U.S. Inland Waterway Modernization: A Reconnaissance Study

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Lock and Dam Modernization: A Reconnaissance Study

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Executive Summary

Basis of Study

The Mississippi River system is of vital importance to the economy of the United States as it enables efficient movement of goods and services. Over the course of the last century, a network of federally owned locks and dams constructed and operated by the U.S. Army Corps of Engineers (USACE) have facilitated commerce along the river. Many of these facilities have reached or even far exceeded their designed life cycle and rehabilitation and modernization is becoming critical to keep the waterways commercially viable. As the state of Iowa has a vested interest in a viable waterway commerce and transportation system, the Iowa Department of Transportation is examining alternatives to the USACE's traditional approach to funding and implementing projects to help modernize and improve the inland waterway navigation system on the Upper Mississippi River System (UMRS). This study is intended to identify and discuss the viability of options available.

Current Issues and Conditions on the Waterways

In 2009 The American Society of Civil Engineers' *Report Card for America's Infrastructure* [2] gave the nation's inland waterway infrastructure a report grade of D-. The inland waterways rely primarily on public investment and have suffered from chronic underfunding, seriously affecting the nation's potential to participate in the highly competitive global market for exportable commodities that will be in great demand in the future. This failure to adequately invest in a publically managed inland waterway system affects the nation's ability to export key commodities like grain, energy, and specialized manufactured goods. It also provides competing countries with an opening to capture market share, which in some cases is tied to long-term contracts. In contrast to the U.S.'s inland waterway system, the investment in the U.S.'s marine ports is dominated by public port authorities and private port-operating companies.

The U.S. economy relies on an efficient and low cost transportation network for movement of its domestic and export commodities. In particular, U.S. export commodities depend on the transportation network to offset higher wage levels and costs of production when compared with international competitors. If the nation does not invest in its waterways infrastructure, transportation costs will increase and export costs will therefore increase, and this increase in costs to export goods will affect the nation's ability to compete in global markets for goods produced in the U.S. If current needs and stagnant investment in inland waterways and marine ports continue, the nation's competitiveness will erode, affecting its ability to sustain well-paying jobs, especially in export sectors.

If the U.S. does no more than maintain its current level of investment in its inland waterways, the losses to its economy due to delays and constricted traffic will increase shipping costs annually. If our inland waterway system remains chronically underfunded, recent studies by the American Society of Civil Engineers [1] show that by 2020 the lost value of exports will be $270 billion and will rise to almost $2 trillion by 2040. Approximately $1.3 trillion in business sales will be lost by 2020, rising to $7.8 trillion by 2040. The cumulative loss in national GDP will be approximately $700 billion by 2020 and reach $4

trillion by 2040. It is projected that such a reduction in production, income, and spending will result in 738,000 fewer jobs in 2020, and that by 2040 the job losses will grow to almost 1.4 million – jobs lost due to the lack of U.S. competitiveness in global trade and because the nation's households and businesses will be spending more for commodities that arrive by marine ports and are transported to market via inland waterways.

Shipping delays at the locks, both scheduled and unscheduled, are a significant threat to the performance of the inland waterway system (Figures 1 and 2). These delays are caused by the mechanical failures, structural maintenance and 'bottlenecked' congestion at the locks due to insufficient funding for their operation and maintenance needs (Figure 3).

When a lock or dam reaches a state of poor repair, waterborne traffic must stop to allow for more frequent scheduled maintenance. Although such anticipated or scheduled delay imposes some level of cost on industries that rely on waterborne commodities, an even greater cost is imposed when an unscheduled delay occurs. Unscheduled delays interrupt business operations for entire supply chains dependent on waterborne shipments. However, with adequate investment in maintenance and infrastructure modernization these delays are preventable.

Figure 1: Lock and Dam Maintenance Hours per Year at the Mississippi River Locks
Source of Data: USACE

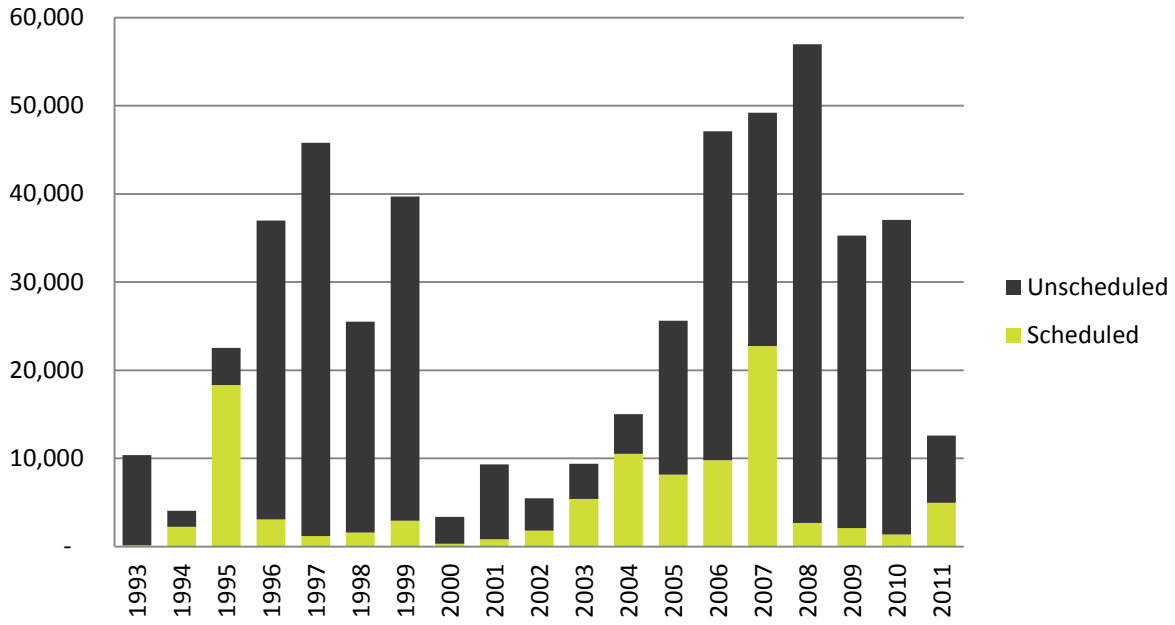


Figure 2: Lock and Dam Maintenance Hours per Year, Locks 9 – 19
Source of Data: USACE

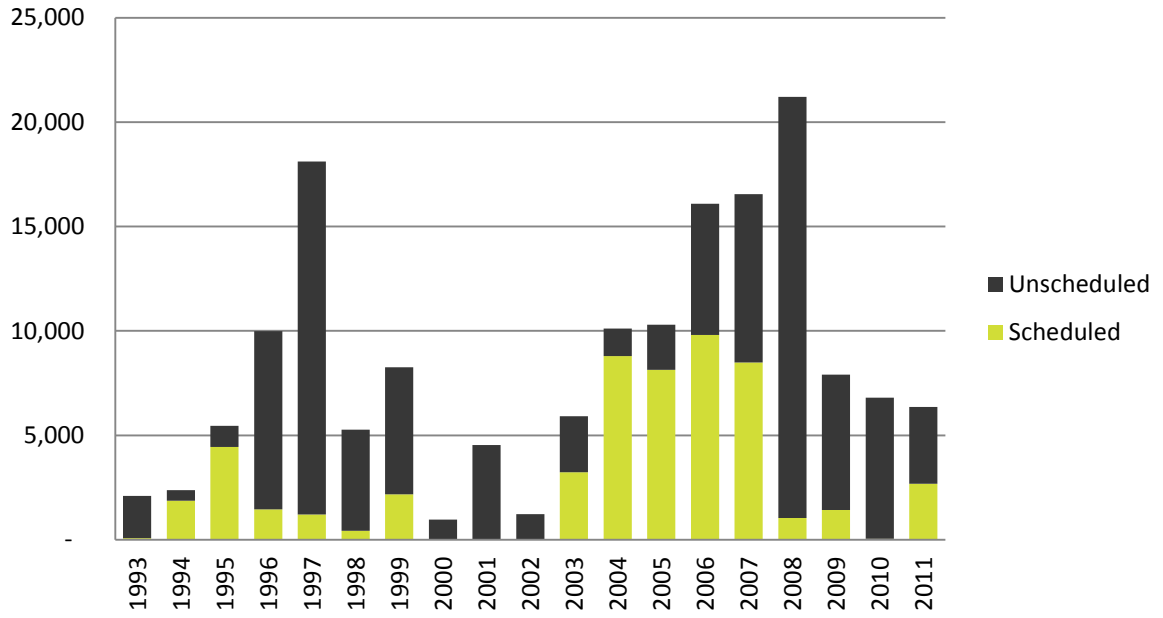
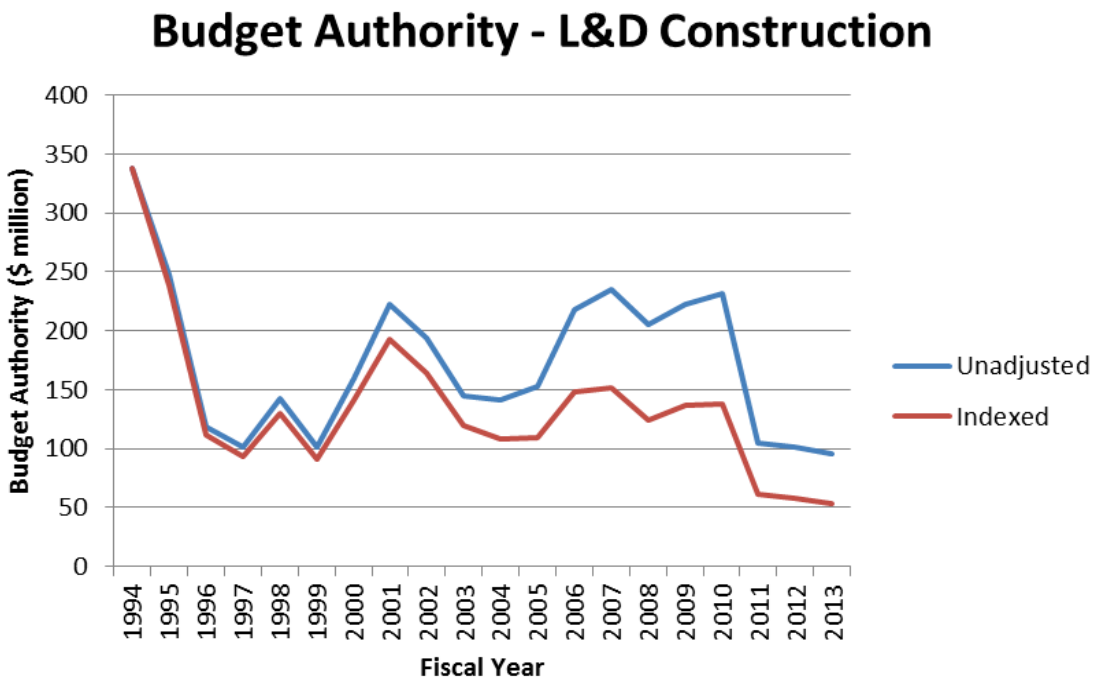


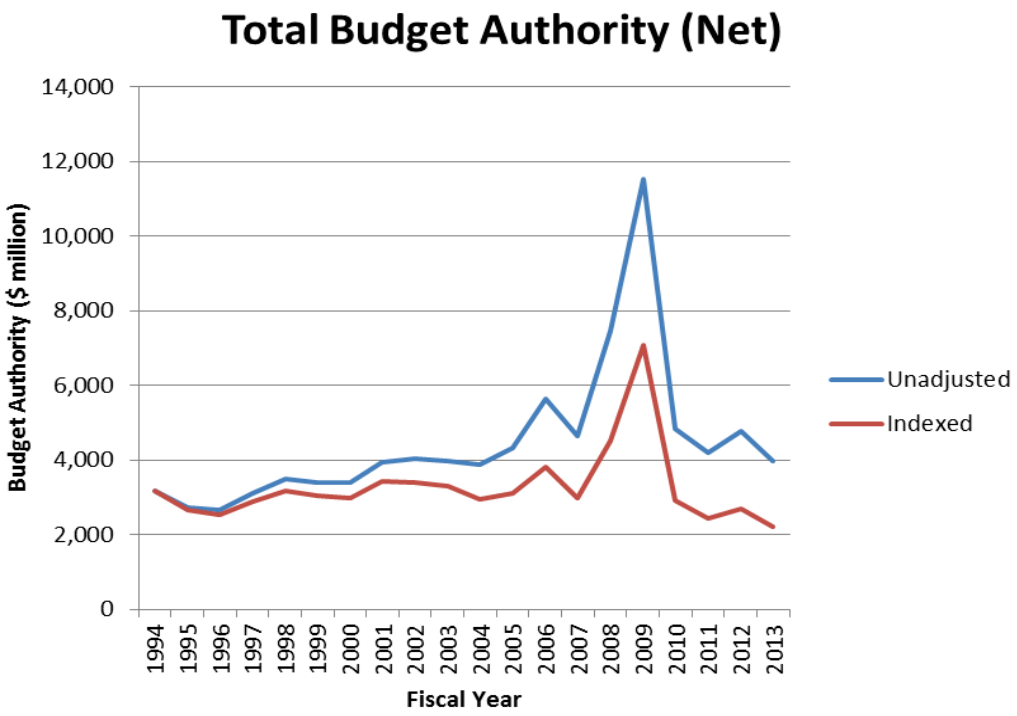
Figure 3: USACE Budget Authority–L&D Construction—FY 1994–FY 2013
Source: Texas Transportation Institute [18]



Based on USACE data trends, maintaining existing levels of unscheduled delays on inland waterways, and not further exacerbating delays, will require almost $13 billion by 2020, and an additional $28 billion by 2040. Current funding levels can support only $7 billion through 2020 and an additional $16 billion through 2040. Of these costs, 27 percent are projected for the construction of new lock and dam facilities, and 73 percent are estimated for the rehabilitation of current facilities. The demands for these funds will peak by 2020, when critical age and capacity thresholds are likely reached. [1]

Federal resources have been steadily dwindling since the 1980s and only limited funds have been available for water infrastructure operations, maintenance, and rehabilitation. This decline in federal funding for water resources infrastructure is especially evident when indexed for inflation, as shown in Figure 4.

Figure 4: USACE Total Budget Authority (Net)—FY 1994–FY 2013
Source: Texas Transportation Institute [18]



Much of the USACE's water resources infrastructure is deteriorating and wearing out faster than it is being replaced. Existing water infrastructure cannot be maintained with the annual funding being allocated by Congress. The USACE faces a massive backlog of authorized, unfunded projects; those that have begun often start and stop depending on whether money is available. Maintenance projects are frequently delayed, as was evidenced by the temporary closures of the system during the summer of 2012 during periods of extreme low flows on the Mississippi River. The most commonly cited example of this failed system of funding allocations is the Olmsted Lock on the Ohio River. Since the project began, it

has used up almost the entire USACE capital budget, leaving little to no allocations for other projects. Originally projected to cost $775 million when it began in 1988, the project now has a price tag of $3.1 billion and a construction plan expected to stretch on for another decade, resulting in even more cost. [19]

It is clear that failure or closure of a lock would cause increased costs to shippers, resulting in decreased cost advantages to Midwestern producers. Additionally, Midwest producers would still need to transport their goods, inadvertently leading to the long-term transport of goods shifting to road and rail. Deterioration of road and rail infrastructure would occur more quickly and would result in financial strains on state resources and railroad capital. Furthermore, the economic opportunity for U.S. exporters, in particular Iowa and other Midwestern grain producers, provided through expansion of the Panama Canal would be lost with abandonment of the inland waterway system. New approaches to fund operations, maintenance and infrastructure replacement are needed to keep water transportation viable as well as to take advantage of emerging opportunities such as the Panama Canal expansion.

Key Findings

This study has resulted in several key findings:

1. No increase in the current funding plan will result in loss of economic benefits and a missed opportunity for Iowa to take economic advantage of the plans for expansion of the Panama Canal (i.e., opportunities to increase grain shipments).
2. Leveraging increased funding from traditional sources is the only practical option to deal with the funding issues in the short term.
3. If no new funding is identified, partial divestiture of the system where traffic does not warrant heavy operations should be examined to minimize economic loss and to potentially increase opportunities for USACE to redirect budget allocations. However, the impact and extent of divestiture would need to be carefully examined for other long-term impacts.
4. A public-private partnership to upgrade and then operate/maintain discrete elements of the waterway system is feasible if a dedicated funding source is found and assuming changes to current policies are made as outlined in the recommendations for 2013 WRDA in Appendix A. For consideration of user fees as a repayment source for availability payments, it should be noted that implementation of such fees would require policy action by the government to modify the prohibition on tolling in 33 USC 565.
5. Revenue bonding against existing and/or new IWTF (Inland Waterways Trust Fund) revenues could provide an infusion of large amounts of capital for lock and dam infrastructure projects. While this would result in higher borrowing costs, the benefits of executing projects sooner might outweigh these costs.
6. While augmentation of traditional (federal appropriations and user fees) funding sources by state/local entities would be beneficial (assuming legislative authorization) in both the near and long term, these additional public funding sources would not be a stand-alone solution. Rather,

this funding would be only part of a more comprehensive solution that includes increased and/or expanded user fees and federal appropriations.

New approaches to fund operations, maintenance, and infrastructure replacement are needed to keep water transportation viable. Funding, operations, maintenance and construction of water resources projects is typically authorized in a Water Resources Development Act (WRDA) bill. The last WRDA bill to be approved by Congress was in 2007. Section 221 of WRDA 2007 included enhanced opportunities for local project partners to be more involved in planning, design and construction of projects beyond the traditional cost share for Lands, Easements, Rights of Way, Relocations and Disposal (LERRDS). The draft 2013 WRDA bill, started in the U.S. Senate Environment and Public Works Committee, holds even greater promise for nontraditional approaches to water resources projects involving USACE.

Currently, the U.S. Senate is considering a WRDA bill for 2013 (see Appendix A).The draft bill evaluated in this discussion currently resides in the United States Senate Environment and Public Works Committee. An opportunity for a non-traditional approach, including alternative funding and operations, to management of the inland waterway system does exist within the draft 2013 WRDA.

Because operations, maintenance, rehabilitation and replacement of locks and dams is a primary USACE mission, Congress would need to authorize and appropriate all of the funds needed to permit, design and construct the necessary upgrades to the lock and dam system. Should a lock and dam rehabilitation be approved as a pilot project, funding appropriated by Congress would be passed through to the non-federal sponsor via the USACE.

Recommended Actions

The State of Iowa has a sincere interest in seeing the continued maintenance, operations, and modernization of our nations' inland waterway navigation system. As such, it is proposed that the State undertake activities that may help the State realize improvements to the inland waterway navigation system. Recommendations for potential initial State actions are provided below.

U.S. Congress

An opportunity to facilitate the future viability of this inland waterway currently exists with the draft WRDA of 2013. It is recommended that the State pursue actions to encourage Congress to:

1. Ensure passage of a WRDA in 2013.
2. Ensure the existence of opportunities for pilot programs that would allow non-federal sponsors the ability to rehabilitate, improve, operate and maintain federal projects. It is recommended that such opportunities be identified and presented to legislators for sponsorship.
3. Ensure opportunities for alternative project delivery and funding mechanisms (user fees, private investments) for existing and proposed civil works and navigation projects. Recommended

language changes to the WRDA bill that would facilitate these changes are included in Appendix A, along with a technical memorandum summarizing these recommendations.

4. Ensure adequate funding for both ongoing and pilot USACE Civil Works and Navigation programs.
5. Raise the excise tax on diesel fuel from $0.20/gallon to $0.30/gallon and index the tax for inflation, to provide more adequate funding for the Inland Waterway Trust Fund.
6. Authorize the USACE to study additional funding mechanisms (recreational fees, lockage fees, tonnage fees, etc.) to provide for more adequate funding for the Inland Waterway System.

The State of Iowa

There are specific actions that the state of Iowa can take to protect and further its interests in the UMRS lock and dam system. Iowa should:

1. Explore the possibility of a coalition of Upper Mississippi River states (Minnesota, Wisconsin, Iowa, Illinois and Missouri) and inland waterway interest groups (agriculture producers/businesses, barge operators, shippers, environmental stakeholders) to drive a legislative agenda in Washington, DC to address funding and legislative changes needed to modernize the Upper Mississippi River System.
2. Express interest to the Secretary of the Army and seek non-federal sponsorship for implementation of a pilot project using the authority in Title II, Section 2025 of the draft WRDA 2013 bill.

Much remains to be decided with the federal government regarding the overall operation of an UMRS lock system and how operation of all or portions of this system by a non-federal sponsor would be regulated and governed. However, it is clear that the existing, inland waterway navigation system is nearing a tipping point in terms of funding for necessary repairs, maintenance and system enhancements.

Background of Relevant Lock and Dam Systems

This section provides background information on the Upper Mississippi River lock and dam system as well as the Tennessee Valley Authority (TVA) and European Rhine River systems for contextual comparison.

Upper Mississippi River System Lockage

The Upper Mississippi River System (UMRS) has 29 locks and 858 miles of commercially navigable waterway (with an average depth of 9 feet), as displayed in Figure 5 (page 9). Also part of the UMRS is the Missouri River, which has no locks along its 735 navigable miles from Sioux City, Iowa to St. Louis, Missouri. Almost every lock and dam in the Upper Mississippi River Basin has exceeded its economic design life of 50 years. Most locks are too small for today's tows.

126 million tons of freight is transported annually on the system—more than 36 times the 1930's tonnage [30]—yet many of the locks and dams built over seven decades ago have never been modernized, resulting in scheduled and sometimes emergency maintenance which causes major traffic delays at the locks. The impact of these delays on consumers is tremendous.

Most of the lock chambers on the UMRS are 110 feet by 600 feet, yet the average length of a modern tow (15 barges pushed by a towboat) is 1,200 feet. For a modern tow to navigate through the system's antiquated locks, it must be split in half and transit the lock one section at a time, resulting in even more costly delays in addition to the maintenance delays.

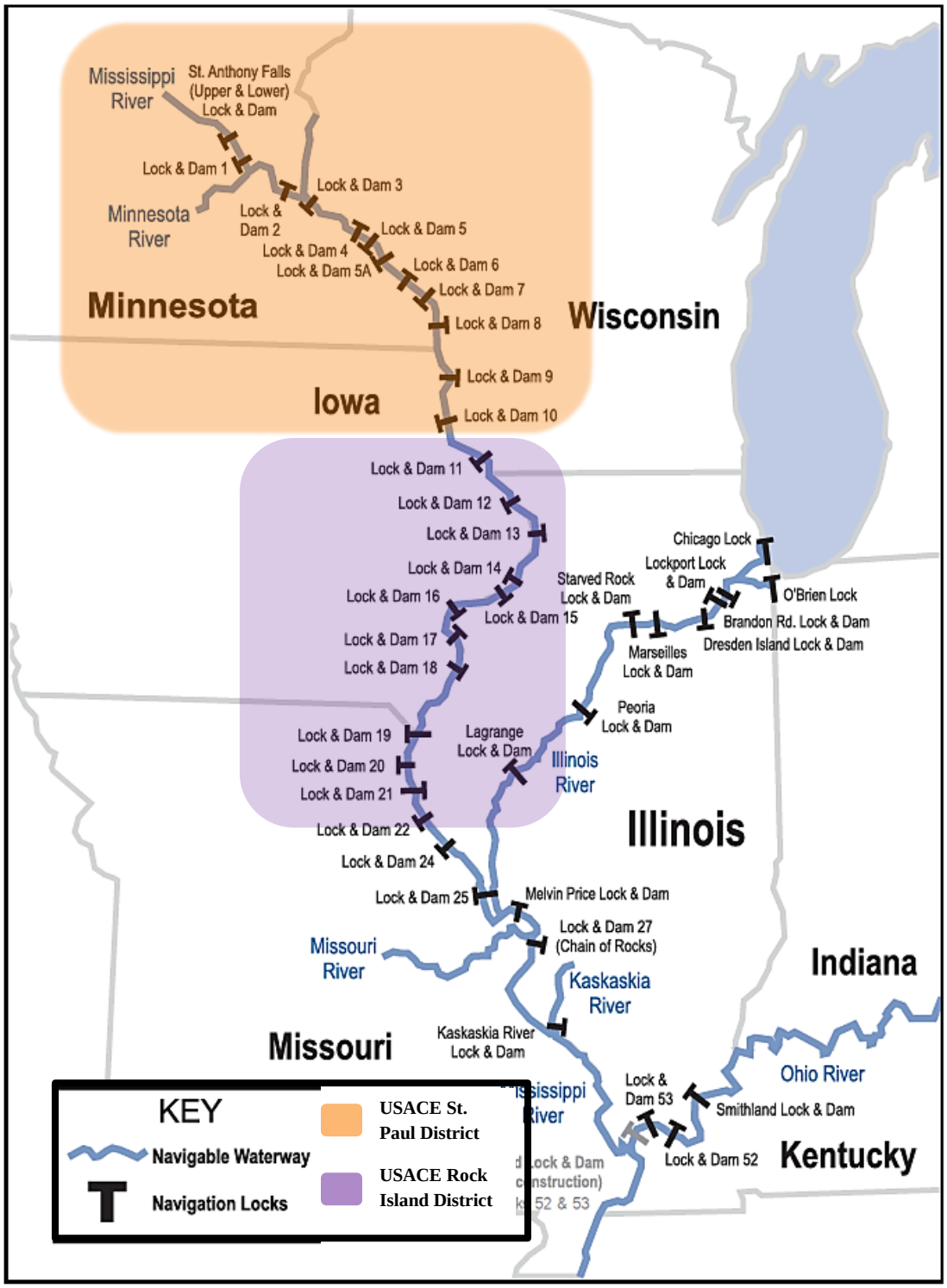
Locks 1–8

Locks 1-8 are located from St. Anthony Falls in Minneapolis, Minnesota through the southern portion of the Minnesota/Wisconsin border. These locks are some of the original locks sanctioned by the U.S. government to be built on the Mississippi River for navigation during the 1930s, and are the least trafficked of the locks along the Mississippi River.

Locks 9–19

Table 1 (page 10) shows a summary of locks 9-19 along the Upper Mississippi River System. All border Iowa, though locks 9, 13, 15, 16, 17, and 18 are physically located on the east bank of the Mississippi. The USACE, as the owners of the lock and dams, operate the Iowa's portion of the system within two geographical districts: the Rock Island District and St. Paul District. Locks and dams 9 and 10 are within the St. Paul District while 11-19 are operated within the Rock Island District (see Figure 5), but all are within the Upper Mississippi Region.

Figure 5: UMRS's Navigation Locks [Appendix B]



There are numerous funding issues with the USACE maintained and operated locks dams including larger, improvement projects that because of budget appropriation leave uncertainty associated with election cycles and funding to complete them. Costs for lock improvement projects are not included in the annual operations and maintenance budget but are approved separately from those appropriations based on project prioritization that supports the spreading out of funds to encompass more when there is not enough to begin with ("repair and maintain") [18]. This method can work for a short while, but similar to driving an old car, eventually the money you put into fixing it every year becomes fiscally irresponsible. Currently, the only project on schedule and funded for the locks and dams located in Iowa is a 314-river-mile reach of 9-foot commercial navigation channel dredging from lock 10 downstream to Saverton, Missouri [21]. Project needs though are much more than dredging.

There is no authoritative list of the projects in the backlog that is publically available and estimates vary widely [33], coupled with a maintenance backlog and an average age of 66 years for Iowa's bordering lock and dams means unless funded they will continue to deteriorate exponentially until the only option is to discontinue their use. Commercially, as discussed in the next section, this will cost Iowa and the region.

Table 1: Summary of locks and dams along Iowa's border with 2008 estimated maintenance costs to bring locks and dams to acceptable operating standards [19] [24] [21]

	Lock	Location	River Mile	Year Open	Length (ft)	Width (ft)	Estimated Maintenance Costs as of 2008[1]
Locks located west bank of the Mississippi (i.e., Iowa side)	10	Guttenberg, IA	615.1	1937	600	110	$8,550,000
	11	Dubuque, IA	583.0	1937	600	110	$29,900,000
	12	Bellvue, IA	556.7	1938	600	110	$27,200,000
	14	Pleasant Valley, IA	493.0	1940	600	110	$29,400,000
	14A (aux)	LeClaire, IA	493.0	1940	320	80	
	19	Keokuk, IA	364.3	1957	1200	110	$51,200,000
Locks located on the east bank of the Mississippi (i.e., the Wisconsin/ Illinois side, but bordering Iowa)	9	Harpers Ferry, IA Lynxville, WI	647.9	1937	600	110	$11,050,000
	13	Clinton, IA Fulton, IL	522.5	1939	600	110	$25,200,000
	15	Rock Island, IL	482.9	1934	600	110	$35,500,000
	15A (aux)	Rock Island, IL	482.9	1934	360	110	
	16	Muscatine, IA Illinois City, IL	457.2	1937	600	110	$32,600,000
	17	New Boston, IL	437.1	1939	600	110	$34,100,000
	18	Gladstone, IL	410.5	1937	600	110	$51,900,000
							Total: $336,600,000

[1] 2008 is the latest data released by the USACE for estimated maintenance costs on a lock-to-lock basis

The entire Upper Mississippi region for the USACE received only $243.8 million in 2008 for not only maintenance, but also operation and rehabilitation [34], in comparison to the above total maintenance needs of $336.6 million. As this funding gap ($92.8 million) continues to grow, the risks borne by potential alternative funding partners increases with it, and until the inadequate public funding is addressed all other funding options become invalid. Due to these deficits, the associated risks of crippling system deficiencies grows; mandating a system of alternative funding solutions to address the problem.

Locks 20–27

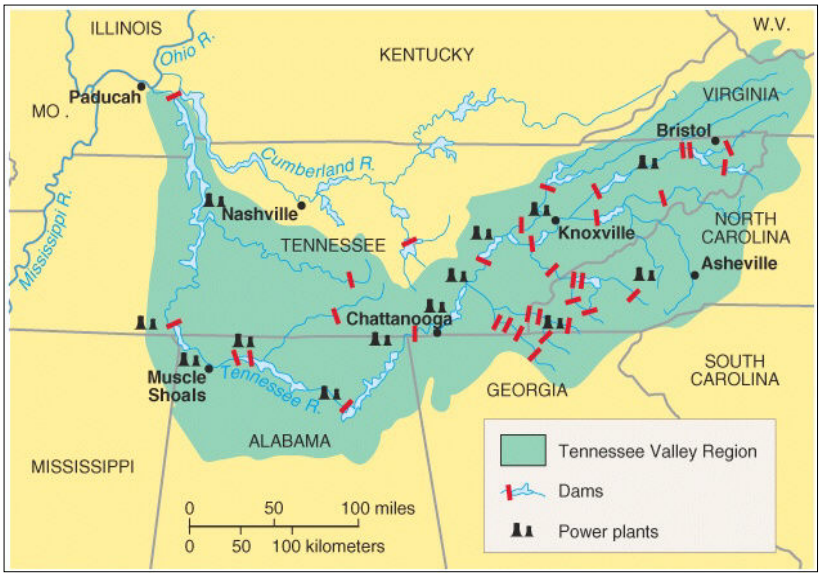
Locks 20-27 border Missouri and Illinois. These facilities are greatly dependent on the commodity movements generated by Iowa; if Iowa's commercial waterway activity is not maintained the effects would be great. Of most importance to this portion of the Mississippi are the three primary tributary river systems: the Illinois, Missouri and Ohio Rivers.

Tennessee Valley Authority River System Management [15] [16]

The Tennessee Valley Authority (TVA) is the nation's largest public power provider and a corporation of the U.S. government. TVA was established by Congress in 1933 by President Franklin Roosevelt as a completely different kind of agency to lift the country out of the Great Depression. His goal was to encompass "a corporation clothed with the power of government but possessed of the flexibility and initiative of a private enterprise."

The TVA region (Figure 6) includes 9 main and 4 auxiliary locks on the Tennessee River, 34 dams, and 27 reservoirs within the region. These locks and dams are owned by the U.S. and their operation is divided between the TVA and the USACE Nashville District. All dams and related buildings, machinery, and lands are operated and maintained by the TVA while the locks are the USACE's responsibility.

Figure 6: The TVA Region [16]



Initially, federal appropriations funded all TVA operations. Appropriations for the TVA power program ended in 1959, and appropriations for TVA's environmental stewardship and economic development activities were phased out by 1999. TVA is now fully self-financing, funding operations primarily through electricity sales and power system financings.

The TVA estimates that shipping goods by barge in the Tennessee River Valley rather than by truck or rail reduces transportation costs by about $550 million each year. These savings from barge prices also work to competitively keep rail and truck costs low. Additionally, economic benefits include incentives for industry to move to locations along the river because of the cost saving possibilities, cities located on the river have thriving economies, and investments in waterfront businesses and industries that provide direct employment for thousands in the region.

TVA's protocols for reservoir operations, river operations and monitoring, and dam monitoring and inspection are some of the best in the nation and have allowed the system to maintain standards of operation allowing for economic growth to the region and system growth for the agency. From 1979 to current day the TVA has increased the value of its assets from $13 billion to $46 billion while continuing to meet its obligation to operate and maintain its systems of dams, reservoirs, and adjacent lands including stewardship of traditional essential water and land activities. No federal appropriations have been received for these stewardship activities since FY 1999 and none have been requested since as this $70-$80 million task is completely funded by power revenues, user fees and sources other than appropriations. Operation and maintenance by the USACE in this District in FY 2013 on the Tennessee River totaled $20.7 million, $6.6 million less than the Rock Island district and conversely, more than adequate when combined with the TVA's resources to maintain and operate the region.

Because the TVA manages the river system as a whole and has been able to grow financially from the region's economic opportunity with power supply and user fees, they are able to focus attention on quality of the river system, including an estimated $240 million saved by flood damage control within the region annually. Recreational use also flourishes in the TVA region with approximately 16.9 million visitors to Tennessee state parks that are helped made possible by TVA's natural resources management, generating over $1.5 billion in total economic output for the region and supporting over 18,600 jobs.

Europe/Germany and the Rhine River

The United States pales in comparison with other nations in regard to operating its waterway systems. Since 2007 the Euro zone has completed 722 waterway projects, Canada 94 public-private projects, and 23 in the United States [14]. A brief overview of elements from the European waterway systems is provided here as background of a stable, robust system that may provide a model for select components of the U.S. inland waterway navigation system.

The overriding framework for all water management issues in the European Union (EU) is the EU Water Framework Directive (WFD). All EU countries have to comply with the WFD and local governments are expected and encouraged to participate in the implementation of objectives.

The importance of local water resources management on a regional scale is increasingly recognized in Germany. The introduction of a new water policy, such as the European Union WFD, has made it easier (and to some extent obligatory) for local governments in Germany to participate increasingly in the management of water resources (the WFD requires certain reforms within the current national and sub-national frameworks in Germany [11]).There are now a number of examples of local governments taking

advantage of these developments as they see the benefits that can be gained by influencing higher-level decision-making in water resources [3].

More than 126 miles long, the Neckar River from Mannheim to Plochingen is the only water transportation route in the Rhine basin that cannot be navigated by ships longer than 344 feet. Through a total of 27 locks and dams, the Neckar River carries maritime traffic to three main trading ports at Heilbronn, Stuttgart and Plochingen. Recently, federal water route authorities decided to expand the Neckar River to accommodate cargo ships up to 442 feet long, awarding five contracts for the planning of maintenance repairs and renewal of the first 10 locks through a public procurement procedure. Private contractors will complete the technical and commercial tasks for this project, planning lock repairs and upgrading their overall stability as the projects progress [32].

Launched in 1992, LIFE+ (The Financial Instrument for the Environment) is one of the spearheads of community policy in Germany along the Rhine River with a focus on environmental improvements. To date, the program has co-financed with the federal government some 2,750 projects with a budget of over $2.1 billion. The LIFE+ Committee is made up of representatives of the 27 member states and is chaired by the Commission. Should this Committee give a favorable opinion, and within the limits of the funds available, the Commission will then decide upon a list of projects to be co-financed. After approval by the European Parliament, individual grant agreements are sent to each successful coordinating beneficiary for signature [9].

Summary

Although the two case study approaches to management of inland waterway systems, the TVA and Rhine River, differ from a top-down, large, executive approach to operation and maintenance (TVA) while the Rhine uses a more grassroots, smaller and coordinating approach they are still both successful in fiscally and operationally managing their systems. The UMRS has a similarly large and executive approach as the TVA but unlike the TVA is does not utilize the synergies of local stakeholders that the current Rhine River system has been built on.

In his presentation in 2001 on River Basin Management and Institutional Development [35], G.J. Alaerts points out the need for initiative and supervision by higher authority with strong local stakeholder participation (and even supervision) as being keys to successful performances within river management. To move that process along he recommends seeking fiscal decentralization and enlisting local stakeholders as owners by raising local revenue for successful financial sustainability. For the state of Iowa and its stakeholders there are many options to approach navigation improvements of the UMRS.

Legal Framework

Existing Laws and Rules

Congress's authority to regulate water resources is primarily rooted in the navigation power implicit in the Commerce Clause of the United States Constitution.[2] Congress has plenary power over interstate commerce, and because navigation is commerce, it may protect the navigable capacity of navigable streams within the United States.[3] Such power grants Congress the authority to prohibit any structure within or over navigable waters or non-navigable tributaries of navigable waters.

The United States has a constitutional right, even a duty, to improve navigation for the benefit of all of its citizens who are affected thereby.[4] So, the federal government may build levees and other public works in, or adjacent to, navigable streams in aid of navigation and flood control, the terms and conditions of which are determined by Congress.[5] The right of the federal government to improve navigation in a navigable waterway extends to the entire bed of the stream up to ordinary high-water mark.[6] Congress's power to give or withhold consent to place obstructions (i.e., structures, fill, etc.) is, however, entirely discretionary and encompasses the authority to grant that privilege upon terms and conditions, and to terminate the privilege once made.[7]

Ownership

The legal regime controlling operations on the Mississippi River and other navigable waterways in Iowa is set forth in the Federal Rivers and Harbors Act. Enacted as part of the Rivers and Harbors Act of 1894, 33 United States Code (USC) § 1 reads:

> It shall be the duty of the Secretary of the Army to prescribe such regulations for the use, administration, and navigation of the navigable waters of the United States as in his judgment the public necessity may require for the protection of life and property, or of operations of the United States in channel improvement, covering all matters not specifically delegated by law to some other executive department.

The Secretary of the Army has delegated the authority to administer the use and navigation of navigable waterways to the Chief of Engineers USACE.[8] Thus, in a standard case, the USACE will own and operate

[2] "The Congress shall power….To regulate commerce with foreign nations, and among the several States, and with the Indian tribes…." U.S. Const. art. I, §8, cl. 3.
[3] U.S. v. Appalachian Elec. Power Co., 311 U.S. 377, 404-405 (1926).
[4] B Amusement Co. v. U.S., 148 Ct. Cl. 337, 180 F.Supp. 383 (1960).
[5] Save the Dunes Council v. Alexander, 584 F.2d 158 (7th Cir. 1978).
[6] City of Demopolis, Ala v. U.S., 167 Ct. Cl. 94, 334 F.2d 657 (1964).
[7] Id. at 426-427.
[8] 33 U.S.C. 540. Army and the supervision of the Chief of Engineers.

a lock and dam structure, however, Congress has granted USACE flexibility to work with state and local agencies as well as private entities.

The Federal Rivers and Harbors Act prohibits obstructions in navigable waters not affirmatively authorized by the Congress except on plans recommended by the Chief of Engineers and authorized by the Secretary of the Army.[9] The creation of any such obstruction, not affirmatively authorized by law, is expressly prohibited.[10] Where the obstruction will not interfere with navigation, however, the Secretary of the Army is invested with discretion to grant or refuse a permit and is not required to state the specific grounds on which that discretion is exercised.[11]

Section 401 of the Federal Rivers and Harbors Act requires the consent of Congress for the erection of structures such as dams in or over navigable waters of the U.S. *not lying wholly within a state*, providing:

> It shall not be lawful to construct or commence the construction of any bridge, causeway, dam, or dike over or in any port, roadstead, haven, harbor, canal, navigable river, or other navigable water of the United States until the consent of Congress to the building of such structures shall have been obtained and until the plans for (1) the bridge or causeway shall have been submitted to and approved by the Secretary of Transportation, or (2) the dam or dike shall have been submitted to and approved by the Chief of Engineers and Secretary of the Army. However, such structures may be built under authority of the legislature of a State across rivers and other waterways the navigable portions of which lie wholly within the limits of a single State, provided the location and plans thereof are submitted to and approved by the Secretary of Transportation or by the Chief of Engineers and Secretary of the Army before construction is commenced.[12]

This statute does not purport to make Congress the source of the right to build; rather, it is assumed that the right comes from the State, and the statute merely subjects the exercise of that right to the further condition of obtaining consent from Congress to the taking of action on the grant.[13]

Title 33 of the Code of Federal Regulations (CFR) provides for instances where navigation structures can be operated by other state and local entities as well as private contractors. One example of regulations governing a *lock* that is not operated by the USACE is found in 33 C.F.R. 207.169, which provides for the use of the navigation lock and dam at Moss Bluff, Florida and establishes the hours of operation for the lock and the required signage to be provided by the *owner or agency controlling the lock*. Another example is Lock and Dam No. 19 located on the Mississippi River near Keokuk, Iowa: while the lock is

[9] 33 U.S.C. 403.
[10] 33 U.S.C. 403(a)
[11] U.S. ex rel. Greathouse v. Hurley, 63 F.2d 137 (App. D.C. 1933).
[12] 33 U.S.C. 401.
[13] Pigeon River Imp., Slide & Boom Co. v. Charles W. Cox, Ltd., 291 U.S. 138 (1934).

owned and operated by the USACE, the *dam* is owned and operated by AmerenUE, a Missouri-based utility which is a subsidiary of Ameren Corporation.

As illustrated above, Congress has not only expressly recognized the need for comprehensive and coordinated development of navigable waters, but it has also given the USACE *broad* authority not only to prevent obstructions to navigation, but also to promote the federal navigational servitude, including transportation improvement and flood control efforts on main stems and tributaries of navigable waters.[14] The USACE has the flexibility to utilize a variety of means to carry out its duties and obligations, including working with state and local governments, as well as private entities.

One example of this is the USACE's authority to enter into *cooperative agreements* with the Upper Mississippi River Basin Association and other agencies to promote and facilitate active State government participation in the river system management, development, and protection.[15] Another is the express authorization States are afforded to enter into cooperative agreements, establish agencies, and designate multi-State entities under 33 U.S.C. 652(d)(1) for river development, which provides:

> The consent of Congress is hereby given to the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, or any two or more of such States, to *enter into negotiations for agreements*, not in conflict with any law of the United States, *for cooperative effort and mutual assistance in the comprehensive planning for the use, protection, growth, and development of the Upper Mississippi River system*, and to establish such agencies, joint or otherwise, or designate an existing multi-State entity, as they may deem desirable for making effective such agreements."[16]

In fact, persons other than the USACE are expressly authorized to make various improvements to navigable waters so long as the USACE approves any such improvement plan, as seen under 33 U.S.C. 565:

> Any person or persons, corporations, municipal or private, who desire to improve any navigable river, or any part thereof, *at their or its own expense and risk* may do so upon the approval of the plans and specifications of said proposed improvement by the Secretary of the Army and Chief of Engineers of the Army. The plan of said improvement must conform with the general plan of the Government improvements, must not impede navigation, and *no toll* shall be imposed on account thereof, and *said improvement shall at all times be under the control and supervision of the Secretary of the Army and Chief of Engineers*.[17]

[14] 33 U.S.C. 401, 403, & 407.
[15] 33 U.S.C. 652(d)(2); See also 33 U.S.C. 701-1.
[16] 33 U.S.C. 652(d)(1); See also 33 U.S.C. 701-1.
[17] 33 U.S.C. 565.

It is important to note that in all such cases, the USACE retains oversight and involvement with the locks and dams as they are required under 33 USC § 1.

Hydroelectric Structures (FERC)

Another standard arrangement is the ownership and operation of hydroelectric structures. In this instance, federal oversight through Title 33 also remains. For example, 33 C.F.R. 207.310 provides for the operation of the power dam at Keokuk, Iowa by the private power company. Supplementing this federal authority is the Federal Power Act in Chapter 12 of Title 16 of the United States Code. The Federal Power Act creates a statutory scheme designed to allow federally supervised *development* of the nation's water resources for power and recreational uses. This act created the Federal Energy Regulatory Commission (FERC) whose jurisdiction includes hydroelectric projects. The coordination of oversight between the USACE and FERC is governed by a 1981 Memorandum of Understanding.

Section 825h of the Federal Power Act provides that FERC "shall have the power…to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate to carry out the provisions of [the FPA]."[18] FERC is also authorized under the Federal Power Act to issue licenses to *private parties* or to *state and local governments* for the purpose of "constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient" in order to develop and improve navigation and to develop, transmit, and utilize power.[19] Significantly, however, no license affecting the navigable capacity of any navigable waters of the United States may be issued until the plans of the dam or other structures affecting the navigation have been approved by the Chief of Engineers and the Secretary of the Army.[20] Section 6 of the Federal Power Act establishes that licenses may be granted for a period of fifty years or less[21] and that FERC may award licenses to project proposals "best adapted to a comprehensive plan for improving or developing a waterway."[22] The controlling standard is whether a particular project will be in the public interest.[23]

FERC involvement in hydroelectric projects is most common for the development of new hydroelectric facilities. However, federal law does not prohibit the conversion of existing dams for hydroelectric use. For instance, in 2007 three new hydroelectric plants were dedicated at existing dams in Arkansas. In fact, these dams had been constructed by the USACE in the early 1900s as locks. When no longer needed, the locks were decommissioned and sold, one to a city and the other two to private interests. It

[18] 16 U.S.C. 825h.
[19] 16 U.S.C. 797(e). See *VA Timberline, LLC v. Appalachian Power Co.*, 08-1248 (4th Cir. 8/31/09), 343 Fed. Appx. 915
[20] 16 U.S.C. 797(e).
[21] 16 U.S.C. 799.
[22] 16 U.S.C. 803(a)(1).
[23] Udall v. FPC, 387 U.S. 428, 450 (1967).

was not until the 1980s that work began to investigate the possibility of hydro development at these sites.

Federal Authority to Sell/Lease Locks and Dams

Article IV, section 3, clause 2 of the U.S. Constitution—the Property Clause—provides:

> The Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States…."

By virtue of the Property Clause, no agency or official of the government is authorized to sell, lease, give away, or otherwise dispose of governmental property without statutory authority, either explicitly or by necessary implication.

As the Supreme Court put it in one case:

> Power to release or otherwise dispose of the rights and property of the United States is lodged in the Congress by the Constitution. Art. IV, §3, Cl. 2. Subordinate officers of the United States are without that power, save only as it has been conferred upon them by Act of Congress or is to be implied from other powers so granted.[24]

Further, the Supreme Court has provided that "Like any other owner [Congress] may provide when, how, and to whom its land can be sold."[25]

Leasing is a form of disposal for purpose of the Property Clause, and is therefore a function of Congress.[26] Accordingly, a federal agency needs statutory authority in order to "outlease (lease government-owned property to nongovernmental parties) property under its control. Naturally, when and if Congress grants such authority, it may also impose conditions on it.[27]

It is important to note that once a dam or lock is sold or leased, however, federal regulation, oversight, and cooperation by the FERC and USACE remains.

In the event of a sale, lease and/or shift in operating authority between the federal government and a state, local or private entity for a navigation structure, the operation requirements will be made part of the transfer agreement[28]. For consideration of user fees as a repayment source for availability payments, it should be noted that implementation of such fees would require policy action by the government to

[24] Royal Indemnity Co., v. United States, 313 U.S. 289, 294 (1941).
[25] United States v. Midwest Oil Co., 236 U.S. 459, 474 (1915).
[26] Ashwander v. Tennessee Valley Authority, 297 U.S. 288, 331 (1995).
[27] E.g., Light . United States, 220 U.S. 523, 536 (1911) (United States "can prohibit absolutely or fix the terms on which its property may be used").
[28] Title 33 of the Code of Federal Regulations

modify the prohibition on tolling in 33 USC 565. It is important to note that in all such cases, the USACE retains oversight and involvement with the locks and dams as they are required under 33 USC § 1.

Engineering Considerations

While engineering challenges will continue to exist with maintenance, rehabilitation, and potential improvements to the system, the potential engineering issues appear more manageable than the economic and political concerns. With enabling legislation and proper funding, most of the engineering issues could be adequately addressed; however, without this legislation and funding, the opportunities to address potential engineering issues will be severely limited. Such engineering issues may include:

- Liability – If ownership and/or operations of portions of the lock and dam system are transferred to state/local entities, they will likely also take on additional liability (federal agencies typically have more sovereignty and less liability).
- Engineering Capacity – Most design work was completed 50 to 70 years ago, and the attrition of engineers with institutional knowledge and design experience with the lock and dam system continues to decrease, reducing the available resources for engineering design
- Flood Risk Management – While the authorized purpose of the system was inland waterway navigation, a flood risk management component of operations does exist. USACE currently manages flood risk operations along with navigation. If ownership and/or operations of the lock and dam system are transferred to other entities, the flood risk management and navigation responsibilities could either be retained by one entity or divided between several entities.
- Operations & Maintenance (O&M) – Maintaining navigation during high/low water levels may become increasingly challenging as climate variability produces more extreme weather patterns (larger floods and more severe droughts). In addition, maintaining structural, mechanical, and electrical components of system will be very challenging without significant investments given the age and condition of infrastructure.
- Ecosystem/Environmental
  - Aquatic Invasive Species (AIS) – The transfer of AIS between ecosystems via the Mississippi River has and continues to be a prominent environmental issue involving the system regardless of ownership.
  - Rehabilitation/System Improvements – Significant construction projects will require a thorough assessment of potential environmental issues including impacts to aquatic habitats and accommodations for dredged materials.

The federal highway system and toll road authorities provide examples of federal infrastructure being integrated with state/local government and/or private industry. As with these examples, the primary issues associated with restructuring the ownership and operation of the lock and dam system are economic-, legal-, and legislative-related, rather than engineering-related. Based on engineering considerations, it would appear that the preferred option is likely to allow for state/local agencies to provide dedicated funding for O&M and rehabilitation of the lock and dam system while maintaining ownership and O&M responsibility with USACE.

Commercial Framework

Commodity Movement Characteristics

As is evidenced by the tonnage statistics provided in Appendix C, the trends in commodity and barge flows are very similar for all 11 locks and dams along Iowa's border (the correlation over time in tonnage trends by lock is over 95 percent with each lock along Iowa's border). Lock 19 at Keokuk, Iowa, the southernmost and highest-volume lock in this part of the UMRS, can be used to characterize typical volumes through the Iowa lock and dam system. In 2011, more than 20 million tons passed through lock 19 with a value of about $3 billion. About 40 percent of these volumes originated in the state of Iowa and 20 percent had a destination in the state. Of all the barge movements through this lock, about 70 percent are loaded and 30 percent empty.

Using this "state to state" data, three major cargo movements can be identified that pass through Lock 19 which account for the most tonnage within Iowa's inland waterway system:

1. Grains southbound to Louisiana. On a volume basis, grains are more than half of the total volume (of the grains, corn comprises 70 percent, soybeans 20 percent, and other grains 10 percent of total);
2. Chemical fertilizers northbound from Louisiana; and,
3. Sand and gravel from Louisiana.

The volumes passing through the other Iowa locks but do not pass through Lock 19 are primarily coal, sand and gravel, and petroleum.

Modal Shifts

U.S. Domestic Trade

The trade volume for marine ports is expected to double from 2011 levels by 2021, and double again shortly after 2030 [Appendix B]. Even if global growth slows due to economic problems in Europe, the U.S.'s major trading partners are a diverse set of countries in Asia and Latin America, and the growth forecasts are indicative of long- term trends that will require major investments in U.S. ports. In the next decade, total U.S. exports are expected to surpass imports for the first time in a generation (see Appendix B).

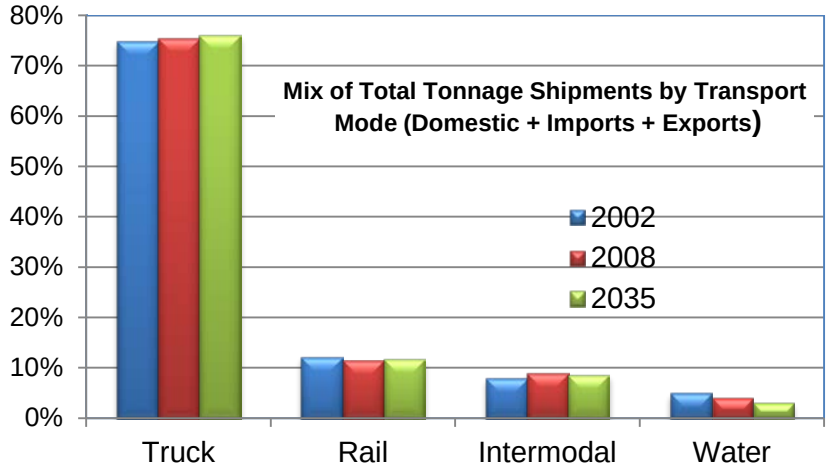
The U.S.'s Freight Transportation Network

The U.S. has an extensive transportation network including railways, roadways and waterways. Trucks carry most of the tonnage and value of freight, but typically only over short distances. Railroads and waterways carry significant volumes over long distances. The biggest rail volume movement is coal (between the Powder River Basin and the Midwest), and the largest inland waterways volume movement is along the Lower Mississippi River. Through 2035, the mix by transportation modes is forecasted to

show little change (Figure 7), but the forecasted growth will place pressure on the domestic transportation network for all modes of transportation.

As trade barriers fall around the world, a new trade barrier is rising across the continental U.S. Congestion at the nation's ports, on its highways, and along its railroads is becoming the traffic barrier of the 21st century. Exports are critical to increasing markets for U.S. farmers; in many Midwestern states, agricultural products are the first or second largest share of products moving on the freight networks. Trucks, railcars, and barges all contribute to a network that moves bulk grain to processors where it is converted into value-added exports. As the world grows more competitive, U.S.'s freight network grows more congested.

Figure 7: Total Tonnage Shipments [Appendix B]



With such an increase in growth looming on the horizon, U.S. shippers realize that the nation's current transportation system cannot handle the forecasted increases. Trucking is clearly the dominant mode of shipping and faces some of the largest problems. However, all the modes play a critical important role in the transportation system. Rail is essential for intermodal and bulk movements across the continent, particularly for items such as automobiles, coal, farm products, chemicals and ore. Domestic shipping by waterway is irreplaceable for the high-volume, low-cost movement of chemicals, grains, ore, aggregates, and salt, particularly on the Mississippi and Ohio River systems.

Inland Waterways in the U.S.

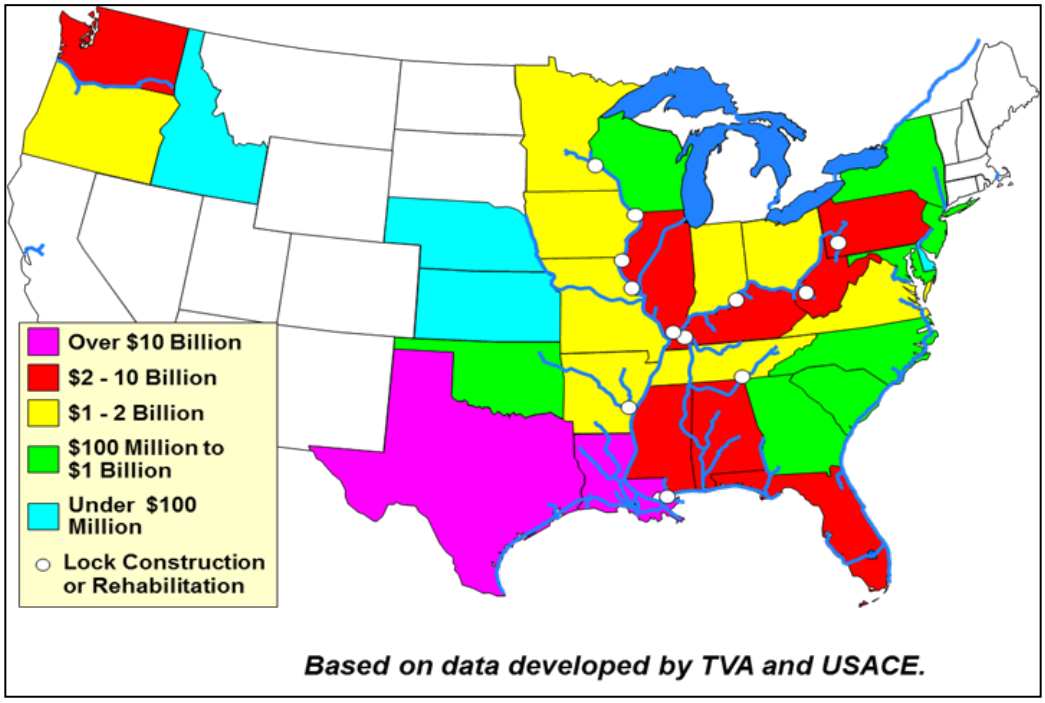
The Inland Waterway System (IWWS) is a key element in the nation's transportation system. This intricate system of waterways ties inland ports to marine ports and provides one of the most cost-effective ways of moving a wide variety of freight within the 48 states and between the U.S. and all of its major trading partners. Approximately 12,000 miles of inland and intracoastal waterways in the United States are commercially navigable.

Planning is critical for the health of the inland and intracoastal waterways. The inland waterway system is currently underutilized for freight transportation. The system is plagued by a lack of capital investment for dredging, lock expansion, channel maintenance and improved port facilities. It is not managed as a key component of the intermodal freight system. As a result, the potential for increased movements of containers on barges has not been realized.

The Inland waterways are a strategic asset to the nation, enabling the U.S. to significantly increase economic output in both domestic and international markets, and move important national defense resources and other supplies in large quantities. Over the next 20 years economists estimate that inland navigation will increase by more than 35 percent [31]. The U.S.'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. Every year, roughly 625 million tons of waterborne cargo transit the inland waterways, a volume equal to about 14 percent of all intercity freight and valued at nearly $70 billion [31]. The annual traffic on the U.S.'s inland navigation system, including the Gulf Intracoastal Waterway and the Ohio, Mississippi (including UMRS), and Columbia-Snake River systems carries the equivalent of 58 million truck trips each year. Today, the Mississippi (including UMRS) and Ohio River systems carry almost 90 percent of all the inland waterway tonnage.

Figure 8 below is a map that shows the level to which the various states use the waterway system.

Figure 8. Value of the Inland Waterway Cargo Shipments by State [26]

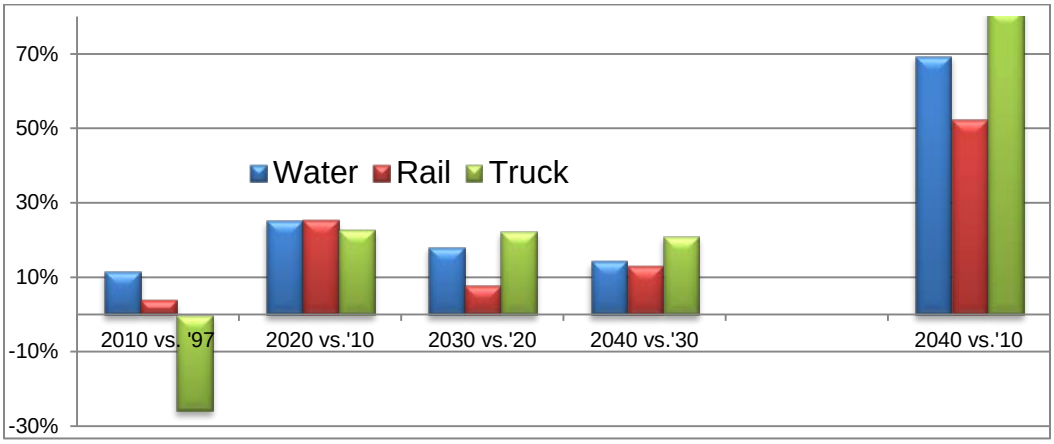


Inland Waterway Shipping Forecast

By 2025, tonnage traffic on inland waterways is expected to increase by 23 percent from 2010; rail is projected to grow by 18 percent and truck freight tonnage by 22 percent. By 2040, this increase is expected to be over 50 percent for trucks, 40 percent for water and 38 percent for rail [Appendix B].

A sum of all the commodities moved from the state of Louisiana to the Mississippi River states*, and all commodities moved from the 8 states on the Mississippi River* to Louisiana show a forecasted growth rate of almost 100 percent from 2010 to 2040 (Figures 9 and 10).

Figure 9: Projected Tonnage Growth Rate for the Mississippi River States* [Appendix B]

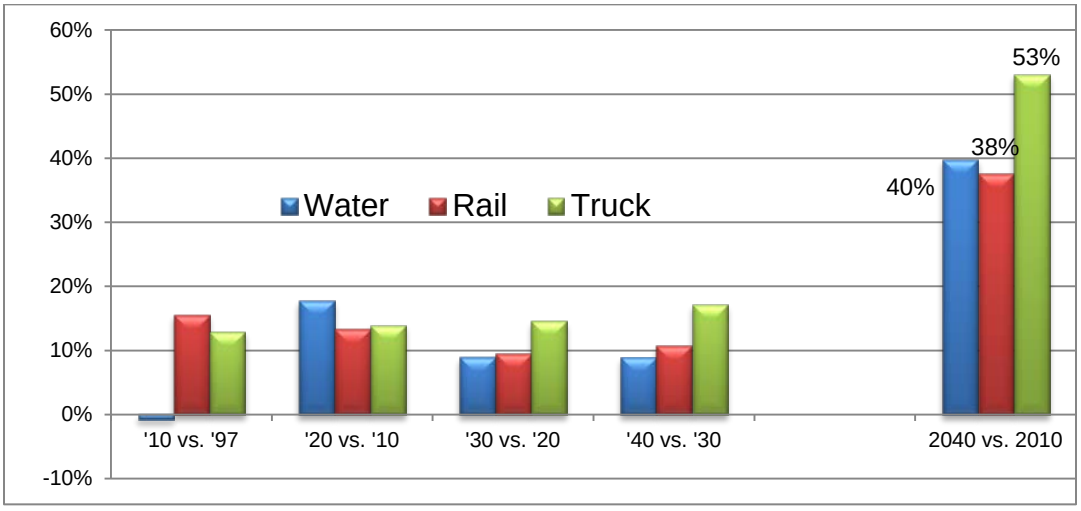


* States included: Mississippi, Arkansas, Tennessee, Kentucky, Missouri, Illinois, Iowa, Wisconsin, and Minnesota

The forecasted growth over the period (2010 to 2040) for water, rail and truck volume along the Mississippi is about double the national average, placing an increased demand on an already stressed system. Iowa clearly has a vested interest in seeing the UMRS improved to meet increased demand.

Historically water borne transportation, nationally, has had the slowest growth, but looking ahead, the forecasted growth rate for inland waterway cargoes is somewhat consistent for each of the three modes of transportation. Thus for the Mississippi River, the forecast is higher than the National average, as shown in Figure 10 below.

Figure 10. Forecasted Growth Rate 2040 vs. 2010 [Appendix B]



In the same period, Iowa is forecasted to grow its share of the total tonnage moved along the Mississippi River as shown in Table 2.

Table 2: Iowa's Share of Total Tonnage on the Mississippi River [Appendix C]

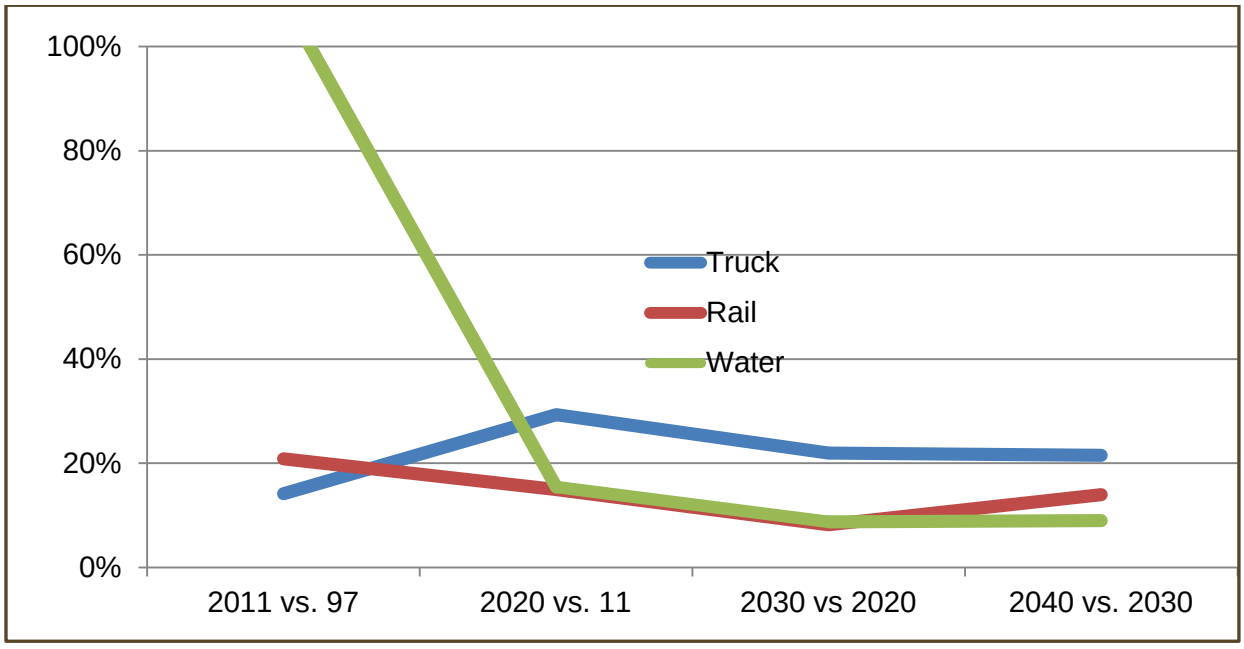
	1997	2010	2040
Iowa as percent of the total tonnage *	2%	5%	6%

* Of the states Mississippi, Arkansas, Tennessee, Kentucky, Missouri, Illinois, Iowa, Wisconsin, and Minnesota

The opportunity exists for Iowa to place additional emphasis on the flow of commodities into, and out of the state via water. Iowa's forecasted growth is greater than the total U.S. growth of inland waterway shipments. [Appendix B]

Iowa's forecasted growth rate for all three modes of transportation are very similar. Iowa has the potential to grow the volume of water traffic on the Mississippi River (Figure 11); however, this growth is dependent on a waterway system that has the long-term capacity to physically handle the growth, and the focus of the state in increasing both imports and exports volume, as well as interstate flows along the river.

Figure 11: Iowa's Forecasted Growth [Appendix B]



Benefits of an Improved System

The benefits of inland waterway transportation are well documented. A 2007 study by the Texas Transportation Institute, *A Modal Comparison of Domestic Freight Transportation Effects on The General Public*, cites major economic benefits of marine transportation relative to other transportation modes including cargo capacity, congestion, energy efficiency/emissions, and safety and infrastructure maintenance impacts. The USACE projects that the inland and intracoastal waterways move over 600 million tons of cargo and provide almost $7 billion in annual transportation savings to the economy as compared to using trucks or trains [27]. The Mississippi River system comprises about 60 percent of this volume and therefore accounts for annual economic benefits of about $4 billion in addition to other benefits such as emission reductions [25].

Appendix B includes an economic impact model developed to assess the economic benefits of barge movements that currently use the UMRS and pass through lock and dam 19 at Keokuk, Iowa. The model quantifies in monetary terms the benefits of waterborne freight movements from:

- Reduced shipping/transportation costs relative to other modes;
- Reduced emission levels relative to other modes;
- Reduced maintenance relative to other modes;
- Reduced roadway congestion due to truck traffic; and,
- Reduced accidents relative to other modes (relative to barge).

The economic benefits of existing freight (2011) passing through lock and dam 19 as opposed to being shipped by rail are $500 million per year, as shown in Table 3 and detailed in Appendix C. If the lock system failed and all traffic moved to other modes, there would be an economic loss of $500 million per year or about $7 billion over 20 years[29].

Table 3: Economic Benefits of Total Barge Freight Traffic passing through Lock and Dam 19, 2011

Annual Economic Benefits ($Million)	
Reduced shipping/transportation costs	$384.0
Reduced emissions	$29.3
Reduced maintenance	$34.3
Reduced accidents.	$78.4
Total Economic Benefits	**$525.9**

[29] Annual impacts were discounted at a rate of 7% real as per CBO guidance and assuming no growth.

Using the shipment origin as a means of allocating these impacts by state implies that about 40 percent of these benefits accrue to the state of Iowa, or about $200 million per year or $3 billion over the next 20 years. Other states, such as Minnesota, also realize significant benefits.

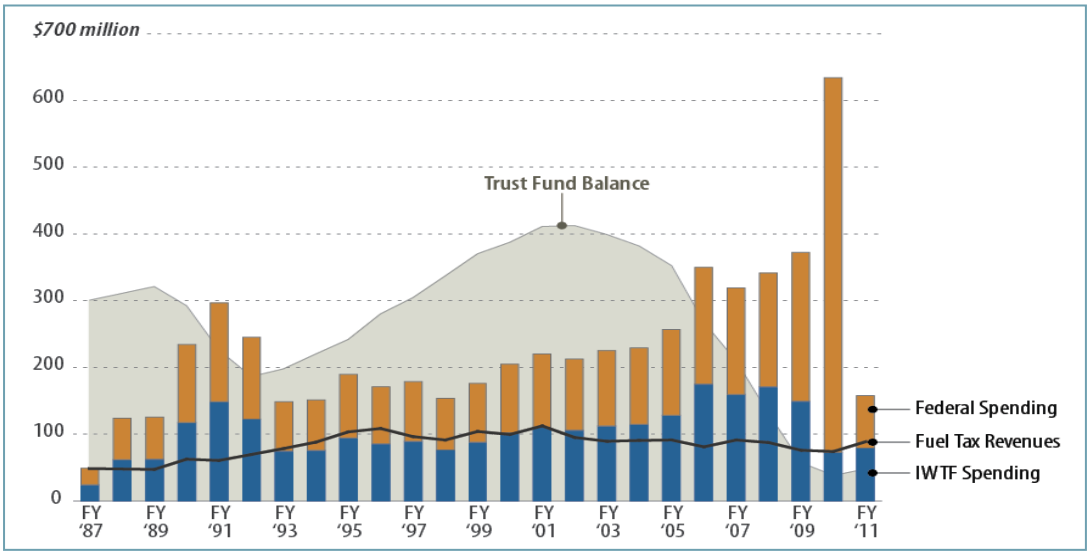
These benefits reflect the benefits received by current users of the system. The upcoming expansion of the Panama Canal will provide a great economic opportunity for U.S. exporters, in particular Iowa and other Midwestern grain producers. The expanded canal will allow the passage of much larger vessels and will significantly reduce transportation costs to key Asian export markets. Gaining economical access to that market would give Iowa the opportunity to capture market share, grow its economy, and create new jobs. However, while the potential opportunity exists, the current state of the UMRS is a barrier to capitalizing on the opportunity. Without a reliable transportation system, this economic opportunity will be lost.

Current Funding Options

Funding of the inland waterway system is governed by the WRDA of 1986. Under the Act, operation and maintenance of the system is the *full* responsibility of the federal government through the USACE. Construction and major rehabilitation projects[30] are equally shared between the federal government and users of the inland waterway system through the Inland Waterway Trust Fund (IWTF), Figure 12, with the Trust Fund being supported from a $0.20 per gallon tax on barge fuel. This level of a $0.20 tax per gallon has been in place since 1995 and has recently averaged about $85 million a year in tax revenues. The federal spending share, as represented by appropriations, did increase in recent years through a number of stop gap measures such as funding made available through the American Recovery and Reinvestment Act (see FY 2010 spike in Figure 12) that did not require an equal cost share.

Figure 12: State of the Inland Waterways Trust Fund

Source: USACE data adapted by CRS



[30] This is currently defined as projects with a cost in excess of $8 million.

Since 2002, the Trust Fund balance has been in a state of decline through IWTF-funded projects, some of which had significant cost over-runs. Currently, the USACE faces a massive backlog of authorized but unfunded projects. The Inland Waterways User Board (IWUB) has identified unconstrained investment needs for the next 20 years totaling $18 billion or about $900 million per year for new construction and major rehabilitation (Inland Marine Transportation Systems, 2010) [6]. However, the IWUB proposes a targeted and prioritized investment strategy requiring annual funding of $380 million to bring the system up to a sustainable and reliable level. This funding reflects what could reasonably be achieved over 20 years to maintain a reliable system. In fact, *one project alone* – the Olmsted Lock on the Ohio River – now has a price tag of $3.1 billion and a schedule that spans another decade [19]. Today the IWTF balance is all but depleted with a balance of about $35 million at year end 2011 as shown in Figure 12, and it is critical to examine new approaches to funding the system. Current annual taxes to the Trust Fund are far less than the level of annual investment required as identified by the IWUB.

All stakeholders recognize the issue that the inland waterways infrastructure requires a significant injection of investment in the system coupled with a new approach to funding these investments [8]. However, despite many reports and different proposals on how to finance the system, an ongoing lack of consensus across the federal level and all stakeholders on how to best approach the issue has accomplished nothing and a "business as usual" approach remains in place.

Alternative Approaches to Funding and Operating

So what are the options for increasing funding to invest in the inland waterway system? Over the past 30 years, the same issues have been debated and discussed including the Congressional Budget Office's 1992 "Paying for Highways, Airways and Waterways" [29]. More recently, there have been several reports from different organizations concerned about the inland waterway system that provide a balanced discussion of the core issues and lay out the range of possible options including some specific recommendations for financing the system.

Using these and other sources, Table 4 presents the range of options that should be considered for appropriately funding UMRS. It should be noted that these various options are not necessarily mutually exclusive and combinations of the various options may ultimately be what is required to get proper levels of funding in place. However, given the state of decline of some of the facilities in the UMRS, some of these options are likely more realistic than others in the near term.

Table 4: Summary of Funding Options

	Option	Description	Impact
1	Business as Usual	Same funding mechanism.	• Continued deterioration of the system; likely results in a significant reduction in system reliability • Could ultimately result in system failure and closure of some parts of the system. • Annual IWTF of $85 million (excl. federal match) • Foregone economic benefits • Lost opportunity to take advantage of upcoming Panama Canal expansion
2	Reduced Level of Service and/or Decommissioning	Close or decrease level of service (LOS) for specific facilities where traffic does not warrant operations. Redirect savings to active facilities. Reducing LOS or closing parts of the system on a cost benefit analysis basis might be a realistic operational approach to planning under a restricted funding scenario.	• Minimized economic losses • Optimization of budget-constrained system
3	Increased Funding from Traditional Sources	Increases in the level of annual funding from current system users and/or federal appropriations.	• Users of the system are quite price-sensitive and higher fees may lead to modal shift. • Current limited U.S. federal budget may make increased funding unrealistic.
3a	Increase Federal Funding	Change the funding mechanism to facilitate a larger share of federal funding.	• The business case exists as the USACE recognizes that public benefits exceed the required infrastructure costs BUT… • Current U.S. federal budget limitations make increased funding unrealistic?
3b	Increase User Fees	Increase the excise tax from its current level and/or implement other fees such as a lockage fee, segment tolls, cargo and/or tonnage based fees to derive additional funding from users. There are different philosophies on how to charge users: (i) marginal cost pricing, or (ii) average cost pricing. Could charge all system users, not just barges, to raise additional funds.	• User fees have not increased since 1995. • IWUB indicated a willingness to increase the tax. • Significant increases in user fees would be required to have an impact. A doubling of existing fees would only generate about $85 million/year. • Implementing different types of user funding mechanisms may have equity impacts that could result in additional resistance. Users of the system are quite price-sensitive and

	Option	Description	Impact
			higher fees may lead to modal shift. • User fees alone will not be sufficient to fund improvements. • Congress rejected plans for new fees.
3c	Increase User Fees and Federal Funding	A hybrid of 3a and 3b – increasing funding from both users and the federal government. The funding share may vary between both parties.	• Most realistic of Option 3. Funding from both parties will have to increase to make a difference.
4	Partnerships	Business arrangements from non-traditional sources are leveraged to advance capital improvements.	• Partners could include the private sector and/or public entities.
4a	Private Sector Partnerships (P3)	Private partners enter into contracts to upgrade and operate the locks, dams and channels in exchange for a stream of annual payments from the federal government over a concession life (e.g., 30 years). The system could be split into segments and each segment assessed/prioritized for P3 viability.	• The stream of payments to the private partner would have to be sourced from the federal government and users (like option 3) • A successful arrangement could advance major capital works • Given current state of the system and traffic levels, may be unrealistic unless users and federal government indicate willingness to increase annual funding levels • Historical union resistance to privatization
4b	Other Non-federal Public Sector Partners	States, local governments and/or Port Authorities would provide funding for specific infrastructure improvements in the state or region (where net economic benefits warrant the investment). Given the waterway is a *system*, such arrangements would likely have to involve a coalition of several states such as those on the Mississippi River.	• Could help get specific projects deemed important to the state/region completed sooner • Other government budgetary situations may limit the applicability of this option.
5	Bonding/Issuing Debt Approach [18]	Bonding is typically used when the initial capital to fund transportation infrastructure exceeds available funding, facilitating an immediate infusion of cash from the bond proceeds. The bonds would be securitized against funds from the current or enhanced excise tax that supports the IWTF.	• There would be a higher cost of borrowing and transaction fees using this approach. • This approach can bring projects to construction and completion much more quickly providing economic benefits. • Provides access to capital for transportation projects from a wide variety of investors.

Of the options discussed in Table 4, not all are implementable in the near term and not all are a stand-alone solution. Four questions or characteristics should be considered to determine whether an option is imminently practical and can address the issue in the near term:

1. Timeliness – can the option be implemented in months as opposed to years?
2. Full-system solution – can the option on its own be applied over the full inland waterway system?
3. Stand-alone – can the option by itself be sufficient to resolve the funding issue?
4. Administrative ease – can the option be implemented without adding additional administration burden or without requiring legislative changes?

Table 5: Assessment of Fund Options

Option	Timeliness	Full System Solution	Stand Alone Solution	Administrative Ease
1. No Action	Yes	Yes	No	Yes
2. Partial Divestiture	No	No	No	Yes
3. Funding from traditional sources	Yes	Yes	Yes	Yes
4. Partnerships	No	to be determined	to be determined	No
5. Bonding	No	Yes	Yes	No

The assessment of the identified options reveals that leveraging increased funding from traditional sources is the only practical option to dealing with the funding issue in the short term. Other options like partial divestiture and partnerships should also be explored and if feasible, can also be implemented when practical.

The bonding approach can possibly provide access to an infusion of large amounts of capital for lock and dam infrastructure projects. The Texas Transportation Institute report indicates that this approach, when combined with moderate increases to user fees, can provide an infusion of up to approximately $2 billion over the next 8 years. Therefore, it is worthy of further discussion and analysis especially when combined with increased funding from traditional sources.

The key determination of how much funding can be raised is the interest rate that investors will require which is a function of how “risky” the investment is perceived to be. Shifting to a debt-financing framework runs counter to the heart of the pay-as-you-go trust fund philosophy that Congress has adhered to for decades. This new approach may be regarded as risky by the rating agencies, making the cost of money that much higher relative to using Treasuries. Also, backing projects with fuel taxes would require some faith that the tax could be raised to protect the debt-service ratio, and the market would presumably see that as a huge political risk, another reason to expect high borrowing costs.

Is Increased Funding from Traditional Sources Realistic?

While leveraging traditional funding sources may be the only possible option for immediate action, implementation ultimately requires support from Congress and as such to reach a consensus on the issue likely requires support from system users as well. It appears through the IWUB report and proposal that there is a willingness by users to have the current fuel tax increase. The IWUB proposal targets $380M

year in funding for capital and major rehabilitation work with the user fuel tax increasing from $0.20 to *at least* $0.26 per gallon (or 30 percent).

Is it realistic to have users of the system pay more into the IWTF by raising the current excise tax on fuel to at least $0.26? It is important to consider the market implications of such a tax change:

- The current level of $0.20 per gallon was set in 1995 and has remained unchanged since then. Since 1995, general inflation has increased by approximately 50 percent and fuel prices have tripled. If the fuel tax had been indexed to general inflation, the current tax rate would be about $0.30 per gallon.
- Margins in the inland marine transportation industry are broadly recognized as being very low. The current fuel tax as a proportion of the overall shipping rate is estimated to be about 2 percent for grain movements. An increase in the fuel tax rate to $0.26 would increase the overall shipping rate by roughly 0.6 percent assuming that this increase in cost is passed on to the shipper.
- With an increased cost to shippers, there will be the potential for a modal shift of some tonnage off the inland waterway and onto other modes. The one-time increase in the shipping rate would be roughly 0.6 percent and therefore could result in a small modal shift of about one percent and result in some overall economic loss.
- The "business as usual" option will increase system unreliability and also result in modal shifts away from the inland waterways and economic losses. Frankly, there is a trade off between the tax change and reliability effects and both should be considered in establishing new tax policy.

It does appear that increasing user rates to at least $0.26 is a realistic option. It has the support of at least some users (e.g., IWUB) and can be accomplished without large-scale modal effects and economic losses.

While realistic, a change in the excise tax to $0.26 will only generate about another $25M in taxes bringing user contributions to the IWTF to about $110M per year. Assuming a willingness of the federal government to match this increased amount with appropriations, the potential amount available for capital and major rehabilitation projects would be $220M year. While this is a meaningful increase, it is far short of the $380M/year proposed by IWUB.

A "rate elasticity" is used to depict the sensitivity of demand to changes in characteristics such as rates. For example, a rate elasticity of -1.0 implies that a (say) 10 percent increase in water shipping rates will lead to a 10 percent modal shift away from the waterway, with everything else being held equal. Similarly, an elasticity of -0.5, would yield a 5 percent modal shift. While rate elasticity estimates vary by geography and commodity, generalized elasticities of -1.0 and -0.5 can be used to illustrate the high-level implications on tax revenues, modal shifts and the economy of changing increasing user fees across the entire inland waterway systems.

Table 6: Impact of Changing User Fees on Modal Shift, Elasticity = -1.0

Fuel Tax Rate	% Change in Shipping Rate	% Modal Switch	Fuel Tax Revenues	Increase in Revenues	Economic Loss: Shipping Rate Increases
$0.20	N/A	N/A	$85	N/A	N/A
$0.26	0.6%	-0.6%	$110	$25	-$40
$0.30	1.0%	-1.0%	$125	$40	-$67
$0.35	1.5%	-1.5%	$144	$59	-$99
$0.40	2.0%	-2.0%	$161	$76	-$132
$0.485	2.9%	-2.8%	$190	$105	-$186

Table 7: Impact of Changing User Fees on Modal Shift, Elasticity = -0.5

Fuel Tax Rate	% Change in Shipping Rate	% Modal Switch	Fuel Tax Revenues	Increase in Revenues	Economic Loss: Shipping Rate Increases
$0.20	N/A	N/A	$85	N/A	N/A
$0.26	0.6%	-0.3%	$110	$25	-$20
$0.30	1.0%	-0.5%	$126	$41	-$33
$0.35	1.5%	-0.8%	$146	$61	-$50
$0.40	2.0%	-1.0%	$166	$81	-$66
$0.485	2.9%	-1.4%	$198	$113	-$94

This high-level analysis illustrates several things that should be kept in mind when tax policy decisions are made regarding any changes to the fuel tax rate:

- The fuel tax rate is itself a small proportion of the overall shipping rate and therefore large changes to the fuel tax rate itself translates into relatively small changes in the overall shipping rate.
- Changes in the fuel tax rate will translate into modal shifts off the inland waterway.
- The fuel tax rate itself would have to increase to a level of about $0.35 a gallon to yield a $50M per year increase in revenues with an elasticity of 0.5.
- The fuel tax itself would have to increase to $0.485 a gallon to yield total fuel tax revenues that equate to half of the $380M per year identified as needed by IWUB.

- The economic loss associated with fuel tax increases is generally comparable or greater in magnitude than the increased revenues from the tax increase, holding all other things equal (e.g., assuming no system reliability improvement).

Summary

It does appear realistic to increase funding for infrastructure improvements through revenues from users from changes to the current fuel tax rate (or other fees). However, significant increases in the fuel tax rate would be required to yield significant (e.g., >$50M per year) funding increases from users. If fuel tax rates are increased, consideration should be given to indexing them to inflation to avoid future funding gaps.

Alternative Delivery and Operations Structures

Agencies often turn to alternative delivery and/or operations when single-source funding is not available on a timely schedule, when financing is needed to bring monies forward, when innovative solutions to design or maintenance issues are needed, or when a consensus or partnership between agencies and organizations would be advantageous to the development of the project. This section looks at both public-public partnerships and public-private partnerships as potential methods to building and improving infrastructure.

Public-Public Partnerships

A public–public partnership is a partnership between a government body or public authority and another such body or a non-profit organization to provide services and/or facilities. Partners can include other local, regional, state, federal, first nations or aboriginal governments; school boards; parks boards; non-governmental organizations; unions; professional organizations; non-profits; and community groups.

The USACE has partnered with local project sponsors on water resources projects. Section 221 of the 1970 Flood Control Act defines a "local sponsor" for a USACE water-resources project as a non-federal interest that is "a legally constituted public body with full authority and capability to perform the terms of its agreements and to pay damages, if necessary, in the event of failure to perform." A local (non-federal) sponsor has the legal and financial capability to provide the cash and real estate requirements needed for a project. A local sponsor could be a town, port, county, or state. A non-profit entity can serve as a local sponsor with the consent of the affected local government. Stakeholders who coordinate local interests with the non-federal sponsor and the USACE are environmental groups, community and citizen groups, developers, and others.

As mentioned in the Legal Framework section of this document, the USACE has the authority to enter into cooperative agreements with other public agencies to develop the river system – i.e., public-public partnerships. It is also notable that 33 USC 565, as discussed previously in the Legal Framework section, states that no toll may be imposed on a river.

Some examples of public-public partnerships include:

- Texas State Highway 21 (SH-21) was developed as a public-public partnership between the state transportation agency and the local toll road authority.
- The C&O Canal Trust is the official nonprofit partner of the Chesapeake & Ohio Canal National Historical Park. Its mission is to work in partnership with the National Park Service to protect, restore, and promote the C&O Canal. The Trust engages communities and individuals to realize the Park’s historical, natural, and recreational potential.
- The Ohio & Erie Canalway is a National Heritage Area with the goal to help preserve and celebrate the rails, trails, landscapes, towns and sites that grew up along the first 110 miles of the

canal. It is managed through a partnership between the non-profit Ohio & Erie Canalway Association and the National Park Service as well as a number of regional partners.

- Our Lands & Waters Foundation is a 501(c)3 organization with the goal to work in partnership with the USACE to realize the full potential of USACE-managed parks as a natural resource that can be enjoyed by many more people. Located in Texas, Our Lands & Waters currently manages 17 facilities on four lakes with the USACE. The non-profit also takes the lead in applying for grants and other funding opportunities as well as soliciting donations.
- USACE partners with the Natural Resources Conservation Service to improve the management of water and related natural resources [28].

Public-Private Partnerships

Public-private partnership (P3) projects are contractual arrangements between a governmental agency or authority and a private entity for the primary purpose of developing and/or operating and maintaining public infrastructure normally in the domain of the governmental sector.

P3 projects are typically large-scale buildings or public infrastructure such as highways or bridges, and this is where many of the examples and definitions discussed herein are sourced. While there are not yet examples of P3 waterway projects, it is possible to apply these delivery methods to canals, locks, and dams.

As P3s have become internationally embraced, and successful examples have surfaced on a national level, the idea of operating all or part of the UMRS under an alternative operating structure has become increasingly discussed. Defining this structure, creating the legal framework, and generating interest among potential private partners are just as key to a successful project as making it economically viable and timely for the government. It must be possible to find value in the economics of the lock and dam system to balance the transfer of economic risk if a P3 is to be successful.

A variety of P3 models have been utilized throughout the world, having the common objective of facilitating private sector participation in the provision of public works projects and thereby transferring to or sharing with the private partners some or all of the traditional public responsibility and risks for financing, designing, constructing, maintaining and/or operating various infrastructure projects.
For purposes of this work, the spectrum of P3 models is defined as follows:

- Design-build (DB) and variations including design-build-maintain (DBM), design-build-operate (DBO) and design-build-operate-maintain (DBOM)
- Design-build (and variations) inclusive of private financial participation (PFP)
- Pre-development agreements (PDAs)

Historically the most commonly utilized public works project delivery model in the U.S. has been design-bid-build (DBB), in which an initial contract(s) is typically awarded by a public owner for the design phase of a project, followed by subsequent contract(s) to a private entity for the construction phase(s) of the project. At the completion of the construction, the project is operated and maintained by the public owner. P3s are becoming much more prevalent as public authorities and jurisdictions are finding that such partnerships can provide financial advantages and efficiencies in project delivery over the more traditional DBB mode[31] [5]. P3s also allow risks to be allocated to the party best able to control them, resulting in potential cost savings to all parties.

Design-Build and Variations

The DB project delivery arrangement is one in which a single private entity (a contractor with subconsultants, or team of contractors and engineers, often with subconsultants) is entrusted by a public infrastructure owner with both design and construction of a project. A DB arrangement is a public-private partnership in which the risks allocated by the public agency owner to the private contractor typically involve only those commonly associated with facility design and construction, including the responsibility of "interface management" between facility design and construction. The DB approach often saves time—and money— in developing infrastructure, owing to the parallel and centrally coordinated undertaking of various elements of design and construction.

For purposes of this discussion, other forms of DB involving private sector participation in operation and/or maintenance (DBOM/DBO/DBM) are considered as variants of DB that may be applicable to particular types of projects affording opportunities for project operations and/or maintenance to be conducted by the private sector.

The DBOM model for project delivery is identical to DB, with the added dimension of transference of facility operation and maintenance responsibility (and inherent risk) from the public infrastructure owner to the private entity responsible for designing and building the facility. Assignment of responsibility for operations and/or maintenance (DBOM, DBO, or DBM) to the private entity can potentially reduce the life-cycle cost of the project. This is because the private entity is responsible for operations and maintenance, with long-term incentives to reduce O&M costs considered in the initial project design and construction.

Design-Build (or DBOM, DBO, DBM) with Private Financial Participation (PFP)

Under the private financial participation (PFP) approach, private sector financing is used to develop the project. This generally includes an at-risk equity investment by the private sector partner that requires a suitable return on investment. In addition to the equity component, any borrowing also requires structured debt repayment that includes borrowing costs. Furthermore, by providing project financing, the private

[31] A recent comparison of twelve large-scale highway and bridge projects in North America indicated that P3 projects had cost overruns averaging 0.81% and schedule overruns averaging -0.30%, as compared to1.49% cost overruns and 11.04% schedule overruns for design-build projects, and 12.71% cost overruns and 4.34% schedule overruns for publically financed large-scale design-bid-build highway projects.

entity generally assumes responsibility for design and construction (or design, construction, operations, and/or maintenance). By using PFP delivery models to deliver projects, the public sector gains access to private sector finance that can supplement up-front public funds or provide more flexible funding methods to deliver projects. For most long-term PFP projects, the private entity may be repaid from project-generated revenues (such as tolls or fares) and/or public funding sources that are pledged for such repayment. It is also possible for private sector financial participation to enable a public agency to deliver additional projects, by allowing previously dedicated funds to be used on another project. The private sector may also present the public sector with upfront payments and/or ongoing lease payments that may be used to deliver additional infrastructure projects for the region. In all cases, PFPs require a dedicated funding source and/or revenue stream for a minimum of 20 years, and concessionaires typically expect a return on their investment of anywhere from 6 to 12 percent.

Below are some common P3 delivery models that incorporate Private Financial Participation.

Design-Build-Finance (DBF)

For purposes of this study, DB projects that could benefit from short-term construction financing provided by the private sector (often referred to as DBF) are also considered as a possible PFP candidate project. DBF is a delivery method in which the private entity is generally repaid from public funding or financing, with the private entity typically paid based on milestone events or deferred payment schedules. Typically, to consider a project for DBF project delivery, the benefits from accelerated project delivery will need to outweigh the costs of private sector financing.

Availability Payments

An availability payment model is a form of PFP that incorporates design, construction, operations and maintenance responsibilities for a given project. Generally, availability payments are made when the project is “available” for use by the public and are paid based on performance specifications. With availability payments, the payments made by a public agency sponsor (such as USACE, for example) can be based on particular defined project milestones or project performance standards. Project milestones can be tied to the completion of the facility by a certain deadline, while performance standards can be measured on various operational metrics.

Availability payments are used extensively in Canada, Europe, and Australia, and are now attracting increasing interest in the U.S. Availability payments could be used in conjunction with private financial participation in a range of P3 projects, including lock expansion/improvement or multimodal facility projects with user fee-generated revenue streams, as well as for non-revenue-producing waterway projects (both new construction and/or capital maintenance). For consideration of user fees as a repayment source for availability payments, it should be noted that implementation of such fees would require policy action by the government to modify the prohibition on tolling in 33 USC 565.

A “shadow toll” delivery model is a variation of the availability payment model that utilizes design, construction, operations and maintenance responsibilities for a given project, but uses a payment mechanism that is based on user transactions that are monitored and counted. The documentation and

parameters of the payment mechanism will have both price (e.g. cost per ton of cargo) and volume (the number of barges/boats using the waterway) elements. The private entity is paid as if it had levied a user fee on the vessels in the specified and agreed manner. It should be noted that such a method of paying the private entity can be adopted even if user fees are not actually being collected in practice, thus transferring traffic or demand risk to the private sector. A variant of this model occurs where user fees are collected by the public agency sponsor, but passed directly on to the private entity, known as pass-through tolls or user fees.

Toll Concession

Under the toll concession framework, a private entity is given the maximum possible transfer of risks and responsibilities including the exclusive rights to collect revenue (e.g. tolls or user fees) and will operate and maintain the asset over a long period of time in accordance with the specified performance requirements. As with the other PFP procurement models, the design, construction, operations, and maintenance all have to meet the standards established by the public agency owner and specified in a "concession agreement." Concession agreements are typically utilized for projects that generate a significant revenue stream as compared to the costs of capital amortization, operations, and maintenance. For consideration of tolling under a concession framework, it should be noted that implementation of such fees would require policy action by the government.

Project Development Agreements (PDA)

A PDA is a P3 project delivery method that typically involves selecting a private sector partner to participate in aspects of the project feasibility phase. This phase can include pre-development, project planning and environmental study activities. After a project is determined feasible, the pre-selected private entity has the right to first negotiation with the public sector to develop and implement the project. During the implementation phase, PDAs can take the form of other P3 delivery models (e.g. DB, DBF, Availability Payments or Toll Concessions). Typically, a PDA may be considered suitable for a project in its early planning stages. The public sector may also consider a PDA in order to achieve private sector innovation in defining and planning the project, with possible acceleration of project delivery. For consideration of tolling or collecting user fees under a PDA framework, it should be noted that implementation of such fees would require policy action by the government.

Potential Changes Needed in Ownership

Iowa Law/Agencies

Given the flexibility described above regarding the ownership and operation of navigation structures, there exists the possibility of entering into an agreement with a private entity governing the ownership and/or operation of locks and dams. If a lock or dam is already under some control of Iowa, the state is in a position to negotiate the transfer of its responsibilities to a private entity. Otherwise, the private entity, perhaps along with the state, will need to negotiate a transfer or responsibilities with the federal government. Various Iowa agencies and departments are authorized to work with both the federal

government and private entities on projects and issues involving navigable waterways, including the Mississippi River.

In addition to Iowa Department of Transportation, the following are just a few of the Iowa entities that could be included in a cooperative endeavor agreement:

- The Iowa Department of Natural Resources (DNR) has the authority to enter into contracts with other agencies and the private sector for preparing and conducting programs designed to protect the state's significant "open spaces."[32]
- The Iowa Department of Agriculture and Land Stewardship (DALS) is required to implement, in conjunction with the federal government and other entities, a program that provides multi-objective resource protections for flood control, water quality, erosion control, and natural resource conservation[33].
- Within DALS, the Water Resources Coordinating Council (WRCC) was established to preserve and protect Iowa's water resources, and to coordinate the management of those resources in a sustainable and fiscally responsible manner. "In the pursuit of this purpose, the council shall use an integrated approach to water resource management, recognizing that insufficiencies exist in current approaches and practices, as well as in funding sources and the utilization of funds. The integrated approach used by the council shall attempt to overcome old categories, labels, and obstacles with the primary goal of managing the state's water resources comprehensively rather than compartmentally." [34]
- Additionally, the Mississippi River Partnership Council may work with the WRCC and is the entity charged with working with federal agencies to optimize the implementation of programs and the expenditure of moneys affecting the Mississippi river and counties in Iowa along the Mississippi river, including the upper Mississippi river basin association and the Mississippi parkway planning commission. [35]
- The Port Authority is charged with fostering and encouraging the participation of private enterprise in the development of the port authority facilities to the fullest extent practicable in the interest of limiting the necessity of construction and operation of the facilities by the Port Authority.[36]

Funding

Funding for the USACE Civil Works program is included in the President's Fiscal Budget [21]. In FY2013, $4.731 billion in discretionary funding was provided to fund the planning, design, construction, operation and maintenance of projects, focusing on the highest-performing projects and programs within

[32] 11 I.C.A. 465A.2.
[33] 11 I.C.A. 466.7.
[34] 11 I.C.A. 466B.3
[35] 1 I.C.A. 28N.3.
[36] 1 I.C.A. 28J.10.

three main Civil Works mission areas: commercial navigation, flood risk management, and aquatic ecosystem restoration. New federal funding in the Civil Works budget consists of $3.744 billion from the general fund, $848 million from the Harbor Maintenance Trust Fund, $95 million from the Inland Waterways Trust Fund, and $44 million from Special Recreation User Fees. Operations and maintenance is funded at $2.532 billion, or just over half of the total funding.

As previously discussed, systems are aging and USACE operations and maintenance and major rehabilitation and replacement needs are much larger than current funding permits. A guaranteed funding source that goes beyond existing sources could assist at meeting this backlog through either traditional or alternative delivery methods. A source that is guaranteed into the future, such as a tax increase or user fee increase, backed by government bonds, could be utilized by a P3 concessionaire to finance against in order to perform work now.

With any P3 arrangement, the source of funding for the private owner/operator will be a central component of the agreement. Given that insufficient funds are a key driver for examining any P3 structure, any funding arrangements are likely to be of a more complex nature. The simplest arrangement would be where the private entity would be given the right to generate its revenue. An example would be a standard hydroelectric agreement where a private company, through various agreements with government agencies and private end-users of the power, is allowed to generate and sell electricity.

A derivation of this structure would be where private interests other than a power company pay the private owner/operator of the structure. The prohibition on tolling in 33 USC 565, noted above, severely limits opportunities for a private company to generate other revenues absent federal legislation on the matter. A private company would likely need to access additional funding through some federal, state or local funding commitment. A complicating factor to this arrangement would be the level of funding certainty in any arrangement of this sort. A dedicated government funding stream would be a much more realistic source for a private entity as compared to funding that is subject to annual appropriation. Typically, in highway projects, federal funding commitments are made to state and local agencies that are then responsible for ensuring funding is available for long-term concessionaire payments. Alternatively, a Transportation Infrastructure Finance and Innovation Act (TIFIA) loan can be utilized for intermodal transportation projects (among other types of projects) and commitments can be pledged directly to a private partner [4].

Maintenance

As mentioned previously, P3s often include elements of operations and maintenance following the initial design and construction of a project. It is also possible to contract out operations and/or maintenance to a private company. For example, in Flanders, Belgium, the management of waterways is outsourced. Transit systems in the U.S. are increasingly opting to hire private companies to operate and/or maintain buses and trains [12].

Assuming no financial viability for a full P3 contract without significant new sources of funding, the USACE could consider contracting out discrete portions of the system, such as operations and

maintenance. A detailed analysis specific to the waterway, locks, dams, and any ancillary structures within a specified project area would need to be performed to determine if cost savings could result from bringing a private operator onboard. Elements appropriate for contracting to private parties would be limited to those not interdependent on the overall system or integral to existing work structures and labor agreements, and could be separately assessed for compliance with performance standards.

The analysis would need to consider whether similar functions could be grouped and performed more efficiently by a private operator. It would look at current union requirements, labor rates, fringe benefits, work rules, etc.

Similar studies have recently been performed for rail, highway, and other infrastructure facilities, with relevant results. Obviously, specifics to water freight systems are not incorporated into these studies, so they are presented merely as an indicator of the possibilities of private contracting. Potential cost efficiencies due to private operations and maintenance of discrete elements could be realized through a new collective bargaining agreement (CBA) or project labor agreement (PLA) between the private contractor and its unionized workers, through new work rules included in the union agreements, and through competition among potential private contractors.

It is important to note that published prevailing labor rates and fringe benefits for union workers cannot serve as an accurate predictor of overall contractual costs for privately-provided operations and maintenance services. In fact, in other sectors for systems maintenance positions, wages and benefits for private sector union workers are typically higher than similar remuneration for public sector union workers.

The potential cost benefit of contracting out to a concessionaire is that the consolidation and long-term nature of providing “bundled” services under a private contract typically embeds efficiencies in the ways in which labor is utilized. Such efficiencies often result in utilization of smaller and/or more focused work crews, better and more judicious use of overtime, negotiation of more advantageous labor work rules, and related actions that give rise to significantly lower contractual costs over the period of the contract. In large measure, the negotiated contract facilitates composite cost savings. Thus, a new CBA or PLA is negotiated between an operations/maintenance contractor and its unionized workers, and that agreement combined with the negotiated price established between the selected contractor and the public authority determines the long-term cost savings likely to be realized by the owner. Potential costs and savings would be specific to the region and type of services included in the contract; a more in-depth study would be required to identify such savings.

If contractors are unsuccessful in negotiating a CBA or PLA with the unions, the proposals may not result in savings. As a result, the procurement must be structured so that the owner is not obligated to award the contracts if the savings in operations and maintenance costs are not sufficient. Additionally, given the contractor’s cost to prepare proposals, it is recommended that a stipend be provided to the unsuccessful proposers and to all proposers if the decision is made not to award a contract.

Competition among potential private contractors could result in aggressive pricing and hence lower long-term operating costs to the owner. A more in-depth industry sounding would need to be performed to gauge the appetite of possible bidders. This sounding could be included in a P3 Feasibility Analysis, similar to a P3 Program Analysis performed by the Los Angeles County Metropolitan Transportation Authority in 2009/10. The Metro study considered nearly 90 potential highway and transit projects in Los Angeles County, analyzed each for the potential of P3 delivery, recommended six projects for in-depth study, and has resulted in three Design-Build transit projects currently under construction as well as five highway projects in various stages of P3 procurement and development. As a part of the study, key members of the industry (including bankers, designers, builders, and consultants) were invited for one-on-one meetings with the Advisory Team and Metro staff for an opportunity to provide input to the development of the projects and the procurement.

Even if the owner ultimately decides to maintain public sector union operation, the transparent willingness of the owner to consider contracting out former public sector services may have the effect of promoting an inclination among the unions to consider increased competitiveness in negotiating future contracts.

Viability and Conclusions

While opportunities exist for P3s on the Mississippi River in Iowa, several funding and political issues would need to be worked through prior to beginning the procurement process. A more in-depth look at P3 opportunities, joint development potential, and site-specific issues would need to be performed, similar to the Los Angeles P3 Analysis mentioned previously. Groundwork for P3s would need to be laid in the political and labor communities. Potential revenue streams would need to be better identified and a strategy for increasing federal funding would need to be implemented. Once these elemental questions have been better identified, a market sounding is recommended through a Request for Information process from the private sector.

Summary

The Upper Mississippi River System (UMRS) has 29 locks and 858 miles of commercially navigable waterway. Almost every lock and dam in the Upper Mississippi River Basin has exceeded its economic design life of 50 years and most locks are too small for today's larger tows. The 126 million tons of freight that are transported annually on the system is more than 36 times the 1930's tonnage, yet many of the locks and dams built more than seven decades ago have never been modernized, resulting in major scheduled and emergency mechanical and structural maintenance causing significant traffic delays at the locks. In addition, federal funding for water infrastructure operations, maintenance, and rehabilitation has dwindled so much since the mid-1980s that existing water infrastructure cannot be maintained with the annual funding currently being allocated by Congress. The resulting massive backlog of authorized, unfunded USACE projects and the pending failure of the inland waterway system would have significant potential impacts the economy of Iowa and the surrounding region (projected annual economic loss of over $500 million if traffic moved to all other modes of commercial transportation).

The potential economic loss associated with failure of the inland waterway system coupled with the potential forecasted growth of Iowa's water-based commodities movement suggests that involvement by the state and other public and/or private entities may be warranted to maintain the system. It does appear realistic to increase funding for infrastructure improvements through user revenues from changes to the current fuel tax rate (or other fees). However, significant increases in the fuel tax rate would be required to yield significant (e.g., >$50M per year) funding increases from users. If fuel tax rates are increased, consideration should be given to indexing them to inflation to avoid future funding gaps.

Assuming an increase to the user rates to $0.26 per gallon, P3s could be used to deliver some of the needed improvements to the system, provided the funding stream was backed by the federal government. However, this user fee increase is not a panacea, as the demand for rehabilitation and modernization would still far outweigh the availability of funding. While opportunities exist for P3s on the Mississippi River in Iowa, several funding and political issues would need to be worked through prior to beginning the procurement process. At this time, it would appear that the most plausible scenario would be to have state/local agencies provide dedicated funding for O&M and rehabilitation of the lock and dam system while maintaining ownership and O&M responsibility with the USACE. However, even this additional public investment would require significant funding from traditional sources including user fees and federal appropriations.

In summary, key findings from this study suggest the following:

1. No increase in the current funding plan will result in loss of economic benefits and a missed opportunity to take advantage of the upcoming expansion of the Panama Canal (i.e., opportunities to increase grain shipments).

2. Leveraging increased funding from traditional sources is the only practical option to deal with the funding issues in the short term.
3. If no new funding is identified, partial divestiture of the system where traffic does not warrant heavy operations should be examined to minimize economic loss and to potentially increase opportunities for USACE to redirect budget allocations. However, the impact and extent of divestiture would need to be carefully examined for other long-term impacts.
4. A public-private partnership to upgrade and then operate/maintain discrete elements of the waterway system is feasible if a dedicated funding source is found and assuming changes to current policies are made as outlined in the recommendations for 2013 WRDA in Appendix A. For consideration of user fees as a repayment source for availability payments, it should be noted that implementation of such fees would require policy action by the government to modify the prohibition on tolling in 33 USC 565.
5. Revenue bonding against existing and/or new Inland Waterways Trust Fund revenues could provide an infusion of large amounts of capital for lock and dam infrastructure projects. While this would result in higher borrowing costs, the benefits of executing projects sooner might outweigh these costs.
6. While augmentation of traditional (federal appropriations and user fees) funding sources by state/local entities would be beneficial (assuming legislative authorization) in both the near and long term, these additional public funding sources would not be a stand-alone solution. Rather, this funding would be only part of a more comprehensive solution that includes increased and/or expanded user fees and federal appropriations.

Much remains to be decided with the federal government regarding the overall operation of an UMRS lock system and how operation of all or portions of this by a non-federal sponsor would be regulated and governed. However, it is clear that the existing inland waterway navigation system is nearing a tipping point in terms of funding for necessary repairs, maintenance and system enhancements.

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Appendix A: WRDA Memo and Draft

U.S. Inland Waterway Modernization: A Reconnaissance Study

Prepared for the Iowa Department of Transportation

HDR Engineering, Inc.

April 2013

Title II

SEC. 2019. NON-FEDERAL PROJECT IMPLEMENTATION PILOT PROGRAM.

(a) IN GENERAL.—The Secretary shall establish a pilot program to evaluate the cost and schedule-effectiveness and project delivery efficiency of allowing non-Federal interests to carry out authorized flood damage reduction, hurricane and storm damage reduction, and navigation projects.

(b) PURPOSES.—The purposes of the pilot program are—

(1) to identify project delivery methods, including design-build and early contractor involvement, and time-saving and cost-saving alternatives that reduce the backlog of authorized Corps of Engineers projects;

(2) to evaluate the technical, financial, and organizational efficiencies of a non-Federal interest carrying out the design, execution, management, and construction of 1 or more projects; and

(3) to evaluate alternatives for the decentralization of the project planning, management, and operational decisionmaking process of the Corps of Engineers.

(c) ADMINISTRATION.—

(1) IN GENERAL.—In carrying out the pilot program, the Secretary shall—

(A) identify a total of not more than 12 flood damage reduction, hurricane and storm damage reduction, and navigation projects, including levees, floodwalls, flood control channels, water control structures, and navigation locks and dams and channels, authorized for repair, rehabilitation and/or construction that—

(i) have received Federal funds and/or have experienced delays or missed scheduled deadlines since the enactment of WRDA 2007; or

(ii) for more than 2 consecutive fiscal years, have an unobligated funding balance for that project in the Corps of Engineers construction account;

(B) notify the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives on the identification of each project under the pilot program;

(C) in consultation with the non-Federal interest, develop a detailed project management plan for each identified project that outlines the scope, budget, design, and construction resource

requirements necessary for the non-Federal interest to execute the project, or a separable element of the project;

(D) on the request of the non-Federal interest, enter into a project partnership agreement with the non-Federal interest for the non-Federal interest to provide full project management control for construction of the project, or a separable element of the project, in accordance with plans approved by the Secretary;

(E) following execution of the project partnership agreement, transfer to the non-Federal interest to carry out construction of the project, or a separable element of the project—

(i) if applicable, the balance of the unobligated amounts appropriated for the project, except that the Secretary shall retain sufficient amounts for the Corps of Engineers to carry out any responsibilities of the Corps of Engineers relating to the project and pilot program; and

(ii) additional amounts, as determined by the Secretary, from amounts made available under subsection (h), except that the total amount transferred to the non-Federal interest shall not exceed the estimate of the Federal share of the cost of

construction, including any required design; and

(F) regularly monitor and audit each project being constructed by a non-Federal interest under this section to ensure that the construction activities are carried out in compliance with the plans approved by the Secretary and that the construction costs are reasonable.

(2) TECHNICAL ASSISTANCE.—On the request of a non-Federal interest, the Secretary may provide technical assistance to the non-Federal interest, if the non-Federal interest contracts with the Secretary for the technical assistance and compensates the Secretary for the technical assistance, relating to—

(A) any study, engineering activity, and design activity for construction carried out by the non-Federal interest under this section; and

(B) obtaining any permits necessary for the project.

(d) COST SHARE.—Nothing in this section affects the cost-sharing requirement applicable on the day before the date of enactment of this Act to a project carried out under this section.

(e) REPORT.—

(1) IN GENERAL.—Not later than 2 years after the date of enactment of this Act, the Secretary shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives a report detailing the results of the pilot program carried out under this section, including any recommendations of the Secretary concerning whether the program or any component of the program should be implemented on a national basis.

(2) UPDATE.—Not later than 5 years after the date of enactment of this Act, the Secretary shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives an update of the report described in paragraph (1).

(f) ADMINISTRATION.—All laws and regulations that would apply to the Secretary if the Secretary were carrying out the project shall apply to a non-Federal interest carrying out a project under this section.

(g) TERMINATION OF AUTHORITY.—The authority to commence a project under this section terminates on the

date that is 5 years after the date of enactment of this Act.

(h) AUTHORIZATION OF APPROPRIATIONS.—In addition to any amounts appropriated for a specific project, there is authorized to be appropriated to the Secretary to carry out the pilot program under this section $50,000,000 for each of fiscal years 2013 through 2017.

TITLE VII—INLAND WATERWAYS

SEC. 7001. PURPOSES.

The purposes of this title are—

(1) to improve program and project management relating to the construction and major rehabilitation of navigation projects on inland waterways;

(2) to optimize inland waterways navigation system reliability;

(3) to minimize the size and scope of inland waterways navigation project completion schedules;

(4) to eliminate preventable delays in inland waterways navigation project completion schedules; and

(5) to make inland waterways navigation capital investments through the use of prioritization criteria that seek to maximize systemwide benefits and minimize overall system risk.

SEC. 7002. DEFINITIONS.

In this title:

(1) INLAND WATERWAYS TRUST FUND.—The term ''Inland Waterways Trust Fund'' means the Inland Waterways Trust Fund established by section 9506(a) of the Internal Revenue Code of 1986.

(2) QUALIFYING PROJECT.—The term ''qualifying project'' means any construction or major rehabilitation project for navigation infrastructure of the inland and intracoastal waterways that is—

(A) authorized before, on, or after the date of enactment of this Act;

(B) not completed on the date of enactment of this Act; and

(C) funded at least in part from the Inland Waterways Trust Fund.

(3) SECRETARY.—The term ''Secretary'' means the Secretary of the Army, acting through the Chief of Engineers.

SEC. 7003. PROJECT DELIVERY PROCESS REFORMS.

(a) REQUIREMENTS FOR QUALIFYING PROJECTS.—With respect to each qualifying project, the Secretary shall require—

and

(1) for an applicable cost estimation, that—

(A) the estimation—

(i) is risk-based; and

(ii) has a confidence level of at least 80 percent; and

(B) a risk-based cost estimate shall be implemented—

(i) for a qualified project that requires an increase in the authorized amount in accordance with section 902 of the Water Resources Development Act of 1986 (Public Law 99–662; 100 Stat. 4183), during the preparation of a post-authorization change report or other similar decision document;

(ii) for a qualified project for which the first construction contract has not been awarded, prior to the award of the first construction contract;

(iii) for a qualified project without a completed Chief of Engineers report, prior to the completion of such a report; and

(iv) for a qualified project with a completed Chief of Engineers report that has

not yet been authorized, during design for the qualified project.

(b) ADDITIONAL PROJECT DELIVERY PROCESS REFORMS.—Not later than 12 months after the date of enactment of this Act, the Secretary shall—

(1) establish a system to identify and apply on a continuing basis lessons learned from prior or ongoing qualifying projects to improve the likelihood of on-time and on-budget completion of qualifying projects;

(#) evaluate the transfer of operations, maintenance and revenues collected from the Inland Waterway Trust Fund, of all or portions of the locks and dams of the inland waterway system to a state, special purpose authority or a public-private partnership entity.

(2) evaluate early contractor involvement and design-build acquisition procedures to improve on-time and best-value project delivery performance; and

(3) implement any additional measures that the Secretary determines will achieve the purposes of this title and the amendments made by this title, including, as the Secretary determines to be appropriate—

(A) the implementation of applicable practices and procedures developed pursuant to management by the Secretary of an applicable military construction program;

(B) the establishment of 1 or more centers of expertise for the design and review of quali-

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fying projects;

(C) the development and use of a portfolio of standard designs for inland navigation locks;

(D) the use of full-funding contracts or formulation of a revised continuing contracts clause; and

(E) the establishment of procedures for recommending new project construction starts using a capital projects business model.

(c) PILOT PROJECTS.—

(1) IN GENERAL.—Subject to paragraph (2), the Secretary shall carry out 1 or more pilot projects to evaluate processes or procedures for the study, design, or construction of qualifying projects. Pilot projects shall be in accordance with the provisions of Title II, Section 2019 of this Act.

(2) INCLUSIONS.—At a minimum, the Secretary shall carry out pilot projects under this subsection to evaluate—

(A) early contractor involvement and design build in the development of features and components;

(B) an appropriate use of continuing contracts for the construction of features and components; and

(C) applicable principles, procedures, and processes used for military construction projects.

(d) INLAND WATERWAYS USER BOARD.—Section 302 of the Water Resources Development Act of 1986 (33 U.S.C. 2251) is amended—

(1) by striking subsection (b) and inserting the following:

''(b) DUTIES OF USERS BOARD.—

''(1) IN GENERAL.—The Users Board shall meet not less frequently than semiannually to develop and make recommendations to the Secretary and Congress regarding the inland waterways and inland harbors of the United States.

''(2) ADVICE AND RECOMMENDATIONS.—For commercial navigation features and components of the inland waterways and inland harbors of the United States, the Users Board shall provide—

''(A) prior to the development of the budget proposal of the President for a given fiscal year, advice and recommendations to the Secretary regarding construction and rehabilitation priorities and spending levels;

''(B) advice and recommendations to Congress regarding any report of the Chief of Engineers relating to those features and components;

''(C) advice and recommendations to Congress regarding an increase in the authorized cost of those features and components;

''(D) not later than 60 days after the date of the submission of the budget proposal of the President to Congress, advice and recommendations to Congress regarding construction and rehabilitation priorities and spending levels; and

''(E) a long-term capital investment program in accordance with subsection (d).

''(3) PROJECT DEVELOPMENT TEAMS.—The chairperson of the Users Board shall appoint a representative of the Users Board to serve on the project development team for a qualifying project or the study or design of a commercial navigation feature or component of the inland waterways and inland harbors of the United States.

''(4) INDEPENDENT JUDGMENT.—Any advice or recommendation made by the Users Board to the Secretary shall reflect the independent judgment of the Users Board.'';

(2) by redesignating subsection (c) as subsection (f); and

(3) by inserting after subsection (b) the following:

''(c) DUTIES OF SECRETARY.—The Secretary shall—

''(1) communicate not less than once each quarter to the Users Board the status of the study, design, or construction of all commercial navigation features or components of the inland waterways or inland harbors of the United States; and

''(2) submit to the Users Board a courtesy copy of all reports of the Chief of Engineers relating to a commercial navigation feature or component of the inland waterways or inland harbors of the United States.

''(d) CAPITAL INVESTMENT PROGRAM.—

''(1) IN GENERAL.—Not later than 1 year after the date of enactment of this subsection, the Secretary, in coordination with the Users Board, shall develop, and submit to Congress a report describing, a 20-year program for making capital investments on the inland and intracoastal waterways, based on the application of objective, national project selection prioritization criteria.

''(2) CONSIDERATION.—In developing the program under paragraph (1), the Secretary shall take into consideration the 20-year capital investment strategy contained in the Inland Marine Transportation System (IMTS) Capital Projects Business

Model, Final Report published on April 13, 2010, as approved by the Users Board.

''(3) CRITERIA.—In developing the plan and prioritization criteria under paragraph (1), the Secretary shall ensure, to the maximum extent practicable, that investments made under the 20-year program described in paragraph (1)—

''(A) are made in all geographical areas of the inland waterways system; and

''(B) ensure efficient funding of inland waterways projects.

''(4) STRATEGIC REVIEW AND UPDATE.—Not later than 5 years after the date of enactment of this subsection, and not less frequently than once every 5 years thereafter, the Secretary, in conjunction with the Users Board, shall—

''(A) submit to Congress a strategic review of the 20-year program in effect under this subsection, which shall identify and explain any changes to the project-specific recommendations contained in the previous 20-year program (including any changes to the prioritization criteria used to develop the updated recommendations); and

''(B) make such revisions to the program as the Secretary and Users Board jointly consider to be appropriate.

''(e) PROJECT MANAGEMENT PLANS.—The chairperson of the Users Board and the project development team member appointed by the chairperson under subsection (b)(3) shall sign the project management plan for the qualifying project or the study or design of a commercial navigation feature or component of the inland waterways and inland harbors of the United States.''.

SEC. 7004. MAJOR REHABILITATION STANDARDS.

(a) IN GENERAL.—The Secretary shall develop a methodology for applying standard accounting principles when classifying activities as major rehabilitation projects.

(b) EVALUATIONS.—The Secretary shall evaluate the effect of applying the methodology developed under subsection (a) to not less than 3 qualifying projects.

(c) REPORT.—The Secretary shall submit to Congress a report on the evaluation under subsection (b).

SEC. 7005. EFFICIENCY OF REVENUE COLLECTION.

Not later than 1 year after the date of enactment of this Act, the Comptroller General shall prepare a report on the efficiency of collecting the fuel tax for the Inland Waterways Trust Fund, which shall include—

(1) an evaluation of whether current methods of collection of the fuel tax result in full compliance with requirements of the law;

(2) whether alternative methods of collection, including commercial and recreational lockage fees would result in increased revenues into the Inland Waterways Trust Fund; and

(3) an evaluation of alternative collection options; and

(4) dedication of all revenues collected into the Inland Waterways Trust Fund to maintenance and improvement of the inland waterway dam system.

TITLE X—INNOVATIVE FINANCING PILOT PROJECTS

SEC. 10001. SHORT TITLE.

This title may be cited as the ''Water Infrastructure Finance and Innovation Act of 2012''.

SEC. 10002. PURPOSES.

The purposes of this title are—

(1) to promote increased development of critical water resources infrastructure by establishing additional opportunities for financing water resources projects;

(2) to attract new investment capital to infrastructure projects that are capable of generating revenue streams through user fees or other dedicated funding sources;

(3) to complement existing Federal funding

sources and address budgetary constraints on the Corps of Engineers civil works program; and

(4) to leverage private investment in water resources infrastructure.

SEC. 10003. DEFINITIONS.

In this title:

(1) ADMINISTRATOR.—The term ''Administrator'' means the Administrator of the Environmental Protection Agency.

(2) COMMUNITY WATER SYSTEM.—The term ''community water system'' has the meaning given the term in section 1401 of the Safe Drinking Water Act (42 U.S.C. 300f).

(3) FEDERAL CREDIT INSTRUMENT.—The term ''Federal credit instrument'' means a secured loan or loan guarantee authorized to be made available under this title with respect to a project.

(4) INVESTMENT-GRADE RATING.—The term ''investment-grade rating'' means a rating of BBB minus, Baa3, bbb minus, BBB (low), or higher assigned by a rating agency to project obligations.

(5) LENDER.—

(A) IN GENERAL.—The term ''lender'' means any non-Federal qualified institutional buyer (as defined in section 230.144A(a) of title 17, Code of Federal Regulations (or a successor regulation), known as Rule 144A(a) of

the Securities and Exchange Commission and issued under the Securities Act of 1933 (15 U.S.C. 77a et seq.)).

(B) INCLUSIONS.—The term ''lender'' includes—

(i) a qualified retirement plan (as defined in section 4974(c) of the Internal Revenue Code of 1986) that is a qualified institutional buyer; and

(ii) a governmental plan (as defined in section 414(d) of the Internal Revenue Code of 1986) that is a qualified institutional buyer.

(6) LOAN GUARANTEE.—The term ''loan guarantee'' means any guarantee or other pledge by the Secretary or the Administrator to pay all or part of the principal of, and interest on, a loan or other debt obligation issued by an obligor and funded by a lender.

(7) OBLIGOR.—The term ''obligor'' means an eligible entity that is primarily liable for payment of the principal of, or interest on, a Federal credit instrument.

(8) PROJECT OBLIGATION.—

(A) IN GENERAL.—The term ''project obligation'' means any note, bond, debenture, or other debt obligation issued by an obligor in connection with the financing of a project.

(B) EXCLUSION.—The term ''project obligation'' does not include a Federal credit instrument.

(9) RATING AGENCY.—The term ''rating agency'' means a credit rating agency registered with the Securities and Exchange Commission as a nationally recognized statistical rating organization (as defined in section 3(a) of the Securities Exchange Act of 1934 (15 U.S.C. 78c(a))).

(10) SECURED LOAN.—The term ''secured loan'' means a direct loan or other debt obligation issued by an obligor and funded by the Secretary in connection with the financing of a project under section 10010.

(11) STATE.—The term ''State'' means—

(A) a State;

(B) the District of Columbia;

(C) the Commonwealth of Puerto Rico; and

(D) any other territory or possession of the United States.

(12) STATE INFRASTRUCTURE FINANCING AUTHORITY.—The term ''State infrastructure financing authority'' means the State entity established or designated by the Governor of a State to receive a cap-

italization grant provided by, or otherwise carry out the requirements of, title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et. seq.) or section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12).

(13) SUBSIDY AMOUNT.—The term ''subsidy amount'' means the amount of budget authority sufficient to cover the estimated long-term cost to the Federal Government of a Federal credit instrument, as calculated on a net present value basis, excluding administrative costs and any incidental effects on governmental receipts or outlays in accordance with the Federal Credit Reform Act of 1990 (2 U.S.C. 661 et seq.).

(14) SUBSTANTIAL COMPLETION.—The term ''substantial completion'', with respect to a project, means the earliest date on which a project is considered to perform the functions for which the project is designed.

(15) TREATMENT WORKS.—The term ''treatment works'' has the meaning given the term in section 212 of the Federal Water Pollution Control Act (33 U.S.C. 1292).

SEC. 10004. AUTHORITY TO PROVIDE ASSISTANCE.

(a) IN GENERAL.—The Secretary and the Administrator may provide financial assistance under this title to carry out not more than 10 pilot projects each, which shall be selected to ensure a diversity of project types and geographical locations.

(b) RESPONSIBILITY.—

(1) SECRETARY.—The Secretary shall carry out all pilot projects under this title that are eligible projects under section 10007(1).

(2) ADMINISTRATOR.—The Administrator shall carry out all pilot projects under this title that are eligible projects under paragraphs (2) through (8) of section 10007.

SEC. 10005. APPLICATIONS.

(a) IN GENERAL.—To receive assistance under this title, an eligible entity shall submit to the Secretary or the Administrator, as applicable, an application at such time, in such manner, and containing such information as the Secretary or the Administrator may require.

(b) COMBINED PROJECTS.—In the case of an eligible project described in section 10007(8), the Administrator shall require the eligible entity to submit a single application for the combined group of projects.

SEC. 10006. ELIGIBLE ENTITIES.

The following entities are eligible to receive assistance under this title:

(1) A corporation.

(2) A partnership.

(3) A joint venture.

(4) A trust.

(5) A Federal, State, or local governmental entity, agency, or instrumentality.

(6) A State infrastructure financing authority.

SEC. 10007. PROJECTS ELIGIBLE FOR ASSISTANCE.

The following projects may be carried out with amounts made available under this title:

(1) A project for flood control or navigation that the Secretary has determined is technically sound, economically justified, and environmentally acceptable, including—

(A) a structural or nonstructural measure to reduce flood risk, enhance stream flow, or protect natural resources; and

(B) a levee, dam, tunnel, aqueduct, reservoir, lock and dam or other related water infrastructure.

(2) 1 or more activities that are eligible for assistance under section 603(c) of the Federal Water Pollution Control Act (33 U.S.C. 1383(c)), notwith-

standing the public ownership requirement under paragraph (1) of that subsection.

(3) 1 or more activities described in section 1452(a)(2) of the Safe Drinking Water Act (42 U.S.C. 300j–12(a)(2)).

(4) A project for enhanced energy or operational efficiency in the operation of a public water system.

(5) A project for accelerated repair and replacement of an aging water distribution facility.

(6) A brackish or sea water desalination project.

(7) Acquisition of real property or an interest in real property for water storage, flood control, navigation reclaimed or recycled water, or wastewater, if the acquisition is integral to a project described in paragraphs (1) through (6).

(8) A combination of projects, each of which is eligible under paragraph (2) or (3), for which a State infrastructure financing authority submits to the Administrator a single application.

SEC. 10008. ACTIVITIES ELIGIBLE FOR ASSISTANCE.

For purposes of this title, an eligible activity with respect to an eligible project includes the cost of—

(1) development-phase activities, including planning, feasibility analysis, revenue forecasting, envi-

ronmental review, permitting, preliminary engineering and design work, and other preconstruction activities;

(2) construction, reconstruction, rehabilitation, and replacement activities;

(3) operation and maintenance;

(4) the acquisition of real property (including water rights, land relating to the project, and improvements to land), environmental mitigation, construction contingencies, and acquisition of equipment;

(5) capitalized interest necessary to meet market requirements, reasonably required reserve funds, capital issuance expenses, and other carrying costs during construction; and

(6) refinancing interim construction funding, long-term project obligations, or a secured loan or loan guarantee made under this title.

SEC. 10009. DETERMINATION OF ELIGIBILITY AND PROJECT SELECTION.

(a) ELIGIBILITY REQUIREMENTS.—To be eligible to receive financial assistance under this title, a project shall meet the following criteria, as determined by the Secretary or Administrator, as applicable:

(1) CREDITWORTHINESS.—

(A) IN GENERAL.—Subject to subparagraph (B), the project shall be creditworthy, which shall be determined by the Secretary or the Administrator, as applicable, who shall ensure that any financing for the project has appropriate security features, such as a rate covenant, to ensure repayment.

(B) PRELIMINARY RATING OPINION LETTER.—The Secretary or the Administrator, as applicable, shall require each project applicant to provide a preliminary rating opinion letter from at least 1 rating agency indicating that the senior obligations of the project (which may be the Federal credit instrument) have the potential to achieve an investment-grade rating.

(C) SPECIAL RULE FOR CERTAIN COMBINED PROJECTS.—The Administrator shall develop a credit evaluation process for a Federal credit instrument provided to a State infrastructure financing authority for a project under section 10007(8), which may include requiring the provision of a preliminary rating opinion letter from at least 1 rating agency.

(2) ELIGIBLE PROJECT COSTS.—The eligible project costs of a project shall be reasonably anticipated to be not less than $10,000,000.

(3) DEDICATED REVENUE SOURCES.—The Federal credit instrument for the project shall be repayable, in whole or in part, from dedicated revenue sources that also secure the project obligations.

(4) PUBLIC SPONSORSHIP OF PRIVATE ENTITIES.—In the case of a project carried out by an entity that is not a State or local government or an agency or instrumentality of a State or local government, the project shall be publicly sponsored.

(b) SELECTION CRITERIA.—

(1) ESTABLISHMENT.—The Secretary or the Administrator, as applicable, shall establish criteria for the selection of projects that meet the eligibility requirements of subsection (a), in accordance with paragraph (2).

(2) CRITERIA.—The selection criteria shall include the following:

(A) The extent to which the project is nationally or regionally significant, with respect to the generation of economic benefits.

(B) The extent to which assistance under this section would foster innovative public-pri-

vate partnerships and attract private debt or equity investment.

(C) The likelihood that assistance under this section would enable the project to proceed at an earlier date than the project would otherwise be able to proceed.

(D) The extent to which the project uses new or innovative approaches.

(E) The amount of budget authority required to fund the Federal credit instrument made available under this title.

(F) The extent to which the project helps maintain or protect the environment.

(G) The extent to which assistance under this section reduce the contribution of Federal grant assistance to the project.

(3) SPECIAL RULE FOR CERTAIN COMBINED PROJECTS.—For a project described in section 10007(8), the Administrator shall only consider the criteria described in subparagraphs (B) through (G) of paragraph (2).

(c) FEDERAL REQUIREMENTS.—Nothing in this section supersedes the applicability of other requirements of Federal law (including regulations).

SEC. 10010. SECURED LOANS.

(a) AGREEMENTS.—

(1) IN GENERAL.—Subject to paragraphs (2) through (4), the Secretary or the Administrator, as applicable, may enter into agreements with 1 or more obligors to make secured loans, the proceeds of which shall be used—

(A) to finance eligible project costs of any project selected under section 10009;

(B) to refinance interim construction financing of eligible project costs of any project selected under section 10009; or

(C) to refinance long-term project obligations or Federal credit instruments, if that refinancing provides additional funding capacity for the completion, enhancement, or expansion of any project that—

(i) is selected under section 10009; or

(ii) otherwise meets the requirements of section 10009.

(2) LIMITATION ON REFINANCING OF INTERIM CONSTRUCTION FINANCING.—A secured loan under paragraph (1) shall not be used to refinance interim construction financing under paragraph (1)(B) later than 1 year after the date of substantial completion of the applicable project.

(3) RISK ASSESSMENT.—Before entering into an agreement under this subsection for a secured loan, the Secretary or the Administrator, as applicable, in consultation with the Director of the Office of Management and Budget and each rating agency providing a preliminary rating opinion letter under section 10009(a)(1)(B), shall determine an appropriate capital reserve subsidy amount for the secured loan, taking into account each such preliminary rating opinion letter.

(4) INVESTMENT-GRADE RATING REQUIREMENT.—The execution of a secured loan under this section shall be contingent on receipt by the senior obligations of the project of an investment-grade rating.

(b) TERMS AND LIMITATIONS.—

(1) IN GENERAL.—A secured loan provided for a project under this section shall be subject to such terms and conditions, and contain such covenants, representations, warranties, and requirements (including requirements for audits), as the Secretary or the Administrator, as applicable, determines to be appropriate.

(2) MAXIMUM AMOUNT.—The amount of a secured loan under this section shall not exceed the lesser of—

(A) an amount equal to 49 percent of the reasonably anticipated eligible project costs; and

(B) if the secured loan does not receive an investment-grade rating, the amount of the senior project obligations of the project.

(3) PAYMENT.—A secured loan under this section—

(A) shall be payable, in whole or in part, from State or local taxes, user fees, or other dedicated revenue sources that also secure the senior project obligations of the relevant project;

(B) shall include a rate covenant, coverage requirement, or similar security feature supporting the project obligations; and

(C) may have a lien on revenues described in subparagraph (A), subject to any lien securing project obligations.

(4) INTEREST RATE.—The interest rate on a secured loan under this section shall be not less than the yield on United States Treasury securities of a

similar maturity to the maturity of the secured loan on the date of execution of the loan agreement.

(5) MATURITY DATE.—

(A) IN GENERAL.—The final maturity date of a secured loan under this section shall be not later than 35 years after the date of substantial completion of the relevant project.

(B) SPECIAL RULE FOR STATE INFRASTRUCTURE FINANCING AUTHORITIES.—The final maturity date of a secured loan to a State infrastructure financing authority under this section shall be not later than 35 years after the date on which amounts are first disbursed.

(6) NONSUBORDINATION.—A secured loan under this section shall not be subordinated to the claims of any holder of project obligations in the event of bankruptcy, insolvency, or liquidation of the obligor of the project.

(7) FEES.—The Secretary or the Administrator, as applicable, may establish fees at a level sufficient to cover all or a portion of the costs to the Federal Government of making a secured loan under this section.

(8) NON-FEDERAL SHARE.—The proceeds of a secured loan under this section may be used to pay

any non-Federal share of project costs required if the loan is repayable from non-Federal funds.

(9) MAXIMUM FEDERAL INVOLVEMENT.—For each project for which assistance is provided under this title, the total amount of Federal assistance shall not exceed 80 percent of the total project cost.

(c) REPAYMENT.—

(1) SCHEDULE.—The Secretary or the Administrator, as applicable, shall establish a repayment schedule for each secured loan provided under this section, based on the projected cash flow from project revenues and other repayment sources.

(2) COMMENCEMENT.—

(A) IN GENERAL.—Scheduled loan repayments of principal or interest on a secured loan under this section shall commence not later than 5 years after the date of substantial completion of the project.

(B) SPECIAL RULE FOR STATE INFRASTRUCTURE FINANCING AUTHORITIES.—Scheduled loan repayments of principal or interest on a secured loan to a State infrastructure financing authority under this title shall commence not later than 5 years after the date on which amounts are first disbursed.

(3) DEFERRED PAYMENTS.—

(A) AUTHORIZATION.—If, at any time after the date of substantial completion of a project for which a secured loan is provided under this section, the project is unable to generate sufficient revenues to pay the scheduled loan repayments of principal and interest on the secured loan, the Secretary or the Administrator, as applicable, subject to subparagraph (C), may allow the obligor to add unpaid principal and interest to the outstanding balance of the secured loan.

(B) INTEREST.—Any payment deferred under subparagraph (A) shall—

(i) continue to accrue interest in accordance with subsection (b)(4) until fully repaid; and

(ii) be scheduled to be amortized over the remaining term of the secured loan.

(C) CRITERIA.—

(i) IN GENERAL.—Any payment deferral under subparagraph (A) shall be contingent on the project meeting such criteria as the Secretary or the Administrator, as applicable, may establish.

(ii) REPAYMENT STANDARDS.—The criteria established under clause (i) shall include standards for reasonable assurance of repayment.

(4) PREPAYMENT.—

(A) USE OF EXCESS REVENUES.—Any excess revenues that remain after satisfying scheduled debt service requirements on the project obligations and secured loan and all deposit requirements under the terms of any trust agreement, bond resolution, or similar agreement securing project obligations may be applied annually to prepay a secured loan under this section without penalty.

(B) USE OF PROCEEDS OF REFINANCING.—A secured loan under this section may be prepaid at any time without penalty from the proceeds of refinancing from non-Federal funding sources.

(d) SALE OF SECURED LOANS.—

(1) IN GENERAL.—Subject to paragraph (2), as soon as practicable after the date of substantial completion of a project and after providing a notice to the obligor, the Secretary or the Administrator, as applicable, may sell to another entity or reoffer into

the capital markets a secured loan for a project under this section, if the Secretary or the Administrator, as applicable, determines that the sale or reoffering can be made on favorable terms.

(2) CONSENT OF OBLIGOR.—In making a sale or reoffering under paragraph (1), the Secretary or the Administrator, as applicable, may not change the original terms and conditions of the secured loan without the written consent of the obligor.

(e) LOAN GUARANTEES.—

(1) IN GENERAL.—The Secretary or the Administrator, as applicable, may provide a loan guarantee to a lender in lieu of making a secured loan under this section, if the Secretary or the Administrator, as applicable, determines that the budgetary cost of the loan guarantee is substantially the same as that of a secured loan.

(2) TERMS.—The terms of a loan guarantee provided under this subsection shall be consistent with the terms established in this section for a secured loan, except that the rate on the guaranteed loan and any prepayment features shall be negotiated between the obligor and the lender, with the consent of the Secretary or the Administrator, as applicable.

SEC. 10011. PROGRAM ADMINISTRATION.

(a) REQUIREMENT.—The Secretary or the Administrator, as applicable, shall establish a uniform system to service the Federal credit instruments made available under this title.

(b) FEES.—

(1) IN GENERAL.—The Secretary or the Administrator, as applicable, may collect and spend fees, contingent on authority being provided in appropriations Acts, at a level that is sufficient to cover—

(A) the costs of services of expert firms retained pursuant to subsection (d); and

(B) all or a portion of the costs to the Federal Government of servicing the Federal credit instruments provided under this title.

(c) SERVICER.—

(1) IN GENERAL.—The Secretary or the Administrator, as applicable, may appoint a financial entity to assist the Secretary or the Administrator in servicing the Federal credit instruments provided under this title.

(2) DUTIES.—A servicer appointed under paragraph (1) shall act as the agent for the Secretary or the Administrator, as applicable.

(3) FEE.—A servicer appointed under paragraph (1) shall receive a servicing fee, subject to ap-

proval by the Secretary or the Administrator, as applicable.

(d) ASSISTANCE FROM EXPERTS.—The Secretary or the Administrator, as applicable, may retain the services, including counsel, of organizations and entities with expertise in the field of municipal and project finance to assist in the underwriting and servicing of Federal credit instruments provided under this title.

(e) APPLICABILITY OF OTHER LAWS.—Section 513 of the Federal Water Pollution Control Act (33 U.S.C. 1372) applies to the construction of a project carried out, in whole or in part, with assistance made available through a Federal credit instrument under this title in the same manner that section applies to a treatment works for which a grant is made available under that Act.

SEC. 10012. STATE AND LOCAL PERMITS.

The provision of financial assistance for project under this title shall not—

(1) relieve any recipient of the assistance of any obligation to obtain any required State or local permit or approval with respect to the project;

(2) limit the right of any unit of State or local government to approve or regulate any rate of return on private equity invested in the project; or

(3) otherwise supersede any State or local law (including any regulation) applicable to the construction or operation of the project.

SEC. 10013. REGULATIONS.

The Secretary or the Administrator, as applicable, may promulgate such regulations as the Secretary or Administrator determines to be appropriate to carry out this title.

SEC. 10014. FUNDING.

(a) IN GENERAL.—There is authorized to be appropriated to each of the Secretary and the Administrator to carry out this title $75,000,000 for each of fiscal years 2013 through 2017, to remain available until expended.

(b) ADMINISTRATIVE COSTS.—Of the funds made available to carry out this title, the Secretary or the Administrator, as applicable, may use for the administration of this title not more than $3,300,000 for each of fiscal years 2013 through 2017.

SEC. 10015. REPORT TO CONGRESS.

Not later than 2 years after the date of enactment of this Act, and every 2 years thereafter, the Secretary or the Administrator, as applicable, shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives a report summa-

rizing the financial performance of the projects that are receiving, or have received, assistance under this title, including a recommendation as to whether the objectives of this title are being met.

Appendix B: Vickerman Associates, Iowa Lock & Dam Study Task 2.4

U.S. Inland Waterway Modernization: A Reconnaissance Study

Prepared for the Iowa Department of Transportation

HDR Engineering, Inc.

April 2013

OLE Statewide Professional Services Agreement

(Supplemental Agreement Number 24)

Iowa Lock and Dam Study

Task 2.4 Commercial Framework Scope of Services

Task 2.4.1 Identification of Key Shipping and Logistics Market Drivers Analysis

Task 2.4.2 Future Shipping Market Forecast Assessment Study

Task 2.4.3 Recommended Inland Waterway and Inland Transport Shipping Development Strategies and Logistics Options

Final Report Dated January 18, 2013

Prepared for:

HDR

Prepared by:

VICKERMAN & ASSOCIATES, LLC

(A Strategic Alliance Partner with HDR Engineering Inc.)

IDOT Lock and Dam Mississippi River Study

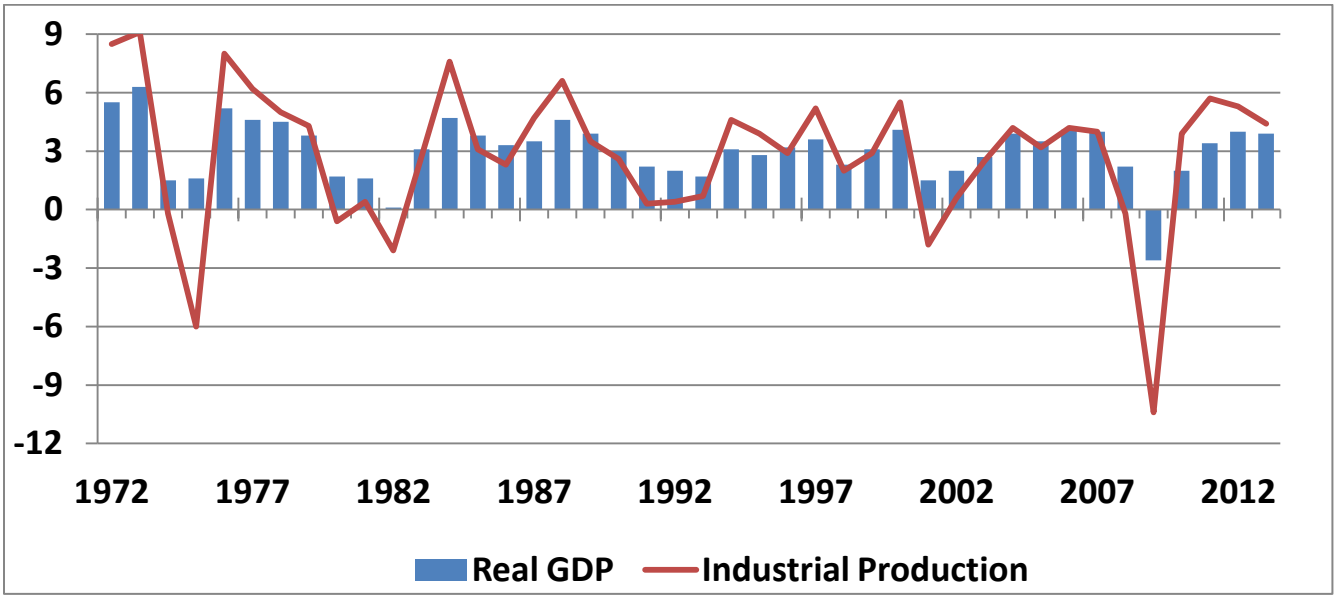
Study Content Outline

- World Economy
- U.S. Trade
- America's freight transportation network
    - Background (highways, rail, water)
    - Panama Canal
    - Containers
    - Container on barge
    - Intermodal
    - Inland water transportation
    - Technology in the transportation industry
- Inland waterways in the U.S.
- U.S. Waterways – Current Issues and Conditions
    - Delays
    - Impact to U.S. economy
    - Investment required
    - Soybeans and the U.S. waterways
- Funding for the U.S. Ports and Waterways (the WAVE4 act & Harbor Maintenance Trust Fund)
- U.S. Waterways – some recent comments
- Upper Mississippi Waterway
- Iowa Transportation
    - Background
    - Freight System
    - Lock traffic
    - Delays on locks
- Macro Demand Forecast of Future River Terminal Cargo Needs
    - Forecasted growth for inland waterways
    - Iowa trade opportunities
- Appendix
    - comments about the waterways today
    - List of sources

The World Economy

GDP drives world trade and U.S. Trade. The 2009 downturn in world GDP and trade was unprecedented.

A comparison Of the Growth Rate of World Trade and GDP



Source: IHS Global Insight

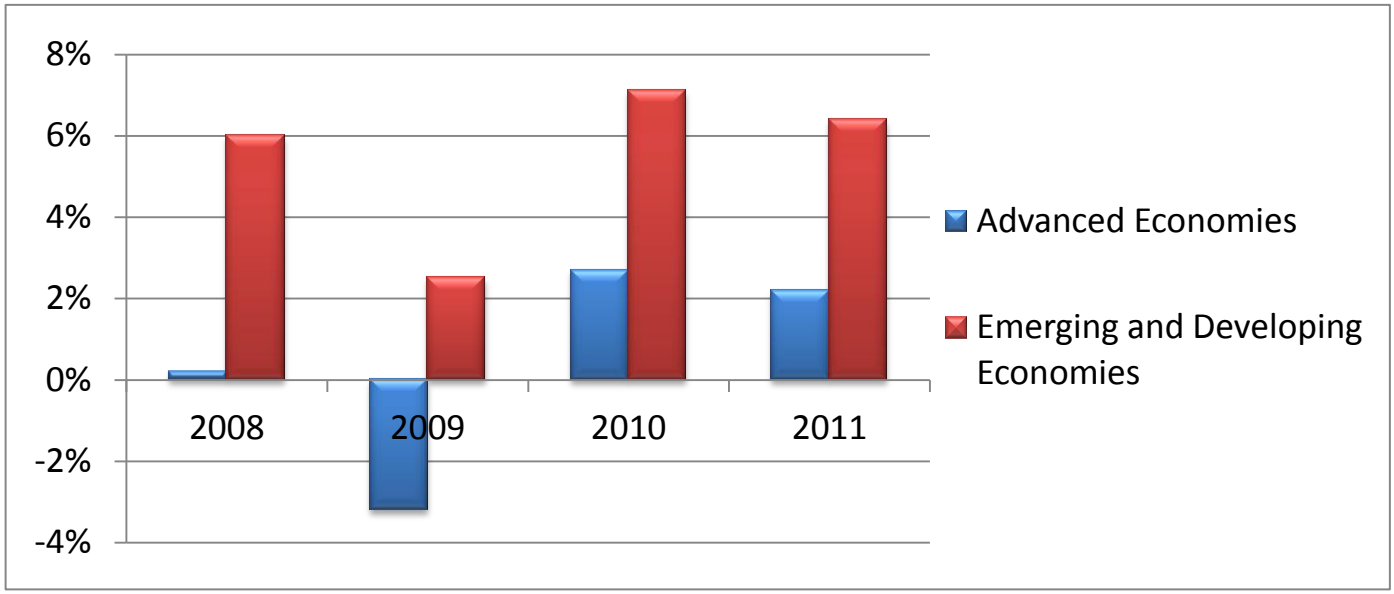
The global economic and trade recovery has proceeded as anticipated, but some downside risks remain elevated. Nevertheless, most economists feel that the likely longer-term outcome is continued, but moderate, global trade growth.

- However, the recovery is a story of two economies – robust strength in emerging markets but more fragile and tentative economic growth through much of the industrialized world (advanced markets).
- Emerging and developing countries prudent policies have contributed to a significantly improved medium-term growth outlook relative to the aftermath of previous global recessions. However, activities in these economics, particularly those in emerging Asia, remain dependent on demand in the advanced economics.
- Advanced and a few emerging economies still face major adjustments in their balance sheets and a need to reform their financial sectors.

The Importance of the Emerging Markets

The world is evolving and it appears that the world economy is at the pivot point of a new economic era. The advanced economies output expansion is not going to have the typical strength of past recovery periods and past growth periods. Nevertheless, emerging markets and the developing world will see a faster pace of growth.

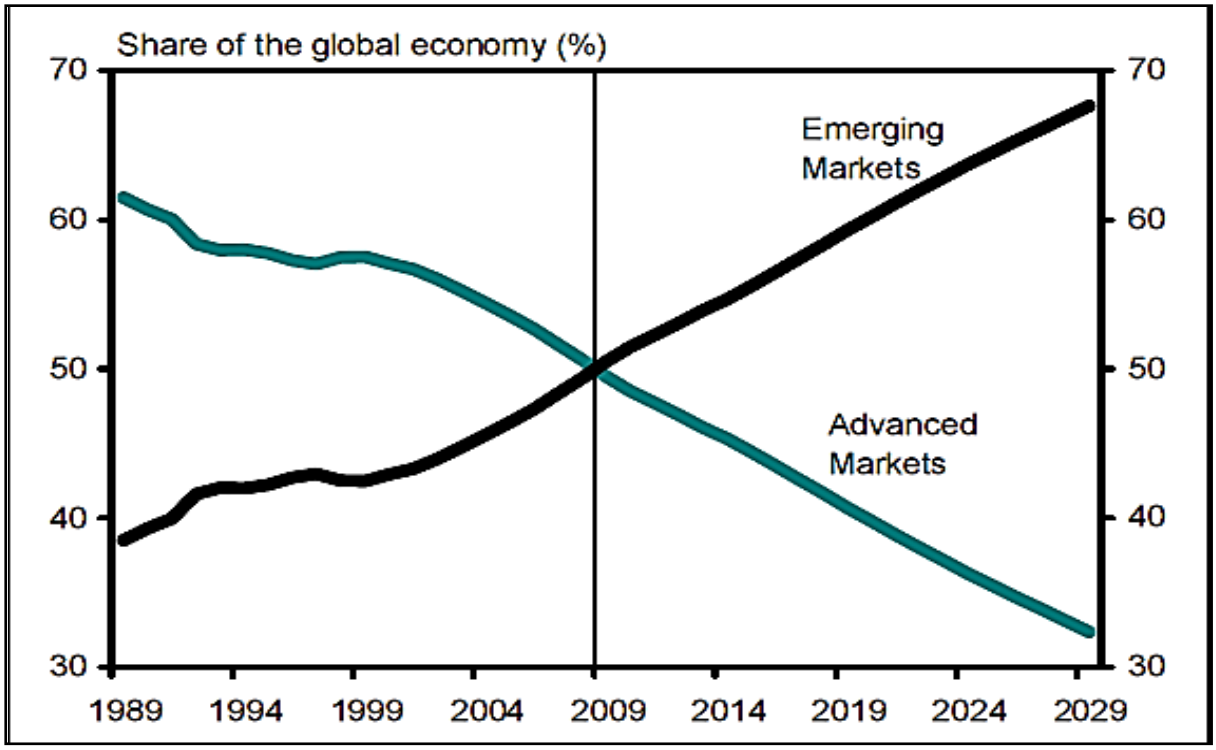
Advancing vs. Developing Countries Growth



Source: IMF, October 2010

Looking ahead, the theme of relative structural and cyclical strength in the emerging market world will remain part of the global landscape for many years. However, amidst a deceleration in advanced economies, the nature of the global supply chain and the globalization of the world economy will also restrain the strength of the emerging markets. This fact combined with further policy efforts to check excessive price growth, suggest that the pace of emerging market growth has likely peaked.

Twenty years ago advanced nations / markets made up two-thirds of the global economy. Today they comprise only half, and within twenty years, advanced markets will decline to account for only one-third of the global output. As a result of this changing market share (in spite of slower expansion in the mature advanced economies), the global economy will continue to see strong growth.



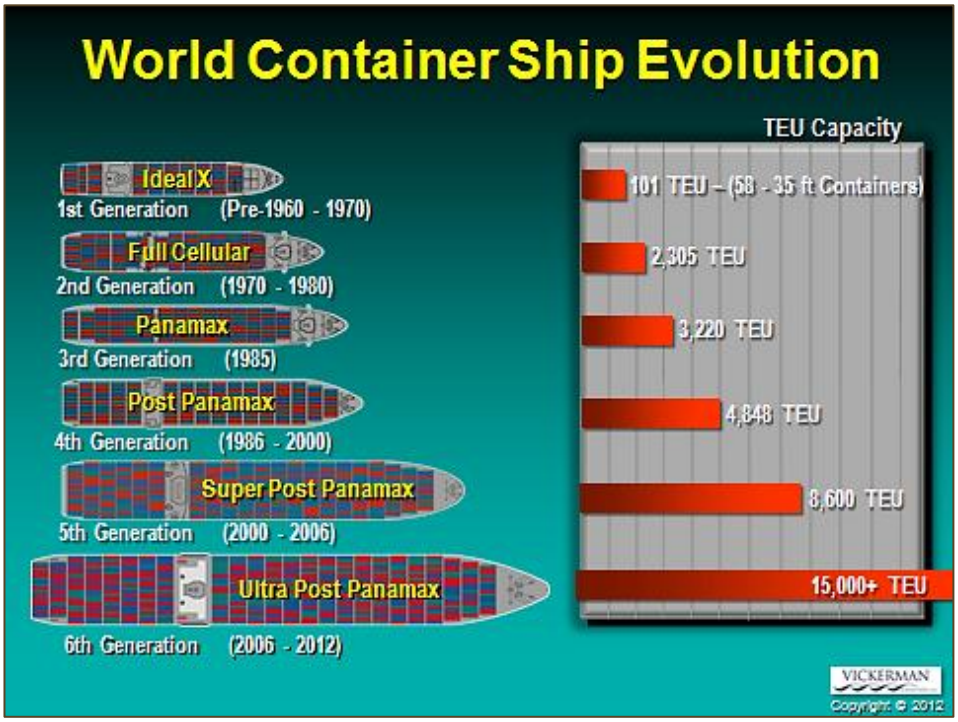
The Canal will shortly reach maximum sustainable capacity. Therefore, the Panama Canal Authority in March 2009 took steps to begin a $5.25 billion construction plan. In announcing bids to build locks on Panama's Atlantic and Pacific coasts, the authority set in motion an effort to assure available capacity. The project will add a third set of locks by 2014, and will allow the canal to handle ships with nominal capacities of up to 12,600 TEUs; this is more than double the approximate 4,800 TEUs, which is now considered Panamax.

The "new" Canal will double capacity and allow more traffic: allowing the canal to meet the changing economics of ocean shipping. In recent years, container shipping has become the Canal's primary income generator and main driving force of traffic growth. Between 1999 and 2004, the Canal's share of the Northeast Asia / U.S. East Coast container trade grew from 11% to 38%.

The average size of ships is increasing rapidly:

- In 1999, 2% of ships were over 5,000 TEUs, with a total capacity of 4 million TEUs.
- In 2006, 10% of ships were over 5,000 TEUs, with a total capacity of 8 million TEUs.
- In 2011, it is estimated that 50% of the global shipping fleet will be over 5,000 TEUs.

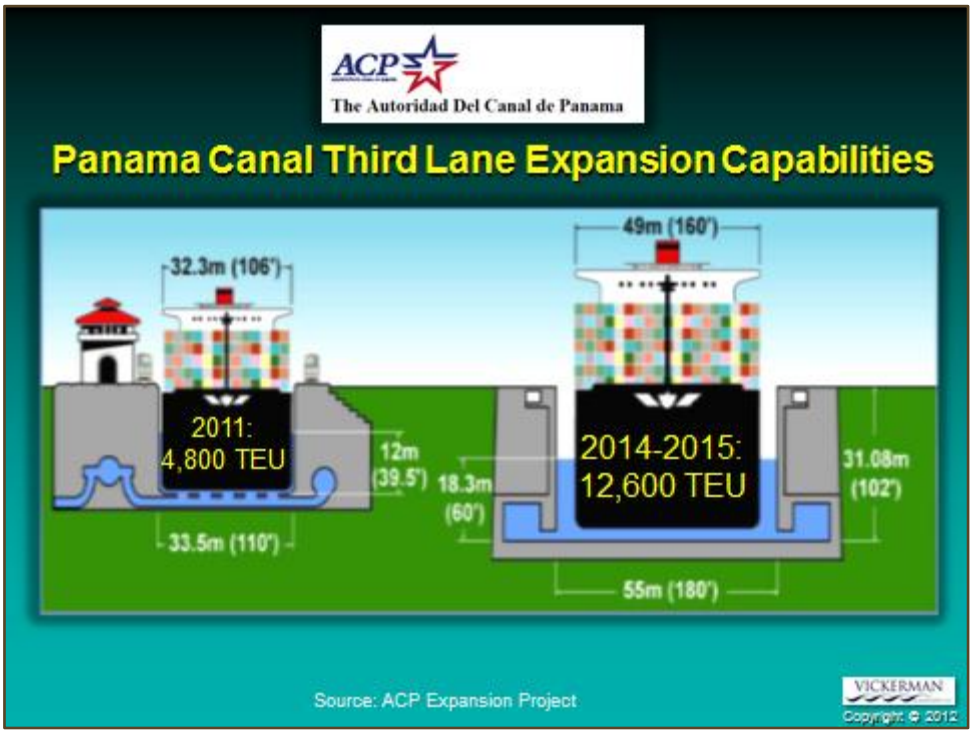
"We anticipate that after 2014, the workhorse of the industry in the U.S. East Coast will be the vessel in the range of 6,000 to 8,000 TEUs," said Rodolfo Sabronge, the canal authority's vice president of research and market analysis. "They offer more flexibility to vessel operators and are in line with infrastructure investment plans in the East Coast and Gulf regions."



Richard Wainio, Port Director at Tampa, Fla., said his port and others along the Gulf Coast would be able to handle ships beneath the size of the post-Panamax giants. “Every port doesn’t need to be able to handle the biggest ships,” he said. “If you’ve got 40 feet of water, you’re going to see an increase in your volume, post-2014.” “Tampa expects growth in container trade after expansion of the Panama Canal is completed in 2014. Growth could come through direct calls or through containers transshipped through Caribbean and regional container hubs that can handle the largest container ships.

Wainio foresees services in which large vessels will transit the canal, drop cargo at a transshipment point in Panama or the Caribbean and continue on to a couple of larger U.S. ports that serve markets large enough to support direct calls. Transshipment adds transit time, but Wainio said that could be minimized by careful scheduling and efficient hub-and-spoke operations. “Post-2014, I don’t see a lot of East and Gulf Coast ports that can handle the bigger ships straight in,” he said, “but I do see opportunities for regional ports in conjunction with two or three really big deep-water ports.”

Wainio, who served 15 years as chief economist at the U.S. Panama Canal Commission, said he thinks canal officials are conservative in predicting all-water services eventually will carry 50 % of U.S. import volume from Asia. “The bottom line is that as the pie grows, there will be a lot more opportunities for carriers,” he said. “I think that once the markets start to recover and we get closer to 2014, some of these carriers are going to be chomping at the bit to put some of these ships into Panama. I think they’re going to be ready to go and you’re going to see a fairly quick movement in that direction.”



A June 2010 article in the Journal of Commerce states: importers say the proposed toll increases effective January 2011 (the increase will likely result in tolls on container ships rising nearly 14%), are unlikely to slow the shift of cargo from the West Coast to the East Coast via the all water service. However, many carriers believe the toll hikes will make alternatives such as the Suez Canal or intermodal rail land bridge more competitive. Carriers say the toll hikes will likely fuel the search for alternative routes, since they will pass the increases on to their customers, especially as the Southern California ports realize their fees are causing cargo diversions.

The director of the National Ports and Waterways Institute in Maryland believes the market has reached a point of equilibrium, at least until a bigger wider Panama Canal opens. Even then, the modernized canal may produce only a "small bump" in market share for East and Gulf ports rather than an opening of the floodgates as some port executives in the regions predict. Although several factors contributed to the shift in market share during the past decade, the biggest factor favoring the all-water route has been the relatively low cost of serving major East Coast markets by direct services.

The freight rate for moving a 40-foot container from Hong Kong to New York via ocean service to LA and intermodal rail to the East Coast is about $3,500 (according to Drewry Shipping Consultants). The all water route to New York is about $3,100, for a savings of $400 to $500. However, the benefit of moving via the West Coast is a savings of seven days in transit. For high-value or time sensitive shipments, the shorter transit time is critical.

Today the East Coast ports have a lock on much of the Asian cargo destined for the immediate eastern seaboard, but they face an uphill battle against West Coast intermodal services for the lucrative markets stretching from Chicago to the Ohio Valley and down through Kentucky to Atlanta.

Asaf Ashar, director of the National Ports and Waterways Institute in Bethesda, only sees the East Coast picking up 2 to 3 percent points in market share when the 8,000 TEU and larger vessels regularly transit the canal. "Most of the diversion of cargo from West Coast ports that was expected to occur because of the all-water services already has occurred". The main benefit of the wider canal will be that it can accommodate the natural growth in cargo volume that will occur in the East Coast populations' centers."

Nevertheless, East Coast ports are deepening harbors, expanding container terminals, and developing rail infrastructure to interior markets in anticipation of a further diversion of cargo from West Coast gateways. NS Rail has completed its Heartland Corridor double-stack project between Hampton Roads Virginia and Chicago. CSX Intermodal is building its Gateway corridor from mid-Atlantic ports to Chicago in anticipation of growing cargo volumes to the Midwest.

However, the increased cost and transit time of serving even relatively close-in markets such as Atlanta and the distribution hubs in the Ohio Valley via truck or intermodal service from East Coast ports can diminish the economics of all-water services. The seven-day transit time disadvantage of all-water services will decrease even further, and the $400 to $500 cost savings inherent in all water services to the east Coast will disappear because of the added transportation costs of servicing the inland markets.

East Coast ports also face costly terminal expansion and projects to deepen harbors to accommodate the larger vessels that will transit the canal.

- Norfolk appears ready
- Ports in the Southeast as well as New York-New Jersey must deepen their harbors. In addition, New York – New Jersey has the Bayonne Bridge height problem.
- Maersk Line sees the Suez routing to the East Coast as another growth opportunity for the East Coast ports, except for the infrastructure limitations.

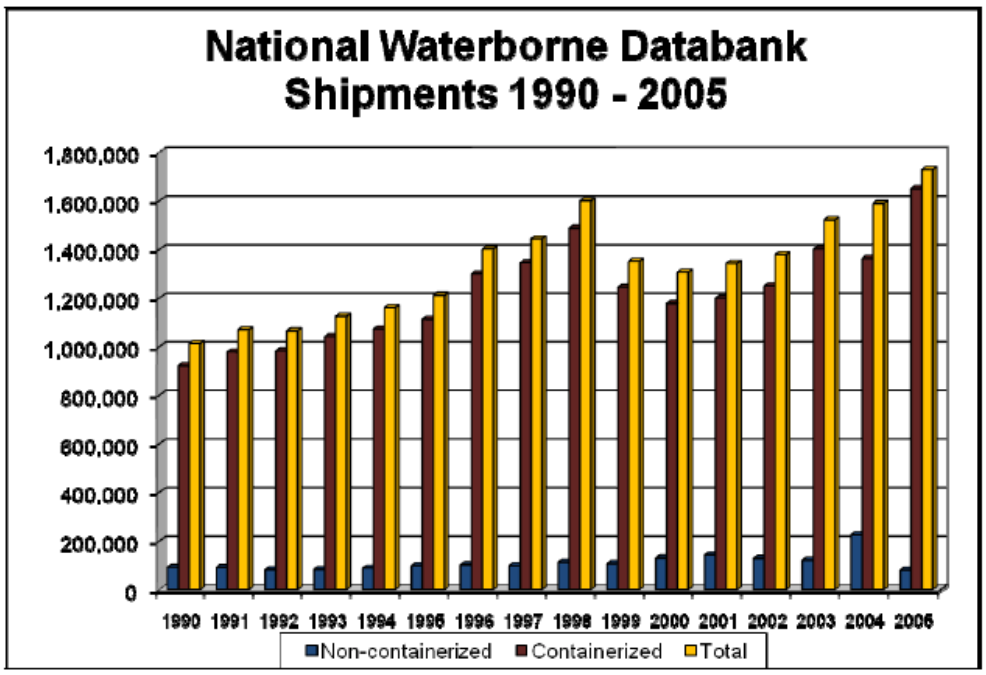
Meanwhile West Coast ports already have depths of 50 feet or greater, which the larger ships need. Oakland and the Pacific Northwest ports have significant excess terminal capacity. BNSF Railroad and Union Pacific are well along on double tracking their corridors to the Midwest. The western railroads now offer expedited intermodal services to market such as Atlanta, where they compete with the all-water services to the East Coast.

In addition, the market share of the Asian trade for reverse intermodal services for the East Coast ports to inland destinations remains in the low single-digits.

Soybean Council:

> *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 2020/2021. After the canal expansion in 2014, 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.*

Container Growth:

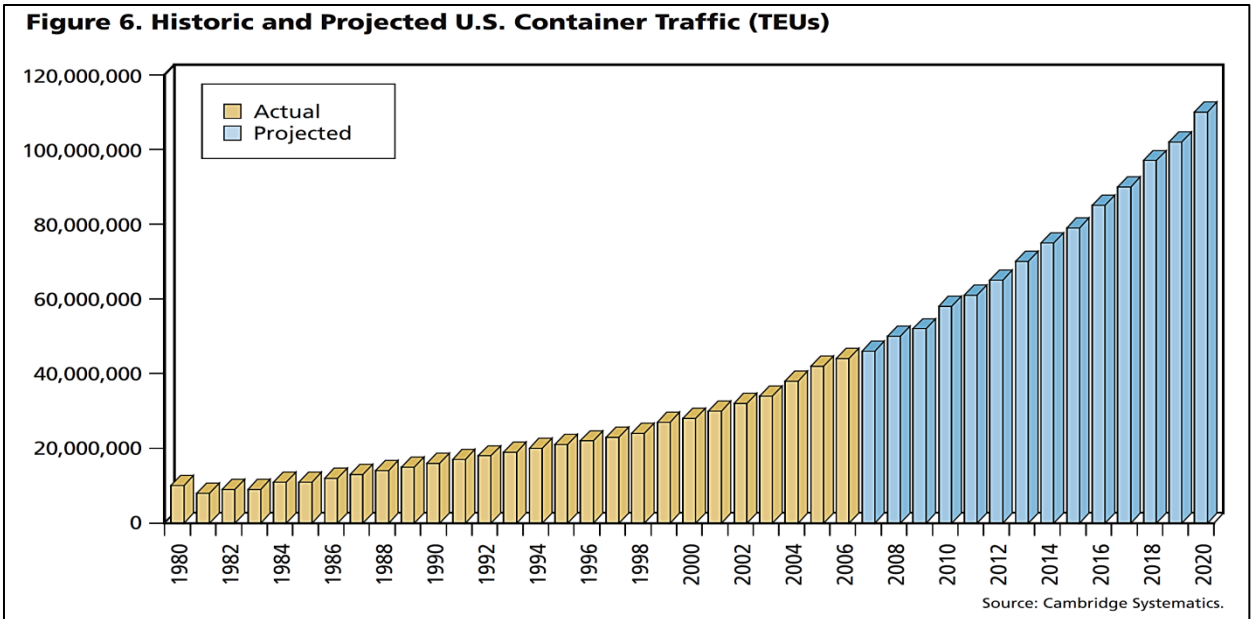


Source: Container Flows in World Trade, January 2009

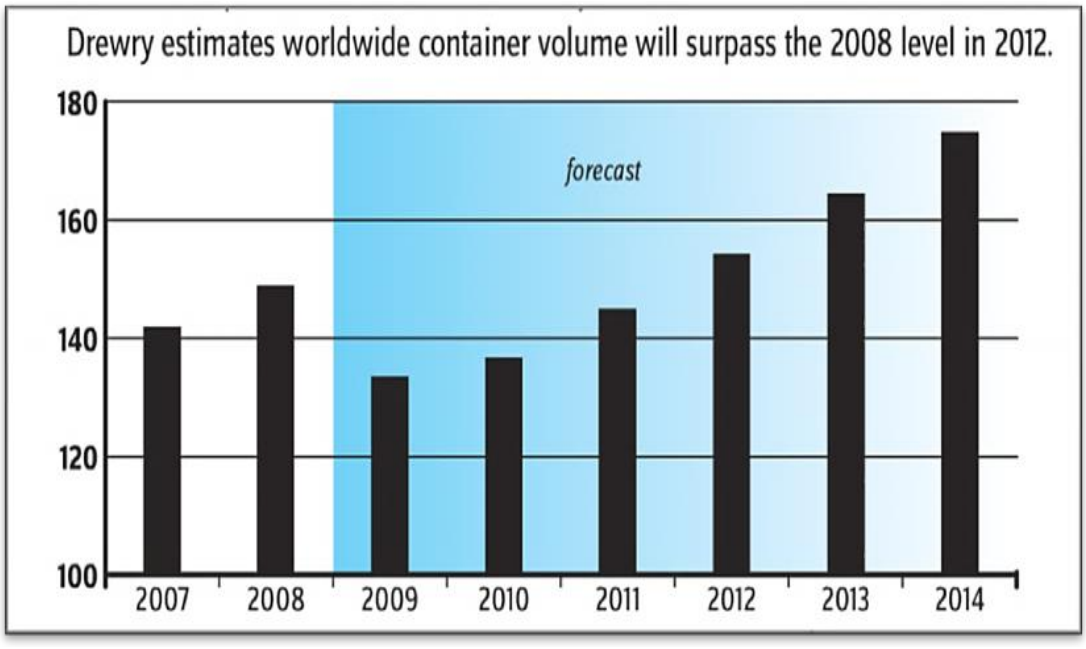
The above chart shows that containerized shipments make up the largest portion of shipments with non-containerized shipments forming a small portion of shipments

As forecasted by the Maritime Administration National Advisory Council:

> *"Container volume is expected to more than double in the next 20 years, and nearly all non-bulk cargo will be containerized. Ports must plan now to ensure that they have the people, training, technology, transportation, assets, and the infrastructure to provide efficient and reliable transportation services. Solutions must be flexible to accommodate changes that will inevitably occur."*



World Container Growth Forecast (includes full and empty containers, port to port, and transshipment volume in millions of TEUs)



Source: Drewry Shipping Consultants

Container-On-Barge (COB) Trends -

One important trend that will improve the value and capability of the inland waterway system is the increased use of container-on-barge transport. Containerization is increasing the adaptability of inland ports to transport large quantities of goods on barges never before thought possible. The European Federation of Inland Ports estimates that further growth in the container sector is likely and inland ports will continue their investment efforts in this field in order to further improve their position in the transport market.

Containers can now hold non-traditional cargo such as liquids, perishable (using refrigeration) and non-perishable agricultural products, as well as bulk cargo such as minerals, petroleum, and others. Improved cargo security is an important benefit of containerization. In Europe, container on barge is highly developed. Containers are designed to be modular for easy interchange among transportation modes, allowing cargoes to be moved by the combination of ship, rail, and truck that best meets the needs of shippers and receivers. Containers can hold more when transported by barge since they are not held to the same weight limitations as overland transport. Containers on barge operations save fuel, ease congestion on roads, and can haul hazardous material or other cargo not suitable for transport through large population centers. Barges facilitate military deployment, moving unit containers and vehicles in a secure manner preventing pilferage and equipment damage associated with fast moving and relatively unguarded transport. Inland waterways are positioned to take some of the lower to moderate value container traffic off the congested roadways. The Columbia-Snake River system already has some container on barge traffic.

At the mouth of the Mississippi a ship to barge container port has been proposed – Sea Point. Sea Point is a floating deep-sea dock. On one side of the port, deep-sea container ships would load and unload containers. Overhead cranes would transfer the containers to and from the other side of the dock where the containers would be loaded on and unloaded from barges for

Graphic from http://sea-point.net

transport up and down the Mississippi River or the Gulf Coast.

For the shipper, there is a tradeoff between the savings on inland transportation costs that COB represents, and the additional time required to complete the all water. For instance, after a container is loaded to a rail car in the New Orleans area it will be available at the Memphis ramp within 24 to 36 hours. For approximately 1/3 the cost and an additional 3 days (4 days total), the same container would be available at the Port of Memphis.

- A standard open hopper river barge can carry 1600 short tons on its 9 foot draft.
  - For containers a river barge will usually cube out before it drafts out.
  - The cubic volume of the containers will fill the barge prior to reaching 1600 short tons
- A standard river box barge will carry eighty-one 20’ containers, or a maximum of about 50 - 20’ and 40’ containers
  - Northbound barge tow normally accommodate 20 loaded barges … about 1000 mixed containers
- A 100 rail car unit train can accommodate a maximum of 300 containers … the same number that can be carried in 6 full barges

Differences Between the Three Modes of Inland Transportation

Gateway Ship Cargo

A Container Ship Unloading 2500 Containers and Loading 2500 Requires a Combination of the Following:

5000 "18 Wheelers" Creating 220 Miles of Traffic (150' Between Trucks)

18 Miles of Double Stack Rail Cars

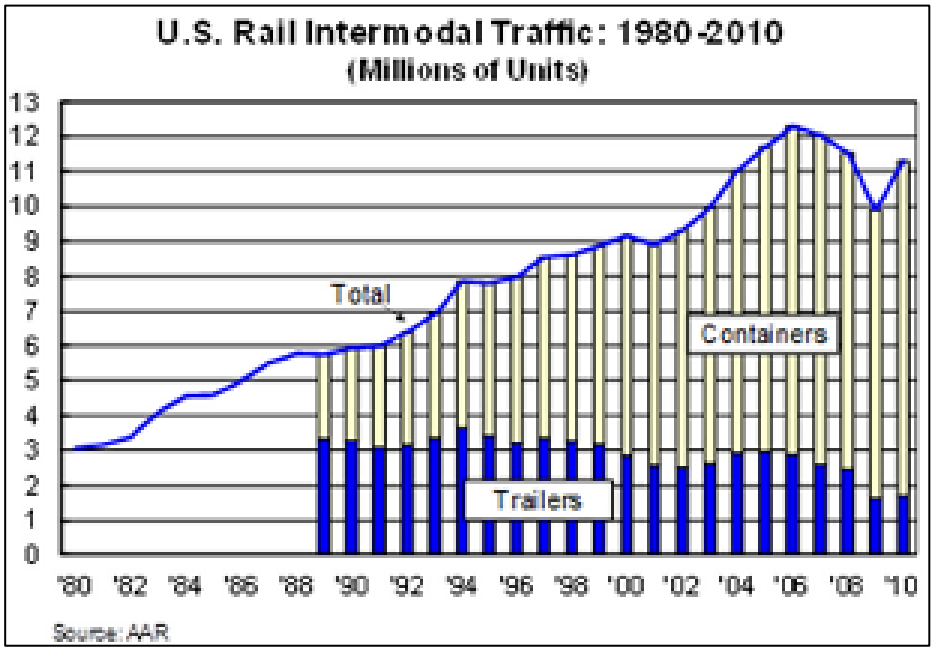
6 Tows of 18 Barges

"Obstacles to starting a COB service are more economic than technical. Perhaps it would be even more accurate to say that the obstacles are more business practices than business costs. Starting a COB service where a traditional bulk barge operation exists presents a classical 'chicken and egg' dilemma. Carriers say that if there is a demand, they will provide the service. Shippers say that if there were a service they would use it. There is a role for the public sector to move both the chicken and the egg as close to each other as possible."

- Container-On-Barge Pre-Feasibility Study, Final Report, Port of Pittsburgh Commission, July 2003

Intermodal Growth -

Rail intermodal is the long-haul movement of shipping containers or truck trailers by rail, combined with a (usually much shorter) truck movement at one or both ends. Today intermodal accounts for approximately 21 percent of US rail revenue, second only to coal among all rail traffic segments.



Source: AAR Economics Department

In response to the widening of the Panama Canal, intermodal infrastructures have a chance to evolve into triple-play intermodal services (containers on trucks, rail, and barge) at container gateway ports. The opportunity (in addition to funding) is largely dependent on the success of two aspects, specifically container-on-barge development (including short-sea-shipping), and short-haul intermodal rail. The former functioning as "marine highways" serving the nation's interior from Gulf Coast ports and the latter serving as "reverse mini-land bridges" from East Coast ports to inland markets.

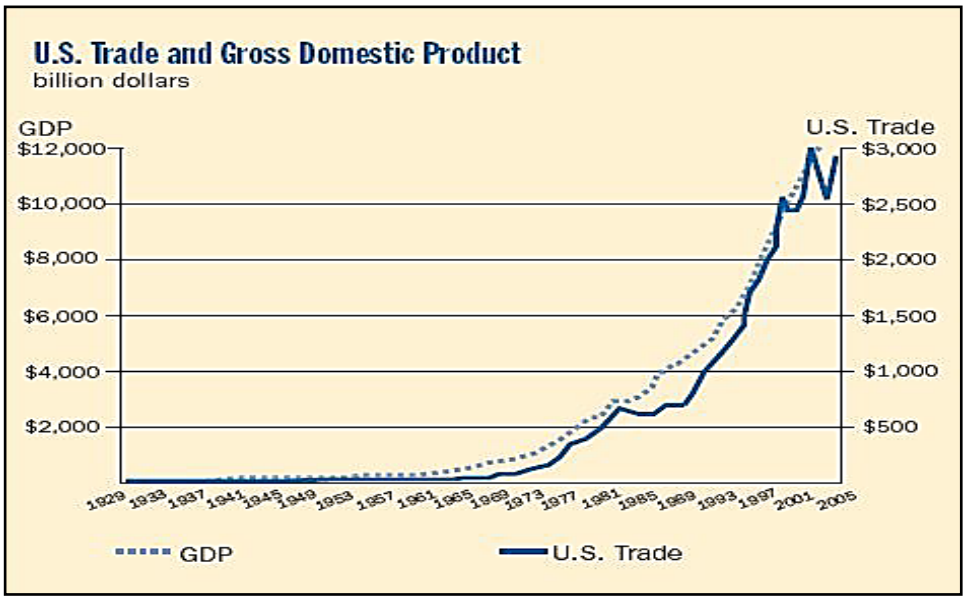
Reverse Mini Rail Land bridges serve the reverse role of the current trans-continental land bridge for containers to/from Asia, except on a smaller scale. Instead of calling on West Coast ports, containers are shipped through the Panama Canal to the East Coast or Gulf Ports and then shipped by rail or truck to a mid-country market. The challenge is in the cost competitiveness of the rail reverse mini land bridge, given the close proximity of the markets to the ports.

A recent set of investments made by eastern and central railroads form the foundation for the development of reverse land bridge services:

Examples of Reverse Land bridge Services from the East Coast and Gulf Coast (RNO Group)

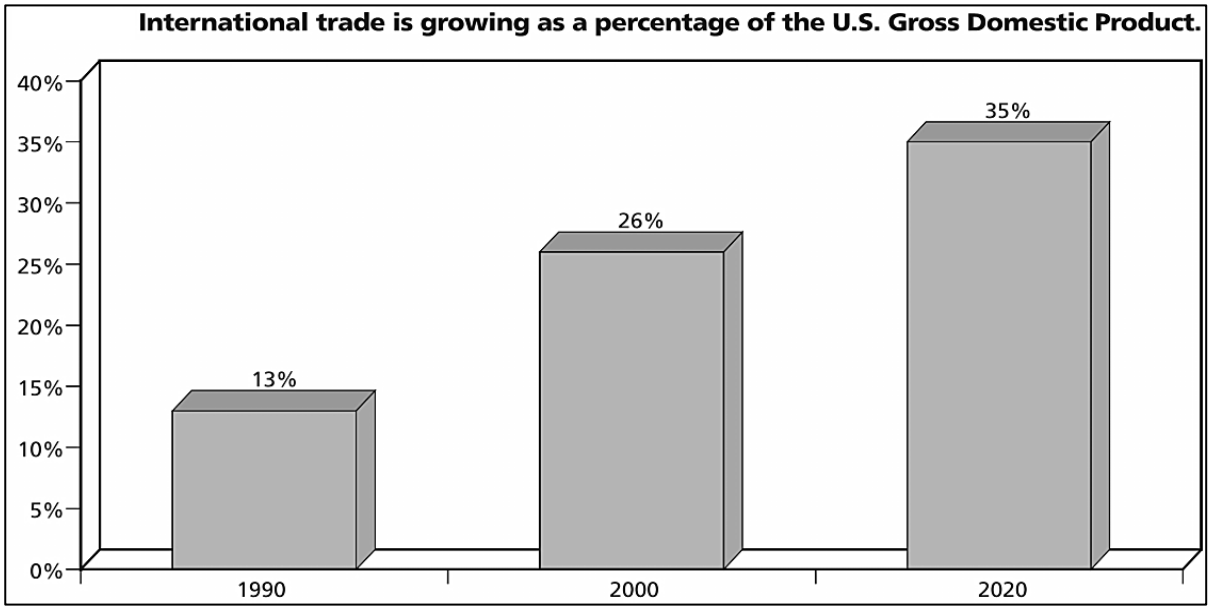
U.S. trade: Current Situation and looking ahead

U.S. trade performance is reliant upon the health of the global economy, the value of the dollar, and the shift in consumer goods manufacturing to lower labor cost nations such as China, Southeast Asia and India. For the U.S., GDP growth and world trade are closely dependent and represent a true measure of the U.S. prosperity. For the U.S., As Goes Economic Growth, So Goes Trade:

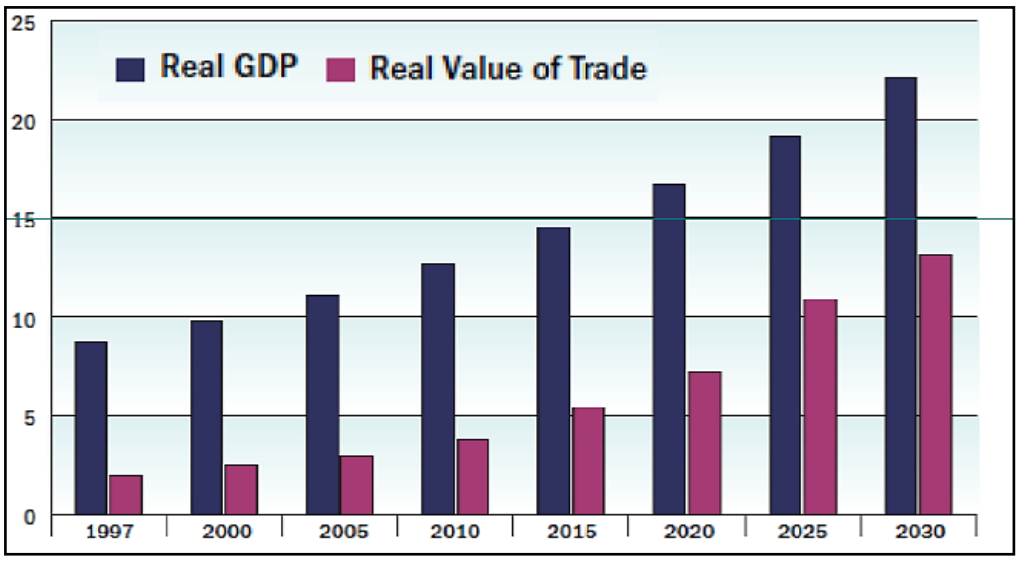


Source: U.S. Department of Transportation based on U.S. Department of Commerce Data

Foreign trade accounted for only 13% of U.S. GDP in 1990; but it grew to nearly 26% by 2000. Recent projections indicate that foreign trade will be equivalent to 35% of GDP by 2020, and may grow to 60% by 2030. As foreign trade continues to grow, marine transportation will become even more important to the U.S. economy.



Value of U.S. Global Trade Compared to U.S. GDP (Trillions of 2000 Dollars)

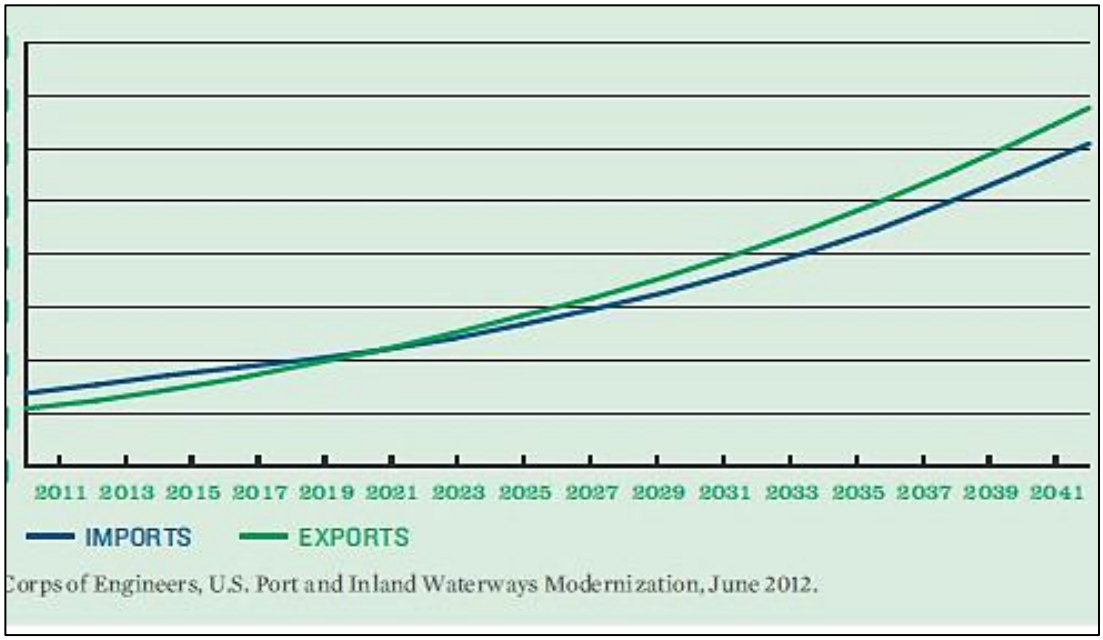


Source: Global Insights, Inc., 2009

Domestic Trade

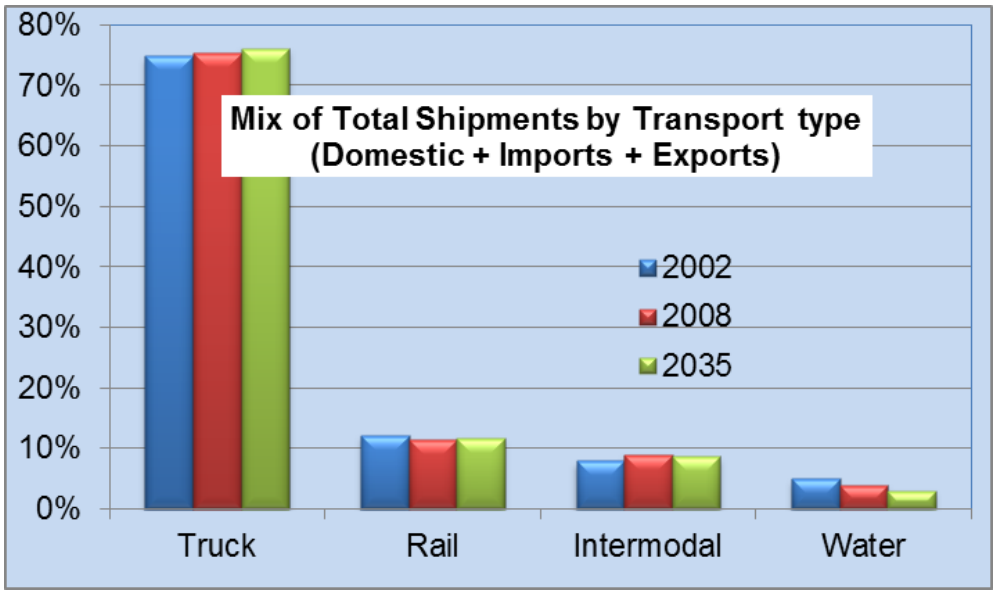
The trade volume for marine ports is expected to double by 2021, and double again shortly after 2030. Even if global growth slows due to economic problems in Europe, the U.S. major trading partners are a diverse set of countries in Asia and Latin America, and the growth forecasts are indicative of long term trends that will require major investments in U.S. ports. In the next decade, total U.S. exports are expected to surpass imports for the first time in a generation.

Projected Growth Forecasts for America's Trade Volume, 2011-2041



America's Freight Transportation Network

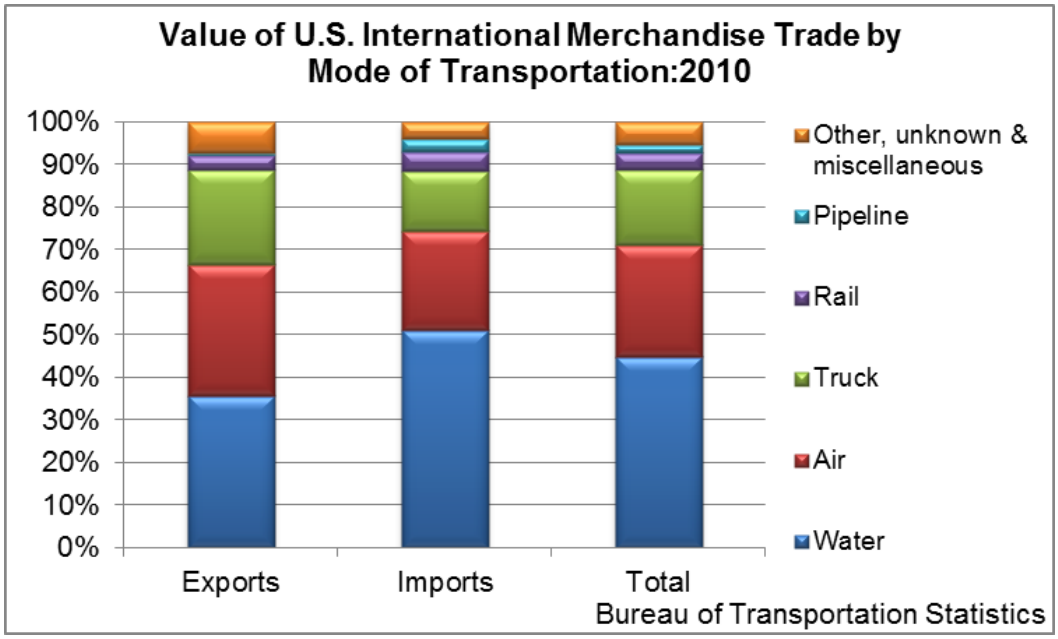
Background



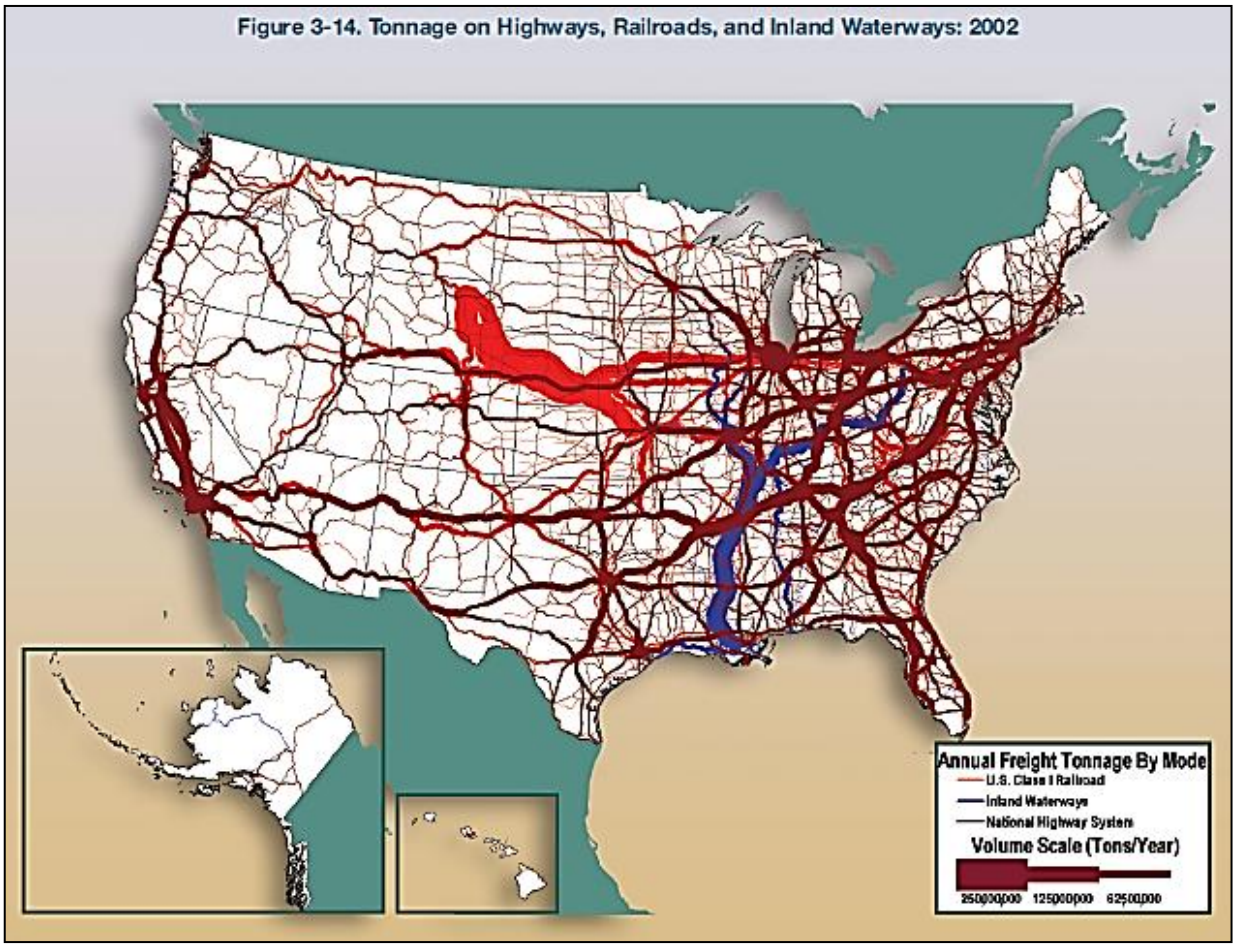
The U.S. transportation system moved, on average, 53 million tons worth $36 billion each day in 2002. The U.S. Department of Transportation Freight Analysis Framework (FAF) estimates that tonnage increased by 11.2 percent by 2008, reaching 58.9 million tons per day. Nearly 10 percent of this tonnage is imports and exports. Growth between 2002 and the estimate for 2008 is slightly lower than the forecasted growth rates through 2035.

Through 2035, the mix by transportation type is forecasted to show little change, however the forecasted growth is big, placing pressure on the domestic transportation network and on all modes of transportation.

In the United States, trucks carry most of the tonnage and value of freight, but railroads and waterways carry significant volumes over long distances. The biggest rail volume movement is coal (between the Power River Basin and the Midwest), and the largest inland waterways volume movement is along the Lower Mississippi River.



Nearly 80 percent of U.S. foreign trade freight tonnage moves by water, but air and truck transportation is nearly as important when freight value is considered. By value, the water share drops to 48 percent, with air and truck accounting for 24 percent and 16 percent respectively. Rail and pipeline account for the balance.

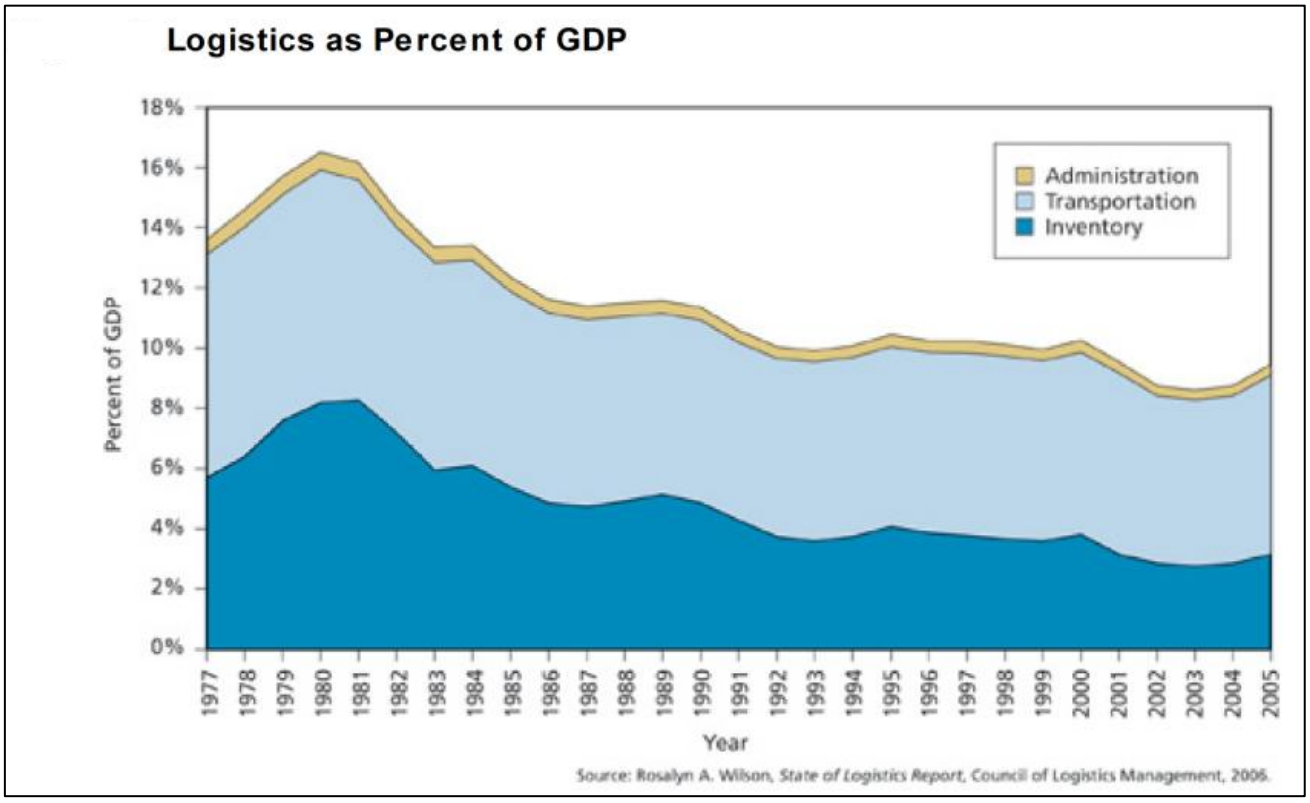


As trade barriers fall around the world, a new trade barrier is rising around the American continent. Congestion at the nations' ports, on its highways, and along its railroads is becoming the new traffic of the 21st century.

Exports are critical to increasing markets for American farmers. In many Midwestern states, agricultural products are the first or second largest share of products moving on the freight networks. Trucks, railcars, and barges all contribute to a network that moves bulk grain to processors where it is converted into value-added exports.

As the world grows more competitive, America's freight network grows more congested. The investments in America's transportation network in the 1950's, 1960's and 1970's led to significant increases in America productivity. The costs of logistics steadily declined from the 1960's until the early 2000's, when measured as a percentage of Gross Domestic Product.

But that trend is changing. Logistic costs are rising, both in absolute terms and in terms of their percentage of the American Economy. These logistic cost increases are primarily caused by delays and inefficiencies in the transportation system, and fuel increases.



With staggering growth looming on America's network, America's shippers realize that the nation's transportation system cannot handle these forecasted increases. Trucking is clearly the dominate mode of shipping and faces some of the largest problems. However, all the modes play a critical important role in the transportation system. Rail is essential for intermodal and bulk movements for intermodal and bulk movements across the continent, particularly for items such as automobiles, coal, and ore. Domestic water shipment is irreplaceable for high-volume, low cost movement of chemicals, grains, ore, aggregates, and salt, particularly on the Mississippi and Ohio River systems.

Highways

The interstate Highway System comprises 1 percent of the public road miles in the United States, but it carries 41% of the large truck traffic in the Country. Today the system is overworked. In 2004 trucks traveled 164 billion miles on the nation's roadways, over the next 30 years that will double. The highway network is the backbone of America's freight system. In 2005 America's highways carried 77% of America's freight when measured by tons shipped, and carried 92% of America's freight when measured by value. Unless America takes direct action soon to develop the new Highway System, the nations' freight highway network will experience greater unreliability, delay, and congestion. Incremental changes will fall far short of the necessary investment needed to reverse these trends.

Future freight demand is forecasted to change -

Future Freight Demand

- Domestic freight traffic expected to increase by 67%
- General cargo freight by 113%
- Highway traffic grows from 11 billion to 19 billion tons (17.2 billion metric tons)
- Rail grows from 2 to 3.7 billion tons (3.4 billion metric tons)
- How is this cargo going to move?
  - Little room left to expand highways, especially in urban areas
  - Rail mileage has been decreasing; much former right-of-way has been developed
  - Rail capacity constraints in urban areas, tunnel clearances, single-track bridges

Rail

Railroads are the most capital intensive industry in the country. Expansion of a rail line, a terminal, or an intermodal terminal represents a permanent high cost investment which will be stranded if business needs change. The high cost and risk of expansion, limits the railroads' ability to scale up capacity to meet shifting demand. As a result,

bottlenecks occur across the country, particularly in and out of ports, around cities, and near the intersections of different railroads.

America needs a new Transcontinental Railroad System, one which reflects the demands of the 21st Century, not the 19th. As with the New Interstate Highway System, the New Transcontinental Railroad System will expand capacity and eliminate the critical bottlenecks which plague the old system today. As with the 19th Century Transcontinental Railroad System, public sector assistance will be needed. New funds, new regulatory flexibility, and new planning systems will be required.

A lack of investment capital is a critical factor influencing railroads' inability to absorb a larger share of the growing freight market. Railroads require up to 17% of their revenue for capital investment, compared to a national average of 3.5% for all industries.

Water

Today, America's ports face daunting challenges in an ever expanding global shipping market. Trade volumes are soaring. Ships are getting larger. Trade routes are shifting and intermodal connections are failing under the volume. The Country needs a new vision for a "Maritime America" that links the heartland to the new economic frontiers in China, India, Brazil and Russia. The major challenges are not at sea, but at the nations ports, docks, railroads, and city streets, which handle the massive surge of containers pouring off the new mega freighters.

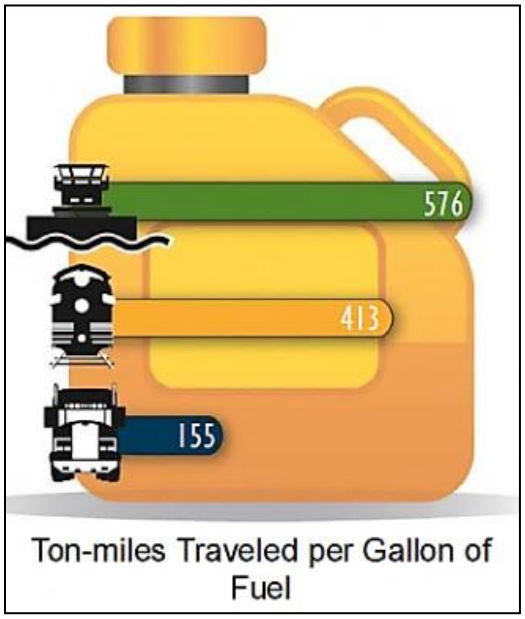
For the inland and intracoastal waterways future planning is critical. Relatively speaking the inland waterway system is an underutilized freight transportation mode. The domestic network is plagued by a lack of capital for investment in dredging, lock expansion, channel maintenance and improved port facilities. It is not managed as a significant mode within the intermodal freight system. As a result, possibilities such as increased movements of containers on barges have not been realized.

The diversion of waterborne freight to highways would more than double the number of heavy trucks on the average rural intrastate. The major inland waterways help remove 58 million truck trips from the U.S. highway system.

Inland Water Transportation

Water ports, by nature, are intermodal. Freight traveling by water must arrive and depart by another transportation mode. Intermodal connectors are roads that provide access to water ports or rail services. Truck congestion on or near the intermodal connections affect ports that rely on trucks for commodity transfer. Improvements to roadways that connect to ports increase the efficiency of ports, benefit trade, and contribute to employment growth and regional productivity.

The Advantages of Inland Water Transportation



Ton-miles Traveled per Gallon of Fuel

America's inland river barge system moves freight more safely and more efficiently than rail or truck. It is a key component of the transportation network and essential to our countries economic strnegth.

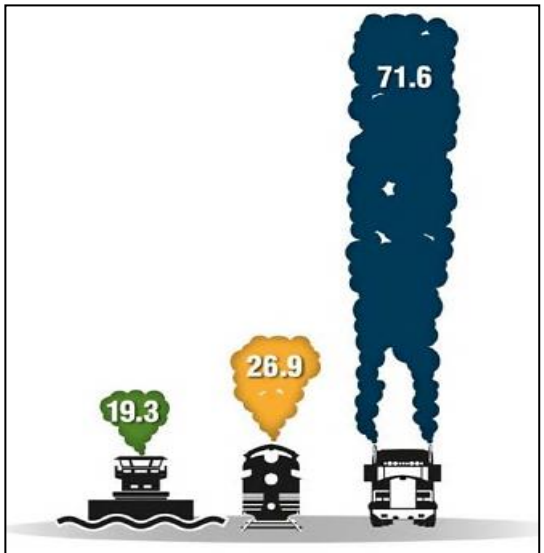
Inland waterways are a strategic asset to the nation, enabling the U.S. to significantly increase economic output in both domestic and international markets, and move important national defense resources and other supplies in large quantities for the armed forces.

Transporting freight by water is the most efficient energy choice. Barges move a ton of cargo 576 miles per gallon of fuel. A rail car would move the same ton of cargo 413 miles, and a truck only 155 miles. A river barge can travel as far on a tablespoon of fuel as a train on a cup or a truck on a gallon!

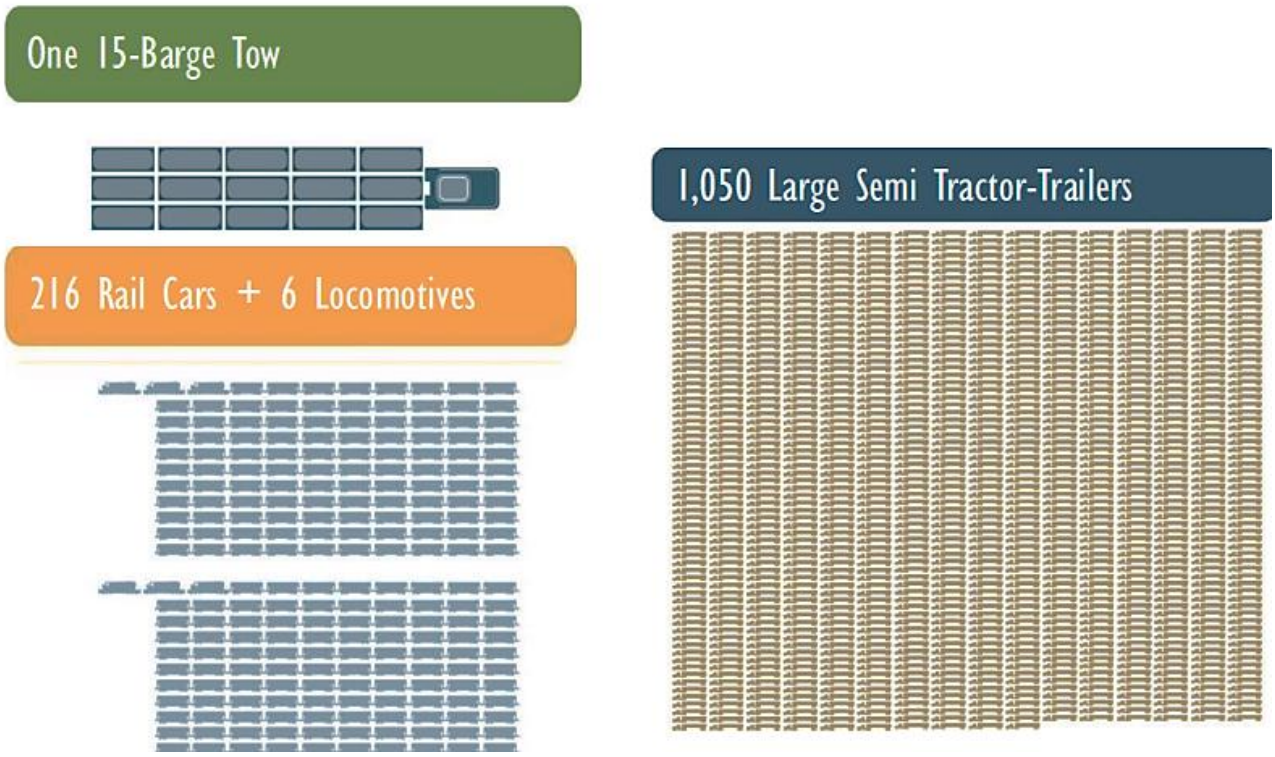
The AEP River Operations (provide barge transportation of dry bulk commodities throughout the inland river system) reports even better ton-mile efficiency at 642.23 miles per gallon

Inland waterway shipping also is the greener way to ship. Inland river barges produce less carbon dioxide.

In terms of CO2 produced per ton of cargo moved, inland river barges have a significant advantage over trains and trucks

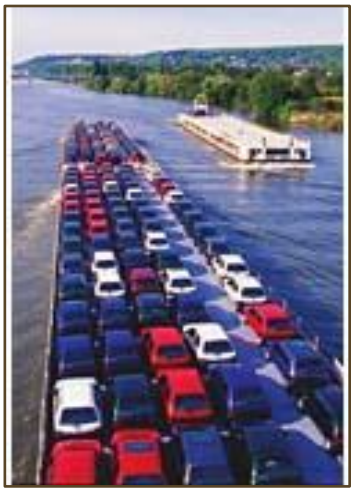


Tons of CO_2 per Million Ton-miles



One 15-barge tow equals 216 rail cars or 1,050 trucks.

Without waterways transport -- 58 million truck trips could be required annually -- that would take a line of trucks that would circle the equator more than thirteen times! That would double truck traffic on our Interstates or increase rail tonnage by 25%.



In Europe, the EU promotes waterways as an economically friendly alternative to highways and rail. A container-on-barge system is highly developed in Europe.

Also in Europe: Two Dutch Companies have launched a new inland shipping concept … inland shipping on LNG – the new "EcoLiner".

The Ecoliner is a low emission, fuel efficient, 360 foot vessel running purely on LNG. The new concept and vessel have been approved for use in Europe and the Dutch companies hope to expand the concept to China, Brazil and India. This new concept is "innovative, safe, environmentally friendly and extremely cost competitive … there is no reason why it cannot be the new inland shipping standard for the future"

The waterways hold overland freight rates in check and provide a cost effective, alternate form of transport. Without the waterways, millions of tons of American grain might never reach ports to be exported, jeopardizing American's competitive edge and undermining agricultural lively hoods across the country.

The inland waterways are a vital portion of the nation's infrastructure and are kept viable for well under $1 billion per year, less than one-thousandth of total federal spending --- a mere quarter of one percent of the federal tax dollars spent on health care would cover the cost of the inland navigation system.

Some policy makers and policy groups argue that barge companies are being subsidized and should be charged for using the inland waterways. But the inland waterway system cannot be owned by any company or state. It is the exclusive domain of Uncle Sam, and the federal government is the sole legal guardian, with responsibility to ensure that the national interest is served. Barge companies do not receive a subsidy. Every penny of government assistance is earmarked for expenditures on navigation infrastructure.

Navigation is but one component of the inland waterway system. Flood control, shore protection, municipal and industrial water supply, bank stabilization, water recreation, and hydroelectric power generation are all benefits provided by the nation's waterways.

The total return on the federal investment in these programs is many times greater than their cost.

Summary of Total Non-Transportation Benefits and Their Annual Value

• Flood Control	Hundred millions of dollars in averted damage
• Recreational (visits only)	Between $250-$500 million
• Lives saved	300+
• Injuries avoided	6,500+
• Emissions reduced	8.1+ million pounds
• Hydropower (# Corps facilities)	$1.5 billion
• Hydropower(non-federal)	$150 million

Taken together, the monetary benefits of the waterways alone could easily exceed $2 billion per year. Moreover, the existence of a thoroughly developed inland navigation system in a large country such as the United States creates a flexibility and capability that many nations do not enjoy. The system provides a number of options that can be extremely valuable in certain circumstances, such as energy crises or times of war.

Technology in the transportation Industry is changing

The global economy is showing signs of recovery, but overall confidence is still tentative. This is one reason why companies are continually searching for ways to reduce costs and grow revenue, while improving service. Technology can play an important role. It can help businesses accurately predict demand and allocate resources accordingly; it can be used to improve customer service; and it can improve safety and security.

The port operator now uses software in the form of a rules-based decision engine that accurately determines the best place to store each container in the port so that is it easily retrieved when it is needed. With just a modest investment in technology, railroads can reduce maintenance costs and increase operational effectiveness.

Better connecting data across shipping networks has enormous potential for customer service. In an industry especially vulnerable to empowered customers, carriers can offer a differentiated service by providing stellar end-to-end service with more precise tracking information. As it stands now, tracking updates can come from a variety of sources, depending on how many people are handling a shipment, and it's not always timely or accurate. A cohesive and interconnected tracking system allows customers to log on and check on the real-time status of a shipment at every single point in the journey for themselves.

By connecting all of the information that is scattered throughout the complex shipping networks, companies get a big-picture view of business across their entire network. They can find hourly or daily upticks in business as well as broad seasonal patterns, and they can adjust their assets to best suit their customers' needs and maximize profits. This is no minor feat -- a common issue for freight logistics providers is how to meet a sudden spike in demand for transportation services

The Supply Chain looking ahead

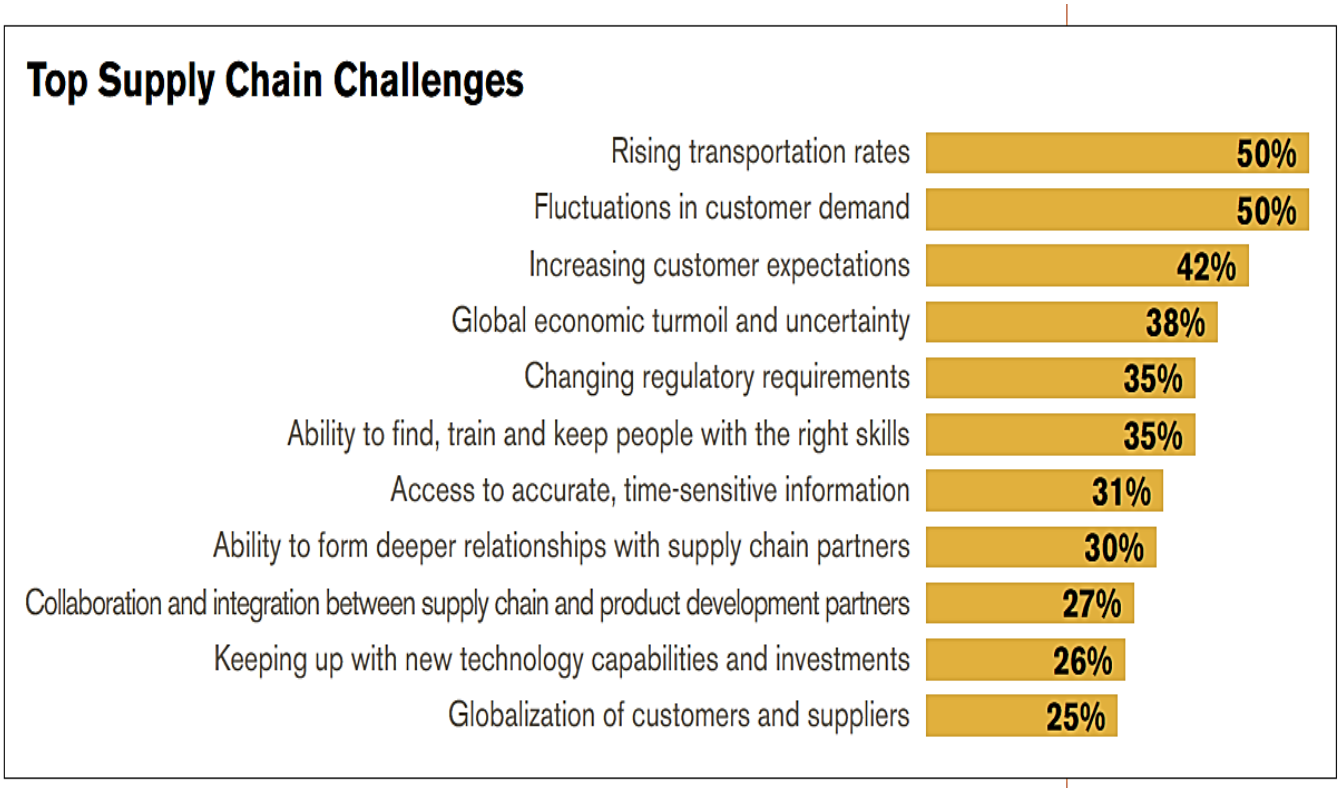
The information age is creating vast transport and logistics efficiencies. Today sophisticated databases track inventory levels and shipments on a global basis via the Internet. As a result, supply chain technology has been one of the fastest-growing segments in the information field.

In addition, the rapid adoption of outsourcing has led many companies, when shipping is vital to their businesses, to turn to logistics service providers for all manner of shipping support, including warehousing, scheduling and distribution services. Supply chain management and logistics services are permanently intertwined with the sectors of transportation, creating efficiencies once undreamed of in the transportation arena. Today business continue to look to their supply chain operators for opportunities to streamline business process, reduce costs, improve customer service, gain a competitive edge, and face any disruptions caused by global commerce uncertainness.

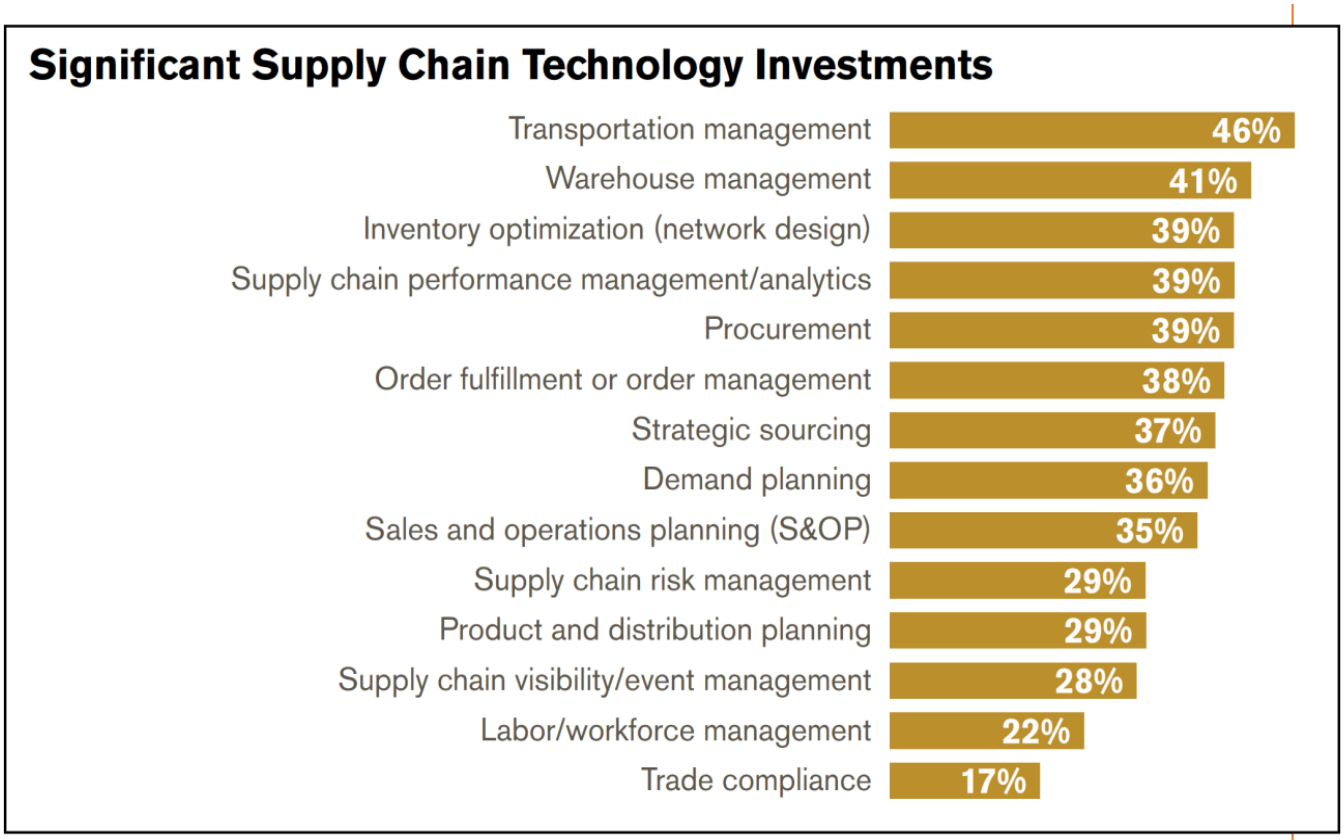
Rising transportation rates, fluctuating customer demand, increasing customer expectations, and global economics uncertainness are among the leading challenges and threats business encounter in operating their supply chains. Effective operation of supply chain segmentation requires greater optimization of sourcing and distribution, improved order fulfillment procedures, greater accuracy in demand planning, and stronger supplier management practices.

Today organizations are making investments in technologies that facilitate or improve sourcing and procurement, inventory optimization, warehouse management, transportation management and supply chain analytical solutions.

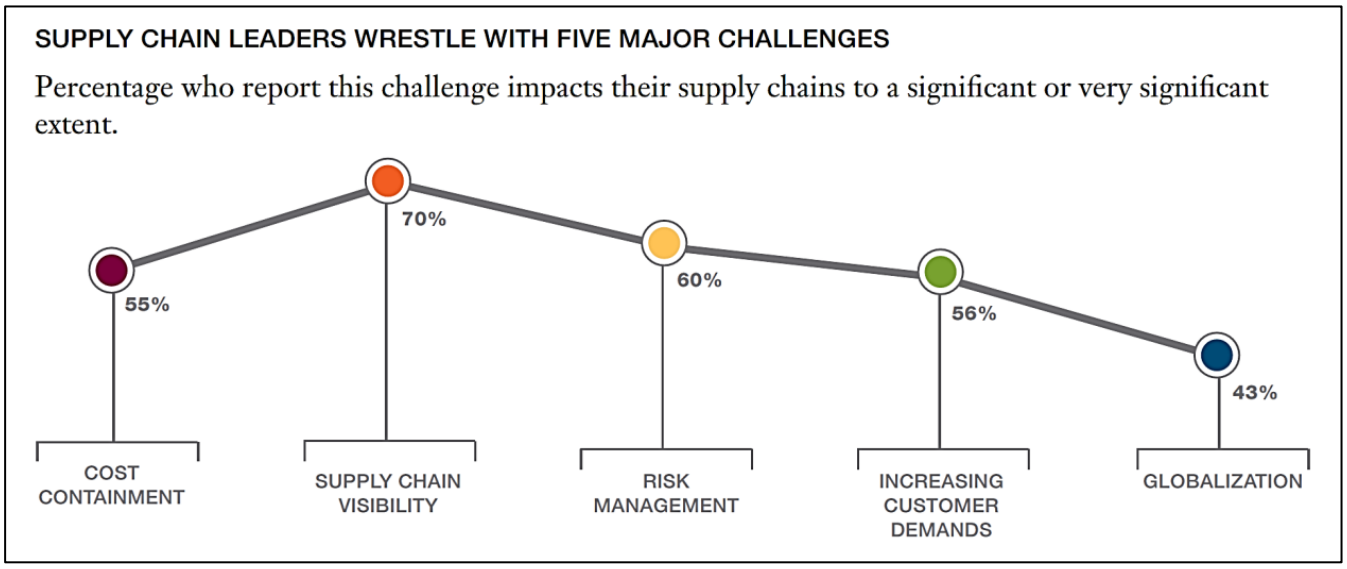
The Top Supply Chain Challenges in the Logistics Supply Chain Today:



The Top Supply Chain Technology Investment Challenges Today are:



Based on an IBM study on "the Supply Chain of the Future", Supply chain managers told IBM that they face five major challenges –

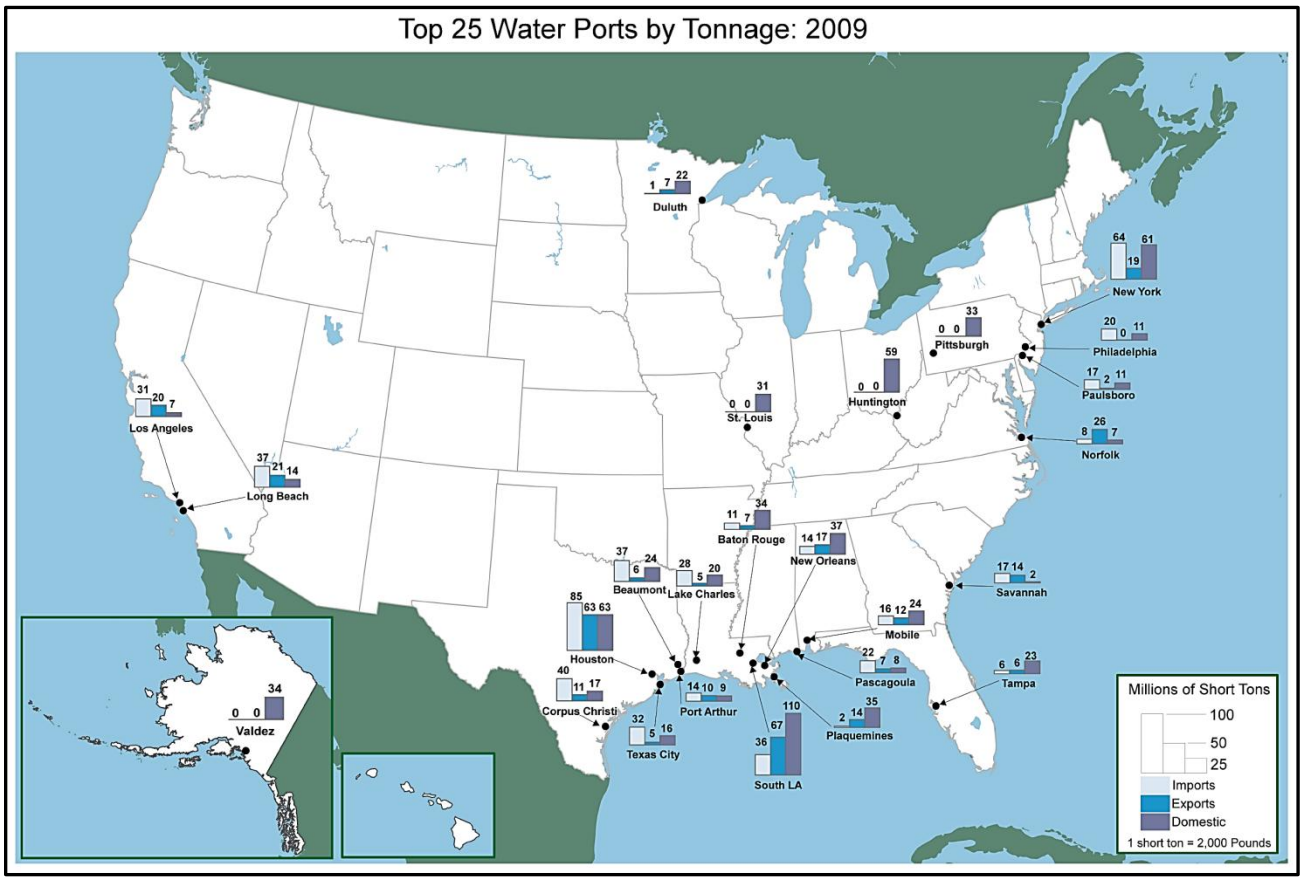


"Supply Chain information that was previously created by people will increasing be generated by sensors, RFID tags, meters, actuators, GPS and other devices and systems. Supply chains not only will be able to see more events, but also witness them as they occur." "Dashboards on devices, perhaps not yet invented, will display the real-time status of plans, commitments, sources of supply, pipeline inventories, and customer requirements."

The Inland Waterway in the U.S.

Background:

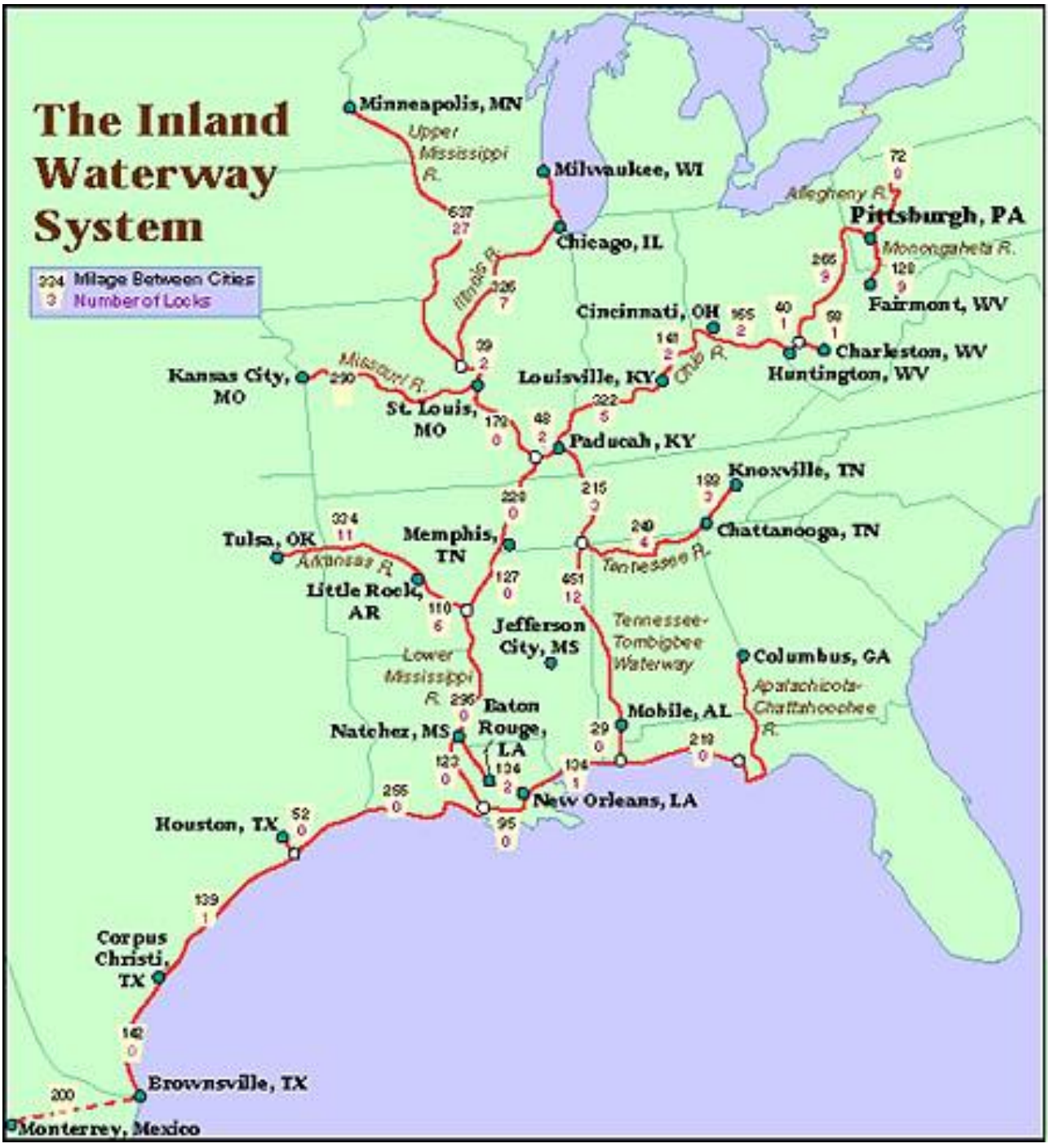
Today some of the highest volume water ports in the U.S. are not located along the U.S. coast.



However, the inland ports are all linked to the Coasts, via the inland waterway. The Inland Waterway System (IWWS) is a key element in the nation's transportation system. This intricate system of waterways ties inland ports to marine ports and provides one of the most cost-effective ways of moving a wide variety of freight within the 48 States and between the U.S. and all of its major trading partners. International trade underscores the importance of U.S. waterborne transportation; more than 70% of traded commodities by weight are imported or exported through marine ports.

The inland waterways and marine port systems mutually support trade of commodities among global markets, with the marine ports serving as gateways and transfer points to highway, rail, and inland water systems. The inland systems transport goods within the U.S. (especially agricultural commodities from America's Midwestern states) as well as provide access to the marine ports. It is estimated that 346 million tons of goods were transferred from inland waterways to marine ports in 2010, primarily for export. When a commodity goes from the inland system to the marine system, a transfer must be made

from one vessel to another at the marine port. Delays on inland systems can affect the ability to move freight efficiently through marine ports.



Approximately 12,000 miles of inland and intracoastal waterways in the United States are commercially navigable. Inland navigation is made possible by locks and dams, ancillary navigation aids, landside terminals, and channel maintenance and dredging where necessary to an appropriate channel depth.

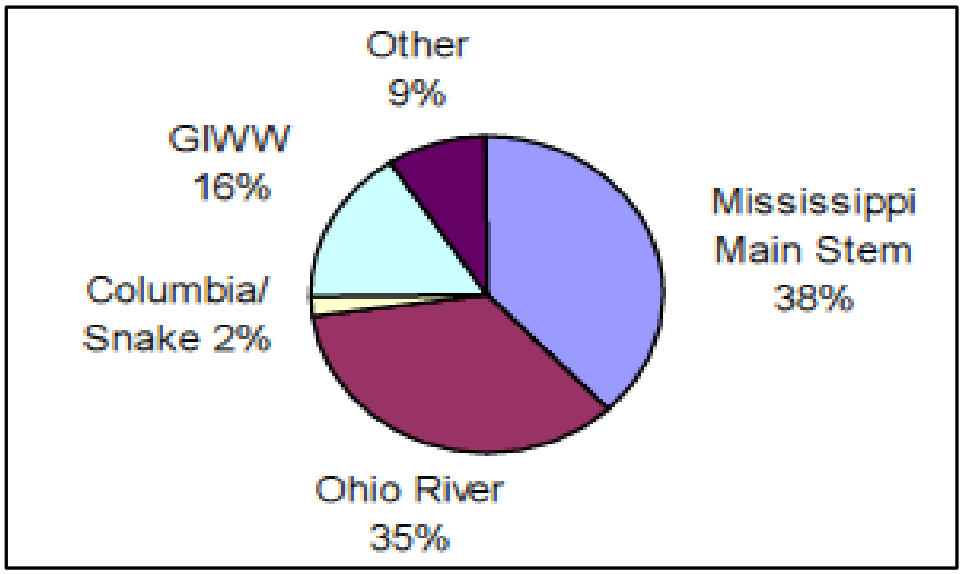
In most of the waterways the controlling depth is 9 feet. The Department of the Army, with the U.S. Army Corps of Engineers as its executive agent, has statutory responsibility for operating and maintaining all U.S. navigable waterways, excluding the Saint Lawrence Seaway. The U.S. Army Corps has constructed and maintains 238 lock chambers at 192 lock sites.

The Army Corp has also constructed multipurpose dams on rivers upstream form navigable channels that are authorized and operated for navigation and other purposes, but are not a part of the navigation channel. During the dry season of the year water is passed through these dams to augment water flows in support of commercial barge transportation.

America's waterways transport more than 60% of the nation's grain exports, about 22% of domestic petroleum and petroleum products and 20% of the coal used in electricity generation. Every year, roughly 624 million tons of waterborne cargo transit the inland waterways, a volume equal to about 14% of all intercity freight and valued at nearly $70 billion.

The annual traffic on America's inland navigation system, including the Gulf Intracoastal Waterway and the Ohio, Mississippi and Columbia-Snake River systems carries the equilvalent of 58 million truck trips each year. (*National Waterways Foundation*)

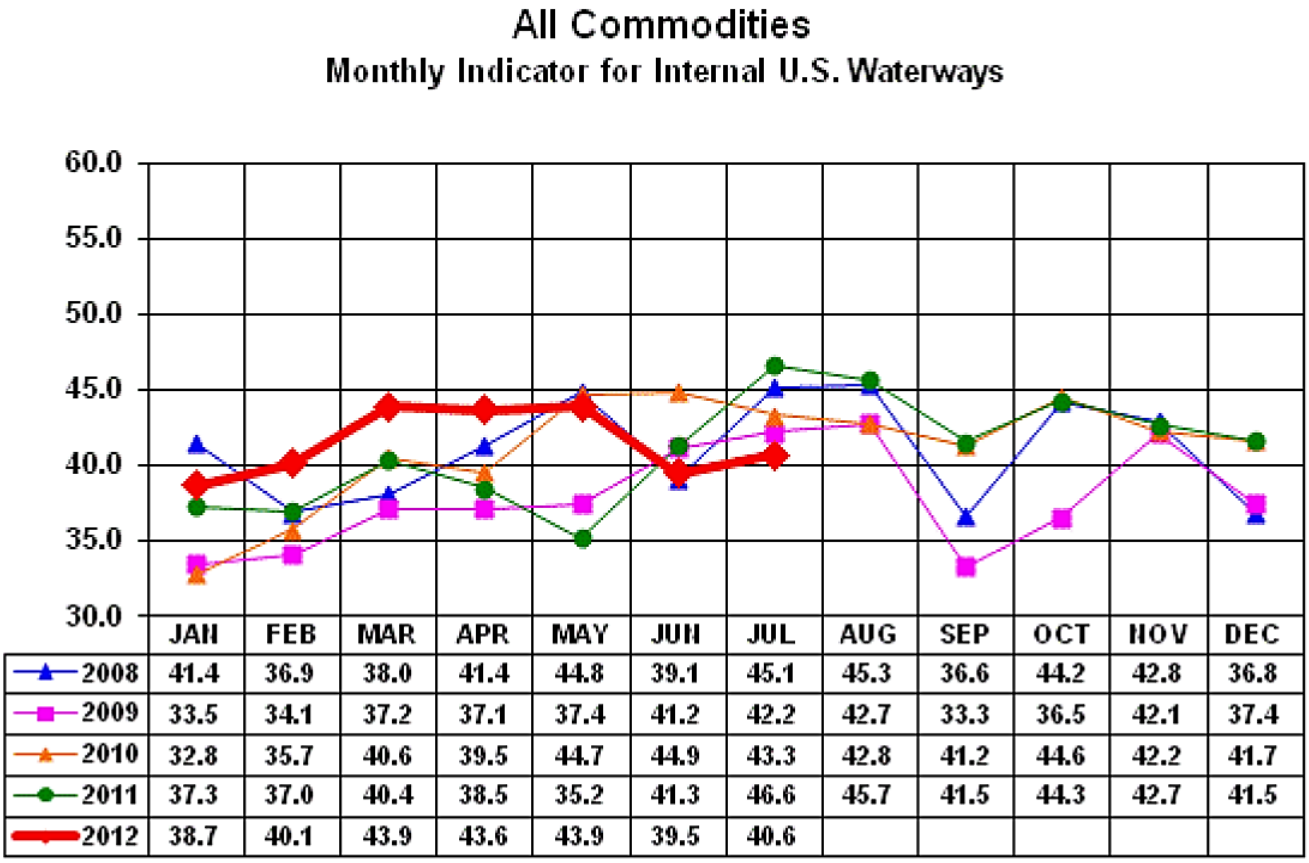
Composition of Internal Tonnage by Waterway



By 2025, tonnage traffic on inland waterways is expected to increase by 23% from 2010; rail is projected to grow by 18% and truck freight tonnage by 22%. By 2040, this increase is expected to be over 50% for trucks, 40% for water and 38% for rail. (Based on U.S. Department of Transportation data).

U.S. Waterborne Freight Forecast for all U.S. States and Commodities				
		Total K Tons		
	Mode of Transport	2010	2025	Growth
Domestic Freight Flow	Truck	12,309,276	14,597,870	19%
	Rail	1,644,709	1,851,826	13%
	Water	463,904	543,772	17%
Imported Freight	Truck	363,022	644,817	78%
	Rail	99,057	151,800	53%
	Water	71,198	114,714	61%
Freight Exported	Truck	338,305	580,395	72%
	Rail	160,040	250,166	56%
	Water	76,793	95,235	24%
Source: http://faf.ornl.gov/fafweb/Extraction2.aspx				

However a review of the past five years shows commodity shipments on the U.S. waterways flat (U.S. waterway Trust Fund report, August 2012, tonnage)



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2008	41.4	36.9	38.0	41.4	44.8	39.1	45.1	45.3	36.6	44.2	42.8	36.8
2009	33.5	34.1	37.2	37.1	37.4	41.2	42.2	42.7	33.3	36.5	42.1	37.4
2010	32.8	35.7	40.6	39.5	44.7	44.9	43.3	42.8	41.2	44.6	42.2	41.7
2011	37.3	37.0	40.4	38.5	35.2	41.3	46.6	45.7	41.5	44.3	42.7	41.5
2012	38.7	40.1	43.9	43.6	43.9	39.5	40.6					

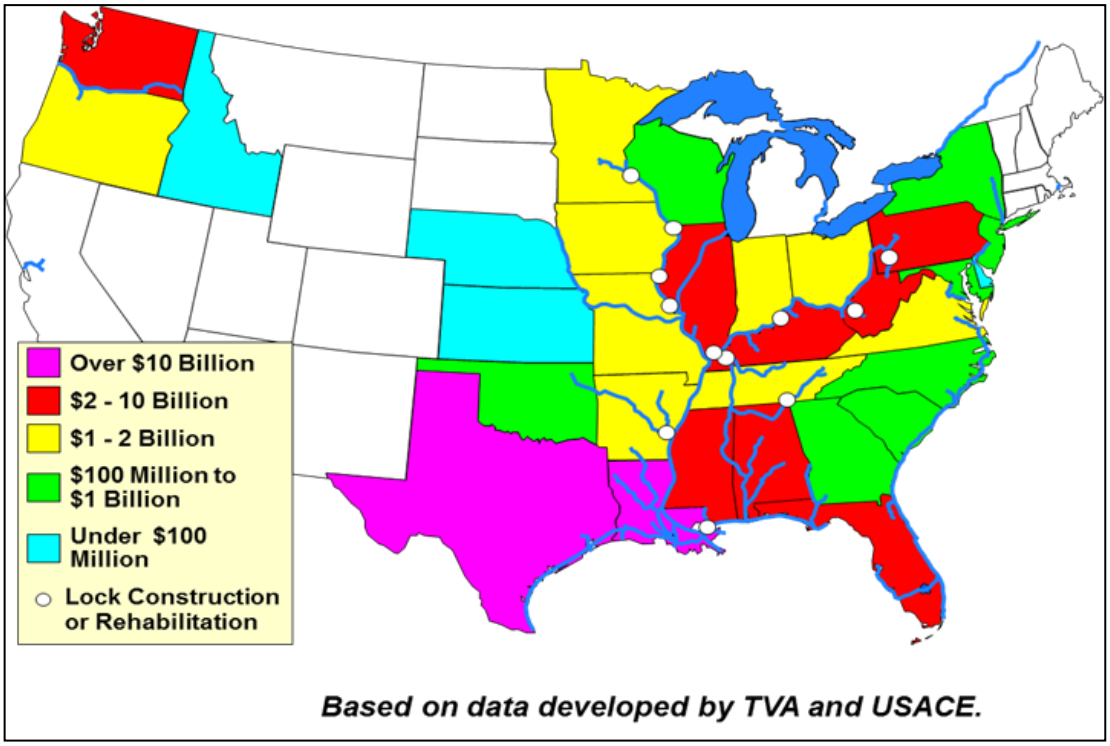
The Mississippi and Ohio waterway system in the U.S.

The Mississippi River System and the Gulf Intracoastal Waterway serve thirty-one states. States on the Gulf Coast and throughout the Midwest and Ohio Valley especially depend on the inland and intracoastal waterways.

Texas and Louisiana each ship over $10 billion worth of cargo annually, while Illinois, Pennsylvania, West Virginia, Kentucky, Mississippi, and Alabama each ship between $2 billion and $10 billion annually.

Below is a map that shows the dollar level to which the various states use the waterway system.

Value of IWW Cargo by State



U.S. Waterways - Current Issues and Conditions

Every four years, the American Society of Civil engineers publish the *"Report Card for America's Infrastructure",* which grades the current state of 15 national infrastructure categories on a scale of A through F. The 2009 Report Card gave the nation's aviation infrastructure a D, and gave its inland waterway infrastructure a D-.

The national waterborne transportation system is basically two systems: inland waterways and marine ports. Inland waterways rely primarily on public investment and have suffered from chronic underfunding; seriously affecting the nation's potential to participate in a highly competitive global market for exportable commodities that will be in great demand in the future. This failure to adequately invest in a publically managed inland waterway system affects the nations' ability to export key commodities like grain, energy, and specialized manufactured goods. It also provides competing countries with an opening to capture market share, which in some cases is tied to long term contracts. The investment in America's marine ports is dominated by public port authorities and private port operating companies.

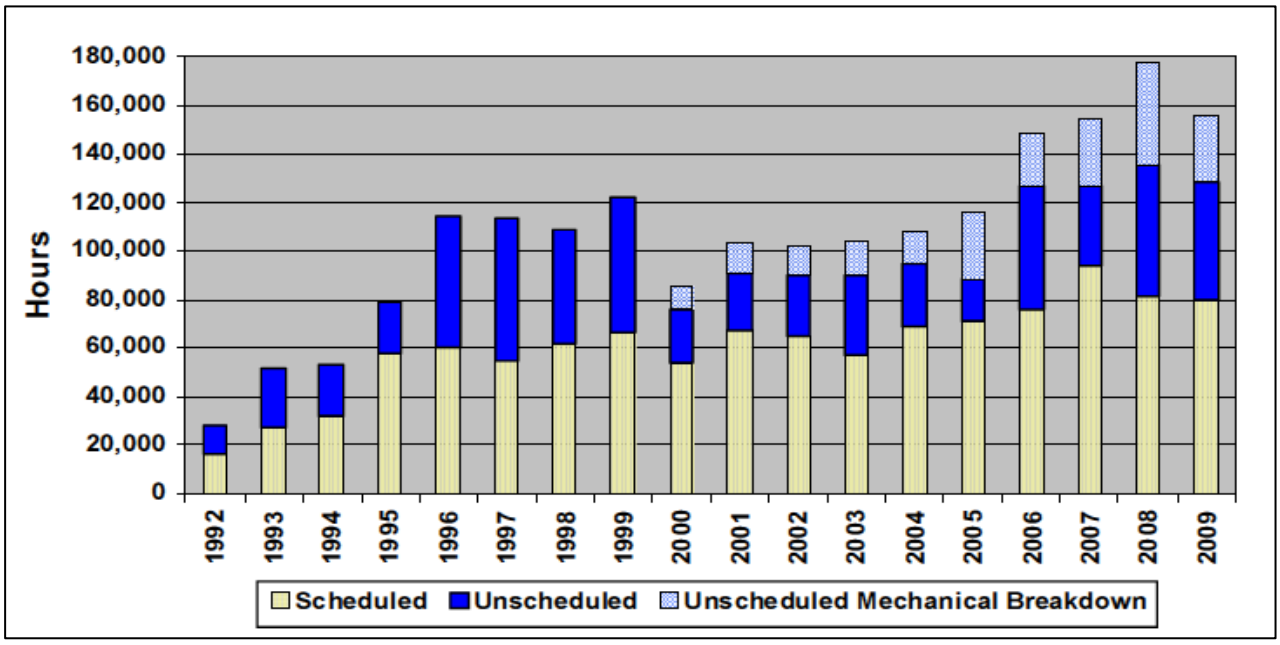
Delays

The following tables show the scheduled and unscheduled delays imposed by deficiencies on the U.S. waterway lock and dam infrastructure in 2009. The over 19,000 of scheduled and unscheduled service interruptions on the nation's waterways in 2009 averaged 52 a day, and of the nearly 156,000 total hours of delays, due to these interruptions, nearly half are unscheduled.

Hours of Scheduled and Unscheduled Delay on US Inland Waterways, 2009

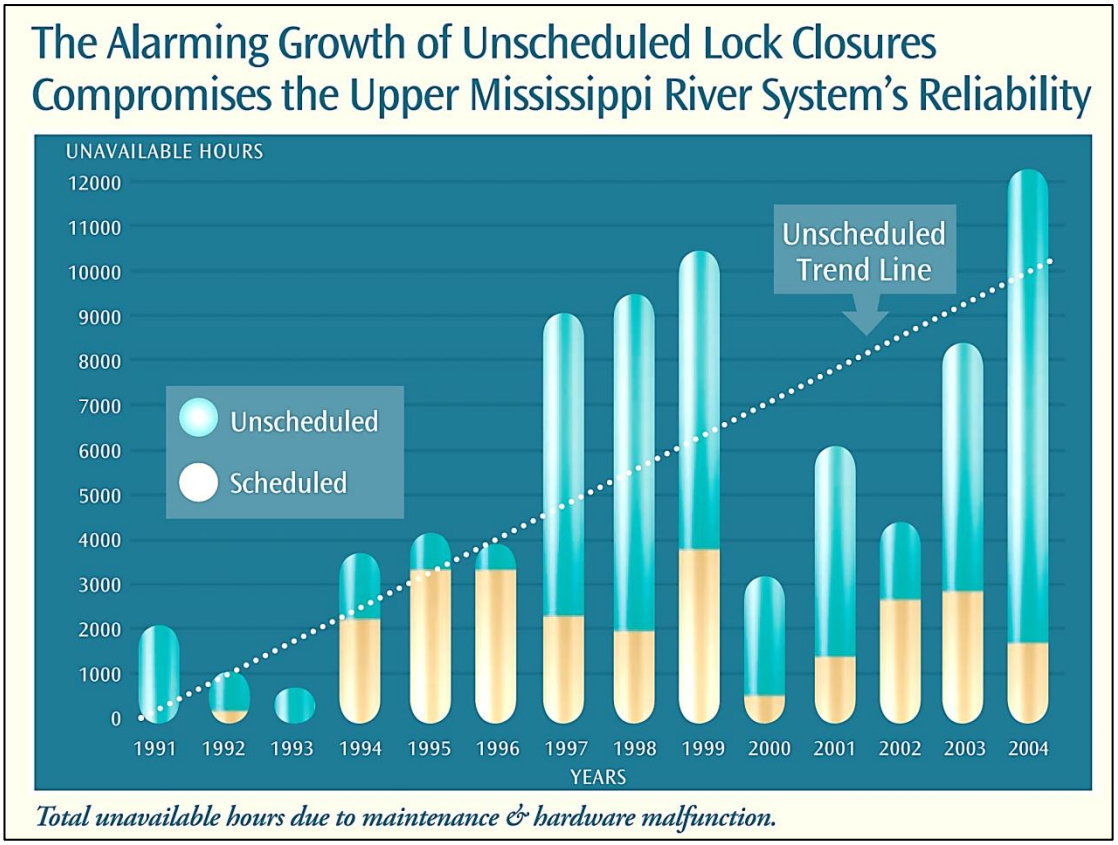
FACTOR	CY2009
Number of Scheduled Delays	6,532
Hours Delayed Due to Scheduled Delays	81,882
Number of Unscheduled Delays	12,494
Hours Delayed Due to Unscheduled Delays	73,689
TOTAL Number of Delays	**19,026**
TOTAL Hours of Delay	**155,571**

SOURCE: U.S. Army Corps of Engineers. Calculations by EDR Group. These data reflect 184 locks with data available for an origin and destination matrix.



The greatest threats to the performance of the inland waterway system are these scheduled and unscheduled delays. The delays are caused by insufficient funding for the operating and maintenance needs of the locks governing the traffic flow on the nation's inland system. When a lock or dam reaches a state of poor repair, waterborne traffic must stop, to allow for more frequent scheduled maintenance. Although this

delay imposes some level of cost on industries that rely on waterborne commodities, the greatest cost is imposed when an unscheduled delay occurs. Unscheduled delays interrupt business operations in entire supply chains dependent on waterborne shipments. But with adequate investment these delays are preventable. A total of 90% of locks and dams on the U.S. inland waterway system experienced some type of unscheduled delay in 2009



Impact to the U.S. Economy

The U.S. economy relies on low transportation costs and an efficient transportation network for its exports to offset higher wage levels and costs of production when compared with its competitors. If the Nation does not invest in its waterways infrastructure, transportation costs will increase and export costs will therefore increase, and therefore the increased costs to export goods will affect the nation's ability to compete in global markets for goods produced in the U.S.

If current needs and investment trends for inland waterways and marine ports continue over time, the nation's competitiveness will erode, affecting its ability to sustain well-paying jobs, especially in export sectors. In addition higher costs will be incurred for imports which will increase the cost of production, and the cost for consumer products sold to households, which eventually will erode consumer disposable income.

The greatest opportunity to grow the U.S. economy lies in gaining access to global markets for the commodities and heavy industrial goods that the nation manufactures. Selling goods abroad returns income from overseas consumers to the United States.

Lost Trade Due to the Gap in Inland Waterways & Marine Ports Investment (billions of dollars)

YEAR OR PERIOD	EXPORTS	IMPORTS	TOTAL TRADE
2020	-42.8	-20.5	-63.3
2040	-141.6	-63.6	-205.2
2012-20	-270.1	-157.4	-427.5
2021-40	-1,711.8	-775.6	-2,487.4
2012-40	-1,981.9	-933.0	-2,914.9

SOURCES EDR Group and LIFT model, University of Maryland, INFORUM Group, 2012.

If the U.S. only maintains its current level of investment in its waterways and ports, the losses to its economy will increase shipping costs annually. By 2020, the lost value of exports will be $270 billion and will rise to almost $2 trillion by 2040. Roughly $1.3 trillion in business sales will be lost by 2020, rising to $7.8 trillion by 2040. The cumulative loss in national GDP will be about $700 billion by 2020 and reach $4 trillion by 2040.

Disposal personal income will be lost, with losses projected at almost $872 billion through 2020 and $4.5 trillion through 2040. With this reduction in production, income, and spending there are projected to be 738,000 fewer jobs in 2020. By 2040, the job losses will grow to almost 1.4 million – jobs that will be lost due to the lack of U.S. competitiveness in global trade and because the nation's households and business will be spending more for commodities that arrive by marine ports and are transported to market via inland waterways.

Failure to act is not acceptable to the U.S. Economy

The Effects of Failure to Invest in Inland Waterways and Marine Ports on U.S. Business Sales, GDP, and Jobs, 2012-2040 *(in billions of dollars)*

ANNUAL IMPACTS	2020	2040	AVERAGE YEAR 2012–2040
GDP	–94	–256	–137
Jobs *(FTE positions)*	–738,000	–1,384,000	–911,000
Business Sales	–183	–517	–270
Disposable Personal Income	–117	–269	–156
CUMULATIVE LOSSES	**2012–2020**	**2021–2040**	**2012–2040**
GDP	–697	–3,278	3,975
Business Sales	–1,335	–6,496	7,831
Disposable Personal Income	–872	–3,662	4,534

NOTE Losses in business sales and GDP reflect impacts in a given year against total national business sales and GDP in that year. These measures do not indicate declines from 2010 levels.

SOURCES EDR Group and LIFT model, University of Maryland, INFORUM Group, 2012.

Effects of Failure to Invest in Airports, Inland Waterways, and Marine Ports, 2012-2040
(in billions of 2010 dollars, unless otherwise indicated)

	AIRPORTS		INLAND WATERWAYS AND MARINE PORTS	
ANNUAL IMPACTS	2020	2040	2020	2040
GDP	–$47	–$70	–$95	–$255
Jobs	–350,000	–358,000	–738,000	–1,384,000
Business Sales	–$87	–$179	–$183	–$517
Disposable Personal Income	–$53	–$53	–$117	–$269
Exports	–$11	–$62	–$43	–$142
CUMULATIVE LOSSES	2012–2020	2021–2040	2012–2020	2021–2040
GDP	–$313	–$1.21 trillion	–$697	–$3.3 trillion
Business Sales	–$580	–$2.7 trillion	–$1.3 trillion	–$6.5 trillion
Disposable Personal Income	–$361	–$1.1 trillion	–$872	–$3.7 trillion
Exports	–$54	–$708	–$270	–$1.7 trillion

NOTE Losses in business sales and GDP reflect impacts in a given year against total national business sales and GDP in that year. These measures do not indicate declines from 2010 levels.

SOURCES EDR Group and LIFT model, University of Maryland, INFORUM Group, 2012.

Top 10 Sectors most Affected by Decline of Waterborne Trade, 2020

(in constant billions of 2010 dollars)

EXPORTS

SECTOR	DOLLAR VALUE
Agriculture, forestry, fisheries	–3.6
Wholesale trade	–2.8
Aerospace	–2.8
Other chemicals	–2.0
Petroleum refining	–1.6
Air transport	–1.3
Meat products	–1.2
Drugs	–1.2
Agriculture fertilizers & chemicals	–1.1
Miscellaneous plastics products	–0.8
All Other Industries	–24.6
TOTAL	**–42.8**

IMPORTS

SECTOR	DOLLAR VALUE
Crude petroleum	–1.8
Apparel	–1.5
Drugs	–1.1
Motor vehicles	–1.0
Other chemicals	–1.0
Motor vehicle parts	–0.8
Primary nonferrous metals	–0.7
Metal products	–0.7
Agriculture, forestry, fisheries	–0.6
Miscellaneous manufacturing	–0.5
All Others	–10.7
TOTAL	**–20.5**

SOURCES EDR Group and LIFT model, University of Maryland, INFORUM Group, 2012.

JOB IMPACTS IN 2020

INDUSTRY	LOSS OF JOBS	PERCENT OF TOTAL LOSS
Retail trade	–110,000	14.9
Other business services	–57,000	7.7
New construction	–53,000	7.2
Wholesale trade	–48,000	6.5
Finance and insurance	–48,000	6.5
Restaurants and bars	–40,000	5.4
Agriculture, forestry, fisheries	–40,000	5.4
Education, social services, NPO	–34,000	4.6
Professional services	–32,000	4.3
Other medical services & dentists	–31,000	4.2
All Other Industries	–247,000	33.5
TOTAL	**–738,000**	**100**

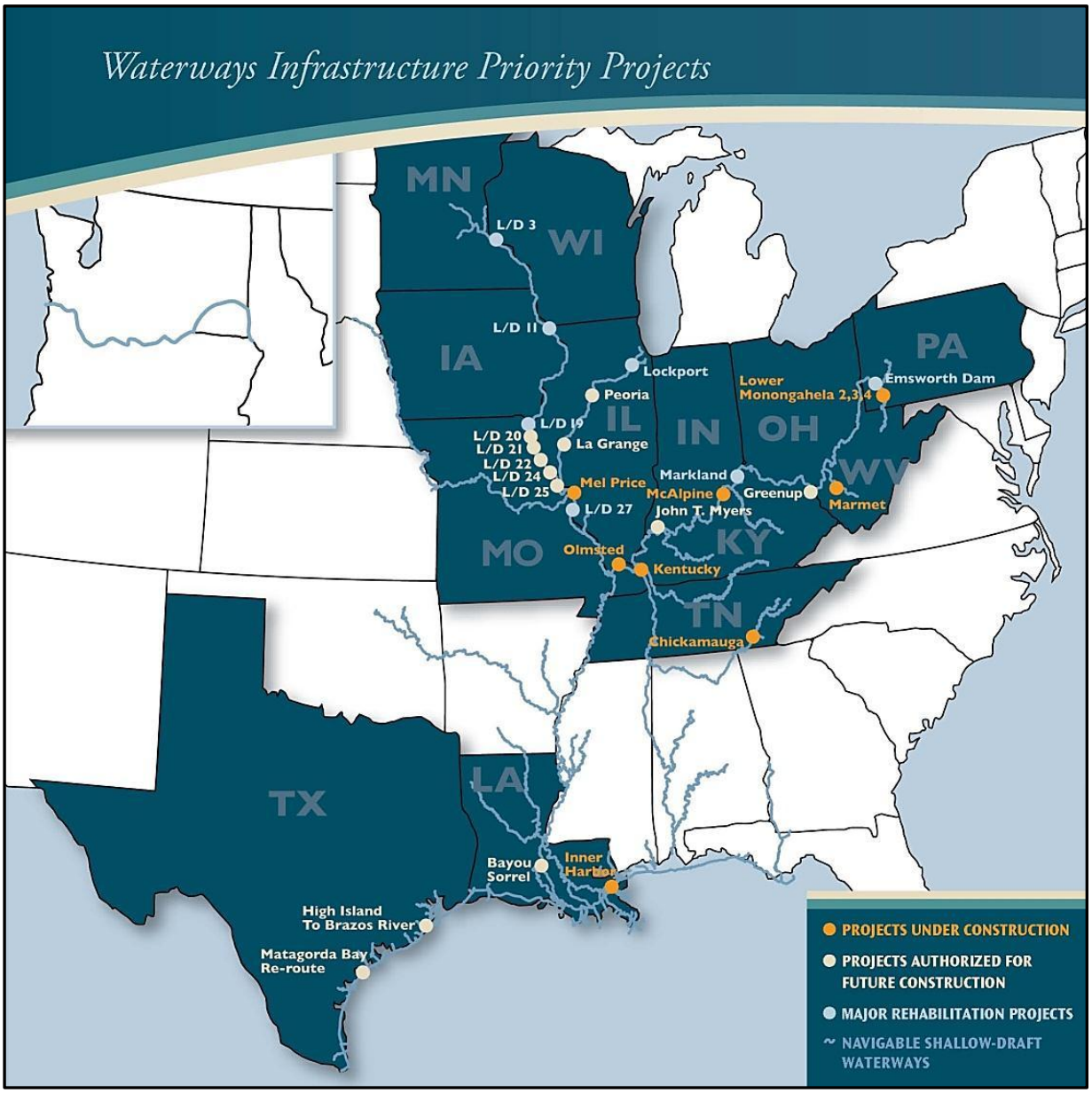
CUMULATIVE BUSINESS SALES IMPACTS, 2012–2020

INDUSTRY	LOSS OF BUSINESS SALES	PERCENT OF TOTAL LOSS
Finance and insurance	–136	10.2
Real estate and royalties	–78	5.9
Wholesale trade	–71	5.3
Retail trade	–71	5.3
Professional services	–53	4.0
Owner–occupied housing	–53	3.9
Agriculture, forestry, fisheries	–50	3.8
Other business services	–44	3.3
Petroleum refining	–38	2.8
Computer & data processing	–33	2.5
All Other Industries	–709	53.1
TOTAL	**–1,335**	**100**

Investment required

Based on trends in data from the U.S. Army of Corps of Engineers, maintaining existing conditions and levels of unscheduled delay on the nation's inland waterway will already require almost $13 billion by 2020, and an additional $28 billion by 2040. Current funding levels can support only $7 billion through 2020 and an additional $16 billion through 2040. A total of 27% of these needs entail the construction of new lock and dam facilities, and 73% are estimated for the rehabilitation of current facilities. The needs will peak after 2020, when critical age and capacity thresholds are likely reached.

The deterioration of the inland waterway infrastructure is well documented. Key factors presented by Inland Waterway Users' Board of the U.S. Army Corps of Engineers, includes:



- While the design life of the locks and dams is generally 50 years, the majority of the locks have exceeded that – many are more than 70 years old
- The Unites States Maritime Administration projects dramatic growth of domestic freight volumes, which will compound the congestion problems on the nation's already overcrowded highway system, driving industries to the inland waterways to find competitive alternatives for moving their goods.
- Enormous project cost overruns and delays in project schedules have greatly strained the Inland Waterways Trust Fund balance.

Estimated Public Capital Investment Gap, Inland Waterways and Marine Ports
(in billions of 2010 dollars)

	ESTIMATED NEED	ESTIMATED FUNDING	UNFUNDED
2012–2020			
Inland Waterways	12.7	7.2	–5.5
Marine	17.6	7.2	–10.4
TOTAL	**30.2**	**14.4**	**–15.8**
2021–2040			
Inland Waterways	28.2	16.0	–12.2
Marine	33.5	16.0	–17.5
TOTAL	**61.7**	**32.0**	**–29.7**
TOTAL 2012–2040	**92.0**	**46.4**	**–45.6**

SOURCES Inland Marine Transportation Systems (IMTS) Capital Projects Business Model, Final Report, Revision 1, prepared by IMTS Capital strategy Team, April 13, 2012; U.S. Port and Inland Waterway Modernization Strategy: Options for the Future, presented at Marine Board Spring Meeting, May 15, 2012. Long-term trends are based on annual needs, appropriations and funding estimates for inland waterways and marine ports over 20 years.

NOTE Numbers may not add due to rounding.

"If cargo going through St. Louis by barge were shifted from the river system to the cities interstates what would happen? A Texas transportation Institute case study for St Louis states -

- Highways costs over 10 years would increase from $345 million to over $721 million
- Truck traffic on St. Louis Interstates would increase by 200%
- Traffic delays would increase by almost 500%
- Injuries and fatalities on Interstate segments would increase from 36% to 45%
- Maintenance cost would increase 80% to 93%

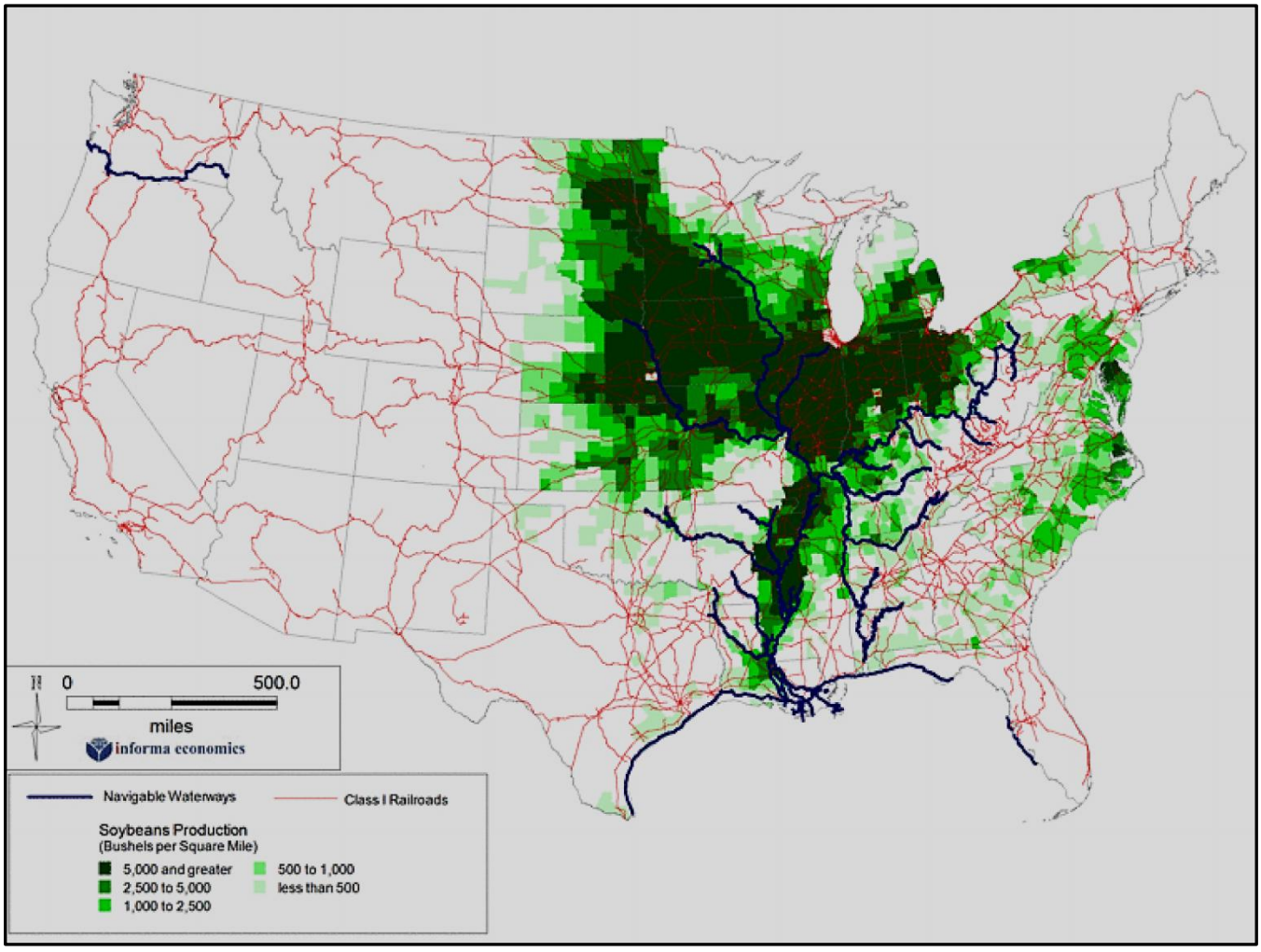
U.S. Waterways - Soybeans and the U.S. Waterways

An analysis of the transportation of soybeans and soybean products, by Infoma Economics (July 2012) for the Soybean Board

"The Soybean Industry is dependent on an efficient fully functioning Waterway System."

Below is a geographic depiction of the density of soybean production, as well an indication where Class 1 railroads are located. It is easy to see how the Midwest and the waterways are critical to the success of the industry

US Navigable Waterways and Class I Railroad Network and Soybean Production Density:



Soybean production is expected to expand over the next decade, and the industry fells is it is very important that the transportation infrastructure be able to accommodate the movement of soybeans and products.

Table 10: Current and Future Soybean Volume (tons) by Mode in 17 Focus States

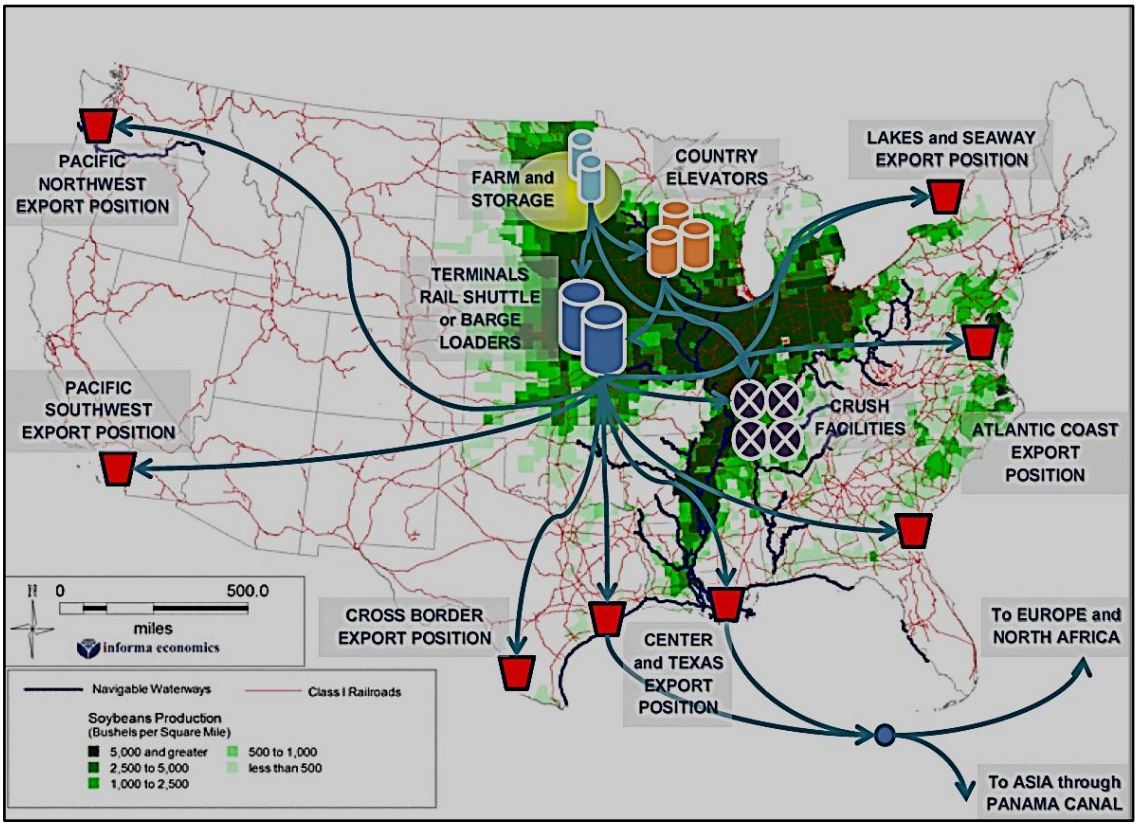
State	Production		Net Shipments		Rail Volume		Barge Volume	
	2009/10	2020/21	2009/10	2020/21	2009/10	2020/21	2009/10	2020/21
Arkansas	3,678,750	3,991,885	2,948,737	3,280,175	145,175	220,141	2,143,562	3,503,600
Illinois	12,903,000	15,047,864	4,806,037	6,682,626	1,683,044	2,086,932	5,765,149	6,201,163
Indiana	7,996,800	9,252,627	540,563	1,632,105	1,587,196	1,715,194	974,127	1,336,507
Iowa	14,580,900	17,110,787	2,908,076	5,705,803	1,895,893	3,304,140	1,698,441	3,397,956
Kansas	4,818,000	4,899,597	2,850,820	2,933,156	1,759,367	2,475,545	-	-
Kentucky	2,044,800	2,255,629	378,262	1,810,418	48,167	76,500	416,616	1,136,922
Michigan	2,388,000	2,982,500	2,081,761	2,637,362	636,093	801,846	-	-
Minnesota	8,544,000	11,746,520	3,459,297	6,634,831	3,771,786	4,119,005	1,363,696	2,506,455
Mississippi	2,314,200	2,166,003	2,250,200	2,092,432	56,590	44,512	2,134,255	1,621,167
Missouri	6,916,500	7,789,598	2,327,882	3,234,796	1,068,777	1,865,051	2,362,163	3,869,833
Nebraska	7,782,600	9,269,520	4,588,180	5,966,680	3,276,149	4,540,871	-	-
North Carolina	1,785,000	1,566,299	250,446	(84,844)	-	-	-	-
North Dakota	3,483,000	4,689,092	3,356,553	4,514,127	4,408,899	5,599,384	-	-
Ohio	6,659,100	7,954,495	3,104,558	4,414,075	2,190,321	3,778,593	785,333	1,369,109
South Dakota	5,279,400	5,851,244	4,612,216	5,090,043	3,241,325	3,827,088	-	-
Tennessee	2,065,500	1,742,966	1,979,998	1,656,259	263,696	188,721	1,388,572	2,269,587
Wisconsin	1,944,000	2,687,392	1,804,252	2,475,365	98,872	219,541	775,543	1,876,531
Sub Total	95,183,550	111,004,017	44,247,839	60,675,409	26,131,351	34,863,065	19,807,459	29,088,830
Others	5,586,780	14,695,983	N/A	N/A	1,319,201	6,725,361	N/A	N/A
U.S. Total	100,770,330	125,700,000	N/A	N/A	27,450,552	41,588,426	19,807,459	29,088,830

Source: Informa Economics

Up 25% up 52% up 47%

Soybean barge movement is predominantly destined for the Center Gulf to be exported to foreign countries. A minority of the barge movements are used for domestic placement of soybeans.

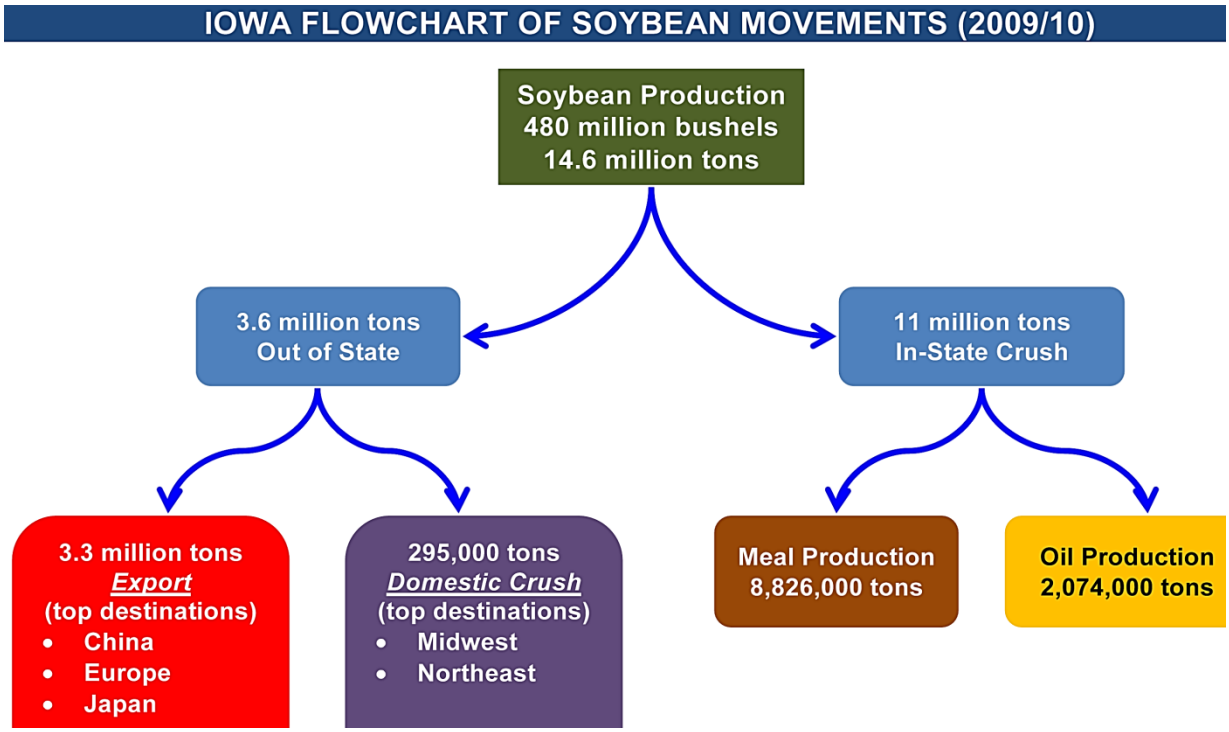
Soybean Logistics Flow:



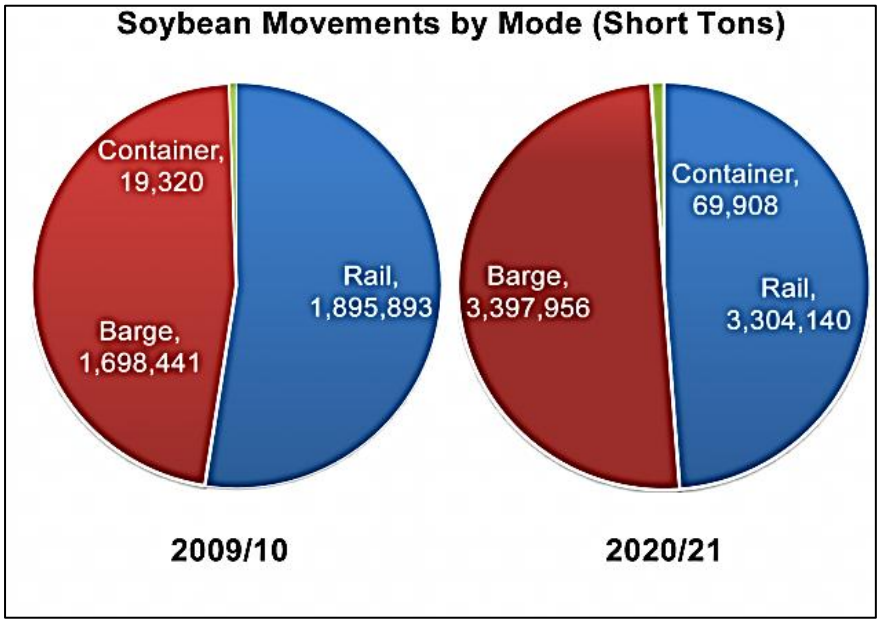
Percentage of Soybeans Moved to Export Positions by Focus States

Soybeans	Barge		Rail				
	Export Position Barge		Export Positon Rail				
Focus State	Center Gulf	Domestic Barge Moves	Center Gulf	PNW	Texas Gulf	Atlantic	Domestic Rail Move
Arkansas	98%	2%	60%	0%	0%	0%	40%
Illinois	93%	7%	53%	14%	4%	0%	29%
Indiana	93%	7%	36%	5%	0%	0%	59%
Iowa	91%	9%	10%	80%	2%	0%	8%
Kansas			29%	0%	51%	0%	20%
Kentucky	93%	7%	60%	0%	0%	0%	40%
Michigan			88%	0%	0%	0%	12%
Minnesota	91%	9%	2%	91%	0%	0%	7%
Mississippi	97%	3%	60%	0%	0%	0%	40%
Missouri	96%	4%	24%	46%	12%	0%	17%
Nebraska			11%	81%	4%	0%	4%
North Carolina							
North Dakota			2%	92%	0%	0%	5%
Ohio	94%	6%	48%	0%	0%	48%	4%
South Dakota			5%	90%	0%	0%	6%
Tennessee	95%	5%	60%	0%	0%	0%	40%
Wisconsin	96%	4%	4%	76%	0%	0%	20%

Soybeans are a critical commodity for the **State of Iowa**, and about 25% of the production is shipped out of State



The quantity of Iowa production shipped out of state via barge is forecasted to more than double by 2020/21



One conclusion / recommendation from the Study - enhance the attractiveness of water transportation as a mode of transportation.

Transportation Infrastructure projects were identified that can significantly reduce the costs of moving soybeans and gain commodities to market. The cost savings is expected to result directly from the enhanced attractiveness in water transportation as a mode of transportation

Cost savings are most likely to be derived from:

- Improved reliability in the delivery time of soybeans and grains
- Reduced travel time and transit times
- Improved efficiencies at ports for using larger, more efficient ocean going vessels
- Potential reassignment of rail traffic to barge traffic for freight currently utilizing rail to avoid deficiencies at key lock and dam facilities

The improvements proposed would involve $467.2 million of construction outlays on an annual average (over a 5 year construction period for locks and over a 10 year period for dredging) in the U.S. economy, and would be expected to increase the output of water transportation by approximately $43.3 million annually.

Funding for the U.S. Ports and Waterways

Inland Waterways – Freight Transportation Solution for the Future

With the least impact of any surface mode on air quality, the environment, and public safety, as well as capacity to spare, the Nation's inland waterways are a transportation solution for the Nation's future. (National Waterways Foundation)

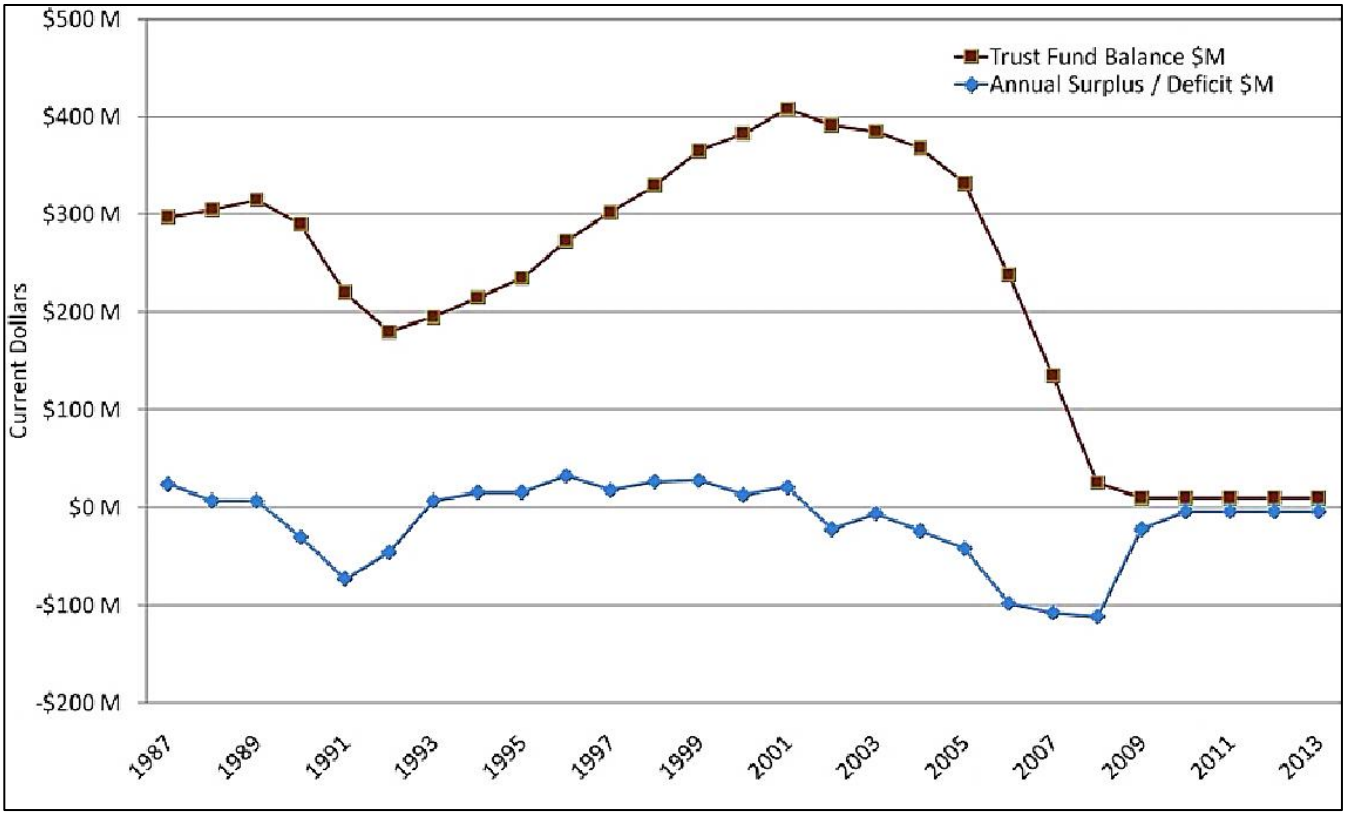
Inland Waterways Trust Fund

*The Inland Waterway Trust Fund supports – by law – **257 locks at 212 sites** on more than **12,000 miles (19,200 kilometers) of inland waterways.***

The Waterway Trust Fund was established in 1986. The funds are generated by a 20-cent per-gallon diesel fuel tax. The funds are meant to pay for one-half of the cost of new construction and major rehabilitation of locks and dams. The other half of the cost, reflecting the broad distribution of all those who benefit from the other uses of the waterways like national defense, water supply, flood control and recreation, is paid from general revenues. The operation and maintenance (O & M) for the inland waterway system is funded 100% by the federal government.

Congressional appropriations in support of navigation O & M have been flat in nominal terms and have actually declined in real terms as prices for labor and materials have increased through the years. In real dollars, O & M funds supporting navigation grew from the later 1970's until the middle 1990's, when expenditures then fell through 2008. An infusion of stimulus money reversed this trend in 2009.

Inland Waterway Trust Fund History and Projections



Funds available for new construction and major rehabilitation projects are limited due to:

1. A 20 cent per gallon tax only on fuel taxed waterways, that has remained unchanged since 1995

2. Declining tax revenues and inflation. Tax collections have declined due to:
   a. Towing industry consolidations
   b. Less long haul grain traffic
   c. More efficient towboats
   d. Fewer empty moves
   e. Deeper draft barges

Due to the congressional stopgap measures, the trust fund balances appear to have stabilized. However, without changes to IWTF financing, funding for new projects is expected to be extremely limited in the foreseeable future, with most of the expected funding going to one project, the Olmsted Lock and Dam project.

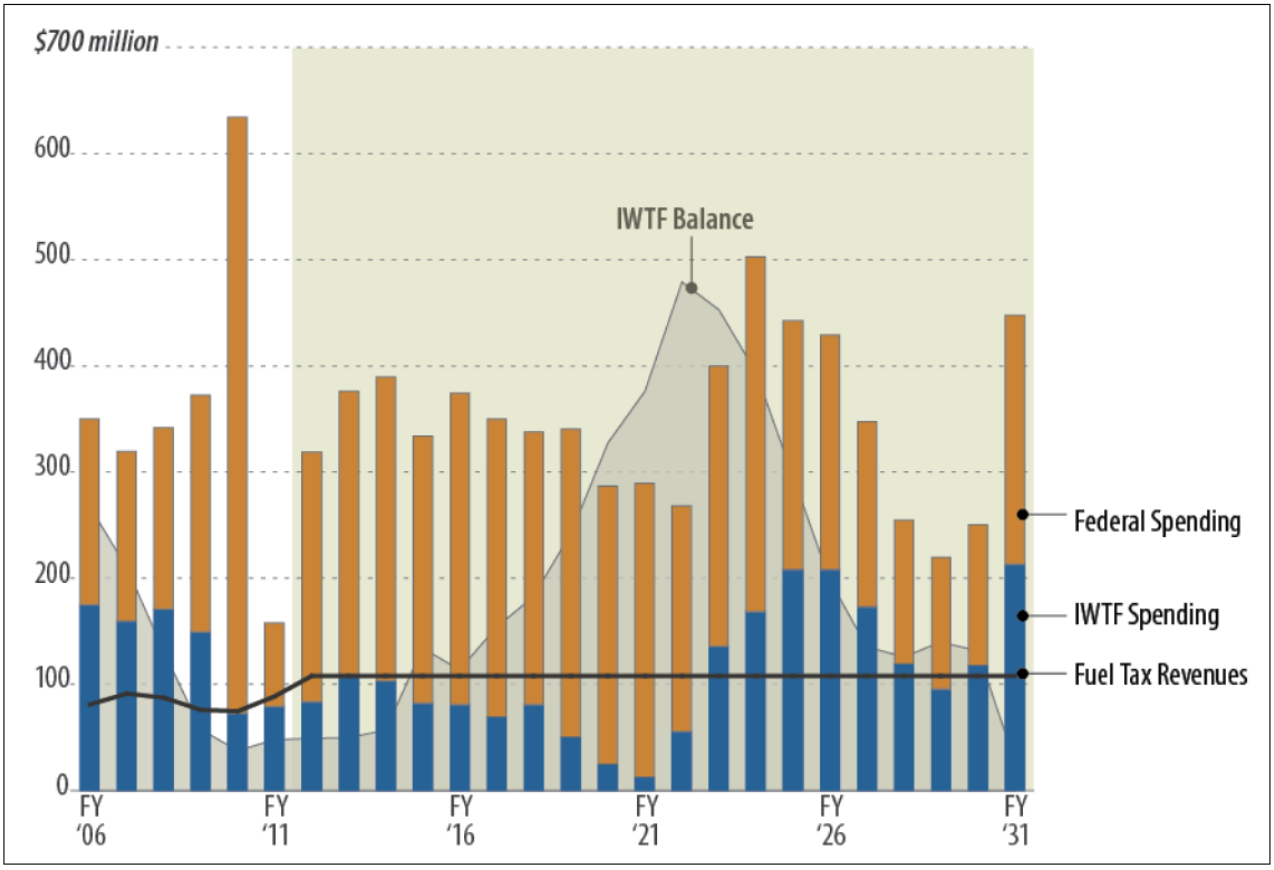
In 2011, the Inland Waterways Users Board (IWUB) created and transmitted to Congress a proposal of its own to solve the funding issue. The proposal has come to represent the preferred alternative of much of the inland waterway user industry. It has not been endorsed by the Corps or the current Administration; but it is the basis for H.R.4342 (see next page for addition data).

The reports general funding recommendations are:

- Increase the fuel tax by $0.06 to $0.09 per gallon
- Increase the Federal share of inland waterway costs
- Increase overall spending on inland waterways

The chart below shows the end result of the reports funding proposal.

Inland Waterway Projects: Projected Funding Trends under IWUB Proposal



Source: CRS adaptation of Corps projections, as proposed in the 2010 Inland Marine Transportation Systems Capital Projects Business Model.

Notes: FY2011 line separates actual values to date from projections under the IWUB proposal. Projections for federal spending do not include any potential cost overruns, which would be funded as a 100% federal expense under the proposal. Fuel tax revenues based on IWUB proposal projections $112 million/year. CRS projections for future IWTF balances under the proposal were calculated by adding the balance at the end of FY2010 to projected balances under the IWUB proposal.

The WAVE4 Act (H.R. 4342) - An Overview Summary

Waterways are Vital for the Economy, Energy, Efficiency, and Environmental Act of 2012…submitted to the US House of Representatives on March 29, 2012

"This legislation represents a comprehensive effort among key stakeholders to more efficiently use the resources dedicated to improving our inland waterway system. Importantly, industry has committed to paying more to meet the maintenance challenges we face, and addressing how projects are prioritized should be a part of this process. We must continue the dialogue on how we accomplish these goals – our future economic growth depends on it." Rep. Costello, lead Democratic (IL) co-sponsor

The underlying intent of this legislation is to achieve comprehensive long-term inland waterway system modernization. The Bill requires the Secretary of the Army, working with the Inland Waterways Users Board, to submit to Congress, within one year of the date of enactment of the WAVE 4 Act, a twenty-year capital investment program for the inland waterways

The Bill:

- Preserves the existing 50% industry/50% federal cost-sharing formula for new lock construction and major lock rehabilitation projects costing $100 million or more.

- Adjusts the current model to provide 100% federal funding for dam construction and major rehabilitation and smaller lock rehabilitation projects, recognizing the value derived by other beneficiaries from dams and the pools created by dams.

- Includes a cost share cap on new lock construction projects to incentivize keeping projects on budget and prevent shippers from bearing the burden of paying for unreasonable cost overruns.

The bill increases the user fee on fuel used in commercial transportation on the inland waterways to 26 cents per gallon from its current 20 cents per gallon, beginning January 1, 2013. The Obama administration generally opposes the bills approach... It has submitted proposals to increase trust fund revenues with new user fees, in addition to the fuel tax. It has included new revenues from an unspecified new inland waterways fee in its FY2013 budget request.

To date none of these changes have been enacted. Some groups also argue that an increased shared of waterway costs should be borne by users, and have suggested that operations and maintenance costs (currently a 100% federal cost) should also be a user responsibility

The bill was referred to a House Committee on March 29, 2012. This bill has a 4% chance of being enacted, per the govtrack us website.

Harbor Maintenance Trust Fund (HMTF) - An Overview Summary

In 1986, Congress established a user fee for coastal ports and harbors - the Harbor Maintenance Tax (HMT). The HMT was designed to provide 100% of the cost of operations and maintenance of the nation's deep draft and coastal waterways. The HMTF is funded by the Harbor Maintenance Tax (HMT), under which certain users of U.S. coastal and Great Lakes harbors pay a tariff of $1.25 per $1,000 in cargo value passing through these waters.

The tax applies to imported and domestic waterborne cargo, as well as the ticket value of cruise ship passengers. Harbor Maintenance Tax revenue is not being fully spent. Enough HMT revenue is collected each year to meet all of the nation's authorized harbor maintenance needs, but less than two–thirds of it is appropriated for harbor maintenance.

- Since 2003, HMT collections have far exceeded funds appropriated for harbor maintenance, resulting in a large and growing "surplus" in the trust fund (GAO, 2008).

- In 2011, over $1.5 billion was collected and symbolically placed in the Harbor Maintenance Trust Fund (HMTF), but only $826 million was expended. Currently, the surplus of collections over expenditures is over $6.4 billion.

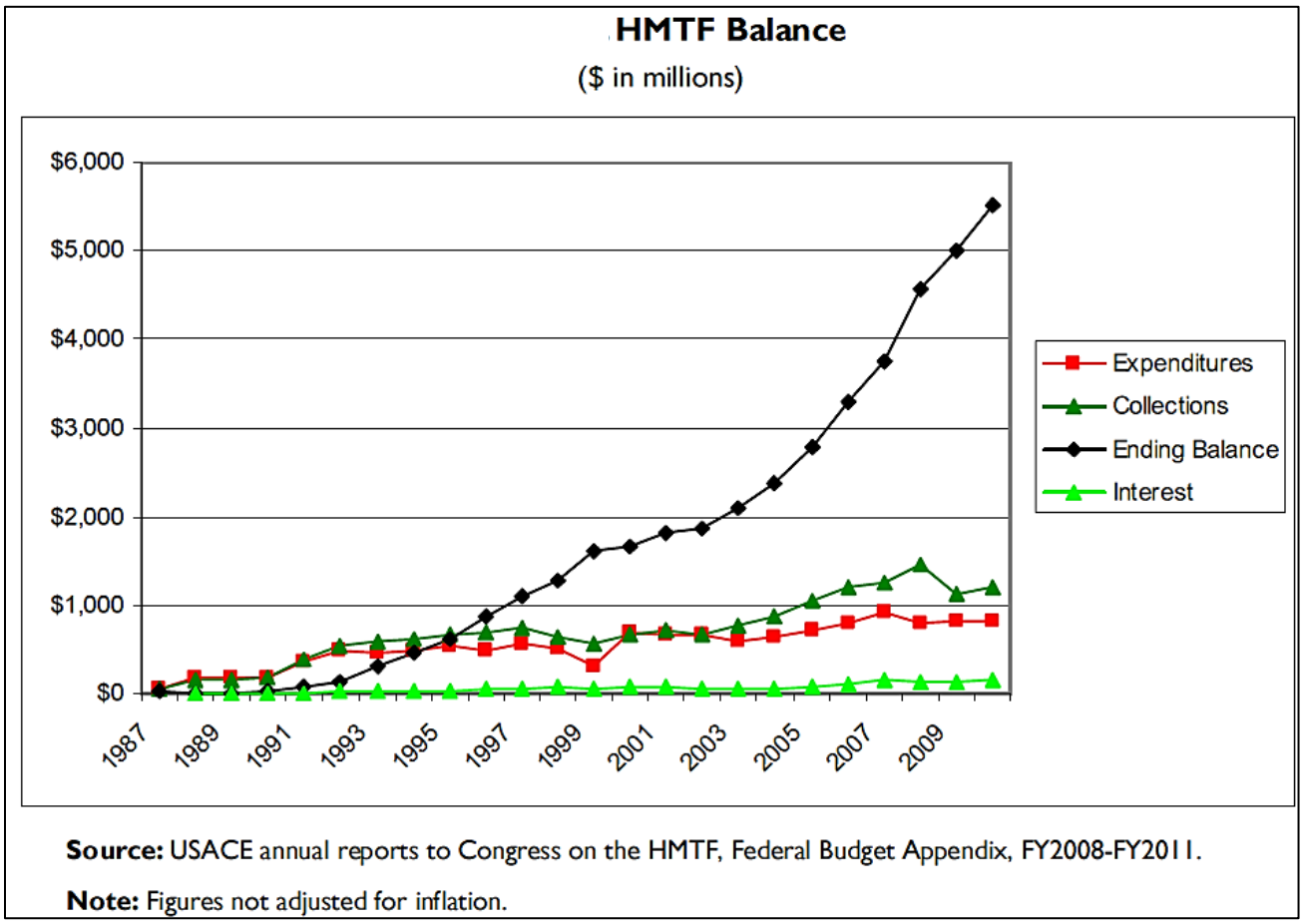
- The GAO reports that the surplus is expected to grow to $8.3 billion by 2013. Rather than being used for their intended purpose, these user fees are instead used to balance the federal budget each year.

In January of 2011, H.R.104/S.412 was introduced into Congress to allow full utilization of the Harbor Maintenance Trust Fund… to ensure that amounts credited to the Harbor Maintenance Trust Fund are used for harbor maintenance.

- The Bill declares that it shall be out of order in the House of Representatives or the Senate to consider any bill, joint resolution, amendment, motion, or conference report that would cause total budget resources for the Fund in a fiscal year for harbor maintenance programs to be less than the level of receipts plus interest credited to the Fund for that fiscal year.

- The Bill is referred to as "Realize America's Maritime Promise Act or the RAMP"

Prognosis: The Bill is still in committee, and *govtrack.us* estimates that the bill has a 10% chance of being enacted.



Minnesota Department of Resources Funding - An Overview Summary

It is interesting to note that the Minnesota department of Resources (DNR) has offered to (May 2012) to provide some funds to assist the Corp with a project.

"The DNR proposal is for the installation and operation of a fish barrier at one of the Corps locks and dams"

This Public Notice announces the preliminary intent of the St. Paul District of the U.S. Army Corps of Engineers ("Corps") to accept funds contributed by the Minnesota Department of Natural Resource ("DNR"). The St. Paul District would allocate funds internally and distribute funds to supporting Corps Districts in order to expedite the Department of Army processing of DNR's proposed modifications to Corps lock and dam facilities on the Mississippi River in Minnesota in accordance with 33 U.S.C. 408[1]

Figure 68: U.S. Inland River System

Upper Mississippi River (UMRS) Waterway

The Upper Mississippi River is the portion of the Mississippi River upstream of Cairo, Illinois, where it is joined by the Ohio River to form the Lower Mississippi River. Unlike the Lower Mississippi, much of the upper river is a series of pools created by a system of locks and dams. The structures were authorized by Congress in the 1930's, and were mostly completed by 1940. A primary reason for damming the River is to facilitate barge transportation. The dams regulate water levels for the Upper River, and play a major part in regulating levels on the Lower Mississippi

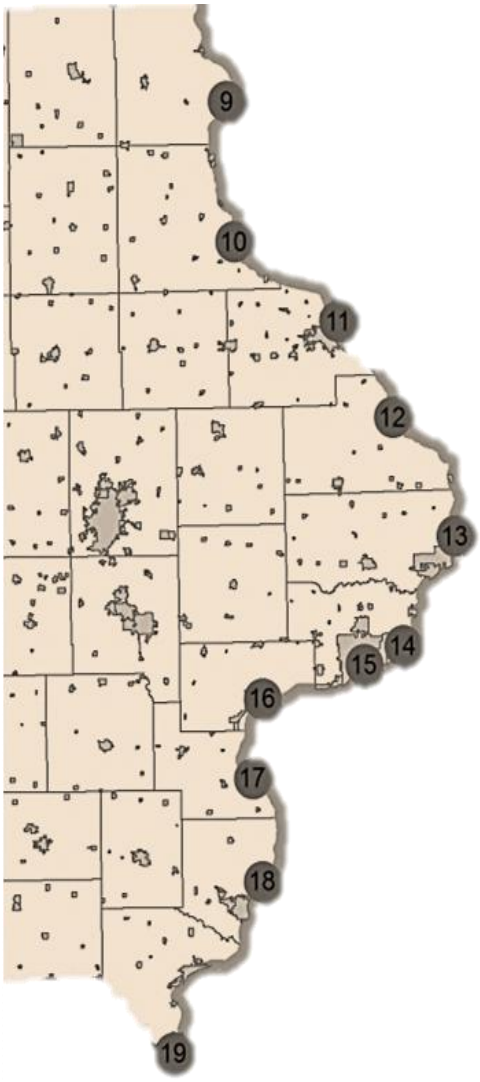
The Upper Mississippi River System includes the Upper Mississippi River and Illinois Waterway and tributary rivers, with 38 locks

and dam sites. The Upper Mississippi has 29 locks and 858 miles of commercially navigable waterway (with an average depth of 9 feet), and the Illinois Waterway has eight locks and is navigable for 291 miles. Also part of the UMRS is the Missouri River, which has no locks along its 735 navigable miles from Sioux City to St. Louis. There is one lock along the 26 navigable miles of the Kaskaskia River in southern Illinois.

Pool	Locality	Lock	Length of Lock	Yr. Built	Mile	
USAF Pool	Minneapolis MN	Upper St. Anthony	400	1963	854	*
USAF Pool	Minneapolis MN	Lower St. Anthony	400	1959	853	*
Pool 1	Minneapolis MN	Lock 1	500	1930	848	*
Pool 2	Hastings MN	Lock 2	600	1930	815	*
Pool 3	Welch MN	Lock 3	600	1938	797	*
Pool 4	Alma WI	Lock 4	600	1935	753	*
Pool 5	Minnesota City MN	Lock 5	600	1935	738	*
Pool 5A	Fountain City WI	Lock 5A	600	1936	728	*
Pool 6	Trempealeau WI	Lock 6	600	1936	714	*
Pool 7	La Crescent MN	Lock 7	600	1937	703	*
Pool 8	Genoa WI	Lock 8	600	1937	679	*
Pool 9	Eastman WI	Lock 9	600	1938	648	*
Pool 10	Guttenberg IA	Lock 10	600	1936	615	*
Pool 11	Dubuque IA	Lock 11	600	1937	583	
Pool 12	Bellevue IA	Lock 12	600	1939	557	
Pool 13	Clinton IA	Lock 13	600	1938	522	
Pool 14	Claire, IA	Lock 14	600	1922	493	
Pool 15	Rock Island IL	Lock 15	600	1934	483	
Pool 16	Illinois City IL	Lock 16	600	1937	457	
Pool 17	New Boston IL	Lock 17	600	1939	437	
Pool 18	Gladstone IL	Lock 18	600	1937	410	
Pool 19	Keokuk IA	Lock 19	1200	1956	364	
Pool 20	Canton MO	Lock 20	600	1936	343	
Pool 21	Quincy IL	Lock 21	600	1938	325	
Pool 22	New London MO	Lock 22	600	1938	301	
Pool 24	Clarksville MO	Lock 24	600	1940	273	
Pool 25	Winfield MO	Lock 25	600	1939	241	
Mel Price Pool	East Alton IL	Melvin Price Lock	1200	1990	201	
Pool 27	Granite City IL	Lock 27	1200	1953	185	

* Operates Seasonally

Lock	Location	River/ Mile	Year Open	Length (feet)	Width (feet)
19	Keokuk, IA	364.3	1957	1200	110
18	Gladstone, IL	410.5	1937	600	110
17	New Boston, IL	437.1	1939	600	110
16	Muscatine, IA	457.2	1937	600	110
15	Rock Island, IL	482.9	1934	600	110
15	Rock Island, IL	482.9	1934	360	110
14	LeClaire, IA	493.0	1940	320	80
14	LeClaire, IA	493.0	1940	600	110
13	Clinton, IA	522.5	1939	600	110
12	Bellevue, IA	556.7	1938	600	110
11	Dubuque, IA	583.0	1937	600	110
10	Guttenberg, IA	615.1	1937	600	110
9	Harpers Ferry, IA	647.9	1937	600	110



Almost every lock and dam in the Upper Mississippi River Basin has exceeded its economic design life of 50 years. Most locks are too small for today's tows. Old age and obsolesce threaten the reliability of the waterway system and flow of commerce.

The 126 million tons of freight that are transported annually on the System is more than 6 times the 1930's tonnage, yet many of the locks and dams built over seven decades ago have never been modernized, resulting in major traffic delays at the locks. The impact of these delays on consumers is tremendous.

Most of the lock chambers on the System are 110' by 600', but the average length of a modern tow (15 barges pushed by a towboat) is 1200 feet. For a modern tow to navigate through the Basin's antiquated locks, it must split in half and transit the lock one section at a time, resulting in costly delays

Eight of the projects along the Iowa border have a single chamber measuring 110" by 600' Lock and dam 19 is the largest and newest project in Iowa's waters, with a 110' x 1200' chamber built in 1957. The other structures were built in the 1930's. Below lock 10 the locks normally operate on an annual basis.

Iowa transportation

The following table shows the freight tonnage moved within, from, and to Iowa in 2010, and the projected tonnage in 2040. Water accounts for less than 2% of the total freight flow.

Iowa freight flows, 2010 vs. 2040 (millions of tons)

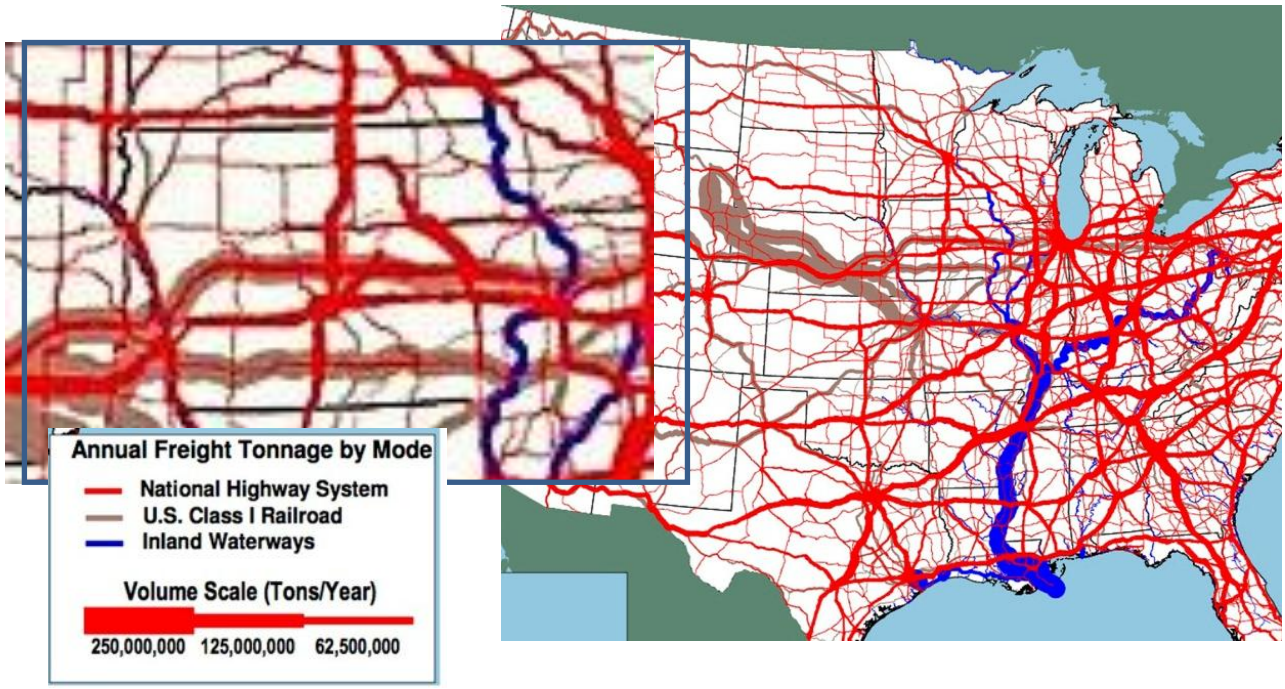
	2010	2040	Percent change
Truck	360.1	514.2	42.6
Rail	65.2	72.5	11.2
Water	6.9	9.7	40.5
Air (including air-truck)	0.02	0.03	50.0
Multiple modes and mail	13.2	16.4	25.0
Pipeline	5.9	5.9	0.5
Other	1.5	1.7	14.0
Total	**453.2**	**620.4**	**36.9**

Source: FHWA, 2009 Freight Analysis Framework

Major Freight Corridors flow through Iowa (2008):

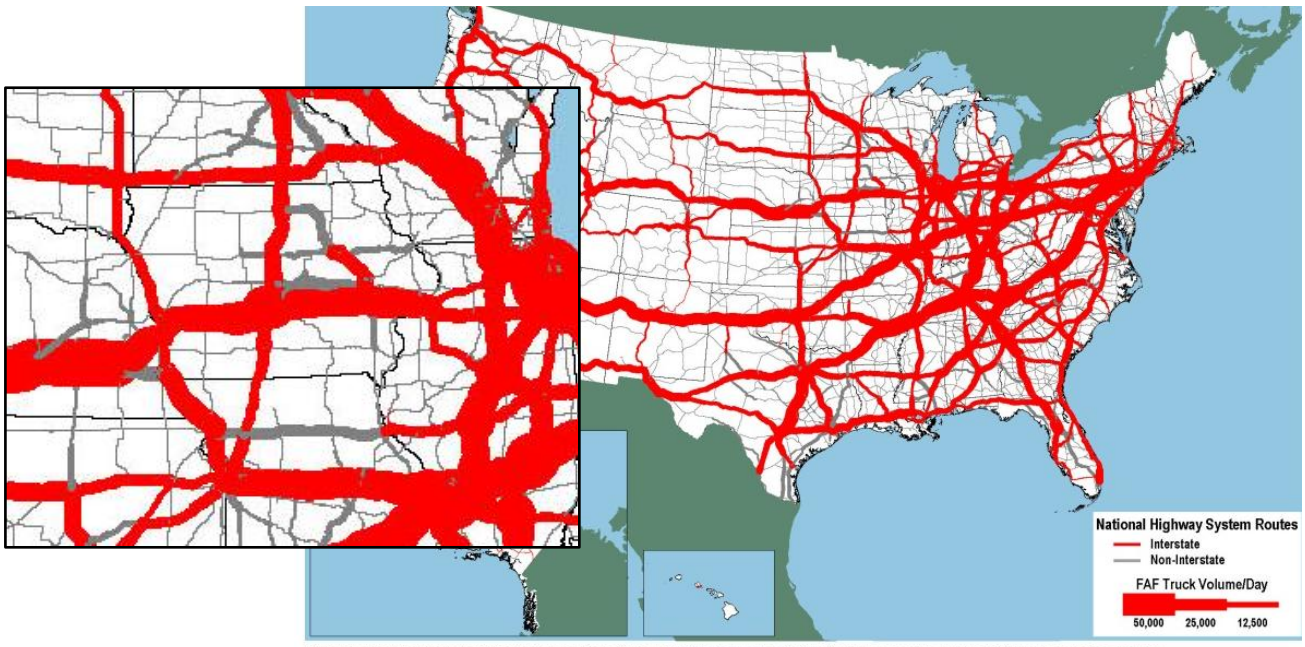
The volume of traffic on the traffic corridors in Iowa is less that in most other neighboring states … providing an opportunity to expand the traffic flow.

Tonnage on Highways, Railroads and Inland Waterways 2007 (U.S. Dept. of Transportation)



Truck Traffic

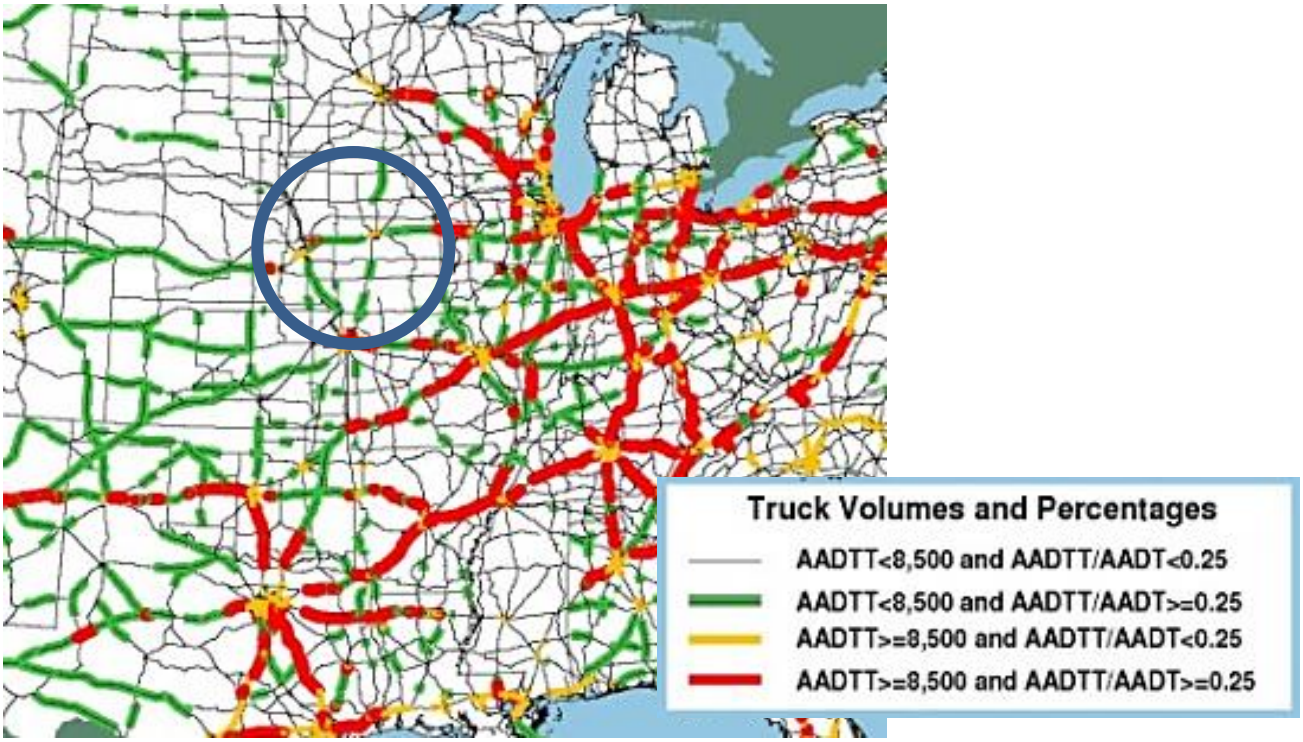
The forecast of the "average daily long-haul freight truck traffic on the National highway System in 2040 …Iowa's traffic increases, but still not as extreme as in neighboring states



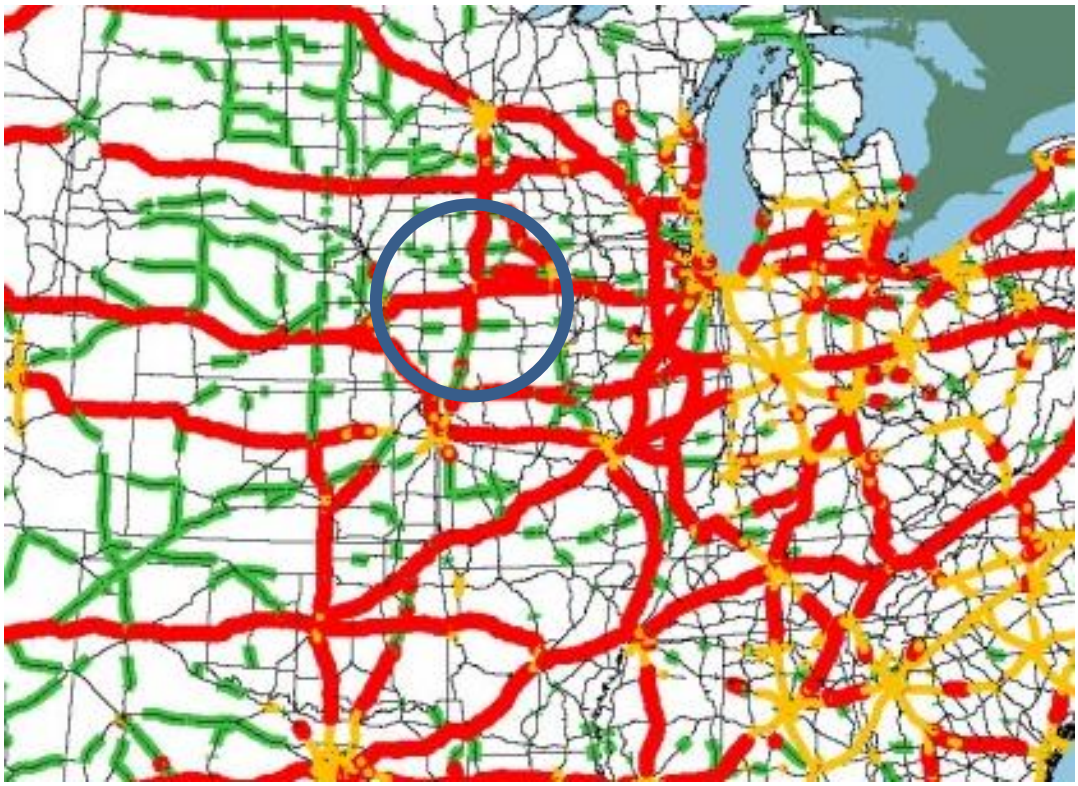
Note: Long-haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail.
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.1, 2010.

Truck congestion also grows … primarily on Iowa's east – west route

Major truck routes on the National Highway System 2007

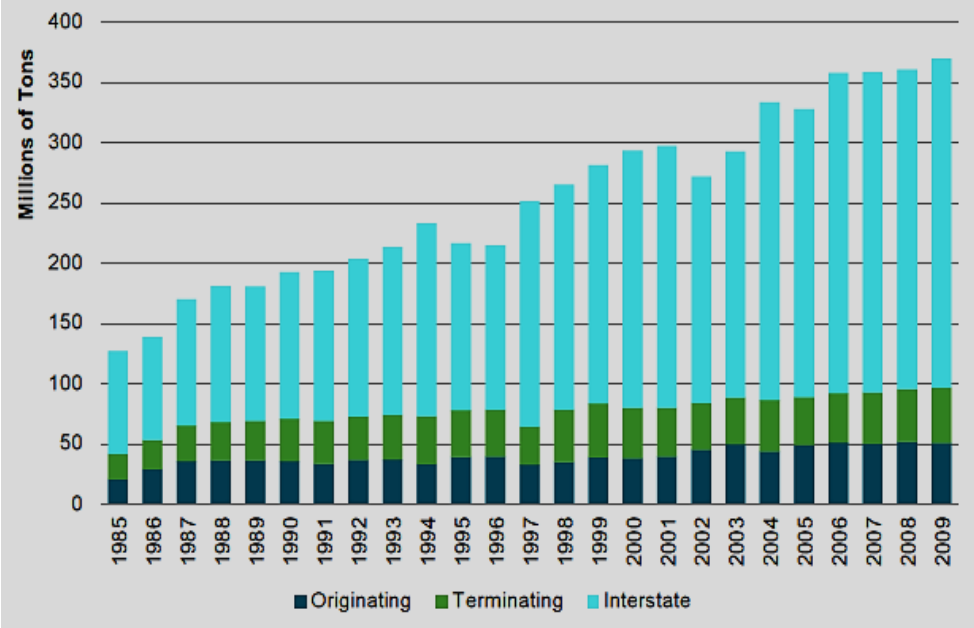


2040 estimated congestion



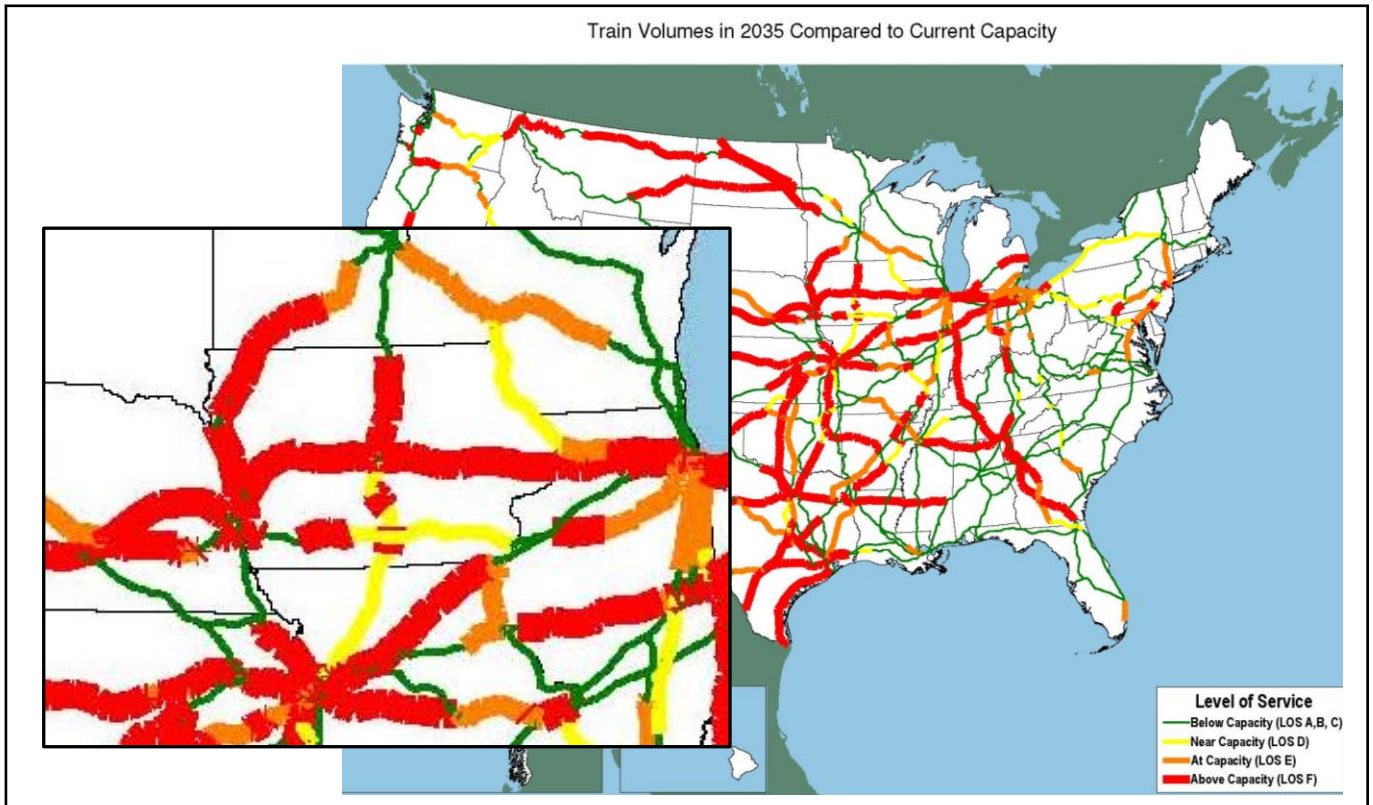
Iowa's Rail Freight System

Iowa's rail freight system has shrunk over time due to abandonments. It consists of 3,947 miles of track. The network is owned by 18 private, for profit railroad companies, five of which are major national and international companies operating through much of the United States. While rail accounts for only 3% of Iowa's 130,000-mile freight system, it carries nearly 14% of the states' freight tonnage.



Source: Iowa DOT, 2009 Iowa Railroad System Plan

A comparison of train volumes in 2035 (compared to current capacity) Shows there is an opportunity to expand train volume in the State

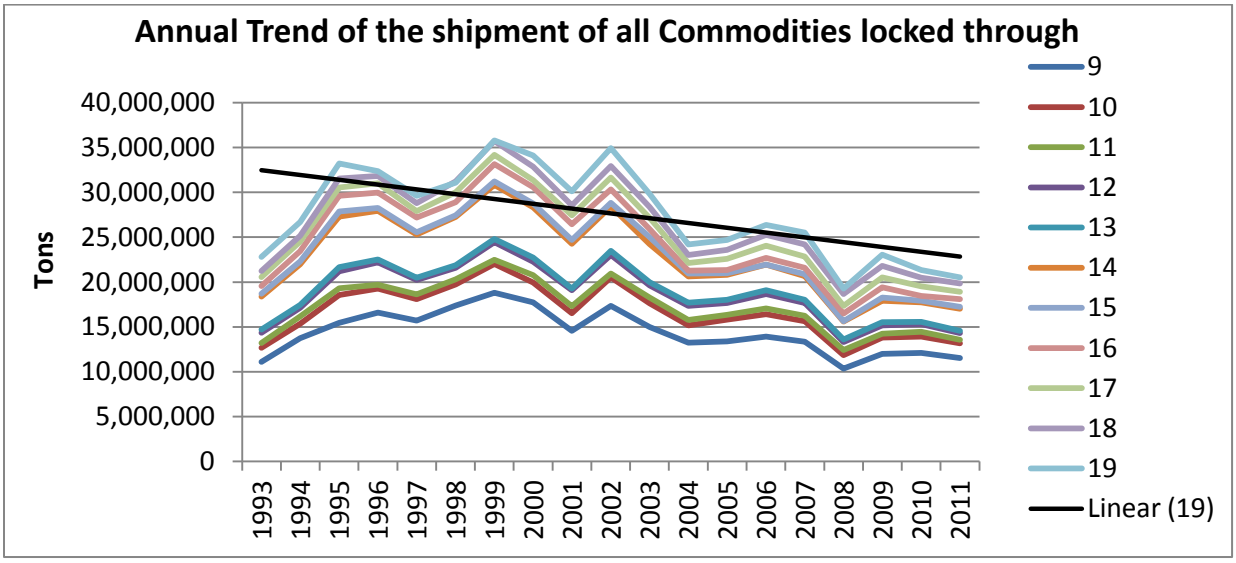


Source: Office of Freight Management and Operations

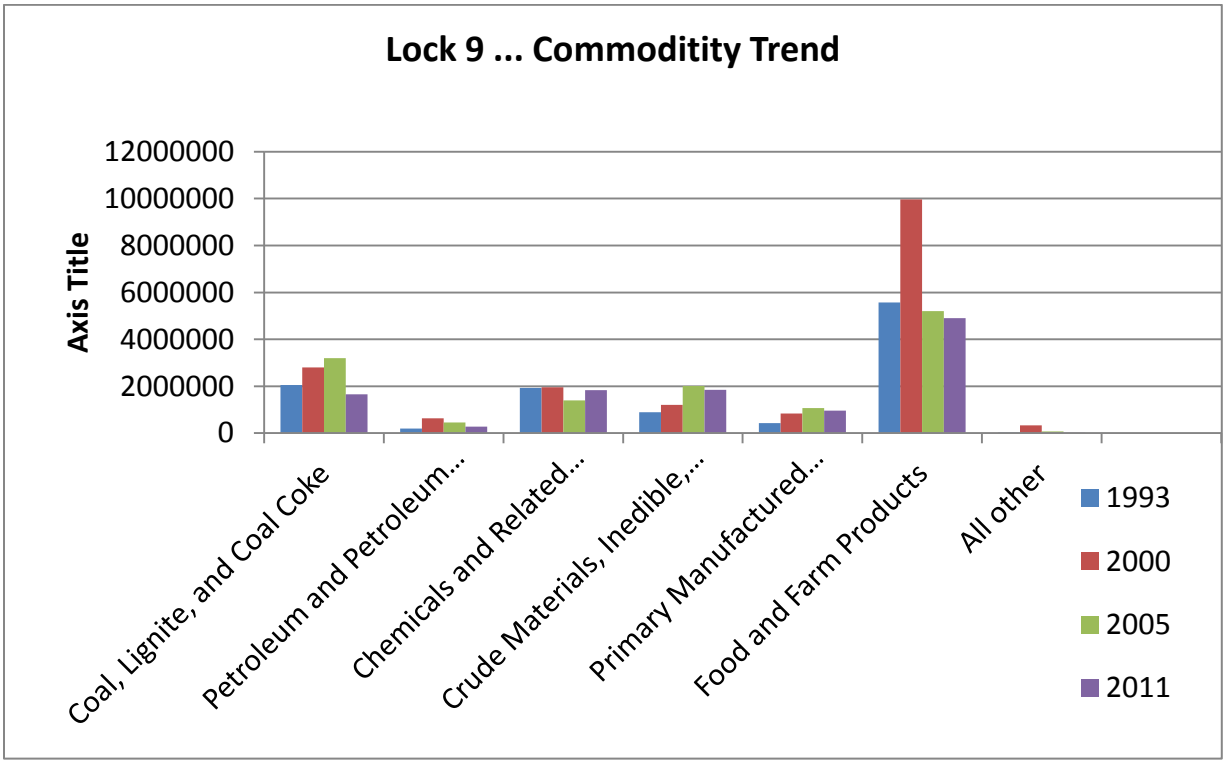
Iowa's water transportation

Lock Traffic

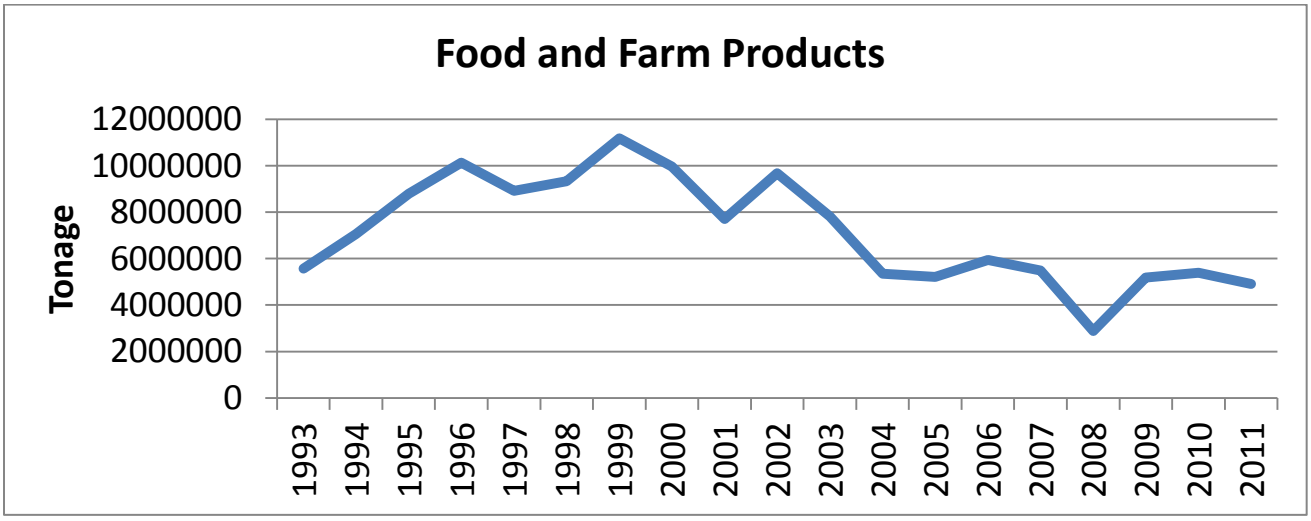
The tonnage trend for all locks on the Mississippi is declining: the trend is consistent for all the Upper Mississippi locks. Lock 19 has consistently had the highest tonnage, while lock 9 has the lowest tonnage



Lock 9:

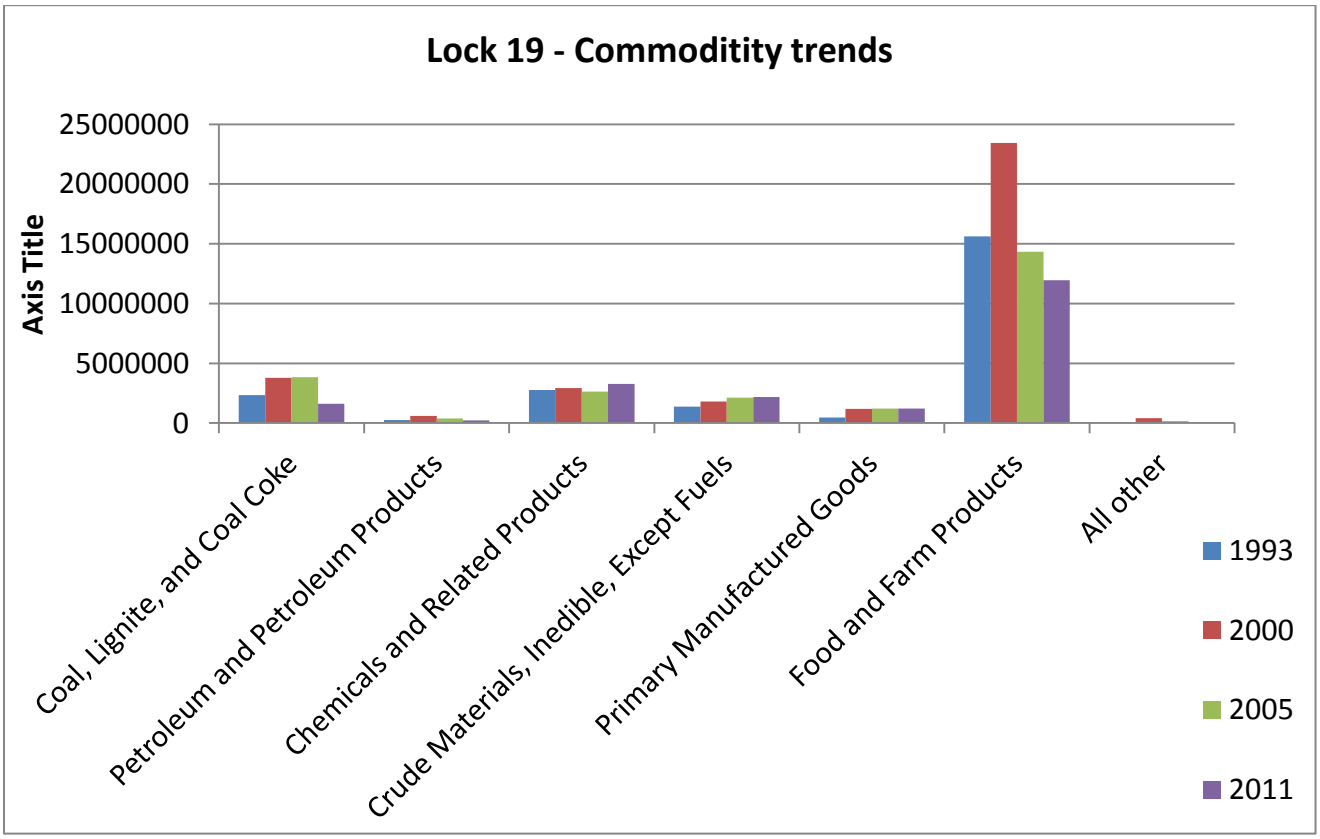


For lock 9, Food and farm products are the largest tonage. However the total tonnage is on a decline. Coal has also shown a decline since 2005.



The peak for food and farm products was 1999 … the 2011 tonnage is less than 50% of the 1999 tonnage.

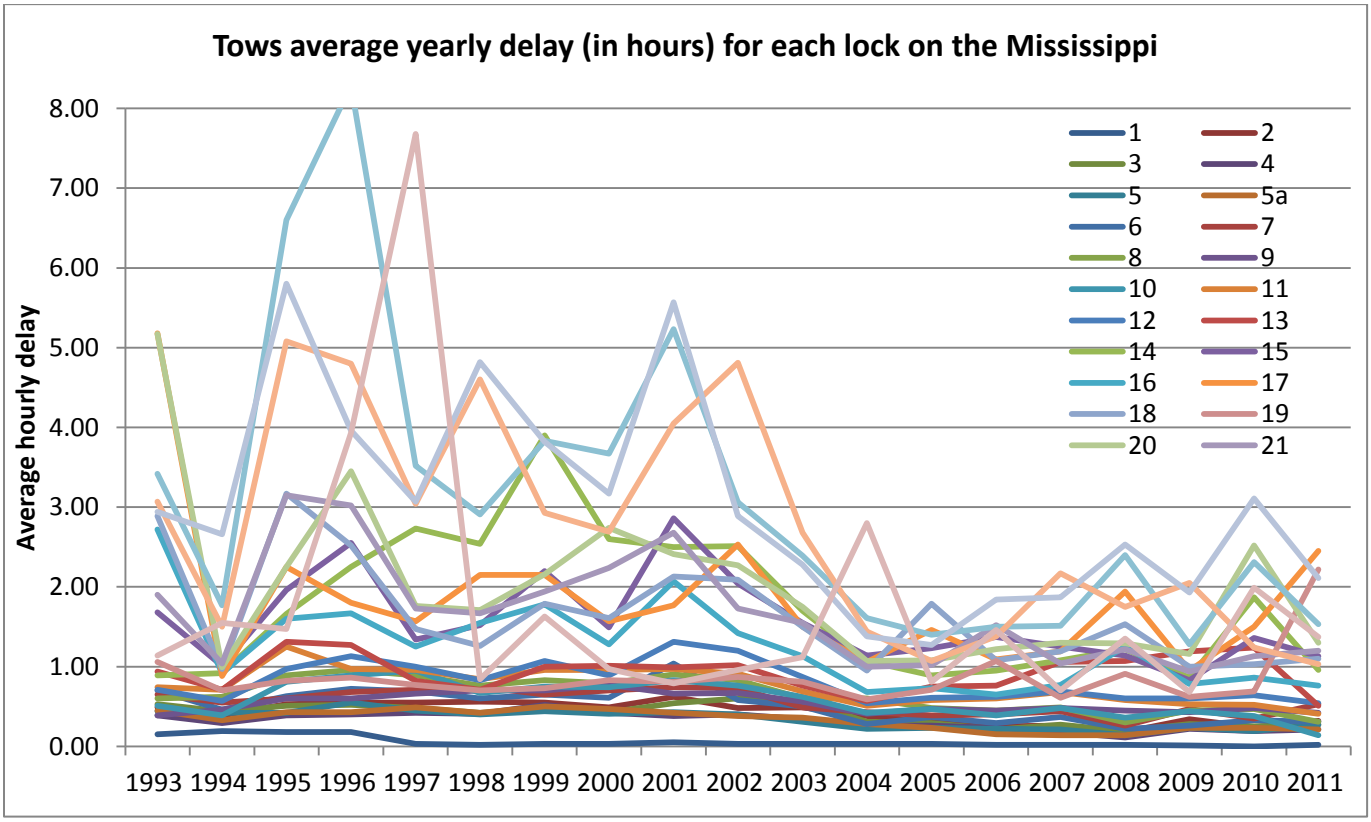
For Lock 19 the trend is similar.



Delays on the various locks

Locks with longest average hourly delay … from 2009, 2010 and 2011 (greater than 1 hour)		
Lock #	Tows av. Delay in hrs.	
15	1.1	**Iowa**
17	1.6	**Iowa**
18	1.0	**Iowa**
19	1.2	**Iowa**
20	1.7	Missouri
21	1.1	Missouri
22	1.7	Missouri
24	1.4	Missouri
25	2.4	Missouri
27	1.3	Missouri

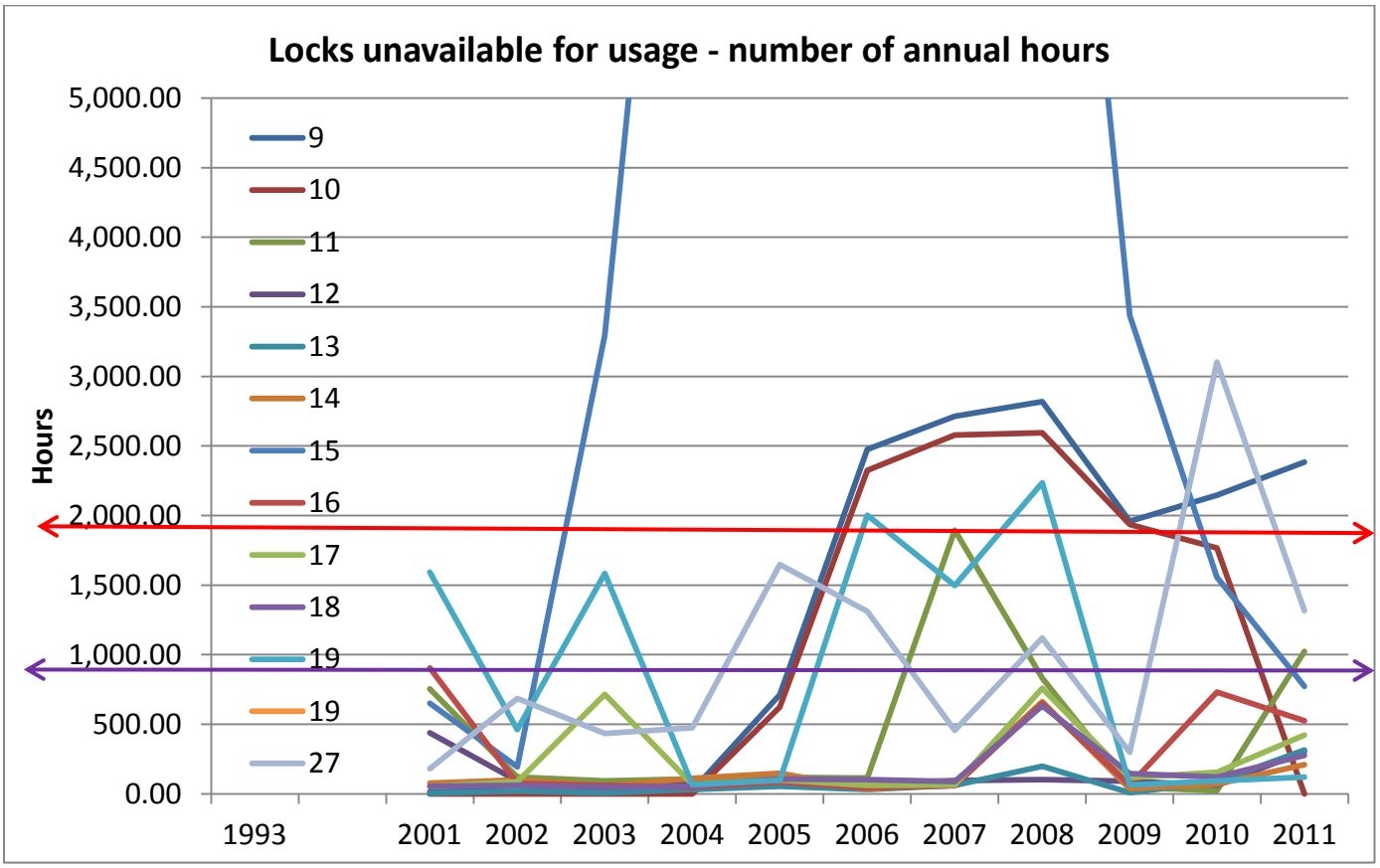
On average the yearly tow delay is on a slight decline



The time the locks are not available (including scheduled and unscheduled times) has somewhat declined in the past couple of years.

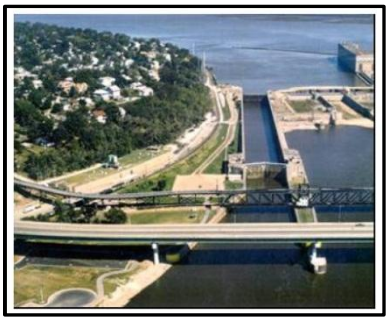
Over time many of the locks have been unavailable for more than 20% of the year -

- 20% unavailable equals 1800 hours
- 10% unavailable equals 900 hours



Status of the Locks and Dams 1 to 19 per information from the Inland Marine transportation Systems Capital Projects Report (April 2010), approved and adopted by the Inland Waterways User Board.

Lock 19



"The Dam is nearly 100 years old and the lock 50 years old. To insure reliability over the next 30 years … Lock rehabilitation is estimated at $50M while the dam is estimated at $20M".

Lock 18
"Recent periodic inspections have noted a significant increase in the rate of concrete deterioration of the dam structure. Immediate concrete repairs are needed at an estimated cost of $18M. To insure reliability over the next 30 years … Lock rehabilitation is estimated at $50M while the dam is estimated at $20M".

Lock 17 to 13 … for each of the locks and dams
To insure reliability over the next 30 years … Lock rehabilitation is estimated at $50M while the dam is estimated at $20M".

Locks 12 to 1 … the estimated cost to insure reliabilty for the next 30 years is estimated at $40M for each lock and $20M for each of the dams

Iowa's Shipments via the River

There are 60 barge terminals in Iowa that shipped and received tonnage in 2010 (55 on the Mississippi River and five on the Missouri River). The ports, terminals and fleeting areas in Iowa provide jobs and income for their communities and support Iowa's industries dependent on river transport.

- The facility shipping the most tonnage was the Agri Gain Marketing dock in McGregor which shipped corn, soybeans and soybean meal.

- Interstate Power and Light's Lansing power station receives the most tonnage among Iowa river docks.

Iowa terminals shipped commodities by barge to 12 states and received commodities from 12 other states. Of those states, Louisiana received the most cargo, nearly 5.4 million tons. Most of this was grain (corn, soybeans, cereal grains and oilseeds) that was then loaded onto ships for shipment to the world market. (2010)
The leading state shipping by barge to Iowa was Louisiana, which transported 1.3 million tons of commodities such as chemicals, fertilizers, sand and gravel. Illinois shipments to Iowa were second at .08 million tons, most of which was coal (2010).

Iowa 2010 Lock Tonnage
(tons in thousands)

LOCK	UPBOUND	DOWNBOUND	TOTAL
Lock & Dam 19	6,920	14,434	21,354
Lock & Dam 18	7,709	12,762	20,471
Lock & Dam 17	7,705	11,808	19,513
Lock & Dam 16	7,080	11,374	18,454
Lock & Dam 15	7,329	10,595	17,924
Lock & Dam 14	7,063	10,675	17,738
Lock & Dam 13	6,246	9,305	15,551
Lock & Dam 12	6,251	9,049	15,300
Lock & Dam 11	6,422	8,034	14,456
Lock & Dam 10	5,820	8,095	13,915
Lock & Dam 9	5,550	6,557	12,107

Source: U.S. Army Corps of Engineers Lock Performance Monitoring System

Iowa 2010 Tonnage by Commodity Groups
Shipped From, To and Within the State
(values in millions of dollars)

Commodity	Shipped	Received	Within	Total	Value
Coal	295,806	772,838	**	1,068,644	$41
Petroleum	0	260,253	**	260,253	$41
Aggregates	497,079	**	0	497,079	$26
Grain	5,809,949	30,722	0	5,840,671	$977
Chemicals	84,577	831,006	**	915,583	$449
Ores/Minerals	**	489,516	**	489,516	$67
Iron/Steel	**	67,086	0	67,086	$43
Other	270,602	260,465	800,230	1,331,297	$849
TOTAL	**6,958,013**	**2,711,886**	**800,230**	**10,470,129**	**$2,493**

*** Insufficient barge operators to release this tonnage – included in "Other Commodities"*
Source: U.S. Army Corps of Engineers Waterborne Commerce Statistics

Iowa 2010 Commodities Shipped by Barge to and from Other States

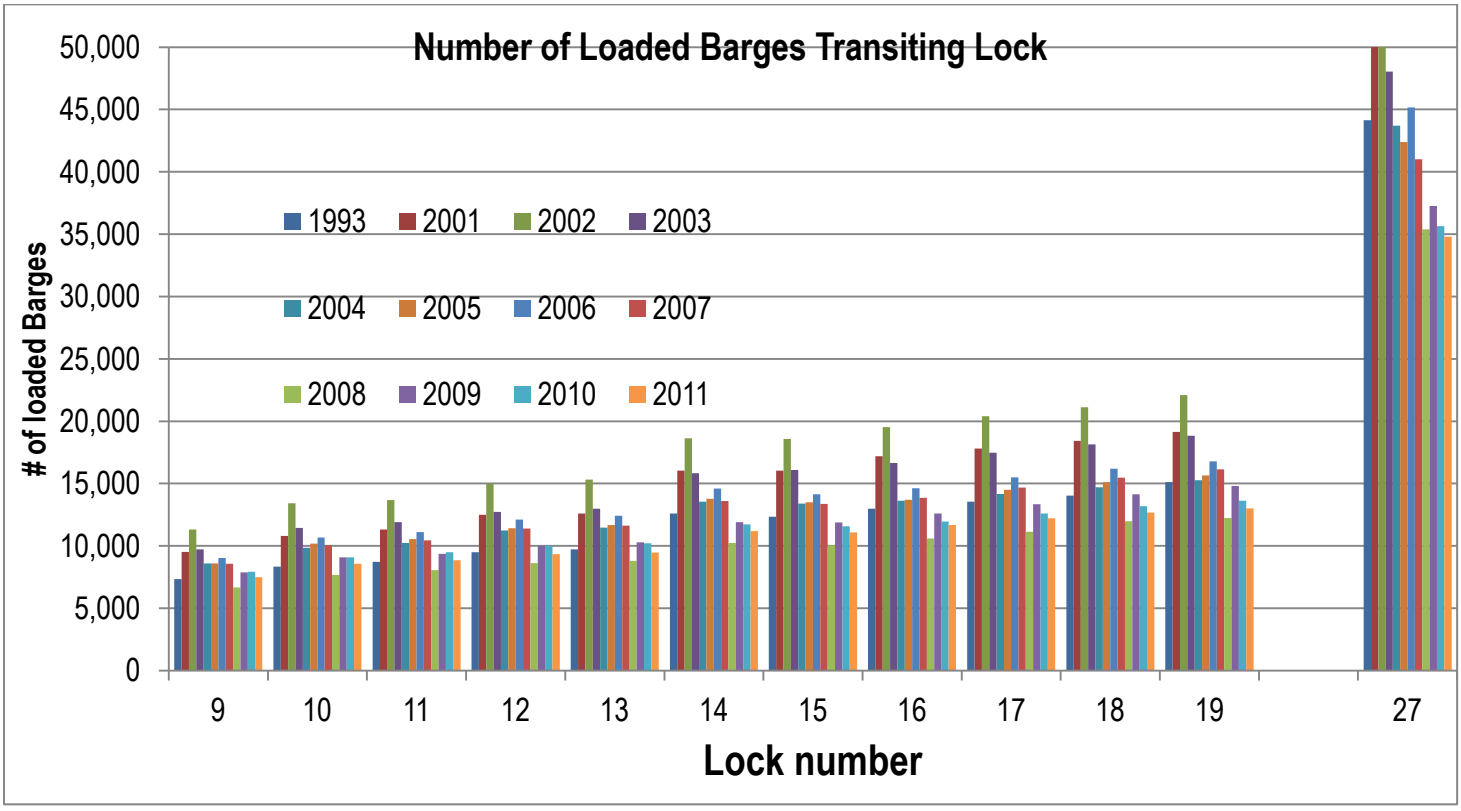
(tonnage in thousands of tons; values in millions of dollars)

Shipments To	Ktons	Value	Top Commodity	Shipments From	Ktons	Value	Top Commodity
Louisiana	5,366	$1,309	Corn	Louisiana	1,290	$631	Non-Metallic Minerals
Minnesota	648	$22	Limestone	Illinois	541	$54	Coal
Alabama	408	$78	Corn	Minnesota	277	$167	Manuf. Metals
Illinois	351	$42	Coal	Missouri	231	$20	Cement
Wisconsin	**	$3	Coal	Kentucky	**	$7	Coal

*** Insufficient barge operators to release this tonnage*
Source: U.S. Army Corps of Engineers Waterborne Commerce Statistics

The number of loaded barges using the Iowa locks is declining and the decline is consistent with all of the locks. Lock 27 in Missouri also shows the same rate of decline.

The year 2002 shows a peak in volume for all locks (no clear explanation is available).



Macro Demand Forecast of Future River Terminal Cargo Needs

The following analysis of the U.S. Department of Transportation's Freight Analysis Framework (FAF) was undertaken to provide a macro demand forecast indication (tonnage and market growth) of future river terminal cargo needs by looking at domestic and international water borne cargo flows characteristics between Iowa and selected regions and states within the FAF data. The following is a summary of that effort which provides market demand insights into the potential growth for river borne cargoes along the Upper and Lower Mississippi River as well as the quantifying Ohio River forecasts as well, all to the planning horizon of 2040.

Forecasted Growth for the North America's Inland River Waterways:

The source of the following cargo forecast analysis is the U.S. Department of Transportation's (USDOT) Freight Analysis Framework (FAF). The Freight Analysis Framework integrates data from a variety of sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation. The data includes both historic information as well future projections out to 2040 and was recently updated by the USDOT in January 2013.

A solid starting point for compiling macro level freight flow information and forecasts related to river terminal tonnage, value and trading partners by mode is the nationally developed FAF data. FAF integrates data from a variety of sources to create a comprehensive macro level picture of freight movement among states and major metropolitan areas by all modes of transportation.

With data from recent Commodity Flow Surveys, as well as additional sources, FAF estimates for tonnage and value, by commodity type, mode, origin, and destination can provide reasonable forecast estimates through 2040.

This analysis primarily considers water transport and analyzes waterborne river cargo flows from Louisiana to each up river state and waterborne river cargo flows from each up river state down river to Louisiana. For the Upper Mississippi River the following states have been used: MO, IL, IA, WI, and MN. For the Lower Mississippi River the states of LA, MS, TN and AR were used. For the Ohio and Lower Mississippi River the following states have been used: LA, MS, AR, TN plus: KY, IN, OHIO, WVA, PA.

This analysis is divided into three major macro cargo demand forecast regions to fully appreciate and compare and contrast the future inland waterway cargo demand forecast estimate requirements.

These cargo flow regions are:

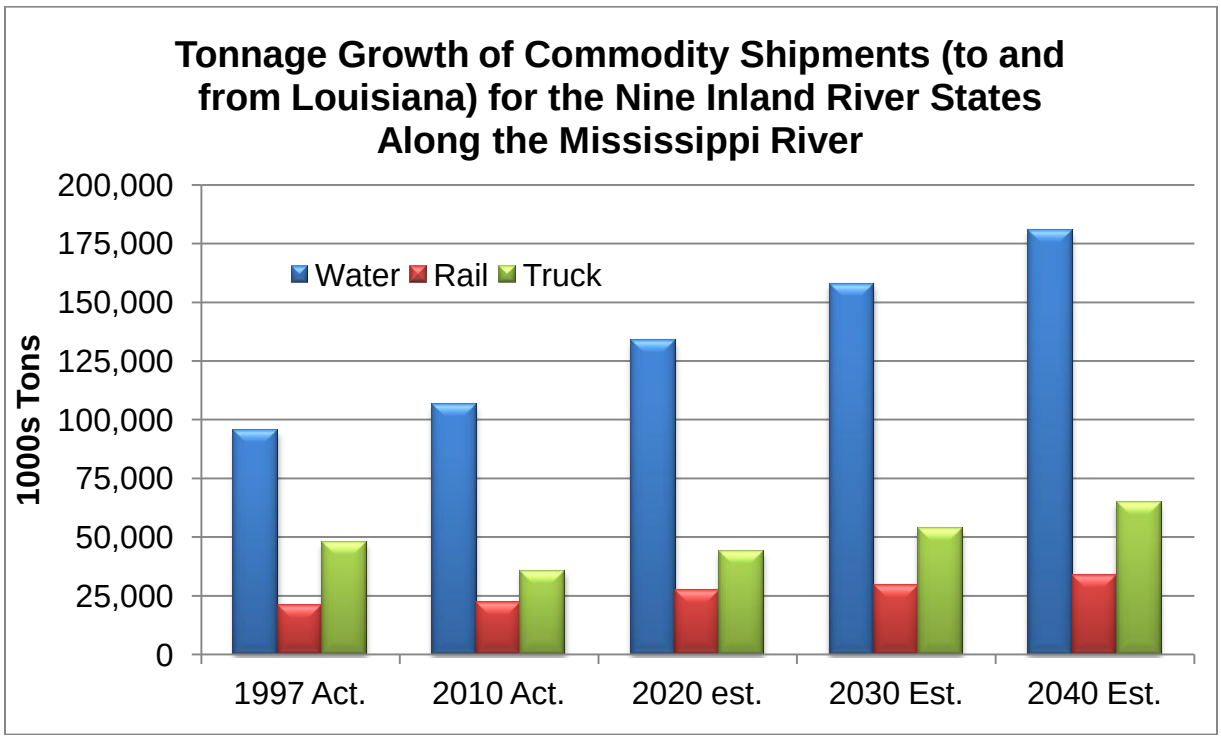
1. **The Mississippi River Region**: (Upper and Lower River Reaches)
2. **The Ohio River Region:** (Ohio River + Lower Mississippi River Reaches - No Upper Mississippi River Contribution)
3. **The Combined Mississippi River and Ohio River Basin Inland Waterway Region** (Ohio River + Lower and Upper Mississippi River Reaches)

The following data represents the sum of all the commodities moved from and to the indicated States in the inbound and outbound directions for the Mississippi River:

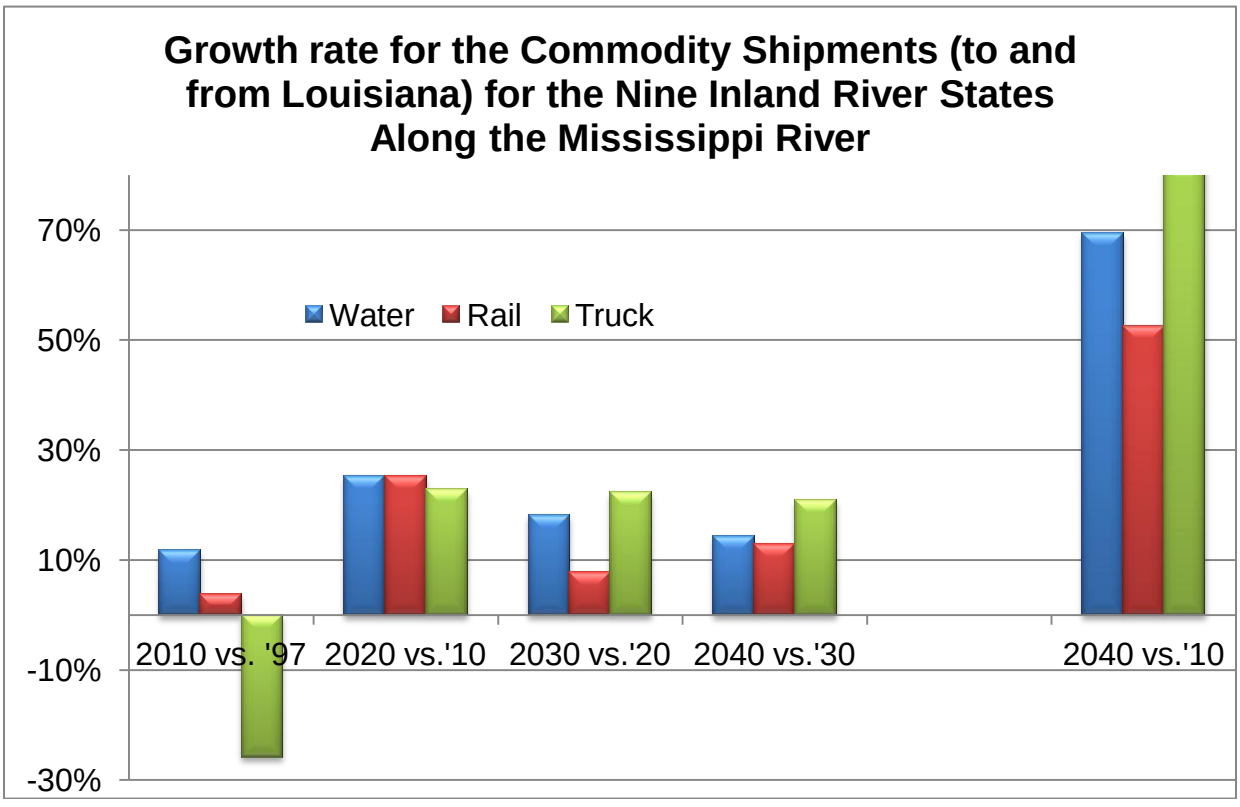
Mississippi River Waterway System **Freight Analysis Framework (FAF) Origin & Destination States** **(Inter/Intra State Regional Analysis including Domestic and International Cargo)**					
Flow of Commodities FROM the following Mississippi River States:					
States FROM:	Louisiana Mississippi	Arkansas Tennessee	Missouri Illinois	Iowa Wisconsin	Minnesota
Flow of Commodities TO the following Ohio River States:					
States TO:	Louisiana Mississippi	Arkansas Tennessee	Missouri Illinois	Iowa Wisconsin	Minnesota

The reference map to the left provides the vicinity relationships of the nine Mississippi River Inland River states analyzed.

Projected tonnage growth for the nine Inland River States:

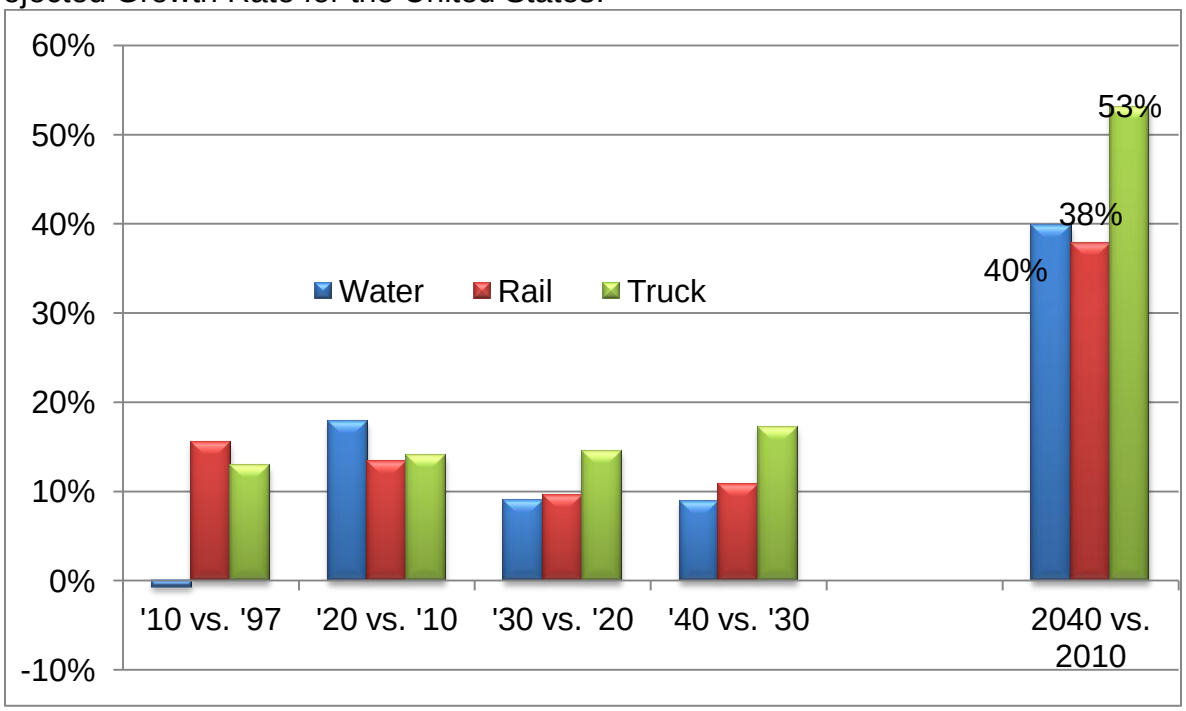


Projected Tonnage (1000s tons) Growth Rate for the nine Inland River States:

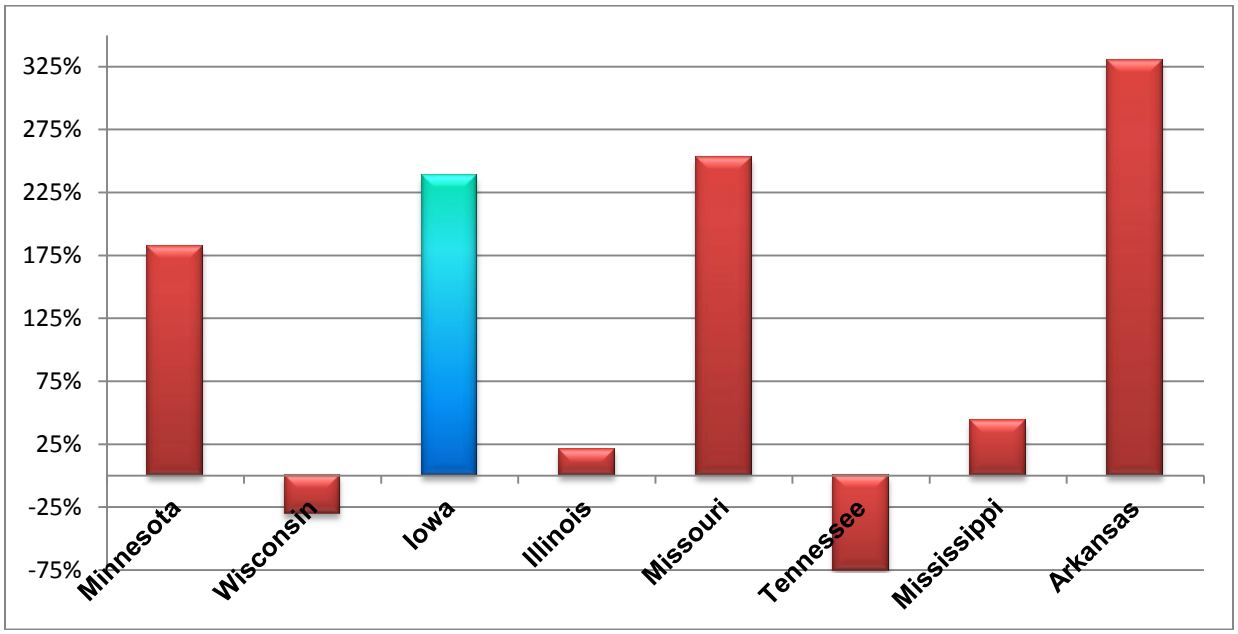


Historically water borne transportation, nationally, has had the slowest growth, but looking ahead, the forecasted growth rate for inland waterway cargoes is somewhat consistent for each of the three modes of transportation. Thus for the Mississippi River, the forecast is higher than the National average

Projected Growth Rate for the United States:

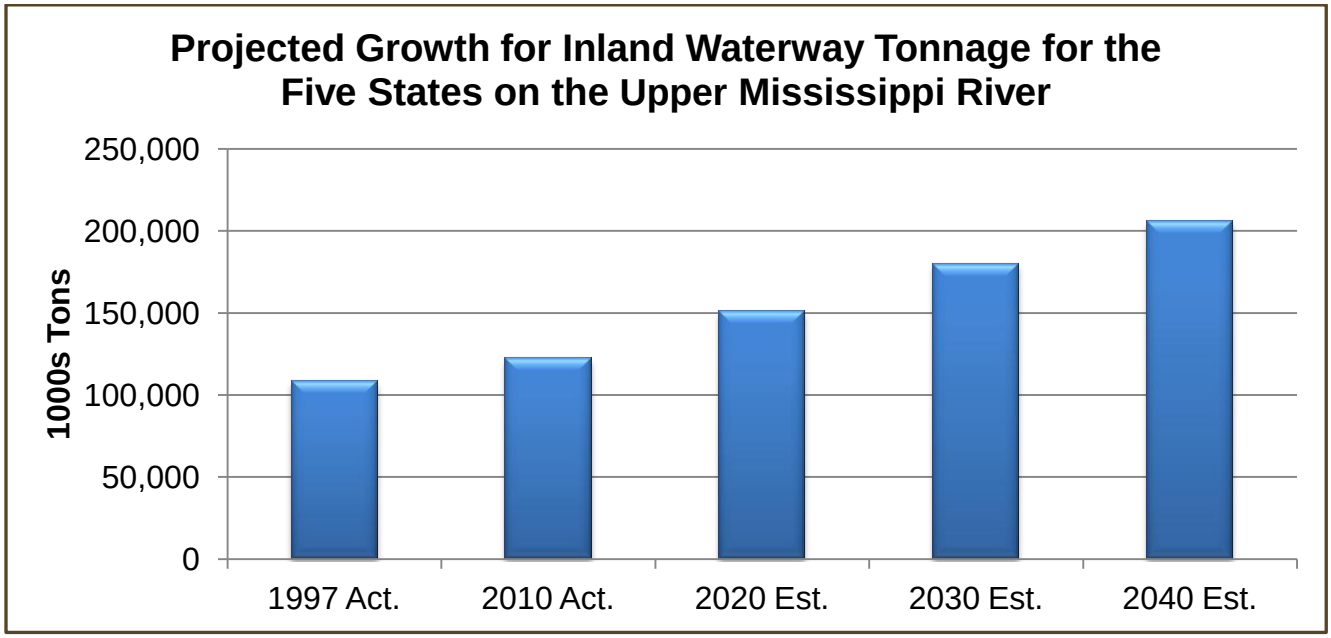


Water mode of transportation - Forecasted (43 year) Growth Rate of the nine States that Border the Mississippi River … **2040 vs. 1997**. Arkansas has the largest percentage growth, but for a very small base. The total volume is driven by the States of Minnesota, Illinois, and Missouri.

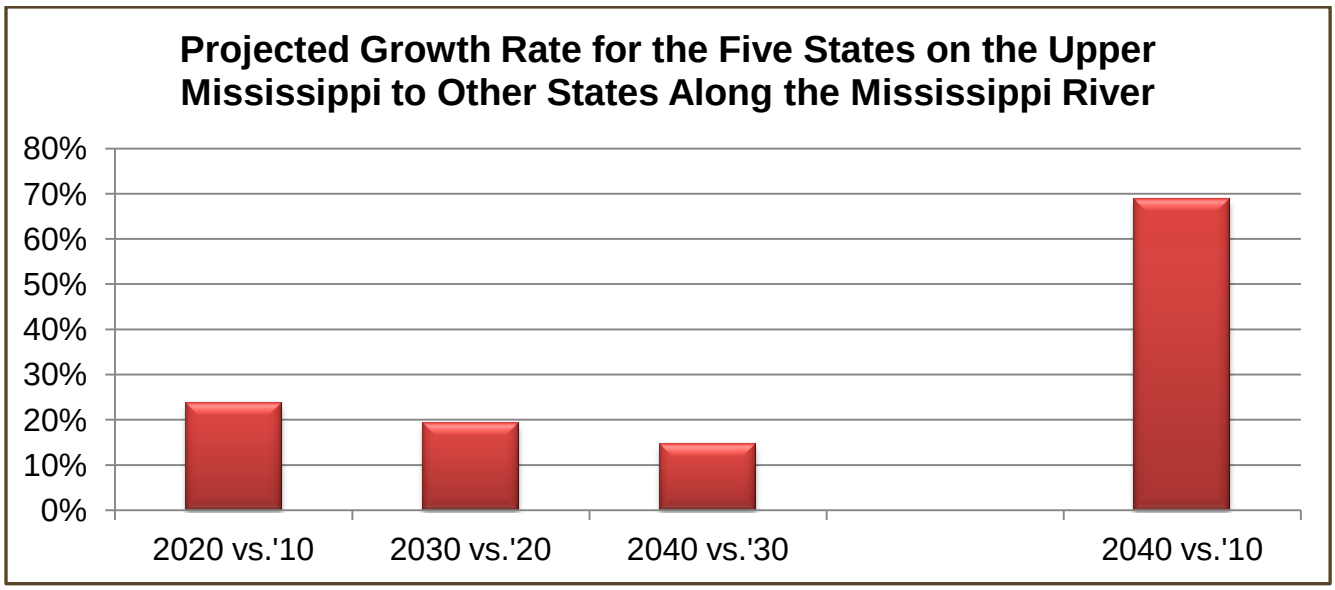


Upper Mississippi River Waterway System Freight Analysis Framework (FAF) - Origin & Destination States (Inter and Intra State Regional Analysis including Domestic and International Cargo)					
Flow of Commodities FROM the following Lower Mississippi River States:					
States FROM:	Louisiana Mississippi	Arkansas Tennessee	Missouri Illinois	Iowa Wisconsin	Minnesota
Flow of Commodities TO the following Ohio River States:					
States TO:	Missouri	Illinois	Iowa	Wisconsin	Minnesota
PLUS: Flow of Commodities FROM the following Ohio River States:					
States FROM:	Missouri	Illinois	Iowa	Wisconsin	Minnesota
PLUS: Flow of Commodities TO the following Lower Mississippi River States:					
States TO:	Louisiana Mississippi	Arkansas Tennessee	Missouri Illinois	Iowa Wisconsin	Minnesota

The FAF data indicates a projected increase in overall waterborne tonnage from 2010 to 2040 for the Upper Mississippi River Region with a substantial increase at the planning horizon of 2010 - 2020.



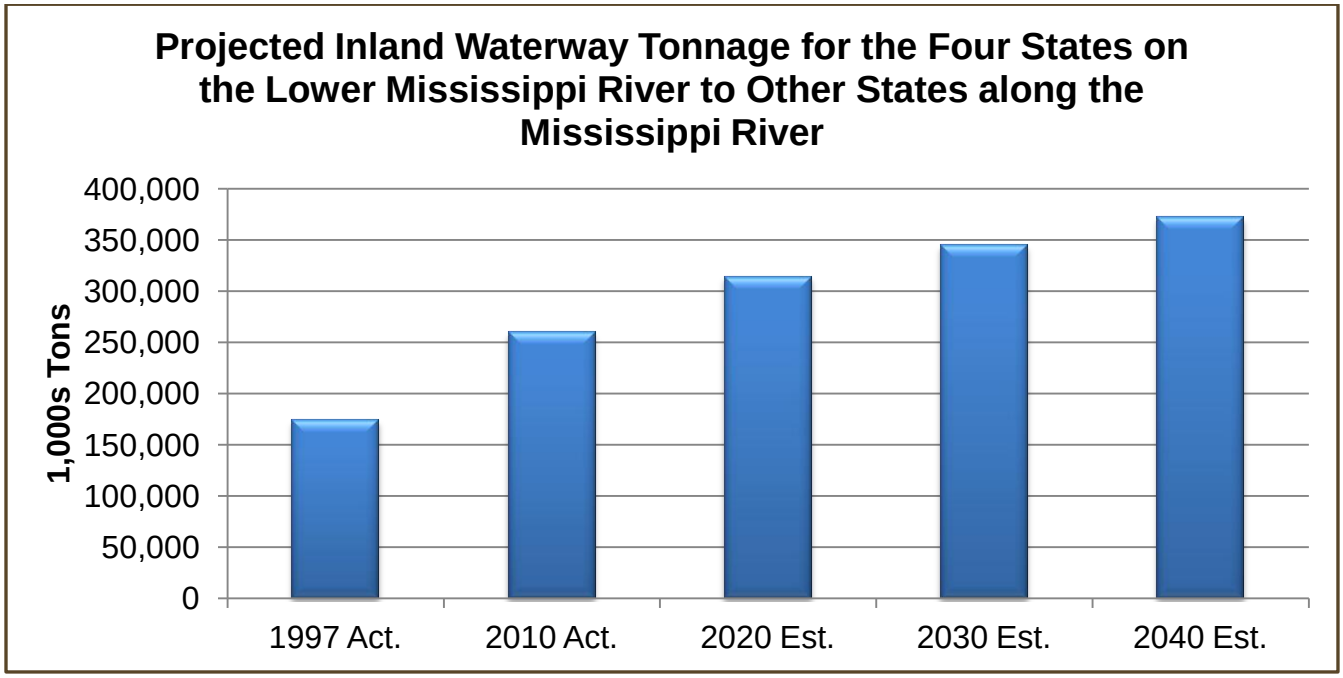
Waterborne cargoes and movement by the inland waterway on the Upper Mississippi River represented by growth rates to the planning horizon of 2040 is illustrated below:



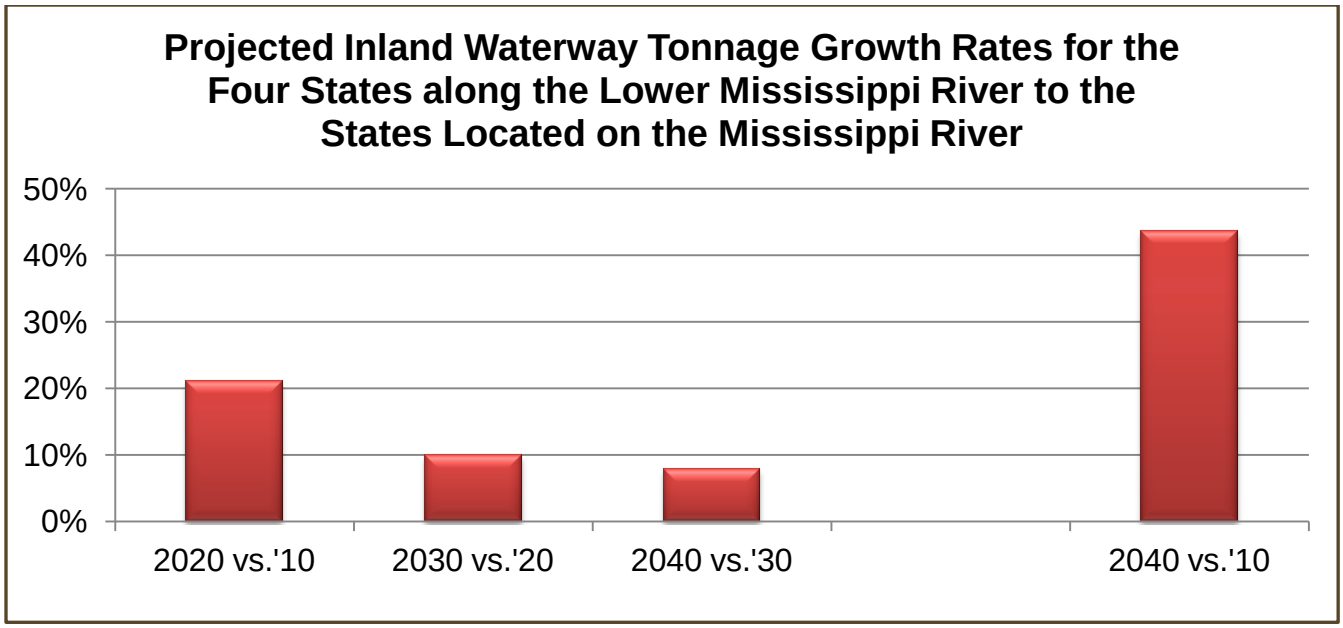
The following data represents the sum of all the commodities moved from and to the indicated States in the inbound and outbound directions for the Lower Mississippi River Region:

Lower Mississippi River Waterway System Freight Analysis Framework (FAF) - Origin & Destination States (Inter and Intra State Regional Analysis including Domestic and International Cargo)					
Flow of Commodities FROM the following Lower Mississippi River States:					
States FROM:	Louisiana Mississippi	Arkansas Tennessee	Missouri Illinois	Iowa Wisconsin	Minnesota
Flow of Commodities TO the following Ohio River States:					
States TO:	Mississippi	Arkansas	Tennessee	Louisiana	--
PLUS: Flow of Commodities FROM the following Ohio River States:					
States FROM:	Mississippi	Arkansas	Tennessee	Louisiana	--
PLUS: Flow of Commodities TO the following Lower Mississippi River States:					
States TO:	Louisiana Mississippi	Arkansas Tennessee	Missouri Illinois	Iowa Wisconsin	Minnesota

The FAF data indicates a projected increase in overall waterborne tonnage from 2010 to 2040 for the Lower Mississippi River Region with a substantial increase at the planning horizon of 2010 - 2020.



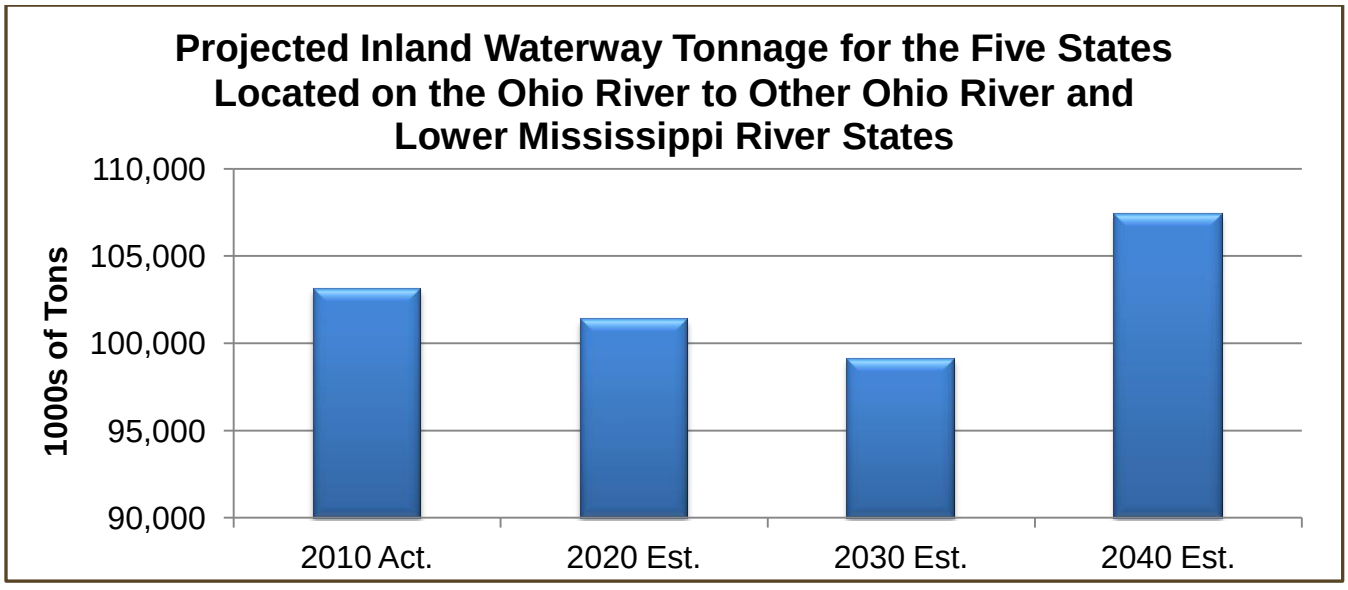
Waterborne cargoes and movement by inland waterway on the Lower Mississippi River represented by growth rates to the planning horizon of 2040 is illustrated below:



Please note the gradual slowing of growth rates over the planning horizon.

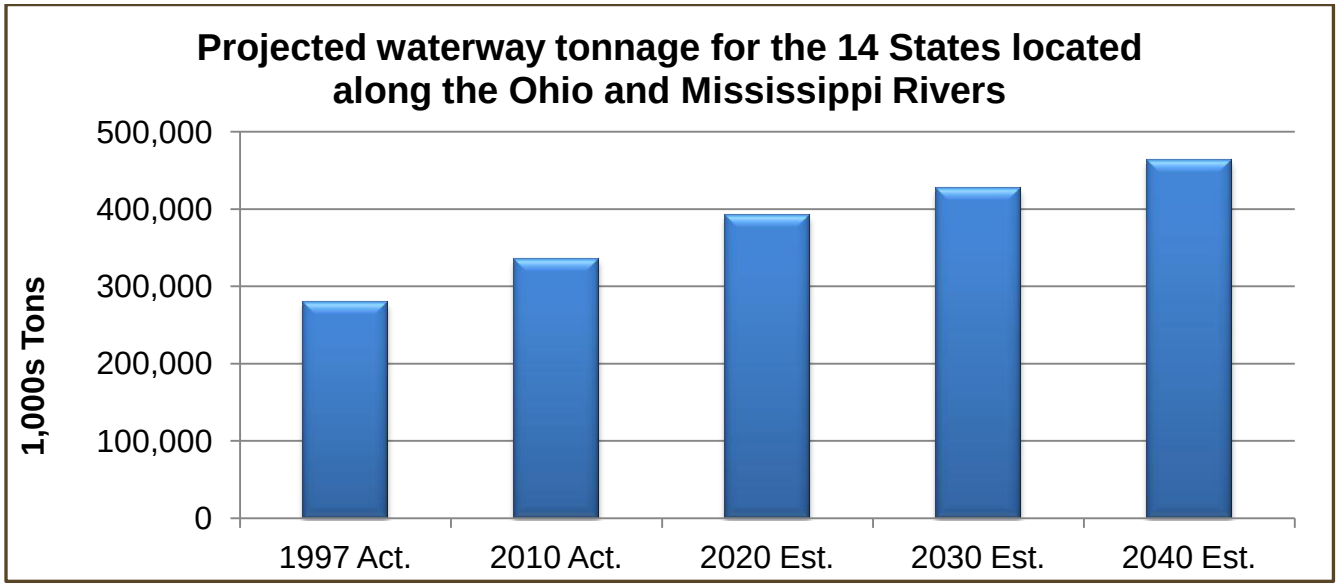
Ohio River Waterway System Freight Analysis Framework (FAF) - Origin & Destination States (Inter and Intra State Regional Analysis including Domestic and International Cargo)					
Flow of Commodities FROM the following Lower Mississippi River States:					
States FROM:	Louisiana Mississippi	Arkansas Tennessee	Kentucky Indiana	Ohio West Virginia	Pennsylvania
Flow of Commodities TO the following Ohio River States:					
States TO:	Kentucky	Indiana	Ohio	West Virginia	Pennsylvania
PLUS: Flow of Commodities FROM the following Ohio River States:					
States FROM:	Kentucky	Indiana	Ohio	West Virginia	Pennsylvania
PLUS: Flow of Commodities TO the following Lower Mississippi River States:					
States TO:	Louisiana Mississippi	Arkansas Tennessee	Kentucky Indiana	Ohio West Virginia	Pennsylvania

The FAF data indicates a projected reduction in overall waterborne tonnage from 2010 to 2020 and 2030 with a substantial increase at the planning horizon of 2040.

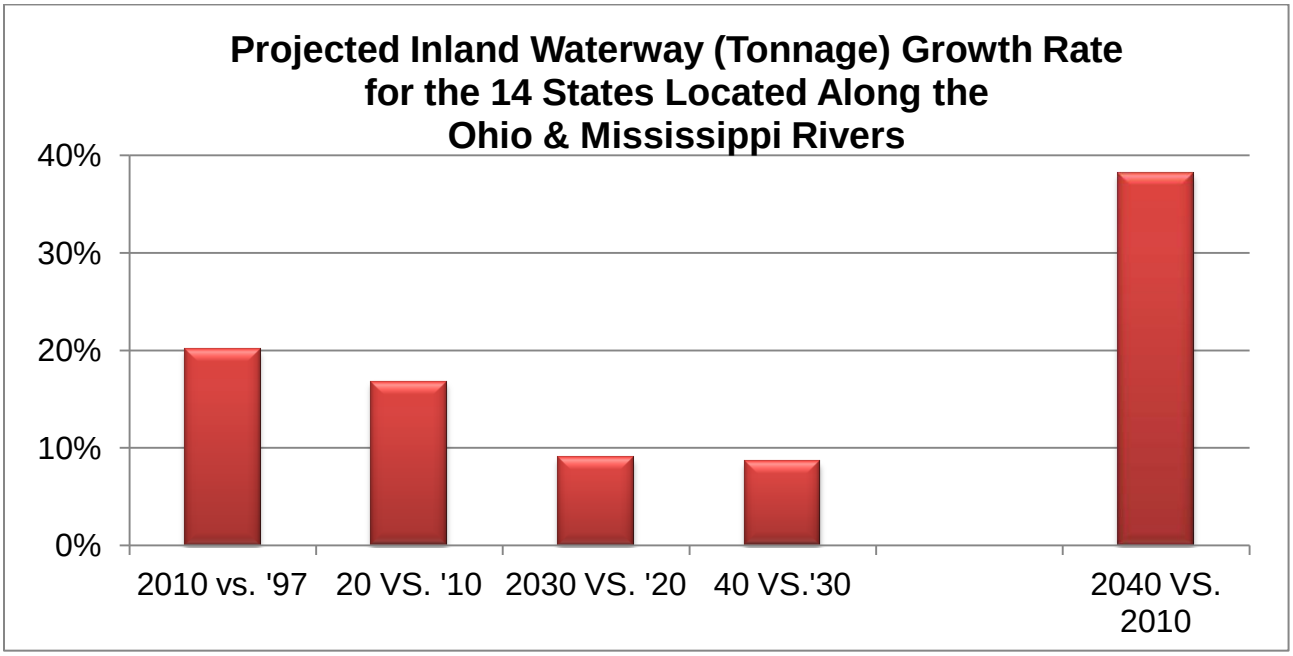


The following data represents the sum of all the commodities moved from and to the indicated States in the inbound and outbound directions for the Mississippi River Region and Ohio River Basin Inland Waterway Region (Ohio River+ Lower and Higher Mississippi River Reaches)

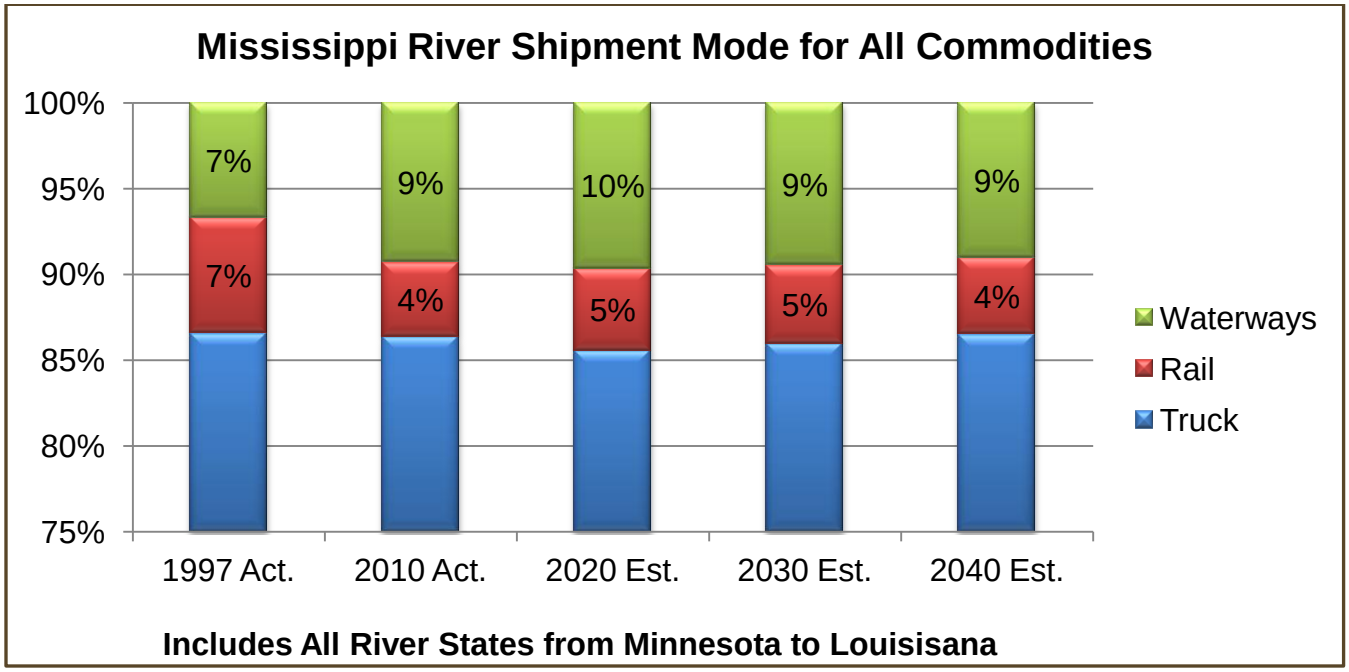
The FAF data indicates an overall projected increase in waterborne tonnage from 2010 to 2040 for the combined Mississippi River (Lower and Upper River Reaches) and Ohio River Systems with a substantial increase at the planning horizons between 2020 and 2030.

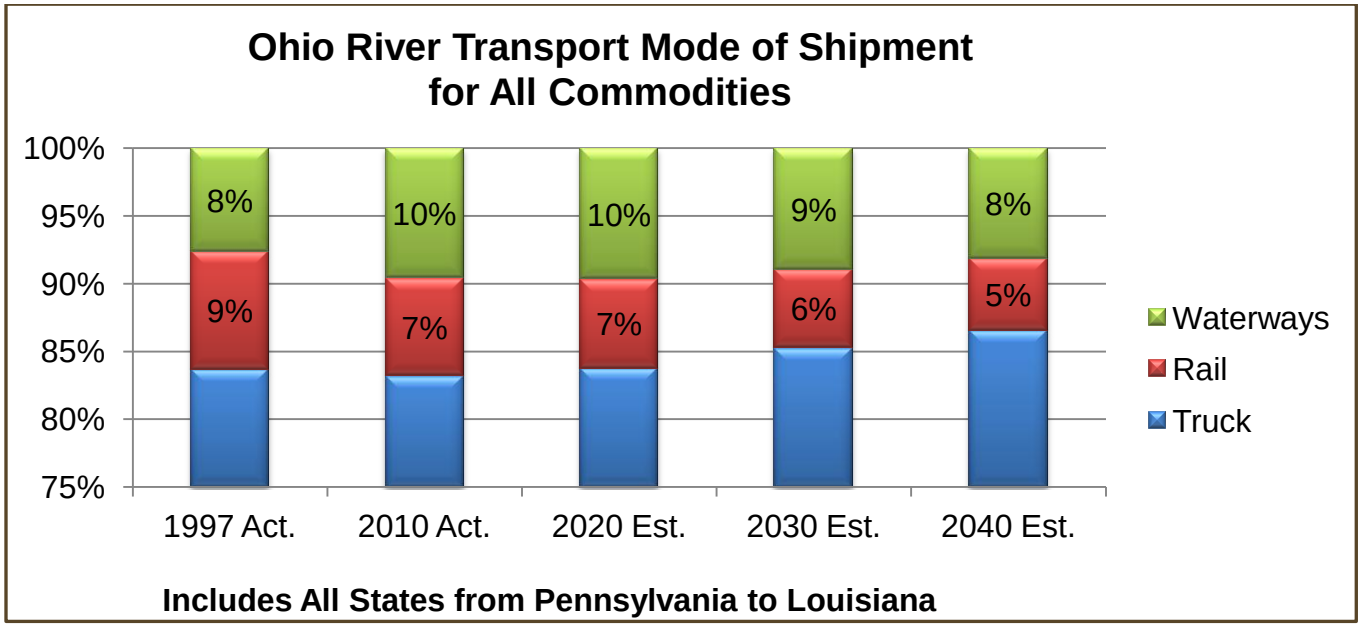


Waterborne cargoes and movement by inland waterway for the combined Mississippi River and Ohio River Systems represented by growth rates to the planning horizon of 2040 is illustrated below:

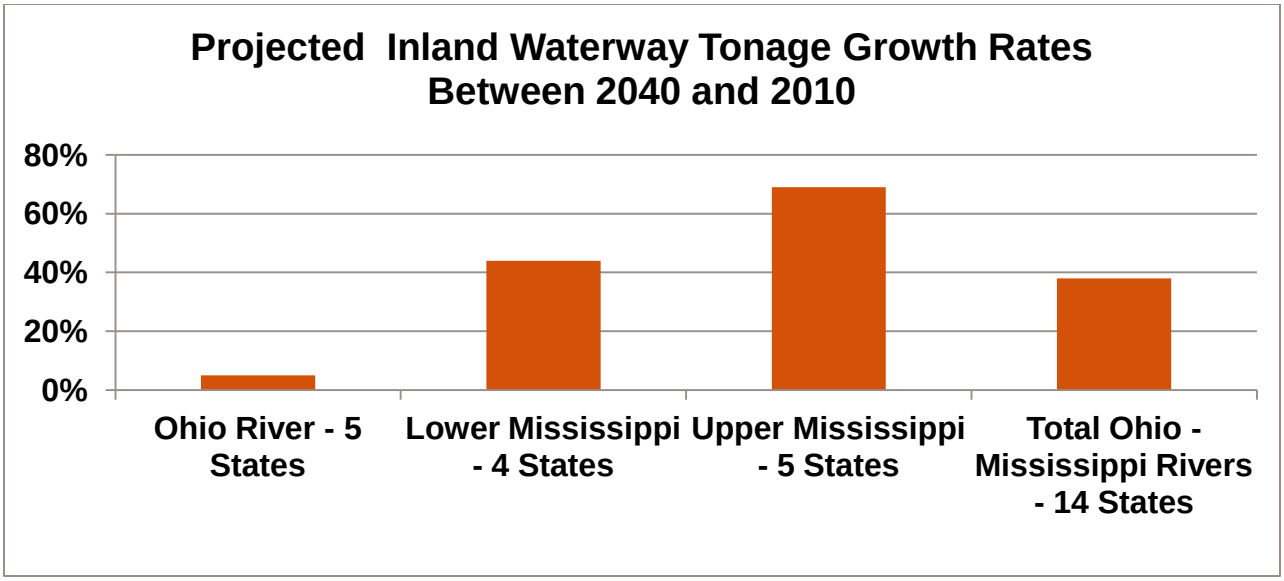


The waterborne cargoes and movement by inland waterway represent approximately 7 to 10 Percent of all Mississippi River and Ohio River Commodities shipments.





The forecasted growth for the upper Mississippi River is greater than either the lower Mississippi area, or the Ohio River area. The reference map to the right provides the vicinity relationships of the five Ohio River Inland River states analyzed.



This forecasted growth can have a positive impact on the allocation of Federal transportation funds.

The State of Iowa

Within the nine States, Iowa's mix of the total tonnage is forecasted to show little change, except with rail:

		2010	2040
Water Mode	**Iowa's mix not forecasted to change …today, Illinois and Missouri account for over 60% of the volume**	**5%**	**5%**
Rail Mode	**Iowa's tonnage forecasted to continue to grow …today Illinois is major player**	**4%**	**13%**
Trucking	**Iowa is forecasted to show little growth … major shipper is Mississippi**	**3%**	**2%**

Iowa is forecasted to slightly grow its share of the total tonnage moved along the Mississippi River

	1997	2010	2040
Iowa as % of the Total Tonnage*	**2%**	**5%**	**6%**

* Of the 8 States along the Mississippi river

Overall the largest mode of transport for Iowa is Truck, and it is forecasted to almost double by 2040

State of Iowa Forecasted Tonnage Shipments Within, From and to All US States Via a Domestic Mode				
		2011 Actual	2040 Forecast	Growth Rate over 30 years
Water	Domestic	6,756	9,006	
	Imports	0	0	
	Exports	583	1,036	
	Total	7,339	10,042	37%
Rail	Domestic	63,815	84,242	
	Imports	2,632	5,060	
	Exports	4,946	9,377	
	Total	71,393	98,679	38%
Truck	Domestic	355,413	673,425	
	Imports	3,370	9,154	
	Exports	1,142	3,166	
	Total	359,925	685,745	91%

Iowa's prime trading partner for water transport is Louisiana

Total Tonnage Flow of Commodities by State from/to Iowa			
		% of Total Tonnage in 2011	Forecasted Growth 2040 vs. 2011
Iowa to	Louisiana	74%	-2%
	Alabama	15%	19%
	Illinois	11%	111%
	Georgia	<1%	75%
	South Carolina	<1%	90%
Louisiana to	Iowa	38%	580%
Illinois to		40%	20%
Missouri to		10%	81%
Alaska to		11%	71%

The mix of commodities that flow from and two Iowa is forecasted to shift:

Commodities That Flow From and To Iowa Via Water			
		% of Total Tonnage in 2011	Forecasted Growth 2040 vs. 2011
Commodities flowing From Iowa			
Cereal grains		60%	-15%
Other agricultural prods.		38%	**49%**
Nonmetal min. prods.		2%	144%
Motorized vehicles		< 1%	76%
Chemical prods.		< 1%	553%
Commodities Flowing to Iowa			
Commodity	State shipped from		
Coal	Illinois	40%	-20%
Fertilizers	Louisiana	16%	**1387%**
Basic chemicals	Louisiana	16%	-5%
Coal-n.e.c.	Alaska	11%	-71%
Nonmetal min. prods.	Missouri	10%	81%
Nonmetallic minerals	Louisiana	7%	85%

The State of Iowa has an opportunity to grow its international business – especially from a transportation basis.

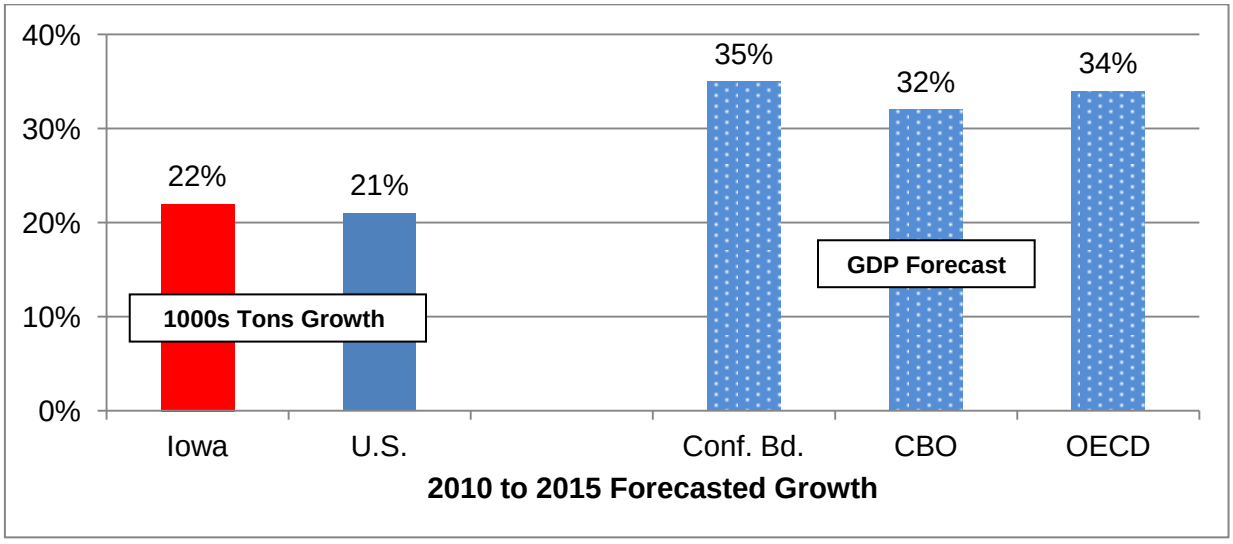
Today the transportation of exports from Iowa directly to a U.S. export port is minimal. The same is true for Imports: a minimal amount of imports are received at a U.S. port and shipped directly to the State of Iowa. This condition offers a unique opportunity for Iowa to focus on the opportunity to grow its international cargo basis.

The expansion of the Panama Canal will create additional growth opportunities that can be capitalized on by the State.

State of Iowa Percentage of U.S. Tonnage			
		2011 Actual	2040 Forecast
Water	Domestic	1%	1%
	Imports	0%	0%
	Exports	1%	0%
Rail	Domestic	2%	2%
	Imports	1%	1%
	Exports	1%	1%
Truck	Domestic	3%	3%
	Imports	0%	1%
	Exports	0%	0%

Based on the Unites States Department of Transportation, the water transportation tonnage for Iowa is forecasted to grow in the next 40 years but the growth is not forecasted to grow the State's share of volume. As shown on the following chart, the growth lags the forecasted GDP growth.

The opportunity exists for Iowa to place additional emphasis on the flow of commodities into, and out of the State via water borne transport.



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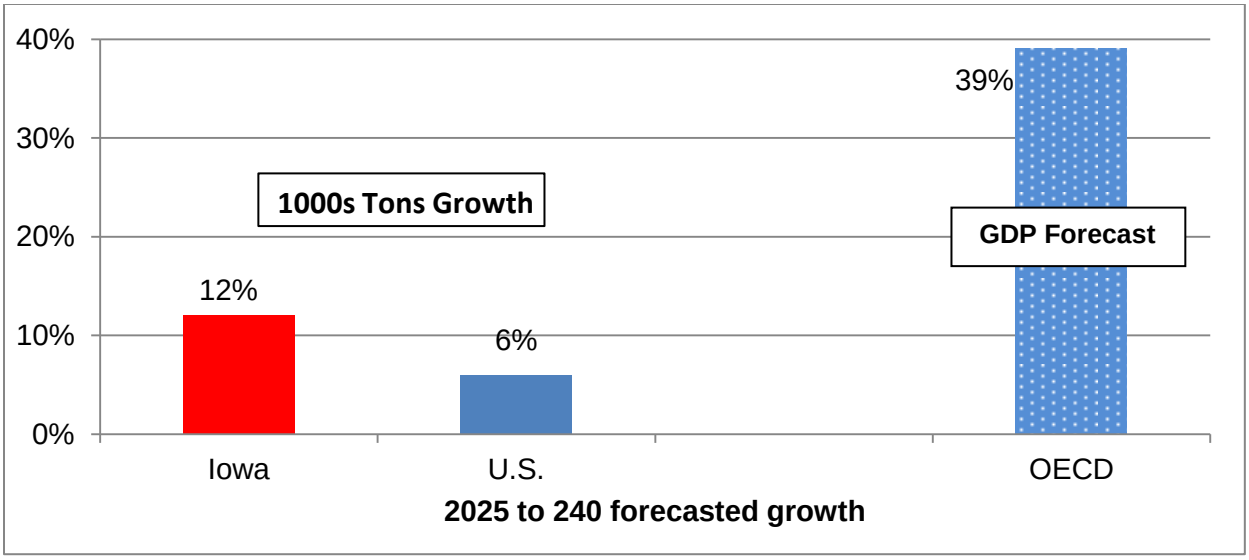
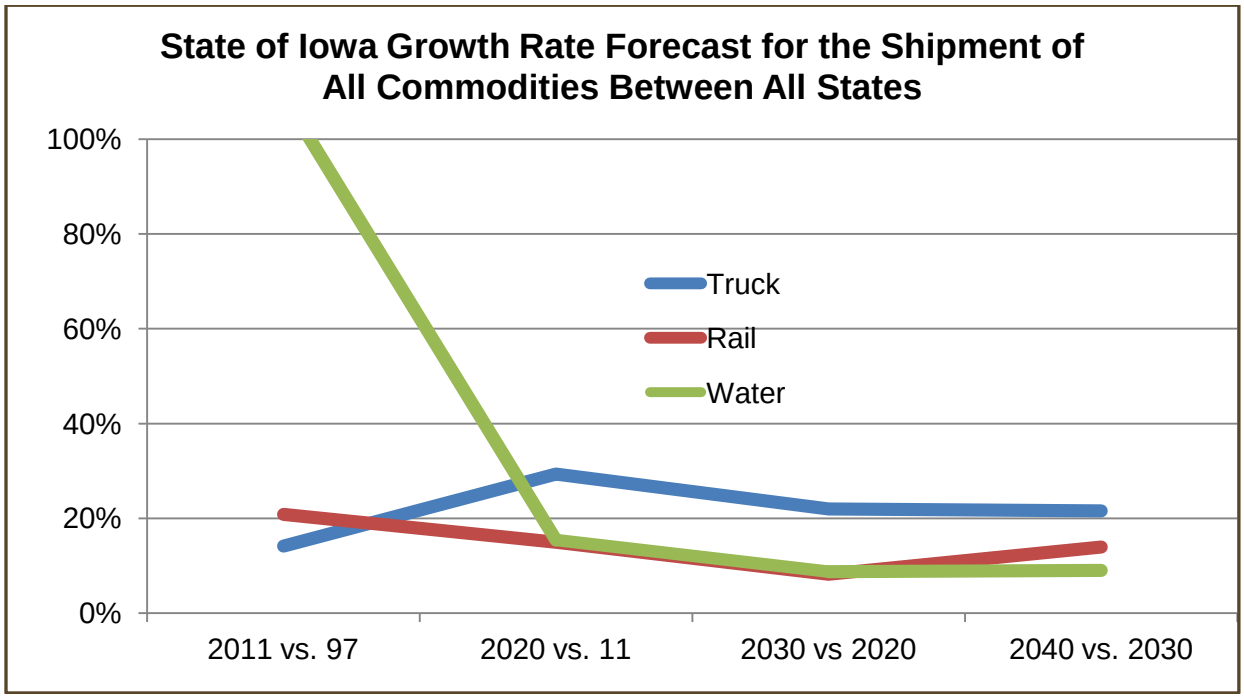


GDP Sources: Conference Board GDP Forecast – Base Scenario Forecast – 11/2012; CBO GDP forecast projections 8/2012; OECD (Organization for economic Cooperation and Development) 2012
***Note:** annual forecasted growth rates were converted to forecast periods. Iowa and U.S. forecasted based on forecast data from U.S. Dept. of Transportation, frame work data.*

Looking ahead, the overall growth rate for all three modes of transportation is very similar. Iowa definitely has the potential to grow the volume of traffic on the Mississippi river.

However, this growth is dependent on a fully functioning waterway system, and the focus of the State in increasing both imports and exports volume, as well as interstate flows along the River.



Appendix

U.S. Waterways - Some comments about the waterways today

Some recent (past two years) comments about both the importance of the Nation's Waterways as well as current issues created by the current condition of the Waterways follows:

"We're going to have a catastrophic failure (on the waterway system) somewhere in this country and then everybody is going to be up in arms"

> Peter Stephaich, chairman of Campbell Transportation, a Houston, Pa., company that operates a fleet of 500 barges and moves about 20 million tons of commodities annually

"It is a function of a kind of unfortunate mentality in this country where, over time, we have become a spending nation and not an investing nation,"

"We just need to get back to this mentality of being an investing nation. Great nations invest in themselves," he said.

> Michael Steenhoek of the Soy Transportation Coalition, an industry group pushing for waterways improvements

Every year, approximately 600 million tons of waterborne commerce transit the inland waterways, a volume equal to about 16% of all intercity freight and valued at nearly $70 billion. If that amount of cargo did not move by water, it would require an additional 58 million truck trips to transport all of that traffic on the Nation's already-congested highways. Needless to say, the negative economic and environmental impacts from such a result would be severe. …. If this situation persists, it threatens to erode the very fabric of our inland waterways system

> Mike Toohey, --- President and CEO of Waterways Council, Inc. (9/21/2011)

"The bad news is we expect congestion to skyrocket."

That means more shipping expense for business that could hinder the recovery and make U.S. companies less competitive worldwide. Ultimately it could increase cost of products and services for the American consumer, too.

> Dan Murray, vice president of the American Transportation Research Institute, told the (USA Today) newspaper

"I call this a stealth attack on our economy," "It's not like an immediate crisis. It's something that's sneaking up on us." … Freight bottlenecks and other congestion cost about $200 billion a year, or 1.6% of U.S. economic output, according to a report last year by Building America's Future Educational Fund, a bipartisan coalition of elected officials. The chamber of commerce estimates such costs are as high as $1 trillion annually, or 7% of the economy.

Janet Kavinoky, executive director of transportation and infrastructure for the U.S. Chamber of Commerce

… are gravely concerned with the condition of our inland waterway system are concluding that there is a need for fresh thinking to be incorporated into this important issue.

The Soy Transportation Coalition

- Unlike Olmsted, the canal project -- run by the Panamanian government -- is on budget and is expected to be completed on time in 2014. -"The country that built the Panama Canal has a lot to learn from the country that is operating the Panama Canal,"

- "How can we expect grain handlers and other freight interests to invest millions of dollars on new or upgraded facilities, when we cannot provide certainty that their shipments will be delivered to customers in an efficient manner?"

- as Brazil continues to invest in its transportation infrastructure while the United States remains "anemic" in developing its system, our competitive advantage over Brazil continues to erode.

Mr. Steenhoek, of the Soy Transportation Coalition,

- issued a dire warning to lawmakers about the possible consequences of delaying crucial infrastructure work on the Mississippi, Ohio and Illinois rivers

- "Catastrophic failure of a lock or dam at a high-volume point along one of the major waterways would have significant economic consequences, because other transportation modes generally lack the capacity to either quickly or fully accommodate the large volume of cargo moved on the inland waterways

Major Gen. John Peabody of the U.S. Army Corps of Engineers' Mississippi River Valley Division

- said that efforts by the administration and Congress to address the growing investment deficit in waterways infrastructure have largely been ineffectual because of political considerations that give precedence to deficit reduction and tax cuts over the badly needed restoration of critical infrastructure.

- "We can sum up the present situation concisely," Rossberg said before the subcommittee chair, Bob Gibbs (R-Ohio), and the ranking minority member, Tim Bishop "These policy failures at the White House and in Congress threaten the nation's economic competitiveness in a global economy

James A. Rossberg, P.E., M.ASCE, the Society's managing director of engineering programs (D–New York).

Spending is inevitable --- doing it now is better to prevent much greater spending and economic decline in the future

Pittsburgh Post-Gazette, (3/25/2012)

- deeply trouble by the lack of funding for these projects, and specifically on the lack of progress on finding a solution to the funding shortfalls in the Inland Waterways Trust Fund.

- We can no longer afford to sit on our hands and wait for these vital lanes of commerce to fail. We need to invest in America and keep our federal waterways open for business.

- The Inland Waterways System is far too important to allow it to continue to languish with inadequate funding and crumbling infrastructure.
  Mark Critz, U.S. Congressman, June 6 2012,

there is overwhelming evidence that even when railroad carriers retain traffic that could move by barge, they do so only by competing with the available barge rate(s). Thus, the railroad prices observed as result of this navigation influence are typically referred to as "water-compelled" rail rates. Estimates across various regions where navigation is available suggest that these competitively enforced transportation rates yield shipper savings of several billion dollars annually

Center for Transportation Research, University of Tennessee, Knoxville (9//2011)

Deteriorating condition of the U.S. lock and dam system puts the competiveness of U.S. soybean farmers at risk. The Study found that American farmers and consumers "...will suffer severe economic distress" if catastrophic U.S. lock or dam failures take place. The U.S. inland waterways serve as an important and economical route to transport U.S. soy to global markets. Fifty-nine percent of total 2011 soybean exports passed through Mississippi River ports, such as the port of New Orleans. Of those soybeans, 89 percent arrives at those ports via the locks of the U.S. inland waterways. A failure at any of the locks along this system could cost U.S. soybean farmers up to $45 million in lost revenue

United soybean Board funded study, “America's Locks & Dams: A Ticking Time Bomb for Agriculture,"

the Olmsted project, together with numerous other similar projects throughout the inland system, underscore the notion that the business model for financing navigation projects in this country is seriously broken

Toohey --- President and CEO of Waterways Council, Inc. (9/21/2011)

Inland waterways are a strategic asset to the nation, enabling the U.S. to significantly increase economic output in both domestic and international markets, and project military power more rapidly and effectively into the 21st Century

Colonel Donald E. Jackson Jr. March 14 2007

Navigable inland waterways are a truly unique national resource belonging to the people of the United States. By tradition, law, and judicial ruling, this resource can only be developed and controlled by the federal government, ideally to promote the general welfare of the people. …,

the public receives $8 in benefits for every $1 the federal government spends on the waterways programs.

Jake Haulk, 98 – Ph.D. in Economics, Research Director of the Allegheny Institute for Public Policy and former senior business economist with the Federal Reserve

Privatizing these facilities and services is an even less attractive option. A company that controlled commercial navigation would find itself making decisions that affected not only navigation, but also municipal water supply, recreation, irrigation, flood damage reduction, and environmental quality. Privatization would not work

Transportation Research Board (2001)

Without strong leadership from the Federal government, however, the nation's rivers and coastal waterways will continue to be underutilized for domestic container and trailer freight transportation. It is difficult for private operators to support the scale of investment needed to initiate large scale operations

United States Department of Transportation, April 2011

"Things could snap at any moment—that's what keeps you up at night," The failure of many locks at once would create an "economic disaster," causing coal, grain fertilizer, and other goods shipped by water to spike in price,

Col. William Graham, commander of Pittsburgh district for the Corps. (1/2011)

general demand for rail transportation (all commodities) is projected to grow at a fast rate through 2035. The resulting level of congestion would affect nearly every region of the country and would likely cause severe price adjustments and congestion delays without significant investment in railroad infrastructure. A potential diversion of barge traffic to rail would further add to the forecasted demand resulting in devastating effects on rail infrastructure, our economy, and our standard of living.

C. James Kruse et al 2011, Director at Center for Ports

today's freight railroads are neither prepared for, nor probably desirous of the traffic moved on the nation's inland waterway system

A wholesale diversion of waterway traffic to the nation's rail network would require roughly 100 thousand additional railroad freight cars and 2,500 additional locomotives

Bray, Center for Transportation Research, University of Tennessee, (9/21/20110

Both see job creation as top priority. Sen. Boxer cited estimates by the U.S. Army Corps of Engineers showing that “every $1 billion in federal investment in water resources projects creates about 26,000 jobs.”

She said that projects, policies and programs authorized by WRDA “are essential components of creating jobs and keeping our economy growing.”

Chairman Sen. Barbara Boxer (D-Calif.) and Sen. James M. Inhofe (R-Okla.)

"If you are building a house, and you buy a door one year, and next year you buy a garage door, and the next a couple of windows—if you had bought the whole house together it would have been much cheaper than buying each little piece at a time

Jeanine Hoey, a Chief of the Corps' Engineering Division.

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End of Document

Appendix C: Commercial Framework Analysis

U.S. Inland Waterway Modernization: A Reconnaissance Study

Prepared for the Iowa Department of Transportation

HDR Engineering, Inc.

April 2013

Commercial Framework Analysis

Lock and Dam Feasibility Study for Iowa Department of Transportation

Dennis Bruce, Principal Economist

HDR Engineering, Inc.

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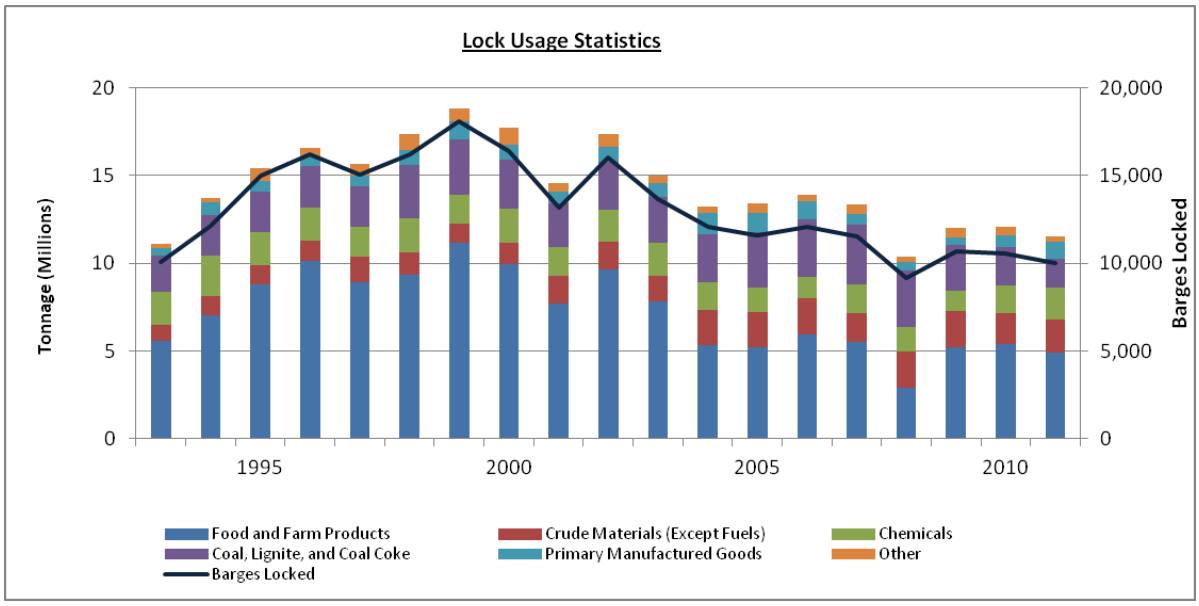
Lock & Dam 9 (Lynxville, Wisconsin / Harpers Ferry, Iowa)

Lock and Dam 9 is located at Mississippi River Mile 647.9 near Lynxville, Wisconsin, 205.1 miles below Minneapolis.

The main lock is located along the left descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 620.0, a tailwater elevation of 611.0, and a vertical lift of 9.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and short concrete riverwall section.

The movable dam consists of concrete structure 811 feet long with five roller gates (20 feet high by 80 feet long), six non-submersible Tainter gates (15 feet high by 35 feet long), and two submersible Tainter gates (15 feet high by 35 feet long), and is located adjacent to the auxiliary lock. Completing the dam system is an earthen embankment approximately 7,200 feet long, located between the movable dam and high ground on the Iowa side of the river, with a submersible sheetpile cell spillway 1,350 feet long.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

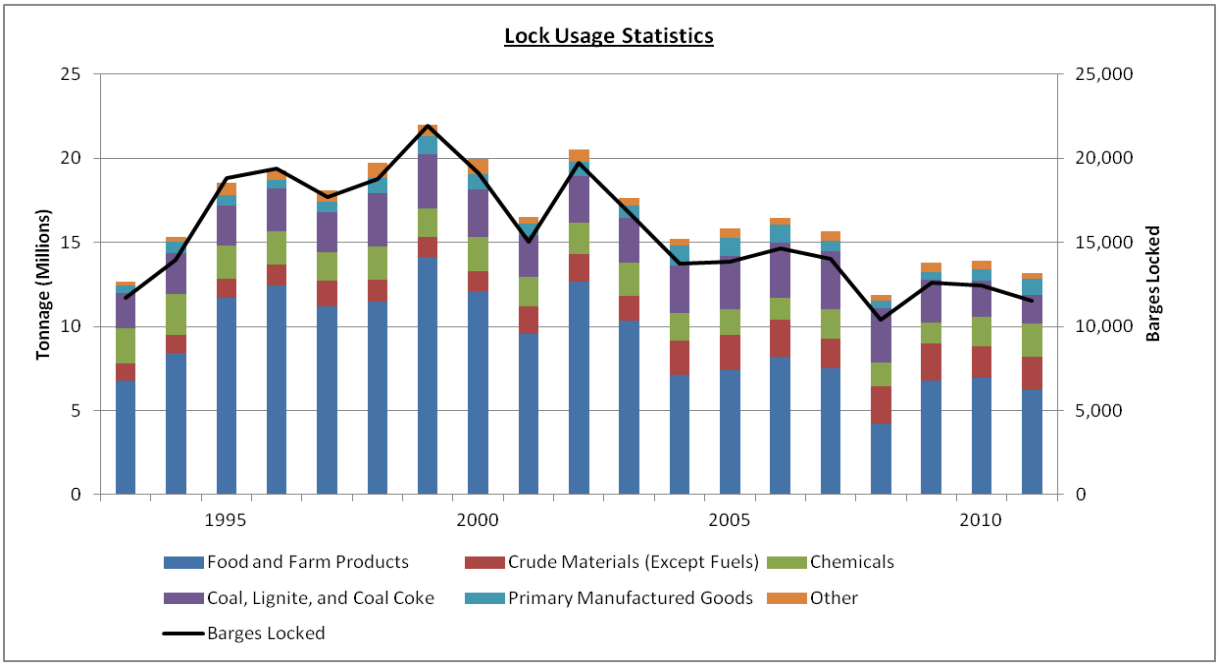
Lock & Dam 10 (Guttenburg, Iowa)

Lock and Dam 10 is located at Mississippi River Mile 615.0 in Guttenberg, Iowa.

The main lock is located along the right descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 611.0, a tailwater elevation of 603.0, and a vertical lift of 8.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and a short concrete riverwall section.

The movable dam consists of a concrete dam 763 feet long with four roller gates (20 feet high by 80 feet long), six non-submersible Tainter gates (20 feet high by 40 feet long), and two submersible Tainter gates (20 feet high by 40 feet long), and is located adjacent to the auxiliary lock. Completing the dam system is an earthen embankment approximately 4,600 feet long, located between the movable dam and high ground on the Wisconsin side of the river, with a concrete overflow spillway 1,200 feet long.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



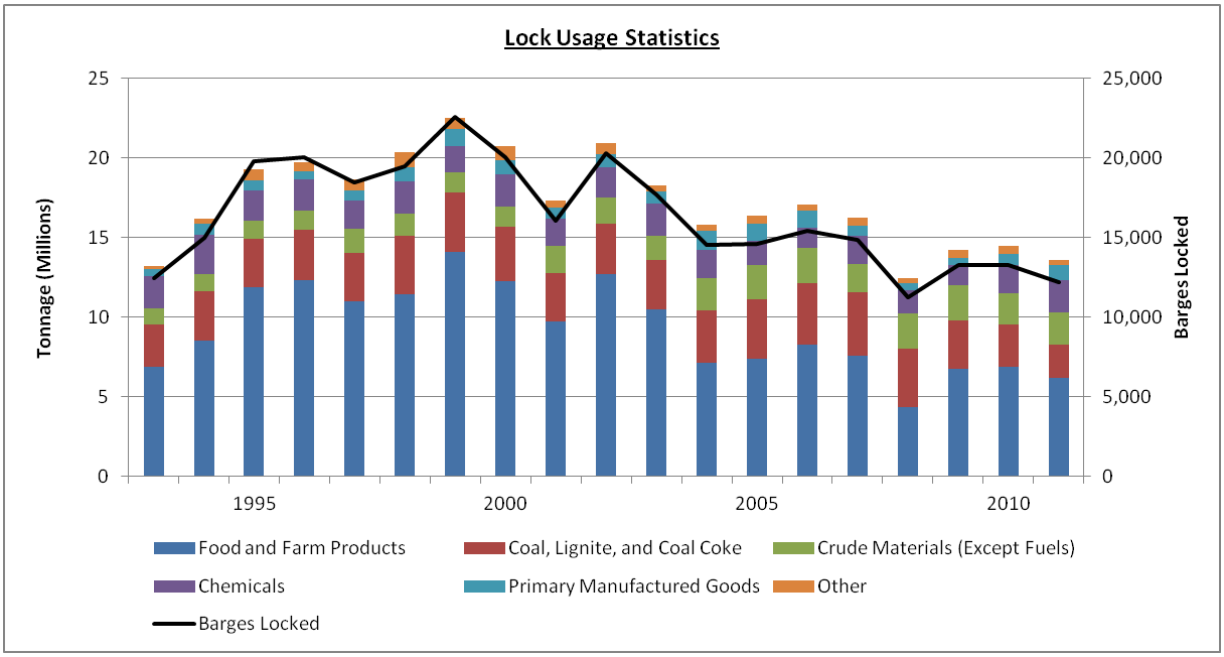
Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

Lock & Dam 11 (Dubuque, Iowa)

Lock and Dam 11 borders on the northern edge of Dubuque, Iowa, and is 583 miles above the confluence of the Mississippi and Ohio rivers. A complex of islands and sloughs extends three-quarters of the way across the river from the Wisconsin shore. The Upper Mississippi River Wildlife and Fish Refuge occupy the land adjacent to the Wisconsin shore, both upstream and downstream from the dam. The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is 11 feet with an average lift of 9.4 feet. It takes approximately seven minutes to fill or empty the lock chamber.

The movable dam has thirteen submersible Tainter gates (20 feet high by 60 feet long) and three submersible roller gates (20 feet high by 100 feet long). The roller gates submerge 8 feet. The dam system also includes a 3,540 foot long, curved, non-overflow, earth and sand-filled dike. It takes nine hours for water to travel from Lock and Dam 10, in Guttenberg, Iowa, to Lock and Dam 11.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



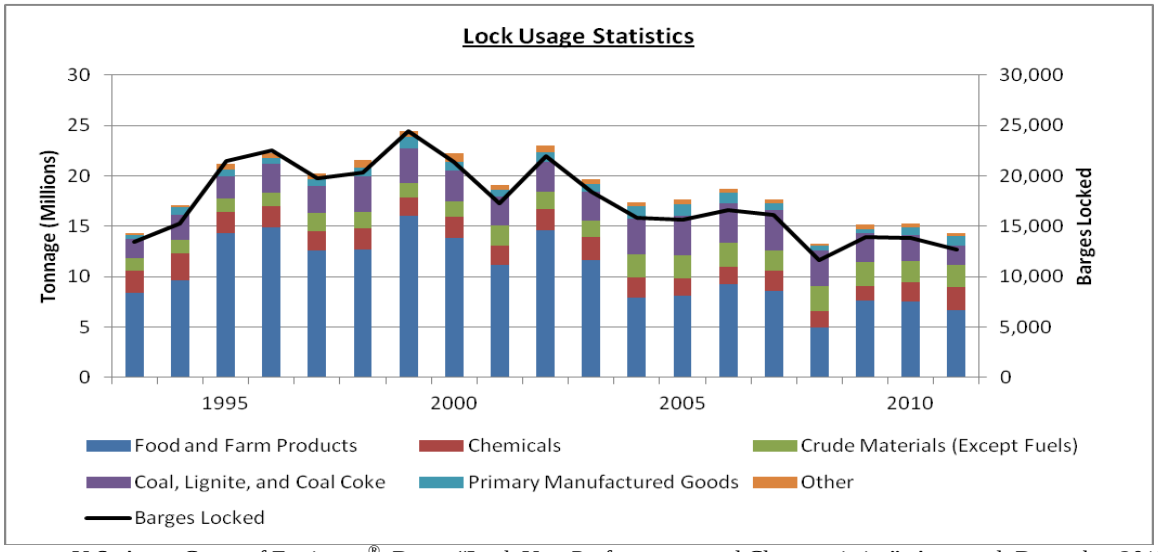
Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

Lock & Dam 12 (Bellevue, Iowa)

Lock and Dam 12 is 556.7 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the river at a point where the bluffs on the Iowa side are very close to the river; a complex of islands and sloughs extends nearly three-quarters of the way across the river from the Illinois side. Bellevue State Park occupies the high ground on the Iowa side, while the urbanized area of Bellevue extends to the government-owned property on the flat land below the bluff. The Lost Mound Unit of the Upper Mississippi River National Wildlife and Fish Refuge occupies the islands, slough, and small flat bottom areas on the Illinois side.

The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is 9 feet with an average lift of 6 feet. It takes approximately 10 minutes to fill or empty the lock chamber. The movable dam consists of seven submersible Tainter gates (20 feet high by 64 feet long) and three submersible roller gates (20 feet high by 100 feet long). The dam system also includes two, non-overflow, earth and sand-filled dikes, two transitional dikes, and a concrete-covered, ogee spillway, submersible earth and sand-filled dike. The foundation is set in sand, gravel, and silt. It takes eight hours for water to travel from Lock and Dam 11, in Dubuque, Iowa, to Lock and Dam 12.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012

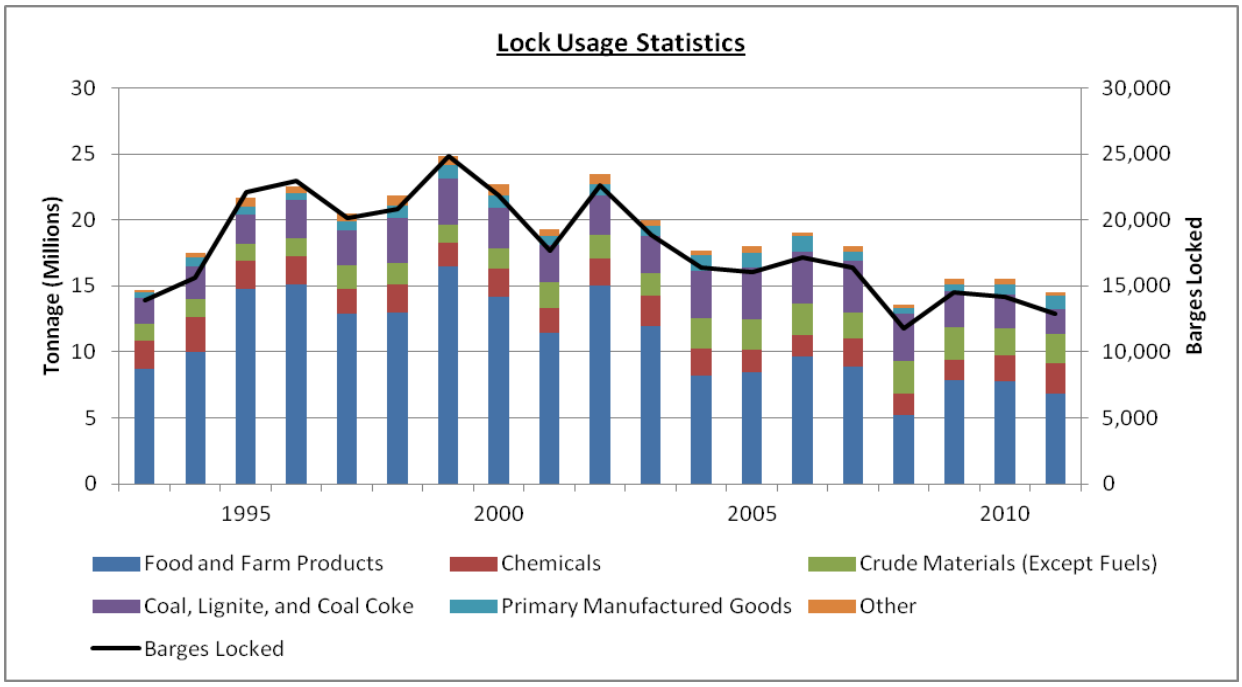
Lock & Dam 13 (Fulton, Illinois / Clinton, Iowa)

Lock and Dam 13 is 522.5 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the river at a point where the bluffs on the Iowa side are very close to the river; islands and chutes dot the river beneath the bluffs. Eagle Point Nature Center occupies the high bluff immediately above the lock and dam. A dense group of sloughs and islands extend out from the Illinois shore.

The lock dimensions are 110 by 600 feet with additional provisions for an auxiliary lock. The maximum lift is 11 feet with an average lift of 8.6 feet. It takes approximately 10 minutes to fill or empty the lock chamber.

The movable dam consists of ten submersible Tainter gates, 20 feet high by 64 feet long; and three submersible roller gates, 20 feet high by 100 feet long. The Tainter gates are elliptical. The dam system also includes three non-overflow earth and sand-filled dikes, two transitional dikes, and a submersible earth and sand-filled dike. It takes ten hours for water to travel from Lock and Dam 12, in Bellevue, Iowa, to Lock and Dam 13.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

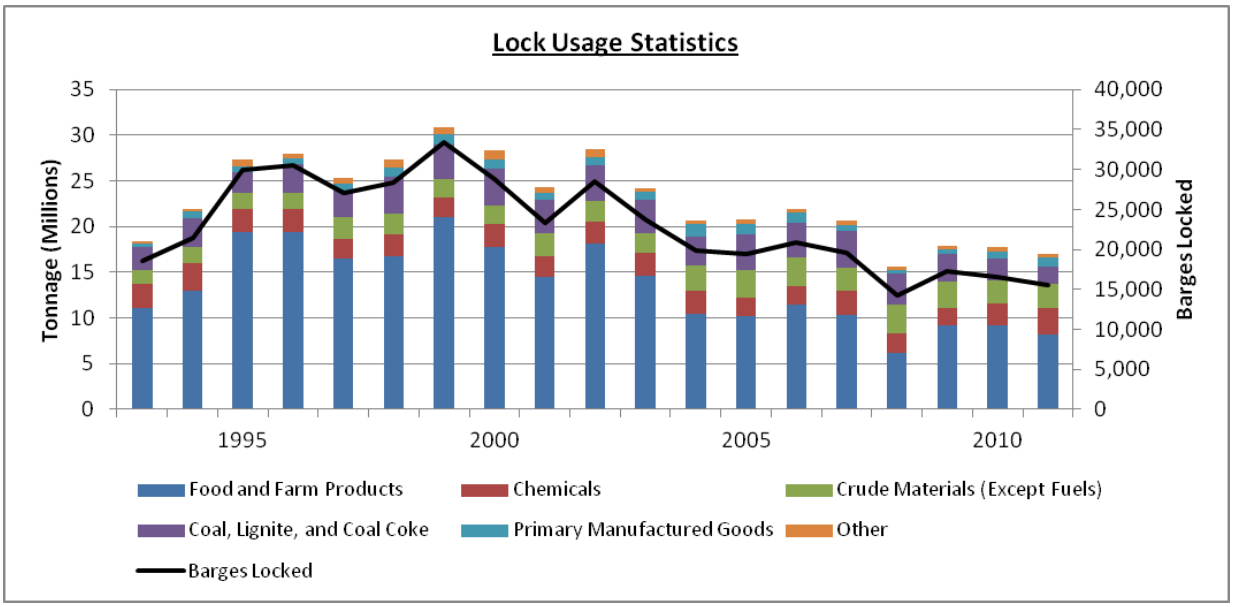
Locks & Dam 14 (Pleasant Valley, Iowa / LeClaire, Iowa)

Lock and Dam 14 is four miles below LeClaire, Iowa, and 493.3 miles above the confluence of the Mississippi and Ohio rivers. The site is also 3.6 miles below the head of the notorious, rock-bedded, Rock Island Rapids. The LeClaire Lock and the remains of the LeClaire Lateral Canal, built in 1921-1924 to bypass this treacherous stretch of river, are located along the Iowa shore.

The main lock's dimensions are 110 by 600 feet. The dimensions of the LeClaire Lock, which is used as an auxiliary lock, are 80 by 320 feet, with a low-water depth of 8 feet at the upper sill and 7 feet at the lower sill. The main lock's maximum lift is 11 feet with an average lift of 9.8 feet. It takes approximately eight minutes to fill or empty the main lock.

The movable dam has thirteen non-submersible Tainter gates (20 feet high by 60 feet long) and four submersible roller gates (20 feet high by 100 feet long). The dam system also includes an earth and sand-filled dike. It takes nine hours for water to travel from Lock and Dam 13, in Fulton, Iowa, to Lock and Dam 14.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



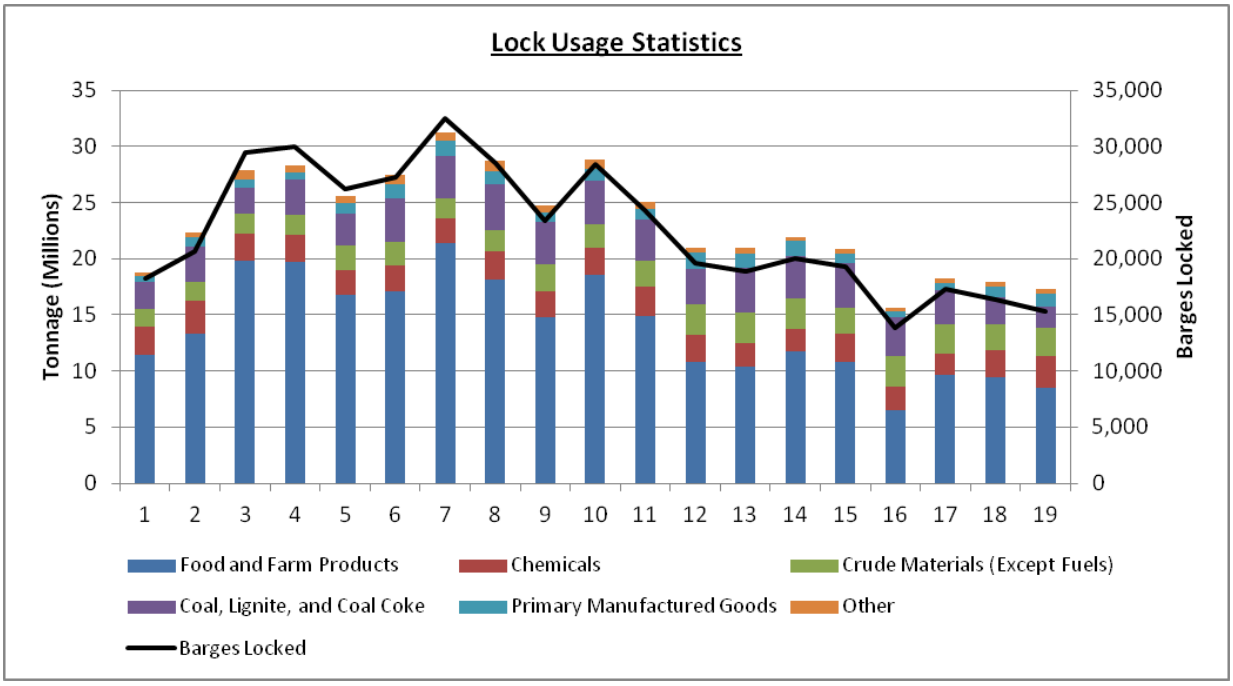
Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

Locks & Dam 15 (Rock Island, Illinois)

In the heart of the Quad Cities, Lock and Dam 15 is 483 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the Upper Mississippi River at one of its narrowest points which is also at the foot of the Rock Island Rapids. The complex extends from the northwest tip of the U.S. Army's Arsenal Island on the Illinois side, to a small area of flat-bottom land on the Iowa side. A roadway and railroad bridge, joining Davenport and Rock Island, spans the site.

The main lock is 110 feet wide by 600 feet long; the auxiliary lock is 110 by 360 feet. Both have a maximum chamber lift of 16 feet with an average of 13 feet and take about seven minutes to fill or empty. Each lock gate weighs nearly 82 tons. The 1,203 foot-long movable dam is the largest roller dam in the United States consisting of eleven non-submersible 100 foot-long roller gates with eleven control houses. Nine gates are 19 feet 4 inches in diameter and two are 16 feet 2 inches. It takes three hours for water to travel from Lock and Dam 14, in Pleasant Valley, Iowa, to Lock and Dam 15.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



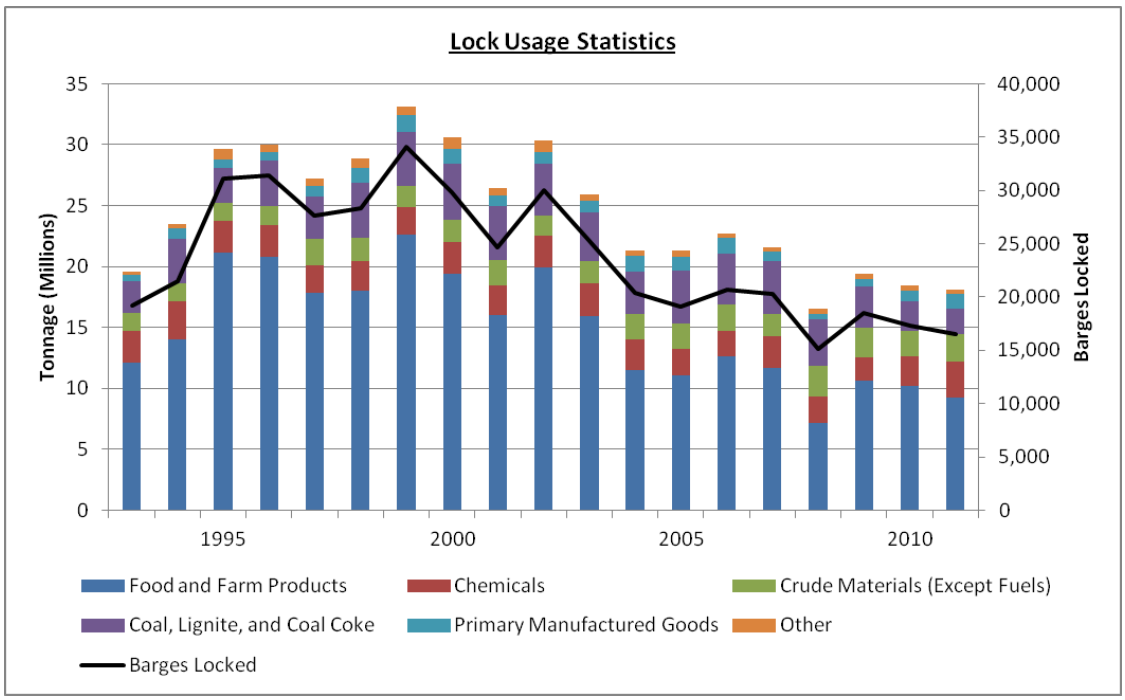
Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

Lock & Dam 16 (Illinois City, Illinois / Muscatine, Iowa)

Lock and Dam 16 is about one mile upstream from Muscatine, Iowa, and 457.2 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the river at a point where the valley is wide. The earthen embankment section of the dam straddles portions of Hog Island in the main channel. The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is 9 feet with an average lift of 6.5 feet. It takes approximately seven minutes to fill or empty the lock chamber.

The movable dam has twelve non-submersible Tainter gates (20 feet high and 40 feet long), three submersible Tainter gates of the same dimensions, and four non-submersible roller gates (20 feet high and 80 feet long). The dam system also includes a linear, concrete capped, ogee spillway; and a submersible earth and sand-filled dike. It takes eight hours for water to travel from Lock and Dam 15, in Davenport, Iowa, to Lock and Dam 16.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



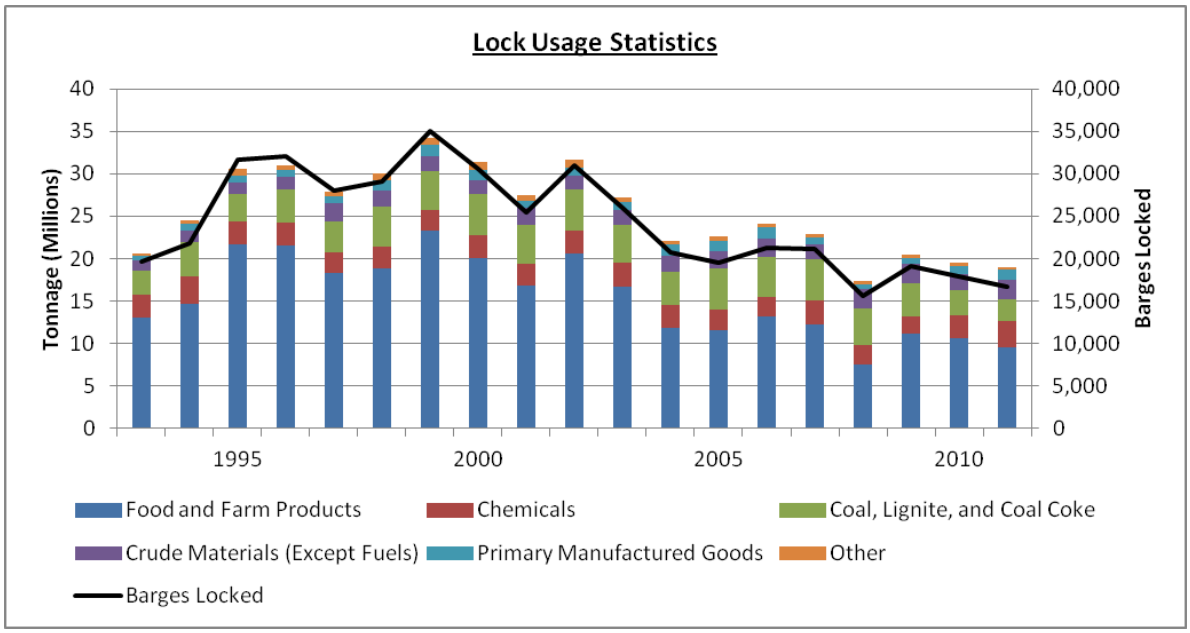
Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

Lock & Dam 17 (New Boston, Illinois)

Lock and Dam 17 is 437.1 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across a wide portion of river where there are several marshy islands. The Port Louisa National Wildlife Refuge and Odessa State Wildlife Management Area occupy the islands, marshes, and sloughs on the Iowa shore both upstream and downstream from the dam.

The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is 8 feet with an average lift of 4 feet. It takes approximately seven minutes to fill or empty the lock chamber. The movable dam has eight submersible Tainter gates (20 feet high by 64 feet long) and three submersible roller gates (20 feet high by 100 feet long). The dam system also includes one non-overflow earth and sand-filled dike, two transitional dikes, and a submersible earth and sand-filled dike. It takes six hours for water to travel from Lock and Dam 16 in Muscatine, Iowa, to Lock and Dam 17.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



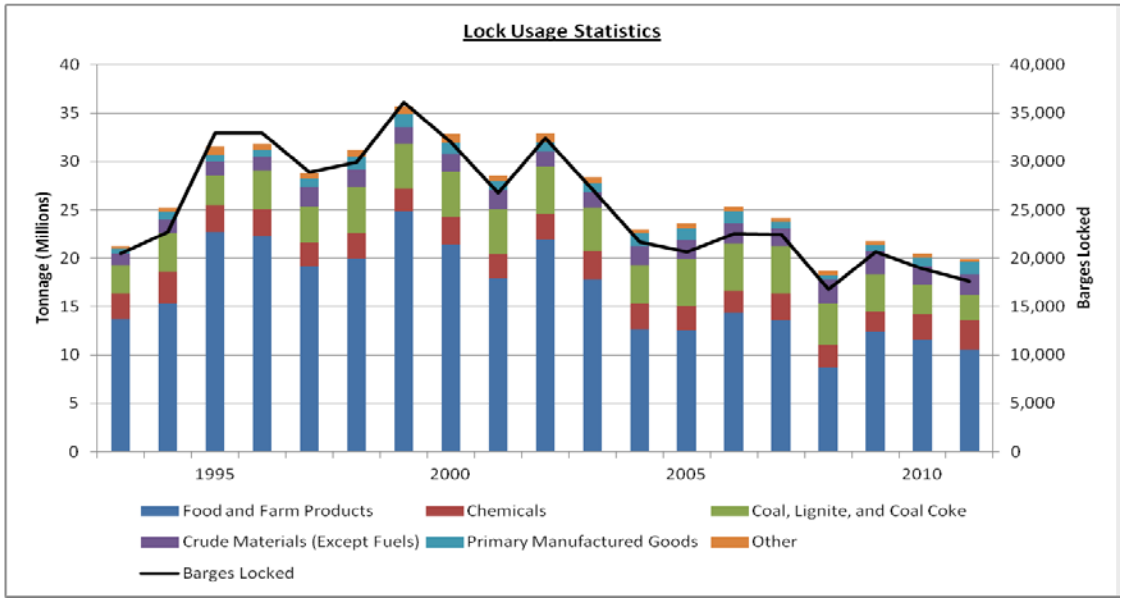
Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

Lock & Dam 18 (Gladstone, Illinois)

Lock and Dam 18 is 410.5 miles above the confluence of the Mississippi and Ohio rivers. The bottom lands on both shores are flat and punctuated by sloughs, marshes, and reefs. The river is dotted with low islands of various sizes. The Oquawka State Wildlife Refuge is adjacent to the lock and dam complex on the Illinois shore. The installation's esplanade interrupts a levee and functions as part of the Henderson River diversion that converted Turkey Island into an extension of the Illinois shore.

Lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. Maximum lift is 9.8 feet with an average lift of 6.9 feet. It takes approximately ten minutes to fill or empty the lock. The dam is composed of fourteen submersible Tainter gates (20 feet high by 60 feet long) and three submersible roller gates (20 feet high by 100 feet long). All gates submerge to a depth of 8 feet. The dam includes a submersible earth and sand-filled dike, a non-overflow earth and sand-filled dike, and two transition dikes. It takes eight hours for water to travel from Lock and Dam 17, in New Boston, Illinois, to Lock and Dam 18.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

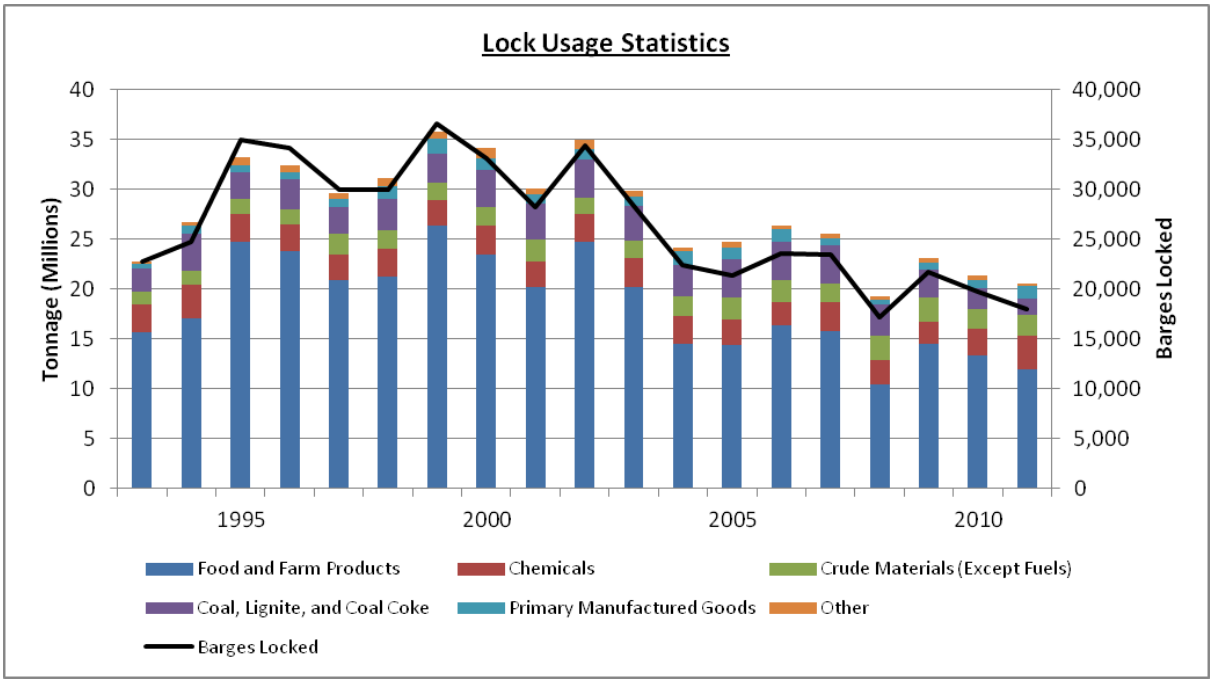
Lock & Dam 19 (Keokuk, Iowa)

Lock and Dam 19 is 364.2 miles above the confluence of the Mississippi and Ohio rivers. Privately built and owned, the dam was built in 1913 and includes 119 rectangular sliding gates.

The lock was constructed from 1952-1957. The main lock is 110 by 1,200 feet, twice the size of the standard 9-foot navigation channel lock. The Keokuk and Hamilton Water Power Company Lock (built between 1910 and 1914) is closed off by a permanent, steel pile, cell structure.

Maximum lift is 38.2 feet with an average lift of 36.3 feet. It takes approximately ten minutes to fill; 9.25 minutes to empty the lock. It takes twelve hours for water to travel from Lock and Dam 18, in Gladstone, Illinois, to Lock and Dam 19.

Source: U.S. Army Corps of Engineers® Mississippi Valley Division, "Upper Mississippi River – Illinois Waterway System Locks & Dams"



Source: U.S. Army Corps of Engineers®, Data: "Lock Use, Performance, and Characteristics". Accessed: December 2012.

Summary of Commodity

As is evidenced by the tonnage statistics provided in the previous section from the U.S. Army Corps of Engineers® "Lock Use, Performance, and Characteristics" database, the trends commodity and barge flows are very similar for all 11 locks and dams along Iowa's border.[1] Lock 19 at Keokuk, Iowa the southernmost and highest volume lock in this part of the Mississippi River system can be used to characterize typical volumes through the Iowa lock and dam system. Of all the barge movements through this lock, about 70 percent are loaded and 30 percent empty.

The dominant volume through Lock 19 is food product or grains representing about 60 percent of the total volume in 2011. Together with chemical fertilizers (16 percent), non-fuel crude materials (11 percent), and coal, lignite and coal coke (8 percent) these commodities account for over 90 percent of the volume through the lock. In the last ten years, overall volumes have fallen by over 40 percent with large declines in food product tonnage of over 60 percent.

To understand the origin-destination pattern of these commodity movements, we leverage the U.S. Army Corps of Engineers' state to state waterborne commodity movements for 2010.[2] We use this data to proxy directional O-D movements on the Mississippi River through Lock 19 by examining separately from states north of Lock 19 and south of Lock 19.

Approximately 63 percent of the tonnage on the Mississippi River along Iowa is southbound, 24 percent is northbound and 13 percent is within the system (e.g., does not pass through Lock 19). Three-quarters of the total tonnage on the system has an origin or destination in Louisiana. In fact, 91 percent of the southbound tonnage and 71 percent of the northbound is to/from Louisiana. The next largest origin of northbound volumes is Missouri at 17 percent of volumes.

Using this "state to state" data, we identify three major cargo movements that pass through Lock 19 which account for most of the tonnage:

1. Grains southbound to Louisiana;
2. Chemical fertilizers northbound from Louisiana; and,
3. Sand and gravel from Louisiana.

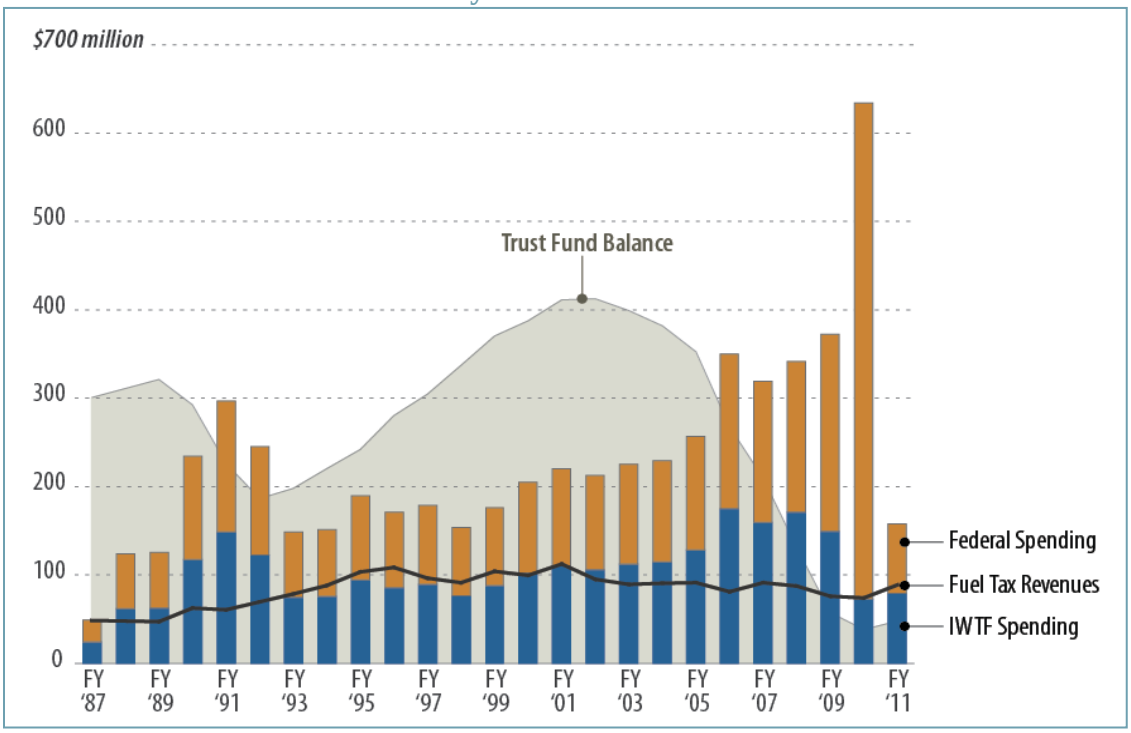
The volumes passing through the other Iowa locks that do not pass through Lock 19 are primarily coal, sand and gravel and petroleum.

[1] The correlation over time in tonnage trends by lock is over 95 percent with each other lock along Iowa's border.
[2] http://www.ndc.iwr.usace.army.mil/wcsc/wcsc.htm

Funding

Funding of the inland waterway system is governed by the Water Resources Development Act of 1986 (WRDA). Under the Act, operation and maintenance of the system is the full responsibility of the federal government through the U.S. Army Corps of Engineers. Construction and major rehabilitation projects[3] are equally shared between the federal government and users of the inland waterway system through the Inland Waterway Trust Fund (IWTF) with the Trust Fund being supported from a $0.20 per gallon tax on barge fuel. This level of a $0.20 tax per gallon has been in place since 1994 and has recently averaged about $85 million a year in tax revenues.

Figure 1: State of the Inland Waterways Trust Fund



Source: Army Corps of Engineers adapted by the Congressional Research Service (CRS), August 2011

Since 2002, the Trust Fund balance has been in a state of decline through IWTF funded projects, some of which had significant cost over-runs. Currently, the U.S. Army Corps of Engineers faces a massive backlog of authorized but unfunded projects. The Inland Waterways User Board (IWUB) has identified investment needs for the next 20 years totaling $18 billion or about $900 million per year for new construction and major rehabilitation.[4] However, the IWUB proposes a targeted and prioritized investment strategy requiring annual funding of $380 million per year. In fact, one project alone – the Olmsted Lock on the Ohio River – now has a price tag of $3.1 billion and a schedule that spans another decade. Today the IWTF balance is all but depleted with a balance of about $35 million at year end 2011 as shown in Figure 1, and it is critical to examine now new approaches to funding the system. Current annual taxes to the Trust Fund of $85 million are far less than the level of annual investment required as identified by the IWUB.

[3] This is currently defined as projects with a cost in excess of $8 million.
[4] Inland Marine Transportation Systems: Capital Projects Business Model (2010).

All stakeholders recognize the issue that the inland waterways infrastructure requires a significant injection of investment in the system coupled with a new approach to funding these investments. However, despite many reports and different proposals on how to finance the system, an ongoing lack of consensus on how to best approach the issue has accomplished nothing and a "business as usual" approach remains in place.

Jurisdictional Review of Inland Waterways

In assessing new approaches to funding the system, it is useful to examine how other jurisdictions fund their inland waterway systems. In this section we review inland waterways infrastructure ownership, operation, and funding mechanisms for several waterways in other jurisdictions, including the U.S., Canada, and Europe. The review summary is presented in Table 1.

For the most part, inland waterways are publicly owned and managed either by the state or government corporations. The reason for public ownership and management of inland waterways is due to their "public good" such as a source of fresh water, recreational and public amenity, habitat protection and potential hydro-electric generation possibilities.[5]

U.S.

In the U.S., we review the Inland Waterway System (IWS), approximately 12,000 miles of fuel-taxed federal waterways which are managed by the U.S. Army Corps of Engineers (USACE).[6] We also look at the Tennessee River, which is owned and managed by the Tennessee Valley Authority (TVA) in partnership with the USACE. The TVA owns and manages the overall system, while the USACE operates the locks, performs maintenance and dredging on the main channel, and designs and builds new locks and major rehabilitation.[7]

Canada

In Canada we review the tolls levied on the Canadian portion of the St. Lawrence Seaway. The Seaway is operated by the St. Lawrence Seaway Management Corporation on behalf of the Federal Canadian government, under a 20-year agreement. The Corporation is a not-for-profit responsible for movement of marine traffic through the Canadian Seaway facilities, which consists of 13 locks between Montreal and Lake Erie.[8]

Europe

In Europe, we review inland waterway charging in The Netherlands, Belgium, France, Germany, Austria, and Hungary. These countries comprise roughly 6,250 miles of inland waterways.[9] Due to the lack of readily available information, infrastructure charging data from these countries is from a 2005 European Commission study assessing infrastructure charging on inland waterways.

[5] OECD. Transport Infrastructure Investment: Options for Efficiency. 2008.
[6] Congressional Research Service. Inland Waterways: Recent Proposals and Issues for Congress. April 2012.
[7] USACE and TDOT. Tennessee Waterway Assessment Study. June 2007.
[8] Great Lakes St. Lawrence Seaway System. Management of the Seaway. 2012.
[9] European Commission. Charging and Pricing in the Area of Inland Waterways: Practical Guideline for Realistic Transport Pricing. August 2005.

Table 1: Jurisdictional Review of Inland Waterway Funding Sources

Jurisdiction (River)	Ownership/ Operation	Funding Source Summary	User Charge
U.S. (Inland Waterway System)	Federal Government/ USACE	Costs for maintenance and construction on inland waterways are funded by the USACE, through appropriations, and the commercial user industry, through user fees (fuel tax) paid to the federal government. The Corps pays for 100 percent of the cost for studies and for operations and maintenance on the IWS, while the cost for new construction or major rehabilitation (currently defined as any upgrade in excess of $8 million) is shared equally. Funds for waterway improvements are drawn from the balance in the Inland Waterways Trust Fund (IWTF) and are cost shared with general Federal revenues on a 50/50 basis.	Fuel Tax $0.20/gal
U.S. (Tennessee River)	TVA (Federal Government Corporation)/ USACE	TVA no longer receives congressional appropriations to help fund its activities in navigation, flood control, environmental research, and land management. Today all of its programs are paid for with power revenues. TVA receives no public tax dollars but finances all of its programs, including those for environmental protection, integrated river management, and economic development, through power sales and the sale of bonds in the financial markets.	No user charge
Canada (St. Lawrence Seaway)	Government/ St. Lawrence Seaway Management Corporation	The St. Lawrence Seaway Management Corporation operates the Seaway on behalf of the Canadian Federal government, under a 20-year agreement. Toll rates are set to pay for operating costs. The Federal government contributes necessary capital for investment. For complete transit of the St. Lawrence Seaway, tolls are set based on a charge per gross registered ton of the ship, per metric ton of cargo as certified on the ship's manifest, per passenger per lock, and a lockage charge per gross registered ton.	Charge per Ton $0.0966 to $0.1546 USD per gross ton Charge per Ton of Cargo $0.6834 to $1.0936 USD per metric ton of cargo Charge per Passenger $1.5 USD per passenger per lock Lockage Charge $0.2575 USD per gross ton
Netherlands (Amsterdam-Rhine Channel, Ijsselmeer)	National and Local Government	No charges for the use of inland waterways owned by the central government. However, users do have to pay fees for ports and locks that are owned by local government. It is estimated in 2002 that freight vessels paid $21 million USD for using the ports and locks. Dividing this amount by the total number of miles travelled on the inland waterways system, including central and local government owned, results in a charge of roughly $0.50 USD per barge-mile travelled.	Port and Lock Fees $0.50/barge-mile

Jurisdiction (River)	Ownership/ Operation	Funding Source Summary	User Charge
Belgium	Regional Government and Outsourced Companies	Shippers pay shipping rights when using inland waterways owned by the government. As of 2005 the shipping rights were $0.0005 USD per ton-mile. In 2000 the shipping rights were decreased by 90 percent in order to stimulate inland shipping. In Flanders, the management of waterways is outsourced to four companies.	Shipping Right Fee $0.0005/ton-mile
France (Rhone-Saone)	Federal Government	Shippers using inland waterways in France pay a toll. The toll grants access to the waterways network and is based on the vessel's characteristics, the route and type of goods transported. Tolls are made up of two parts: the access right to the network, which is not related to the ton-miles, and the variable component, related to ton-miles travelled.	Access Right Fee $11.83 to $87.13 USD per vessel Variable Toll Fee $0.14 to $0.18 USD per ton-mile
Germany (All National Rivers)	Federal and Local Government	The average charging price for waterways in Germany depends on the value of the goods transported. However, no charging mechanism exists for "international rivers" namely Elbe, Danube, Rhine and Oder. For Moselle, the pricing mechanisms are decided in agreement among France, Germany and Luxembourg. Local regions are responsible for the tariff policies in the ports. Fees collected per vessel vary depending on the size of the vessel.	Port Fee $39 to $132 USD per vessel
Austria (Danube)	Viadonnau (Federal Government Corporation)	Austria does not collect tolls for locks or taxes for the discharge of waste and waste oil. Viadonnau is a government corporation responsible for maintenance of the Danube waterway.	No user charge
Hungary		In Hungary, port and pier fees are charged. There are no additional charges for waterway use. An example of port and pier fees is provided for the Mahart-Csepel port.	Port Fee $0.03 USD per ton per day Pier Fee $0.47 USD per ton

Funding Options

So what are the options for increasing funding to invest in the inland waterway system? Over the past 30 years, the same issues have been debated and discussed including the Congressional Budget Office's "Paying for Highways, Airways and Waterways" (1992). More recently, there have been several reports from different organizations concerned about the inland waterway system that provide a balanced discussion of the core issues and lay out the range of possible options including some specific recommendations for financing the system. Examples include:

- The Inland Waterway User Board[10] in their "Inland Marine Transportation Systems Capital Projects Business Model" report made a series of recommendations including increasing overall funding to $380 million per year over the next 20 years, including increasing the current fuel tax to at least $0.26 per gallon.
- The National Research Council identified 5 general options: business as usual, divestiture or decommissioning, increasing federal funding, increasing revenues and partnerships. With respect to private sector involvement in the U.S. Army Corps of Engineers infrastructure operations and maintenance opportunities, the NRC states that:

  "These opportunities are greater in the areas of flood risk management, port and harbor maintenance, and hydropower generation, and less for inland navigation."
- The U.S. Army Corps of Engineers in their "U.S. Port and Inland Waterways Modernization: Preparing for Post-Panamax Vessels" report identified general options such as: business as usual, increased tax and appropriations, and public-private partnerships as potential options. Different types of user fees are also discussed including annual vessel use fees and segment tolls.

Using these and other sources, we have developed and documented in Table 2 the range of options that should be considered for appropriately funding the Inland Waterway System. It should be noted that these various options are not necessarily mutually exclusive and combinations of the various options may ultimately be what is required to get proper levels of funding in place. However, given the urgent nature of the situation some of these options are likely more realistic than others in the near term.

[10] The Inland Waterway User Board consists of 11 members appointed by the Secretary of the Army to provide balanced representation of the primary commercial users and shippers using the inland waterway system. The Board is a federal advisory committee intended to give commercial users a strong independent voice in the investment decision making in supporting with their cost-sharing tax payments.

Table 2: Summary of Funding Options

	Option	Description	Comment
1	Business as Usual	Same funding mechanism. Likely results in a significant reduction in system reliability. Could ultimately result in system failure and closure of some parts of the system.	• Continued deterioration of the system. • Annual IWTF of $85 million (excl. federal match). • Foregone economic benefits. • Lost opportunity re. Panama Canal expansion.
2	Reduced Level of Service and/or Decommissioning	Close or decrease level of service (LOS) for specific facilities where traffic does not warrant operations. Redirect savings to active facilities. Reducing LOS or closing parts of the system on a cost benefit analysis basis might be a realistic operational approach to planning under a restricted funding scenario.	• Minimized economic losses. • Optimization of budget constrained system
3	Increased Funding from Traditional Sources	Increases in the level of annual funding from current system users and/or federal appropriations.	• Users of the system are quite price sensitive and higher fees may lead to modal shift. • Current U.S. federal budget situation may make increased funding unrealistic.
3a	Increase Federal Funding	Change the funding mechanism to facilitate a larger share of federal funding.	• The business case exists as the Corps recognizes that public benefits exceed the required infrastructure costs BUT… • Current U.S. federal budget situation makes increased funding unrealistic?
3b	Increase User Fees	Increase the excise tax from its current level and/or implement other fees such as a lockage fee, segment tolls, cargo and/or tonnage based fees to derive additional funding from users. Implementing different types of specific user funding mechanisms may have equity impacts that could result in additional resistance. There are different philosophies on how to charge users: (i) marginal cost pricing, or (ii) average cost pricing: • Could charge all system users, not just barges, to raise additional funds.	• User fees have not increased since 1994. • IWUB indicated a willingness to increase the tax. • Significant increases in user fees would be required to have an impact. A doubling of existing fees would only generate about $85 million/year. • Users of the system are quite price sensitive and higher fees may lead to modal shift. • User fees alone will not be sufficient to fund improvements. • Congress rejected plans for new fees.
3c	Increase User Fees and Federal Funding	A hybrid of 4a and 4b – increasing funding from both users and the Federal government. The funding share may vary between both parties.	• Most realistic of Option 4. Funding from both parties will have to increase to make a difference.
4	Partnerships	Business arrangements from non-traditional sources are leveraged to advance capital improvements.	• Partners could include the private sector and/or public entities.
4a	Private Sector Partnerships	Private partners enter into contracts to upgrade and operate the locks, dams and channels in exchange for a stream of	• The stream of payments to the private partner would have to be sourced from the Federal government and

	Option	Description	Comment
		annual payments from the Federal government over a concession life (e.g., 30 years). The system could be split into segments and each segment assessed/prioritized for P3 viability.	users (like option 4). • A successful arrangement could advance major capital works. • Given current state of the system and traffic levels, may be unrealistic unless willingness of users and federal government to increase annual funding levels. • Union resistance to privatization.
4b	Other Non-federal Public Sector Partners	States, local governments and/or Port Authorities would provide funding for specific infrastructure improvements in the State or region (where net economic benefits warrant the investment).	• Could help get specific projects deemed important to the State/region completed sooner. • Other government budgetary situations may limit the applicability of this option.

Of the options discussed in Table 2, not all are implementable in the near term and not all are a solution of their own. Given the urgency of the current situation, we have assessed the various options by focusing on whether they are imminently practical - can address the issue in the near term. Four questions or characteristics of the option are assessed:

(i) timeliness – can the option be implemented in months as opposed to years?
(ii) full system solution – can the option on its own be applied over the full system?
(iii) stand-alone – can the option by itself be sufficient to resolve the funding issue?
(iv) administrative ease – can the option be implemented without adding additional administration burden or without requiring legislative changes?

Table 3: Assessment of Fund Options

Option	Timeliness	Full System Solution	Stand Alone Solution	Administrative Ease
Business as Usual	Yes	Yes	No	Yes
Reduced Level of Service and/or Decommissioning	No	No	No	No?
Funding from traditional sources	Yes	Yes	Yes	Yes
Partnerships	No	TBD	TBD	No

The assessment of the identified options reveals that leveraging increased funding from traditional sources is the only practical option to dealing with the funding issue in the short term. Other options like reduced level of service and/or decommissioning and partnerships should also be explored and if feasible, can also be implemented when practical.

- Business as usual should not be an acceptable option. The problem with business as usual is well documented and is broadly regarded as sub-optimal.
- Reduced level of service and/or decommissioning is something that should be considered as a normal course of operating a system. On its own, this is not a total solution.
- Partnerships are opportunities that should be explored further, starting now. However, establishing any sort of partnership arrangements will take time and even if a successful partnership arrangement is possible, interim solutions to the funding mechanism in advance of possible partnerships need to occur.

Is Increased Funding from Traditional Sources Realistic

While leveraging traditional funding sources may be the only possible option for immediate action, implementation ultimately requires support from Congress and as such to reach a consensus on the issue likely requires support from system users as well. It appears through the IWUB report and proposal that there is a willingness by users to have the current fuel tax increase. The IWUB proposal of targeting $380 million a year in funding for capital and major rehabilitation work with the user fuel tax increasing from $0.20 to at least $0.26 per gallon (or 30 percent).

Is it realistic to have users of the system pay more into the IWTF by raising the current excise tax on fuel to at least $0.26? It is important to consider the market and economic implications of such a tax change:

- The current level of $0.20 per gallon was set in 1994 and remained unchanged since then. Since 1994, general inflation has increased by approximately 50 percent and fuel prices have tripled. If the fuel tax had been inflation indexed to general inflation, the current tax rate would have been about $0.30 per gallon.
- Margins in the inland marine transportation industry are broadly recognized as being very low. We estimate the current fuel tax as a proportion of the overall shipping rate to be about 2 percent for grain movements. An increase in the fuel tax rate to $0.26 would increase the overall shipping rate by roughly 0.6 percent assuming that this increase in cost is passed on to the shipper.
- With an increased cost to shippers, there will be the potential for a modal shift of some tonnage off the inland waterway and onto other modes. The one-time increase in the shipping rate would be roughly 0.6 percent and therefore could result in a small modal shift of about 0.6 percent[11] and result in some overall economic loss.
- The "business as usual" option will increase system unreliability and also result in modal shifts away from the inland waterways and economic losses. There is a trade off between the tax change and reliability effects and both should be considered in establishing new tax policy.

It does appear that increasing user rates to at least $0.26 is a realistic option for increasing funding from users. It has the support of at least some users (e.g., IWUB) and can be accomplished without large scale market effects and economic losses.

While realistic, a change in the excise tax to $0.26 will only generate about another $25 million in taxes bringing user contributions to the IWTF to about $110 million per year. Assuming a willingness of the Federal government to match this increased amount with appropriations, makes the potential amount available for capital and major rehabilitation projects $220 million year. While this is a meaningful increase, it is far short of the $380 million/year proposed by IWUB.

In the IWUB proposal, the federal contribution is greater than the current 50-50 split. In the absence of any agreement by the Federal government endorsing the IWUB proposal, we explore the feasibility of further increases to the fuel tax rate.

Is it realistic to increase user fees to more than the $0.26 per gallon?

The next question, is it realistic to increase user fees to more than the $0.26 per gallon? To understand the implications of fuel tax increases on the market and the economy, we need to more fully explore the literature on how sensitive shippers are to rate changes and what the economic implications are of a modal shift.

Of particular importance from a policy perspective is to understand how much cargo will shift from barge to other modes due to rate increases. In this section we review elasticity data used to determine volumes and modal shift from barge to other modes due to an increase in taxes. There is no broad consensus on how sensitive shippers are to changes in shipping rates, transit times

[11] This assumes an average elasticity of 0.90.

and system reliability. However, the economic literature provides strong statistical evidence that these relationships do exist for even small changes in rate, time and reliability.

Table 4 provides modal switch elasticities by commodity grouping and mode. These elasticities measure the sensitivity of shippers to switching modes due to changes in shipment characteristics such as shipping rate, transit time and reliability. While the elasticity may vary with the degree of rate change, we have selected a 10 percent change for displaying the elasticities. The modal switch elasticity is defined as the percent of volume that would switch modes given a certain change in rate, time or reliability[12]. For example, a modal switch elasticity of 0.50 with respect to rates, would imply that for a 10 percent increase in rates, 5 percent of volume would switch modes (e.g., 0.50 times 10 percent).

We have summarized various elasticity values that have been developed in studies developed under the U.S. Army Corps of Engineers Navigation Economic Technologies research program. In general these studies indicate that:

- There is a statistically significant relationship between modal choices and shipment characteristics such as rate, transit times and system reliability.
- The modal switch elasticity of barge shipments with respect to rates is inelastic (e.g., less than 1.0).
- Barge movements are relatively insensitive to changes in transit times.
- While differences exist by commodity, barge movements are quite sensitive to changes in system reliability. In fact for non-agricultural commodities, the modal switch elasticity is elastic (e.g., greater than 1.0).

Table 4: Elasticity[13] by Mode, Commodity Type and Region

Source	Rate	Time	Reliability	Geography	Commodity	Modes
Train and Wilson (2007)[14]	0.59	0.025	0.19	Upper Mississippi and Illinois	Agricultural	Barge
	0.87	0.050	0.26			Rail
	0.26	0.009	0.42			Truck
Train and Wilson (2007)[15]	0.86	1.16	1.56	Upper Mississippi and Illinois	Oil and gas, mining, aggregates	Barge
	0.89	1.11	1.03	Upper Mississippi and Illinois	Wood, paper, petroleum, coal, chemicals, plastics, and fuel	Barge
	0.85	1.06	1.55	Upper Mississippi and Illinois	Minerals and metals	Barge
	3.36	2.98	3.37	Upper Mississippi and Illinois	Oil and gas, mining, aggregates	Rail
	3.43	2.88	2.40	Upper Mississippi and Illinois	Wood, paper, petroleum, coal, chemicals, plastics, and fuel	Rail

[12] Reliability in these studies is defined as shippers' perception to the percentage of time that shipments will arrive on time.
[13] Elasticities are reported at the 10 percent change level.
[14] Train, Kenneth and Wesley W. Wilson. "Transportation Demands For Agricultural Products in the Upper Mississippi And Illinois River Basin", *USACE NETS*, (2007).
[15] Train, Kenneth and Wesley W. Wilson. "Transportation Demands For The Movement Of Non-Agricultural Commodities Pertinent To The Upper Mississippi And Illinois River Basin.", U*SACE NETS*, (2007).

	3.60	2.77	2.63	Upper Mississippi and Illinois	Minerals and metals	Rail
	1.23	1.32	1.87	Upper Mississippi and Illinois	Oil and gas, mining, aggregates	Truck
	1.26	1.27	1.25	Upper Mississippi and Illinois	Wood, paper, petroleum, coal, chemicals, plastics, and fuel	Truck
	1.35	1.21	1.39	Upper Mississippi and Illinois	Minerals and metals	Truck

While elasticity estimates vary by geography and commodity, we have selected generalized elasticities of 1.0 and 0.5 to illustrate the high level implications on tax revenues, modal shifts and the economy of changing increasing user fees across the entire inland waterway system. We emphasize that these results are illustrative-only and are quite sensitive to assumption changes. The key assumptions are:

- Changes in the fuel tax rate are passed on to shippers through shipping rate increases.
- Annual volumes are 540 million tons on the inland waterway system.
- The shipping rate savings from using barges as opposed to other modes is $11 on average.

Table 5: Impact of Changing User Fees on Modal Shift, Elasticity = -1.0

Fuel Tax Rate	% Change in Shipping Rate	% Modal Switch	Fuel Tax Revenues	Increase in Revenues	Economic Loss: Shipping Rate Increases
$0.20	N/A	N/A	$85	N/A	N/A
$0.26	0.6%	-0.6%	$110	$25	-$40
$0.30	1.0%	-1.0%	$125	$40	-$67
$0.35	1.5%	-1.5%	$144	$59	-$99
$0.40	2.0%	-2.0%	$161	$76	-$132
$0.485	2.9%	-2.8%	$190	$105	-$186

Table 6: Impact of Changing User Fees on Modal Shift, Elasticity = -0.5

Fuel Tax Rate	% Change in Shipping Rate	% Modal Switch	Fuel Tax Revenues	Increase in Revenues	Economic Loss: Shipping Rate Increases
$0.20	N/A	N/A	$85	N/A	N/A
$0.26	0.6%	-0.3%	$110	$25	-$20
$0.30	1.0%	-0.5%	$126	$41	-$33
$0.35	1.5%	-0.8%	$146	$61	-$50
$0.40	2.0%	-1.0%	$166	$81	-$66
$0.485	2.9%	-1.4%	$198	$113	-$94

This high level analysis illustrates several things that should be kept in mind when tax policy decisions are made regarding any changes to the fuel tax rate:

- The fuel tax rate is itself a small proportion of the overall shipping rate and therefore large changes to the fuel tax rate itself translates into relatively small changes in the overall shipping rate.
- Changes in the fuel tax rate will translate into modal shifts off the inland waterway.
- The fuel tax rate itself would have to increase to a level of about $0.33 a gallon to yield a $50 million per year increase in revenues.

- The fuel tax itself would have to increase to almost $0.50 a gallon to yield total fuel tax revenues that equate to half of the $380 million per year identified as needed by IWUB.
- The economic loss associated with fuel tax increases is generally comparable or greater in magnitude than the increased revenues from the tax increase, holding all other things equal (e.g., assuming no system reliability improvement). However, barge shippers tend to be more sensitive to reliability than pure rate changes. Any marginal positive change in shipper's perception of reliability improvements due to inland waterways funding improvements would yield positive economic benefits. In general, the elasticities in Table 4 indicate that for most commodities barge movements are more sensitive to reliability than shipping rates. Therefore if an X percent increase in funding yielded an X percent perceived increase in reliability, than the net economic effect would be positive.

Summary

It does appear realistic to increase funding for infrastructure improvements through revenues from users from changes to the current fuel tax rate (or other fees). However, significant increases in the fuel tax rate would be required to yield significant (e.g., >$50 million per year) funding increases from users. If fuel tax rates are increased, consideration should be given to indexing them to inflation to avoid future funding gaps.

The Benefits of an improved inland waterway system

The benefits of inland waterway transportation are well documented. A 2007 Study by the Texas Transportation Institute[16], cites major economic benefits of marine transportation relative to other transportation modes including cargo capacity, congestion, energy efficiency/emissions, safety and infrastructure maintenance impacts. The U.S. Army Corps of Engineers projects that the inland and intracoastal waterways move over 600 million tons of cargo and provide almost $7 billion in annual transportation savings to the economy (as compared to using trucks or trains).[17] The Mississippi River system comprises about 60 percent of this volume and therefore accounts for annual economic benefits of about $4 billion without even considering other benefits such as emission reductions, etc. We have developed an economic impact model[18] to assess the economic benefits of barge movements that use the Upper Mississippi River and pass through Lock and Dam 19 at Keokuk, Iowa. The model quantifies in monetary terms the benefits of waterborne freight movements from:

- Reduced shipping/transportation costs relative to other modes;
- Reduced emission levels relative to other modes;
- Reduced maintenance;
- Reduced roadway congestion due to truck traffic; and,
- Reduced accidents relative to other modes (relative to barge).

The estimates quantified measure the economic benefits of freight moving on the water as opposed to other modes for its complete journey from origin to destination (e.g., Iowa to Louisiana). While the barge movements considered are those that pass through Lock and Dam 19, the benefits do not accrue to the State of Iowa alone but rather span the Upper Mississippi region and other parts of the U.S.

The economic benefits of existing freight (2011) passing through Lock and Dam are $0.5 billion (B) per year. Another way of looking at these estimates is to say that if the lock system failed and all traffic moved to other modes, there would be an economic loss of $0.5 billion per year or about $7 billion over 20 years.[19]

Table 7: Economic Benefits of Barge Freight Traffic passing through Lock and Dam 19, 2011

	Annual Economic Benefits ($M)
Reduced shipping/transportation costs	$384.0
Reduced emissions	$29.3
Reduced maintenance	$34.3
Reduced roadway congestion	$0.0
Reduced accidents.	$78.4
Total Economic Benefits	**$525.9**

[16] A Modal Comaprison of Domestic Freight Transportation Effects on the General Public.
[17] Inland Waterway Navigation: Value to the Nation (2009).
[18] The model logic is provided in Economic Impact Model Logic and Assumptions Appendix.
[19] Annual impacts were discounted at a rate of 7 percent real as per CBO guidance.

Scenario Analysis

To hypothesize the impact that no new funding for the inland waterway system would have on freight currently passing through Lock and Dam 19, we have employed scenario analysis. This analysis is designed to illustrate the potential economic value of lost opportunities if the inland waterway system is not appropriately maintained. We estimate the difference in economic benefits under two distinct traffic scenarios:

- Under the no new funding scenario, we assume that traffic levels remain the same on the system. This is possibly a conservative assumption in that if anything, traffic would likely actually decline over time if reliability declines.
- Under the new funding scenario, we assume that traffic volumes grow by 4 percent a year, at least in part due to the economic potential associated with the Panama Canal Expansion in 2014. "On the export side the ability to employ bulk vessels is expected to significantly lower the delivery cost of U.S. agricultural exports to Asia and other foreign markets. This could have a significant impact on both the quantity of U.S. agricultural exports and commodities moving down the Mississippi River for export at New Orleans".[20]

The 4 percent difference in traffic per year between a new funding versus a no new finding scenarios is equivalent to about a 3 to 4 percent annual decline in perceived system reliability based on the modal shift elasticities presented in Table 4. The difference between the two scenarios over 20 years is approximately $2 billion.[21] This analysis, while hypothetical does reveal even that the impact of traffic moving off the waterway can result in substantial economic losses or foregone opportunities over time.

Table 8: Difference in the Economic Benefits of Barge Freight Traffic passing through Lock and Dam 19 Under Alternative Scenarios, Over 20 Years

	Present Value of Economic Benefits over 20 years ($B)
Reduced shipping/transportation costs	$1.7
Reduced emissions	$0.1
Reduced maintenance	$0.2
Reduced roadway congestion	$0.0
Reduced accidents.	$0.3
Total Economic Benefits	**$2.3**

[20] Source: U.S. Port and Inland Waterways Modernization: Preparing for Post Panamax Vessels, Page XIV, U.S. Army Corps of Engineers, June 20, 2012.
[21] Annual impacts were discounted at a rate of 7 percent real as per CBO guidance.

Economic Impact Model Logic and Assumptions Appendix

The Structure and Logic model, key assumptions and monetized impacts of these results over the project lifecycle are provided below.

Figure 2: S&L for Cargo Diverted to Rail

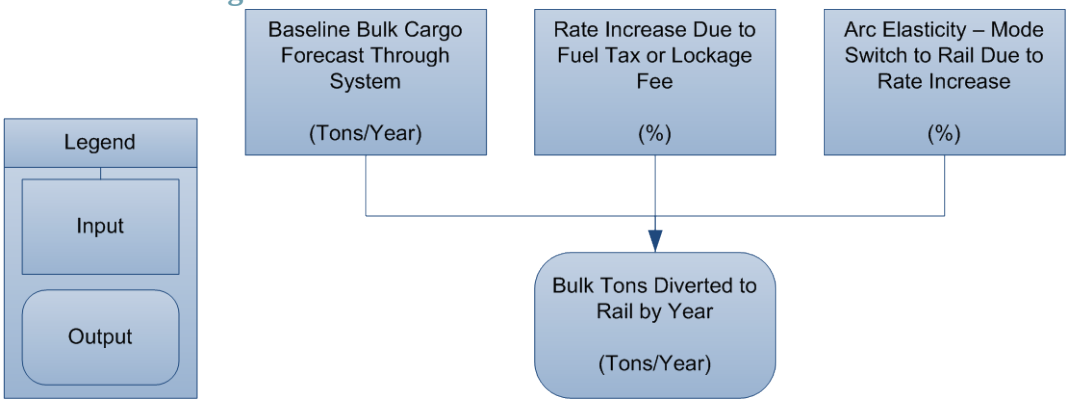


Figure 3: S&L for Cargo Diverted to Truck

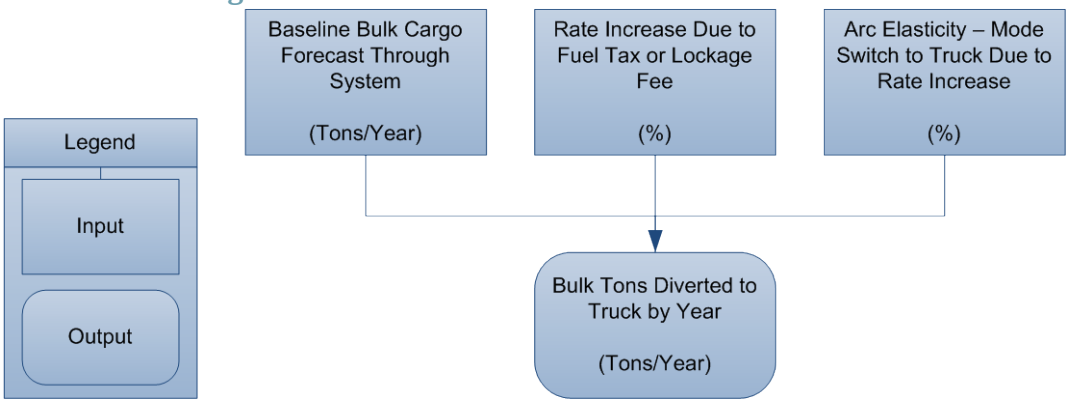


Figure 4: S&L for Cargo Shipping Cost

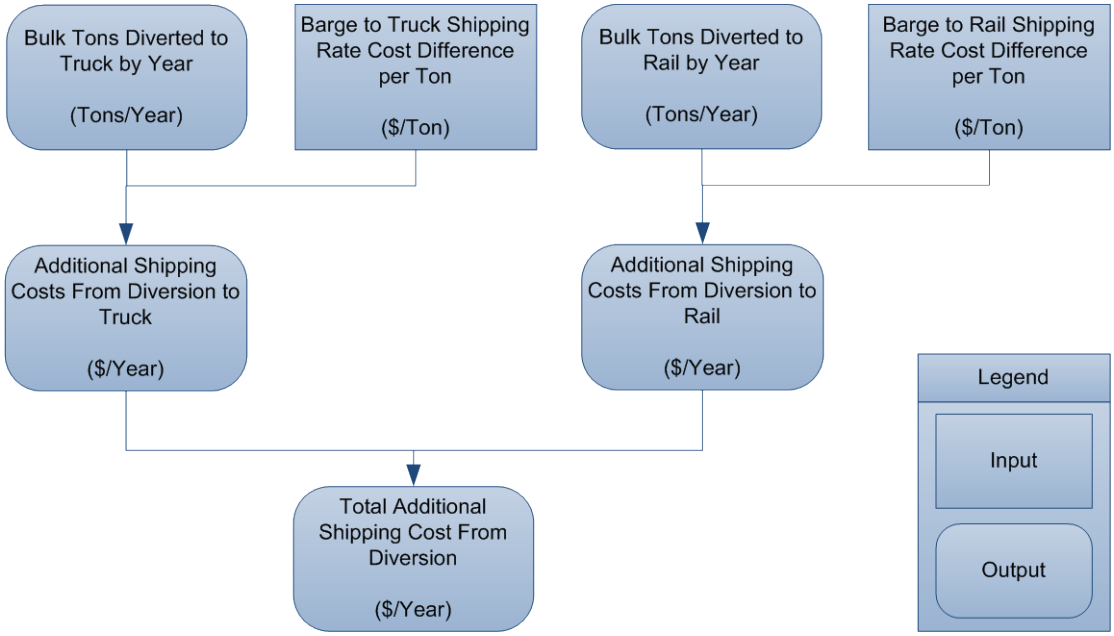


Figure 5: Change in Rail Emission Cost from Diversion

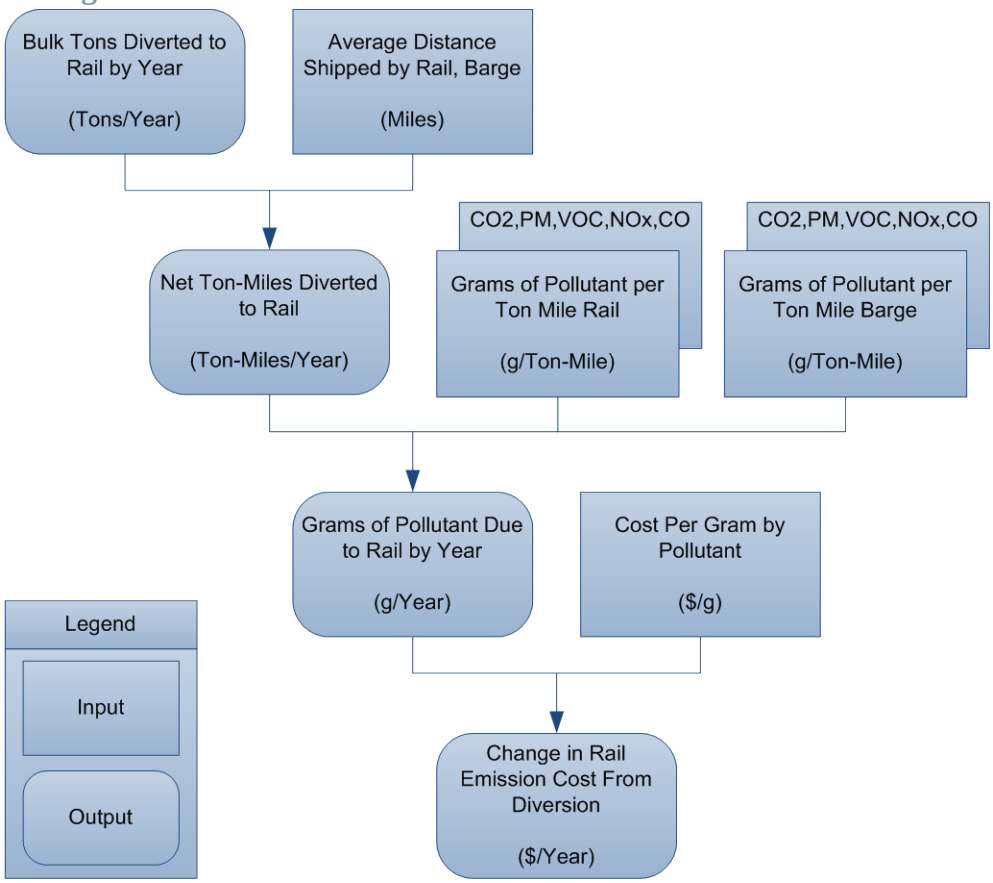


Figure 6: S&L for Change in Truck Emission Cost from Diversion

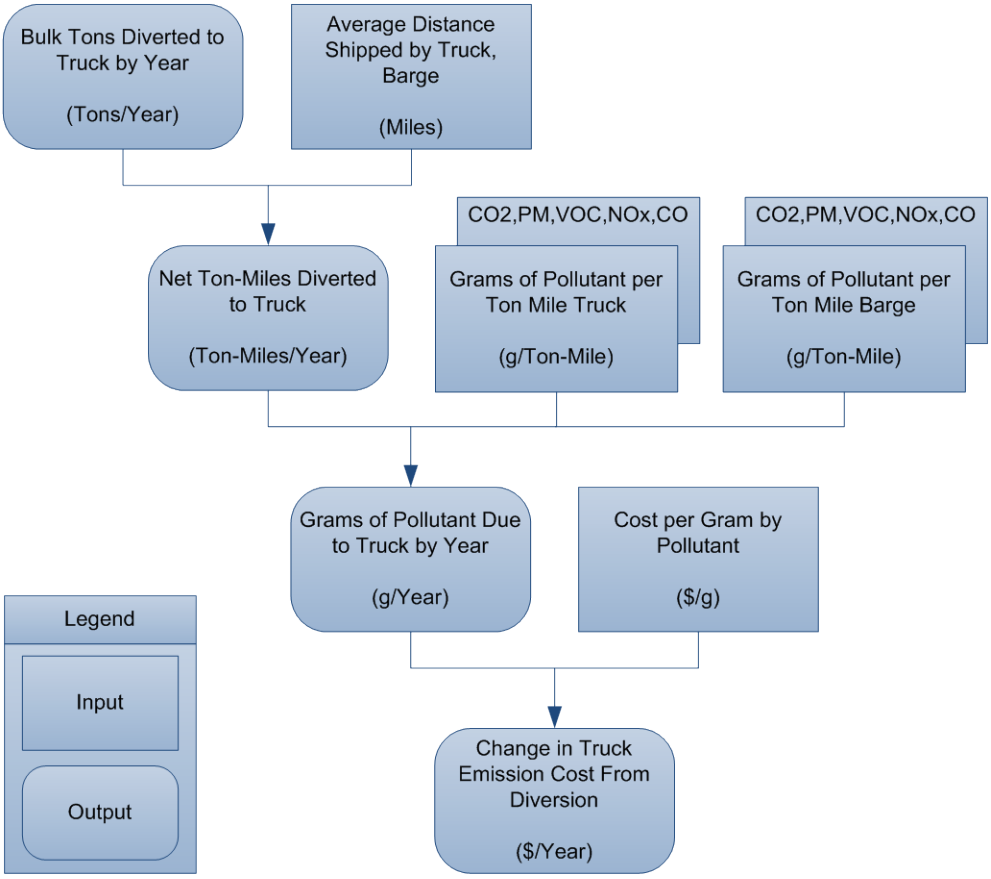


Figure 7: S&L for Change in Rail Accident Cost from Diversion

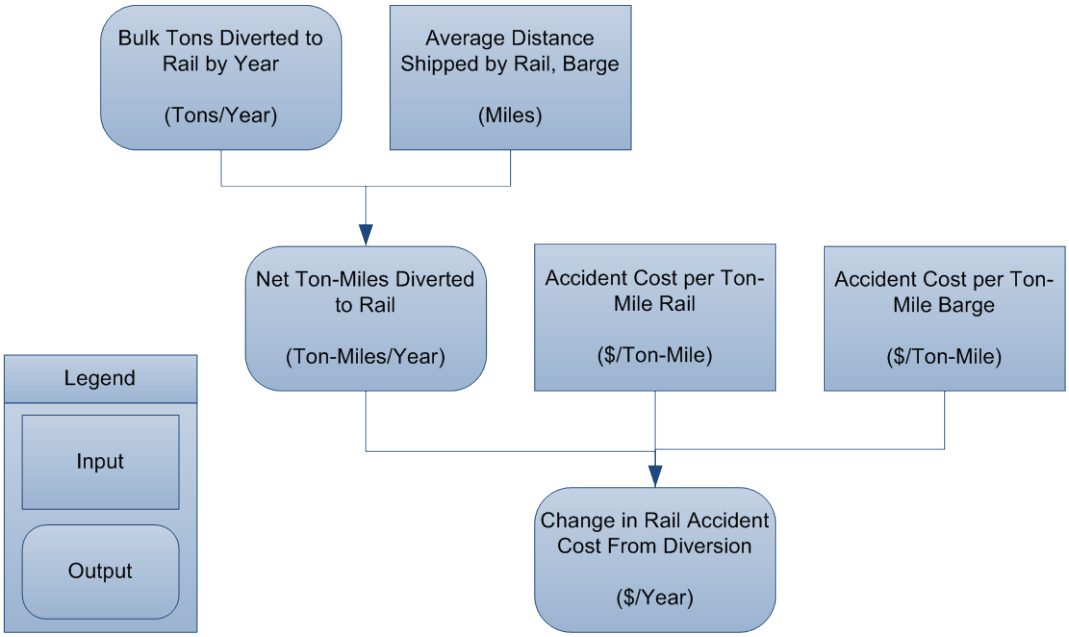


Figure 8: S&L for Change in Truck Accident Cost from Diversion

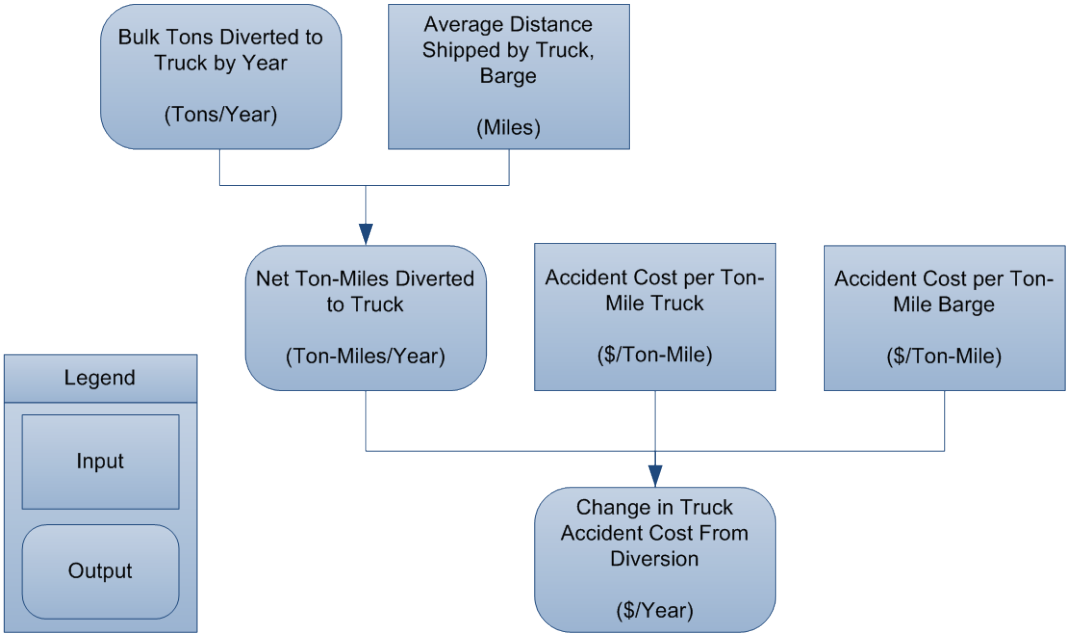


Figure 9: S&L for the Change in Rail Operating and Maintenance Cost from Diversion

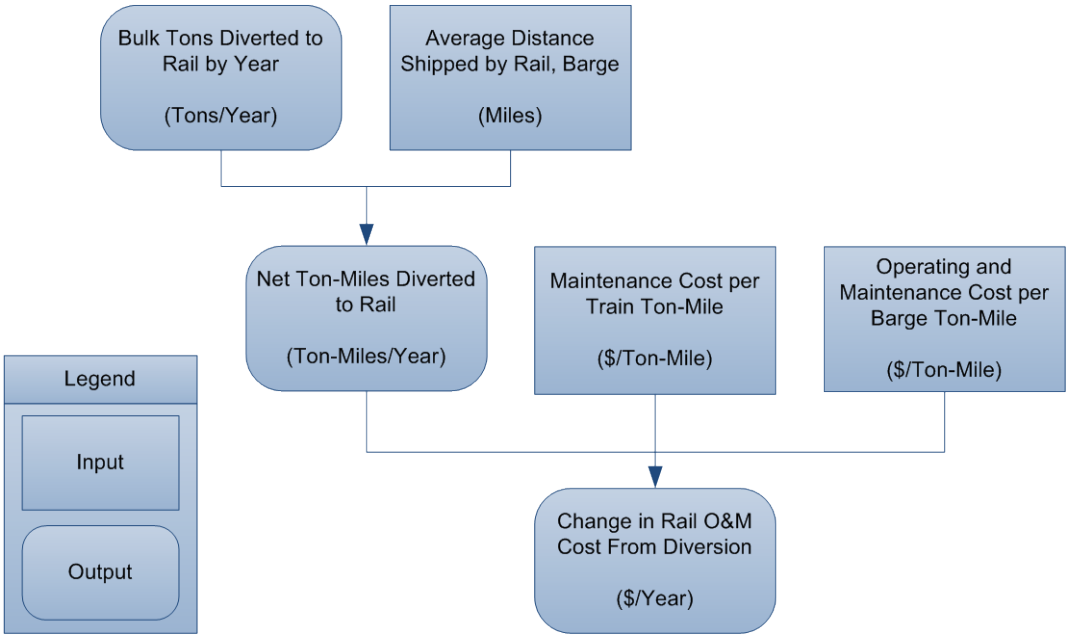


Figure 10: S&L for the Truck Operating and Maintenance Cost from Diversion

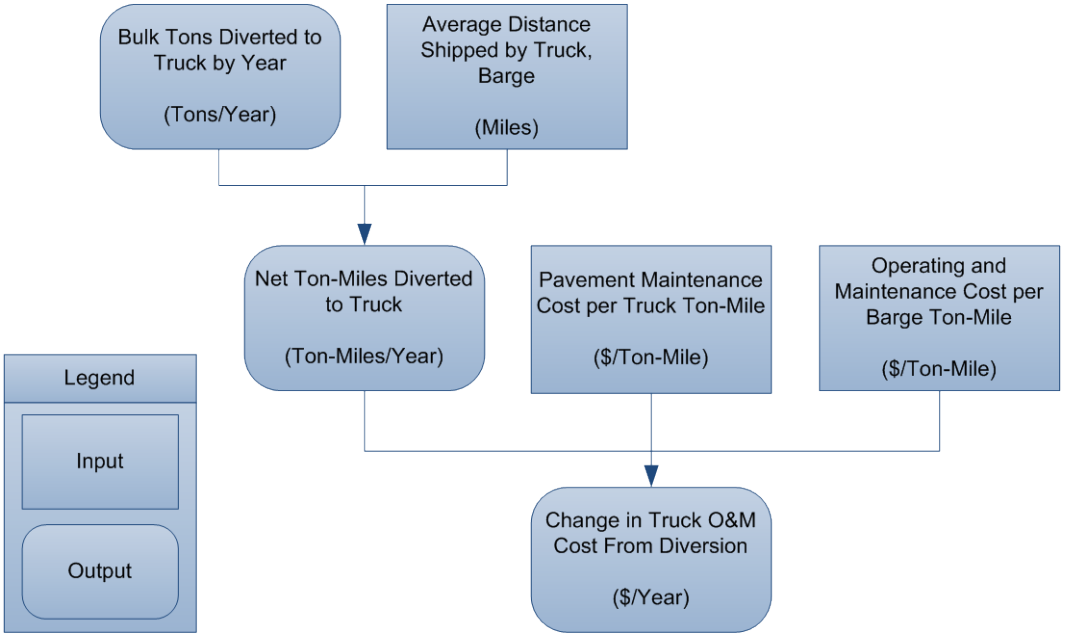
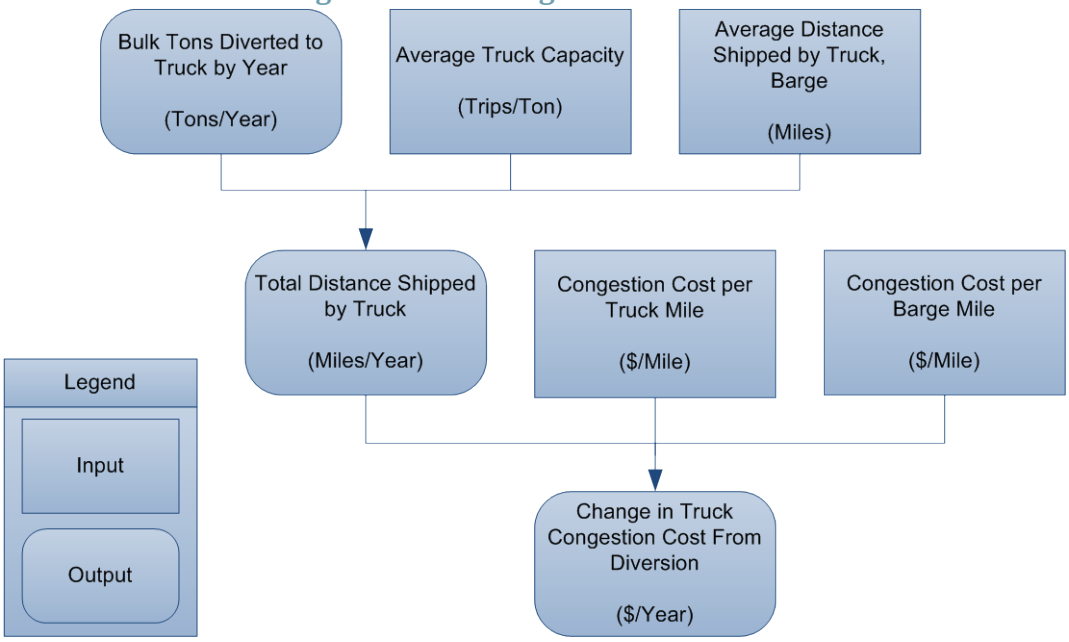


Figure 11: S&L for the Change in Truck Congestion Cost from Diversion



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Appendix D: Roedel Parson Koch Blache Balhoff & McCollister Legal Firm, Iowa Lock & Dam Study Task 3

U.S. Inland Waterway Modernization: A Reconnaissance Study

Prepared for the Iowa Department of Transportation

HDR Engineering, Inc.

April 2013

I. Federal Authority to Regulate Locks/Dams

Congress's authority to regulate water resources is primarily rooted in the navigation power implicit in the Commerce Clause of the United States Constitution.[1] Congress has plenary power over interstate commerce, and because navigation is commerce, it may protect the navigable capacity of navigable streams within the United States.[2] Such power grants Congress the authority to prohibit any structure within or over navigable waters or non-navigable tributaries of navigable waters.

The United States has a constitutional right, even a duty, to improve navigation for the benefit of all of its citizens who are affected thereby.[3] So, the federal government may build levees and other public works in, or adjacent to, navigable streams in aid of navigation and flood control, the terms and conditions of which are determined by Congress.[4] The right of the federal government to improve navigation in a navigable waterway extends to the entire bed of the stream up to ordinary high-water mark.[5] Congress's power to give or withhold consent to place obstructions is, however, entirely discretionary and encompasses the authority to grant that privilege upon terms and conditions, and to terminate the privilege once made.[6]

II. Control/Ownership/Operation/Responsibilities of Locks and Dams

The legal regime controlling operations on the Mississippi River and other navigable waterways in Iowa is set forth in the Federal Rivers and Harbors Act. Enacted as part of the Rivers and Harbors Act of 1894, 33 United States Code (USC) § 1 reads:

> It shall be the duty of the Secretary of the Army to prescribe such regulations for the use, administration, and navigation of the navigable waters of the United States as in his judgment the public necessity may require for the protection of life and property, or of operations of the United States in channel improvement, covering all matters not specifically delegated by law to some other executive department.

The Secretary of the Army has delegated the authority to administer the use and navigation of navigable waterways to the Chief of Engineers ("Corps of Engineers").[7] Thus, in a standard case, the Corps of Engineers will own and operate a lock and dam structure.

The Federal Rivers and Harbors Act prohibits obstructions in navigable waters not affirmatively authorized by the Congress except on plans recommended by the Chief of

[1] "The Congress shall power….To regulate commerce with foreign nations, and among the several States, and with the Indian tribes…." U.S. Const. art. I, §8, cl. 3.
[2] U.S. v. Appalachian Elec. Power Co., 311 U.S. 377, 404-405 (1926).
[3] B Amusement Co. v. U.S., 148 Ct. Cl. 337, 180 F.Supp. 383 (1960).
[4] Save the Dunes Council v. Alexander, 584 F.2d 158 (7th Cir. 1978).
[5] City of Demopolis, Ala v. U.S., 167 Ct. Cl. 94, 334 F.2d 657 (1964).
[6] Id. at 426-427.
[7] 33 U.S.C. 540. Army and the supervision of the Chief of Engineers.

Engineers and authorized by the Secretary of the Army.[8] The creation of any such obstruction, not affirmatively authorized by law, is expressly prohibited.[9] Where the structure will not interfere with navigation, however, the Secretary of the Army is invested with discretion to grant or refuse a permit and is not required to state the specific grounds on which that discretion is exercised.[10]

Section 401 of the Federal Rivers and Harbors Act requires the consent of Congress for the erection of structures, such as dams in or over navigable waters of the U.S. *not lying wholly within a state*, providing:

> It shall not be lawful to construct or commence the construction of any bridge, causeway, dam, or dike over or in any port, roadstead, haven, harbor, canal, navigable river, or other navigable water of the United States until the consent of Congress to the building of such structures shall have been obtained and until the plans for (1) the bridge or causeway shall have been submitted to and approved by the Secretary of Transportation, or (2) the dam or dike shall have been submitted to and approved by the Chief of Engineers and Secretary of the Army. However, such structures may be built under authority of the legislature of a State across rivers and other waterways the navigable portions of which lie wholly within the limits of a single State, provided the location and plans thereof are submitted to and approved by the Secretary of Transportation or by the Chief of Engineers and Secretary of the Army before construction is commenced.[11]

This statute does not purport to make Congress the source of the right to build; rather, it is assumed that the right comes from the State, and the statute merely subjects the exercise of that right to the further condition of obtaining consent from Congress to the taking of action on the grant.[12]

Title 33 of the Code of Federal Regulations provides for instances where navigation structures can be operated by other state and local entities as well as private contractors. One example of regulations governing a *lock* that is not operated by the Corps of Engineers is found in 33 C.F.R. 207.169, which provides for the use of the navigation lock and dam at Moss Bluff, Florida and establishes the hours of operation for the lock and the required signage to be provided by the *owner or agency controlling the lock.* Another example is Lock and Dam No. 19, located on the Mississippi River near Keokuk, Iowa, while the lock is owned and operated by the Corps of Engineers, the *dam* is owned and operated by AmerenUE.

As illustrated above, Congress has not only expressly recognized the need for comprehensive and coordinated development of navigable waters, but it has also given the Corps

[8] 33 U.S.C. 403.
[9] 33 U.S.C. 403(a)
[10] U.S. ex rel. Greathouse v. Hurley, 63 F.2d 137 (App. D.C. 1933).
[11] 33 U.S.C. 401.
[12] Pigeon River Imp., Slide & Boom Co. v. Charles W. Cox, Ltd., 291 U.S. 138 (1934).

of Engineers' *broad* authority to not only prevent obstructions to navigation, but also to promote the federal navigational servitude, including transportation improvement and flood control efforts on main stems and tributaries of navigable waters.[13] As such, the Corps of Engineers has the flexibility to utilize a variety of means to carry out its duties and obligations, including working with state and local governments, as well as private entities.

One example of this is the Corps of Engineers authority to enter into *cooperative agreements* with the Upper Mississippi River Basin Association and other agencies to promote and facilitate active State government participation in the river system management, development, and protection.[14] Another is the express authorization States are afforded to enter into cooperative agreements, establish agencies, and designate multi-State entities under 33 U.S.C. 652(d)(1) for river development, which provides:

> The consent of Congress is hereby given to the States of Illinois, *Iowa*, Minnesota, Missouri, and Wisconsin, or any two or more of such States, to *enter into negotiations for agreements*, not in conflict with any law of the United States, *for cooperative effort and mutual assistance in the comprehensive planning for the use, protection, growth, and development of the Upper Mississippi River system*, and to establish such agencies, joint or otherwise, or designate an existing *multi-State entity*, as they may deem desirable for making effective such agreements."[15]

In fact, persons—other than the Corps—are expressly authorized to make various improvements to navigable waters so long as the Corps approves any such improvement plan, as seen under 33 U.S.C. 565:

> Any person or persons, corporations, municipal or private, who desire to improve any navigable river, or any part thereof, *at their or its own expense and risk* may do so upon the approval of the plans and specifications of said proposed improvement by the Secretary of the Army and Chief of Engineers of the Army. The plan of said improvement must conform with the general plan of the Government improvements, must not impede navigation, and *no toll* shall be imposed on account thereof, and *said improvement shall at all times be under the control and supervision of the Secretary of the Army and Chief of Engineers*.[16]

However, it is important to note that in all such cases, the Corps of Engineers retains oversight and involvement with the locks and dams as they are required under 33 USC § 1.

[13] 33 U.S.C. 401, 403, & 407.
[14] 33 U.S.C. 652(d)(2); See also 33 U.S.C. 701-1.
[15] 33 U.S.C. 652(d)(1); See also 33 U.S.C. 701-1.
[16] 33 U.S.C. 565.

A. Hydroelectric Structures (FERC)

Another standard arrangement is the ownership and operation of hydroelectric structures. In this instance, federal oversight through Title 33 also remains. For example, 33 Code of Federal Regulations (CFR) 207.310 provides for the operation of the power dam at Keokuk, Iowa by the private power company. Supplementing this federal authority is the Federal Power Act in Chapter 12 of Title 16 of the United States Code. The Federal Power Act creates a statutory scheme designed to allow federally-supervised *development* of the nation's water resources for power and recreational uses. This act created the Federal Energy Regulatory Commission ("FERC") whose jurisdiction includes hydroelectric projects. The coordination of oversight between the Corps of Engineers and FERC is governed by a 1981 Memorandum of Understanding.

Section 825h of the Federal Power Act provides that FERC "shall have the power…to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate to carry out the provisions of [the FPA]."[17] FERC is also authorized under the Federal Power Act to issue licenses to *private parties* or to *state and local governments* for the purpose of "constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient" in order to develop and improve navigation and to develop, transmit, and utilize power.[18] Significantly, however, no license affecting the navigable capacity of any navigable waters of the United States may be issued until the plans of the dam or other structures affecting the navigation have been approved by the Chief of Engineers and the Secretary of the Army.[19] Section 6 of the Federal Power Act establishes that licenses may be granted for a period of fifty years or less[20] and that FERC may award licenses to project proposals "best adapted to a comprehensive plan for improving or developing a waterway."[21] The controlling standard is whether a particular project will be in the public interest.[22]

FERC involvement in hydroelectric projects is most common for the development of new hydroelectric facilities. However, federal law does not prohibit the conversion of existing dams for hydroelectric use. For instance, in 2007 three new hydroelectric plants were dedicated at existing dams in Arkansas. In fact, these dams had been constructed by the Corps of Engineers in the early 1900s as locks. When no longer needed, the locks were decommissioned and sold one to a city and the other two to private interests. It was not until the 1980s that work began investigating the possibility of hydro development at these sites.

[17] 16 U.S.C. 825h.
[18] 16 U.S.C. 797(e). See *VA Timberline, LLC v. Appalachian Power Co.*, 08-1248 (4th Cir. 8/31/09), 343 Fed. App. 915
[19] 16 U.S.C. 797(e).
[20] 16 U.S.C. 799.
[21] 16 U.S.C. 803(a)(1).
[22] Udall v. FPC, 387 U.S. 428, 450 (1967).

B. Federal Authority to Sell/Lease Locks and Dams

Article IV, section 3, clause 2 of the U.S. Constitution—the Property Clause—provides: "The Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States…." By virtue of the Property Clause, no agency or official of the government is authorized to sell, lease, give away, or otherwise dispose of governmental property without statutory authority, either explicitly or by necessary implication. As the Supreme Court put it in one case:

> Power to release or otherwise dispose of the rights and property of the United States is lodged in the Congress by the Constitution. Art. IV, §3, Cl. 2. Subordinate officers of the United States are without that power, save only as it has been conferred upon them by Act of Congress or is to be implied from other powers so granted.[23]

Further, the Supreme Court has provided that "Like any other owner [Congress] may provide when, how, and to whom its land can be sold."[24]

Leasing is a form of disposal for purpose of the Property Clause, and is therefore a function of Congress.[25] Accordingly, a federal agency needs statutory authority in order to "outlease (lease government owned property to nongovernmental parties) property under its control. Naturally, when and if Congress grants such authority, it may also impose conditions on it.[26]

It is important to note that once a dam or lock is sold or leased, however, federal regulation, oversight, and cooperation by the FERC and Corps of Engineers remains.

In the event of a sale, lease and/or shift in operating authority between the federal government and a state, local or private entity for a navigation structure, the operation requirements will be made part of the transfer agreement.

[23] Royal Indemnity Co., v. United States, 313 U.S. 289, 294 (1941).
[24] United States v. Midwest Oil Co., 236 U.S. 459, 474 (1915).
[25] Ashwander v. Tennessee Valley Authority, 297 U.S. 288, 331 (1995).
[26] E.g., Light . United States, 220 U.S. 523, 536 (1911) (United States "can prohibit absolutely or fix the terms on which its property may be used").

III. Public/Private Partnership (P3)

A. Iowa Law/Agencies

Given the flexibility described above regarding the ownership and operation of navigation structures, there exists the possibility of entering into an agreement with a private entity governing the ownership and/or operation of locks and dams. If a lock or dam is already under some control of Iowa, the State is in a position to negotiate the transfer of its responsibilities to a private entity. Otherwise, the private entity, perhaps along with the State, will need to negotiate a transfer or responsibilities with the federal government. Various Iowa agencies and departments are authorized to work with both the federal government and private entities on projects and issues involving navigable waterways, including the Mississippi River. In addition to Iowa Department of Transportation, the following are just a few of the Iowa entities that could be included in a cooperative endeavor agreement:

- The Department of Natural Resources ("DNR") has the authority to enter into contracts with other agencies and the private sector for preparing and conducting programs designed to protect the state's significant "open spaces".[27]

- The Department of Agriculture and Land Stewardship ("DALS") is required to implement, in conjunction with the federal government and other entities, a program that provides multi-objective resource protections for flood control, water quality, erosion control, and natural resource conservation.[28]

- Within DALS, the Water Resources Coordinating Council ("WRCC") was established to preserve and protect Iowa's water resources, and to coordinate the management of those resources in a sustainable and fiscally responsible manner. "In the pursuit of this purpose, the council shall use an integrated approach to water resource management, recognizing that insufficiencies exist in current approaches and practices, as well as in funding sources and the utilization of funds. The integrated approach used by the council shall attempt to overcome old categories, labels, and obstacles with the primary goal of managing the state's water resources comprehensively rather than compartmentally."[29]

- Additionally, the Mississippi River Partnership Council may work with the WRCC and is entity charged with "working with federal agencies to optimize the implementation of programs and the expenditure of moneys affecting the Mississippi river and counties in Iowa along the Mississippi river, including the upper Mississippi river basin association and the Mississippi parkway planning commission.[30]

- Port Authority shall foster and encourage the participation of private enterprise in the development of the port authority facilities to the fullest extent practicable in the interest

[27] 11 I.C.A. 465A.2.
[28] 11 I.C.A. 466.7.
[29] 11 I.C.A. 466B.3
[30] 1 I.C.A. 28N.3.

of limiting the necessity of construction and operation of the facilities by the port authority.[31]

B. Funding

With any P3 arrangement, the source of funding for the private owner/operator will be a central component of the agreement. Given that insufficient funds are a key driver for examining any P3 structure, any funding arrangements are likely to be more of a more complex nature. The simplest arrangement would be where the private entity would simply be given the right to generate its revenue. An example would be a standard hydroelectric agreement where a private company, through various agreements with government agencies and private end-users of the power, is allowed to generate and sell electricity.

A derivation of this structure would be where private interests other than a power company pay the private owner/operator of the structure. The prohibition on tolling in 33 USC 565, noted above, severely limits opportunities for a private company to generate other revenues absent federal legislation on the matter. A private company would likely need to access additional funding through some federal, state or local funding commitment. A complicating factor to this arrangement would be the level of funding certainty in any arrangement of this sort. A dedicated government funding stream would be a much better source for a private entity as compared to funding that is subject to annual appropriation.

[31] 1 I.C.A. 28J.10.