

ARMY GEOSPATIAL CENTER

ENABLING GEOSPATIAL INFORMATION DOMINANCE



USACE S-100 Development Precision Marine Navigation Workshop

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US Army Corps of Engineers
BUILDING STRONG.®



Inland Electronic Navigational Charts (IENC)

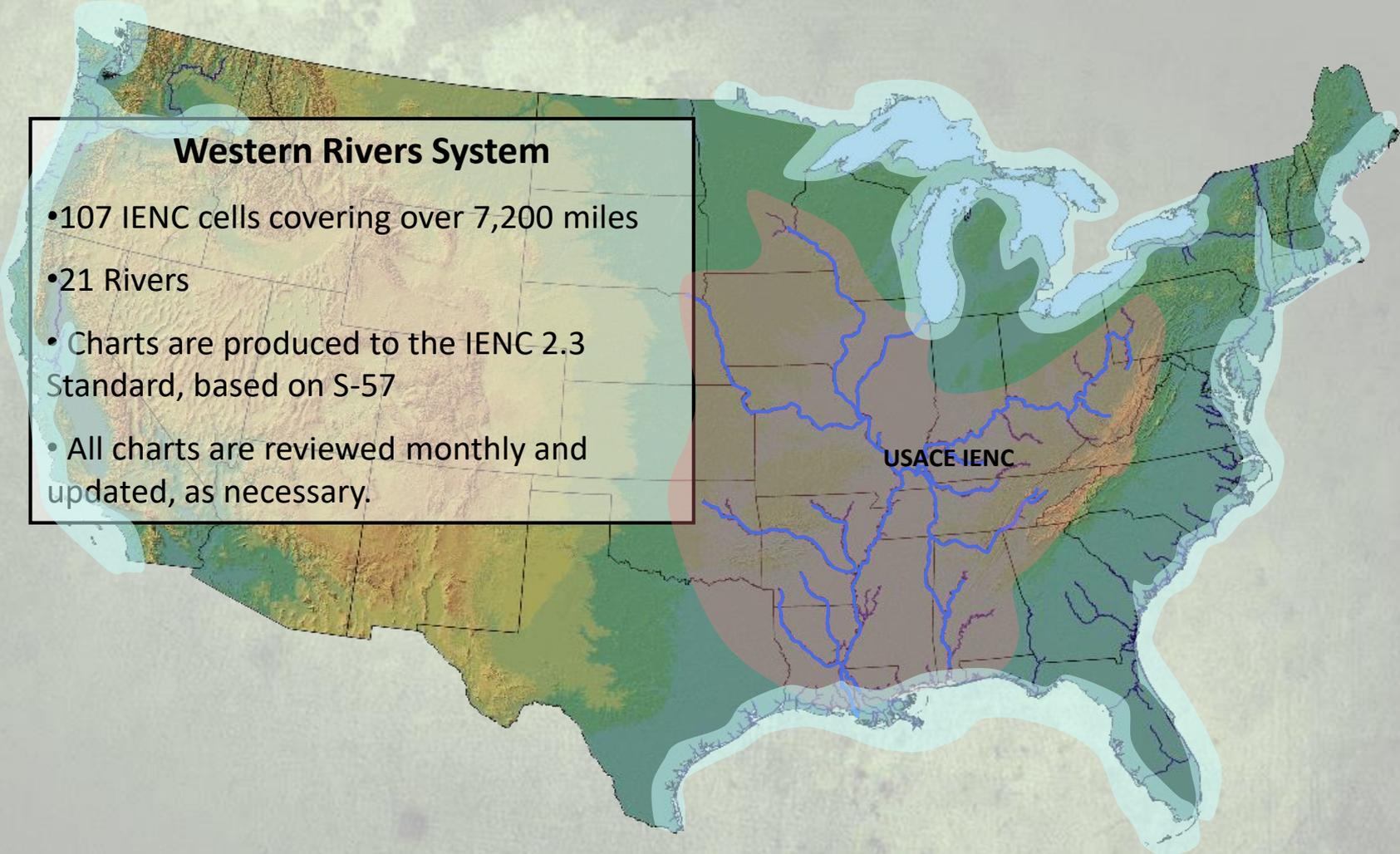


IENC Coverage in the USA

Western Rivers System

- 107 IENC cells covering over 7,200 miles
- 21 Rivers
- Charts are produced to the IENC 2.3 Standard, based on S-57
- All charts are reviewed monthly and updated, as necessary.

USACE IENC



Why an “Inland” Standard?

Examples of unique features found in waterways which are not found in maritime waters

- Casino / Gaming Boats

- Fleeting Areas

- Ice Breakers

- Lock Guide Walls

- Exceptional Navigation Structures (Lift bridges/viaducts)





International IENC Standards and Development

The Inland ENC Harmonization Group (IEHG)

Objective: to develop and to maintain a harmonized standard for Inland Electronic Navigational Charts (IENCs) suitable for inland navigation that is based on the standards of IHO for 'maritime' ENC

Guiding principle: to agree upon specifications for Inland ENCs that are suitable for all known inland ENC data requirements for safe and efficient navigation on inland waterways.





The Inland ENC Harmonization Group

- International Working Group
- Recognized in 2009 by IHO as a Non Governmental International Organization (NGIO) with observer status
- Current standard based on S-57
- Future standard will be S-100 compliant
 - S-401:
 - Edition 1.0 published on 2019-10-31
 - Compliant with Version 4.0.0 of the S-100 Data Model
 - Modeled after S-101, with unique, inland features / characteristics taken into consideration
 - S-402: Bathymetric Inland ENC (under development)



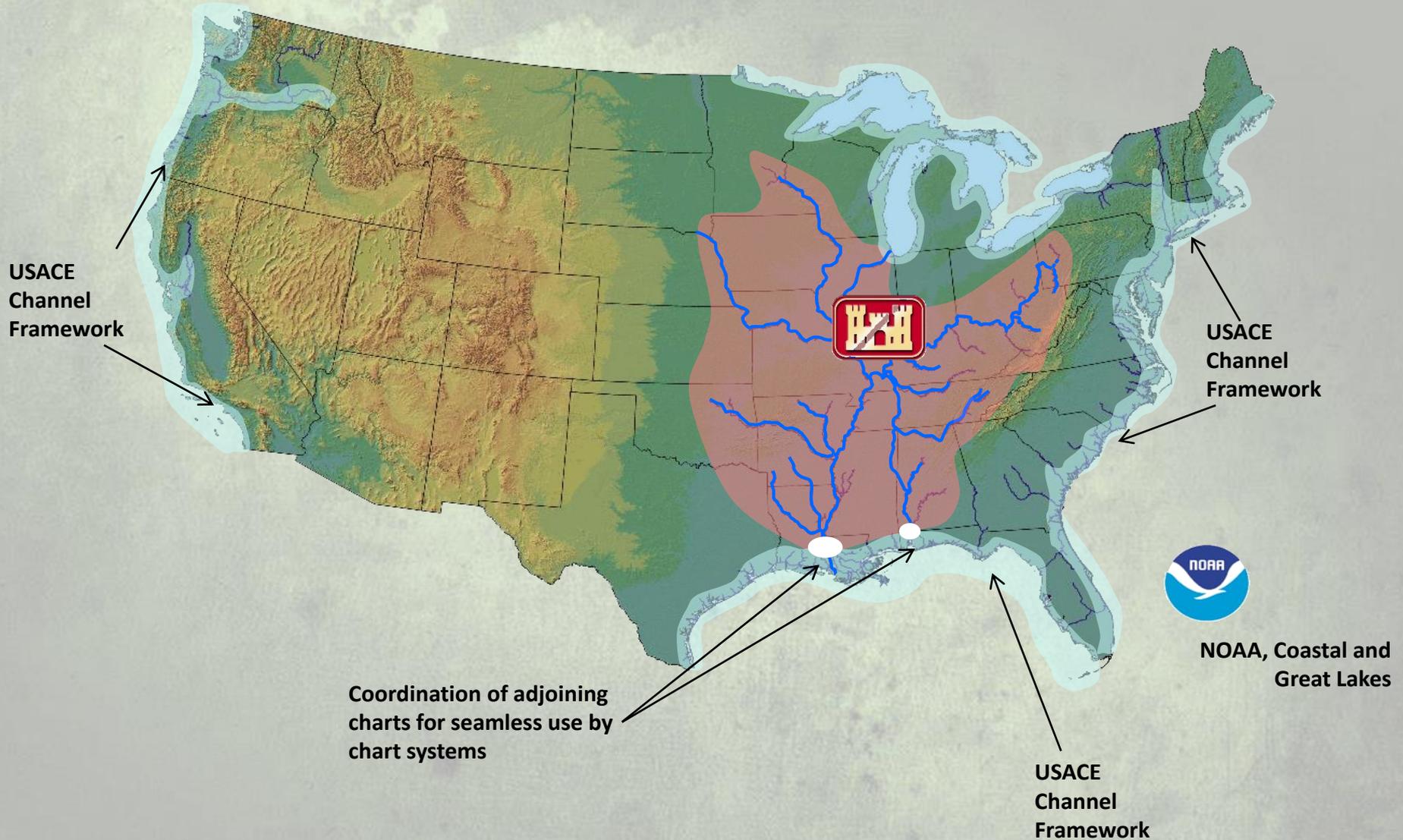


USACE Partnering with NOAA





Partnering: NOAA Coordination and Data Sharing





eHydro Enterprise Website



USACE Hydrographic Surveys powered by eHydro

USACE District:
All

USACE Channel:
All

Channel ID:
All

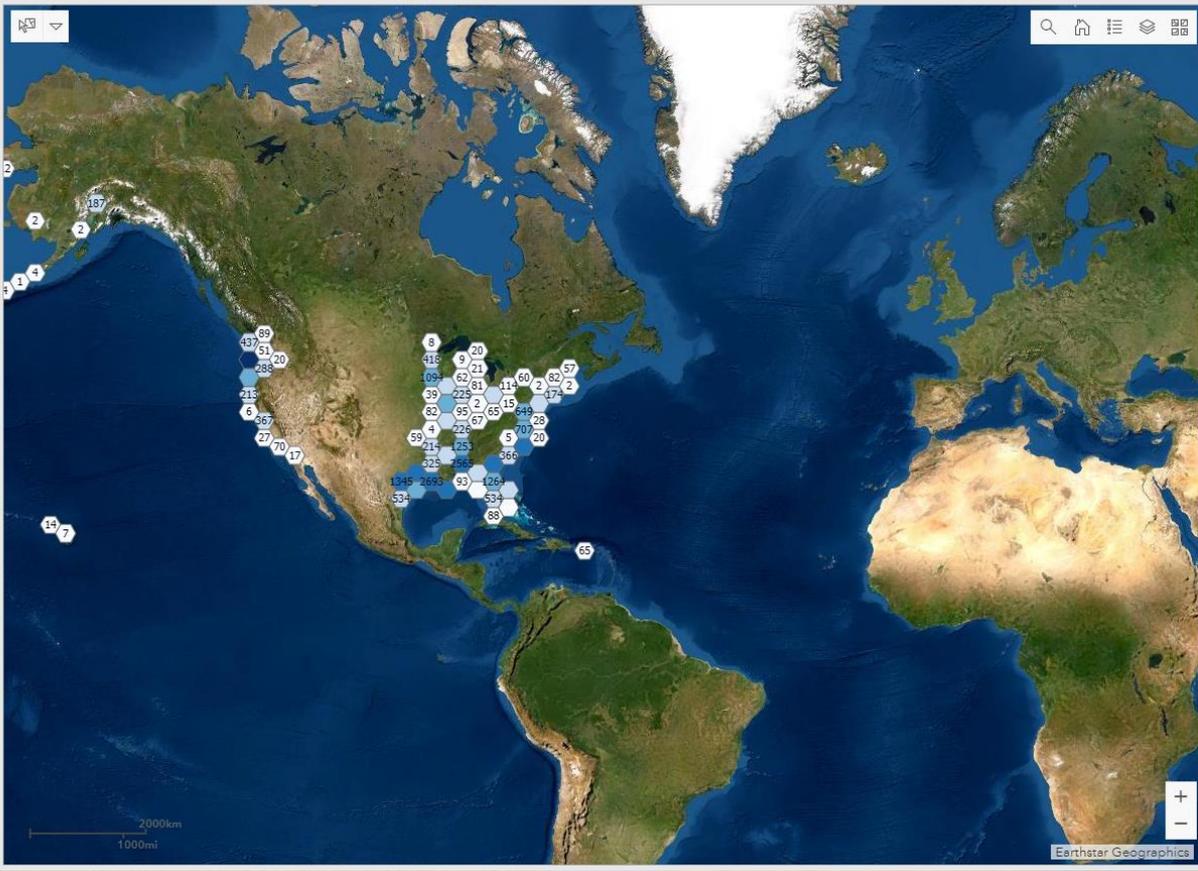
Survey Date Range:
All Surveys | Last 60 days | 2019 | 2018
Custom Date Range

- Select Survey:
List is limited to 50 records. To see older surveys, configure a custom date range or zoom in on the map to limit results.
- District: CEMVN
Name: LOWER SHEET 20
Survey ID: CR_20_LWR_20200926_PR
Survey Date: 9/26/2020
[Download Data](#)
 - District: CEMVN
Name: LOWER SHEET 21
Survey ID: CR_21_LWR_20200926_PR
Survey Date: 9/26/2020
[Download Data](#)
 - District: CEMVN
Name: SOUTHWEST PASS - SHEET 4
Survey ID: SW_04_SWP_20200925_CS
Survey Date: 9/25/2020
[Download Data](#)
 - District: CEMVN
Name: SOUTHWEST PASS - SHEET 5
Survey ID: SW_05_SWP_20200925_CS
Survey Date: 9/25/2020
[Download Data](#)
 - District: CESWG
Name: CHANNEL_TO_PALACIOS
Survey ID: PS_03_GLF_20200925_CS
Survey Date: 9/25/2020
[Download Data](#)
- Survey List | Recently Updated



Use the dropdown menus or simply pan and zoom on the map to filter the Hydrographic Survey data.

Use any combination to drill down to the data you are interested in. To remove the filter, set the filter to "All".



<https://navigation.usace.army.mil/Survey/Hydro>



CATZOC Assessment

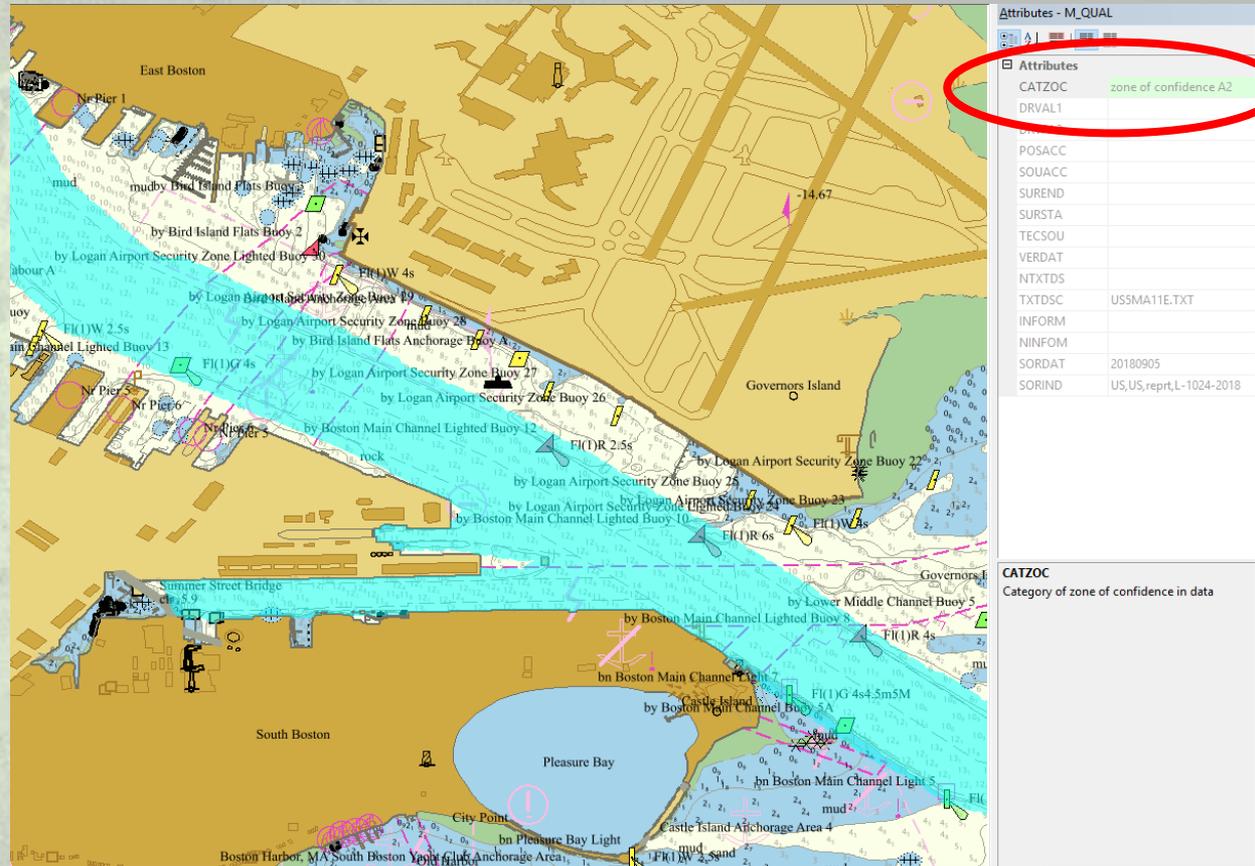


Evaluates:

- Survey seafloor coverage
- Positional accuracy
- Depth accuracy
- Feature detection and identification

USACE Channels

- 2001 - 2017
 - “U” (Unassessed)
- 2017
 - “B”
- 2018 forward
 - Upgrade key channels





CATZOC: Delaware River Channel



Commodities

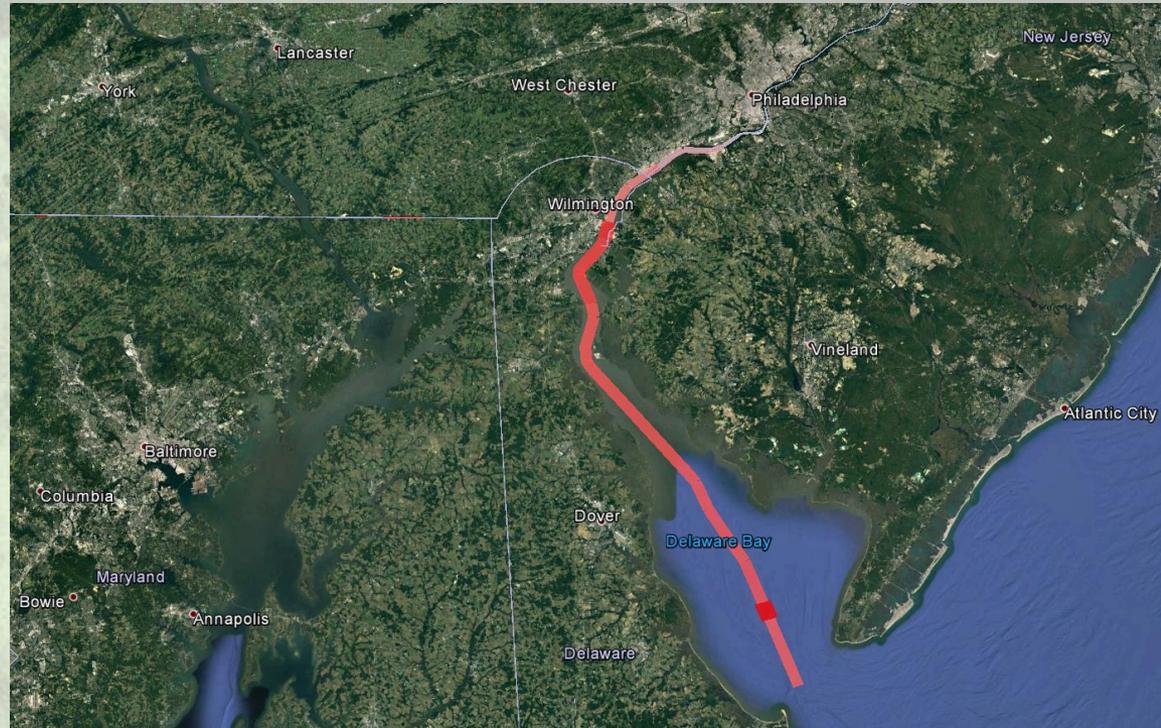
- \$52B worth of commodities*
 - Crude oil (\$13.5B, 28M tons)
 - Machinery, equipment (\$12.2)
- Most of the East coast refining capacity
- Tankers and liquid barge vessels

CATZOC B

- Lightering up to 32 feet

CATZOC A2

- Lightering to only 36 feet
- Tankers: + \$2.6M per foot of draft*
- Barge: + \$530,000 per foot of draft*



*FY17 commodity values

Source: USACE Institute for Water Resources



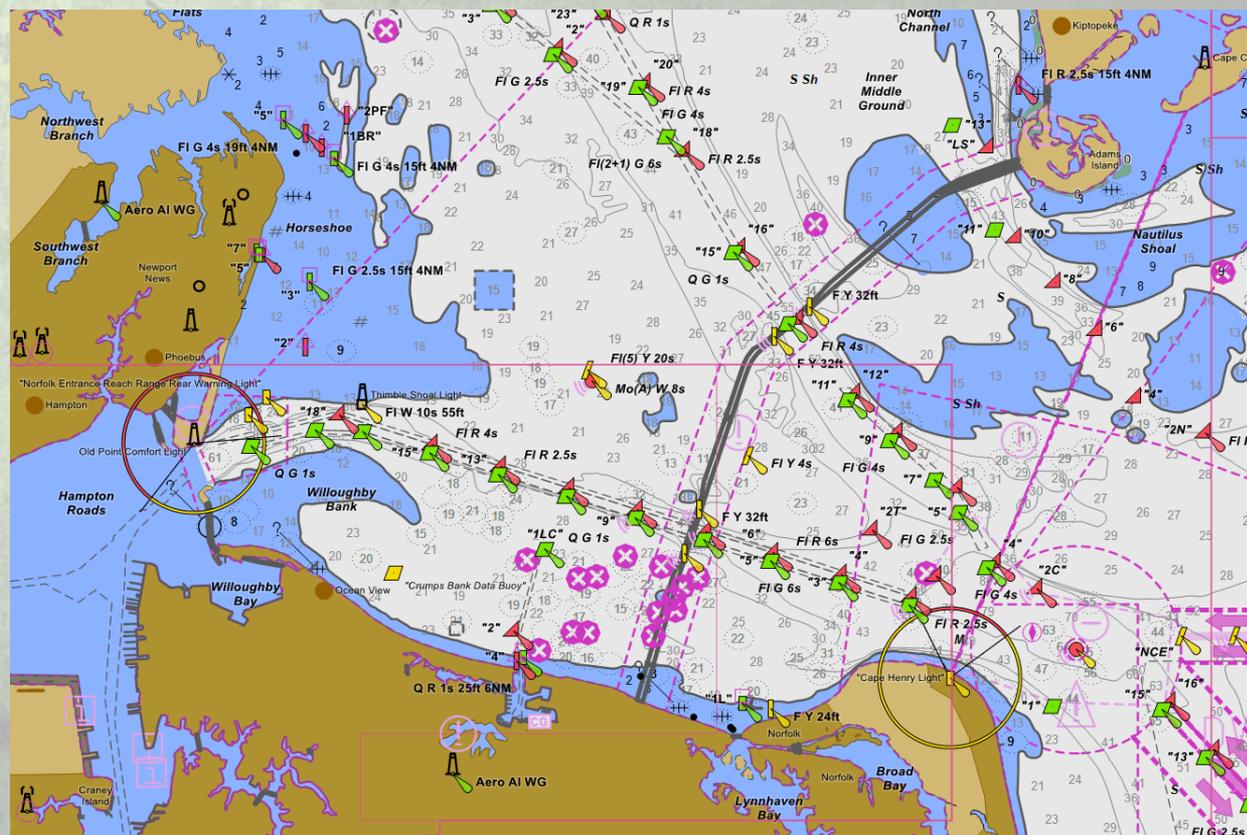


CATZOC: Other Channels



Additional channels

- Boston Harbor
 - Now at CATZOC A2
- Future
 - Thimble Shoal Channel





eHydro Joint Metadata Project



Goals

- Collaborate toward ISO 19115-2
 - Vector and point data
 - Data collection instruments
- Standardize USACE metadata
 - Consistent
 - Correct
 - Machine readable
- Enhance NOAA CATZOC evaluation

eHydro Metadata - D:\MB-SS Projects\8101 C&D Canal\Sort\000_eHydro.etext

Data Source Information | Quality of Bathymetric Data | Survey Equipment and Process Steps

Title	ehydro survey nam
Responsible Party	George
Contact Info	Dave
Phone	(860) 635-1500
Address	56 Bradley St, Mid
E-Mail Address	George@comcast.
Online Resource	Note
Legal Constraint: License	Note

eHydro Metadata - D:\HYPACK PROJECTS\DEVELOPMENT\NORBIT WC TEST NY\Sort\median 5x5...

Data Source Information | Quality of Bathymetric Data | Survey Equipment and Process Steps

Acquisition Start Date	20190905
Acquisition End Date	20190905
Vertical Coordinate Reference System	Note
Vertical Unit of Measure	US Foot
Horizontal Coordinate Reference System	Note
Full Bathymetric Coverage	Yes
Resolution	5.0

eHydro Metadata - D:\HYPACK PROJECTS\DEVELOPMENT\NORBIT WC TEST NY\Sort\median 5x5...

Data Source Information | Quality of Bathymetric Data | Survey Equipment and Process Steps

Multibeam Sensor	NORBIT WBMS
Vertical Beam Sensor	
Sidescan Sensor	
Lidar Sensor	
Interferometric Sensor	
Attitude and Positioning Equipment	
Sound Velocity Sensors	
Sound Velocity Processing	
Vertical Datum Processing	
Processing Software	HYPACK
Data Quality Control	





The Use of AIS on Inland Waterways





AIS Aids to Navigation

Ohio River High Water Event in Louisville District (Feb. 2018)

- 3 Locks & Dams on the Ohio River required alternate navigation routes to keep navigation open
- Coordinates for “virtual buoys” provided to the USACE Lock Operations Management Application (LOMA) team thru the USCG
- Transmission of buoys was initiated by LOMA team when river stages prevented normal locking or navigation over the dam.
- River remained open to navigation at:
 - Locks & Dam No. 52 (ORM 938.9) – Navigation over bear traps
 - John T. Myers Locks & Dam (ORM 846.0) – Navigation over Fixed Weir
 - Newburgh Locks & Dam (OHR 776.1) – Navigation over Fixed Weir

AIS AtoNs for Low Water Events

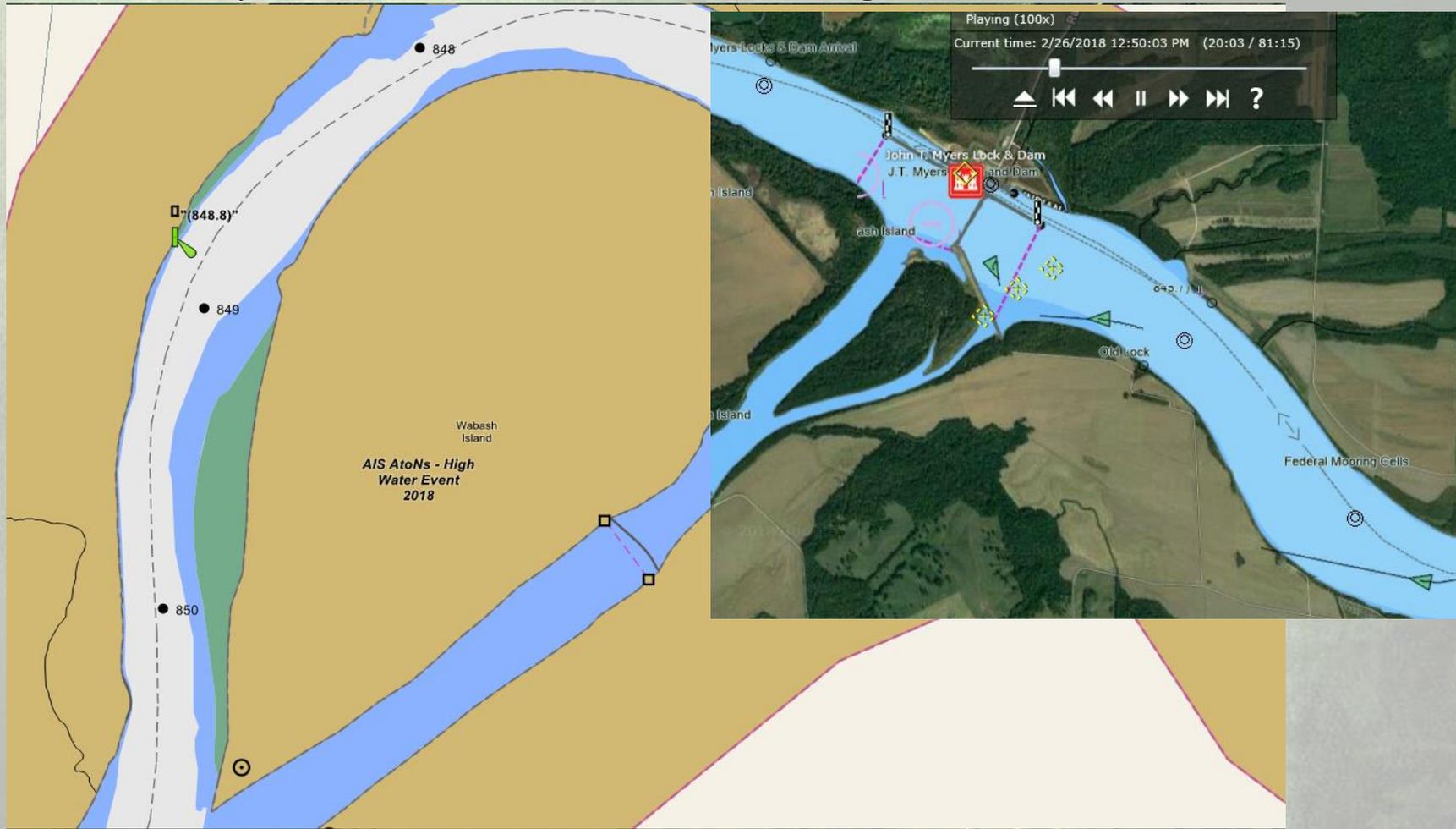
- LOMA presently transmitting over 50 AIS AtoNs on inland waterways due to low water and shoaling conditions.
- Aids are used temporarily until the USCG is able to mark the channel properly.



AIS Aids to Navigation

Ohio River High Water Event in Louisville District (Feb. 2018)

John T. Myers Locks & Dam (ORM 846.0) – Navigation over Fixed Weir





Questions?

