US Army Corps of Engineers

U. S. Army Corps of Engineers Inland Marine Transportation System Improvement Report

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DOCUMENT APPROVAL

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Deputy Commanding General/Deputy Chief of Engineers Statement

I want to express my appreciation to all those involved in the eighteen month effort to review the performance of our inland Navigation mission. I fully support the improvements resulting from this review.

The Navigation mission of the U.S. Army Corps of Engineers is a critical component of the Nation's Marine Transportation System (MTS) and an important contributor to our Nation's ability to remain competitive in the global economy. This review of key processes associated with the Navigation mission, resulting in the Inland Marine Transportation System (IMTS) is a major step forward.

We will operate the IMTS as a system-of-systems approach to managing resources. The numerous and invaluable suggestions from Navigation customers, managers, and employees enabled us to focus on topics and issues of major importance to them. Our customers told us that system reliability is a top concern, managers provided insight into beneficial operational improvements, and our employees spoke about human resources-related improvements that would enable them to do their jobs better, faster, and smarter. As a result system availability, operations, and human capital became the three pillars of the review effort. The resulting improvements are all focused on strengthening these pillars.

An IMTS Board of Directors comprised of Division Commanders with a Navigation mission will oversee the implementation effort. Chaired by the Deputy Commanding General for Civil and Emergency Operations, the Board will be assisted by an IMTS Working Group. IMTS Management Teams at the Division levels will assist in implementing the improvements across regions and Navigation Systems. The goal is to have the new processes in-place by 2010. I have charged the Board to continuously communicate with stakeholders (the Administration and Congress), customers, partners (such as the U.S. Coast Guard and Committee on MTS), and employees and their representative labor unions. We will establish a Navigation Gateway to keep everyone informed of our progress and invite comments from customers and employees about the improvements and the impact of those improvements.

Asset management is a critical component of this effort. We will implement an asset management platform that will enable us to objectively demonstrate the state of our facilities and the priorities for maintaining them. We will use this platform to communicate critical requirements affecting system reliability to assist decision makers during budget preparation, authorization and allocation.

I look to the executives and managers of the Navigation function, headquarters staff principals, and Commanders and their staff to provide their fullest support to the IMTS endeavor. I will use every opportunity to emphasize our commitment and periodically

convey the state of our progress to the Assistant Secretary of the Army for Civil Works, appropriate leadership in the Department of Defense and Department of the Army, the Office of Management and Budget, Congress, and IMTS users.

I want to especially thank employees at our project sites across the Nation for their contribution to the day-to-day operation and maintenance of locks and dams which are at the center of the IMTS.

Essayons!

Executive Summary

The Navigation Mission of the US Army Corps of Engineers (USACE) is to provide safe, reliable, efficient and environmentally sustainable waterborne transportation systems for the movement of commercial goods, for national security needs, and for recreation. This Inland Marine Transportation System (IMTS) is a critical component in this Nation's ability to remain competitive in the global economy.

IMTS reliability is the most important requirement that enables American business and industry to competitively participate in global trade.

USACE is knowledgeable and experienced at operating and maintaining the critical nodes in the navigation infrastructure (locks, dams, channels and other structures) in order to maintain safe navigation for commerce and recreation. These locks and dams enable the passage of waterborne traffic on sections of rivers that would be impassable without them. The river infrastructure is aging; many locks and dams have far exceeded their design life. Maintenance requirements are increasing as many of these older structures experience failures in key mechanical, electrical and structural components. Repair and replacement costs are exceeding funding resources, which adversely impacts system availability and reliability.

Lock failures can result in significant shutdowns of a portion of the river transportation system. Shutdowns will cause significant hardship on inland transportation and result in additional stress on alternate transportation modes.

USACE used the United States Code and the Office of Management and Budget performance requirements to examine the business practices associated with the operation and maintenance of the Navigation lock and dam system. Currently each lock operates within the general guidance and direction of an individual District. Adjacent Districts (and their associated Divisions) work to coordinate maintenance activities which may impact locks within the same Navigation System but this is usually accomplished on an informal basis.

USACE formed a study team composed of experienced lock operation, maintenance, supervision, and management personnel. The team visited most lock and dam sites and solicited ideas and suggestions from employees and stakeholders for best practices or areas needing study and improvement.

The study focused on identifying the best practices from both USACE and industry on ways to improve the reliability of the IMTS, to establish national standards for basic

procedures and training, to increase communication, to share lessons-learned, plan maintenance on a regional or system-wide basis and recognize the value of the Federal employee.

The team developed improvements and grouped them into three major themes:

Human Capital – addresses issues relating to the workforce. Such things as training, certification, work shifts, and staffing are discussed and developed into actions for improvement. While not specifically addressed in the individual recommendations, many of these improvements will require Union notification and possible local bargaining prior to implementation. There are eleven topics in the Human Capital theme.

Operations – addresses issues and procedures to improve the performance of the navigation lock system. Recommendations to standardize and streamline practices to facilitate easy transit through a series of locks and establish a standard set of operating practices are developed. There are seven topics in the Operations arena.

System Availability – addresses issues and procedures that will improve system reliability and availability. These include recommendations for coordination of major maintenance activities, means of sharing and transferring lessons-learned, and equipment pools for faster access to leased or owned equipment. There are seven topics in this area.

This Business Process Review study does not recommend the creation of a new national organization, decreased staffing, or other changes that would disrupt the existing chain of command. Rather, the recommended changes will strengthen the existing Corps chain of command and enhance the performance within the existing organizational structure.

To effectively manage and implement these improvements, provide for a means of long-term continual improvement, and develop a set of performance standards, a Board of Directors, Working Group and Division Teams will be established. Process improvement activities will be conducted within the current USACE command and control structure. National oversight will assure common standards and communication and Regional planning will assure effective use of resources and manpower.

The main report and appendices explain these themes and the mechanism for oversight, guidance, and performance improvements. Waterway users, the public, and employees will be able to track implementation through a public website.

These improvements will enable IMTS to improve system reliability and make a positive impact on the Nation by meeting transportation needs well into the future.

During the review of the draft Final Report from this study, comments were received about specific details of implementing the improvements. Although these comments did not require any changes to the draft final report, they will be useful to the action teams during the implementation phase. These comments will be made available to the action teams along with other pertinent documents to enhance the success of implementing the improvements.

Structure of the Report

The Improvement Report consists of a main body and four appendices. The appendices augment information in the main body of the report.

(1) Section I - Introduction - Introduces the reader to the purpose of the study, provides information about the importance to the Nation of the functions covered by the report, explains the USACE civil works mission, and the organization of the Navigation System. The purpose of the introduction is to provide the reader with information about why improvements to the USACE Navigation System operation and maintenance processes - as part of the Nation's Marine Transportation System - are important.

Appendix I consists of three parts: Part A – Importance to the Nation; Part B - Civil Works Strategic Plan, Fiscal Year 2004 – Fiscal Year 2009; and Part C – Infrastructure Asset Management.

(2) Section II - Improving Navigation System Reliability - Discusses the Business Process Review. It explains who conducted the study, how it was conducted, and the resulting recommended improvements. The purpose of the this section of the report is to enable the reader to understand the collaborative process used to identify improvements, the resulting improvement recommendations, and the development of a Baseline Requirements Document and associated Baseline Operating Objectives to which the improvements apply.

Appendix II consists of two parts: Part A – Baseline Requirements Document; and Part B – Business Process Review Findings and Recommendations.

(3) Section III - Implementation and Execution Strategy - Discusses how the improvements will be implemented. The purpose of this section of the report is to demonstrate to the reader that USACE intends to establish a formal oversight structure comprised of senior leaders supported by a day-to-day working group to implement the improvements and that a plan is in place to implement the improvements and monitor the results on an on-going basis.

Appendix III consists of one part: Inland Marine Transportation System (IMTS) Implementation Plan.

(4) Section IV - Performance Measurement - Presents criteria used by the Office of Management and Budget (OMB) and the Headquarters, USACE Directorate of Civil Works to measure performance. The purpose of this section of the report is to enable the reader to understand internal and external performance measures and metrics and how the internal Baseline Operating Objectives are intended to support the Directorate of Civil Works performance measurements and OMB criteria.

Appendix IV consists of two parts: Part A – Office of Management and Budget Criteria and Part B – Engineer Circular (EC) 11-2-193.

(5) Section V - The Way Ahead - The purpose of this section of the report is to provide a macro-level view for the reader of how USACE intends to tie the improvements to the Baseline Operating Objectives for continuous performance measurement monitoring and that the formal oversight structure and day-to-day working body will continue as the platform for continuous process improvements in new areas.

There is no appendix to Section V.

SECTION I - INTRODUCTION

Modes of carrying commercial freight include surface (rail and truck), inland waterway, and air transportation.

The purpose of this section of the report is to provide the reader with information about why improvements to the USACE Navigation System operation and maintenance processes - as part of the Nation's Marine Transportation System - are important. The Introduction is augmented by Appendix I which consists of three parts: Part A – Importance to the Nation; Part B - Civil Works Strategic Plan, Fiscal Year 2004 – Fiscal Year 2009; and Part C – Infrastructure Asset Management.

1.0 Purpose of the Review

This review examined the Operation and Maintenance (hereafter referred to as O&M) of the U.S. Army Corps of Engineers (hereafter referred to as USACE) Navigation System.

1.1 Respond to Requirements in United States Code

This review responds to the requirements in Unites States Code Title 5, Part 1, Chapter 3, Section 305[1] which states:

> *(b) Under regulations prescribed and administered by the President, each agency shall review systematically the operations of each of its activities, functions, or organization units, on a continuing basis. (c) The purpose of the reviews includes – (1) determining the degree of efficiency and economy in the operation of the agency's activities, functions, or organization units; (2) identifying the units that are outstanding in those respects; and (3) identifying the employees whose personal efforts have caused their units to be outstanding in efficiency and economy of operations.*

[1] http://www.law.cornell.edu/uscode/html/uscode05/usc_sec_05_00000305----000-.html

1.2 Achieve Efficiencies and Economies

The improvements identified as a result of the review will enhance the ability of USACE to:

(1) Operate a Navigation System with consistency to the user;

(2) Establish a seamless system;

(3) Make effective use of scarce resources; and

(4) Make improvements to the Inland Marine Transportation System (hereafter referred to as IMTS).

USACE manages a system of "marine highways" that enables the Nation to be competitive in a global market. USACE maintains more than 12,000 miles of inland waterways and operates over 200 locks and ancillary facilities. This system moves commerce throughout the nation on multiple segments to domestic and foreign markets. Consistent with environmental sustainment and safety objectives, these segments act as one of the nation's transportation arteries to the world.

Chart I-1 from the USACE Institute for Water Resources (hereafter referred to as IWR) compares fuel consumption per mile by truck, train, and barge for one ton of freight. The information in the chart is based on data provided by the Tennessee Valley Authority.

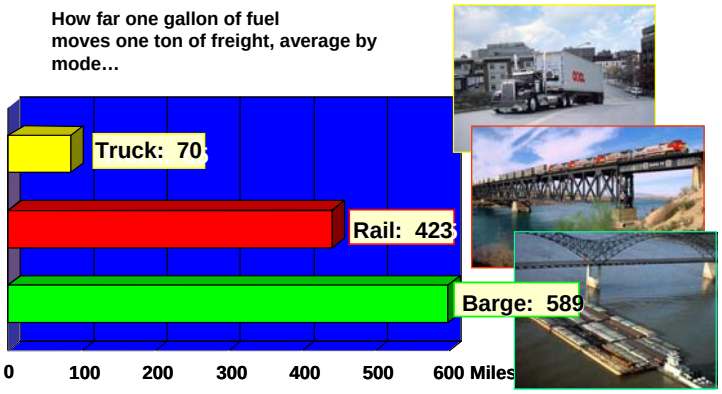

Chart I-1 Fuel Comparison by Mode (Truck, Train, & Barge)

2.0 Importance to the Nation

The "marine highway" is an economical way to move large volumes of bulk commodities as well as low volume high value items over great distances. *"Inland waterways maintained by the Corps handle over 630 million tons of consumer goods per year valued at over $70 billion."*

2.1 Economic Impact

The capacity of a standard 15 barge tow is equivalent to 870 trucks stretching 35 miles on an interstate and accomplishes the task at a cost per ton-mile of about half that of rail or one-tenth that of trucks. These savings can then be passed on to subsequent manufacturers, fabricators and finally to the customer, providing a significant financial advantage for the economic base of the Nation. Improved fuel efficiency, improved air quality, and reduced roadway congestion are additional advantages of transporting bulk commodities via inland waterways.

Chart I-2 from the USACE brochure *Inland Waterways Value to the Nation* compares barge capacity to rail and truck transportation modes. The brochure is available at http://www.vtn.iwr.usace.army.mil/pdfs/InlandNavigation.pdf.

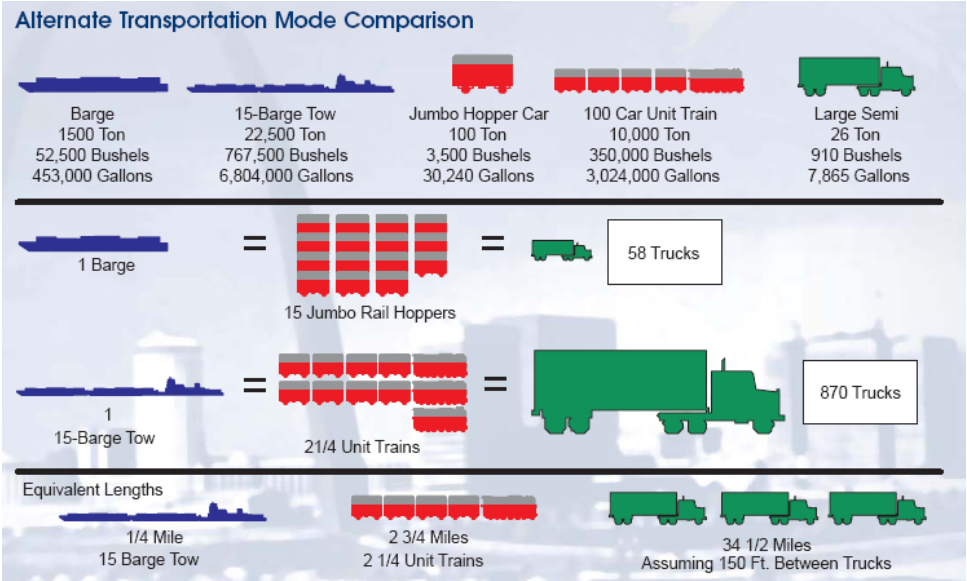

Chart I-2 Tonnage & Fuel Comparison (Barge, Rail, & Truck)

Waterway Users

The users of the Nation's inland waterways are customers as well as stakeholders. Users include the navigation industry, shippers, U. S. Coast Guard (hereafter referred to as USCG), recreation boaters, and the military (for mobilization and movement of

equipment from the hinterland to coastal ports). The American Waterways Operators (hereafter referred to as AWO) estimates that *"there are 31,449 vessels (towboats, tugboats, and barges) active in the towing industry as of December 31, 2002."* [2]

User groups such as the AWO track data and statistics associated with the use of the Nation's inland waterways. These groups rely on data produced by the USACE Navigation Data Center (NDC).[3] In 2006, barges carried over 813 million tons of goods. Petroleum and petrochemicals were the leading commodity group followed by coal and crude materials as shown in Chart I-3. [4]

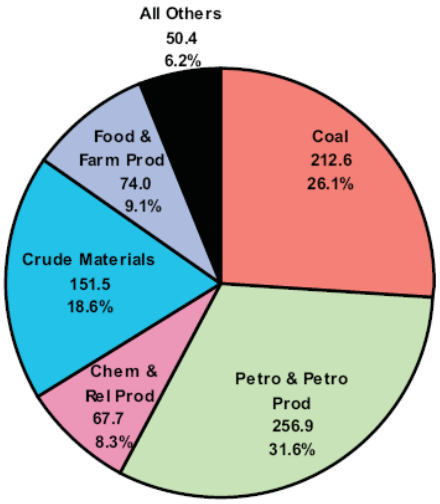

Chart I-3 Barge Traffic by Commodity Group, 2006

Stakeholders

State and local governments economic interest in commercial transportation, including waterway transportation of commodities, is also reflected in the statistics these stakeholders track and the studies they have conducted. For example, the East-West Gateway Council of Governments[5] tracks commercial intermodal transportation statistics. The States of Arkansas, Indiana[6], Louisiana[7], and Mississippi[8] have conducted economic impact studies of the inland waterways significance and contribution to their economies.

A 2002 study conducted by the University of Arkansas indicates that *"Arkansas port activities directly and indirectly contribute to the economic growth of this state. It is predicted that these impacts will continue to increase in the future. Increased support and development of ports in Arkansas will increase port activities and can positively affect the economy of this state."*[9]

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[2] Source: AWO website, http://www.americanwaterways.com/industry_stats/fleet_data/index.html
[3] http://www.iwr.usace.army.mil/ndc/
[4] http://www.iwr.usace.army.mil/ndc/wcsc/pdf/wcusnatl06.htm
[5] http://ewgateway.org/datacenter/stlregdata/trans/freightshare/freightshare.htm
[6] http://www.portsofindiana.com/newsroom/publications/economic%20impact%20study.pdf
[7] http://portsoflouisiana.org/documents/Economic_Impacts_of_the_Ports_Of_Louisiana_and_the_Maritime_Industry_(Ryan_2001).pdf
[8] www.ie.msstate.edu/.../Mississippi's%20Industrial%20Gulf%20Ports%20FinalProjectrpt.Couvillion.doc
[9] University of Arkansas, "*Economic Evaluation of the Impact of Waterways on the State of Arkansas*", July 21, 2002. http://www.waterways.dina.org/impact.pdf

2.2 National Priority

Domestic companies operating vessels on U.S. waterways increased by 19.6% from 2002 to 2003.[10] Over the last thirty years, the Nation's population grew by 78 million people. According to the U.S. Census Bureau, the projected population over the next thirty years will increase by an additional 81 million citizens.[11] Such growth will place increased demand on the performance of navigable waterways.

Inland waterways are an integral component of the Nation's commercial freight transportation system. The Congress and the Executive Branch have each expressed a commitment to intermodal transportation:

Congress

Photo Courtesy of
Oak Ridge National Laboratory

In 1991 the 102d Congress passed the *Intermodal Surface Transportation Efficiency Act (ISTEA)*.[12]

In its declaration of policy in Section 2 the Congress declared, *"It is the policy of the United States to develop a National Intermodal Transportation System that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an energy efficient manner."*

Section 5005 of the Act established a Commission on Intermodal Transportation to, *"make a complete investigation and study of intermodal transportation in the United States"* and directed that commission to recommend ways to speed the Nation's conversion to an efficient intermodal transportation system as well as identify resources necessary to accomplish that conversion.

Although the principal focus of the Commission on Intermodal Transportation was on intermodal surface transportation, in its final report[13] the commission noted that, *"Ports, airports, railroads**, inland waterways** [emphasis added], transit and highway systems are the foundation for this Nation's economy, quality of life, and success as a world power. In an era of scarce resources, America needs to invest more strategically in transportation infrastructure to meet the future needs of travelers and shippers and to maintain the Nation's competitive position in an increasingly global economy. Consideration must be given to the relative strengths and efficiencies of all transportation modes. Government policies and spending must optimize the*

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[10] American Society of Civil Engineers (ASCE), "2005 Progress Report, "*Report Card for America's Infrastructure*". http://www.asce.org/reportcard/2005/page.cfm?id=36

[11] U.S. Census Bureau, 2004, "*U.S. Interim Projections by Age, Sex, Race and Hispanic Origin:* www.census.gov/ipc/www/usinterimproj/

[12] http://thomas.loc.gov/cgi-bin/query/z?c102:H.R.2950.ENR: See also Title 49, Subtitle III, Chapter 55, Subchapter I, Section 5501 National Intermodal Transportation System policy http://www.law.cornell.edu/uscode/49/usc_sec_49_00005501----000-.html

[13] *Toward A National Intermodal Transportation System – Final Report – NCIT*, National Commission on Intermodal Transportation, 1994. http://ntl.bts.gov/DOCS/325TAN.html

contribution of each mode to the overall transportation system and to the Nation's quality of life."

With regard to the Nation's intermodal transportation, in Section 2 of Public Law 102-580[14], *Water Resources Development Act of 1992*, October 31, 1992, the 102d Congress found that –

(1) *"A sound and strong infrastructure is the essential core and foundation of the Nation's economic well –being and growth and its ability to compete in the global economy:"*

(2) *"It should be a goal of the United States to develop a National intermodal transportation system that moves people and goods in an efficient manner."*

(3) *"A National intermodal transportation system is a coordinated, flexible network of diverse but complementary forms of transportation which moves people and goods in the most efficient manner."*

(4) *"A National intermodal transportation system will enhance the ability of United States industry to compete in the global marketplace by reducing transportation costs."*

(5) *"The improvement of the Nation's* ***inland waterway system*** *[emphasis added] is a central part of a National intermodal transportation system which permits the efficient transport of goods between markets within the Nation and between inland markets and coastal ports."*

President

"The US MTS (Marine Transportation System), which consists of waterways, ports and their connections, commercial and recreational vessels, vehicles and system users, such as importers and exporters, is a vital public-private partnership. The waterborne cargo moving on the MTS contributes more than $742 billion annually to the U.S. gross domestic product and creates employment for more than 13 million individuals. As the US economy continues to expand and [my] administration pursues greater international trade liberalization, the importance of our marine transportation infrastructure will continue to grow. The expected projection of commercial and recreational vessel operations brings with it the challenge to ensure that vessels in our oceans, coasts, Great Lakes, and waterways are operating in an environmentally responsible manner."[15]

[14] http://www.usace.army.mil/cw/cecw-p/leg_manage/wrda/wrda92.pdf
[15] http://www.cmts.gov/

Committee on the Marine Transportation System[16]

The interagency Committee on the Marine Transportation System (hereafter referred to as the CMTS) was established under the authority of the President in the U.S. Ocean Action Plan, issued December 17, 2004, *"Supporting Marine Transportation."*[17]

The Charter of the CMTS is to:

(1) Improve federal Marine Transportation System (hereafter referred to as MTS) coordination and policies;

(2) Promote the environmentally sound integration of marine transportation with other modes of transportation and with other ocean, coastal, and Great Lakes uses;

(3) Develop outcome based goals and strategic objectives for the safety, security, efficiency, economic vitality, environmental health, and reliability of the MTS for commercial and National defense requirements, as well as, a method for monitoring progress towards those goals;

(4) Coordinate budget and regulatory activities that impact the MTS; and

(5) Recommend strategies and implement plans to maintain and improve the MTS.

The Assistant Secretary of the Army for Civil Works [hereafter referred to as the ASA(CW)] is a member of the committee. A representative from Headquarters USACE participates on the CMTS Working Group.

[16] http://www.cmts.gov/about.htm
[17] **http://ocean**.ceq.gov/**actionplan**.pdf

2.3 Intermodal Maritime and Inland Waterways Transportation System

The intermodal maritime and inland waterways transportation system of the Nation is the responsibility of both USACE and the Department of Transportation.[18] The role of USACE with respect to Navigation is to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for movement of commerce, National security needs, and recreation. USACE derives this responsibility from the Commerce Clause of the U.S. Constitution, the 1960 River and Harbor Act, and various Water Resources Development Acts (e.g., 1986, 1988, 1996) defining the Federal government's authority to regulate commerce and Navigation and to provide Navigation improvements.[19] USACE accomplishes this mission through a combination of capital improvements (e.g. planning, design, and construction of Navigation channels) and the O&M of existing infrastructure projects (e.g., regulating water levels on inland waterways).

<u>Fuel Taxed Waterways</u>

Subject to Public Law 95-502, October 21, 1978 and Public Law 99-662, November 17, 1986 there are twenty-seven Inland and Intracoastal Fuel Taxed Waterways as shown in Figure I-1.[20]

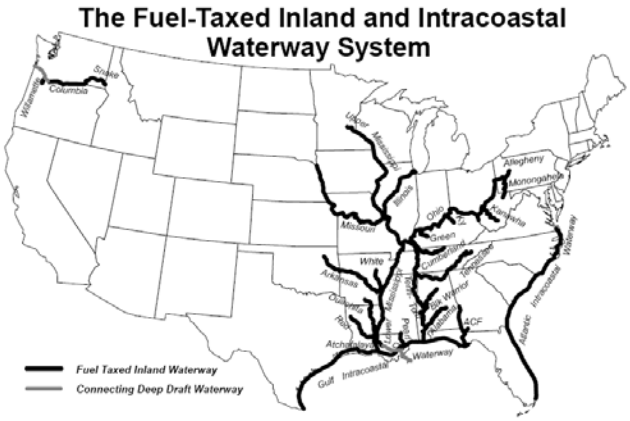

Figure I-1 Fuel-Taxed Inland Waterway System [21]

[18] http://www.vtn.iwr.usace.army.mil/pdfs/InlandNavigation.pdf
[19] Engineer Pamphlet 1165-2-1, Digest of Water Resources Policies and Authorities, 30 July 1999. http://www.usace.army.mil/publications/eng-pamphlets/ep1165-2-1/entire.pdf
[20] The statutory definitions of Inland and Intracoastal Fuel Taxed Waterways are available at the above website and in Appendix I, Part A – Importance to the Nation.
[21] http://www.iwub.iwr.usace.army.mil/FuelTaxedWaterways.htm

Inland Waterway Users Board

The Inland Waterway Users Board is an independent, Federal Advisory Committee established by Section 302 of Public Law 99-662 and governed by the policies and procedures in Department of Defense Instruction 5105.04, August 6, 2007, Department of Defense Federal Advisory Committee Management Program.[22] The Secretary of the Army appoints its eleven members. The Inland Waterways Users Board represents all geographic areas on the fuel-taxed inland waterways system of the United States. The composition of the Board also reflects a balanced industry focus, including shipper and carrier members from companies of different sizes and specializing in the transport of different commodities.

The Board's purpose is to make recommendations to the Congress and the Secretary of the Army on the priorities and spending from the Inland Waterways Trust Fund for construction and rehabilitation projects on the fuel-taxed system. Such recommendations reflect the independent judgment of the Board and are reflected in an annual report made to the Secretary of the Army and the Congress. The Board typically meets three times a year to accomplish its business, with the meetings open to the public.

USACE is the proponent for the Board. The Deputy Commanding General for Civil and Emergency Operations is the Executive Director of the Board. USACE headquarters also provides the Executive Secretary to the Board. The USACE Institute for Water Resources (IWR) in Alexandria, Virginia provides the Executive Assistant and other subject matter specialists that support the authorized activities of the Board.

Trust Fund Projects are depicted on the *Inland Waterways Users Board* website at: http://www.iwub.iwr.usace.army.mil/TrustFundProjects.htm.

President's Budget

As noted by the Office of Management and Budget (hereafter referred to as OMB), since 2001 USACE has, "*Placed greater emphasis on existing infrastructure.*" OMB foresees that the 2009 Budget will emphasize "*maintenance of key Corps facilities.*" For instance, the Budget has emphasized maintenance and rehabilitation of facilities to improve reliability on three inland waterways with the most commercial traffic: the Ohio River; the Mississippi River; and the Illinois Waterway."[23]

[22] http://www.dtic.mil/whs/directives/corres/pdf/510504p.pdf
[23] http://www.whitehouse.gov/omb/budget/fy2009/corps.html

3.0 U.S. Army Corps of Engineers Civil Works Program Areas

The USACE Civil Works mission[24] is to: *"Contribute to the national welfare and serve the public by providing the Nation and the Army with quality and responsive:*

Development and management of the Nation's water resources;

Protection, restoration, and management of the environment;

Disaster response and recovery; and

Engineering and technical services

in an environmentally sustainable, economic, and technically sound manner through partnerships."

As discussed in the Civil Works Strategic Plan: Fiscal Year 2004 – Fiscal Year 2009, USACE accomplishes the Civil Works mission through nine business programs:[25]

3.1 Navigation

The Navigation Program is responsible for providing safe, reliable, efficient, and environmentally sustainable waterborne transportation systems for the movement of commercial goods, for national security needs, and for recreation. Through authorities related to navigation, the Corps[26] develops inland waterways, ports, and harbors through river deepening, channel widening, jetty construction, lock expansion, dam operations, and dredged material disposal activities. Civil Works operates and maintains 12,000 miles of inland and intracoastal waterways, nearly 13,000 miles of deep draft and coastal inlet channels, 240 locks, 300 major commercial harbors, and over 600 smaller recreational and commercial harbors.

- ***The U.S. marine transportation industry supports nearly $1 trillion in commerce accounting for 27 percent of the Gross Domestic Product and creates employment for 13 million individuals.***
- ***The inland waterways move about 630 million tons or 15 percent of the Nation's bulk freight.***
- ***The inland and intracoastal waterways maintained by the Corps of Engineers handle over 625 million tons of cargo valued at over $100 billion.***
- ***Nearly 800,000 jobs result from the activities of the inland waterway system.***
- ***The inland waterway system generates a total payroll of $1.7 billion and over $425 million in Federal and State payroll taxes annually.***
- ***On average, inland waterways save U.S. shippers and consumers more than$10 per ton of cargo shipped compared to an alternate overland mode.***

[24] http://www.vtn.iwr.usace.army.mil/pdfs/cw_strat.pdf (Civil Works Strategic Plan, Fiscal Year 2004 – Fiscal Year 2009).
[25] Note that EC 11-2-193, *Corps of Engineers Civil Works Direct Program, Program Development Guidance, Fiscal Year 2010* does not include Support for Others as one of the eight civil works business lines as this activity is not funded through the civil works program budget but is separately reimbursed.
[26] As used in the referenced document, "Corps" refers to USACE.

3.2 Flood and Coastal Storm Damage Reduction

The second largest Civil Works program is Flood and Coastal Storm Damage Reduction. This program is aimed at saving lives in the event of floods and storms and reducing the property damage they cause. Flood protection authorities provide for dams and related hydropower construction and operation, levee construction, large-scale pumping systems, and the protection and stabilization of shorelines through beach replenishment.

Civil Works projects provide 8,500 miles of emplaced levees and dikes, 383 reservoirs, and more than 90 shore protection projects along 240 miles of the nation's 2,700 miles of shoreline. With the exception of reservoirs, most of the infrastructure constructed under this business line is owned and operated by the sponsoring cities, towns, and agricultural districts. The Flood Program has an impressive record. Through Fiscal Year 2000, the Nation prevented an estimated $419 billion ($709 billion adjusted for inflation) in riverine and coastal damages for the $43.6 billion ($122 billion, adjusted for inflation) it invested in flood damage reduction projects. This translates into a $6 return on investment for every dollar spent for flood protection.

3.3 Environmental Protection and Restoration

Given a growing public demand for environmental restoration and protection, the Corps' Environmental Program emphasizes environmental protection, restoration and management through stewardship, ecosystem restoration, mitigation, environmental compliance, and research and development activities. In Fiscal Year 2002 this business comprised $705 million, or 15 percent of the Civil Works budget. Environmental work ranges from monitoring water quality at dam sites, to operating fish hatcheries with the States, to constructing fish passage facilities at Columbia River dams. In 1997 the Corps assumed responsibility for the Department of Energy's "Formerly Utilized Sites Remedial Action Program" (FUSRAP), which mandates the cleanup of former Manhattan Project and Atomic Energy Commission sites. Within the Civil Works Program, the Corps is also responsible for cleaning up former military sites and hazardous waste sites under the U.S. Environmental Protection Agency's "Superfund" Program as part of its Support for Others efforts.

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Since 1998, the Corps has added more than 120,000 acres of aquatic, wetland, and floodplain ecosystems to America's natural habitats. Currently the Corps is engaged in the Comprehensive Everglades Restoration Plan – a project to restore 52 miles and 27,000 acres of wetlands of the Kissimmee River in Florida, and to improve the conditions for over 300 fish and wildlife species and water quality.

3.4 Regulatory

The Corps has programmatic regulatory authority to act as a steward of lands and waters managed by the Corps. The Regulatory Program is responsible for issuing permits for construction and dredging in the nation's navigable waters, including wetlands. The property rights of private citizens and the views of Federal, State, local agencies, interest groups, and the general public must be balanced. This calls for the Corps to protect aquatic ecosystems while allowing reasonable use of private property and infrastructure development. Adverse impacts to the aquatic environment of a proposed project are offset by mitigation requirements to restore aquatic functions and values. Great effort is made to make permit decisions in a timely manner to minimize the inconvenience caused to the regulated public. In Fiscal Year 2002, this $132 million program accounted for 3 percent of the Civil Works budget.

3.5 Hydropower

The Corps' multi-purpose authorities afford hydroelectric power as an additional benefit of projects built for navigation and flood control. The Corps is the largest owner/operator of hydroelectric power plants in the United States and one of the largest in the world. The Civil Works $133 million Hydropower Program constituted 4 percent of the Fiscal Year 2002 Civil Works budget. The Corps' 75 multipurpose reservoirs with 345 generating units, mostly in the Pacific Northwest, generate about 24 percent of hydroelectricity -- 3 percent of the total electric power capacity in the United States. This capacity amounts to nearly 100 billion kilowatt-hours produced each year or enough energy to serve about ten million households – equal to ten cities the size of Seattle, Washington. Hydropower is a renewable source of energy and one of the least environmentally disruptive sources of electric power. It produces none of the airborne emissions that contribute to acid rain or the greenhouse effect. Hydroelectricity is distributed by Federal power marketing agencies.

The contribution of the Corps' Hydropower Program plays a vital role in the stability of the nation's overall electric system far beyond 3 percent of the nation's electric capacity it generates. In 2000, revenue returned from power sales to the U.S .Treasury amounted to $444 million.

3.6 Recreation

The Corps is an important provider of outdoor recreation as an ancillary benefit of flood prevention and navigation projects. The Corps manages recreation areas on 12 million acres, or 2 percent of Federal lands. An additional 600 State parks, 600 local government parks, and 420 quasi-public areas are managed by others on Corps land. The Corps operates more than 4,300 recreation sites at 463 projects – mostly lakes – and hosts more than 370 million visits a year at its facilities. The Corps currently collects about $34 million in recreation user fees annually.

The Corps' Recreation Program has significant economic impact. Recreation projects provide 500,000 full- or part-time jobs generating $15 billion annually in visitor spending. In an average year, visitors spend just over $6 billion on trip expenses in local communities around Corps lakes for gas, food, and lodging.

3.7 Water Supply

Careful management of the Nation's water supply is critical to limiting water shortages and lessening the impact of droughts. The Corps has an important role to ensure that homes, businesses, and farms nationwide have enough water to meet their needs. The Corps has the authority for water supply as part of projects that serve navigation, flood protection, and hydroelectric purposes. There are over 9.5 million acre-feet of Municipal and Industrial (M&I) storage space – equal to 3.1 trillion gallons of water -- in 177 Corps reservoirs in 24 States plus Puerto Rico. At a rate of 750 gallons per day, this is enough water to fulfill every American's water needs for 17 days.

The Corps supplies 3 trillion gallons of water to 10 million people in 115 cities, including some of America's largest metropolitan areas, such as Washington, D.C., Atlanta, and Dallas-Ft. Worth.

3.8 Emergency Management

The water resources infrastructure provided by the Corps supports homeland security and the swift return to normalcy from devastating natural disasters. In any given year, there are 30 presidential disaster declarations demanding a response from the Civil Works Program. The Corps has to be ready to respond to any and all emergencies with little or no notice, as the events of September 11, 2001 showed. The Civil Works Emergency Management Program has adopted a unified and integrated corporate planning approach to raise responsiveness to the highest possible level. In addition, the Corps responds in the event of severe flooding under Public Law 84-99.

When the word of the terrible events of September 11, 2001 reached Corps personnel, they responded instantly by ferrying more than 3,000 people safely out of Manhattan. Structural engineers in the Corps monitored unstable buildings. Others supported search and rescue operations. The Program also provided a mobile command center to support the New York Fire Department. In the aftermath of the tragedy, the Corps' Prime Power battalion sent 31 personnel to New York City to help install 50 generators to power medical triage facilities, temporary structures, and buildings in the financial district, including Wall Street's Mercantile Exchange and the NASDAQ Electrical Hub. Perhaps the Corps' biggest mission was debris removal. Civil Works experts helped to set up a management process and develop a plan for debris removal. The Corps dredged a section of the Hudson River to accommodate the barges needed to ferry away debris. More than 75,000 cubic yards of sediment was dredged in just nine days and 10,000 tons of debris was moved daily to the Kills Ferry Landfill site managed by the Corps on Staten Island. This eliminated the need for trucks to traverse the 20-mile land route from the site to the landfill. With each barge carrying 30 truckloads of debris, this also greatly reduced traffic, road wear, and pollution. In addition, the Corps used its geographic information system and thermal imaging to let emergency personnel know where fires were still burning in the rubble.

3.9 Support for Others[27]

As stated above, we leverage the capabilities developed and applied in our Civil Works business programs in support of others. Through the Support for Others Program, the Corps provides reimbursable technical assistance and management expertise to Indian Nations, the Department of Defense, other Federal agencies, State and local governments, private U.S. firms, and foreign nations to complement their expertise. The Corps International and Interagency Services Division leverages the capabilities of the Civil Works Program to support the objectives of the National Security and Military Strategies. The Corps performs $600-$800 million of work each year for about 60 Federal entities outside the Department of Defense.

4.0 Navigation Program and the Inland Waterways[28]

USACE facilitates the safe, reliable, and economic movement of vessels in the Nation's navigable harbors, rivers, waterways, and canals by operating and maintaining the lock, dam, and river channels on the Nation's inland water system. More than 60 percent of domestic waterborne tonnage travels on the inland Navigation System, including major commodities such as petroleum, coal, grain, sand, gravel, and stone. The locks accommodate 80 percent of all domestic barge traffic.[29] The inland and coastal waterway transportation system carries one-sixth of the Nation's volume of industrial materials, commodities, and products. Coastal ports and the Great Lakes furnish the deep and shallow draft capabilities important to U.S. foreign trade, on which nearly 25

[27] See footnote 25.
[28] Appendix I, Part B – Civil Works Strategic Plan, Fiscal Year 2004 – Fiscal Year 2009.
[29] USACE Waterborne Statistics Center, www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm

percent of the Nation's economic activity depends.[30] The navigable harbors, rivers, waterways, and canals support the mobilization and sustainability of the Nation's military and is critical to National defense.

Numerous inland waterway projects are ongoing, including modernizing facilities and making investments in environmental restoration and management.

The Navigation mission is a subset of a much larger USACE watershed management function. Thus, the decisions made concerning the Navigation System have ripple effects on other mission areas in the watershed functions and must be made holistically. The O&M of the Navigation System must work in conjunction with the other water management functions (flood damage reduction, hydropower, environmental, etc.) to avoid unintended consequences or adverse impacts on the execution of each function.

4.1 Organization

The USACE civil works divisions are organized around the geography of the Nation's river systems as shown in Figure I-2.

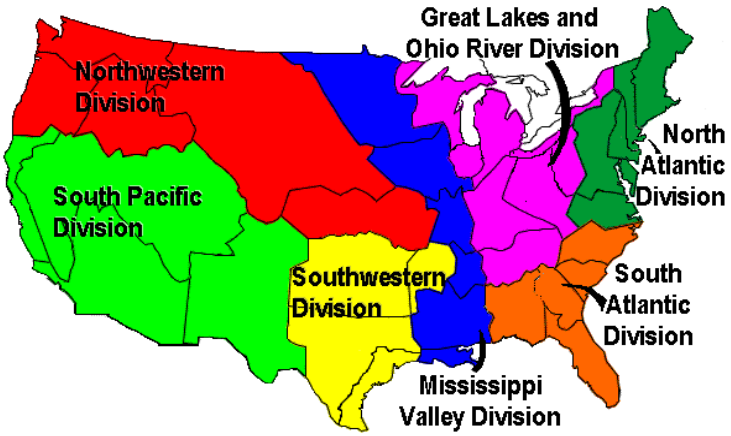

Figure I-2 Watershed Boundaries of USACE Divisions

[30] http://www.ndc.iwr.usace.army.mil/publications.htm

Chart I-4 shows the Divisions and their Districts that perform Navigation Program-related Operations and Maintenance functions.

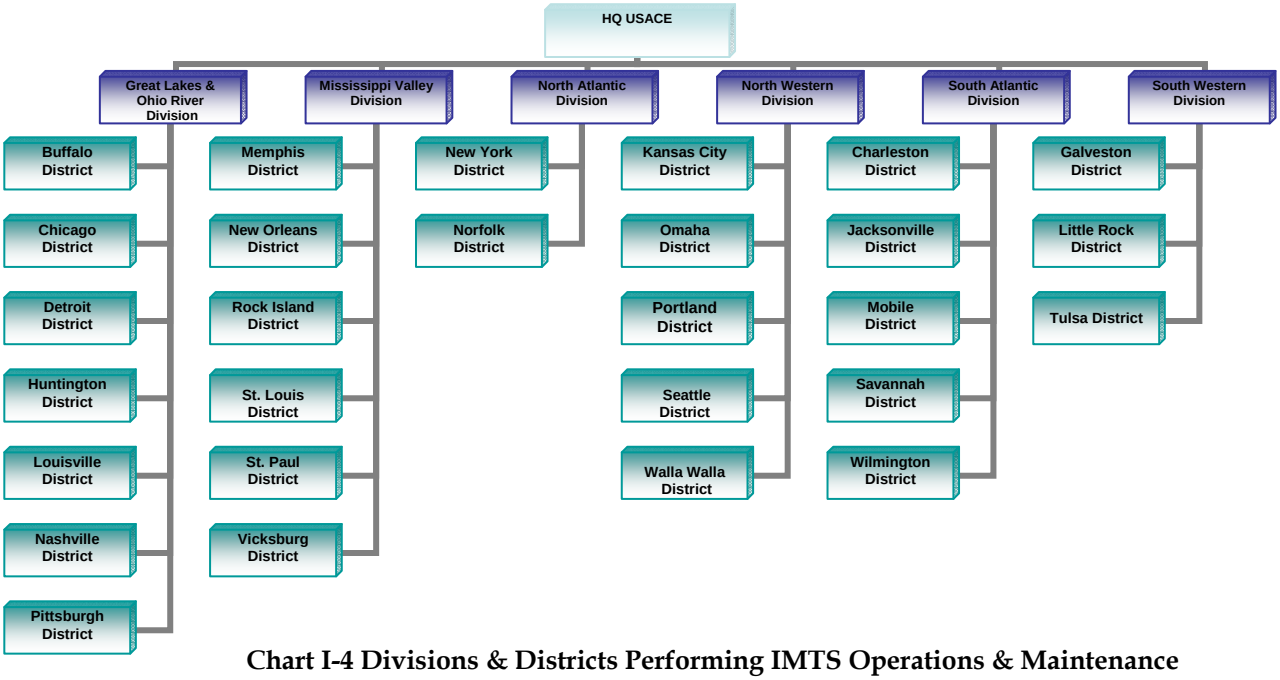

Chart I-4 Divisions & Districts Performing IMTS Operations & Maintenance

4.2 Managing Assets[31]

USACE is responsible for and manages an extensive portfolio of diverse infrastructure assets on behalf of the Nation. The value of these assets ranks among the top five for all Federal agencies. Congress and users expect USACE to sustain these infrastructure assets at their highest possible levels of performance. Table I -1 is a "short list" of those infrastructure assets. The value of these assets is more than $200 billion and includes the waterway assets shown in Table 1-2.

Asset Type	Approximate # of Assets
Structures	43,000
Tracts of Land	2,850,000
Buildings	12,000

Table I-1 Infrastructure Assets

Asset Type	Approximate # of Assets
Coastal Structures	1,000
Dams	600
Recreation Areas	2,500
Lock and Maintenance Sites	200
Hydropower Facilities	75

Table I–2 Waterway Assets

USACE has instituted an Asset Management Program utilizing risk and reliability techniques to make better decisions for prioritizing limited resources to maximize Navigation System reliability. Asset

[31] Asset management is discussed in greater detail in Appendix I, Part C – Infrastructure Asset Management.

management is an important adjunct of a smart long-term planning strategy for O&M to extend the useful life of the infrastructure in an environment of limited funding.

Additionally, requirements to manage assets is driven by Public Law 101-576, the "*Chief Financial Officers Act of 1990*" as amended by Public Law 103-256, the "*Federal Financial Management Act of 1994*". *Executive Order 13327, Federal Real Property Asset Management (2004)* and *Department of Defense* (hereafter referred to as DoD) *Instruction 4165.14, Business Enterprise Architecture and Inventory Instruction (2006)* compel a focus on intelligent asset management.

4.3 Funding

The funding to support waterborne commerce must compete for scarce National investments with other intermodal transportation priorities. The issues surrounding the funding of navigation projects in competition with other modes are not without controversy given the challenges of upgrading and maintaining this aging infrastructure. The following, taken from the winter, 2002, issue of Rural America magazine illustrates this challenge. [32]

"Inland waterways face a number of pressing challenges, infrastructure foremost among them. With over 170 lock sites and 210 lock chambers Nationwide, many facilities are in various stages of disrepair (Casavant). In particular, the system of locks and dams on the Mississippi and Illinois Rivers, mostly constructed between 1930 and 1950, is aging. Also, many Upper Mississippi locks cannot fully meet the needs of current barge traffic."

"The Army Corps of Engineers is responsible for routine maintenance of navigation channels, including dredging and channel widening. However, upgrading and repairing the system can cost $100 million or more per lock. Mississippi River Lock 26, near Alton, Illinois, was replaced in 1994 at a cost of $950 million…"

4.4 Challenges

While there is little question about the contribution of inland waterways to the National, state, and local economies, the Navigation Program's O&M functions face many factors that affect its ability to meet the economic expectations of external stakeholders and customers.

Two critical factors – an aging infrastructure and a relatively flat budget in real terms – greatly affect the current operating environment of the USACE Navigation Program. These critical factors have driven the USACE Navigation business line managers to investigate opportunities for significant change.

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[32] Rural America, Winter 2002/Volume 16, Issue 4, *The Nation's Inland Waterway System and Rural America* http://www.ers.usda.gov/publications/ruralamerica/ra164/ra164c.pdf

In 2001 the American Society of Civil Engineers (hereafter referred to as ASCE) report card for Navigable Waterways was a D+ but four years later, the 2005 ASCE report card was lowered to a D-. The 2005 ASCE assessment of the waterway infrastructure found:

"Waterway usage is increasing, but the facilities are aging; many Corps-owned or-operated locks are well past their planned design life of 50 years. Of the 257 locks still in use in the United States, 30 were built in the 19th Century, another 92 locks are more than 60 years old… inland waterways operated by the U.S. Army Corps of Engineers, nearly 50% are functionally obsolete. By 2020, that number will increase to 80%. The cost to replace the present system of locks is more than $125 billion."[33]

[33] ASCE, " *Report Card for America's Infrastructure", Navigation Waterways* http://www.asce.org/reportcard/2005/page.cfm?id=36

SECTION II - IMPROVING NAVIGATION SYSTEM RELIABILITY

Belleville Lock & Dam

The purpose of this section of the report is to enable the reader to understand the collaborative process used to identify improvements, the resulting improvement recommendations, and the development of a Baseline Requirements Document and associated Baseline Operating Objectives to which the improvements apply. This section of the report is augmented by Appendix II consisting of two parts: Part A – Baseline Requirements Document; and Part B – Business Process Review Findings and Recommendations.

1.0 Background

The study initially started as a public-private competition (A-76). During the preliminary planning phase a business case analysis (hereafter referred to as BCA) was performed to assess the feasibility of conducting a competition. Given the large number of project sites and other factors such as the interdependency of the navigation function with other functions, the BCA clearly demonstrated that for this particular function very little, if any, benefits could be derived from a public-private competition.

A "High Performing Organization (hereafter referred to as HPO) is a recognized alternative to following the competitive sourcing procedures of OMB Circular A-76. This alternative describes a process. However, because earlier applications of the HPO process resulted in new, independent organizations and because a new separate organization was not going to be the recommendation of this study, the term HPO was abandoned to avoid misunderstandings. In order to communicate as clearly as possible the overall thrust of the study, the term that best describes this study effort is "Business Process Review" (hereafter referred to as BPR). This study does not recommend the creation of a new national organization, decreased staffing, or other changes that would disrupt the existing chain of command. Rather, the recommended changes will strengthen the existing Corps chain of command and enhance the performance within the existing organizational structure.

In order to convey the nation-wide coverage of the BPR and the system-of-systems approach to improving the inland Navigation System, the term Inland Marine Transportation System (IMTS) was also adopted.

2.0 BPR Team and Advisors

Members of the BPR Team were chosen for their knowledge and experience in the O&M of the inland Navigation System. Furthermore, personnel with a cross section of skills and backgrounds charged with executing the Navigation mission of USACE were members: lockmasters, District Navigation section and branch chiefs, District chiefs (and assistant chiefs) of operations, human resources, Division staff involved in the Navigation mission, and senior staff at the Headquarters. Experts from cost engineering, Navigation design, and database management were added to the team to provide both a link to required sources of Navigation statistics and a perspective from those that indirectly support the Navigation mission. The team was also supported by contract personnel who provided a vital link in facilitating the collection of data and assembly of the report. This diverse team, as shown in Table II-1, was also essential in acquiring and recording the concerns of the many USACE personnel who directly serve the Navigation industry in operating and maintaining USACE lock and dam facilities on how to provide a more efficient Navigation System for customers.

Headquarters, USACE	
Chief, Navigation Branch	Operations & Regulatory Directorate
Deputy Chief, Operations & Great Lakes & Ohio River Division (LRD) Regional Integration Team	Operations & Regulatory Directorate
National Technical Specialist	Cost Engineering
Program Analyst	Strategic Sourcing Program Office
Laboratories	
Electrical Engineer, Senior Project Manager (retired)	Engineer Research & Development Center (ERDC)
Physical Scientist, Project Manager	Institute for Water Resources (IWR)
Division Representatives	
Operations Maintenance Manager	Great Lakes & Ohio River Division (LRD)
Civil Engineer, Operations Program Manager	Northwestern Division (NWD)
District Representatives of the Great Lakes & Ohio River Division (LRD)	
Chief, Maintenance Section, Technical Support Branch	Louisville District (LRL)
Lockmaster, Cannelton Locks & Dam	Louisville District (LRL)
Chief, Management Support Branch (retired) & U.S. Merchant Marine Master	Nashville District (LRN)
District Representatives of the Mississippi Valley Division (MVD)	
Chief, Operations Division	Rock Island District (MVR)
Lockmaster, Lock & Dam 11	Rock Island District (MVR)
Chief, Design Branch, Engineering & Construction Division	St. Louis District (MVS)
Assistant Chief Operations Division	St. Louis District (MVS)
District Representatives of the South Atlantic Division Districts (SAD)	
Chief, Lock Operations & Repair Section, Black Warrior & Tombigbee/Alabama-Coosa Project	Mobile District (SAM)
Supervisory Civil Engineer, Operations Project Manager (retired)	Mobile District (SAM)
District Representatives of the Southwestern Division (SWD)	
Chief, Design Branch	Little Rock District (SWL)
Navigation System Operations Manager, Locks 14, 15, and 16	Tulsa District (SWT)

Table II-1 BPR Team and Advisors

Two formal advisory teams were established to ensure the BPR Team proceeded in a manner that would best benefit the needs of USACE Navigation customers. A reach-back team, composed of employees from lock and dam facilities, repair stations, and District offices, provided necessary feedback and information during the study. A Navigation Board of Advisors, composed of senior staff at the Division and Headquarters level, reviewed recommendations developed by the team to ensure a clear and comprehensive map for a direction forward.

The team established monthly in-person meetings and weekly conference calls to conduct their work. Input was received from a variety of sources including USACE Navigation function staff, USACE Navigation function management, waterway users, unions, employees, and the public.

3.0 Methodology

The BPR study methodology included defining the Navigation function scope; defining the baseline Navigation processes, workload, and costs; defining the Navigation performance requirements – including the development of a Baseline Requirements Document; identifying process improvements to increase performance and reduce costs; and assessing organizational enhancements that support the process improvements.

3.1 Goal

The review was based on a watershed approach to ensure that the resulting improvements are implemented across the IMTS to enhance Navigation program performance as a whole.

System reliability is the goal of the BPR and is based on the following tenets:

(1) The reliable transit of vessels from point of origin to destination according to schedule and within cost depends upon the on-time availability of the locks and channels.

(2) Reliability in transiting a lock or section of navigable channel along the system impacts the schedules and costs of the commercial waterway operators as well as businesses and industries that depend upon the timely delivery of the commercial products. Unreliability and delays also impact the schedules and costs of other commercial freight transportation providers that are part of this intermodal transportation system.

3.2 Objectives

To facilitate achieving the goal, the BPR Team focused on identifying improvements that maximize the efficiency, effectiveness, reliability, and sustainability of the IMTS. The team established the following objectives for the IMTS end-state:

(1) Operate the series of locks as a system to improve system reliability in accordance with USACE safety principles;

(2) Standardize lock and dam operations with similar conditions to best-in-class procedures;

(3) Standardize the lock and dam maintenance with similar conditions to best-in-class procedures;

(4) Optimize the channel conditions to support the system's reliability;

(5) Operate within the USACE "Environmental Operating Principles;" and

(6) Enhance career progression and establish a capable workforce through human resources improvements.

3.3 Collaboration

Conducted site visits

Met with employees

Held sessions with Division and District Commanders and Operations Chiefs

Collaboration with others was a significant ingredient of the study. To ensure the widest possible inclusion of others in the identification of ideas and the framing of recommendations, the BPR Team:

(1) Visited a majority of the USACE lock sites, repair stations, and field offices;

(2) Established a public website to describe the BPR process and solicited feedback;

(3) Published a draft Performance Work Statement (PWS) (hereafter called the Baseline Requirements Document) for public comment in December 2007;

(4) Attended waterway user conferences to invite input from users of the system;

(5) Interviewed individuals who have spent their careers as users of the Navigation System; and

(6) Obtained input from operations project managers, operations chiefs, supervisors of locks and dams, and District Commanders.

3.4 Study Process

The effort to improve Navigation System reliability extends beyond individual locks and dams to include the entire inland waterway system. The IMTS approach recognizes the critical USACE inland waterway mission as part of the Nation's Marine Transportation System (MTS) and is consistent with the strategic vision of Congress regarding the Nation's transportation infrastructure.

The BPR effort was a system-of-systems approach through which the BPR Team examined the entire range of waterway functions including lock and dam O&M, channel maintenance and bank stabilization, and facility condition and investment strategy. As mentioned under collaboration above, the team:

(1) Conducted site visits;

(2) Met with employees;

(3) Held sessions with Division and District Commanders and Operations Chiefs;

(4) Interviewed inland waterway users from business and industry including tow boat pilots; and

(5) Communicated with the Saint Lawrence Seaway Management Corporation, Saint Lawrence Seaway Development Corporation, and the Permanent International Association of Navigation Congresses (PIANC) to gain lessons-learned about international lock operations and maintenance.

The team spent the first seven months of the review effort researching, developing, testing, and refining the requirements for the system. They began the requirements development process by assessing the statutes and regulations that currently drive aspects of the Navigation requirements.

Once the requirements were identified, the team proceeded to shape ideas for improvements.

4.0 Requirements Determination

Developing a Baseline Requirements Document (Appendix II, Part A) of the Navigation function was a critical step in focusing the team on the improvements that would enhance performance. The document describes the activities performed to manage, operate, and maintain the IMTS; establishes the baseline performance requirements for the IMTS; identifies the linkage between statutes and regulations to the requirements; and reflects the Navigation-related functions included in the review. The Baseline Requirements Document focuses on performance-based outcomes to foster the objectives discussed earlier.

As the team narrowed its focus on the critical requirements, it canvassed Navigation users and partners to ensure they were appropriate and the resulting metrics reflect the outcomes of these meetings. IMTS users, employees, and other interested parties were invited to comment on the Baseline Requirements Document during its development. The final Baseline Requirements Document incorporates many of those comments.

4.1 Functions Included in the BPR

Diagram II-1 identifies the functions included in the BPR. Note that the hydropower function is not included.

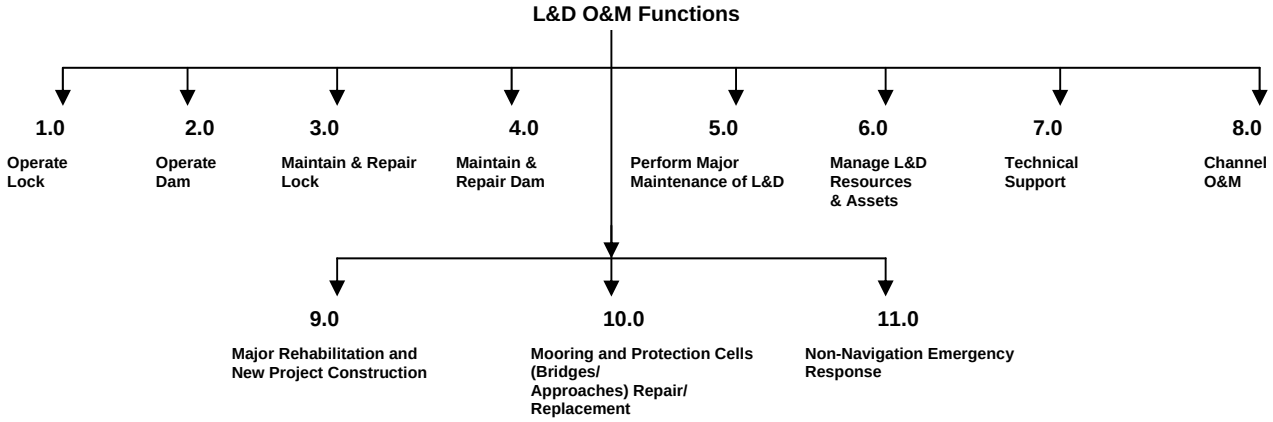


Diagram II -1 Operation and Maintenance - Navigation Locks & Dams (L&D)

4.2 Baseline Requirements Document

The functions included in the BPR are described in the Baseline Requirements Document (as indicated by the paragraph number in parenthesis). The document serves as the baseline against which improvements will be applied and measured.

New Marmet Lock , Kanawha River
West Virginia

Operate Lock (C.5.1) - The activities performed under this function are operating locks in accordance with appropriations, annual authorizations, Army and Engineering regulations, and policy and technical guidance. The baseline metrics for this function (discussed in Section IV – Performance Measurement) are: (1) the performance of lockages on demand or on schedule in accordance with priorities defined in the lock hours of operation; and (2) queued vessels transiting the locks in accordance with established procedures and standards.

Belleville Lock & Dam - Belleville Lock and Dam is located on West Virginia and Ohio shores

Operate Dam (C.5.2) - The activities performed under this function are effective dam operations to meet Navigation System reliability and flood control expectations in accordance with appropriations, authorization, Army and Engineer regulations, and policy and technical guidance. Dam operations include all activities associated with the operation of a Navigation dam structure and associated facilities and equipment. These dams release water through the operation of spillway gates and outlet works for flood control and maintenance of a navigation pool.

Maintain and Repair Lock (C.5.3) - The activity performed under this function is routine maintenance and repairs. The baseline goal of the lock maintenance and repair function is to minimize unscheduled outages and unreliability to customers.

Maintain and Repair Dam (C.5.4) - The activities performed under this function are routine and nonroutine maintenance and repair of dams and associated structures, such as spillways, embankments, outlet works, levees, pumping stations, and other structures.

Crane Hercules holds a miter gate in place
For repairs at Lock 25 Winfield, MO

Perform Major Maintenance of Locks and Dams (C.5.5) - The activities performed under this function include management and administration related to major scheduled maintenance, repair, and emergency repair to ensure system reliability. This may involve personnel at the lock and dam sites, central maintenance facilities, or mobile maintenance fleets. It may also involve personnel from other lock and dam sites inside or outside the parent District, Division, and HQUSACE or outside resources.

Manage L&D Resources and Assets (C.5.6) - These activities include personnel and staffing issues, preparing the annual budget, responding to data calls, managing government-furnished property (GFP) and Navigation System assets, purchasing within credit card limits, ensuring security, and conducting public relations.

Technical Support (C.5.7) - Coordinate with USACE organization providing support to Navigation functions to determine the most efficient and effective procedures to procure technical services.

St. Paul District cutterhead dredge "*Goetz*"

Channel Operations and Maintenance (C.5.8) – The activities performed under this function include project management and oversight of channel O&M within the Navigation System and actions necessary to keep channels open to Navigation to meet Navigation performance standards.

St. Louis District trail dike

Major Rehabilitation and New Project Construction (C.5.9) - The activities performed under this function include identifying, requesting, and funding the planning and reporting activities required to request major rehabilitations and new construction. It also includes the O&M-funded preparation activities that precede a major rehabilitation. Specific tasks include data acquisition, data analysis ("what if" scenarios), and project justification documentation. These reports must be completed in accordance with Project Management Division guidance and formats.

Olmsted Lock & Dam, Olmsted, IL future boat mooring area during the construction phase.

Mooring and Protection Cells (Bridges and Approaches) Repair and Replacement (C.5.10) - The activities performed under this function include constructing and repairing Federal mooring and protection cells within the Navigation System for the continuity and safety of the Navigation mission, including periodic inspections.

Non-Navigation Emergency Response (C.5.11) - The activities performed under this function includes emergency activities, assessing the impact to performance of the Navigation mission, and reporting this assessment to higher management for resolution. It also encompasses providing support during natural disasters and public emergencies (such as hurricanes), in accordance with past practice and local staffing levels, and maintaining adequate emergency response capabilities.

5.0 Improvements Identification

In addition to the requirements determination resulting in the Baseline Requirements Document, the team also reviewed Inland Navigation mission-related regulations, reports, and documents in order to define the scope of the Inland Navigation function as a whole. The team used this process to define the baseline Inland Navigation processes, workload, and costs. This process enabled the team to assess alternatives and identify process improvements. The BPR Team applied the steps shown in Diagram II-2 to develop BPR-related improvements.

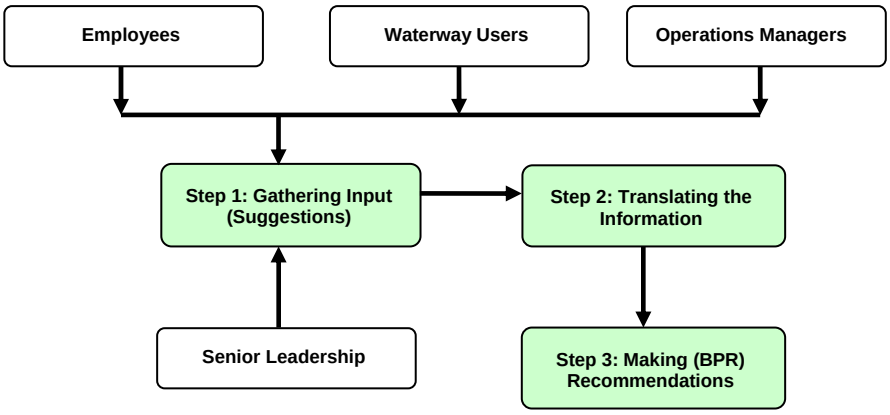


Diagram II-2 BPR Steps

5.1 Gathering Input

The team received numerous suggestions from employees, waterway users, and Navigation function managers at the Division, District, project office, repair stations, Lock and Dam site levels, as well as subject matter experts on the BPR Team. Suggestions included the following:

Enhance the effectiveness of the preventative maintenance and repair of IMTS infrastructure and its impact upon system reliability by (a) deploying a standard maintenance management system Facility and Equipment Management (FEM) system throughout the IMTS, and (b) sharing corporate knowledge of major maintenance, especially best practices.

Improve the performance of major maintenance and its impact upon System Reliability by establishing formal means to share corporate knowledge of major maintenance, especially best practices.

Raise System Reliability and customer satisfaction by better coordination of the schedule of major maintenance activities for a river or waterway system; an IMTS River System Management Team should be established for each system to devise the schedule and minimize system unreliability.

Increase System Reliability by moving to a risk-based ranking process for major maintenance budgeting that is based on an annual condition assessment process; both the ranking process and assessment should be established as an IMTS-wide standard.

Implement a 3-Phase Inspection System for major maintenance activities to return a facility to service sooner with improved quality.

Improve NavLocks channel maintenance through more active partnering with the USCG (e.g. sharing hydrographic surveys), regional Indefinite Delivery/Indefinite Quantity (hereafter referred to as ID/IQ) environmental contracts for environmental services, including mussel surveys, water quality laboratory work, and sediment analysis, and establishing regional and National forums for sharing best practices on channel maintenance.

Provide faster access to leased equipment required for major maintenance projects from the regional/system equipment pool (leased equipment) by developing a regional ID/IQ contract.

Develop budgets for systems rather than individual projects thereby enabling (a) enhanced investment decisions an a better return on investment (hereafter referred to as ROI) from the funds, (b) faster response time to emergencies due to greater flexibility in moving funds, (c) optimized construction schedules and better economies of scale.

Restructure the Plant Replacement and Improvement Program (hereafter referred to as PRIP) to cut equipment costs through vigorous management actions.

Provide customers a more uniform and consistent method of locking a vessel through a site by adopting IMTS-wide standards for locking procedures that directly impact a customer such as radio contact channels, working channels during lockages, lockage sequencing plans, signals and aids to Navigation and providing strobe lights to signal recreational vessels.

Improve efficiency of lock operations by (a) adjusting hours of operation to the service level that corresponds with lock usage based on a detailed customer analysis, and (b) adopting best practices in use at some Districts for use of other available personnel for lock operations during low-use periods.

Correct safety issues and dysfunctional elements of the existing security systems at Locks and Dams that hinder the ability of lock personnel to operate and maintain the equipment in a safe and efficient manner.

Strengthen the business case for Navigation funding through a risk-informed, budget-based assessment management system that is based on a strategic approach.

Explore innovate alternatives to plant acquisition for the design and construction of floating plant equipment that will improve performance such as (1) Design/build construction contracts, (2) Lease-to-own contracts, and (3) Procurement of off-the-shelf designs.

Improve procedures for supply contracts (Multiple Award Task Order Contract [hereafter referred to as MATOC], ID/IQ, Impact Card, etc.) for obtaining repair and replacement parts.

Increase the ability of customers to move commodities through selected IMTS river systems by moving to a system-based approach to water control in those systems; the approach includes (a) a consistent approach to river forecasting, (b) standardized water control procedures within each system, and (c) assignment of a lead District to manage the development of the procedures and policies for that system.

Upgrade IMTS employee skills and expertise through IMTS knowledge management and sharing that includes better opportunities for face-to-face networking, newsletters, and advanced knowledge sharing Requirements Documents hosted at a website.

Enhance skills of lock personnel by offering IMTS-wide training based on best practices and recognize achievements through Lock Personnel Certification.

Write more uniform and consistent Position Descriptions (hereafter referred to as PDs) for IMTS positions to improve consistency.

Reduce the hardship on existing employees and enhance deployment capability by improving the hiring process to fill vacancies more rapidly.

Assign administrative duties to administrative staff.

Enhance leadership and management.

Set up a process for establishing on-site staffing shifts in collaboration with bargaining units.

Improve staffing and grade structure alignment.

Make on-site supervision at project sites more effective through better-defined work leadership roles and improved span-of-control.

Put more emphasis on Lock Supervisor training and offer more opportunities to enhance supervisory skills.

Improve Navigation data management, including (a) a streamlined single lock data entry system to replace the two existing ones (Lock Performance Monitoring System and O&M Navigation Information systems), and (b) consistent definitions of terms, and (c) training for lock personnel who enter the data.

5.2 Translating the Information

Navigation System commercial users have emphasized that system reliability is their highest priority. To that end, improving system reliability is the overarching goal of this initiative.

The team considered the numerous suggestions it received to improve system reliability. These ideas were condensed into the twenty-five BPR Topics shown in Table II-2 (number sequence does not indicate the topic's level of importance).

BPR #	Topic
1	Share Corporate Knowledge of Major Maintenance
2	Share Corporate Knowledge of Preventative Maintenance & Repair
3	Enhance the Hiring Process
4	Strengthen Leadership & Management
5	Improve Level of Service
6	Training & Certification for Lock Staff
7	Augment Supervisory Skills at Locks & Field Offices
8	Share IMTS Knowledge & Information
9	NavLock Channel Maintenance
10	Enhance On-Site Supervision
11	Physical Security at Locks & Dams
12	Acquisition of Land & Floating Plant & Equipment
13	Restructure the Plant Replacement & Improvement Program (PRIP)
14	Standardize Position Descriptions
15	Regional/System Equipment Pool (Leased Equipment)
16	Scheduling & Budgeting Major Maintenance
17	Service Providers for Maintenance Projects
18	Optimize Shift Schedules
19	Standardize Staffing & Grade Structure
20	Standardize Locking Procedures
21	Improved Alignment of Administrative Tasks
22	Improve Consistency in the Application of Drug Testing Policies
23	Systems-Based Budgeting
24	Implement 3-Phase Inspection System for Major Maintenance
25	Standardize Water Control Procedures

Table II-2 List of BPR Topics

The team further grouped the BPR Topics into three major categories referred to as pillars: Human Capital, Operations, and System Availability. These pillars are of equal importance to improving system reliability.

Human Capital
BPR Topics that relate to the Navigation workforce including training, certification, work shifts, and staffing.

Operations
BPR Topics that focus on the critical business and operations processes of the NavLocks system including standardizing and streamlining practices to facilitate easy transit through a series of locks and establishing a standard set of operating practices.

System Availability
BPR Topics focused on the system's ability to provide unrestricted passage including coordination of major maintenance activities, means of sharing lessons-learned, and equipment pools for faster access to leased or owned equipment.

Table II-3 shows the BPR Topics grouping under the three pillars.

Human Capital		Operations		System Availability	
Topic #	**Topic**	**Topic #**	**Topic**	**Topic #**	**Topic**
3	Enhance the Hiring Process	5	Improve Level of Service	1	Share Corporate Knowledge of Major Maintenance
4	Strengthen Leadership & Management	11	Physical Security of Locks & Dams	2	Share Corporate Knowledge of Preventative Maintenance & Repair
6	Training & Certification for Lock Staff	12	Acquisition of Land & Floating Plant Equipment	9	NavLock Channel Maintenance
7	Augment Supervisory Skills at Locks & Field Offices	13	Restructure the Plant Replacement & Improvement Program (PRIP)	15	Regional/System Equipment Pool (Leased Equipment)
8	Share IMTS Knowledge & Information	20	Standardize Locking Procedures	16	Scheduling & Budgeting Major Maintenance
10	Enhance On-Site Supervision	23	Systems-Based Budgeting	17	Service Providers for Maintenance Projects
14	Standardize Position Descriptions	25	Standardize Water Control Procedures	24	Implement 3-Phase Inspection System for Major Maintenance
18	Optimize Shift Schedules				
19	Standardize Staffing & Grade Structure				
21	Improved Alignment of Administrative Tasks				
22	Improve Consistency in the Application of Drug Testing Policies				
11 BPR Topics		**7 BPR Topics**		**7 BPR Topics**	

Table II-3 BPR Topics Listed by Pillar

5.3 Making Recommendations

The BPR Team developed Findings and Recommendations for each BPR Topic. The Findings and Recommendations are provided in Appendix II, Part B. Each BPR Topic includes: Findings, Recommendations, Cost Analysis, Benefits, Challenges, Statutory or Regulatory Changes Required to Achieve the End State, Elements of Implementation Requiring Coordination with External Stakeholders, Implementation (Activities/Steps, Schedule, Resource Plan, Relationship to Baseline Requirements Document, Implementation Measurement, and Quality Assurance).

Most BPR Topics include several improvements (recommendations) Table II-4 shows the number of improvements associated with each BPR Topic.

BPR Topic #	BPR TOPIC	Number of Improvements
1	Share Corporate Knowledge of Major Maintenance	**4**
2	Share Corporate Knowledge of Preventative Maintenance & Repair Procedures	**2**
3	Enhance the Hiring Process	**4**
4	Strengthen Leadership & Management	**3**
5	Improve Level of Service	**1**
6	Training & Certification for Lock Staff	**6**
7	Augment Supervisory Skills at Locks & Field Offices	**5**
8	Share IMTS Knowledge & Information	**4**
9	NavLock Channel Maintenance	**6**
10	Enhance On-Site Supervision	**3**
11	Physical Security at Locks & Dams	**2**
12	Acquisition of Land & Floating Plant Equipment	**4**
13	Restructure the Plant Replacement & Improvement Program (PRIP)	**8**
14	Standardize Position Descriptions	**5**
15	Regional/System Equipment Pool (leased equipment)	**1**
16	Scheduling & Budgeting Major Maintenance	**7**
17	Service Providers for Maintenance Projects	**1**
18	Optimize Shift Schedules	**5**
19	Standardize Staffing & Grade Structure	**6**
20	Standardize Locking Procedures	**16**
21	Improved Alignment of Administrative Staff	**2**
22	Improve Consistency in the Application of Drug Testing Policies	**5**
23	Systems-Based Budgeting	**5**
24	Implement 3-Phase Inspection System for Major Maintenance	**2**
25	Standardize Water Control Procedures	**8**
	Total Improvements	**115**

Table II-4 Number of Improvements by BPR Topic

Table II-5 summarizes the improvements associated with each BPR Topic. The table also appears in Appendix III, IMTS Implementation Plan, in order to establish the actions that are required to implement the improvements.

Summarized Improvements
1 – Share Corporate Knowledge of Major Maintenance
(1) Establish mandatory regional workshops on major maintenance.
(2) Develop a regional skills database of technical competencies.
(3) Establish visits by technical support personnel to major maintenance activities of other districts to increase sharing of information.
(4) Review the Lakes and Rivers Division Navigation Locks & Dams Maintenance Standard and implement a Maintenance Standard policy.
2 – Share Corporate Knowledge of Preventative Maintenance & Repair Procedures
(1) Provide a standard maintenance management system.
(2) Exchange information at Lock and Dam O&M Workshop. .
3 – Enhance the Hiring Process
(1) Reduce fill time by establishing a central recruitment unit for IMTS.
(2) Assess system identified by DoD to replace Resumix.
(3) Conduct workforce planning to identify expected turnover.
(4) Build and maintain extended workforce contact lists.
4 – Strengthen Leadership & Management
(1) Identify best practices.
(2) Develop specific performance goals.
(3) Encourage leadership and management training for all supervisors.
5 – Improve Level of Service
Utilize the 12 point decision tree for identifying Navigation locks that have opportunity for reduced hours of operation. Each step of decision tree should reduce number of locks available for further study
6 – Training & Certification for Lock Staff
(1) Develop standardized, nationwide training and certification for new lock operators (those assigned duties for operating locks or dams).
(2) Provide refresher training, at reasonable intervals, to stay abreast of changes and technology.
(3) Establish a mechanism (such as newsletters, conferences, or training officers) to inform and facilitate lock personnel participation in mission-related maintenance training to learn and improve skills.
(4) Develop a Prospect Course, specifically for new lock personnel, required as part of the lock operator certification process and also available to journeymen lock personnel as stated in the Individual Development Plan (IDP) and as funding allows.
(5) Standardize the training duration and grade structure for lock operators during the training and certification period, where the grade advances as phases of training are completed.
(6) Establish adequate training budgets and staffing procedures to allow for training for new and current lock personnel (operators, mechanics, and electricians).

Summarized Improvements
7 – Augment Supervisory Skills at Locks & Field Offices
(1) Enforce mandatory completion of the following required courses for new supervisors: Human Resources for new supervisors, online supervisory development course, and Army Continuing Education System courses.
(2) Train new supervisors on the provisions of the current union contracts in the first year following their selection.
(3) Provide refresher training for current lock supervisors.
(4) Use scheduled Navigation conferences to devote time in discussing supervisory issues, and make training in various supervisory skills part of the agenda.
(5) When a new union contract is negotiated, require training of all operations and maintenance supervisory personnel on the provisions of the agreement. Hold refresher training on the content of the current union agreement every three (3) years.
8 – Share IMTS Knowledge & Information
(1) Develop a Memorandum of Agreement (MOA) for a Public Affairs Officer contact dedicated to the IMTS to improve communication internally, with customers, and with the public.
(2) Public Affairs Office MOA shall include development of a newsletter, published at least quarterly, to cover lock and dam O&M, dredging, employee interest stories, and other IMTS-related issues.
(3) Using the functionality of the Navigation Gateway, establish a website to share IMTS-related knowledge and information through threaded discussions, wikis, newsletter archives, etc.
(4) Working Group should establish a process action team (PAT) to develop the Public Affairs Office MOA.
9 – NavLock Channel Maintenance
(1) Share USACE hydrographic surveys with the USCG in a standard file format (such as AutoCAD DXF).
(2) Conduct working meetings between local USACE offices and USCG detachments to discuss fleeting routes (sailing instructions) and ways to improve marking the river channel with buoys.
(3) Initiate a regional ID/IQ-type contract for environmental services, including mussel surveys, water quality laboratory work, and sediment analysis.
(4) Use existing regional and national meeting forums (such as the Inland Waterways Conference) to evaluate best practices for contracting, Quality Assurance/Quality Control (QA/QC), coordination with USCG, industry, and interest groups.
(5) Establish a Geographic Information System (GIS) based platform for use by districts with significant dredging requirements.
(6) Regional areas shall maintain a database of historic dredging areas. Budget packages shall be developed to investigate long-term solutions (eliminate the need for dredging where economically feasible). Use of technology such as micro-modeling for these areas to determine cost-effective solutions such as weir fields, etc., should become widespread.
10 – Enhance On-Site Supervision
(1) Assign on-site supervisory responsibility to one person at each lock and dam site.
(2) If a site does not have a supervisor whose normal duty station is at that site, ensure the site supervisor's assigned duty station is within 45 minutes of the site.
(3) Ensure every site always has a designated person officially assigned.

Summarized Improvements
11 – Physical Security at Locks & Dams
(1) Perform Life Cycle Cost Analysis on existing security systems to determine the most effective strategy for operation, maintenance, and future replacement.
(2) Establish an interim security policy at sites where systems do not operate as designed, cannot be repaired, or do not exist.
12 – Acquisition of Land & Floating Plant Equipment
(1) Propose standardized sizes and shapes of Corps plant assets.
(2) Draft recommended changes to ER 1130-2-500.
(3) Districts will provide contract administration (QA/QC) oversight of design/build contracts for standardized vessels and provide them to prospective offerors for design/build and best value supply contracts.
(4) Create basic size and shape drawings and simple specifications.
13 – Restructure the Plant Replacement & Improvement Program (PRIP)
(1) Implement Plant Increment Inflation Cost in lieu of the plant increment cost; investigate returing plant salvage value to owner; and revise ER 37-1-29 to allow plant owners to recoup trade in value for plant items and recoup salvage value of divested plant items when the GSA AXCESS Program is utilized.
(2) Assign a salvage value of 10% of original cost to all plant items.
(3) Allow plant owners to determine the *appropriate* useful life for plant items within established PRIP guidelines.
(4) Establish separate rental rates for plant actually in operation and plant not in operation but in transit for use by another Corps District, or in a standby status.
(5) Depreciation factor should not be included in the rental rate beyond the useful life of the plant.
(6) Raise the minor item threshold from $350K and increase the major item threshold to $3M.
(7) Modify ER 37-1-29 to facilitate the above six recommendations.
(8) Districts/regions should consider reducing the useful life term of plant items.
14 – Standardize Position Descriptions
(1) Develop standardized PDs and associated job titles for IMTS lock personnel and enter them into the FASCLASS database.
(2) Include cross-functional lock O&M activities in appropriate PDs (rather than separate O&M PDs)
(3) Reassign incumbents to the new standardized PDs when it does not affect their grade. If grade is affected hold action in abeyance until the position becomes vacant.
(4) If any of the standardized PDs include duties that require incumbent training, notify the union so that training requirements can be negotiated before processing reassignment.
(5) Have supervisors meet with each IMTS employee to discuss the new standard PDs and performance expectations.
15 – Regional/System Equipment Pool (Leased Equipment)
Develop ID/IQ contracts for regional use.
16 – Scheduling & Budgeting Major Maintenance
(1) Establish teams based on the Division model to schedule maintenance.
(2) Establish mandatory higher-level coordination teams to facilitate communication between Divisions and industry points of contact.

Summarized Improvements
(3) Coordinate maintenance schedules to minimize system unavailability.
(4) Develop a single risk-based ranking process for maintenance and budgeting utilizing the best facets of the existing Division models.
(5) Implement the standardized annual condition assessment process and the chosen risk-basked ranking process for maintenance items.
(6) Reconcile fleet and resource utilization based upon the final prioritization list.
(7) Address standardization of PDs to incorporate working conditions.
17 – Service Providers for Maintenance Projects
Establish ID/IQ contracts for river-related work, especially recurring work items.
18 – Optimize Shift Schedules
(1) Maximize the use of family-friendly, practical shifts for IMTS.
(2) Review shift schedules and practices for compliance with EM 385-1-1.
(3) Clearly state maximum shift duration in EM 385-1-1.
(4) Review schedules for compliance with circadian cycle best practices.
(5) Train new shift workers on circadian cycles.
19 – Standardize Staffing & Grade Structures
(1) Use the IMTS staffing guide as a best practice for operational (which includes minor maintenance) staffing at lock sties.
(2) Use the IMTS staffing guide as a best practice for maintenance staffing for lock sites, including on-site maintenance manpower or pooled manpower as locally determined.
(3) Develop a regional strategy for staffing and use of major maintenance facilities such as fleets, maintenance crews, and other activities.
(4) Ensure all districts comply with ER 5-1-11 and related Directorate of Civil Works white paper dated 1 Aug 05 requiring a standardized organization structure.
(5) Establish a process for reviewing all contracted IMTS O&M work.
(6) Once factual workload based models are developed, a link should be established to the Systems-Based Budgeting BPR to provide baseline budgets.
20 – Standardize Locking Procedures
(1) Review and standardize Navigation Notice #1 (blue book, red book, purple book) on an annual basis.
(2) Post all Navigation notices on unique or abnormal towing configurations or situations on one website accessible to all Navigation customers.
(3) Publish approved lockage Standard Operating Procedures (SOP) for each lock site.
(4) Standardize audible and visual signals for inland Navigation.
(5) Require that recreational vessels handle courtesy lines where available because of turbulence in the lock chamber.
(6) Require that recreational boaters handling and/or tending a line wear a life jacket at all times.
(7) Require that recreational vessels turn engines off when inside lock chamber.
(8) Require use of small boat chains with talk-back speaker on lock walls for recreational craft that do not have marine radios.
(9) Require the use of strobe lights to signal entry at lock sites with frequent recreational craft lockages.
(10) Implement the standard O&M National Uniform Program for Lock and Dam and maintenance employees.

Summarized Improvements
(11) Develop crew change policy at lock sites.
(12) Update Navigation Charts to improve consistency.
(13) Revise the production process for Navigation Charts.
(14) Publish public contact information.
(15) Update signage at lock sites to comply with National Sign Standards Manual.
(16) Require that all lock sites, where applicable, will have a visual, audible or electronic means to notify mariners that severe out draft conditions exist.
21 – Improved Alignment of Administrative Tasks
(1) Implement optimal ratios of supervisor/technical to administrative personnel to maximize man-hours spent on assigned duties.
(2) Provide administrative personnel with all appropriate permissions and authorities to perform duties.
22 – Improve Consistency in the Application of Drug Testing
(1) Standardize disciplinary actions following a positive test.
(2) Review and revise the positions list of employees designated for random drug testing (Testing Designated Position list) to ensure standardization across USACE of positions tested, and to ensure list includes positions with duties requiring testing.
(3) Review and revise the authority to perform non-random drug testing to be consistent with the current practices used by industry, customers, and USCG.
(4) Train supervisors.
(5) Develop standardized approach (or policy) when suspicion of intoxication is exhibited.
23 – System-Based Budgeting
(1) Define level of service for each project.
(2) Determine and fund, based on defined level of service, the baseline O&M activities for each project.
(3) Evaluate the Mississippi Valley Division/Lakes and Rivers Division major maintenance models and develop a hybrid model that could be applied to all regions.
(4) Develop a Business Case Model that demonstrates the efficiencies that could be gained by modifying O&M budgets to allow movement of funds based on the highest ROI and to fund execution year emergency situations that arise.
(5) Develop revised data for budget development purposes and minimize data collection.
24 – Implement 3-Phase Inspection System for Major Maintenance
(1) Provide local, formal training on the three-phase inspection to supervisors, engineers, and others involved in major maintenance activities.
(2) Assign a person (collateral duty) to be the QC manager for each major maintenance activity.
25 – Standardize Water Control Procedures
(1) Identify regions where opportunity exists to allow users to load additional commodities if river forecasts are improved and communicated.
(2) Develop a consistent approach to river forecasting within these regions, to allow for facilitation of problem solving and standardization.
(3) Standardize water control procedures (gate settings) within select river systems to maximize the benefits to the entire river system.
(4) Establish a lead district(s) to spear head set water control policies within a river system.

Summarized Improvements
(5) Lead District(s) champion buy-in for a regional system.
(6) Lead District(s) helps to establish policies to be used throughout the river system on evaluation of forecasts.
(7) Lead District(s) shall have a QA/QC mission within the river system.
(8) Lead District(s) shall be responsible for assembling a team from the districts with the river system (not every district needs to be represented, or representation can be on a rotating basis) to meet and advise the lead district(s) on policies.

Table II-5 Summarized Improvements by BPR Topic

System reliability as supported by the three pillars is the keystone required by USACE customers to support the Nation's waterborne infrastructure and the global markets it sustains. The following lists the benefits associated with the improvements under each of the pillars: Human Capital, Operations, and System Availability.

(1) Human Capital (11 topics):

BPR 3 - Enhance the Hiring Process:

Expedited recruitment;
Timely hiring:
Effective placement of skilled staff to ensure continuity of operations, maintenance, and repair services;
Improved accomplishment of major maintenance and repair; and
Expedited emergency response.

BPR 4 - Strengthen Leadership and Management:

Improved leadership skills for supervisors and managers; and
A strengthened workforce to achieve safe, efficient, reliable lockages and maintenance activities.

BPR 6 - Training and Certification for Lock Staff:

Uniform, well-trained staff to ensure consistent, safe lock operations and enhance career opportunities for the workforce.

BPR 7 - Augment Supervisory Skills at Locks and Field Offices:

Supervisors with the skills necessary to enhance management and employee relationships.

BPR 8 - Share IMTS Knowledge and Information:

Increased communication;
Improved public relations;
Enhanced internal exchange of information; and
Greater employee situational awareness.

BPR 10 - Enhance On-Site Supervision:

More on-site supervision;
Defined work leadership roles and authority; and
Improved span of control.

BPR 14 - Standardize Position Descriptions:

Uniform and consistent position descriptions for IMTS positions to facilitate employee mobility and career advancement.

BPR 18 - Optimize Shift Schedules:

Productive, cost-effective, and worker-friendly shift schedules to allow for more efficient and effective lock and dam O&M.

BPR 19 - Standardize Staffing and Grade Structure:

Savings from transferring work to in-house performance where business case demonstrates it is more advantageous to the government;
Enhanced human resources management by more efficiently matching workforce to workload; and
Enhanced ability of managers to effectively operate the facilities under their responsibility.

BPR 21 - Improved Alignment of Administrative Tasks:

Effective allocation of administrative, supervisory, and maintenance work to appropriate staff.

BPR 22 - Improve Consistency in the Application of Drug Testing Policies:

A safer workplace and a reduction in the risk of drug-related accidents.

(2) Operations (7 topics):

BPR 5 - Improve Level of Service:

Optimized hours of operation based upon usage patterns enhancing the ability to balance resources with system reliability.

BPR 11 - Physical Security at Locks and Dams:

Security systems that perform as designed and provide intended level of protection.

BPR 12 - Acquisition of Land and Floating Plant Equipment:

Reduced purchase costs for land and floating plant equipment through innovative acquisition strategies.

BPR 13 - Restructure the Plant Replacement and Improvement Program (PRIP):

Lower ownership costs of revolving fund assets.

BPR 20 - Standardize Locking Procedures:

Improved customer satisfaction through consistent procedures.

BPR 23 - Systems-Based Budgeting:

Enhanced investment decisions and a better "Return On Investment" from the funds;
Faster response time to emergencies due to greater flexibility in moving funds; and
Optimized construction schedules and better economies of scale.

BPR 25 - Standardize Water Control Procedures:

Increased opportunity for customers to move commodities through selected IMTS river systems.

(3) Systems Availability (7 topics):

BPR 1 - Share Corporate Knowledge of Major Maintenance:

Formalized use of regularly scheduled regional and national workshops to facilitate networking, the exchange of proven repair techniques (and unsuccessful repair techniques) that will maximize lock reliability, and build a knowledge base to share resources (equipment, materials, and personnel) to improve emergency repairs.

BPR 2 - Share Corporate Knowledge of Preventative Maintenance and Repair Procedures:

Improved networking and exchange of proven preventive maintenance (PM) and repair techniques to minimize lock unavailability (as well as learning about unsuccessful PM and repair techniques to avoid).

BPR 9 - NavLock Channel Maintenance:

Decreased acquisition timelines for environmental contracts;
Reduced volume of historic dredging locations through evolving technology; and
Improved sharing of survey information with the USCG.

BPR 15 - Regional/System Equipment Pool (Leased Equipment):

Savings, through economies of scale, by utilizing an alternative acquisition strategy; and
Faster access to leased equipment.

BPR 16 - Scheduling and Budgeting Major Maintenance:

Enhanced coordination of simultaneous closures;
Increased benefits to customers by prioritizing major maintenance activities; and
Increased return on investment through standardized condition assessment and risk-based ranking process (Asset Management).

BPR 17 - Service Providers for Maintenance Projects:

Reduced acquisition time through effective use of alternative procurement vehicles on a regional basis.

BPR 24 - Implement 3-Phase Inspection System for Major Maintenance:

Returning sites to service in less time and within budget;
Improved quality of repair; and
Less rework.

Each BPR includes a detailed project schedule that will commence at some point after the IMTS Board of Directors is established. The IMTS Board of Directors is discussed in Section III. Table II-6 shows the recommended phases of the implementation schedule. The schedule envisions implementation starting immediately after a Charter for the IMTS Board of Directors is signed.

Phase 1				Phase 2	
#	BPR Topic	#	BPR Topic	#	BPR Topic
1	Share Corporate Knowledge of Major Maintenance	11	Physical Security Procedures at Locks & Dams	9	NavLock Channel Maintenance
2	Share Corporate Knowledge of Preventative Maintenance and Repair Procedures	13	Restructure Plant Replacement & Improvement Program (PRIP)	12	Acquisition of Land & Floating Plant Equipment
3	Enhance the Hiring Process	14	Standardize Position Descriptions (PDs)	15	Regional/System Equipment Pool (Leased Equipment)
4	Strengthen Leadership & Management	16	Scheduling & Budgeting Major Maintenance	17	Service Providers for Maintenance Projects
5	Improve Level of Service	18	Optimize Shift Schedules	22	Improve Consistency in the Application of Drug Testing Policies
6	Training & Certification for Lock Staff	19	Standardize Staffing & Grade Structure	25	Standardize Water Control Procedures
7	Augment Supervisory Skills at Locks & Field Offices	20	Standardize Locking Procedures		
8	Share IMTS Knowledge & Information	21	Improved Alignment of Administrative Tasks		
10	Enhance On-Site Supervision	23	Systems-Based Budgeting		
		24	Implement 3-Phase Inspection System for Major Maintenance		

Table II-6 Recommended Implementation Schedule (listed in no order)

SECTION III - IMPLEMENTATION AND EXECUTION STRATEGY

This section of the report discusses how the improvements will be implemented. The purpose of this section of the report is to demonstrate to the reader that USACE intends to establish a formal oversight structure comprised of senior leaders supported by a day-to-day working group to implement the improvements and that a plan is in place to implement the improvements and monitor the results on an on-going basis. This part of the report is augmented by Appendix III consisting of one part: Inland Marine Transportation System (IMTS) Implementation Plan.

1.0 Inland Marine Transportation System Board of Directors

An IMTS Board of Directors (hereafter referred to as the Board) will oversee the implementation effort of the recommendations contained in this report. The Board is empowered to establish and implement USACE-wide Navigation policies and strategies. The Board will be assisted by an IMTS Working Group. IMTS Management Teams at the Division levels will assist in implementing the improvements across Districts (regions) and Divisions (Navigation Systems).

The Board is a change agent for incorporating the system-wide management of resource prioritization. District Commanders have a responsibility for mission execution within their districts, leveraging regional resources.

The Navigation System will continue to operate at its current capacity as the improvements are implemented. Waterway users, the public, and employees will be able to track implementation progress through the IMTS website.

1.1 Members

The Deputy Commanding General for Civil and Emergency Operations is the Board Chair. Board members are:

Commander, South Atlantic Division (SAD);

Commander, Great Lakes, and Ohio River Division (LRD);

Commander, Mississippi Valley Division (MVD);

Commander, Northwestern Division (NWD);

Commander, Southwestern Division (SWD); and

Chief of Operations, HQUSACE

1.2 Charter

The IMTS Board Charter from the Deputy Commanding General follows:

CHARTER

Inland Marine Transportation System Board of Directors

ESTABLISHMENT

The Inland Marine Transportation System (hereafter IMTS) Board of Directors (hereafter "Board") is hereby established for the purpose of integrating the execution of the IMTS Implementation Plan and for other purposes as the Deputy Commanding General and Director of Civil and Emergency Operations may deem appropriate.

MEMBERS

The Deputy Commanding General for Civil and Emergency Operations shall Chair the Board

The members of the IMTS Board are –

Commander, South Atlantic Division (SAD),

Commander, Lakes and Rivers Division (LRD),

Commander, Mississippi Valley Division (MVD)

Commander, Northwestern Division (NWD)

Commander, Southwestern Division (SWD)

Chief of Operations, HQUSACE

NON-VOTING MEMBERS

The Chair may appoint members of his staff to serve as advisors.

The Strategic Sourcing Program Manager shall:

(1) Serve as a permanent advisor to the Board on issues of general interest to the Office of the Assistant Secretary of the Army for Civil Works, Office of Management and Budget, Department of Defense, and Department of the Army as such issues relate to the historical purpose behind the establishment of this Board and for purposes of reporting the progress in implementing the results emanating from that original purpose.

(2) Serve as staff assistant to the Chair for purposes of integrating information into the Implementation Plan that warrant documentation.

(3) Track actions assigned by the Board to staff principals for action and report on their status to the Chair.

The Office of Counsel, Directorate of Human Resources, Directorate of Contracting, Directorate of Corporate Information, Directorate of Logistics, and Office of Public Affairs shall designate a senior member of their staff to serve as a Point of Contact (POC) for the Board. The POCs shall:

(1) Ensure that Headquarters, Division, and District staff from their principal area of responsibility are aware of the plan implementation effort and provide such support in implementing the improvements as is necessary for the success of that effort consistent with Public Law and higher authority policies.

(2) Promptly coordinate with Department of the Defense and/or Department of the Army staff principals in their respective areas to pursue decisions on waivers to policy and/or procedures that may be necessary to implement the improvements and shall keep the Board informed on their progress.

AUTHORITY

The Board shall appoint, in writing thropugh Division Commanders, members to serve as the Working Group of the Board.

The Board shall monitor execution and review/approve Working Group recommendations and products.

The Board shall charge the Working Group with day-to-day responsibility for managing and executing the plan. The Working Group may appoint Process Action Teams (PATs) with a finite lifespan to focus on IMTS issues. With the approval of the Board, the Working Group may establish permanent Collaborative Action Teams (CATs) as needed to address specific cross-divisional issues. These teams may support the Division level effort.

The Board may establish standing committees on matters it sees fit and the standing committees will report directly to the Board.

The Board shall convene at least quarterly either in-person or via video conference or telephonically to carry out its responsibilities.

WORKING GROUP

The Working Group shall function as representatives of the Board from Divisions with a Navigation mission.

The Working Group team members are non-voting members of the Board.

The Working Group may set up PATs consisting of Operations Chiefs, Operations Managers, Lockmasters, and others, as needed. In establishing such PATs the Working Group shall coordinate with the District and Division Commanders in the selection of team members.

With the approval of the Board, the Working Group may establish CATs. In establishing such CATs the Working Group shall coordinate with the District and Division Commanders in the selection of team members.

The Working Group shall report on the status of plan implementation at least quarterly when the Board convenes. Such reports may be made via teleconference or telephonically, as appropriate.

2.0 Working Group

The Working Group is the executive agent of the Board and is comprised of staff from Divisions with a Navigation mission. The Working Group reports directly to the Board.

2.1 Composition

The Working Group will include Navigation subject matter experts that represent each of the Division Commanders and the Navigation Business Line Manager. In addition, a representative of the North Atlantic Division (NAD) will serve on the Working Group. To give the appropriate cross-section of skills on the working group, there will be an at-large member from each of the five Navigation divisions; the nomination of these members will be coordinated to ensure an adequate and appropriate cross-section of operation skills and experience. It is imperative that At-large members shall represent all aspects of the O&M community (for example, lock masters, repair center managers, operations project managers, etc). Composition of the Working Group will include:

SAD Representative + At-large member;

LRD Representative + At-large member;

MVD Representative + At-large member;

NWD Representative + At-large member;

SWD Representative + At-large member;

Navigation Business Line Manager, HQUSACE; and

NAD Representative.

2.2 Responsibilities

Consistent with the Charter, the Working Group responsibilities include:

(1) Establishing National PATs and CATs including their roles and responsibilities;

(2) Recommending actions to the Board for approval and implementation;

(3) Recommending implementation of PAT results at the Division level which do not require approval of the Board;

(4) Working with National level Customers and Partners;

(5) Monitoring the status of IMTS implementation and performance;

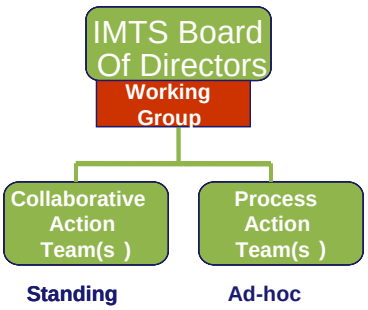
(6) Selecting a Working Group Team Leader and deciding the procedures for rotating this position (the Working Group Team Leader coordinates the administrative support for the Working Group);

(7) Establishing regional CATs across Division borders for inter-divisional systems (for example, Gulf Intracoastal Waterway); and

(8) Reporting to the Board on the status of plan implementation at least quarterly.

3.0 Integration with Divisions

Most of the improvements require more than one action associated with their implementation. The Implementation Plan (Appendix III) describes the actions and the levels of involvement it will take to implement them to include the Board, Working Group, PATs, CATs, and Division Management Teams. It is important to note that this horizontal linkage at the Division or regional level is for the purpose of carrying out Board/Working Group/PAT/CAT responsibilities.



It is envisioned that this approach will enhance teamwork on some (but not all) of the IMTS-related decisions made by Chiefs of Operations. In carrying out this approach, Chiefs of Operations will continue to make routine, day-to-day decisions in their areas of responsibility. The expected outcome is that those routine, day-to-day decisions in the areas of responsibility of the Chief of Operations will be enhanced and informed by the vertical and horizontal linkage.

3.1 Process Action Teams

As permitted by the Charter, the Working Group may set up PATs consisting of Operations Chiefs, Operations Managers, Lockmasters, and others, as needed. The PATs will focus on IMTS issues and have a finite lifespan. In establishing such PATs the Working Group shall request representation from Division and District Commanders.

Chart III-1 illustrates the process for horizontal integration of the Board and Working Group with Division PATs.

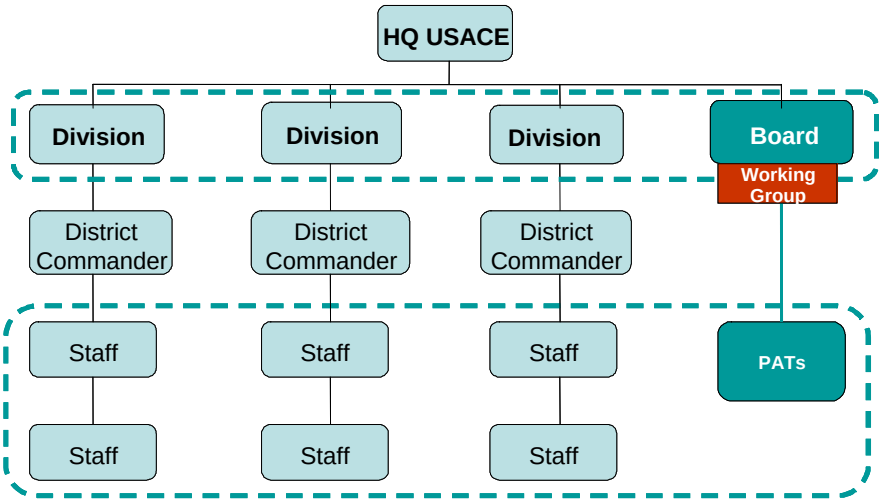


Chart III-1 Integration of PATs at Division Level

3.2 Collaborative Action Teams

As permitted by the Charter, and with the approval of the Board, the Working Group may establish CATs as need to address specific cross-divisional issues. The CATs are permanent teams that address continuing IMTS issues. In establishing CATs, the Working Group shall request representation from Division and District Commanders.

Recommended CATs include; Navigation Strategic Planning, Asset Management, Budget Engineering Circular Development and Process Improvements, Collecting Best Practices, and Managing National Metrics (QA/QC).

The Working Group will also establish CATs as needed to addresses specific cross divisional issues. These teams may support the Division level effort. An example is a Gulf Intracoastal Waterway (GIWW) team to address cross-divisional Navigational issues.

3.3 Division Management Teams

Similar to existing teams within a Division, IMTS Management Teams will be established. The management activities for the IMTS at the regional level will be built around this existing model. An IMTS Management Team (regional) will be formed for each Navigation Division.

(1) Establish regional IMTS Management Teams within a Division (McClellan Kerr, Upper Miss/Ill, etc.) as shown in Chart III-2;

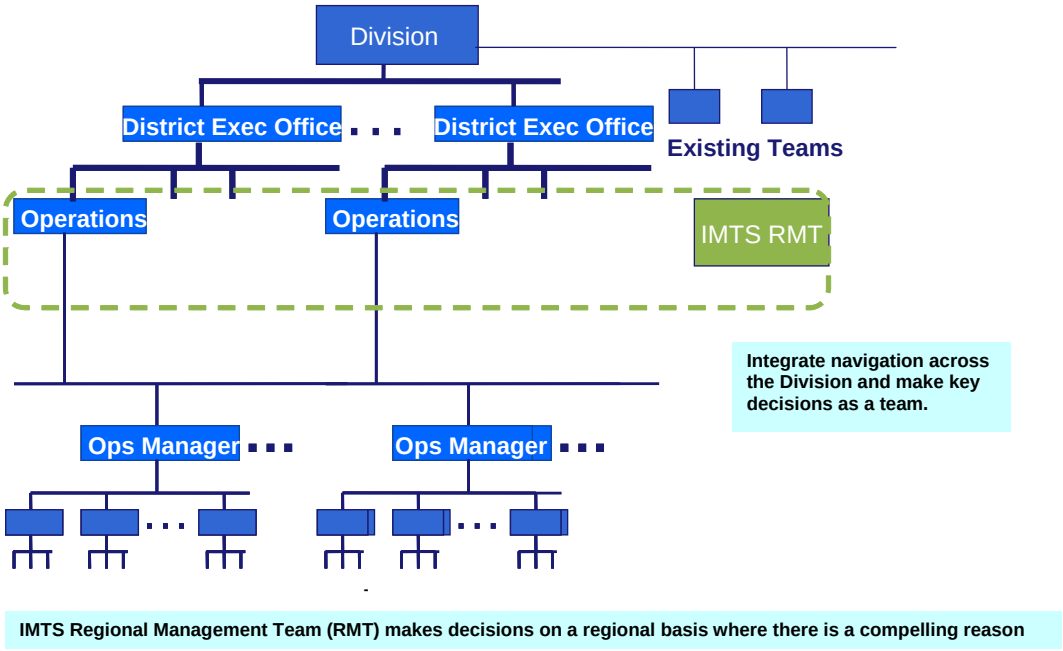


Chart III-2 IMTS Management Team (Regional) Concept

Composition

(1) District Representative(s) from each District in the Division;

(2) District Operations Chief; and

(3) Division Navigation Business Line Manager

Responsibilities

(1) Report to their Division;

(2) Coordinate with the Working Group;

(3) Nominate Division representatives to Working Group for approval by Division commander;

(4) Implement IMTS Board recommendations in the Division;

(5) Establish Division IMTS PATs on local issues;

(6) Recommend local issues for National standardization PAT; and

(8) Establish Navigation System IMTS Management Teams (Gulf Intracoastal Waterway [GIWW], Upper Miss/Ill-Ohio, Cumberland-Tennessee-TennTom, etc.) for which another Division is the lead;

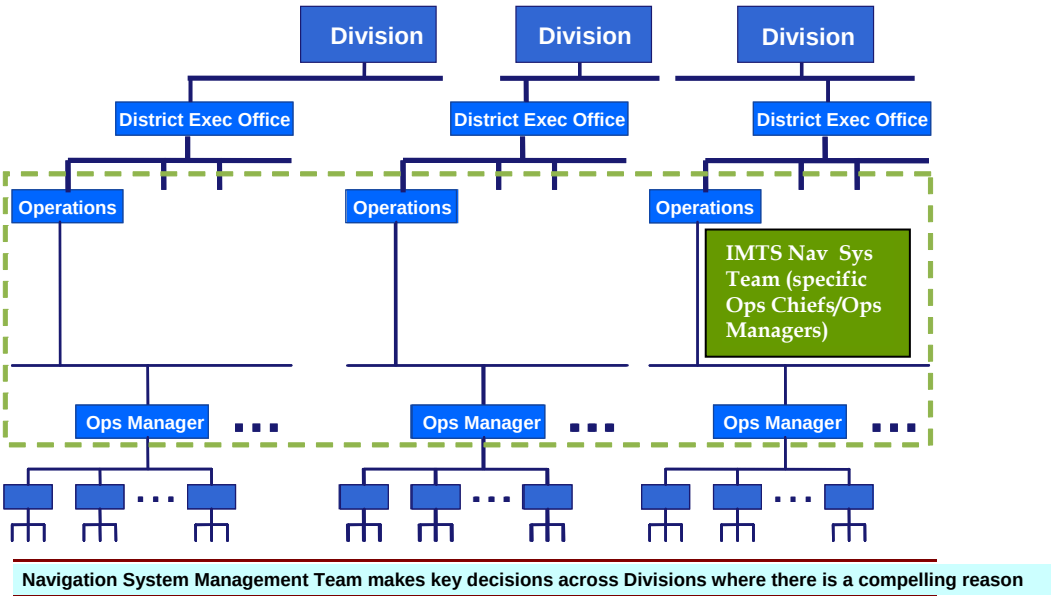


Chart III-3 IMTS Management Team (Navigation System) Concept

(9) Provide at-large representatives of the Division to the Working Group and representatives to PATs/CATs. At-large representatives are to be coordinated with other Divisions to ensure appropriate cross-section of skills; and

(10) Work with Regional Customers and Stakeholders.

(11) Work with Districts to ensure Operations Project Managers are empowered to lead teams making funding recommendations in accordance with the established navigation mission goals and objectives.

SECTION IV - PERFORMANCE MEASUREMENT

The purpose of this section is to enable the reader to understand internal and external performance measures and metrics and how the internal Baseline Operating Objectives are intended to support the Directorate of Civil Works performance measurements and OMB criteria. This section is augmented by Appendix IV consisting of two parts: Part A – Office of Management and Budget Criteria and Part B – EC 11-2-193.

1.0 Relationship of BPR Improvements to Internal and External Criteria

The BPR identified improvements that support both internal and external performance measurement. The following diagram shows this relationship.

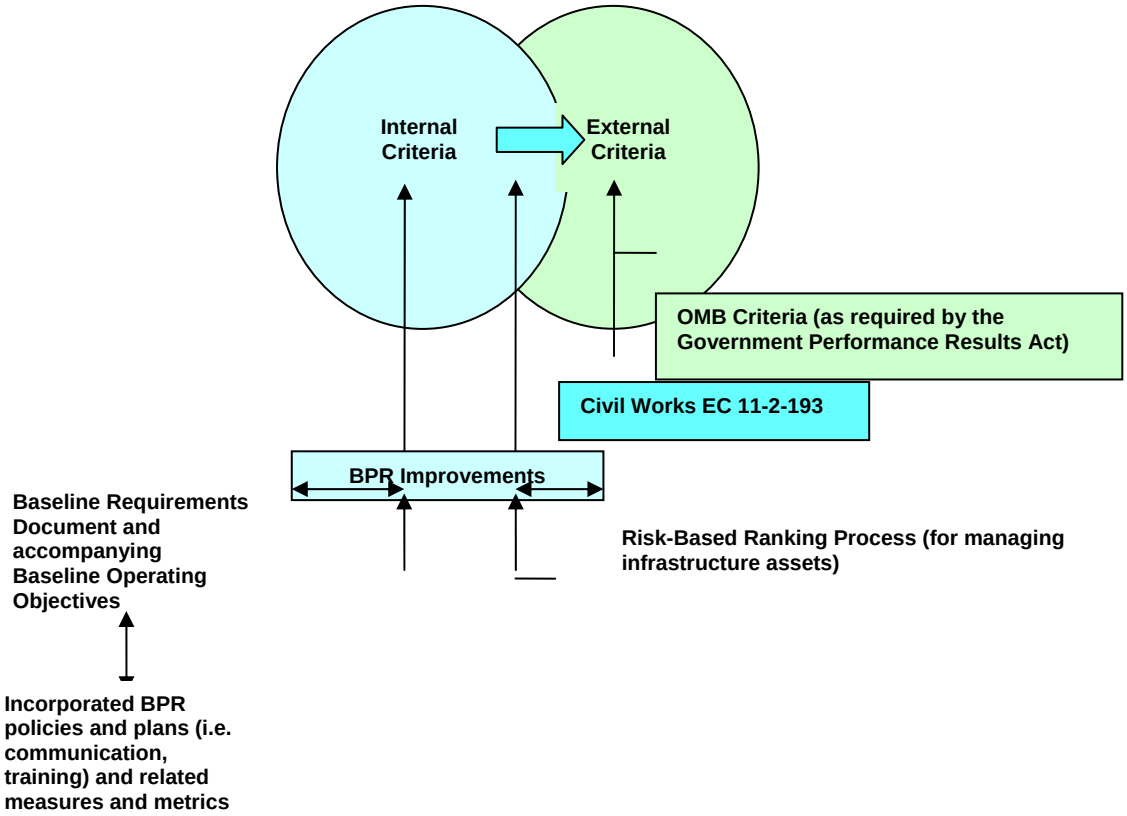


Diagram IV-1 Internal and External Performance Measurement

The BPR identified and expanded on a best practice for measuring system performance. The platform adopted by the Board will support and enhance the current asset condition and impacts guidance in EC 11-2-193 and provide information to respond to external OMB criteria.

The Baseline Operating Objectives in the Baseline Requirements Document (Appendix II, Part A) contains internal performance measurement criteria. The BPR Topic-related

improvements are intended to enable the IMTS to facilitate meeting these requirements. The Baseline Requirements Document is a "living document" and the Baseline Operating Objectives which are a part of that document will be updated to continuously reflect improvements as they are identified and implemented.

2.0 External Criteria

USACE must respond to OMB for purposes of Public Law 103-62, *Government Performance Results Act of 1993*, (GPRA) which requires strategic planning and performance measurement.[34] GPRA requires that annual plans must establish performance goals to be achieved by a program; express such goals in objective, quantifiable, and measurable form (unless otherwise authorized); establish performance indicators to assess relevant outputs, service levels, and outcomes by each program activity; provide a basis for comparing actual program results against performance goals; and describe the means used to verify and validate measured values.

2.1 OMB Criteria

The criteria USACE is discussing with OMB are addressed in Appendix IV, Part A – OMB Criteria. These criteria have yet to receive OMB approval. The proposed criteria include programmatic and internal tracking measures:

(1) Segment availability based on the number of instances where a mechanical driven failure or shoaling resulting in the closure of all or part of a high or moderate commercial use segment for over 24 hours or closures in excess of one week;

(2) Percent of high commercial use segments with sufficient preventative maintenance to achieve a good service level.[35]

(3) Total O&M funds expended per segment ton-mile averaged over a five-year period, including rehabilitations.

(4) Percent of funding to construct and expand projects that are allocated to high return investments.

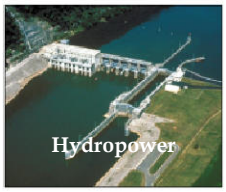
[34] http://www.sc.doe.gov/bes/archives/plans/GPRA_PL103-62_03AUG93.pdf
[35] "Good Service Level" will be based on discussions with stakeholders.

2.2 USACE Criteria to Support External Criteria Requirements

Hartwell Dam & Lake

The budget guidance in EC 11-2-193 (hereafter referred to as the Circular) *"is to ensure the development of convincing budget rationale and justification for the budget request."* Toward this end the Circular adopts a *"nationwide perspective . . . to assure that available funding provides the greatest public benefit for the investment."*[36] This guidance is consistent with the GPRA objectives which require strategic planning and performance measurement. EC 11-2-193 (Program Development Guidance, 12 May 08) provides guidance for the development and submission of the civil works budget for Fiscal Year 2009. [37] Among other things, the Circular will enable USACE to link internal civil works mission performance measures with the externally driven OMB performance measures as shown earlier in Diagram IV-1.

Building on the Civil Works Strategic Plan, the guidance in the Circular addresses eight civil works business lines:[38]



Recreation

Regulatory

[36] EC 11-2-193, Appendix V (draft), paragraph V-4.
[37] See Appendix IV, Part B – EC 11-2-193, Appendix V – Navigation.
[38] Note that EC 11-2-193 does not include Support for Others as one of the eight civil works business lines as this activity is not funded through the civil works program budget but is separately reimbursed.

Appendix V of the Circular addresses Navigation. Table V-1 of the Circular displays the Navigation Program objectives and the performance measures published in the Civil Works Strategic Plan. A copy of the table from the Circular follows.

Program Objectives	Performance Measures
Obj.1: Invest in navigation infrastructure when the benefits exceed the costs.	- BCR (project specific measure) - Annual net benefits
Obj. 2: Support sustainable regional, basin-wide, or watershed planning and activities in partnership with others.	- Percent of projects recommended in Chief's reports that apply watershed principles
Obj. 3: Enhance Life-Cycle Infrastructure Management. Improve the reliability of water resources infrastructure using a risk informed asset management strategy.	- Percent of navigation asset inventory with recent structural/operational risk assessments, including SPRA assessments. - Percent of navigation asset inventory risk assessments that reveal a significant level of risk (including DSAC Class I, II and III projects). - Number of funded actions underway that address assets where there is a significant level of risk.
Obj. 4: Operate and manage the navigation infrastructure so as to maintain justified levels of service in terms of the availability to commercial traffic of high-use navigation infrastructure (waterways, harbors, channels).	- Risk and Reliability: Facility Condition Assessment and Impacts

Table IV-1 Navigation Program Objectives and Performance Measures (Table V-1 in the Circular)

Because *"Over half of all inland navigation projects have or will soon exceed their original 50-year design life . . . the Corps must pursue an on-going program to rehabilitate, modify, or replace structures and components, and maintain channels exhibiting a deteriorating ability to meet system demands."* Accordingly, the Circular depicts the strategies shown in the Table IV-2 for the Program Year (PY).

Budget Strategy	Ranking Criteria
Keep ongoing studies or PEDs going if likely to produce recommendation for project (I) or start new phase of studies or PED (I)	Date of Agreement – executed or expected Commercial tonnage increase % reduction in delay costs Years to complete Watershed study –y/n Benefit to Cost Ratio (BCR) – PED only
Complete ongoing construction to start getting benefits of high performing navigation projects (each contract should be separate line item) (C)	BCR Other purpose outputs by BL
Initiate and complete replacements and rehabilitations (each contract should be separate line item) (C and O&M)	Inland Waterways Users Board priority Relative risk of failure BCR Years to complete
Initiate and complete dam safety assurance/ seepage control/static instability correction projects (C)	Relative risk of failure – risk compared to other Corps dams (portfolio risk assessment if available in PY) Critical loss of pool and /or navigation Other purpose outputs by BL
Operations - Assure that projects perform as designed (O&M)	Cumulative benefits Cumulative O&M costs for above benefits (over set time period)
Maintenance - Make sure projects are safe to operate (managing risk) (O&M)	Navigation channel availability Lock closures exceeding 24 hours duration due to mechanical failure – scheduled and unscheduled Condition assessment and consequences/impact Cumulative benefits Cumulative O&M costs for above benefits (over set time period)
Fund adequate data collection (Remaining Items, I, C, O&M)	Consequence of inadequate data

Legend: I – Investigations, C – Construction, O&M – Operations & Maintenance, PED – Planning, Engineering, Design, BCR – Benefit Cost Ratio, BL – Business Line

Table IV-2 Navigation Budget Performance Measures (Table V-2 in the Circular)

The guidance in the Circular takes a systems approach so that *"each project/segment will be considered when developing the Civil Works program."* This systems approach is aimed at ensuring *"that investments are integrated into a whole that preserves or enhances performance at the system level."* The systems approach also facilitates the implementation of the goals in the Strategic Plan. With respect to IMTS, this approach will assist decision makers in determining the mix in the PY of investments in maintenance, operations improvements, replacements and rehabilitations, new construction, planning, and design that will maximize system efficiency, safety, and reliability over time.

Paragraph V-6 of the Circular indicates that, *"From the National Navigation Performance Metrics workshops and regional stakeholders' conferences, contributions from Stakeholders and Corps leaderships were derived to help from the Navigation program performance-based budgeting concept."* The *"key themes"* derived from Navigation System users included: *reliability improvements, risk reduction, linking investments to underpinning the national economy, durability of Navigation systems, Navigation systems responsiveness to International trade growth, and justified efficiency improvements in Navigation."* According, the Corps *"will work with appropriate local/regional partners and stakeholder to develop a Five-Year Management Plan"* for respective projects. Budget increments *"to assure uniformity across the country in building annual budgets form the same point"* will be adopted to achieve the objectives. The increment process is discussed in paragraph V-7 of the Circular.

2.3 Conceptual Approach for Measuring System Performance

The BPR Team identified a best practice for measuring system performance and will discuss this with the Board. The platform adopted by the Board will support and enhance the current asset condition and will impact future guidance in the Circular by providing information to respond to external OMB criteria. The following discusses the proposed concept.

System Reliability

System Reliability is a primary Navigation goal that has significant commercial implications regarding the continuous flow of river traffic. The Board may elect to explore a method for establishing performance measures for river systems based on the concept that performance is directly related to activities accomplished that *minimize risks to system reliability*. The BPR Team examined options for measuring system reliability. The team concluded that by aggregating key performance metrics at the site level, then further at the river subsystem (segment) and the overall river system level, an effective summary display of performance can be achieved. Consistent with the OMB Performance Assessment Rating Tool (PART) Document, this approach provides a method for developing performance measures for the IMTS.

The IMTS Challenge

Many facets ranging from users and stakeholders to funding and system management converge to affect operation of the IMTS as shown in Figure IV-1. Although the emerging IMTS and its improved processes should help to streamline current operations, proof of performance is vested in measures that define System Reliability.

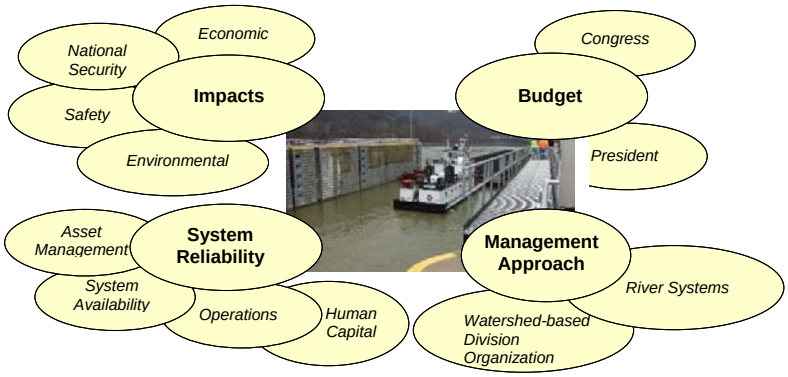


Figure IV-1 Multiple Facets of IMTS

IMTS Performance Measurement Concept

System condition and system operation are two primary measures that can account for system performance. The two elements (system condition and system operations) depicted in Figure IV-2 show sample performance elements that combine to define system performance.

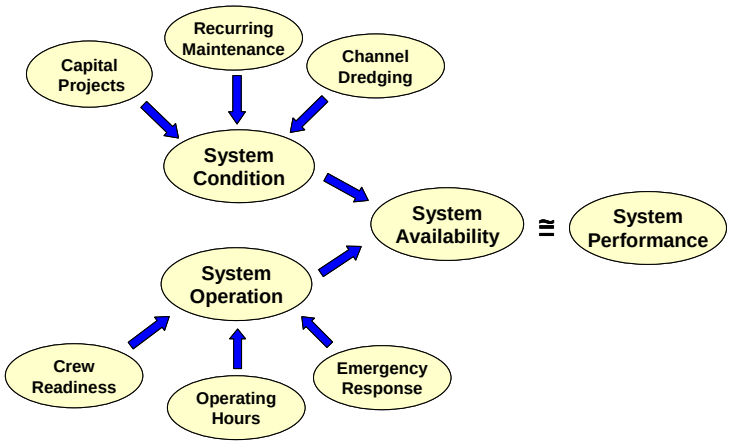


Figure IV-2 System Condition & System Operation Performance Area

Although some of the supporting elements, such as recurring maintenance, could be interchanged, i.e. supporting either System Condition or System Operation, that is less important than understanding the nature of the contribution to system reliability (analogous to system performance).

Of greatest importance is the recognition that system condition must be defined and measured using techniques such as the Facility Condition Assessment methodology developed by the Great Lakes and Ohio River Division (LRD). This method has many

of the characteristics common to the Facility Condition Index (FCI), a metric widely used by the real property industry for comparing property condition. These condition metrics provide a framework for comparing assets and enable property owners to establish targets for investing in property to sustain condition at an appropriate level.

System operation and its family of performance measures also impact system reliability. Many system operation performance measures have been incorporated into daily USACE civil works operations for years. Utilization measures, such as number of lockages and types of vessel data have been standardized as key metrics. Lock availability (or unavailability) and number of vessels are examples of traffic and utilization data. Response time for emergencies and elements that define crew readiness are performance areas that measure system operation.

Figure IV-3 illustrates some typical metrics associated with both system condition and system operation. These are not all inclusive, and may not be the most critical metrics, but they serve to demonstrate that overall system performance is dependent on the individual metrics associated with each lock and dam site and the adjacent channels. The three "outcome metrics" to the right area of the chart are used to define system performance and are typically the metrics of greatest interest to waterway users, especially those who depend on the river for transporting commodities, such as grain, coal, and chemicals.

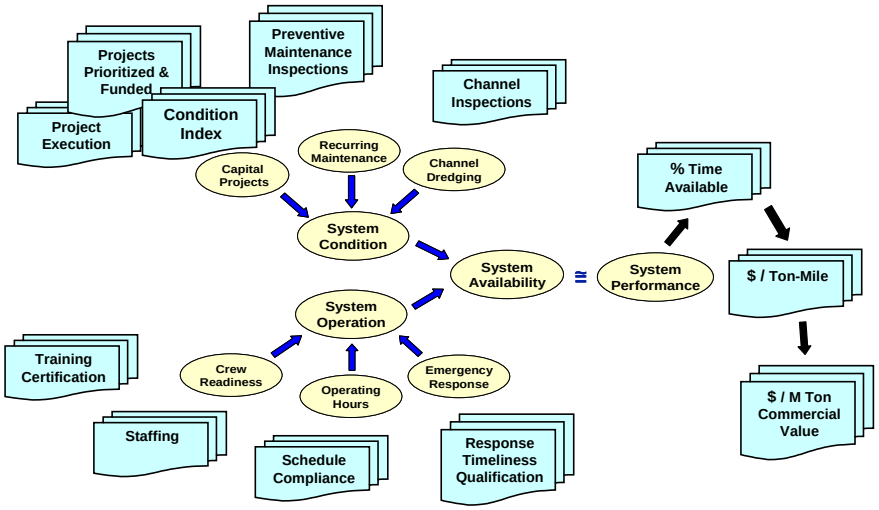


Figure IV-3 System Performance Measures

System Performance Summary

Because of the radical differences between condition metrics and the operation metrics, the approach to summarizing system performance keeps these two families of metrics separate. This is appropriate for a few important reasons:

(1) System condition is highly dependent on facility age and success in maintaining and recapitalizing facilities to sustain condition.

(2) Capital projects, including major maintenance and major repairs are funded from sources separate from operation funds, such as trust funds. Funding decisions for capital projects are not always within USACE control.

(3) The system's operation performance is dependent on an ongoing series of annual preventative maintenance processes. Operation and maintenance funding levels that support operations performance, if not sustained, can have an equally severe impact on overall system performance.

In order to develop summary performance measures for both the system operation and system condition families of metrics, the BPR Team proposes using a series of weights that define the relative contribution of each measure to system performance. Weights can be determined using techniques such as Expert Choice or similar Requirements Documents that capture, through analytical hierarchical processes, the judgments of experienced practitioners. The contributions of each set of performance metrics are then folded into a summary index that becomes a valid measure for the system. The following figure illustrates a notional operation performance summary using four selected performance metrics. The chart at the right in Figure IV-4 illustrates a conceptual scoring range for the Operation Performance Summary (Notional).

Performance Area	Relative Weight	Target Score	Actual Score	Weighted Score
Factor 1	0.3	100	78	23.4
Factor 2	0.15	100	85	12.75
Factor 3	0.55	100	83	45.65
Factor 4	1.0	100		81.80

Scoring Range	Performance Rating
85 - 100	Acceptable
73 - 85	Marginal
< 73	Poor

Figure IV-4 Notional Operation Performance Summary

Condition Performance Summary Illustration

To illustrate a condition performance summary, Figure IV-5 uses the facility condition index (FCI) to demonstrate how this metric could be adapted for use in the summary condition performance. The Lock and Dam (L&D) Facilities and Target columns illustrate the percent of facilities currently in each category, and those targeted for a future fiscal year, given programmed funding levels.

Rating	FCI Range	L&D Facilities (%)	USACE L&D Target– Future Fiscal Years
Acceptable	0-10	25%	52%
Marginal	11-25	40%	23%
Poor	>25	35%	20%

Figure IV-5 Condition Performance Summary (Notional)

To complete the summary performance metrics, the BPR Team chose the triangle convention shown in Figure IV-6. The inverted triangle represents the asset condition summary and the upright triangle depicts the operation condition summary.

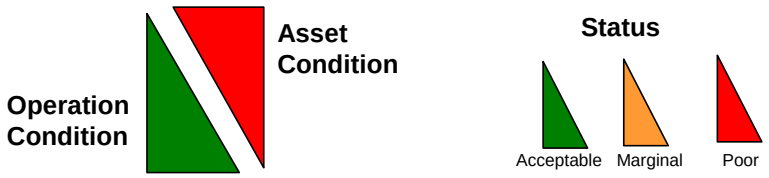


Figure IV-6 Performance Notation

Traffic volume for each system component must be incorporated into the development of overall system performance metrics. Traffic volumes across lock and dam sites can be grouped into the three classifications shown in Figure IV-7.

Class	Annual Lockages
A	> x
B	x - y
C	< y

Figure IV-7 Lock and Dam Site Volume Classification

Figure IV-8 illustrates a river system (Ohio River and its tributaries). The above lock and dam classification is applied to each lock and dam site indicated by the symbol . The sample performance metrics shown in the figure below illustrate the types of metrics that can be included in system summary performance metrics. The IMTS goals are notional, but illustrate the types of goals that must be established to meet system performance standards.

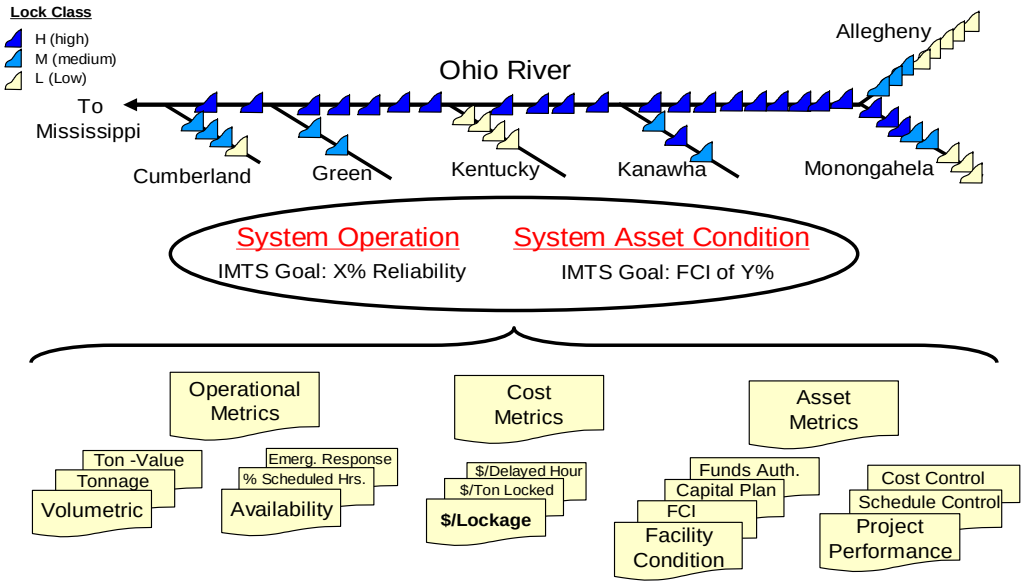


Figure IV-8 Conceptual Model System-wide Performance Indicators

Figure IV-9 displays the Great Lakes and Ohio River Division portion of the Ohio River system, including its subsystem segments and tributaries. The figure illustrates how performance measures at individual lock and dam sites roll up to subsystems (segments) and overall river systems. By applying the same concept of relative weights for performance measures and weights to site volume classifications, the performance across an array of sites, segments, and systems can be illustrated. Such system displays can be further automated to permit drilling down to separate performance measures at each site.

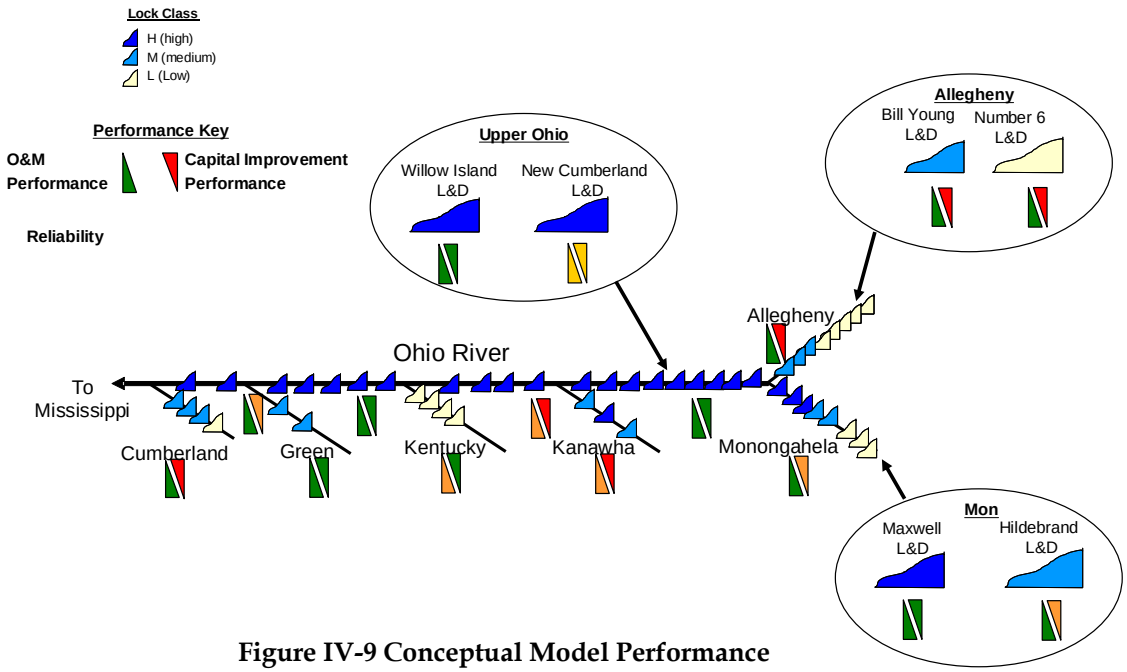


Figure IV-9 Conceptual Model Performance Summary Roll Up

Performance Goals

The Board may elect to establish system performance goals – both near term and long-term – and monitor system performance. Those goals can be different for each class of lock and dam, channel and river segment. Similarly, the elements of project programs and risk management can be folded into the overall performance system approach. The following figure illustrates some of these expanded concepts such as a display of the data associated with Minimum Percent Availability Target information, Project Plan and Prioritization, and Risk Management for PY budget development and/or GPRA reporting to OMB.

Figure IV-10 illustrates how the IMTS may track system availability. This performance measure would likely be grouped by river system class. Currently, USACE categorizes its river system metrics into 3 groups based on vessel traffic volume. This helps communicate the impact of availability on the local, regional, and national economy.

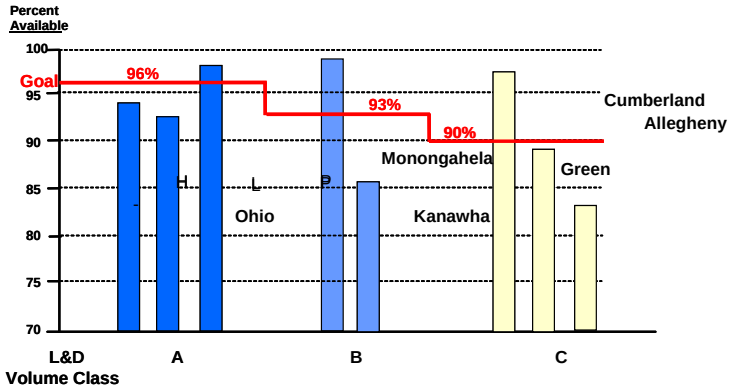


Figure IV-10 Minimum Percent Availability

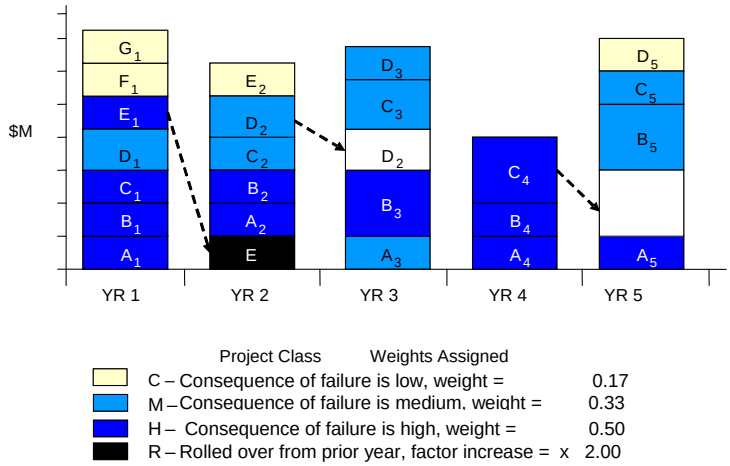


Figure IV-11 Project Plan and Prioritization

In addition to tracking System availability, the IMTS could track critical metrics and components that may drive system reliability. Figure IV-11 provides an example of how the IMTS might track major maintenance and rehab projects. Color codes and shades could be used to identify projects that support the 3 classes of river systems. Additionally, this graphic could identify projects that might be delayed and the reasons for delay. Eventually, this would help the IMTS understand the potential impacts of these projects schedules on system availability.

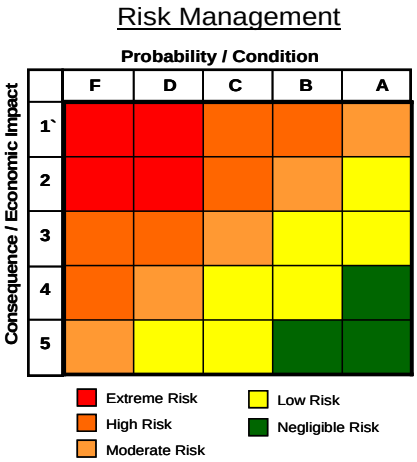


Figure IV-12 represents the USACE Risk Management metric which the IMTS could adopt to track the impacts of lock asset condition and the consequence/ economic impacts. USACE currently tracks this Risk Management matrix and provides updates to OMB and other stakeholders. The IMTS could augment this matrix with other metrics to begin to develop a cause and effect relationship that would help to identify and improve specific causes of unreliability.

Figure IV-12 Risk Management

Performance Measurement Dashboard

As shown in Figure IV-13, the foregoing measurement concepts can be combined into a comprehensive system of "dashboard metrics" once the individual metrics and their respective weights are determined.

Figure IV-13 Performance Measurement Dashboard Displays

Summary

In summary, most of these metrics are not new to USACE. Many currently exist in different forms and have been applied to varying degrees across the IMTS. The immediate challenge is to define those of greatest importance that contribute to system availability, and then to combine those through a series of weight determinations in order to produce the roll up summaries and their respective contributions to output measures.

3.0 Internal Performance Measurement

The IMTS will track the drivers or causes affecting reliability. Several IMTS BPR topics address improvements impacting reliability (for example: BPR 16 - Scheduling and Budgeting Major Maintenance). The following drivers may eventually be included in the overall IMTS performance measures:

(1) Asset condition;

(2) Unscheduled lock outages; and

(3) Channel operation conditions.

3.1 Lock and Channel Availability

Lock and Channel availability drive system reliability. IMTS commercial users are most concerned with unscheduled closures (unavailability). The Working Group will obtain approval from the Board to establish a National Measures CAT. This CAT will collect information on additional metrics that provide information on the Navigation components in order to demonstrate improved IMTS reliability.

The Human Capital, Operations, and System Availability pillars are all linked to the reliability of locks and channels.

3.2 System Reliability

System reliability is the measure the IMTS will use to track performance. Per EC 11-2-193, reliability will be measured by the following:

(1) Segment availability based on the number of instances where a mechanical driven failure or shoaling resulting in the closure of all or part of a high or moderate commercial use segment for over 24 hours or closures in excess of one week.

(2) Percent of high commercial use segments with sufficient preventative maintenance to achieve a *good service level*.[39]

3.3 Baseline Operating Objectives

The IMTS Baseline Requirements Document recognizes that the Navigation System is composed of multiple river systems, including river lock structures, dam structures, and channels, that must work as a system to optimize the waterways for commercial

[39] "Good Service Level" will be based on discussions with stakeholders.

transportation. The Baseline Requirements Document describes the functions that must be performed to operate and maintain the Navigation locks and dams.

Table IV-3 shows the relationship between the BPR improvements and the Baseline Requirements Document. The table constitutes Technical Exhibit 7 in the Baseline Requirements Document. As the improvements are implemented and where Quality Control (QC) requirements are identified these will be added to the Baseline Requirements Document as Technical Exhibit (TE) 4, Appendix II, currently labeled Reserved.

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
C.5.1	**Operate Lock**	IMTS will operate locks in accordance with appropriations, annual authorization, Army and Engineer regulations, and policy and technical guidance. Lockages will be performed on demand or on schedule in accordance with priorities defined in TE-2, 2006 Lock Hours of Operation & Percent Availability of Lock Chamber. Queued vessels will transit the locks in accordance with established procedures and standards.	3	Enhance the Hiring Process	(1) Expedited recruitment (2) Timely hiring (3) Effective placement of skilled staff to ensure continuity of operations, maintenance, and repair services. (4) Improved accomplishment of major maintenance & repair (5) Expedited emergency response
			4	Strengthen Leadership & Management	(1) Improved leadership skills for supervisors and managers (2) A strengthened workforce to achieve safe, efficient, reliable lockages and maintenance activtities
			5	Improve Level of Service	Optimized hours of operation based upon usage patterrns enhancing the ability to balance resources with system reliability
			6	Training & Certification for Lock Staff	Uniform, well-trained staff to ensure consistent, safe lock operations and enhance career opportunities for the workforce
			8	Share IMTS Knowledge & Information	(1) Increased communication (2) Improved public relations (3) Enhanced internal exchange of information (4) Greater employee situational awareness
			14	Standardize Position Descriptions	Uniform & consistent position descriptions for IMTS positions to facilitate employee mobility & career advancement

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
			18	Optimize Shift Schedules	Productive, cost-effective, and worker-friendly shift schedules to allow for more efficient & effective lock & dam O&M
			19	Standardize Staffing & Grade Structure	(1) Savings from transferring work to in-house performance where business case demonstrates it is more advantageous to the government (2) Enhanced human resources management by more efficiently matching workforce to workload (3) Enhanced ability of managers to effectively operate the facilities under their responsibilitity
			20	Standardize Locking Procedures	Improved customer satifaction through consistent procedures
			23	Systems-Based Budgeting	(1) Ehanced investment decisions & a better "Return On Investment" from the funds (2) Faster response time to emergencies due to greater flexibility in moving funds (3) Optimized construction schedules & better economies of scale
C.5.2	**Operate Dam**	Effective dam operations are needed to meet IMTS reliability and flood control expectations in accordance with appropriations, authorization,	6	Training & Certification for Lock Staff	Uniform, well-trained staff to ensure consistent, safe lock operations and enhance career opportunities for the workforce

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
		Army and Engineer regulations, and policy and technical guidance. Dam operations include all activities associated with the operation of a Navigation dam structure and associated facilities and equipment. These dams release water through the operation of spillway gates and other outlet works, flood control, and maintenance of a Navigation pool. Respond to inquiries from users and the public regarding pool level and flow conditions, particularly during high- and low-water conditions or events.	8	Share IMTS Knowledge & Information	(1) Increased communication (2) Improved public relations (3) Enhanced internal exchange of information (4) Greater employee situational awareness
			14	Standardize Position Descriptions	Uniform & consistent position descriptions for IMTS positions to facilitate employee mobility & career advancement
			25	Standardize Water Control Procedures	Increased opportunity for customers to move commodities through selected IMTS river systems
C.5.3	**Maintain & Repair Lock**	The goal of the maintenance and repair program is to minimize unscheduled outages and unreliability to customers. Perform scheduled preventive maintenance (daily, weekly, monthly, periodic, and routine) according to the preventive maintenance schedule. Track scheduled maintenance using an approved Computerized Maintenance Management System (CMMS). (TE-5, Lock Site Locations) Perform emergency lock maintenance and repair to minimize the impact on	2	Share Corporate Knowledge of Preventative Maintenance & Repair Procedures	Improved networking & exchange of proven preventive maintenance (PM) and repair techniques to minimize lock unavailability (as well as learning about unsuccessful PM and repair techhiques to avoid)
			3	Enhance the Hiring Process *Specifically:* *C.5.3.1 Perform Lock Maintenance* *C.5.3.3 Perform Emergency Lock Maintenance & Repair*	(1) Expedited recruitment (2) Timely hiring (3) Effective placement of skilled staff to ensure continuity of operations, maintenance, and repair services. (4) Improved accomplishment of major maintenance & repair (5) Expedited emergency response

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
		system reliability, including unscheduled repairs that need immediate attention to maintain a functional lock (unscheduled unavailability/stoppage). (TE-6A FY2006 Unscheduled Unavailable Hours by Lock Condition Category and TE-6B, Trends in Unscheduled Unavailable Hours by Reason Code Associated with Lock O&M)	4	Strengthen Leadership & Management *Specifically:* *C.5.3.1 Perform Lock Maintenance* *C.5.3.3 Perform Emergency Lock Maintenance & Repair*	(1) Improved leadership skills for supervisors and managers (2) A strengthened workforce to achieve safe, efficient, reliable lockages and maintenance activtities
			6	Training & Certification fo Lock Staff	Uniform, well-trained staff to ensure consistent, safe lock operations and enhance career opportunities for the workforce
			7	Augment Supervisory Skills at Lock & Field Offices *Specifically:* *C.5.3.1 Perform Lock Maintenance* *C.5.3.3 Perform Emergency Lock Maintenance & Repair*	Supervisors with the skills necessary to enhance management & employee relationships
			8	Share IMTS Knowledge * Information	(1) Increased communication (2) Improved public relations (3) Enhanced internal exchange of information (4) Greater employee situational awareness

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
			10	Enhance On-Site Supervision	(1) More on-site supervision (2) Defined work leadership roles and authority (3) Improved span of control
			12	Acquisition of Land & Floating Plant Equipment	Reduced purchase costs for land & flating plant equipment through innovative acquisition strategies
			13	Restructure Plant Replacement & Improvement Program (PRIP)	Lower ownership costs of revolving fund assets
			14	Standardize Position Descriptions	Uniform & consistent position descriptions for IMTS positions to facilitate employee mobility & career advancement
			18	Optimize Shift Schedules	Productive, cost-effective, and worker-friendly shift schedules to allow for more efficient & effective lock & dam O&M
			19	Standardize Staffing & Grade Structure *Specifically:* *C.5.3.1 Perform Lock Maintenance* *C.5.3.3 Perform Emergency Lock Maintenance & Repair*	(1) Savings from transferring work to in-house performance where cost comparison demonstrates it is more economical (2) Enhanced human resources management by more efficiently matching workforce to workload (3) Enhanced ability of managers to effectively operate the facilities under their responsibilitity

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
			21	Improved Alignment of Administrative Tasks *Specifically:* *C.5.3.1 Perform Lock Maintenance* *C.5.3.3 Perform Emergency Lock Maintenance & Repair*	Effective allocation of administrative, supervisory, and maintenance work to appropriate staff
			24	Implement 3-Phase Inspection System for Major Maintenance	(1) Returning sites to service in less time and within budget (2) Improved quality of repair (3) Less rework
5.4	**Maintain & Repair Dam**	Perform routine and non-routine maintenance and repair of dams and associated structures, such as spillways, embankments, outlet works, levees, pumping stations, and other structures. Perform project management and oversight of the maintenance and repair of a Navigation dam structure and its associated facilities and equipment to achieve NavLocks System reliability.	2	Share Corporate Knowledge of Preventative Maintenance & Repair Procedures	Improved networking & exchange of proven preventive maintenance (PM) and repair techniques to minimize lock unavailability (as well as learning about unsuccessful PM and repair techhiques to avoid)
			3	Enhance the Hiring Process	(1) Expedited recruitment (2) Timely hiring (3) Effective placement of skilled staff to ensure continuity of operations, maintenance, and repair services (4) Improved accomplishment of major maintenance & repair (5) Expedited emergency response
			6	Training & Certification for Lock Staff	Uniform, well-trained staff to ensure consistent, safe lock operations and enhance career opportunities for the workforce

Baseline Requirements Document			Improvement Benefits		
Para.	Activity	Requirement	Topic #	Topic	Benefits
			7	Augment Supervisory Skills at Lock & Field Offices	Supervisors with the skills necessary to enhance management & employee relationships
			8	Share IMTS Knowledge & Management	(1) Increased communication (2) Improved public relations (3) Enhanced internal exchange of information (4) Greater employee situational awareness
			12	Acquisition of Land & Floating Plant Equipment	Reduced purchase costs for land & flating plant equipment through innovative acquisition strategies
			13	Restructure the Plant Replacement & Improvement Program (PRIP)	Lower ownership costs of revolving fund assets
			14	Standardize Position Descriptions	Uniform & consistent position descriptions for IMTS positions to facilitate employee mobility & career advancement
			18	Optimize Shift Schedules	Productive, cost-effective, and worker-friendly shift schedules to allow for more efficient & effective lock & dam O&M

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
5.5	**Perform Major Maintenance of Locks & Dams**	Perform major maintenance of locks and dams, including management and administrative activities related to major scheduled maintenance, repair, and emergency repair to ensure system reliability. This may involve personnel at the lock and dam site, central maintenance facility, or mobile maintenance fleet. It may involve personnel from other lock and dam sites inside or outside the parent district, division, and HQUSACE or outside resources. Perform all activities required for major maintenance and repairs, including planning, scheduling, communicating with users, closing the lock chamber, conducting the maintenance or repairs, and reopening the chamber. Major maintenance and repairs will be performed in a manner that minimizes the impact on system reliability. Perform emergency repairs as needed to meet the performance requirements	1	Share Corporate Knowledge of Major Maintenance *Specifically:* *C.5.5.1 Conduct Scheduled Maintenance & Repairs* *C.5.5.2 Conduct Emergency (Unscheduled) Repairs*	Formalized use of regularly scheduled regional & national workshops to facilitate networking, the exchange of proven repair techniques (and unsuccessful repair techiques) that will maximize lock reliability, and build a knowledge base to share resources (equipment, materials, and personnel) to improve emergency repairs.
			3	Enhance the Hiring Process *Specifically:* *C.5.5.1 Conduct Scheduled Major Maintenance & Repairs* *C.5.5.2 Conduct Emergency (Undscheduled) Repairs*	(1) Expedited recruitment (2) Timely hiring (3) Effective placement of skilled staff to ensure continuity of operations, maintenance, and repair services (4) Improved accomplishment of major maintenance & repair (5) Expedited emergency response
			12	Acquisition of Land & Floating Plant Equipment	Reduced purchase costs for land & flating plant equipment through innovative acquisition strategies
			13	Restructure the Plant Replacement & Improvement Program (PRIP)	Lower ownership costs of revolving fund assets

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
		described in TE-1, Performance Requirement Summary.	15	Regional/System Equipment Pool (Leased Equipment) *Specifically:* *C.5.5.1 Conduct Scheduled Maintenance & Repairs* *C.5.5.2 Conduct Emergency (Unscheduled) Repairs*	(1) Savings through economies of scale, by utilizing an alternative acquisition strategy (2) Faster access to leased equipment
			16	Scheduling & Budgeting Major Maintenance *Specifically:* *C.5.5.1 Conduct Scheduled Maintenance & Repairs* *C.5.5.2 Conduct Emergency (Unscheduled) Repairs*	(1) Enhanced coordination of simultaneous closures (2) Increased benefits to customers by prioritizing major maintenance activities (3) Increased return on investment through standardized condition assessment & risk-based ranking process (Asset Management)
			17	Service Providers for Maintenance Projects *Specifically:* *C.5.5.1 Conduct Scheduled Maintenance & Repairs* *C.5.5.2 Conduct Emergency (Unscheduled) Repairs*	Reduced acuqisition time through effective use of alternative procurment vehicles on a regional basis

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
			23	Systems-Based Budgeting *Specifically:* *C.5.5.1 Conduct Scheduled Maintenance & Repairs* *C.5.5.2 Conduct Emergency (Unscheduled) Repairs*	(1) Ehanced investment decisions & a better "Return On Investment" from the funds (2) Faster response time to emergencies due to greater flexibility in moving funds (3) Optimized construction schedules & better economies of scale
			24	Implement 3-Phase Inspection System for Major Maintenance *Specifically:* *C.5.5.1 Conduct Scheduled Maintenance & Repairs* *C.5.5.2 Conduct Emergency (Unscheduled) Repairs*	(1) Returning sites to service in less time and within budget (2) Improved quality of repair (3) Less rework
5.6	**Manage Lock & Dam Resources & Assets**	Prepare, coordinate, and submit the annual O&M budget according to annual USACE budget guidance and incorporate consideration of asset management. Execute the approved budget and adjust or realign it to meet changing needs with command	4	Strengthen Leadership & Management *Specifically:* *C.5.6.5 Perform Lock, Dam and Facility Secuirty*	(1) Improved leadership skills for supervisors and managers (2) A strengthened workforce to achieve safe, efficient, reliable lockages and maintenance activtities

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
		approval. Develop the overhead budgets to support rate determinations and training, in coordination with other activities. In accordance with USACE policy, provide the physical security and safety for the lock and dam sites according to the site security safety plan. Physical security may include the use of guards (when authorized), perimeter fences, gates (possibly with electronic entry controls), security plans, surveillance cameras, and security screening for those entering the lock and dam site. Manage the capital investment program to ensure capital investments are identified, prioritized, supported, and requested. The Plant Replacement and Improvement Program (PRIP) may be used by some capital investments.	8	Share IMTS Knowledge & Management *Specifically:* *C.5.6.1 Prepare Annual Lock/Dam O&M Budget* *C.5.6.5 Perform Lock, Dam, and Facility Security* *C.5.6.8 Capital Investment.*	(1) Increased communication (2) Improved public relations (3) Enhanced internal exchange of information (4) Greater employee situational awareness
			10	Enhance On-Site Supervision *Specifically:* *C.5.6.5. Perform Lock, Dam, and Facility Security*	(1) More on-site supervision (2) Defined work leadership roles and authority (3) Improved span of control
			11	Physical Security Procedures *Specifically:* *C.5.6.5. Perform Lock, Dam, and Facility Security*	Security systems that perform as designed & provide intended level of protection.

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
			16	Scheduling & Budgeting Major Maintenance *Specifically:* *C.5.6.1 Prepare Annual Lock/Dam O&M Budget*	(1) Enhanced coordination of simultaneous closures (2) Increased benefits to customers by prioritizing major maintenance activities (3) Increased return on investment through standardized condition assessment & risk-based ranking process (Asset Management)
			19	Standardize Staffing & Grade Structure *Specifically:* *C.5.6.5 Perform Lock, Dam, and Facility Security*	(1) Savings from transferring work to in-house performance where business case demonstrates it is more advantageous to the government (2) Enhanced human resources management by more efficiently matching workforce to workload (3) Enhanced ability of managers to effectively operate the facilities under their responsibilitity
			21	Improved Alignment of Administrative Tasks *Specifically:* *C.5.6.1 Prepare Annual Lock and Dam O&M Budget* *C.5.6.5 Perform Lock, Dam, and Facility Security*	Effective allocation of administrative, supervisory, and maintenance work to appropriate staff

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
			23	Systems-Based Budgeting *Specifically:* *C.5.6.1 Prepare Annual Lock and Dam O&M Budget*	(1) Ehanced investment decisions & a better "Return On Investment" from the funds (2) Faster response time to emergencies due to greater flexibility in moving funds (3) Optimized construction schedules & better economies of scale
C.5.7	**Technical Support**				
C.5.8	**Channel Operations & Maintenance**	Perform all functions, including project management and oversight, of channel O&M within the IMTS. Conduct actions necessary to keep channels open to Navigation to meet Navigation performance standards. Comply with State and Federal water quality terms and standards. Select and fund the provider of choice to perform water quality analysis. Identify and mark hazards to Navigation, other than USCG mandated aids to Navigation (marker piles, stone mounds, etc., to help vessels avoid grounding). Perform channel reconnaissance and hydrographic surveys to uncover channel impediments that could cause vessel groundings and restrict the use of Navigation channels.	8	Share IMTS Knowledge & Management *Specifically:* *C.5.8.3 Water Quality* *C.5.8.5 Aids to Navigation (Fixed and Floating)* *C.5.8.7 Channel Reconnaissance and Hydrographic Surveys (Channel Patrol)*	(1) Increased communication (2) Improved public relations (3) Enhanced internal exchange of information (4) Greater employee situational awareness
			9	NavLock Channel Maintenance *Specifically:* *C.5.8.3 Water Quality* *C.5.8.5 Aids to Navigation (Fixed and Floating)* *C.5.8.7 Channel Reconnaissance and Hydrographic Surveys (Channel Patrol)*	(1) Decreased acquisition timelines for environmental contracts (2) Reduced volume of historic dreding locations through evolving technology (3) Improved sharing of survey information with the USCG

Baseline Requirements Document			Improvement Benefits		
Para.	**Activity**	**Requirement**	**Topic #**	**Topic**	**Benefits**
			12	Acquisition of Land & Floating Plant Equipment	Reduced purchase costs for land & flating plant equipment through innovative acquisition strategies
			13	Restructure the Plant Replacement & Improvement Program (PRIP)	Lower ownership costs of revolving fund assets
C.5.9	**Major Rehabilitation & New Project Construction**	Identify, request, and fund the planning and reporting activities required to request major rehabilitations and new construction. This work includes the O&M-funded preparation activities that precede a major rehabilitation. Specific tasks include data acquisition, data analysis ("what if" scenarios), and project justification documentation. These reports must be completed in accordance with Project Management Division guidance and formats.	12	Acquisition of Land & Floating Plant Equipment	Reduced purchase costs for land & flating plant equipment through innovative acquisition strategies
			13	Restructure the Plant Replacement & Improvement Program (PRIP)	Lower ownership costs of revolving fund assets
C.5.10	**Mooring/Protection Cells (Bridges/Approaches)**	Construct and repair Federal mooring and protection cells within the IMTS for the continuity and safety of the Navigation mission, including periodic inspections to assess current condition.	12	Acquisition of Land & Floating Plant Equipment	Reduced purchase costs for land & flating plant equipment through innovative acquisition strategies
			13	Restructure the Plant Replacement & Improvement Program (PRIP)	Lower ownership costs of revolving fund assets
C.5.11	**Non-Navigation Emergency Response**				

Table IV-3 Relationship of BPR Improvements and Baseline Requirements

3.4 Quality Control

The Work Breakdown Structure Table in Appendix III shows the Project Quality Control Plan and Objectives. The information in that table is from the implementation measurements identified in each BPR Topic Findings and Recommendations.

The National Measures CAT will be responsible for QC tracking. This CAT will develop a separate QC Plan to track IMTS performance measures.

SECTION V - THE WAY AHEAD

The purpose of this section of the report is to provide a macro-level view for the reader of how USACE intends to tie the improvements to the Baseline Operating Objectives for continuous performance measurement monitoring and that the formal oversight structure and day-to-day working group will continue as the platform for continuous process improvements in new areas. There is no appendix to this Section.

USACE IMTS is a key component of the total Marine Transportation System (MTS) that carries the pulse of U.S. commerce to the world and allows the Nation to maintain its position in the global economy.

It is imperative that USACE operate and maintain the system in an efficient, reliable, and economical manner. To achieve this, the BPR identified 25 BPR Topics and over 100 improvements to enhance the reliability of the IMTS.

The implementation and execution strategy discussed in Section III establishes a system-wide approach to implement the BPR improvements. It establishes a formal forum (the Board) and a process (Working Group, PATs, CATs, and IMTS Management Teams) to implement and measure the improvements.

Moreover, with the establishment of the Board, Working Group, CATs, and IMTS Management Teams, a mechanism is put in place for continuous improvement and a means for USACE to formally address the changing needs of its customers.

The next immediate steps in the way ahead include the following. Where appropriate the responsible official is indicated. The steps, except for numbers 6 and 7, are in order of occurrence.

(1) Convene the IMTS Board of Directors to (This may occur electronically to eliminate travel and per diem costs) [Responsible official: Strategic Sourcing Program Manager (SSPM)/BPR Team Leader]:

(a) Present the Charter;

(b) Discuss the way ahead; and

(c) Identify suggested Working Group members and Working Group leader.

(2) Prepare and issue [Responsible official: SSPM]:

(a) Working Group appointment letters; and

(b) Memorandum for Staff Principals and Commanders.

(3) Convene the Working Group to identify PATs, CATs, and IMTS Management Team members. (This may occur electronically to eliminate travel and per diem costs) [Responsible official: SSPM /Working Group leader]

(4) Obtain Board approval of the CATs (as required by the Charter) [Responsible official: Working Group leader]

(5) Implement the plan (to include updating the Baseline Requirements Document as improvements impacting that document occur as discussed in Section V) [Responsible official: Working Group leader].

(6) Post information on appropriate web sites as the steps are completed and as implementation proceeds [Responsible official: Working Group leader].

(7) Continuously identify new opportunities for improvement [Responsible officials: The Board, Working Group, IMTS Management Teams].

Glossary

The following are the acronyms used in the main report and appendices:

Acroynm	Meaning
AIWW	Atlantic Intercoastal Waterway
AMP	Asset Management Program
ASA(CW)	Assistant Secretary of the Army for Civil Works
ASCE	American Society of Civil Engineers
AWO	American Waterways Operators
AWS	Alternate Work Schedule
BCA	Business Case Analysis
BPR	Business Process Review
CAT	Collaborative Action Team
CBO	Congressional Budget Office
CFMS	Corps of Engineers Financial Management System
CHRA	Civilian Human Resources Agency
CMTS	Committee on the Marine Transportation System
COP	Community of Practice
CPAC	Civilian Personnel Activity Center
CWS	Compressed Work Schedule
DFW	Drug Free Workplace
DHHS	Department of Health and Human Services
DoD	Department of Defense
DoT	Department of Transportation
EC	Engineer Circular
ER	Engineer Regulation
FCI	Facility Condition Index
FEM	Facility Equipment Management system
FY	Fiscal Year
FPPjM	Functional Proponent Project Manager
FTE	Full-Time Equivalent
GAO	Government Accountability Office
GFP	Government Furnished Property
GIS	Geographic Information System
GIWW	Gulf Intracoastal Waterway
GPRA	Government Performance Results Act
GSA	General Services Administration
GWOT	Global War on Terrorism

Acroynm	Meaning
HPO	High-Performing Organization
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HR	Human Resources
ID/IQ	Indefinite Delivery/Indefinite Quantity
IDP	Individual Development Plan
IMTS	Inland Marine Transportation System
ISTEA	Intermodal Surface Transportation Efficiency Act
IWR	Institute for Water Resources
LMI	Logistics Management Institute
LRD	Great Lakes and Ohio River Division
MARAD	Maritime Administration
MATOC	Multiple Award Task Order Contract
MOA	Memorandum of Agreement
M&R	Maintenance and Repair
MTS	Marine Transportation System
MVD	Mississippi Valley Division
NAD	North Atlantic Division
NDC	Navigation Data Center (USACE)
NWD	Northwestern Division
O&M	Operations & Maintenance
OMB	Office of Management & Budget
PAO	Public Affairs Office (or Public Affairs Officer)
PART	Performance Assessment Rating Tool
PAT	Process Action Team
PD	Position Description
PDT	Project Delivery Team
PIANC	Permanent International Association of Navigation Congresses
PM	Preventive Maintenance
PMBP	Program Management Business Plan
PMP	Project Management Plan
PNW	Pacific Northwest
POC	Point of Contact
PRIP	Plant Replacement/Improvement Program
PWS	Performance Work Statement
PY	Program Year
QA	Quality Assurance
QC	Quality Control
RAND	Risk Assessment and Methodology for Dams

Acroynm	Meaning
REMIS	Real Estate Management Information System
ROI	Return on Investment
SAD	South Atlantic Division
SOP	Standard Operating Procedure
SOS	Standard Organization Structure
SSPM	Strategic Sourcing Program Manager
SWD	Southwestern Division
T&A	Time and Attendance
TDP	Testing Designated Position List
TEU	Twenty foot Equivalent Units
TWIC	Transportation Workers Identification Card
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
WBS	Work Breakdown Structure