US Army Corps of Engineers
e-Navigation Projects

AAPA Harbors and Navigation Committee Meeting
Port of Seattle 13 August 2014

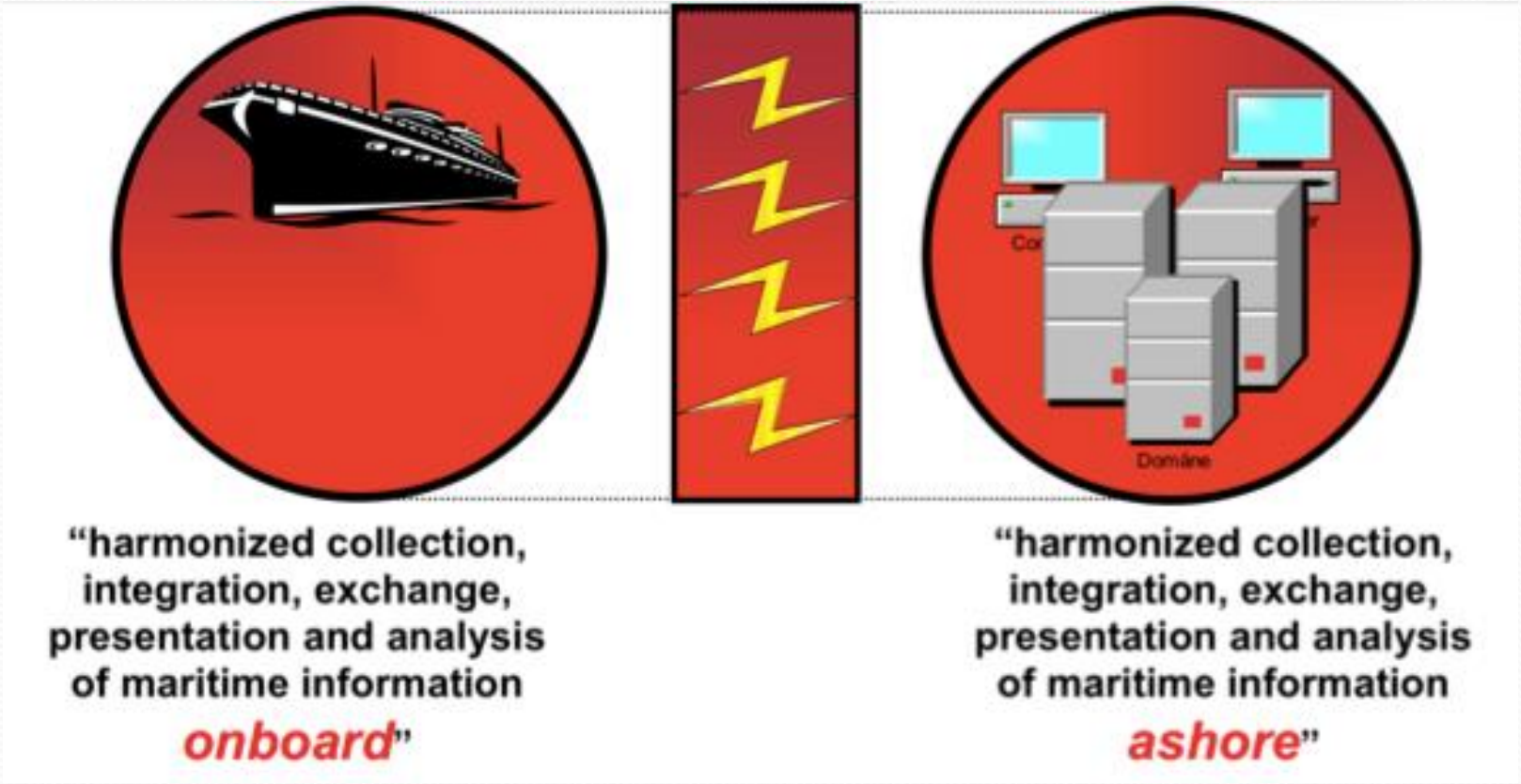
Brian Tetreault
US Army Corps of Engineers
Research and Development Center – Coastal and Hydraulics Lab

e-Navigation:
International definition

"e-Navigation is the harmonised collection, integration, exchange, presentation and analysis of maritime information onboard and ashore by electronic means to enhance berth to berth navigation and related services, for safety and security at sea and protection of the marine environment"

MSC85/26/Add.1 annex 20

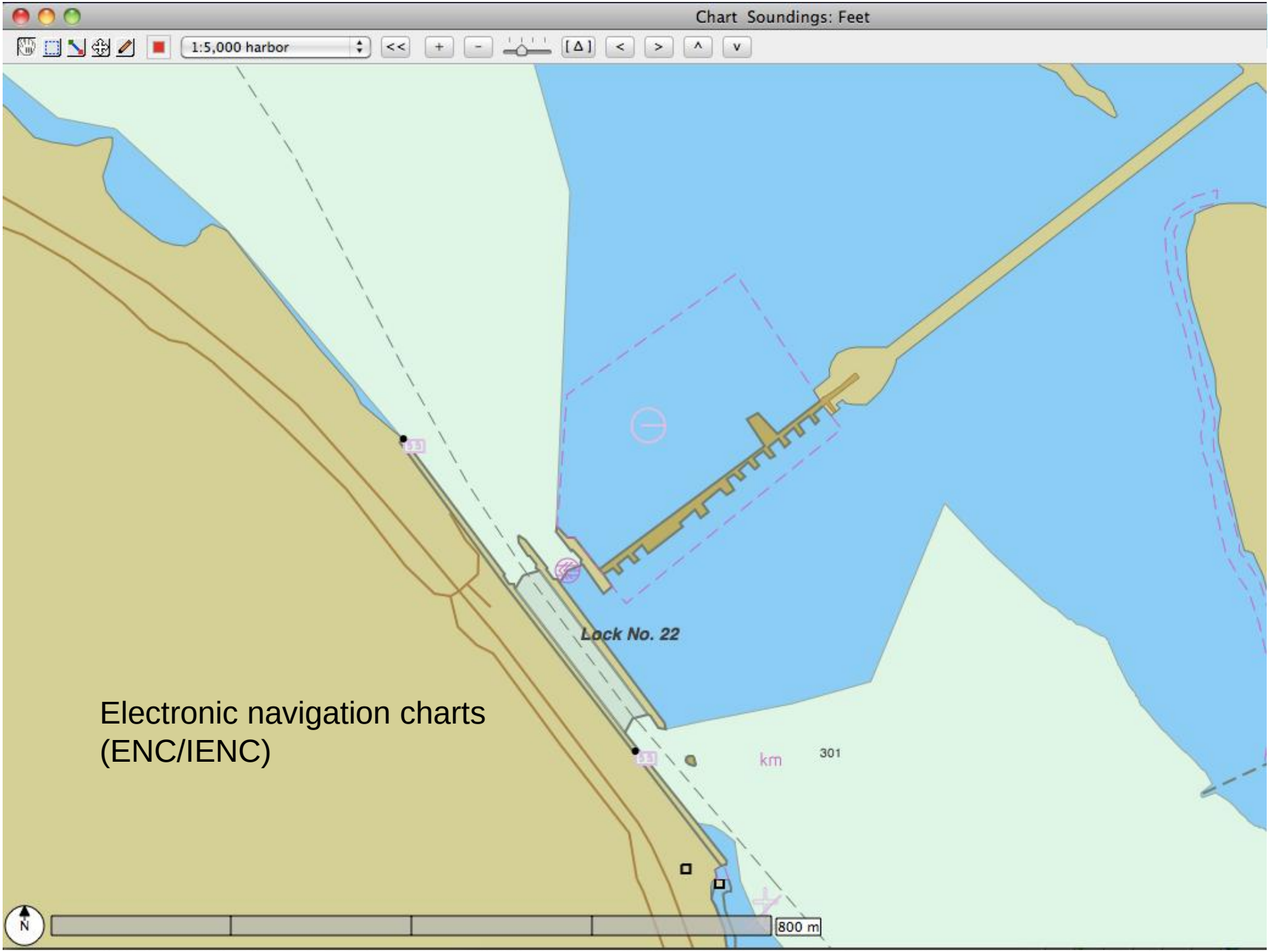
e-Navigation:
“three sides of the coin”



“Information Paper on the Draft IALA Recommendation e-Nav 140 on e-Navigation Architecture – the shore perspective”

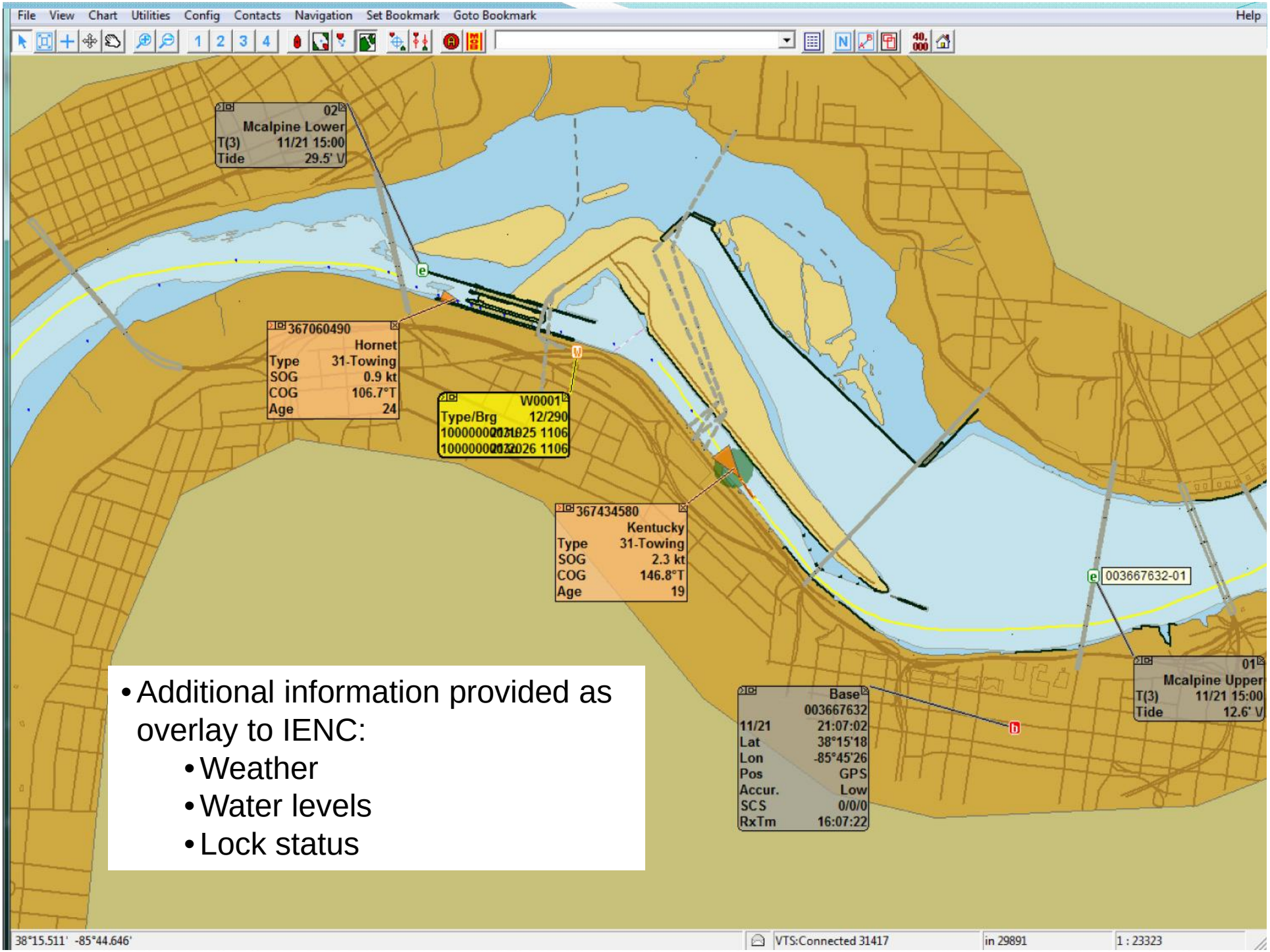
e-Navigation: “Analog to Digital”

- Paper charts
- Manual positioning
- Voice communications
- Visual aids to navigation



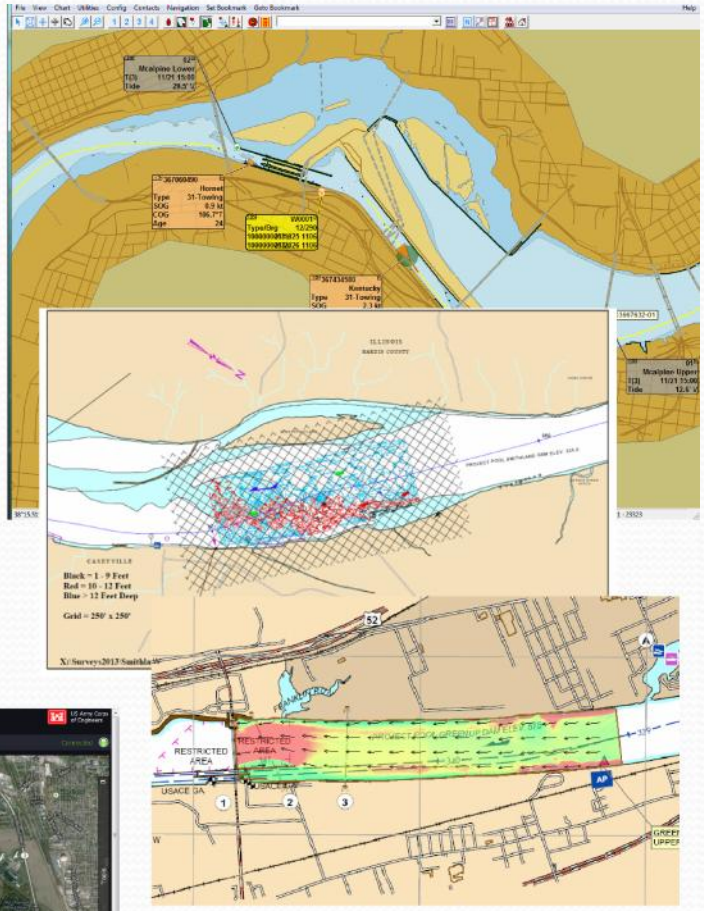
Electronic navigation charts
(ENC/IENC)

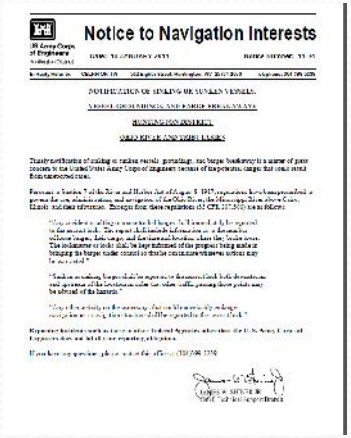

27
26
25
24
23
22
21
20


File View Chart Utilities Config Contacts Navigation Set Bookmark Goto Bookmark Help
02
Mcalpine Lower
T(3) 11/21 15:00
Tide 29.5' V
367060490
Hornet
Type 31-Towing
SOG 0.9 kt
COG 106.7°T
Age 24
W0001
Type/Brg 12/290
1000000021025 1106
1000000021026 1106
367434580
Kentucky
Type 31-Towing
SOG 2.3 kt
COG 146.8°T
Age 19
003667632-01
01
Mcalpine Upper
T(3) 11/21 15:00
Tide 12.6' V
Base
003667632
11/21 21:07:02
Lat 38°15'18
Lon -85°45'26
Pos GPS
Accur. Low
SCS 0/0/0
RxTm 16:07:22
• Additional information provided as overlay to IENC:
• Weather
• Water levels
• Lock status
38°15.511' -85°44.646'
VTS:Connected 31417
in 29891
1 : 23323

USACE e-Navigation projects

- Inland Electronic Navigation Charts (IENCs)
- Hydrographic surveys
- Lock Operations Management Application (LOMA)
- Lock approach current modeling
- Notices to Navigation Interests -“eMSI”





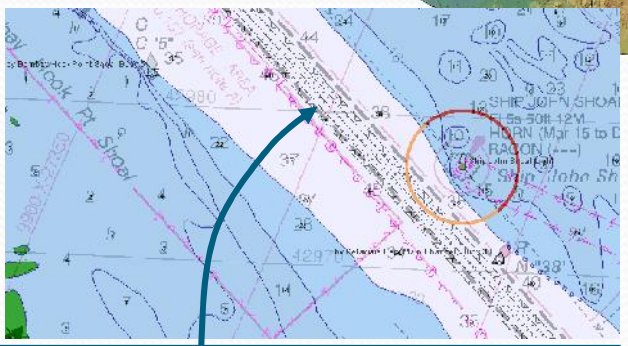
USACE Inland Electronic Navigational Chart Program Status - 2014

- 106 charts of inland rivers available on web
- ~7000 miles available in Inland Standard 2.2, shapefiles and KML
- US Coast Guard buoys chart overlay available
- Program managed via Army Geospatial Center & Louisville District

- Monthly Update cycle, can update weekly as needed
- 100% traceable audit trail for source data
- RSS and XML catalogs available for all data
- IENC data on WWW (Amazon Cloud & Web Services)

- R&D: IENC mobile apps for Android
- Mississippi River SW Pass overlay near release.
- 265 Miles of the White River, AR to be released in June 2014.

Inland Electronic Navigation Charts (IENCs)



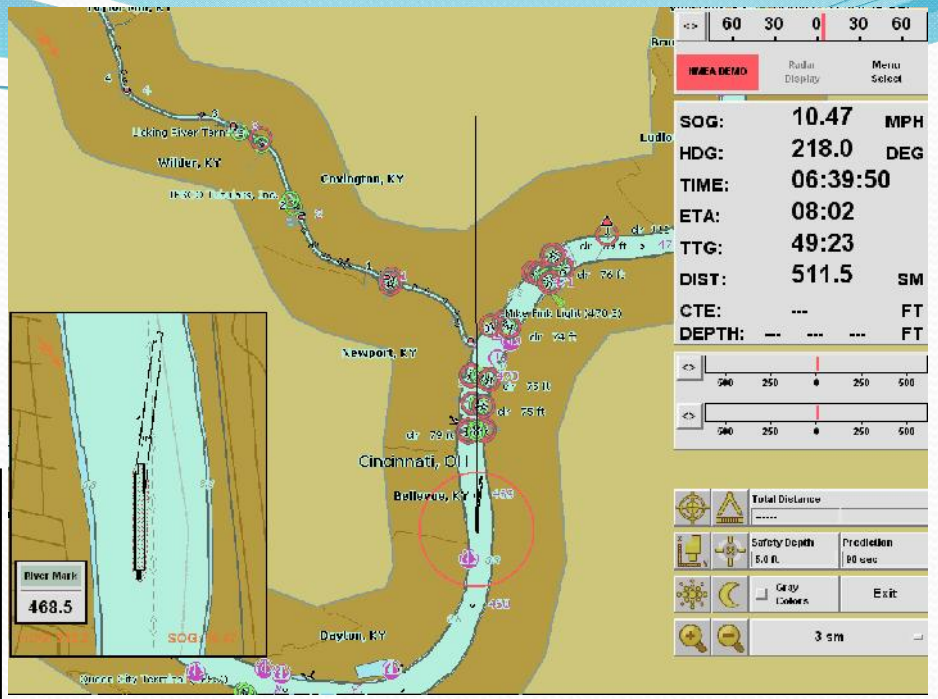
More consistent and reliable channel data from Corps for NOAA charts

Coordination of adjoining charts for seamless use by chart systems

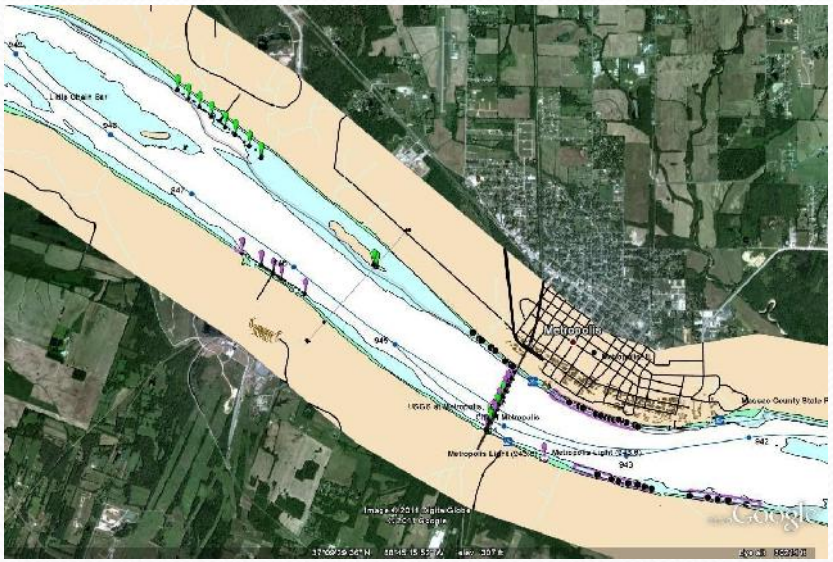
NOAA, Coastal and Great Lakes

IENC Examples

S-57 example

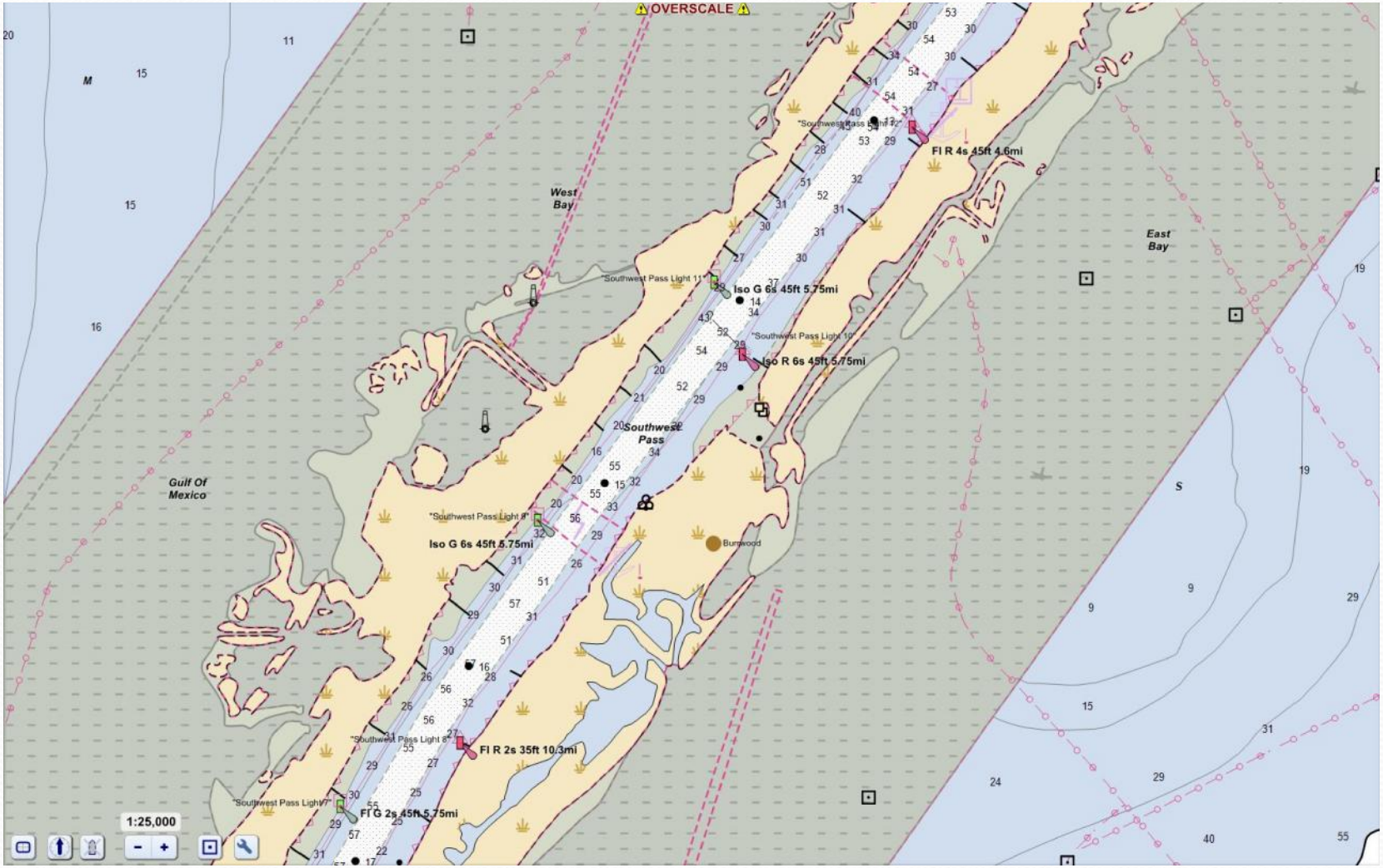


ECS showing Ohio River data



KML File of Allegheny River

Miss River Southwest Pass



Jefferson County Port Authority Proposed Fleeting Area
Will It Affect Navigation?

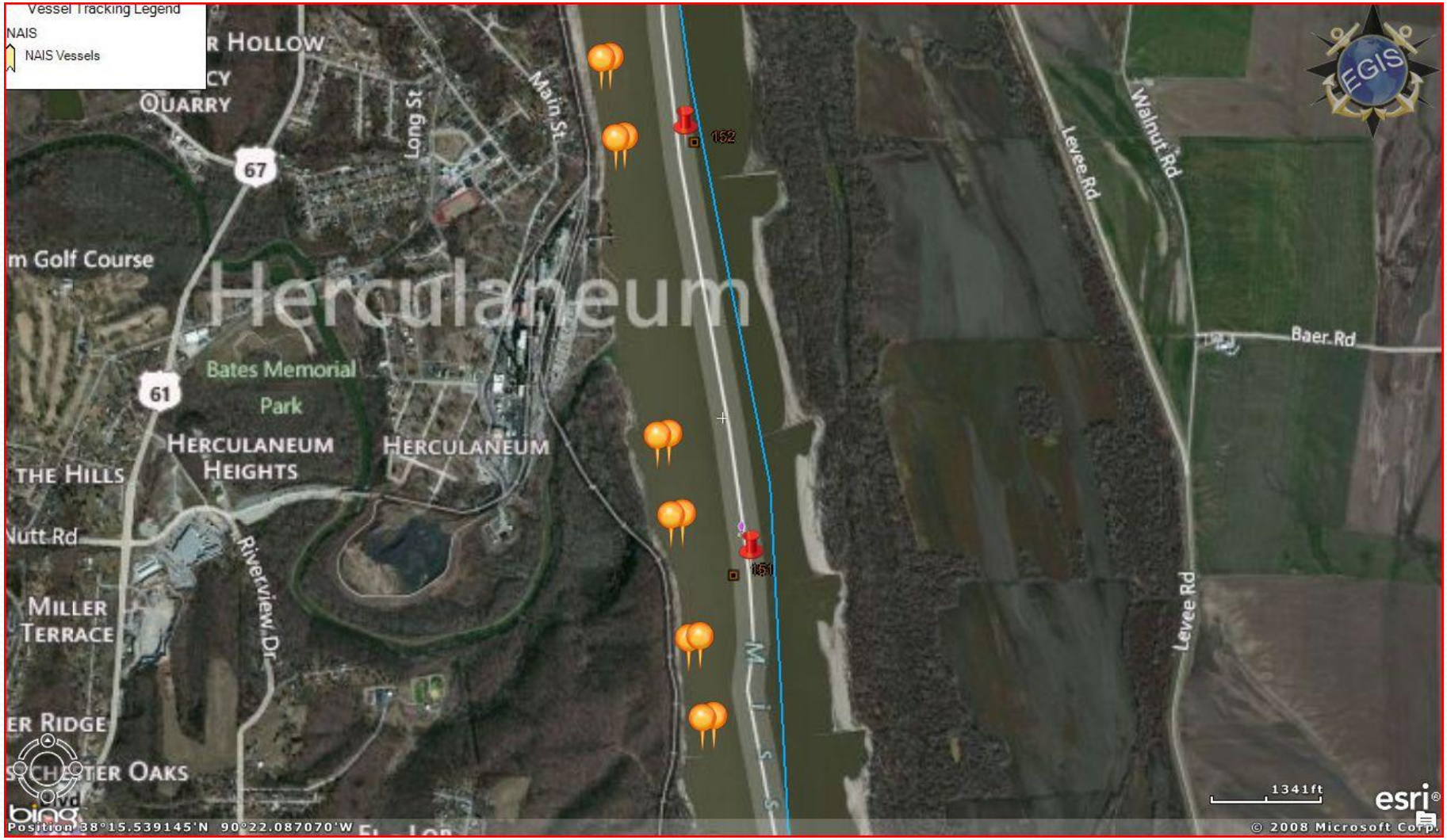
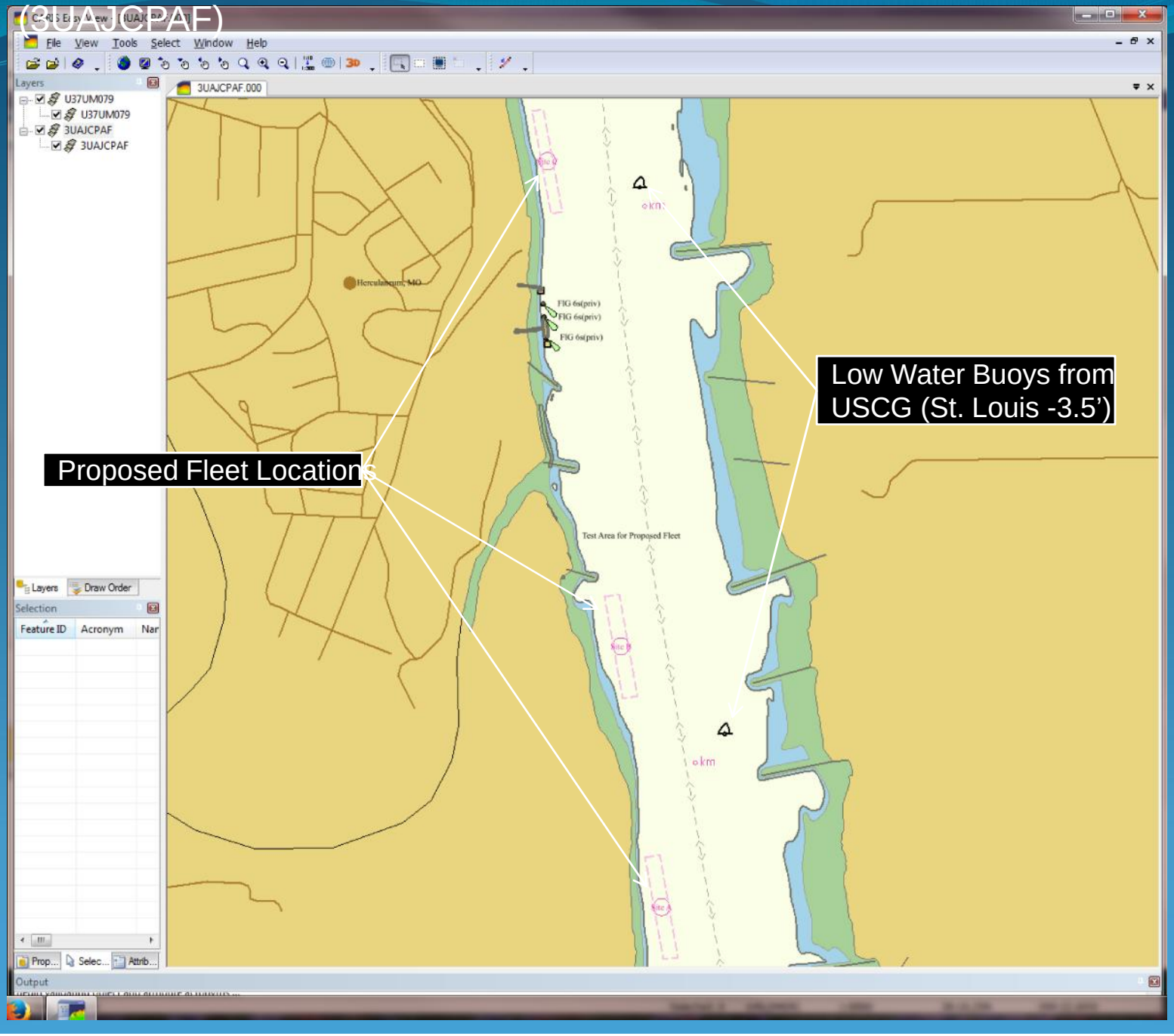
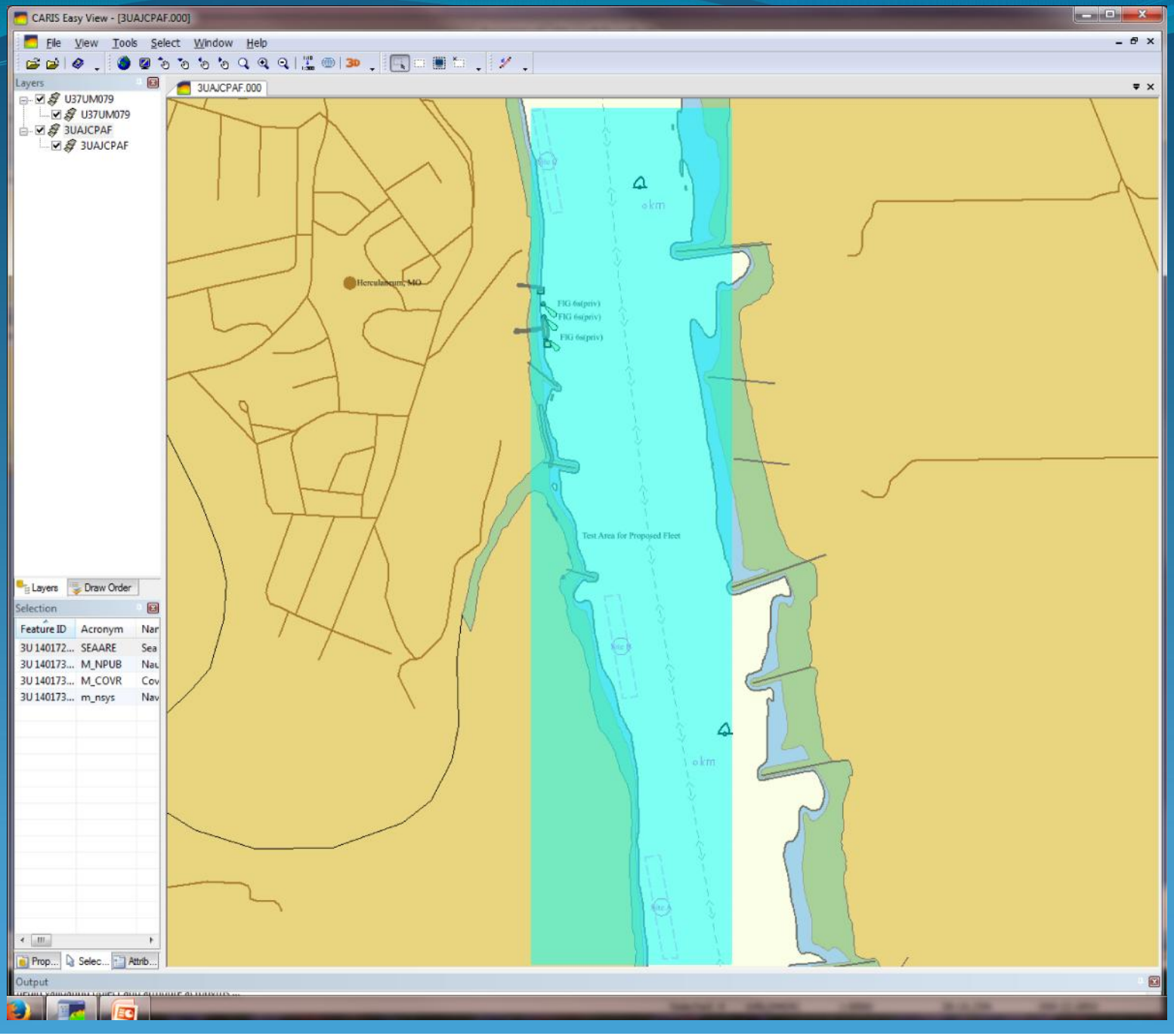


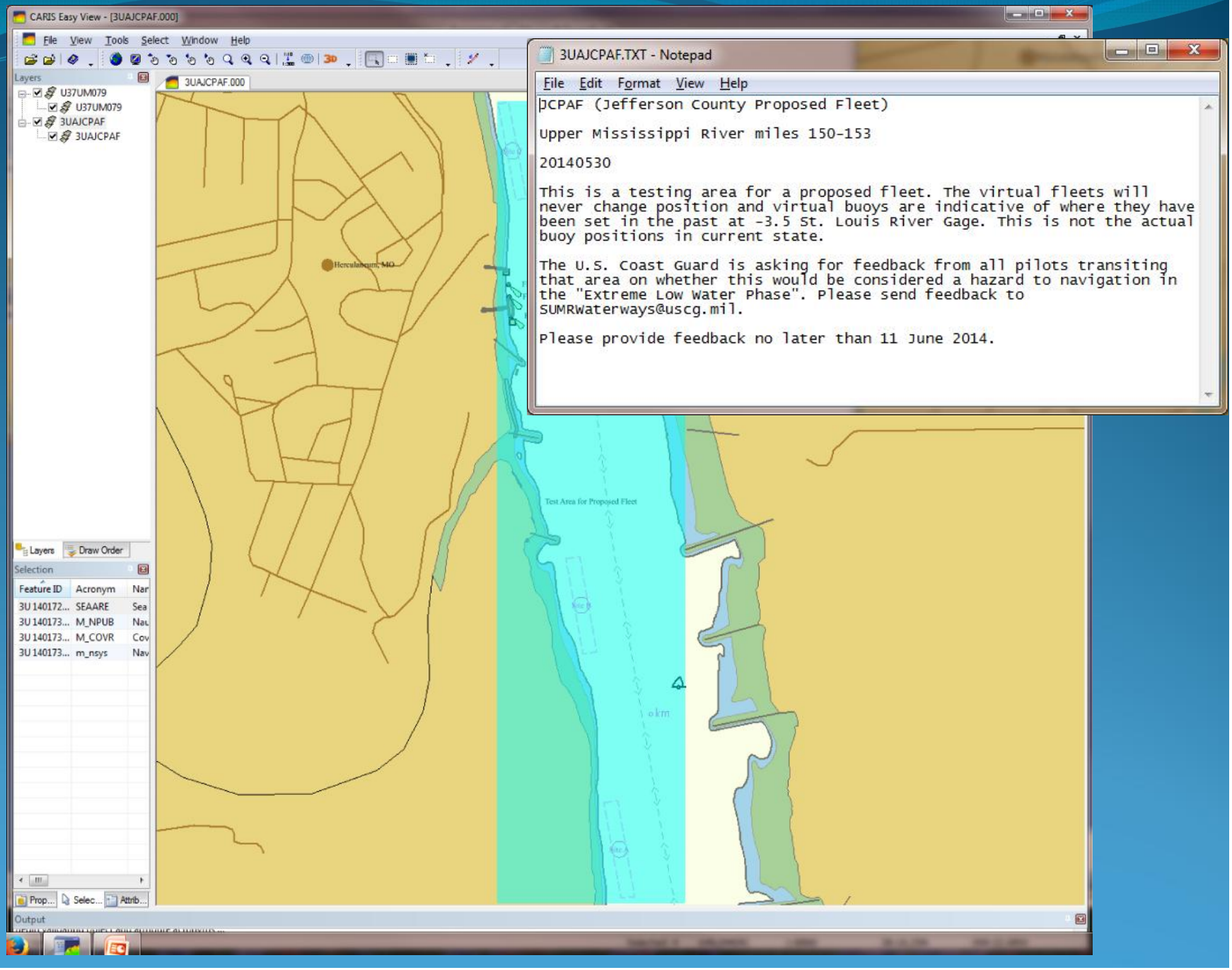
Chart U37UM079 with Proposed Fleet & Low Water Buoy Overlay (3UAJCPAF)



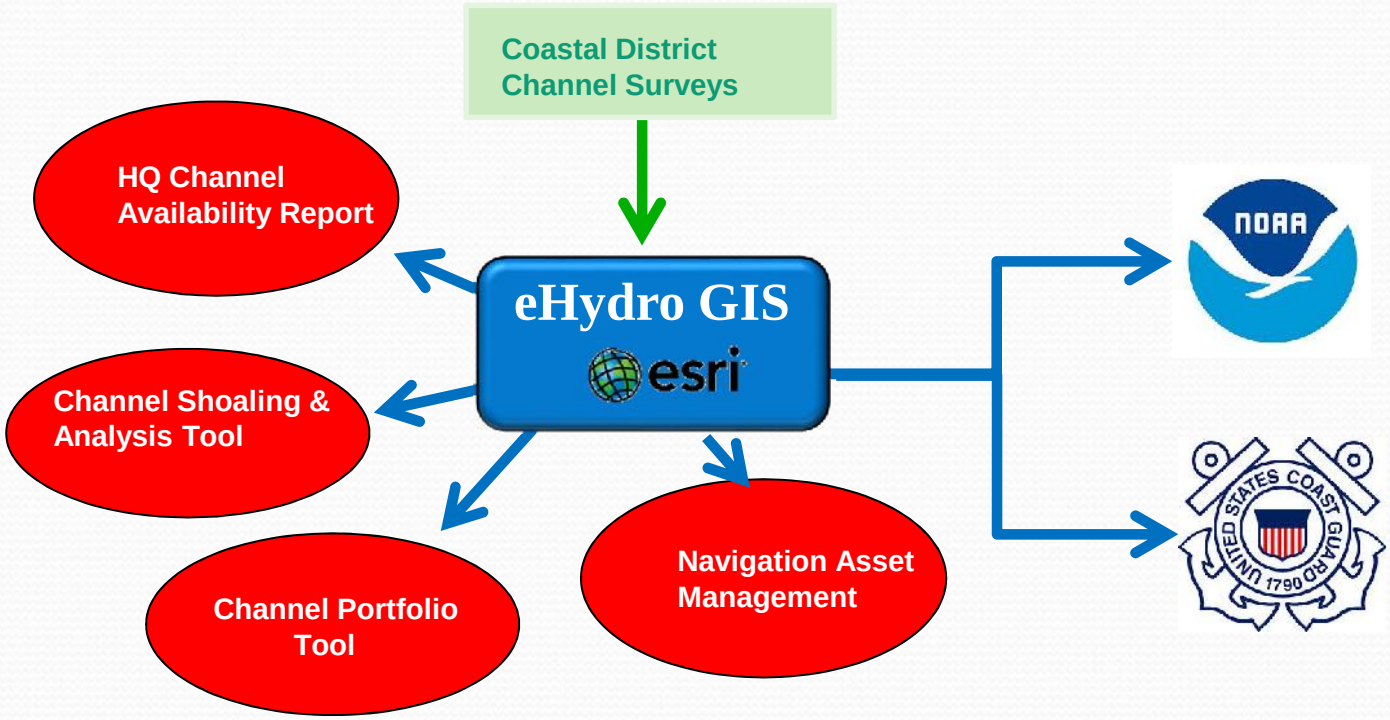
Overlay Chart 3UAJCPAF Overlay Area



Overlay Chart 3UAJCPAF Overlay with M_NPUB Text Description



USACE Development - eHydro



USACE Navigation developments

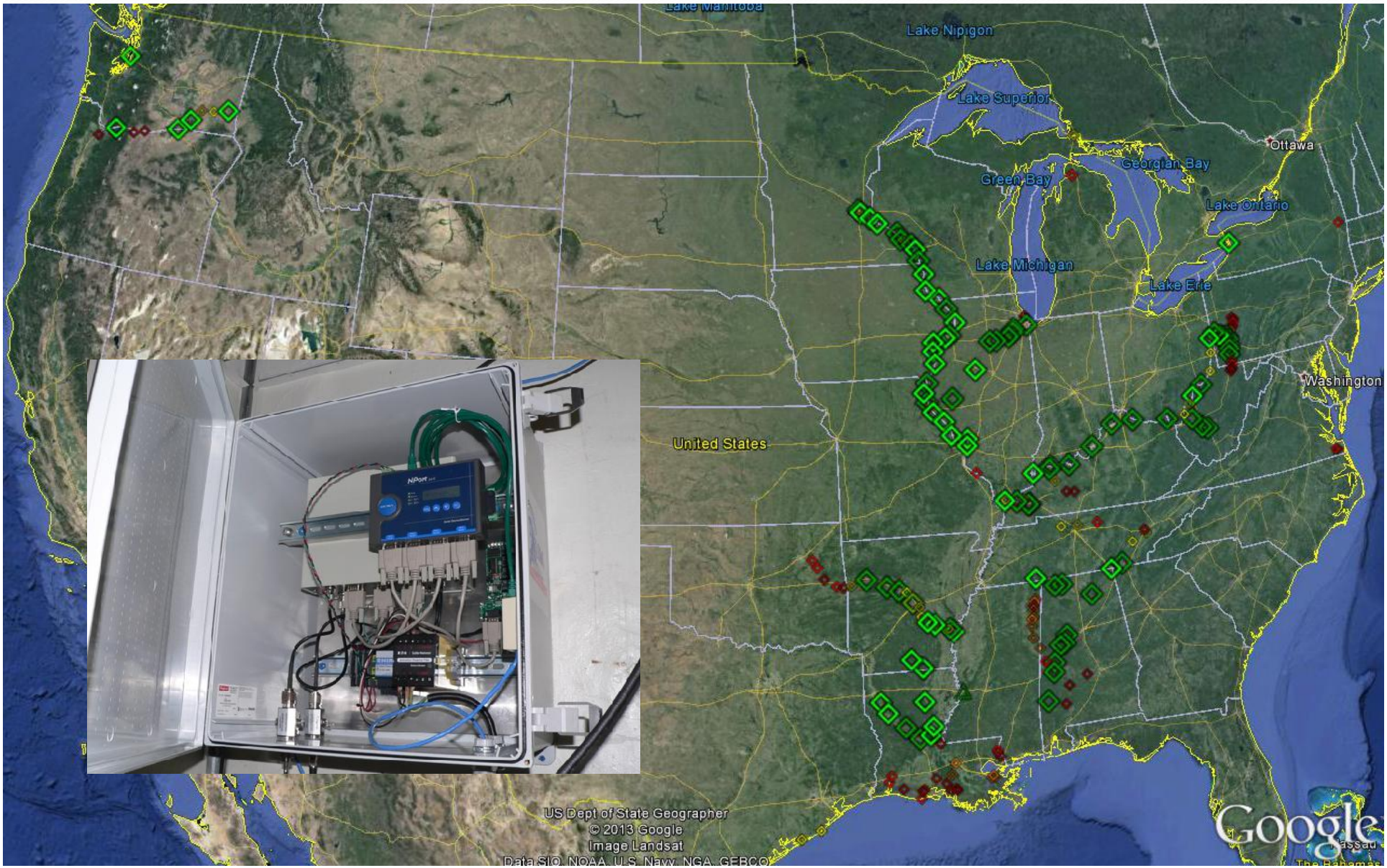
Lock Operations Management Application (LOMA)

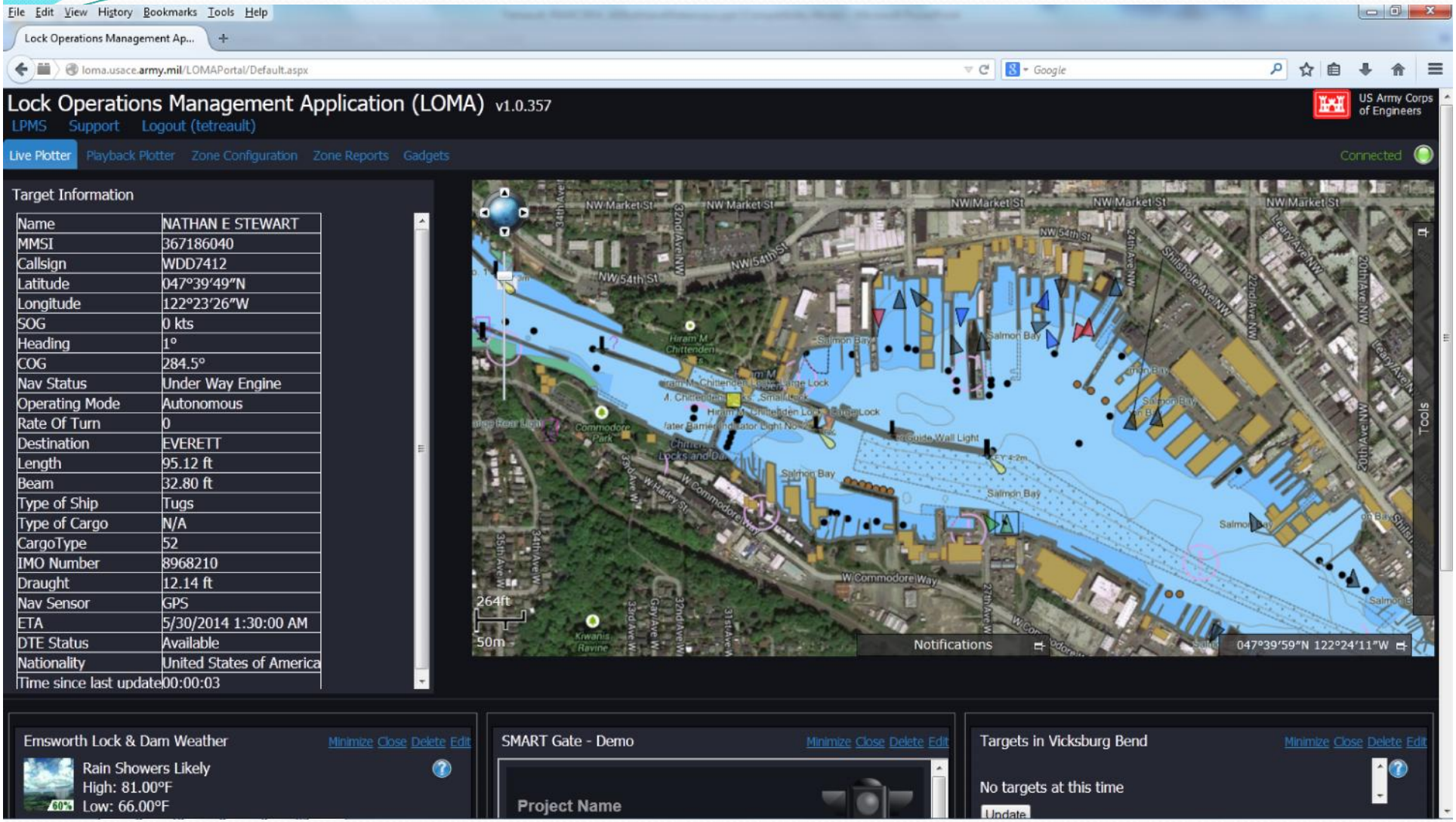
- Purpose:
  - Provide end users information needed for decision support
- Goals:
  - Increase lock operator situational awareness
  - Provide vessel operators better information
  - Provide better information to Corps management
  - Exchange information with external users
- AIS is the central LOMA technology

LOMA current capabilities

- Lock operator situational display
- AIS vessel information
- Zone management
- Playback capability

LOMA equipment deployment




File Edit View History Bookmarks Tools Help
Lock Operations Management Ap...
loma.usace.army.mil/LOMAPortal/Default.aspx
Lock Operations Management Application (LOMA) v1.0.357
US Army Corps of Engineers
LPMS Support Logout (tetreault)
Live Plotter Playback Plotter Zone Configuration Zone Reports Gadgets
Connected
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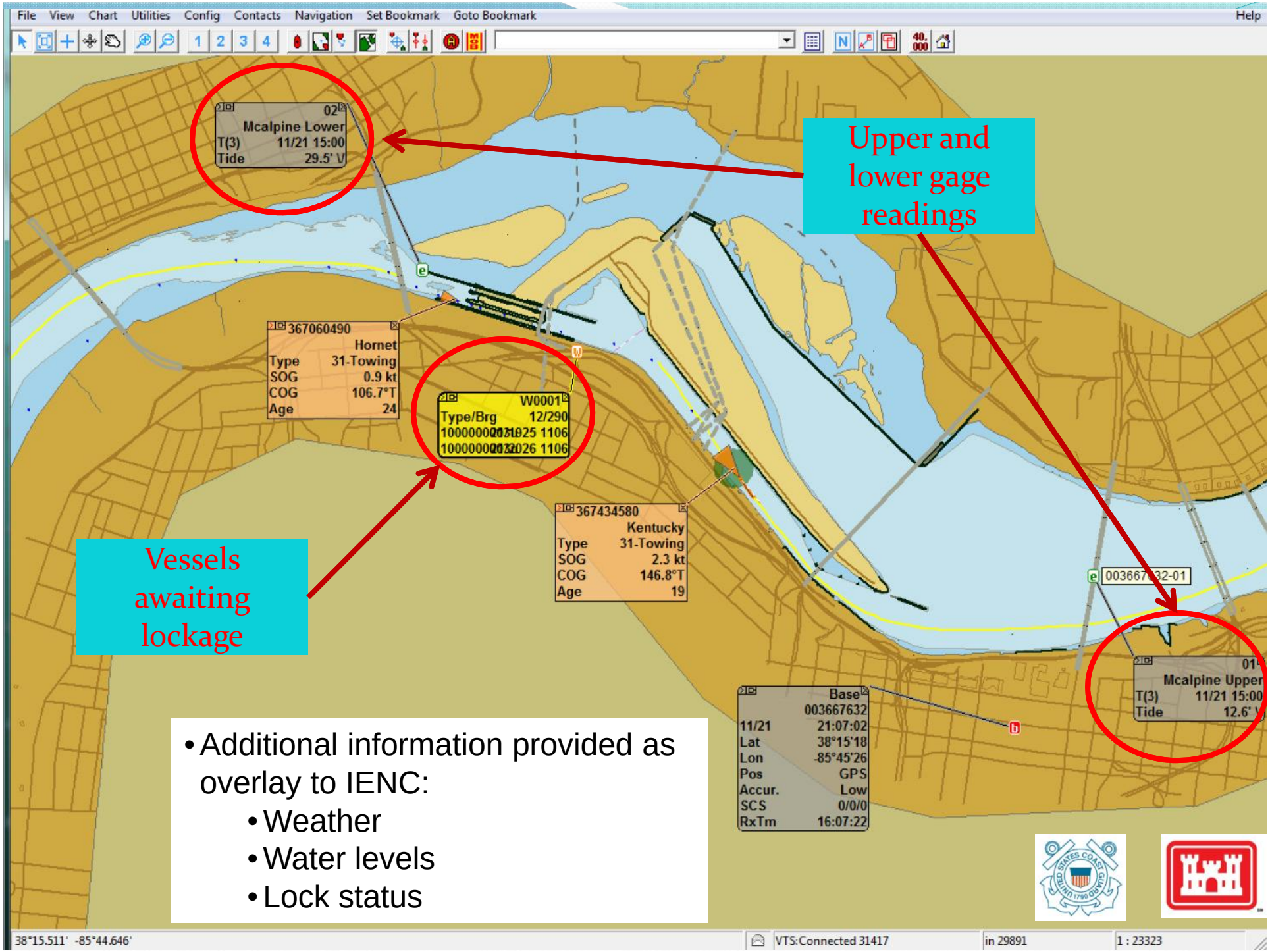
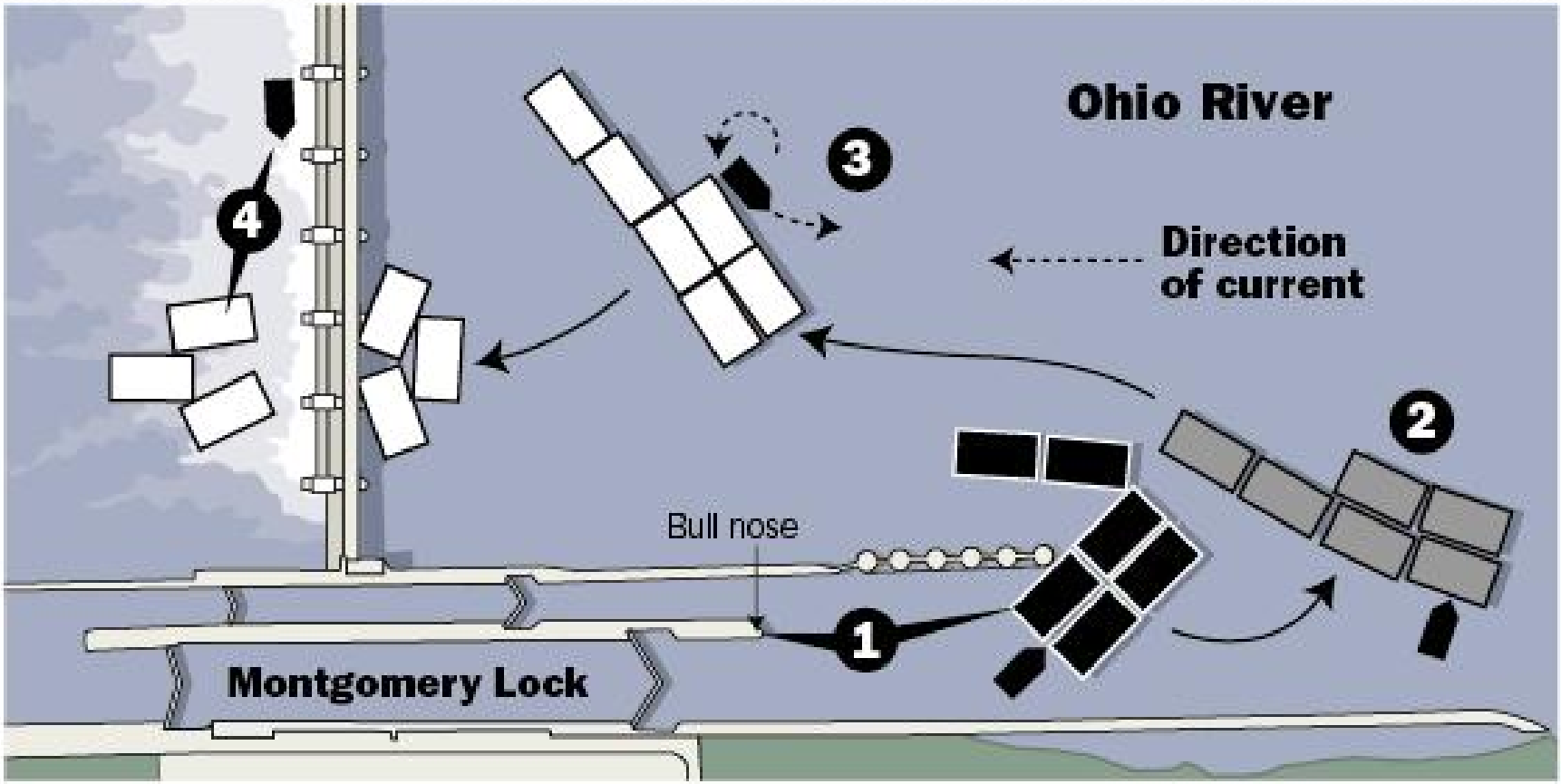
Name NATHAN E STEWART
MMSI 367186040
Callsign WDD7412
Latitude 047°39'49"N
Longitude 122°23'26"W
SOG 0 kts
Heading 1°
COG 284.5°
Nav Status Under Way Engine
Operating Mode Autonomous
Rate Of Turn 0
Destination EVERETT
Length 95.12 ft
Beam 32.80 ft
Type of Ship Tugs
Type of Cargo N/A
CargoType 52
IMO Number 8968210
Draught 12.14 ft
Nav Sensor GPS
ETA 5/30/2014 1:30:00 AM
DTE Status Available
Nationality United States of America
Time since last update 00:00:03
NW Market St
NW 54th St
Salmon Bay
W Commodore Way
Commodore Park
Kiwanis Ravine
264ft
50m
Notifications
047°39'59"N 122°24'11"W
Tools
Emsworth Lock & Dam Weather
Minimize Close Delete Edit
Rain Showers Likely
High: 81.00°F
Low: 66.00°F
SMART Gate - Demo
Minimize Close Delete Edit
Project Name
Targets in Vicksburg Bend
Minimize Close Delete Edit
No targets at this time
Update

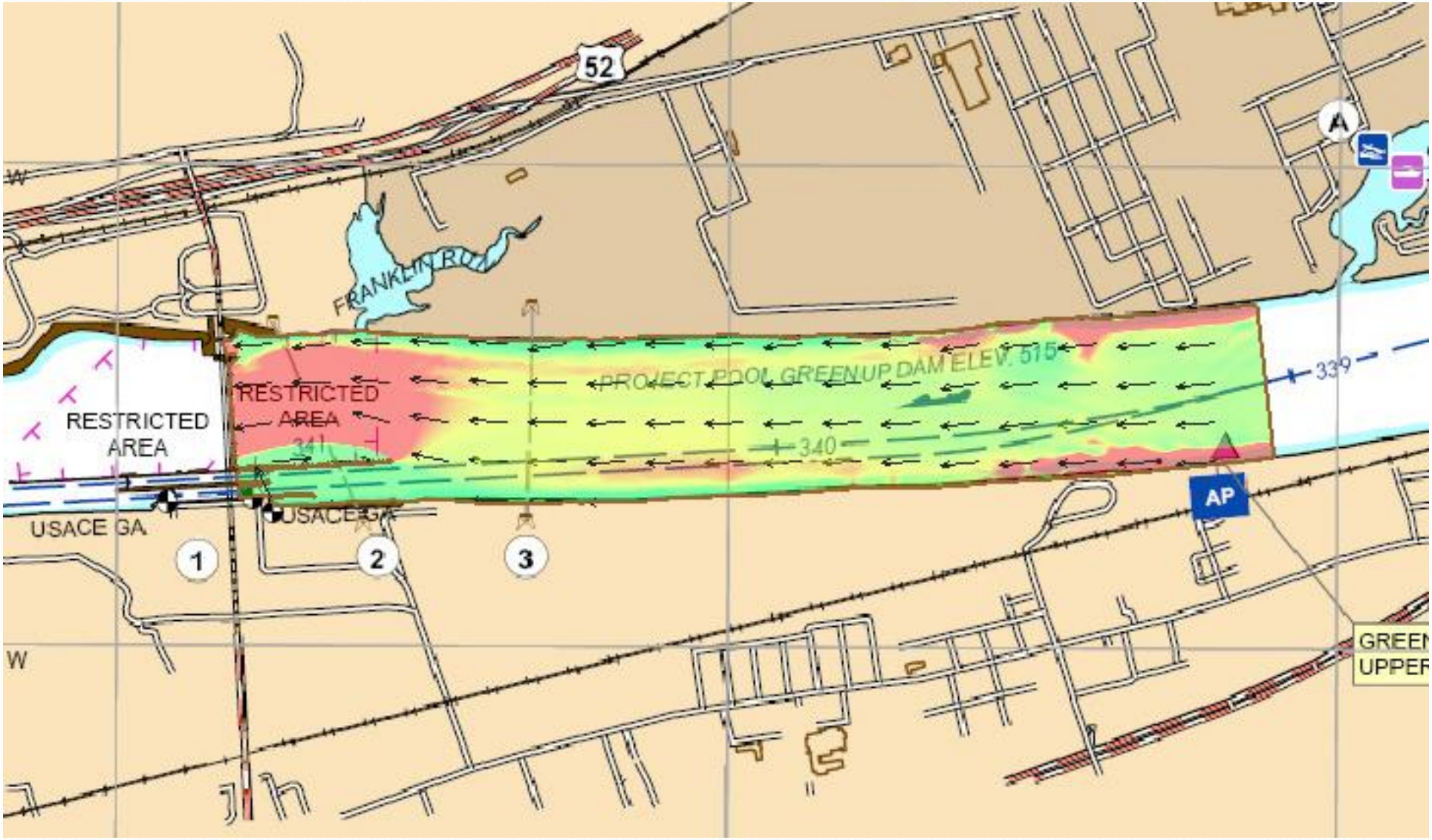

File View Chart Utilities Config Contacts Navigation Set Bookmark Goto Bookmark Help
02
Mcalpine Lower
T(3) 11/21 15:00
Tide 29.5' V
Upper and lower gage readings
367060490
Hornet
Type 31-Towing
SOG 0.9 kt
COG 106.7°T
Age 24
W0001
Type/Brg 12/290
1106
1106
367434580
Kentucky
Type 31-Towing
SOG 2.3 kt
COG 146.8°T
Age 19
Vessels awaiting lockage
003667632-01
01
Mcalpine Upper
T(3) 11/21 15:00
Tide 12.6' V
Base
003667632
11/21 21:07:02
Lat 38°15'18
Lon -85°45'26
Pos GPS
Accur. Low
SCS 0/0/0
RxTm 16:07:22
• Additional information provided as overlay to IENC:
• Weather
• Water levels
• Lock status
38°15.511' -85°44.646'
VTS:Connected 31417
in 29891
1 : 23323

Lock approach current modeling

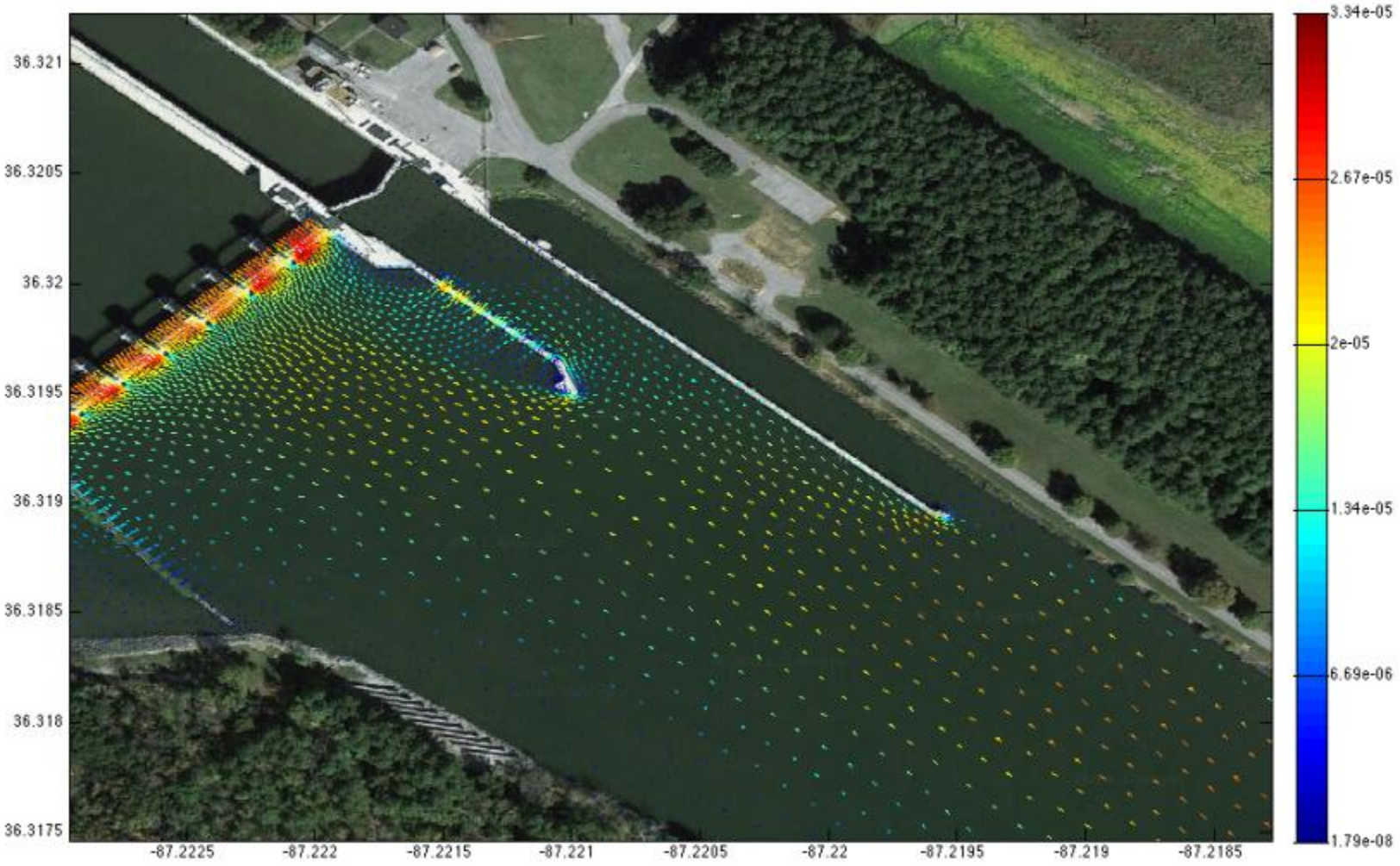
- Vessel operators need river current information at critical locations (e.g., lock approaches)
  - Sensors are expensive to install and maintain; provide limited information



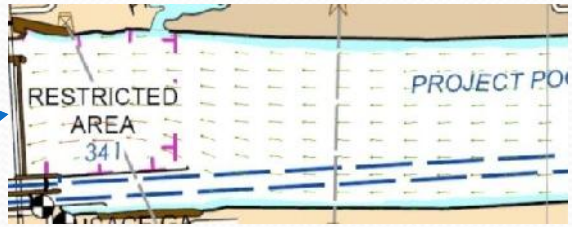
Lock approach current modeling



Lock approach current modeling



Lock approach model data via AIS



Model output
101100011101
010010000110
100100100
010

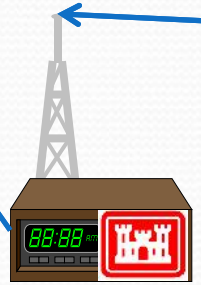
Convert to ASM

LOMA

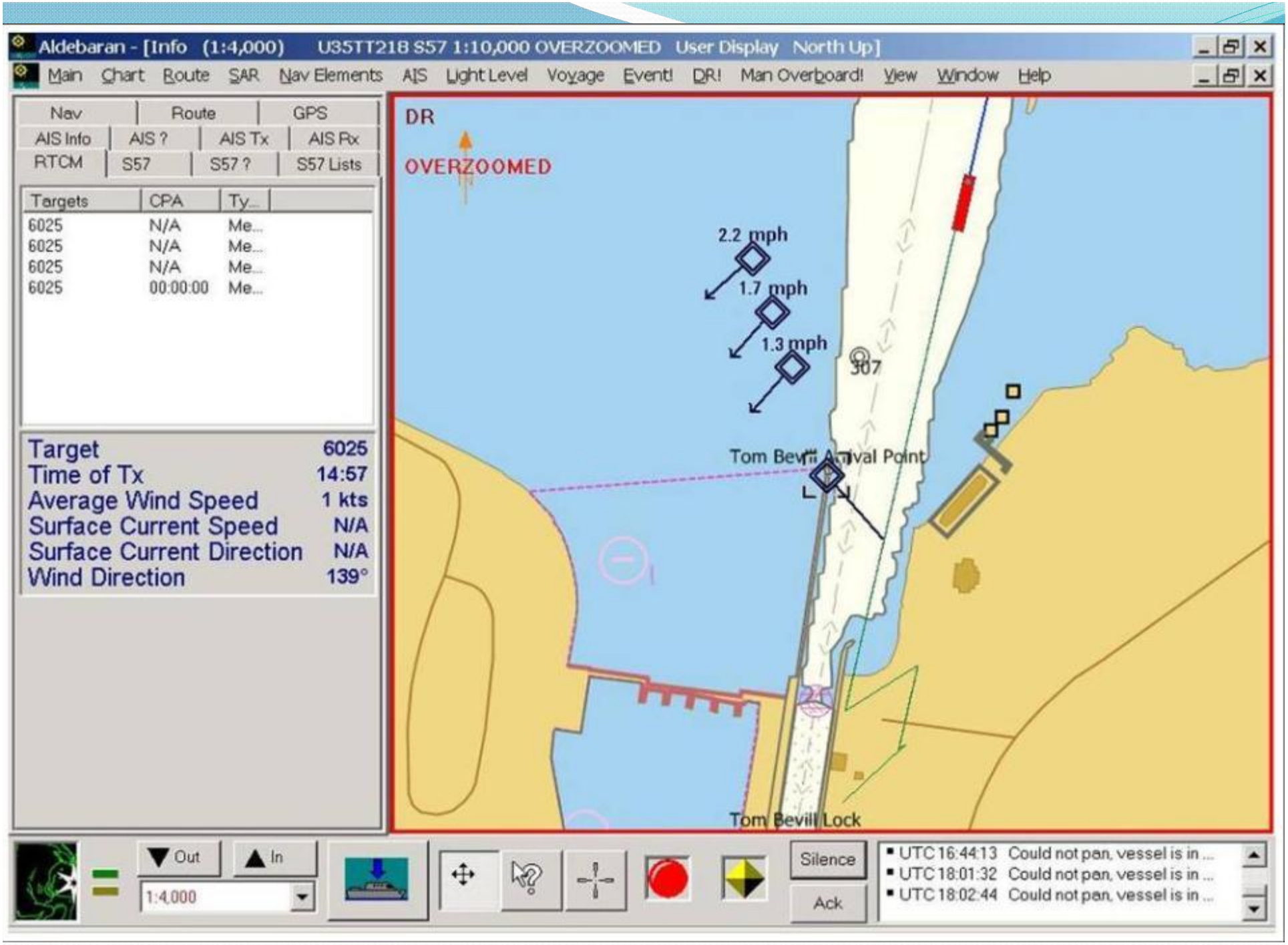
Model input:
- Bathymetry
- Structure plans
- Dam discharge
-Surface elevation (pool)

AIS message

Payload



AIS units at Locks


Aldebaran - [Info (1:4,000) U35TT218 S57 1:10,000 OVERZOOMED User Display North Up]
Main Chart Route SAR Nav Elements AIS Light Level Voyage Event! DR! Man Overboard! View Window Help
Nav Route GPS
AIS Info AIS ? AIS Tx AIS Rx
RTCM S57 S57 ? S57 Lists
Targets CPA Ty...
6025 N/A Me...
6025 N/A Me...
6025 N/A Me...
6025 00:00:00 Me...
Target 6025
Time of Tx 14:57
Average Wind Speed 1 kts
Surface Current Speed N/A
Surface Current Direction N/A
Wind Direction 139°
DR
OVERZOOMED
2.2 mph
1.7 mph
1.3 mph
307
Tom Bevill Arrival Point
Tom Bevill Lock
Out
In
1:4,000
Silence
Ack
UTC 16:44:13 Could not pan, vessel is in ...
UTC 18:01:32 Could not pan, vessel is in ...
UTC 18:02:44 Could not pan, vessel is in ...

Marine Safety Information (MSI)

"Notices to Skippers"

U.S. Department of Homeland Security
United States Coast Guard

LOCAL NOTICE TO MARINERS
WEEKLY EDITION

District: 17 **Week: 01/06**

-Navigation Information Service (NIS)-
Watchstander, 24 hours a day at (703) 313-5900
~Navcen Internet Address~
www.navcen.uscg.gov
-Local Notice to Mariners-
www.navcen.uscg.gov/lnm

Issued by: Commander (DPW) Telephone: (907) 463-2269 (0800-1600)
Seventeenth Coast Guard District After Hours: (907) 463-2004 (1600-0800)
PO Box 25517 Facsimile: (907) 463-2273
Juneau, AK 99802-5517

Questions, comments or additional information on this Local Notice to Mariners should be sent to the address above or by E-mail to: D17-PF-D17-LNM@uscg.mil. You can get the U.S. Coast Guard 17th District-s Local Notice to Mariners via the Internet directly from the U.S. Coast Guard Navigation Center web site at www.navcen.uscg.gov/lnm/d17.

No. 31
2 AUGUST 2014
UNITED STATES OF AMERICA

NOTICE TO MARINERS

Published Weekly by the
National Geospatial-Intelligence Agency

Prepared Jointly with the
National Ocean Service and U.S. Coast Guard

Contents

Office of Coast Survey

Nautical Charts & Pubs | Surveys & Wrecks | GIS & Other Products | Research & Development | Customer Service | Business Opportunities | Education

Chart: 11354, Current Edition: 28, Print Date: Jul. /2012
Intracoastal Waterway Morgan City to Port Allen, including the Atchafalaya River

Download RNC
View Chart Image
Paper/RNC Catalog

Action	Item Name	Charting Label	Latitude	Longitude	Published Document	Kapp	RNC Panel	RNC Posted	PDF Posted
Add	Atchafalaya Channel Daybeacon 21	G "21" Ke Rel	N 29° 18' 40.355"	W 091° 26' 18.323"	LNM 25/14 8th Dist	35	11354_3	7/3/2014	7/3/2014
Delete	Atchafalaya Channel Buoy 21	G C "21"	N 29° 18' 40.322"	W 091° 26' 10.316"	LNM 25/14 8th Dist	35	11354_3	7/3/2014	7/3/2014
Relocate	Atchafalaya Channel Buoy 57	G C "57"	N 29° 28' 00.632"	W 091° 16' 50.652"	LNM 24/14 8th Dist	35	11354_3	6/26/2014	6/26/2014
Relocate	Atchafalaya Channel Lighted Buoy 58	R "58" FI R 2.5s	N 29° 28' 02.047"	W 091° 16' 40.421"	LNM 24/14 8th Dist	35	11354_3	6/26/2014	6/26/2014
Change	tabulation - ATCHAFALAYA RIVER	tabulation - ATCHAFALAYA RIVER	N 29° 36' 00.000"	W 091° 10' 00.000"	LNM 24/14 8th Dist	35	11354_3	6/19/2014	6/19/2014
Change	tabulation - ATCHAFALAYA RIVER	tabulation - ATCHAFALAYA RIVER	N 29° 30' 00.000"	W 091° 10' 00.000"	LNM 15/14 8th Dist	35	11354_3	4/10/2014	4/10/2014
Add	Dump Site Label	Dump Site (dredged material) (see note 5) Depths from surveys of 1995-2010	N 29° 14' 55.730"	W 091° 31' 52.380"	LNM 15/14 8th Dist	35	11354_3	4/10/2014	4/10/2014
Add	Atchafalaya River & Bayous Chene, Boeuf, and Black - West dump site PT 3 OF 4	Chart No. 1 N24	N 29° 20' 30.000"	W 091° 26' 10.000"	LNM 15/14 8th Dist	35	11354_3	4/10/2014	4/10/2014
Add	Atchafalaya River & Bayous Chene, Boeuf, and Black - West dump site PT 1 OF 4	Chart No. 1 N24	N 29° 10' 12.090"	W 091° 31' 04.000"	LNM 15/14 8th Dist	35	11354_3	4/10/2014	4/10/2014
	Atchafalaya River & Bayous Chene,								

Navigation Notices

Notice to Navigation Interests

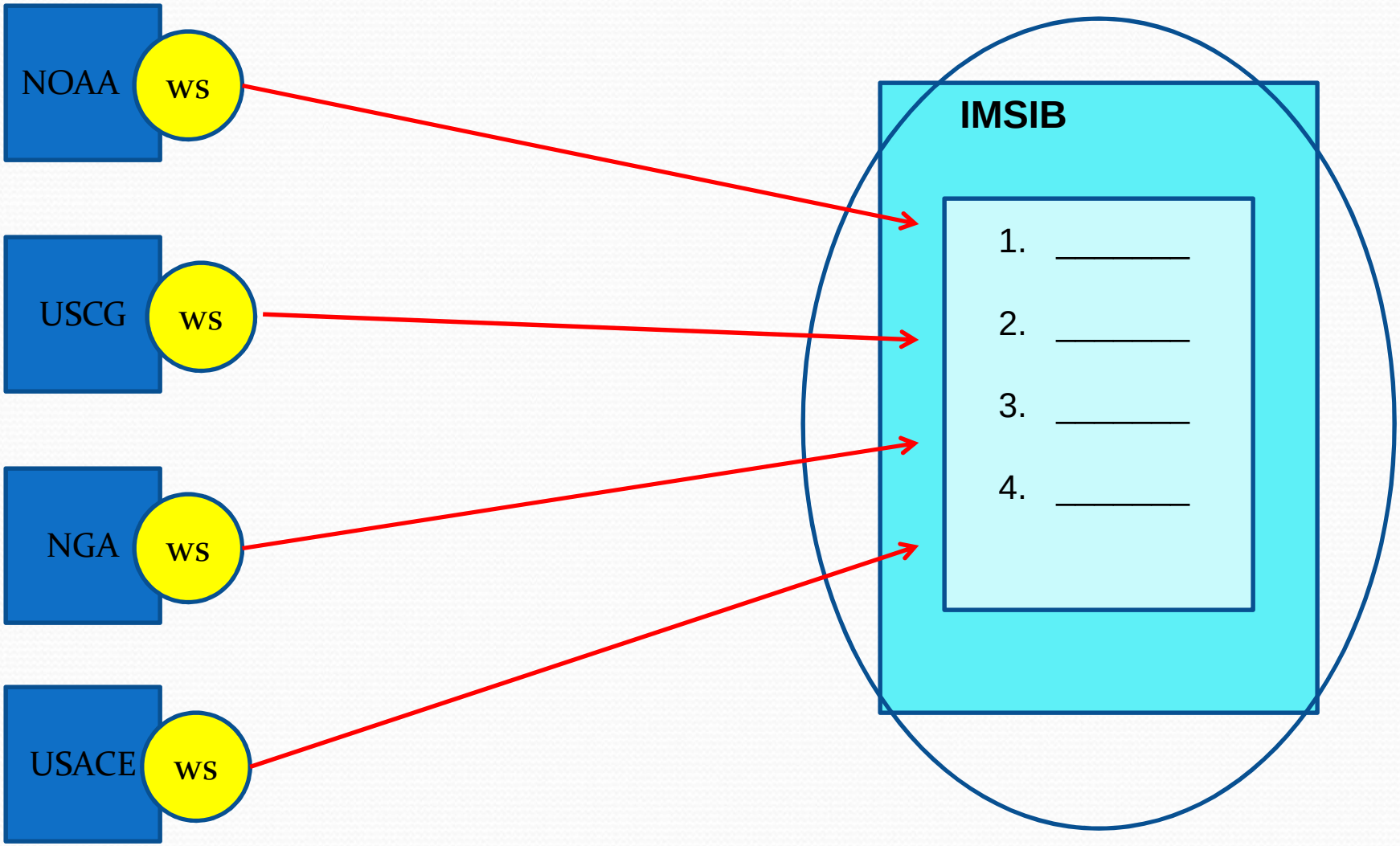
In Reply Refer to:
OP-TN, P.O. Box 2288, Mobile, AL 36628
251-694-3710

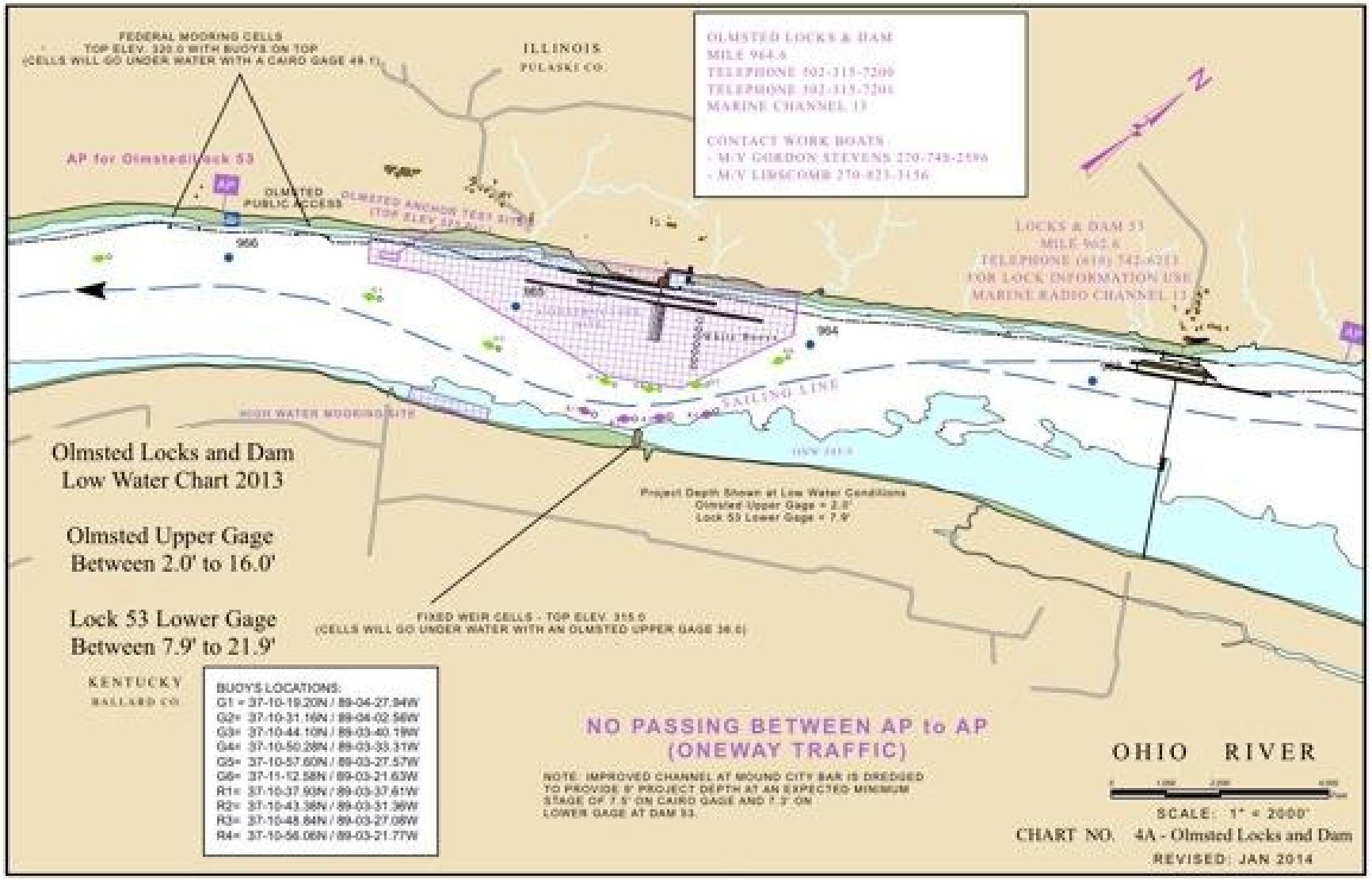
»Date Bulletin Issued	»Bulletin	»System/Location
9/17/2012	Navigation Bulletin No. 12-24	TENNESSEE-TOMBIGBEE WATERWAY, MISSISSIPPI
9/14/2012	Navigation Bulletin No.12-23	TENNESSEE-TOMBIGBEE WATERWAY, MISSISSIPPI
6/29/2012	Navigation Bulletin No. 12-17	BLACK WARRIOR & TOMBIGBEE RIVERS, ALABAMA
6/28/2012	Navigation Bulletin No. 12-16	TENNESSEE TOMBIGBEE WATERWAY, MISSISSIPPI
6/5/2012	Navigation Bulletin No. 12-15	TENNESSEE-TOMBIGBEE WATERWAY, MISSISSIPPI
6/5/2012	Navigation Bulletin No. 12-14	MOBILE SHIP CHANNEL, MOBILE CO., ALABAMA
6/5/2012	Navigation Bulletin No. 12-12	BLACK WARRIOR & TOMBIGBEE RIVERS, ALABAMA
6/4/2012	Navigation Bulletin No. 12-13	TENNESSEE-TOMBIGBEE WATERWAY, MISSISSIPPI
5/25/2012	Navigation Bulletin No. 12-11	TENNESSEE-TOMBIGBEE WATERWAY, MISSISSIPPI
5/9/2012	Navigation Bulletin No.12-10	TENNESSEE TOMBIGBEE,WATERWAY, MISSISSISSIPPI
5/4/2012	Navigation Bulletin No. 12-09	BLACKWARRIOR & TOMBIGBEE RIVERS, ALABAMA
5/3/2012	Navigation Bulletin No. 12-08	BLACKWARRIOR & TOMBIGBEE RIVERS, ALABAMA
4/25/2012	Navigation Bulletin No. 12-07	PERDIDO PASS, ALABAMA
4/3/2012	Navigation Bulletin No. 12-06	BLACK WARRIOR RIVER, ALABAMA
4/4/2012	Navigation Bulletin No. 12-05	BLACK WARRIOR RIVER, ALABAMA
3/5/2012	Navigation Bulletin No. 12-04	BLACK WARRIOR RIVER, ALABAMA
3/2/2012	Navigation Bulletin No. 12-03	GULF INTRACOASTAL WATERWAY/APALACHICOLA BAY, FLORIDA

Enhanced Marine Safety Information (eMSI)

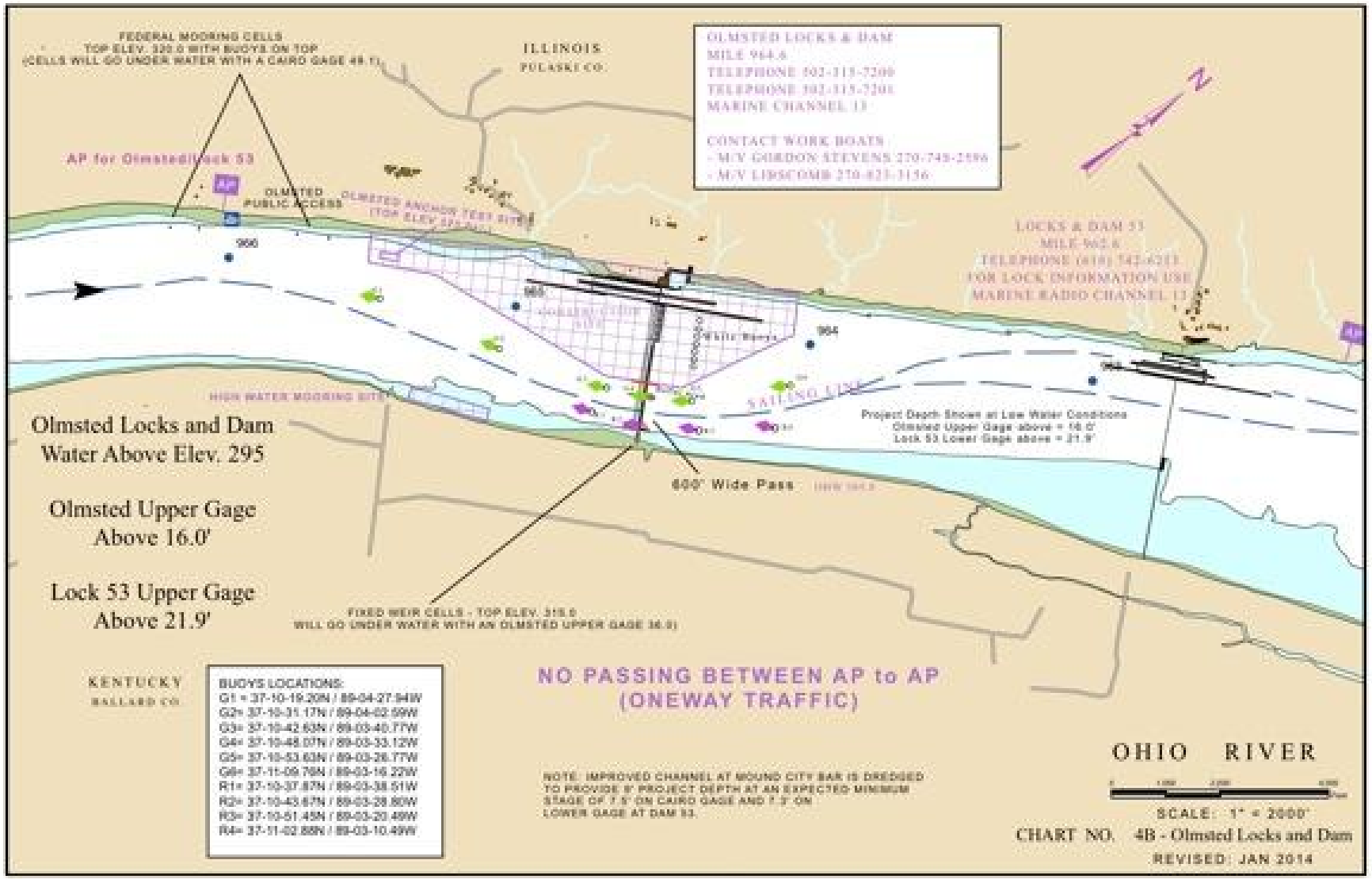
- Purpose: Coordinate various government-provided navigation information services:
  - USCG: Notices to Mariners (NTM)
  - USACE Notices to Navigation Interest
  - NOAA: Chart corrections/updates
  - NGA: International NTM
- Provide an "integrated navigation information bulletin"
  - Accessed and delivered electronically
  - Variety of formats available as web services
  - Transmitted via AIS
- Status
  - ~Monthly interagency meetings
  - Identifying common data fields, connectivity between agency systems
  - Goal: Demonstration web services by 30 Sep 14

Integrated “eMSI Bulletin” concept

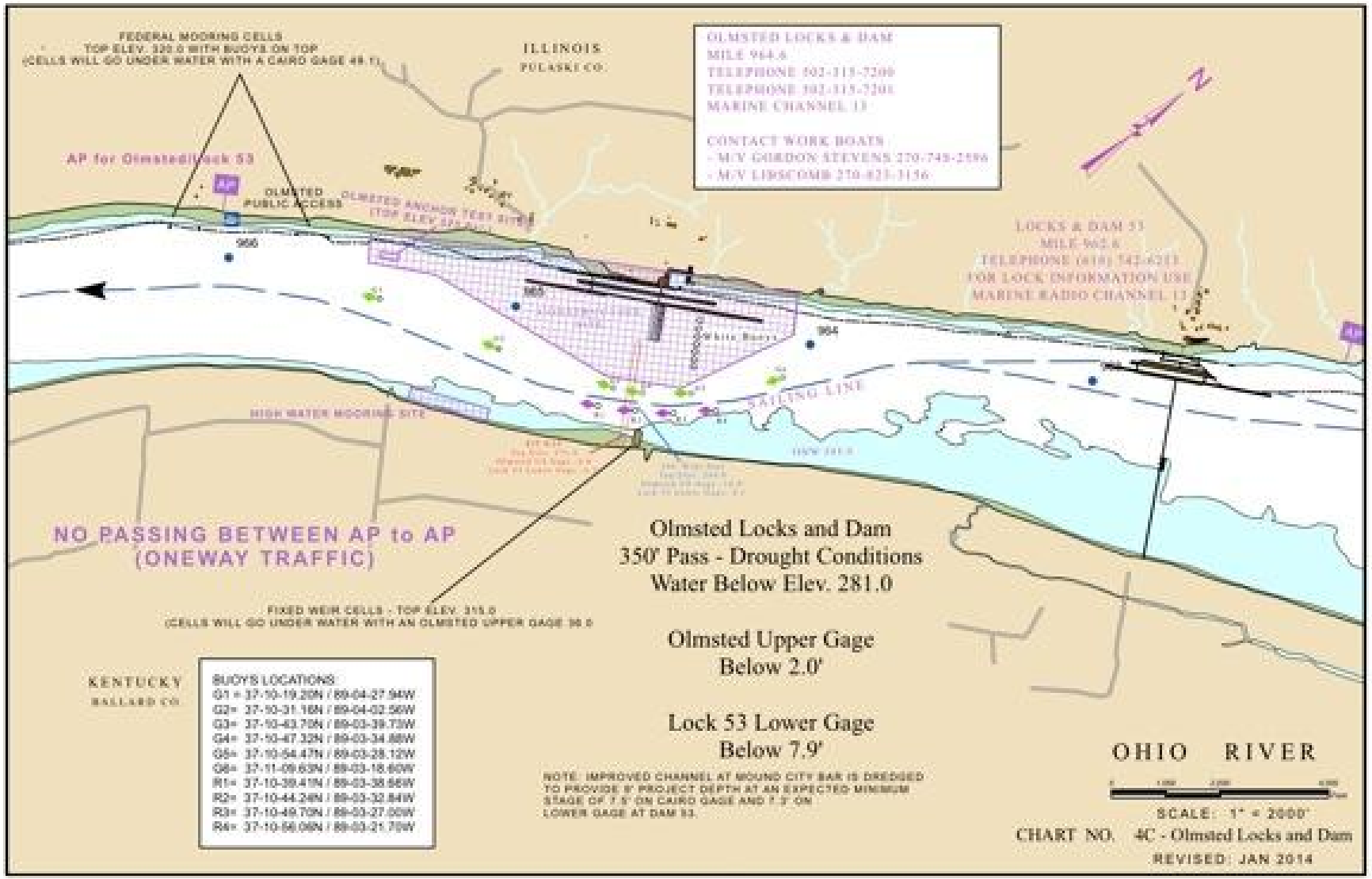




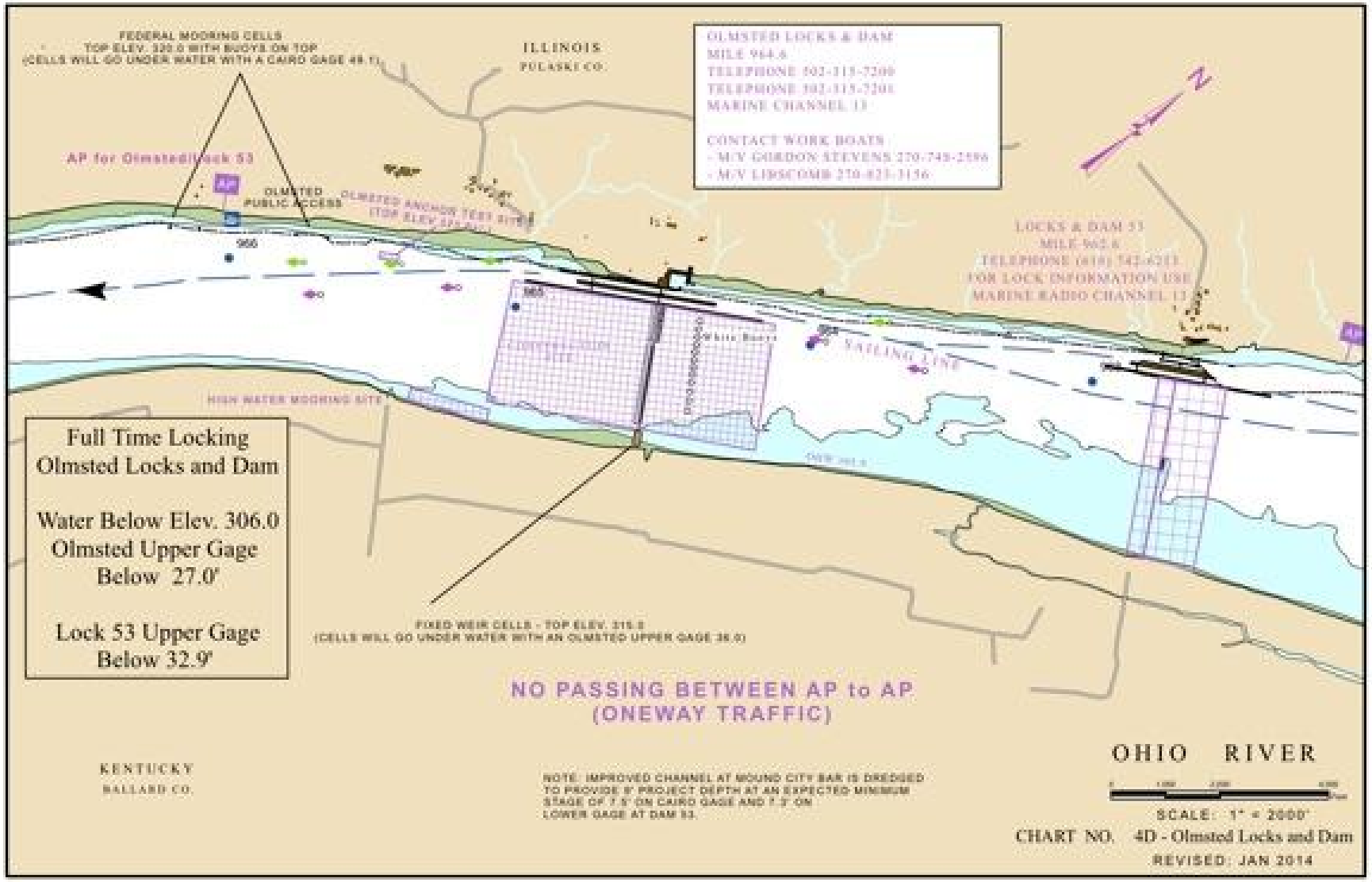
Olmsted Lock and Dam Construction project



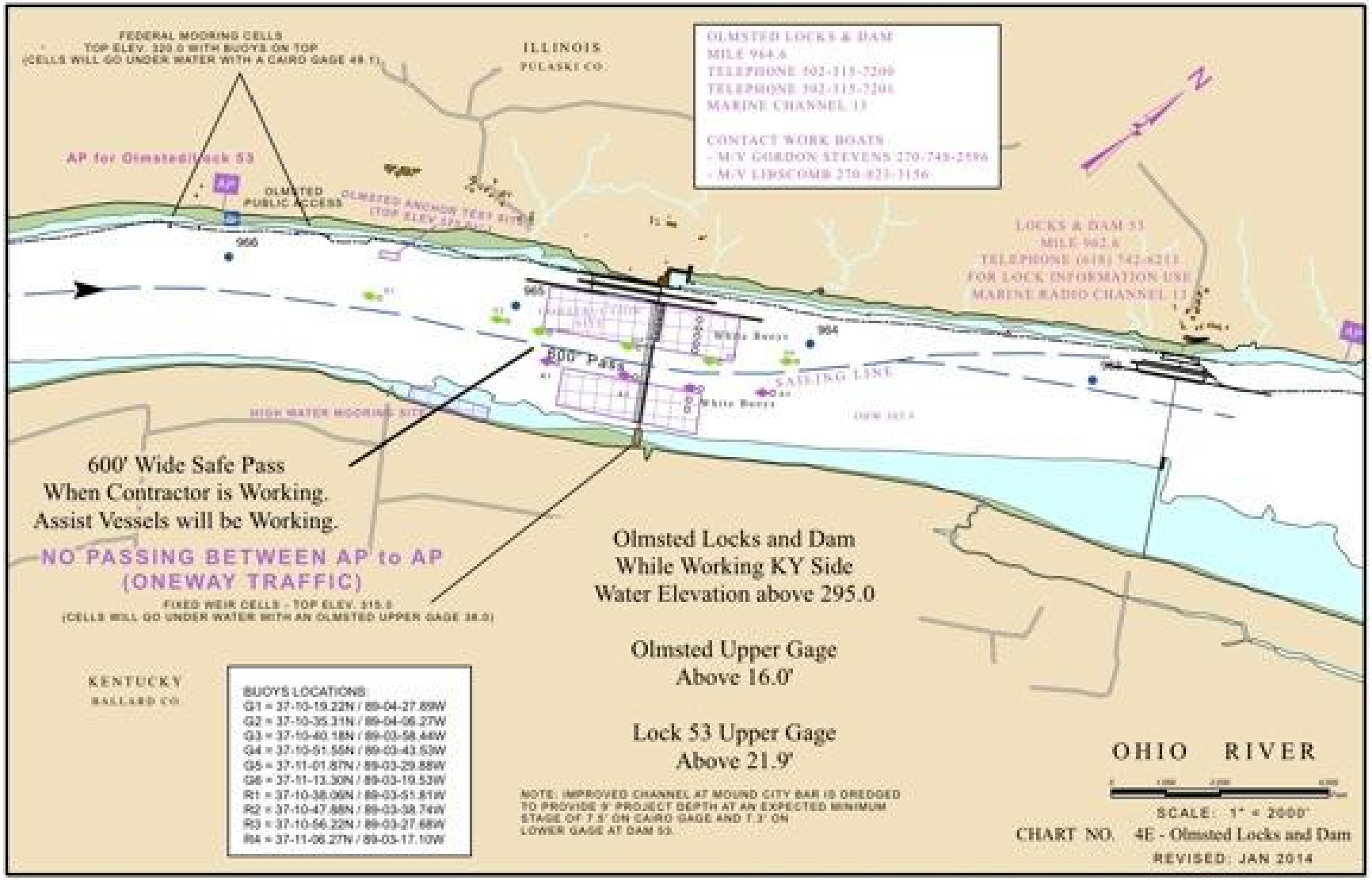
Olmsted Lock and Dam Construction project



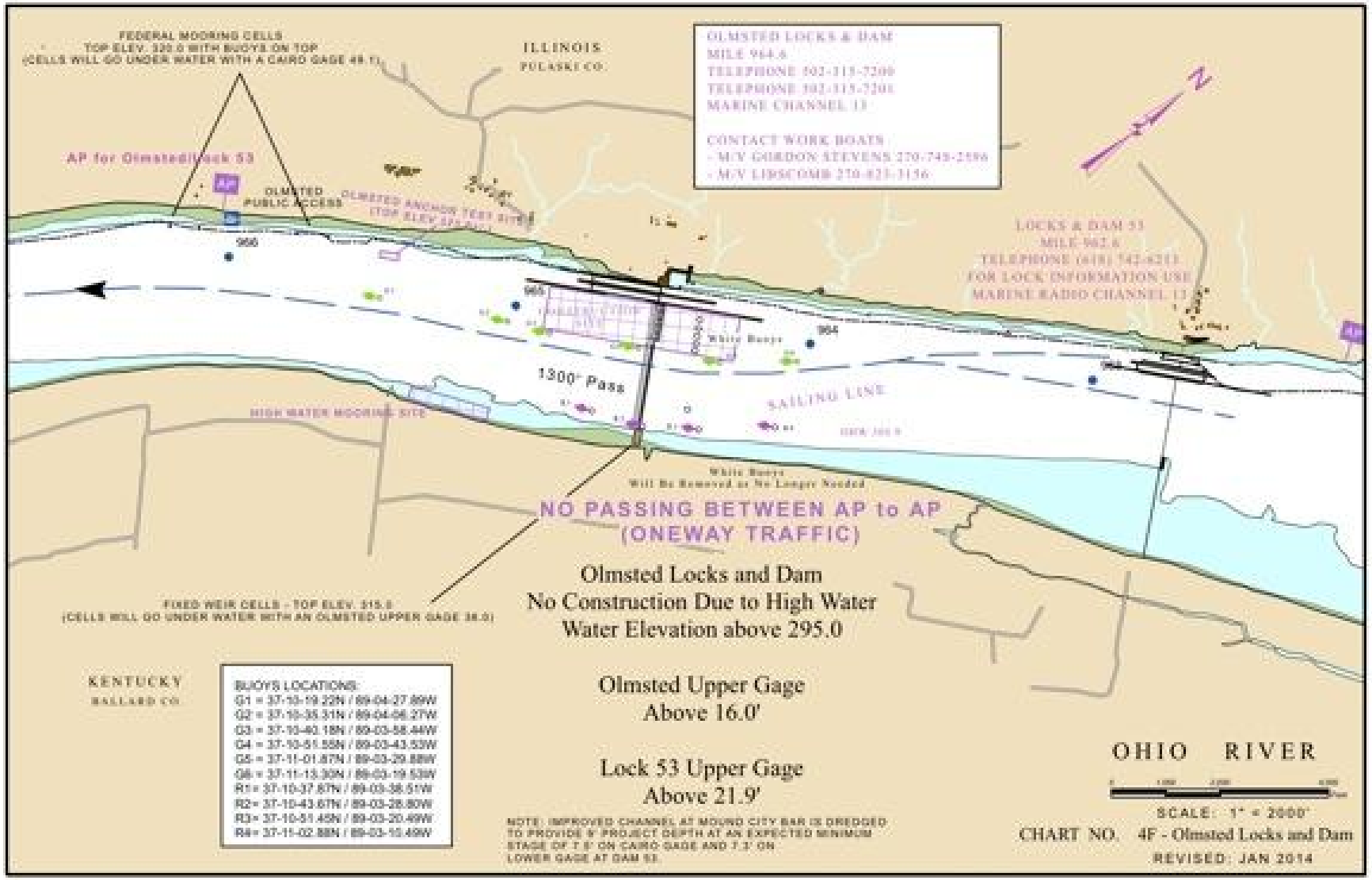
Olmsted Lock and Dam Construction project



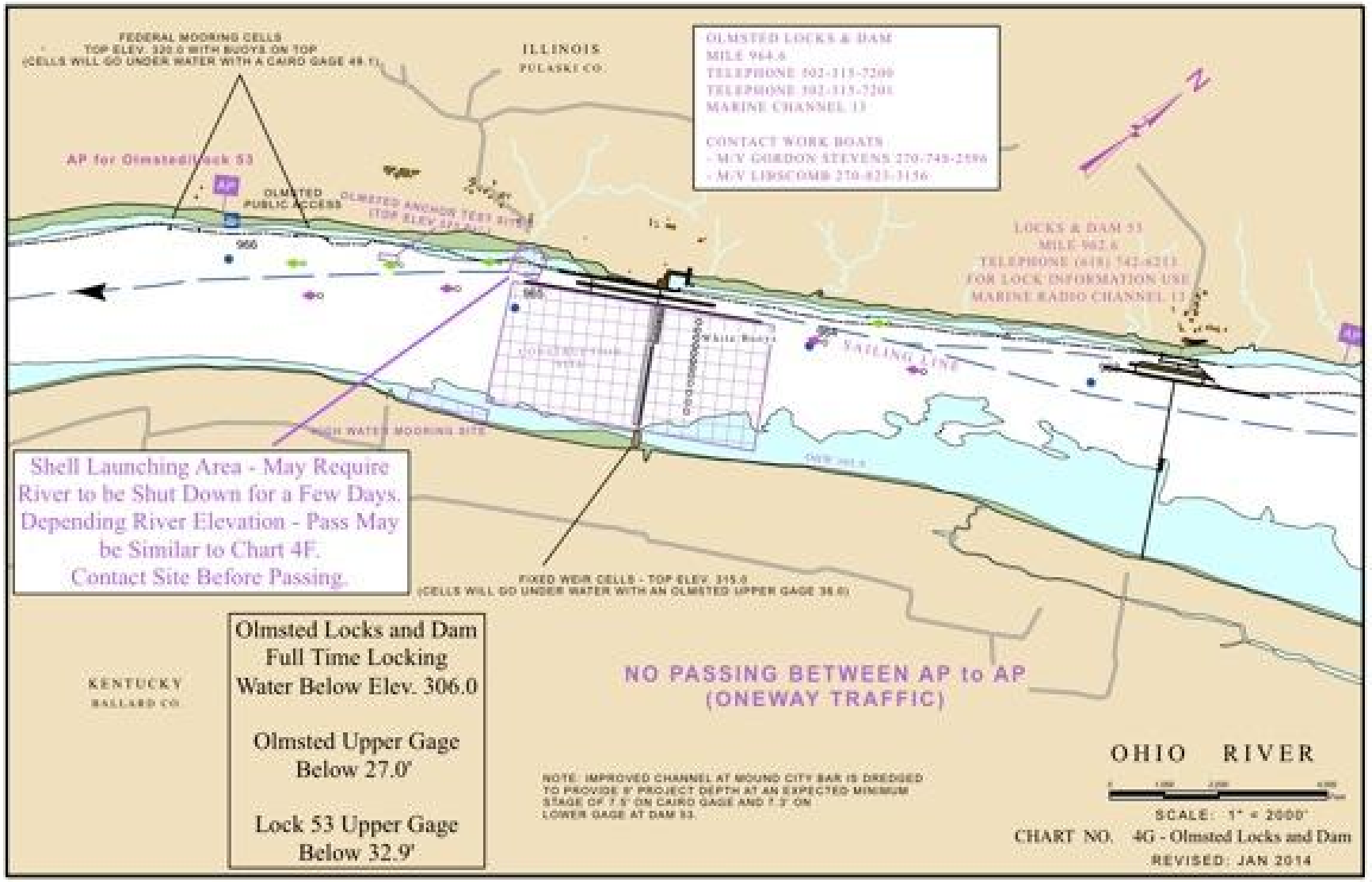
Olmsted Lock and Dam Construction project



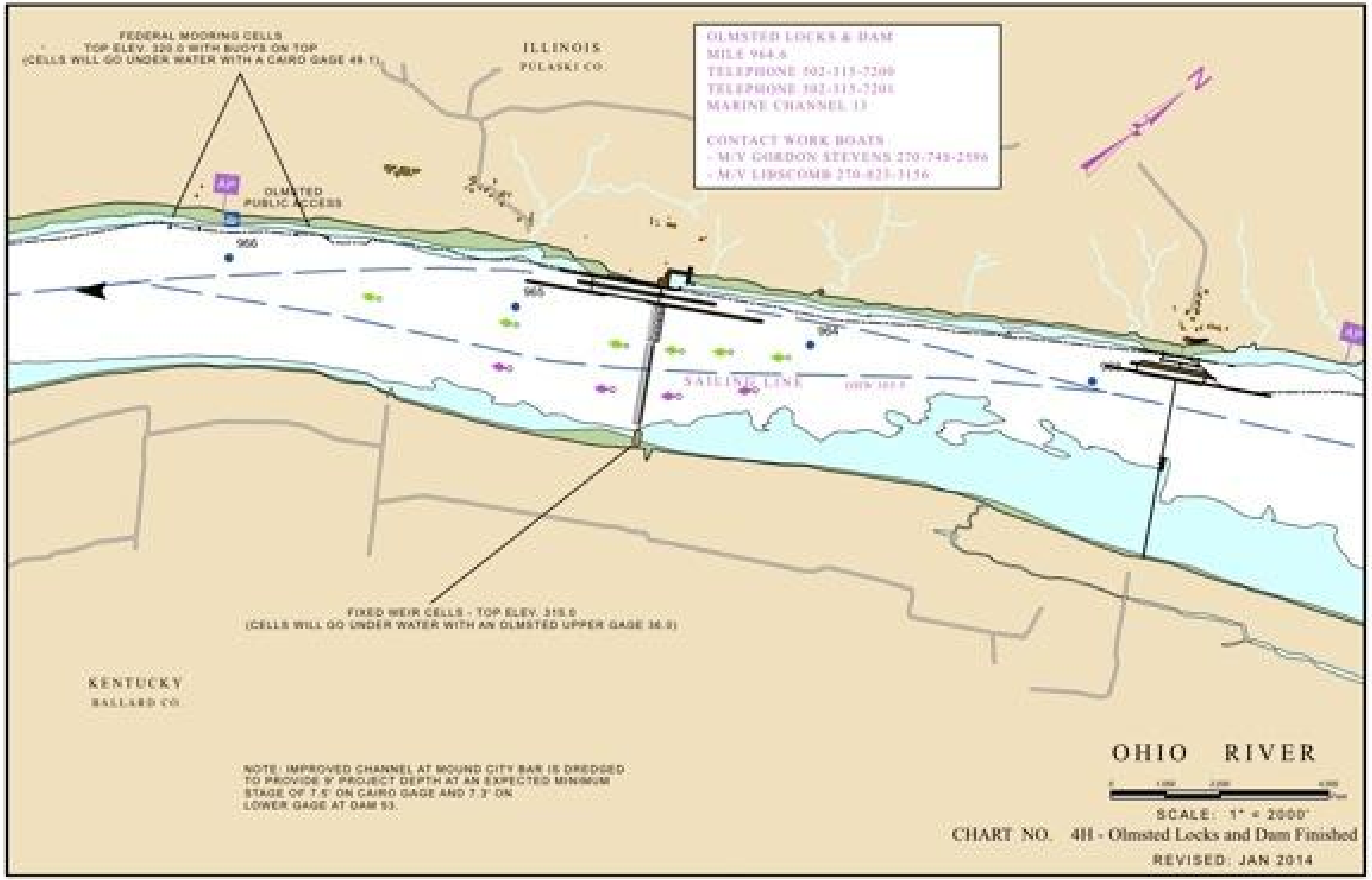
Olmsted Lock and Dam Construction project



Olmsted Lock and Dam Construction project



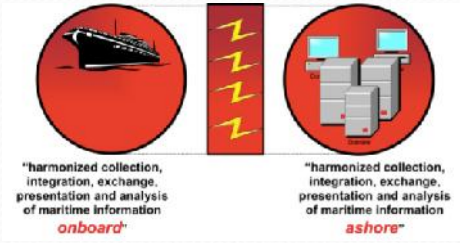
Olmsted Lock and Dam Construction project



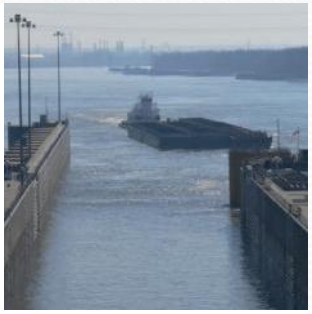
Olmsted Lock and Dam Construction project

Summary

- e-Navigation
  - "Three sides of the coin;" "analog to digital"
- Emerging technologies
  - LOMA
  - Expanded use of AIS
  - Enhanced Marine Safety Information (eMSI)
- More information:
  - "Future of Navigation" outreach effort
  - National Harbor Safety Committee Conference, Philadelphia, 25-27 August 14
  - eNavigation2014, Seattle, 12-13 November 2014, enavigation.org



Thank you for your attention!



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