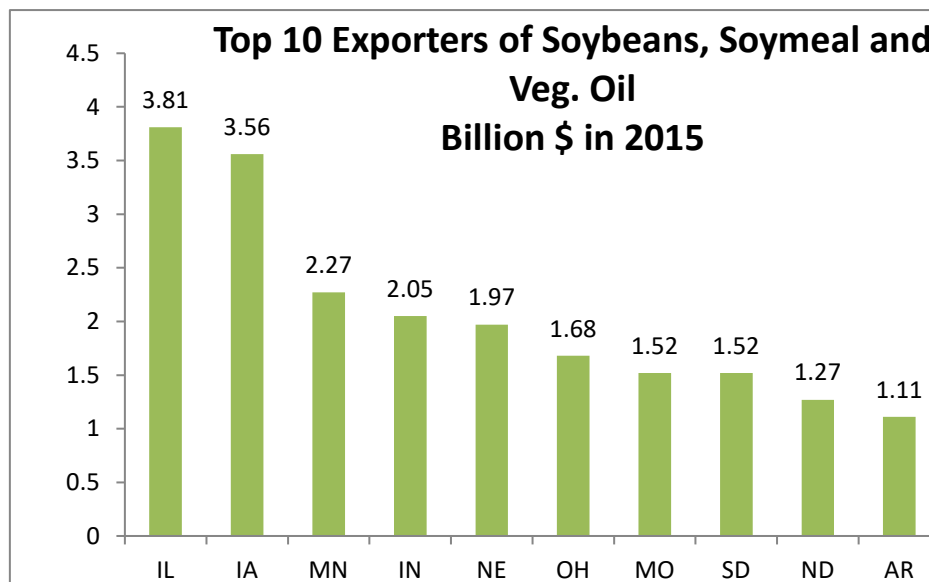
Over 60% of the U.S. grain exports are carried on the nation's inland waterways, as stated above, and Illinois is second only to Iowa in the top state exporters of grain. Figures 1-3 show the leading state exporters of agricultural products, soybeans and grain products. Illinois was the third largest exporter of agricultural products valued at 8 billion dollars in 2015. Over 3.8 billion in Illinois exports were soybean products, and another 3.25 billion were corn and grain products. Illinois was the nation's top exporter of soybeans, soymeal and vegetable oil in 2015.

**Figure 1: Top U.S. State Exporters of Agricultural Products**



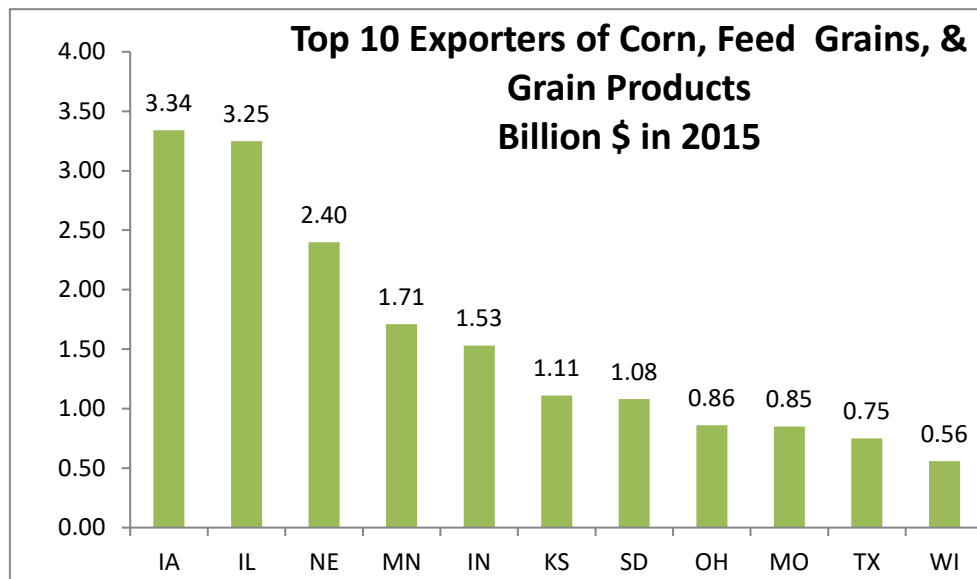
Source: USDA Economic Research Service; USDA Foreign Agricultural Service (Global Agricultural Trade System). May 2017

**Figure 2: Top U.S. State Exporters of Soybeans and Soymeal and Vegetable Oil**



Source: USDA Economic Research Service; USDA Foreign Agricultural Service (Global Agricultural Trade System). May 2017

**Figure 3: Top U.S. State Exporters of Corn, Feed Grains and Grain Products<sup>3</sup>**



Source: USDA Economic Research Service; USDA Foreign Agricultural Service (Global Agricultural Trade System). May 2017

Soybeans moving downstream by barge along the Upper Mississippi River and Illinois River primarily originate in four states: Illinois, Iowa, Minnesota, and Missouri. As a leading agricultural crop, the value (in billions) of soybean production in each of these four states is shown below in Table 13. Tables 14 and 15 show the mode split and the domestic/export ratios for soybeans shipped by these top four states (Horinko Group).

**Table 13: Value in Billions of Waterborne Soybeans: Upper Mississippi and Illinois Rivers**

|                  | <u>2009/2010</u> | <u>2011/2012</u> |
|------------------|------------------|------------------|
| <b>Illinois</b>  | \$4.22           | \$4.96           |
| <b>Iowa</b>      | \$4.63           | \$5.50           |
| <b>Minnesota</b> | \$2.67           | \$3.11           |
| <b>Missouri</b>  | \$2.22           | \$2.26           |

Again, these four key soybean producing states illustrate the importance of inland waterways to soybean growers. The 2009/2010 soybean transportation volume (in tons) among barge, rail, and truck/container is shown in Table 14.

**Table 14: Soybean Volumes by Mode**

|                  | <u>Barge</u> | <u>Rail</u> | <u>Container</u> | <u>Total</u>     |
|------------------|--------------|-------------|------------------|------------------|
| <b>Illinois</b>  | 5,765,149    | 1,683,044   | 1,157,520        | <b>8,605,713</b> |
| <b>Iowa</b>      | 1,698,444    | 1,895,893   | 19,320           | <b>3,613,657</b> |
| <b>Minnesota</b> | 1,363,696    | 3,771,786   | 13,980           | <b>5,149,462</b> |
| <b>Missouri</b>  | 2,362,163    | 1,068,777   | 14,550           | <b>3,445,490</b> |

<sup>3</sup> <https://apps.fas.usda.gov/gats/>

Soybeans shipped on inland waterways are bound for some domestic markets, but primarily for export markets. More than 90 percent of the soybean barge movements on U.S. inland waterways is destined for Gulf ports for export to foreign markets, notably China, Europe, and Japan. Less than ten percent of barge movements are used for domestic soybean placement. The typical percentage of soybeans moved by barge to export and domestic positions from these key four states are shown in Table 15:

**Table 15: Export and Domestic Soybean Shipments Over Inland Waterways**

|                  | <u>Export</u> | <u>Domestic</u> |
|------------------|---------------|-----------------|
| <b>Illinois</b>  | 93%           | 7%              |
| <b>Iowa</b>      | 91%           | 9%              |
| <b>Minnesota</b> | 91%           | 9%              |
| <b>Missouri</b>  | 96%           | 4%              |

The chief destinations for U.S. agricultural exports in 2016 are listed in Table 16. North and South America are the chief importers of U. S agricultural exports, with Asia as the second largest importer in 2016. Together these two destinations account for 93.7% of all U.S. agricultural exports.

**Table 16: Geographic Distribution of US Agricultural Exports (2016) \$137 Billion<sup>4</sup>**

|                                  |       |
|----------------------------------|-------|
| Asia                             | 42.2% |
| N/S America                      | 51.5% |
| Europe                           | 12.8% |
| Africa, Middle East, and Oceania | 7.6%  |

<sup>4</sup>Source: United States Department of Agriculture

Figure 4 shows U.S. soybean exports to the world and China in millions of bushels for 2016. There is a dip in 2013, as previously observed, but otherwise soybean exports have been steadily growing, with China accounting for a nearly two thirds share in 2013/2014. That share has fallen, since China's imports have remained fairly constant while U.S. soybean exports to the world has increased by about 30% since 2013.

<sup>4</sup> <http://usda.mannlib.cornell.edu/usda/current/AES/AES-05-25-2017.pdf>

Figure 4: U.S. Soybean Exports to the World and China 2001-2016<sup>5</sup>



### *Comparative Economic Advantage from US Inland Waterway System*

The United States currently enjoys a competitive advantage in shipments to China due to our inland waterway system. It currently costs \$85.19 to transport one metric ton of soybeans from Davenport, Iowa to Shanghai, China, versus \$141.73 from North Mato Grosso, Brazil, to Shanghai. However, Brazil is planning to invest \$26 billion to modernize its ports and waterways, which will make Brazil's soybeans cheaper to move. Without much needed investment U.S. infrastructure continues to become less reliable and efficient, and our competitive advantage is at risk.

US, Argentina and Brazil account for 88% of world soybean exports and 73% of world corn exports. A USDA June 2016 study of competitiveness of corn and soybean exports found that the US had lowest production costs and total shipping costs (including marketing, handling and transporting) for corn. US had lowest total costs for soybean production and shipping except for one State in Brazil, which was balanced out by much "larger production from the US Heartland." (e.g. including IL).<sup>6</sup>

Our continued advantage in the global market depends on our making the necessary investments in infrastructure, including our inland waterways. Again, this will require the strategic management of an intermodal freight network.

<sup>5</sup> <https://www.iowafarmbureau.com/Article/File/get?path=Files%2Farticle-89866%2FSOYBEAN%20PROD%20EXPORTS-%2010062016%20.pdf>

<sup>6</sup> [www.ers.usda.gov/publications/eib-economic-information-bulleting/eib-154](http://www.ers.usda.gov/publications/eib-economic-information-bulleting/eib-154)

## Key Components of the Illinois Maritime Transportation System

### *Maritime Highways in Illinois/M-35, M-55, M-70 and M-90 Marine Highway Corridors*

The America's Marine Highway Program is a Department of Transportation-led program to expand the use of our Nation's navigable waterways to relieve landside congestion, reduce air emissions, provide new transportation options, and generate other public benefits by increasing the efficiency of the surface transportation system.

It was established by Section 1121 of the Energy Independence and Security Act of 2007. Section 405 of the Coast Guard and Maritime Transportation Act of 2012 further expanded the scope of the program beyond reducing landside congestion to efforts that increased the utilization or efficiency of domestic freight or passenger transportation on Marine Highway Routes between U.S. ports.<sup>7</sup> The National Defense Authorization Act for Fiscal Year 2016 added to the definition of short sea shipping to include cargo shipped in discrete units or packages that are handled individually, palletized or unitized for purposes of transportation; or freight vehicles carried aboard commuter ferryboats<sup>8</sup>.

The Marine Highway system currently includes 26 all-water Marine Highway Routes that serve as extensions of the surface transportation system, as shown in Figure 5. The Secretary of Transportation designates these Routes because they can offer relief to landside corridors that suffer from traffic congestion, excessive air emissions or other environmental concerns and challenges or provide new transportation options.<sup>9</sup>

Illinois is part of several corridors that provide regional and global access: M35/M-55, which includes the Mississippi and Illinois Rivers, from New Orleans to Chicago; and M-70, which includes the Mississippi, Missouri and Ohio Rivers, from Kansas City to Pittsburgh. The M-55 corridor was selected to address congestion on I-55; M-70 will provide additional support for travel along I-70. In addition, the M90 Corridor was identified to capture containerized freight moving along the eastern border of Wisconsin via Lake Michigan and into Chicago. The ports of Marinette, Manitowoc, Green Bay and Milwaukee as well as the Port of Chicago at the Illinois International Port District are serviced by this corridor. This corridor is driven by the large volume of containers moving between Chicago and the Fox Valley and Green Bay areas, which has produced significant congestion on I41 and I94. It is important to note that the Port of Milwaukee can run barges to Chicago and points south for the entire year, circumventing the seasonal limitations of much of the Great Lakes.

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<sup>7</sup> [Coast Guard and Maritime Transportation Act of 2012](#)

<sup>8</sup> [The National Defense Authorization Act for Fiscal Year 2016](#)

<sup>9</sup> <https://www.marad.dot.gov/ships-and-shipping/dot-maritime-administration-americas-marine-highway-program/>

Figure 5: The Marine Highway System<sup>10</sup>



Source: MARAD: United States Department of Transportation Maritime Administration

### *Impact of Panama Canal*

In addition to the Marine Highway activity, there are other initiatives related to waterways that will affect Illinois waters and economic activity. The most significant is the expansion of the Panama Canal, which built larger locks to accommodate ocean vessels, and is likely to bring more activity to the Mississippi River. The US Army Corp of Engineers released a study in June 2012 that noted the potential for grain exports, because of the expansion project (Institute for Water Resources).

The Panama Canal Authority's new set of locks on the Panama Canal, will allow the canal to handle ships with nominal capacities of up to 12,600 TEU's (twenty-foot equivalent units); which is more than double the previous maximum capacity of 4,800 TEUs. Even though ocean vessels do not traverse the inland waterways, it is anticipated their increased capacity will allow additional imports and exports if the ports and lock and dam system can handle the increased demand. The Soybean Council has stated, "The expansion of the Panama Canal has the potential to increase the commercial viability of the U.S. inland waterway system—provided that we make prudent investments in our ports and lock and dam inventory. Our research predicts that grain and oilseeds transiting the Panama Canal will increase 30 percent by 2020/21. After the canal expansion, ocean vessels will be able to accommodate up to 13,300 additional metric tons of soybeans (approximately 500,000 bushels) per voyage, which amounts to an additional \$6 million in cargo value (American Society of Civil Engineers)." The larger vessels could

<sup>10</sup> <https://www.marad.dot.gov/ships-and-shipping/dot-maritime-administration-americas-marine-highway-program/>

dominate world trade and are expected to represent 62 percent of total container ship capacity by 2030. Illinois, as one of the largest soybean exporters in the US could benefit from that expansion (Institute for Water Resources).

### *Great Lakes Shipping*

The Maritime Transportation System in the Great Lakes-St. Lawrence River Basin is home to globally significant agricultural and manufacturing centers as well as significant mineral deposits including iron, zinc, silver, coal, copper, lead and limestone. The mining of these resources is commercially feasible in large part due to the proximity and cost-effectiveness of water-borne transportation. In many cases, water-based transportation is the only cost-effective way to move materials from mine to market – there are no substitute paths for many materials that are largely moving from north to south across the region (Conference of Great Lakes and St. Lawrence Governors and Premiers).

The Great Lakes-St. Lawrence River Basin provides access to a market of more than 100 million consumers across eight US States and two Canadian Provinces, which together account for 30% of US and Canadian economic activity amounting to about US \$5.8 trillion in 2014. Moreover, the Maritime Transportation System in the Basin has the capacity to greatly expand cargo flows. The St. Lawrence Seaway system, for example, is estimated to use only about 50% of its full capacity, while many Great Lakes ports such as Cleveland and Chicago have similarly significant capacity available.

Despite its utility, the Great Lakes have historically been a seasonal system that has not allowed for year-round navigability due to ice cover. Shipping on the Great Lakes has therefore been dominated by a narrow set of bulk commodities, which inhibits the development of multi-modal logistics operations and economic clusters in the Great Lakes. By contrast, the sections of the Great Lakes-St. Lawrence River Basin which are open year-round have developed a diverse and relatively stable cargo base across multimodal corridors. Table 17 shows the tonnage by Great Lakes states for 2011 and 2015. This shows an increase in tonnage. Table 18 shows the tonnage for Great Lakes Ports for the same two years, revealing both gains and losses among the various ports.

Waterborne commerce on the Great lakes including Illinois is concentrated in a small number of bulk commodities such as taconite, coal, grain, cement and aggregates. Flows of these commodities, in particular coal, have been declining or remaining static. If waterborne transportation is to prosper and boost regional competitiveness, it needs to increase commodity flows while diversifying cargoes.. In many ways, the Great Lakes-St. Lawrence River Basin is well positioned to take on these challenges but will need to overcome a number of structural, institutional and cultural challenges to accomplish this.

Building new markets for the waterborne transportation system will require a series of strategic actions, especially improving opportunities for waterborne shipments, and developing a coordinated regional marketing plan for promoting maritime commerce and related activity. Project cargoes such as wind turbines represent a recent success story and future opportunities could include things like food products, cars and other finished goods.

**Table 17: 2015 and 2011 Waterborne Tonnage by Great Lakes States (In Units of 1000 Tons)**

| State        | 2015 Totals    | 2011 Totals    |
|--------------|----------------|----------------|
| <b>Total</b> | <b>476,835</b> | <b>534,845</b> |
| Illinois     | 93,994         | 109,663        |
| Indiana      | 66,196         | 67,442         |
| Michigan     | 58,752         | 61,851         |
| Minnesota    | 39,710         | 43,109         |
| New York     | 38,694         | 42,923         |
| Ohio         | 83,719         | 95,518         |
| Pennsylvania | 62,088         | 82,297         |
| Wisconsin    | 33,682         | 32,042         |

Source: US Army Corps of Engineers, Waterborne Commerce Statistics Center. Accessed June 2017

**Table 18: Waterborne Tonnage for Top Ten Great Lakes Ports 2011 and 2015**

| Waterborne Tonnage (short tons) 2015, 2011 |            |            |                |
|--------------------------------------------|------------|------------|----------------|
| Port Name                                  | 2015 Total | 2011 Total | Percent Change |
| Duluth-Superior, MN & WI                   | 33,326,718 | 35,081,473 | -5.0%          |
| Chicago, IL                                | 16,736,279 | 20,351,240 | -17.8%         |
| Two Harbors, MN                            | 15,780,429 | 15,630,264 | 1.0%           |
| Cleveland, OH                              | 13,697,162 | 11,573,531 | 18.3%          |
| Detroit, MI                                | 13,285,147 | 13,738,737 | -3.3%          |
| Indiana Harbor, IN                         | 11,617,126 | 11,977,265 | -3.0%          |
| Burns Waterway Harbor, IN                  | 8,949,771  | 8,281,274  | 8.1%           |
| Toledo, OH                                 | 8,495,498  | 11,127,950 | -23.7%         |
| Mount Vernon, IN                           | 8,375,192  | 5,993,122  | 39.7%          |
| Gary, IN                                   | 7,825,034  | 9,723,094  | -19.5%         |

Source: US Army Corps of Engineers, Waterborne Commerce Statistics Center. Accessed June 2017

### ***Short Sea Shipping/"Container on Barge Shipping"***

The US Department of Transportation Marine Administration (MARAD) recognized the value of coast-wise and inland waterway transportation by designating "Short Sea Shipping"—the movement of freight by water over short distances—as an integral part of the "marine highways system". Great Lakes ports have available capacity to move freight and short sea transportation can help alleviate

highway and rail congestion. Roll on-roll off (RORO) vessels that seamlessly transport trucks over short distances by ship are successfully being used in many areas of the world and represent a particularly attractive option to grow short sea shipping while reducing freight's environmental footprint.

Short sea shipping for “non-traditional” cargoes needs a regional approach to development of infrastructure and marketing. State and Provincial transportation agencies will need to collaboratively develop a regional short sea shipping plan. This planning should explore the costs and benefits (economic and environmental) of short sea shipping options around highway, rail and border crossing congestion points. Within this larger regional planning process and broader sub-regional plans, multi-jurisdictional teams will need to evaluate the development of specific short sea shipping routes in conjunction private partners, local and federal governments (Conference of Great Lakes and St. Lawrence Governors and Premiers). For example: WI has recently embarked on a multi-year, multi-agency “Wisconsin Commercial Ports Development Initiative.” The most recent CFIRE report, “Identification and Development of Wisconsin Port Market Scenarios”, identified commodities, companies and economic opportunities for increased use of Lake Michigan to ship commodities and some industrial goods from Wisconsin ports south to Chicago and other Great Lakes Ports thus reducing congestion on I41 and I94

### *Challenges to Great Lakes Shipping from Invasive Species*

In addition, the Corp is studying methods to control the spread of invasive aquatic species into the Great Lakes water basin. There is concern that the Illinois River will provide a channel for non- native aquatic life to gain access to the Great Lakes. Controlling this access may impact river barge traffic. The challenge facing the US and Canada is preventing the invasive species from decimating the Great Lakes fishing and recreational industry without causing irreparable damage to the \$20 billion commercial freight industry that relies on access to and from the Great Lakes. For example, more than 15,000 jobs in Illinois and Indiana alone rely on the Brandon Road Lock near Joliet so that strategies to control invasive species will need to be carefully evaluated to avoid disrupting commercial activity on the Chicago Area Waterway System and harm the local, regional and ultimately the national economy.

The full effects and consequences of aquatic invasive species on recreational and fishing activities could take decades to emerge. The Binational Ecological Risk Assessment of Bigheaded Carps (DFO, 2012) determined that following the arrival of Asian carps, it would take seven years for the impacts to be realized. Fisheries and Oceans Canada used this information to conduct a Socio-Economic Impact Assessment (DFO, 2014) to better understand the impacts of an Asian carp establishment in the Great Lakes. The study uses 2011 as the base year, and an adjusted base of 2018 from which to consider the 20 year and 50 year impacts. Table 19 shows the estimated costs by activity.

**Table 19: Estimated Values of Affected Activities in the Great Lakes in 20 and 50 Years**

| <b>List of Activities</b>    | <b>Base Year<br/>of 2018<br/>(\$Million)</b> | <b>20 Years<br/>(\$Billion)</b> | <b>50 Years<br/>(\$Billion)</b> |
|------------------------------|----------------------------------------------|---------------------------------|---------------------------------|
| Commercial Fishing           | \$250                                        | \$5.50                          | \$11                            |
| Recreational Fishing         | \$670                                        | \$14                            | \$31                            |
| Recreational Boating         | \$8,749                                      | \$184                           | \$400                           |
| Wildlife Viewing             | \$248                                        | \$5.50                          | \$11                            |
| Beaches and Lakefront<br>Use | \$273                                        | \$5.50                          | \$12                            |
| <b>Total</b>                 | <b>\$10,190</b>                              | <b>\$214.50</b>                 | <b>\$465</b>                    |

Source: Fisheries and Oceans Canada staff calculation, Policy and Economics, Central and Arctic Region May 2017

The Asian Carp Regional Coordinating Committee’s (ACRCC) 2017 Action Plan identified over 60 high-priority strategic activities planned for implementation in the coming year. The Action Plan serves as a foundation for the work of the ACRCC partnership — a collaboration of 27 U.S. and Canadian federal, state, provincial, and local agencies and organizations — to achieve its mission of preventing the introduction and establishment of Asian carp in the Great Lakes

Developed annually since 2010, the Action Plan, formerly titled the Asian Carp Control Strategy Framework, has evolved to incorporate advances in the scientific body of knowledge on Asian carp population status, life history, and risk; and the latest developments in detection, prevention, and control capabilities. The 2017 Action Plan builds upon prior Asian carp strategies by applying “lessons learned” and using an adaptive management approach. Many of these actions target a specific Asian carp behavior or life stage to achieve the maximum collective impact on fish populations. These actions are intended to dramatically reduce the Asian carp populations at locations near the electric barrier, resulting in a reduced threat of dispersal towards the Great Lakes.

A significant addition to the ACRCC’s strategic approach in 2016 and carried forward in 2017 is new interagency contingency response plans developed specifically for potential rapid-response in the event of new detections of Asian carp of all life stages in upstream navigation pools and other select locations in the Illinois Waterway and Chicago Area Waterway System (CAWS).

The 2016 efforts by the ACRCC and the Illinois Department of Natural Resources led to the removal of over one million pounds of Asian carp from the upper Illinois River in 2016 and were successful in keeping the invasive species away from the electric barrier system and out of Lake Michigan. The 2017 Action Plan contains specific projects that support these new contingency plans, as well as activities identified in the Monitoring and Response Plan (MRP). Immediate actions to address any potential threat will be taken as direct in the contingency plan. This year \$17 million of Great Lakes Restoration Initiative funding, in addition to more than \$25 million of federal agency base funding, has been

allocated to implement key projects and initiatives to safeguard the Great Lakes from invasive species. Some aspects of the 2017 Action Plan recommendations were put on hold by the US Army Corps of Engineers in February 2017 pending an economic review.

### ***Locks and Dams***

Navigation on the four major rivers in the state is controlled by a series of locks and dams. There are 15 lock and dam structures along the Mississippi River. The Illinois River and canal system have eight lock and dam facilities; on the Ohio River, along the Illinois border with Kentucky, there are currently three lock and dam structures. The final lock and dam in the state is on the Kaskaskia River, in Modoc.

Table 20 is a listing of all the lock and dam facilities in the State. Figure 6 depicts Illinois' navigable waterways and locks and dams.

**Table 20: Lock and Dam Facilities on Navigable Rivers in Illinois**

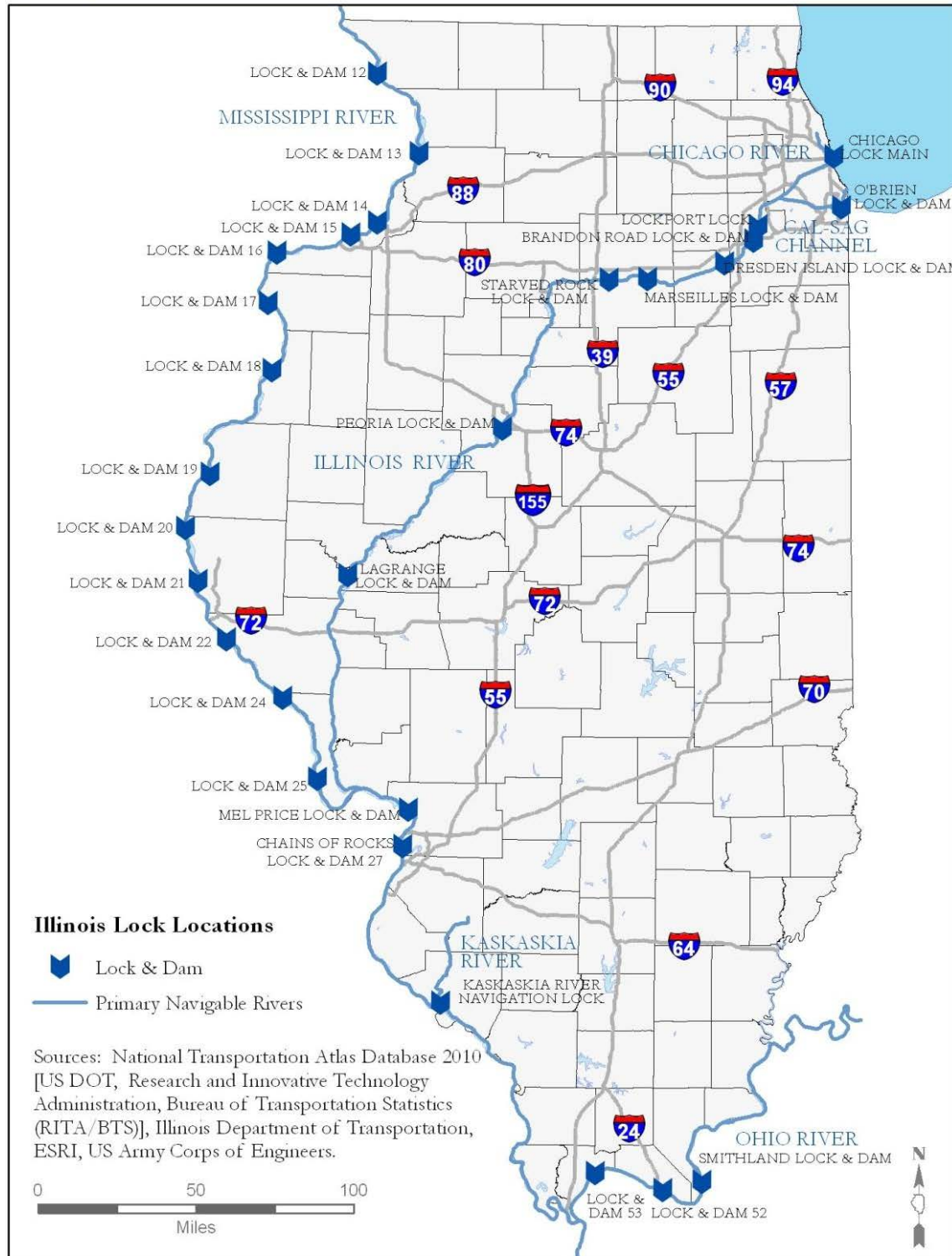
| <b>Name</b>                                                                    | <b>Location [River Bank]</b> | <b>River Milepoint</b> | <b>Corp District</b> |
|--------------------------------------------------------------------------------|------------------------------|------------------------|----------------------|
| <b>[Upper] Mississippi River</b>                                               |                              |                        |                      |
| 12                                                                             | Bellevue, Iowa [R]           | 567                    | Rock Island          |
| 13                                                                             | Fulton, Illinois [L]         | 522                    | Rock Island          |
| 14                                                                             | Pleasant Valley, Iowa [R]    | 493                    | Rock Island          |
| 15                                                                             | Rock Island, Illinois [L]    | 483                    | Rock Island          |
| 16                                                                             | Illinois City, Illinois [L]  | 457                    | Rock Island          |
| 17                                                                             | New Boston, Illinois [L]     | 437                    | Rock Island          |
| 18                                                                             | Gladstone, Illinois [L]      | 410                    | Rock Island          |
| 19*                                                                            | Keokuk, Iowa [R]             | 364                    | Rock Island          |
| 20                                                                             | Canton, Missouri [R]         | 343                    | Rock Island          |
| 21                                                                             | Quincy, Illinois [L]         | 325                    | Rock Island          |
| 22                                                                             | New London, Missouri [R]     | 301                    | Rock Island          |
| 24                                                                             | Clarksville, Missouri [R]    | 273                    | St. Louis            |
| 25                                                                             | Winfield, Missouri [R]       | 241                    | St. Louis            |
| Melvin Price*                                                                  | Alton, Illinois [L]          | 201                    | St. Louis            |
| Chain of Rocks / 27                                                            | Granite City, Illinois [L]   | 185.5                  | St. Louis            |
| <b>Illinois River and Canal System: River Milepoint from Grafton, Illinois</b> |                              |                        |                      |
| Chicago Harbor                                                                 | Chicago [R]                  | 327 [Main]             | Chicago              |
| T.J. O'Brien                                                                   | Chicago [R]                  | 327 [South]            | Rock Island          |
| Lockport                                                                       | Lockport [L]                 | 291                    | Rock Island          |
| Brandon Road                                                                   | Joliet [R]                   | 286                    | Rock Island          |
| Dresden Island                                                                 | Morris [L]                   | 272                    | Rock Island          |
| Marseille [Lock]                                                               | Marseilles [L]               | 245                    | Rock Island          |
| Starved Rock                                                                   | Ottawa [R]                   | 231                    | Rock Island          |
| Peoria                                                                         | Creve Coeur [L]              | 158                    | Rock Island          |
| LaGrange                                                                       | Versailles [R]               | 80                     | Rock Island          |
| <b>Ohio River: River Milepoint from Pittsburgh Point</b>                       |                              |                        |                      |
| Smithland                                                                      | Hamletsburg [L]              | 919                    | Louisville           |
| 52                                                                             | Brookport [R]                | 939                    | Louisville           |
| 53                                                                             | Grand Chain [R]              | 963                    | Louisville           |
| <b>Kaskaskia River</b>                                                         |                              |                        |                      |
| Kaskaskia                                                                      | Modoc [R]                    | 0.8                    | St. Louis            |

\*Main lock length = 1,200 feet

River milepoints run north/east to south/west

Source: US Army Corps of Engineers, various websites

**Figure 6: Locks and Dams of Illinois River System**



Illinois operates state-owned locks and dams and other water control facilities.

All locks and dams on the four rivers are operated and maintained by the Corps. Five of the dams on the Illinois River (Brandon Rd, Dresden, Lockport, Marseilles and Starved Rock) are operated and maintained by the Corps. On the Upper Mississippi River, Locks 12 through 22 are managed by the Rock Island District. The Rock Island District also operates and manages all locks on the Illinois River and canal system, except for the Chicago Harbor, which is under the Chicago District. On the Mississippi, Locks 24 through 27 are under the purview of the St. Louis District, which also is responsible for the Kaskaskia Lock and Dam. The three Ohio River lock and dam facilities are managed by the Louisville District.

### **Mississippi River**

The U.S. Army Corps of Engineers (USACE) operates and maintains 580 miles of the Upper Mississippi River on Illinois's western border. The nine-foot Channel Navigation Project extends down the Upper Mississippi River from Minneapolis-St. Paul, Minnesota to its confluence with the Ohio River and includes 38 locks in Illinois, Iowa, Minnesota, Missouri and Wisconsin. The system's 600-foot locks do not accommodate today's modern fifteen barge 1,200-foot long tows without having to split the load and pass through the lock in two lockages. This procedure requires uncoupling barges at midpoint, which triples the time needed to lock the 15-barge tow and increases accident rates among deckhands.

More than 580 manufacturing facilities, terminals and docks ship and receive cargo on the Upper Mississippi River basin. In 2015, the system moved more than 316 million tons of commercial cargo worth roughly \$50 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group.

### **Illinois River Waterway**

There are eight locks on the Illinois River System, all of which were built in the 1930s. USACE operates 327 miles of the Illinois River Waterway flowing from the T.J. O'Brien Lock in Chicago to the Mississippi River at Grafton, Ill. Although the Illinois River makes up the largest section of the Illinois River Waterway, it is also made up of segments of the Des Plaines River, Chicago Sanitary and Ship Canal, Cal-Sag Channel, Little Calumet River and Calumet River. The Chicago Sanitary and Ship Canal connects to the Lake Michigan docks, which allows deep-draft ships to offload and receive commodities.

### **Ohio River**

The Ohio River, which borders the southern portion of the state, flows into the Mississippi River at the southernmost tip of the state. Shippers relying on the Ohio River System (ORS) saved more than \$2 billion in transportation costs compared to overland transportation. These savings resulted in more than \$11 billion in additional national output, which provided approximately 100,000 jobs and \$3 billion in income. However, there are significant maintenance and rehabilitation needs along this route. There are three Illinois locks on the Ohio River. Opened in 1980, the Smithland Lock is 1,200 feet long.

The outdated Locks 52 and 53 and associated wicket dams are currently being replaced by the 1,200-foot Olmsted Locks and Dam, currently estimated to cost \$3.1 billion, with completion currently scheduled for 2018. This location is one of the most crucial points in the nation's navigation system – the hub of the inland waterways navigation system. On an annual basis, approximately 90 million tons of waterborne commerce passes through this area.

## The Great Lakes

The Chicago Harbor Lock is one of the busiest locks in the nation with more than 11,000 annual lockages over the past decade. Approximately 34,000 commercial and recreational boats pass through the lock annually. The lock allows safe passage of boats navigating the two-to five-foot water level difference between Lake Michigan and the Chicago River and enables Illinois to comply with the Supreme Court decree restricting the amount of water that can be diverted from Lake Michigan into the Chicago River. The lock also serves as a flood risk management structure with gates that reliably open when needed to prevent flooding of downtown Chicago from Chicago River overbank flooding.

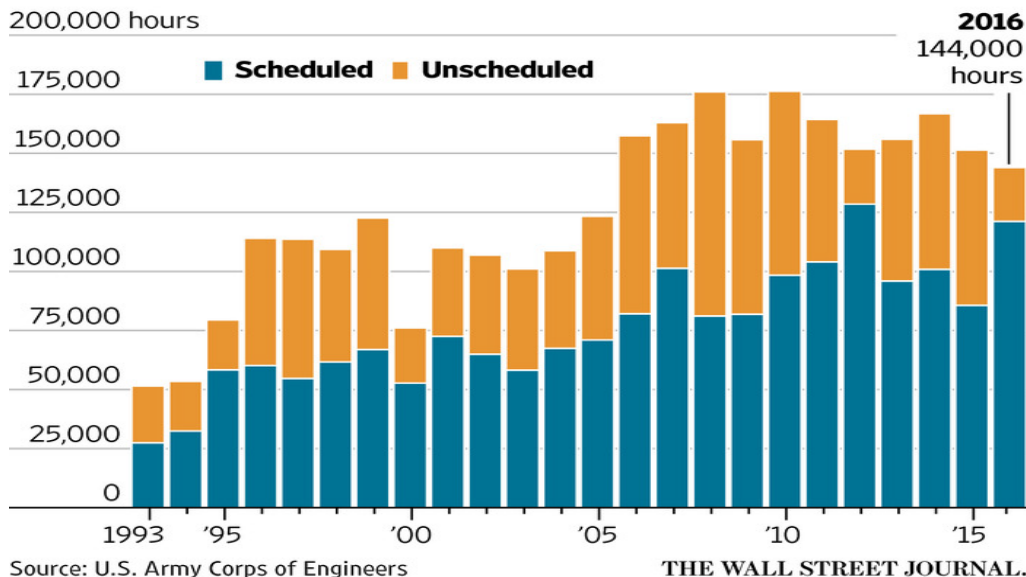
## Current Capacity and Condition

Most of the locks and dams along the Illinois, Mississippi and Ohio rivers were built in the 1930s with a 50-year design life. These locks and dams are now in significant need of rehabilitation and repair.

A total of 90 percent of locks and dams on the U.S. inland waterway system experienced some type of unscheduled delay in 2009. In September 2012, Lock 27 failed and was closed for 5 days due to low water levels. This closure stranded 63 tows (455 barges) at a cost of \$2.8 million/day. Shippers estimated that to offload “stranded” product: would have required 6,100 railcars, or 26,400 trucks. Figure 7 summarizes the increased delays due to lock closures for the Ohio River, Illinois Rivers and the Upper Mississippi River. These delays result in lower agricultural prices for Illinois producers and increased shipment costs.

**Figure 7: Lock Closures for the Ohio River, Illinois Rivers and the Upper Mississippi River**

Amount of time locking systems, which raise and lower boats on rivers, were unavailable due to scheduled or unscheduled maintenance.



Almost \$13 billion in cumulative investment will be needed by 2020 just to maintain the current level of unscheduled delays, and an additional \$16 billion by 2040. However, current funding levels support only \$7 billion funding in 2020, and \$16 billion in 2040. By maintaining the current level of investment, the increased shipping costs will result in a loss in production, income and spending,

resulting in 738,000 fewer jobs in 2020, and 1.4 million fewer jobs in 2040 (ASCE; IMTS).

Through the Water Resources Development Act of 2007 (WRDA 2007), Congress authorized more than \$2 Billion for major work on the locks and dams on the Upper Mississippi and Illinois rivers. As of March 2014, no construction funds were appropriated for this work outside of the Ohio River system. The following projects were prioritized but not funded:

- Seven new 1,200-foot locks at locks and dams 20 through 25 on the Mississippi River and at LaGrange and Peoria on the Illinois River.
- Mooring facilities at Mississippi River Locks and Dams 12, 14, 18, 20, 22 and 24 and at LaGrange Lock on the Illinois Waterway.
- Switchboats at Mississippi River Locks and Dams 20 through 25.

### Six Key Locks for Expanding Agricultural Exports from Illinois

A 2014 report<sup>11</sup> identified several key locks needed for expanding agricultural exports and taking advantage of the opportunities from the Panama Canal expansion and other projects. In particular, it noted that the key corn and soybean producer states (led by Illinois) were dependent on barge transportation, especially for export shipments. Inland waterways represent a major part of the overall US agricultural supply chain. The barge transportation highlighted the comparative importance of six locks, two locks on the lower Illinois River (Peoria and LaGrange) and four locks on the Upper Mississippi River (Locks 24, 25, Melvin Price, and 27).

More recent estimates of costs were developed and shown below in Table 21:

**Table 21: Illinois Lock and Dam Projects and Estimated Completion Costs**

| Project                                                                      | Type           | Amount (\$<br>x 1 Million) |
|------------------------------------------------------------------------------|----------------|----------------------------|
| Lagrange-Illinois River                                                      | Construction   | \$453.10                   |
| LD 22 Upper Mississippi                                                      | Construction   | \$300.40                   |
| LD 24 Upper Mississippi                                                      | Construction   | \$473.20                   |
| LD 25 Mississippi                                                            | Rehabilitation | \$28.90                    |
| LD 25 Upper Mississippi                                                      | Construction   | \$456.80                   |
| Mel Price LD Upper Mississippi                                               | Rehabilitation | \$85.50                    |
| Thomas Obrien IL Waterway (IIPD)                                             | Rehabilitation | \$25.10                    |
| <b>Upper Mississippi TOTAL</b>                                               |                | <b>\$1,369.90</b>          |
| <b>Average Annual Direct Project Benefits (Over Project Life) (Millions)</b> |                | <b>\$235.90</b>            |

Source: INLAND NAVIGATION IN THE UNITED STATES: An Evaluation of Economic Impacts and the Potential Effects of Infrastructure Investment. National Waterways Foundation,

<sup>11</sup> *Proposed Public-Private Partnership Projects for U.S. Inland Waterways Infrastructure Financing, Operations, and Governance* The Horinko Group. Prepared for the U.S. Soybean Export Council December 2013

## ***Ports and Harbors***

Ports and harbors are two water facility terms that are often used interchangeably. A port provides infrastructure and services for loading and unloading cargo and passengers, while a harbor is where ships are sheltered and can anchor close to a shore. Harbors are more often along lakes, seas and oceans, while ports are in harbors and along rivers.

In Illinois, Lake Michigan has three harbors for large ocean going vessels and more for recreational boats. The harbors along Lake Michigan that handle freight-bearing ships are the Waukegan Harbor, Chicago Harbor and the Calumet Harbor. Waukegan is also a port, while the Calumet Harbor connects to the Illinois International Port/Port of Chicago via the Calumet River and Lake Calumet. The Chicago Harbor is not a port, but some freight cargo passes through, to access the Chicago River and the Illinois River and canal system. The Chicago District of the Corps has jurisdiction for the harbor facilities on Lake Michigan. Figure 8 depicts Illinois' 16 port districts and the many water landing facilities along the four major navigable waterways. Table 22 lists the Illinois Port Districts and their locations.

Data on waterborne freight volume for the major maritime ports in Illinois is included in the Table 23. Other ports (such as Heart of Illinois Port in Peoria) have developed marketing analyses to upgrade ports in their areas to increase maritime freight. The two largest ports in Illinois are the Port of St. Louis (for Missouri and Illinois combined) which moved 34.96 million tons of freight in 2015 ranking it 21<sup>st</sup> in tonnage out of the 150 primary US ports and The Port of Chicago, located at Lake Calumet, which moved 16.7 million tons of freight, placing it 38<sup>th</sup> nationally and 2<sup>nd</sup> in the Great Lakes.

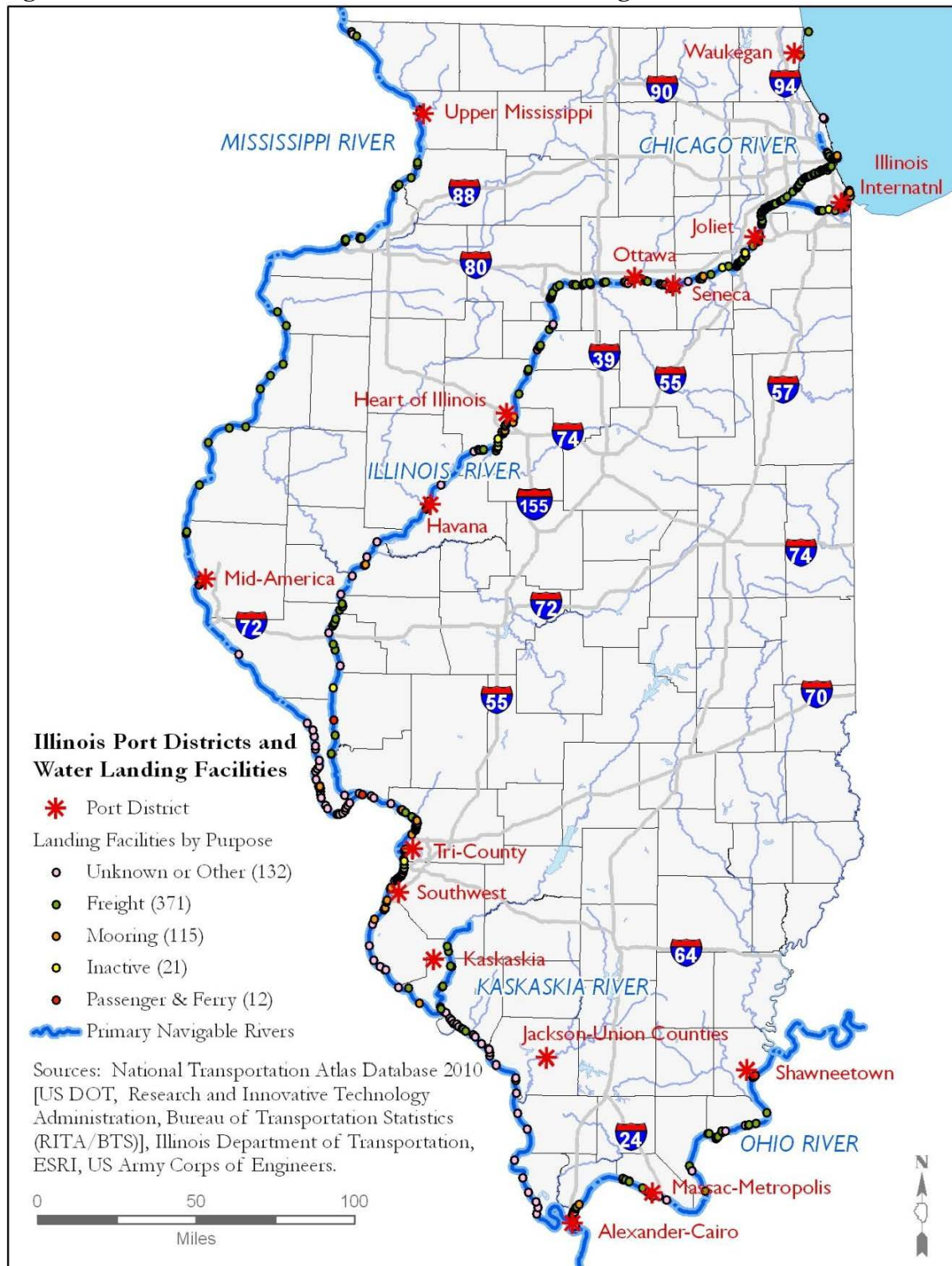
More detailed information on total quantities of materials shipped through Illinois Port Districts is not readily available because Port Districts are involved in a variety of economic activities with only a limited number operating docks and terminals involved in maritime freight shipping. This leads to incomplete data on totals. For example Kaskaskia Port District directly handled 1.44 million tons of commodities in 2015 but the Army Corp of Engineers documented 5.89 million tons through all docks in the port district including privately owned docks. A number of port districts also have not yet developed shipping interests.

Port development and activity in Illinois involves private industry and the State, which uses enabling legislation to create port districts. The enabling legislation gives ports tax-exempt status and the ability to issue bonds for port development. Port districts are required to submit financial reports to the Office of the State comptroller. The 19 authorized public port districts in Illinois are listed in Table 22. IDOT has, historically provided technical and operating assistance to port districts in coordination with the state often works with port districts to facilitate economic development in the area. IDOT supports water freight movement by providing the roads to and from the water terminals. Support for such efforts is critical for the expanded economic development around maritime freight. A recent study by FHWA found that 20% of the 45 million containers handled by US ports in 2014 were directly moved from the ports by rail with 80% being move to inland locations via trucks using highway connectors (USDOT/FHWA).

Private industry creates loading and unloading facilities on riverfront sites for their own use, after obtaining approvals from the municipal jurisdiction, the Corps and IDOT/IDNR. These facilities include docks, wharves, mooring sites, terminals and other storage facilities, loading and unloading

equipment, and other supportive structures

**Figure 8: Illinois' Active Port Districts and Water Landing Facilities**



**Table 22: Illinois Port Districts**

| Port Authority/District                                                                                                                                                      | City                           | Web                                                                          | Authorization   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------|-----------------|
| Alexander-Cairo Port District. Created in 2010.                                                                                                                              | Cairo                          | None                                                                         | 70 ILCS 1801/10 |
| Havana Regional Port District. Created in 1961. Now within the Heart of Illinois RPD. Signed intergovernmental agreement in 2007                                             | Havana                         | <a href="http://www.havanaregional.com">www.havanaregional.com</a>           | 70 ILCS 1805/1  |
| Heart of Illinois Port District. Created in 2003. Foreign Trade Zone 114                                                                                                     | Peoria                         | None                                                                         | 70 ILCS 1807/10 |
| Illinois International Port Authority. Created in 1951 as Chicago Regional Port District; renewed in 1952 as the Illinois International Port District. Foreign Trade Zone 22 | Chicago                        | <a href="http://www.iipd.com">www.iipd.com</a>                               | 70 ILCS 1810/3  |
| Illinois Valley Port District. Created in 1972                                                                                                                               | LaSalle/Bureau/Putnam Counties | None                                                                         | 70 ILCS 1815/3  |
| Jackson-Union Counties Port District. Created in 1976.                                                                                                                       | Carbondale                     | None                                                                         | 70 ILCS 1820/3  |
| Joliet Regional Port District. Created in 1957                                                                                                                               | Joliet/Romeoville              | <a href="http://www.flylot.com">www.flylot.com</a>                           | 70 ILCS 1825/3  |
| Kaskaskia Port District. Created in 1965                                                                                                                                     | Red Bud                        | <a href="http://www.kaskaskiaport.com">www.kaskaskiaport.com</a>             | 70 ILCS 1830/3  |
| Massac-Metropolis Port District. Created in 2009                                                                                                                             | Metropolis                     | <a href="http://www.mmsuperport.org">www.mmsuperport.org</a>                 | 70 ILCS 1831/10 |
| Mid-America Intermodal Authority Port District. Created in 1998                                                                                                              | Quincy                         | <a href="http://www.midamericaport.com">www.midamericaport.com</a>           | 45 ILCS 165/10  |
| Mt. Carmel Regional Port District                                                                                                                                            | Mt Carmel                      | None                                                                         | 70 ILCS 1835    |
| Ottawa Port District. Created in 2011.                                                                                                                                       | Ottawa                         | <a href="http://www.ottawaportdistrict.com">www.ottawaportdistrict.com</a>   | 70 ILCS 1837/10 |
| Seneca Regional Port District. Created in 1960                                                                                                                               | Ottawa/Seneca                  | <a href="http://www.senecaport.com">www.senecaport.com</a>                   | 70 ILCS 1845/3  |
| Shawneetown Regional Port District. Created in 1961                                                                                                                          | Shawneetown                    | <a href="http://www.shawneetownport.com">www.shawneetownport.com</a>         | 70 ILCS 1850/3  |
| Southwest Regional Port District                                                                                                                                             | Dupo                           | None                                                                         | 70 ILCS 1855/3  |
| Tri-City Regional Port District/Americas Central Port. Created in 1959. Foreign Trade Zone 33                                                                                | Granite City                   | <a href="http://www.americascentralport.com">www.americascentralport.com</a> | 70 ILCS 1860/3  |
| Upper Mississippi River International Port District. Created August 24, 2009                                                                                                 | Galena/Carroll County          | None                                                                         | 70 ILCS 1863/3  |
| Waukegan Port District. Created in 1955                                                                                                                                      | Waukegan                       | <a href="http://www.waukeganport.com">www.waukeganport.com</a>               | 70 ILCS 1865/3  |
| White County Port District. Created in 1994                                                                                                                                  | Carmi                          | None                                                                         | 70 ILCS 1870/1  |

Not all of port districts operate only as a waterway port. For Example, the Joliet Port District acquired Lewis University Airport in 1989 and operates it. Other Port districts operate warehousing, golf courses, etc

The largest Illinois Ports for shipping are shown in Table 23 below:

**Table 23: Major Illinois Freight Ports**

| Name                                              | Location     | 2013 tonnage | 2015 tonnage |
|---------------------------------------------------|--------------|--------------|--------------|
| Illinois International Port District              | Chicago      | 15,428,892   | 16,736,279   |
| Kaskaskia Regional Port District                  | Red Bud      | 5,208,066    | 5,890,000    |
| America's Central Port                            | Granite City | 2,500,000    | 2,750,000    |
| Mid America Port District (Quincy Municipal Dock) | Quincy       | 345,140      | 330,377      |

Notes:

1. Kaskaskia Total includes commodities handled at all docks in Port District. The KRPD only owns a single dock which handled 1.44M tons in 2015
2. America's Central Port is part of the St Louis Port in terms of US Army Corp of Engineers (ACE )reporting. In 2015 the combined (MO and IL) St Louis report handled 34.96M tons with America's Central Port handling (we estimate)about 2.75M tons.
4. Data obtained from the Waterborne Statistics Center website (05/05/2017). ACE did not include Kaskaskia totals in its annual reports prior to 2013

### **Ports as Key Components of the Multimodal Freight System**

Maritime transportation is essential to regional and international trade as it facilitates the shipment of large volumes of raw and finished goods at comparatively low transport costs and with strong environmental performance. Maritime transport is critical to key industries and to overall regional competitiveness and sustainability.

When transportation options are efficient and competitive, shippers benefit from lower transport costs, faster and better service, and increased reliability, which in turn contribute to their own competitiveness and growth. The more options shippers have to move their goods competitively, the better. This exerts downward pricing pressure on transportation costs generally, whether or not a particular mode is used. In order to continue to play its important role, the maritime sector must be willing to adapt, improve and change to successfully exploit new opportunities.

Inland ports in Illinois already take advantage of these intermodal opportunities but further research and market analysis will be needed to both determine ways to increase the use of maritime resources for the transport of goods already using barges and waterways and to identify specific industries and routes where investment can make such a modal shift cost effective. Recent studies for Missouri, Peoria and Wisconsin examined industries that could benefit from increased use of maritime shipping from Northern and Eastern Wisconsin down to the Gulf via Chicago (MODOT) (CFIRE 10-02).

**Figure 9: Kaskaskia Port District – Example of Intermodal Operations**

*Prairie State Energy Campus made a \$1 billion investment in Best Available Control Technology (BACT) to create the cleanest coal-fueled power plant in Illinois and one of the cleanest in the world. Because Prairie State's coal is from its mine mouth coal mine, located across the road from the power plant, it does not have to railroad in coal, saving on transportation costs and significantly reducing emissions. The standard operating procedure for supplying scrubber stone to the plant relies on water and rail transportation. No scrubber stone is hauled in by truck thereby reducing wear and tear on public roads, reduced congestion, cleaner air and cheaper transportation costs to provide a sustainable source for the scrubber stone.*

***How scrubber stone gets from Ste Genevieve, MO to Prairie State Power Plant***

|            |                                                                                       |
|------------|---------------------------------------------------------------------------------------|
| 0 miles    | Lhoist – Product source (2 barges)                                                    |
| 10 miles   | Travel by water on the Mississippi River (Enters JFC Lock and Dam on Kaskaskia River) |
| 24.5 miles | Travel by water to KRPD #1 (Transfer to either rail or storage)                       |
| 8 miles    | Travel by rail on KRPD Track to Lenzburg                                              |
| 8 miles    | Travel by rail on the CN Mainline Track                                               |
| 6 miles    | Travel by rail on Prairie State Spur to Power Plan                                    |

## **State Programs to Support Maritime Transportation Systems**

Other States with either comparable commodities or comparable Maritime Highway Systems to Illinois have developed a variety of structures and funding mechanisms to support their maritime Transportation systems. Some of the key initiatives, programs, and funding specifically dedicated to Ports and Waterways in their respective states in 2016 are discussed below.

### ***Florida***

The Seaport and Waterways Office in the Florida DOT works with Florida's deep-water seaports and inland waterways to assist in planning and funding strategic seaport projects as well as assisting with seaport-related issues. The Office is responsible for statewide seaport system planning, coordinating with statewide freight planning, project management, coordinating seaport projects with Strategic Intermodal System (SIS) planning, and coordinating with the Florida Seaport Transportation and Economic Development (FSTED).

The State Legislature has created and authorized a series of agencies affiliated with the Florida Seaport and Waterways Office. In 2010 Florida completed the Florida Seaport System Plan which is integrated with the Florida Transportation Plan (FTP) and the Florida Strategic Intermodal System (SIS) plan. The Florida Seaport System plan and report is updated annually. The Florida Ports Council is a nonprofit corporation that serves as the professional association for public seaports. It provides support and assistance to Florida Seaport Transportation and Economic Development Commission (FSTED) and the Florida Ports Financing Commission. The FSTED was created to finance port transportation projects on a 50-50 basis with local port districts. Ports Financing Commission can issue bonds upon authorization of the Florida legislature. Since 2011 the Commission has funded approximately \$1billion in Seaport funding,

## ***Indiana***

Indiana has 4 of the top 10 ports in the Great Lakes in addition two significant commercial ports on the Ohio River and the state ranks 15<sup>th</sup> nationally in total foreign and domestic waterborne shipping. In 2015-17 Biennium budget, the state legislature as part of intermodal programs designated a Capital Funding allocation (\$5M) to support improvements to 3 major ports (one on Great Lakes and 2 on Ohio River.)

## ***Minnesota***

Minnesota's Port authorities and municipalities provide funding generated from tax levies, land leases, storage and dockage fees, project-specific federal grants, economic development investments, and related financing activities. However, much of the financing for the marine system is from private investment.

Minnesota created a framework for integrating maritime freight issues into the MnDOT long-term plan and improving the economic competitiveness of the Minnesota ports.

While local governments and private sources primarily fund Minnesota ports and terminals, Minnesota DOT also administers the Port Development Assistance Program (PDAP). The PDAP provides the state's public port authorities with a 80 percent state, 20 percent local funding assistance using grants under conditions established by the Minnesota Legislature. The PDAP is used for facility and infrastructure upgrades and rehabilitation, facility expansion, capacity expansion, and system upgrades. These funds however cannot be used for regular maintenance projects. Over the past ten years the annual appropriation for PDAP has ranged from \$0 to \$3 million. Last year, PDAP funding for Port related project totaled approximately \$1.75M.

## ***Missouri***

Missouri DOT assists in capital and administrative funding for ports and waterways. It also serves as an informational clearinghouse, provides technical assistance and represents port interest within the industrial and governmental groups. The Missouri DOT waterways section also provides assistance and funding to two Mississippi River ferry crossings.

Capital needs are jointly prioritized annually by Missouri DOT and the Missouri Port Authority Association. The Missouri Port Authority Association is the statewide association of ports and provides coordination and support with the Missouri DOT. The Port Authority Association, while independent of the Missouri DOT, the DOT publicly promotes the association and provides some indirect staff support. Each public port receives a base amount of administrative funding, plus additional funding determined by set of performance criteria. The two operating ferryboat services receive 50 percent of the State Ferry Boat Assistance Funds and both services receive federal funds based on a federal formula of passengers, vehicles and route miles served.

In 2016, MO DOT received administrative funds in the amount of \$400,000 from the State Transportation Fund. In addition, the State Ferry Boat Assistance Fund received \$ 176,000 from the State Road Fund and the Port Capital Fund received \$6.2 Million for statewide improvements and approximately \$41,000 annually for the Federal Ferry Boat Program.

## *Ohio*

The Ohio Department of Transportation funded a multi-year project starting in 2015 to create the Ohio Maritime Transportation Study to identify the best mechanisms and programs to leverage Ohio's Maritime Transportation System. In addition, the Ohio General Assembly created the Maritime Port Funding Study Committee to study alternative funding mechanisms for maritime ports. The Study Committee was to issue a report of its findings and recommendations in 2017.

The first part of the study was released in March 2017 and provided a consistent analysis of commodities and industries that use Ohio's Maritime Transportation System.

## *Oregon*

Oregon ports and waterways are involved in both international container markets as well as grain markets for export. In 2010 MARAD designated the Marine Highway/M-84 Corridor to include the Columbia, Willamette and Snake Rivers, connecting commercial navigation channels, ports, and harbors and running parallel to I-84. In 2010, the Oregon Business Development Commission and the Oregon Infrastructure Finance Authority (IFA) developed Ports 2010: A New Strategic Business Plan for Oregon's Statewide Port System (Statewide Business Plan) to define the state's role and investment in Oregon's 23 ports. The Statewide Business Plan identified the key strengths and significant challenges of Oregon's port system and recommended a centralized program to finance the infrastructure necessary to support the development of individual port projects. Through the Statewide Business Plan, the state required each port to update its strategic business plan to ensure consistency with the statewide plan.

The Strategic Plan created a series of funding mechanisms. Three programs are eligible for funding annually through the General Fund: The Marine Navigation Improvement Fund, the Port revolving Fund (capped at \$3M per project) and the Port Planning and Marketing Fund (capped at \$50,000 per project). These funds provide grants to match federal funding, help fund planning grants and assist in the planning and construction of port infrastructure projects. All are subject to funding through Oregon Legislature. In 2017, The Oregon Legislature authorized bonds to fund major port infrastructure projects and other related studies. Ports are also eligible for funding through Connect Oregon, a biennial state funded capital investment program that funds Marine, air, and rail projects but not Highway projects.

The Oregon Public Ports Association coordinates efforts of the Ports with participation by the Oregon DOT but it is not an official Division or Program within the Oregon DOT.

## **MOVING FORWARD - Recommended Actions for IDOT**

Illinois industries are responsible for nearly 20% of the waterborne freight shipments in the United States but the State has a fragmented system to provide oversight and support for that industry. IDOT needs to create the support infrastructure that recognizes the value maritime freight system provides to the Illinois economy and its role in a multimodal freight transportation system. To effectively create that infrastructure and support the multimodal maritime freight transportation system, IDOT should:

1. Establish stable staffing to provide knowledgeable and consistent support to the port districts and industries that use the maritime transportation system.
2. Provide financial assistance, ideally with surrounding states, for planning and construction to upgrade Port facilities and jointly develop market analyses as WI, MO, and OH have begun.
3. Continue long term engagement and intergovernmental relationships with federal agencies, and other industry organizations and representatives
4. Take the lead and create Interagency structures and public/private entities bringing various state agencies and public/private stakeholders together to establish statewide needs.
5. Support research and market analyses that create the sound data to better understand the quantities, sources and destinations of shipped goods so that sound business plans can be developed to grow Illinois' Maritime Freight industry.

## **Specific Program Recommendations**

### **1. IDOT Staffing:**

Department Ports and Waterways Section should be re-established to promote the use of Illinois' navigable rivers and to act as focal point for port districts and industries. It should act as an informational clearinghouse; provide technical assistance and represent port interests within industrial and governmental circles. In addition, a Ports and Waterways Section would provide a major point of contact to assist authorized port authorities in working with other state agencies to obtain permits and seek grants to foster port infrastructure improvements and local economic development. Finally, IDOT should take the lead in working with Port Authorities and Industry to develop Performance Measures to evaluate progress made in growing the Illinois Maritime Transportation System.

### **2. Creation of Maritime Freight Database and Market Analysis:**

IDOT needs to take the lead in developing accurate and comprehensive data on the maritime freight transportation system. The state currently lacks complete data on the nature of freight moved on the Illinois River System and the value of that freight. A significant challenge in developing any performance measure system involves the data collection process. The National Cooperative Freight Research Program (NCFRP) identified the data challenge more specifically as “developing common definitions for measures, capturing data in a timely manner, integrating disparate data from various data sources, and providing the institutional support to sustain a reporting system.”<sup>vi</sup> Performance measures are useless without the necessary and accurate data. Creating Freight Performance measures is a central component of the last two federal transportation funding programs (MAP-21 and the FAST Act). Additionally, data driven performance based measures and system wide goals, with consideration toward multimodalism and financial and environmental sustainability, are overall strategic IDOT goals should be incorporated within the Vision Plan: *Build a Better IDOT* and comprehensive plans such as the Long Range Transportation Plan (LRTP)

Once data is collected and integrated with goals and performance measures there should be a requirement for an annual report on the status of the industry, the economic impact of the

industry and its impact on freight movement in IL

### **3. Ports and Waterways Interagency Working Group:**

Illinois Department of Transportation should develop a Ports and Waterways Interagency Working Group with other state agencies including DNR, IEPA and DCEO to coordinate state activity related to ports; one of the needs is to identify existing programs and apply them consistently to meet state goals. For example, The River Edge Redevelopment Zone Act supports municipalities with river access to remediate environmentally-challenged property located adjacent to or surrounding an Illinois River. The law enables communities to designate an area as a redevelopment zone, and allows the municipality to access grants or to provide tax incentives to remediate and cost-effectively clean the environmentally-challenged land. The enacted law specifies redevelopment zones in East St. Louis, Rockford, Aurora, Elgin and Peoria, and allows the creation of additional redevelopment zones as needed, based on a set of guidelines. This program was able in the recent past to designate millions of dollars to redevelop former industrial sites along the Illinois River System.

### **4. Sponsor Development of a Illinois Public Port Association:**

Illinois Department of Transportation should support and assist in the creation of a nonprofit association representing voluntary member ports and affiliated organizations including major industrial users of the Maritime Transportation system. IPPA should help to encourage economic development within the State of Illinois and encourage other industries to use maritime transportation for economic and environmental reasons.

Reasonable goals of IPPA should be:

- To develop and foster good relations among all ports in the State of Illinois
- To promote the exchange of information between ports relative to new techniques or technologies on development, organization, administration and management
- To facilitate the formulation of common positions, policies or plans on questions of common interest and to present such positions at regional, state, national and international discussions
- To initiate measures which represent the interests of Association members within intergovernmental and other organizations in order to improve conditions and efficiency of the state's ports
- To promote favorable publicity by publication through newsletters, journals, magazines or other media of all port affairs
- To promote academic research and educational interest in the ports and marine sectors
- To foster and encourage economic development within the State of Illinois

### **5. Funding Mechanisms:**

Illinois needs to make some level of funding available for planning and marketing as other states have done to assist in planning, environmental, and capital projects. Even a small fund could help Port Districts plan for larger infrastructure projects and even match other sources of funding including available federal funds. The Port Development Revolving Loan Fund

(Illinois Compiled Statutes, 30 ILCS 750/9-11 created in 1995 still exists but has not been funded for a number of years. The loan program was available to port districts on a competitive basis, with a maximum loan amount of \$3.0 million. The fund was intended to cover up to 50 percent of a project's cost, with the remaining funding coming from other sources. Even a relatively small initial funding from existing IDOT funding sources would help promote greater organization and activity by the port districts to facilitate and enhance the utilization of Illinois' navigable waterways for the development of inland intermodal freight facilities.

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