

WELCOME

WALLA WALLA DISTRICT & PORTLAND DISTRICT NAVIGATION MEETING

15 MAY 2017

PORT OF MORROW SAGE CENTER



"The views, opinions and findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."



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NOTE:
TAMTER GATE

AGENDA (REVISED)

08:30-09:00	Sign-In	(coffee)
09:00-0910	Today's Meeting Objectives	Sheryl Carrubba; Navigation Program Manager, Northwestern Division
09:10 – 09:25	Welcoming Remarks	COL Jose Aguilar, Commander, Portland District LTC Damon Delarosa, Commander, Walla Walla District
	Slide Show and District Comments on the FY 2017 Extended Lock Outage	
09:25 -09:40	Portland District Projects	Dwane Watsek, Chief of Operations, Portland District
09:40-10:00	Walla Walla District Projects	Rick Werner, Chief of Operations, Walla Walla District
10:00 -10:45	Corps of Engineers River Information Services – Product Development	Brian Tetreault, Navigation System Specialist, ERDC

AGENDA (REVISED)

Break

11:00-11:50

Stakeholder After Action Discussion

**Beth Coffey, Chief Operations and
Regulatory, Northwestern Division**

**Kristen Meira, Executive Director,
Pacific Northwest Waterways
Association**

1150 - Noon

Closing comments

AFTER ACTION STAKEHOLDER REVIEW

THANK YOU FOR TAKING THE TIME TO TALK TO US ABOUT YOUR EXPERIENCE DURING THE EXTENDED OUTAGE

WE'LL RECORD YOUR COMMENTS TO IMPROVE OUR PROCESS

A Link to a DIGITAL copy of our AAR questionnaire will be posted on the Extended Outage Website:

<http://www.nww.usace.army.mil/Missions/Navigation/FY17LockOutage.aspx>



COLUMBIA-SNAKE RIVER NAVIGATION SYSTEM SPRING STAKEHOLDER MEETING

Dwane E. Watsek
Chief, Operations Division
Portland District
May 15, 2017



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BONNEVILLE LOCK AND DAM

Annual Preventative maintenance

- Tainter Valve Inspection
- Miter Gates
- Swing Bridge
- Oil purifying system

Inspect components and also replace consumable items

Changed broken or plugged grease lines on the Miter Gates

Performed maintenance on each Farval system as required annually.

Accomplished testing of fire system including the deluge for the downstream Miter Gates.

Performed Preventative Maintenance on various other auxiliary systems.

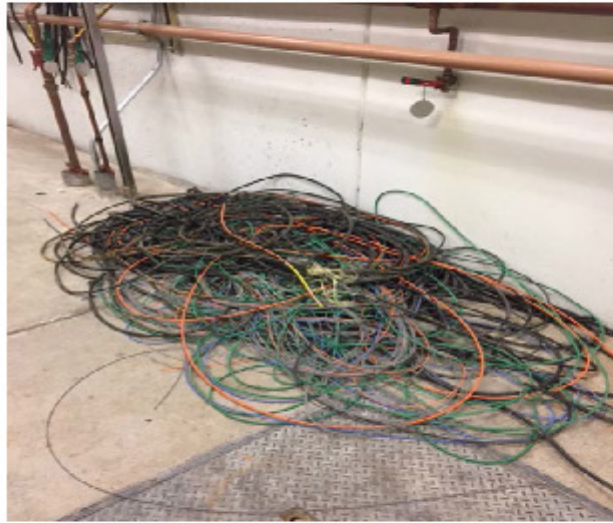
De-watered Miter Gates 1, 2 and 3 for visual inspections



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BONNEVILLE LOCK AND DAM



Security-Sensitive
Not Publicly
Releasable

Security-Sensitive
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Security-Sensitive
Not Publicly
Releasable

Security-Sensitive
Not Publicly
Releasable



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THE DALLES LOCK AND DAM

Annual Preventative Maintenance

Tainter Valves

Inspect bottom seal and pintle bearings Miter Gates 1 & 2

Provided safe access to construction contractor for periods of extended inclement weather

Provided full-time HEC management

External street lighting ground mitigations

Downstream Approach lighting received new fixtures and power supply circuit

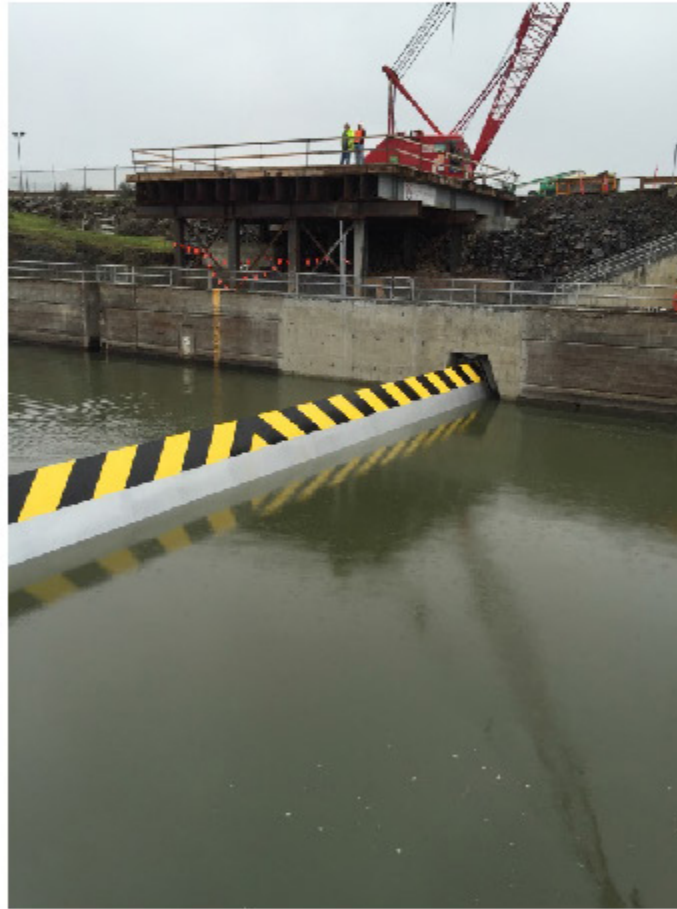


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THE DALLES LOCK AND DAM

Security-Sensitive
Not Publicly
Releasable



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JOHN DAY LOCK AND DAM

Annual Preventative Maintenance and inspections of all navigation lock systems/components, especially the gates, tainter valves, and mooring bits

Utilized newly acquired work tug to move the floating bulkhead between the Downstream Slot and its berth during the Maintenance Outage

Late in the maintenance cycle approximately 5 feet of the bearing shoe on the downstream gate was discovered missing - interim repair made until final repair to the 30 feet of bearing shoe can be done during the 2018 outage

A crack in Upstream Gate was repaired by welding.

Floating bulkhead pump #1 (of 4) was replaced

New cameras were installed at the lock stands to improve Operator visibility during lock operation

All work completed 2 days ahead of scheduled Return-to-Service of the lock



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JOHN DAY LOCK AND DAM



Adverse winter weather with ice build up in the lock chamber



Newly acquired work tug for moving and positioning the floating bulkhead



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2016-2017 EXTENDED NAVIGATION OUTAGE

Walla Walla District
Rick Werner, NWW Operations Chief

NWD/PNWA Spring Navigation Meeting
15 May 2017

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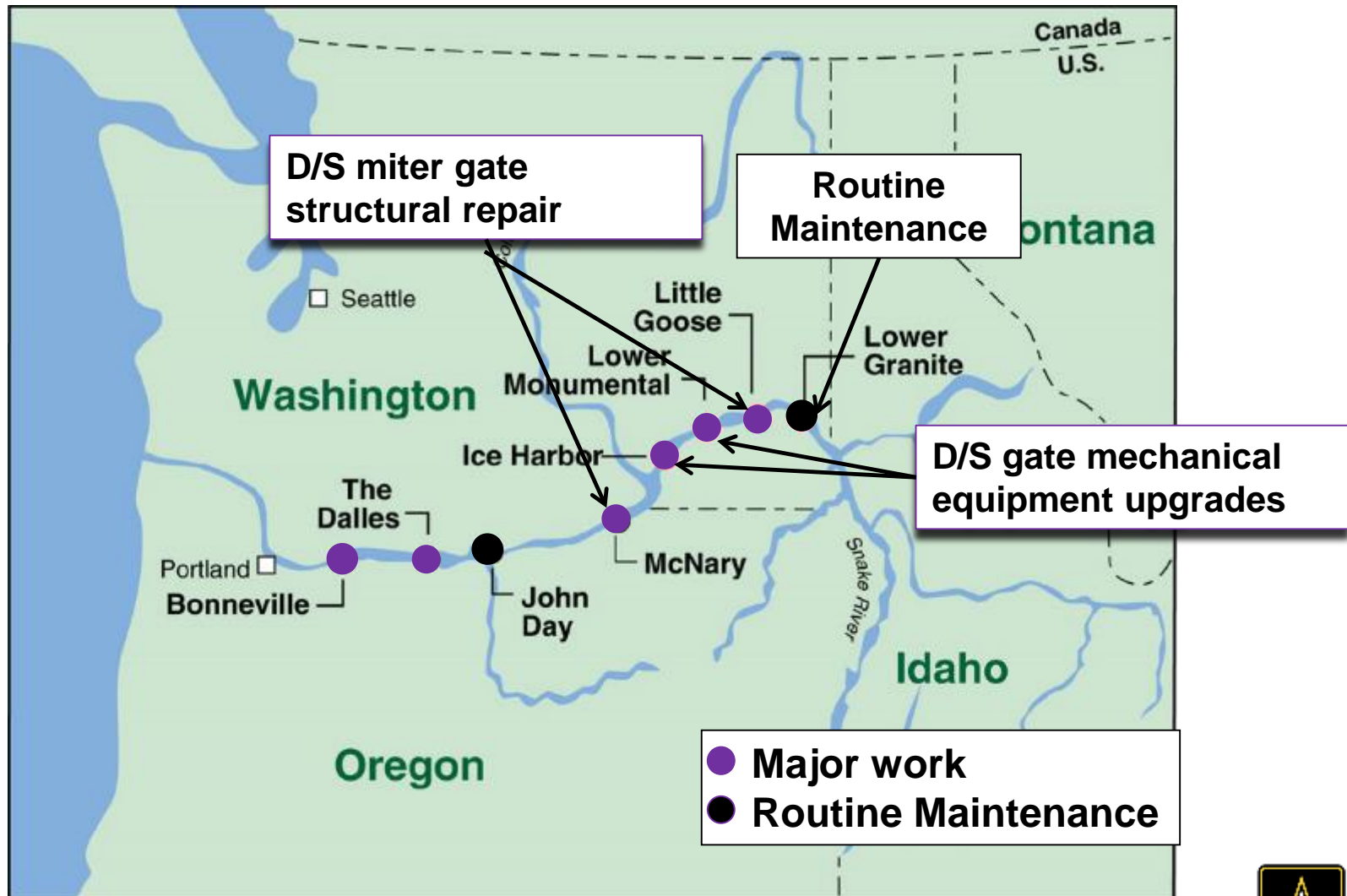


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CSRS EXTENDED LOCK OUTAGE

(12 DEC 2016 – 20 MAR 2017)



MCNARY DOWNSTREAM MITER GATE REPAIRS

Scope:

- Structural crack repairs
- Gudgeon line boring and pin replacement
- Replacement of bottom seal
- Replacement of timber fenders



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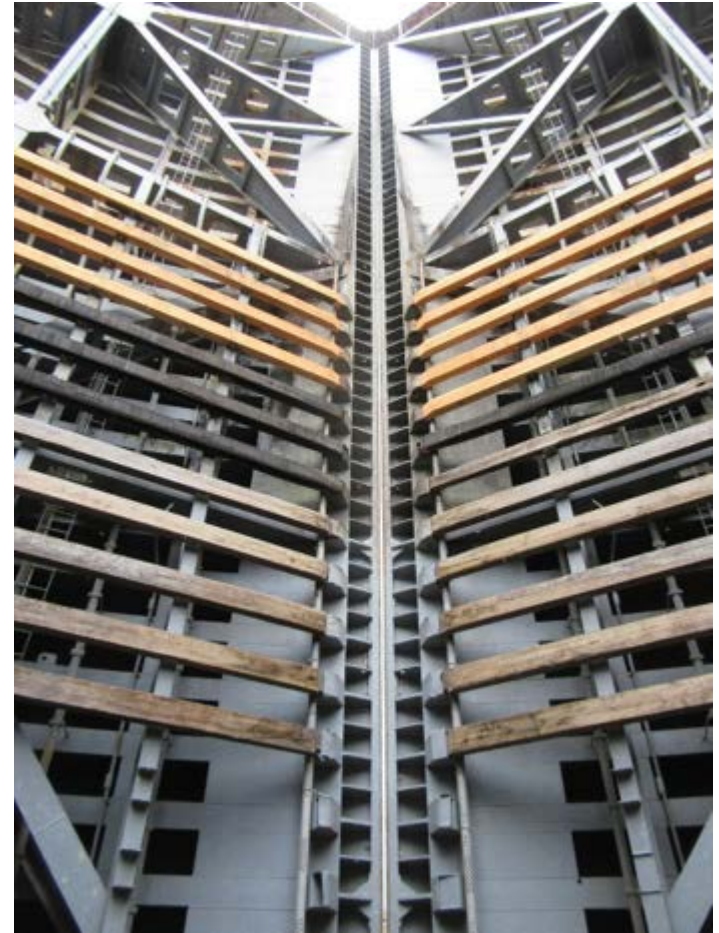


MCNARY D/S MITER GATE REPAIRS

All contract work completed one day ahead of schedule.

Water-up and post-construction operational tests held 14-16 March 2017.

MNA Returned to service on 17 March 2017



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MCNARY TAINTER VALVES 1 & 3



MCNARY TAITNER VALVES 1 & 3



ICE HARBOR DOWNSTREAM GATE MACHINERY REPLACEMENT

Scope: Upgrade the downstream lift gate machinery to include:

- Replace machinery and controls
- Replace the bull gear ring



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ICE HARBOR D/S GATE



Bull gear replacement/pinion/shaft repairs

LOWER MONUMENTAL DOWNSTREAM GATE MACHINERY REPLACEMENT

Scope: Upgrade the downstream lift gate machinery to include:

- Replace machinery and controls
- Repair the sheave



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LOWER MONUMENTAL D/S GATE



Replace machinery and controls



LOWER MONUMENTAL D/S GATE



Repair the sheave



LOWER MONUMENTAL D/S GATE

Sheave Repairs



LITTLE GOOSE DOWNSTREAM GATE REPAIRS

- Scope: Conduct critical structural repairs to the downstream miter gate
 - ▶ Structural repairs
 - ▶ Gudgeon and pintle replacement
 - ▶ Quoin and miter seal repairs



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LITTLE GOOSE D/S GATE



Gudgeon repairs, quoin and miter seal work



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LITTLE GOOSE D/S GATE



Pintle ball and receiver replacement



LITTLE GOOSE D/S GATE

Gate in mitered position



WHAT WENT RIGHT

- Good scopes of work for length of outage.
- Able to overcome weather impacts
- Stakeholder communications



WHAT DID NOT GO SO WELL

- Little Goose: Original contractor/COE communications
- Ice Harbor: Sheave noise discovered during final testing



US Army Corps of Engineers e-Navigation developments

ERDC
Engineer Research and
Development Center

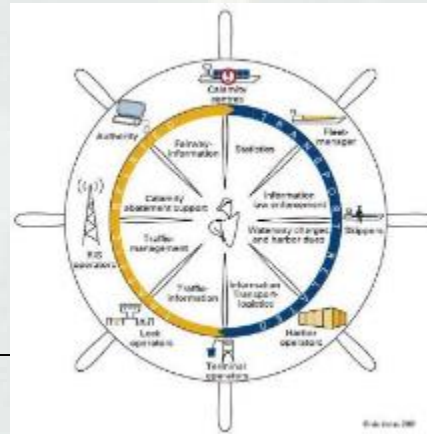
Columbia-Snake River Navigation Meeting
15 May 2017
Sage Center – Boardman, OR

Brian Tetreault
US Army Corps of Engineers
Coastal and Hydraulics Laboratory
US Army Engineer R&D Center



USACE e-Navigation capabilities and projects

- Lock Operations Management Application (LOMA)
- AIS analysis capabilities
 - ▶ AISAP
- AIS Transmit capabilities
 - ▶ Olmsted
 - ▶ Mat Sinking Unit
 - ▶ Lock approach modeling
- *River Information Services*
- *eHydro*



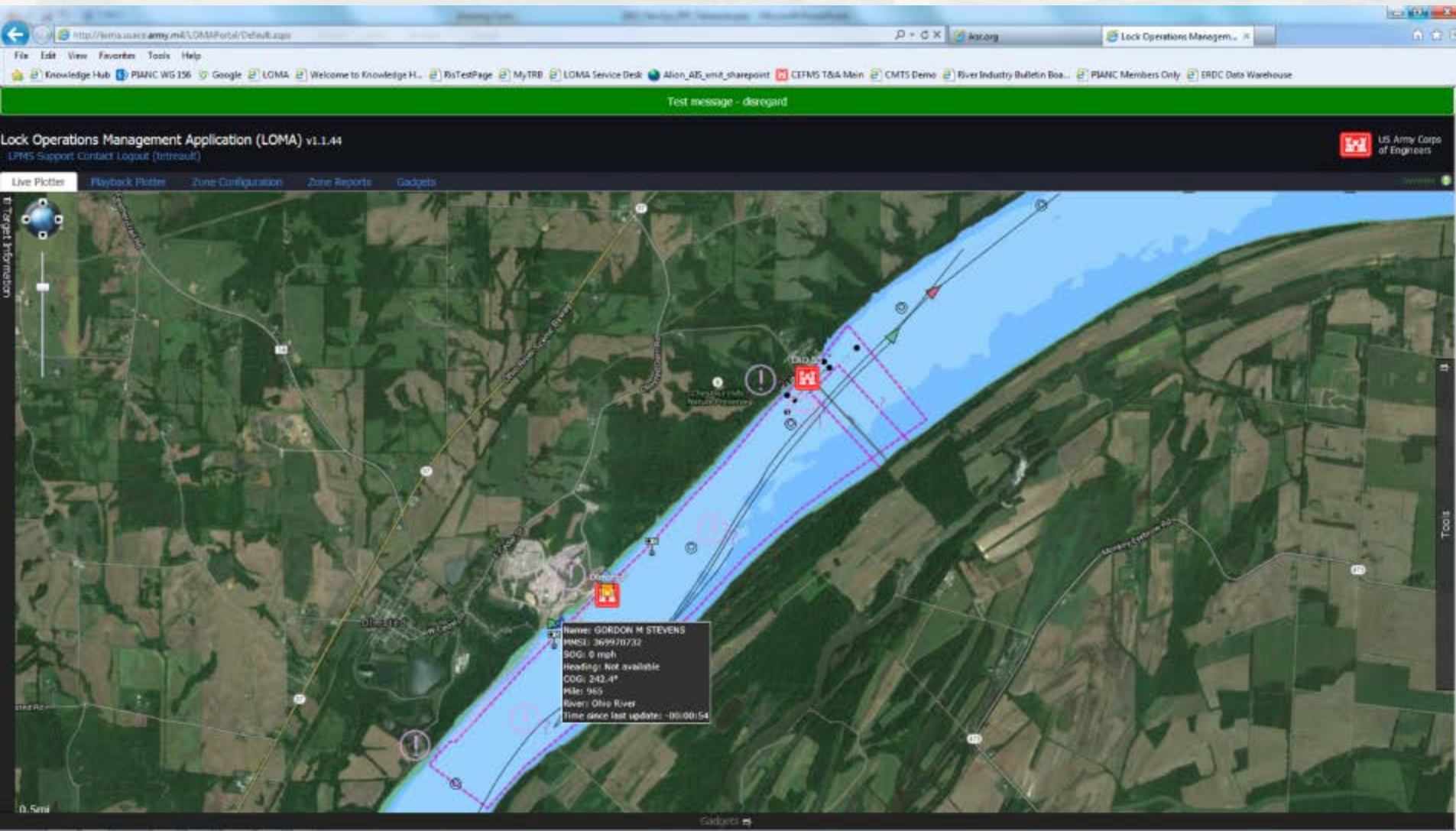
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Current LOMA Capabilities

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



LOMA - Zones

Lock Operations Management Application (LOMA) v1.1.44
LPMS Support Contact Logout (mfwink)

Live Plotter Playback Plotter Zone Configuration Zone Reports Gadgets

Target Information	
Name	JOHN D NUGENT
MMSI	367057860
Callsign	WDC6557
Latitude	037°13'42"N
Longitude	088°57'32"W
SOG	8.2 kts
Heading	Not available
COG	268.6°
Nav Status	Under Way Engine
Operating Mode	Autonomous
Rate Of Turn	Not available
Destination	CAIRO
Length	134.48 ft
Beam	45.92 ft
Type of Ship	Vessel - Towing
Type of Cargo	N/A
CargoType	31
IMO Number	0
Draught	9.51 ft
Nav Sensor	GPS
DTE Status	Available
Nationality	United States of

Gadgets

Targets In Olmsted

- MAVERICK
- LIPSCOMB
- KALLI C. EYMARD
- OLM0032

Zone Report

Lock Operations Management Application (LOMA) v1.1.44
 LPMS Support Contact Logout (mfwink)

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Live Plotter Playback Plotter Zone Configuration **Zone Reports** Gadgets

Show 10 entries Search:

Zone Name	MMSI	Vessel Name	Cargo Type	Ship Type	Entry Time	Exit Time	Time in Zone	SOG	COG	CalSign	Mile Mark	River	Nationality	Lat/Lon	Zone Owner
Vbg-UST	367434080	DON BOLING	N/A	Towing	1/11/2016 2:06:14 PM	1/11/2016 2:16:33 PM	0:10:19	11 kts	96.8	WDF2979	440	Mississippi River Mouth of Ohio River to Baton Rouge LA	United States of America	032°20' 46"N 090° 56'21"W	mfwink
Vbg_DST	366862710	WALTER BLESSEY JR	N/A	Towing and length of the tow exceeds 200 m or breadth exceeds 25 m	1/11/2016 1:45:40 PM	1/11/2016 1:52:31 PM	0:06:51	12.3 kts	232.6	WDA9212	433	Mississippi River Mouth of Ohio River to Baton Rouge LA	United States of America	032°17' 19"N 090° 56'09"W	mfwink
Vbg-UST	366862710	WALTER BLESSEY JR	N/A	Towing and length of the tow exceeds 200 m or breadth exceeds 25 m	1/11/2016 1:15:51 PM	1/11/2016 1:25:11 PM	0:09:20	12.6 kts	96	WDA9212	440	Mississippi River Mouth of Ohio River to Baton Rouge LA	United States of America	032°20' 43"N 090° 56'21"W	mfwink
Vbg_DST	366996740	LYDIA BRENT	N/A	Fishing	1/11/2016 1:13:51 PM	N/A	1:14:02	3.8 kts	45.9	WDC2716	433	Mississippi River Mouth of Ohio River to Baton Rouge LA	United States of America	032°17' 29"N 090° 56'16"W	mfwink
Vbg_DST	367402880	BIG VALLEY 499	All ships of this type	Passenger ships	1/11/2016 12:20:41 PM	1/11/2016 12:35:31 PM	0:14:50	12.2 kts	35.7	WCZ7096	435	Mississippi River Mouth of Ohio River to Baton Rouge LA	United States of America	032°18' 28"N 090° 54'59"W	mfwink



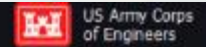
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Lock ETA

Lock Operations Management Application (LOMA) v1.1.44

LPMS Support Contact Logout (mfwink)



Live Plotter Playback Plotter Zone Configuration Zone Reports Gadgets connected

Target Information	
Name	CITY OF JOLIET
MMSI	365947464
Callsign	WDC2653
Latitude	038°54'27"N
Longitude	090°13'15"W
SOG	3.8 kts
Heading	Not available
COG	312.8°
Nav Status	Undefined
Operating Mode	Autonomous
Rate Of Turn	Not available
Length	36.08 ft
Beam	164.00 ft
Type of Ship	Vessel - Towing
Type of Cargo	N/A
CargoType	31
IMO Number	1048576
Draught	10.50 ft
Nav Sensor	GPS
DTE Status	Available
Nationality	Not found
LockETA	1/11/2016 9:37:30 PM
Lock	L&D 25
Mile	205
PreviousMile	204

Map: Satellite view of the Mississippi River locks area. A red icon representing the 'CITY OF JOLIET' is positioned near the West Alton Lock. A tooltip for this target displays: Name: CITY OF JOLIET, SOG: 3.8 kts, LockETA: 1/11/2016 9:37:35 PM, Mile: 205, Time since last update: 00:00:12, Nearest Lock: L&D 25. Other locations visible include East Alton, Wood River, Hartford, South Roxana, and Rozana. A scale bar shows 0.5mi and 5km. Coordinates at the bottom right are 038°54'24"N 090°13'07"W.

Notifications Gadgets

Targets in Vbg-UST MVD_TestLock Status SMART Gate - Demo



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COASTAL & HYDRAULICS
LABORATORY

Additional LOMA Capabilities

Filter Selection

MMSI:

Target Type:

Class A
Class B
Base Station
AtoN

Vessel Type:

Pilot
Search and rescue Vessels
...
WIG - No Sub Type
WIG - Hazard Category X
...
Vessel - Fishing

Nav Status

Underway Using Engine
At Anchor
Not Under Command
...

Vessel Size:

From:

To:

SOG:

From:

To:

Playback query

Target Type:

Class A
Class B
AToN
Base Station
Met/Hydro

Navigation Status:

Under way using engine (0)
At anchor (1)
Not under command (2)
Restricted manoeuvrability (3)
Constrained by her draught (4)

Vessel Type:

Reserved for future use - No Sub Type (1)
WIG - No Sub Type (2)
Vessel - No Sub Type (3)
HSC - No Sub Type (4)
Special Craft - No Sub Type (5)

Vessel Length:

From: m

To: m

Vessel Speed:

From: kts

To: kts

Live target display filter



Vessels of interest selection and display

Vessels of Interest

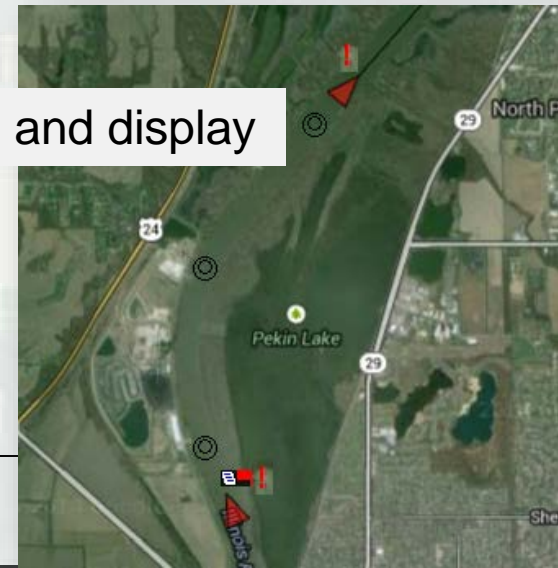
[Minimize](#) [Close](#) [Delete](#)

Vessels

- [TY DOLESE](#)
- [VIRGINIA RENEE](#)
- [SYNERGY](#)

River/Mile

- Yazoo River MS Mile 4
- Ohio River Mile 9
- Cumberland River Mouth to Nashville TN Mile 21



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Incident playback

Using LOMA data and interface

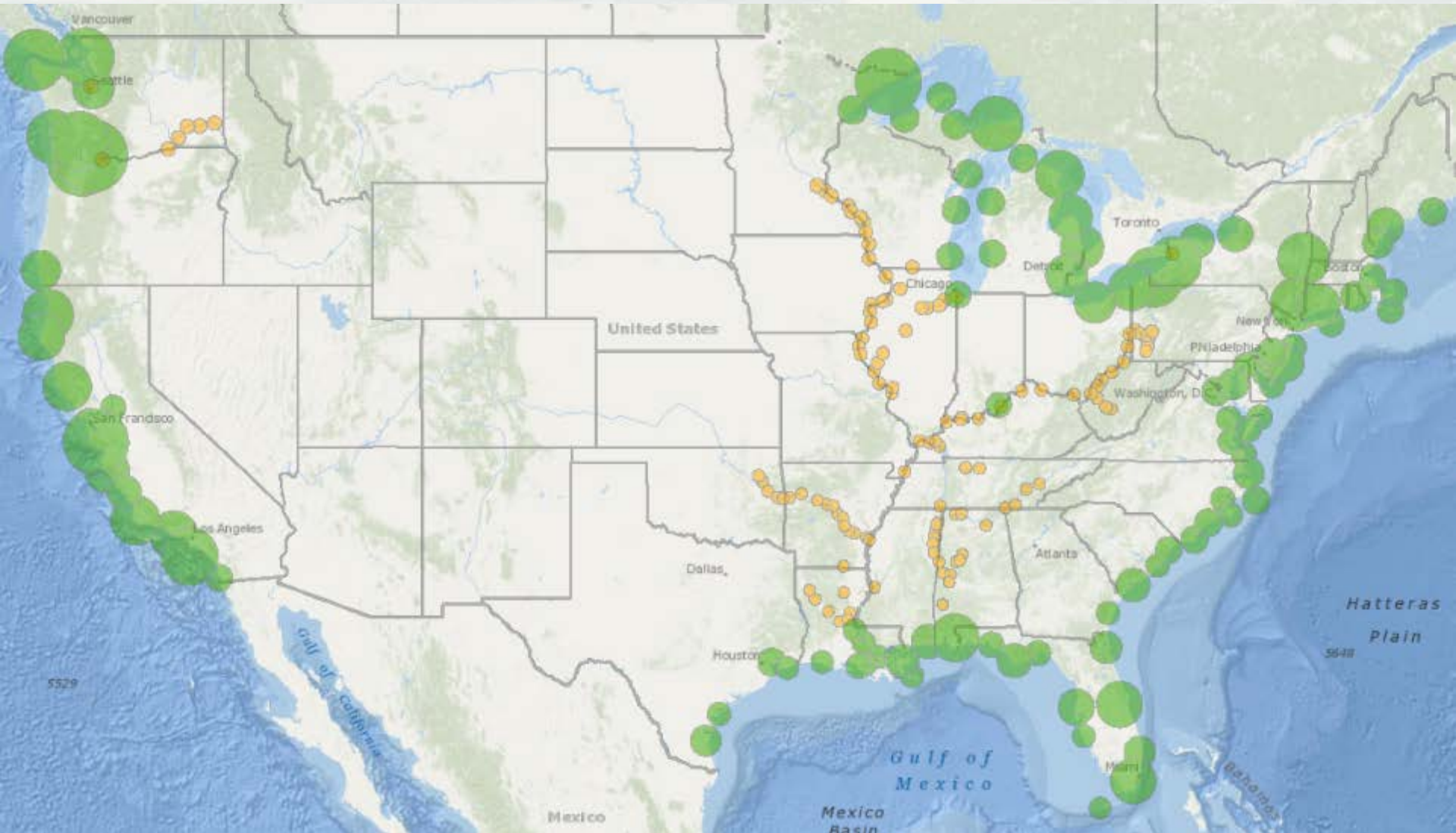


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USACE-USCG AIS coverage



AIS Analysis Portal (AISAP)

The screenshot displays the AISAP web application interface. The browser address bar shows the URL <http://ais-portal.usace.army.mil/>. The page header includes the AISAP logo, navigation links for "Data Requests", "Logged in as: kenneth.n.mitchell@usace.army.mil", "Base Map", "Toggle Layers", and "Measure".

The main content area is divided into a sidebar on the left and a map on the right. The sidebar contains the following sections:

- Notes:** A text input field.
- Source:** "Request 50178: Chesapeake Entrance; Aug. 2015; 5-min data (kenneth.n.mitchell@usace.army.mil)".
- Areas of Interest:** A table with tabs for "Edit AOIs", "Edit Vectors", and "Analysis".

Name	<input checked="" type="checkbox"/>	↑	<input checked="" type="checkbox"/>	V	<input checked="" type="checkbox"/>	C
Chesapeake_entrance	<input checked="" type="checkbox"/>	↑	<input type="checkbox"/>	V	<input type="checkbox"/>	C
Baltimore	<input checked="" type="checkbox"/>	↑	<input type="checkbox"/>	V	<input type="checkbox"/>	C
C&D Canal	<input checked="" type="checkbox"/>	↑	<input type="checkbox"/>	V	<input type="checkbox"/>	C
Norfolk-Hampton Rds	<input checked="" type="checkbox"/>	↑	<input type="checkbox"/>	V	<input type="checkbox"/>	C

The map on the right shows a satellite view of the Chesapeake Bay area with a heatmap overlay. The heatmap uses a color scale from blue (low density) to red (high density) to represent AIS data. A white line with circular markers follows the main waterway. The map includes zoom controls (+/-) and a copyright notice at the bottom: "Copyright © 2013 ESRI, i-cubed, GeoEye | Earthstar Geographic. esri".

Summary statistics

Summary

Report Date Range: 2015-02-28T18:00:00 to 2015-03-06T18:00:00

Num Reports: 6968

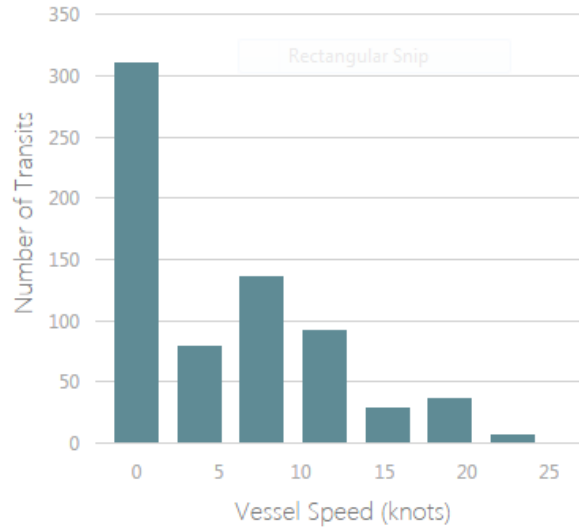
Num Unique Vessels: 68

Num Transits: 688

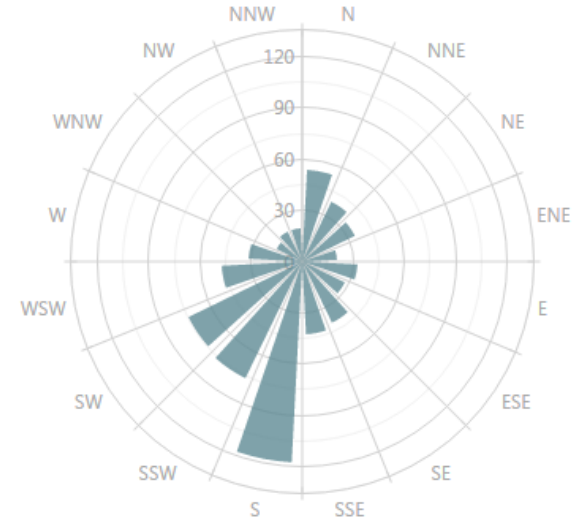
Traffic Sample Statistics

Metric	Mean	StdDev
Vessel Draft (ft)	14.73	11.94
Vessel Length (ft)	260.32	281
Vessel Width (ft)	53.13	40.06
Vessel Speed (knots)	4.24	1.31

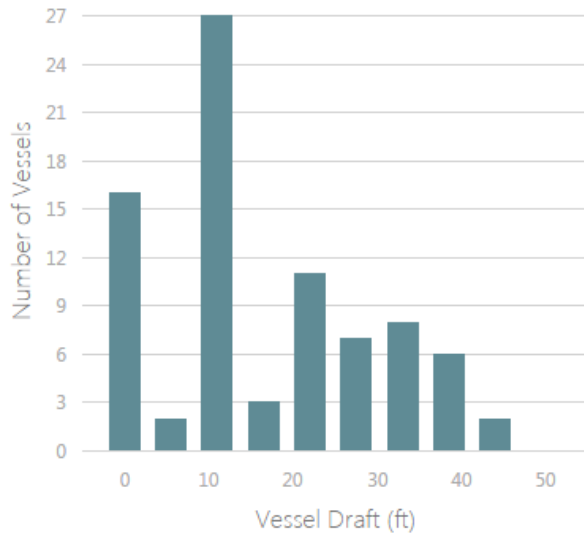
Vessel Speed



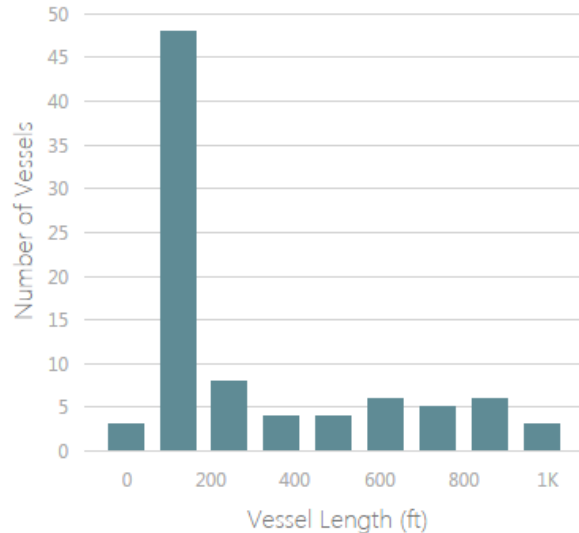
Vessel Course



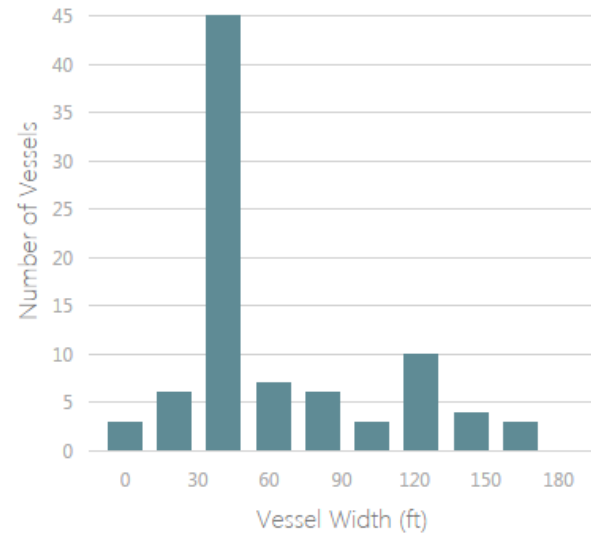
Vessel Draft



Vessel Length

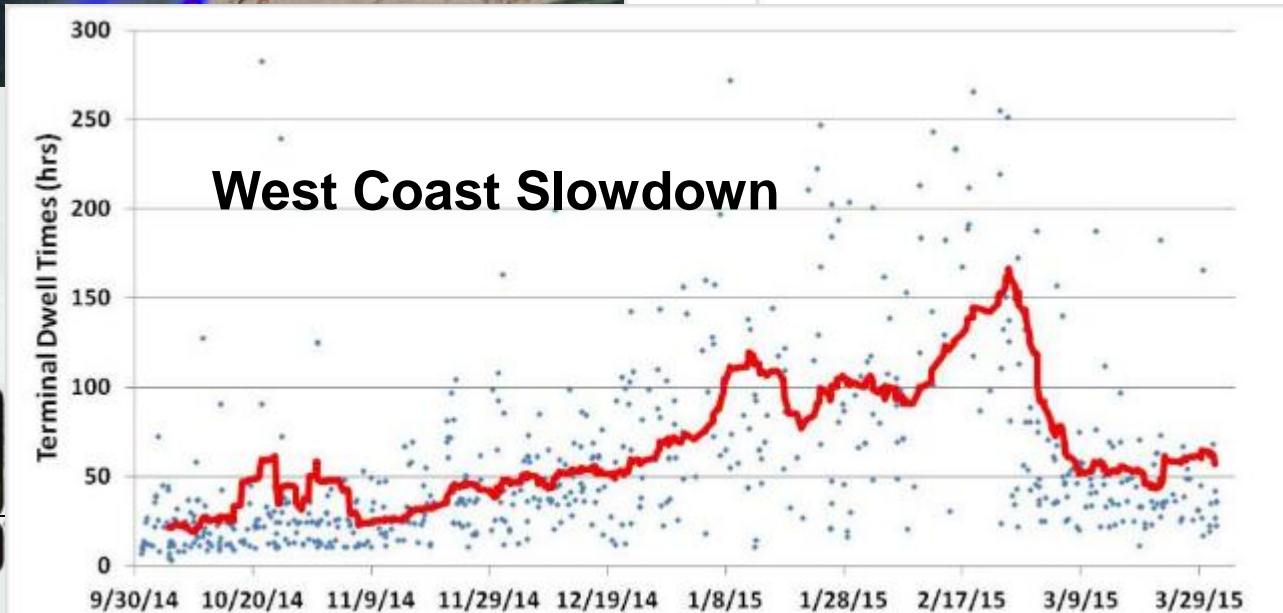
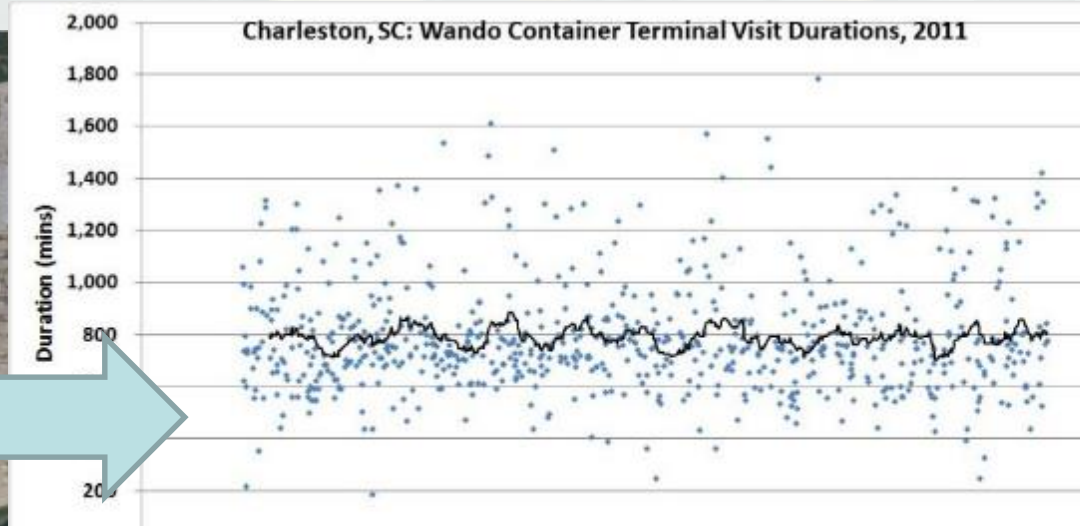
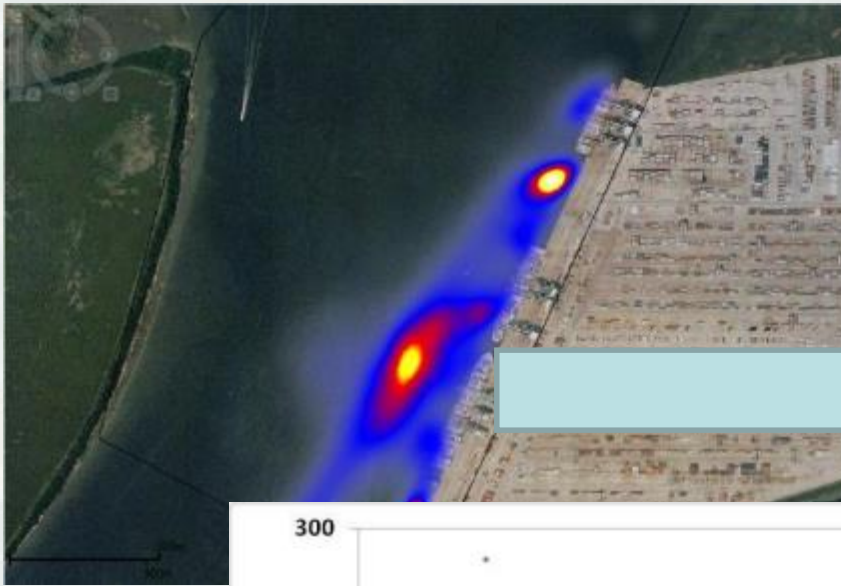


Vessel Width



Potential Applications

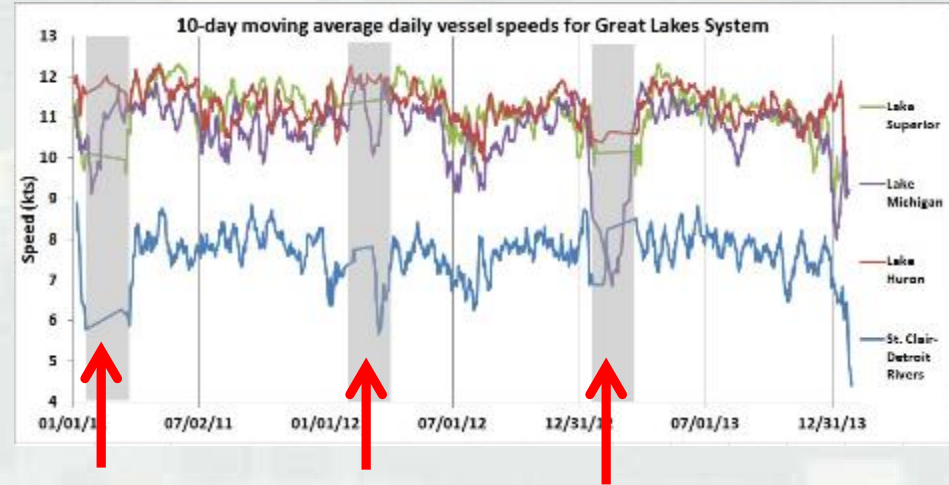
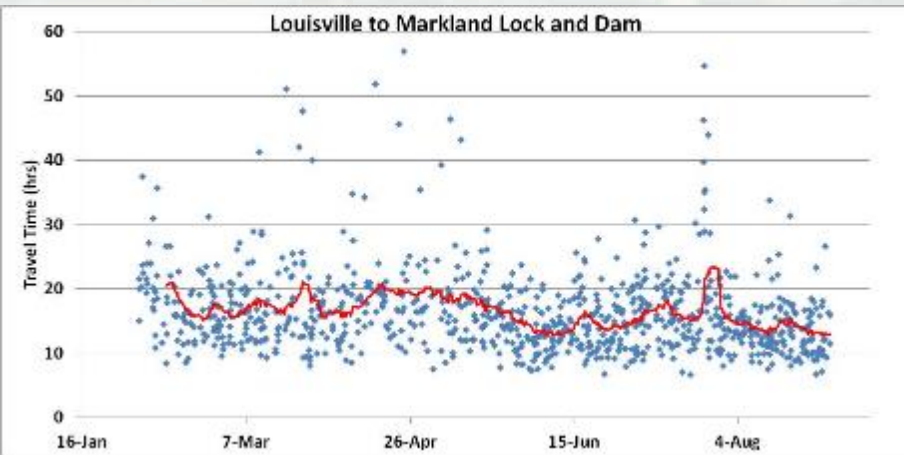
Port dwell times



6/2011 9/14/2011 11/3/2011 12/23/2011



Vessel travel time analysis



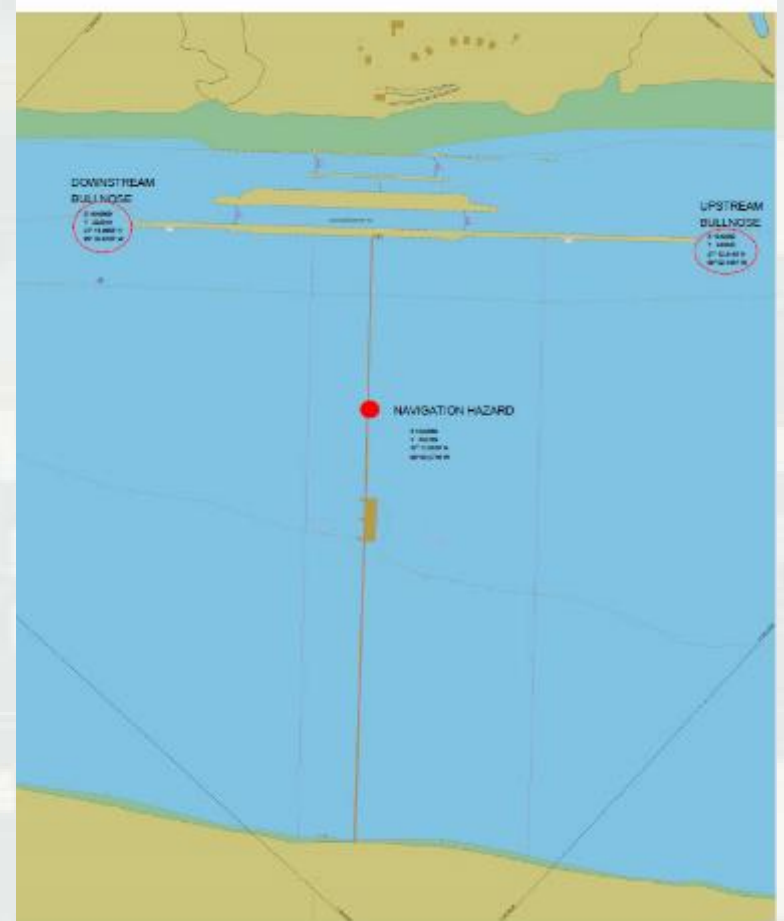
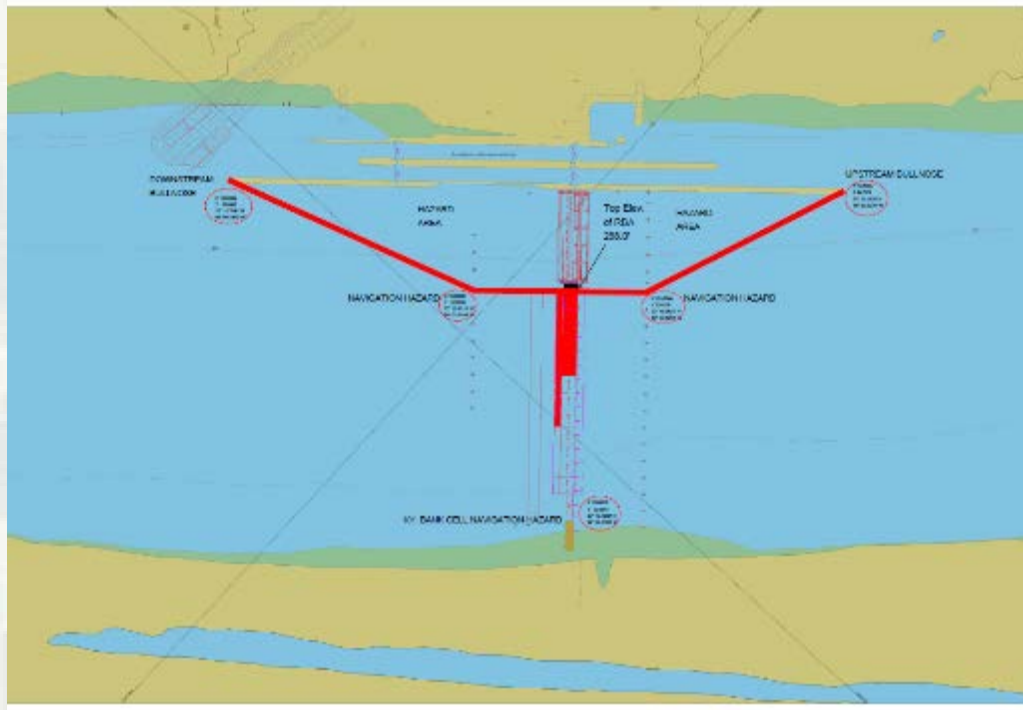
Inland Port Area AOI	Approx. River Mile Distance	Downbound Travel Time (hrs)		Upbound Travel Time (hrs)	
		Mean	Standard Deviation	Mean	Standard Deviation
		5 th percentile	# of observations	5 th percentile	# of observations
St. Louis, MO	175	27.0	8.5	45.4	12.9
Cairo, IL		17.0	211	29.3	233
Memphis, TN	215	25.2	12.0	55.1	14.3
		17.0	413	36.4	371
Vicksburg, MS	285	34.4	12.7	52.1	6.1
		23.2	154	39.4	47
Old River, LA	125	13.5	9.5	31.5	15.3
		4.9	169	19.0	183
		7.5	75	12.7	3.5



Olmsted Lock and Dam project



Olmsted & Lock 53 work area



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HYDRAULIC
LABORATORY

Current notification – USCG LNM

lm0824r2016.pdf - Adobe Acrobat Pro
File Edit View Window Help TerraGo

Create ▾ | | Customize ▾

19 / 29 | | 121% ▾ | | |

Tools | Fill & Sign | Comment

MILE 934.0 - MILE 936.0 - FIREWORKS DISPLAY/SAFETY ZONE
LNM: 24-16

MILE 940.8 - BRIDGE MAINTENANCE
I-24 Highway Bridge; At times work barges may be located channelward adjacent to the navigation piers in both the Illinois and Kentucky spans. Work barges will be removed each night. For more information, mariners may contact the onsite work boat M/V SIR KETTLEWELL via VHF-FM Channel 68 or by calling (314) 607-1699.
LNM: 33-15

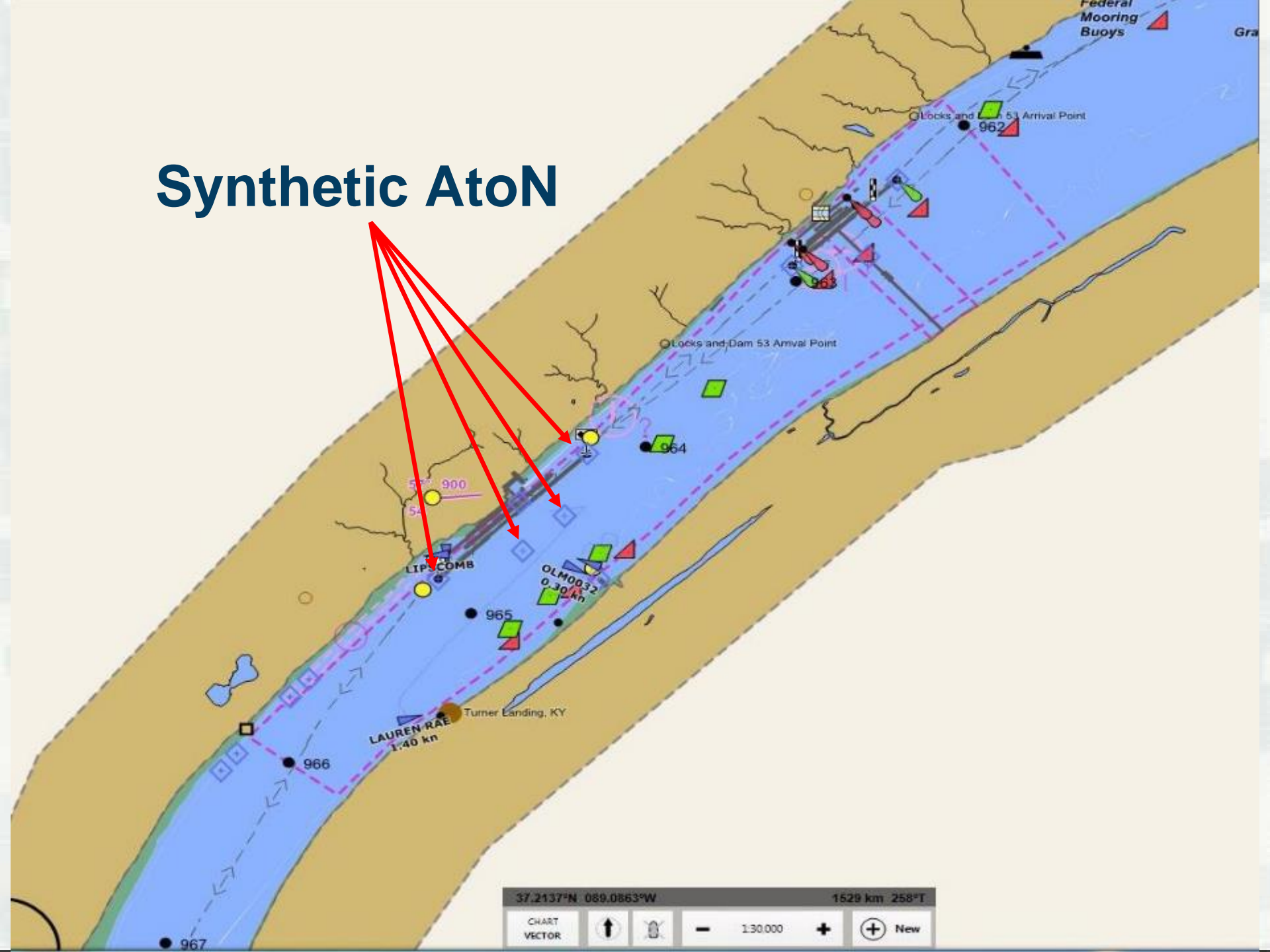
MILE 953.0 - MILE 968.0 - L/D REPAIRS/TOW RESTRICTIONS - UPDATE
Effective June 13, 2016, the Olmsted Project in the vicinity of Mile 964.4, will begin passing all vessel traffic through the riverside lock chamber. Mariners must contact the lockmaster for traffic information when arriving at the approach points at Mile 953.0 and 968.0. The barge configuration restriction is now limited to a 3 by 5, 1,200 feet by 108 feet, including tow, maximum of 15 barges and no more than 2 wide for 54-foot chemical barges until the lane returns to the navigation pass. During this period, a helper boat will be available 24-hours a day. Mariners are reminded that this area is no passing, meeting overtaking or waiting/hovering zone that extends from Mile 962.0 to Mile 966.0. Mariners MUST proceed at their slowest safe speed to minimize their wake.
LNM: 24-16

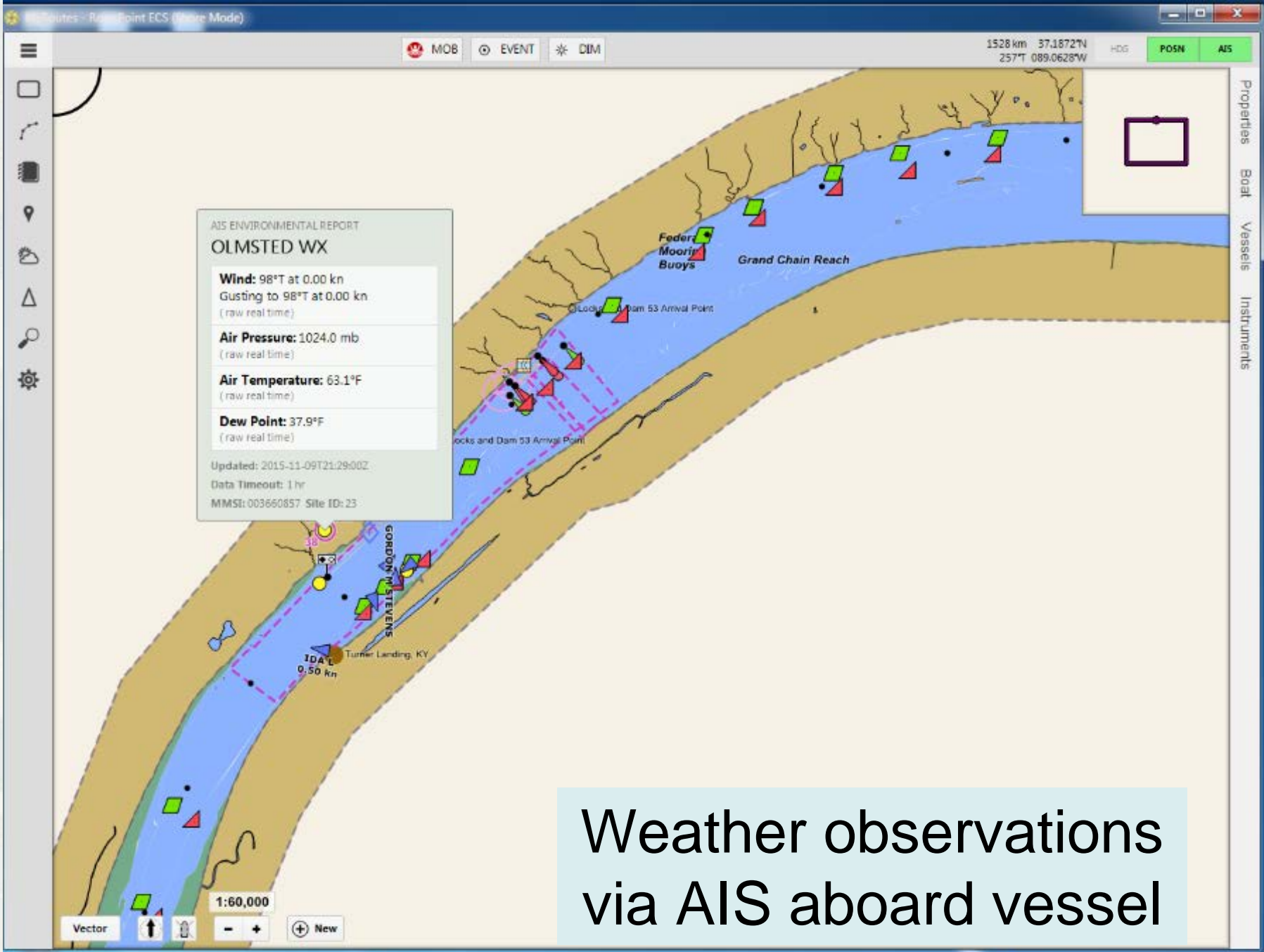


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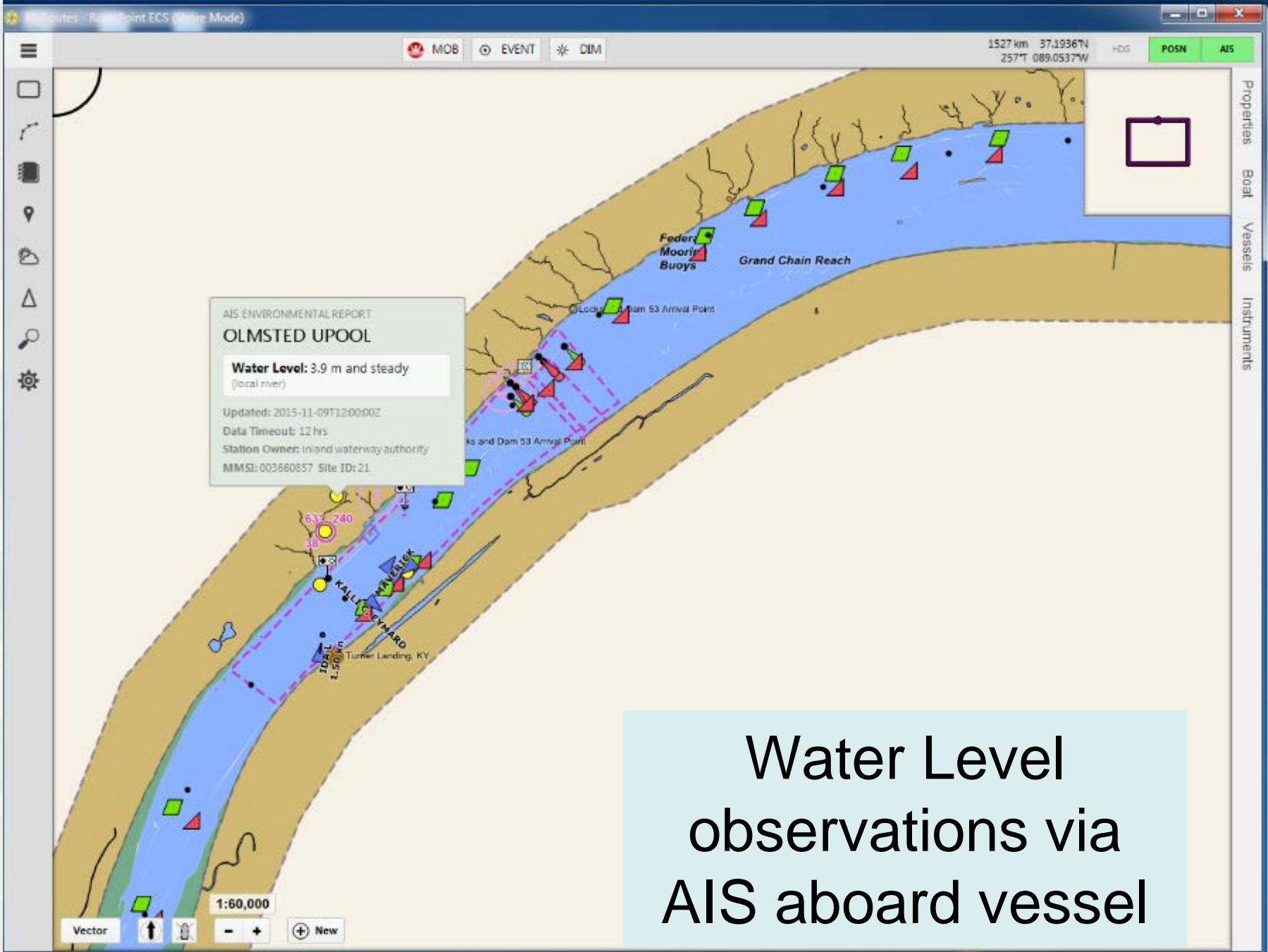


Synthetic AtoN

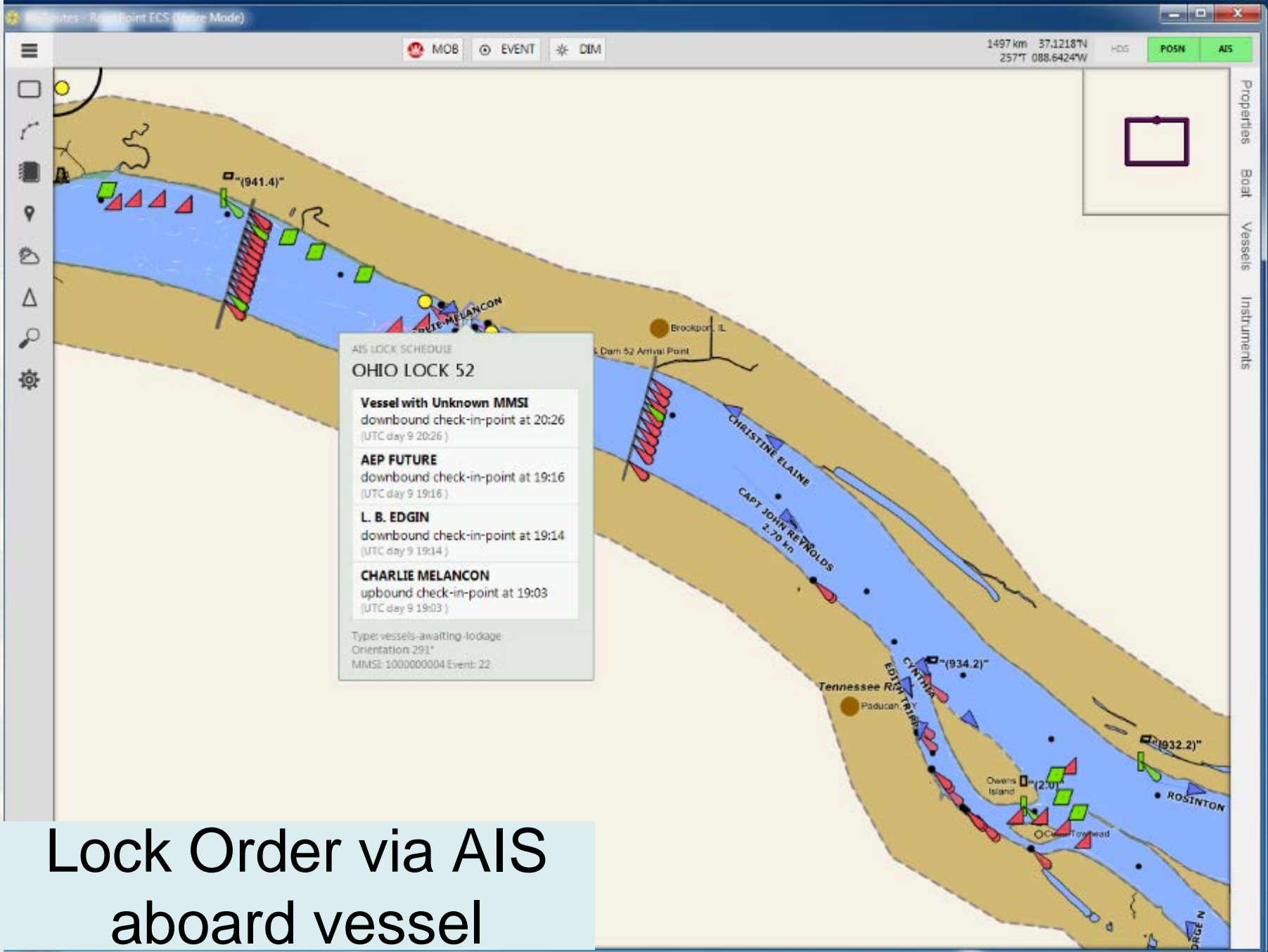




Weather observations
via AIS aboard vessel



Water Level observations via AIS aboard vessel



Lock Order via AIS
 aboard vessel

Mat Sinking Unit operations



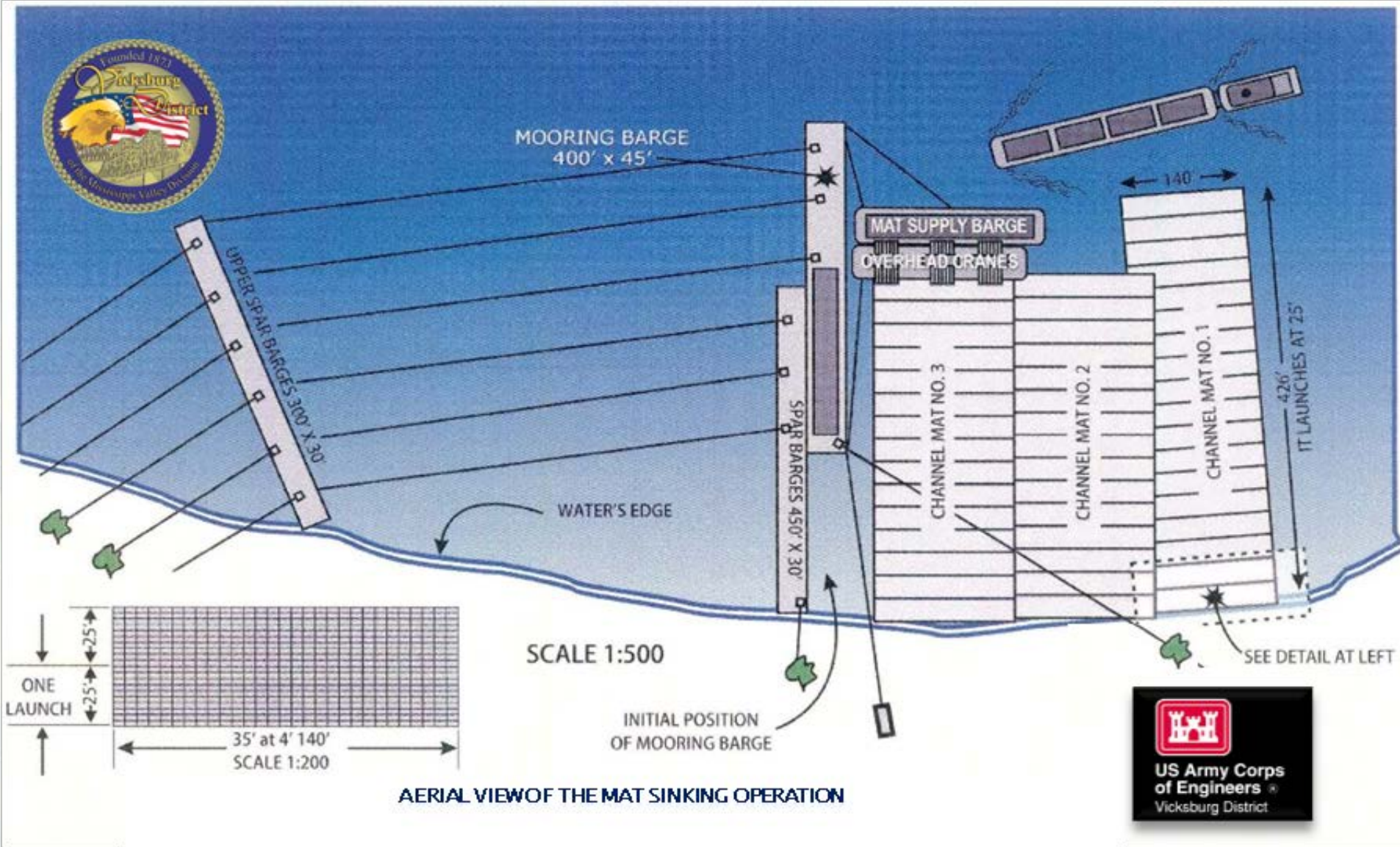
Mat Sinking Unit operations



Mat Sinking Unit operations



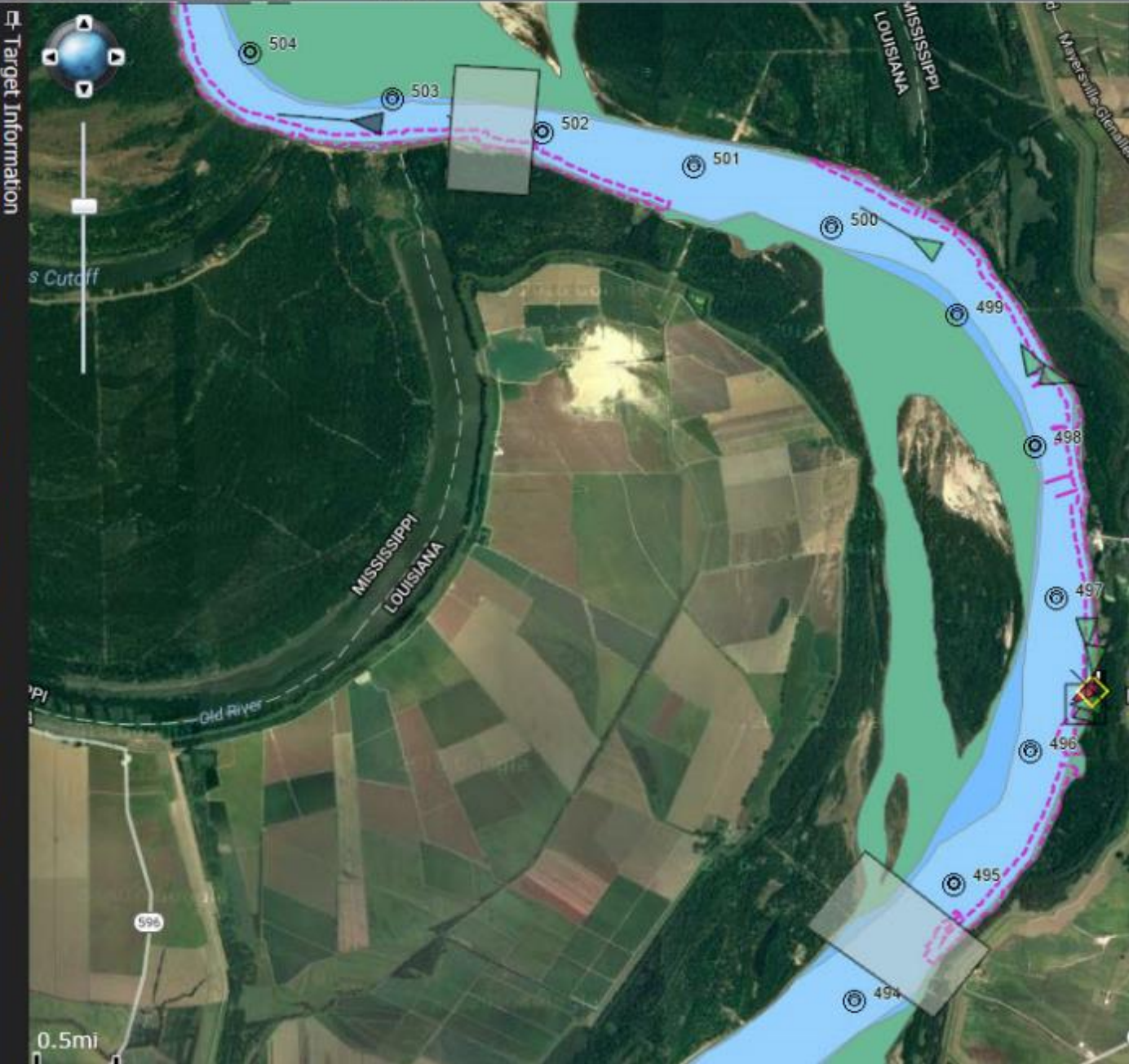
Mat Sinking Unit operations



AERIAL VIEW OF THE MAT SINKING OPERATION

Target Information

Name	WILLIAM JAMES
MMSI	366999267
Callsign	AAAG
Latitude	32°54'05"N
Longitude	091°03'40"W
SOG	0 mph
Heading	Not available
COG	272°
Nav Status	Moored
Operating Mode	Autonomous
Rate Of Turn	Not available
Length	164.00 ft
Beam	45.92 ft
Type of Ship	Vessel - Towing
Type of Cargo	N/A
CargoType	31
IIMO Number	0
Draught	0.00 ft
Nav Sensor	GPS
DTE Status	Available
Nationality	United States of America
Lock	Not available
Mile	496
River	Mississippi River
	Mouth of Ohio River to Baton Rouge LA
Time since last update	00:03:46



Collision between the *Riley Elizabeth* Tow and
US Army Corps of Engineers Barge Plant
Mississippi River near Waterproof, Louisiana
July 18, 2014

NTSB

Marine Accident Report

4. Recommendations

As a result of its investigation, the National Transportation Safety Board makes the following safety recommendations to the US Army Corps of Engineers:

Specify in the information you provide to the public how far US Army Corps of Engineers projects extend into the waterway. (M-15-13)

Use automatic identification system aids to navigation or application-specific messages to mark potential hazards to navigation. (M-15-14)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

CHRISTOPHER A. HART
Chairman

ROBERT L. SUMWALT
Member



U.S. ARMY

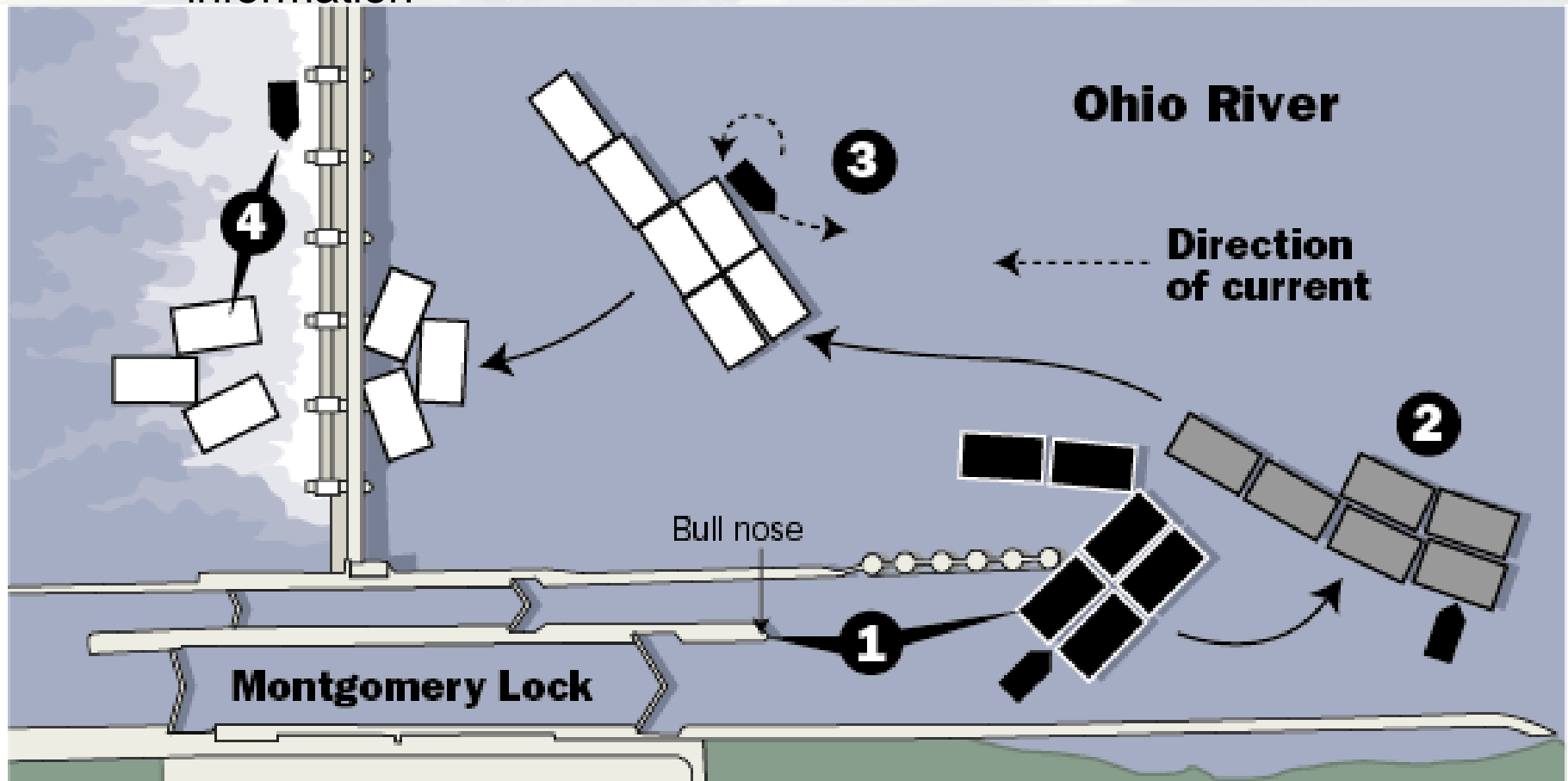
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Safety Board

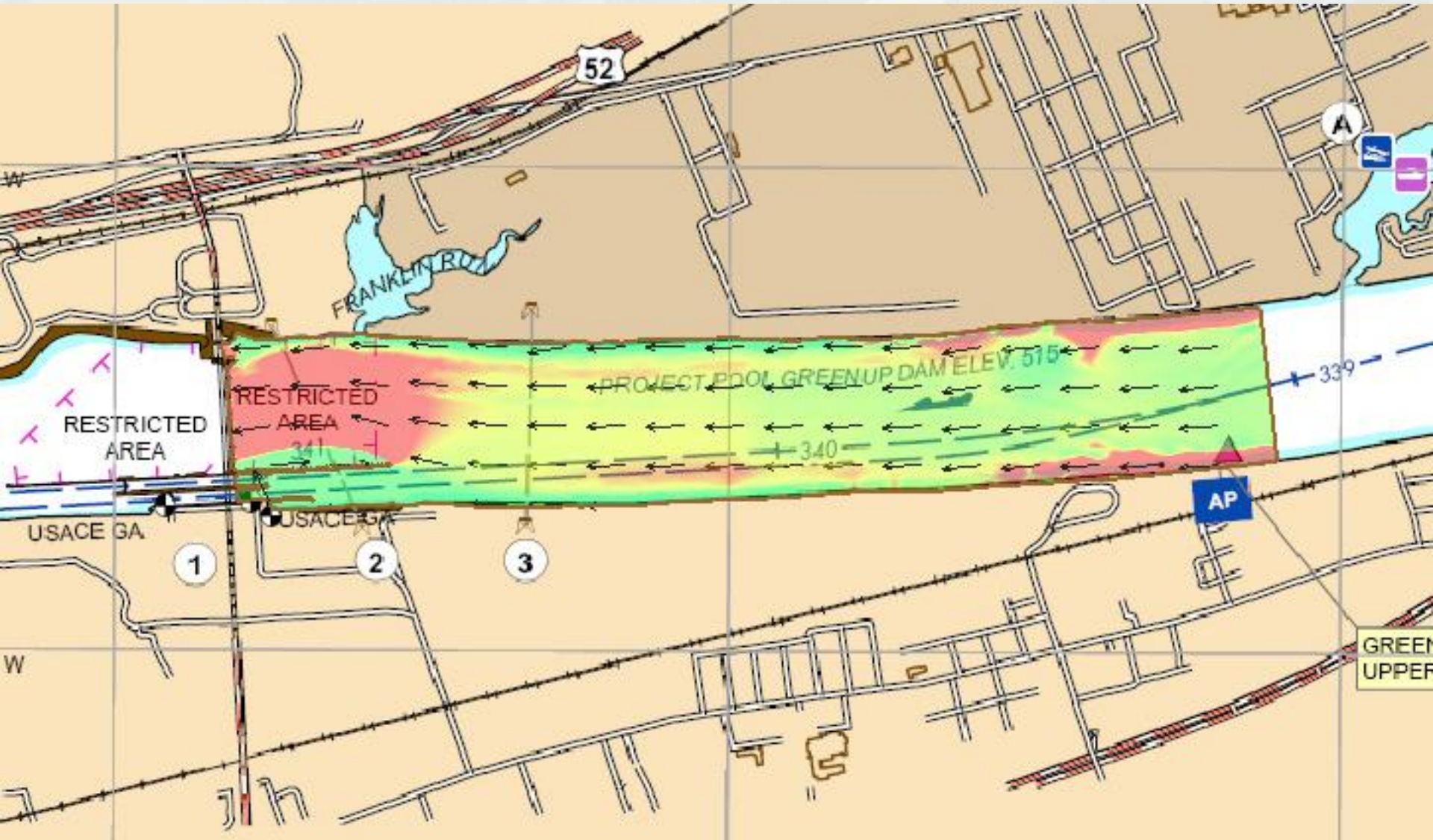
COASTAL &
HYDRAULICS
LABORATORY

Lock approach current modeling

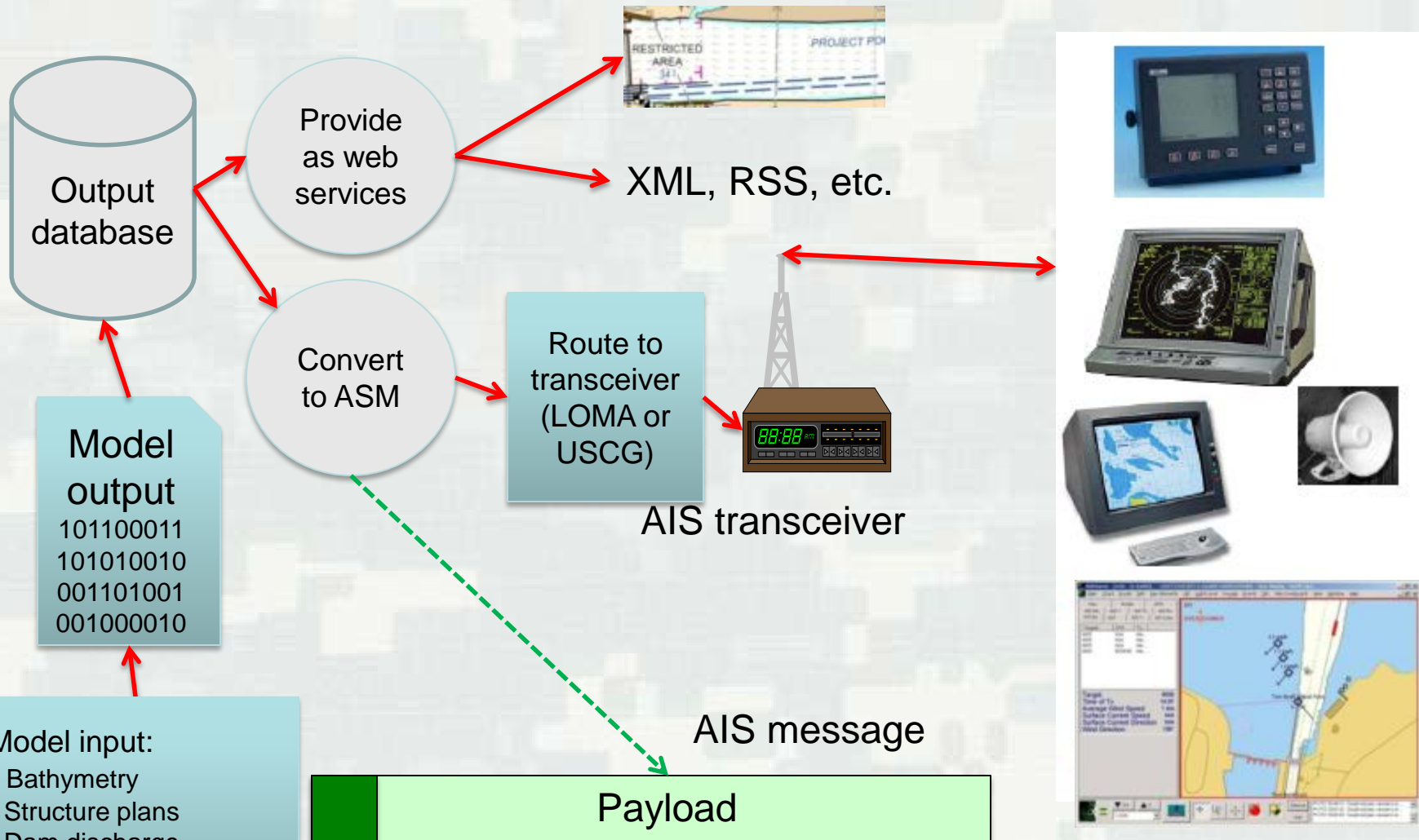
- Vessel operators need river current information at critical locations (e.g., lock approaches)
 - Sensors are expensive to install and maintain; provide limited information



Lock approach current modeling



Lock approach model data dissemination



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°



River Information Services

River Information Services:

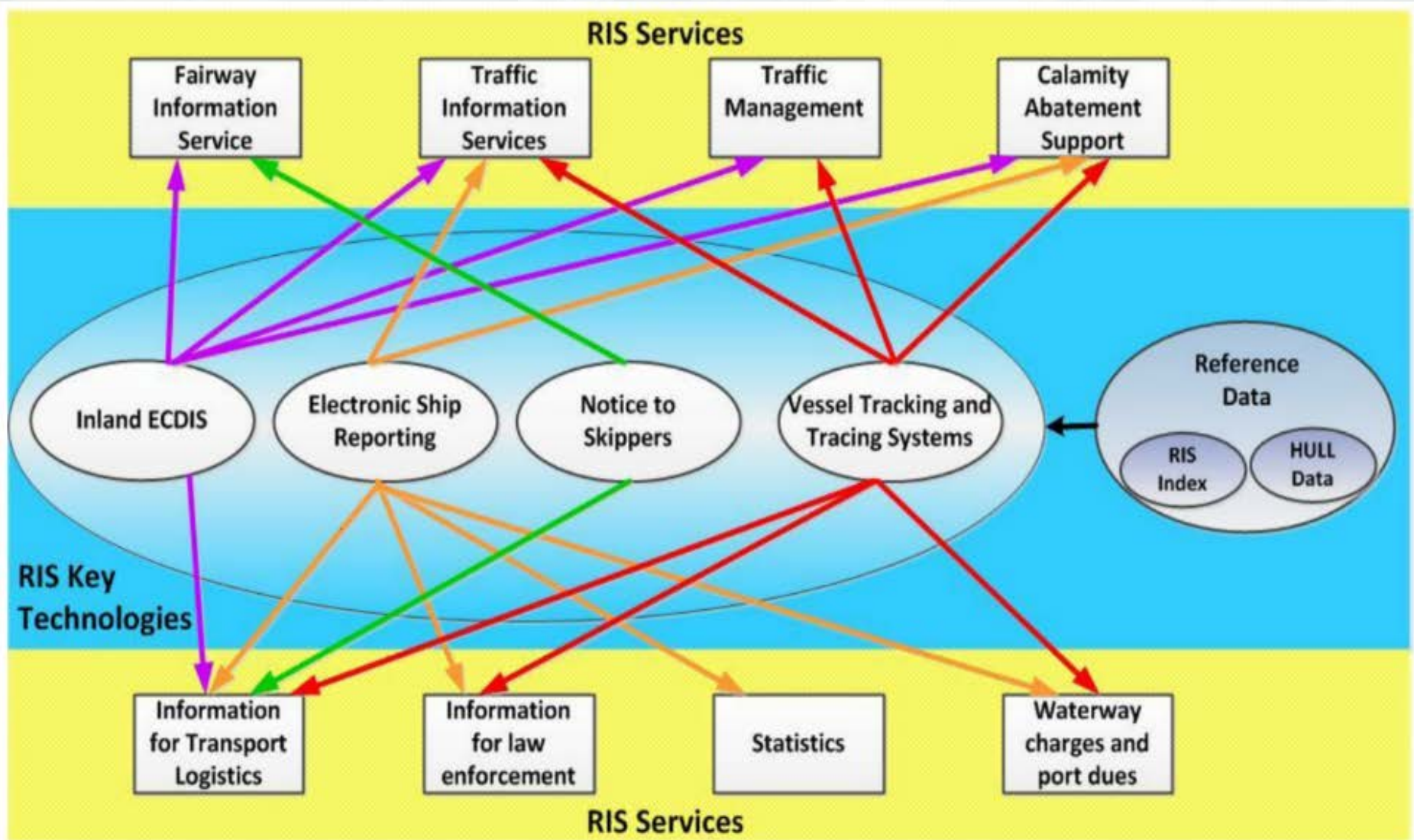
“the [harmonised information services](#) to support traffic and transport management in inland navigation, [including interfaces to other transport modes](#). RIS aims at contributing to a safe and efficient transport process and utilising the inland waterways to its fullest extent.”



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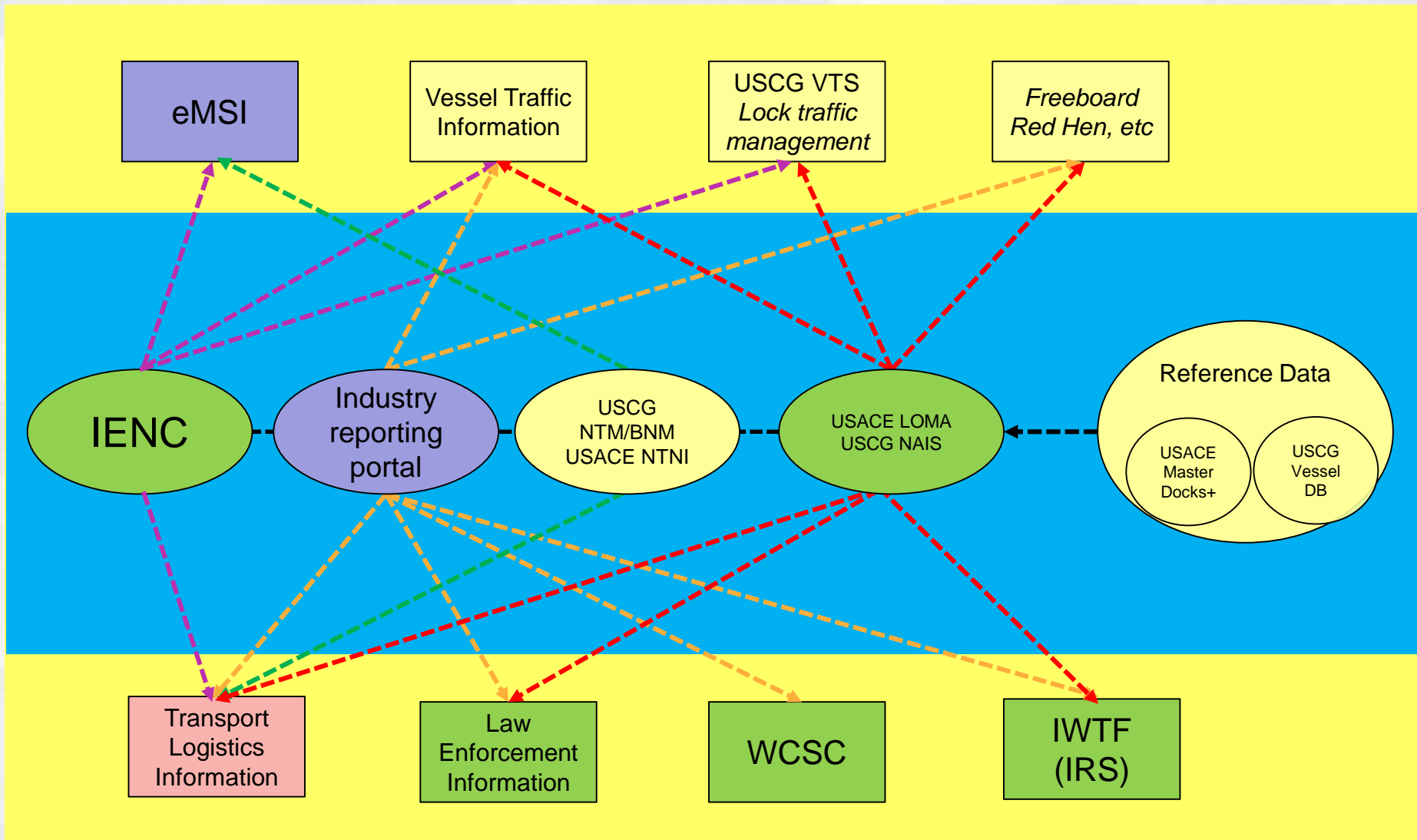


Relationship between RIS Services and RIS Key Technologies

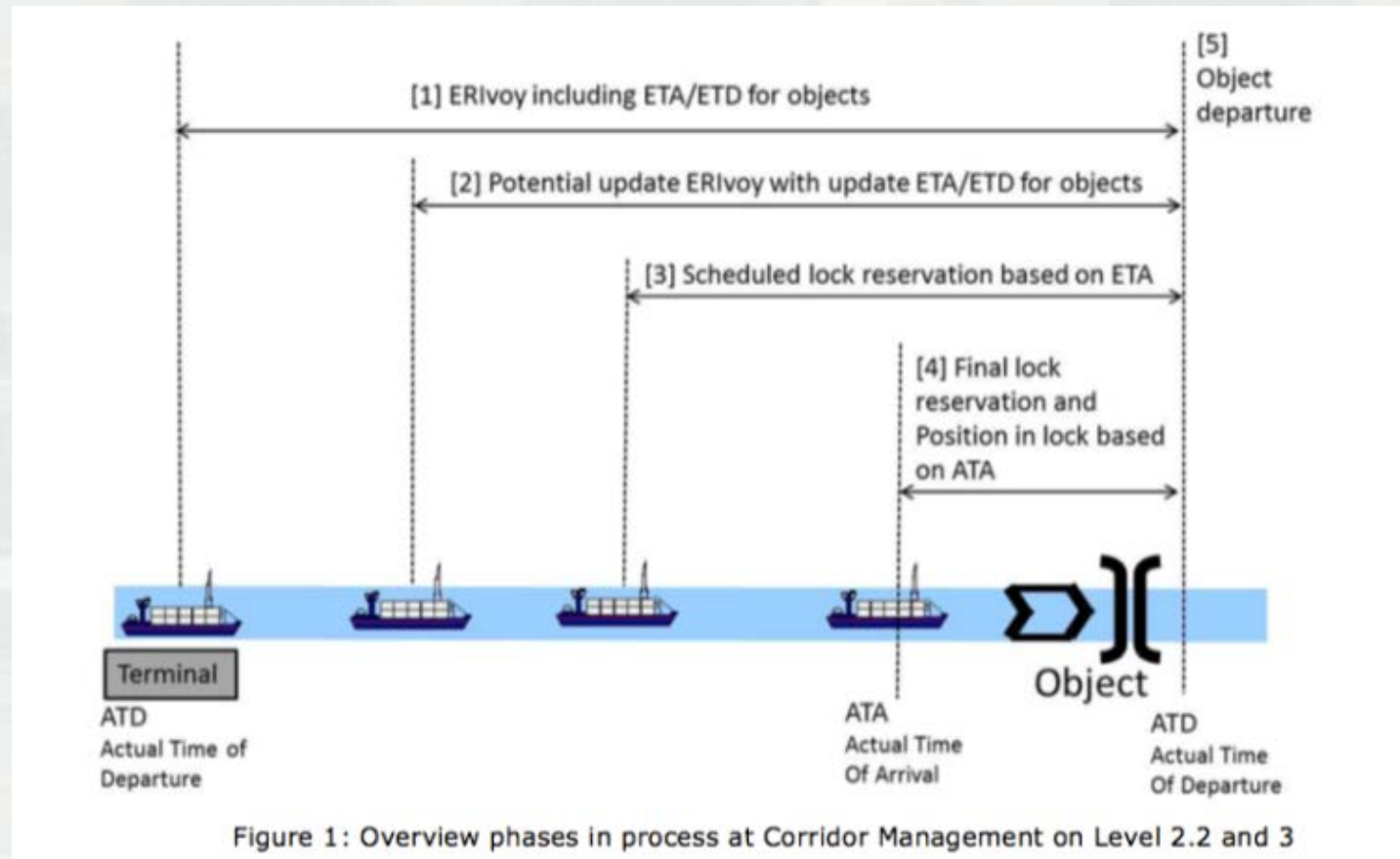


Existing US RIS Capabilities

Mapped to key RIS technologies and services



Corridor management “Assured lockage”



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RIS-related projects

- RIS Enterprise (RISE) framework
 - ▶ Effort to integrate disparate systems and data sources
- “Inland Marine Digital Transformation”
 - ▶ Use advanced information management techniques to implement RIS capabilities
 - Cloud computing, streamed data analytics, machine learning
- National USACE RIS Key Team
 - ▶ Framework for RIS governance
 - ▶ Set priorities
 - ▶ Conduct test beds
 - ▶ Interagency coordination



eHydro

Improved hydrographic services delivery



District Surveys



Channel condition reports



Soundings for buoy placement

HQ Channel Availability Report

Channel Shoaling & Analysis Tool

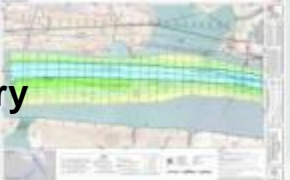
Channel Portfolio Tool

Navigation Asset Management

eHydro GIS
esri



Products for Navigation Industry



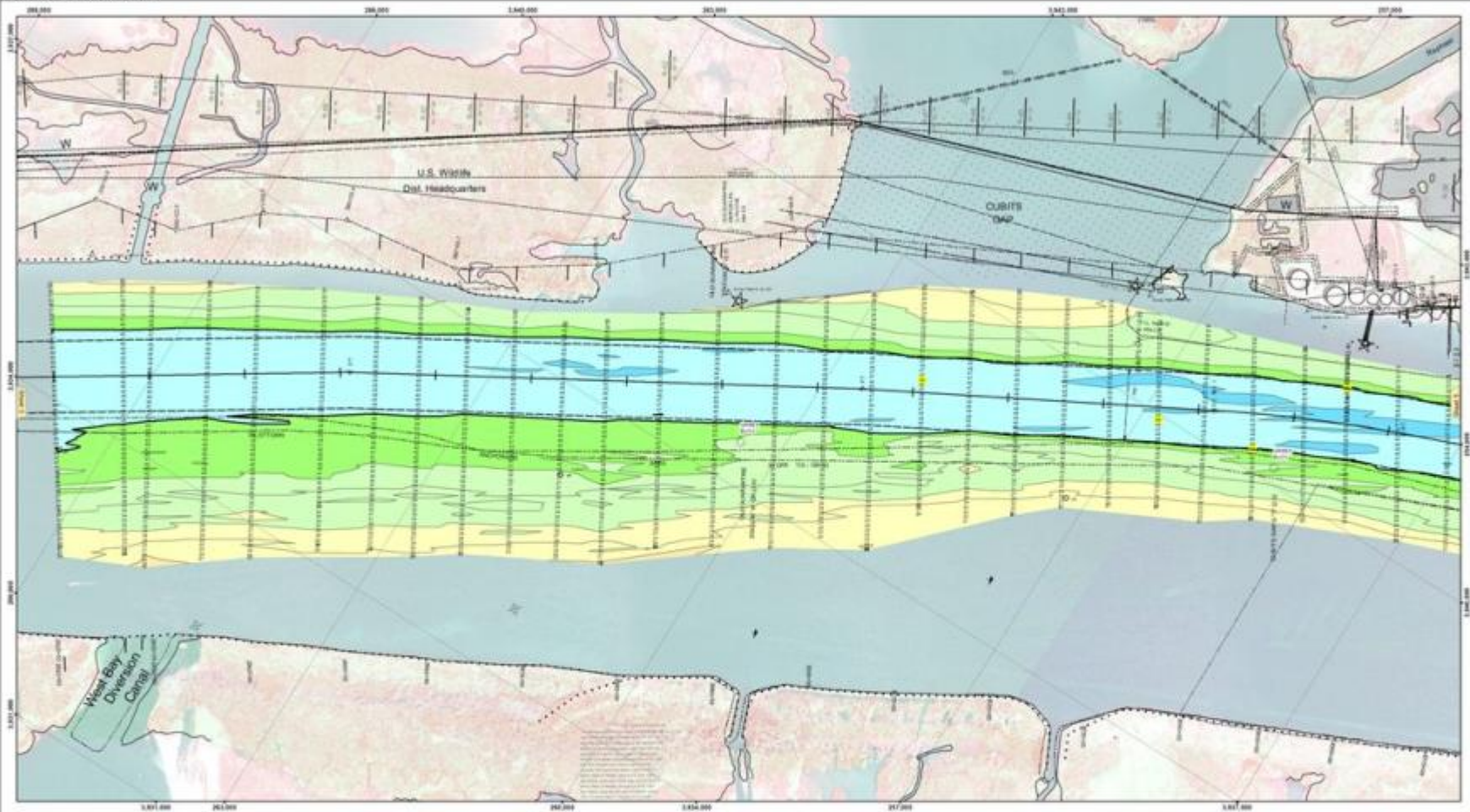
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eHydro products

CORPS OF ENGINEERS

U.S. ARMY



LEGEND

— Federal Navigation Channel	— Cable Area	■ Borrow Area	■ -10' and above
— Federal Navigation Center Line	■ Placement Area	★ Shearless Sounding**	■ -10' to -20'
— As-built Pipeline/Cable	■ Anchorage Area	★ Beacon, General	■ -20' to -30'
— Unconfirmed Pipeline/Cable	— Obstruction Point	★ Red Navigation Buoy	■ -30' to -40'
— Project Depth Contour	— Wracks-Submerged	★ Green Navigation Buoy	■ -40' to -45'
			■ -45' to -50'
			■ -50' and below

Gage Reading: 33 MAG @ PLOT TOWER @ 1033
 Sea Conditions: CHOPPY
 Vessel Name: 06-173
 Survey Type: CONDITION 18
 Sounding Frequency: 1.0Hz

Scale: 0 500 1,000 1,500 2,000 2,500 Feet

NOTES:
 Electronic Sounding System
 Water level at Station of 1033 (PLOT TOWER) is based on the Mean High Water Datum. Station 1033 is located on the Gulf Coast of the United States. Station 1033 is located on the Gulf Coast of the United States. Station 1033 is located on the Gulf Coast of the United States.
 Sounding Frequency: 1.0Hz
 Sounding Accuracy: ± 0.1m
 Sounding Depth: 0 to 100m
 Sounding Interval: 1.0m
 Sounding Rate: 1.0m/s
 Sounding Accuracy: ± 0.1m
 Sounding Depth: 0 to 100m
 Sounding Interval: 1.0m
 Sounding Rate: 1.0m/s



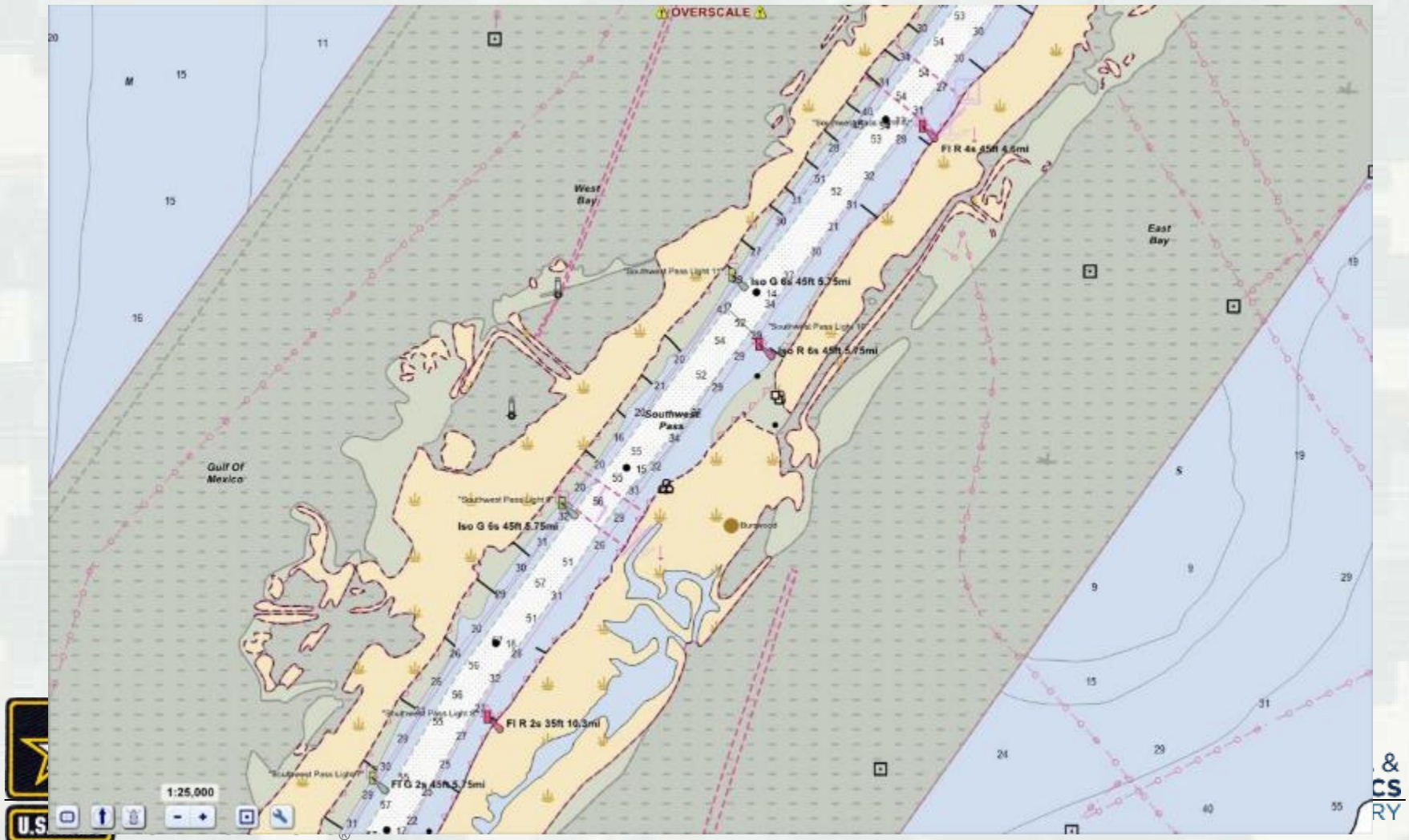
US Army Corps of Engineers
 District Central
 1033 PLOT TOWER @ 1033
 06-173
 CONDITION 18
 1.0Hz

DATE	BY	REVISION
01 May 2014	SW_04_SWP_26140501_FORUM	1

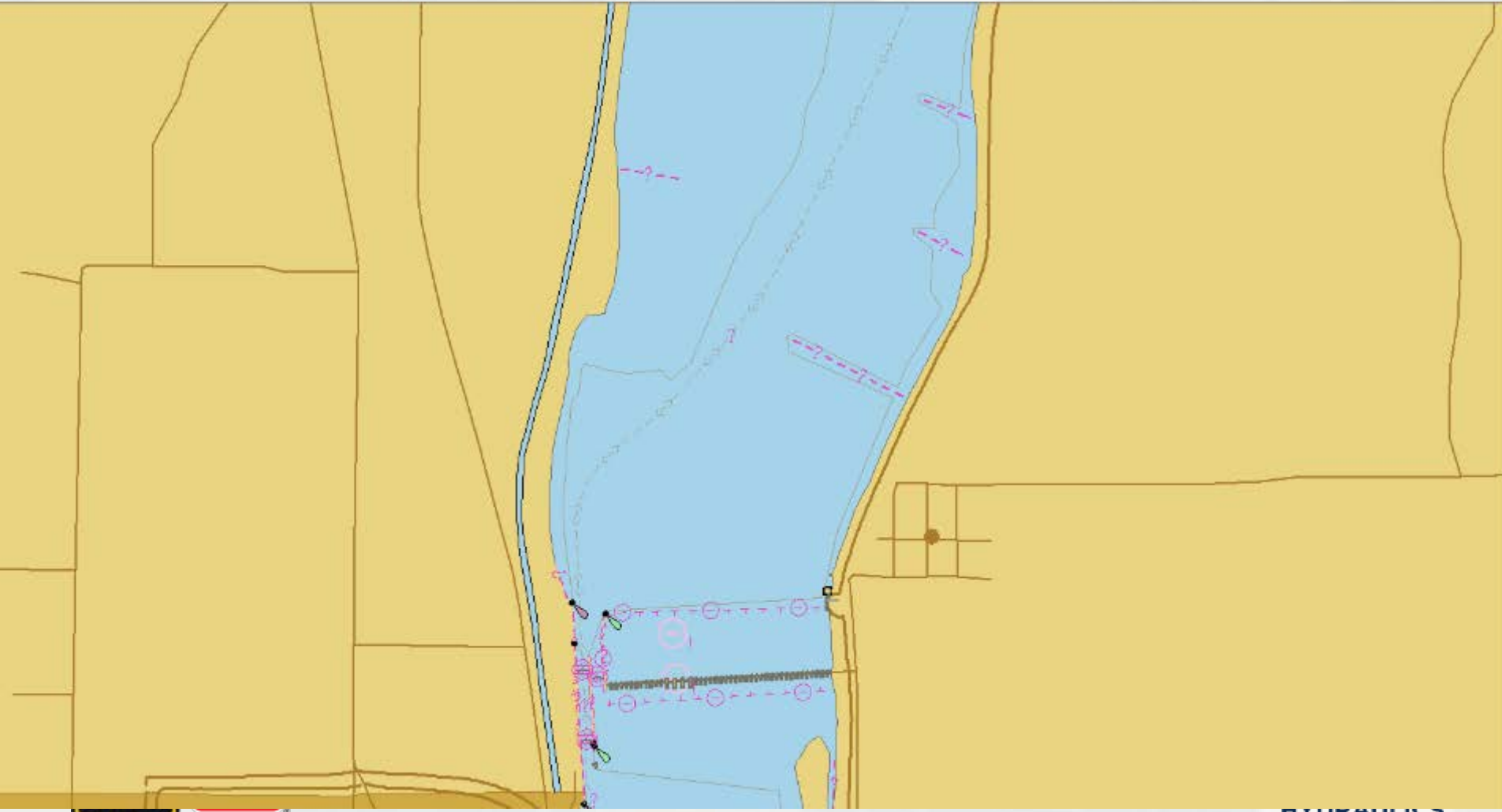
MISSISSIPPI RIVER - B.R. TO GULF
 SOUTHWEST PASS - SHEET 4
 SW_04_SWP_26140501_FORUM
 01 May 2014

Sheet Reference Number
 4 of 13

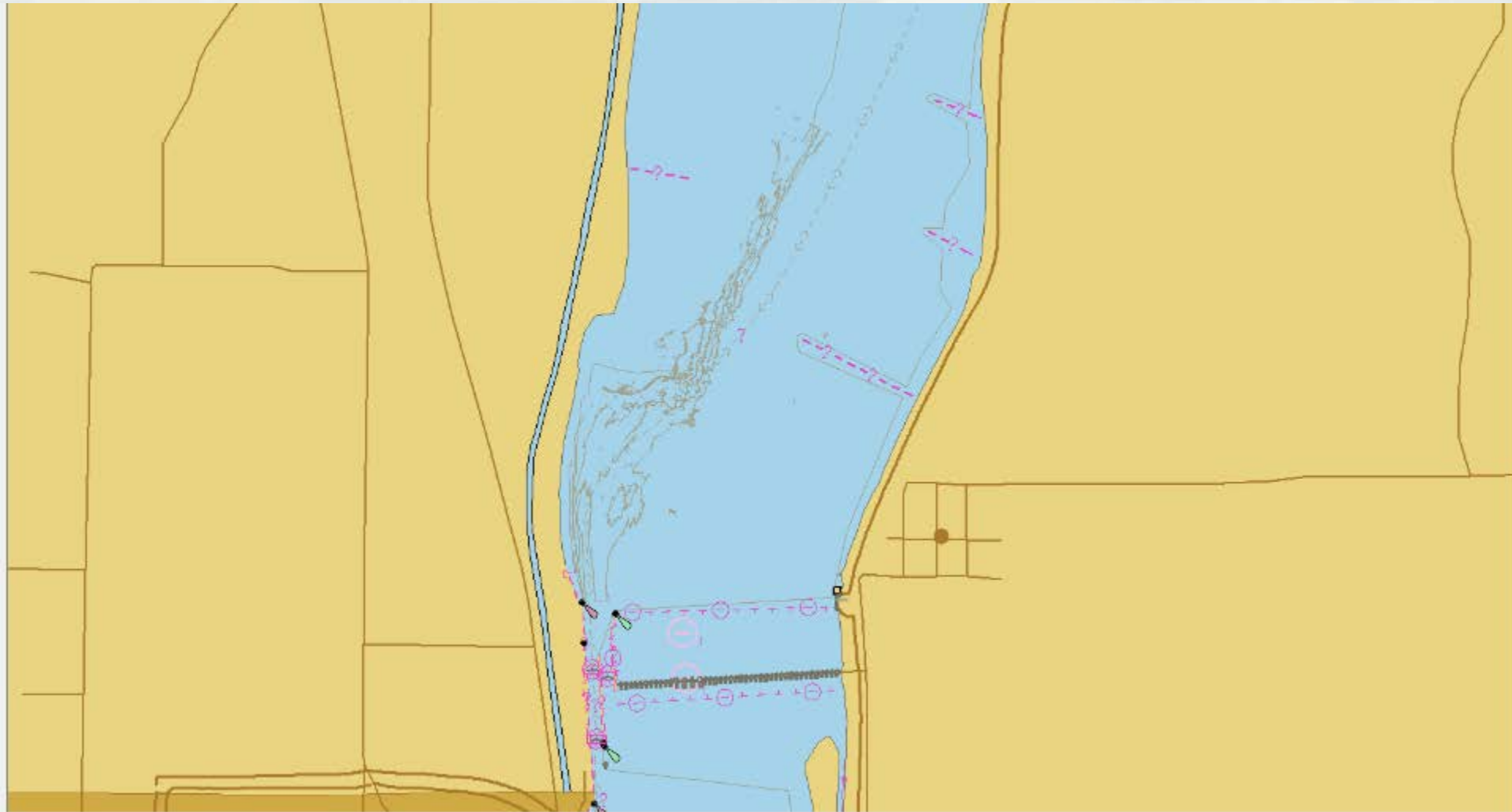
Miss River Southwest Pass



Inland survey overlay



Inland survey overlay



Summary and request for Input

- Developing capabilities:
 - ▶ e-Navigation
 - ▶ Automatic Identification System (AIS)
 - ▶ River Information Services
- What is important to you?
 - ▶ Columbia-Snake River system
 - ▶ Stakeholders



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Thank you for your attention!



**US Army Corps
of Engineers®**

Engineer Research and
Development Center

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