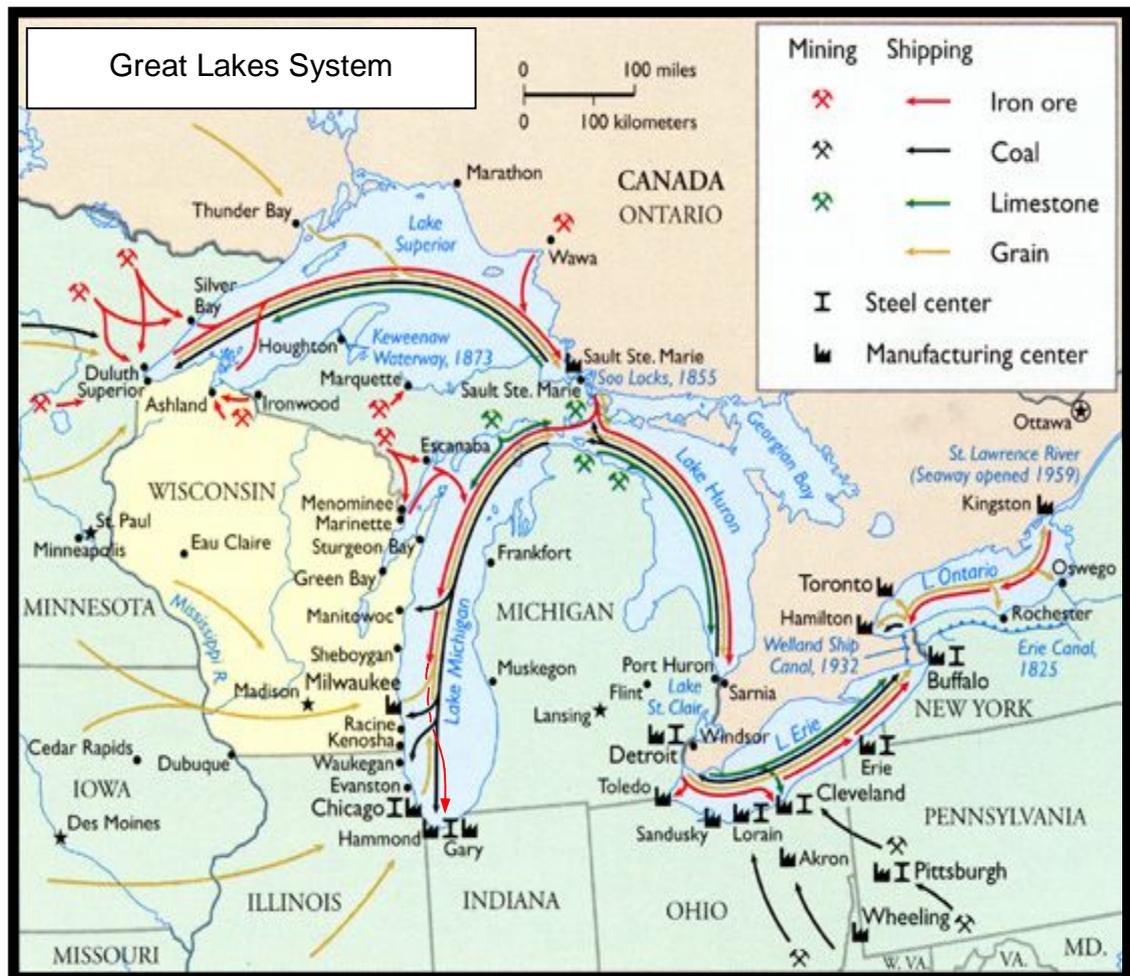




# Great Lakes Navigation System Five-Year Development Plan



**Great Lakes and Ohio River Division  
FY09 – FY13  
April 2008**

## **Executive Summary**

### **Purpose of the Five Year Development Plan**

The Five Year Development Plan (FYDP) guides the U.S. Army Corps of Engineers in planning for the Great Lakes Navigation System's needs over a given five-year span, defined in this report as the years 2009-2013. The intent is to implement 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 refinement of metrics that can fairly and accurately be used to prioritize system needs in a constrained funding environment is a critical component of the FYDP process. The value of the FYDP rests on best utilizing available funds while meeting federally mandated performance-based budgeting requirements.

In the past, commercial cargo tonnage has been a primary criteria used to prioritize investment in the Great Lakes Navigation System (GLNS). 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 as individual system components.

The Corps' Great Lakes Navigation team continues to refine and improve our prioritizing criteria (metrics). We need to refine our metrics to account for 'interconnectivity to other ports' or 'a system-based approach'. Clearly, our primary mission in this area is to support commercial navigation but other valid, supporting metrics are: harbors of refuge, input from the US Coast Guard on public safety, and other commercial activities (e.g. ferry boat activity and commercial fishing).

The three USACE Great Lakes Districts -- Buffalo, Chicago, and Detroit -- operate under 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 are leveraged to form multidisciplinary regional teams. Various assets and activities are managed jointly in cases where it achieves regional efficiency. Floating plant and survey resources are the two areas that have transitioned to regional management. These efforts toward regional management will continue.

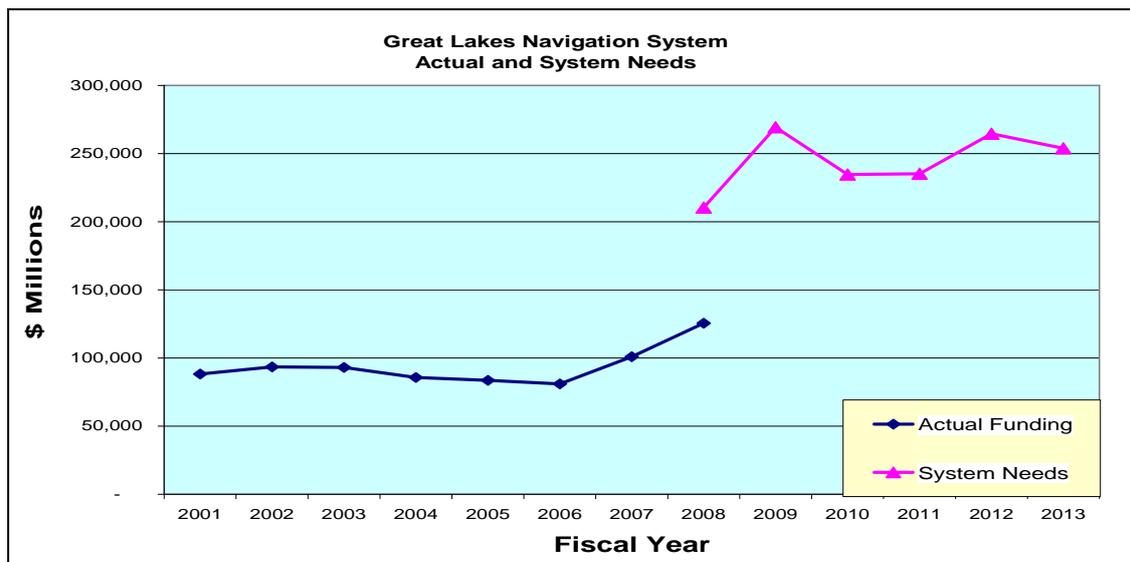
This is an information report for the purpose of eliciting the expertise of Great Lakes navigation stakeholders regarding the identification and reporting of navigation system needs and priorities, and is a starting point in the formulation of each year's annual budget request. This report does not represent a recommendation for funding in the President's budget and does not include consideration of other national funding needs.

## 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 Great Lakes Navigation System is comprised of individual harbors and channels (projects). The 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.

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 2008 and funding needs from FY09 to FY13.



In a constrained budget environment, available funding falls short of identified system needs. To enable the best investment decisions in this constrained budget environment, we use a risk-based management system based on meeting performance standards to set funding priorities.

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### **APPENDIX A: Great Lakes Navigation Business Line Program Requirements**

## **About this Report**

This third update of the Great Lakes Navigation System Five Year Development Plan (FYDP) represents a significant revision of the original document published in FY06. The original 2006 FYDP correctly focused on many internal objectives. Many of these process objectives have been achieved; other objectives have been modified as we move forward as a learning organization. The 2008 FYDP was prepared to describe the investments required for the Great Lakes Navigation System for the years 2009-2013. The goal is to develop a regional asset management plan that articulates priorities and is coordinated with navigation stakeholders.

This annual report is the work of a project delivery team comprised of interdisciplinary experts from the three U.S. Army Corps of Engineers Great Lakes Districts. Team members represent expertise in the areas of engineering, environmental science, operations and maintenance, economics, and program management.

The body of this report includes discussions on methodology, proposed actions, and program funding needs. The appendix includes a detailed project by project list of navigation system needs over the next five years. The Great Lakes FYDP has been developed in accordance with Engineer Circular (EC) 11-2-187, *Corps of Engineers Civil Works Direct Program, Program Development Guidance*.

This is an informational report for the purpose of eliciting the expertise of Great Lakes navigation stakeholders regarding the identification and reporting of navigation system needs and priorities, and is a starting point in the formulation of each year's annual budget request. This report does not represent a recommendation for funding in the President's budget and does not include consideration of other national funding needs.

## **Value of the Great Lakes Navigation System (GLNS)**

### **Introduction**

The Great Lakes Navigation System (GLNS) is an interconnected system of locks (Soo Locks, Black Rock Lock New York, and Chicago Lock), four navigational channels, more than 30 U.S. ports and 130 harbors. Lakes Superior is linked to Lakes Michigan and Huron by the two operational locks at Sault Ste. Marie administered by the US Army Corps of Engineers (USACE) and the channels of the St. Marys River. Lakes Michigan and Huron are linked to Lake Erie by the St. Clair River, Lake St. Clair, and the Detroit River. Lake Erie is linked to Lake Ontario by the Niagara River and the Welland Canal, which is comprised of eight locks administered by the Canadian government.

## **Current Value - Value to Industry**

With respect to American domestic marine trade, approximately 96 million tons are moved internally between ports on the system on an annual basis. This accounts for about 10 percent of all US waterborne domestic traffic. The GLNS carries vast quantities of coal from Montana and Wyoming to power generating stations along the shores of the Great Lakes. Other commodities shipped through the system include limestone, coke, salt, petroleum products, chemicals, processed iron and steel as well as a variety of goods carried in containers.

The true importance of the GLNS, however, rests with the nature of its traffic: the prosperity of several sectors of the U.S. economy depends on the GLNS. These include iron and steel, cement manufacturing, energy production, and agricultural exports. All of these industries depend on the availability of reliable, low-cost waterborne transportation. Specifics on the two most important industries follow:

**STEEL PRODUCTION** - The North American steel industry is clustered around the perimeter of the Great Lakes, as is the automotive industry that depends on it. The GLNS transports much of the iron ore used in these industries. In 2005, total American iron ore production amounted to 55 million tons, 95% of which originated in Minnesota and Michigan. About 78% of this total (43.3 million tons) was shipped on the GLNS.

**ENERGY PRODUCTION** - Most of the coal passing through the GLNS is destined not for the steel industry but for power generation. Coal-fired electrical plants stretch along the shores of the Great Lakes, which offer a highly cost-effective way of providing plants with the fuel that they need. In 2005, the system handled about 39 million tons of coal worth approximately \$1.8 billion. Of this total, 94% was destined for power generation.

## **Value to Shippers**

It is clear that the GLNS offers shippers significant savings: A survey of U.S. ports suggests that the system saves them approximately \$1.8 billion a year in transportation costs. Moreover, these savings are especially felt in strategic sectors such as steelmaking and power generation, the competitiveness of which is vital to the health of the North American economy.

## **Future Value**

Traffic in bulk commodities through the GLNS is expected to steadily increase through year 2050. On the Welland Canal, traffic is expected to grow by 0.5 % annually while traffic through the Soo Locks is expected to grow 0.7% annually. Although, the forecast performed only includes traffic moving through a lock, all other GLNS traffic is expected to experience corresponding growth due to the similarities of the subject markets.

## Short Sea Shipping

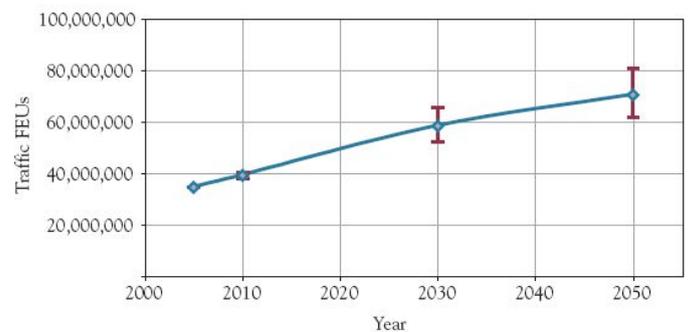
Highways and rail lines in the Great Lakes region are currently experiencing growing congestion. Much of the large volume of trade passing between Canada and the United States is funneled through crossings at Windsor-Detroit and Niagara Falls. The road and rail networks carrying this traffic are reaching physical limits -- the challenges of which have been exacerbated by new security procedures. Short sea shipping on the Great Lakes has the potential to alleviate these problems.

Short sea shipping is the practice of adding a waterborne leg to a shipment that would normally travel by road or rail. The GLNS is currently under-utilized, operating at only half of its potential capacity. Through short sea shipping, the GLNS can offer complementary transportation routes through under-utilized ports and move goods directly across lakes rather than around them. Effective short sea shipping on the Great Lakes would require an investment in upgraded surface links to the rest of the transportation grid, enhanced port facilities for loading and unloading containers, as well as regular shipping service along the most likely alternative routes.

## Containerized Shipping

The future of the GLNS should also be considered within the broader context of international trade. The advent of a global economy has been accompanied by the emergence of containerized shipping and the development of new markets in Asia. The development of new Asian markets has shifted the focus of international trade from the Atlantic to the Pacific resulting in congestion in the ports of North America's west coast. In response, shippers are looking for alternative routes, one of which is to move containerized goods from East Asia through the Suez Canal into Europe and then continue the journey to ports along the eastern seaboard of North America. Such goods could then be transhipped onto carriers that move them through the Great Lakes St. Lawrence Seaway System (GLSLS) and into the heart of North America. Given that most GLNS shipping has traditionally focused on bulk commodities, a key determinant of success would be the ability of GLNS vessels and ports to handle containerized cargoes. If such capabilities are ensured, containerized traffic in the GLSLS is expected to double over the next half century.

Forecast of market for container market traffic in the GLSLS region



## Conclusions

For many years, the GLNS has played a vital role as a major transportation corridor serving the commerce of the Great Lake basin. During that time, its role has evolved to accommodate changing economic circumstances and its economic contribution remains significant on a regional and national level. That said, the GLNS remains focused on the delivery of bulk goods, such as iron ore and coal to domestic markets, while also participating in the downbound flow of grain for trans-Atlantic export.

There have been fluctuations in total tonnages carried through the system over the years, reflecting changes in the supply and demand of different commodities. The past few years, however, have seen these traffic levels stabilize to about 151 million tons annually. This volume of traffic could not be transferred to an already overloaded land-based transportation network without severe economic impacts on the industries served. Marine transportation continues to be a viable and essential complement to the existing road and rail transportation networks in the region. Since trade volumes are expected to increase in coming years, marine transportation is likely to grow in importance.

If the GLSLS is to remain reliable, its infrastructure must be maintained. The system consists of locks, shipping channels, ports, navigation structures, bridges, control and communications systems, as well as interfaces to other transportation modes. Locks can experience deterioration to components such as walls and gates, or mechanical failures that affect gate movement or the pumping of water in and out of lock chambers. Navigation channels accumulate silt over time and must be dredged continuously to maintain the required depth. Entry channels into ports are especially prone to shoaling. Failure to adequately fund dredging operations increases costs to shippers and industry along with limiting production capabilities and ultimately harming the national economy.

## Current Assessment and Desired Future Condition of the GLNS

### Overview

*“A reliable, cost effective transportation network is one advantage American businesses have in the global economy”*

Mr. Mike White, Director of Programs, Great Lakes and Ohio River Division,  
US Army Corps of Engineers

The Nation has many important priorities competing for attention and ultimately for Federal funding. In recent years shrinking O&M budgets combined with aging infrastructure and lower lake levels have strained the Great Lakes Districts' ability to adequately maintain the GLNS. A backlog of dredged material has accumulated in the system's harbors and channels, the much needed recapitalization of the 41 year-old Poe Lock and 64 year-old MacArthur Lock at Sault Ste Marie has been deferred,

and required repairs of the system's 140+ miles of breakwaters have largely been unfunded. Across the system, capacity at our confined disposal facilities is shrinking. Facility siting costs and environmental constraints are making the expansion of existing capacity and the construction of new capacity a growing challenge.

However, the Great Lakes FY 2008 O&M appropriation adequately funds dredging of sediment that has accumulated over the past year and should even remove a small portion of the backlog. Though slower than planned, recapitalization of the Soo Locks has begun. The FY 2008 budget does not provide a sustainable funding level for breakwater repairs but it does represent a significant increase in funding compared to recent years.

## **Connecting Channels and Locks**

The Great Lakes connecting channels consist of the St. Marys River with two operational locks at St. Marys Falls connecting Lake Superior to Lake Huron and the St. Clair River-Lake St. Clair-Detroit River connecting Lake Huron to Lake Erie. Lake Erie is connected to Lake Ontario by the Welland Canal and its eight locks which are maintained and operated by the Canadian government. Additionally, the Chicago Lock on the Chicago River connects the Great Lakes to the Illinois River and ultimately the Mississippi River. The Black Rock Lock in Buffalo connects Buffalo Harbor, on Lake Erie, to Tonawanda Harbor, NY.

### **Current Condition (Connecting Channels and Locks)**

Maintaining the connecting channels and locks, even in stressed budgets, is always a top priority. Strike removal (sounding for, locating, and removing boulders and other obstructions from the Federal channel) is a continuous activity. Strike removal is the primary activity for two of the Corps' five floating plants (crane barges and tugs) on the Great Lakes during the navigation season. All four operational locks: the Poe and MacArthur at Sault Ste Marie, the Chicago Lock, and Black Rock Lock must operate with an extremely high degree of reliability. The Great Lakes Navigation Team has developed a Soo Locks Recapitalization Plan, which lays out the rehabilitation and modernization projects that must be completed over the next six years to maintain the reliability of the Soo Locks through the year 2035. The Great Lakes Districts are also participating in the Great Lakes and Ohio River Division's asset management program that will improve our ability to prioritize and track maintenance of our locks and to make risk based decisions in the budget process.

### **Future Needs (Connecting Channels and Locks)**

While our current 'snapshot' condition of the connecting channels and locks is very positive there are several significant near term future needs:

- ✓ Recapitalization of the Soo Locks: The Soo Locks are a vital component of the Great Lakes Navigation system. 'Routine' annual O&M activities do not support needed repairs, replacement, and upgrades such as the purchase of stop logs, the complete replacement of aged hydraulic systems, the complete replacement of the 60 year old steam lines, or the upgrade to a modern, digital surveillance camera system. The recapitalization of the Soo Locks requires approximately \$60M over 5-6 years.
- ✓ The Chicago Harbor Lock is one of the busiest locks in the nation, with annual lockages of 12,000. Over 35,000 commercial and recreational boats, 680,000 passengers, and 125,000 tons of freight pass through the lock annually. The Lock allows safe passage of boats navigating the 2 to 5 foot water level between Lake Michigan and Chicago River and allows the State of Illinois to comply with the Supreme Court Decree restricting the amount of water that can be diverted from Lake Michigan into the Chicago River. The Lock also serves as a flood damage reduction structure with gates that must reliably open when needed to prevent flooding of downtown Chicago from Chicago River overbank flooding. 'Routine' annual O&M activities do not support needed repairs to the lock which include the replacement of the 4 sector gates and the associated operating machinery and electrical systems.
- ✓ The Neebish Rock Cut (St Marys River), last deepened in the 1960s, requires wall stabilization. This is a critical reach of the St. Marys River between the Soo Locks and Lake Huron. Increased rock slippage or a major failure of a wall section would have severe impact on the GLNS. Funding in FY08 will allow a more detailed analysis and cost estimate. Preliminary estimates for repairs are \$7M; this figure is likely to change once a more comprehensive analysis is complete.
- ✓ With 1185 lockages in 2007, the Black Rock Lock provided safe passage for 328 commercial and 1377 recreational boats. The lock and a 2.0 mile pier that separates the channel from the Niagara River allow vessels to bypass the swift and dangerous waters of the Niagara River. 'Routine' annual O&M activities do not support needed repairs to the lock which include replacement of the gate sills and fendering.

## **Dredging**

Dredging requirements of the GLNS harbors and channels are extremely site specific. Some harbors require annual dredging, others are dredged bi-annually, and still others are dredged less frequently. Some projects require annual dredging of the outer harbor due to littoral deposition while the inner harbor is dredged less frequently. The engineers and hydrologists of the Great Lakes Districts base their understanding of these natural cycles on the Corps' 100+ years of experience.

However, nature is often unpredictable. Occasionally, a single storm event can push large shoals into a federal channel.

Precise budgeting for dredging is a challenge given the budget cycle which requires recommending funding levels more than two years out. A regional funding approach such as the \$6.544M that was provided for Great Lakes commercial dredging in the FY08 Omnibus Bill is an efficient and effective tool to allocate funds to the most critical needs for the greatest return on investment.

## Annual Great Lakes Dredging 1986-2009

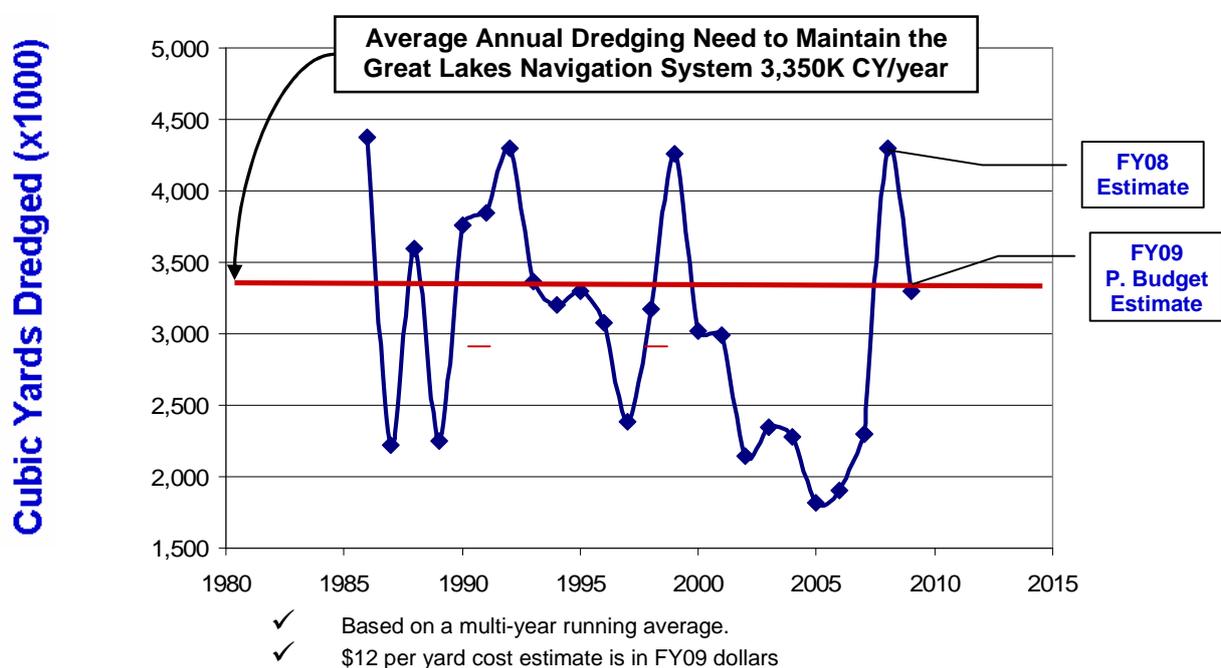


Figure 1: Corps Dredging on the Great Lakes

### Current Condition (Dredging)

The Great Lakes Districts estimate that approximately 3.35 M cubic yards of dredging is required annually to maintain Great Lakes federal harbors and channels. From the mid 90s to 2007 limited funding led to less than 2.35 MCY of dredged system-wide on an annual basis and a 'backlog' developed (figure 1). The buildup of shoaling is estimated at 18 million cubic yards. The Corps attempted to maintain project depths where possible and at most projects allowed channel widths, turning basins, and other areas to shoal. Full project dimensions have not been maintained. The FY08 appropriation and the FY09 President's Budget have begun to reverse this trend.

## **Future Needs (Dredging)**

The Great Lakes Districts have made significant progress developing and using performance metrics for prioritizing dredging needs and funding. We are working to improve our current performance based budgeting process for prioritizing dredging requirements while incorporating a system based approach and guidance from Headquarters US Army Corps of Engineers.

- ✓ System based approach: A system based approach recognizes the GLNS is interdependent. Simply stated, the “big, high priority” harbors are dependent on the “smaller, lower priority harbors” and vice versa. Tonnage and commerce at a small or medium sized harbor is likely destined to or originated from a larger harbor. A unique aspect of Great Lakes shipping is that much of the commerce originates from and is transported to American ports.
- ✓ The FY2008 Energy and Water Development Appropriation included a provision for \$6.5M funding for dredging of commercial harbors on the Great Lakes. The appropriation bill directed the Corps to prioritize dredging needs based on maximizing transportation cost savings, taking into account the relationship among harbors, and to consult with Appropriations Committees and other interested parties. This regional provision allows the Corps to work with stakeholders to identify the greatest needs relative to system benefits. This approach is a small step in the direction of a system-based funding approach.
- ✓ Headquarters US Army Corps of Engineers is developing national criteria based on use. High use is classified as over 10M tons annually, moderate use is classified as 1-10M tons annually, and low use is classified as less than 1M tons annually. HQ USACE is also tying performance criteria to channel availability. The Great Lakes Navigation Team is working with HQs USACE to incorporate Great Lakes’ needs into the national criteria.

## **Dredged Material Disposal Capacity**

Currently, dredged material is managed using one of four methods on the Great Lakes. Clean sand is generally used for beach nourishment; it is placed on the beach or just offshore in shallow water. Beneficial uses such as beach nourishment or use as upland fill are pursued whenever practical. Other clean sediment is disposed of in open water at a limited number of locations. Sediment that is not suitable for beach nourishment or that is not suitable for open lake placement is deposited in Confined Disposal Facilities (CDFs). New CDFs are called Dredged Material Disposal Facilities or DMDFs. Where CDFs are not available upland disposal in commercial landfills is used. Highly contaminated sediments are cleaned up under EPA environmental programs or under the authority of Section 312 of WRDA 1990, as amended; the disposal of highly contaminated material is site specific.

## **Current Condition (Dredged Material Disposal Capacity)**

There are 26 active CDFs and DMDFs supporting Crops dredging on the Great Lakes. Their capacity varies from very limited (e.g. Cleveland) to extensive (e.g. Monroe). The new Saginaw DMDF should open in FY2008 and the Indiana Harbor CDF is schedule to open in FY2010.

Regional priorities for expanding existing capacity or constructing new capacity are:

- Buffalo Harbor
- Calumet Harbor - Chicago Area CDF
- Cleveland Harbor
- Duluth-Superior Harbor - Erie Pier CDF
- Green Bay Harbor - Cat Islands CDF
- Indiana Harbor CDF
- Lorain Harbor CDF
- Milwaukee Harbor
- St. Marys River

## **Future Needs (Dredged Material Disposal Capacity)**

The Great Lakes Navigation Team is strengthening its regional approach to dredged material disposal management. This year, we began taking steps in that direction with the formation of a regional team to track and prioritize system needs. The management, planning (DMMP), and construction of CDF/DMDF is executed by each district.

Securing the funding for construction, real estate challenges, environmental concerns, process constraints, and legal challenges can make expanding existing CDF capacity or constructing new CDF capacity a 10-year, or longer, process. The reality of this time period requires that the Great Lakes Districts track capacity and initiate dredged material management plans (DMMPs) more than a decade prior to forecast closure of existing facilities.

Test programs and investigations in the beneficial reuse of dredged material are important. The physical properties of the dredged material and beneficial reuse opportunities are site specific, but in general the increasing cost of CDF construction and increased environmental concerns make expanding beneficial reuse essential. Sediment management programs that emphasize beneficial reuse can decrease the sediment load, and therefore decrease future dredging needs. Programs that prevent soil erosion have multiple environmental and economic benefits; two of which are less need for dredging and for disposal of dredged material.

The long term future of dredged material disposal will be found in a combination of site specific solutions. A few possible solutions are expanding existing capacity, constructing new capacity, and extending capacity. In some cases, capacity can be extended indefinitely through beneficial reuse, dredged material management, and supporting programs that minimize disposal needs.

Another challenge that the Great Lakes Navigation Team faces is that environmental permitting for open-lake placement is becoming more restrictive. Currently, open-lake placement is allowed by pertinent law and regulations on Lake Erie, Lake Ontario, and the southern end of Lake Michigan; however, obtaining the required environmental permitting appears to be on a trajectory of increased uncertainty. The team is beginning discussions on the future of open-lake placement, recognizing that Federal regulations require that costs of disposal above that required to meet Federal environmental standards are to be non-Federal costs.

## **Breakwaters and Structures**

There are over 130 coastal cities and towns on the Great Lakes with federal navigation projects that include breakwaters; 63 of these projects currently support commercial navigation. Originally built to safeguard navigation in the federal harbors from waves and ice, these structures also provide critical flood and storm damage protection for buildings, roads, facilities, and municipal infrastructure. In many cases, cities and downtowns have 'grown up' behind and are now safeguarded by federal breakwaters.

### **Current Condition (Breakwaters and Structures)**

Over 50% of the coastal structures on the Great Lakes were built prior to World War I (1918) and 80% are older than their typical 50-year design life. Federal funding for maintenance of projects is prioritized base on economic benefits related to commercial navigation. Federal breakwaters at harbors with small amounts of commercial navigation are a low priority for funding. Funding for structure repairs at harbors with significant levels of commercial navigation has been under funded for the last decade.

In 2007 the three Great Lakes Districts formed a regional, multi-disciplined breakwater assessment team which developed technical assessment criteria and began inspecting and rating breakwaters around the Great Lakes. This effort is ongoing and will continue annually. The breakwater assessment teams findings will be used to improve our budget prioritization for breakwater repairs.

Repairs to federal breakwaters on the Great Lakes are made by both Corps floating plant and marine contractors working for the Corps. Typically, the Corps' floating plant is used for small preventive maintenance work and smaller repairs while contracts are let for larger repairs, reconstruction or new construction of breakwaters. In FY2008 the Corps' floating plant was adequately funded and

contract repairs are programmed at three breakwaters. This is a step in the right direction but this level of funding is inadequate to maintain the system in the long term. The FY2009 Presidents Budget does not include funding for large repair - rehabilitation projects of breakwaters.

### **Future Needs (Breakwaters and Structures)**

The GLNS has between \$35 and \$50M in annual needs for structure repair. The majority of these needs represent significant repairs or reconstruction of navigation structures. The breakwater assessment team's work will allow us to more prioritize these total needs so that the most urgent structures are given priority in the budget process each year. Additionally, the Corps' floating plant must be adequately funded for annual work executing minor repairs and performing preventive maintenance. Future GLNS breakwaters and structure needs include:

- ✓ Significantly increase funding of major breakwaters repairs and rehabilitation
- ✓ Continue work by the Corps' regional breakwater assessment team to both quantify the total needs and prioritize the needs.
- ✓ Adequately fund the Corps' floating plant which executes minor repairs to federal breakwaters
- ✓ Determine the value of breakwaters that no longer support commercial navigation but are performing important storm damage reduction functions and find a source for funding repairs on these projects.

Table 1 is a summary of critical funding needs at GLNS deep draft harbors over the next five years. The annual maintenance dredging need for deep draft harbors ranges from \$46M to \$59M annually. The cost to virtually remove the dredging backlog by FY13 is \$25M to \$33M annually over the next five years.

A suitable location to place dredged material is essential to dredging operations in any harbor. CDFs are one option available for dredged material placement. DMMPs provide a plan for the placement of dredged material from future dredging operations. The annual need for CDFs and DMMPs at GLNS deep draft harbors is between \$10M and \$43M annually.

Low lake levels coupled with an aging infrastructure have resulted in a need for repairs or reconstruction of navigation structures in deep draft harbors. It will cost between \$37M and \$43M annually to maintain and rehabilitate navigation structures over the next five years.

The locks at Sault Ste. Marie are the key link between Lake Superior harbors and other Great Lakes harbors. The Soo Locks Recapitalization Plan provides necessary funding to maximize reliability and reduce the risk of catastrophic failure of the locks. The implementation of this plan requires \$11M to \$15M annually over the next five years.

**GLNS Needs FY09-FY13 FYDP TOTAL (Commercial Harbors)**

FY	Annual Maint. Dredging (x1000)	Backlog Removal Dredging (x1000)	<b>DREDGING TOTAL (X1000)</b>	CDFs & DMMPs (x1000)	Breakwater Prev. Maint. & Rehab. (x1000)	Soo Locks ReCap (x1000)	Other Navigation O&M Costs (x1000)	<b>Total System O&amp;M Need (x1000)</b>
FY09	\$58,797	\$30,079	<b>\$88,876</b>	\$31,480	\$47,740	\$10,986	\$38,992	<b>\$218,074</b>
FY10	\$54,179	\$37,380	<b>\$91,559</b>	\$25,080	\$70,405	\$13,629	\$37,115	<b>\$237,788</b>
FY11	\$45,828	\$25,467	<b>\$71,295</b>	\$27,210	\$38,578	\$12,737	\$50,293	<b>\$200,113</b>
FY12	\$50,192	\$28,887	<b>\$79,079</b>	\$43,276	\$49,105	\$15,155	\$41,168	<b>\$227,783</b>
FY13	\$49,643	\$27,206	<b>\$76,849</b>	\$38,072	\$37,134	\$15,000	\$42,416	<b>\$209,470</b>

**Great Lakes Navigation System Operations and Maintenance (O&M)**

**Process Goals and Objectives**

Performance based budgeting using metrics and the concept of risk mitigation to prioritize O&M needs is in place and is currently being used. The Great Lakes Districts are currently working to adjust and improve these processes based on lessons learned and guidance from or Headquarters, Great Lakes and Ohio River Division and Headquarters, US Army Corps of Engineers. As we refine our processes we have two related objectives. The first objective is to ensure that our limited resources are used in the most effective and efficient manner possible to support the GLNS. The second and equally important objective is to ensure that the GLNS can compete fairly for Federal resources based on the value and needs of the system. This is our duty to the Great Lakes Navigation and the American public. To achieve these objectives, a complete understanding of the value of the GLNS must be integrated into the processes.

One lesson learned in the refining of these processes is that prioritizing all of the diverse O&M needs (dredging, breakwaters maintenance, CDF maintenance, lock operations and maintenance) in a single process presents several technical challenges. Several other activities and higher headquarters initiatives are, or will soon, further complicate the process for prioritizing O&M funding. These initiatives include:

- ✓ HQs USACE initiative to provide national level performance standards for coastal channel availability (The Great Lakes are considered a coastal system in USACE' two-system classification: coastal and inland)
- ✓ The Great Lakes and Ohio River Division has directed the Great Lakes Districts to examine the current process to determine if it will put the long-

term system health of the system at risk if placing breakwater repairs are too low in priority.

- ✓ The Great Lakes and Ohio River Division's asset management process is currently focused exclusively on, and only provides criteria for, locks and dams.
- ✓ GLNS stakeholders and Congress have suggested a process that accounts for the relationship among harbors.

With these considerations in mind, the Great Lakes Districts are examining the merits of using categorized performance based budgeting. For example, we may develop one process to prioritize all dredging needs and a separate process to prioritize all breakwater repairs. Additionally, the Great Lakes Districts will examine the concept of minimum or base funding. Under the base or minimum funding concept increment 1 activities (IAW EC 11-2-187) which must be funded, for example 'basic' lock operations or Chicago Sanitary Ship Canal diversion accounting would not be prioritized. They would instead be "must fund" items (appendix B). A benefit of this approach is that it may allow the process more efficient allocation of resources by eliminating prioritization efforts related to the "must fund" activities and allowing a greater focus on the allocation of resources above the 'must fund' level.

A key task for the Great Lakes Navigation Team is to demonstrate the supportive relationship of projects with less than 1-million tons per year to high use commercial harbors to allow both types of projects to be categorized as increment 1, "critical routine activities" as defined in EC 11-2-187.

### **Stakeholder Involvement and Engagement**

Stakeholder participation is crucial to the FYDP success. Three meetings are held per year along with routine, on-going coordination and communication. Stakeholder expertise is valued; their input provides the Corps with critical knowledge and perspective of the GLNS and its needs.

The three meetings each year, each with a different focus (Table 2) are currently accommodating both the Stakeholders' and the Great Lakes Navigation Team's needs. The Great Lakes Navigation Team will continue to adjust in efforts to sustain the very positive results of these meetings based on stakeholder feedback and our own after action reviews.

<b>Table 2: USACE Great Lakes Navigation Team - Annual Stakeholder Events</b>			
Date Window	Event	Remarks	Ongoing meetings and communications with individual stakeholders
FEB – 1 <sup>st</sup> Monday	Communications: Release of the President's Budget	Stakeholders desire quick, accurate, well organized access to the President's Budget information	
FEB	Marine Community Day	Stakeholder led event, USACE attends and provides GLNS update. Also, GLNS FYDP annual update is published.	
MAY	GLNS Stakeholder Meeting	US Army Corps of Engineers led event. Corps Seeks input of Stakeholder priorities for budget development	
NOV-DEC	GLNS Stakeholder Meeting	US Army Corps of Engineers led event. Corps Seeks Strategic input and updates on GLNS conditions.	
FEB	Shallow Draft Harbor Stakeholder Meetings	The first regional meeting focusing exclusively on shallow draft harbors (via multiple VTC sites) was held 6 Feb 2008. Format and timing of future meetings is TBD	

## Investigations and Assessments

Comprehensive investigations, condition assessments, and risk analyses are required management measures to efficiently and effectively maintain the GLNS. Current priorities are:

- ✓ Complete Great Lakes Navigation System Review - Supplemental Reconnaissance Report
- ✓ Continue work with the US Army Corps of Engineers' Navigation Center which will allow better use of economic and other information to support performance based budgeting and better communicate the value of the GLNS

## Construction

As a mature system the GLNS has limited new construction needs. New construction is focused on the construction of a new "Poe sized" lock at Sault Ste Marie and the construction or expansion of confined disposal facilities (CDFs) across the region.

Regional priorities for new construction are:

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

7. Complete Cleveland Harbor Confined Disposal Facility construction in FY14

## **Shallow Draft Harbors**

Maintenance of federally authorized shallow draft harbors in the Great Lakes has not been budgeted by the Corps for a number of years. This policy is consistent with Administration priorities, but the Energy and Water Development Appropriations, which directs funding for the Corps of Engineers, often includes funding for shallow draft harbors. For example, the FY 2008 Energy and Water Development Appropriations Act included over \$6M for dredging of shallow draft harbors, including a regional appropriation of \$1.5M for dredging of small harbors on Lake Superior. This provision for regional funding allows the Corps to work with stakeholders and Congress to direct the funds to the harbors with the greatest needs.

The program described in this FYDP includes critical funding needs for shallow draft harbors as well as deep draft (commercial) harbors.

Table 3 is a summary of critical funding needs at GLNS shallow draft harbors over the next five years. The annual maintenance dredging need for GLNS shallow draft harbors is between \$3M and \$19M annually. Due to constrained budgets, many shallow draft harbors on the Great Lakes have had inadequate dredging for several years. Some harbors are in such dire need of dredging that it is unsafe for vessels to use the federal navigation channel. It will take between \$340K and \$3.8M annually in additional dredging at shallow draft harbors to remove the dredging backlog.

Navigation structures in many shallow draft harbors are in need of significant repairs or reconstruction. Residential and commercial infrastructure has been built around shallow draft harbors with the assumption that navigation structures will perform as designed and serve as protection from large swells. Deteriorated and unserviceable navigation structures will not perform as designed and as a result many homes and businesses are in jeopardy. GLNS shallow draft harbors require \$2 to \$20M annually for necessary repair of navigation structures.

**Table 3: GLNS Needs FY09-FY13 FYDP TOTAL (Shallow Draft Harbors)**

FY	Annual Maint. Dredging (x1000)	Backlog Removal Dredging (x1000)	<b>DREDGING TOTAL (X1000)</b>	CDFs & DMMPs (x1000)	Breakwater Prev. Maint. & Rehab. (x1000)	Other Navigation O&M Costs (x1000)	<b>Total REC O&amp;M Need (x1000)</b>
FY09	\$15,896	\$3,760	\$19,656	\$905	\$17,144	\$1,732	\$39,437
FY10	\$18,527	\$1,130	\$19,657	\$905	\$19,520	\$2,580	\$42,662
FY11	\$3,319	\$490	\$3,809	\$0	\$4,100	\$658	\$8,567
FY12	\$7,585	\$3,558	\$11,143	\$0	\$1,640	\$679	\$13,462
FY13	\$7,408	\$342	\$7,750	\$0	\$9,340	\$523	\$17,613

## Conclusion

The Corps' Great Lakes Navigation System FYDP represents a rational process using performance based budgeting that effectively and efficiently invests the limited resources provided to operate and maintain the Great Lakes Navigation System for the benefit of the Great Lakes region and the Nation.

The FYDP processes incorporate federal and U.S. Army Corps of Engineers directives and policies, the knowledge and experience of the professionals of the three Great Lakes Districts (Buffalo, Chicago and Detroit), and the input and insight of our stakeholders. The FYDP process will adjust as the federal government and Corps mandates and polices change, our knowledge grows, and Stakeholder priorities shift.

*“The Corps cares only about executing the will of the American people, as expressed by their elected representatives here in Congress, as directed by the National Command Authorities, and as sanctioned by the courts.”*

BG David Fastabend, (then) Commander, Northwest Division, USACE, in testimony before the Water & Power Subcommittee Senate Committee on Energy and Natural Resources, 10 July 2002