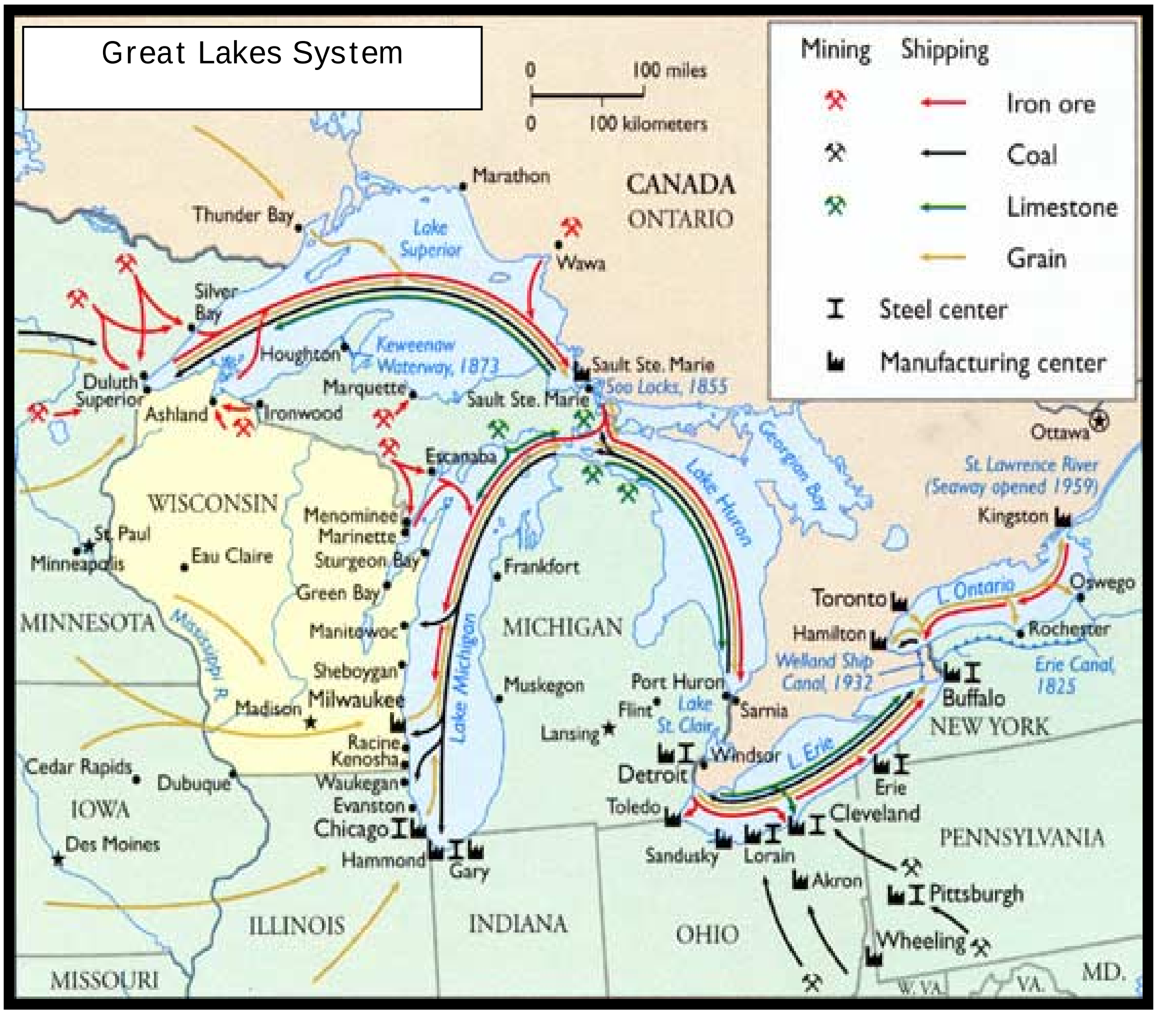
Great Lakes Navigation System
Five-Year Development Plan



Great Lakes and Ohio River Division
FY07 – FY12
December 2006

Executive Summary

Purpose of the Five Year Development Plan

The Five Year Development Plan (FYDP) is a recently developed instrument to guide the U.S. Army Corps of Engineers in planning for Great Lakes navigation system needs over a given five-year span, defined in this report as the years 2007-2012. The intent is to establish a program that thoroughly engages stakeholders and focuses resources on the system's most critical needs in terms of reducing risk and providing optimal reliability. The goal of the program is to maximize benefits using a cohesive, basin-wide approach and then to structure funding requirements accordingly.

Stakeholder participation is crucial to the FYDP success; initial meetings have already been held to facilitate this participation. At a November 2005 meeting, stakeholder concurrence was reached on a number of overall goals, including the need to revise the metrics used to prioritize system investments. Future stakeholder meetings will continue to take place at regularly scheduled intervals.

Clearly, development of metrics that can fairly and accurately be used to prioritize system needs in a constrained funding environment may be the most important component of the FYDP process—and its most prominent challenge. The FYDP was predicated, to a great extent, on a recent trend of diminishing resources available for system investment. Its value will largely rest in making the best use of the available funds while meeting federally mandated performance-based budgeting requirements.

In the past, commercial cargo tonnage has been the primary metric used to prioritize Great Lakes navigation system investment. Many stakeholders have objected to this approach on the grounds that it does not accurately reflect the full and true value of the system as a whole or of individual system components.

Accordingly, the Corps' Great Lakes FYDP team continues to investigate alternative metrics. Preliminary research indicates that employing transportation savings as a primary metric and system ton-miles as a screening tool have merit and warrant further investigation. The efforts to develop alternative metrics are ongoing.

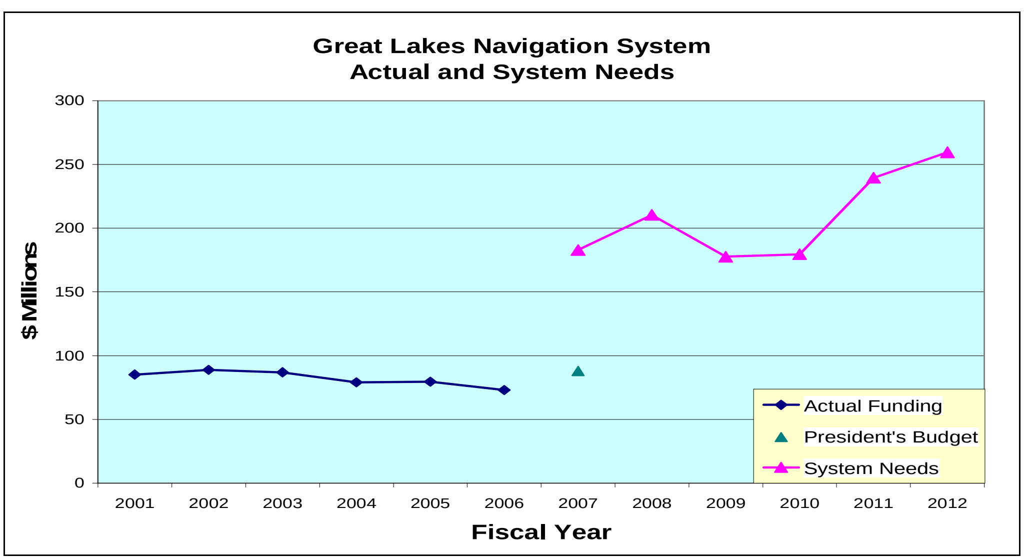
One FYDP-related outcome already underway is progress among the three USACE Great Lakes Districts—Buffalo, Chicago, and Detroit—toward a unified, regional approach to management of the Great Lakes navigation system. With the Detroit District as lead, specific strengths and expertise of each district will be leveraged to form multidisciplinary regional teams. Various assets and activities will be managed jointly among the three districts to achieve maximum regional efficiency. Floating plant and survey resources are the two areas that have transitioned to regional management. These efforts toward regional management will continue.

Assessing Value, Risk and Budget Reality

Management of the Great Lakes navigation system has been a Corps of Engineers mission since the 1820s. Today the Corps' responsibilities extend across a complex 2,400-mile deepwater system from Duluth, Minnesota to Massena, New York on the St. Lawrence Seaway. The relative economic value of the system to the region and the nation is significant and can be calculated in a number of ways. However, it must be recognized that any true valuation of this unique resource must include broader sociocietal and environmental indicators as well as economic indicators.

It is also critical to note that the Great Lakes navigation system is comprised of individual harbors and channels (projects), and that overall system viability depends on maintaining the integrity of this network. Loss or diminishment of any single project in the long-term potentially affects the viability of the system as a whole. Finally, there are overarching strategic issues to consider in the FYDP process, not the least of which includes homeland security in the post-9/11 era, and bi-national considerations in asset and resource management.

The Corps supports the President's budget and respects the many competing demands within the budget process. However, resources available for operation and maintenance of the Great Lakes navigation system have been below the level needed to meet reliability and efficiency goals for several years. The chart below identifies actual funding from Fiscal Year (FY) 2001 through 2006 and funding needs from FY07 to FY12. Needs are defined as system requirements that are needed to achieve an acceptable level of risk in the system, maximizing system reliability, and reducing the risk of catastrophic failures that would result in significant economic impact to the nation. Needs are system requirements that will allow the Corps to achieve a functional service level in the system, not a requirement to do all potential work that the system could possibly use. System needs are constrained by the Corps' ability to realistically accomplish the work considering in-house and contract capabilities.



In a constrained budget environment, available funding falls short of identified system needs. To enable the best investment decisions in this constrained budget environment, the FYDP proposes to use a risk-based management system based on meeting performance standards to set priorities. Risk in this context quantifies the probabilities of diminished performance having economic and other consequences. Performance standards must be incorporated into the budget process. Without such standards, there is not a common understanding of the expected performance levels, nor is there a foundation upon which risk assessment may be applied. Risk increases as conditions deteriorate below the expected performance levels.

The FYDP defines a program for achieving "acceptable levels of risk" using accurate, consistent, and reliable metrics to gauge performance of Great Lakes navigation system assets. This program considers information developed through two sub-programs: harbor valuation and risk assessment. Harbor valuation will establish and maintain a comprehensive database of economic and other associated benefits information at a local, regional, and national level. Risk assessment will establish and maintain the engineering models, resources, and information that support assessment of the reliability of individual projects.

Theoretically, as maintenance and construction work on the navigation system progresses, current risk levels will move closer to the acceptable risk levels. The goal is to focus limited resources where they are most needed, identify the optimal resource levels, and plan ahead so that work might be addressed in future year plans.

The Issue of Recreational Harbors

Maintenance of authorized shallow draft or recreational harbors in the Great Lakes has not been budgeted by the Corps for several years. While this policy is consistent with the Administration's position, it clearly does not reflect the intent of Congress. This has put the Corps' Great Lakes Districts in the tenuous position of trying to respond to or execute individual Congressional requests each year for specific harbors.

This practice is unsustainable and does not represent a holistic approach to the operation and maintenance of the Great Lakes shallow draft harbors. Consequently, the recommended program in this FYDP includes critical funding needs for shallow draft harbors.

Near-term Actions

Based on the rationale articulated above, the FYDP team proposes a systematic approach to identifying the requirements of the Great Lakes navigation system based on metrics that reflect its true value and its local, regional, and bi-national significance. Accordingly, the team recommends that the following actions be implemented:

- Commercial navigation features on the Great Lakes should be budgeted as one complete navigation system (using metrics of system-wide transportation savings), and not as a collection of individual projects by district. The team also recommends that the FY 2009 Budget Engineer Circular (EC) incorporate this system-wide approach for the navigation business line for the Great Lakes**.**

- Shallow draft or recreational harbors should receive a direct budget line item in the O&M appropriation of $3 million annually to meet the most critical maintenance needs.

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About this Report

The Great Lakes Navigation System Five Year Development Plan (FYDP) was prepared to objectively describe the investments required for the Great Lakes navigation system for the years 2007-2012. The primary goal is to develop a regional asset management plan that articulates priorities and is coordinated with navigation stakeholders. This FYDP provides an investment strategy for a safe, efficient, effective, reliable, and environmentally sustainable navigation system while also recognizing existing financial constraints.

To prepare this report, a project delivery team comprised of interdisciplinary experts from the three U.S. Army Corps of Engineers Great Lakes Districts was assembled. Team members represented expertise in the areas of engineering, economics, environmental, operations and maintenance, and program management. Utilizing concepts of performance based budgeting; stakeholder engagement; risk, reliability, and consequences; economic return; and environmental sustainability, the team endorsed the following as keys to developing a successful Great Lakes Navigation FYDP:

- One focused regional team (versus three separate Districts) must represent the Corps of Engineers on the Great Lakes.
- This FYDP should act as a road map that clearly defines where we want to be and how we are going to get there.
- This FYDP must also be collaborated with stakeholders – it cannot be insular to the USACE Great Lakes and Ohio River District.
- The value of shallow draft/recreational harbors on the Great Lakes must be recognized and addressed in this FYDP.
- This FYDP has to be based on a system needs approach that presents a strategy to maintain assets based on metrics that accurately reflect the value of the Great Lakes navigation system.

The main body of this report includes discussions on methodology, proposed management actions, and optimum program definition and funding. Ten appendices are also included, describing the specific Great Lakes navigation program features, characteristics, and goals; the processes and strategies employed for the FYDP currently and in the future; and budgetary recommendations to achieve the program goals.

Methodology

Development of the Great Lakes navigation FYDP is a four-step process that involves: 1) identifying current conditions within the USACE Great Lakes navigation business line (the system in general and specific elements within it); 2) identifying the desired future conditions of same; 3) establishing specific goals, objectives, and funding needs to achieve the desired future conditions; and 4) proposing management actions to meet those goals and objectives.

Current Condition Statement

Under the current condition of the USACE navigation business line for the Great Lakes, the three Great Lakes Districts (Buffalo, Chicago, and Detroit) have begun to unify the development, management, and execution of the Great Lakes Navigation Program. The districts have corporately focused on developing business processes for establishing program priorities and meeting mission requirements. Operation and Maintenance (O&M) Program priorities that were based on historical requirements and current conditions and thus reflected as a collection of individual projects are now being viewed on a system-wide basis. Stakeholders continue to be engaged on a regular basis. Districts have historically managed assets independently, but in the past two years have begun to regionally coordinate and share personnel and equipment. Although data and information are collected and maintained within each district, the organization and presentation of data continue to be somewhat different from district to district, making overall system-wide sharing and management more difficult.

A challenge of the current budgetary process is that despite the system-wide view that the Districts are beginning to take of the Navigation program, the basic Corps of Engineers budgetary process treats Great Lakes navigation projects (and all other projects) as a collection of individual projects. Also, on an individual project basis, Great Lakes shallow draft and recreational harbor projects have no relative priority in the O&M budgetary process and, as such, have not been included in recommended budgets in several years. O&M activity on these projects therefore is sporadic and entirely dependent on Congressional Adds to annual appropriations.

Desired Future Condition Statement

Under the desired future condition, the Great Lakes Districts would continue current efforts to base the Navigation Program on priorities that thoroughly engage stakeholders and focus resources on the highest priority projects in terms of reducing risk and providing optimal reliability to maximize benefits. Corporate business processes, policy, and organizational structure will continue to be shaped to execute the Great Lakes Navigation Program as a single regional program. Building on actions already underway, the program will be organized and focused for one complete system. Additional metrics will be developed and used that reflect its local, regional, and bi-national significance.

The basic budgetary process should be revised to budget Great Lakes commercial navigation features as one complete navigation system and not as a collection of individual projects or districts. Information would be collected and maintained as a system. Great Lakes shallow draft and recreational harbors should receive an annual offset in the O&M Appropriation of $3M to meet the most critical maintenance needs of these projects. This comprehensive Five-Year Development Plan, which includes program goals, fact-based performance metrics, and prioritization criteria, is one of the critical tools for achieving the desired future condition.

Goals and Objectives

Goals and objectives used in the context of this planning document are defined as follows: goals are strategic ideas that describe the ultimate purpose, intent, or ends toward which the USACE Great Lakes Region will direct its efforts. Goals generally express long-term, rather than short-term, expectations. Objectives, on the other hand, are specific and measurable within a defined timeframe. Objectives lead to actions resulting in the achievement of goals. The goals and objectives listed below flow from the desired future condition described previously. They therefore represent the basic recommendations of this FYDP.

- ***Goal***

Describe the value and needs of the Great Lakes navigation system. Paint a picture to stakeholders, elected officials, and USACE leaders, that clearly emphasizes the values and needs of the Great Lakes navigation system.

- ***Objective***

Use the FYDP as a means to provide a broad overview of the socio-economic and environmental value of the Great Lakes navigation system. Include an inventory and condition assessment of both deep draft and shallow draft Federal navigation projects and infrastructure. Communicate the critical need for the annual $3M appropriation offset for shallow draft and recreational harbor maintenance.

Build on the FYDP to develop qualitative and quantitative tools to describe and continuously update the values and needs of the Great Lakes navigation system. Establish system and regionally based tools, models, and business processes that develop and maintain this information in coordination with stakeholders. Develop USACE vertical business processes and automated tools to share this information and corporately update changes to program goals. Evaluate capability of utilizing P2 as a means to share this information within the USACE vertical team. Communicate system value and USACE capabilities to stakeholders and elected officials as a region versus individual Districts.

- ***Goal***

Focus on financial execution of annual Navigation Program budget and broad system-wide goals. Work within USACE to modify the budgetary process to budget Great

Lakes commercial navigation features as one complete navigation system. Recognize financial constraints on government. Ensure that stakeholders understand where financial gaps exist, and what the corresponding risks to system reliability are as a result of this condition.

- ***Objective***

Utilize the FYDP to fully develop a strategy that maximizes return on investment (improved reliability), and reduces overall system risk. Develop rigorous fact-based methodology to allocate resources to projects with the greatest return on investment, optimizing project and system reliability accordingly. Actively engage stakeholders in setting and adjusting program.

- ***Goal***

Establish standardized analytical tools and models to determine Risk and Reliability Metrics.

- ***Objective***

Build on the FYDP to develop infrastructure maintenance programs based upon engineering risk and reliability. Define various levels of maintenance in terms of system performance and return on investment.

- ***Goal***

Establish USACE corporate strategy and prioritization metrics for investment in the Great Lakes navigation system. Establish a road map that clearly articulates a desired future condition statement for the Great Lakes navigation system that is driven by five-year national program goals.

- ***Objective***

Utilize the FYDP to establish specific goals for the Great Lakes navigation system. Program goals must consider what is important to navigation stakeholders. Ensure that goals for the Great Lakes navigation system nest with USACE national goals for the navigation business line. Use risk and reliability metrics to establish annual and out-year budgets that fully (recommended budget) or partially (constrained budget) meet system goals.

- ***Goal***

Improve and enhance current Stakeholder Outreach and Communication.

- ***Objective***

Build on existing stakeholder outreach and communication efforts (both formally and informally) on short- and long-term program planning and execution. Define primary stakeholders that represent balanced regional requirements and needs. Ensure that stakeholders understand the rationale for decision making and establish an organized advocacy to communicate system values and needs and receive stakeholder feedback and input.

- ***Goal***

Develop Information Technology that operates and maintains information as a system within the region.

- ***Objective***

Compare and use the most advantageous existing hardware and software to maintain data such that it is readily available to the USACE vertical team through a central automated system. Make information sharing with stakeholders deliberate and organized. Make key information readily available on the Intranet.

- ***Goal***

Develop the Regional Business Center and Business Processes to facilitate asset management for operation and maintenance of Great Lakes Federal navigation projects. Shape all facets of USACE mission execution (budget formulation, program execution, and project management) to accomplish navigation system program goals as a region versus each district separately.

- ***Objective***

Detroit District is the lead district for the navigation business line. Build on the lead district concept to realize the regional business center. Utilize navigation business line program goals to identify out-year project and funding requirements (workload). Continue current efforts to match these requirements with individual district expertise to establish regional leads for specific navigation related activities such as structure repair, dredging, hydrographic surveys, contract acquisition, construction management and contract administration, studies, environmental compliance, outreach, and cost savings initiatives. This does not mean that all staffing and funding is maintained exclusively at the lead district; it simply means that the lead district for the specified activity has the responsibility to establish effective business processes and resource allocation to execute the specific task as a region. This concept can be applied to all levels of responsibility and staffing.

Current/Desired Future Condition Table

Goals/Objectives	CURRENT CONDITION	DESIRED FUTURE CONDITION
System Value and Needs	Defined locally for individual projects within each District. Various methods of determining value and needs. Each District has five-year major maintenance plan that defines needs for individual projects within their District.	Defined regionally as a system. Standardized analytical tools and models define, monitor, and update system value and needs from an engineering, economic, and environmental perspective. Stakeholders formally engaged as a region.
Program Goals	Formal goals focus on financial execution of annual operating budget. Informal goals focus on five-year requirements of individual projects within each District. Stakeholders are engaged informally on a project specific basis.	Focus on financial execution of annual operating budget and broad system-wide management that improves reliability and reduces overall system risk. Budget navigation as a complete system. Stakeholders are actively engaged in setting and adjusting goals.
Risk and Reliability Metrics	Defined locally for individual projects within each District. Various methods to determine risk and reliability. Maintenance of infrastructure based upon historical and current requirements. Capability to define various levels of maintenance in terms of system performance and return on investment is improving.	Defined regionally as a system. Standardized analytical tools and models to determine risk and reliability. Maintenance of infrastructure based upon engineering risk and reliability. Strong capability to define various levels of maintenance in terms of system performance and return on investment.
Prioritization Metrics	Driven by annual pre-set ceilings for each District that are based upon historical funding levels. National policy guidance establishes individual District priorities. Districts beginning to establish priorities on a regional basis, based on national policy, system requirements, and stakeholder needs.	Driven by five-year national program goals and priorities. System-wide program goals nest with national goals. Risk and reliability metrics are used to establish annual and out-year operating budgets that fully (recommended budget) or partially meet (constrained budget) system goals.
Stakeholder Outreach and Communication	Regular engagement in long-term strategic planning and formal communication on short-term program execution has been initiated. Stakeholders beginning to understand rationale for decision-making but sometimes lack an organized advocacy to communicate system value and needs.	Formal and informal coordination on both short and long-term program planning and execution. Defined set of primary stakeholders that represent balanced regional requirements and needs. Information and rationale for decision making readily available via the Internet. Stakeholders understand rationale for decision making and have an organized advocacy to communicate system value and needs.
Information Technology	Information generated and maintained as individual projects within each District. Data are maintained within functional elements at each District and not readily available to the USACE vertical team. Information sharing with stakeholders is event driven.	Information generated and maintained as a system within the region. Data are maintained and readily available to USACE vertical team through a central automated system. Information sharing with stakeholders is deliberate and organized.
Regional Business Center	Districts are moving to operate as a system. Efforts are underway to manage funding, staff resources, and equipment as a complete system.	Three Districts operate as a region. Funding, staff resources, and equipment are managed to meet regional and system requirements.
Business Processes	Various business processes have been revised to manage similar activities and mission requirements. Vertical team coordination is sometimes inefficient, and/or insular to each District, but regional context is moving forward.	Standardized business processes are utilized to manage similar activities and mission requirements. Vertical team coordination is commonplace; information flows efficiently in both directions and represents regionally thinking.

Management Actions

Following are proposed actions specific to the goals and objectives of the USACE Great Lakes navigation program identified above. The actions are aimed at achieving the desired future condition as expressed above. They are broken into short-term activities envisioned for the FY07-FY08 time-frame, and long-term activities extending to FY09-FY12.

System Value and Needs

Short-term recommended actions:

- Prepare a general overview of the Great Lakes navigation system from an engineering, economic, and environmental perspective. Use the document to communicate the value and needs of the Great Lakes navigation system and to establish regional program goals and requirements (Appendix D).
- Work with subject matter experts such as the USACE Institute for Water Resources, LRD Navigation Planning Center, Waterborne Commerce Statistical Center, and Environmental Research Development Center to develop analytical tools and models that add rigor to the system overview. Establish automated mechanisms and business processes to update and share this information with the USACE regional and vertical team.
- Work with navigation stakeholders to incorporate a real-time business perspective and outlook into system value and needs assessment.
- Consider the system value and needs to develop a comprehensive and focused program of priorities for the Great Lakes navigation system. Use these priorities to develop and manage a regional plan for out-year work activities and funding requirements.
- Prepare an overview of the Great Lakes shallow draft and recreational harbor network. Work with state and local agencies and other shallow draft and recreational harbor stakeholders to document the relative importance of continued availability of this network of projects to the region as a whole. Establish the need for the recommended $3M annual appropriation (Appendix C).

Long-term recommended action:

- Strengthen and build upon each short-term recommended action.

Program Goals

Short-term recommended actions:

- Work regionally with navigation stakeholders to further develop and refine preliminary system-wide program goals.

- Continue to refine and modify system needs for maintenance, construction, and planning actions on the Great Lakes navigation system (See Program Needs Definition below).
- To strengthen the achievement of the system-wide approach to Great Lakes commercial navigation, work within USACE to modify the Great Lakes Navigation budgetary process to budget Great Lakes commercial navigation features as one complete system (Appendix A).
- Incorporate stakeholder feedback into a refined FYDP for the Great Lakes.
- Continue the development of revised metrics (system-wide transportation savings and ton-miles) to accurately reflect the value of investments in the Great Lakes navigation system.

Long-term recommended actions:

- Analyze the Great Lakes system for at least five years to validate that overall risk is being reduced and that reliability has improved.
- Improve project and system valuation metrics beyond tons and ton-miles. Please refer to Appendix D for further details.

Risk and Reliability Metrics

Short-term recommended action:

- Work with subject matter experts to develop/refine analytical tools that evaluate risk and reliability of Great Lakes navigation features (breakwaters, CDFs, piers, channels, etc.). Please refer to Appendices E and G.

Long-term recommended action:

- Authenticate analytical models and tools with the goal of verifying that overall system reliability has improved. Please refer to Appendix F.

Prioritization Metrics

Short-term recommended actions:

- Establish system-wide Great Lakes Navigation Business Line project ranking criteria that address the most vital components of the system (Appendix B).
- Work with subject matter experts such as the USACE Institute for Water Resources, LRD Navigation Planning Center, and Waterways Data Collection Center to further refine proposed metrics (transportation savings and ton-miles) on a system-wide approach. Incorporate National Program goals adapted to the Great Lakes Navigation system.

- Continue to coordinate proposed metrics with regional stakeholders over the next several months.

Long-term recommended action:

- Use metrics to establish and revise FYDP requirements. Please refer to Appendix E.

Stakeholder Outreach and Communication

Short-term recommended actions:

- Continue working with stakeholders to develop and implement the FYDP. Primary stakeholders consist of small diverse groups of navigation-oriented businesses and government and non-governmental organizations that seek reliability and efficiency improvements.
- Continue working with primary navigation stakeholders to finalize and refine system-wide program goals. The goals were established at stakeholder meetings in January and February 2006. These meetings were facilitated by the primary stakeholders and include local and regional stakeholders such as port authorities, dock owners, shipping companies, local governments, and businesses. The intent of these meetings was to thoroughly engage stakeholders and to define the navigation system needs for the FYDP.
- Meet with primary stakeholders each fall (Nov/Dec) to review the current FY Great Lakes system needs and President's budget for the navigation business line. Also review system needs for current FY plus one. Through discussions with stakeholders, develop understanding and agreement if possible on system needs for current FY and following FY.
- Meet with primary stakeholders each February to review the upcoming FY President's budget (current year plus one) for the navigation business line. Discuss with stakeholders key points of the Navigation program including the President's budget, program goals, and specific activities required to achieve program goals.
- Meet with primary stakeholders each April to discuss strategy for the current year plus two FY budget development. Consider system risks for reliability and efficiency in developing the FY Civil Works budget for the navigation business line. Balance stakeholder needs with overall USACE mission responsibility in developing formal budget submittal.
- Continue to expand and develop new ways of considering stakeholder needs and requirements for the Great Lakes navigation system. Deliberately seek ways to expand USACE situational awareness of Great Lakes navigation system issues, performance, and trends. Valuable sources of information include publications such as the *Great Lakes Seaway Review, U.S. Department of Transportation Maritime Administration Industry Survey*

Series-Great Lakes Operators, and Lake Carriers' Association annual statistical reports and position papers.

Long-term recommended action:

- Continue to develop stakeholder communication and outreach so that it becomes a regular and routine part of doing business. Coordinate on key issues, activities, initiatives, and challenges. Please refer to Appendix I.

Information Technology

Short-term recommended actions:

- Develop existing P2 capabilities related to strategic planning and communication (internal and external). Work with the Great Lakes and Ohio River Division (LRD) P2 Regional Coordination Group to gain a better understanding of these capabilities and how they can be used to serve as the primary data management tool for establishing, tracking, and sharing all information and activities.
- Establish P2 capabilities described above and provide suitable level of user education that result in efficient and effective use of the tool.
- Establish regional standard for document sharing. Re-energize Electronic Data Management System (EDMS) initiative to establish single means of document sharing. Ensure standard is formally established and communicated. Provide suitable level of user education that result in efficient and effective use of the tool.

Long-term recommended action:

- Continue to develop information technology.

Regional Business Center

Short-term recommended actions:

- Detroit District has the lead for preparing the navigation FYDP and has been serving as the primary point of contact for coordination with LRD. The District has been formally designated as the lead District for the Great Lakes navigation business line. Continue developing and reviewing the description of the role and responsibilities of the lead district, as well as the supporting districts and the role and responsibility of the LRD navigation business line leader.
- Use navigation business line program goals to identify out-year projects and funding requirements (workload). Match these requirements with individual

district expertise to establish regional leads (in any Great Lake District) for specific navigation related activities such as structure repair, dredging, surveys, contract acquisition, construction management and contract administration, studies, environmental compliance, outreach, and cost savings initiatives. Lead points of contacts will have the responsibility to establish effective business processes that result in the activity being planned and executed as a region.

- Continue formalized ongoing efforts to establish regional floating plant, survey, and dive programs. Review recommendations of project delivery teams on how to best manage each program. Update as necessary, inventories of equipment, personnel, capabilities, and future workload. Implement improved business processes that were identified by teams to manage the programs.

Long-term recommended action:

- Continue to develop regional business center.

Business Processes

Short-term recommended action:

- Select a few common program management business processes or activities that each district currently executes independently and reshape them to reflect a regional perspective. Examples include, but are not limited to, annual budget formulation and testimony; member fact sheets and congressional visits; and distribution of survey data.

Long-term recommended action:

- Continue to develop regional business processes.

Program Needs Definition

A program that meets system requirements for acceptable levels of risk for maintenance, construction, and planning actions required on the Great Lakes navigation system in the years FY06-FY11 was developed with input from the Great Lakes navigation industry stakeholders. It characterizes or defines the requirements to maintain the system in a reliable, effective, efficient, safe and environmentally sustainable manner. These system requirements are defined as system needs in this FYDP document. System needs are requirements that can be reasonably accomplished considering realistic constraints such as Corps in-house resources and contract capability to achieve a functional service level on the system. System needs do not reflect a 'wish list' of all system optimal activities that would be needed to bring the system up to optimum standards. It reflects a more realistic, executable system requirements based need.

A key component to the historic and continued reliability of the Great Lakes navigation system has been a proactive preventative maintenance program. A maintenance and repair schedule along with an appropriate inspection program is needed to reduce the risk of project failures and maximize the benefit of available funds. Rationale is presented for developing the system, priorities of the actions, and what the major activities sequence should be.

General System Actions

The following items define the general system actions that were established during the development of the optimum program for the Great Lakes Navigation System FYDP:

A. Maintain authorized project depths and channel dimensions in critical harbors.

B. Ensure uninterrupted maintenance and/or operation of critical navigation system choke points such as the Soo Locks and connecting channels.

C. Operate and/or maintain structures that are critical to safe and efficient navigation.

D. Maintain capability to assist in disaster, emergency, and/or national security response.

E. Operate and maintain the Great Lakes navigation system in accordance with the USACE environmental operating principles.

F. Maintain cutting edge technology with regards to operating and maintaining the Great Lakes navigation system.

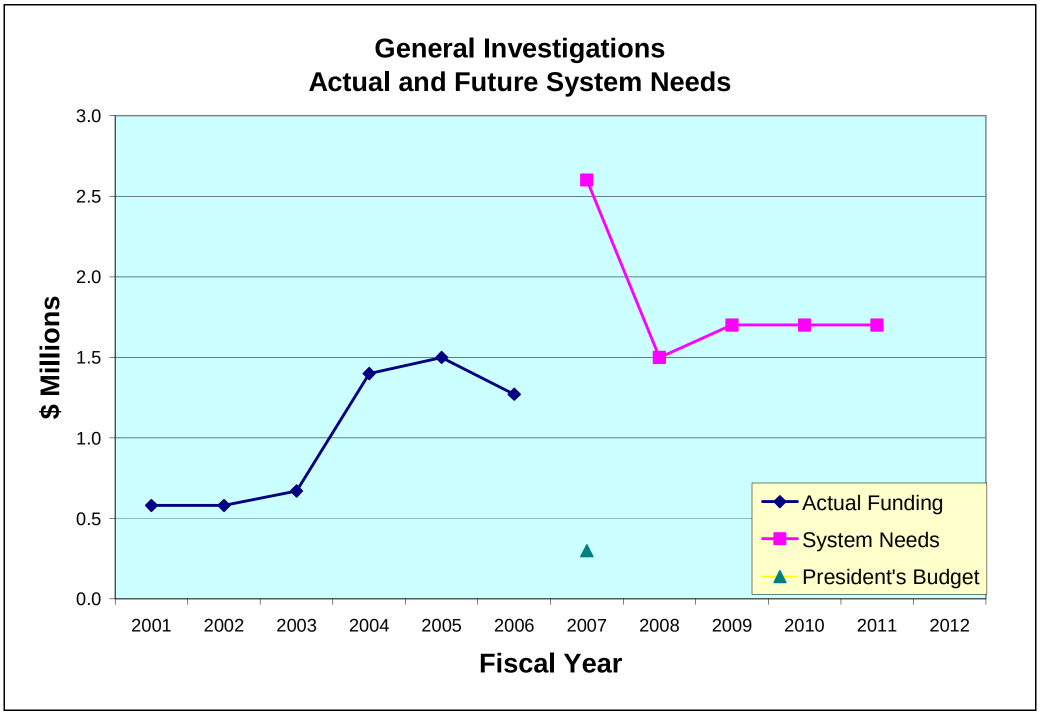
G. Establish, maintain, and continuously improve effective means of USACE/navigation stakeholder outreach and communication.

Investigations and Assessments

Comprehensive investigations, condition assessments, and risk analyses are optimum management measures that are needed to enable attaining a functional service level in the navigation system. The specific major system requirement of this type is the following:

H. Complete Great Lakes Ste. Lawrence Seaway Study, and utilize as guiding document for the navigation FYDP.

Funding for system needs provides for efficient utilization of analyses and the earliest achievement of benefits. The following chart shows the actual funding FY01 - FY06, and funding needed to achieve system needs for FY07 – FY12.



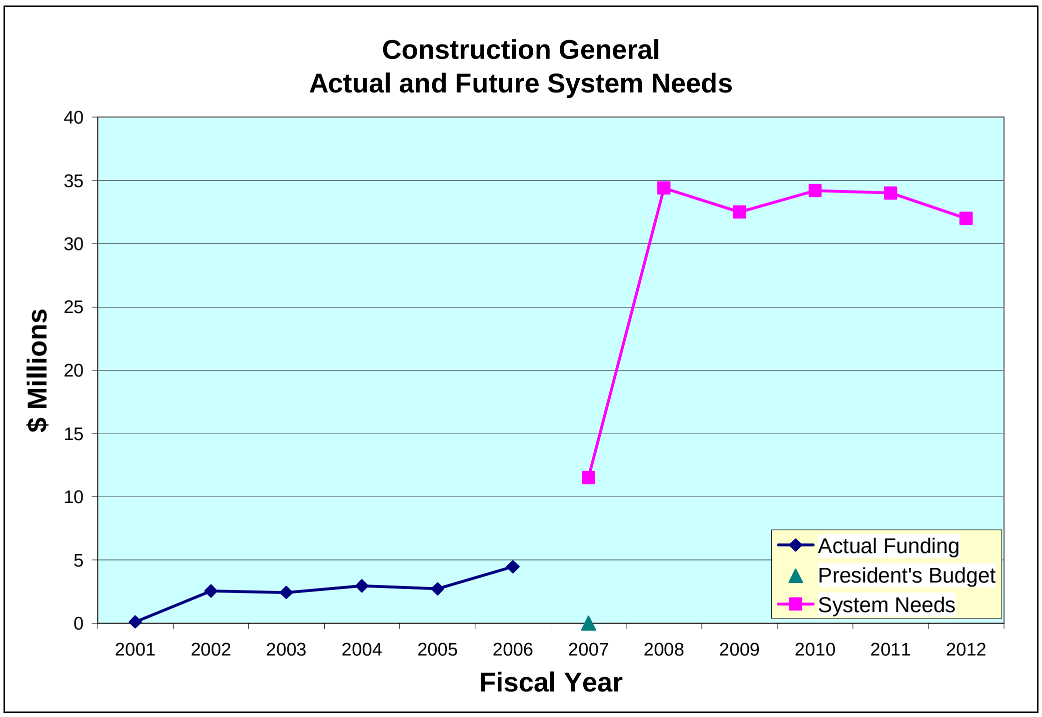
Construction

Constrained funding precludes efficiently completing ongoing construction of major projects and results in the cost of construction being needlessly inflated. The future projects identified by the FYDP process methodologies under development may be deprived of timely completion under these conditions. The Great Lakes navigation system funding level must be predictable and planned in concert with all construction projects such that the needs of the system can be budgeted in the most efficient manner.

Construction for completing projects currently underway includes the following, shown in efficient chronological completion order to ensure continuity to develop and improve the efficiency and reliability of the navigation system.

1. Complete Indiana Harbor Combined Disposal Facility construction in FY09.
2. Complete Chicago Lock West Gates Replacement construction in FY09.
3. Complete Sault Ste. Marie Replacement Lock construction in FY11.
4. Complete Chicago Lock East Gates Replacement construction in FY11.
5. Complete Loraine Harbor Combined Disposal Facility construction in FY13.

Funding for system needs provides for efficient construction and the earliest achievement of benefits. The following chart shows the actual funding FY01 - FY06 and system needs funding for FY07 – FY12.



Maintenance

A majority of federal projects on the Great Lakes are between 60 and 100 years old. The maintenance requirements will continue to accelerate as regular maintenance activities are delayed. The cost to operate and maintain these facilities is not expected to remain constant over time. The effects of inflation, increasing age of the facilities, increasing traffic levels, and the need to operate and maintain both new and old technology equipment will require enhanced knowledge and capability at each project.

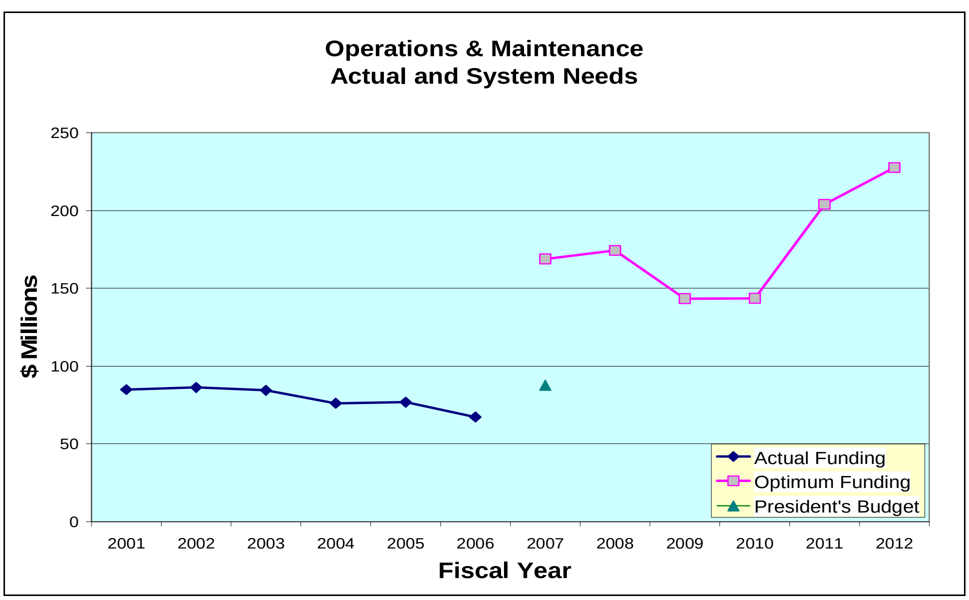
The constrained funding for maintenance of navigation projects has caused a decline in the reliability of many of the harbors in the system. As part of this Five Year

Development Plan, the system continues to need a comprehensive maintenance schedule for its navigation facilities. Current assessment of the system's locks, channels, CDFs, and protective structures reveals that 33 percent are below the Acceptable Level of Risk for the particular site. The assessment for each site is shown in Appendix F. A summary is shown in the chart below:

	Current Level of Performance Reliability					
Acceptable Level of Performance Reliability	**A**	**B**	**C**	**D**	**F**	**# Projects Currently Below Acceptable**
A	1	4	3	0	0	7
B	0	2	5	2	0	7
C	0	1	9	6	0	6
D	0	7	10	9	2	2
F	0	3	2	0	0	0
Totals						22

Total commercially-significant navigation projects	66
# Projects Currently Below Acceptable	22
% Projects Currently Below Acceptable	33%

Funding for system needs provides for the maintenance to meet the Great Lakes Navigation System risk reduction goals. The investments required to achieve acceptable levels of risk for the fiscal years FY07 through FY12 are shown on the table in Appendix F. The following chart shows the actual funding FY01 - FY06, and system needs funding levels for FY07 – FY12.



APPENDIX A

Recommended Changes to Budget EC for FY 2009 Civil Works Budget Development

1. It is recommended that the requirements for the Great Lakes be addressed on a systems-approach (with one comprehensive single appropriation) as opposed to a collection of individual projects and appropriations.

2. Results from our initial stakeholder meeting indicate that ton-miles are used as a performance indicator globally. The FYDP team's preliminary analysis indicates that a transportation savings metric is meaningful and objective to employ on the Great Lakes on a systemic basis. System ton-miles shall initially be used as a secondary project screen.

   The ultimate objective is to be able to determine system transportation savings and evaluate the return on investment for the Great Lakes. This long-term goal is not yet achievable with the economic data presently available. In the interim, the goal is to evaluate an investment by comparing it with the negative consequences and costs that the investment prevented. Estimates need to be made to determine the benefits associated with individual ports and the benefits associated with specific improvements or channel maintenance actions. Please refer to Appendix D for further details.

3. A mechanism to provide minimum functionality for the Great Lakes shallow draft harbors is crucial. The $3.0M cost for maintaining 15-20 of these harbors on an annual basis appears to represent a very nominal investment compared to the enormous benefits in safety, search and rescue capability, recreation, and Native American fishing rights. It is recommended that $3.0M be annually allocated to meet the most critical requirements of shallow draft harbors on the Great Lakes.

APPENDIX B

Great Lakes Navigation Business Line
Project Ranking Criteria

INTRODUCTION: An analogy can be made that the critical components of the Great Lakes navigation system are similar to the vascular system in the human body. Accordingly, the loss of functionality of these critical components has catastrophic consequences for the entire Great Lakes navigation system as a whole.

The most vital components of the Great Lakes navigation system are the locks on the St. Marys River and the Great Lakes Connecting Channels. Approximately one-half of all tonnage shipped on the Great Lakes depends on these projects on every transit and Great Lakes stakeholders refer to these projects as the lifeline of the system.

FY08 GREAT LAKES RANKING STRATEGY:

a. General: The Great Lakes regional team included and ranked packages in increment one (risk and reliability category one) that represent requirements to maintain "bare bones" system functionality. The work that supports this "bare bones" functionality primarily includes lock operations, maintenance dredging, and essential navigation structure repairs. Increment two (which may contain work in R&R 1 or 2) generally represents work packages that involve substantial maintenance investments that support navigation in critical nodes of the system. Increments three and four represent work packages that are not critical to the overall system functionality, and Increment five contains work at shallow draft or recreational harbors.

   The Great Lake regional team also assessed other important project features when ranking the merits of work packages in Increments one and two. These features included: USCG marine safety presence, the lack of other transportation modes available to deliver key commodities, crucial harbor of refuge, ferry service, commercial fishing, and relative importance to the continued viability of the Great Lakes navigation system.

b. The Great Lakes regional team employed the above concepts in developing Increment one with priorities summarized as follows: (1) work that supports lock operations at the Soo Locks, (2) work essential in the Great Lakes Connecting Channels, (3) work that provides basic functionality at the top shipping and receiving harbors (Duluth-Superior, Indiana Harbor, Cleveland, and Chicago), (4) work that supports the overall safety of the system (channel condition surveys and reporting requirements), (5) other work that supports overall Great Lakes navigation system functionality (maintenance dredging, work that supports maintenance dredging and hired labor navigation structure repairs). Increment two includes key Great Lakes fleet navigation structure repairs and major maintenance packages to maintain the integrity of the system into the future such as Poe Lock maintenance, Indiana Harbor CDF, Cleveland breakwater and CDF repairs, and Ashtabula Harbor CDF.

APPENDIX C

Great Lakes Navigation Business Line
Shallow Draft Harbor Maintenance

There are nearly 80 shallow draft Federal harbors on the Great Lakes under the authority of the Great Lakes Districts. The harbors are located in urban areas, areas where tourism is prevalent, rural and wilderness areas, and in areas of almost any combination of those conditions. The projects are typically comprised of access or entrance channels protected by breakwaters and/or piers and include vessel mooring and refuge areas. The uses of the harbors include recreational boating; permanent and transient mooring; commercial, charter and recreational fishing; storm refuge; subsistence (i.e. access point for supplying islands with provisions); ferry service; U.S. Coast Guard stations; research vessel sites; etc. The primary benefits of the projects are usually provided by these uses. Secondary benefits of the harbors accrue as the local infrastructure to support the direct use of the projects is developed by non-Federal interests. Marinas, establishments for repairs and supplies, establishments for provisioning and other related marine services and facilities extend the benefits of the shallow draft harbors. In addition, at locations where harbors are adjacent to municipalities, the project invariably becomes the focus of the village or town such that municipalities and local businesses adopt and thrive on the nautical theme and benefits are multiplied 10 to 15 times or greater for harbors near more populated areas.

About 50 shallow draft harbors require periodic maintenance dredging to provide safe vessel passage. Dredging frequency varies from annually at harbors subject to severe shoaling to every 10 to 15 years at harbors where shoaling is light. In any given year, 15 to 18 harbors may require dredging to avoid danger to users and maintain any state of project operability. The unit cost of dredging varies from about $4 to $10 per cubic yard, depending on the type of dredge equipment, dredged material quantities, material placement alternatives, and other factors. The total cost of maintenance dredging, including engineering and design and surveys, may vary from a low of about $75,000 at harbors dredged frequently (1 to 3 year intervals) to over $500,000 for harbors that are dredged every 5 to 10 years or less frequently. Thus, the annual budget for maintenance dredging of shallow draft harbors is about $3 to $4 Million depending on the number of harbors requiring dredging in a given year. A potential shallow draft harbor dredging schedule is shown on the following pages.

Shallow Draft Harbor Dredging

Harbor	FY07	Cost (x$1000)		FY08	Cost (x$1000)		FY09	Cost (x$1000)		FY10	Cost (x$1000)		FY11	Cost (x$1000)
LRB														
Barcelona		420												488
Cape Vincent														
Cattaraugus Creek														103
Cooley Canal					350									
Great Sodus Bay											250			
Irondequiot Bay		378												460
Little River					400									
Little Sodus Bay														403
Oak Orchard								400						
Olcott		445												490
Port Clinton					270									
Put-in-Bay								385						
Rocky River								373						
Sturgeon Point														
Toussaint river								485						
Vermillion		353			280									370
West								365						
Wilson		500												500
Total	**5**	**2096**		**4**	**1300**		**5**	**2008**		**1**	**250**		**7**	**2814**
LRC														
Burns					100						104			
Total					**100**						**104**			

Shallow Draft Harbor Dredging

Harbor	FY07	Cost (x$1000)	FY08	Cost (x$1000)	FY09	Cost (x$1000)	FY10	Cost (x$1000)	FY11	Cost (x$1000)
LRE										
Algoma			x	200						
Arcadia	x	80	x	80	x	80	x	80	x	80
Au Sable	x	225								
Big Bay	x	125								
Big Suamico							x	375		
Black River (PH)									x	650
Black River (UP)	x	85							x	85
Bolles Harbor					x	185				
Caseville					x	280				
Cedar River									x	200
Clinton River							x	675		
Cornucopia					x	110				
Grand Traverse	x	95							x	95
Harrisville					x	185				
Lac La Belle			x	125						
Leland	x	120	x	120	x	120	x	120	x	120
Lexington	x	125			x	125			x	125
Little Lake	x	160			x	160			x	160
New Buffalo			x	130			x	130		
Oconto										
Pentwater	x	120	x	120	x	120	x	120	x	120
Point Lookout			x	475						
Port Austin										
Portage Lake	x	200					x	200		
Port Sanilac	x	125					x	125		
Port Wing			x	200					x	200
Saugatuck	x	225					x	225		
Saxon							x	180		
Sebewaing	x	400			x	550			x	550
South Haven			x	250						
Two Rivers					x	260				
Whitefish Point			x	150						
White Lake			x	225						
Total	**13**	**2085**	**11**	**2075**	**11**	**2175**	**10**	**2230**	**11**	**2385**
Totals		**4181**		**3475**		**4183**		**2584**		**5199**

APPENDIX D

Great Lakes Navigation Business Line Overview

Objective: The objective of this section is to provide an overview of the Great Lakes navigation system from an economic, infrastructure, and environmental perspective.

Great Lakes Navigation System (GLNS): The Great Lakes navigation system is a continuous 27-foot deep draft waterway that extends from the western end of Lake Superior at Duluth, MN to the Gulf of St. Lawrence on the Atlantic Ocean, a distance of over 2,400 miles. This bi-national resource is composed of the five Great Lakes (Superior, Michigan, Huron, Erie, and Ontario), the connecting channels, the St Lawrence River and the Gulf of St. Lawrence. The U.S. portion of the system includes 136 harbors of which 71 are commercial, four locks, 104 miles of breakwaters and jetties, and over 600 miles of maintained navigation channel. In addition, the GLNS is connected to several other shallow draft waterways (Illinois Waterway, New York State Barge Canal, etc.) to form an important waterborne transportation network, reaching deep into the continent.

System Volume and Commodities: The GLNS provides the means of transporting significant amounts of waterborne commerce annually. Over 156 million tons of commodities were shipped on the system of waterways that comprise the GLNS in 2003. Part of the area served by the system, commonly referred to as the Mid-continent region, constitutes the industrial and agricultural heartland of North America. It encompasses nineteen States and three Canadian Provinces. Over 80 million people, approximately 30% of the combined populations of Canada and the U.S., live in this area. The region produces nearly 35% of the combined gross national products, a third of their capital investments and about 30% of their combined personal income. In the U.S. the eight Great Lakes states account for a third of the total U.S. exports.

Iron ore (in the form of pellets) has been, and remains, the dominant commodity transported on the Great Lakes. In 2003 it accounted for 31% of all bulk commodities shipped across the lakes. Lesser, but still significant, quantities of coal, stone aggregates, cement, minerals, grain and petroleum products are transported across the lakes. Coal ranks second to iron ore; its share of bulk shipments in 2003 was 27% of all bulk commodities. Currently stone is the third leading bulk commodity accounting for 22% of bulk shipments in 2003. Figure B-1 provides an overview of 2003 GLNS traffic distribution by commodity. Table B-1 provides an overview of GLNS traffic by area and tonnage.

Figure B-1 Great Lakes Commodity Traffic Distribution, 2003

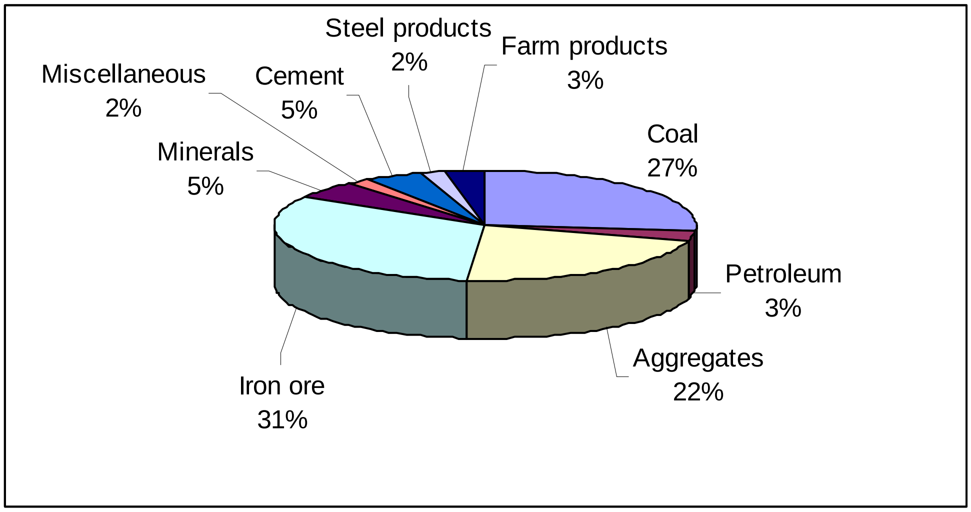


Table B-1: Historic GLNS Traffic, by Area, 1994 – 2003 (in millions of tons)

Area	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Annual %Growth 1994 - 2003
Detroit River, MI	72,027	73,502	75,023	75,939	82,842	75,242	80,508	74,278	74,653	63,961	-1.2%
Lake Erie 1/	83,498	83,622	87,915	93,036	97,799	89,100	96,992	84,890	80,901	72,713	-1.4%
Lake Huron	108,454	113,028	114,151	120,629	119,891	116,091	120,671	113,288	114,050	100,750	-0.7%
Lake Michigan 2/	62,747	65,424	66,993	66,691	64,080	62,165	63,516	59,860	57,770	57,904	-0.8%
Lake Ontario 3/	26,082	27,656	30,691	28,409	29,042	26,231	31,853	27,272	22,267	22,154	-1.6%
Lake Superior	76,771	79,029	77,945	82,715	81,444	79,828	80,773	70,232	76,575	68,430	-1.1%
St. Claire River, MI	75,531	78,813	78,546	79,777	84,238	79,910	85,079	79,143	79,341	68,067	-1.0%
St. Lawrence River 4/	19,197	21,048	22,181	18,228	20,702	18,167	23,274	18,610	13,091	12,976	-3.8%
St. Marys River, MI	75,939	78,639	78,939	83,822	82,235	81,315	84,925	74,916	80,330	71,921	-0.5%
Welland Canal, Canada	25,657	27,144	30,117	27,724	28,497	25,696	31,172	26,771	21,774	21,453	-1.8%
Net United States Traffic on the Great Lakes	175,275	177,750	181,773	188,579	192,232	182,862	187,490	171,359	167,226	156,484	-1.1%

1/ Including Upper Niagara River

2/ Including the Port of Chicago (Chicago Harbor, North Branch, South Branch, Sanitary Ship Canal, Calumet-Sag Channel, Lake Calumet and Calumet Harbor and River)

3/ Including Lower Niagara River

4/ Between International boundary line and Lake Ontario

Note: US traffic (an origin or destination in the U.S.) only.

Economic Value: The GLNS has an enormous economic impact on the North American economy. It generates over $2 billion and some 50,000 jobs to the U.S. economy, and adds an additional $3 billion annually and up to 17,000 jobs in Canada. For individual ports in the system, trade has been a catalyst for billions of dollars in capital investment and industrial growth. The base economies of many GLNS ports, and the entire Midwest, were defined by cost effective access to raw materials provided by the waterway. The GLNS and St. Lawrence Seaway provide U.S. and Canadian farmers of the Great Plains an economical route to the world market for roughly 14 million metric tons a year of wheat, corn, soybeans and other products.

Maritime commerce on the GLNS involves two general trade communities: traffic moved on the Seaway, much of which is overseas import/export trade, and inter-lake domestic trades contained within the Great Lakes. Though the two trades are largely distinct, they both service the steel industry. Lakers haul iron ore to the integrated mills manufacturing steel, while "salties" specialize in carrying primary steel products.

The GLNS is a multi-modal system. Seamless movements of goods and commodities flow from ship to rail and truck and from rail and truck to ship in well-synchronized trade patterns. Some of the most successful GLNS trades rely on multimodal connections, such as low-sulfur coal railed to Great Lakes loading ports from Wyoming and Montana for shipment by self-unloading vessels throughout the Lakes and grain railed from the Canadian Prairie Provinces to Thunder Bay for direct export by ocean freighters. It is no coincidence that the major rail and highway hubs of the mid-continent, such as Chicago, Toronto, Detroit and Toledo-are major GLNS ports as well. More than 40 interstate and provincial highways and nearly 30 rail lines link the 65 major and regional ports of the system with consumers and industries all over North America.

Environmental Setting: The Great Lakes system enjoys global prominence, containing some 6.5 quadrillion gallons of fresh surface water, a full 20 percent of the world's supply and 95 percent of the United States' supply. They lend not only geographic definition to the region, but help define the region's distinctive socio-economic, cultural and quality of life attributes, as well. An international resource shared by the United States and Canada, the system includes parts of eight states and one province: Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, New York, and Ontario. The watershed of the Lakes includes portions or all of eights states and two Canadian provinces. There are thirty-five federally recognized Indian Tribal Nations and over 200 counties within the U.S. portion of the System.

The Great Lakes System, including the international section of the St. Lawrence River above Cornwall, Ontario/Massena, New York, covers about 299,000 square miles. Because of the large size of the watershed, physical characteristics such as climate, soils and topography vary across the System. To the north, the climate is cold and the terrain is dominated by granite bedrock called the Laurentian Shield consisting of Precambrian rocks under a generally thin layer of acidic soils. Conifers dominate the northern forests. In the southern areas of the System, the climate is much warmer and the soils are deeper with layers or mixtures of clays, silts, sands, gravels and boulders deposited as glacial drift or as glacial lake and river sediments. The lands are usually fertile and can be readily drained for agriculture. Urban development in the Great Lakes states is also variable, ranging from dense urban areas such as Chicago to remote wilderness such as Isle Royale and the Boundary Waters Canoe Area.

The Great Lakes System might be physically characterized as a large, inland sea with about 100 major tributaries draining into it. Human development in the System has been concentrated around the rim of the Lakes and lower reaches of tributaries where the water resources provided for transportation in addition to supplying water for industrial and potable uses. Most of the population centers around the Great Lakes were heavily dependant on the Lakes for waterborne commerce during their rapid growth in the 19th century. Harvesting the forestry resource of the northern half of the System helped spurn urban development around the System.

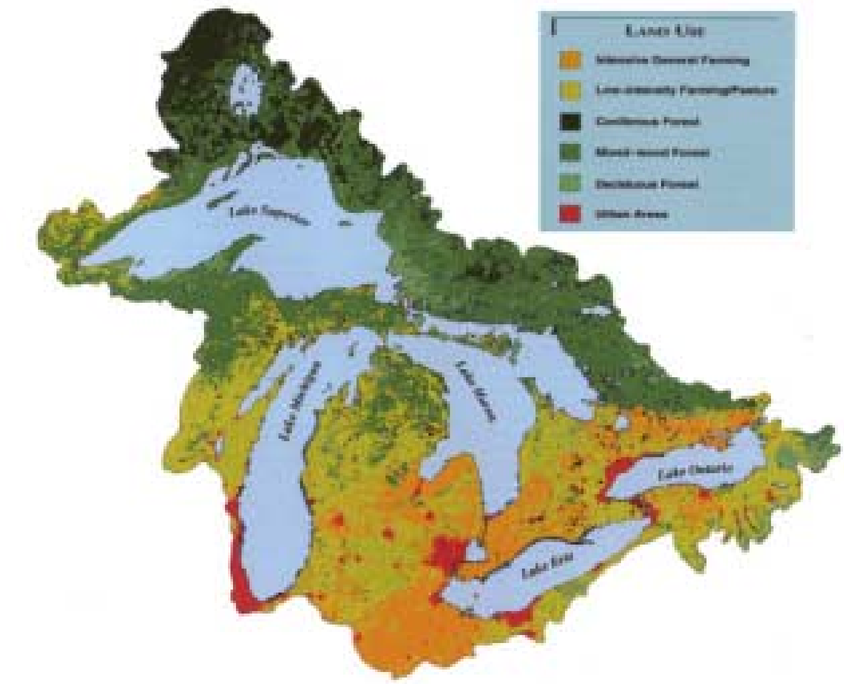


Figure 2-3. Land-Use Map of Great Lakes System

Approximately 52 percent of the Great Lakes System is forested; 35 percent is in agricultural uses; 7 percent is urban/suburban; and 6 percent is in other uses. Major commerce and industries in the System include manufacturing, tourism, and agriculture. Nearly 20 percent of the U.S. population and 40 percent of the Canadian population resides within the System.

Development occurred around the rim of the lakes and tributaries because the water resources provided for transportation as well as industrial and potable water supply. Most of the cities around the Great Lakes were heavily dependant on the Lakes for waterborne transportation during their rapid growth in the 19th Century. Commercial and industrial development was concentrated along waterfronts. Away from the rim of the lakes, development was focused along tributaries where thousands of low-head dams were constructed to provide water for industries (principally lumber, pulp & paper), irrigation and potable supply. Flood damage reduction was a purpose at some of these impoundments.

The importance of waterborne commerce to most of the cities around the Great Lakes peaked in the early part of this Century, and has declined steadily since. However, its importance to the regional economy is still very high because of the transport of raw materials for steel making, coal-fired power production, and construction (limestone, cement, stone & gravel). At the turn of the Century, there were over 100 commercial ports in the Great Lakes. Today, the bulk of Great Lakes waterborne transportation is concentrated in less than 20 harbors. Domestic carriers focused at "internal" markets dominate the maritime and commerce interests in the Great Lakes. The physical constraints of the navigation infrastructure in the Great Lakes and St. Lawrence Seaway cannot accommodate large, sea-going vessels comparable to marine ports, and have become a major handicap to the expansion of international trade. The breakwaters, piers, embankments and other navigation infrastructure at most of the harbors around the Lakes were constructed 50-100 years ago, and are showing their age.

Waterfronts that used to be the heart of industry and commerce at Great Lakes cities are now lined with abandoned factories and brown fields. The value of these waterfronts for urban renewal has been recognized by many cities, and several commercial harbors have been transformed into residential and recreational centers. The industry of recreation has replaced a "rust-belt" economy at many of the cities on the rim of the Great Lakes. A draft study on recreational boating shows that one-third of all registered recreational boats in the United States are located in the eight Great Lakes States, where boating results in more than $10 billion of annual economic activity. In addition, U.S. Fish and Wildlife survey data indicate that fishing, hunting and wildlife watching generate almost $18 billion in annual revenues in the Great Lakes region.

Many of the communities that developed along tributaries have evolved along similar lines. Riverfront properties are valued for recreation and residential use, displacing industrial and commercial users in some cases. Urban sprawl in the post WW II era expanded residential development into flood-prone areas, including wetlands, prior to the enactment of Federal and state regulations. As the value of these properties has increased, some localized flood protection measures have been constructed. In rural areas, dams and impoundments built for agricultural, industrial or other uses that are no longer needed lie abandoned or are the responsibility of municipalities who have little interest or ability to maintain them.

An artifact of urban and industrial development in the System was the contamination of soil, water and sediments. Environmental laws and regulations passed in the past 30 years, coupled with a major investment in pollution control have enabled significant progress in restoring the quality of these resources. The initial, rapid success in environmental restoration on the most visible symptoms of pollution (e.g., dead alewife's, algal blooms) was followed by a more slow progress with the less visible contamination sources (e.g., sediments, combined sewers, groundwater).

Another artifact of the urban/industrial development in the Great Lakes Navigation System was the destruction of wetlands and aquatic habitat. Numerous structures extending into the lakes or designed to protect harbors, roads, buildings or other structures have altered natural coastal processes and destroyed most of the coastal wetlands and natural shorelines. Agricultural and forestry practices, development along tributaries, construction of impoundments, and urban sprawl have consumed most of the interior wetland and aquatic habitat within the System.

The development of the navigation system in the Great Lakes System, beginning with the Welland Canal and later the St. Lawrence Seaway and Sault Ste. Marie locks connecting the upper and lower Lakes has facilitated the introduction of a number of non-native species into the Great Lakes, such as the sea lamprey, zebra mussel, round goby and ruffe. Other species, including most of the game fish in the Lakes, were introduced intentionally, and their populations maintained by stocking. These non-native species have permanently altered the complexion of the Great Lakes ecosystem, which remains in a state of flux.

APPENDIX E

Recommended FYDP Navigation System Risk Assessment

Risk Level Methodology for Great Lakes Commercial Navigation Projects

Acceptable Risk Level

A	Virtually no compromise to authorized Federal project features accepted.
B	Minimal compromise to authorized Federal project features accepted.
C	Moderate compromise to authorized Federal project features accepted.
D	Substantial compromise to authorized Federal project features accepted.
E	Significant compromise to authorized Federal project features accepted.

DISTRICT	PROJECT NAME	Acceptable Risk Level	Current Risk Level
LRB	ANYPLACE HARBOR, OH	B	C
LRB	THAT CHANNEL AND HARBOR, NY	D	E
LRB	THIS HARBOR, NY	C	D
LRB	LAKE HARBOR, PA	C	C
LRB	SOMEBURG, NY	D	D
LRB	PROJECT CONDITIONS SURVEYS, NY	A	B
LRB	HARBOR, NY	D	D
LRB	WHAT HARBOR, OH	B	D
LRC	BURNS HARBOR, IN	B	B
LRE	CHANNELS, MI	A	C
LRE	CHANNELS	A	A
LRE	LITTLE USED WATERWAY, MI	E	C

Harbor Evaluation Guidance for determining Current Risk Level:

Harbors consist of the following elements:

1. CDF
2. Federal Channel area
3. Protective Structures (includes breakwaters, jetties, and piers)

Lock structures have been omitted from this list purposely. Consideration for these critical features has typically been made by treating these as separate projects from the harbor areas in which they reside.

It is likely that within a particular harbor, each of the above-listed elements will have differing condition indices that result in a variation in the associated Current Level of Risk. It is possible that Acceptable Levels of Risk may also be varied for each element in the Optimum Condition. This leads to inconsistency in providing an overall Current Level of Risk rating each harbor.

The interim approach to resolve this inconsistency is to weight the factors, and then calculate an overall Level of Risk associated with each harbor. Not all the harbor elements are equivalent in value for the O&M mission. A CDF located within a harbor is the most critical harbor element, as dredging work cannot be completed without this feature in place. Maintenance of the Federal Channel areas (dredging) would be second in importance, followed thereafter by the structures associated with the harbor.

Breakwaters, piers, and jetties have been downgraded in this manner due to their typical slow rate of failure. In general, even substantially degraded breakwater structures provide substantial protection to the harbor. Therefore, maintenance can often be deferred without substantial negative impacts to harbor operation and navigation traffic. A breakwater that fails is often still a mass within the water that functions as a reef, and provides at least some wave protection. Similarly, a small breach within a breakwater structure does not necessarily degrade wave conditions within the inside of the harbor significantly enough to hinder navigation traffic. Acceptable wave conditions for safe navigation within a particular harbor is a characteristic that that should be set by the stakeholders, and breakwater failures must then be evaluated on what impact they have on the degradation from this expected condition.

The following harbor element weighting factors are recommended for harbors that include a CDF:

1. CDF operation and maintenance – 30%
2. Federal Channel maintenance - 40%
3. Breakwater maintenance – 30%

Harbors without a CDF would use the following weighting factors:

1. Federal Channel maintenance – 60%
2. Breakwater maintenance – 40%

The use of these harbor element-weighting factors is best demonstrated with an example.
Calumet Harbor Current Level of Risk Calculation:

1. CDF condition = 1   (only 3 years of remaining capacity)

2. Federal channel condition = 3   (substantial cross section losses upstream in less critical areas, balanced by lesser amounts of shoaling in the more highly trafficked areas.)

3. Breakwater condition = 3   (This figure is generous, and is selected only in the interest of using whole numbers as condition indices. The primary structure harbor protective structure is constructed out of steel-sheetpile cells, which can fail suddenly and dramatically, as opposed to most timber crib and rubblemound structures on the G.L. The last failure occurred approximately 17 years ago, and was dramatic, as three cells unraveled simultaneously, resulting in a 100’

breach. This area was subsequently encapsulated with stone. The structure is 70 years old, and all the remaining cells all have tears in the steel sheetpile.)

Based on these rankings, the overall Current Level of Risk associated with Calumet Harbor would be:

Current Level of Risk Index = (1 x 0.30) + (3 x 0.40) + (3 x 0.30) = 2.40

Given the fact that the harbor's primary protective structure was overrated (in the interest of using whole numbers), the Level of Risk Index should be rounded down to 2. Similar analysis will have to be made on a case-by-case basis whenever Level of Risk Index calculations result in fractional numbers.

APPENDIX E: Recommended FYDP Navigation System Risk Level Definitions

Risk Level	Description
A	**Virtually no compromise to authorized Federal project features accepted.**

Federal Navigation Channels:

- Recommended availability of navigation channels.
- No greater than 10 percent loss of channel cross-section or reach area during the navigation season.
- No greater than 6 inches of shoaling in primary channel traffic areas during the navigation season.

Federal Navigation Structures:

- Navigation structures are well maintained and have minimal deterioration.
- Critical structures have 0-10 percent loss of as-built cross-section.
- Protected Federal channel areas have no greater than 6 inches of degradation (increase) in average wave height.
- Total length of navigation structures' cross-sectional losses is no greater than 15 percent of the total as-built navigation structures' length.

Federal Navigation Locks:

- Navigation locks and ancillary features are well maintained and have minimal deterioration.
- At least one lock chamber is always available for passage.

Federal Confined Disposal Facilities:

- Confined disposal facilities are well maintained, and have minimal deterioration.
- Confined disposal facility has at least 15 years of remaining capacity.

Project Condition Surveys:

- Project feature condition inspections are completed annually for all commercial harbor project elements.
- Wave gauge data gathering is current and continuous for the purpose of monitoring navigation conditions within the harbor-protected areas of the Federal Channel.
- Bathymetric data is available for all Federal Channel areas, and accurately reflects current conditions. Sounding data utilized for condition analysis must not be older than five months old.

SYSTEM SIGNIFICANCE METRIC: The project is critical to continued viability of the Great Lakes navigation system. It is a leading U.S. port (LRD Navigation Planning Center data) that has a five-year average annual tonnage greater than 20 million tons, and/or is a point of passage that controls movement of commodities to other ports in the system.

APPENDIX E: Recommended FYDP Navigation System Risk Level Definitions

Risk Level | **Description**

B — **Minimal compromise to authorized Federal project features accepted.**

Federal Navigation Channels:

- Minimal shoaling in primary channel traffic areas.
- No greater than 20 percent loss of channel cross-section or reach area during the navigation season.
- No greater than 12 inches of shoaling in primary channel traffic areas during navigation season.

Federal Navigation Structures:

- Navigation structures are routinely maintained and have minimal deterioration.
- Critical structures have 11-20 percent loss of as-built cross-section.
- Protected Federal channel areas have no greater than 12 inches of degradation (increase) in average wave height.
- Total length of navigation structures' cross-sectional losses is no greater than 25 percent of the total as-built navigation structures' length.

Federal Navigation Locks:

- Navigation locks and ancillary features are routinely maintained, and have minimal deterioration.
- At least one lock chamber is always available for passage.

Federal Confined Disposal Facilities:

- Confined disposal facilities are routinely maintained, and have minimal structural deterioration.
- Confined disposal facility has at least 12 years of remaining capacity.

Project Condition Surveys:

- Project feature condition inspections are completed annually for all commercial harbor project elements.
- Wave gauge data gathered for the purpose of monitoring navigation conditions within the harbor-protected areas of the Federal Channel is no greater than one year old.
- Bathymetric data is available for all Federal Channel areas, and accurately reflects current conditions. Sounding data utilized for condition analysis must not be older than five months old.

SYSTEM SIGNIFICANCE METRIC: The project is very important to continued viability of the Great Lakes navigation system. It has a five-year average annual tonnage greater than greater than 5, but less than 20 million tons (LRD Navigation Planning Center data). These harbors ship and/or receive commodities that support numerous businesses and industries with national significance.

APPENDIX E: Recommended FYDP Navigation System Risk Level Definitions

Risk Level	**Description**
C	**Moderate compromise to authorized Federal project features accepted.**

Federal Navigation Channels:

- Moderate shoaling in primary channel traffic areas.
- No greater than 30 percent loss of channel cross-section or reach area during the navigation season.
- No greater than 24 inches of shoaling in primary channel traffic areas during navigation season.

Federal Navigation Structures:

- Navigation structures are maintained as required and have moderate deterioration.
- Critical structures have 21-30 percent loss of as-built cross-section.
- Protected Federal channel areas have no greater than 18 inches of degradation (increase) in average wave height.
- Total length of navigation structures' cross-sectional losses is no greater than 35 percent of the total as-built navigation structures' length.

Federal Navigation Locks:

- Navigation locks and ancillary features are maintained as required, and have moderate deterioration.
- At least one lock chamber is always available for passage.

Federal Confined Disposal Facilities:

- Confined disposal facilities are maintained as required, and have moderate structural deterioration.
- Confined disposal facility has at least 9 years of remaining capacity.

Project Condition Surveys:

- Project feature condition inspections are completed every other year for all commercial harbor project elements.
- Wave gauge data gathered for the purpose of monitoring navigation conditions within the harbor-protected areas of the Federal Channel is no greater than two years old.
- Bathymetric data is available for all Federal Channel areas, and reflects semi-recent conditions. Sounding data utilized for condition analysis must not be older than twelve months old.

SYSTEM SIGNIFICANCE METRIC: The project is moderately important to continued viability of the Great Lakes navigation system. It has a five-year average annual tonnage greater than greater than 1, but less than 5 million tons (LRD Navigation Planning Center data). These harbors ship and/or receive commodities related to businesses or industries with interstate significance.

APPENDIX E: Recommended FYDP Navigation System Risk Level Definitions

Risk Level	Description
D	**Substantial compromise to authorized Federal project features accepted.**

Federal Navigation Channels:

- Substantial shoaling in primary channel traffic areas.
- No greater than 40 percent loss of channel cross-section or reach area during the navigation season.
- No greater than 36 inches of shoaling in primary channel traffic areas during navigation season.

Federal Navigation Structures:

- Navigation structures are maintained as required and have substantial deterioration.
- Critical structures have 31-40 percent loss of as-built cross-section.
- Protected Federal channel areas have no greater than 24 inches of degradation (increase) in average wave height.
- Total length of navigation structures' cross-sectional losses is no greater than 45 percent of the total as-built navigation structures' length.

Federal Navigation Locks:

- Navigation locks and ancillary features are minimally functional, and have substantial deterioration.

Federal Confined Disposal Facilities:

- Confined disposal facilities are minimally maintained, and have substantial structural deterioration.
- Confined disposal facility has less than 6 years of remaining capacity.

Project Condition Surveys:

- Project feature condition inspections are completed every other year for all commercial harbor project elements.
- Wave gauge data gathered for the purpose of monitoring navigation conditions within the harbor-protected areas of the Federal Channel, if available, is greater than two years old.
- Bathymetric data is available for all Federal Channel areas, and reflects previous conditions. Sounding data utilized for condition analysis must not be older than two years old.

SYSTEM SIGNIFICANCE METRIC: The project is relatively important to continued viability of the Great Lakes navigation system. It has a five-year average annual tonnage less than 1 million tons. These harbors ship and/or receive commodities related to businesses or industries with regional significance.

APPENDIX E: Recommended FYDP Navigation System Risk Level Definitions

<u>**Risk Level**</u> <u>**Description**</u>

F **Significant compromise to authorized Federal project features accepted.**

Federal Navigation Channels:

- Significant shoaling in primary channel traffic areas.
- Greater than 40 percent loss of channel cross-section or reach area during the navigation season.
- Greater than 36 inches of shoaling in primary channel traffic areas during navigation season.

Federal Navigation Structures:

- Navigation structures are maintained as required and have significant deterioration.
- Critical structures have greater than 40 percent loss of as-built cross-section.
- Protected Federal channel areas have greater than 24 inches of degradation (increase) in average wave height.
- Total length of navigation structures' cross-sectional losses is greater than 45 percent of the total as-built navigation structures' length.

Federal Navigation Locks:

- Navigation locks and ancillary features are minimally maintained, and have significant deterioration.

Federal Confined Disposal Facilities:

- Confined disposal facilities are minimally maintained, and have significant structural deterioration.
- Confined disposal facility has less than 3 years of remaining capacity.

Project Condition Surveys:

- Project feature condition inspections have not been completed within the past two years for all commercial harbor project elements.
- Wave gauge data for the purpose of monitoring navigation conditions within the harbor-protected areas of the Federal Channel is not available.
- Bathymetric data is not available for all Federal Channel areas, or is greater than two years old.

SYSTEM SIGNIFICANCE METRIC: This level of risk is unacceptable for any commercial harbor. It is used to describe the current risk level or actual conditions at many harbors.

APPENDIX F

Proposed Tools for FYDP using Risk, Reliability, and Consequences

***Objective*:** This section provides a general discussion of specific engineering, environmental, and economic data, metrics and evaluation tools that should be considered in preparing a FYDP. It identifies specific factors and criteria that should be considered; summarizes and provides examples of available data and tools to analyze and compare these variables; and recommends data and tools that should be developed for future FYDP development. The overarching theme of this section is to identify tools and processes that can be used now and in the future to forecast the reliability of system components and the economic, engineering, and environmental consequences of not maintaining or improving the system.

At its most basic level, the proposed methodology seeks to establish a base value of the navigation systems in question and, in probabilistic terms, forecast the future reliability of the systems infrastructure. The structural performances of key physical components of these systems are represented with cumulative probabilities of failure through time. These failure probabilities are linked to an event tree of consequences. The repairs required to regain basic performance, and the nature of the diminished physical performance determines the first order consequences of a component failure. Physical performance consequences range from no impact on the one extreme, to lock closures, loss Federal Channel sections, and dangerous wave conditions within harbors on the other. These physical consequences are in turn used to estimate economic effects on the navigation industry, shippers and communities and any adverse effects on environmental and recreational resources relative to the initial base values.

***Great Lakes Navigation System (GLNS) System Risk Issues*:** There are several risk issues that influence the reliability of the GLNS. The most obvious is the continuously changing depths of federal channels and turning systems. The majority of federal commercial deep draft harbors on the Great Lakes require periodic maintenance dredging. Available depth changes are the result of three primary elements. The most far-reaching element is the continuous seasonal and annual fluctuation of lake water levels within the system, which impacts large numbers of harbors simultaneously. The second common element is the shoaling that results from sediment transport from sources upstream of Federal harbors. Another source of shoal material results from the littoral transport of sand and gravel along the lake coasts into federal channels. Lake storms often contribute to this latter process. Shoaling in federal channels reduce the available depth for commercial vessels that call there thereby restricting the maximum tonnage on a transit. The result of vessel light loading is substantial increases in the transportation cost of a transit. The third factor affecting navigation on the GLNS is the age and condition of locks and coastal structures, i.e. breakwaters, jetties, etc. at federal projects. The advanced age of most of these features, combined with their continued exposure to the adverse conditions associated with the harsh Great Lakes' climate including frequent hostile storm conditions, inevitably results in high risks of structure failure. Navigation structures at federal projects require routine inspection and periodic repair and maintenance. If left unchecked, the eventual disintegration of these protective structures will lead to unsafe navigation, shipping delays, and/or ultimately federal project closure. The costs of cleanup and repair that is associated with deteriorating navigation structures increases exponentially as the structures unravel. In other words, the costs associated with expedient maintenance and repair in early stages of structure problems is not only cost effective, but prudent stewardship.

***System Reliability and Value Metrics*:** Once system risk issues are identified, system reliability and value metrics can be developed that can be used to consider potential economic, engineering, and environmental consequences of not maintaining certain features of a navigation system. Reliability and consequences can be two of the factors considered in preparing the FYDP and prioritizing navigation project investments in a constrained funding environment. The metrics can be grouped into four category levels:

Category I. - Value of System Node to Overall Navigation System

These metrics are intended to measure node (i.e. GLNS harbor, Ohio River Navigation System, ORNB, lock) significance within the system. Examples of these types of metrics would include: 3-year average port tonnage accommodated, evidence of port tonnage expansion or reduction, overall values or cargo associated with port tonnage, tons accommodated by commodity, and the presence of certain highly significant industries. Metrics for GLNS nodes will be based primarily upon the application of this first category of metrics. Nodes of greater significance to the overall system will require a higher level of reliability, which would in turn, provide a low risk of failure and serious adverse consequences.

Category II. - Value of System Node to Local Users and Communities

These metrics will assess the localized conditions and values associated with the system node, to measure its performance from both a navigation operations standpoint, and from the perspective of its relevance on the local and regional area. Examples of these types of assessments would include: carrier transit days and transit costs, carrier transit delays, availability of service days, and local economic significance in terms of jobs and/or revenue measures associated with the system node. Existing or predicted environmental conditions for the system node, such as lake or river levels occurring during the period of assessment when compared with historical seasonal averages is a critical element for consideration at this level.

Tertiary or non-monetary values of the system node would also be considered at this level. Examples of these types of system node metrics could include regional functions, such as the presence of a USCG base or Homeland Security mission at the node, the presence of power generation, industry, or infrastructure water intakes within the node, the use of the node as a Harbor of Refuge by different classes of vessels, the existence of environmental sustainability benefits, or recreational importance.

Category III. – Component Project Significance to System Node

The previous two categories of metrics will be used to assess system nodes, measuring their relative significance with respect to one another. The metrics at this level will determine the relative value of each component within a particular harbor, lock, or other project area. Historically, local prioritization of project maintenance work was based heavily upon the current physical condition of the system nodes' component elements: pier and breakwater sections, federal channel areas, etc. However, the condition assessment of an individual system node component alone cannot determine the value of a repair or improvement with respect to all others. The determination of the overall impact of a component failure on the operation of the system node, at the level of service expected by the node users and stakeholders, is a critical aspect of this process that must be assessed and compared with all other needs.

Examples of metrics at this level would include: average increase in harbor wave conditions resulting from structure degradation, percentage of system node users impacted by channel shoaling, percentage of remaining storage capacity within a combined disposal facility, and percent utilization of lock or channel areas. The use of a component for other functions unrelated to waterborne commerce, such as flood control or environmental sustainability, would also be considered within this category.

Category IV. - Component Project Operational Reliability and Risks

The metrics at this level will utilize the reliability risk assessments developed for the system node components and determine the relative value of a making a repair or improvement. At this point in the analysis, project components of equivalent GLNS and Ohio River Navigation System (ORNB) nodes are being ranked on the basis of existing condition and predicted reliability. The development of adequate component reliability data for all existing GLNS and ORS project elements is presently an incomplete effort. The identification of the two systems' current reliability data, as well as the current organizational data-collection needs pertaining to this effort is one of the central elements of this report.

Examples of metrics at this level would include: life cycle cost rankings, reactive repair cost rankings, preventative cost rankings, and component risk assessment rankings. Prior to the development of the various types of component data sets and rankings, previous major rehabilitation project data and dates, as well as condition indices developed by annual inspections could be used for this same purpose.

One of the subsequent activities associated with the development and application of reliability metrics is the creation of sorting or ranking algorithms that will apply these metrics and determine the relative worth of projects and work packages, creating a project value index. A complete and comprehensive performance measurement of systems' project nodes could also be developed with this approach. The development of the metrics' four categories from the global down to the narrow and specific component-based perspective is essential to capturing this concept. Each of the metrics proposed for the four categories, as well as the four categories themselves, will require extensive evaluation to establish their relative worth. It is anticipated that the greatest consideration will be applied to the broader scale metrics listed in the top categories.

Future FYDP team members are cautioned against adopting a "more is better" approach to the development and utilization of specific reliability metrics. Any metrics used for evaluation and ranking purposes will require uniform and annual data collection by district personnel, as well as by stakeholders.

***System Risk and Reliability Assessment*:** This section describes the engineering models, resources, and information that are needed to assess the condition and reliability of individual projects and navigation systems along with consequences of unreliable performance. For both the GLNS and ORS, the Risk and Reliability Assessment would provide engineering-based information on implementation costs to:

- Support **risk reduction** for each individual navigation structure, channel, or harbor project.
- Support **improving the reliability** of each navigation structure, channel, or harbor project and of the regional navigation system.

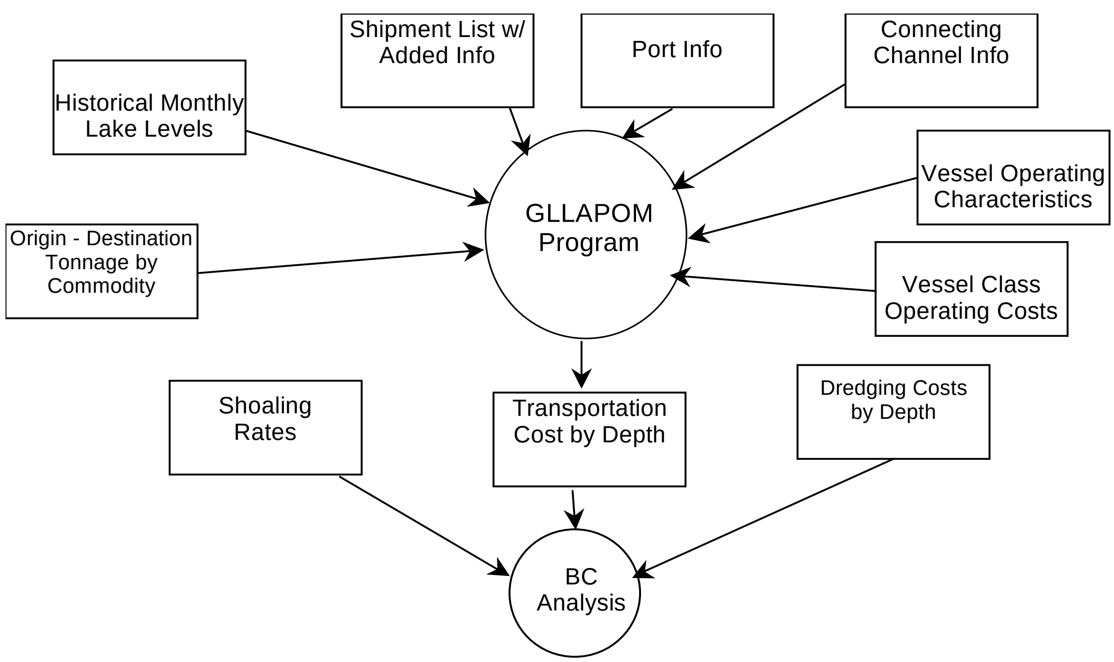
***Risk and Reliability Assessment Criteria for the Great Lakes Navigation System*:** Engineering reliability modeling is an important analytical tool that has recently been integrated into Great Lakes and Ohio River Division (LRD) navigation studies. In order to prioritize navigation investment decisions, it is necessary to ascertain the physical impacts and resulting economic and environmental consequences that could be expected to occur under both a "with" vs. "without" federal action scenarios. Different analytical techniques are required within the GLNS to assess the impact of each commonly occurring situation: (1) regular fluctuation in available channel depth resulting from annually occurring shoaling within channels, and/or due to river and lake water level variation from historical seasonal averages, (2) the risk and resultant impacts of various degrees of failure of federal coastal structures from age and usage, or resulting from storm attack, and (3) the availability of disposal options for dredged channel sediments.

The overall reliability of a harbor or project area is the result of the conditions associated with, and resulting from, its main component elements. Harbors perform two primary functions: the protection of vessels from hazardous wave conditions, and the delivery of a known and reliable Federal Channel area for navigation and trade. One aspect of reliability assessment that requires particular consideration for the GLNS harbor projects is that an adequate definition of failure for each of the harbor functions has not yet been established, which can be related back to the condition and performance of the harbor project components. Unlike the ORNB where the failure of mechanical apparatus can prevent lock operation and result in a substantial disruption in waterborne commerce, the GLNS harbors slowly degrade rather than fail outright, and prevent the passage of commercial navigation traffic. Unmitigated degradation of harbor components typically results in delays to navigation interests, and increased transportation costs for cargo.

Catastrophic losses to life, property, and marine vessels are also possible, but this outcome usually requires the occurrence of a severe storm event that results in the substantial loss of coastal structures, or extensive and unknown shoaling within the navigation channel. **The definition of failure in terms of the specific harbor and Federal Channel conditions necessary for safe navigation must be established in partnership with the stakeholders, for the purpose of defining minimally acceptable performance standards.** Only thereafter can the reliability of the GLNS harbors be adequately measured.

Criteria for GLNS Federal Channels**:** As shoal material fills in navigation channels, the vertical column of water available to a vessel using the channel may restrict the vessel from maximizing the amount of tonnage the vessel can carry, hence raising the cost per ton for the movement. The Buffalo District has developed a transportation cost model, Great Lake Level Analysis of Port Operation and Maintenance (GLLAPOM) to measure the impacts associated with constrained harbor depths that result from shoaling. GLLAPOM simulates each vessel movement for given historical shipments list at a port of interest and determines the maximum tons the vessel can carry given the constraint. The increased time necessary to move all of the historical cargo tonnages needed results in higher transportation costs. Figure 4-1 provides an overview of GLLAPOM program.

Figure 4-1. Great Lake Level Analysis of Port Operation and Maintenance (GLLAPOM)



The GLLAPOM application should be modified as necessary for the purpose of using it to evaluate the navigation impacts resulting from annual river and lake water level fluctuations, when significant deviation from historical seasonal averages occurs. Periods of higher than average lake and river levels reduce the impacts of channel shoaling, while periods of lower than average river and lake levels increase the impact of channel shoaling on commercial navigation. As the result of multiple drought years within the Great Lakes watershed, certain areas within the GLNS deviate substantially from their seasonal historical average water levels, greatly hindering commercial navigation cargo capacities in these areas:

CURRENT GLNS FEDERAL CHANNEL DEPTH HANDICAPS

LAKE	JUNE 2005 Mean Level (IGLD 1985)	Average June Mean Level (IGLD 1985)	Deviation (inches)
Superior	601.67’	601.90’	- 2.76”
Michigan	578.12’	579.33’	-14.52”
Huron	578.12’	579.33’	-14.52”
St. Clair	574.34’	574.70’	-4.32”
Erie	571.95’	571.95’	0.00”
Ontario	246.16’	246.23’	-0.84”

The conditions listed above have persisted fairly consistently for three years within Lake Michigan, and Lake Huron. Please note that that peak lake level during any given year typically occurs during June and July, with the exception of Lake Superior, when it occurs during September.

Criteria for GLNS Federal Locks**:** The GLNS includes four locks, each of which performs two separate functions, although one is typically primary. Locks, which primarily serve a commercial navigation mission, are the Soo and Black Rock Locks. The Chicago Lock is serves a flood control mission. Maintenance requirements at all GLNS locks will continue to accelerate as the cycles of operation continue to increase, as paint systems deteriorate, as mechanical and electrical systems become worn out and obsolete, and as the concrete structures are exposed to impacts, water, ice and other deterioration. The new electronic systems which control opening and closing lock gates and valves, moving dam gates and monitoring these features along with the security of the project will require enhanced technical capability by project personnel.

Modeling the risk of lock component failure within the GLNS will be undertaken similarly as proposed for the ORNB. The economic impacts associated with lock failure for those projects serving the navigation function varies from extreme in the case of the Soo Locks, to moderate in the event of a Black Lock closure. While the probabilities of catastrophic failure for the locks serving the flood control mission are estimated to be much lower than those locks serving in the commercial navigation mission, the damages associated with the failure of a flood control lock are estimated to be much more extreme. Adequately evaluating the probability of either event will require a similar effort for the GLNS locks as has already been initiated within the ORNB. In the event of a commercial navigation lock closure, the economic impact is measured as the transportation cost increases associated with delay, which may include alternative routings for the transported commodities. Data derived for the recent Soo Lock LRR will also greatly assist this effort.

***Criteria for GLNS Federal Navigation Structures*:** There is a vital national interest in the stability and behavior of Great Lakes navigation structures. Navigation structures are important assets for the economic health of many coastal communities to: protect harbors and inlets that are important commercial and military navigation links; protect shore-based infrastructure; provide beach and shoreline stability control; stabilize navigation channels; protect commercial and recreational navigation, coastal communities, roadways, bridges, etc. and provide flood protection. These navigation features are in a state of continuous threat from fluctuating lake levels, and wave attack from lake storms. The increased risks, decreased reliability, and resulting impacts to the protected infrastructure features and waterborne commerce due to coastal structure degradation must be evaluated.

Baseline inspections by structural engineering personnel for all harbor protective structures are required to establish an array of risks of failure associated with selected magnitudes of storms, as determined by coastal engineering. For each damageable event, the potential threat to specific associated Great Lake carriers needs to be analyzed from an economic perspective. This effort cannot be initiated until failure conditions with the area protected by the harbor are defined by the needs of the stakeholders, at a minimum.

Construction types vary for breakwaters in the GLNS, depending upon the time period when each structure was initially constructed. Many of the oldest structures are laid-up type structures with a stone face and timber crib cores. Other particularly old structures (80-130+ years in service) are timber cribs, which have had a concrete or stone superstructure added later. In nearly all cases, these superstructures are between 45-70 years old. Slightly newer breakwater structures (40-80 years old) are often concrete caisson, and various types of steel sheet pile structures. Steel sheet piles have also been used more recently to encase collapsing timber crib breakwaters as one method of mitigation. Practically all of these coastal structure types are substantially older than the typical 50-year design life expected, and are demonstrating various characteristics of failure. Many of the breakwater structures have not had a major rehabilitation effort completed since they were constructed. In other cases, previous major rehabilitation efforts to certain structures occurred 40-50 years ago.

Another consideration is the common practice of at least partially encapsulating older breakwater structures on the Great Lakes with stone to mitigate localized structural failure, and reduce its impacts to the protected area. The newest breakwater structures (<40 years old) are typically of stone rubble mound construction. In each case, the sizes and types of stone used, as well as the geometric cross-section of placement, are aspects that influence structural reliability to varying and currently uncertain degrees.

DISTRIBUTION OF BREAKWATER CONSTRUCTION TYPES WITHIN GL SYSTEM DISTRICTS:

BREAKWATER TYPE	NO. OF MILES	% of TOTAL	AGE RANGE
Laid-up Structures	14.2 miles	13.7%	80 – 130 years
Rubblemound	31.6 miles	30.6%	40 years
Timber Cribs	30.8 miles	29.8%	80 – 100 years
Misc. Others types or combinations	26.8 miles	25.9%	40 – 80 years

The cost of maintaining the existing coastal infrastructure is high, and methods for reducing these costs are being developed and employed. One present focus on reducing the costs of coastal structures is by employing risk, life-cycle, and reliability analysis techniques in both planning and design studies in order to develop more efficient designs. These design methodologies are becoming more prevalent in order to focus on life-cycle efficiency as opposed to the historical perspective of "no damage" for the design storm.

Two ERDC R&D research work units at the Coastal and Hydraulics Laboratory are underway to provide tools for predicting the behavior of rubble mound structures. One of the work units will develop computer-based methodologies for risk analysis of coastal structures. Another work unit will predict and prevent deterioration on breakwaters, jetties, and revetments due to dominant failure modes. It is likely that both of these research efforts will be able to be applied to laid-up stone structures as well as rubblemound structures. There have also been several previous technical reports by the Waterways Experimentation Station for specific stone rubblemound structures, evaluating stone material losses over time. This sort of data may be used to model estimates of cross-sectional reliability for similar breakwater cross-sections. Further, a technical study will be initiated at LRC in FY06 to evaluate representative samples of materials from typical COE breakwater stone suppliers for the GLNS. The intent of this study is to evaluate material degradation within actual and consistent harbor conditions, for the purpose of determining which will be useful in predicting

Presently, COE personnel may utilize Technical Report REMR-OM-24 “Condition and Performance Rating Procedures for Rubble Breakwaters and Jetties”. This document developed structural and functional rating procedures for structures with the goal being to develop condition indices that can be utilized in repair work prioritization. The consistent use of these condition indices was the best approximation in determining the reliability of these types of structures over time.

One significant challenge presented by very old timber crib breakwaters is the lack of reliability data for in-situ wood structures. Quantifying the likelihood of failure for these types of structures is particularly difficult, due to the manner in which they are constructed. All comprehensive inspections of timber cribs require that divers must be employed, although typically timber structures do not degrade within fresh water below a depth of approximately 6’ below the water surface, where the air content within the water drops below a certain level. Above that 6’ depth, dry rot is universally present to some degree, the degree of which tends to correspond with the fluctuation of lake level where the structure is located. Wooden structures do not yet have the array of non-destructive testing methods that can be applied to in-situ concrete structures. In-situ testing applications for wooden structures are currently still in the research and development phase, and are useful only when a great deal of data is known about the fabrication and materials used for a particular timber structure. In addition, timber cannot yet be accurately evaluated in the manner of concrete core tests to determine remaining strength, and the resultant likelihood of failure under specified conditions.

As a result of this scarcity of structural evaluation tools, timber crib breakwater reliability predictions will rely heavily on visual inspection of existing structure conditions. One methodology that must be developed is a condition and performance rating procedure for timber crib breakwater structures, which is similar in scope to the REMR-OM-24 document for rubble mound structures. The underlying problem with this type of approach is the lack of consistency among GL&ORD personnel evaluating the structures. Any methodology that is developed and employed to evaluate coastal structure condition must address the problem of also developing a process or procedure to calibrate the results of inspections conducted by different individuals at different times. Without substantial efforts to standardize coastal structure condition surveys throughout the GLNS, the data collected will be biased and unusable for fairly evaluating operation and maintenance program needs.

A second significant challenge is the determination of the harbor impacts associated with breakwater structure cross-sectional degradation. The ability to measure the significance of cross-sectional losses to harbor shoaling rates, and protected area wave conditions are not adequately known at this point in time. The determination of these impacts is absolutely critical to develop realistic estimates for the damages or benefits associated with investment in these project components. At a minimum, wave gauges will need to be installed and monitored in the GLNS and regionally important harbors, to establish a database upon which to develop significance metrics associated with breakwater degradation.

Criteria for GLNS Federal Confined Disposal Facilities: Due to time constraints, criteria for Federal confined disposal facilities were not developed. Future FYDP team members should utilize the concepts outlined for GLNS channels, locks, and navigation structures to develop these criteria.

Performance and Valuation of Navigation Projects**:** The development of performance and valuation metrics is intended to accomplish an assessment that can be applied to the GLNS allowing projects to compete for resources fairly and consistently. A transparent and unbiased evaluation and prioritization process that is understood at all levels of LRD program management is the desired outcome. The independent objectives of this sub-program for both systems are as follows:

- Enable a broad range of users including other federal agencies, state agencies, and industry stakeholders, to access via the Internet the economic, environmental, and other benefits information associated with each **individual infrastructure, channel, or harbor project**.
- Enable a broad range of users including other Federal agencies, state agencies, and industry stakeholders, to access via the Internet the economic, environmental, and other benefits information associated with the accumulated value of the **regional navigation system**.
- Accumulate and enable the information accessibility of the multiple benefits associated with each navigation project, e.g. total economic benefits to the navigation industry, consumers, and producers (e.g. electricity, steel, grain, refineries, etc.) dependent upon the navigation system, dependent upon the water supply, inherent infrastructure flood damage reduction capability, regional jobs supported through waterways availability, recreational value of the waterway, and environmental value of the waterway.
- Provide total economic and environmental impact of infrastructure unscheduled closure (e.g., lock main chamber unscheduled closure due to miter gate failure) for probable closure scenarios.

- Provide total economic and environmental impact of reduced use scenarios (e.g. each foot lost of vessel carrying capacity due to insufficient channel depth) for typical cargo scenarios.

***Performance and Valuation Tools Currently Available*:** Water resource agencies like the Corps of Engineers focus on accurately estimating the National Economic Development (NED) and, most recently, the National Ecosystem Restoration (NER) benefits gained by making waterway investments. For NED benefits, transportation savings for a base level of traffic are estimated. Plans that improve lock or system performance typically decrease transportation costs thereby increasing benefits, while plans that degrade lock performance typically cause a rise in transportation costs thereby lowering benefits. As a system degrades, waterway carriers' costs increase as delays are encountered and shipper costs increase as they shift to more expensive transportation modes or routes, build stockpiles and inventories, or shift or idle production. Current tools and databases allow carrier costs to be estimated. Studies aimed at estimating the economic effects on shippers of degraded service have only recently been initiated.

Benefit estimation requires several databases and models. In fact, building the databases themselves requires extensive modeling. The **transportation rate database** relies on Waterborne Commerce Statistics (WCS), the Lock Performance Monitoring System (LPMS), and the STB Waybill tapes to support vessel cost and rail cost models currently maintained by TVA. The **traffic demand forecast database** relies on the WCS, the Coaldat and Powerdat databases (RDI software and compiled data from the Energy Information Administration and Federal Energy Regulatory Commission raw data) in support of the waterway allocation of future utility coal shipments generated by the National Power and Utility Fuel Economics models (maintained by Hill and Associates). Lock performance is described in part through application of the **Waterways Analysis Model** (WAM), which depends on LPMS data and the waterway fleet database. The **fleet database** is drawn from WCS data, US Coast Guard data, and the vessel operating cost data developed by IWR. All of these databases and models support LRD's navigation system economic model, the **Ohio River Navigation Investment Model** (ORNIM). The ORNIM model, developed and used for the ORMSS, represents a state-of-the-art (albeit first generation) navigation investment model for lock chambers on the Main stem Ohio River.

***Performance and Valuation Tools To Be Developed*:** As mentioned above, economic analyses have focused on NED benefit estimates, especially those related to waterway carrier costs. And estimates of regional benefits accruing from an investment, other than in counties of persistent unemployment, have not been a factor in federal investment decisions (though recently LRD has indicated it will now consider regional and other social effects in selecting one plan over another).

NED evaluation methods are limited by the availability of economic impact data, most notably incomplete **information on shipper response to unscheduled lock closures** and an incomplete **accounting of economic losses associated with unexpected closures**. Similarly, environmental evaluation methods are limited by an incomplete **accounting of environmental losses associated with unexpected closures**. These limitations suggest the kind of modifications that will need to be made to fully consider the value of the waterway system. This also means a more complete accounting of the **environmental and economic consequences associated with possible pool losses and reduced water depths**.

Again, **shipper costs associated with degraded lock performance** have not been adequately assessed. Recently initiated research on shipper response to interruptions in waterway service is being sponsored by the Corps' Institute for Water Resources and the Planning Center of Expertise for Inland Navigation. Results of these studies will help with future valuation estimates. Additional research and development of techniques is required in order to estimate benefits associated with **emission reduction, highway congestion, and accident reduction**. On-going research has already shown that some of these tasks will be a challenge to complete in a meaningful and useful way.

The importance of our waterways is apparent in demographic patterns, where population densities are highest proximate to our nation's coastal and inland ports. This is not surprising given the **life sustaining and intrinsic value of water**. Measuring this value in monetary terms is difficult, and in many instances impossible. Even commercial values, like **transportation and tourism**, are in many ways difficult to measure, not to mention placing a value on our waterway's contributions to **quality of life**, as reflected in **job availability, income levels, water supply, diminished exposure to pollutants and accidents, aesthetics, and recreation opportunities**. Both governmental and nongovernmental partners have a role to play in performing comprehensive valuation analyses.

As direct beneficiaries of federal investment, local, state and regional agencies, commissions, and authorities have a particular interest in the contribution of the waterway to their **area's economic well-being and quality of life**. In some cases this support will be as straightforward as asking companies to provide specific **information on their dependence on the waterway** for transportation or water supply. Furthermore, as members of the immediate community they serve, these agencies and commissions may have access to necessary information related to a **region's dependence upon the waterway** that would allow them to conduct studies that provide information on **employment, accident and emission reduction, and environmental impacts** of the waterway at their respective level. **Regional economic and quality of life models** either need to be developed by the Corps or the Corps will need to provide guidance to the stakeholders developing and running these models. **Consistent methods and techniques** are necessary if the information generated is to be used as part of the Corps of Engineers performance based budgeting process.

Federal and state agencies, especially the US Fish and Wildlife Service and state departments of natural resources, are obvious partners in identifying and evaluating both positive and negative environmental effects. Expanding on this partnership will direct future efforts towards determining **effects of differing scenarios of water level management on long term sustainability** of resources such as aquatic and terrestrial species, wildlife management areas, wildlife refuges, migratory wildlife, aesthetics, and recreation. Again, consistent methods and techniques will be required if this information is to be used in performance based budgeting.

Finally, while environmental benefits are recognized as national benefits in nature, they have generally not been included in economic analyses of navigation investment studies because of the difficulty in monetizing these benefits. Establishment of appropriate **metrics for both monetary and non-monetary values** would allow consistent and more complete comparison among investment choices through a one-stop process. Expansion of the ORNIM to a system-wide Navigation Investment Model will need to occur to optimize future investments.

A recommended sequence of valuation assessment tasks follows. It should be noted that many of these activities should be conducted concurrently.

Recommendation for valuation assessment:

1. Establish a process to gather shipper response information.
2. Continue work with IWR on evaluation of benefits of accident reductions, emission reduction, and highway congestion.
3. Develop evaluation methods for economic and environmental consequences of water level changes.
4. Develop more complete evaluation methods for economic and environmental consequences of degraded lock performance
5. Develop criteria and databases for regional economic dependence on waterways, economic well-being, and quality of life factors.
6. Develop criteria and databases on effects of waterways on transportation, tourism, and recreation.
7. Develop database on Municipal and Industrial water intakes.
8. Develop metrics needed to compare monetary and non-monetary benefits equally.

By executing the above-listed activities, the development of project and system valuation metrics is anticipated to progress beyond the present use of tons, and proposed use of ton-miles. Future project and/or system metrics will develop into the following levels of detail:

A. Transportation savings between current waterborne traffic and alternative modes between the same origin and destination pairs;
B. Incremental transportation savings per foot of federal channel depth available;
C. Net incremental transportation savings per foot of depth, which is the incremental transportation savings, minus the incremental cost to obtain;
D. GLNS system analysis that accounts for port trade-offs and prioritizes investments on the basis of net incremental transportation savings per foot.

At the present time, it is already possible to develop the metrics described in levels A. and B above. The progression to level C. is also possible presently, although additional GL district support would be necessary to provide the project cost data this is required.

Progression to level D, requires the collection of new data and the development of new models. A great deal of engineering reliability information associated with project features, such as hazard functions and corresponding consequences (costs/closures), will be needed. The costs associated with utilizing alternative modes of transportation will also have to be gathered. Thereafter, a system model would need to be developed that can examine the trade-offs across ports, and optimize investments. This is similar to, but greater than, the single port investment model that is used by GLOPM.

***Current Level of Performance and Valuation Tools*:** Development of the databases and models necessary to quantitatively prioritize investment decisions is a multi-year effort *that has only just begun*. However, priorities must be established each year for annual budget submissions and rankings. As an initial step in bridging the gap between previous year budgeting processes and the implementation of the Navigation Investment Model, *an interim* framework has been developed. This framework is based on determination of acceptable levels of risk for each project of the navigation system. Acceptable levels of risk were developed through available engineering data, experience of personnel most familiar with each project, available economic information, and professional judgment. The current level of risk was then determined in similar fashion and compared to the acceptable level of risk to begin setting priorities (please refer to Appendix C for a more detailed description of the interim framework). While this process represents an improvement over previous methods, it is limited in applicability to only the near term needs at each project and can, therefore, only be used to project a few years into the future.

Ultimately, waterway value and waterway risk will be considered jointly within the modeling framework referred to as the Navigation Investment Model. This model will be capable of systematically estimating the risks associated with project performance and integrating these with the benefits of existing navigation infrastructure and any incremental investments that might be proposed within a given year. Focusing the Navigation Investment Model analysis on existing infrastructure and maximizing reliability within a given budget shifts the focus to measuring economic and environmental losses accompanying degradation of system performance.

APPENDIX G

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

								FEDERAL CHANNEL					COMBINED DISPOSAL FACILITY				
STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	FEDERAL CHANNEL LENGTH (Linear Miles)	FEDERAL CHANNEL AREA (Sq. Miles)	Average Annual Shoaling Rate (CY)	FY05 Fed. Channel Condition per GL Risk Level Metrics	FY05 Channel Handicap Mean Water Level vs. Historical Avg. (Inches)	Total Storage Capacity (CY)	Number of Navigation Projects Served	Remaining Storage Capacity (CY)	Remaining Life (years)	FY05 CDF Condition per GL Risk Level Metrics
IL	Lake Michigan	Calumet Harbor and River	Chicago	IL 2	D	C	A	12.44	2.76	45,000	C	-14.52"	1,300,000	1	400,000	5	D
		Chicago Harbor	Chicago	IL 7	D	C	D	1.66		15,000	C	-14.52"	N/A	N/A	N/A	N/A	N/A
		Chicago River	Chicago	IL 4, IL 7	D	C	D	2.84		2,000	D	-14.52"	N/A	N/A	N/A	N/A	N/A
		Waukegan Harbor	Waukegan	IL 10	D	C	D	1.35	0.08	40,000	C	-14.52"	N/A	N/A	N/A	N/A	N/A
IN	Lake Michigan	Burns Small Boat Harbor	Portage	IN 1	S	R	REC. Harbor	1.25	0.00	3,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Burns Waterway Harbor	Portage	IN 1	D	C	B	2.50	0.34	10,000	C	-14.52"	N/A	N/A	N/A	N/A	N/A
		Indiana Harbor	East Chicago	IN 1	D	C	B	4.70	0.42	100,000	D	-14.52"	** FUTURE **	1	** UNDER CONSTRUCTION **		
		Michigan City Harbor	Michigan City	IN 2	S	R	REC. Harbor	1.85	0.05	18,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
MI	Lake Erie	Bolles Harbor	Bolles Harbor	MI 15	S	R	REC. Harbor	2.08	0.03	10,000	REC. Harbor	0.00"	355,000	1		100	A
		Detroit River	Detroit	MI 13/14/15	D	C	A	82.97	49.17	50,000		0.00"	18,000,000	2		50	A
		Monroe Harbor	Monroe	MI 15	D	C	C	4.81	0.27	50,000		0.00"	4,300,000	1		50	A
		Rouge River	Detroit	MI 13	D	C	B	4.55	0.15	25,000		0.00"	18,000,000	2		50	A
	Lake Huron	Alpena Harbor	Alpena	MI 1	D	R	REC. Harbor	2.33	0.08	2,500	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Au Sable Harbor	Au Sable	MI 1	S	R	REC. Harbor	0.53	0.01	2,500	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Bay Port Harbor	Bay Port	MI 10	S	R	REC. Harbor	0.89	0.01	1,500	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Belle River	Marine City	MI 10	S	R	REC. Harbor	1.02	0.02	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Black River	Port Huron	MI 10	D	C	D	0.44	0.09	2,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		Caseville Harbor	Caseville	MI 10	S	R	REC. Harbor	0.81	0.02	4,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Channels in Straits of Mackinac	Mackinac Island	MI 1	D	C	A	0.66	0.02	0		-14.52"	N/A	N/A	N/A	N/A	N/A
		Cheboygan Harbor	Cheboygan	MI 1	D	C	D	2.41	0.08	0		-14.52"	N/A	N/A	N/A	N/A	N/A
		Detour Harbor	Detour Village	MI 1	S	R	REC. Harbor	0.21	0.01	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Hammond Bay Harbor	Huron Beach	MI 1	S	R	REC. Harbor	0.34	0.03	600	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Harbor Beach Harbor	Harbor Beach	MI 10	D	C	D	0.57	0.14	20,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		Harrisville Harbor	Harrisville	MI 1	S	R	REC. Harbor	0.42	0.05	7,500	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Kawkawlin River	Kawkawlin	MI 1	S	R	REC. Harbor			0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Les Cheneaux Island Channels	Cedarville	MI 1	S	R	REC. Harbor	7.03	0.13	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Lexington Harbor	Lexington	MI 10	S	R	REC. Harbor	0.25	0.01	6,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Mackinac Island Harbor	Mackinac Island	MI 1	S	R	REC. Harbor	0.00	0.00	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	FEDERAL CHANNEL: FEDERAL CHANNEL LENGTH (Linear Miles)	FEDERAL CHANNEL AREA (Sq. Miles)	Average Annual Shoaling Rate (CY)	FY05 Fed. Channel Condition per GL Risk Level Metrics	FY05 Channel Handicap Mean Water Level vs. Historical Avg. (Inches)	COMBINED DISPOSAL FACILITY: Total Storage Capacity (CY)	Number of Navigation Projects Served	Remaining Storage Capacity (CY)	Remaining Life (years)	FY05 CDF Condition per GL Risk Level Metrics
		Mackinaw City Harbor	Mackinaw City	MI 1	S	R	REC. Harbor	0.09	0.00	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Pine River	St Clair	MI 10	S	R	REC. Harbor	1.57	0.02	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Point Lookout	Au Gres	MI 1	S	R	REC. Harbor	3.26	0.06	7,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Port Austin	Port Austin	MI 10	S	R	REC. Harbor	0.53	0.03	1,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Port Sanilac	Port Sanilac	MI 10	S	R	REC. Harbor	0.19	0.00	7,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Saginaw River	Bay City	MI 4/5	D	C	C	36.00	1.80	150,000		-14.52"	10,000,000	1		15	A
		Sebewaing River	Sebewaing	MI 10	S	R	REC. Harbor	0.47	0.05	12,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		St. Clair River	Algonac	MI 10	D	C	A	37.01	6.86	10,000		-14.52"	2,000,000	1		30	A
		Tawas Bay Harbor	East Tawas	MI 1	S	R	REC. Harbor	0.30	0.02	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
	Lake Michigan	Arcadia Harbor	Arcadia	MI 2	S	R	REC. Harbor	0.27	0.00	4,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Cedar River Harbor	Cedar River	MI 1	S	R	REC. Harbor	0.27	0.01	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Charlevoix Harbor	Charlevoix	MI 1	D	C	C	0.78	0.01	750		-14.52"	N/A	N/A	N/A	N/A	N/A
		Cross Village Harbor	Cross Village			R	REC. Harbor	0.21			REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Frankfort Harbor	Frankfort	MI 2	D	C	D	0.94	0.11	3,500		-14.52"	N/A	N/A	N/A	N/A	N/A
		Grand Haven Harbor	Grand Haven	MI 2	D	C	C	2.88	0.15	42,500		-14.52"	N/A	N/A	N/A	N/A	N/A
		Grand River	Grand Haven	MI 2	S	R	REC. Harbor	14.51	0.28	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Grays Reef Passage	Cross Village	MI 1	D	C	A	1.80	1.71	0		-14.52"	N/A	N/A	N/A	N/A	N/A
		Grelickville Harbor	Traverse City	MI 4	S	R	REC. Harbor	0.18	0.01	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Holland Harbor	Holland	MI 2	D	C	D	6.02	0.19	40,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		Inland Route	Alanson	MI 1	S	R	REC. Harbor	13.35	0.00	120	REC. Harbor	-14.52"	19,500	1		50	A
		Leland Harbor	Leland	MI 4	S	R	REC. Harbor	0.28	0.01	15,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Little Bay De Noc	Kipling	MI 1	S	R	REC. Harbor	0.45	0.02	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Ludington Harbor	Ludington	MI 2	D	C	D	1.06	0.13	20,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		Manistee Harbor	Manistee	MI 2	D	C	C	2.01	0.07	7,500		-14.52"	N/A	N/A	N/A	N/A	N/A
		Manistique Harbor	Manistique	MI 1	S	R	REC. Harbor	0.87	0.04	0		-14.52"	N/A	N/A	N/A	N/A	N/A
		Menominee Harbor	Menominee	MI 1	D	C	D	2.73	0.62	6,000		-14.52"	N/A	N/A	N/A	N/A	N/A

APPENDIX G

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STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	FEDERAL CHANNEL					COMBINED DISPOSAL FACILITY				
								FEDERAL CHANNEL LENGTH (Linear Miles)	FEDERAL CHANNEL AREA (Sq. Miles)	Average Annual Shoaling Rate (CY)	FY05 Fed. Channel Condition per GL Risk Level Metrics	FY05 Channel Handicap Mean Water Level vs. Historical Avg. (Inches)	Total Storage Capacity (CY)	Number of Navigation Projects Served	Remaining Storage Capacity (CY)	Remaining Life (years)	FY05 CDF Condition per GL Risk Level Metrics
		Muskegon Harbor	Muskegon	MI 2	D	C	C	1.33	0.07	20,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		New Buffalo Harbor	New Buffalo	MI 6	S	R	REC. Harbor	0.55	0.01	2,500	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Pentwater Harbor	Pentwater	MI 2	S	R	REC. Harbor	0.53	0.01	20,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Petoskey Harbor	Petoskey	MI 1	S	R	REC. Harbor	0.00	0.00	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Portage Lake Harbor	Onekama	MI 2	S	R	REC. Harbor	0.53	0.01	6,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Saugatuck Harbor	Saugatuck	MI 2	S	R	REC. Harbor	2.42	0.46	5,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		South Haven Harbor	South Haven	MI 6	S	R	REC. Harbor	0.47	0.01	3,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		St James Harbor	St James	MI 1	S	R	REC. Harbor	0.15	0.00	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		St Joseph Harbor	St Joseph	MI 6	D	C	D	1.00	0.05	42,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		St Joseph River	St Joseph	MI 6	S	R	REC. Harbor	22.00	0.17	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		White Lake Harbor	Whitehall	MI 2	S	R	REC. Harbor	0.51	0.01	6,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
	Lake St. Clair	Channels in Lake St Clair	Grosse Pointe	MI 12/13	D	C	A	14.51	2.20	10,000		-4.32"	N/A	N/A	N/A	N/A	N/A
		Clinton River	Mt Clemens	MI 10	S	R	REC. Harbor	8.14	0.08	8,000	REC. Harbor	-4.32"	370,000	1		50	A
	Lake Superior	Big Bay Harbor	Big Bay	MI 1	S	R	REC. Harbor	0.32	0.00	5,000	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Black River	Black River	MI 1	S	R	REC. Harbor	0.32	0.01	1,000	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Chippewa Harbor	Isle Royale	MI 1	S	R	REC. Harbor	0.05	0.00	0	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Eagle Harbor	Eagle Harbor	MI 1	S	R	REC. Harbor	0.17	0.01	0	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Grand Marais Harbor	Grand Marais	MI 1	D	C		0.57	0.05	0		-2.76"	N/A	N/A	N/A	N/A	N/A
		Grand Traverse Bay Harbor	Grand Traverse	MI 1	S	R	REC. Harbor	0.30	0.01	2,500	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Keweenaw Waterway	Houghton	MI 1	D	C	F	19.45	1.52	12,000		-2.76"	308,000	1		30	A
		Lac La Belle Harbor	Lac La Belle	MI 1	S	R	REC. Harbor	1.10	0.01	400	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Little Lake Harbor	Little Lake	MI 1	S	R	REC. Harbor	0.57	0.02	2,500	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Marquette Harbor	Marquette	MI 1	D	C	C	0.66	0.10	0		-2.76"	N/A	N/A	N/A	N/A	N/A
		Ontonagon Harbor	Ontonagon	MI 1	D	C	D	0.83	0.03	50,000		-2.76"	N/A	N/A	N/A	N/A	N/A
		Presque Isle Harbor	Trowbridge Park	MI 1	D	C	B	0.53	0.16	4,000		-2.76"	N/A	N/A	N/A	N/A	N/A
		St Marys River	Sault Ste Marie	MI 1	D	C	A	65.15	8.21	6,000		-2.76"	N/A	N/A	N/A	N/A	N/A
		Whitefish Point	Whitefish Point	MI 1	S	R	REC. Harbor	0.27	0.01	1,000	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A

APPENDIX G

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STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	FEDERAL CHANNEL: FEDERAL CHANNEL LENGTH (Linear Miles)	FEDERAL CHANNEL: FEDERAL CHANNEL AREA (Sq. Miles)	FEDERAL CHANNEL: Average Annual Shoaling Rate (CY)	FEDERAL CHANNEL: FY05 Fed. Channel Condition per GL Risk Level Metrics	FEDERAL CHANNEL: FY05 Channel Handicap Mean Water Level vs. Historical Avg. (Inches)	COMBINED DISPOSAL FACILITY: Total Storage Capacity (CY)	COMBINED DISPOSAL FACILITY: Number of Navigation Projects Served	COMBINED DISPOSAL FACILITY: Remaining Storage Capacity (CY)	COMBINED DISPOSAL FACILITY: Remaining Life (years)	COMBINED DISPOSAL FACILITY: FY05 CDF Condition per GL Risk Level Metrics
MN	Lake Superior	Beaver Bay Harbor	Beaver Bay			R	REC. Harbor	0.12			REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Duluth Harbor	Duluth	MN 8	D	C	A	15.65	2.37	150,000		-2.76"	1,000,000	1		40	A
		Grand Marais Harbor	Grand Marais	MN 8	D	C		0.44	0.68	0		-2.76"	N/A	N/A	N/A	N/A	N/A
		Knife River	Knife River	MN 8	S	R	REC. Harbor	0.25	0.00	0	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Lutsen Harbor	Schroeder		S	R	REC. Harbor	0.15			REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Two Harbors Harbor	Two Harbors	MN 8	D	C	B	0.29	0.01	0		-2.76"	N/A	N/A	N/A	N/A	N/A
NY	Black River Bay	Sacket's Harbor	Harbor	NY 23	S	R	REC. Harbor	0.00	0.00	0	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
	Lake Erie	Barcelona Harbor	Barcelona	NY 27	S	R	REC. Harbor	0.41	0.01	10,000	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
		Black Rock Channel & Tonawanda Harbor	Buffalo	NY 27	D	C	D	15.60	1.09	0		0.00"	N/A	N/A	N/A	N/A	N/A
		Buffalo Harbor	Buffalo	NY 27	D	C	C	13.20	1.83	70,000		0.00"	6,900,000				
		Cattaraugus Creek Harbor	Sunset Bay	NY 27	S	R	REC. Harbor	0.95	0.02	0	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
		Dunkirk Harbor	Dunkirk	NY 27	D	C		0.83	0.09	13,000		0.00"	N/A	N/A	N/A	N/A	N/A
	Lake Ontario	Great Sodus Bay Harbor	Sodus Point	NY 25	D	R	REC. Harbor	1.46	0.07	10,000	REC. Harbor	-0.84"	N/A	N/A	N/A	N/A	N/A
		Irondequoit Bay Harbor	Irondequoit	NY 25	S	R	REC. Harbor	0.58	0.01	3,000	REC. Harbor	-0.84"	N/A	N/A	N/A	N/A	N/A
		Little Sodus Bay Harbor	Fair Haven	NY 25	D	R	REC. Harbor	0.66	0.03	3,000	REC. Harbor	-0.84"	N/A	N/A	N/A	N/A	N/A
		Oak Orchard Harbor	Breeze	NY 28	S	R	REC. Harbor	0.52	0.01	3,500	REC. Harbor	-0.84"	N/A	N/A	N/A	N/A	N/A
		Olcott Harbor	Olcott	NY 28	S	R	REC. Harbor	0.28	0.01	2,000	REC. Harbor	-0.84"	N/A	N/A	N/A	N/A	N/A
		Oswego Harbor	Oswego	NY 23	D	C	D	2.70	0.27	15,000		-0.84"	N/A	N/A	N/A	N/A	N/A
		Port Ontario Harbor	Port Ontario	NY 23	S	R	REC. Harbor	3.30	0.01	0	REC. Harbor	-0.84"	N/A	N/A	N/A	N/A	N/A
		Rochester Harbor	Rochester	NY 28	D	C	D	3.30	0.11	115,000		-0.84"	N/A	N/A	N/A	N/A	N/A
		Wilson Harbor	Wilson	NY 28	S	R	REC. Harbor	0.17	0.02	2,750	REC. Harbor	-0.84"	N/A	N/A	N/A	N/A	N/A
	Little River	Little River	Falls	NY 28	S	R	REC. Harbor	0.23	0.00	2,000	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
	Morristown Bay	Morristown Harbor	Morristown	NY 23	S	R	REC. Harbor	0.13	0.00	0	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
	St. Lawrence River	Cape Vincent Harbor	Cape Vincent	NY 23	D	R	REC. Harbor	0.97	0.06	0	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
		Ogdensburg Harbor	Ogdensburg	NY 23	D	C	D	2.20	0.37	0		0.00"	N/A	N/A	N/A	N/A	N/A
OH	Lake Erie	Ashtabula Harbor	Ashtabula	OH 14	D	C	B	3.82	0.35	40,000		0.00"	N/A	N/A	N/A	N/A	N/A
		Cleveland Harbor	Cleveland	OH 11	D	C	B	12.80	1.05	350,000		0.00"	2,900,000	1		1	F
		Conneaut Harbor	Conneaut	OH 14	D	C	B	1.50	0.21	50,000		0.00"	N/A	N/A	N/A	N/A	N/A

APPENDIX G

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

								FEDERAL CHANNEL					COMBINED DISPOSAL FACILITY				
STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	FEDERAL CHANNEL LENGTH (Linear Miles)	FEDERAL CHANNEL AREA (Sq. Miles)	Average Annual Shoaling Rate (CY)	FY05 Fed. Channel Condition per GL Risk Level Metrics	FY05 Channel Handicap Mean Water Level vs. Historical Avg. (Inches)	Total Storage Capacity (CY)	Number of Navigation Projects Served	Remaining Storage Capacity (CY)	Remaining Life (years)	FY05 CDF Condition per GL Risk Level Metrics
		Cooley Canal Harbor	Reno Beach	OH 9	S	R	REC. Harbor			2,000	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
		Fairport Harbor	Fairport	OH 14	D	C	C	2.10	0.19	120,000		0.00"	N/A	N/A	N/A	N/A	N/A
		Huron Harbor	Huron	OH 9	D	C	C	1.52	0.10	122,000		0.00"	2,600,000	1		10	C
		Lorain Harbor	Lorain	OH 13	D	C	C	5.00	0.38	90,000		0.00"	1,850,000	1		0	F
		Port Clinton Harbor	Port Clinton	OH 9	S	R	REC. Harbor	0.95	0.02	0	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
		Put-In-Bay Harbor	Put-In-Bay	OH 9	S	R	REC. Harbor	0.30	0.01	1,000	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
		Toussaint River	Toussaint River Township	OH 9	S	R	REC. Harbor			0	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
		Vermilion Harbor	Vermillion	OH 9	S	R	REC. Harbor	0.34	0.02	0	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
		West Harbor	Gem Beach	OH 9	S	R	REC. Harbor	2.50	0.04	0	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
	Maumee Bay	Toledo Harbor	Toledo	OH 9	D	C	B	14.00	1.04	750,000		0.00"	5,300,000				
	Rocky River	Rocky River Harbor	Rocky River	OH 10	S	R	REC. Harbor	0.96	0.02	10,000	REC. Harbor	0.00"	N/A	N/A	N/A	N/A	N/A
	Sandusky Bay	Sandusky Harbor	Sandusky Bay	OH 9	D	C	C	6.95	0.49	240,000		0.00"	N/A	N/A	N/A	N/A	N/A
PA	Lake Erie	Erie Harbor	Presque Isle Bay	PA 3	D	C		3.23	0.40	0		0.00"	420,000	1			
WI	Lake Michigan	Algoma Harbor	Algoma	WI 8	S	R	REC. Harbor	0.40	0.02	2,500	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Big Suamico Harbor	Suamico	WI 8	S	R	REC. Harbor	0.70	0.01	6,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Fox River	Green Bay	WI 8	S	R	REC. Harbor	10.68		0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Green Bay Harbor	Green Bay	WI 8	D	C	C	19.00	1.36	150,000		-14.52"	1,200,000	1		20	A
		Kenosha Harbor	Kenosha	WI 1	D	C	F	1.00	0.09	3,500		-14.52"	N/A	N/A	N/A	N/A	N/A
		Kewaunee Harbor	Kewaunee	WI 8	D	C	F	1.08	0.05	7,500		-14.52"	500,000	1		20	A
		Manitowoc Harbor	Manitowoc	WI 6	D	C	D	2.69	1.53	8,000		-14.52"	800,000	1		40	A
		Menominee Harbor	Menominee	WI 8	D	C		2.73	0.62	6,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		Milwaukee Harbor	Milwaukee	WI 4	D	C	C	6.44	0.73	12,500		-14.52"	1,600,000	1		25	A
		Oconto Harbor	Oconto	WI 8	D	C		0.74	0.02	5,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		Pensaukee Harbor	Pensaukee	WI 8	S	R	REC. Harbor	0.98	0.02	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Port Washington	Port Washington	WI 5	D	C	D	1.12	0.06	0		-14.52"	N/A	N/A	N/A	N/A	N/A
		Sheboygan Harbor	Sheboygan	WI 6	D	C	D	1.53	0.11	7,500		-14.52"	N/A	N/A	N/A	N/A	N/A
		Sturgeon Bay Harbor	Sturgeon Bay	WI 8	D	C	D	8.56	0.52	6,000		-14.52"	N/A	N/A	N/A	N/A	N/A
		Two Rivers Harbor	Two Rivers	WI 6	S	R	REC. Harbor	1.08	0.05	3,000	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
		Washington Island Harbor	Jackson Harbor	WI 8	S	R	REC. Harbor	0.76	0.03	0	REC. Harbor	-14.52"	N/A	N/A	N/A	N/A	N/A
	Lake Superior	Ashland Harbor	Ashland	WI 7	D	C	D	2.41	0.60	0		-2.76"	N/A	N/A	N/A	N/A	N/A

APPENDIX G

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	FEDERAL CHANNEL: FEDERAL CHANNEL LENGTH (Linear Miles)	FEDERAL CHANNEL: FEDERAL CHANNEL AREA (Sq. Miles)	FEDERAL CHANNEL: Average Annual Shoaling Rate (CY)	FEDERAL CHANNEL: FY05 Fed. Channel Condition per GL Risk Level Metrics	FEDERAL CHANNEL: FY05 Channel Handicap Mean Water Level vs. Historical Avg. (Inches)	COMBINED DISPOSAL FACILITY: Total Storage Capacity (CY)	COMBINED DISPOSAL FACILITY: Number of Navigation Projects Served	COMBINED DISPOSAL FACILITY: Remaining Storage Capacity (CY)	COMBINED DISPOSAL FACILITY: Remaining Life (years)	COMBINED DISPOSAL FACILITY: FY05 CDF Condition per GL Risk Level Metrics
		Bayfield Harbor	Bayfield	WI 7	S	R	REC. Harbor	0.15	0.01		REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Cornucopia Harbor	Cornucopia	WI 7	S	R	REC. Harbor	0.38	0.00	2,000	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		La Pointe Harbor	Madeline Island	WI 7	S	R	REC. Harbor	0.08	0.00	200	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Port Wing Harbor	Port Wing	WI 7	D	C		0.57	0.01	14,000		-2.76"	N/A	N/A	N/A	N/A	N/A
		Saxon Harbor	Village of Francis	WI 7	S	R	REC. Harbor	0.23	0.00	15,000	REC. Harbor	-2.76"	N/A	N/A	N/A	N/A	N/A
		Superior Harbor	Superior	WI 7	D	C	A	9.95	1.51	10,000		-2.76"	N/A	N/A	N/A	N/A	N/A
GLNS SYSTEM TOTALS								341.62	73.10	3,380,820			79,722,500	22	400,000		

CODES:

DRAFT: D = Deep; S = Shallow

TYPE: C = Commercial; R = Recreational

Acceptable Risk Level

A	Virtually no compromise to authorized Federal project features accepted.
B	Minimal compromise to authorized Federal project features accepted.
C	Moderate compromise to authorized Federal project features accepted.
D	Substantial compromise to authorized Federal project features accepted.
F	Significant compromise to authorized Federal project features accepted.

APPENDIX G

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
IL	Lake Michigan	Calumet Harbor & River	Chicago	IL 2	D	C	A	ALL	various	BW	various	12,153	various	various	various	C	N/A
								Crib B/W - Reach A	CWC	BW	1904	1,400	1921	100%	Y	C	3
								Crib B/W - Reach A-1	CWC	BW	1904	300	UNK	100%	N	C	3
								Crib B/W - Reach B	CWC	BW	1904	4,864	1924	100%	Y	C	2
								Crib B/W - Reach B-1	CWC	BW	1904	150	UNK	100%	N	C	2
								Det. B/W - Reach C	SSP	BW	1935	4,507	N/A	N/A	Y	C	1
								Det. B/W - Reach C-1	SSP	BW	1935	250	1957	100%	N	A	1
								Det. B/W - Reach C-2	SSP	BW	1935	250	1957	100%	N	A	1
								Dock Wall - Reach D	Other	Other	1976	432	N/A	N/A	N	B	4
		Chicago Harbor	Chicago	IL 7	D	C	D	ALL	various	various	various	20,357	various	various	various	D	N/A
								Shore Arm - Reach A	CWC	BW	1917	750	1950	100%	Y	D	5
								Shore Arm - Reach B-1	CWC	BW	1917	300	1950	100%	Y	D	5
								Shore Arm - Reach B-2	CWC	BW	1917	1,000	1955	100%	Y	D	5
								Shore Arm - Reach B-3	CWC	BW	1917	200	1965	100%	N	D	5
								Ext. (NW) B/W - Reach C	CWC	BW	1889	3,759	1961	100%	N	D	1
								Ext. (NW) B/W - Reach C-4	CWC	BW	1889	300	1961	100%	N	D	1
								Ext. (NW) B/W - Reach D	CWC	BW	1889	616	1957	100%	N	D	1
								Ext. (NW) B/W - Reach E	CWC	BW	1889	546	1957	100%	N	D	1
								S. Extension - Reach F	LUS	BW	1917	2,227	N/A	N/A	Y	D	2
								S. Extension - Reach G	LUS	BW	1920	1,532	N/A	N/A	Y	D	3
								S. Extension - Reach H	Other	BW	1923	1,185	N/A	N/A	Y	C	3
								North Pier - Reach J	CWC	P	1876	960	1965	100%	N	A	4
								Inner B/W - Reach K	CWC	BW	1874	220	1934	100%	Y	C	7
								Inner B/W - Reach L	CWC	BW	1874	84	1934	100%	Y	C	7
								Inner B/W - Reach M	CWC	BW	1874	296	1934	100%	Y	C	5
								Inner B/W - Reach N	CWC	BW	1874	3,488	1934	100%	Y	C	5
								Inner B/W - Reach O	CWC	BW	1874	150	1930	100%	Y	C	5
								Inner B/W - Reach P	CWC	BW	1880	300	1965	100%	N	C	6
								Inner B/W - Reach R	CWC	BW	1880	800	1955	100%	Y	C	6
								Inner B/W - Reach S	CWC	BW	1880	1,444	1958	100%	N	C	6
								Inner B/W - Reach T	CWC	BW	1924	100	1958	100%	N	C	1
								Inner B/W - Reach U	CWC	BW	1874	100	1934	100%	Y	C	5
		Chicago River	Chicago	IL 4, IL 7	D	C	D	N. Branch Basin Docks	Other	Other	1915	994	N/A	N/A	Y	C	1
		Waukegan Harbor	Waukegan	IL 10	D	C	D	ALL	various	various	various	7,419	various	various	various	C	N/A
								Shore Connect. - Reach A	Other	Other	1931	398	N/A	N/A	Y	B	4
								Shore Connect. - Reach B	SSP	BW	1931	100	N/A	N/A	Y	B	4
								Shore Connect. - Reach C	SSP	BW	1931	299	N/A	N/A	Y	B	4
								Shore Connect. - Reach D	SSP	BW	1931	238	N/A	N/A	Y	C	4
								N. B/W - Reach E	Other	BW	UNK	271	N/A	N/A	Y	C	1
								N. B/W - Reach F	CWC	BW	1904	588	1977	100%	N	C	1
								Wall Revetment - Reach G	Other	Other	1956	632	N/A	N/A	Y	B	5

APPENDIX G

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

								PROTECTIVE STRUCTURES									
STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								N. Pier Wall - Reach J	Other	Other	1961	444	N/A	N/A	N	B	5
								N. Pier - Reach K	CWC	P	1904	998	1932	100%	Y	D	2
								South Pier - Reach L	CWC	P	1903	226	2004	100%	N	A	3
								South Pier - Reach M	CWC	P	1903	1,227	1977	100%	N	A	3
								South Pier - Reach M-1	CWC	P	1903	120	1961	100%	N	A	3
								South Pier - Reach N	CWC	P	1903	121	1932	100%	Y	B	3
								South Pier - Reach O	CWC	P	1903	118	1977	100%	N	B	3
								South Pier - Reach P	CWC	P	1903	1,572	1932	100%	Y	B	3
								South Pier - Reach R	CWC	P	1903	67	1932	100%	Y	B	3
IN	Lake Michigan	Burns Small Boat Harbor	Portage	IN 1	S	R	REC. Harbor	ALL	LUS	BW	1984	1,721	N/A	N/A	N	REC. Harbor	N/A
								North Breakwater	LUS	BW	1984	678	N/A	N/A	N	C	2
								West Breakwater	LUS	BW	1984	1,043	N/A	N/A	N	C	1
		Burns Waterway Harbor	Portage	IN 1	D	C	B	North Breakwater	RMS	BW	1968	5,830	1995 - 2005	92%	N	B	1
		Indiana Harbor	East Chicago	IN 1	D	C	B	ALL	various	BW	various	3,085	N/A	N/A	Y	B	N/A
								N. B/W - Reach A	LUS	BW	1922	560	N/A	N/A	Y	B	1
								E. B/W - Reach B	Other	BW	1926	201	N/A	N/A	Y	B	3
								E. B/W - Reach C	LUS	BW	1935	2,324	N/A	N/A	Y	B	2
		Michigan City Harbor	Michigan City	IN 2	S	R	REC. Harbor	ALL	various	various	various	5,406	various	various	various	C	N/A
								Det. B/W - Reach A	CWC	BW	1903	198	1978	100%	N	C	1
								Det. B/W - Reach B	CWC	BW	1903	1,006	1969	100%	N	C	1
								Det. B/W - Reach C	CWC	BW	1903	100	1969	100%	N	C	1
								W. Pier - Reach D	SSP	P	1948	298	1972	100%	N	B	2
								W. Pier - Reach E	Other	P	1909	487	1969	100%	N	B	2
								W. Pier - Reach F	Other	P	1909	50	1969	100%	N	C	2
								E. Pier - Reach G	CWC	P	1902	100	1930	100%	Y	B	5
								E. Pier - Reach H	CWC	P	1902	306	1972	100%	N	B	5
								E. Pier - Reach J	CWC	P	1902	176	1972	100%	N	B	5
								E. Pier - Reach K	CWC	P	1902	213	1930	100%	Y	B	5
								E. Pier - Reach L	Other	P	1902	326	1930	100%	Y	C	5
								E. Pier - Reach M	CWC	P	1902	604	1991	100%	N	B	3
								E. Pier - Reach M-1	CWC	P	1902	542	1991	100%	N	B	3
								E. B/W - Reach N	Other	P	1884	1,000	2003	100%	N	A	4
MI	Lake Erie	Bolles Harbor	Bolles Harbor	MI 15	S	R	REC. Harbor	ALL	various	various	1970	800	N/A	N/A	N	REC. Harbor	N/A
								Jetty	RMS	J	1970	400	N/A	N/A			
								North Revetment	SSP	R	1970	400	N/A	N/A			
		Detroit River	Detroit	MI 13/14/15	D	C	A	ALL	RMS	Other	1959	9,450	N/A	N/A	various	(Collective)	N/A
								Cofferdam	RMS	Other	1959	3,500	N/A	N/A	Y		
								Compensating Dike	RMS	Other	1959	5,950	1981		N		

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GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
		Monroe Harbor	Monroe	MI 15	D	C	C	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Rouge River	Detroit	MI 13	D	C	B	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Lake Huron	Alpena Harbor	Alpena	MI 1	D	R	REC. Harbor	Breakwater	RMS	BW	1940	750	N/A	N/A	Y		1
		Au Sable Harbor	Au Sable	MI 1	S	R	REC. Harbor	ALL	SSP	various	192	2,407	1978		N	REC. Harbor	N/A
								North Jetty	SSP	J	1962	227	1978		N		
								North Pier	SSP	P	1962	980	1978		N		
								South Jetty	SSP	J	1962	200	1978		N		
								South Pier	SSP	P	1962	1,000	1978		N		
		Bay Port Harbor	Bay Port	MI 10	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Belle River	Marine City	MI 10	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Black River	Port Huron	MI 10	D	C	D	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Caseville Harbor	Caseville	MI 10	S	R	REC. Harbor	North Breakwater	RMS	BW	1960	1,780	1980		N	REC. Harbor	1
		Channels in Straits of Mackinac	Mackinac Island	MI 1	D	C	A	NONE	RMS	various	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Cheboygan Harbor	Cheboygan	MI 1	D	C	D	West Pier	RMS	P	1969	775	1985		N		1
		Detour Harbor	Detour Village	MI 1	S	R	REC. Harbor	Breakwater	RMS	BW	1982	1,300	N/A	N/A	N	REC. Harbor	1
		Hammond Bay Harbor	Huron Beach	MI 1	S	R	REC. Harbor	ALL	RMS	BW	1965	1,905	various	various	N	REC. Harbor	N/A
								East Breakwater	RMS	BW	1965	1,445	1985		N		
								West Breakwater	RMS	BW	1965	460	N/A	N/A	N		
		Harbor Beach Harbor	Harbor Beach	MI 10	D	C	D	ALL	CWC	BW	various	5,034	various	various	various	(Collective)	N/A
								Main Breakwater	CWC	BW	1874	1,874	1905		Y		
								North Breakwater	CWC	BW	1876	1,204	1983		N		
								South Breakwater	CWC	BW	1884	1,956	1971		N		
		Harrisville Harbor	Harrisville	MI 1	S	R	REC. Harbor	ALL	RMS	BW	1959	2,675	1984		N	REC. Harbor	N/A
								North Breakwater	RMS	BW	1959	505	1984		N		
								South Breakwater	RMS	BW	1959	2,170	1984		N		
		Kawkawlin River	Kawkawlin	MI 1	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Les Cheneaux Island Channels	Cedarville	MI 1	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Lexington Harbor	Lexington	MI 10	S	R	REC. Harbor	ALL	RMS	BW	1976	2,595	N/A	N/A	N	REC. Harbor	N/A
								North Breakwater	RMS	BW	1976	1,905	N/A	N/A	N		
								South Breakwater	RMS	BW	1976	690	N/A	N/A	N		
		Mackinac Island Harbor	Mackinac Island	MI 1	S	R	REC. Harbor	ALL	RMS	BW	1914	1,860	1987		N	REC. Harbor	N/A

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								East Breakwater	RMS	BW	1914	910	1987		N		
								West Breakwater	RMS	BW	1914	950	1987		N		
		Mackinaw City Harbor	Mackinaw City	MI 1	S	R	REC. Harbor	ALL	RMS	various	1967	930	N/A	N/A	N	REC. Harbor	N/A
								East Breakwater	RMS	BW	1967	430	N/A	N/A	N		
								North Breakwater	RMS	BW	1967	200	N/A	N/A	N		
								Wave Absorber	RMS	Other	1967	300	N/A	N/A	N		
		Pine River	St Clair	MI 10	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Point Lookout	Au Gres	MI 1	S	R	REC. Harbor	ALL	RMS	BW	1986	7,900	N/A	N/A	N	REC. Harbor	N/A
								East Breakwater	RMS	BW	1986	4,000	N/A	N/A	N		
								West Breakwater	RMS	BW	1986	3,900	N/A	N/A	N		
		Port Austin	Port Austin	MI 10	S	R	REC. Harbor	ALL	various	BW	1959	3,276	1979		N	REC. Harbor	N/A
								Breakwater	RMS	BW	1959	1,350	1979		N		
								Breakwater	SSP	BW	1959	1,926	1979		N		
		Port Sanilac	Port Sanilac	MI 10	S	R	REC. Harbor	ALL	SSP	various	1951	2,407	N/A	N/A	**Y**	REC. Harbor	N/A
								North Breakwater	SSP	BW	1951	1,558	N/A	N/A	**Y**		
								South Pier	SSP	P	1951	849	N/A	N/A	**Y**		
		Saginaw River	Bay City	MI 4/5	D	C	**C**	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Sebewaing River	Sebewaing	MI 10	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		St. Clair River	Algonac	MI 10	D	C	**A**	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Tawas Bay Harbor	East Tawas	MI 1	S	R	REC. Harbor	Breakwater	SSP	BW	1978	1,664	N/A	N/A	N	REC. Harbor	1
	Lake Michigan	Arcadia Harbor	Arcadia	MI 2	S	R	REC. Harbor	ALL	RMS	P	various	2,545	1989		N	REC. Harbor	N/A
								North Pier	RMS	P	1909	1,084	1989		N		
								South Pier	RMS	P	1800	1,461	1989		N		
		Cedar River Harbor	Cedar River	MI 1	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	REC. Harbor	N/A
		Charlevoix Harbor	Charlevoix	MI 1	D	C	**C**	ALL	various	various	various	4,141	various	various	N	(Collective)	N/A
								North Pier	SSP	P	1979	281	1981		N		
								North Pier	RMS	P	1897	478	1981		N		
								North Pier	CWC	P	1879	73	1966		N		
								North Revetment	SSP	R	1970	959	1972		N		
								South Pier	CWC	P	1879	452	1981		N		
								South Pier	SSP	P	1930	407	1970		N		
								South Revetment	SSP	R	1930	1,491	1970		N		
		Cross Village Harbor	Cross Village			R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Frankfort Harbor	Frankfort	MI 2	D	C	**D**	ALL	various	various	various	4,549	various	various	various	(Collective)	N/A

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GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES: Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								North Breakwater	CWC	BW	1932	1,966	N/A		**Y**		
								North Pier	SSP	P	1870	1,249	N/A		**Y**		
								South Breakwater	CWC	BW	1928	1,590	N/A		**Y**		
								South Breakwater	RMS	BW	1928	998	1994		N		
								South Pier	SSP	P	1868	450	1981		N		
								South Revetment	SSP	R	1949	262	1982		N		
		Grand Haven Harbor	Grand Haven	MI 2	D	C	C	ALL	various	various	various	9,919	various	various	various	(Collective)	N/A
								Govt Basin Revetment	SSP	R		692	N/A	N/A	**Y**		
								North Pier	SSP	P	1879	1,427	1955		**Y**		
								North Pier	CWC	P	1873	406	1984		N		
								North Revetment	SSP	R	1873	1,744	1981		N		
								North Revetment	CWC	R	1918	150	N/A	N/A	**Y**		
								South Pier	SSP	P	1868	1,150	1957		N		
								South Pier	CWC	P	1883	78	1954		**Y**		
								South Revetment	CWC	R	1857	2,898	1984		N		
								South Revetment	SSP	R	1857	1,374	1972		N		
		Grand River	Grand Haven	MI 2	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Grays Reef Passage	Cross Village	MI 1	D	C	A	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Grelickville Harbor	Traverse City	MI 4	S	R	REC. Harbor	ALL	various	BW	various	2,024	N/A	N/A	various	REC. Harbor	N/A
								East Breakwater	RMS	BW	1966	332	N/A	N/A	N		
								Outer Breakwater	SSP	BW	1950	1,253	N/A	N/A	**Y**		
								West Breakwater	RMS	BW	1966	420	N/A	N/A	N		
								West Breakwater	SSP	BW	1966	19	N/A	N/A	N		
		Holland Harbor	Holland	MI 2	D	C	D	ALL	various	various	various	5,244	various	various	various	(Collective)	N/A
								North Breakwater	SSP	BW	1906	100	1964		N		
								North Breakwater	CWC	BW	1906	652	1964		N		
								North Pier	SSP	P	1875	214	1958		N		
								North Pier Connector	RMS	CONN	1908	285	1964		N		
								North Revetment	SSP	R	1872	1,443	1972		N		
								South Breakwater	CWC	BW	1907	701	1933		**Y**		
								South Breakwater	SSP	BW	1907	100	1963		N		
								South Pier	SSP	P		152	N/A	N/A	N	N/A	
								South Pier Connector	RMS	CONN	1908	273	1963		N		
								South Revetment	CWC	R	1871	1,324	1933		**Y**		
		Inland Route	Alanson	MI 1	S	R	REC. Harbor	Breakwater /Walls	SSP	BW	1958	1,782	N/A	N/A	N	REC. Harbor	1
		Leland Harbor	Leland	MI 4	S	R	REC. Harbor	ALL	various	various	various	2,187	various	various	various	REC. Harbor	N/A
								Breakwater	RMS	BW	1968	1,100	N/A	N/A	**Y**		
								South Pier	SSP	P	1948	190	N/A	N/A	**Y**		
								South Pier	RMS	P	1936	897	1968		**N**		

GREAT LAKES NAVIGATION SYSTEM
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STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
		Little Bay De Noc	Kipling	MI 1	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Ludington Harbor	Ludington	MI 2	D	C	D	ALL	various	various	various	9,523	various	various	various	(Collective)	N/A
								North Breakwater	SSP	BW	1909	100	1994		N		
								North Breakwater	CWC	BW	1909	2,803	1970		N		
								North Pier	SSP	P	1880	311	1981		N		
								North Revetment	SSP	R	1917	1,250	1987		N		
								Offshore Breakwater	RMS	BW	1981	380	N/A	N/A	N		
								South Breakwater	CWC	BW	1954	3,446	N/A	N/A	Y		
								South Breakwater	SSP	BW	1983	54	N/A	N/A	N		
								South Pier	RMS	P	1981	505	N/A	N/A	N		
								South Revetment	CWC	R	1981	674	N/A	N/A	N		
		Manistee Harbor	Manistee	MI 2	D	C	C	ALL	various	various	various	6,034	various	various	various	(Collective)	N/A
								North Pier	SSP	P	1912	1,225	1964		N		
								North Revetment	SSP	R	1928	1,554	1960		N		
								South Breakwater	CWC	BW	1912	2,485	1966		N		
								South Revetment	SSP	R	1949	420	N/A	N/A	Y		
								South Stub Pier	SSP	P	1949	350	N/A	N/A	Y		
		Manistique Harbor	Manistique	MI 1	S	R	REC. Harbor	ALL	various	BW	various	4,026	various	various	various	(Collective)	N/A
								East Breakwater	CWC	BW	1887	1,744	1958		N		
								East Breakwater	RMS	BW	1953	500	N/A	N/A	Y		
								West Breakwater	CWC	BW	1911	1,782	N/A	N/A	Y		
		Menominee Harbor	Menominee	MI 1	D	C	D	ALL	various	P	various	3,387				(Collective)	N/A
								North Pier	SSP	P		1,224					
								South Pier	SSP	P		2,001					
								South Pier	CC	P		162					
		Muskegon Harbor	Muskegon	MI 2	D	C	C	ALL	various	various	various	14,599	various	various	various	N/A	N/A
								North Breakwater	RMS	BW	1930	3,064	N/A	N/A	Y		
								North Pier	RMS	P	1906	278	1980		N		
								North Revetment	RMS	R	1906	3,965	1980		N		
								South Breakwater	CC	BW	1927	1,460	N/A	N/A	Y		
								South Breakwater	CWC	BW	1928	1,561	1966		N		
								South Pier	SSP	P	1868	299	1966		N		
								South Revetment	CWC	R	1903	3,579	1934		Y		
								South Revetment	SSP	R	1890	393	1966		N		
		New Buffalo Harbor	New Buffalo	MI 6	S	R	REC. Harbor	ALL	various	BW	1975	2,045	N/A	N/A	N	REC. Harbor	N/A
								North Breakwater	RMS	BW	1975	1,130	N/A	N/A	N		
								North Breakwater	SSP	BW	1975	175	N/A	N/A	N		
								South Breakwater	RMS	BW	1975	740	N/A	N/A	N		

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GREAT LAKES NAVIGATION SYSTEM
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STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
		Pentwater Harbor	Pentwater	MI 2	S	R	REC. Harbor	ALL	various	various	various	3,949	various	various	various	REC. Harbor	N/A
								North Pier	CWC	P	1870	471	1938		Y		
								North Pier	RMS	P	1959	60	1959		N		
								North Revetment	CWC	R	1878	1,571	1939		Y		
								South Pier	CWC	P	1869	551	1938		Y		
								South Revetment	CWC	R	1873	1,296	1939		Y		
		Petoskey Harbor	Petoskey	MI 1	S	R	REC. Harbor	ALL	various	BW	various	1,150	various	various	Y	REC. Harbor	N/A
								West Breakwater	CWC	BW	1895	795	1930		Y		
								West Breakwater	RMS	BW	1897	355	1945		Y		
		Portage Lake Harbor	Onekama	MI 2	S	R	REC. Harbor	ALL	CWC	various	various	4,500	various	various	Y	REC. Harbor	N/A
								North Pier	CWC	P	1900	200	1939		Y		
								North Revetment	CWC	R	1883	2,000	1939		Y		
								South Pier	CWC	P	1900	200	1940		Y		
								South Revetment	CWC	R	1800	2,100	1940		Y		
		Saugatuck Harbor	Saugatuck	MI 2	S	R	REC. Harbor	ALL	CWC	various	various	5,292	various	various	Y	REC. Harbor	N/A
								North Pier	CWC	P	1904	1,200	1937		Y		
								North Revetment	CWC	R	1904	1,578	1937		Y		
								South Pier	CWC	P	1904	1,400	1936		Y		
								South Revetment	CWC	R	1906	739	1938		Y		
								South Revetment	SSP	R	1906	375	1959		Y		
		South Haven Harbor	South Haven	MI 6	S	R	REC. Harbor	ALL	various	various	various	4,090	various	various	various	(Collective)	N/A
								North Pier	SSP	P	1912	1,095	1962		N		
								North Revetment	SSP	R	1876	1,055	1970		N		
								South Pier	CWC	P	1912	400	1940		Y		
								South Pier	SSP	P	1871	529	1970		N		
								South Revetment	SSP	R	1950	1,011	N/A	N/A	Y		
		St James Harbor	St James	MI 1	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		St Joseph Harbor	St Joseph	MI 6	D	C	D	ALL	various	various	various	4,675	various	various	various	(Collective)	N/A
								North Pier	CWC	P	1880	930	1931		Y		
								North Pier	SSP	P	1901	474	1953		Y		
								North Revetment	SSP	R	1836	948	1951		Y		
								South Pier	SSP	P	1901	1,358	1972		N		
								South Pier	CWC	P	1899	426	1976		N		
								South Revetment	SSP	R	1889	539	1972		N		
		St Joseph River	St Joseph	MI 6	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES: Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
		White Lake Harbor	Whitehall	MI 2	S	R	REC. Harbor	ALL	various	various	various	3,940	various		Y	REC. Harbor	N/A
								North Pier	CWC	P	1870	1,717	1936		Y		
								South Pier	CWC	P	1870	1,953	1937		Y		
								Interior Breakwater	SSP	BW		270	N/A	N/A	Y		
	Lake St. Claire	Channels in Lake St Clair	Grosse Pointe	MI 12/13	D	C	A	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Clinton River	Mt Clemens	MI 10	S	R	REC. Harbor	Breakwater	RMS	BW	1966	1,538	N/A	N/A	N	REC. Harbor	1
	Lake Superior	Big Bay Harbor	Big Bay	MI 1	S	R	REC. Harbor	ALL	various	various	1966	1,578	N/A	N/A	N	REC. Harbor	N/A
								East Breakwater	RMS	BW	1966	471	N/A	N/A	N		
								West Breakwater	RMS	BW	1966	827	N/A	N/A	N		
								Revetment	SSP	R	1966	280	N/A	N/A	N		
		Black River	Black River	MI 1	S	R	REC. Harbor	ALL	RMS	BW	1957	1,680	N/A	N/A	N	REC. Harbor	N/A
								East Breakwater	RMS	BW	1957	825	N/A	N/A	N		
								West Breakwater	RMS	BW	1957	855	N/A	N/A	N		
		Chippewa Harbor	Isle Royale	MI 1	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Eagle Harbor	Eagle Harbor	MI 1	S	R	REC. Harbor	ALL	various	various	various	526	N/A	N/A	various	REC. Harbor	N/A
								Guide Piers	CWC		1878	146	N/A	N/A	Y		
								Revetment	SSP	R	1960	380	N/A	N/A	N		
		Grand Marais Harbor	Grand Marais	MI 1	D	C		ALL	various	various	various	10,179	various	various	various	REC. Harbor	N/A
								East Pier	CWC	P	1893	1,445	1971		N		
								Pile Dike - Ruins	Timber Piles		1895	5,770	1905		Y		
								West Groin	Timber		1892	100	N/A	N/A	Y		
								West Pier	CWC	P	1883	1,812	1971		N		
								West Pier	SSP	P	1961	802	N/A	N/A	N		
								East Groin	Timber		1892	250	N/A	N/A	Y		
		Grand Traverse Bay Harbor	Grand Traverse	MI 1	S	R	REC. Harbor	ALL	SSP	various	various	1,620	various	various	various	REC. Harbor	N/A
								North Breakwater	SSP	BW	1964	344	N/A	N/A	N		
								North Pier	SSP	P	1945	518	1951		Y		
								North Revetment	SSP	R	1949	190	1951		Y		
								South Pier	SSP	P	1949	271	N/A	N/A	Y		
								South Revetment	SSP	R	1951	297	1984		N		
		Keweenaw Waterway	Houghton	MI 1	D	C	F	ALL	various	various	UNKN	23,971	N/A	N/A	Y	(Collective)	N/A
								East Breakwater UE	SSP	BW	UNKN	50	N/A	N/A	Y		
								East Breakwater UE	CWC	BW	UNKN	2,385	N/A	N/A	Y		
								East Breakwater LE	CWC	BW	UNKN	2,802	N/A	N/A	Y		
								East Revetment LE	CWC	R	UNKN	912	N/A	N/A	Y		

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STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES: Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								East Revetment UE	SSP	R	UNKN	8,288	N/A	N/A	Y		
								West Breakwater UE	SSP	BW	UNKN	50	N/A	N/A	Y		
								West Breakwater UE	CWC	BW	UNKN	2,645	N/A	N/A	Y		
								West Revetment LE	SSP	R	UNKN	2,007	N/A	N/A	Y		
								West Revetment UE	SSP	R	UNKN	4,832	N/A	N/A	Y		
		Lac La Belle Harbor	Lac La Belle	MI 1	S	R	REC. Harbor	ALL	SSP	BW	1959	1,181	N/A	N/A	N	REC. Harbor	N/A
								North Breakwater	SSP	BW	1959	491	N/A	N/A	N		
								South Breakwater	SSP	BW	1959	690	N/A	N/A	N		
		Little Lake Harbor	Little Lake	MI 1	S	R	REC. Harbor	ALL	RMS	BW	1964	1,270	N/A	N/A	N	REC. Harbor	N/A
								East Breakwater	RMS	BW	1964	270	N/A	N/A	N		
								West Breakwater	RMS	BW	1964	1,000	N/A	N/A	N		
		Marquette Harbor	Marquette	MI 1	D	C	C	ALL	various	various	various	4,510	various	various	various	(Collective)	N/A
								East Breakwater	CWC	BW	1868	3,010	1965		N		
								East Breakwater	RMS	BW	1912	1,500	N/A	N/A	Y		
		Ontonagon Harbor	Ontonagon	MI 1	D	C	D	ALL	various	various	various	4,878	various	various	various	(Collective)	N/A
								East Pier	CWC	P	1868	1,705	1935		Y		
								East Revetment	SSP	R	1800	610	1980		N		
								West Pier	CWC	P	1884	1,398	1935		Y		
								West Pier	SSP	P	1881	96	1946		Y		
								West Revetment	CWC	R	1868	1,069	1933		Y		
		Presque Isle Harbor	Trowbridge Park	MI 1	D	C	B	ALL	various	various	various	2,866	various	various	various	(Collective)	N/A
								East Breakwater	CWC	BW	1903	1,266	1927		Y		
								East Breakwater	RMS	BW	1938	1,600	1987		N		
		St Marys River	Sault Ste Marie	MI 1	D	C	A	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Whitefish Point	Whitefish Point	MI 1	S	R	REC. Harbor	ALL	SSP	BW	various	1,041	N/A	N/A	N	REC. Harbor	N/A
								Interior Breakwater	SSP	BW	1969	270	N/A	N/A	N		
								North Breakwater	SSP	BW	1959	587	N/A	N/A	N		
								South Breakwater	SSP	BW	1969	184	N/A	N/A	N		
MN	Lake Superior	Beaver Bay Harbor	Beaver Bay			R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Duluth Harbor	Duluth	MN 8	D	C	A	ALL	SSP	P	1900	3,461	N/A	N/A	Y	(Collective)	N/A
								North Pier	SSP	P	1900	1,729	N/A	N/A	Y		
								South Pier	SSP	P	1900	1,732	N/A	N/A	Y		
		Grand Marais Harbor	Grand Marais	MN 8	D	C		ALL	various	various	various	2,672	various	various	various	REC. Harbor	N/A
								Breakwater	CWC	BW	1883	300	1926		Y		
								Breakwater	RMS	BW	1959	1,026	N/A	N/A	N		
								East Sea Walls	CONC	SW	1936	1,346	1957		N		
		Knife River	Knife River	MN 8	S	R	REC. Harbor	ALL	various	various	1958	245	N/A	N/A	N	REC. Harbor	N/A

APPENDIX G

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES: Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								South Breakwater	CWC	BW	1958	30	N/A	N/A	N		
								South Breakwater	RMS	BW	1958	215	N/A	N/A			
		Lutsen Harbor	Schroeder		S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Two Harbors Harbor	Two Harbors	MN 8	D	C	B	ALL	various	various	various	2,528	various	various	various	(Collective)	N/A
								East Breakwater	SSP	BW	1948	326	N/A	N/A	Y		
								East Breakwater	CWC	BW	1947	1,302	1950		Y		
								West Breakwater	CWC	BW	1893	900	1933		Y		
NY	Black River Bay	Sacket's Harbor	Harbor	NY 23	S	R	REC. Harbor	Jetty	RMS	J		164	N/A	N/A			1
	Lake Erie	Barcelona Harbor	Barcelona	NY 27	S	R	REC. Harbor	ALL	various	various	various	1,483	various			REC. Harbor	N/A
								West Breakwater	SSP/RMS	BW		693					
								East Breakwater	SSP/RMS	BW		790					
		Black Rock Channel & Tonawanda Harbor	Buffalo	NY 27	D	C	D	Bird Island Pier	RMS	P		10,700	N/A	N/A			1
		Buffalo Harbor	Buffalo	NY 27	D	C	C	ALL	various	various	various	14,233	various			(Collective)	N/A
								Old Breakwater	LUS	BW		6,123					
								Old Breakwater Ext.	LUS	BW		504					
								West Breakwater	LUS	BW		1,800					
								North Breakwater	CWC	BW		2,204					
								S. Entrance Arm BW	LUS	BW		2,000					
								Stony Point BW	LUS	BW		1,603					
		Cattaraugus Creek Harbor	Sunset Bay	NY 27	S	R	REC. Harbor	ALL	various	various	various	3,000	various	various	N	REC. Harbor	N/A
								South Breakwater	RMS	BW		1,850	1984	50%	N		
								North Breakwater	RMS	BW		600	1984	50%	N		
								Berm	RMS	BW		550		1%	N		
		Dunkirk Harbor	Dunkirk	NY 27	D	C		ALL	various	various	various	6,888	various			REC. Harbor	N/A
								West Breakwater	LUS	BW		1,200					
								East Breakwater	LUS	BW		1,464					
								Breakwater	LUS	BW		2,814					
								West Pier	CWC	P		1,410					
	Lake Ontario	Great Sodus Bay Harbor	Sodus Point	NY 25	D	R	REC. Harbor	ALL	various	various	various	4,527	various			REC. Harbor	N/A
								East Breakwater	CWC	BW		1,653					
								East Pier	SSP	P		1,294					
								West Pier	SSP	P		1,580					
		Irondequoit Bay Harbor	Irondequoit	NY 25	S	R	REC. Harbor	ALL	RMS	various	various	2,150	various			REC. Harbor	N/A
								West Breakwater	RMS	BW		1,390					

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GREAT LAKES NAVIGATION SYSTEM
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STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								East Jetty	RMS	J		760					
		Little Sodus Bay Harbor	Fair Haven	NY 25	D	R	REC. Harbor	ALL	SSP	various	various	5,157	various			REC. Harbor	N/A
								West Pier	SSP	P		1,747					
								East Pier	SSP	P		1,810					
								East Breakwater	SSP	BW		1,600					
		Oak Orchard Harbor	Breeze	NY 28	S	R	REC. Harbor	ALL	various	various	various	2,120	various			REC. Harbor	N/A
								West Jetty	RMS	J		900					
								East Jetty	RMS	J		670					
								Detached BW	SSP	BW		550					
		Olcott Harbor	Olcott	NY 28	S	R	REC. Harbor	ALL	SSP	P	various	1,723	various			REC. Harbor	N/A
								East Pier	SSP	P		850					
								West Pier	SSP	P		873					
		Oswego Harbor	Oswego	NY 23	D	C	D	ALL	various	various	various	10,265	various			(Collective)	N/A
								Outer West BW	CWC	BW		4,515					
								West Arrowhead BW	LUS	BW		2,700					
								East Arrowhead BW	LUS	BW		2,200					
								Detached BW	LUS	BW		850					
		Port Ontario Harbor	Port Ontario	NY 23	S	R	REC. Harbor	ALL	RMS	BW	various	1,690	various			REC. Harbor	N/A
								South Breakwater	RMS	BW		1,350					
								North Breakwater	RMS	BW		340					
		Rochester Harbor	Rochester	NY 28	D	C	D	ALL	SSP	P	various	5,770	various			(Collective)	N/A
								West Pier	SSP	P		3,064					
								East Pier	SSP	P		2,706					
		Wilson Harbor	Wilson	NY 28	S	R	REC. Harbor	ALL	SSP	P	various	1,331	various			REC. Harbor	N/A
								West Pier	SSP	P		667					
								East Pier	SSP	P		664					
	Little River	Little River	Falls	NY 28	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Morristown Bay	Morristown Harbor	Morristown	NY 23	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	St. Lawrence River	Cape Vincent Harbor	Cape Vincent	NY 23	D	R	REC. Harbor	Breakwater	CWC	BW		1,381				REC. Harbor	1
		Ogdensburg Harbor	Ogdensburg	NY 23	D	C	D	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OH	Lake Erie	Ashtabula Harbor	Ashtabula	OH 14	D	C	B	ALL	various	various	various	13,201	various			(Collective)	N/A
								West Breakwater	RMS/LUS	BW		7,311					
								East Breakwater	RMS/LUS	BW		4,342					
								Inner Breakwater	RMS/LUS	BW		1,398					

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								West Pier	CWC	P		150					
		Cleveland Harbor	Cleveland	OH 11	D	C	B	ALL	various	various	various	28,990	various			(Collective)	N/A
								East Breakwater	RMS	BW		17,000					
								East Arrowhead BW	LUS	BW		1,250					
								West Arrowhead BW	LUS	BW		1,250					
								West Breakwater	CWC	BW		6,048					
								West Spur BW	RMS	BW		400					
								West Pier	CWC	P		1,440					
								East Pier	SSP	P		1,602					
		Conneaut Harbor	Conneaut	OH 14	D	C	B	ALL	various	various	various	6,838	various			(Collective)	N/A
								West Breakwater	LUS	BW		4,268					
								West BW Shorearm	LUS	BW		1,670					
								East Pier	CWC	P		600					
								West Pier	CWC	P		300					
		Cooley Canal Harbor	Reno Beach	OH 9	S	R	REC. Harbor	ALL	RMS	BW	various	1,745	various			REC. Harbor	N/A
								West Breakwater	RMS	BW		1,385					
								East Breakwater	RMS	BW		360					
		Fairport Harbor	Fairport	OH 14	D	C	C	ALL	various	various	various	11,707	various			(Collective)	N/A
								West BW Arrowhead	LUS	BW		3,878					
								East BW Arrowhead	LUS	BW		1,300					
								East Breakwater	LUS	BW		5,450					
								West Pier	SSP	P		500					
								East Pier	SSP	P		579					
		Huron Harbor	Huron	OH 9	D	C	C	ALL	various	various	various	4,973	various			(Collective)	N/A
								East Breakwater	LUS	BW		1,450					
								West Pier	LUS	P		1,360					
								West Pier	SSP	P		2,163					
		Lorain Harbor	Lorain	OH 13	D	C	C	ALL	various	various	various	13,419	various	various	various	(Collective)	N/A
								Outer Breakwater	SSP	BW		2,180	N/A	N/A			
								East Breakwater	LUS	BW		2,020	N/A	N/A			
								East BW Shorearm	SSP	BW		2,210	N/A	N/A			
								West Breakwater	LUS	BW		2,812	N/A	N/A			
								West BW Shorearm	RMS	BW		1,189	N/A	N/A			
								Detached BW	RMS	BW		325	N/A	N/A			
								Main Breakwater	RMS	BW		800	N/A	N/A			
								West Pier	SSP	P		1,004	2004	100%	N		
								East Pier	SSP	P		880	2003	100%	N		
		Port Clinton Harbor	Port Clinton	OH 9	S	R	REC. Harbor	ALL	RMS	J	various	4,180	various			REC. Harbor	N/A

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GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								East Jetty	RMS	J		2,200					
								West Jetty	RMS	J		1,980					
		Put-In-Bay Harbor	Put-In-Bay	OH 9	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Toussaint River	Toussaint River Township	OH 9	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Vermilion Harbor	Vermillion	OH 9	S	R	REC. Harbor	ALL	various	various	various	2,656	various			REC. Harbor	N/A
								East Pier	LUS	P		459					
								West Pier	LUS	P		1,334					
								Detached BW	SSP	BW		864					
		West Harbor	Gem Beach	OH 9	S	R	REC. Harbor	ALL	RMS	BW	various	2,700	various			REC. Harbor	N/A
								North Breakwater	RMS	BW		1,350					
								South Breakwater	RMS	BW		1,350					
	Maumee Bay	Toledo Harbor	Toledo	OH 9	D	C	B	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Rocky River	Rocky River Harbor	Rocky River	OH 10	S	R	REC. Harbor	East Pier	RMS	P		900				REC. Harbor	1
	Sandusky Bay	Sandusky Harbor	Sandusky Bay	OH 9	D	C	C	ALL	various	various	various	10,805	various			(Collective)	N/A
								East Jetty	RMS	J		6,000					
								Spur Dike	RMS	BW		1,450					
								Rock Dike	RMS	BW		3,355					
PA	Lake Erie	Erie Harbor	Presque Isle Bay	PA 3	D	C		ALL	SSP	P	various	5,463	various	N/A		REC. Harbor	N/A
								North Pier	SSP	P		3,248	N/A	N/A			
								South Pier	SSP	P		2,215	N/A	N/A			
WI	Lake Michigan	Algoma Harbor	Algoma	WI 8	S	R	REC. Harbor	ALL	CWC	various	1932	2,832	N/A	N/A	Y	(Collective)	N/A
								North Pier	CWC	P	1932	1,102	N/A	N/A	Y		
								South Breakwater	CWC	BW	1932	1,730	N/A	N/A	Y		
		Big Suamico Harbor	Suamico	WI 8	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Fox River	Green Bay	WI 8	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Green Bay Harbor	Green Bay	WI 8	D	C	C	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Kenosha Harbor	Kenosha	WI 1	D	C	F	ALL	various	various	1900	3,123	various	various	N	(Collective)	N/A
							F	North Det Breakwater	CWC	BW	1900	796	1977		N		
							F	North Pier	SSP	P	1900	1,077	1970		N		
							F	South Pier	SSP	P	1900	1,250	1970		N		
		Kewaunee Harbor	Kewaunee	WI 8	D	C	F	ALL	various	various	various	6,874	various	various	various	(Collective)	N/A
								East Revetment	CWC	R	1925	490	N/A	N/A	Y		
								North Breakwater	CONC	BW	1936	540	N/A	N/A	Y		
								North Breakwater	RMS	BW	1936	2,440	N/A	N/A	Y		
								North Stub Pier	RMS	P	1881	553	1987		N		

APPENDIX G

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								South Pier	SSP	P	1893	1,314	1966		N		
								South Revetment	SSP	R	1882	421	1933		Y		
								South Revetment	CWC	R	1956	70	N/A	N/A	Y		
								West Revetment	SSP	R	1973	1,046	N/A	N/A	N		
		Manitowoc Harbor	Manitowoc	WI 6	D	C	D	ALL	various	various	various	5,479	various	various	various	(Collective)	N/A
								North Breakwater	CWC	BW	1895	2,437	1926		Y		
								North Breakwater	CC	BW	UNKN	318	N/A	N/A	N		
								North Stub Breakwater	RMS	BW	1982	160	N/A	N/A	N		
								North Stub Pier	SSP	P	1948	74	1949		Y		
								South Breakwater	CC	BW	1908	290	1933		Y		
								South Breakwater	CWC	BW	1907	2,052	1925		Y		
								South Breakwater	SSP	BW	1907	148	1951		Y		
		Menominee Harbor	Menominee	WI 8	D	C		ALL	various	various	various	3,387	various	various	various	REC. Harbor	N/A
								North Pier	SSP	P	1877	1,224	1963		N		
								South Pier	SSP	P	1879	2,001	1955		Y		
								South Pier	CC	P	1883	162	1933		Y		
		Milwaukee Harbor	Milwaukee	WI 4	D	C	C	ALL	various	various	various	22,768	various	various	various	(Collective)	N/A
								North Breakwater	CWC	BW	1924	1,736	1987		N		
								North Breakwater	SSP	BW	1882	5,532	1976		N		
								North Breakwater	CC	BW	1924	1,744	1987		N		
								North Pier	CWC	P	1855	2,598	1986		N		
								South Breakwater	CC	BW	1925	9,646	N/A	N/A	Y		
								South Breakwater	RMS	BW		25	N/A	N/A	Y		
								South Pier	SSP	P	1953	1,085	N/A	N/A	Y		
								South Pier	CC	P	1909	402	N/A	N/A	Y		
		Oconto Harbor	Oconto	WI 8	D	C		ALL	various	various	1974	2,144	N/A	N/A	N	REC. Harbor	N/A
								South Pier	SSP	P	1974	67	N/A	N/A	N		
								South Pier	CWC	P	1974	2,077	N/A	N/A	N		
		Pensaukee Harbor	Pensaukee	WI 8	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Port Washington	Port Washington	WI 5	D	C	D	ALL	various	various	various	4,769	various	various	various	(Collective)	N/A
								North Breakwater	CC	BW	1934	1,082	N/A	N/A	Y		
								North Breakwater	SSP	BW	1934	1,455	1980		N		
								North Stub Pier	SSP	P	1940	125	N/A	N/A	Y		
								South Breakwater	CC	BW	1936	393	N/A	N/A	Y		
								South Breakwater	RMS	BW	1936	614	N/A	N/A	Y		
								South Revetment	SSP	R	UNKN	1,100	N/A	N/A	Y		
		Sheboygan Harbor	Sheboygan	WI 6	D	C	D	ALL	various	various	various	5,741	various	various	various	(Collective)	N/A
								North Breakwater	RMS	BW	1913	221	1964		N		
								North Breakwater	CWC	BW	1913	2,524	1963		N		
								North Revetment	CWC	R	1905	336	1918		Y		

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GREAT LAKES NAVIGATION SYSTEM
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STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								North Stub Pier	SSP	P	1903	120	1964		N		
								South Pier	CWC	P	1895	908	1964		N		
								South Pier	SSP	P	1984	50	N/A	N/A	N		
								South Pier	CWC	P	1885	1,582	1925		Y		
		Sturgeon Bay Harbor	Sturgeon Bay	WI 8	D	C	D	ALL	various	various	various	15,109	various	various	various	(Collective)	N/A
								North Breakwater	CWC	BW	1874	1,194	1931		Y		
								North Det Breakwater	CWC	BW	1879	150	1931		Y		
								North Revetment	CWC	R		260	N/A	N/A			
								North Revetment	SSP	R		2,441	N/A	N/A			
								North Revetment	RMS	R	1964	3,510	N/A	N/A			
								South Breakwater	CWC	BW	1879	1,194	1927		Y		
								South Det Breakwater	CWC	BW	1879	150	1927		Y		
								South Revetment	SSP	R		3,589	N/A	N/A			
								South Revetment	CWC	R	1895	2,621	1948		Y		
		Two Rivers Harbor	Two Rivers	WI 6	S	R	REC. Harbor	ALL	various	various	various	3,695	various	various	various	REC. Harbor	N/A
								North Pier	CWC	P	1907	1,567	1931		Y		
								North Pier	SSP	P	1979	26	1953		Y		
								North Revetment	SSP	R	1917	382	N/A	N/A	Y		
								South Pier	CWC	P	1872	1,694	1941		Y		
								South Pier	SSP	P	1879	26	1951		Y		
		Washington Island Harbor	Jackson Harbor	WI 8	S	R	REC. Harbor	NONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Lake Superior	Ashland Harbor	Ashland	WI 7	D	C	D	ALL	various	various	various	8,000	various	various	Y	(Collective)	N/A
								Breakwater	CWC	BW	1911	48	1914		Y		
								Breakwater	RMS	BW	1889	7,952	1910		Y		
		Bayfield Harbor	Bayfield	WI 7	S	R	REC. Harbor	ALL	SSP	P	1960	242	N/A	N/A	N	REC. Harbor	N/A
								North Pier	SSP	P	1960	103	N/A	N/A	N		
								South Pier	SSP	P	1960	139	N/A	N/A	N		
		Cornucopia Harbor	Cornucopia	WI 7	S	R	REC. Harbor	ALL	various	various	various	1,618	N/A	N/A	N	REC. Harbor	N/A
								Deflection Dike	CWC	DD	1960	150	N/A	N/A	N		
								East Pier	SSP	P	1957	938	N/A	N/A	N		
								West Pier	SSP	P	1957	530	N/A	N/A	N		
		La Pointe Harbor	Madeline Island	WI 7	S	R	REC. Harbor	ALL	SSP	BW	1967	200	N/A	N/A	N	REC. Harbor	N/A
								West Breakwater	SSP	BW	1967	74	N/A	N/A	N		
								West Breakwater	SSP	BW	1967	126	N/A	N/A	N		
		Port Wing Harbor	Port Wing	WI 7	D	C		ALL	various	various	various	1,852	1950	various	various	REC. Harbor	N/A
								East Pier	CWC	P	1903	447	1950		Y		
								East Revetment	CWC	R	1904	388	1950		Y		

APPENDIX G

GREAT LAKES NAVIGATION SYSTEM
FEDERAL OPERATIONS AND MAINTENANCE PROJECT FEATURES and CONDITION INVENTORY

STATE	LOCATION	PROJECT NAME	MUNICIPALITY	CONG. DIST	DRAFT	TYPE	Harbor Optimum Condition per GL Risk Level Metrics	PROTECTIVE STRUCTURES									
								Structure	CLASS	TYPE	Year Constructed	Length (Ft.)	Last Year of Major Rehab./ Struct. Revision	Portion of structure completed by Major Rehab. (%)	>50 years since construct. or last Major Rehab.? (Y or N)	FY05 Structure Condition per GL Risk Level Metrics	Structure Rank (Order of priority for same-project structures)
								West Pier	SSP	P	1961	1,017	N/A	N/A	N		
		Saxon Harbor	Village of Francis	WI 7	S	R	REC. Harbor	ALL	various	various	1968	1,034	N/A	N/A	N	REC. Harbor	N/A
								East Breakwater	RMS	BW	1968	335	N/A	N/A	N		
								West Breakwater	SSP	BW	1968	281	N/A	N/A	N		
								West Breakwater	SSP	BW	1968	418	N/A	N/A	N		
		Superior Harbor	Superior	WI 7	D	C	A	ALL	various	various	various	10,210	various	various	various	(Collective)	N/A
								North Breakwater	CWC	BW	1909	948	N/A	N/A	**Y**		
								North Breakwater	RMS	BW	1908	3,719	N/A	N/A	**Y**		
								South Breakwater	CWC	BW	1909	852	N/A	N/A	**Y**		
								South Breakwater	CONC	BW	1909	1,014	N/A	N/A	**Y**		
								North Pier	CONC	P	1900	2,096	N/A	N/A	**Y**		
								South Pier	SSP	P	1900	1,253	1958		N		
								South Pier	CWC	P		328	N/A	N/A			
GLNS SYSTEM TOTALS												545,976					

CODES:

DRAFT: D = Deep
S = Shallow

TYPE: C = Commercial
R = Recreational

STRUCTURAL CLASS: RMS = Rubblemound Stone
LUS = Laid-Up Stone
SSP = Steel Sheet Pile w/Concrete Cap
CWC = Wood Crib Base w/Concrete Cap

STRUCTURAL TYPE: BW = Breakwater
P = Pier
J = Jetty

APPENDIX H
GREAT LAKES and OHIO RIVER DIVISION

NAVIGATION BUSINESS LINE PROGRAM REQUIREMENTS
FOR THE GREAT LAKES NAVIGATION SYSTEM

FIVE YEAR DEVELOPMENT PROGRAM

FY08 - FY12 Program Needs for Great Lakes Navigation System

(Appropriations in Thousands; Allocations shown for sub-projects; future appropriations assume zero S&S)

District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
LRB	CG	211	012873	OTTAWA RIVER HARBOR, OH						$ -	$ 121	$ 117	$ 146	$ 22	$ -	$ 3,500	$ 2,244	$ -	$ -	$ -	$ -
LRB	CG	220	006840	NEW YORK STATE CANAL SYSTEM, NY						$ -	$ -	$ 408	$ 561	$ 444	$ 1,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000
LRB	CG	232	160195	LORAIN HARBOR (COMBINED DISPOSAL FACILITY), OH						$ 26	$ 43	$ 2	$ 1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LRE	CG		017380	SAULT STE MARIE (REPLACEMENT LOCK), MI						$ -	$ 2,321	$ 1,850	$ 2,006	$ 2,110	$ 1,485	$ 2,200	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000
LRE	CG		057420	SAGINAW DMDF											$ 1,731	$ 164	$ -	$ -	$ -	$ -	$ -
	GLNS CG TOTAL									**$ 26**	**$ 2,485**	**$ 2,377**	**$ 2,713**	**$ 2,576**	**$ 4,216**	**$ 10,864**	**$ 32,244**	**$ 30,000**	**$ 30,000**	**$ 30,000**	**$ 30,000**
LRB	GI	111	081813	CUYAHOGA RIVER BULKHEAD STUDY, CLEVELAND, OH	**N/A**	**N/A**	**N/A**			$ -	$ -	$ -	$ -	$ 79	$ 2	$ 421	$ -	$ -	$ -	$ -	$ -
LRB	GI	111	129142	CUYAHOGA RIVER, OH WATERSHED	**N/A**	**N/A**	**N/A**			$ -	$ -	$ -	$ -	$ -		$ 100	$ 250	$ -	$ -	$ -	$ -
LRC	GI	111	129142	INDIANA HARBOR CALUMET WATERWAY, IN	**N/A**	**N/A**	**N/A**			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 100	$ -	$ -	$ -
LRE	GI			GREAT LAKES RECREATIONAL BOATING STUDY	**N/A**	**N/A**	**N/A**			$ -	$ -	$ -	$ -	$ -	$ 100	$ -	$ -	$ -	$ -	$ -	$ -
LRE	GI		010662	GREAT LAKES ST. LAWRENCE SEAWAY SYSTEM STUDY	**N/A**	**N/A**	**N/A**			$ 579	$ 551	$ 671	$ 1,413	$ 1,509	$ 1,272	$ 2,034	$ 1,500	$ 1,700	$ 1,700	$ 1,700	$ -
	GLNS GI TOTAL									**$ 579**	**$ 551**	**$ 671**	**$ 1,413**	**$ 1,588**	**$ 1,374**	**$ 2,555**	**$ 1,750**	**$ 1,800**	**$ 1,700**	**$ 1,700**	**$ -**
LRB	CAP	216	124882	CLEVELAND LAKEFRONT STATE PARK, OH	**N/A**	**N/A**	**N/A**			$ -	$ -	$ -	$ -	$ 28	$ 1	$ 30	$ -	$ -	$ -	$ -	$ -
LRB	CAP	216	150071	BUFFALO INNER HARBOR, NY	**N/A**	**N/A**	**N/A**			$ 53	$ 29	$ 31	$ 179	$ 120	$ 21	$ 200	$ -	$ -	$ -	$ -	$ -
LRB	CAP	216	166097	FAIRPORT HARBOR, OH	**N/A**	**N/A**	**-**			$ 31	$ 21	$ 2	$ -	$ -	$ -	$ 100	$ 100	$ 300	$ 2,000	$ 2,000	$ -
LRB	CAP	216	165254	WALNUT CREEK ACCESS AREA, ERIE COUNTY, PA	**N/A**	**N/A**	**N/A**			$ 5	$ 6	$ 24	$ 50	$ -	$ -	$ 100	$ 113	$ 200	$ 200	$ 2,000	$ 2,000
LRE	CAP		006910	CAT ISLAND, GREEN BAY, WI											$ 225	$ 225	$ 2,000	$ 2,000	$ 2,000	$ -	$ -
	GLNS CAP TOTAL									**$ 90**	**$ 56**	**$ 57**	**$ 229**	**$ 148**	**$ 247**	**$ 655**	**$ 2,213**	**$ 2,500**	**$ 4,200**	**$ 4,000**	**$ 2,000**
LRB	O&M	111	000650	ASHTABULA HARBOR, OH	**B**	**C**	**1**			$ 1,635	$ 2,599	$ 1,859	$ 1,245	$ 803	$ 1,005	$ 12,531	$ 13,000	$ 1,818	$ 800	$ 1,660	$ 3,880
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	044036	BARCELONA HARBOR, NY	**NOT RATED**	**REC. PROJECT**	-			$ 5	$ -	$ -	$ 3	$ -	$ -	$ 420	$ -	$ 3	$ 18	$ 43	$ 420
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	120	001660	BLACK ROCK CHANNEL AND TONAWANDA HARBOR, NY	**D**	**F**	**2**			$ 1,784	$ 3,535	$ 1,950	$ 2,939	$ 1,549	$ 1,243	$ 2,716	$ 3,594	$ 1,647	$ 4,897	$ 6,343	$ 1,395
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	002140	BUFFALO HARBOR, NY	**C**	**D**	**1**			$ 320	$ 113	$ 1,048	$ 1,303	$ 99	$ 818	$ 1,022	$ 2,535	$ 4,241	$ 5,264	$ 865	$ 1,967
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	008277	BUFFALO RIVER ENVIRONMENTAL DREDGING, NY	**N/A**	**N/A**	**N/A**			$ 0	$ 23	$ 14	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	044037	CAPE VINCENT HARBOR, NY	**NOT RATED**	**REC. PROJECT**	-			$ -	$ 1	$ -	$ -	$ -	$ -	$ -	$ -	$ 5	$ 5	$ 45	$ -
				OPERATIONS			-														
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														

NAVIGATION BUSINESS LINE PROGRAM REQUIREMENTS
FOR THE GREAT LAKES NAVIGATION SYSTEM

FIVE YEAR DEVELOPMENT PROGRAM

District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
				LOCKS			-														
LRB	O&M	111	073920	CATTARAUGUS CREEK HARBOR, NY	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ 5	$ -	$ -	$ -	$ -	$ 18	$ 403	$ 53	$ 400
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	003430	CLEVELAND HARBOR, OH	B	C	1			$ -	$ -	$ -	$ -	$ -	$ 3,823	$ 6,184	$ 9,735	$ 14,513	$ 9,738	$ 74,761	$ 72,784
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	003770	CONNEAUT HARBOR, OH	B	C	1			$ -	$ -	$ -	$ -	$ -	$ 1,462	$ 1,883	$ 1,590	$ 3,745	$ 1,110	$ 455	$ 1,150
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	001093	COOLEY CANAL, OH	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ 265	$ -	$ -	$ 750	$ -	$ -	$ 80	$ 95	$ 800
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	050600	DUNKIRK HARBOR, NY	D	D	0			$ 258	$ 328	$ 340	$ 269	$ 24	$ -	$ 481	$ 726	$ 805	$ 485	$ 565	$ 505
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	005600	ERIE HARBOR, PA	C	C	0			$ 147	$ 44	$ 131	$ 137	$ 48	$ -	$ 637	$ -	$ 260	$ 65	$ 75	$ 955
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	005760	FAIRPORT HARBOR, OH	C	D	1			$ 1,659	$ 1,686	$ 1,478	$ 1,102	$ 1,038	$ -	$ 2,341	$ 925	$ 1,890	$ 2,015	$ 650	$ 2,245
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	006860	GREAT SODUS BAY HARBOR, NY	NOT RATED	REC. PROJECT	-			$ 7	$ 32	$ 65	$ 348	$ 150	$ -	$ -	$ -	$ 700	$ 650	$ 2,503	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	007920	HURON HARBOR, OH	C	D	1			$ 63	$ 919	$ 921	$ 91	$ 1,073	$ 93	$ 990	$ 1,070	$ 1,315	$ 585	$ 965	$ 1,465
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	008220	IRONDEQUOIT BAY HARBOR, NY	NOT RATED	REC. PROJECT	-			$ 3	$ 1	$ -	$ 3	$ -	$ -	$ 378	$ -	$ -	$ 450	$ 25	$ -
				OPERATIONS			-								$0						
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														
				LOCKS			-														
LRB	O&M	111	008336	LITTLE RIVER, NY	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 300	$ -	$ -
				OPERATIONS			-								$0						
				CDF's			-														
				CHANNELS			-														

APPENDIX H
GREAT LAKES and OHIO RIVER DIVISION

NAVIGATION BUSINESS LINE PROGRAM REQUIREMENTS
FOR THE GREAT LAKES NAVIGATION SYSTEM

FIVE YEAR DEVELOPMENT PROGRAM

District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
				STRUCTURES			-														
				LOCKS			-														
LRB	O&M	111	009970	LITTLE SODUS BAY HARBOR, NY	NOT RATED	REC. PROJECT	-			$ -	$ 35	$ 65	$ 3	$ 300	$ -	$ -	$ -	$ 50	$ 15	$ 403	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	010060	LORAIN HARBOR, OH	C	D	1			$ 1,262	$ 1,412	$ 3,791	$ 3,085	$ 3,286	$ 798	$ 1,778	$ 1,040	$ 1,545	$ 2,240	$ 1,625	$ 15,415
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	012980	OAK ORCHARD HARBOR, NY	NOT RATED	REC. PROJECT	-			$ 62	$ 1	$ 30	$ 151	$ -	$ -	$ -	$ -	$ 400	$ 50	$ 20	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	013130	OGDENSBURG, NY	D	D	0			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 40	$ 40	$ -	$ -	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	044066	OLCOTT HARBOR, NY	NOT RATED	REC. PROJECT	-			$ -	$ 5	$ 5	$ 5	$ -	$ -	$ 445	$ -	$ 65	$ 5	$ 25	$ 450
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	013440	OSWEGO HARBOR, NY	D	F	1			$ 972	$ 34	$ 146	$ 205	$ 975	$ -	$ 954	$ 5,600	$ 2,540	$ 2,035	$ 200	$ 1,615
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	021540	PORT CLINTON HARBOR, OH	NOT RATED	REC. PROJECT	-			$ 2	$ 85	$ 10	$ 20	$ 185	$ -	$ 890	$ -	$ 1,165	$ 1,210	$ 810	$ 670
				OPERATIONS			-								$0						
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														
				LOCKS			-														
LRB	O&M	111	073733	PORT ONTARIO HARBOR, NY	NOT RATED	REC. PROJECT	-			$ -	$ 1	$ -	$ -	$ -	$ -	$ -	$ -	$ 60	$ -	$ -	$ 15
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	470	076536	PROJECT CONDITION SURVEYS, NY			1			$ -	$ 219	$ 24	$ 184	$ 115	$ 367	$ 275	$ 215	$ 300	$ 305	$ 310	$ 315
LRB	O&M	470	014600	PROJECT CONDITION SURVEYS, NY			1			$ 141	$ (0)	$ -	$ -	$ -	$ -						
LRB	O&M	470	076539	PROJECT CONDITION SURVEYS, OH			1			$ -	$ 85	$ 13	$ 110	$ 84	$ 212	$ 260	$ 368	$ 235	$ 240	$ 245	$ 250
LRB	O&M	470	076542	PROJECT CONDITION SURVEYS, PA			1			$ -	$ 3	$ 32	$ 21	$ 59	$ 41	$ 75	$ 85	$ 60	$ 65	$ 70	$ 75
LRB	O&M	111	008296	PUT-IN-BAY, OH	NOT RATED	REC. PROJECT	-			$ 8	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 60	$ 370	$ -	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	015390	ROCHESTER HARBOR, NY	D	D	0			$ 698	$ 38	$ 200	$ 624	$ 48	$ -	$ 1,127	$ -	$ 1,255	$ 40	$ 1,295	$ 40
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	

APPENDIX H
GREAT LAKES and OHIO RIVER DIVISION

NAVIGATION BUSINESS LINE PROGRAM REQUIREMENTS
FOR THE GREAT LAKES NAVIGATION SYSTEM

FIVE YEAR DEVELOPMENT PROGRAM

District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
				LOCKS																	
LRB	O&M	111	044072	ROCKY RIVER, OH	NOT RATED	REC. PROJECT	-			$ 1,241	$ 11	$ 76	$ 290	$ -	$ -	$ -	$ -	$ 448	$ -	$ 3	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	073935	SACKETS HARBOR, NY	D	D	0			$ -	$ 10	$ -	$ -	$ -		$ -	$ -	$ 60	$ -	$ -	$ -
				OPERATIONS			-								$0						
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														
				LOCKS			-														
LRB	O&M	111	016260	SANDUSKY HARBOR, OH	C	C	0			$ 692	$ 101	$ 1,042	$ 43	$ 943	$ 786	$ 1,047	$ 1,050	$ 1,155	$ 1,185	$ 2,080	$ 1,413
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	087433	STURGEON POINT HARBOR, NY	NOT RATED	REC. PROJECT	-			$ 21	$ 8	$ 15	$ 13	$ 15		$ -	$ -	$ 20	$ 20	$ 20	$ 20
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	018280	TOLEDO HARBOR, OH	B	D	2			$ 2,829	$ 3,260	$ 2,850	$ 3,446	$ 3,367	$ 2,814	$ 5,885	$ 3,975	$ 5,328	$ 8,249	$ 5,516	$ 4,974
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRB	O&M	111	087453	TOUSSAINT RIVER, OH	NOT RATED	REC. PROJECT	-			$ 226	$ 43	$ 125	$ 208	$ 15		$ -	$ -	$ 530	$ 35	$ 35	$ 35
				OPERATIONS			-								$0						
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														
				LOCKS			-														
LRB	O&M	111	044003	VERMILION HARBOR, OH	NOT RATED	REC. PROJECT	-			$ 385	$ 2	$ 183	$ 298	$ -		$ 353	$ -	$ 330	$ 253	$ -	$ 388
				OPERATIONS			-								$0						
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														
				LOCKS			-														
LRB	O&M	111	074025	WEST HARBOR, OH	NOT RATED	REC. PROJECT	-			$ 51	$ (3)	$ 28	$ 320	$ -	$ -	$ -	$ -	$ 60	$ 353	$ 75	$ -
				OPERATIONS			-								$0						
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														
				LOCKS			-														
LRB	O&M		073938	WILSON HARBOR, NY	NOT RATED	REC. PROJECT	-			$ 18	$ 10	$ 9	$ 3	$ 175	$ -	$ 500	$ -	$ 53	$ 515	$ 10	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
		LRB O&M TOTAL								**$ 20,699**	**$ 19,026**	**$ 20,405**	**$ 21,402**	**$ 18,817**	**$ 13,462**	**$ 43,922**	**$ 45,548**	**$ 46,719**	**$ 44,050**	**$ 101,845**	**$ 113,641**
LRC	O&M	111	002250	BURNS WATERWAY HARBOR, IN	B	C	1			$ 3,702	$ 1,424	$ 5,242	$ 2,171	$ 4,064	$ 995	$ 2,040	$ 5,422	$ 1,969	$ 2,049	$ 2,131	$ 1,593
				OPERATIONS				N/A	N/A					$333		$40	$152	$158	$165	$171	$178
				CHANNELS				B	C					$300		$2,000	$3,555	$1,811	$1,884	$1,960	$0
				STRUCTURES				B	B					$3,431		$0	$1,715		$0	$0	$1,415
LRC	O&M			BURNS SMALL BOAT HARBOR, IN	NOT RATED	REC. PROJECT	-			$ 2	$ 120	$ 720	$ -	$ -	$ -	$ 10	$11	$ 391	$ 11	$ 12	$ 332
				OPERATIONS				N/A	N/A					$0		$10	$11	$11	$11	$12	$12
				CHANNELS				C	C					$0		$0	$0	$380	$0	$0	$0

APPENDIX H
GREAT LAKES and OHIO RIVER DIVISION

NAVIGATION BUSINESS LINE PROGRAM REQUIREMENTS
FOR THE GREAT LAKES NAVIGATION SYSTEM

FIVE YEAR DEVELOPMENT PROGRAM

District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
				STRUCTURES				C	C					$0		$0	$0	$0	$0	$0	$320
LRC	O&M		002410	CALUMET HARBOR AND RIVER, IL & IN	A	C	2			$ 3,392	$ 4,142	$ 2,846	$ 2,979	$ 1,804	$ 712	$ 4,219	$ 3,852	$ 3,754	$ 5,805	$ 5,936	$ 8,621
				OPERATIONS				N/A	N/A					$639		$160	$300	$312	$325	$338	$351
				CDF's				A	E					$0		$390	$531	$1,397	$1,800	$4,498	$5,221
				CHANNELS				A	C					$114		$1,769	$1,436	$396	$1,965	$0	$1,980
				STRUCTURES				A	C					$1,051		$1,900	$1,585	$1,649	$1,715	$1,100	$1,069
LRC	O&M		045009	CHICAGO HARBOR, IL	D	D	0			$ 3,471	$ 3,438	$ 2,289	$ 3,403	$ 4,096	$ 5,284	$ 10,304	$ 5,859	$ 6,475	$ 6,733	$ 6,332	$ 14,945
				OPERATIONS				N/A	N/A					$1,399		$1,497	$1,655	$1,721	$1,790	$1,862	$1,936
				CHANNELS				D	C					$0		$0	$0	$0	$0	$981	$0
				STRUCTURES				D	D					$0		$1,600	$3,984	$4,525	$4,705	$3,241	$1,404
				LOCKS				B	D					$2,697		$7,207	$220	$229	$238	$248	$11,605
LRC	O&M		003810	CHICAGO RIVER, IL	D	B	0			$ 330	$ 357	$ 331	$ 338	$ 385	$ 342	$ 398	$ 450	$ 431	$ 448	$ 466	$ 485
				OPERATIONS				N/A	N/A					$385		$398	$450	$431	$448	$466	$485
				CHANNELS				D	B					$0		$0	$0	$0	$0	$0	$0
LRC	O&M		018120	INDIANA HARBOR, IN	B	D	2			$ 409	$ 65	$ 62	$ 285	$ 871	$ 469	$ 43,405	$ 37,560	$ 13,280	$ 15,480	$ 16,126	$ 15,653
				OPERATIONS				N/A	N/A					$521		$545	$760	$3,200	$3,328	$3,461	$3,600
				CDF's				B	E					$0		$42,860	$36,800	$0	$0	$0	$0
				CHANNELS				B	D					$350		$0	$0	$10,080	$11,138	$11,585	$12,053
				STRUCTURES				B	B					$0		$0	$0	$0	$1,014	$1,080	$0
LRC	O&M		008218	LAKE MICHIGAN DIVERSION, IL	N/A	N/A	N/A			$ 805	$ 811	$ 1,204	$ 492	$ 547	$ 574	$ 607	$ 624	$ 1,021	$ 683	$ 710	739
LRC	O&M		011060	MICHIGAN CITY HARBOR, IN	D	D	0			$ 396	$ 2,655	$ 1,733	$ 2,329	$ 316	$ 403	$ 215	$ 15	$ 994	$ 276	$ 288	$ 1,118
				OPERATIONS				N/A	N/A					$233		$15	$15	$16	$16	$17	$18
				CDF's				N/A	N/A					$0		$200	$0	$0	$0	$0	$0
				CHANNELS				D	E					$0		$0	$0	$250	$260	$271	$281
				STRUCTURES				D	C					$83		$0	$0	$728	$0	$0	$819
LRC	O&M	470	076517	PROJECT CONDITION SURVEYS, IL				N/A	N/A	$ 30	$ 31	$ 31	$ 28	$ 33	$ 29	$ 66	$ 99	$ 135	$ 141	$ 147	153
LRC	O&M		076518	PROJECT CONDITION SURVEYS, IN				N/A	N/A	$ 55	$ 56	$ 51	$ 51	$ 59	$ 53	$ 118	$ 177	$ 186	$ 194	$ 202	210
LRC	O&M		019560	WAUKEGAN HARBOR, IL	D	D	0			$ 1,057	$ 770	$ 957	$ 1,108	$ 1,503	$ 1,065	$ 1,784	$ 798	$ 1,841	$ 1,756	$ 2,033	$ 934
				OPERATIONS				N/A	N/A					$80		$80	$80	$84	$87	$90	$94
				CDF's				D	E					$0		$0	$0	$0	$0	$0	$0
				CHANNELS				D	C					$730		$1,704	$718	$747	$777	$808	$840
				STRUCTURES				D	C					$693		$0	$0	$1,010	$892	$1,135	$0
		LRC O&M TOTAL								**$ 13,649**	**$ 13,869**	**$ 15,466**	**$ 13,184**	**$ 13,678**	**$ 9,925**	**$ 63,166**	**$ 54,867**	**$ 30,477**	**$ 33,576**	**$ 34,383**	**$ 44,783**
LRE	O&M		074177	ALGOMA HARBOR, WI	D	C	0			$ (1)	$ -	$ -	$ -	$ -	$ -	$ -	$ 215	$ -	$ -	$ -	$ 250
				OPERATIONS											$0		$20				$25
				CDF's																	
				CHANNELS													$195				$225
				STRUCTURES																	
				LOCKS																	
LRE	O&M		074196	ALPENA HARBOR, MI	C	D	1			$ 81	$ -	$ -	$ 55	$ -	$ 34	$ 429	$ -	$ 322	$ -	$ 607	
				OPERATIONS												$37		$42		$47	
				CDF's																	
				CHANNELS												$392				$560	
				STRUCTURES														$280			
				LOCKS																	
LRE	O&M		046063	ARCADIA HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 96	$ 122	$ 129	$ 97	$ 65	$ 71	$ 120	$ 159	$ 164	$ 170	$ 183	$ 192
				OPERATIONS												$10	$13	$14	$15	$16	$17
				CDF's													$0				
				CHANNELS												$110	$146	$150	$155	$167	$175
				STRUCTURES																	
				LOCKS																	
LRE	O&M		000630	ASHLAND HARBOR, WI	D	B	0			$ 5	$ -	$ 184	$ 344	$ -	$ 143	$ -	$ 662	$ -	$ 335	$ 473	$ 356
				OPERATIONS													$42		$45	$48	$51
				CDF's																	
				CHANNELS													$350			$425	
				STRUCTURES													$270		$290		$305
				LOCKS																	
LRE	O&M		000770	AU SABLE HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 265	$ -	$ -	$ -	$ -	$ -	$ 214		$ -	$ -	$ 225	
				OPERATIONS			-								$0	$18				$20	
				CDF's			-														
				CHANNELS			-									$196				$205	
				STRUCTURES			-														
				LOCKS			-														

APPENDIX H
GREAT LAKES and OHIO RIVER DIVISION

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FOR THE GREAT LAKES NAVIGATION SYSTEM

FIVE YEAR DEVELOPMENT PROGRAM

District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
LRE	O&M		076062	BAY PORT HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 96	$ -	$ 108	$ -	$ -	$ -	$ 1,156		$ -	$ 1,316	$ -	$ -
				OPERATIONS			-								$0	$54			$70		
				CDF's			-														
				CHANNELS			-									$1,102			$1,246		
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		001410	BIG BAY HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 110	$ -	$ -	$ 116
				OPERATIONS			-											$9			$11
				CDF's			-														
				CHANNELS			-											$101			$105
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M	111	000612	BIG SUAMICO HARBOR, WI	NOT RATED	REC. PROJECT	-			$ 119	$ 416	$ 20	$ -	$ -	$ -	$ -	$ 375	$ -	$ -	$ -	$ 400
				OPERATIONS			-										$25				$37
				CDF's			-														
				CHANNELS			-										$350				$363
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		001640	BLACK RIVER HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 113	$ 5	$ 28	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		001110	BLACK RIVER, PORT HURON, MI	D	B	0			$ 33	$ 50	$ 491	$ 295	$ -	$ -	$ -	$ -	$ -	$ -	$ 740	$ -
				OPERATIONS																$90	
				CDF's																	
				CHANNELS																$650	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		087750	BOLLES HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 262	$ 26	$ (0)	$ 206	$ -	$ -	$ -	$ 388	$ -	$ -	$ -	$ -
				OPERATIONS			-										$13				
				CDF's			-														
				CHANNELS			-										$375				
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		074199	CASEVILLE HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ 248	$ 24	$ 114	$ -	$ 280	$ -	$ -	$ -
				OPERATIONS			-									$9		$25			
				CDF's			-														
				CHANNELS			-									$105		$255			
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		002820	CEDAR RIVER, MI	NOT RATED	REC. PROJECT	-			$ 142	$ 273	$ -	$ -	$ -	$ 361	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		002940	CHANNELS IN LAKE ST CLAIR, MI	A	C	2			$ 54	$ 107	$ 95	$ 117	$ 74	$ 162	$ 257	$ 360	$ 681	$ 161	$ 167	$ 723
				OPERATIONS												$87	$190	$156	$161	$167	$173
				CDF's												$170	$170				
				CHANNELS														$525			$550
				STRUCTURES																	
				LOCKS																	
LRE	O&M			CHANNELS IN STRAITS OF MACKINAC	A	A	0			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		002990	CHARLEVOIX HARBOR, MI	C	C	0			$ 171	$ 62	$ 64	$ 199	$ 108	$ 82	$ 137	$ 188	$ 175	$ 605	$ 184	$ 189
				OPERATIONS												$21	$38	$22	$23	$24	$25
				CDF's																	
				CHANNELS												$116	$150	$153	$582	$160	$164
				STRUCTURES																	

APPENDIX H
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FOR THE GREAT LAKES NAVIGATION SYSTEM

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District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
				LOCKS																	
LRE	O&M		074203	CHEBOYGAN HARBOR, MI	D	B	0			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 484	$ -	$ -
				OPERATIONS															$24		
				CDF's																	
				CHANNELS															$460		
				STRUCTURES																	
				LOCKS																	
LRE	O&M		003490	CLINTON RIVER, MI	NOT RATED	REC. PROJECT	-			$ 716	$ 22	$ 4	$ -	$ 479	$ 166	$ 660	$ -	$ -	$ -	$ -	$ 862
				OPERATIONS			-									$30					$42
				CDF's			-														
				CHANNELS			-									$630					$820
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		003970	CORNUCOPIA HARBOR, WI	NOT RATED	REC. PROJECT	-			$ 238	$ -	$ -	$ -	$ 128	$ -	$ -	$ 123	$ -	$ -	$ 144	$ -
				OPERATIONS											$0		$13			$17	
				CDF's																	
				CHANNELS													$110			$127	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		004710	DETROIT RIVER, MI	A	C	2			$ 3,018	$ 4,284	$ 3,833	$ 4,792	$ 4,074	$ 2,964	$ 5,591	$ 6,133	$ 5,740	$ 5,475	$ 5,868	$ 6,000
				OPERATIONS											$0	$725	$848	$880	$920	$963	$1,005
				CDF's												$260	$510	$125		$130	
				CHANNELS												$4,006	$4,175	$4,335	$4,555	$4,775	$4,995
				STRUCTURES												$600	$600	$400			
				LOCKS																	
LRE	O&M		005050	DULUTH - SUPERIOR HARBOR, MN & WI	A	B	1			$ 2,322	$ 3,138	$ 2,309	$ 2,666	$ 4,598	$ 5,356	$ 5,190	$ 4,125	$ 4,640	$ 4,718	$ 4,431	$ 4,800
				OPERATIONS												$477	$475	$500	$525	$555	$585
				CDF's												$125	$250	$130	$133	$136	$140
				CHANNELS												$2,883	$2,500	$2,560	$2,685	$2,915	$3,200
				STRUCTURES												$1,705	$900	$1,450	$1,375	$825	$875
				LOCKS																	
LRE	O&M		022870	EAGLE HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		006130	FRANKFORT HARBOR, MI	D	C	0			$ 133	$ 176	$ 179	$ 265	$ -	$ 33	$ 237	$ -	$ 450	$ -	$ 334	$ 300
				OPERATIONS			-								$33	$37		$40		$44	
				CDF's			-														
				CHANNELS			-									$200		$260		$290	
				STRUCTURES			-											$150			$300
				LOCKS			-														
LRE	O&M		006670	GRAND HAVEN HARBOR, MI	C	C	0			$ 457	$ 925	$ 577	$ 697	$ 819	$ 1,338	$ 455	$ 771	$ 907	$ 792	$ 1,671	$ 1,365
				OPERATIONS			-									$40	$196	$138	$142	$149	$156
				CDF's			-										$125	$130	$135	$142	$149
				CHANNELS			-									$415	$450	$474	$515	$1,200	$595
				STRUCTURES			-											$165		$180	$465
				LOCKS			-														
LRE	O&M		046064	GRAND MARAIS HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 163	$ 122	$ 255	$ (35)	$ 23	$ 805	$ 6,500	$ -	$ 473	$ -	$ -	$ 533
				OPERATIONS			-											$43			$48
				CDF's			-														
				CHANNELS			-											$430			$485
				STRUCTURES			-									$6,500					
				LOCKS			-														
LRE	O&M		006730	GRAND TRAVERSE BAY HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ 51	$ 216	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 95	$ -
				OPERATIONS																$7	
				CDF's																	
				CHANNELS																$88	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		074160	GRAY'S REEF PASSAGE, MI	A	B	1			$ -	$ -	$ -	$ 73	$ -	$ -	$ 112	$ -	$ -	$ 125	$ -	$ -
				OPERATIONS											$0						
				CDF's																	
				CHANNELS												$112			$125		

District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
				STRUCTURES																	
				LOCKS																	
LRE	O&M		006910	GREEN BAY HARBOR, WI	C	C	0			$ 1,608	$ 3,220	$ 2,745	$ 2,066	$ 3,353	$ 3,174	$ 3,607	$ 5,130	$ 3,519	$ 3,634	$ 3,910	$ 4,102
				OPERATIONS												$395	$305	$320	$334	$350	$367
				CDF's												$480	$825	$125	$75	$80	$85
				CHANNELS												$2,732	$4,000	$3,074	$3,225	$3,480	$3,650
				STRUCTURES																	
				LOCKS																	
LRE	O&M		074208	HAMMOND BAY HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 392	$ -	$ -	$ 445
				OPERATIONS														$17			$20
				CDF's																	
				CHANNELS														$375			$425
				STRUCTURES																	
				LOCKS																	
LRE	O&M		007300	HARBOR BEACH HARBOR, MI	D	B	0			$ -	$ -	$ -	$ -	$ 35	$ 350	$ -	$ -	$ -	$ -	$ -	$ 490
				OPERATIONS																	$40
				CDF's																	
				CHANNELS																	$450
				STRUCTURES																	
				LOCKS																	
LRE	O&M		053550	HARRISVILLE HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 9	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		007610	HOLLAND HARBOR, MI	D	C	0			$ 877	$ 499	$ 373	$ 904	$ 1,212	$ 1,244	$ 549	$ 687	$ 1,293	$ 775	$ 611	$ 1,720
				OPERATIONS												$131	$97	$138	$141	$145	$150
				CDF's																	
				CHANNELS												$418	$425	$1,155	$454	$466	$1,210
				STRUCTURES													$165		$180		$360
				LOCKS																	
LRE	O&M		048140	INLAND ROUTE, MI	NOT RATED	REC. PROJECT	-			$ 23	$ 35	$ 28	$ 36	$ 17	$ -	$ -	$ 1,148	$ 272	$ -	$ -	$ -
				OPERATIONS													$48	$52			
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS													$1,100	$220			
LRE	O&M		008910	KENOSHA HARBOR, WI	F	C	0			$ 79	$ 299	$ -	$ 80	$ 177	$ -	$ 158	$ 395	$ -	$ 207	$ 451	$ -
				OPERATIONS			-	F								$32	$45		$32	$33	
				CDF's			-	F													
				CHANNELS			-	F									$350			$418	
				STRUCTURES			-	F								$126			$175		
				LOCKS			-	F													
LRE	O&M		076050	KEWAUNEE HARBOR, WI	F	B	0			$ 93	$ 85	$ 77	$ 120	$ 89	$ 248	$ 295	$ 430	$ -	$ 260	$ 333	$ -
				OPERATIONS			-	F								$35	$30		$22	$23	
				CDF's			-	F													
				CHANNELS			-	F												$310	
				STRUCTURES			-	F								$260	$400		$238		
				LOCKS			-	F													
LRE	O&M		008960	KEWEENAW WATERWAY, MI	F	C	0			$ 283	$ 601	$ 74	$ 569	$ 373	$ 314	$ 496	$ 495	$ 470	$ 497	$ 520	$ 546
				OPERATIONS			-									$46	$45	$50	$52	$54	$56
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-									$450	$450	$420	$445	$466	$490
				LOCKS			-														
LRE	O&M		009210	LAC LA BELLE, MI	NOT RATED	REC. PROJECT	-			$ 12	$ 49	$ (0)	$ 7	$ -	$ 76	$ -	$ -	$ 184	$ 192	$ -	$ -
				OPERATIONS			-											$24	$27		
				CDF's			-														
				CHANNELS			-											$160			
				STRUCTURES			-												$165		
				LOCKS			-														
LRE	O&M		046018	LELAND HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 152	$ 186	$ 185	$ 151	$ 118	$ 78	$ 110	$ 190	$ 201	$ 212	$ 223	$ 236
				OPERATIONS			-									$10	$15	$18	$20	$22	$24
				CDF's			-														

NAVIGATION BUSINESS LINE PROGRAM REQUIREMENTS
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FIVE YEAR DEVELOPMENT PROGRAM

District	Funding Category	CCS	CWIS	Official Authorization Name	Project Acceptable Level of Performance	Project Current Level of Performance	Project # Levels Below Acceptable Performance	Element Acceptable Level of Performance	Element Current Level of Performance	FY01 Actual	FY02 Actual	FY03 Actual	FY04 Actual	FY05 Actual	FY06 Actual	FY07 Needs	FY08 Needs	FY09 Needs	FY10 Needs	FY11 Needs	FY12 Needs
				CHANNELS			-									$100	$175	$183	$192	$201	$212
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		074006	LEXINGTON HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 0	$ -	$ 143	$ (12)	$ -	$ -	$ 175	$ -	$ 192	$ -	$ 205	$ -
				OPERATIONS			-									$15		$17		$19	
				CDF's			-														
				CHANNELS			-									$160		$175		$186	
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M			LITTLE BAYDeNOC	F	B	0			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS			-								$0						
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		009890	LITTLE LAKE HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 435	$ 18	$ 319	$ 160	$ 16	$ -	$ 400	$ 311	$ 322	$ 338	$ 355	$ 371
				OPERATIONS			-									$15	$21	$17	$18	$19	$19
				CDF's			-														
				CHANNELS			-									$385	$290	$305	$320	$336	$352
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		010270	LUDINGTON HARBOR, MI	D	B	0			$ 222	$ 554	$ 147	$ 294	$ 503	$ 394	$ 777	$ 1,037	$ 1,751	$ 1,982	$ 262	$ 525
				OPERATIONS												$177	$87	$92	$97	$102	$107
				CDF's																	
				CHANNELS													$350		$385		$418
				STRUCTURES												$600	$600	$1,659	$1,500	$160	
				LOCKS																	
LRE	O&M		010480	MANISTEE HARBOR, MI	C	C	0			$ 592	$ 61	$ 82	$ 557	$ 431		$ 656	$ 756	$ 178	$ 710	$ 197	$ 729
				OPERATIONS												$47	$47	$48	$50	$52	$54
				CDF's																	
				CHANNELS												$400	$500		$660		$675
				STRUCTURES												$209	$209	$130		$145	
				LOCKS																	
LRE	O&M		010490	MANISTIQUE HARBOR, MI	F	B	0			$ 2,221	$ (4)	$ 3	$ -	$ -		$ -	$ -	$ 707	$ -	$ -	$ -
				OPERATIONS														$57			
				CDF's																	
				CHANNELS														$650			
				STRUCTURES																	
				LOCKS																	
LRE	O&M		010510	MANITOWOC HARBOR, WI	D	C	0			$ 182	$ 570	$ 105	$ 73	$ 297	$ -	$ 792	$ 230	$ 457	$ 260	$ 685	$ 1,081
				OPERATIONS												$108	$20	$32	$35	$38	$41
				CDF's																$180	$800
				CHANNELS												$542		$425		$467	
				STRUCTURES												$142	$210		$225		$240
				LOCKS																	
LRE	O&M		048013	MARQUETTE HARBOR, MI	C	C	0			$ (1)	$ 204	$ 333	$ 303	$ 9	$ -	$ -	$ 387	$ -	$ -	$ 481	$ -
				OPERATIONS													$37			$51	
				CDF's																	
				CHANNELS																	
				STRUCTURES													$350			$430	
				LOCKS																	
LRE	O&M		045044	MENOMINEE HARBOR, MI & WI	D	B	0			$ 79	$ 100	$ 180	$ 30	$ 144		$ -	$ 600	$ 227	$ -	$ 479	$ -
				OPERATIONS													$50	$52		$54	
				CDF's																	
				CHANNELS													$550			$425	
				STRUCTURES														$175			
				LOCKS																	
LRE	O&M		011270	MILWAUKEE HARBOR, WI	C	B	0			$ 396	$ 458	$ 549	$ 303	$ 971	$ 749	$ 1,666	$ 4,869	$ 1,263	$ 2,147	$ 3,007	$ 1,268
				OPERATIONS												$176	$179	$188	$197	$207	$218
				CDF's												$230	$3,000	$425			$450
				CHANNELS												$770	$840			$750	
				STRUCTURES												$490	$850	$650	$1,950	$2,050	$600
				LOCKS																	
LRE	O&M		011760	MONROE HARBOR, MI	C	C	0			$ 532	$ 60	$ 561	$ 41	$ 173	$ 435	$ 500	$ 550	$ -	$ 560	$ -	$ 588
				OPERATIONS			-									$75	$92		$90		$95

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				CDF's			-														
				CHANNELS			-									$425	$458		$470		$493
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		012060	MUSKEGON HARBOR, MI	C	C	0			$ (0)	$ 456	$ 98	$ 415	$ 44	$ 468	$ 770	$ 841	$ 419	$ 2,892	$ 1,875	$ 1,403
				OPERATIONS			-									$14	$66	$69	$72	$75	$78
				CDF's			-														
				CHANNELS			-									$556	$500		$550		$600
				STRUCTURES			-									$200	$275	$350	$2,270	$1,800	$725
				LOCKS			-														
LRE	O&M		001020	NEW BUFFALO HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 136	$ 6	$ 178	$ -	$ 85	$ 74	$ -	$ 130	$ -	$ 139	$ -	$ 146
				OPERATIONS			-								$7		$15		$17		$19
				CDF's			-														
				CHANNELS			-								$64		$115		$122		$127
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		023370	OCONTO HARBOR, WI	NOT RATED	REC. PROJECT	-			$ 81	$ 34	$ -	$ -	$ -		$ -	$ -	$ 338	$ -	$ -	$ -
				OPERATIONS			-											$28			
				CDF's			-														
				CHANNELS			-											$310			
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		013330	ONTONAGON HARBOR, MI	D	C	0			$ 506	$ 1,992	$ 939	$ 660	$ 532	$ 392	$ 551	$ 1,093	$ 625	$ 892	$ 674	$ 988
				OPERATIONS			-									$31	$68	$40	$42	$44	$48
				CDF's			-														
				CHANNELS			-									$520	$575	$585	$600	$630	$660
				STRUCTURES			-										$450		$250		$280
				LOCKS			-														
LRE	O&M		013850	PENTWATER HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 597	$ 248	$ 79	$ 163	$ 87	$ 89	$ 150	$ 163	$ 178	$ 185	$ 194	$ 204
				OPERATIONS			-									$19	$13	$21	$22	$23	$24
				CDF's			-														
				CHANNELS			-									$131	$150	$157	$163	$171	$180
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		074170	PETOSKEY HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,198	$ -	$ -	$ -	$ -
				OPERATIONS			-										$20				
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-										$3,178				
				LOCKS			-														
LRE	O&M		014220	POINT LOOKOUT HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 486	$ 6	$ -	$ -	$ 56	$ -	$ -	$ -	$ -	$ 438	$ -	$ -
				OPERATIONS			-												$23		
				CDF's			-														
				CHANNELS			-												$415		
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		074213	PORT AUSTIN HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 7	$ 81	$ 21	$ 238	$ -		$ -	$ -	$ 456	$ -	$ -	$ -
				OPERATIONS			-											$36			
				CDF's			-														
				CHANNELS			-											$420			
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		046039	PORT SANILAC HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 283		$ 127	$ (11)	$ -		$ 150	$ -	$ 165	$ -	$ 182	$ -
				OPERATIONS			-									$10		$15		$17	
				CDF's			-														
				CHANNELS			-									$140		$150		$165	
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		014420	PORT WASHINGTON HARBOR, WI	D	C	0			$ 23	$ 47	$ 301	$ -	$ -	$ 189	$ -	$ -	$ 190	$ 246	$ 192	$ -
				OPERATIONS			-									$0		$20	$21	$22	
				CDF's			-														
				CHANNELS			-									$0		$170		$170	
				STRUCTURES			-												$225		
				LOCKS			-														
LRE	O&M		074190	PORT WING HARBOR, WI	NOT RATED	REC. PROJECT	-			$ 45	$ 256	$ 71	$ -	$ 157	$ -	$ -	$ 165	$ -	$ 181	$ -	$ 193

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				OPERATIONS			-										$15		$16		$18
				CDF's			-														
				CHANNELS			-										$150		$165		$175
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		021530	PORTAGE LAKE HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 2,838	$ 1,927	$ 922	$ 34	$ -	$ -	$ 225	$ -	$ -	$ -	$ 273	$ -
				OPERATIONS												$15				$20	
				CDF's																	
				CHANNELS												$210				$253	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		048012	PRESQUE ISLE HARBOR, MI	B	C	1			$ -	$ -	$ 86	$ -	$ -	$ -	$ 292	$ -	$ 331	$ -	$ 364	$ -
				OPERATIONS														$19		$21	
				CDF's																	
				CHANNELS																	
				STRUCTURES												$292		$312		$343	
				LOCKS																	
LRE	O&M	470	076526	PROJECT CONDITION SURVEYS, MI				A	B	$ -	$ -	$ 69	$ 168	$ 38	$ 155	$ 376	$ 368	$ 390	$ 410	$ 430	$ 450
LRE	O&M		076527	PROJECT CONDITION SURVEYS, MN				A	B	$ -	$ -	$ 9	$ 4	$ 68	$ 32	$ 96	$ 96	$ 100	$ 106	$ 112	$ 120
LRE	O&M		076555	PROJECT CONDITION SURVEYS, WI				A	B	$ -	$ -	$ 25	$ 23	$ 58	$ 74	$ 210	$ 206	$ 216	$ 226	$ 236	$ 248
LRE	O&M		015590	ROUGE RIVER, MI	B	B	0			$ 180	$ 182	$ 877	$ 162	$ 370	$ 770	$ 180	$ 1,321	$ -	$ 1,217	$ -	$ 1,270
				OPERATIONS												$20	$105		$107		$110
				CDF's												$160	$160				
				CHANNELS													$1,056		$1,110		$1,160
				STRUCTURES																	
				LOCKS																	
LRE	O&M		057420	SAGINAW RIVER, MI	C	D	1			$ 1,951	$ 1,392	$ 2,293	$ 1,408	$ 2,665	$ 3,394	$ 3,792	$ 4,049	$ 4,134	$ 4,339	$ 4,415	$ 4,767
				OPERATIONS												$324	$294	$309	$324	$340	$357
				CDF's												$150	$150	$125	$130		$140
				CHANNELS												$3,318	$3,605	$3,700	$3,885	$4,075	$4,270
				STRUCTURES																	
				LOCKS																	
LRE	O&M		016390	SAUGATUCK HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 483	$ 177	$ 25	$ 238	$ -		$ 315	$ -	$ 418	$ -	$ 462	$ -
				OPERATIONS			-									$45		$48		$52	
				CDF's			-														
				CHANNELS			-									$270		$370		$410	
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		016500	SAXON HARBOR, WI	NOT RATED	REC. PROJECT	-			$ (32)	$ 5	$ (1)	$ -	$ -	$ -	$ -	$ -	$ 339	$ -	$ -	$ -
				OPERATIONS			-											$29			
				CDF's			-														
				CHANNELS			-											$310			
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		076061	SEBEWAING RIVER, MI	NOT RATED	REC. PROJECT	-			$ 35	$ 29	$ 24	$ -	$ -	$ 324	$ 500	$ -	$ -	$ 837	$ -	$ -
				OPERATIONS												$24			$24		
				CDF's																	
				CHANNELS												$476			$813		
				STRUCTURES																	
				LOCKS																	
LRE	O&M		066700	SHEBOYGAN HARBOR, WI	D	C	0			$ 105	$ 415	$ 341	$ 506	$ 2,151		$ -	$ 1,230	$ 4,517	$ -	$ -	$ 239
				OPERATIONS			-										$80	$27			$29
				CDF's			-														
				CHANNELS			-										$800	$300			
				STRUCTURES			-										$350	$4,190			$210
				LOCKS			-														
LRE	O&M	113	017181	SOUTH HAVEN HARBOR - MITIGATION OF SHORE DAMAGE, MI	D	C	0			$ (0)	$ -	$ 30	$ (0)	$ -	$ -						
LRE	O&M		017180	SOUTH HAVEN HARBOR, MI	D	C	0			$ 79	$ 1,445	$ 833	$ -	$ -	$ -	$ -	$ 302	$ -	$ -	$ -	$ -
				OPERATIONS													$22				
				CDF's																	
				CHANNELS													$280				
				STRUCTURES																	
				LOCKS																	
LRE	O&M		017300	ST CLAIR RIVER, MI	A	B	1			$ 2,311	$ 801	$ 537	$ 1,050	$ 885	$ 768	$ 1,471	$ 1,740	$ 1,791	$ 1,573	$ 2,098	$ 1,731
				OPERATIONS												$170	$234	$175	$183	$192	$201

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				CDF's													$125			$130	
				CHANNELS												$1,301	$1,381	$1,616	$1,390	$1,776	$1,530
				STRUCTURES																	
				LOCKS																	
LRE	O&M		074219	ST JAMES HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
LRE	O&M		017351	ST JOSEPH HARBOR - MITIGATION OF SHORE DAMAGE, MI	D	D	0			$ 131	$ 120	$ 74	$ 103	$ -	$ -	$ -					
LRE	O&M		017350	ST JOSEPH HARBOR, MI	D	D	0			$ 996	$ 496	$ 503	$ 624	$ 766	$ 1,341	$ 842	$ 1,034	$ 1,320	$ 490	$ 910	$ 1,206
				OPERATIONS												$62	$167	$110	$115	$120	$126
				CDF's												$267	$267			$115	
				CHANNELS												$513	$600	$950	$375	$390	$1,080
				STRUCTURES														$260		$285	
				LOCKS																	
LRE	O&M	300	017380	ST MARYS RIVER, MI	A	B	1			$ 22,169	$ 26,252	$ 22,879	$ 19,975	$ 16,329	$ 16,528	$ 20,185	$ 22,700	$ 23,310	$ 24,210	$ 25,330	$ 26,415
				OPERATIONS												$7,619	$7,022	$7,310	$7,600	$7,910	$8,225
				CDF's													$200	$150	$150	$150	
				CHANNELS												$2,320	$2,390	$4,090	$4,240	$2,990	$3,140
				STRUCTURES																$1,500	$1,600
				LOCKS												$10,246	$13,088	$11,760	$12,220	$12,780	$13,450
LRE	O&M		017760	STURGEON BAY HARBOR AND LAKE MICHIGAN SHIP CANAL, WI	D	C	0			$ 237	$ 96	$ 109	$ 86	$ 1,238	$ 242	$ -	$ 630	$ 1,140	$ 2,100	$ 2,408	$ 325
				OPERATIONS													$80	$90		$93	
				CDF's																	
				CHANNELS														$750			
				STRUCTURES													$550	$300	$2,100	$2,315	$325
				LOCKS																	
LRE	O&M		074019	TAWAS BAY HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS			-														
				CDF's			-														
				CHANNELS			-														
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		018700	TWO HARBORS, MN	B	B	0			$ -	$ -	$ 16	$ 135	$ -	$ -	$ 198	$ 368	$ -	$ 402	$ 633	$ 440
				OPERATIONS			-								$0		$18		$27	$33	$35
				CDF's			-														
				CHANNELS			-													$600	
				STRUCTURES			-									$198	$350		$375		$405
				LOCKS			-														
LRE	O&M		018710	TWO RIVERS HARBOR, WI	NOT RATED	REC. PROJECT	-			$ 444	$ 133	$ 2,667	$ 71	$ 251	$ 373	$ -	$ 2,520	$ 410	$ -	$ -	$ 795
				OPERATIONS			-								$0		$20	$30			$35
				CDF's			-														
				CHANNELS			-											$380			$410
				STRUCTURES			-										$2,500				$350
				LOCKS			-														
LRE	O&M		074176	WHITE LAKE HARBOR - MITIGATION OF SHORE DAMAGE, MI	NOT RATED	REC. PROJECT	-			$ 60	$ -	$ 29	$ -	$ -	$ -						
LRE	O&M		019810	WHITE LAKE HARBOR, MI	NOT RATED	REC. PROJECT	-			$ 176	$ 20	$ 11	$ -	$ -	$ -	$ 120	$ 319	$ -	$ -	$ -	$ -
				OPERATIONS			-									$14	$19				
				CDF's			-														
				CHANNELS			-									$106	$300				
				STRUCTURES			-														
				LOCKS			-														
LRE	O&M		019850	WHITEFISH POINT HARBOR, MI	NOT RATED	REC. PROJECT	-			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
				OPERATIONS																	
				CDF's																	
				CHANNELS																	
				STRUCTURES																	
				LOCKS																	
		LRE O&M TOTAL								**$ 50,604**	**$ 53,387**	**$ 48,565**	**$ 41,501**	**$ 44,314**	**$ 43,814**	**$ 61,776**	**$ 74,024**	**$ 66,157**	**$ 66,001**	**$ 67,629**	**$ 69,127**
	GLNS O&M TOTAL									**$ 84,952**	**$ 86,282**	**$ 84,436**	**$ 76,087**	**$ 76,809**	**$ 67,201**	**$ 168,864**	**$ 174,439**	**$ 143,353**	**$ 143,627**	**$ 203,857**	**$ 227,551**

APPENDIX H
GREAT LAKES and OHIO RIVER DIVISION

NAVIGATION BUSINESS LINE PROGRAM REQUIREMENTS
FOR THE GREAT LAKES NAVIGATION SYSTEM

FIVE YEAR DEVELOPMENT PROGRAM

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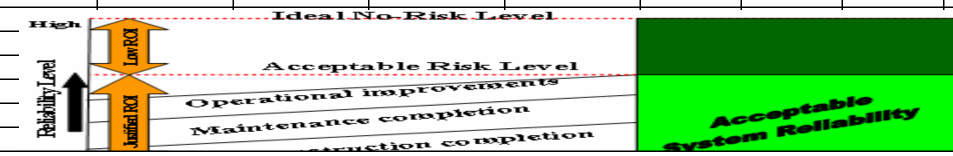
	GLNS GRAND TOTAL, ALL APPROPRIATIONS									$ 85,646	$ 89,373	$ 87,541	$ 80,442	$ 81,121	$ 73,038	$ 182,938	$ 210,646	$ 177,653	$ 179,527	$ 239,557	$ 259,551
NOTES:														PROJECT ACTIVITY SUBHEADING DEFINITIONS:							
				Acceptable Risk Level										OPERATIONS		Includes Lock Ops, PCS, DMMPs, and Environmental Compliance.					
			A	Virtually no compromise to authorized Federal project features accepted.										CDFs		Includes all CDF Ops, Structural Repairs, and Environ. Monitoring.					
			B	Minimal compromise to authorized Federal project features accepted.										CHANNELS		Includes all Federal Channel Area dredging or other maintenance.					
			C	Moderate compromise to authorized Federal project features accepted.										STRUCTURES		Includes all harbor protective structure repairs and maintenance.					
			D	Substantial compromise to authorized Federal project features accepted.										LOCKS		Includes all lock maintenance.					



APPENDIX I

Communications Plan

1. **Purpose**: To outline a communication plan for explaining the Great Lakes and Ohio River Division's regional Great Lakes Navigation System Five-Year Development Perspective (FYDP) to key stakeholders.

2. **Background**: The FYDP was developed by a regional team consisting of members from the Chicago, Detroit, and Buffalo Districts and the Great Lakes and Ohio River Division. The team also engaged a representative group of stakeholders (Canadian Shipowners Association, Lake Carriers' Association, Great Lakes Commission and Great Lakes Maritime Task Force) to gather their views and opinions on managing the Great Lakes as one holistic navigation system.

3. **Key audiences:**
    1) USACE Headquarters
    2) Congressional Offices
    3) Great Lakes Stakeholders
        a. US Coast Guard
        b. Canadian Shipowners Association
        c. Council of Great Lakes Governors
        d. American Great Lakes Ports
        e. AAPA
        f. Lake Carriers' Association
        g. Federation of Navigation
        h. St. Lawrence Seaway Management Corp
        i. American Great Lakes Ports Association
        j. U.S. Department of Transportation – Maritime Administration (MARAD)
        k. U.S. Great Lakes Shipping Association
        l. U.S. Fish and Wildlife Service
        m. U.S. Environmental Protection Agency
        n. U.S. Natural Resources Conservation Service
        o. State Natural Resource Agencies
        p. Great Lakes Commission
        q. Great Lakes Fisheries Commission
        r. Great Lakes Maritime Task Force
        s. Great Lakes Mayors
        t. Great Lakes United
        u. Great Lakes Alliance
        v. The Nature Conservancy, Great Lakes Program
        w. Shipping federation of Canada

4. Key messages (Talking Points):

1) Annually, over 200 million tons of cargo on the Great Lakes is shipped or received through twenty-seven states, two U.S. territories, and a number of Canadian provinces.
2) Over 100 countries use the Great Lakes to trade with the U.S. and Canada, making the Great Lakes the mid-continent's trade link to markets around the world.
3) Firms that rely on the Great Lakes for transportation represent billions of dollars of investment in iron ore mines, steel mills, stone quarries, agricultural processing, petroleum facilities, electricity generating plants and storage facilities.
4) Great Lakes Shipping is an environmentally friendly transportation system, using less fuel and creating fewer emissions than rail or truck cargoes of similar size.
5) Although the Great Lakes Navigation System has been providing for safe, reliable, commercial navigation through the years, the system infrastructure is aging.
6) Constrained operation and maintenance budgets have resulted in limitations on vessel draft, vessel maneuverability and harbor access.
7) Low lake level conditions exacerbate these poor conditions, particularly at harbors that are already being maintained at less than authorized depths.
8) The Five-Year Development Plan will develop project performance and valuation metrics, which are tools based upon analyses of project risk, reliability, and consequences. These analyses are necessary to utilize performance-based budgeting processes, and provide unbiased navigation system asset management recommendations for decision makers as they determine the funding available for the Great Lakes Navigation System.
9) Specific project features of the system to be evaluated include: maintenance of navigation locks, maintenance of navigation channels (width, depth, segments dredged), maintenance of navigation structures (breakwaters and piers), and short/long-dredged material management activities which includes the maintenance, construction, and operation of confined disposal facilities.
10) The Five-Year Development Plan is flexible, allowing the Corps to use adaptive asset management principles to monitor and evaluate system changes, and recommend possible reactions to these changes. By annually preparing accurate, consistent, and reliable project valuation and performance data, and utilizing the metrics developed, the Corps will assist decision makers in the optimization of the Federal investment in navigation and ecosystem infrastructure, working to provide a sustainable and reliable navigation system.
11) The Corps will continue to engage stakeholders to solicit their input regarding Great Lakes navigation priorities, and the appropriate economic metrics used for project valuation and performance analyses. Stakeholder input will be critical for accurately evaluating system reliability and the associated economic consequences.

APPENDIX J

Great Lakes Port and Channel Tonnages, Average Savings per Ton, and Total Transportation Savings

Connecting Channels [1/]	Tons 2003	Average SPT (FY05$)	2003 Transportation Savings
Detroit River	63,961,000	$ 14.80	$ 946,622,800
St. Marys River	71,921,000	$ 14.80	$ 1,064,430,800
St. Clair River	68,067,000	$ 14.80	$ 1,007,391,600
Lake St. Clair [2/]	60,834,491	$ 14.80	$ 900,350,467
Port/Harbor [3/]			
Duluth Superior	38,295,000	$ 13.44	$ 514,684,800
Two Harbors	13,033,000	$ 7.60	$ 99,050,800
Indiana Harbor	14,133,000	$ 8.81	$ 124,511,730
Cleveland	12,621,000	$ 15.82	$ 199,664,220
Toledo	9,864,000	$ 14.01	$ 138,194,640
Presque Isle	8,776,000	$ 9.78	$ 85,829,280
Conneaut	6,705,000	$ 15.28	$ 102,452,400
Rouge River (Dearborn)	9,740,000	$ 16.60	$ 161,684,000
Ashtabula	10,427,000	$ 11.84	$ 123,455,680
Gary	9,010,000	$ 6.25	$ 56,312,500
Burns Harbor	8,069,000	$ 12.45	$ 100,459,050
Milwaukee	3,002,000	$ 23.84	$ 71,567,680
Chicago	22,610,000	$ 19.81	$ 447,904,100
Saginaw	5,404,000	$ 20.01	$ 108,134,040
Green Bay	2,084,000	$ 22.00	$ 45,848,000

1/ Used all sampled moves ffrom TVA's GLSLS rate study to estimate a total tonnage weighted savings per ton (SPT). This SPT was applied to all movements' tonnage to estimate the transportation savings.

2/ Lake St Clair Tonnage not available in WCSC publication - OMBIL FY03 tonnage is reported here.

3/ Used all sampled moves for the port from TVA's GLSLS rate study to estimate a tonnage weighted savings per ton for the port. This SPT was applied to the port's tonnage to estimate the transportation savings.