



# United States of America

Country Report  
*to the*

U.S.-Canada

## Regional Hydrographic Commission

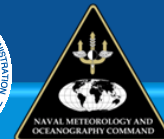
*National Oceanic and Atmospheric Administration*

*Naval Meteorology and Oceanography Command*

*National Geospatial-Intelligence Agency*

April 29, 2013

U.S. Hydrographic Services



# Outline

- US Interagency Responsibilities and Personnel Transitions
- Maritime Transportation System and E-nav
- Disaster Response 2012-2013
- Geospatial products and georeferencing priorities
- Validation
- International Priorities

Reference: General Organizational Information



# U.S. mapping and charting responsibilities



## U.S. Department of Commerce

- NOAA – Nautical Charts to U.S. EEZ 200 nautical mile limit, Hydrography/National Shoreline surveys, Legal Boundaries, Tides and Currents,



## U.S. Department of Defense

- Naval Meteorology and Oceanography Command – Surveying International Waters
- National Geospatial Intelligence Agency – Nautical Charts for International Waters
- Army Corps of Engineers – Maintenance of navigable channels & navigable inland waterways



## U.S. Department of Homeland Security

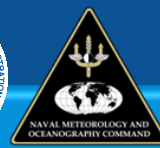
- Coast Guard – Maintenance of maritime Aids to Navigation, Local Notice to Mariners
- FEMA – Disaster Response and Floodplain Mapping



## U.S. Department of Interior

- U.S. Geological Survey – Interior to coastline base maps

U.S. Hydrographic Services



# US Personnel Transition 2013

- **NOAA**

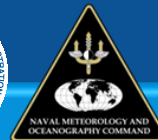
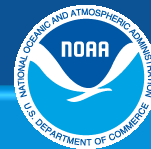
- Acting Under Secretary of Commerce for Oceans and Atmosphere and Acting NOAA Administrator
  - Dr. Kathy Sullivan replaced Dr. Jane Lubchenco
- NOAA Deputy Under Secretary for Oceans and Atmosphere for Operations
  - David Kennedy replaced Dr. Kathy Sullivan
- NOS Assistant Administrator
  - Dr. Holly Bamford replaced David Kennedy
- OCS Director and National Hydrographer
  - RDML Gerd F. Glang replaced CAPT John Lowell (August 2012)
- OCS Marine Chart Division Chief
  - CDR Shep Smith replaced CAPT Doug Baird (Feb 2013)

- **NGA**

- Chief Hydrographer
  - John Lowell replaced RADM Chris Andreasen (Feb 2013)

- **Navy**

- Oceanographer of the Navy
  - RDML Jonathan White replaced David RDML Titley
- Commander Naval and Meteorological Operations Command (CNMOC) and Hydrographer of the Navy
  - RDML Brian Brown replaced RDML Jonathan White



# The National Strategy for the Marine Transportation System

National Strategy for the Marine Transportation System:  
*A Framework for Action*

Letter of Promulgation ..... 1  
Preface ..... 3  
Executive Summary ..... 5

**SECTION ONE: THE MTS** ...  
Overview .....  
Components .....  
Functions .....


**SECTION TWO: MTS CHALLENGES** ...  
System Capacity .....  
Safety and Security .....  
Environmental Impacts .....  
Disruptions .....  
Finance and Economics .....

**SECTION THREE: MTS PRIORITIES** ...  
Capacity .....  
Safety and Security .....  
Environmental Stewardship .....  
Resiliency and Reliability .....  
Finance and Economics .....

**SECTION FOUR: GOING FORWARD** ...

**ANNEX I: THE CMTS** .....  
**ANNEX II: GLOSSARY** .....

**National Strategy  
for the  
Marine Transportation System:  
*A Framework for Action***



*By the  
Committee on the Marine Transportation System  
July 2008*

- Established by the Cabinet-level CMTS
- Goal - Use modern technology to support a safer, more efficient, more secure and environmentally sound Marine Transportation System
- 5 themes
  - Capacity
  - Safety and Security
  - Environmental Stewardship
  - Resiliency and Reliability
  - Finance and Economics
- Establishes IAT's to make and execute plans.
- eNav IAT established Feb. 2011
- 11 participating agencies

<http://www.cmts.gov/>



# U.S. e-Navigation Strategic Action Plan

## VISION

“To establish a framework that enables the transfer of data between and among ships and shore facilities, and that integrates and transforms that data into decision and action information.”

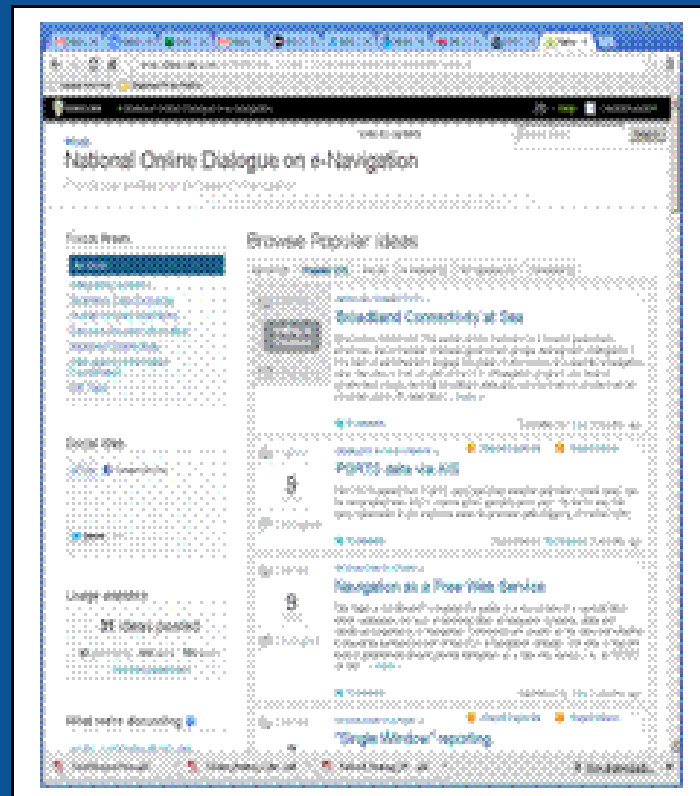
[http://www.cmts.gov/downloads/CMTS\\_e-Navigation\\_Strategic\\_Action\\_Plan\\_Feb\\_2012.pdf](http://www.cmts.gov/downloads/CMTS_e-Navigation_Strategic_Action_Plan_Feb_2012.pdf)



# e-Navigation Online Dialog

## Top 5 Ideas

- Broadband Connectivity at Sea
  - Navigation as a Free Web Service
  - Single Window Reporting
  - PORTS Data via AIS
  - Use an Open Source Reference System
- Architecture for e-Navigation



<http://enav.ideascale.com>

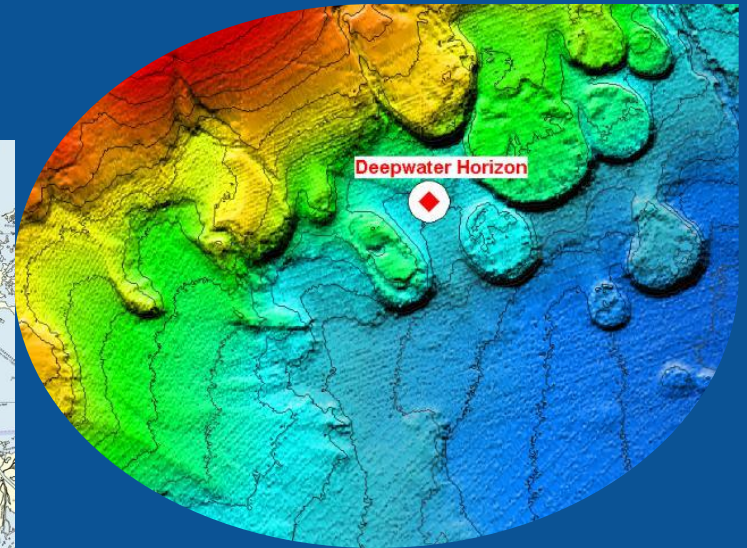
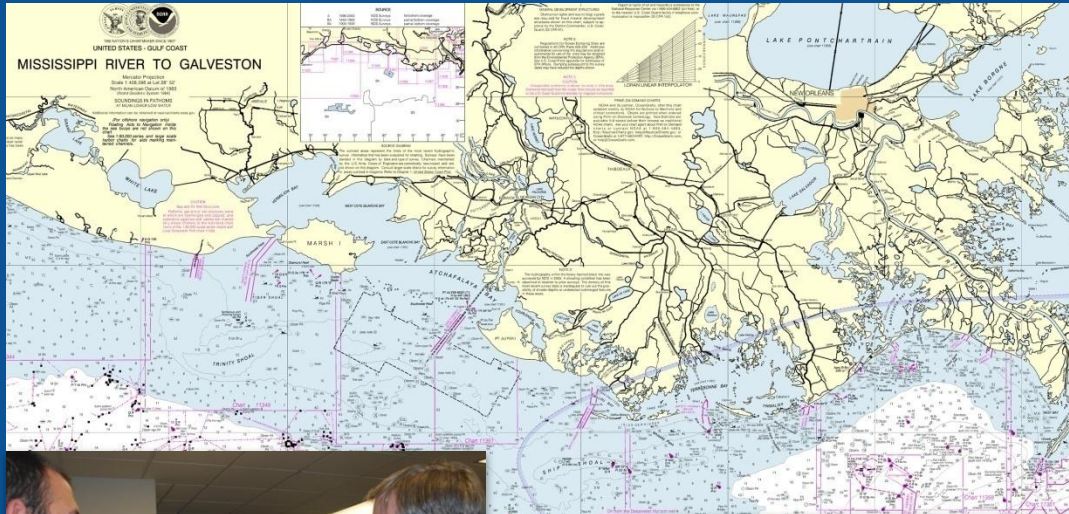
# Next Steps

- New Work Plan by the IAT
- IAT will recommend several projects, including those from the On-Line Dialog, and assign them to agencies, and ask the CMTS to direct action
- The Strategic Action Plan 'focus areas' will be revisited for potential projects
- Collection of solutions will continue.
- Upon finalization of the IMO eNav work, the IAT will likely recommend additional projects indicated by the IMO plan.





# NOAA navigation products are used in response to oil spills



U.S. Hydrographic Services





Environmental Response  
Management Application  
(ERMA)



*Web-based GIS system supporting environmental  
response efforts and operations*

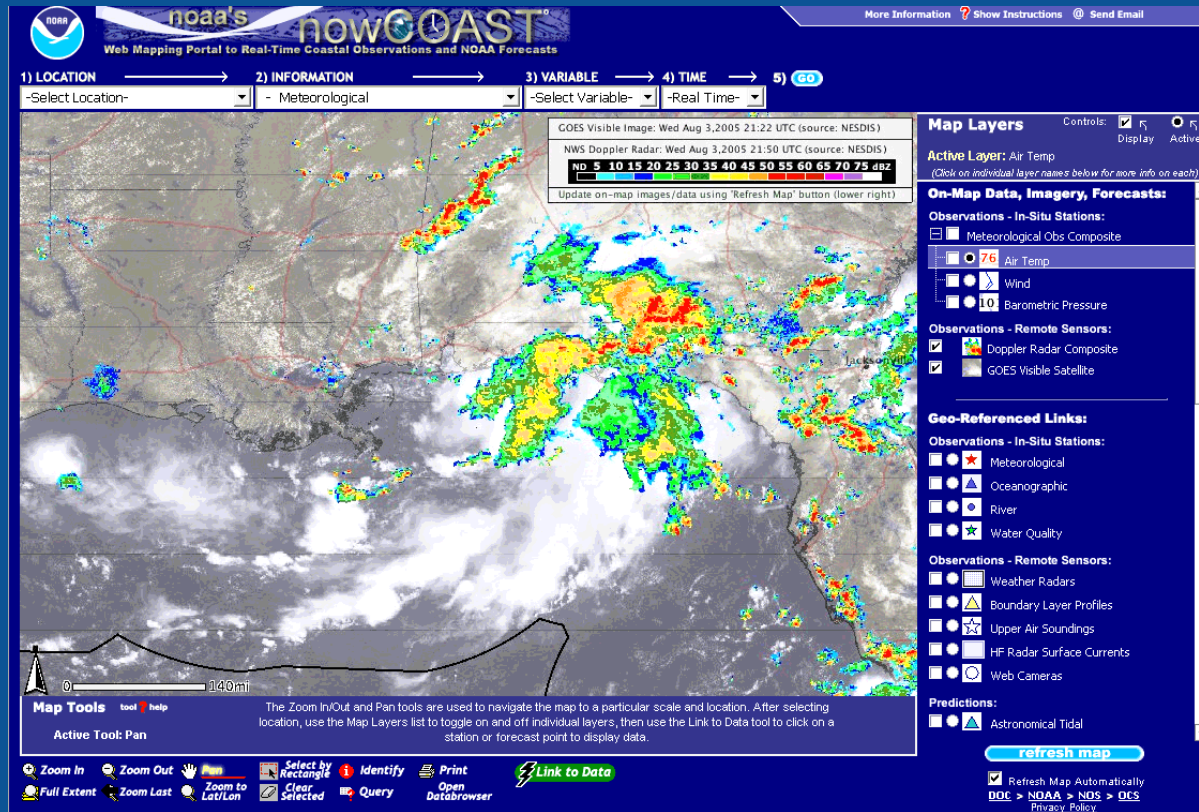
- Developed by NOAA as pilot project in 2008
- Expanded for use in Haiti after earthquake
- Full operations for Gulf Oil Spill



# Newly acquired imagery printed with shoreline impacts

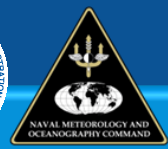


## NOAA Map-Based Web Portal to Real-Time Coastal Observations & NOAA Forecasts



Meteorological, Oceanographic, & River observations from national and regional networks as well as NOAA (NOS & NWS) forecasts for U.S. coastal areas.

<http://nowcoast.noaa.gov/>





1) LOCATION

2) INFORMATION

3) VARIABLE

4) TIME

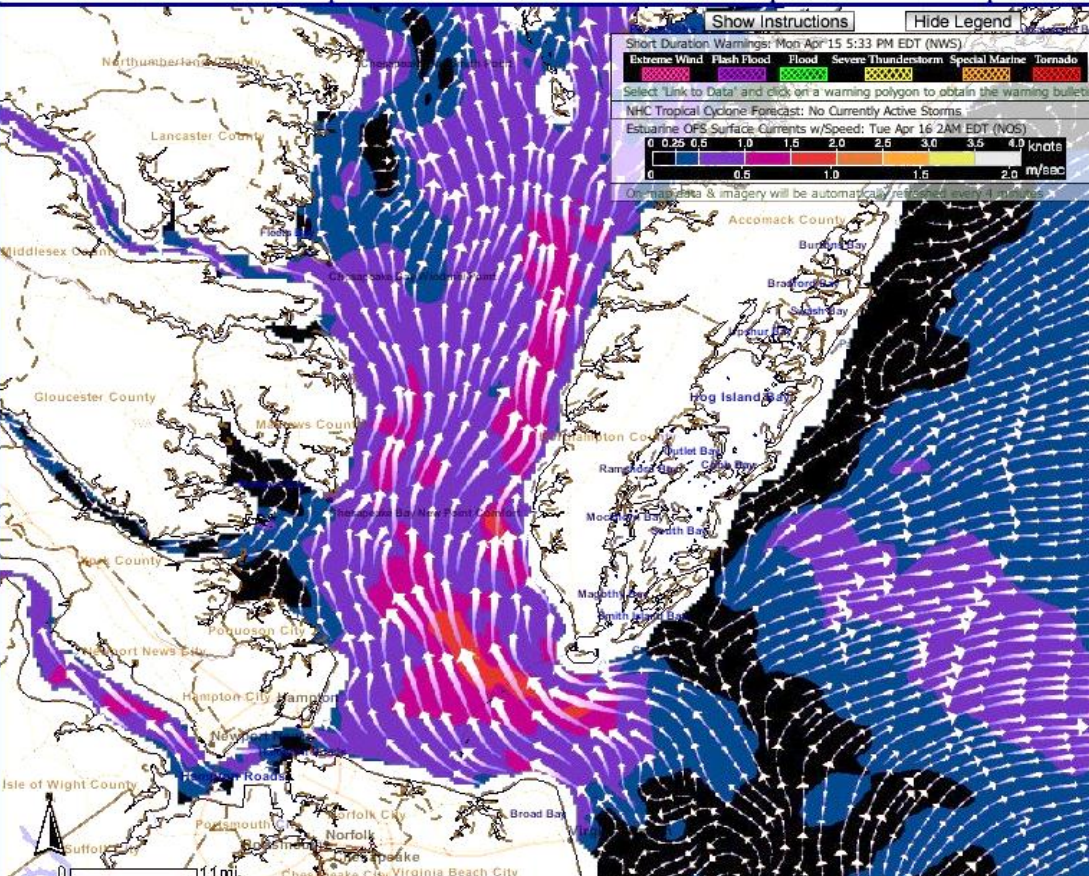
5) GO

Atlantic Tropical Region

Sfc. Water Currents - Estuaries (NOS OFS)

w/Flow Speed

Tue Apr 16 2AM EDT



Show Instructions Hide Legend

Short Duration Warnings: Mon Apr 15 5:33 PM EDT (NWS) / ...  
Extreme Wind Flash Flood Flood Severe Thunderstorm Spetal Marine Tornado

Select "Link to Data" and click on a warning polygon to obtain the warning bullet.

NHC Tropical Cyclone Forecast: No Currently Active Storms

Estuarine OFS Surface Currents w/Speed: Tue Apr 16 2AM EDT (NOS)

0 0.25 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 knots  
0 0.5 1.0 1.5 2.0 m/sec

Overmapdata & imagery will be automatically refreshed every 10 minutes.

### Map Layers

Controls:      
Display Acti

Active Layer: Short Duration Warnings

(Click on individual layer names below for more info on each)

Cloud Imagery (GOES Infrared)

### Analyses:

Meteorological

- Surface Air Temperature
- Surface Wind Speed
- Surface Wind Velocity (Barb)
- Surface Wind Velocity (Vector)
- Precipitation Amount

Oceanographic

- Sea Surface Temperature

### Model Nowcast/Forecast Guidance:

Oceanographic

Surface Water Currents

w/ Speed

Ocean Basins (NCOM)

Cycle Time: Sun Apr 14 8PM EDT

[+0-hr] Sun Apr 14 8PM EDT

[+12-hr] Mon Apr 15 8AM EDT

[+24-hr] Mon Apr 15 8PM EDT

[+36-hr] Tue Apr 16 8AM EDT

[+48-hr] Tue Apr 16 8PM EDT

Estuaries (NOS)

Cycle Times: Mon Apr 15 2PM EDT

[+0-hr] Mon Apr 15 2PM EDT

[+6-hr] Mon Apr 15 8PM EDT

[+12-hr] Tue Apr 16 2AM EDT

[+18-hr] Tue Apr 16 8AM EDT

[+24-hr] Tue Apr 16 2PM EDT

[+30-hr] Tue Apr 16 8PM EDT

[+36-hr] Wed Apr 17 2AM EDT

[+42-hr] Wed Apr 17 8AM EDT

[+48-hr] Wed Apr 17 2PM EDT

[+54-hr] Wed Apr 17 8PM EDT

[+60-hr] Thu Apr 18 2AM EDT

[+66-hr] Thu Apr 18 8AM EDT

[+72-hr] Thu Apr 18 2PM EDT

[+78-hr] Thu Apr 18 8PM EDT

[+84-hr] Fri Apr 19 2AM EDT

[+90-hr] Fri Apr 19 8AM EDT

[+96-hr] Fri Apr 19 2PM EDT

[+102-hr] Fri Apr 19 8PM EDT

[+108-hr] Sat Apr 20 2AM EDT

[+114-hr] Sat Apr 20 8AM EDT

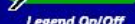
[+120-hr] Sat Apr 20 2PM EDT

### Map Tools

tool help

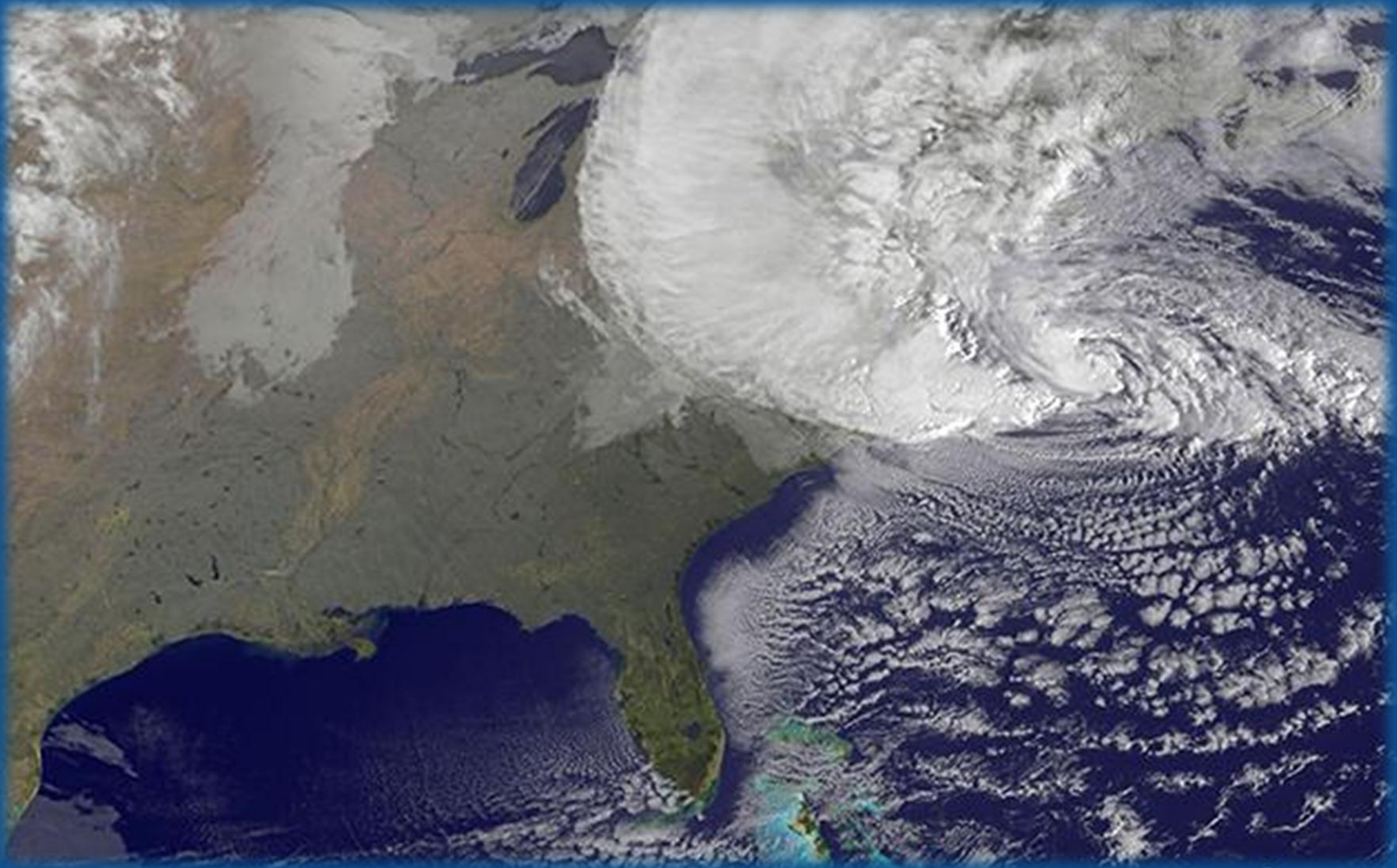
Active Tool: Pan

The Zoom In/Out and Pan tools are used to navigate the map to a particular scale and location. After selecting location, use the Map Layers list to toggle on and off individual layers, then use the Link to Data tool to click on a station or forecast point to display data.



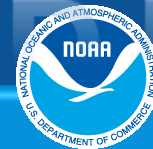
Redraw Map Automatically





# HURRICANE SANDY

U.S. Hydrographic Services



*Port of New York - New Jersey*

- *NOAA starts surveying Oct 31*
- *Port resumes modified ops within 5 days*

*Cape May, New Jersey - Lewes, Delaware*

- *NOAA starts surveying Oct 31*
- *After comparison with earlier data, shoaling reported on Nov 4*

*Hampton Roads - Norfolk, VA*

- *NOAA starts surveying Oct 29*
- *Port resumes normal operations at 4 pm the next day (Oct 30)*



# ESRI Tools at NGDC Under Development

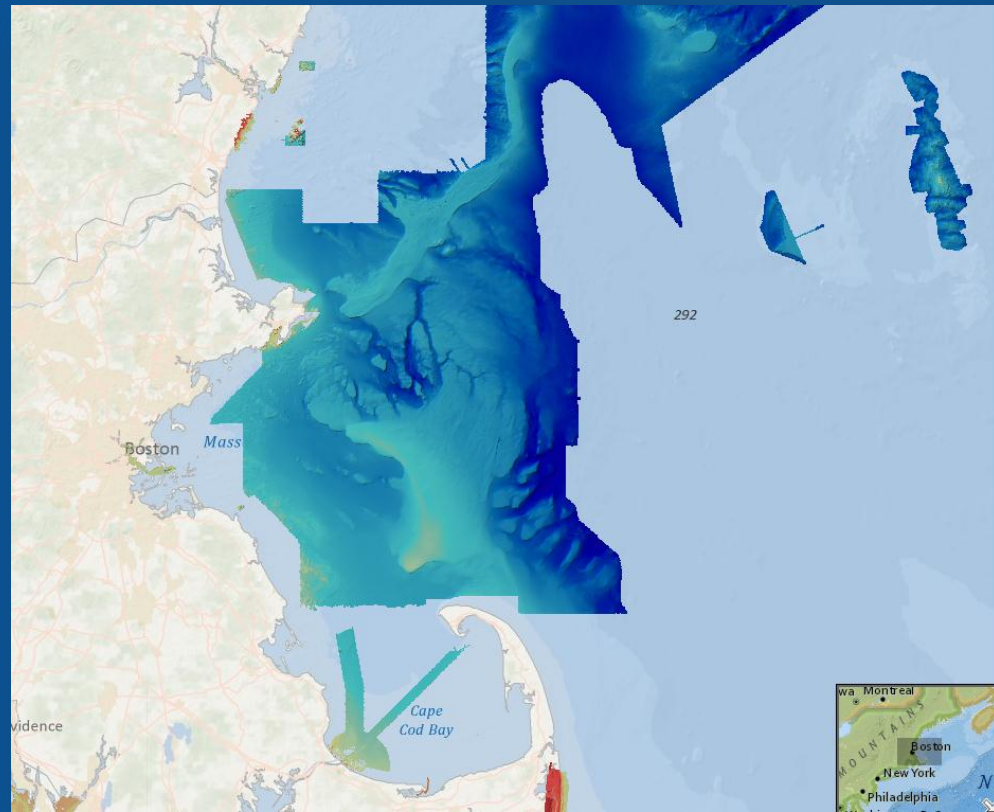
<http://maps.ngdc.noaa.gov/viewers/bathymetry/>

## *Present:*

- Access to multibeam BAGS
- Access to point sounding data

## *Under Development:*

- ESRI ArcGIS with Image Server
- Grid Resolution on the Fly
- Selection of “most recent” soundings





# ENC Direct to GIS

NOAA *ENC Direct to GIS* Select a Port or Marine Sanctuary to Zoom to:

Map Services [More Info](#) [Send Email](#)

**ENC GIS DATA**

- Approach/Harbor ENC GIS Data
  - Aids to Navigation
  - Caution
  - Cultural Features
  - Depth
  - Harbor Installations
  - Infrastructure
  - Metadata
  - Natural Features
  - Regulated Area
  - Time Varying Objects
- Coastal ENC GIS Data
- General ENC GIS Data
- Overview ENC GIS Data
- Base Map

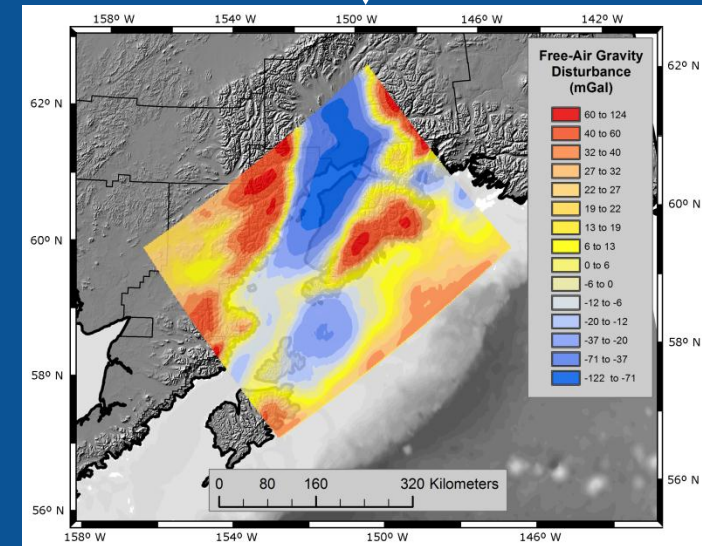
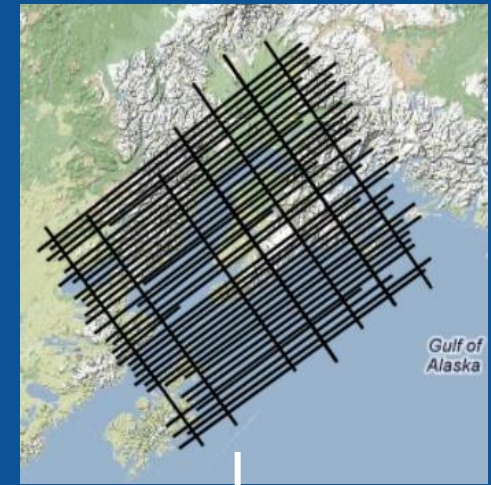
Auto Refresh

**Download all or specified layers in .shp files and other user selectable formats**

THIS PRODUCT IS NOT FOR NAVIGATIONAL USE.

# GRAV-D Gavity for the Redefinition of the American Vertical Datum

- Purpose: To redefine the official civilian vertical datum as the geoid through the use of GNSS technology and a gravimetric geoid model
- GRAV-D Data Processing
  - Positioning is critical
  - Software has evolved since 2007
- Evaluation: Crossovers & EGM08
- Data Release to Public
- Ongoing R&D

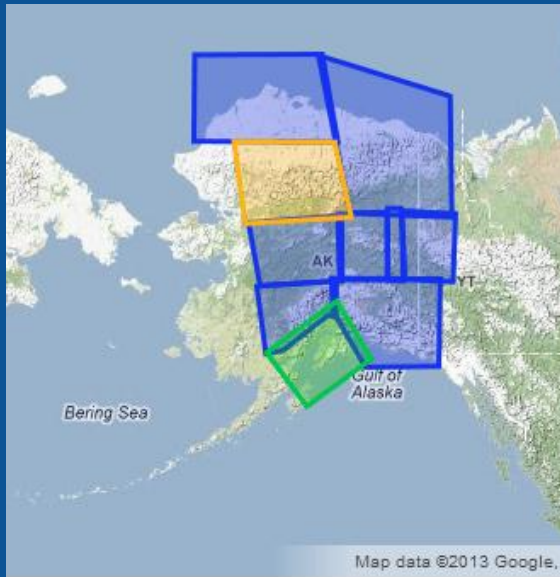


# Gravity for the Redefinition of the American Vertical Datum (GRAV-D)

- **In 2010, began operational collection of airborne gravity data to calculate a geoid model and ultimately a new vertical reference system for accurate height measurements up to 2 cm in the U.S. and territories**
  - Provides highly accurate height measurements that determine where water flows
  - Connects satellite and terrestrial gravity measurements for efficient and accurate gravity monitoring
- **Benefits:** \$522 million in additional annual benefits from completion of a modernization of the vertical component of the NSRS through gravity collection from GRAV-D program
- **Priorities:** Working in Alaska/Arctic as a priority through 2013, then will move to the Great Lakes and coastal areas



# GRAV-D Status (January 2013)



## Map Legend

**Green:** Available data and metadata

**Blue:** Data being processed

**Orange:** Data collection underway

**White:** Planned for data collection

# VDatum

- All elevation data are referenced to a vertical datum
- BUT there are many different vertical datums in use around the nation
- For elevation data sets to be blended together they must be referenced to the same vertical datum:

**VDATUM provides a solution!!**



*WGS 84,  
NAD 83 (NSRS)  
+17 others*

## Ellipsoidal Datums



*(MSL)*



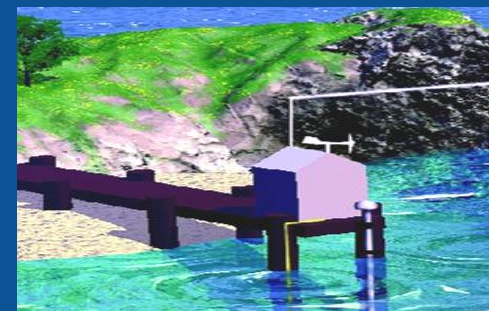
*NAVD 88,  
NGVD 29*

## Orthometric Datums



*MHHW, MHW,  
MTL, DTL, LMSL,  
MLW, MLLW*

## Tidal Datums



# Validation - GPS Water Level Buoy

- Establish baseline for separation model between tidal datum and ellipsoid
- Tool for VDatum validation
- Ability to place “tide gauge” away from shore in areas of interest

*Four 30-day deployments in different environments adjacent to shore water level gauge*



AXYS Hydrolevel Water Elevation Monitoring Buoy

# Validation - Bathymetric Mapping AUV

- Can position and depth data meet NOAA standards?
- Can this AUV be operated safely from NOAA ships?
- What are the efficiency gains?



*Size: 32.4 cm x 3.25 m  
(~1 x 10 1/2 feet)  
Weight: 270 kg (~600 lbs)*

Hydroid REMUS-600 with  
Kongsberg EM3002 Sonar and  
Advanced Navigation System

# Successful Transition to Operations: OCS Emergency Response Side Scan Sonar AUV

- Pool of qualified operators, biannual training requirement
- Hand deployable; easy to ship and transport
- Other applications (Habitat mapping, debris identification for removal)



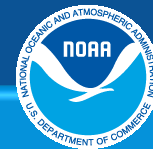
Hydroid REMUS-100 with Marine  
Sonic Side Scan Sonar &  
VCT Harborscan with Klein UUV  
3500 Side Scan Sonar

VCT Size: 19 cm x 2.4 m  
(7.5 in x 8 feet)  
Weight: 55 kg (~120 lbs)



# U.S. International Priorities

- International Partnerships and Capacity Building
- Increased data access and sharing among nations and organizations (LiDAR, Vdatum, Ship Surveys)
- Advancing Digital Standards - S101, S100
- Emergency Prevention, Preparedness, and Response Capacity
- Transboundary charts – lessons learned, best practices
- Marine Spatial Planning Infrastructure support
- Elimination of ENC Gaps and Overlaps in accordance with the WEND Principles



# Saudi Arabia – Working to set up new Hydrographic Offices



U.S. Hydrographic Services



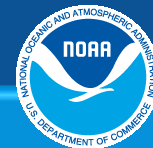
# Key IHO Meetings Calendar

- S100/S101 Roadmap (March 25-29)
- USCHC-36 (April 29)
- WEND WG-3 (May 13; Monaco)
- SCWG (May 29; Silver Spring, MD)
- IRCC-4 (June; Australia; RDML Glang)
- SNPWG (June; Silver Spring, MD)
- TSMAD/DIPWG (June, Silver Spring, MD)
- ARHC-4 (October 28)

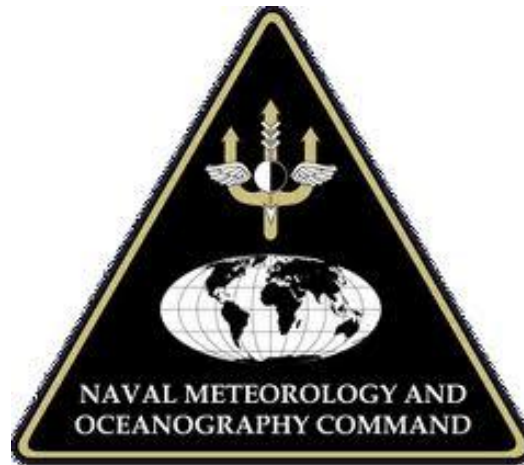


# General Background Information

- U.S. survey priorities (2012)
- Statistics and figures
  - MTS, ENC's productions, ENC overlaps
- OCS Organizational Challenges
- US Canada DNC Cooperation status (as of 2013) and NGA hard copy chart distribution
- Websites



# Thank you

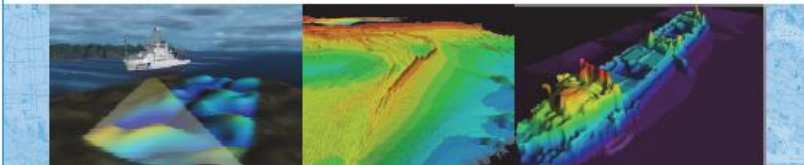


Office of  
Coast Survey



## NOAA HYDROGRAPHIC SURVEY PRIORITIES

*2012 Edition*

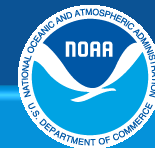


Available online at <http://www.nauticalcharts.noaa.gov/hsd/NHSP.htm>

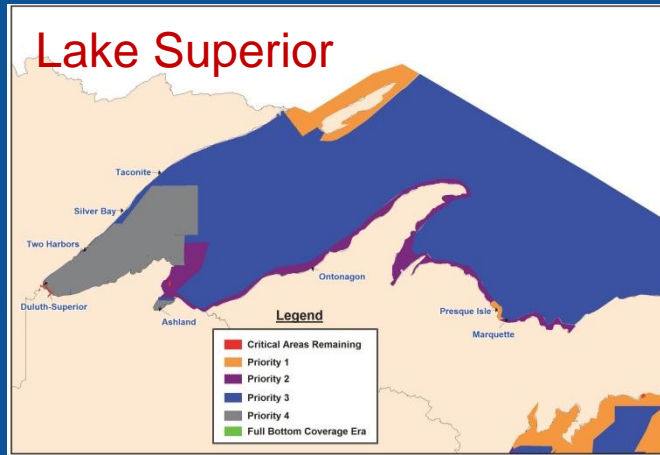
# NOAA Hydrographic Survey Priorities

Available online at  
<http://www.nauticalcharts.noaa.gov/hsd/NHSP.htm>

U.S. Hydrographic Services

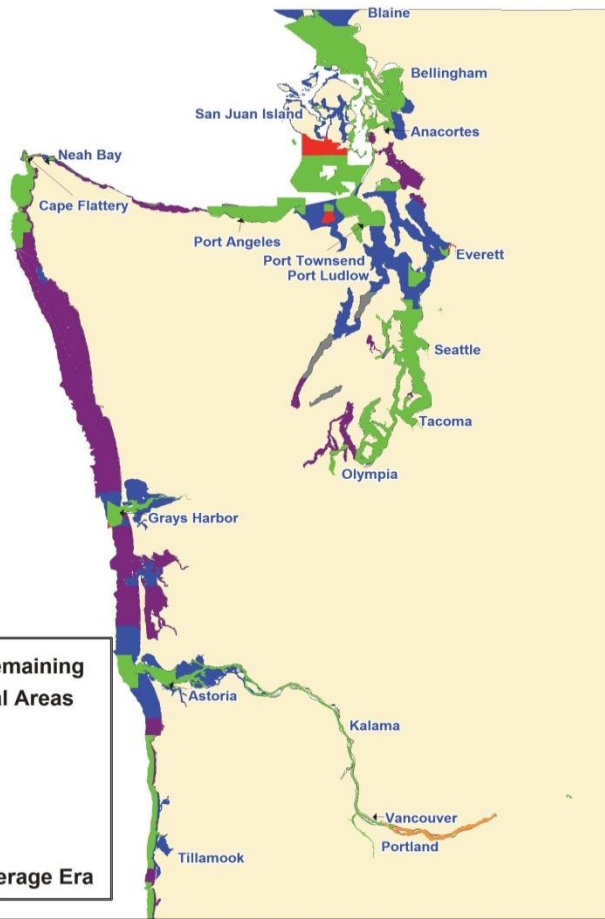


# U.S. 2013 Survey Priorities in the Great Lakes



# US Survey Priorities 2013: West and East Coast

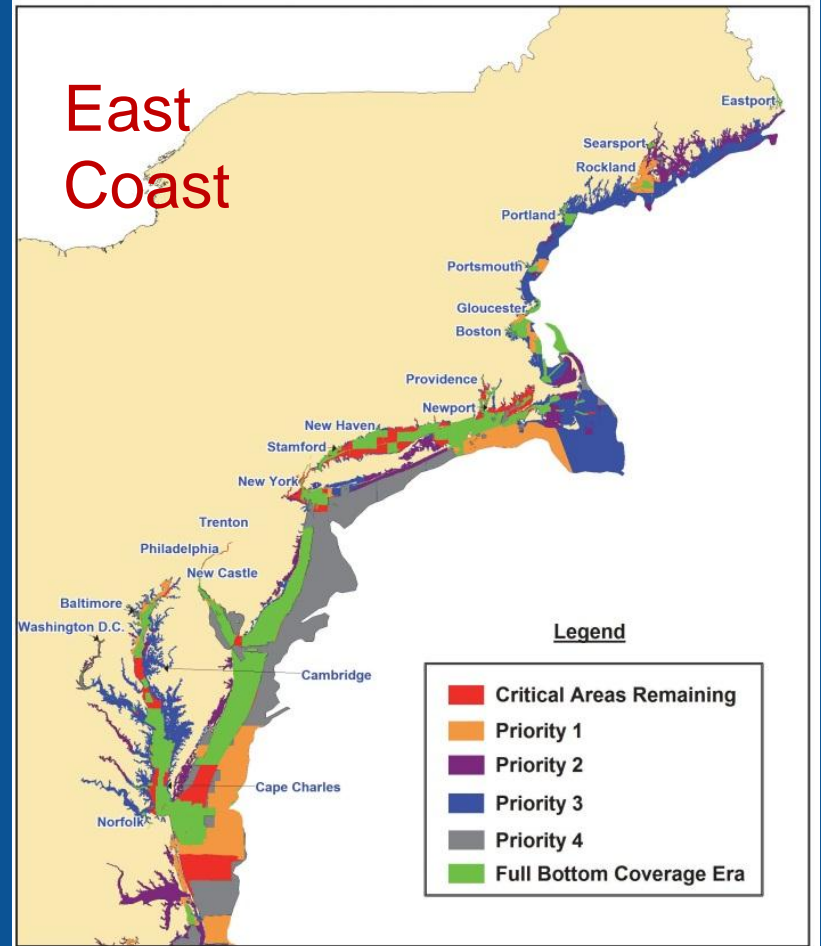
## West Coast



**Legend**

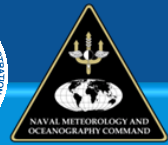
- Critical Areas Remaining
- Emerging Critical Areas
- Priority 1
- Priority 2
- Priority 3
- Priority 4
- Full Bottom Coverage Era

## East Coast



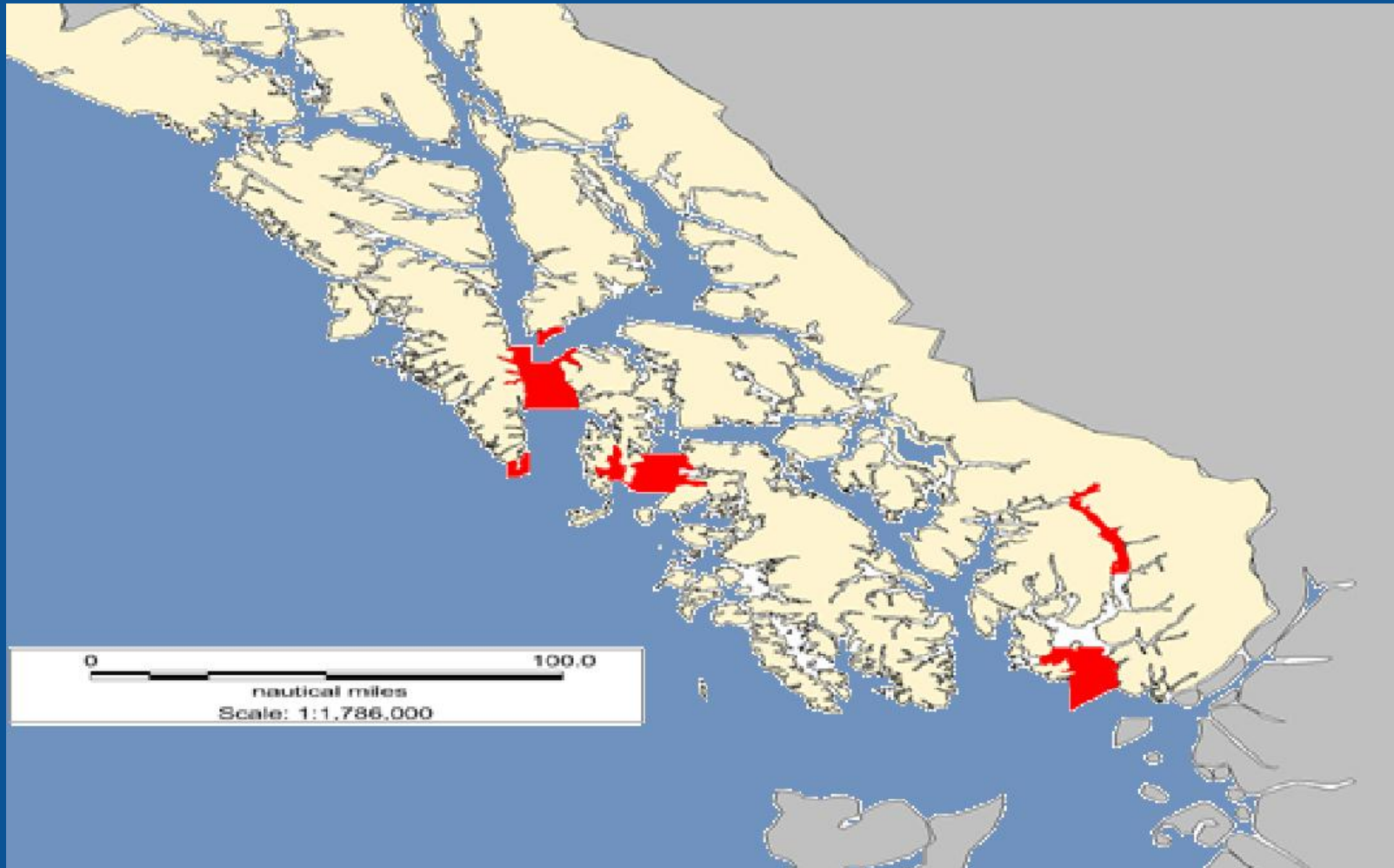
**Legend**

- Critical Areas Remaining
- Priority 1
- Priority 2
- Priority 3
- Priority 4
- Full Bottom Coverage Era





# US Survey Priorities 2013: Alaskan Panhandle



U.S. Hydrographic Services



# U.S. Marine Transportation System

- 99% volume of U.S. overseas trade is by ship\*
- 25,000 miles of navigable channels\*
- 3700+ marine terminals\*
- 326 public/private ports\*
- 238 locks in 192 locations\*
- 13+ million jobs\*
- \$649 billion annually to the U.S. GDP\*
- \$212 billion in annual port sector federal/state/local taxes\*
- 12 million cruise passengers
- 78 million recreational boaters
- 110,000 fishing vessels



US Dept of Transportation, Maritime Administration  
[http://www.marad.dot.gov/ports\\_landing\\_page/marine\\_transportation\\_system/vitsa.htm](http://www.marad.dot.gov/ports_landing_page/marine_transportation_system/vitsa.htm)

**U.S. Hydrographic Services**



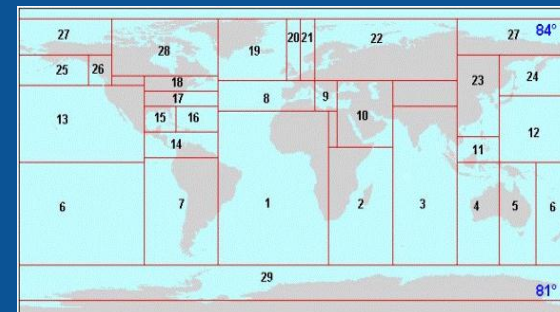
# Challenges

- The total value of marine freight is estimated to increase by 43 percent domestically and 67 percent internationally between 2010 and 2020.\*
  - Ferry passenger transport is experiencing rapid growth in response to land-transport congestion.\*
  - Commercial fishing and military use of the MTS also is expected to grow.\*
  - The increasing demands on our MTS also must be safely handled and balanced with environmental values, in order to ensure that freight and people move efficiently to, from, and on our waterfronts.
- \* As per US Dept. of Transportation, Bureau of Transportation Statistics



# NGA Digital Nautical Charts

Canada co-produces DNC for NGA



NGA global DNC coverage: <http://dnc.nga.mil/NGAPortal/DNC.portal>

DNC	Libraries	Harbor	Approach	Coastal	General	
18	260	185	69	4	2	
	15	9	4	1	1	US
	245	176	65	3	1	CAN
26	104	64	31	6	3	
	47	29	14	2	2	US
	57	35	17	4	1	CAN
27	26	8	9	6	3	
	15	2	6	5	2	US
	11	6	3	1	1	CAN
28	45	14	10	15	6	
	9	3	3	2	1	US
	36	11	7	13	5	CAN

Total Libraries = 435: **US = 86** **Canada = 349**

U.S. Hydrographic Services



# Changes in NGA Hardcopy Charts

- NGA has adopted 232 Canadian charts for chart coverage in the USCHC region
  - Printed and distributed to only US Gov't users
- NGA has withdrawn thousands of charts for public sale over the past few months
  - Only 20 charts are now available for entire North America Region
  - Available through <http://www.oceangrafix.com>



# Data sharing

...all of NOAA's offices shall provide open access to ocean and coastal datasets for the purposes of transparency and collaboration...

ALL BATHYMETRIC DATA MADE AVAILABLE WITHIN A FEW MONTHS OF COLLECTION

Center for Coastal & Ocean Mapping  
Joint Hydrographic Center  
A Center for Expertise in Ocean Mapping and Hydrographic Science

Home Research Law of the Sea Arctic

Law of the Sea Mapping Program

Arctic Ocean

Click on images to the left or on a box on the image below

2000-01-01  
2007-01-01  
2008-01-01  
2009-01-01

Related Images

Related Reports

Related Data

Rolling Deck Repository

Bathymetry & Global Relief

Natural Hazards

Marine Geology & Geophysics

NOAA is directed to present all datasets in useful and meaningful ways to all users.

<http://www.ngdc.noaa.gov>



# ENC Status and Distribution

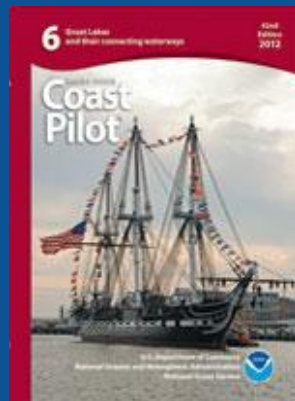
- Current status
  - The United States has completed its ENC coverage to meet IMO obligations including the top 175 US ports by tonnage and associated approaches plus the transit ENC's between these ports
  - 744 US ENCs in the USCHC Region
  - 928 US ENCs
- Certified ENC distributors
  - PRIMAR, UKHO, Maris, Jeppessen, Chart World
- [www.nauticalcharts.noaa.gov/mcd/index.htm](http://www.nauticalcharts.noaa.gov/mcd/index.htm)



# New Coast Pilot Production System



East Coast (north)  
42 edition 2012



Great Lakes  
43 edition 2013



Alaska (panhandle)  
34 edition 2012



Alaska  
30 edition 2012

- HTML generated from the XML
  - HTML is created on the fly
  - Display is optimized for web viewing
- Web-based search capability
- Search By Geographic Location (coming soon)
- New smart phone and tablet apps from 3<sup>rd</sup> party providers
- POD books from 3<sup>rd</sup> party providers

<http://www.nauticalcharts.noaa.gov/nsd/cpdownload.htm>

<http://www.nauticalcharts.noaa.gov/nsd/cpsearch.php>

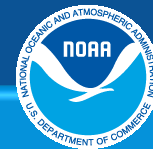
U.S. Hydrographic Services





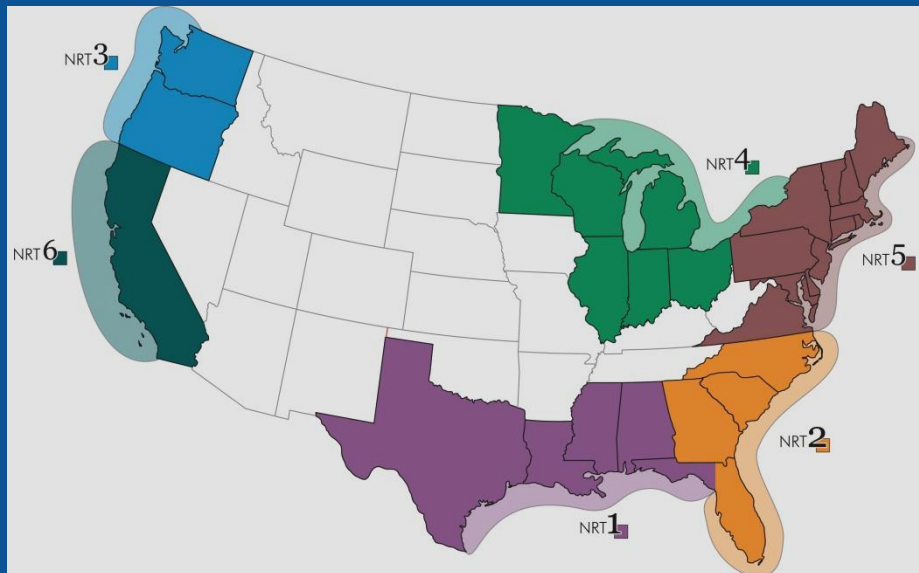
# Elimination of transboundary ENC Overlaps (80+)

- Canada, New Zealand, Mexico, Japan, Republic of Korea
- Remaining: Canada, Russian Federation, Cuba



# Coast Survey is set up for rapid maritime response

Navigation managers coordinate activities and assets with Coast Guard, port officials, and other agencies



Navigation response teams and NOAA survey ships, if available, conduct surveys

# Web Sites

<http://chartmaker.noaa.gov/>

[www.nga.mil/maritime](http://www.nga.mil/maritime)

<http://www.usno.navy.mil/>

