Great Lakes Navigation System

Marie Strum
U.S. Army Corps of Engineers
Great Lakes Navigation

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A non-linear navigation system with 60 federal commercial harbors and 79 federal shallow draft/recreational harbors.
Great Lakes Navigation System

- A non-linear interdependent system of 139 deep and shallow draft projects; commercial ports are dependent on each other for the efficiency and health of the system
- 90% of the traffic is internal to the system – U.S. and Canadian ports
- GLNS saves the country $3.6B per year compared to the next least costly mode of transportation

The Great Lakes Navigation System Provides Key Economic Benefits*

In 2010 alone:

✓ GLNS generated 226,800 U.S. and Canadian jobs and an additional 447,600 in related user jobs (ex: steel or stone company)

✓ $14.1B in personal wages, salaries, and local expenditures and an additional $22.7B from related user industries

✓ As a result of maritime activity on GLNS, generated $33.6B in business revenue and an additional $115.5B from related user industries

* Data from Martin Associates October 2011 Report
Corps Great Lakes Navigation Funding Status
FY12 Corps Funding Status

- Congress passed the FY12 Consolidated Appropriations Bill; enacted Dec 23, 2011.

- The FY12 Appropriations bill included additional O&M funds for ongoing work – to be allocated by USACE HQ

Additional Funding for Ongoing Work
- Navigation Maintenance $34M
- Deep-draft harbor and channel $55M
- Inland waterways $30M
- Small, remote, or subsistence nav $30M
FY12 Corps Funding Allocation

• Final allocation was announced on February 8. $8.9M was applied to Great Lakes Navigation projects.

  ➢ Dredging:
    ➢ Holland $585,090
    ➢ Manistee $495,000
    ➢ Saginaw $2,079,000
    ➢ St. Joseph $693,000
    ➢ Waukegan $788,040
  ➢ Soo Locks Asset Renewal $2,753,190
  ➢ Repair failing Milwaukee breakwater $1,485,000
FY 12 Funding
Great Lakes Navigation

$78.4M in named projects in FY12 Conference for O&M
$ 8.9M allocation from “Additional Funding for Ongoing Work”

$87.3M total for GL Nav O&M

Key Items in FY12 Appropriation
$26.6M in Dredging (2.0M cubic yards)
$11.7M in Dredged Material Management
$5.2M in Soo Asset Renewal
FY 13 President’s Budget
Great Lakes Navigation

$85.9M  O&M
$7M  CG (Green Bay Cat Islands DMDF)

Key Items in FY13 President’s Budget
$31.0M in Dredging (2.4M cubic yards)
$12.0M in Dredged Material Management
$3.1M in Soo Asset Renewal
Dredging Funding Trends 2007 - 2013

Quantity Dredged (M cu yd)

FY07 FY08 FY09 FY10 FY11 FY12 FY13

3.3M Annual Reqm’t

FY12 Nat’l Provision
ARRA (Stimulus)
L. Superior Regional Provisions
Michigan Regional Provision
Commercial Regional Provisions
Energy & Water Adds
President’s Budget
Dredged Material Management
Current Dredged Material Management Conditions

DREDGED MATERIAL MANAGEMENT STATUS
- Critical – Dredged Material Management issues could severely restrict channel availability within 5 years
- Pressing – Dredged Material Management issues could severely restrict channel availability within 10 years.
- No pressing issues within next 10 years; continue to work on long range planning such as DMMPs.

ANNUAL DREDGING REQUIREMENT (CY)
- 800K
- 100K – 250K
- 50K – 95K
- <50K

Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Lake St. Clair
Detroit River
Rouge River
Huron
Lorain
Cleveland
Fairport
Ashtabula
Conneaut
Erie
Dunkirk
Buffalo
Harbor
Rochester
Harbor
Oswego
Ogdensburg
Great Lakes Dredged Material Management

- Federal navigation channels are located in 28 of 31 Areas of Concern (AOCs)
- "Restrictions on Dredging" - one of 13 beneficial use impairments listed in WQA
- USACE has removed over 100 million cubic yards of contaminated sediments
- CDFs are now more than 80% full

**Partnerships**
- Collaboration with EPA Legacy Act cleanup at Ashtabula, OH
- Milwaukee CDF used for Legacy Act cleanup of Kinnickinnic River; new CDF at no cost to Corps
- Buffalo River CDF repair facilitated strategic navigation dredging with GLRI and Legacy Act funds
- Working with state of MI on using Pte. Mouillee as potential placement site for GLRI dredging
Green Bay – Cat Islands

Provide for 2.35M cy of disposal capacity
Provide significant reduction in M/D costs
Restores over 1,400 acres of habitat

Total Project Cost = $30.6M
FY11 E&W = $0
FY12 Approp = $0
FY13 Pres Bud= $7M
GLRI Funding = $12M
**Indiana Harbor Confined Disposal Facility**

**$180M Project: FY 11 - $8.0M (CG)**

**Completed Construction**

- **Obstruction Removal**
  - $2.0M - FY06

- **Slurry Wall**
  - $10.6M - FY07

- **Dikes I**
  - $5.6M - FY07

- **South Cutoff Wall**
  - $17.3M - FY10

- **Groundwater Gradient Control System**
  - $21.0M - FY11

- **Dikes II**
  - $5.5M - FY11

**South End Features**

- $2.8M
- Contractor: IES
- Completion in Sep

**Complete Dikes III**

- $7.9M
- Contractor: Rausch
- Completion in Sep

**Groundwater drawdown & Interim Treatment Plant**

- $5.0M
- Contractor: Clean Harbors
- Completion in Dec 2011

**Facility Operations/ Dredging Contract**

- Award in September 2011 - $3.9M (O&M)
- Contractor: TBD
- Initiate dredging in Spring, 2012
Cleveland Harbor Dredged Material Management

- Out of capacity in FY15 without long-term management alternatives
- Potential short term fill management activities: harvesting and re-use for beneficial uses, mechanical offloading
- Added efforts by dredgers due to decreased allowance for dredge water may slow dredging operations and increase federal costs
- Dredged Material Management funding: FY12 = $5.0M; FY13 President’s Budget = $4.8M
Duluth Harbor CDF Capacity

- 21st Avenue Site - 75 acres, 800k CY capacity, $1.5M
- Pursuit of Open Water Placement - testing ongoing
- Mineland Reclamation - pilot study, 30,000 CY
- Exterior Berm Raising – performed in 1990s - increased capacity by 750k CY
- Fill Management - Interior berm raising, pond excavation, construction of MSE Wall/Intermediate Offloading Platform ongoing
Initiatives to Combat Funding Challenges

Initiatives underway to reduce requirements/increase efficiencies:

- Dredge sediment traps to remove material more efficiently before it gets to harbor
- Work regional sediment management initiatives to reduce sediment load off the watershed
- Leverage EPA funding from Legacy Act and GLRI (both dredging and dredged material management)
DMM Summary

- Relying on new CDF construction, in general, is not viable;
- Recognize that state and local governments must be active participants in search for new solutions to dredged material disposal and placement needs.

Strategies

1. **Extend CDF Life** through Fill Management
2. Create CDF Capacity through **Beneficial Reuse and Use**
3. **Reduce Material** Entering Federally Maintained Navigation Channels
4. Engage State Agencies in Solutions to participate in studies or expert elicitation to **improve basis for environmental dredging windows**
5. **Reinforce the Federal Standard** for open-lake placement to maintain efficiency of the Corps dredging program while protecting the environment.
6. Foster Partnership with USEPA to **Leverage Funding** for Projects Supporting Environmental Goals and Navigation Benefits

Communication

- Great Lakes Brochure
- Web Site:  
  www.lre.usace.army.mil/greatlakes/navigation
  - Fact Sheets
  - Presentations
- Mailing Lists – send information to 
glnavigation @usace.army.mil
Key Great Lakes Contacts

GL Navigation Business Line Manager
Mike O’Bryan – (313) 226-6444
Marie Strum – (313) 226-6794

Shamel Abou-El-Seoud - Chicago Operations Chief
(312) 846-5470

Josh Feldmann - Buffalo District Operations Chief
(716) 879-4206

Dave Wright - Detroit Operations Chief
(313) 226-3573

www.lre.usace.army.mil/greatlakes/navigation
Questions?
Great Lakes Navigation

**Key Issues**

- Dredging Needs – Growing Backlog
- Dredged Material Management Challenges
- Lock Reliability
- Deteriorating navigation structures/communicating risk to stakeholders

Interdependent Ports

Total Tonnage for 8 Harbors
95.8M tons
System Connectivity for 8 Federal Harbors

Total Tonnage for 8 Harbors
95.8M tons

Duluth-Superior Harbor
46.5M tons

>10M Ton Harbor
1-10M Ton Harbor
<1M Ton Harbor

BUILDING STRONG®
Port Interdependency

- Great Lakes ports are linked in trade with each other in a complex pattern of interdependency.
- If lower use ports are closed, it will affect larger ports, both in tonnage and economic impact.
- Duluth Port Director Adolph Ojard stated in Duluth Seaway Port Authority’s Fall 2011 report, writing on the effect that harbor closings will have on his own port, the largest on the Great Lakes:

  ► “These closings will begin a process, if left unchecked, of restricting trade and maritime activity that will reduce jobs at every Great Lakes port. With over 40 million tons of commerce, the Twin Ports of Duluth-Superior will begin to see the negative effects of these budget shortfalls.”
Omnibus Bill
Regional Dredging Provisions

FY08 Commercial Dredging ($6.544M)
  • Transportation Cost Savings
  • Relationship Among Harbors
  • Coordinate with Stakeholders
FY08 Lake Superior Small Harbor Dredging ($1.564M)
FY08 Michigan Reprogramming Provision

FY09 $5M Michigan Provision (30 Eligible Harbors)

FY10 $6M Michigan Provision (32 Eligible Harbors)
FY10 Lake Superior Small Harbor O&M ($1.9M)
The Soo Locks
A Lynch Pin of the Great Lakes Navigation System

- 70% of the commercial commodities transiting the Soo Locks are limited by size to the Poe Lock
  - Security concerns - foreign crews in vessels are capable of seriously damaging or destroying locks
  - There is currently no redundancy for the Poe Lock

- The economic impact of a 30-day unscheduled closure of the Soo Locks = $160M

- Two major efforts are underway to improve reliability of the Soo Locks
  1. Maintain existing infrastructure through Asset Renewal Plan
  2. Add redundancy by constructing a new replacement lock with the same dimensions as the Poe Lock
Soo Locks Asset Renewal
Long-Term Plan

Asset Renewal Plan will maximize reliability and reduce risk through 2035

- $32.8M funded to date through FY12
  - New hydraulics, stop logs, utilities
  - Crib Dam construction
  - Compressed Air System design
  - Mac Lock modernization design

- Remaining funding required $87 million over 5 years
  - Compressed air system
  - Rock Cut stabilization
New Replacement Lock

- Inconsistent with Administration policy due to BCR of 0.73
- WRDA 2007: Construction at 100% federal expense
- Other Considerations: Security, rail/infrastructure capacity, impacts of extended closure
Soo Locks Construction

Full Funded Total Project Cost Estimate: $580.3 M

Current BCR: .73

Funds Expended Through FY10: $29.5 M

Completed Construction Contracts:
- Coffer Dam: $3.2 M
- Down Stream Approach Channel Excavation: $7.1 M

FY13 Budget and Potential Construction Information:
- FY13 President’s Budget = $0
- FY13 Capability = $125,000,000
  - Increment 1 - $12 M Continue Design & Up Stream Approach Wall at RR Bridge
  - Increment 2 - $28 M Down Stream Approach Walls
  - Increment 3 - $41 M Up Stream Channel Excavation
  - Increment 4 - $44 M Up Stream Approach Walls

Way Ahead, as funding allows
- Complete Design
- Any funds received will be used for two purposes
  - Move forward with new lock design and construction
  - Provide long term stabilization of construction sites if full funding will not be received

80 Million tons of cargo transits the locks annually
30 day unscheduled outage = $160M
Without the Poe Lock, America’s Steel Industry would be severed from its major source of iron ore
Over 90% of the U.S. Iron Ore passes through the locks
~8,000 vessels traverse the locks annually
Great Lakes Navigation Structures

- 104+ miles of navigation structures on the Great Lakes
- Structures include piers, jetties, revetments, and breakwaters
- Most were built between 1860 and 1940
- Jetties and piers were constructed perpendicular to shore to keep the channel open for navigation
- Offshore breakwaters were constructed to allow safe navigation entry to harbors and channels
Grand Haven Harbor:
C: Medium Risk of Failure
Grand Haven Harbor:
Overall rating of ‘C’, rating of ‘D’ where remaining failed earth anchors are located along boardwalk

Infrastructure:
1. Grand Haven State Park
2. Stearns Park: United States Coast Guard- Grand Haven Station
3. Lakefront/Channel front Homes
4. Captain’s Cove Condominiums
Grand Haven Harbor: Potential Impact Areas

<table>
<thead>
<tr>
<th>Buffer Feet</th>
<th>Land Value</th>
<th>Improv. Value</th>
<th>Total Assessed Value</th>
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<tbody>
<tr>
<td>1,000</td>
<td>$56M</td>
<td>$10M</td>
<td>$66M</td>
</tr>
<tr>
<td>1,500</td>
<td>$63M</td>
<td>$74M</td>
<td>$137M</td>
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<tr>
<td>2,000</td>
<td>$80M</td>
<td>$105M</td>
<td>$185M</td>
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FY12 Corps Funding Status (cont’d)

• Criteria established by Congress for allocation of national O&M funding:
  - Complete ongoing work to maintain authorized widths and depths
  - Particular emphasis on places with a Coast Guard presence
  - Enhance national, regional, or local economic development
  - Promote job growth or international competitiveness
  - National defense; public health and safety
FY12 Corps Pilot Program

• FY11 Funding included $1.4M nationwide for a low use navigation projects.
• Program’s intent is to assist local sponsors with efforts leading to navigation dredging.
• The funds are not to be used for dredging; assist with:
  • surveying/quantity determinations
  • disposal site sizing and identification
  • environmental clearances
  • plan and spec development
  • contract administration/quality assurance.
• Received funding for St. Joe, Manistee, Leland, Holland, Rochester, and Conneaut
## Sample GL SAND Results
### Economic Impact on Interconnected Ports

#### Economic Impact of 6-Foot Shoal in Ashtabula Harbor

<table>
<thead>
<tr>
<th>PORT</th>
<th>Economic Impact to Interdependent Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST LAWRENCE RIV ABOVE INTER BDRY-PORT CARTIER</td>
<td>$6,334,464</td>
</tr>
<tr>
<td>ST CATHARINES ONTARIO</td>
<td>$51,911</td>
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<tr>
<td>HAMILTON ONTARIO</td>
<td>$136,439</td>
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<tr>
<td>CLARKSON ONTARIO</td>
<td>$152,472</td>
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<tr>
<td>FAIRPORT HARBOR OHIO</td>
<td>$722</td>
</tr>
<tr>
<td>NANTICOKE ONTARIO</td>
<td>$760,653</td>
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<tr>
<td>WINDSOR ONTARIO</td>
<td>$9,095</td>
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<tr>
<td>COURTRIGHT ONTARIO</td>
<td>$1,482,917</td>
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<tr>
<td>ALPENA MICHIGAN</td>
<td>$15,639</td>
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<td>CALCITE MICHIGAN</td>
<td>$459,073</td>
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<tr>
<td>MUSKEGON HARBOR MICHIGAN</td>
<td>$79</td>
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<tr>
<td>GRAND HAVEN HARBOR MICHIGAN</td>
<td>$6,165</td>
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<tr>
<td>GREEN BAY WISCONSIN</td>
<td>$303</td>
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<tr>
<td>ESCANABA MICHIGAN</td>
<td>$65,539</td>
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<td>PORT INLAND MICHIGAN</td>
<td>$450,579</td>
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<tr>
<td>MARQUETTE HARBOR MICHIGAN</td>
<td>$309,579</td>
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<tr>
<td>PRESQUE ISLE HARBOR MICHIGAN</td>
<td>$180,437</td>
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<tr>
<td>SUPERIOR WIS</td>
<td>$1,350,904</td>
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<tr>
<td>SILVER BAY MINN</td>
<td>$8,147,984</td>
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<tr>
<td><strong>ASHTABULA HARBOR OHIO</strong></td>
<td><strong>$19,914,954</strong></td>
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</table>
### Sample GL SAND Results

<table>
<thead>
<tr>
<th></th>
<th>St. Joseph Harbor</th>
<th>Waukegan Harbor</th>
<th>Holland Harbor</th>
<th>Great Lakes System Modeled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tons Modeled</strong></td>
<td>326,297</td>
<td>452,443</td>
<td>421,555</td>
<td>132,455,531</td>
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<tr>
<td><strong>Number of Interconnected Harbors</strong></td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>-</td>
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<tr>
<td><strong>Jobs</strong></td>
<td>63</td>
<td>92</td>
<td>77</td>
<td>26,036</td>
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<tr>
<td><strong>Revenue</strong></td>
<td>$7,320,507</td>
<td>$9,799,559</td>
<td>$11,267,114</td>
<td>$5,325,226,611</td>
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<tr>
<td><strong>Salary</strong></td>
<td>$2,865,558</td>
<td>$4,228,311</td>
<td>$3,507,993</td>
<td>$1,192,769,570</td>
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<td><strong>Emissions Reduction Annually (lbs of PM-10)</strong></td>
<td>1,843,565</td>
<td>2,712,832</td>
<td>31,449,114</td>
<td>5,075,324,081</td>
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<tr>
<td><strong>Fatal rail accident cost avoided</strong></td>
<td>$23,745</td>
<td>$50,556</td>
<td>$14,449</td>
<td>$27,662,254</td>
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<tr>
<td><strong>Non-fatal rail accident cost avoided</strong></td>
<td>$19,990</td>
<td>$42,561</td>
<td>$12,164</td>
<td>$23,287,655</td>
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<tr>
<td><strong>Physical damages from rail accident cost avoided</strong></td>
<td>$3,820</td>
<td>$8,132</td>
<td>$2,324</td>
<td>$4,449,649</td>
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<tr>
<td><strong>Total Rail accident cost avoided</strong></td>
<td>$47,555</td>
<td>$101,249</td>
<td>$28,937</td>
<td>$55,399,558</td>
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<td><strong>Fatal Truck accident cost avoided</strong></td>
<td>$118,840</td>
<td>$33,635</td>
<td>$678,659</td>
<td>$28,451,156</td>
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<tr>
<td><strong>Non-fatal Truck accident cost avoided</strong></td>
<td>$555,833</td>
<td>$157,315</td>
<td>$3,174,193</td>
<td>$133,070,380</td>
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<tr>
<td><strong>Physical damages from Truck accident cost avoided</strong></td>
<td>$23,291</td>
<td>$6,592</td>
<td>$133,008</td>
<td>$5,576,048</td>
</tr>
<tr>
<td><strong>Total Truck accident cost avoided</strong></td>
<td>$697,964</td>
<td>$197,542</td>
<td>$3,985,860</td>
<td>$167,097,584</td>
</tr>
</tbody>
</table>
Backlog Growth Under Constrained Dredging Funding 2012-2017

- Cumulative Backlog (1,000 cu yds) - Green Line
- Cubic Yards Dredged (x1000) - Blue Line

Dredging Backlog Grows to 23M CY by 2017

Assume FY13-FY17 Ann. Dredging Equal to FY13PB Level of 2.4M CY

- Annual Great Lakes Dredging 1986-2011
- Average Annual Need
- Dredging Backlog
Coastal Structure Communication Objective

Program Objective: Communicate the risk of breakwater and structure conditions to local stakeholders and navigation system users

Process:
1. **Conduct Condition Assessments**
   - Commercial Harbors- Use detailed Breakwater Assessment Team (BAT) Evaluation
   - Recreational Harbors- Rely on expert elicitation
2. **Conduct Harbor Infrastructure Inventory on all structures**
3. **Prepare summary document** that conveys the current condition of the harbor infrastructure as well as the risk involved in the event of failure
4. **Share with stakeholders** in regional meetings