

**Proposed Public-Private Partnership Projects
for U.S. Inland Waterways Infrastructure
Financing, Operations, and Governance**

Prepared by:

The Horinko Group

for

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About U.S. Soybean Export Council



The U.S. Soybean Export Council (USSEC) is a dynamic partnership of key stakeholders representing soybean producers, commodity shippers, merchandisers, allied agribusinesses and agricultural organizations. Through a global network of international offices and strong support in the U.S., USSEC helps create and sustain demand for U.S. soybeans and soybean products, advocates for the use of soy in feed, aquaculture and human consumption, promotes the benefits of soy use through education and connects industry leaders through a robust membership program.

The activities of USSEC to expand international markets for U.S. soybeans and products are made possible by producer checkoff dollars invested by the United Soybean Board and various State Soybean Councils, through the American Soybean Association's investment of cost-share funding provided by USDA's Foreign Agricultural Service as well as support from cooperating industry. USSEC operates internationally as the American Soybean Association-International Marketing. USSEC connects producers who grow the highest-value crop in North America with a world of opportunities to improve human nutrition and livestock production. USSEC/ASA-IM employs over 150 staff worldwide to provide technical assistance and business expertise to companies and organizations around the globe.

About The Horinko Group



The Horinko Group (THG) is an environmental and business development consulting firm operating at the intersection of policy, science, and communications. Founded in 2008, THG has established itself as an innovator and a trusted, third party convener. The firm has a proven track record of addressing complex natural resource challenges, while meeting the needs of the broader community.

THG advocates for efficiency, sustainability, and holistic solutions based on cutting-edge science and sound business practice. THG works alongside federal, state, and local governments, NGOs, and the private sector to achieve measurable results for its clients, partners, and the communities and markets in which they operate. There are unique challenges and opportunities given the fiscal and regulatory uncertainty of these times. THG assists all stakeholders in thinking strategically about these opportunities and capitalizing on the business advantages of sustainability.

Disclaimer

Although the U.S. Army Corps of Engineers staff members were interviewed during this effort and their views helped inform the report's conclusions and recommendations, the Corps has not reviewed this report. The report does not represent the position of the U.S. Army Corps of Engineers, the Secretary of the Army, or any federal, state, or local department or agency.

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Executive Summary

America's inland waterways, built, operated, and maintained by the U.S. Army Corps of Engineers (Corps or USACE), are at a crossroads. Going forward, two paths exist. The first path, a continuation of current financing mechanisms, funding levels, operating practices, and governance arrangements points to continued deterioration of waterway serviceability. A crisis exists with respect to the Corps' lock and dam water infrastructure. Insufficient funding, extensive deferred maintenance, and a fix-as-fail repair strategy have led to unscheduled lock closures and accompanying delays. Shippers and producers are confronted with a system whose reliability is being challenged. Depending on the type of lock malfunction, protracted repair time will likely have adverse consequences for shippers. Lock unavailability reduces efficiency, increases costs for carriers (and ultimately shippers and commodity consumers), and threatens system reliability.

A second path, the one recommended within this report, consisting of a public-private partnership (P3), if implemented in one or two pilot projects, could demonstrate an alternative approach to guide the system's renewal. A P3, broadly defined, represents a contractual agreement between a public sector agency, such as the Corps, and, typically, a private sector entity to deliver a public service.

This report provides a regional perspective focused on what many concede is a critical system segment, given the importance of locks on the lower Illinois River and the Upper Mississippi River to agricultural interests, including soybean growers-exporters. The report outlines two possible P3 pilot projects, one involving two locks and dams (Peoria and LaGrange) on the lower Illinois River and another involving four locks and dams (Locks 24, 25, Melvin Price, and 27) on the Upper Mississippi River. These pilot projects could be undertaken separately or in combination.

In the pilot P3, a non-federal entity, either one or more private entities or a public authority (in conjunction with one or more private entities) could participate in the funding, operation and maintenance, and replacement or major rehabilitation of the locks and dams under a real property instrument and cooperative agreement while still owned by the federal government (Corps). Pursuant to a long-term arrangement, these

assets would be leased to a non-federal entity; they would not be sold but would remain the property of the federal government and under Corps agency oversight. The Corps would inspect, monitor and enforce compliance of the non-federal partner's activities under the agreement, and perform non-navigational functions, such as flood control, environmental remediation and maintain safe recreational access. The P3 contract would not in and of itself cause the elimination of current Corps' employees' positions, salaries, or benefits.

Tapping private capital and expertise, in the context of federal fiscal constraints, could significantly promote more efficient and more reliable river transport benefitting carriers and shippers. Enhanced maintenance and repairs will likely enhance performance and prolong these locks and dams' lifecycle sufficiently beyond their estimated 50-year design life, thereby obviating the need at many locations for expensive new construction and expansion.

The viability of a pilot P3 rests on three key assumptions: 1) Congressional authorization for the Corps to enter into a long-term lease for navigational assets, namely, locks and dams, under either existing or new statutory authority; 2) Congressional approval for a sufficient revenue stream from the leased assets for the P3 lessee; and 3) an adequate rate of return for private sector equity investors and a sufficient debt service coverage ratio for private sector debt investors. Assuming that each of these conditions is met, this report recommends that the Corps and other stakeholders give serious consideration to the implementation of one or two inland waterway pilot P3 projects.

Private investors would most likely be interested in an Upper Mississippi River P3 containing only the Melvin Price Locks and Dam and Locks and Dam 27. The main locks at both of these facilities are 1200-feet in length, the standard for modern locks, and do not require any expansion or new construction. Having undergone a major rehabilitation completed in 2011, Locks and Dam 27 does not need further major expenditures for the foreseeable future, as long as preventative maintenance is routinely addressed to protect this recent investment. Although structural components of the Melvin Price Locks and Dam were completed in 1990, recent inspections verify a need for major rehabilitation work estimated to cost \$40 million for the lock and \$20 million for the dam. As part of their due diligence, private investors would assess the needed

work and obtain their own cost estimates.

This report recommends convening successive discussions to first scope and then refine a pilot or pilots that identifies specific project outputs and responsibilities that would form the basis of a P3 contract. The scoping discussion would convene waterway users, such as carriers, shippers and producers, and representatives of the Corps of Engineers to discuss the benefits and challenges in formulating a successful P3 pilot addressing specific locations and desired outputs to be covered in the P3 contract. Thereafter, a subsequent discussion, consisting of various experts, including potential investor groups, service providers, risk managers, and others could examine and react to project environment, asset condition, and the constraints on revenue development and assist in refining and vetting a proposed P3 with respect to key questions, including structuring required return on private sector equity and the requisite debt service coverage ratio on debt obligations, cost reduction and revenue enhancement possibilities, scope of services to be provided, and risk management. In particular, these experts would focus on developing various financial opportunity metrics to support the implementation of a pilot P3 project.

I. Introduction

This introductory section provides background on the Corps and U.S. inland waterways. A brief overview of the soybean supply chain and the importance of inland waterways for soybean exports, offers the rationale for moving from a national treatment of U.S. inland waterways to a regional, supply chain based perspective, focusing attention on two locks and dams (Peoria and LaGrange) on the lower Illinois River and four locks and dams (24, 25, Melvin Price and 27) on the Upper Mississippi River that together represent a critically important and manageable component of the overall system.

U.S. Army Corps Of Engineers

The U.S. Army Corps of Engineers is an agency in the U.S. Department of Defense with military and civil works responsibilities. As part of its civil works program, the Corps plans, builds, operates, and maintains water resource public works in the United States. In addition to enabling commercial transportation through navigational support, the Corps' other primary water resource responsibilities include flood risk management and damage mitigation, as well as aquatic ecosystem restoration. Its other water resource missions include: water supply; hydropower; recreation; and environmental stewardship of its operational project lands and waters, and emergency management services.¹ The Corps' recreational mission is carried out on the 12 million acres it oversees at its more than 400 water resource projects nationwide. The management of these operational lands is addressed within the Corps' Civil Works Environmental Stewardship business line.

To fulfill its navigational support mission, the Corps plans, builds, operates, maintains, and rehabilitates locks and dams on selected U.S. rivers with the objective of managing water levels to provide more reliable river channels. Navigational support, with the system's associated infrastructure, however, goes far beyond locks and dams. It also includes channels, dredged material placement facilities, tow marshaling areas, berthing facilities (including docks and anchorage areas), and navigational aids, such as channel buoys. The Corps maintains and regulates river channel depths through dredging and

¹ For an overview of Corps Civil Works Program see U.S. Army Corps of Engineers-Civil Works (Corps), Building On a Foundation Of Strength, Fiscal Year 2012 United States Army Annual Financial Report (2012 Annual Report), 2-5.

water management. These dredged channels, as well as the locks and dams, comprise America's Inland Marine Transportation System (IMTS). These interconnected rivers and the aggregation of navigation infrastructure form a marine highway, tying America's inland terminals to its ocean ports.

Inland Waterway Locks

At present, the Corps operates and maintains a network of some 11,000 miles comprising the IMTS, where commercial vessels using these waterways pay a special fuel tax. The system includes a minimum nine-foot navigation channel, as well as 171 commercially active locks sites with 207 lock chambers.²

In comparison to rail or highway transport, the IMTS provides a comparative energy efficient and likely cost effective³ means to transport commercial goods, particularly bulk commodities, such as agricultural products, including soybeans and corn, as well as coal, cement and gravel, chemicals, and processed and scrap metals, over long distances. A single barge has dry-cargo capacity of 16 rail cars or 70 trucks. It is reported that one barge can carry 53,000 bushels of soybeans, one rail car 3,670 bushels, and one truck/container 870 bushels, one 15 barge-tow of soybeans equals 216 rail cars or 1,050 semi-trucks,⁴ and that inland waterways contribute far fewer greenhouse gas emissions per mile than rail or truck freight transportation.

² Presentation, Jeff McKee, Navigation Branch, HQ, U.S. Army Corps of Engineers, American Association of Port Authorities Harbors & Navigation Meeting, July 25, 2011.

³ However, the variations in travel miles from one point of origination to the same final destination by barge versus rail, so-called circuitry, must be considered. Railroads may follow a straighter path down the Illinois River and Mississippi River to Gulf ports because these two rivers may not flow as directly. Nationwide, barges have a 1.3 to 1 circuitry factor compared to trains, that is, a barge must travel 30 percent further than a rail car to reach the same destination. Because of their greater fuel efficiency than the average train, a unit train, that is, rail cars going to the same final destination hauling one type of commodity, may be significantly more efficient than a flotilla of barges. For an analysis of cargo capacity, congestion issues, emissions issues, energy efficiency, and safety impacts see Center for Ports and Waterways (CPW), Texas Transportation Institute (TTI), A Modal Comparison of Domestic Freight Transportation Effects On The General Public, Final Report, December 2007, 9-43.

⁴ Presentation, Ken Eriksen, Senior Vice President, Informa Economics, Conditions of Illinois Infrastructure for Commodities, Illinois Soybean Association, Export Transportation Summit (Presentation, Eriksen), June 13, 2013, 16. See also *Economist*, "Crying out for dollars", February 2, 2013, 24-25, at 25.

Although inland waterway traffic on the IMTS accounts for only 4 to 5 percent of the annual total commercial tonnage shipped,⁵ these waterways represent an important transportation route for the shipment of bulk goods over long distances. Shippers depend on these inland waterways to annually move some 630 million tons of freight valued at more than \$180 billion. This cargo moves at an average cost savings of more than \$14 per ton in comparison to alternative overland transportation modes. In total, more than \$9.2 billion in transportation cost savings are currently achieved each year.⁶

The IMTS is also an essential component in maintaining our nation's economic competitiveness and its state and local economies. It also facilitates economic development, locally and regionally.

Inland Waterway Dams

The federal government owns 3,225, some 4 percent of the nation's dams. Of these, the Corps owns 694 dams.⁷ Despite their few numbers, the Corps' dams, many of which are co-located with locks, provide many benefits.

Seventy-five hydropower projects, with 350 generating units, exist at Corps' dams. Owning and operating 24 percent of the U.S. hydropower capacity, the Corps ranks as the nation's leading federal hydropower producer.⁸ In addition, there are 90 non-federal power plants at Corps' dams, regulated by the Federal Energy Regulatory Commission.⁹

The Corps' locks and dams create extensive upstream pools. The Corps serves as the nation's number one provider of outdoor recreation with some 423 river and lake projects, many of which depend on pools created by inland waterway dams.¹⁰ Municipalities draw drinking water and manufacturing facilities, electric utilities, and farmers, among others, obtain needed water from pools created by these dams.

⁵ Charles V. Stern, *Inland Waterways: Recent Proposals and Issues for Congress*, Congressional Research Service (CRS), R41430 (Inland Waterways), August 5, 2013, 2.

⁶ IMTS Capital Investment Strategy Team, *Inland Marine Transportation Systems (IMTS) Capital Projects Business Model, Final Report, Revision 1 (IMTS)*, April 13, 2010, 4.

⁷ American Society of Civil Engineers (ASCE), *2013 Report Card For America's Infrastructure (2013 Report Card)*, March 2013, 15.

⁸ 2012 Annual Report, 5.

⁹ Michael J. Sale, *Outlook for the U.S. Army Corps of Engineers Hydropower Program*, U.S. Army Corps of Engineers, Institute for Water Resources, 2011-WR0-P-02, March 2011, 2.

¹⁰ IMTS, 69.

II. Importance of Certain U.S. Inland Waterways for Soybean Exporters

Locks on U.S. inland waterways exist for logistical reasons, specifically, to support the movement of commercial goods. The U.S. inland waterways serve a key role in the export market for grains, such as soybeans, and also coal and chemicals among other cargos.

Soybeans moving downstream by barge along the Upper Mississippi River and Illinois River primarily originate in four states: Illinois, Iowa, Minnesota, and Missouri. As a leading agricultural crop, the value (in billions) of soybean production in each of these four states was as follows:¹¹

	<u>2009/2010</u>	<u>2011/2012</u>
Illinois	\$4.215	\$4.955
Iowa	\$4.627	\$5.500
Minnesota	\$2.674	\$3.108
Missouri	\$2.216	\$2.259

Again, these four key soybean producing states illustrate the importance of inland waterways to soybean growers. The 2009/2010 soybean transportation volume (in tons) among barge, rail, and truck/container was as follows:¹²

	<u>Barge</u>	<u>Rail</u>	<u>Container</u>
Illinois	5,765,149	1,683,044	1,157,520
Iowa	1,698,444	1,895,893	19,320
Minnesota	1,363,696	3,771,786	13,980
Missouri	2,362,163	1,068,777	14,550

Soybeans shipped on inland waterways are bound for some domestic markets, but primarily for export markets. More than 90 percent of the soybean barge movements on U.S. inland waterways is destined for Gulf ports for export to foreign markets, notably China, Europe, and Japan. Less than ten percent of barge movements are used for

¹¹ Informa Economics, *Farm To Market: A Soybean's Journey From Field To Consumer (Farm To Market)*, July 2012, 107 (Table 14: Value of Soybean Production in Focus States (\$ Millions)).

¹² *Ibid.*, 103 (Table 10: Current and Future Soybean Volume (tons) by Mode in 17 Focus States), 116, 124, 140, 148.

domestic soybean placement. The typical percentage of soybeans moved by barge to export and domestic positions from these key four states is as follows:¹³

	Barge Movement for:	
	<u>Export</u>	<u>Domestic</u>
Illinois	93%	7%
Iowa	91%	9%
Minnesota	91%	9%
Missouri	96%	4%

III. A Regional Perspective: Six Key Locks for Soybean and Other Exports

Having analyzed these four key soybean producer states and the dependence of soybean growers on barge transportation, especially for export shipments, we see the comparative importance of certain locks on the lower Illinois River and the Upper Mississippi River. Thus, this report focuses on six locks, two locks on the lower Illinois River (Peoria and LaGrange) and four locks on the Upper Mississippi River (Locks 24, 25, Melvin Price, and 27). These six locks comprise the locks under initial consideration for possible lease in one or two pilot P3s for purposes of this report. These locks have not been identified, endorsed, or agreed to by the Corps or Congress. Appendix A contains a brief description of these six locks (and the accompanying dams) of interest to soybean growers-exporters due to their relative contribution to the overall U.S. soy supply chain.

IV. Existing Funding for Inland Waterways' New Construction, Major Rehabilitation, Operations, and Maintenance

This section provides a brief overview of the existing funding mechanisms for the upkeep of U.S. inland waterways. After discussing the federal authorization and appropriation process for new construction and major rehabilitation projects, it examines the funding sources for: 1) operations and maintenance; and, 2) new construction and major rehabilitation. Next, it considers how the Corps and the Office of Management and Budget (OMB) establish budgetary priorities for Corps' projects within a constrained federal fiscal environment.

¹³ *Ibid.*, 104 (Table 11: Percentage of Soybeans Moved to Export Positions by Focus States).

Authorization of and Funding for U.S. Inland Waterways

Congressional appropriations for U.S. inland waterways construction, operation and maintenance are typically provided separately from the granting of authority to perform these functions. Congress authorizes and adds new water resource projects to previously existing authorized activities through periodic federal Water Resources Development Acts (WRDAs), with the last one enacted in 2007. The 2007 WRDA authorized, but did not provide appropriations for, the construction of new 1200-foot locks at the Peoria Lock and Dam—Illinois River (Peoria L&D), LaGrange Lock and Dam—Illinois River (LaGrange L&D), Lock and Dam 24—Mississippi River (Lock and Dam 24), and Lock and Dam 25—Mississippi River (Lock and Dam 25).¹⁴ Although the massive WRDAs typically focus on new project authorization, they also authorize operation, maintenance, and rehabilitation of existing projects.¹⁵ However, the WRDAs neither prioritize authorized projects, nor include a timeline for funding appropriations from general revenues.

Overall, project authorizations generally outpace project appropriations. Because funding does not keep pace with the backlog of authorized projects, the Corps must attempt to distribute or allocate funds across multiple projects, many of which lack adequate funding to proceed, or for which no funding has been provided at all.

In April 2011, the Corps estimated the value of the current backlog of its construction projects at \$62 billion:

- 1) \$21.5 billion in uncompleted activities included in the President's budget (of this total, inland waterway projects may account for \$12-\$15 billion, apart from decommissioning underutilized locks and finding savings in the way construction is scheduled and completed);

¹⁴ Water Resources Development Act of 2007, Public Law 110-114, §8003(b)(1).

¹⁵ For examples of operations, maintenance, and rehabilitation projects and studies in the WRDA of 2007, see National Research Council (NRC), *Corps of Engineers: Water Resources Infrastructure: Deterioration, Investment, or Divestment? (Corps)* (Washington, DC: National Academies Press, 2013), 30 (Table 2-2 Examples of Operation, Maintenance and Rehabilitation Projects and Studies in the Water Resources Development Act of 2007)). The National Research Council, as the operating arm of the National Academy of Sciences (NAS), carries out research for the NAS and issues reports, among other functions, including providing independent, expert opinions on Corps' projects and issues.

- 2) \$38.5 billion for other active projects not yet in the President's budget; and,
- 3) \$2 billion in inactive, authorized construction projects.¹⁶

The ever-growing construction backlog results in projects being delayed, or pursued in a start-stop manner, confounding efficient project delivery, thereby driving up costs.

Congress typically delivers Corps' construction appropriations in incremental amounts, not an entire project amount. The partial project funding process through appropriation enactments further exacerbates the project delivery problem. Construction projects typically move forward in a piecemeal process, yielding inefficient project delivery, marked by schedule delays, higher overall costs and creating the likelihood of significant cost overruns.

Federal Funding for Inland Waterways

Generally speaking, federal funding for the IMTS comes from two different streams: first, operations and maintenance and second, new construction and major rehabilitation. The federal government funds operations and maintenance costs through general appropriations.¹⁷ Besides operations and maintenance work on locks and dams, these expenditures also include dredging and dredged material disposal, water level and flow regulation, and bank stabilization, among other items. In recent years, federal expenditures for Corps operations and maintenance on inland waterways have averaged somewhat in excess of \$500 million a fiscal year, pre-sequestration.¹⁸

¹⁶ Nicole T. Carter and Charles V. Stern, Army Corps Fiscal Challenges: Frequently Asked Questions, CRS, R41961, December 15, 2011, 11, 12 (Figure 5. Estimate of Corps Civil Works Construction Backlog).

¹⁷ 33 USC §2212(b).

¹⁸ For example, in fiscal year 2012, the Corps sought \$531 million for inland waterways operations and maintenance, out of a total of \$2.314 billion requested for operations and maintenance. Congress appropriated a total of \$2.412 billion for Corps operations and maintenance, apart from a supplemental disaster relief appropriation of \$534 million. Department of the Army, Office, Assistant Secretary of the Army (Civil Works), Fiscal Year 2012 Civil Works Budget for the US Army Corps of Engineers (2012 Budget), 5 (FY 2012 Budget Business Line/Account Cross-Walk (\$ Millions)); Consolidated Appropriations Act, 2012, Public Law 112-74, Division B, Title I; Disaster Relief Appropriations Act, 2012, Public Law 112-77, Title I.

New construction and major rehabilitation, i.e., any upgrade in excess of \$8 million, for navigation projects on the IMTS, including locks and dams, are funded under a 50-50 cost share arrangement between direct users and the federal government.¹⁹ Direct users, specifically, the inland waterways shipping industry, fund the Inland Waterways Trust Fund (IWTF) through a twenty cent per gallon tax on commercial transportation fuel, which has remained constant since 1995.²⁰ The federal government funds the other 50 percent through general appropriations.

Expenditures from the IWTF are not automatic. Construction and major rehabilitation projects must not only receive Congressional authorization but also be funded by separate, discretionary Congressional appropriations.

Today, expenditures from the IWTF cannot exceed the expected amount of fuel tax revenues collected in a fiscal year. Because the average annual fuel tax revenues of between \$75 and \$95 million are insufficient to cover one half of the cost of construction and major rehabilitation projects on inland waterways, the federal government covers, through general appropriations, more than one half of these costs.

The bottom line: user-funded annual IWTF receipts only cover some 8 percent to 10 percent of the total costs the Corps incur each year to support inland waterway navigation.²¹

¹⁹ 33 USC §2212(a), 26 USC §9506(c)(1), (2).

²⁰ 26 USC §4042. The Inland Waterways Revenue Act of 1978 created the IWTF within the U.S. Treasury Department to hold revenues for major rehabilitation and new construction expenditures for navigation on U.S. inland waterways as provided in separate appropriation acts. The statute defined segments of inland and intercostal waterways to be subject to a tax on fuel used in commercial transportation on these designated waterways. The IWTF was reauthorized as part of the 1986 Water Resources Development Act.

²¹ Committee on the Marine Transportation System, U.S. Department of Transportation, National Strategy for the Marine Transportation System, July 2008, 27 (less than 10 percent) and Office of Management and Budget (OMB), Living Within Our Means and Investing in The Future: The President's Plan for Economic Growth and Deficit Reduction (Living Within Our Means), September 2011, 33 (about 8 percent).

Establishing Corps' Budgetary Priorities

Three main accounts within the annual federal Corps' budget represent a high percentage of total funding sought.²² First, the General Investigations account funds studies to determine the need, engineering feasibility, economic justification, environmental and social suitability of proposed solutions to water and related land resource problems. Second, the General Construction account funds construction, major rehabilitation, and related activities for water resources development projects having navigation, flood reduction, water supply, hydroelectric, and environmental restoration benefits. Third, the Operations and Maintenance account funds operations and maintenance (including dredging), routine repairs, minor rehabilitation at water resource projects the Corps operates and maintains.

With respect to operations, maintenance, routine repairs, and minor rehabilitation priorities, the Corps makes decisions about these priorities within its proposed annual budget, which it submits for review to OMB. The Corps uses its own Engineering Circular²³ to provide guidance for the development and submission of its civil works budget to OMB. In addition to using the Engineering Circular to help identify the locks and dams in the greatest need of repair and provide a systematic maintenance schedule, the Corps has also initiated an asset management program to provide guidance for its budgetary submission.²⁴

In striving to formulate a performance-based budget, the Engineering Circular, in general, primarily directs budgetary focus to the maintenance of critical infrastructure at priority lock sites with the greatest need of repair and the most commercial traffic. Funds go to safety improvements at Corps' dams based on risk and the consequences of failure. With respect to construction and major rehabilitation, the Corps gives priority to

²² CPW, TTI, *New Approaches For U.S. Lock and Dam Maintenance and Funding (New Approaches)*, January 2013, 7.

²³ Department of the Army, U.S. Army Corps of Engineers, Army Programs, Corps of Engineers Civil Work Direct Program, Program Development Guidance, Fiscal Year 2009, Circular 11-2 -187 (Engineering Circular), May 11, 2007.

²⁴ NRC, *Corps*, 47, 82.

projects with the greatest net economic and environmental returns per dollar expended.²⁵

More specifically, within a constrained federal budgetary environment, to carry out its navigation mission, the Engineering Circular provides that the Corps' objectives include funding: 1) navigation infrastructure when the benefits exceed the costs; 2) high priority operations and maintenance; and 3) operating and managing navigation infrastructure to maintain commercial traffic service levels on high use waterways. Performance-based measures with respect to objectives 2 and 3 center on risk and reliability as it relates to asset condition assessment and impacts.²⁶

Within these general objectives and performance measures, the Corps' budgetary strategy for: 1) operations seeks to assure that each project performs as designed, for the percentage of time the project is available to operate as designed, focusing on cumulative benefits and cumulative operations and maintenance costs for these benefits (over a set time period); and, 2) maintenance strives to make certain, through risk management, that each project is safe to operate, based on the percentage of scheduled and unscheduled closures and each project's condition assessment and impact.²⁷

Next, the asset condition assessment and impact prioritization for any non-routine maintenance effort uses a weighted evaluation process with two key parameters, criticality and traffic, related to risk and/or reliability considerations. With respect to criticality, the key reliability factor focuses on whether an item: 1) has failed or 2) faces eminent failure, that is, a 50 percent or greater likelihood that failure will occur within five years, thereby providing the basis for the Corps' current fix-as-fail repair strategy. Furthermore, reliability looks to whether or not the item's failure would close navigation for five days or more. Traffic considerations include commercial tons and the number of lockages. These two measures relate to an item's relative economic impact and to risk, that is, the relative economic impact of an item's failure.²⁸

²⁵ Department of the Army, Office, Assistant Secretary of the Army (Civil Works), Fiscal Year 2013, Civil Works Budget for the U.S. Army Corps of Engineers, February, 2012, 1.

²⁶ Engineering Circular, V-1 (Table V-1 Navigation Objectives and Performance Measures).

²⁷ *Ibid.*, V-3 (Table V-2 Navigation Budget Performance Measures).

²⁸ *Ibid.*, V-7 to V-8.

Following the Engineering Circular's operations and maintenance priorities, each Corps budgetary unit prepares its own budget. In creating a budget, units generally request and allocate funds by four levels: 1) Base amount (bare bones); 2) Periodic lock inspections and dam safety; 3) Recovery to base level for facilities operating below base amount; 4) Backlog (larger repair items).

Office of Management and Budget Review

Once the Corps prepares its proposed budget, the Office of Management and Budget plays a significant role in overseeing and finalizing the Corps' budget. As with all federal agencies, OMB must review and approve the Corps' budget before its inclusion in the President's budget submitted to Congress. OMB reviews the Corps' financial needs and its programs. OMB then negotiates with the Corps' over the amount of money to be included in the Corps' final budget.

In making budgetary priority decisions, OMB uses various factors with respect to operations and maintenance as well as the major rehabilitation and new construction of inland waterways. Examples of factors OMB uses to prioritize funding operations and maintenance of navigation infrastructure include the imminent risk to human life and the amount of commercial tonnage transported on a waterway. OMB sets minimum benefit-cost ratio (BCR) thresholds for construction projects to be included in the final budget request. For example, new construction starts typically need a BCR of 2.5 to 1 at a 7 percent discount rate for future cash flows.²⁹

After its review, OMB sends the proposed budget back to the Corps. The Corps then revises its budget request and prepares supporting material for inclusion in the President's budgetary submission to Congress.

Not bound by the President's proposed budget, both houses of Congress initiate their own budget process. Ultimately, Congress passes various appropriation bills to fund the federal government's discretionary spending. The Energy and Water Development Appropriations bill typically establishes the Corps' funding.

²⁹ CPW, TTI, New Approaches, 8-9.

V. Current and Projected Funding Gap: New Construction, Major Rehabilitation, and Deferred Maintenance

All current reporting, whether prepared by the Corps or outside experts, agree that the U.S. inland waterways system faces a funding crisis. In view of the current and projected inadequate funding, with respect to new construction and major rehabilitation projects as well as operations, maintenance, routine repairs, and minor rehabilitation efforts, the Corps cannot fulfill its navigation mission on the IMTS.

New Construction and Major Rehabilitation

Federal funding for new construction and major rehabilitation has declined steadily, apart from the infusion of funds in fiscal years 2006-2010. Recently, Congress has appropriated between \$170 million and \$200 million per fiscal year, pre-sequestration.³⁰ Inadequate funding limits impede the number of new and ongoing inland waterway lock and dam construction projects.

Under the existing capital projects business model the Corps uses, system wide, its inland waterways projects already under construction would require an estimated \$4.77 billion to complete. With current IWTF revenues of \$75 to \$95 million per year, assuming matching federal appropriations, these projects likely will not be completed until 2040 at the earliest.³¹ As of 2010, the Corps further estimated there was an additional \$4.3 billion needed for other already authorized, but unfunded, construction projects.³² Regionally, the current cost estimates for four authorized, but unfunded, lock expansion projects, which comprise four of the six locks under consideration for one or two pilot P3s, Peoria L&D, LaGrange L&D, Lock and Dam 24, Lock and Dam 25, equal \$349.3 million, \$348 million, \$411.1 million, and \$430.1 million, respectively,³³ totaling \$1.538.5 billion. In sum, new project needs, both underway and shovel-ready,

³⁰ For example, in fiscal year 2012, the Corps sought \$166 million (presumably including \$83 million from the IWTF) for inland waterway construction out of a total of \$1.480 billion requested for construction. Congress appropriated a total of \$1.694 billion for construction. 2012 Budget, 5 (FY 2012 Budget Business Line/Account Cross-Walk (\$ Millions)) and Consolidated Appropriations Act 2012, Public Law 112-74, Division B, Title I.

³¹ CPW, TTI, *New Approaches*, ix, 48.

³² IMTS, 20.

³³ CPW, *New Approaches*, 37 (Table 8. Phase 1 and Phase 2 Projects from Capital Projects Business Model (Locks Only)).

overwhelm the available construction funds. At the same time, construction costs have increased significantly and project completion dates have been significantly delayed.

Looking ahead, estimates place the total capital needs of the IMTS during the next 20 years (2013-2033) at about \$18 billion, or a yearly average of some \$900 million.³⁴ Maintaining current levels of unscheduled delays at locks, so as not to further exacerbate delays, will require more than \$13 billion between 2013 and 2020. About one quarter (27 percent) of these needed funds would go to the construction of new locks and dams; some three quarters (73 percent) would fund the major rehabilitation of current facilities. With funding projected not to exceed \$7 billion during this seven-year period, an unmet near-term financing deficit of \$6 billion exists for construction and major rehabilitation projects.³⁵

Of the six regional locks under consideration by the authors of this report for one or two pilot P3s, the most pressing major rehabilitation projects, but not the highest priority in the IMTS, exist at the LaGrange L&D and Lock and Dam 25. Estimates for the major lock rehabilitation at the LaGrange L&D run between \$57.7 million and \$78.8 million. At Lock and Dam 25, the lock and dam require major rehabilitations at an estimated cost of \$40 million for the lock and some \$20 million to \$43.8 million for the dam. Details of the LaGrange L&D and Lock and Dam 25 major rehabilitations are set forth in Appendix B.

Other less pressing major rehabilitation projects exist at Peoria L&D, Lock and Dam 24, and Melvin Price Locks and Dam. The major lock and dam rehabilitations at the Peoria L&D will cost an estimated \$50 million and \$20 million, respectively. The cost of the major rehabilitation of the lock at Lock and Dam 24 may equal \$11.85 million. The major lock and dam rehabilitation at the Melvin Price Locks and Dam will cost an estimated \$40 million and \$20 million, respectively. Appendix C contains the details of these major rehabilitation projects at the Peoria L&D, Lock and Dam 24, Lock and Dam 25, and Melvin Price Locks and Dam.

³⁴ ASCE, 2013 Report Card, 40.

³⁵ *Ibid.* Estimates indicate more than \$25 billion is required to address various deficiencies on Corps-owned dams. *Ibid.*, 16.

Implications of Deferred Maintenance and a Fix-as-Fail Repair Strategy

Beyond construction and major rehabilitation funding needs, as the result of chronic underfunding, the nation's inland water infrastructure suffers from extensive deferred maintenance. For the State of Illinois alone, including waterway reaches that border the State, estimates place total deferred maintenance of lock and dam components at some \$560 million.³⁶ Because of funding constraints, in accordance with its Engineering Circular, the Corps has implemented a fix-as-fail repair strategy. Recent reports, summarized in this section, point to the IMTS's deterioration, marked by system wide delays. Lock unavailability serves as an indicator of inland waterway decay and lack of serviceability.

As the result of inadequate funding for maintenance and routine repairs, the locks and dams system wide face deterioration and decline. As the Corps candidly states:³⁷

The system's aging infrastructure requires more repairs than the Corps can accomplish given the historical level of navigation appropriations. ... Many locks and dams received only the most critically-needed maintenance; some locks, dams, and waterways were only maintained in caretaker status. The overall condition of the inland...waterways is expected to decline, and projects will continue to experience lock closures due to mechanical breakdowns and failures.

In a recent report, the National Research Council highlights the critical underfunding situation, which has led to significant water infrastructure deterioration, again system wide. The report concludes that continuing the financing status quo "will entail continued deterioration of the [inland navigation] system and eventual, significant disruptions in service. It also implies that the system would be modified by deterioration, rather than by plan."³⁸ Noting that over the past 20 years funding consistently has "been inadequate to maintain all of this [water resource] infrastructure

³⁶ Presentation, Eriksen, 22.

³⁷ Corps, 2012 Annual Report, 16. Besides locks and dams, the condition of channels also must be considered. Many factors limit or control channel width and depth availability, with dredging operations having the greatest impact. Dredging operations currently face funding shortfalls and increased costs. The recent, significant increase in dredging costs results from the near doubling of fuel costs and substantial increases in steel and labor costs. Also, new environmental requirements and the construction of more distant dredged material placement sites have increased channel-dredging costs. *Ibid.*

³⁸ NRC, *Corps*, 80.

at acceptable levels of performance and efficiency....The water resources infrastructure of the Corps of Engineers thus is wearing out faster than it is being replaced or rehabilitated.”³⁹ The NRC further indicates that inadequate funding to cover operations, maintenance, and minor rehabilitation needs had led “to an unsustainable situation for maintenance of existing [water resources] infrastructure. This scenario entails increased frequency of infrastructure failure and negative social, economic, and public safety consequences.”⁴⁰

As a result of chronic underfunding and more recent federal fiscal constraints, throughout the IMTS, the Corps has adopted a “fix-as-fail”⁴¹ approach to maintaining locks. It only repairs a major component when it reaches an unacceptable performance level, i.e. when it fails or when failure is imminent. As the Corps indicates, the same strategy applies regionally with respect to the Peoria L&D and Locks and Dams, 24, 25, Melvin Price, and 27:⁴²

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventive maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

As the result of underfunding, unscheduled closures and delays abound system wide and regionally, imposing additional costs on carriers and ultimately on shippers. Barges are daily stopped for hours as a result of unscheduled delays, thereby slowing goods from getting to market. According to the American Society of Civil Engineers (ASCE):⁴³

³⁹ *Ibid.*, 2, 31.

⁴⁰ *Ibid.*, 9, 87.

⁴¹ CPW, TTI, *New Approaches*, 29.

⁴² Corps, Rock Island District, *Illinois Waterway, Locks & Dams 2012*, Peoria Lock & Dam, 16; Corps, Mississippi Valley District, *Upper Mississippi River Locks & Dams*, n.d., Lock & Dam 24, 2, Lock & Dam 25, 2, Melvin Price-Locks & Dam 26, 2, Chain of Rocks-Locks & Dam 27, 2.

⁴³ ASCE, 2013 Report Card, 39.

Ninety percent of the locks and dams on the U.S. inland waterway system experienced some type of unscheduled delay of service in 2009, averaging 52 delays a year. The hours lost due to unscheduled delays has increased significantly since the 1990s, which costs industry and consumers hundreds of millions of dollars annually. For 2011, the number of hours of delay experienced by barges throughout the entire inland waterway system reached the equivalent of 25 years.

With scheduled and unscheduled lock closures frequently occurring, according to the ASCE:⁴⁴

When a lock or dam reaches poor condition, barges have to stop more often and allow for scheduled maintenance. These scheduled lock outages to address maintenance issues are increasing. Unscheduled delay is most often the result of high volumes at transit points, as well as occasional failures in equipment, resulting in increased operating costs. Unscheduled delays are especially costly because vessel operators are unable to anticipate and offset the costs of these incidents.

The bottom line for the ASCE: a grade of D-, barely above failing, for our nation's inland waterways.⁴⁵

Deferred maintenance and an inability to fund routine repairs have, despite the Corps' best efforts, increased the number of unscheduled closures system wide. In fiscal year 2011, inland waterways experienced 23,100 hours of closures of more than 24 hours, resulting from mechanical breakdowns of main lock chambers, up from 11,100 hours in fiscal year 2009. However, these more than 24 hour lock closures decreased to 16,500 in fiscal year 2012.⁴⁶ These trends indicate the system's unreliability and adversely impact the confidence of inland waterway users and shippers. The degraded condition sends a signal to shippers to investigate alternatives.

As shown in Appendix D, the six regional locks exhibit a mixed pattern with respect to delays and lock unavailability. An analysis of these six regional locks under

⁴⁴ *Ibid.*

⁴⁵ *Ibid.*, 38.

⁴⁶ Corps, 2012 Annual Report, 17 (Table 5. Navigation, Operations and Maintenance Activities Performance Indicators) and 27.

consideration for one or two pilot P3s bears out these negative system wide conclusions as to delays, but not lock unavailability, generally speaking.

In sum, system wide, the urgent or critical maintenance backlog continues to build up. The Corps' immediate challenge focuses on the maintenance and repair of existing inland water infrastructure. Given the present funding levels, however, the Corps can address only the most urgent maintenance and repair needs.

Looking to the future, system wide and regionally, with status quo funding, aging infrastructure will require higher levels of maintenance, repair, and minor rehabilitation expenditures. Without some type of capital infusion, closures, scheduled and unscheduled, and delays will become more commonplace. System efficiency and reliability will decrease, imposing higher costs on carriers that will be passed on to users. Because the status quo arrangements cannot meet the funding gap, enhanced maintenance and repairs (and possibly upgrading) require a massive capital infusion.

VI. Current Proposals to Fund Corps' Maintenance, Repairs, Major Rehabilitation, and Construction Backlog on U.S. Inland Waterways

To finance future Corps operations, maintenance, major rehabilitation, and construction needs, assuming the continuation of the traditional governance approach, four basic options exist: 1) increasing the fuel tax; 2) increasing federal government appropriations; 3) imposing user fees; or, 4) implementing some combination of these three alternatives. Another possibility centers on issuing debt to finance critical construction and major rehabilitation projects. None of these proposals offered by stakeholders, the President, members of Congress, or research institutions and experts have been enacted.

To shore up the IWTF, the Inland Waterways User Board (IWUB)⁴⁷, a federal advisory committee, recommended a 6 to 9 cents per gallon increase in the current 20 cents per gallon fuel tax.⁴⁸ The increase could generate upwards of about \$112 million annual tax

⁴⁷ WRDA of 1986 established the Inland Waterways Users Board, a federal advisory committee. The act provides that the board consist of 11 members, selected by the Secretary of the Army, representing commercial users and shipping interests in the main geographical areas served by the inland waterways, with consideration given to tonnage shipped on these waterways. The board makes recommendations to the Secretary regarding IWTF construction and major rehabilitation priorities. IMTS, 6.

⁴⁸ *Ibid.*, 72.

revenues for the IWTF, with federal appropriations presumably continuing to track the heightened revenues flowing into the IWTF.

In an effort to distribute costs more equally among those benefitting from the IMTS, at least in its eyes, the IWUB also recommended a change in the current cost-sharing distribution arrangement. New lock construction and rehabilitation of lock projects costing at least \$100 million would continue to be cost shared 50 percent from general appropriations and 50 percent from the IWTF. However, construction and rehabilitation of lock projects costing below \$100 million and the operations and maintenance of all dam projects (regardless of cost) would be 100 percent funded from general appropriations.⁴⁹

According to the IWUB, full funding of its two proposals would require average annual expenditures of \$270 million from general federal revenues and \$110 million from the IWTF or a total of some \$380 million,⁵⁰ a substantial increase from fiscal year 2011 expenditures for construction and major rehabilitation of about \$170 million. Estimates by the Congressional Research Service indicate IWUB's cost sharing proposal would increase the general appropriations share for new construction and rehabilitation expenditures over 25 years from 50 percent to 70 percent for the same subset of projects, with some \$1.33 billion in federal funding needed in the first five years following the proposal's enactment.⁵¹ An increase in expenditures of this magnitude appears unlikely in the current era of federal fiscal austerity.

Basically mirroring the IWUB proposal, the proposed WAVE-4 Act (Waterways Are Vital for the Economy, Energy, Efficiency and Environment) introduced by Representative Wayne Edward (Ed) Whitfield (R-KY) would increase the fuel tax by 6 cents per gallon. The bill would also alter the cost sharing split, making the federal government responsible for a larger share of inland waterway lock and dam construction and major rehabilitation costs.⁵² In the Senate, the proposed RIVER Act (Reinvestment In Vital Economic Rivers) introduced by Senator Robert P. (Bob) Casey, Jr. (D-PA) would raise

⁴⁹ *Ibid.*, 70. Other cost sharing options are set forth in *Ibid.*, 69 (Table 5-1. Cost-Sharing Options Considered).

⁵⁰ *Ibid.*, 70.

⁵¹ Stern, *Inland Waterways*, 13, and n. 37 at 13.

⁵² H.R. 1149, March 14, 2013, 113th Congress, 1st Session.

the fuel tax by 9 cents per gallon and alter the cost sharing split, but in a way less costly for federal expenditures.⁵³

The Obama administration has opposed the IWUB proposal. In a December 2010 letter, the Assistant Secretary of the Army for Civil Works attacked both aspects of the IWUB proposal.⁵⁴ First, the proposed fuel tax increase would do little to address the funding shortfall, noting, “[T]his level of revenue increase would not be sufficient to support efficient investment in the inland waterways... .” With respect to changing the cost sharing distribution, the letter indicated that the IWUB’s proposal “would transfer a significant responsibility from the users... to the general taxpayer. Such a major shifting of costs is inconsistent with the user-pay principle that helps to guide Civil Works investment decisions.”

The Obama administration has recommended replacing or supplementing the fuel tax with some type of user fee. In its first iteration, the Obama administration’s budget request for fiscal year 2010 proposed phasing out and replacing the fuel tax, with a user fee imposed on those using the system.⁵⁵ Following a Corps proposal to the Bush 43 administration,⁵⁶ the user fee would take the form of a lock passage fee. The amount of the per barge lockage fee would depend on the size of the lock: 1) equal to or greater than; or, 2) less than 600 feet in length.

In its second iteration, the Obama administration in 2011 proposed maintaining the current fuel tax and supplementing it with a two-tier annual fee for commercial carriers to be set by the Corps to achieve specified revenue targets.⁵⁷ The proposal would subject all inland waterway carriers to a new yearly license fee in addition to the fuel tax. Vessels using these waterways would pay a higher fee than those not using the locks. Only setting forth annual revenue targets, the proposal did not specify the amount of the license fee, tying the fees to IWTF balances beginning in fiscal year 2022 and thereafter.

⁵³ S. 407, February 28, 2013, 113th Congress, 1st Session.

⁵⁴ Letter, Jo-Ellen Darcy, Assistant Secretary of the Army for Civil Works, to Rep. James L. Oberstar, Chair, Committee on Transportation and Infrastructure, House of Representatives, December 21, 2010.

⁵⁵ OMB, Analytical Perspectives: Budget of the U.S. Government Fiscal Year 2010, 270-271, 275 (Table 17- 3. Effects of Proposals).

⁵⁶ Letter, John Paul Woodley, Jr., Assistant Secretary of the Army (Civil Works), to Hon. Richard B. Chaney, April 4, 2008, with attached proposal: Lock User Fee Act of 2008.

⁵⁷ OMB, Living Within Our Means, 33 and 2011 Obama Administration Proposal, Inland Waterways Capital Investment Act.

Congress has consistently rejected any type of user fee. The carriers maintain that a user fee would negatively impact inland marine shipping industry by increasing shippers' costs and reducing barge traffic volume.⁵⁸ In an effort to counter the Obama administration's user pays approach, some go so far to assert that a lockage fee "might put a large portion of the Upper Mississippi River system out of reach of domestic and export markets via waterway transport."⁵⁹ Carriers also maintain that because lock and dam improvements also provide general public benefits, such as recreation and water supply, part of their cost ought to come from general federal appropriations. However, general appropriations for inland waterways seem unlikely to increase in view of federal fiscal constraints.

Another possible capital source looks to debt financing to provide one hundred percent of a project's cost up front, thereby reducing construction time and costs.⁶⁰ The Corps or a new federal inland waterway authority, modeled after the Tennessee Valley Authority, could issue bonds with an explicit or implicit federal guarantee of the debt obligations, to finance one or more construction projects. Interest and principal repayments could come from (and be secured by) IWTF revenues either: 1) existing IWTF revenues; 2) IWTF base and increment (the amount of a fuel tax increase) revenues; or, 3) IWTF increment revenues.

Estimates indicate that under each of these scenarios, IWTF could pay debt servicing costs over 30 years, albeit at a low debt service coverage ratio (the ratio of IWTF revenues to total debt servicing costs). However, the future IWTF revenues represent estimates as does the assumed interest rate, thereby placing the projected debt service coverage ratio in doubt. The huge debt servicing costs may overwhelm the available cash flow. Also, the debt financing approach would 1) lock in financing via the IWTF system for 30 years; and, 2) require Congressional approval. It is also unclear whether the approach would finance major rehabilitation work or only new construction projects.

⁵⁸ See, e.g., American Waterways Operators, News Release, "Barge and Towing Industry Opposes Proposal to Impose Unfair Inland Waterways Lockage Tax," May 12, 2009.

⁵⁹ CPW, *New Approaches*, 5-6.

⁶⁰ *Ibid.*, 66-73.

VII. Build and Expand Versus Preserve and Maintain: A Key Question

Congress and the Corps traditionally have relied upon and sought to implement a build and expand approach to the IMTS. Given the huge construction and major rehabilitation backlog, extensive deferred maintenance, and a fix-as-fail repair strategy, this report urges a transition to a repair and sustain approach designed to achieve a serviceable and highly reliable inland waterway system, not a theoretically great one. This report advocates a repair and sustain approach for the following four reasons:

First, regular maintenance, including repairs and minor rehabilitation, can significantly extend lock and dam viability beyond their projected 50-year design life. Five out of the six locks and dams under consideration for one or two P3s (in this report), with the exception of the Melvin Price Locks and Dam where the main lock and dam were placed in service in 1990, are more than fifty years old. However, regular maintenance can extend a lock and dam's 50-year design life for an additional 50 years or more at far lower cost than new construction or expansion.⁶¹ For example, the Kiel Canal in Germany, which links the North Sea to the Baltic Sea, was open in 1895 and widened in 1907-1914. The existing locks, built more than a century ago, have given excellent service, but are now in need of modernization/enlargement to accommodate size increases in ships.⁶² Furthermore, as noted in Appendix A, four of the six regional locks and dams have already undergone extensive rehabilitation, Peoria L&D in 1987-1990, Lock and Dam 24, work completed in 2005, Lock and Dam 25, work completed in 1999, and Chain of Rocks-Locks and Dam 27, work completed in 2011. Also, the LaGrange L&D underwent minor rehabilitation in 1986-1988. At the Melvin Price Locks and Dam, a minor rehabilitation was completed in 2013.

Second, barge traffic has declined, roughly 68 to 77 percent, during nearly two decades, on each of the six locks in our regional focus, obviating the need for expansion.

⁶¹ Despite the evidence of long-term lock viability with sound maintenance and repair practices, others, however, continue to urge lock replacement. For example, a recent report states: "with the average age of 80% of the structures on the Upper Mississippi River basin being 50+ years old, at some point in time the feasibility of maintaining versus replacement is not cost effective." CPW, TTI, *New Approaches*, 5. See also IMTS, 2, asserting: "The economic service life for navigation structures is typically 50 years, and is usually extended through major rehabilitation to 75 years."

⁶² The Kiel Canal was closed to larger vessels from March 6 until March 14, 2013, seemingly a first in the canal's 118-year history, to fix a broken lock. Nina Koeppen, "Cut Leaves German Public Works in a Fix," *Wall Street Journal*, March 15, 2013, A9.

At the Peoria L&D, all commodities traffic dropped from 67,828,754 tons in calendar year (cy) 1995 to 21,360,854 tons in cy 2012, with food and farm products traffic dropping from 30,431,478 tons in cy 1995 to 8,542,639 tons in cy 2012.⁶³

At the LaGrange L&D, all commodities traffic decreased from 77,905,906 tons in cy 1995 to 24,561,728 tons in cy 2012, with food and farm products traffic decreasing from 38,080,622 tons in cy 1995 to 5,789,894 tons in cy 2012.⁶⁴

At Lock and Dam 24, all commodities traffic declined from 75,084,056 tons in cy 1995 to 22,426,843 tons in cy 2012, with food and farm products traffic declining from 54,155,474 tons in cy 1995 to 14,149,426 tons in cy 2012.⁶⁵

At Lock and Dam 25, all commodities traffic plummeted from 74,868,818 tons in cy 1995 to 22,163,268 tons in cy 2012, with food and farm products traffic plummeting from 53,808,484 tons in cy 1995 to 13,927,272 tons in cy 2012.⁶⁶

At Melvin Price Locks and Dam, all commodities traffic fell off from 156,844,216 tons in cy 1995 to 48,953,338 tons in cy 2012, with food and farm products traffic falling off from 96,255,342 tons in cy 1995 to 23,663,690 tons in cy 2012.⁶⁷

At Locks and Dam 27, all commodities traffic waned from 168,867,840 tons in cy 1995 to 56,612,966 tons in cy 2012, with food and farm products traffic tailing off from 102,341,222 tons in cy 1995 to 24,998,217 tons in cy 2012.⁶⁸

Despite these downward traffic trends on the six regional locks, expansion proponents offer two caveats. First, they assert that these barge traffic figures reflect the past, particularly corn processed as ethanol across the Corn Belt. With a likely reduction in the corn ethanol mandate, known as the renewable fuel standard, corn surpluses may

⁶³ Corps, IWR, Navigation and Civil Works Data Center (Data Center), Locks by Waterway, Tons Locked by Commodity Group (Tons Locked), Calendar Year 1993-2012, sheet 115
<www.navigationdatacenter.us/lpms/cy2012comweb.htm> (October 11, 2013).

⁶⁴ Corps, IWR, Data Center, Tons Locked, Sheet 112.

⁶⁵ Corps, IWR, Data Center, Tons Locked, Sheet 145.

⁶⁶ Corps, IWR, Data Center, Tons Locked, Sheet 146.

⁶⁷ Corps, IWR, Data Center, Tons Locked, Sheet 157.

⁶⁸ Corps, IWR, Data Center, Tons Locked, Sheet 147.

return along the Upper Mississippi River.⁶⁹ As ethanol needs recede, barge corn traffic may increase.

Advocates for expansion maintain that the Panama Canal enlargement will likely increase agricultural barge traffic down the Illinois River and the Mississippi River. According to some recent estimates, the Panama Canal enlargement may increase total grain and oilseeds transiting the canal by 30 percent by 2020/2021.⁷⁰ Also, the canal expansion may likely benefit U.S. agriculture, including soybean exports, leading to an increase in regional barge traffic. Barge movements of soybeans are projected to increase by more than fifty percent to 29 million (29,088,830) tons in 2020/2021 from 19.8 million (19,807,459) tons in 2009/2010.⁷¹ Thus, the water-borne shipment of Midwest grains to Asia, via Gulf ports, expansion proponents maintain, may become more attractive than overland transport modes, perhaps increasing barge traffic down the Illinois River and the Upper Mississippi River and on to the Gulf ports.⁷²

Beyond agricultural produce, the growth in non-agricultural traffic, particularly coal, represent rough estimates. We do not know if coal exports, particularly from Illinois, will rebound and if so by how much. Coal experts tell us that currently 85% of Illinois coal is exported principally for European markets. There is also a modest increase in movement due to power plants being retrofitted with scrubbers. Illinois' high sulfur coal production has dropped from 62 million tons in 1990, the year the Clean Air Act amendment on emission standards passed, to a low in 2003 of less than 32 million tons. However, with the increase in foreign demand, production is recovering and in 2012 returned to 48 million tons. Most Illinois coal enters the Upper Mississippi River at or below St. Louis. Accordingly, regional coal interests are more focused on adequate channel maintenance and dredging of the open river below St. Louis and maintaining adequate depths at the Port of New Orleans for Post-Panamax container ships.

⁶⁹ Informa Economics, *Farm To Market*, 209.

⁷⁰ Presentation, Mike Steenhoek, Executive Director, Soy Transportation Coalition, Illinois Soybean Export Transportation Summit, June 13, 2013.

⁷¹ Informa Economics, *Farm to Market*, 103 (Table 10: Current and Future Soybean Volume (tons) by Mode in 17 Focus States).

⁷² Corps, Institute for Water Resources (IWR), *U.S. Port and Inland Waterways Modernization: Preparing for Post-Panamax Vessels (Modernization)*, June 20, 2012, 44, 70. See also CPW, TTI, *America's Locks & Dams: "A Ticking Time Bomb For Agriculture?"* Final Report, (Time Bomb) December 2011, 29, projecting an increase in the values of freight traffic on the Upper Mississippi River and the Illinois River, surpassing historical highs by 2015 and 2019, respectively.

Finally, in terms of traffic projections, expansion proponents point to U.S. Department of Transportation (DOT) estimates. Nationwide, the DOT projects an annual two percent increase, by weight, in water traffic (including harbors and non-fuel taxed waterways) between 2011 and 2040.⁷³ These nationwide figures, including harbors, do not, however, tell us anything about the specific future traffic patterns on the lower Illinois River and the Upper Mississippi River.

In sum, it is difficult to know whether the six regional locks, two on the lower Illinois River and four on the Upper Mississippi River, will accommodate future traffic at existing cost levels and whether any traffic increases, if they occur, will result in additional delays and higher costs for shippers. Shippers facing increased costs and disruptions will likely seek ways to work around locks experiencing major congestion or closures and look to alternative overland, rail or truck, routes.

The bottom line: this report agrees with a recent report by the Corps' Institute of Water Resources that if the inland waterways are well maintained, the need for new lock capacity, via lock expansion, may be unnecessary. In particular, current capacity appears adequate to meet the potential demand, with the impact of post-Panamax vessels not anticipated to require lock capacity expansion.⁷⁴

As a second caveat to the historic barge traffic trends, expansion advocates maintain the size of 600-foot locks often present an additional obstacle, contributing to delays and raising carriers' costs. The standard, modern lock chamber, such as the Melvin Price Locks and Dam and Locks and Dam 27, is 1200-foot long. These longer locks reduce transit time and facilitate the faster, safer movement of barge traffic, thereby reducing delays, improving carriers' efficiency, and lowering shippers' transportation costs.

Any flotilla greater than eight barges must be broken up and moved through a 600-foot lock chamber in two stages (termed "cuts" by the industry) causing a barge operator to incur additional delays and costs. Thus, with a tow of 15 barges, having a length

⁷³ U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Facts and Figures 2012, FWHA-HOP-13-001, November 2012, 9 (Table 2-1. Weight of Shipments by Transportation Mode: 2007, 2011, and 2040 (millions of tons)).

⁷⁴ Corps, IWR, Modernization, xxii, 58, 92.

approaching 1200 feet, the first three rows of barges (9 in total) are locked through first in a 600-foot lock and the last two rows of barges (6 in total) are then locked through. Because of the time spent decoupling, moving through, and recoupling the barges, the two-step process takes about 1.5 to 2 hours. A tow can lock through a 1200-foot lock in one step in about 0.5 to 1 hour.⁷⁵ On the Upper Mississippi River, estimates place time saved with a 1200-foot lock expansion (in comparison to an existing 600-foot lock) at an average of about 49 minutes.⁷⁶

The extra time required for a double cut raises towboat and barge fuel and labor costs. The additional costs for each lock traversed must be calculated and all costs must, of course, be aggregated to determine the total expenses to carriers along a voyage. For example, at Lock and Dam 25, estimates place the additional costs of a double cut, assuming some 2,407 tows per year requiring a double cut, at \$618 per tow.⁷⁷

In addition to cost and time savings, larger locks provide greater throughput capacity. A 1200-foot long lock chamber can process roughly 100 million tons per year. In contrast, a 600-foot long lock chamber has a capacity of some 45 to 55 million tons per year.⁷⁸ However, in view of the historic declining barge traffic on the lower Illinois River and the Upper Mississippi River and uncertainties regarding future traffic projections, capacity does not appear to represent a problem.

The time delays and additional costs must, of course, be balanced against the projected expenditures of between \$348 million and \$430 million for each lock expansion at Peoria L&D, LaGrange L&D, Lock and Dam 24, and Lock and Dam 25. The cost of new lock construction/expansion may exceed the benefits delivered from reducing the waiting time achieved from a 1200-foot long lock. Reliability may be opted for over expanded capacity with reduced recapitalization costs as the primary driver.

Third, for the foreseeable future, the federal government faces fiscal austerity. We cannot assume that federal appropriations will be available to fund the four regional lock expansions, let alone proper maintenance and repairs at the six regional locks. As a

⁷⁵ CPW, TTI, *New Approaches*, 52-53.

⁷⁶ *Ibid.*, 53.

⁷⁷ *Ibid.*, 59.

⁷⁸ *Ibid.*, 53.

result of current project delivery processes and federal fiscal constraints, the first benefits of the four lower Illinois River and Upper Mississippi River lock expansions, if funded, may not come until 2040, at the earliest. In addition to lock expansion costs, major rehabilitation projects, as set forth in Appendix B and C, exist at five locks, Peoria L&D, LaGrange L&D, Lock and Dam 24, Lock and Dam 25, and Melvin Price Locks and Dam. For the foreseeable future, federal appropriations appear unlikely to fund these major rehabilitations.

Fourth, repair and improved maintenance, together with scaled down major rehabilitations focused on critical components of the system, represents a more attractive path for private capital given rate of return on investment considerations. Likewise, because of a probable inadequate projected rate of return on debt/equity investments, it seems unlikely that private capital would fund any of the four regional lock expansions.

Cost conscious private investors would likely realize that regular maintenance and repairs could extend the useful life of locks, improve reliability and reduce unscheduled closures, at a considerably lower cost than new construction. Repair and improved maintenance will improve delivery time for shippers. Enhanced repair and maintenance practices that also promote reliability as well as efficiency, apart from lock upgrades, may, however, increase the demand for inland waterways, possibly raising the charges imposed by carriers.

Given the federal budgetary and private capital realities, the U.S. inland waterways need more innovative, lower cost solutions. Thus, the Corps will need to give consideration to more collaborative approaches, including public-private partnerships. This report agrees with the following conclusion offered by the National Research Council: “Broader use of public-private partnerships would offer a range of possibilities for bringing new resources and potentially more efficient methods to [Operations, Maintenance, and Rehabilitation] of Corps water resources infrastructure.”⁷⁹

⁷⁹ NRC, *Corps*, 89. See also *Ibid.*, 10 and 90.

VIII. Overview of Public-Private Partnerships

Although not a panacea for all infrastructure situations, P3s provide one of the most successful methods employed by various infrastructure-related industries. Four types of P3s, namely, outsourcing, design-build, operations and maintenance, and long-term leases, are discussed in this section. P3s structured as long-term leases provide an infusion of private capital and best practices in operations and maintenance, to increase efficiency and reduce costs, thereby achieving heightened cost effectiveness. P3s shift risks from the public sector to private investors without altering the government's continued ownership of the leased assets subject to the contractual arrangement. Possible disadvantages of P3s are also assessed.

The success of other nations and various infrastructure industries has led all levels of America's public sector to recognize P3 as an effective financing, operations, maintenance, and delivery (rehabilitation and construction) method. Government-owned assets managed in P3 transactions include highways, water and wastewater, seaports, and transit.

Private Sector Investors

In addition to benefits for the public sector, private sector investment in P3 infrastructure as an investment asset vehicle has increased dramatically over the last two decades. Many infrastructure funds, with capital provided by pension funds, seek opportunities as an alternative to the risk/reward profiles of traditional equities and bonds. Life insurance companies have invested in infrastructure debt obligations. Estimates indicate that \$625 billion in private capital awaits investment in U.S. infrastructure, including some \$250 billion in equity funds leveraged with an additional \$375 billion in debt.⁸⁰ Other estimates indicate that private capital could fund at least \$60 billion per year in U.S. infrastructure improvements.⁸¹

⁸⁰ Sphere Capital, *The Benefits of Private Investment in Infrastructure*, August 2011, 7, 8, 17.

⁸¹ Donna Cooper and John F. Craig, *Using Pension Funds to Build Infrastructure and Put Americans to Work*, Center for American Progress, March 2013, 2.

P3 Contractual Model

A P3 exemplifies a contractual model. Infrastructure remains under public ownership and control, as embodied in a contract, with some type of delegated management to a private firm. Competition typically exists for contracts, through competitive bidding procedures.

The P3 contractual model offers private sector expertise. However, an agreement must extend long enough for the private firm to produce intended efficiencies. With long-term contracts, private firms may provide capital for infrastructure maintenance, repairs, and even improvements.

Types of P3s

There are four basic types of P3s: outsourcing; design-build; operations and maintenance; and long-term leases (also known as concessions).

Outsourcing

The most limited type of contractual agreement involves the outsourcing, by contract, of ancillary, non-core infrastructure functions, such as billing. With a service contract, typically a short-term agreement, the private firm takes responsibility for one or more specific tasks, while the public sector owner-operator focuses on its core areas.

Design-Build

A P3 can take the form of a design-build contract, a type of service agreement. The public sector hires one or more private firms to design, prepare bid specifications, and manage the construction of a new facility, which the public sector then owns and operates. This method allows the public sector to take advantage of innovation in design owing to private sector expertise and obtain delivery and construction efficiencies driven by market pressures in the private sector.

Using the design-build format, in 2013 Senator Richard J. (Dick) Durbin (D-IL) and Mark S. Kirk (R-IL) introduced the proposed Water Infrastructure Now Public-Private Partnership (WIN P3) Act.⁸² The bill would authorize a five-year pilot program to identify up to 15 previously authorized navigation, flood damage reduction, and hurricane/storm damage reduction projects for private participation. Once a project would be chosen under the pilot program, the Corps could enter into an innovative agreement with private entities for project planning, design, and construction (or a separate element of the project) in an effort to speed up project delivery. Before entering into a project partnership agreement, the bill would require the Secretary of the Army to contract with an independent third party to assess “whether, and provide justification that, the proposed partnership agreement would represent a better public and financial benefit than a similar transaction using public funding or financing.”⁸³ In addition, the bill would require the Secretary of the Army to regularly monitor and audit each project constructed by a private partner “to ensure that the construction activities are carried out in compliance with plans approved by the Secretary and that the construction costs are reasonable.”⁸⁴ The bill would not authorize or permit the privatization, i.e., the sale to a private party, of any federal asset.⁸⁵ Also, all existing laws and regulations applicable to the Secretary of the Army in carrying out the project would also apply to the private party.⁸⁶

Although the arrangement would turn over the planning, design, and construction of a specified number of projects to one or more non-federal entities, in an effort to expedite the planning, design, and construction of new water infrastructure projects, the bill would maintain the existing cost-sharing mechanism for project construction and the stop-and-start appropriation process. Furthermore, the continued focus on construction projects, as opposed to proper maintenance and repair expenditures, as previously analyzed, arguably seems unwarranted.

⁸² S. 566, March 14, 2013, 113th Congress, 1st Session. The companion bill is H.R. 1153, March 14, 2013, 113th Congress, 1st Session.

⁸³ S. 566, §3(d)(1).

⁸⁴ *Ibid.*, §3(c)(1)(F).

⁸⁵ *Ibid.*, §4.

⁸⁶ *Ibid.*, §3(g).

Operations and Maintenance Agreements

Other types of contracts delegate more responsibilities to a private firm, with the public sector continuing to retain asset ownership. Under a short-term agreement, the contractor assumes, to a greater or lesser degree, responsibility for the day-to-day operations of a facility and may provide additional services, such as billing. Under the contract, the public sector continues to receive revenues from the facility. Typically receiving a fixed fee as its remuneration, the contractor bears no financial risk and generally does not make any capital investment.

With respect to inland waterways, the Corps presently enters into short-term (one year with two-three year renewable option) contracts with private firms for various maintenance functions, including dredging, routine and emergency repairs, building dikes, and handling low water situations. The Corps enters into these short-term maintenance contracts pursuant to the Federal Acquisition Regulations.⁸⁷ The Corps retains operational responsibilities at its locks and dams.

Long-Term Leases

A private firm may enter into a long-term lease for an infrastructure asset. The contractor assumes responsibilities not only for operations and maintenance with respect to an asset already in existence but also typically provides capital to maintain (and even upgrade) a facility, which continues in public ownership.

In a long-term lease arrangement, the agreement between the public sector lessor and the lessee can be structured in any mutually beneficial fashion. In a typical model, the lessee pays the public sector owner a fee for the real property interest and the right to operate the asset for the specified time period. The payment to the public sector may consist of one upfront payment, or a series of periodic payments over the term of the

⁸⁷ The Federal Acquisition Regulations govern the acquisition process, that is, the process through which the federal government purchases (more technically, acquires) goods and services. The general regulatory provisions are set out in Title 48 Code of Federal Regulations, Chapters 1 (Parts 1-53), 2 (Parts 201-253) (Defense Acquisition Regulations System, Department of Defense), 51 (Parts 5108, 5119, 5145, 5152) (Department of the Army Acquisition Regulations). Competitive bidding requirements are contained in *Ibid.*, Chapters 1 (Part 6) and 2 (Part 206) (Defense Acquisition Regulations System, Department of Defense).

lease. The long time period, typically from 25 to 50 years, such as 50 years in the Port of Baltimore P3 and 40 years in the Bayonne Municipal Utilities Authority P3, both discussed later in this report, allows a lessee time to recoup its capital investment, including payments made to the public sector owner.

User rates for the asset are typically set as part of the lease. The lessee bills and collects revenues, with part returned to the public sector owner to pay for an asset it owns and has financed.

Another type of long-term P3 involves the public sector hiring a private sector partner, often a consortium of firms (often referred to as a joint venture), to design, build, and then operate a facility. At the conclusion of the contract, the publicly-owned facility reverts to governmental operation and maintenance.

Corps' Current Long-Term Lease Arrangements

The Corps now leases land for recreational concession purposes such as marinas, campgrounds, and resorts, on its property to private sector entities. After the Corps conducts a market feasibility study to establish needs and concession viability, it solicits competitive proposals.

The concession terms typically run 25 years, with a private company developing, operating, maintaining, and managing the facility during the lease term. The Corps also leases land to state and local governments, which, in turn, lease the property to (or partner with) private operators.

The Corps enters into these long-term commercial and non-commercial recreational leases pursuant to congressional authorization for the Secretary of the Army “to grant leases of lands, including structures or facilities thereon, at water resource development projects for such periods, and upon such terms and for such purposes as he may deem reasonable in the public interest....”⁸⁸

⁸⁸ 16 USC §460d.

Current policy interpretations question whether this authority could extend to or include navigation functions of the Corps, but additional legislative action would likely be warranted.

IX. Advantages and Possible Disadvantages of Long-Term P3s

The advantages of long-term P3s include: additional financial capacity; increased efficiency and service quality; and, redistribution of risks from the public to the private sector. Possible concerns pertaining to long-term P3s include: service declines; loss of flexibility of public sector asset management; transaction costs related to complex negotiations and contractual agreements; and, workforce reductions.

Advantages of P3s

P3 Serves As a Financing Tool

By converting physical assets into financial capital, a long-term P3 contractual arrangement typically provides a new financing source. The public sector typically obtains funds through the payment by the private partner of a one-time, upfront fee and/or a stream of annual payments. The increased financing costs resulting from higher interest rates paid by the private partner on its debt obligations (in comparison to interest rates typically paid by the public sector borrower) must, however, be balanced against the availability of private capital to fund the P3 arrangement. In other words, the availability of private capital likely outweighs its cost-of-capital disadvantage, resulting from higher interest rates on borrowed funds. A P3 also brings value to the arrangement over the long-term.

P3 Serves as a Managerial Tool to Increase Efficiency and Reduce Costs

A private firm must generate an acceptable level of return on its debt/equity investment. Typically, private firms will look for revenue opportunities not currently realized and/or drive down costs through greater efficiencies. Because of the incentive structure created by the profit motive, generally speaking, it is assumed that private firms will use fewer resources and be more efficient than public enterprises in supplying the same services.

Private providers have incentives to introduce efficiency improvements to cut costs through a variety of means including: reducing overhead costs; careful attention to all expenditures; removing politics from decision-making; improving work practices and introducing more flexible management policies; offering the “right” salaries and other incentives to attract and retain talent; making better use of technologies, such as data management information technology and systems; and, adopting innovation more readily.

When we speak about attaining efficiencies through innovation, a word of caution is in order. Inland waterways are not technologically dynamic assets. Thus, fewer opportunities exist to reduce costs significantly through technological innovation. However, opportunities may exist for non-technological innovation, such as effective traffic management systems.

Possible Disadvantages of P3s

Service Declines

Service declines, such as decreased reliability resulting from unscheduled lock closures, may present a contractor accountability issue when a private firm takes over operations and maintenance functions. To increase profits, a private operation may cut corners and reduce service quality, at least the argument runs.

These concerns are met in the bidding, contracting, and monitoring processes. In considering bids for a pilot P3, the Corps must exercise due diligence and obtain detailed information about each bidder’s (and its parent’s) qualifications, its financial and operational capacity and sustainability, and its performance history. Contracts establish objective performance (operational and maintenance) standards, designed to obtain heightened, sustained performance levels, such as improving lock availability by reducing lock closures. If a failure to meet any performance standard constitutes a material breach, contracts provide for termination, among other remedies. Termination clauses motivate private contractors to meet their contractual and other legally mandated obligations.

In addition to setting forth operational and maintenance standards, contracts may provide for specific, annual amounts the private partner must expend on these items, as well as capital improvements, thereby eliminating the problem of inadequate, unpredictable Congressional appropriations.

Beyond spelling out the parties' rights and responsibilities, an agreement would include monitoring and continued oversight by the Corps to ensure that the private firm delivers the services contemplated by the P3 arrangement. The private firm would be required to provide sufficiently detailed periodic and annual reports to enable performance evaluations.

Loss of Public Control

With a P3, a concern exists about the loss of public control over the daily operations and maintenance of the locks and dams subject to the arrangement.

Despite these fears, the public sector need not worry about day-to-day operations and maintenance issues. Control of the locks and dams is embodied in the contract with the operator. The agreement, as noted, will contain clear-cut, objective performance standards and specific goals, such as the reduction in unscheduled lock closures. A need exists for effective, ongoing monitoring of contractor execution. An agreement will typically impose disincentives on a contractor for nonperformance, such as penalties, and contain termination provisions.

Transaction Costs

Entering into a P3 involves transaction costs. Expenses result from the time and effort expended in planning, decision-making, negotiations, contract drafting and enforcement, and resolving disputes. Before going forward with a pilot P3, the Corps must evaluate its options. It must (or hire experts to) prepare and oversee the bidding process. Contract completeness is important, contributing to increased costs. A need exists for a long-term commitment by the Corps to the oversight process including monitoring contractual performance and reviewing reports and complaints. However,

these transaction costs can be recovered through the upfront or annual fees paid by the private contractor.

Workforce Reductions

To achieve the expected efficiency gains and cost savings, P3 critics assert that an operator will reduce the workforce size by eliminating well-paying public sector jobs, increasing the number of part-time employees, and extracting concessions from employees in terms of working hours and work practices. These fears are not warranted.

To provide safeguards, a contract will typically be structured so that existing employees are not harmed. For example, an operations and maintenance contract typically requires the P3 to honor existing public sector collective bargaining agreements. Any transfer of employees will respect their union representation and employment terms. An agreement typically requires the contractor to retain all existing employees who meet minimal criteria, such as passing a drug test. A contract will preserve existing employees' salary and benefit arrangements.

X. Meeting the Expectations of P3 Private Partners; Obtaining an Adequate Rate of Return on Investment and Sufficient Debt Service Coverage Ratio

Private sector involvement in the financing, operation, maintenance, and governance of U.S. inland waterways turns in part, on obtaining an adequate rate of return on investment. The P3 venture must meet profit objectives. The private partner would look to reduce costs and increase revenues. Debt investors require a sufficient debt service coverage ratio also discussed in this section.

Cost Containment and Reduction

Cost containment and reduction would look to two major possibilities. First, cost containment by a P3 would focus on enhanced maintenance and repair practices, not on constructing longer, 1200-foot locks, which in view of declining barge traffic, as previously discussed, are unlikely to be needed. This approach will save more than \$1.5

billion with respect to four locks, two on the Illinois River (Peoria and LaGrange) and two on the Upper Mississippi River (Locks 24 and 25).

Second, a P3 could implement numerous cost reduction possibilities. A private entity would likely analyze every cost, perhaps using a process called zero-based budgeting, assessing all costs from zero, including overhead, administration, utilities, plant and fleet, and service base operations. By identifying strategic costs versus nonstrategic costs, the process would strive to eliminate nonessential expenditures, apart from personnel. Possibilities include:

- Analyzing whether the major rehabilitations at Peoria L&D, LaGrange L&D, Lock and Dam 25, and Melvin Price Locks and Dam are necessary. If needed, can they be performed in a less costly manner? Can they be delayed and for how long?
- Instead of operating the locks 24/7, reducing the hours the locks are open, either seasonally or year round, without decreasing the number of employees, except by attrition.
- Installing sensors (or some other type of electronic device) in locks and lock walls to detect minor problems before they necessitate extensive repairs and unscheduled closures. Again, a short-term expenditure would likely save money in the long-term.
- Automating the locks, without decreasing the number of employees except by attrition, and installing automatic backups for failed components.

The P3 could use a rigorous asset management strategy that monitors the condition of leased locks and dams and their performance as well as analyze the discounted costs of an enhanced maintenance and repair strategy. With respect to existing locks and dams, the P3 would strive to apply a variety of practices, including managerial, financial, and engineering, to provide the requisite service level in the most cost effective, reliable, and safe manner. Given the desire to reduce costs so as to increase profits, the asset management strategy will help the P3 make the most efficient possible choices about operations, maintenance, repairs, and minor rehabilitation expenditures.

Most importantly, a P3 could implement regular, routine lock and dam maintenance and repairs. As previously analyzed, currently the Corps uses a fix-as-fail approach to lock maintenance and repairs. As the result of inadequate lock maintenance and repairs, particularly with respect to lock gates (the most critical component), major components will likely fail more often and sooner than they should, requiring emergency repairs, more frequent replacement of components, and earlier and more expensive rehabilitation. In addition to raising lock operating costs, deferred maintenance contributes to an increase in unscheduled closures and the resulting transit delays.

Because emergency repairs are typically more expensive than preventive maintenance, a P3 would have the financial incentive to: prevent costly lock failures and unavailability caused by component malfunctioning, particularly as a lock ages; reduce, if not eliminate, the need for major (in excess of \$8 million) lock rehabilitations; and lengthen a lock's lifecycle.

Although it is more costly in the short-term to perform periodic, routine maintenance and repairs as well as minor rehabilitations, when conditions warrant, studies indicate greater long-term cost effectiveness results from following this approach rather than the Corps' current fix-as-fail strategy.

As part of an asset management strategy, consistent, timely, regular maintenance and repairs designed to reduce lock closures, thereby improving lock availability, and extend lock and dam viability rests on a number of possibilities:

- Conducting regular condition assessment inspections (including underwater inspections and lock dewaterings) of every leased lock and dam.
- Scheduling routine maintenance and repairs before a lock or dam reaches an unacceptable performance level resulting from a major component failure. For example, rotating lock miter gates based on service hours instead of waiting for failure.

- Better staging of repairs to minimize the time and expense of more costly emergency repairs.
- Positioning major spare parts and equipment more effectively to reduce the time and expenses if a lock or dam requires an emergency repair.
- To deal with lock congestion resulting from a number of barge tows arriving at a specific lock at the same time, which negatively impact transit times, implementing an effective traffic management system, for instance, barge traffic appointment scheduling to help reduce lockage delays.⁸⁹ Carriers could pay a fee to cover the cost of administering the reservation system.
- Quickening tow lockages by purchasing assist vessels (switchboats), which extract and help secure the first section of a double lockage tow. These helper boats would pull the barges in the first cut of a double lockage tow out of the lock chamber and hold them away from the lock for re-coupling after the completion of the second cut. This strategy would increase the P3's costs in the short-term but would reduce delays, thereby improving lock availability.
- Extending lock guide walls to make maneuvering barges during tow cuts easier and thus more efficient.

In sum, heightened efficiencies, beginning with overhead cost reduction (if not elimination), taken together will provide one leg of the return on investment equation. Revenues comprise the other leg.

⁸⁹ For an analysis concluding that the economic benefit of new traffic management practices, such as appointment and scheduling systems, are “very small” relative to the “potentially large disruptions” see Ray A. Mundy and James F. Campbell, *Management Systems for Inland Waterways Traffic Control*, Volume I: Identification and Evaluation of alternatives for Managing Lock Traffic on the Upper Mississippi River, Midwest Transportation Consortium, Project 2004-03, November 2005, 6, 84-85.

Revenue Availability and Enhancement

To attain the requisite return on its investment, a P3 must focus on generating revenues and improving its cash flow. Assuming a P3 cannot impose any type of user fees, revenues could flow from:

- Low head (10- to 15-foot) hydropower projects by retrofitting existing dams. Assuming that the P3 arrangement grants the lessee whatever authority the Corps has to license a dam for the hydropower development,⁹⁰ then the lessee seemingly could piggyback on the Corps' authority, without Congressional approval, to engage in hydropower development. The P3's rights with respect to hydropower development require further, detailed investigation beyond the scope of this report.

Seemingly, the P3 could undertake the retrofitting a dam for hydropower generation and sell the power to local utilities at market rates.⁹¹ The P3 would need to: 1) obtain Federal Energy Regulatory Commission (FERC) license⁹²; 2) obtain Corps approval for any modifications at a dam⁹³; and, 3) meet environmental standards, especially where endangered fish species spawn and migrate. Or, the P3 could obtain an annual fee by licensing a utility to retrofit a dam. The utility would then sell power to its customers.

Hydrokinetic energy projects represent another possibility, again requiring a pilot P3 to obtain a FERC license. Here, energy comes from marine turbines that capture currents in rivers while being tethered to riverbed floors or mounted on small floating barges, appropriately anchored, so as not to interfere with navigation.

⁹⁰ See, e.g., Price Dam Partnership, Limited, Federal Energy Regulatory Commission, Order Issuing Original License (Major Project), Project No. 12187-000, 112 Federal Energy Regulatory Commission ¶62, 090 (July 29, 2005). Brookfield Renewable Power, Inc., the successor licensee, has filed an application for the surrender of its license. Federal Register 78:87 (May 6, 2013): 26345.

⁹¹ The Public Utility Regulatory Policies Act of 1978, Public Law 95-617, requires electric utilities to offer to buy energy produced at a small power production facility (16 USC §796(17)(A)), at a rate not to exceed the incremental cost to the electric utility of alternative electric energy (16 USC §824a-3(b)).

⁹² 16 USC §§791(a)-825(r).

⁹³ 33 USC §408

The P3 could look to hydropower and hydrokinetic eligibility for various income tax credits, such as the Renewable Electricity Production Tax Credit,⁹⁴ if available, and possible federal grants for renewable energy projects.

- Selling water used for residential, commercial, industrial, and agricultural purposes as well as to coal-fired power plants to meet their cooling needs. Those who presently obtain water without any charge will likely push back, opposing the long-term P3 arrangement and then any charge for water.

Assuming that the P3 lease grants the lessee whatever rights the Corps possesses with respect to water supply disposition, the lessee may be able to sell the water, without Congressional approval. However, the states (Illinois alone or Illinois-Missouri together) have certain rights with respect to water supply and distribution under state law. To deal with these rights, the P3 could enter into a partnership arrangement with one or two states in order to sell water. Again, those who presently obtain water for free would likely seek to block this partnership.

The P3's rights with respect to water supply and disposition require further, detailed investigation beyond the scope of this report.

It seems highly improbable that the revenues generated from hydropower/hydrokinetic energy and/or the sale of water would meet private investors' rate of return requirements. Because these revenue streams would be inadequate to interest the private sector and support a viable P3, some type of user (lockage) fee, requiring Congressional authorization, is needed. Also, consideration should be given to congestion pricing to raise revenues and reduce delays. Assessment of the feasibility of implementing user fees, in view of previous carrier opposition, would require a detailed study. Among other items, the study could identify the appropriate fee levels and estimate the impact of such fees on traffic (more technically, the price elasticity of demand). Because of widescale use of electronic tolling, the feasibility and cost of toll collection no longer represent impediments. With an adequately funded P3

⁹⁴ 26 USC §45.

maintenance and repair program, which would reduce lock closures, decrease transit delays, and yield fuel and labor savings, the inland marine shipping industry may drop its opposition to reasonable user fees. Furthermore, it is likely that if fee payers see their fees consistently applied to assure lock reliability, they may be more inclined to support reasonable user fees.

Other possible revenue streams requiring Congressional approval include:

- Receiving a share of funds distributed from the Inland Waterway Trust Fund for a specified time period.
- Receiving part of the federal appropriations for the operation and maintenance of inland waterways for a specified time period.
- Receiving part of the federal appropriations for major rehabilitation (but not the new construction) of inland waterways for a specified time period.
- Imposing fees, such as an annual license or dockage fee, on recreational vessels, commercial fishing users, seasonal concessionaires, such as kayak rentals, and a per vehicle surcharge on commercial ferry services, among other possibilities.
- Obtaining an assignment from the federal government of rental payments from relevant, existing long-term recreational leases.⁹⁵
- Entering into and receiving rental payments from new long-term recreational leases, including new marina and resort developments and other types of development, such as commercial load-out and terminal facilities located on Corps navigation operational project lands.
- If additional land is leased, other fee generating possibilities, include use of the land for riparian buffer management providing source water protection

⁹⁵ 16 USC §460d (last sentence) requires all funds received from Corps' recreational leases to be deposited in the U.S. Treasury.

and use of reforested land as carbon and nutrient deposits (more technically, sinks) to support carbon and nutrient trading opportunities.

The P3 may also tap various incentives, such as tax abatement, offered by regional, state, or local entities as part of an economic development plan oriented around a part of an inland waterway.

A Sufficient Debt Service Coverage Ratio

As a margin of safety, debt investors in a pilot P3 will require an adequate debt service coverage ratio. This ratio connotes how many times cash, more technically earnings before interest and taxes, is available to pay interest and principal payments on the debt obligations. The higher the debt service coverage ratio, the safer the bond, and the higher its credit rating. An investment grade rating will enable life insurance companies, among others, to purchase the bonds.

Generally speaking, a debt service coverage ratio of two to one is considered an adequate margin of safety. Having the ratio based, in part, on earnings, focuses attention on improving operating efficiencies through cost containment and reduction and increasing revenue availability and enhancement, thereby bolstering the ratio.

Beyond a simple numerical test, credit rating agencies use a number of other factors in rating debt instruments including the issuer (public or private sector), economic essentiality, certainty of the earnings stream (such as forecasts of future traffic patterns), type of instrument (general obligation or revenue bond), existence of a guarantee (and identity of the guarantor), the availability of a debt reserve fund, and future capital needs and projected additional borrowing.⁹⁶

⁹⁶ For an overview of a credit rating agency's perspective on water and wastewater projects see Michael Wilkins and Jane Eddy, "Global Water and Wastewater Project Criteria: A Rating Agency Perspective" in *Reinventing Water and Wastewater Systems: Global Lessons for Improving Water Management*, eds. Paul Seidenstat, David Haarmeyer, Simon Hakim (New York: John Wiley, 2002), 141-148.

XI. Structuring a Long-Term Intrastate and/or Interstate Pilot P3: Analysis of Existing P3 Projects for Potential Application to One or Two Pilot P3s

This section begins by considering the statutory authority for the Corps to enter into a P3 with either a public authority or various private entity configurations. A public authority could serve as the P3 partner by itself or it could bring in private sector expertise. The more typical types of P3s involve one or more private entities as the P3 partner. These include one firm providing the requisite capital and services, the private partner structured as a joint venture (or a consortium of firms), or the service provider and a capital provider (and/or obtainer) functioning as the private partner. The lease would run from 25 to 50 years. It could be structured so the lessee would make annual payments to the Corps (or the federal government), as the lessor. In the alternative, the Corps (or the federal government) could receive one upfront payment or a smaller upfront payment and a reduced series of annual payments. As developed by the examples in this section, the P3 contract typically provides specified, annual amounts for infrastructure maintenance and repairs as well as capital improvements. Knowing that these funds will be there obviates the need to rely on the vagaries of the Congressional appropriation process. By saving time and money thereby gaining efficiencies, the P3 provides long-term value to the leased water resources infrastructure.

Statutory Authority for a Pilot P3

Subject to various statutory authorities bearing on all Corps civil works projects, the Corps could lease a portion of an inland waterway, either two locks and dams on the Illinois River and/or four locks and dams on the Upper Mississippi River as one or two pilot P3 projects, subject to the Corps' continued asset ownership as well as its oversight and monitoring. Because the Corps' existing, specific statutory authority for long-term leases is limited to recreational uses, the long-term lease of navigational assets, specifically locks and dams, could take one of two possible approaches. First, the Secretary of the Army has statutory authority to enter into leases "in the public interest" for property that is: 1) under the Secretary's control, such as navigational structures; 2) not for the time needed for public use; and 3) is not required to meet the Corps' needs and responsibilities.⁹⁷ Using this statute as authority for a long-term lease faces two

⁹⁷ 10 USC §2667(a).

obstacles. First, current inadequate funding and deferred maintenance needs seemingly could not counter the second requirement because the locks and dams are in fact needed for public use. Second, a lease faces a durational barrier. Although typically under this provision, leases cannot be for more than five years, an exception exists if the Secretary determines that a longer lease will be in the “public interest.”⁹⁸ It is uncertain whether the Secretary will approve a 25-to-50-year lease. The statute further provides that the repair or improvement of the leased property may serve as part or all of the consideration for the lease;⁹⁹ a helpful provision if a long-term lease could be obtained.

Second, if the P3 cannot lease locks and dams pursuant to any existing statutory authority, then the lease would require new Congressional approval. One or two pilot P3 projects could be included in a future WRDA, together with a firm implementation deadline for the Corps to enter into pilot P3s.

A Public Authority as the P3 Partner

The public authority model for the P3 lessee could follow the approach used for the Panama Canal expansion project.

With the handover of the canal from the United States to Panama on December 31, 1999, the Panama Canal Authority (PCA), an entity of the government of Panama, was established under Panama’s National Constitution. The PCA received the exclusive authority for the operation, administration, management, preservation, maintenance, and modernization of the Panama Canal, together with its activities and related services, so that the canal could continue to operate on a safe, continuous, efficient, and profitable manner.¹⁰⁰ On assuming these responsibilities, the PCA shifted its operations from a profit-neutral utility to a market-oriented business model, one focused on customer service and reliability.

To double the capacity of the canal and allow more traffic and longer, wider ships to transit, the PCA embarked on an expansion project. The massive expansion project will:

⁹⁸ 10 USC §2667(b)(1).

⁹⁹ 10 USC §2667(b)(5), (c).

¹⁰⁰ Canal De Panamá, About ACP, ACP Overview <www.pancanal.com/eng/acp/acp-overview.html> (accessed February 26, 2013).

construct new and larger locks for the Atlantic and Pacific channels; construct a new access channel for the Pacific locks; deepen the Atlantic and Pacific channels; deepen and widen the navigation channel for Gatun Lake; and increase the maximum operating level of Gatun Lake.

The expansion project will increase the vessel size of ships that can transit the canal. With the completion of the expansion, the canal will accommodate 366-meter-long ships with a 15-meter draft, versus pre-expansion lengths of 296-meters and 12-meter drafts. These bigger ships, so-called post-Panamax ships, having a carrying capacity of up to 12,000, Twenty-foot Equivalent Units (TEUs), the standard unit measure of the containerized shipping industry, will be able to transit the canal.

The expansion project began construction in September 2007. The locks are projected to be ready for vessels in late 2015. The projected trial run date is only slightly behind the original October 2014 completion date.

The expansion project's cost estimates run to about \$5.25 billion. The PCA self-financed about \$2.95 billion through increased tolls. Another \$2.3 billion was financed through external funding designed to cover the peak 2009-2011 construction activities.

In December 2008, five major multilateral agencies from Europe, Asia, and Latin America agreed to finance \$2.3 billion in debt financing. The \$2.3 billion was allocated as follows: European Investment Bank (\$500 million); Japan Bank for International Cooperation (\$800 million); Inter-American Development Bank (\$400 million); International Finance Corp. (\$300 million); Corporacion Andina de Fomento (\$300 million). Knowing that the funds were available saved time and money in completing the expansion project.

The financing arrangement provided for a 10-year grace period and a 20-year amortization period. The financing was obtained on an unsecured basis without being tied to any revenue source, such as tolls, transit reservation services, or rental charges for portable Automatic Identification System units. In other words, the full faith and credit

of the PCA, similar to a general obligation bond, backed the financing by the five multilateral agencies.¹⁰¹

Application of the Panama Canal Public Authority Approach to a Pilot P3

With respect to an Intrastate or Interstate Pilot P3, a newly created or existing intrastate or interstate public authority could enter into a long-term contract with the Corps to finance, operate, maintain, and possibly rehabilitate the leased locks and dams. A new intrastate public authority, modeled after the Triborough Bridge Authority, a public benefit corporation and a political subdivision of New York State, which built and operated the Triborough Bridge (the Robert F. Kennedy Bridge, now owned and operated by the MTA Bridges and Tunnels, an affiliate agency of the Metropolitan Transit Authority), would require authorization by the applicable state legislature, specifically Illinois, or possibly the relevant Illinois counties. An interstate public authority would require authorization by two state legislatures, Illinois and Missouri. For example, the two-state port district authority, the Port Authority of New York and New Jersey, was established in 1921, as the Port of New York Authority, through an interstate compact between the states of New York and New Jersey. Today, the Port Authority oversees much of the regional transportation infrastructure, including bridges, tunnels, airports, and seaports, in the New York-New Jersey area.

At present, among other possible impediments, approval by the relevant legislative body (or bodies) for either an intrastate or an interstate public authority remains uncertain. The public authority must also possess the requisite administrative and operational capacity.

Depending on the use of proceeds, either the intrastate or the interstate public authority may be able to issue tax-free municipal bonds to finance the upfront and/or annual payments to the Corps as well enhanced maintenance and repairs as well as certain rehabilitation expenditures.¹⁰² Public authority-issued bonds typically would have a

¹⁰¹ Tenders Info, “Panama: Leaders of Multilateral Agencies and The Panama Canal Sign Agreement for \$2.3 billion to Finance The Canal Expansion Program, December 12, 2008 <Lexis Nexis>. See also, CPW, TTI, *New Approaches*, 79-89.

¹⁰² 26 USC §103(a), (c). See *Commissioner of Internal Revenue v. White’s Estate*, 144 F. 2d 1019 (2d Cir. 1944), cert. denied 323 U.S. 792 (Triborough Bridge Authority) and *Commissioner of Internal Revenue v. Schamberg’s Estate*, 144 F. 2d 998 (2d Cir. 1944), cert. denied 323 U.S. 792 (Port of New York Authority).

cost-of-capital advantage over privately-issued debt. This tax subsidy flowing to investors in the form of tax-exempt interest payments received by investors would lower the return on investment required by a P3 structured in this manner, in comparison to a more typical public-private partnership, involving a private sector partner. The tax subsidy going to investors results, however, in a loss of income taxes on the interest paid to the holders of the tax-exempt bonds.

The bonds could be structured as revenue bonds, with the debt secured by a dedicated revenue source, such as the revenues generated by the locks and dams covered by the lease. If the revenues fell short, the public authority would have no obligation to cover interest charges and principal repayment with any other funds.

Several limitations exist with respect to revenue bonds. Because bond payments only rely on a dedicated revenue stream, typically, interest rates are higher on revenue bonds than on general obligation bonds to reflect the higher risk to investors. Issuance costs for revenue bonds are also generally higher because of the more complex nature of these bonds. The minimum debt service coverage ratio, that is, the required ratio of income to scheduled interest and principal payments, may limit the bonding capacity of the dedicated revenue stream.

Rather than a newly created public authority, an existing public authority, perhaps a local port district, could serve as the Intrastate and/or Interstate pilot P3's sponsor, its immediate lessee/concessionaire. Such a body could investigate and facilitate the public sector (federal-state-local)-private sector interaction and cooperation requisite to the successful implementation of the pilot P3 project. However, it is uncertain whether a local port district (or other existing public body) would be willing (and could) perform these additional, intermediary functions. This public body may be unable to issue tax-exempt revenue bonds.

Bringing the Private Sector into the Public Authority Model for the P3 Partner

Assuming it is able, under a long-term lease with the Corps, the public authority could, in turn, contract with one or more private firms to operate, maintain, repair, and possibly rehabilitate the locks and dams subject to contract.

Depending on how the lessee-partner is structured and the use of proceeds, the public authority may be able to issue traditional tax-exempt bonds, thereby obtaining a cost-of-capital advantage. Or, to reduce its cost of capital, the private partner could have the public authority issue bonds on its behalf. These bonds may constitute private activity bonds under the Internal Revenue Code.¹⁰³ These bonds, which are issued to provide financing for certain projects having a public purpose, reduce the federal income tax benefits enjoyed by the bondholders. Specifically, the interest paid on private activity bonds constitutes a tax preference item for purposes of calculating the alternative minimum tax (AMT). These bonds carry a higher interest than traditional tax-exempt bonds to compensate for the adverse AMT treatment, thereby reducing the cost-of-capital advantage. Dollar limitations (the volume cap) also exist on the issuance of private activity bonds.¹⁰⁴

More Typical Types of P3s Involving One or More Private Entities as the P3 Partner

A more typical type of P3 could take the form of either: 1) one entity providing the capital and the required operations and maintenance (OM) or operations, maintenance, and rehabilitation (OMR) services; or 2) a joint venture, also known as a special purpose vehicle, in which one firm would provide (and/or help secure) the capital and another private entity (or group of for profit firms) would provide the required OM or OMR services.

P3 with One Firm Providing the Requisite Capital and Services

With 2015 in mind, when the expanded Panama Canal would allow longer and wider ships to transit from the Pacific Ocean to East Coast ports, a 2010 P3 gave control of Seagirt Marine Terminal in the Port of Baltimore to a private firm, Ports America Chesapeake (PAC), a subsidiary of Ports America Group (PAG), for fifty years. PAG and its predecessor firms had operated in the Port of Baltimore for more than 88 years before entering into the P3.

¹⁰³ 26 USC §141.

¹⁰⁴ 26 USC §146.

The Seagirt Marine Terminal serves as the main on-and-off boarding point for containers in the Port of Baltimore, Maryland. It opened in 1990 with three 45-foot berths, serviced by three cranes. When these berths and cranes were designed and installed, the biggest container ship had a capacity of about 4,000 TEUs. The largest ships that called at Seagirt, prior to the P3, were capable of carrying 6,400 TEU's, but came only one half full because of the terminal's size restrictions.¹⁰⁵

Facing capital improvement needs and an unwillingness of the State of Maryland to fund these capital projects through debt financing, apart from a public-private partnership, the P3 became an attractive option. The P3 required one company, Ports America Chesapeake, a wholly-owned subsidiary of Ports America Group (PAG), wholly-owned, in turn, by Highstar Capital, to pour millions of dollars into the terminal's maintenance and development and take over responsibility for the terminal's container operations, which the PAG group had operated since the terminal opened. PAG, in 2009-2010, was the largest independent terminal operator in the Americas, operating 84 terminals in the United States. Highstar Capital, a private equity firm, was a long-standing investor in the global infrastructure market. Already by 2009, Highstar Capital had a 10-year history of infrastructure investment with more than \$6 billion in equity value in various infrastructure projects including transportation, energy, waste services, and water. Highstar committed to making equity investment in the Port of Baltimore P3.

The 50-year investment required PAC to create a 50-foot-deep berth and to purchase four cranes to help prepare the terminal for larger (post-Panamax) cargo ships carrying up to 14,000 TEUs. The Maryland Port Administration (MPA) continues to own the Seagirt Marine Terminal. At the end of the 50-year lease term, the MPA will resume responsibility for the operation and maintenance of the terminal.

¹⁰⁵ Nicholas Sohr, "Hopes are high for expanded Seagirt Marine Terminal in Maryland," *Daily Record* November 22, 2009 <ProQuest>.

According to Beverley K. Swaim-Staley, Chair, Maryland Port Commission and Maryland Transportation Authority, and Secretary of the Maryland Department of Transportation, the P3:¹⁰⁶

1) Ensures that the Seagirt Marine Terminal is developed, maintained and operated in a manner that exceeds what the public sector could accomplish over the next 50 years...; 2) Avoids the need for additional State debt for capital projects at Seagirt during that time period [apart from the P3]; 3) Provides a capital reinvestment payment to the Maryland Transportation Authority (MdTA) in excess of \$100 million to deliver much needed system preservation projects on MdTA facilities; 4) Aligns risk between the private sector (e.g. financial and construction cost; and projected container market growth) and public sector (e.g. security, environmental and adverse actions as a result of statutory changes) in a responsible manner. ...

All told, the [P3] Agreement represents a net present value to the MPA and the MdTA of approximately \$450 million; and a total projected value of somewhere between \$1.3 and \$1.8 billion. Perhaps most importantly, the MPA now stands to accomplish the development of Seagirt Berth IV by 2014 (\$105.5 million estimated value) at a time when prospects for the development seemed unattainable through public resources. Furthermore, future costs to maintain the Seagirt Terminal as a state-of-the-art facility will be borne by the private operator.

Specifically, pursuant to the P3 agreement:¹⁰⁷

- 1) PAC agreed to provide the following consideration, among other items a non-refundable capital investment payment in excess of \$100 million to the MdTA, \$140 million if the lessee received tax-exempt finance, \$120 million if it did not, to be used for specific transportation projects; annual rental payments of \$3.2 million, escalating annually beginning in year 5, with a yearly specified minimum and maximum percentage; incremental fees of \$15 per container for containers above 500,000 annually, as indexed for inflation beginning in year 5, with a yearly specified minimum and maximum percentage.

¹⁰⁶ Letter, Beverley K. Swaim-Staley, Secretary, Maryland Department of Transportation, to Hon. Ulysses Currie, Hon. Thomas McLain Middleton, Hon. Norman Conway, Hon. Sheila Ellis Hixson, November 23, 2009.

¹⁰⁷ Adapted from Maryland Port Administration and Maryland Department of Transportation, A Report to the Maryland General Assembly, Senate Budget and Taxation Committee, Senate Finance Committee, House Appropriations Committee, House Ways and Means Committee, Regarding Public-Private Partnership of the Seagirt Marine Terminal, Description of the Proposed Agreement, November 2009.

2) PAC agreed to build equipment and have operational a 50-foot-deep berth at Seagirt (Berth IV) by July 1, 2014 and to purchase four new post-Panamax cranes, two by July 2014 and two by May 2019. The estimated value of the berth and the four cranes was \$105.5 million. PAC completed the berth in January 2013 and purchased the four cranes by June 2012, far ahead of schedule. PAC agreed to make additional capital investments in the terminal over the agreement's term, with substantial improvements requiring MPA approval. The estimated value of these additional capital investments was some \$205 million.

3) Pursuant to the P3, the Maryland Economic Development Corp. issued about \$220 million in tax-exempt bonds, with \$125 million used toward the capital reinvestment payment to the MdTA and \$95 million used for the construction of Berth IV. These bonds were revenue bonds backed solely by revenues from Seagirt.

4) PAC received the right to all revenues from Seagirt during the lease term. It received full control over operations and work practices at Seagirt as long as in contract compliance. PAC also obtained the right to move current container and container/roll on businesses at the Port of Baltimore to Seagirt, thereby consolidating all container business at the port into one terminal, with specified exclusivity periods.

5) PAC committed to hiring a "significant portion" of the 28 MPA/State employees who provide crane maintenance at Seagirt. Under the P3, unionized employees who perform terminal operations and stevedoring at Seagirt will become PAC employees with their union representation remaining the same.

6) Staying the course long-term, PAC agreed to maintain Seagirt in good working order and condition, as specified in a list of regular system preservation requirements, with PAC receiving control over the timing and nature of system preservation costs provided standards are met, thereby relieving the MPA from future maintenance expenditures required for system preservation. These

projected system preservation and maintenance related capital expenses were estimated at \$258 million.

A joint inspection of the premises will occur every five years, with PAC required to remedy any deficiencies. If PAC fails to repair and maintain the premises, MPA will give PAC written notice of the need to cure and PAC will have a specified time period to do so. If PAC fails to cure, MPA may enter the premises to make the needed repairs or do the required maintenance or bring the premises into compliance. PAC must dredge all Seagirt berths to their specified permitted depths.

7) The agreement contains an extensive default section under which the MPA can find PAC in default for a number of occurrences, including the failure to pay the basic rent and fees, failure in meeting any major commitment under the agreement, such as failing to meet environmental requirements, and any assignment without approval as required under the agreement. Upon a PAC default, the agreement gives the MPA a number of remedies, including terminating the agreement or operating (or reletting) Seagirt instead of PAC.

8) The MPA agreed to continue to maintain the Facility Security Plan and perimeter infrastructure security.

Another P3 variation could take one of two forms: 1) a joint venture or a consortium of several private firms; or, 2) one firm providing the required services and another providing (or helping secure) the requisite capital. Of the many examples of these variations, two are noteworthy.

Private Partner Structured as a Joint Venture (or a Consortium of Firms)

In 2005, Indiana faced a \$3 billion gap in its highway budget, equal to two years of new road construction. A P3 agreement for the Indiana Toll Road gave the state the opportunity to improve its roads without blowing apart the state's budget.

In June 2006, the Indiana Finance Authority, a public body of the State of Indiana, which owns the Indiana Toll Road (ITR), entered into a 75-year lease for the ITR with ITR Concession Company LLC, a subsidiary of Statewide Mobility Partners LLC (SMP). SMP is a 50-50 consortium owned by Macquaire Infrastructure Group (MIG), a publicly-owned Australian company which leases and finances, among other activities, highways, bridges, and tunnels globally, and Cintra Concesiones de Infraestructuras de Transporte SA (Cintra), a Spanish company which leases, finances, manages, and operates, among other activities, various toll road concessions. Cintra assumed primary responsibility for the management and operations of the ITR.

In return for the state giving up 75 years of ITR revenues, SMP paid an upfront concession fee of \$3.8 billion. Indiana allocated the upfront payment as follows: \$200 million to retire the outstanding Indiana Toll Road bonds; \$500 million to the Next Generation Trust Fund, with the interest generated by the fund distributed periodically to the Major Moves Construction Fund; and \$3.1 billion to fund the Major Moves Construction Fund to build highway projects in Indiana.

With a total cost of the deal at \$3.996 billion (including \$196 million for reserves and other costs), MIG and Cintra together made a \$760 million equity investment in the project, each contributing \$380 million, with the remainder financed by \$3.248 billion in loans from a syndicate of seven banks, without recourse to the joint venturers. In addition to the acquisition debt facility of \$3.248 billion, the bank syndicate provided a capital expense facility of \$665 million and a liquidity expense facility of \$150 million. The liquidity expense facility pays the current interest expenses on the other two facilities and provides a buffer against fluctuations in operating cash flows. The financing involves a step-up interest rate swap with a counterparty, under which some interest payments on the acquisition and capital expense indebtedness were deferred and added to the principal amount until maturity. The financing also deferred principal amortization to later years, when presumably the project's cash flows would be much higher.¹⁰⁸

¹⁰⁸ Macquaire Investment Group, Press Release, "MIG-Cintra Consortium Reaches Financial Close on Indiana Toll Road," June 30, 2006; Cintra, Press Release, "Cintra begins operating Indiana Toll Road (USA) under a 75-year concession," June 29, 2006; *Project Finance*, "Indiana Toll Road", 272 (July 2006): 18.

Under the agreement, the concessionaire collects and retains all tolls and certain other revenues during the lease term.¹⁰⁹ Although the details are unimportant for purposes of this report, the lease provided for annual toll increases based on the highest of three factors: 1) 2 percent; 2) increases in inflation; or, 3) increases in economic growth,¹¹⁰ thereby providing an inflation-linked return on the concessionaire's equity investment.

The agreement requires the concessionaire to undertake certain improvements, among other items. The concession features a large amount of capex, \$573 million in maintenance capital expenditures, and about \$525 million in renewal, replacement, and expansion capital expenditures over the first 25 years.¹¹¹ Knowing that the funds would be there saves time and money, thereby promoting efficiency.

The operating standards manual imposes detailed requirements on the concessionaire. If the joint venture fails to perform and comply with the terms of the agreement, including the operating standards, a provision exists for a cure period and dispute resolution, before the concession terminates, among other remedies, provided for the Indiana Finance Authority.

Private Partner Structured with a Service Provider and a Capital Provider (or Obtainer)

In another type of P3, one private firm could provide (or help secure) the capital and a different entity could provide the OM or OMR services.

The Bayonne New Jersey Municipal Authority (BMUA), created by a 1997 municipal ordinance, owns the city's water and wastewater system. In addition to a history of deferred asset maintenance, it faced declining water usage, the loss of a large industrial customer, a substantial public debt burden (guaranteed by the city) and a credit risk to the city, and concerns regarding operating efficiencies and attracting and retaining qualified staff. Double-digit rate increases were needed to keep its system running.

¹⁰⁹ Indiana Toll Road Concession and Lease Agreement, dated as of April 12, 2006 by and between The Indiana Finance Authority and ITR Concession Company LLC (ITR Agreement), §7.3(a) and (b).

¹¹⁰ ITR Agreement, §7.1 and Schedule 7.1, §3(ix).

¹¹¹ Letter, ITR Concession Company LLC, to Charles Schalliol, Director, Indiana Finance Authority, January 20, 2006 Appendix 2-Capital Expenditure Calculation.

In December 2012, BMUA entered into a 40-year Bayonne Water & Wastewater Concession Agreement with the concessionaire, Bayonne Water Joint Venture LLC, a special purpose vehicle, consisting of Kohlberg Kravis Roberts & Co (KKR) and United Water, a unit of Suez Environnement Co.¹¹² KKR is a leading global investment firm, active in private equity as well as infrastructure and natural resources, credit and mezzanine, and public equity financing. Suez Environnement, a global leader in water and wastewater services, among other activities, manages worldwide nearly 1,900 (1,888) drinking water production units and more than 1,600 (1,643) wastewater plants. United Water provides water and wastewater services to some 5.7 million people in the U.S. It operates 100 municipal and industrial water and wastewater systems through P3s and owns and operates 20 water and wastewater utilities in the U.S.

Under the agreement, the BMUA will continue to own the system. The concessionaire will operate the system, including billing, collection, operation and maintenance, in turn, through United Water Operations Contracts, Inc. (UWOC), pursuant to an operations and maintenance agreement with the joint venture. The agreement thus gives BMUA access to Suez's and United Water's water and wastewater expertise to meet and solve its operational needs.

The concessionaire is responsible for operating and maintaining the water and wastewater systems in accordance with written operating and technical standards, thereby offloading the operational and maintenance burden to the private sector. Because the special purpose vehicle agreed to spend up to \$500,000 per year on maintenance expenses, the BMUA knows that the funds will be there.

¹¹² Bayonne Water & Wastewater Concession Agreement, The Bayonne Municipal Utilities Authority and Bayonne Water Joint Venture, LLC, dated as of December 20, 2012 (Bayonne Agreement) and United Water, Press Release, "United Water and KKR Sign Unique Utility Partnership with City of Bayonne, NJ," December 20, 2012. See also *Public Works Financing*, "United Water, KKR Seal a 40-year P3 in Bayonne, NJ," 277 (December 2012): 1-2; Dan Sugarman, Sustainable City Network, Water Partnerships Provide Investment Capital and Debt Relief in Bayonne, N.J., December 11, 2012; Michael Corkery, "Private Equity Tries On the Hard Hat," *Wall Street Journal*, April 23, 2013, C1; Dennis J. Enright Why the Bayonne Water/Wastewater Public-Private Partnership Succeeded, NW Financial Group LLC, April 1, 2013 <www.nwfinancial.com/pdf/NW-BMUA-Report.pdf> (accessed October 14, 2013).

As part of the transaction, BMUA received an upfront payment of \$150 million, which enabled the authority to pay off its debt of some \$130 million, thereby helping ease the pressure on the city's finances. Also, some \$6.5 million was set aside for a rate stabilization fund to help with the rate transition provided for in the agreement.

The concessionaire also agreed to put another \$150 million into the system, including about \$14 million during the P3's first three years to pay for capital improvements. The required initial capital improvements include replacing water meters, citywide, and upgrading the system's billing and collection. Going forward, the concessionaire will spend \$2.5 million per year, adjusted for inflation, on other capital projects identified by the concessionaire, in consultation with the BMUA, based on needed critical upgrades, repairs, and safety improvements, in accordance with the agreement's operating and technical standards. A capital improvements budget will be set annually and unspent funds will roll forward. Capital expenses in excess of \$2.5 million per year will pass through to ratepayers as well as expenditures to meet uncontrollable events, such as new laws or administrative regulations, that increase the concessionaire's costs above \$3 million per year. Because the contract requires the concessionaire to stay the course over the long-term, the P3 offers enhanced efficiencies, by saving time and money, thereby delivering value over the life cycle of the leased infrastructure.

BMUA will continue to exist, providing oversight and monitoring of the P3, funded by an annual fee of \$500,000 per year, indexed for inflation, payable by the concessionaire, to cover its costs in administering the agreement.

As part of the deal, the concessionaire will receive basically all of the water and sewer revenues from the system for 40 years. While recognizing that private investors must achieve a reasonable rate of return on their investment, BMUA did not want the two firms to receive a windfall. The P3 agreement effectively caps their potential profits. The agreement provides for a complex rate-setting formula, beyond the scope of this report, that performs three functions: guarantees annual capital investments for the system; sets fixed, predictable, annual rate increases for the ratepayers; and a known annual revenue path for the concessionaire. Revenues in excess of operating and maintenance costs, capital improvements, debt servicing, and equity distributions, among other items, will

go into the rate stabilization fund. If water usage drops, the concessionaire can tap as much as \$5 million of this reserve fund to make up for any revenue shortfalls.

The private firms expected new revenues and efficiency savings over the medium-term, but not in the short-term. Projected revenue gains include: 1) about \$1 million annually from re-metering to capture previously unbilled water; 2) increased water sales of about \$3 million per year from announced new real estate developments and the resulting population growth; and, 3) revenue gains from the right to sell excess water to United Water.

In addition to other expected operating efficiencies, the agreement provides that the systems' employees will be cut from 33 to 19 during a one-year transition period. The concessionaire agreed to cause UWOC, at its discretion to: 1) provide employment for these employees at the water or wastewater systems UWOC operates in the New York/New Jersey area; 2) work opportunities for these employees to develop new and alternative job skills; or, 3) severance payments.¹¹³

In addition to strict operating and technical standards, the agreement contains extensive default, remedial, and termination provisions. In the event of a default by the concessionaires or BMUA, significant termination compensation is payable.

XII. Favorable Federal Income Tax Aspects for a Private Sector Partner in a Long-Term P3

From a private entity's viewpoint, various risks, apart from return on investment considerations, exist in a 25- to 50-year lease for two or four locks and dams. These risks include maintaining the necessary capacity, financial and administrative, to meet the OM or OMR service requirements contained in the agreement. As part of the P3, the Corps will transfer various other risks, such as future traffic patterns and business conditions, to the private sector.

¹¹³ Bayonne Agreement, §2.7.

Cognizant of these risks, the Internal Revenue Code provides federal income tax benefits to the private partner in a P3. These tax benefits contribute to reducing the real cost of the concession to the private entity.

With the term of the lease exceeding five of the regional locks and dams' remaining design life (with the exception of the Melvin Price Locks and Dam), at the time of the transaction, the Internal Revenue Code will treat the concessionaire as the acquirer-owner for federal income tax purposes. In brief, the private entity can amortize part of the upfront payment allocated by the agreement to the right to collect user fees, among other revenue sources, over fifteen years, on a straight-line (pro rata) basis.¹¹⁴

To qualify as a Section 197 intangible, which applies to a broad class of intangibles, the right to collect user fees, among other revenue sources, must be a government-granted right, separate from the leasehold of tangible property, and not an interest in land.¹¹⁵ The private partner will amortize the remaining portion of the upfront payment as prepaid rent of the concession term.

XIII. Conclusion and Recommendations

The viability of a pilot P3 rests on three key assumptions: 1) Congressional authorization for the Corps to enter into a long-term lease for navigational assets, namely, specified locks and dams, under either existing or new statutory authority; 2) Congressional approval for a sufficient revenue stream for the P3 lessee; and, 3) an adequate rate of return for private sector equity investors and a sufficient debt service coverage ratio for private sector debt investors. Assuming these three conditions are met, the implementation of the Intrastate Pilot P3 and/or the Interstate Pilot P3 merits serious consideration. The P3 will likely achieve the requisite efficiency improvements that will facilitate enhanced reliability in a cost effective manner, while providing the requisite capital for enhanced maintenance and repairs, among other items, no longer dependent on the uncertainties of the Congressional appropriation process. Any P3 would protect current Corps' employees' positions, salaries and benefits.

¹¹⁴ 26 USC §197(a) and Treasury Regulation §1.197-2(b)(8).

¹¹⁵ 26 USC §197(d)(1)(D), (e)(2), and Treasury Regulation §1.197-2(c)(3).

Private investors would most likely be interested in an Upper Mississippi River P3 containing only the Melvin Price Locks and Dam and Locks and Dam 27. The main locks at both of these facilities are 1200-feet in length, the standard, modern lock, and do not require any expansion or new construction. Having undergone a major rehabilitation completed in 2011, Locks and Dam 27 do not need further major expenditures for the foreseeable future. Although the main portion of the Melvin Price Locks and Dam was completed in 1990, seemingly they require major rehabilitation work estimated to cost \$40 million for the lock and \$20 million for the dam. As part of their due diligence, private investors would assess the needed work and obtain their own cost estimates.

With the cost-of-capital an important consideration, further study must be undertaken to investigate the possibility of the Corps entering into the P3 with an intrastate or interstate public authority together with one or more private firms as service providers.

In the alternative, looking to a P3 between the Corps and a private partner, the nature of private party requires further investigation. The private partner could take one of three possibilities: 1) one entity providing financing and service expertise; 2) a joint venture consisting of two or more firms sharing, in some type of arrangement, the financial as well as operation and maintenance tasks; or 3) a joint venture combining a financial partner and an operating partner.

Having a separate financial partner, with experience in complex, sophisticated financial transactions, at the table in negotiating and structuring the P3 may prove advantageous. As shown by the Bayonne NJ transaction, this arrangement may make negotiating a reasonable return on the debt/equity invested in the project somewhat easier than if the financial and operational interests are combined or jointly shared.

Having a separate financial partner may also help improve the terms of the debt investment, for instance, by reducing the interest payable. In the Bayonne P3, the transaction obtained \$175 million in debt-equity financing. Two thirds of the financing was provided in a private placement with three life insurance companies for a 25-year fixed interest rate loan. With KKR's expertise, the interest rate on the investment grade

loan was close to the cost of BMUA refinancing its tax-exempt obligations by itself.¹¹⁶

Beyond the structure and financing of the P3 arrangement, its scope requires further investigation. In a P3 agreement with the Corps, the contract would presumably include locks, dams, dredging, and maintenance of channels, through river engineering, and water supply. However, if the private sector controls the navigation on the inland waterway, subject to continued Corps oversight and monitoring, decisions must be made and responsibilities allocated regarding other Corps' functions, including flood control and damage reduction, recreation (boating and fishing), water supply, and ecosystem restoration and environmental quality. Two possibilities exist: First, the P3 partner, whether a public authority or a private entity (or entities) could take over one or more of these non-commercial functions. Second, in the more likely scenario, the Corps would retain its non-commercial functions, such as ecosystem restoration,¹¹⁷ funded by federal appropriations, and continue to balance and sort out the conflicting goals of the various interests, marked by complex and diverse objectives. It is hard to charge users and recoup costs given the diffuse benefits of these non-commercial functions, such as flood control projects. Or, these non-commercial functions could be transferred to state and local governmental levels or some type of regional watershed management authority.

Regardless of the exact scope of the P3 agreement and the continued federal role and responsibilities, a successful P3 rests on consistent, ongoing, diligent oversight and monitoring of the agreement and the private sector's performance under the contract. Funding ought to be built into the P3 agreement to provide for public sector oversight and monitoring, presumably by the Corps. As the National Research Council points out, "Multiple criteria, including social and environmental considerations, for operations and maintenance will continue to be important, certainly requiring some level of Corps oversight."¹¹⁸

¹¹⁶ Dennis Enright, NW Financial Services, financial advisor to Bayonne, N.J., *Public Works Financing*, "United Water-KKR," 1-2.

¹¹⁷ The Water Resources Development Act of 2007, Public Law 110-114, §8004, authorized ecosystem restoration on the Upper Mississippi River and the Illinois Waterway System, with an authorization to appropriate \$1.717 billion to carry out some 225 restoration projects.

¹¹⁸ NRC, Corps, 90.

As the first step in the implementation of a pilot P3 project, we recommend the convening of two successive discussions to first scope and then refine a pilot or pilots that identifies specific project outputs and responsibilities that would form the basis of a P3 contract. The first discussion would bring together various stakeholders, including, among others, representatives from the Corps, carriers, the Inland Waterways Users Board, shippers of goods (both agricultural and non-agricultural, including manufactured goods, coal and other energy sources, and chemicals), hydropower and hydrokinetic interests, electric utilities that rely on waterways for cooling of existing electricity generation facilities, municipal, industrial, and agricultural interests receiving water supplies, recreational and commercial (non-towboat and barge) users, state and local interests, local real estate and recreational interests, local and regional economic development groups, port authorities, elevator operators, chambers of commerce, labor unions, and those interested in environmental restoration and flood damage reduction.

Thereafter, the second discussion would vet the proposed P3 project with respect to the required return on private sector equity investments and the requisite debt service ratio on debt obligations, cost reduction and revenue possibilities, scope of services to be provided, and risk management, sharing, and assignment (particularly risks from sources outside either party's control), among other items. This second gathering would convene various experts, including private sector investors/lenders, other capital sources, and service providers. In particular, these experts would focus on developing various financial opportunity metrics to support the implementation of a pilot P3 project.

Appendix A: Brief Description of Six Regional Locks and Dams of Interest to Soybean Exporters

Peoria Lock and Dam—Illinois River

The Peoria Lock and Dam is located in the Illinois River, 157.7 miles above the confluence of the Illinois River with the Mississippi River. The lock and dam were put in service in 1939. The lock is 600-feet long and 110-feet wide.

The overall length of the dam is 570 feet; the movable part of the dam is 432-feet long containing 108 wickets (3.75-feet wide, 16.42-feet high), which lift the gates into position by a hydraulic cylinder applying force to the downstream side. The dam includes a single 84-foot long submersible tainter (radial arm) gate adjacent to the lock wall.

The lock is used during low and moderate river flows when the wickets are raised to maintain the nine-foot navigation depth. During high river flows, the wickets are lowered and open river conditions prevail.

From 1987-1990, a major rehabilitation changed the physical components of the dam by replacing 26 of the original 134 wickets with a single 84-foot long submersible tainter gate adjacent to the lock wall.

(U.S. Army Corps of Engineers (Corps), Rock Island District, Illinois Waterway: Locks & Dams 2012 (Illinois Locks & Dams), 15 and IMTS, B3-78)

LaGrange Lock and Dam—Illinois River

The LaGrange Lock and Dam is located in the Illinois River, 80.2 miles above the confluence of the Illinois River with the Mississippi River. The lock and dam were put in service in 1939. The lock is 600-feet long and 110-feet wide.

The wicket section of the 1,066-foot long dam is 436-feet long, contained 109 wickets (3.75-feet wide, 14.92-feet high).

The lock is used during low and moderate river flows when the wickets are raised to

maintain the nine-foot navigation depth. During high river flows, the wickets are lowered and open river conditions prevail.

The lock underwent rehabilitation in 1986 to 1988, including minor concrete repairs, repositioning the lock machinery, and installing a traveling keel, which holds the head of the tow into the guide walls as the tug pulls the tow into the lock chamber and then out of the lock chamber.

(Corps, Illinois Locks & Dams, 17)

Lock and Dam 24—Mississippi River

Lock and Dam 24 is located in the Upper Mississippi River, 273.4 miles above the confluence of the Mississippi and Ohio Rivers. The lock and dam were placed in service in 1940. The lock is 600-feet long and 110-feet wide.

The movable portion of the dam is 1,340-feet long with 15 submersible tainter (radial arm) gates, each 80-feet wide and 25-feet high, which pivot vertically to control water flow. A 2,720-foot submersible earthen dike extends from the movable dam to the Illinois shore.

A major rehabilitation was completed in 2005. The work consisted of: 1) replacing a large portion of the concrete in the lock chamber walls, walkways, and work areas and 2) installing new gate and valve machinery elevating the electrical components above the 1993 flood levels. Eighty five million dollars were appropriate for the major rehabilitation; \$70 million was expended.

The American Recovery and Reinvestment Act of 2009 provided \$2.15 million for the minor rehabilitation of the tainter (radial arm) gate chains and sprockets (a toothed wheel whose teeth engage the links of a chain for raising the tainter gates). Delivery of these items was taken in 2010; however, they have not yet been installed. The remaining work, which may not be needed, includes repairs to the tainter gate trunions, where the tainter gate is hinged, downstream bulkheads, and a picking beam, which attaches the bulkheads to a crane for placement in the slots.

(Corps, Mississippi Valley District, Upper Mississippi River Locks & Dams (Upper Mississippi River Locks & Dams), Lock and Dam 24, n.d., 1; IMTS, B3-71; CPW, TTI, Time Bomb, 77 (Table 3.8 Listing of Study Area Lock and Dam Rehab, Maintenance, and Improvement Needs))

Lock and Dam 25—Mississippi River

Lock and Dam 25 is located in the Upper Mississippi River 241.4 miles above the confluence of the Mississippi and Ohio Rivers. The lock and dam were placed into operation in 1939. The lock is 600-feet long and 110-feet wide.

The movable portion of the dam is 1,296-feet long with three submersible roller gates, 25-feet high and 100-feet long, which have embedded tracks on which a gate rolls, and 14 submersible tainter (radial arm) gates. The tainter gates pivot vertically and are raised or lowered to control the depth of the water in the 32-mile pool upstream of the dam. In high water times, the tainter gates are raised to allow the river to flow almost unimpeded. The three roller gates also restrict water flow in a manner designed to reduce erosion.

A 5-mile long dike, part of the facility, extends upstream on the Missouri side of the river.

A major rehabilitation was completed in 1999 at a cost of \$24.4 million. The rehabilitation: 1) replaced the lock miter gates (a gate where the two gate leaves meet at an angle pointing upstream to resemble a miter joint), auxiliary lock closure structure, the power distribution system, the lock motors and controllers, the control system, the miter gate system; 2) installed a dewatering pump system and; 3) added debris openings in the dam guard work.

The American Recovery and Reinvestment Act of 2009 provided the following funds for a minor rehabilitation completed in 2010: \$2.15 million for tainter gate chains and sprockets, \$435,000 for spillway rehabilitation, \$200,000 for diesel compressors, \$1.2 million for culvert (openings in lock walls) valve machinery, \$1.9 million to install

downstream bulkhead slots to allow dewatering for the gate maintenance and repairs, and \$200,000 to repair concrete.

Scour (sediment removal) repairs were completed in 2012 at a cost of some \$11 million. (Corps, Upper Mississippi River Locks & Dams, Lock & Dam 25, 1; IMTS, B2-8, B3-72; CPW, TTI, Time Bomb, 78 (Table 3.8))

Melvin Price Locks and Dam—Mississippi River

Melvin Price Locks and Dam are located in the Upper Mississippi River, 200.8 miles above the confluence of the Mississippi and Ohio Rivers. The main lock and dam were placed in service in 1990 and the auxiliary lock in 1994. The main lock chamber is 1200-foot long, 110-foot wide, with a 600-foot long, 110-foot wide auxiliary lock chamber. The main lock has a vertical lift gate, with wheels (rollers) at each end, enabling vertical movement in slots, and a miter gate. The auxiliary lock has two miter gates.

The 1,160-foot long movable dam has nine non-submersible tainter (radial arm) gates, each 42-feet high and 110-feet long.

The American Recovery and Reinvestment Act of 2009 provided \$4.73 million for a minor rehabilitation including \$230,000 for a spur dike, \$2 million to replace fenders (cushioning shields or bumpers, which protect the lock walls from barge impacts when entering and exiting a lock) on the main lock miter gate, \$2 million to replace four bulkheads, and \$500,000 for a lock bulkhead lifting beam (a beam that straddles the bulkhead to distribute the load for a single point pick up by a crane, which lifts the beam, and the beam, in turn, lifts the bulkhead). These projects were completed in fiscal year 2013.

(Corps, Upper Mississippi River Locks & Dams, Melvin Price-Locks and Dam 26, 1; IMTS, B3-73; CPW, TTI, Time Bomb, 79 (Table 3.8))

Chain of Rocks—Locks and Dam 27—Mississippi River

The locks for Locks and Dam 27 (Chain of Rocks) are located in the Upper Mississippi 185.5 miles above the confluence of the Mississippi and Ohio Rivers at the southern end

of the 8.4-mile long Chain of Rocks Canal. The dam is located at Mississippi River mile 190.2. The locks were put into service in 1953. The locks consist of a main chamber and an auxiliary chamber. The main lock is 1200-feet long and 110-feet wide. The auxiliary lock is 600-feet long and 110-feet wide.

The dam is 2,500-feet long. It is a non-movable, low water dam that extends across the river. The dam was completed in 1964.

A major rehabilitation, funded at a cost of \$43 million, including \$28.3 million in American Recovery and Reinvestment Act funds, included the following new items: main lock lift gate; miter gates; culvert valve machinery on the main and auxiliary locks; high mast lights; lockwall stability and lock sill anchorage tie downs and bulkheads. The work was completed in fiscal year 2013.

(Corps, Upper Mississippi River Locks & Dams, Chain of Rocks-Locks and Dam 27, 1)

Appendix B: More Pressing Major Rehabilitation Projects for Two of the Six Regional Locks and Dams

LaGrange Lock and Dam

According to the Corps, the LaGrange Lock needs a major rehabilitation of lock concrete and its electrical and mechanical systems. For more than 70 years, the lock has been exposed to repeated freeze/thaw cycles and flooding resulting in the degradation of the lock components. The vertical concrete has deteriorated so that sections have had to be removed and/or threaten to fall into the lock chamber. Safety issues abound. Barges can become wedged under the armored sections, which protect the lock from barge impacts, resulting in a potentially dangerous situation for deck hands, lock personnel, and potential damage to barges. Furthermore, hazardous conditions exist resulting from the deteriorated horizontal concrete on the land and the river walls of the lock chamber.

The mechanical and electrical systems require constant patching and labor-intensive repairs. Parts are difficult to obtain and in most cases must be specially ordered. In coming years, a “very high” probability exists that the mechanical and electrical systems will fail, requiring “extensive and expensive” repairs. The “very probable” potential for an “incident” to occur due to deteriorated lock concrete will necessitate the lock closure for more than one week. The potential increases every year the lock concrete is not repaired. Furthermore, the downstream end of the lock needs bulkhead slots to allow for lock dewatering.

Current cost estimates for the lock rehabilitation, depending on the scope of the work range from \$57.7 million to upwards of \$78.8 million.

(Corps, 2012 Illinois Waterway, LaGrange Lock & Dam, 18; CPW, TTI, New Approaches, 37 (Table 8. Phase 1 and Phase 2 Projects from Capital Projects Business Model (Locks Only)) and CPW, TTI, Time Bomb, 86 (Table 3.8). See also Corps, 2012 Illinois Waterway, LaGrange Lock & Dam, 18, estimating the cost at \$75.9 million. The project has a benefits to cost ratio of 1.5. IMTS, B2-10)

Lock and Dam 25

At Lock and Dam 25, estimates for major dam rehabilitation run between \$20 to \$43.8 million. The lock also requires major rehabilitation, at an estimated cost of \$40 million, including the lock miter gates, the auxiliary lock closure gates, culvert (openings in the lock walls) valves, miter gate culvert valve machinery and the replacement of the power distribution system, lock motors and controllers, and the control system.

(CPW, TTI, New Approaches, 37 (Table 8) and IMTS, B3-72. CPW, TTI, Time Bomb, 78 (Table 3.8) estimated the cost of the lock rehabilitation at \$18 million. The project has a benefits to cost ratio of 2.06. IMTS, B3-72)

Appendix C: Less Urgent Major Rehabilitation Projects On Three of the Six Locks and Dams

Peoria Lock and Dam

At the Peoria Lock and Dam, a future major rehabilitation, according to the Corps, budgeted at an estimated total cost of \$70 million, with the lock and dam rehabilitation of \$50 million and \$20 million, respectively. The lock rehabilitation will likely include: repair or replacement of the miter gates, the emergency gates, culvert (openings in the lock walls) valves, gate and culvert valve machinery, dam gate, electrical and mechanical components, concrete repair and resurfacing, and scour (sediment removal) repairs. (IMTS, B3-78. Other estimates place the cost of lock rehabilitation at \$22.9 million. CPW, TTI, Time Bomb, 87 (Table 3.8))

Lock and Dam 24

At Lock and Dam 24, a major rehabilitation item, at an estimated cost of [\$11.85] million, is the repair of tainter gate trunion (the hinge or pivoting anchor on a gate). (CPW, TTI, Time Bomb, 77 (Table 3.8))

Melvin Price Lock and Dam

At the Melvin Price locks, future rehabilitation projects, with an estimated cost of \$40 million, include lock miter gates, auxiliary lock closure gates, culvert valves, the miter gate and culvert valve machinery, replacement of the power distribution system, the lock motors and controllers, and the control system. Major dam rehabilitation expenses are estimated at \$20 million. (IMTS, B3-73)

Appendix D: Delays and Lock Unavailability at Six Regional Locks

Peoria Lock and Dam

Scheduled unavailability from calendar year (cy) 2000 through cy 2012: none.

Unscheduled unavailability has held constant:

<u>Calendar Year</u>	<u>Number / Time (hours)</u>
2008	25 / 56.23
2009	20 / 60.38
2010	23 / 47.78
2011	7 / 28.67
2012	19 / 59.12

(Corps, Institute for Water Resources (IWR), Navigation and Civil Works Navigation Data Center (Data Center), Locks by Waterway, Locks Unavailability, Calendar Years 1993-2012 (Locks Unavailability), Sheet 115

<www.navigationdatacenter.us/lpms/lock2012webunavail.htm> (October 11, 2013))

The average processing time has increased at this lock as follows:

<u>Calendar Year</u>	<u>Average Processing Time (hours)</u>
2012	.93
2011	.63
2010	.55
2009	.37
2008	.40

As the result of the increased processing time, delays also increased:

<u>Percent of Vessels Delayed</u>	<u>Calendar Year</u>	<u>Average Delays (hours)</u>
73%	2012	3.23
29%	2011	.69
28%	2010	.55
16%	2009	.39
17%	2008	.40

(Corps, IWR, Data Center, Locks by Waterway, Lock Usage, Calendar Years 1993-2012
(Lock Usage), Sheet 115

<www.navigationdatacenter.us/lpms/data/lock2012.web.htm>(October 11, 2013))

LaGrange Lock and Dam

Scheduled Unavailability		
<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2007	2	5.33
2012	2	6.83

Unscheduled unavailability has evidenced an irregular pattern:

Unscheduled Unavailability		
<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2008	6	9.42
2009	7	14.87
2010	12	28.30
2011	34	74.57
2012	3	7.32

(Corps, IWR, Data Center, Locks Unavailability, Sheet 112)

The average processing time increased:

<u>Calendar Year</u>	<u>Average Processing Time (hours)</u>
2012	.97
2011	.72
2010	.62
2009	.51
2008	.50

As the result of the increased processing time, delays also increased:

<u>Percent of Vessels Delayed</u>	<u>Calendar Year</u>	<u>Average Delays (hours)</u>
61%	2012	3.42
29%	2011	.99
22%	2010	.87
16%	2009	.44
15%	2008	.47

(Corps, IWR, Data Center, Lock Usage, Sheet 112)

Lock and Dam 24

<u>Scheduled Unavailability</u>		
<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2008	2	105.22
2011	2	19.42

Unscheduled unavailability has decreased:

Unscheduled Unavailability		
<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2008	37	549.37
2009	64	253.74
2010	29	61.87
2011	33	93.67
2012	14	61.83

(Corps, IWR, Data Center, Locks Unavailability, Sheet 145)

Average lock processing time has held constant:

<u>Calendar Year</u>	<u>Average Processing Time (hours)</u>
2012	.87
2011	.88
2010	.84
2009	.85
2008	.86

The average delays have decreased at this lock:

<u>Calendar Year</u>	<u>Average Delays (hours)</u>
2012	1.04
2011	1.03
2010	1.24
2009	2.05
2008	1.75

(Corps, IWR, Data Center, Lock Usage, Sheet 145)

Lock and Dam 25

Scheduled Unavailability

<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2012	2	11.38
2010	2	668.98

Unscheduled unavailability has decreased:

Unscheduled Unavailability

<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2008	115	1002.63
2009	107	206.40
2010	105	1674.73
2011	84	343.43
2012	15	50.15

(Corps, IWR, Data Center, Locks Unavailability, Sheet 146)

The average processing time has increased:

<u>Calendar Year</u>	<u>Average Processing Time (hours)</u>
2012	1.04
2011	1.02
2010	.94
2009	.86
2008	.86

The average delays have increased:

<u>Calendar Year</u>	<u>Average Delays (hours)</u>
2012	5.98
2011	2.11
2010	3.11
2009	1.93
2008	2.53

(Corps, IWR, Data Center, Lock Usage, Sheet 146)

Melvin Price Locks and Dam

Scheduled Unavailability (since cy 2008)

<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2012	1	2.42

Unscheduled unavailability has decreased:

Unscheduled Unavailability

<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2008	193	634.48
2009	163	1059.75
2010	138	631.82
2011	118	354.88
2012	13	15.82

(Corps, IWR, Data Center, Locks Unavailability, Sheet 157)

Average processing time has increased slightly:

<u>Calendar Year</u>	<u>Average Processing Time (hours)</u>
2012	.77
2011	.73
2010	.72
2009	.67
2008	.68

The average delays have increased:

<u>Calendar Year</u>	<u>Average Delays (hours)</u>
2012	1.50
2011	.84
2010	2.01
2009	1.02
2008	.82

(Corps, IWR, Data Center, Lock Usage, Sheet 157)

Locks and Dam 27

Scheduled unavailability has soared:

<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2008	2	24.35
2010	3	7.02
2011	2	21.60
2012	4	1703.93

Unscheduled unavailability increased, then decreased:

Unscheduled Unavailability		
<u>Calendar Year</u>	<u>Number</u>	<u>Time (hours)</u>
2008	58	1095.38
2009	29	298.27
2010	55	3095.28
2011	123	1294.15
2012	9	130.87

(Corps, IWR, Data Center, Locks Unavailability, Sheet 147. On September 15, 2012, some five dozen tug boats and more than 400 barges were stranded when the main lock at Locks and Dam 27 was shut down. A large, rock-filled steel cell, used to help align barges prior to transiting the lock, split, blocking the channel with rock. The steel cell has armored sections to protect it from impacts caused by the barges. Because of the low water level, the barges impacted an unarmored portion of the cell's shaft. *New York Times*, "Missouri: Damaged Lock Snarls Barge Traffic on Mississippi River", September 20, 2012, A21)

The average processing time increased:

<u>Calendar Year</u>	<u>Average Processing Time (hours)</u>
2012	.80
2011	.71
2010	.71
2009	.64
2008	.67

Also, the average delays increased:

<u>Calendar Year</u>	<u>Average Delays (hours)</u>
2012	7.92
2011	1.37
2010	1.99
2009	.68
2008	1.35

(Corps, IWR, Data Center, Lock Usage, Sheet 147)

Appendix E: Synthesis of Subject Matter Expert Interviews

Overview of Interview Process

As part of an overall effort to assemble and analyze information pertinent to understanding the potential for new approaches to the funding and financing of the U.S. inland waterway system, The Horinko Group conducted interviews of subject matter experts that sought to bring forward the best thinking of Corps of Engineers navigation business line practitioners, producers, shippers, government contractors, and a number of other direct beneficiaries of an improved inland navigation system. These interviews were not undertaken to assess advocacy for the system or to reveal the views of a broader bandwidth of beneficiaries, but rather to gain tangible insights of those most familiar with the workings of the system and to shed additional light on a variety of strategies for cost containment, greater reliability, and alternative financing structures to make sustainability of the current system achievable. Additionally, if reform or evolution of current federal water resource policy put forth a challenge to identify and formulate a regional alternative financing pilot or pilots, these same subject matter experts were asked where such a pilot might be of greatest value and urgency to benefit the commodities supply chain.

This overall research and reporting effort, including interviews, was initiated and completed in sixty days and was somewhat confounded by the federal government shutdown in October 2013. Given the rapid response, partly driven by the perceived need to better inform near-term discussion of pilot formulation and selection, all interviews were conducted in a compressed timeframe.

Seventeen interviews were conducted during this timeframe. Interviewees were thoughtfully selected based on direct and lengthy experience with the system as a federal service provider, contractor, or direct beneficiary. A list of individuals interviewed is included with Section I.

Each interview lasted between 45 minutes and one hour. Two sets of questions were used, one for Corps personnel and Corps contractors and another for producers and shippers. The two sets of questions were utilized to get specific answers to fairly specific

questions from experts regarding solutions. Corps and contractor personnel were asked about unrealized efficiencies, cost containment strategies and practice, current operation and maintenance practices, and budgetary and program development processes. Producers and suppliers were challenged to reflect on the relative criticality of waterborne transportation to their supply chain, their ideas regarding alternative financing strategies and opportunities for private investment, and their views on where a regional pilot would make the greatest impact as a scalable replicable model. Both groups were asked about various revenue enhancement strategies, identifying a larger group of beneficiaries of the navigation pools and operational project lands as well as the locks, performance metrics, and the possible role of joint power authorities and/or advisory commissions. Both sets of interview questions are included with Section II.

These interviews were conducted confidentially. No individual attribution is revealed in our reporting. Instead common themes, compelling observations, reflections on existing assumptions, and recommendations regarding next steps that were revealed during the interviews formed the basis for our Interview Summary. Key themes and points raised during the interviews are captured within Section III.

Section I: Interview Participants

- Edward Belk, Director of Programs, Mississippi Valley Division, USACE
- John Becherer, CEO, U.S. Soybean Board
- Dean Campbell, Past Chair, Soy Transportation Coalition
- Steve Censky, CEO, American Soybean Association
- Dennis Fenske, Assistant Chief, Operations Division, St. Louis District, USACE
- Phillip Gonet, President, Illinois Coal Association
- Tom Hance, Washington, DC Representative, American Soybean Association
- James Hannon, Chief, Operations and Regulatory Division, USACE
- Daniel Mecklenborg, Senior VP and Chief Counsel, Ingram Barge Company
- Phillip Nelson, President, Illinois Farm Bureau
- Dennis Norris, Chief, Operations, Mississippi Valley Division, USACE
- Bill Northey, Secretary, Iowa Department of Agriculture and Land Stewardship
- Thomas O'Hara, Project Manager, CH2MHill (USACE Retired)
- Andrew Schimpf, Rivers Project Manager and MVS Navigation Business Line Manager, St. Louis District, USACE
- Joseph Schwenk, Project Manager, Alberici Constructors (USACE Retired)
- Richard Tolman, CEO, National Corn Growers Association
- Royce Wilken, President, ARTCO and Transportation Officer, Archer Daniels Midland Company

Section II: Subject Matter Expert Interview Questions

Producer and Shipper Question Set

- How would you characterize the relative importance of the inland waterway system in the movement of U.S. commodities?
- What are your thoughts regarding the need to improve performance and reliability of the system and the matter of expand vs. repair and sustain?
- How important is setting priorities, and how would you arrive at priorities for operating and recapitalizing the system?
- Are you confident that cost savings and cost containment strategies could make a significant difference and should be pursued?
- How do you weigh the importance of lock repairs against the larger effort to sustain an entire river reach, segment, or region?
- What other beneficiaries (direct or indirect) of the inland waterway system should be an active participant in revenue generating discussions that could include expanded user fees?
- How important is it for payers to see their fees returned to the region where they originate to make improvements relevant to them?
- Could you envision a role for a non-government regional commission or advisory group to set service levels, priorities, revenue allocations, schedules, and promote commercial activity to generate additional revenue?
- Could public-private partnerships (P3s) have an important role in recapitalization of the system?

- Under what conditions could P3s best serve users, investors, and the federal taxpayer?
- If you could recommend a regional pilot that would serve the purpose of demonstrating a valid P3 model and also address a portion of the system critical to the movement of commodities, where would you focus your attention?

Corps Navigation and Contractor Question Set

- How would you describe current efforts to realize operational efficiencies and generate cost containment in the operation and upkeep of the inland waterway system?
- Is there a better way to formulate budgetary packages and fund projects in order to focus on work priorities that address risk and improve reliability of the system?
- How would you more effectively engage a larger body of beneficiaries of the system in order to bring more individuals into the discussion of financing major repairs?
- What are your thoughts regarding revenue enhancement strategies and the opportunity for expanded commercial activities at Corps project sites?
- What do you think is the single most important performance metric when assessing the performance and reliability of the inland waterway system?
- How do you balance the commitment of limited funds between repair of locks and the needs of the waterway reaches away from the locks?
- Do you see a role for public-private partnerships (P3s) as an alternative funding and financing mechanism to sustain the inland waterway system?
- What obstacles will have to be overcome in advancing a P3 approach?

- What do you see as a critical next step in advancing the discussion of alternative financing and funding approaches?
- Where would you begin in assessing potential P3 pilots for real consideration?

Section III: Interview Summary

Perspectives Offered by Producers and Shippers

Overall Importance of the Inland Navigation System

- The inland waterway system is critically important but too often taken for granted and its impact not understood. When there is an issue with the system, like an unscheduled closure, the impact is felt immediately.
- The rivers are very important for farm inputs and grain outputs. If you lose one part of the system, the remainder becomes less efficient.
- The Inland Waterway System is critical to the agricultural industry. Intermodal opportunities for transportation choices have increased, but gains in mode do not lessen the need for updates on another mode.
- Our rail and waterways not only provide redundancy, but their competitive nature also provides an important competitive pricing advantage.
- Historically, the U.S. has enjoyed a competitive edge globally due to the quality of our transportation infrastructure; however, we lose that edge if our waterways and ports are disrupted or their serviceability is not assured.
- With better seed, better nutrient management, and growing markets, the demand for U.S. grain is going to continue to grow worldwide. We need waterborne transportation arteries to keep up. The cost of not doing so should be a real consideration. The “lost opportunity cost” is real.
- Illinois coal production is bouncing back, going from a high of 62 millions tons in 1980, down to 31 million tons in 2003, and back up to 48 million tons in 2011 with most of today’s Illinois coal going out of the state and overseas. The EU is a big market. Panama Canal Expansion will open up Asia. Most Illinois coal enters the river below St. Louis.

Need to Improve Performance and Reliability and the Question of Expand vs. Repair and Sustain

- An overall lack of funding confounds efforts to properly maintain waterway reaches away from the locks and undermines the ability to respond to emergencies driven by high or low water, accidents, and mechanical failures. The system and past investments in the system are being placed at great risk.
- Reliability and capacity are key considerations. Priority one is reliability. Capacity is adequate if existing structures are properly maintained and selectively improved.
- Maintenance reinvestment driven by disasters and failures is not a viable maintenance formula. The investment in O&M of the system is simply insufficient. Foreign countries are stepping up infrastructure investment. Lost opportunity costs here in the U.S. are somehow largely ignored or marginalized in their importance.
- There needs to be a balance between repair and rebuild. The Corps' O&M Budget needs to be well planned.
- The devil is in the details in the matter of repair versus replacement. The key is predictable and sustained serviceability.
- There is definite need to improve performance. The Corps needs to establish a baseline of service and private funds need to be focused on recapitalization.
- The Corps needs to be repositioned to be more efficient. Efficiency must be incentivized. Insufficient funding can confound efficiency, reliability, and uncertainty for potential investors.

- Arriving at some consensus on whether locks should be repaired, replaced, or replaced with expanded capacity will generate a great deal of discussion.
- Expansion of lock chambers at key locks in key reaches could remove bottlenecks and promote efficiency. Given what most view as the fiscal reality, however, there is growing sentiment that a planned for approach that strategically weighs the costs and benefits of expansion versus repair is fully warranted, and that at a minimum, the current footprint should be repaired to restore its full serviceability.
- Investing in the repair of 70 and 80 year-old structures instead of complete replacement seems short sighted. Where it makes sense to completely replace locks, it also makes the additional capitalization necessary to expand capacity compelling. The rationale being: if you were going to replace it, why would you not use that construction cycle to also expand it unless it was simply unaffordable?
- Comprehensive planning has to go beyond a single business line such as navigation and instead integrate a system approach to navigation, flood damage reduction, recreation, and other uses that depend on the natural capital that our rivers support.

Arriving at Priorities Given Funding Constraints

- The needs of the supply chain should drive decision-making as to where available funds should be used, not politics. Expenditures need to be focused on where they will generate the biggest return. Priorities and decisions regarding expansion need to be fact-based. The cost-benefit ratio of expand vs. repair needs to be more clearly communicated. If expansion is not indicated or affordable, then much greater attention must be immediately directed to assuring timely maintenance to avoid unscheduled closures.
- Regional priorities seem intuitive based on where commodities originate and where they are bound. We are not talking about locks for the sake of locks; we

are talking about supply chains.

- Some geographic or regional priorities will emerge, the Upper Mississippi River and the Illinois River, the Ohio River, and the Port of New Orleans certainly, but there is also a general sentiment that operational performance of the entire system should be priority one.
- Priorities should be driven by careful data analysis, but the data needs to be accurate. The response needs to be an efficient, planned for, not a piecemeal, approach.
- It is very hard to track Corps expenditures. There is a need for greater transparency and greater detail in how funds are specifically being used.
- There needs to be greater transparency of the Corps' O&M Budget overall and greater budgetary requirement consistency across Corps operational districts. Requirements should be described consistently so comparisons are not confounded.
- Once clear priorities are established, some regions will undoubtedly suffer and not keep up unless local funders step up and are allowed to participate.
- Getting funding relief for Olmsted Project should prove helpful on capital side with other projects authorized in WRDA 2007. The trust fund is simply not keeping pace. The 9-cent per gallon proposed hike on fuel tax should help.

Operational Cost Savings and Cost Containment Strategies: Will It Be Enough?

- Existing approaches need to be tested from time to time. Operations and maintenance practices need to be standardized across projects. All existing projects need to begin at some standardized funding baseline.
- There is a need to accurately reveal current operational procedures and efforts at cost containment as part of the larger discussion on alternative financing and

funding approaches.

- A review of existing operation and maintenance business practices should be conducted to identify best management practices for broad adoption. It may be that additional efficiencies will not be uncovered, but all would benefit from becoming better informed about existing practices.
- A discussion of cost containment strategies is warranted and the discussion should include individuals from the business community.
- At locks receiving less use perhaps a private company or entity could manage the day-to-day operation. These locks could be operated when needed using a lockage schedule.
- More verification needs to be effectively communicated so that adequate attention and analysis is being given to cost saving strategies. It is doubtful, however, that this effort will generate a level of savings that could make a major contribution to the long-overdue updating of 80 year-old facilities.
- A major contributor to greater efficiency would be multi-year funding (up front funding) to avoid stops and starts on major repair and rehabilitation efforts. Construction contractors account for funding delays in their project risk management. Congress should allocate project funding for major repairs up front. Funding should include multi-year commitment to avoid work stoppages and slow downs while all parties wait for Congress to pass annual budgets. Funding schedule uncertainty is an obvious cost inflator on contracts.
- Both the American Recovery and Reinvestment Act and the New Orleans Hurricane Protection Recovery Efforts should be closely examined for lessons learned and best management practices since both efforts showcased streamlining approaches that contributed to timely completion of major work outputs. Multi-year funding should be pursued legislatively.

- We need to find ways to streamline the project delivery process and reduce/reform the bureaucracy and politics that slow down getting major repairs underway and completed.
- Major rehabilitation and repairs could benefit from private sector involvement and oversight that is profit driven. Day-to-day operations and maintenance could remain with the federal government.
- Theoretically, efficiencies gained in operation and routine maintenance could generate additional revenue for major repairs. That said, it is unclear whether the amount of savings that could be realistically achieved would contribute toward making any real headway on backlog maintenance items. A more significant course correction in how the recapitalization of public works is handled seems inevitable. Getting people on board for real change is always difficult, but in this case, it is overdue. Olmsted has taught us that.

Locks and the Reaches Between Locks: Taking a Systems Approach

- It is not just a matter of addressing the continued serviceability of the locks and dams. A lack of attention to dredging, channel improvements, training structures, the timely removal of obstructions, and proper water management can also confound reliability of the supply chain.
- There are risk management issues away from the locks that cannot be overlooked and are beyond the scope of day-to-day operations and maintenance base-funding allocations. Reliability means making the whole system work.
- Maintenance dredging is just as important as miter gate repairs.
- We do not have a river management problem. We have a funding problem. With sufficient predictable funding, more thoughtful planning, priority setting, improved maintenance and reliability can all gain a foothold.

- The risk of focusing on lock repairs at the expense of the reaches between locks argues for attaining funding where several locks and the areas between locks are considered as one entity and funded as such. It all has to work together.

Beneficiaries, Revenue, and User Fees

- The list of beneficiaries of the navigation pools is long. This should not be simply a discussion of who benefits directly from the locks. Navigation pools are providing benefits for water withdrawal, waterside commercial activities, water-based recreation, public open space, tourism, fish and wildlife, etc. We need to better communicate the values of the system to a larger audience.
- The broader band of beneficiaries, not only of the locks but also the navigational pools, and of the waterways in general, need to be brought into the conversation regarding funding to assure the reliability of a system that serves so many.
- Identifying and bringing more beneficiaries of the system into the room is timely. Everyone benefits, everyone should pay, and everyone should have a voice. Setting an equitable fee structure for all users may be difficult. Perhaps the discussion of fees will at a minimum make all beneficiaries of the system a little more aware of the costs and of what would be lost if the dams were no longer serviceable.
- We must find additional sources of revenue. The value of water and the diverse array of benefits water provides to so many is sorely under appreciated and perhaps not understood. The benefits of healthy working rivers and the investments made to sustain commercial navigability extend beyond shippers and producers. Navigation pools also support expanded opportunities for flat water recreation, waterside development, and water withdrawal for residential and industrial use.
- All that benefit directly or indirectly from a healthy, working river should be considered beneficiaries and should contribute. Many communities, businesses, and citizens benefit from long-standing improvements that sustain the navigation

system, and those improvements also sustain recreation on the river and the lands acquired along the navigational pools, which are open to public use.

- It is hard to imagine fishermen and recreational boaters supporting additional fees but if they were brought into the discussion they may become better informed and more supportive of preserving navigation as a way to maintain the recreational benefits that depend on navigation-related improvements.
- Consideration should be given to opening up Corps lands around the lock sites for commercial activities that would not confound operation of the locks or the public's enjoyment of the thousands of acres of lands acquired for navigation.
- There is bi-partisan support for lock fees but long-standing resistance from user groups for lockage fees or tolls. Everything should be on the table for discussion to generate additional revenue, including hydropower, local port development, concession fees, boating and fishing license related fees, etc. Unfortunately, a lot of people probably feel the waterways already get a fair share of the federal tax dollar, so looking at new sources of revenue seems inevitable.
- Both direct and indirect services provided by the inland navigation system need to be more effectively communicated in order to identify and engage a broader bandwidth of beneficiaries. Regarding generation of additional revenues, both hydropower expansion and local tax contribution should be considered.
- Hydropower expansion at the Corps dams should be investigated and encouraged. This could present another income stream. The Columbia and Upper Missouri Rivers generate a significant return to the U.S. Treasury from hydropower fees at Corps dams.
- Other beneficiaries of the system should pay their share in sustaining a system that they also depend on. Other uses like irrigation, water withdrawals for industrial use, recreational use of the navigation pools, and other users that depend on a pooled condition should also pay a fee.

- The Harbor Maintenance Trust Fund is in good shape. There needs to be a stronger linkage between ports and inland waterways. One isn't much good without the other.

Returning Revenue to the Region: Creating a Regional or Watershed Trust

- Additional revenues generated from the system need to be plowed back into the system. Revenues generated in the region should return to the region.
- A legislative mechanism to return revenues to their point of origin is an area that warrants early attention.
- A dedicated trust returning user generated revenues to where they were collected would foster user confidence that their fees matter. A trust would benefit from more outside influence and control than the present inland waterway trust fund that is government controlled.
- The role of the U.S. Treasury will likely confound how a dedicated trust might be utilized to return fees generated locally and regionally back to their point of origin.
- A dedicated trust would make fee payers more confident that their contributions were being returned to be reinvested in projects that fee payers depend on.
- The idea of establishing a dedicated trust to ensure that a significant portion of any new revenue generated locally comes back to where it originated is an intriguing idea and deserves thoughtful consideration. Fee payers would feel better if they were confident that a large measure of contributed resources were being returned to the system segments they most relied on and felt connected to.
- Taxpayers and rate or fee payers need to be able to relate what they are contributing to real costs and real outputs. A dedicated trust managed transparently would foster greater confidence that fees are making a difference.

Role for Regional Commissions, Advisory Body, and/or Joint Powers Authority

- A governing role for a regional commission or regional authority to drive priorities, watch cost growth, and meet schedules is a step in the right direction. A body of appointed and elected members could place greater focus on efficiency and running the system like a business. Such a group could also promote greater regional advocacy. A key to their success would be multi-year funding and the ability to plan, set priorities, allocate resources to problems, generate revenue, borrow, and take action.
- A true partnership shares control and management. The role of a commission or joint powers authority seems intuitive where private funds were sought either from fees or private investment.
- The institutional arrangements and responsibilities of a local or regional governing body should at least be explored. The devil is in the details. The specifics for their overall role and how they relate or interact with federal sector (Corps) would need to be addressed in great detail. This can't be trial and error; we need a workable solution, now.
- The role of a commission needs to be addressed head on. However, that scale of change will need advocacy and champions in order for it to get a fair hearing. Such a commission could raise awareness and have a role in moving us to best management practices, defensible priorities and allocation of resources, and re-organizing to drive efficiency. Any commission will need the authority to drive change.
- Any board should serve as a convener and problem solver, not just another layer or self-serving power center. How do you avoid a competition between regional commissions? A commission should be a force for raising awareness and moving things forward.
- We should look at the structure and function of familiar boards, i.e., levee boards, fire protection boards, and whether we need a governing board or simply an

advisory board. This should not be a governmental body that can be lobbied, but it should function more like a company board. The board should not serve to undermine or diminish federal investment or involvement.

- Groups like the River Industry Executive Task Force (RIETF) and the River Industry Action Committee (RIAC) could have an expanded advisory role. However, commissions or regional advisory bodies cannot simply become another layer. A commission needs enough oversight and control to be a valid partner, not just an advisor.
- The Inland Waterway Trust Fund should not be thought of as a public-private partnership. It is too one-sided and there is too much government control for it to be considered a partnership for P3 discussion purposes. A partner has to be more than a paying advisor.

Solutions Within Existing Authority vs. Seeking Additional Legislative Authorities

- Additional legislation and new regulations could be an advantage or just create a new set of problems. This matter needs to be carefully approached.
- Real change will require an act of Congress. Even if we have the authority, if it is untested and requires agency (Corps) policy shift or significant process change, there will be foot dragging. We need Congress to act to effect real change. The major concern is, will Congress get it right? We do not need change for sake of change. We need something reasonable and actionable, not more bureaucracy.
- I could support new legislation if called for, but beyond authorization, we need action. WRDA 2007 serves as a useful example. The Upper Mississippi River Navigation and Environmental Sustainability Program (NESP) was authorized but nothing happened. Nothing was funded. Legislation is just part of the solution. There will be a great deal of support if whatever is pursued can be demonstrated to be actionable. The currently proposed WRDA may prove to give us some relief, but we really need to see some real progress before we push for even more legislation.

- To do P3s effectively, you will need additional legislation. This effort will have considerable support but there will be those who pushback against real change. P3 contracts have to be well written, performance based, and have an adequate and attainable return on investment.

Could Public-Private Partnerships Have a Bigger Role in the Recapitalization of the System? And Under What Conditions Could P3s Best Serve Users, Investors, and the Federal Government?

- P3s are viable and proving themselves in the transportation sector. Their viability hinges on attracting investor capacity and a contract that protects the interests of all participants. How the P3 is structured will play a big part in attracting investors. The P3 contract needs to assure that output expectation is met. Tolls are straightforward. You invest in improvements. You have a tollbooth and the collected tolls (revenue) are returned to the investors to provide them a return on their investment. How to structure P3s in order to generate a return on investment is crucial.
- The fiscal reality of the federal budget makes exploring all alternative financing and funding options, including P3s, imperative.
- State and Federal budgets make exploring P3 approaches inevitable. Federal entitlements are squeezing out investments in research and infrastructure. We need a three prong approach including the Inland Waterway Trust, the federal government, and the venture capital with ROI target of 6.5%. The “Build American” highway projects might provide a good model for creating viable opportunities for private participation (Build America Bonds).
- We need a rating tool (like Moody’s) that rates and identifies preferred P3 investment opportunities.
- P3s should certainly be explored. What are others doing? Where are the relevant examples and the successful models? The profit incentive of private sector involvement will drive efficiency and drive down costs. The Corps has no profit

incentive.

- There are too few examples of waterway P3s. There are no apparent experts in the Corps or federal government that have stepped up to lead a thoughtful discussion of how an inland waterway P3 would be developed. Outreach needs to quickly get beyond traditional stakeholders and advocates and engage potential investors and those with real P3 experience. It is critical to sort out what investors are looking for early on.
- P3 participants could be motivated by more than profit. There could be three reasons for private participation in a P3: investment without return but organizational mission or other interests are served, investment is repaid, or there is an attractive return on investment. A return may not be necessary if other financial interests are served by protecting serviceability of the inland waterway system.
- The P3 approach that depends on private resources will reduce political pet projects. Having real skin in the game will eliminate projects that fail to generate investor interest. People are afraid of privatization. Certain groups fear the business community encroaching on what they view as public sector programs. Bottom line: more dollars are needed; where are they going to come from?
- There are very likely low performing locks or reaches that could be completely privatized.
- Highways (toll ways) seem to offer good examples of transportation P3s. We need a working group to thoroughly investigate P3s. Education will prove important to making headway.

P3 Pilot: Observations Regarding Design and Preferred Location

- P3 Pilots need to present a successful demonstration of viable models. Pilots need to set big visible goals with traceable milestones and high degree of accountability for performance and return on investment. Areas of greatest

concern that also provide greatest contribution to value chain need to be considered first.

- We need to listen to potential investors and private equity experts that have experience with P3 contracts and joint ventures. We need P3 experts to guide us, not just stakeholders and engineers.
- I think the Upper Mississippi River System is critically important and logically would be a good place to start. That said, I think the term “pilot” connotes an experimental or exploratory approach. We do not need exploratory efforts, we need solutions. We need a plan with priorities and we need to begin. P3s are not new; they are just new to the inland waterway system. We know, or should know, what needs to be repaired and the nature of those repairs, now all we need is a plan and funding. On the matter of repair vs. expand, we need to move beyond the debate and onto a new term, modernization. We need to modernize the system. How we manage it, how decisions are made on where to allocate funds, some expansion may be appropriate, some projects may be transferred or deauthorized, others will simply need to be repaired and sustained.
- The pilot needs to focus on an important segment of system. First, the pilot(s) needs to deal with a high-volume area so it provides realistic and scalable demonstration, not one that provides little real test. The Port of New Orleans is important. Big investors at export or outlet points must be included. New business ought to be developed at the port then expanded inland.
- Producers will likely focus on Upper Mississippi River System. The size of the pilot should be considered to ensure the pilot is doable. Iowa, Illinois, and Missouri are key states for an interstate pilot. Illinois River + Mel Price + 27 + America’s Central Port + St. Louis Harbor + Middle River (Chicago to Cairo) would be an ideal focus area for a regional pilot or regional platform with nested pilots.
- The Upper Mississippi River System is priority one and needs to be part of any serious conversation regarding first effort pilots. However, investors need to be

drawn into the discussion early on regarding pilot formulation and selection so their expectations can be effectively addressed. P3s are worthy of serious consideration, but like all things new, you have to stay after it or nothing will happen.

- We need to focus on regions that will make a difference and serve as useful models. P3 success stories need to be celebrated and shared. Illinois-Iowa-Missouri should receive serious consideration for an early pilot.
- The reach from Chicago, IL to Grafton, IL would be a good pilot. The Illinois River is wholly contained within one state. Illinois has experience with a variety of P3s. The Illiana Expressway is one example. The St. Louis to Cairo, IL reach (referred to as the Middle River reach) is another important area that could provide a useful pilot. This reach is lock free but depends on training structures and dredging and adequate flows to support a critical link in the system.

Perspectives of Corps Navigation Business Line Managers and Corps Contractors

Opportunities to Realize Operational Efficiencies and Cost Containment

- The Corps infrastructure portfolio, valued at a ¼ trillion dollars is mostly 50 years old or older and in too many cases is in a deteriorating condition. We have 197 locks and a flat budget. We have to find ways to achieve optimum efficiency and reliability. Today, the Corps is attempting to craft and advance a civil works modernization strategy.
- The Corps' goal is to plan, manage, and prioritize the way forward to a more reliable inland waterway system. This effort will be based on life cycle management principles and test assumptions regarding expected project life, intended/authorized purposes, and service levels. Alternative financing mechanisms will be examined. Authority transfers, deauthorizations, and disposals will be considered. Additional legislation where needed will also be recommended.
- There are two fundamental costs: 1) operations, which is labor intensive effort geared at keeping facility up and running; and, 2) maintenance, which is directed toward plant upkeep and rehabilitation. The trend has been heading towards little investment in planning and construction across the Corps. Of the \$4.5-5.0 billion annual Corps budget, more is spent on operation and maintenance of existing operational projects than on recapitalization.
- There is an ongoing planned effort to drive down operational costs to free up resources for maintenance. The Corps has a smaller operational workforce today. The traditional role of government-owned plant (cranes) is slowly giving way to outsourced equipment rental.
- Funding for day-to-day operations is fairly flat. Routine maintenance is improving where operational savings are aggressively pursued. Practically all funds are utilized for day-to-day operation and routine maintenance. Unless

there is a major failure or emergency, major rehabilitation of structures and machinery isn't getting much attention. Budget packages compete nationally, but the national agency funding cap confounds any real reinvestment in infrastructure. Major rehabilitation is being further deferred due to the strain on funds created by large complex projects like Olmsted. Lack of flexibility in moving resources where and when needed is also confounding.

- Investment levels are flat and buying power is falling off. Single lock facilities lack redundancy. Lack of replacement gates places systems at further risk. If gate fails and there is no back up, the lock has to shut down.
- One effort toward generating cost containment could be adjusting service levels to promote a more robust discussion of priorities and operational procedures.
- An efficiency measure would be tow lockage management where lockages could be scheduled.
- On the matter of budgets, operational budgets for baseline and very routine maintenance have been fairly stable. Standardization of items that make up the base operating budget for each lock and each district navigation program might reveal savings or at least establish an understood and defensible base budget, freeing up additional dollars for commonly agreed on non-routine budget items. It is difficult to establish baseline funding targets when different locations approach their base calculations differently.
- An area that might benefit from greater consistency would be decisions regarding whether to use hired labor or contract labor. Some locations more aggressively outsource in order to keep work force costs associated with workforce management contained. Programs that depend too greatly on hired labor are less flexible in moving resources where they are most needed. In lean years, programs with small workforces that depend on contracting lose resources to programs with larger workforces in order for managers to avoid laying off government employees. This practice tends to penalize those programs more

aggressively outsourcing for efficiency.

- No real agreement or consistency exists regarding what constitutes routine vs. non-routine maintenance across projects. Project operational baseline programming needs to be defined and disclosed. Greater transparency of base programs across projects and districts would set up “apple to apple” comparisons. There is also a need for greater detail in budget package work descriptions for reviewers. It is difficult for budget reviewer to really drill down and understand what is happening at the facility level.
- Dredging further confounds baseline forecasting, as dredging requirements are difficult to forecast.
- Differences in contracting across districts, for the same service or deliverable can escalate contract costs. Standardization of contract requirements across districts, at least regionally, could produce cost savings.
- Regionalization has gotten some traction, but some reflection and adjustment is warranted. There is still considerable organizational duplication between districts within a given region, even though more and more work is being addressed regionally. There needs to be greater incentive for pursuing greater workforce reduction to free up resources.
- The Corps’ navigation business line team is working on regional approaches, but it’s difficult to reveal results when resources are not being made available to make any real headway.
- The American Recovery and Reinvestment Act of 2009 (ARRA) provided a big lift and allowed Corps to take a bite out of the critical maintenance backlog list. ARRA was streamlined. Locks 27 on the Upper Mississippi River is a good example. Another instructive process model is the New Orleans Hurricane Protection Recovery Effort. Full funding was provided upfront which allows acquisition strategies that maximize efficiency. Economies of scale were possible.

Contractors were confident in their schedules. Costs were contained and the schedule was met.

Development of Budgetary Packages, Managing Priorities to Address Risk and Improve Reliability

- There are difficult fiscal choices confronting Congress and the Administration. The Office of Management and Budget manages a federal budget in two parts: what the White House wants and everything else. For some time, water resources development has been in the second group. Sequestration and no earmarks have had a further impact. With no earmarks, Congress's role is somewhat marginalized. There is a need to better communicate the importance of the inland waterway system to the White House and OMB.
- Bundling of priority work items across projects, versus a project-by-project funding approach, may promote greater focus on critical work items. Best practice models that test these approaches should be incentivized and implemented.
- Lack of up front commitment of funds necessary to complete large work items is a big barrier. Multi-year funding could be a game changer. The American Recovery and Reinvestment Act and NOLA Hurricane Protection Recovery are both good process examples of up front funds assurance. Promoting design-build acquisitions can also save time and money and should be encouraged.
- Reliability should drive priorities in budgetary package ranking, reliability of the system, and reliability of critical features of the system. Miter gates need to be rotated out for maintenance based on service hour schedule prior to failure. Spare gate management needs to be improved. Standardization or modularizing components would make maintenance easier across locks, projects, and districts. This standardization would enhance reliability.
- Assumptions regarding performance-based vs. risk and reliability-based budgeting need testing. Funding of projects vs. funding of critical items across

projects needs rethinking. Program managers need the flexibility to move resources where they are needed.

Financing Major Rehab, Repairs, and Replacement: Identifying and Engaging a Larger Body of Beneficiaries

- Reauthorization of single purpose navigation projects to include other authorized multiple purposes like water supply, water quality, recreation, fish and wildlife, hydropower, etc. could advance the narrative on multiple uses and users, benefits and beneficiaries. Water supply is a major benefit, marginalized in how it is communicated to stakeholders. Even if a broader group of beneficiaries didn't contribute funding, their voice could be helpful in revealing a broader coalition for enhanced river management. Commercial concessions on Corps lands may be viewed as a revenue generator, but the administrative oversight of Corps outgrants creates additional overhead costs to inspect leaseholds that too often outpaces rental revenues.
- We, in the Corps, probably need to do a better job effectively communicating the importance of the inland waterway system to a larger body of direct and indirect beneficiaries.
- We need to begin by identifying beneficiaries of healthy, working rivers. We need to move beyond who benefits from the locks directly and look at who benefits both directly and indirectly from the navigation dams and the pools created to support navigation, which supports so many other activities.
- A local or regional governance mechanism that fosters a more shared approach or true partnership could assist with rallying financing.
- The inland waterway system, the river, and the river corridor continue to be regional economic development platform and driver. Navigation has been the key authority platform that has positioned the federal government to address economic development considerations of the corridor. There is no stomach for charging additional fees. We need to harness the beneficiaries' passion and their

voice as much as their pocket book. Riverside mayors are beginning to come together and frame regional needs and opportunities with a focus on river corridors.

Revenue Enhancement Strategies

- There may be a legitimate opportunity to expand commercial activities at and around each lock site.
- We, in the Corps, need to become smarter about private equity investors and investor support of P3s. The Corps is currently looking at P3 opportunities across all business lines.
- Corps operational lands could be opened up to commercial activities. America's Central Port is a good example. Much of the port footprint is a leasehold on Corps properties at Locks 27 and the Chain of Rocks Canal.
- Low head hydropower and hydro-kinetic hydropower development on the Upper Mississippi River at existing Corps dams could be a revenue generator, if hydropower generated revenue were returned to the region and not lost to the U.S. Treasury.
- Companies should not be allowed to secure a Federal Energy Regulatory Commission licenses for hydropower development at Corps dams and then fail to act in a reasonable timeframe.
- Natural gas extraction and the drop in gas prices are likely to undermine the hydropower market over the short term, but over the long term, it seems like a worthwhile pursuit. Retrofitting Corps dams for hydropower is structurally doable. Some argue if there were a market for hydropower in places like the Upper Mississippi River valley, it would have happened by now. But as power companies seek to diversify and green their portfolio with alternative energy production, expanded hydropower development may be more attractive.

- Additional revenues generated need to be placed in a dedicated trust that returns the majority of revenues to the region where they were generated.
- Port expansion, terminal development, and commercial fleetings in the vicinity of Corps dams, as well as other industrial leases sited on Corps lands, could be a revenue generator; although, it's doubtful the revenue generated would be a difference maker given the size of the navigation maintenance backlog facing the Corps.
- State tax revenues are generated on boat licenses, trailer licenses, fuel, etc., a portion of which could go into a trust to develop and maintain those features on the river that drive local and regional economies. Beneficiaries would be more supportive of additional fees if those fees were returned to where they were generated, making improvements relevant to fee payers.

Performance Metrics and System Report Cards: Identifying the Best Single Metric for Assessing Performance in Order to Reveal Risk and Assign Priorities

- Cost per ton-mile and risk assessment are two performance measurements that should be tested beyond tonnage. That said, keep in mind we are managing scarcity. We are using five-year averages for most budgeting. Practically speaking, metrics simply allow us to prioritize the resources we have, which are proving to be insufficient, so it is arguable that metrics are not the solution we need. One analysis that warrants more attention is the opportunity cost of not reinvesting in the inland waterway system. Taking into consideration lost opportunities, rather than simply costs, might reshape OMB priorities. The cost of doing nothing may prove to be the most expensive option.
- Tonnage may not measure federal interest as effectively as ton-miles. You may have a commodity that moves in heavy amounts between two locks thirty miles apart. And, you may have another reach of segment with no locks (open river reach between St. Louis and Cairo, IL) where you have tonnage moving across greater distance and across more jurisdictions, making the regional case for

federal involvement more tenable.

- For locks, tonnage works, and for extended reaches, ton-miles will work. There is need to go beyond these metrics and look at longer-term commodity production and movement trends. Trends might better reflect and support the case for federal involvement and the level of federal investment. Tonnage at Locks 25 on the Upper Mississippi River System reveals a drop between 1998 and 2012 from 73 million tons down to 23 million tons with biggest drop occurring in 2000 and 2001. Tonnage at 25 has now stabilized. A drop in corn shipments accounted for 50% of the drop.
- Shipping by road and rail is based on weight moved. For inland waterways, perhaps cost of tonnage per mile should be the basis of the fee, instead of a tax on fuel. This approach might prove to generate greater revenue.
- Metric-wise we need to do a better job of accounting for the significance of indirect benefits of the inland waterway system. Other uses of Corps project lands and waters offer compelling examples. For example, Pool 26 on the Upper Mississippi River is reported to have the largest number of registered recreation watercraft on the entire Mississippi River. We need to fully account for these other users and their dependence on the navigational pools.

The Risk of Confounding System Performance by Focusing on Backlog Maintenance at Lock Sites and Looking Past Challenges Along Waterways Away from Locks

- Metrics aside, we manage performance by managing risk. Those risks factors that occur away from the locks need to be fully accounted for also.
- A near term objective for the Corps over the next six months is testing and determining that we are focused on the real needs of the inland waterway system. We have to improve reliability of what is already there. We have to do a better job of managing risk. This effort begins with formulating and testing a method to conduct condition assessments and demonstrating the method's viability in a real world segment of the waterway system. We need to prioritize work that buys

down risk. The Corps hopes to have this condition assessment tool up and running within the next six months. The Illinois River could present an active inland waterway reach to test this assessment model. A plan for the Illinois River could be completed by May 2014. The Corps is committed to working out the priorities of where to place limited funds they have in order to net the greatest benefit from the system.

- When looking at everything that comprises the U.S. Inland Waterways System the physical, structural nature of the locks and dams make them more visible. Visible failures are easier to see than an unseen build up of bed material away from the lock that requires timely maintenance dredging to keep the channel open. There is a natural tendency for others to pay more attention to the problems they can see and react to other conditions as they arise, i.e. emergency removal of the rock pinnacles in Mississippi River below St. Louis during extreme low flow period.
- There are a number of reasons to focus equally on reaches as well as locks. There are efficiencies to be gained away from the locks. Standardization of dredging practices comes to mind. Some districts dredge more aggressively than others. What's the right level of effort to maintain reasonable serviceability of the system? Dredge disposal requirements are handled differently across states, which can drive up costs regionally. During low water there is also the cost tradeoff between emergency dredging and temporarily increasing water releases upstream.
- It is a system; the locks are just one part of it.

Alternative Financing and Funding Strategies That Encourage Private Recapitalization, the Role of Public-Private Partnerships (P3s)

- We need to take a “lessons learned” approach to P3 alternative financing strategies. The Inland Waterway Trust Fund is a P3 of sorts and it is not proving to be sustainable. Why not? We do not need to push a P3 approach that creates

another unsustainable solution. Local outputs need to assure system outcomes.

- The Inland Waterway Trust Fund is probably a poor example of a public-private partnership because it is too one-sided with way too much government control to be considered a true partnership. Fuel tax revenue represents a private contribution, but it is tightly controlled and managed by the government.
- P3s cannot be a substitute for the government's role in protecting the federal investment in waterborne commerce and an interstate system of inland waterways. The narrative on P3s will be very important. P3 driven contribution to recapitalization of the system needs to be additive, not offsetting. We are trying to dig out of a hole, not simply keep the hole from getting deeper.
- A viable P3 approach needs to account for the comparative contribution of river reaches and segments to supply chains, not political boundaries and interests. Priorities should be based on real need. Ideally, a privately appointed and elected commission could help steer efficiencies, schedules, service levels, priorities, formulate investment opportunities, and promote commercial activities to build revenue. Such a commission could weed out low performers and drive a critical set of higher objectives.
- P3s cannot be pursued at some cosmetic level. That will prove to be a waste of time. Perhaps it is time to reflect on the role of the Federal Highway Administration and how they are encouraging private investment and corporatization of the highway system. Several large companies are emerging as investors, designers, builders, and operators. URS is having apparent success in California. Parsons is another company actively involved in public sector infrastructure P3s. Alberici Construction in St. Louis has full time staff dedicated to P3s. Joint ventures are becoming more and more common. Design and build approaches also provide a fast track delivery option.
- Labor unions are seeing a return from P3 involvement. Laborers and craftsmen are going back to work and unions are investing via their pension funds.

- The Corps has done a great job and could continue to do the job if resourced to do so. But the fiscal reality is that greater private involvement and investment is called for, and P3s are the pathway to accomplish that.

Obstacles to Overcome in Advancing P3 Approach and Important Next Steps

- Lack of practical knowledge, politics, and risk aversion to new ideas and new processes could hold back P3s and overall modernization of inland waterways.
- P3s have revenue streams that support return on investment for investors. Collected revenues generated at Corps operational projects go directly to the Federal Treasury. Toll Roads collect a toll. Those toll revenues are returned to investors. Recreational use fees and hydropower fees generated at Corps projects go directly to the Treasury.
- The Corps needs to better understand venture capital, how it works, and the value proposition of P3s. We really need to educate ourselves. We need to get the Corps' policy house in order so P3s can be approached and forged with optimal efficiency and success. We need to listen to what investors want and need. There needs to be a mutual understanding. The government needs to understand and appreciate the needs of investors and the investor needs to understand and appreciate the government's role in serving the public trust. The Corps needs to self assess our project and program portfolio and do a better job of communicating its role as a revenue generator. We would all benefit from a good narrative on P3 models and lessons learned elsewhere.
- The overall system is managed under an existing P3, the Inland Waterway Trust Fund. However, 90% of system costs are borne by the government and taxpayer and 10% or less is made up by private sector contribution (fuel tax). Transforming the current system into something more balanced where private sector (beneficiaries) pay a larger share will mean closing a rather large gap which may confound any real opportunity for reasonable return on investment by private investors.

- Too many of us still operate with the perception that what we traditionally refer to as public works should be approached as the business of government and taxpayers.
- Too much of the P3 conversation on inland waterways is still optimistic generalities. The P3 cannot be one-sided. Shared responsibility of participants has to be more than cosmetic. There is a considerable gap to close between what the federal government spends and what the user contributes via the Inland Waterway Trust Fund. Any additional revenues generated on the backs of taxpayers will simply go to the Treasury unless a more balanced sharing of costs are arrived at.
- The stigma of privatization has to be addressed head on. Corporatization or corporate involvement is not privatization.
- Too much is made of federal workers losing their jobs. Under the right circumstances many or all of these federal workers could find employment with private concessionaires or whoever is operating the locks in the future.
- The real barriers to a P3 approach will be the typical pushback to major change. It will not happen until someone takes it on thoughtfully and champions a fair testing of the theory. The test needs to be an actual pilot, not more studies.

Finding the Right Pilot to Model a New Approach

- Initial pilots could be selected based on existing system data to identify risk with the locks and reaches at greatest risk getting a first look. Ultimately, investors will likely determine where the pilots are that they want to invest in.
- The Illinois Waterway (8 locks) would make a compelling platform for P3 contracts.
- Low performing reaches like the Kaskaskia River or the Lower Allegheny may seem like safe places to experiment with pilot P3s, but they would not generate

the models needed that can be replicated in critical segments of the system.

- If these are to be truly system pilots involving more than simply one or two lock sites, then the Chicago to Cairo reach of the Upper Mississippi River might be a compelling pilot(s) platform from a supply chain perspective. It would allow you to update the Lockport, Peoria, and LaGrange locks on the Illinois River. Moving downstream this service region could include Mel Price and Locks 27 on the Mississippi River above St. Louis, both critically important and both in pretty good shape with recent improvements at 27. You would include America's Central Port on the Chain of Rocks Canal and St. Louis Harbor and the open reach of the "middle Mississippi" between St. Louis and Cairo, IL.
- Locks 24 and 25 on the Upper Mississippi and the two lower Illinois River Locks at Peoria and LaGrange were all to be addressed in Phase One of the Upper Mississippi River Navigation and Environmental Sustainability Program (NESP) authorized by 2007 WRDA but never funded. These four locks could be addressed together or separately. If approached separately, you would have an interstate pilot with 24 and 25 and an intrastate pilot with the two lower Illinois River locks.
- Priority reaches for pilot consideration from a corn and soybean concern would have to be the Upper Mississippi River System Locks 20, 21, 22, 24, and 25 involving Iowa, Illinois, and Missouri, and the two lower locks on the Illinois River (Peoria and LaGrange). These sites and reaches are not only critically important regionally and nationally, but they are also closer to a shovel ready condition with cost estimates and work scopes considered during the ramp up to NESP and 07 WRDA.
- Pilots have to pass the regional system or reach test. You cannot simply focus on one or two locks. That will only perpetuate the project delivery culture in place now and hold back further progress to embrace a system or supply chain approach.

Rating or Grading the Investor Opportunity

- With the push to find P3 solutions to major infrastructure financing challenges and the amount of available capital looking for preferred investment, we really need to make it easier for investors to compare and grade investments. Financial information about the inland waterway system needs to be accessible and accurate. Cost data cannot be debatable or a matter of speculation. A grading mechanism similar to what banks and rating companies (e.g., Moody's) use needs to be quickly formulated so that investors can more easily and confidently scan investment opportunities to support recapitalization of U.S. waterborne transportation infrastructure.
- The matter of repair and sustain vs. expand needs to become a more sophisticated narrative where investors are confident in cost and benefit comparison. Investors may be willing to invest in repair but not in a larger commitment to back expansion.
- There is plenty of available capital out there. It is a matter of engaging investors and making them aware that the opportunity exists and the opportunity for a favorable return on investment is legitimate.