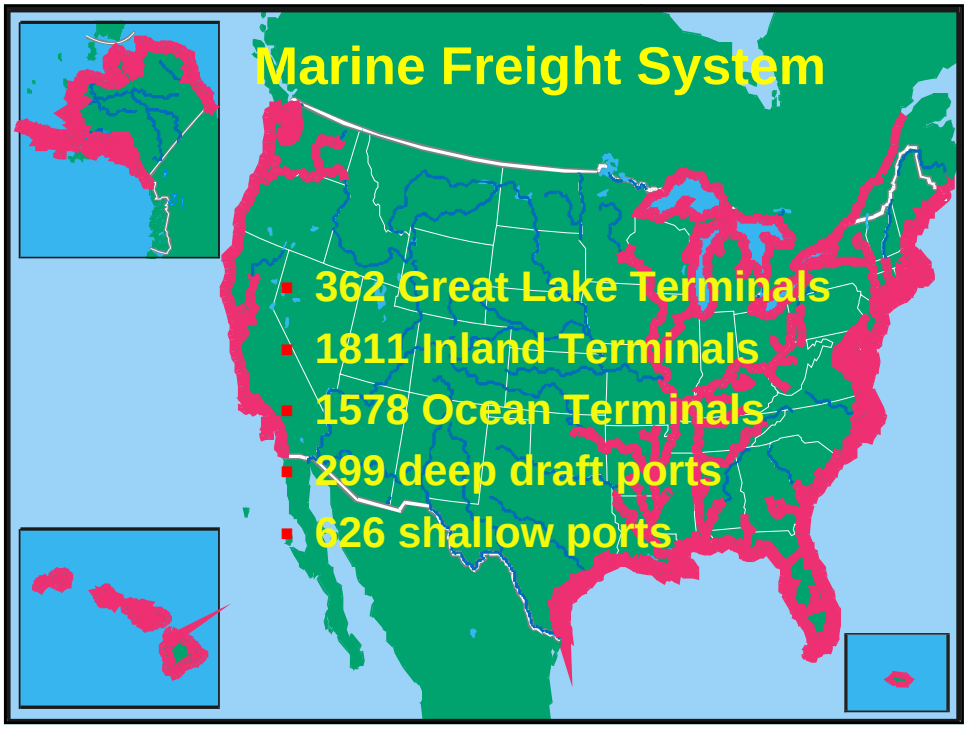
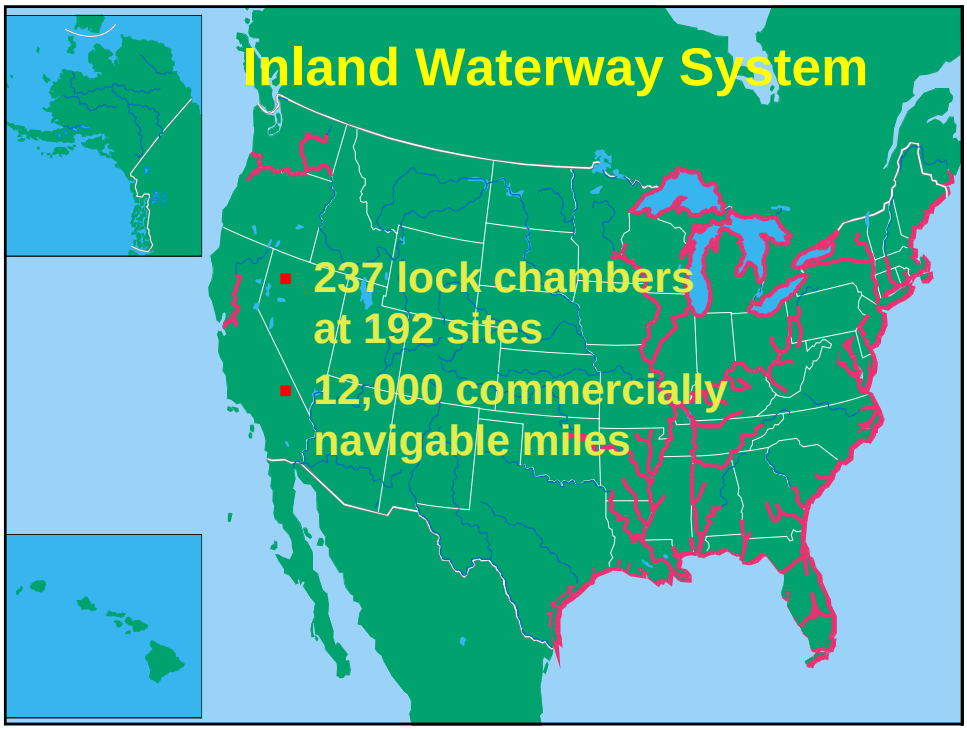
Corps Navigation Mission

Provide safe,reliable,efficient,effective and environmentally sustainable waterborne transportation systems for movement of commerce, national security needs, and recreation.


Marine Freight System
362 Great Lake Terminals
1811 Inland Terminals
1578 Ocean Terminals
299 deep draft ports
626 shallow ports


Inland Waterway System
237 lock chambers at 192 sites
12,000 commercially navigable miles

Navigation

- 25,000 miles of commercially navigable channels (12,000 miles are inland/shallow draft channels)
- 627 shallow draft, 299 deep draft harbors
- 238 lock chambers @ 192 lock sites
- 26 locks over 100 years old
- 234 million cubic yards dredged last year (new and maintenance) at a cost of $887 million

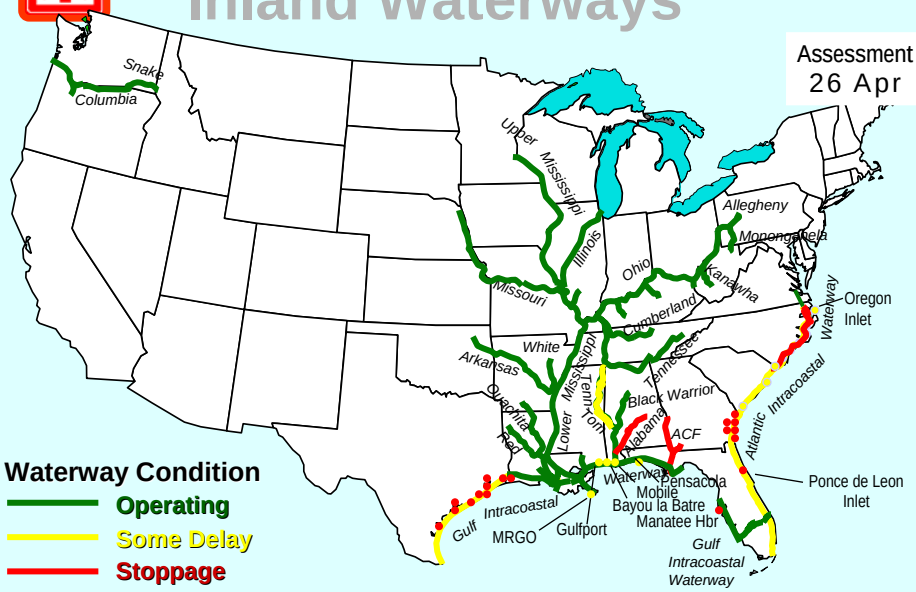
Navigation

- 2002 tonnage - 2.46 billion tons
  (1.39 billion tons foreign)
- Value of foreign tonnage - $737 billion
- Trust Fund Revenues generated FY 2002:
  $108 million - Inland Waterways Trust Fund
  $711 million - Harbor Maintenance Trust Fund
- 40 million cubic yards dredged material applied to beneficial uses annually

CECW-O

Inland Waterways

Assessment
26 Apr



Waterway Condition

- **Operating**
- **Some Delay**
- **Stoppage**

Challenge: Aging Water Resources Infrastructure

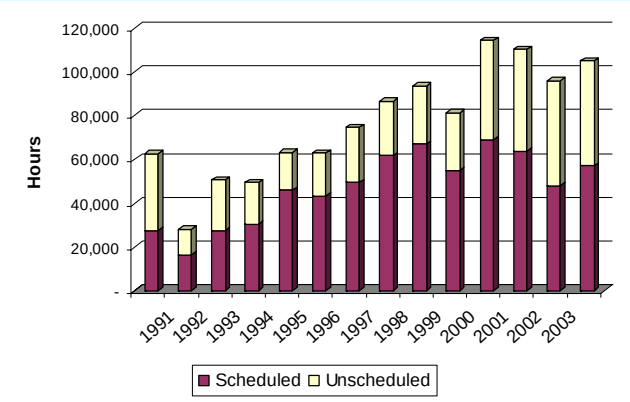
- **Investments in water resources infrastructure have declined in real terms**
- **Aging infrastructure results in more frequent closures for repairs, decreased performance and costly delays**

Leaking spare miter gates, Upper Miss Lock 19

Crumbling lock wall, Lower Mon 3, opened in 1907

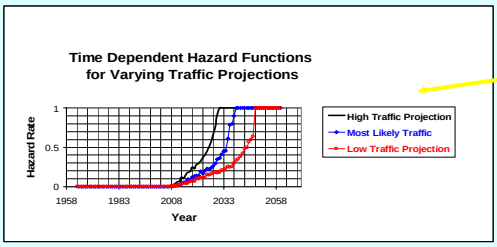
Concrete deterioration at Chickamauga could result in lock failure

Risk and Reliability

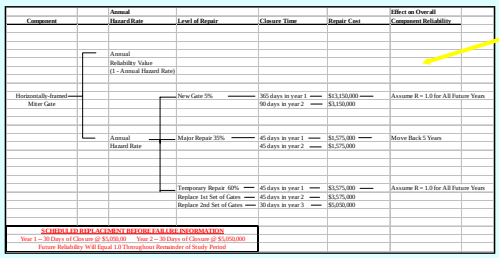


Engineering Reliability

Utilization on ORMSS



Time dependent probabilities of failure for various alternatives through study period

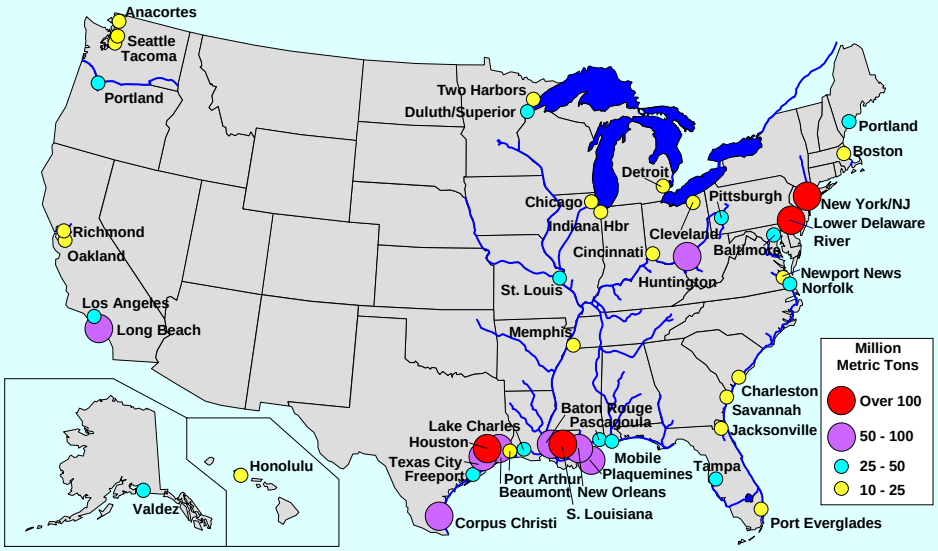


Consequence event tree given the limit state is exceeded in the reliability analysis

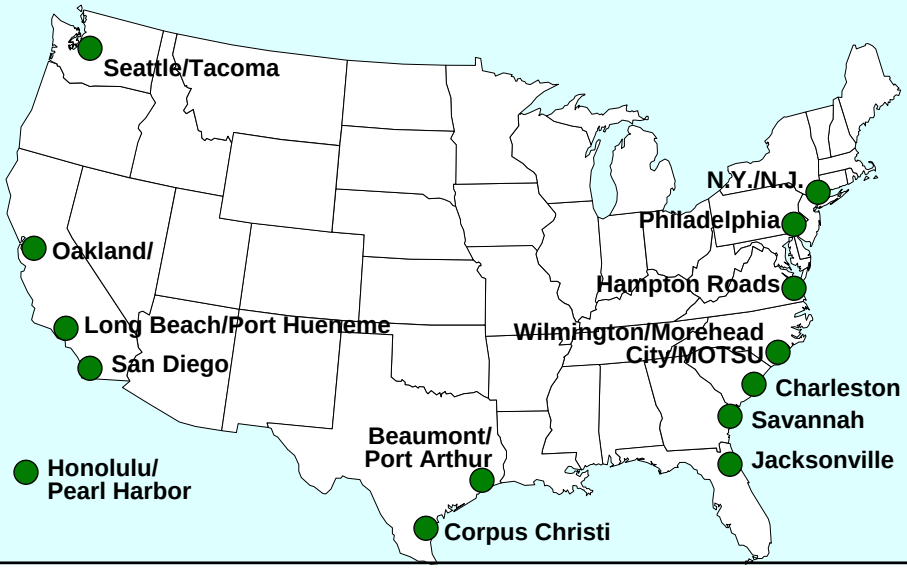
WHAT IS FEM??

- **An automated maintenance management system using off-the-shelf MAXIMO software that has been configured to the Corps applications and requirements. Information from this system will be used to manage our assets in proper balance with our business processes and budget.**

U.S. Harbors Handling over 10 Million Metric Tons in 2001



Strategic Ports

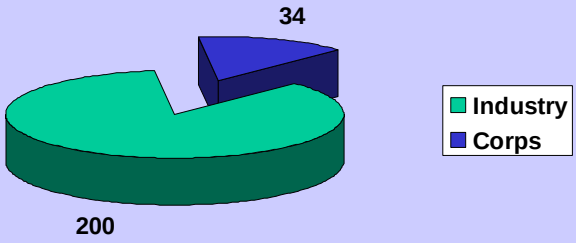


Future Freight Demand

- **Freight traffic expected to increase by 67%**
- **General cargo freight by 113%**
- **Highway traffic grows from 11 billion to 19 billion tons (17.2 billion metric tons)**
- **Rail grows from 2 to 3.7 billion tons (3.4 billion metric tons)**
- **How is this cargo going to move?**
  - **Little room left to expand highways, especially in urban areas**
  - **Rail mileage has been decreasing; much former right-of-way has been developed**
  - **Rail capacity constraints in urban areas, tunnel clearances, single-track bridges**

DREDGING QUANTITY

- TOTAL - 234 million cubic yards

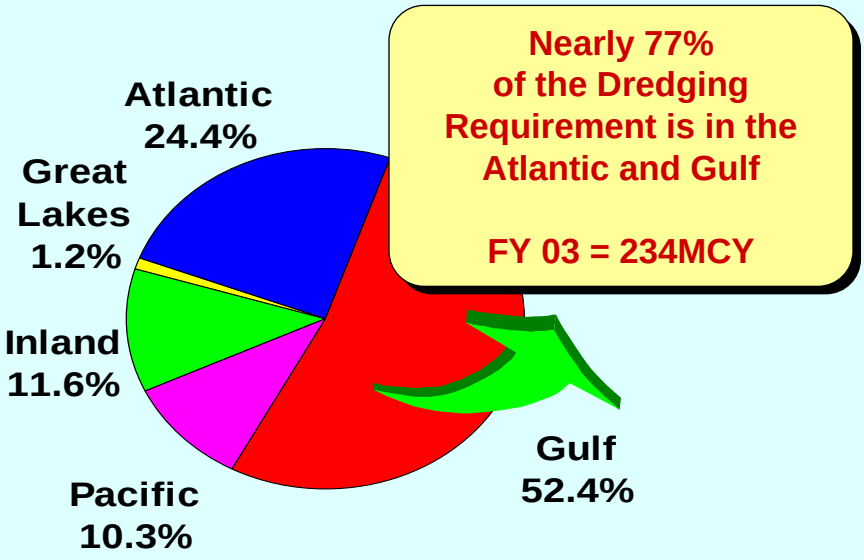


DREDGING FY 03

- Total dredging -$887.3 million, 233.8 million cubic yards
- Corps - $88.6 million(10%), 33.9 million cubic yards(14.5%)
- Industry - $798.7 million(90%), 199.9 million cubic yards(85.5%)

Preliminary Dredging Data			
	For FY 04		
MSC	Dollars	CYs	
	(000)	(000)	
Great Lakes & Ohio Rive	$27,281.9	3,963.9	
Mississippi Valley	$147,929.3	101,864.8	
North Atlantic	$236,601.7	29,758.4	
Northwestern	$65,964.9	17,044.6	
Pacific Ocean	$37,750.1	6,707.9	
South Atlantic	$246,586.7	46,612.7	
South Pacific	$59,720.6	7,285.6	
Southwestern	$46,926.3	21,551.9	
Total	$868,761.5	234,789.8	

Dredging "Requirement" By Region



Dredging & Disposal Issues
Not just "Spoil"
•More demand for beneficial use of dredged material
•Scarcity of disposal sites
•Contaminated sediments
•Dredging "windows" for protection of species
•Need for tools to predict shoaling, dredging requirements

DMMPs/PMPs
OPS IS RESPONSIBLE!!!
CRITICAL FOR FUTURE CG FUNDING
GIVES OPS MANAGER A PROACTIVE TOOL
Where the RDT/LPG needs to participate

Dredging Issues

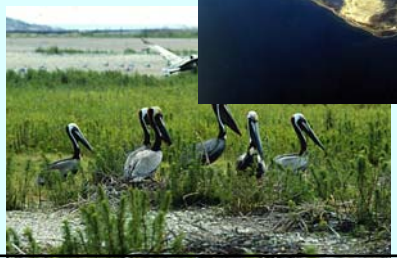
- Environmental Windows
- Endangered Species
- Dredged Material Disposal
- Dredge Availability
- Dwindling Operation & Maintenance Budget

Ecosystem Restoration & Navigation

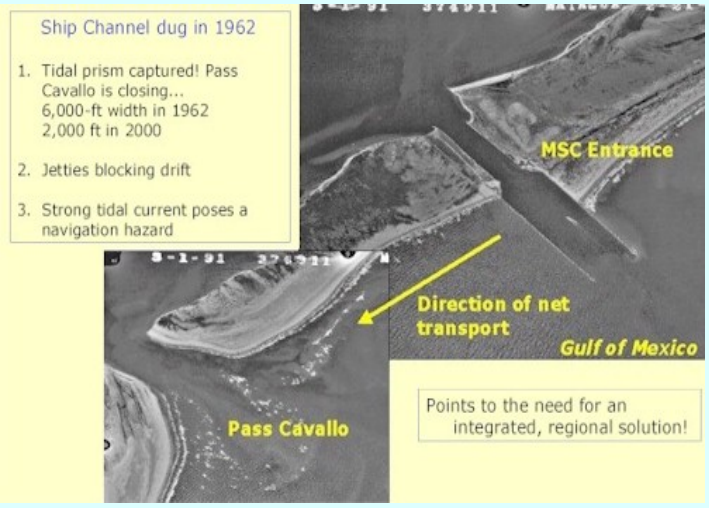
Poplar Island, Chesapeake Bay, Maryland

Navigation in Perspective

- Dredged material is a resource – we will manage it for beneficial uses
- We will need to focus on regional management and watershed management of sediments
- Environmental stewardship/sustainability will be an integral part of our planning, operations and maintenance activities
- Proactive management tools must be developed



REGIONAL SEDIMENT MANAGEMENT (RSM)



Regional Sediment Management is ...

… regulation and management of littoral, estuarine, and riverine sediment within the boundaries of a physical system where sediment exchange occurs naturally.

Regional sediment management recognizes that the physical system and embedded ecosystems respond beyond the space and time scales of individual projects, and that a proactive regional planning and engineering approach will produce significant cost savings and project benefits.

Navigation Objectives and Performance Measures

Program Objectives	Performance Measures
Obj.1: Invest in navigation infrastructure when the benefits exceed the costs.	- Remaining BCR - Annual net benefits
Obj. 2: Support sustainable regional, basin-wide, or watershed planning and activities in partnership with others.	- % of projects recommended in Chief's reports that apply watershed principles
Obj. 3: Fund high-priority O&M.	% change in $ amount of essential backlog at key facilities.
Obj. 4: Operate and manage the navigation infrastructure so as to maintain justified levels of service in terms of the availability to commercial traffic of high-use navigation infrastructure (waterways, harbors, channels).	- % of time navigation infrastructure with high levels of commercial traffic sustains its functional purpose.

Performance Metrics

- BCR - the benefit cost ratio for project
- RB/RC - the remaining benefit / remaining cost ratio
- Commercial tonnage impacted
- Percent reduction in delay costs (inland only)
- Sys Ton-mi - the total tons X the total distance from origin to destination
- Proj annual benefits -total (all purposes) NED benefits for (proposed) project

Performance Metrics (cont)

- Proj annual costs -total (all purposes) NED costs for (proposed) project
- Net benefits - estimated benefits of this budget request
- Yrs to complete - years required to complete this budget request's phase (study, PED, construction contract, etc)
- Other proj. purpose - list other purposes (outputs) associated with this project (study) -

Performance Metrics (cont)

- percentage of time project is available to perform as designed without limits from deferred maintenance, etc
- cumulative NED benefits for project in current dollars
- cumulative NED costs for project in current dollars for same features as benefits (separable and joint)
- Pub Health/Safety - critical hazardous situation, imminent failure resulting in severe consequences to public

Performance Metrics (cont)

- Consequences - budget request needed to comply with safety, settlements, etc - what is impact if not funded this PY
- Purpose - what the budget amount accomplishes. E.g. initiate, continue, complete recon, feas, PED, contract, ensure justified level of service
- Remarks - additional information to support budget request that is not in the other fields

FY 06 Budget Development

- Culture Change to Field
- Data Not Consistent
- Trends Needed
- Additional Vessel Draft Metric Needed
- O&M Benefits Lacking
- Better Increment Development

Low-Use Waterway Segments

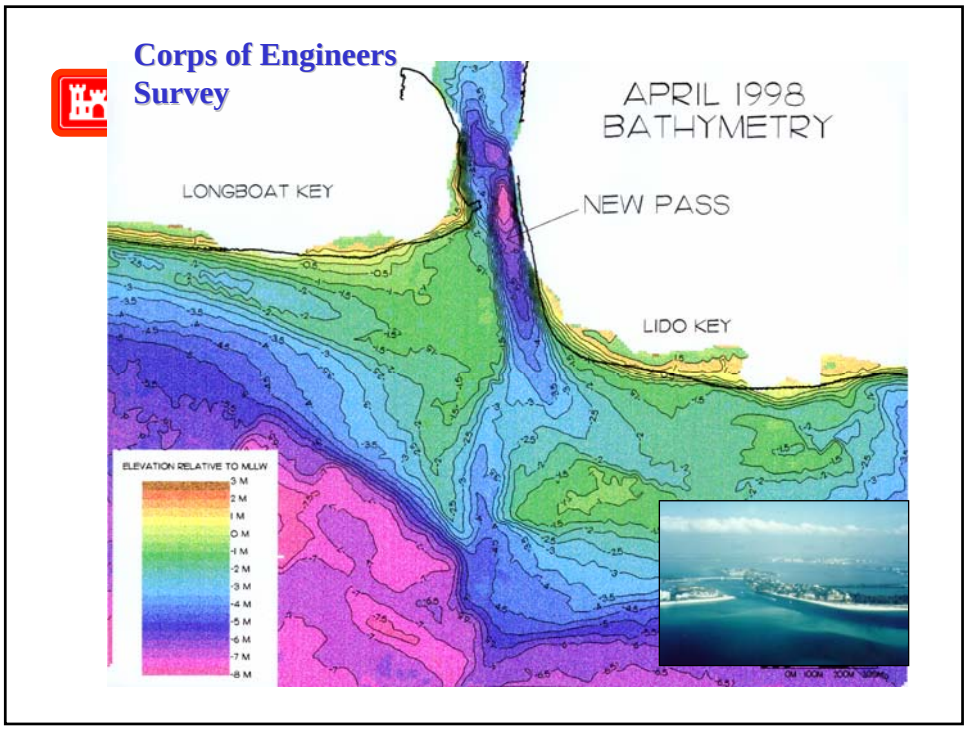
- Segments with <1 million tons on waterways with < 1 billion system ton-miles
- Multipurpose benefits
- Investment benefits
- Growth trend
- Other values
- Caretaker costs

Low-use Shallow Harbors

- < 1 million tons
- Supports some fisheries output
- Investment Benefits
- Public transportation (Channel Islands)
- Boater safety (hazardous inlet)
- Subsistence Harbors
- Harbors of Refuge

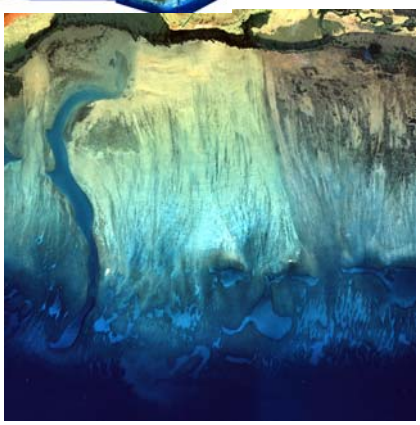
SEEKING SOLUTIONS

Airborne Coastal Mapping & Charting
Joint Airborne Lidar Bathymetry
Technical Center of Expertise

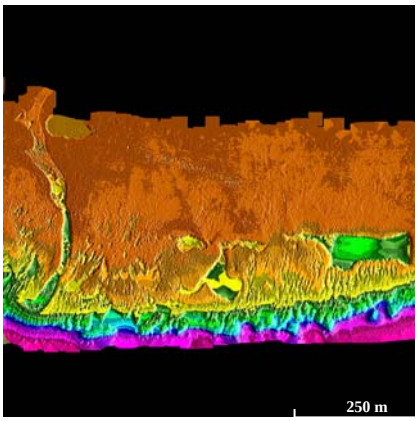

Corps of Engineers
Survey
APRIL 1998
BATHYMETRY
LONGBOAT KEY
NEW PASS
LIDO KEY
ELEVATION RELATIVE TO MLLW
3 M
2 M
1 M
0 M
-1 M
-2 M
-3 M
-4 M
-5 M
-6 M
-7 M
-8 M

Remote Sensing Applications to Coral Reefs

Aerial Photomosaic & Bathymetry



Natural Color



Color-Coded Bathymetry

USGS
science for a changing world

BOOKMARKS

- **ER on Dredging – http://www.usace.army.mil/publications/eng-regs/er1110-2-520/c-8.pdf**
- **Take a trip thru a dredge : http://www.wes.army.mil/el/dots/trip.html**
- **DOTS website: http://www.wes.army.mil/el/dots/**
- **Navigation Gateway : http://navigation.usace.army.mil/**
- **Regional Sediment Management : http://www.wes.army.mil/rsm/**
- **Navigation education : http://education.wes.army.mil/navigation/navigate.html**
- **Navigation Data Center: http://www.iwr.usace.army.mil/ndc/**
- **Navigation Information Connection: http://www.mvr.usace.army.mil/navdata/**

SILT HAPPENS