BIG RIVER COALITION

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November 22, 2021

VERTICAL CLEARANCE OF THE SEVEN BRIDES CROSSING THE MISSISSIPPI RIVER SHIP CHANNEL

The Big River Coalition (BRC) is committed to "Advocating for a Mightier Mississippi River" to ensure the future of unimpeded navigation on the Mississippi River Ship Channel (MRSC) as one of the nation's fundamental natural resources and a true economic superhighway. The Coalition is committed to protecting maritime commerce across the Mississippi River and Tributaries (MRT) while focusing on maximizing transportation efficiencies on the Mississippi River Ship Channel from Baton Rouge to the Gulf of Mexico. The Mississippi River and Tributaries project has an estimated $ 735.7 billion annual impact on the nation's economy and is responsible for approximately 2.4 million jobs (585,000 jobs on the Lower River – Cairo, IL to the Gulf of Mexico and 1.86 million plus jobs on the Upper River-Lake Itasca, MN to Cairo, IL and including the IL River). As the future of the MRT is shaped, it is imperative that navigation representatives strive to ensure that systematic approaches protect maritime trade by maintaining fully authorized channel dimensions, while also updating and maintaining our navigation infrastructure, specifically the locks and dams of the MRT system. The Big River Coalition missions are focused on securing increased funding from the Harbor Maintenance Tax and the Inland Users Fuel Tax, efforts to deepen the Mississippi River Ship Channel to 50 feet and to increase the beneficial use of dredged material or "Sediment Recycling."

The National Oceanic and Atmospheric Administration (NOAA) provides the following definition of an "air gap":

"What is air gap?

The NOAA Air Gap system is a tool that measures the **vertical clearance** between a defined reference point under a bridge and the surface of the water below."

The following quotes are reproduced from Marine Accident Brief # DCA19FM003:

…"However, the NTSB reviewed the available data for the Sunshine Bridge and other bridges with multiple spans on the Lower Mississippi River and found inconsistencies in the vertical clearances provided for all navigable spans."…

and,

"Navigational aids should provide mariners with a simple and precise way to navigate and not increase workload or cause confusion. Mariners would be better equipped with the correct information if all of the information was included on the chart and any additional data sources were clearly stated so as to "steer" the mariner to the map books, river gages, and/or other Corps of Engineers information."…

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The following information was compiled with the assistance of the listed government agencies to verify the documented methods each uses to calculate the vertical clearance at the bridges that span over the Mississippi River Ship Channel.

Seven bridges cross over the length of the Mississippi River Ship Channel from the Baton Rouge I-10 Bridge on the upriver at Mile 233.8 Above Head of Passes (AHP) to the southernmost bridge at New Orleans – the Crescent City Connection (Mile 95.7 AHP). This document lists how the noted Government Agencies: the National Oceanic and Atmospheric Administration (NOAA), the U.S. Coast Guard (USCG) and the U.S. Army Corps of Engineers (USACE) and the New Orleans Baton Rouge Steamship Pilots Association (NOBRA) calculate the vertical clearance at each of these seven bridges.

BRIDGES CROSSNING OVER THE MISSISSIPPI RIVER SHIP CHANNEL:
This document only focuses on the main channel span for the bridges listed, but the Sunshine Bridge Allision demonstrates the need for more accurate methods to determine clearance at all navigable spans that cross our navigable channels.

1) **I-10 HIGHWAY BRIDGE (Baton Rouge, LA)**: This bridge crosses over the Mississippi River Ship Channel at Mile 229.3 AHP and was opened to vehicular traffic in 1968.

The listed vertical clearances or present methods to determine vertical clearances at the main channel span of the Baton Rouge I-10 Bridge are:

A) NOAA's published chart 11370 documents a vertical clearance of 125 feet.
B) USACE list the vertical clearance at 174 feet minus the **Port Allen Gage*** and offers the minimum vertical clearance as 127 feet with the Port Allen Gage at 47 feet.
C) USCG list the vertical clearance as 174 feet minus the **Port Allen Gage*** and offers the minimum vertical clearance as 127 feet with the Port Allen Gage at 47 feet.
D) NOBRA list the vertical clearance as 172.5 feet minus the Baton Rouge Gage this gage is at Mile 228.4 AHP and 0.9 miles away from the bridge.

The Baton Rouge Gage is located Mile 228.4 AHP and the Baton Rouge I-10 is 0.90 miles upriver from this gage. (Note details below, as to why the Port Allen Gage location is emphasized above.)

This is the northernmost bridge that crosses the Mississippi River Ship Channel. This bridge has been approved for an additional Air Gap Sensor to be added to the National Oceanic and Atmospheric Administration's (NOAA) Physical Oceanographic Real-Time System or PORTS® with installation expected over the next few months. This additional Air Gap (Vertical Clearance) Sensor will be added into the Lower Mississippi River's PORTS® suite of sensors and offers an accurate solution to resolve some of the discrepancies noted by the NTSB.

NTSB/MAB-20/29 highlighted the confusion in the process of determining vertical clearance at bridges over the Mississippi River Ship Channel but did not provide detailed recommendations to resolve all discrepancies, as the report focused on the Sunshine Bridge allision. The Coalition proposes the solution of installing NOAA PORTS® Air Gap sensors, which provide accurate real time vertical clearances that do not have to be adjusted, manipulated, or converted to remove the confusion that mariner's face in trying to accurately calculate the vertical clearance formula(s). The dashboards on commercial vessels are complicated enough and technology exists (NOAA PORTS®) that provides accurate vertical clearance or air gaps for bridges over navigation channels.

In researching the established methods to determine the vertical clearances or air gaps at each of these seven bridges multiple errors or confusing factors were uncovered and verified. In this case the Port Allen Gage is highlighted because truthfully there is no Port Allen Gage on the Mississippi River, it was only after asking questions and detailed research that the following was uncovered. The USACE website that offers comprehensive listings of river and lake stages at all of the USACE District across the country is RiverGages.com although if entered that way, the web link that pulls up is: https://rivergages.mvr.usace.army.mil/WaterControl/new/layout.cfm

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The Coalition advised the USACE of the following background information to explain what was uncovered during the research for this document. There is no Port Allen Gage on the Mississippi River as verified by RiverGages.com under the selection for "Mississippi River & Passes" there is not a Port Allen Gage listed. The true Port Allen Gage is on the Intracoastal Waterway, as reproduced from RiverGages.Com the "Port Allen Lock – Intracoastal Waterway (52415), Location of Gage: Intracoastal Waterway at Port Allen Lock. Located on west end of the lock (Morgan City – Port Allen route). The site also shows, Record High Stage: 9.65 feet and Record High Stage Date: 04/13/1980."

I utilize RiverGages.com multiple times a week and have for many years and had never noticed this problem until focusing on the challenges of providing accurate vertical clearance information. The Port Allen Gage was listed in bold above to document the listing of the wrong gage, the following was also uncovered:

RiverGages.com shows the following for the Baton Rouge Gage, "Mississippi River at Baton Rouge (01160)" Record High Stage 47.28 Ft., Record High Stage Date 05/15/1927" and "Location of Gage: On forebay wall of Port Allen Lock at river mile 228.4, natural flow affected by tides at low water."

In response to sharing the above with the USACE New Orleans District staff the USACE both acknowledged the nomenclature technically listed the wrong gage in the Vertical Air Gap Calculation Formula for the Baton Rouge I-10 Bridge and announced it would make the following adjustments.

"The New Orleans Geospatial Engineering Team ("the mapping team") reviewed the document that was sent by you (Sean Duffy of Big River Coalition) on 19-Oct-2021. The mapping team reviewed the USACE 2015 Lower Mississippi Navigation Book, Chart No. 74 and the chart figure called "Chart No. 74 Supplement A" showing bridge clearance for I-10 Hwy Bridge at Baton Rouge.

In regard to the "Port Allen Lock River Side Gage", the mapping team concurs that this reference is misleading. This is an issue of nomenclature. The chart should more clearly refer to the gage as "Mississippi River at Baton Rouge".

The USACE RiverGages.com www site states that this "Mississippi River at Baton Rouge" gage is physically located on the river side forebay wall of the Port Allen Lock. Again, this is an issue of nomenclature. The intent of the chart book was to refer to this same gage.

Courses of Action:

1. Change the USACE chart gage name to show "Mississippi River Baton Rouge Gage (01160)". The 01160 Gage ID will be very definitive for correlation of river stage to a specific 01160 gage via the publicly available information on RiverGages.com.

2. As the publication cycle for this chart book is not fixed, it cannot be determined when chart corrections would be available to the public via a printed chartbook. Therefore, USACE New Orleans will issue a "Navigation Bulletin" with this chart correction. The Navigation Bulletin will become part of a later USCG Local Notice to Mariners (LNM). It is incumbent on mariners to update their charts with this information from the LNM.

3. USACE New Orleans will also coordinate with NOAA and the USCG to resolve the discrepancy in low steel elevation that exists between the NOAA chart and the USACE chart."

The Big River Coalition works closely with the government agencies and applauds the swift and appropriate actions by the USACE to make the noted adjustment or correction. The USCG has confirmed that it will also update their listings for the Baton Rouge I-10 Bridge vertical clearance calculation to match the noted adjustment from the USACE (174 – Baton Rouge Gage).

The following quotes are also reproduced from NTSB/MAB-20/29:

"**Calculating Overhead Clearance.** Overhead clearance is found by calculating the bridge's vertical clearance in relation to the nearest river gage and subtracting the vessel's air draft."…

"River gage information is critical in calculating overhead clearance, since the Mississippi River experiences fluctuations in water levels during times of greater-than-average rainfall and snowmelt, or during drought conditions. River levels are monitored using gages, supplied by the Corps of Engineers, at specific locations along the river. The nearest gage to the accident site was the Donaldsonville Gage. Mariners can obtain hourly figures for a specific location's river level via the Corps of Engineers "rivergages.com" internet site."

2) **SUNSHINE BRIDGE, Louisiana State Highway 70 (Burnside, LA)**: This bridge crosses the Ship Channel at Mile 167.4 AHP and was opened to vehicular traffic in 1964. (In some places the NTSB and USCG lists the bridge at both Mile 167.4 or Mile 167.5).

A) NOAA's published chart 11370 documents a vertical clearance of 133 feet.
B) USACE list the vertical clearance as 171 feet minus the Donaldsonville Gage which is located at Mile 173.6 AHP meaning it is 6.2 miles upriver of the bridge. The USACE also lists the Minimum Vertical Clearance as 135 feet with a corresponding Donaldsonville Gage reading of 36 feet. The highest reading of the Donaldsonville Gage was 36.01 feet recorded on May 15, 1927.
C) USCG list matches that of the USACE, vertical clearance is 171 feet minus the Donaldsonville Gage, minimum vertical clearance of 135 feet at a Donaldsonville Gage of 36 feet.
D) NOBRA list the vertical clearance of this bridge as 168 feet minus the Donaldsonville Gage.

3) **VETERANS MEMORIAL BRIDGE, Louisiana State Highway 3213 (Gramercy, LA):** crosses the Ship Channel at Mile 145.9 AHP and opened to vehicular traffic in 1995.

A) NOAA's published chart 11370 documents a vertical clearance of 139 feet.
B) USACE list the vertical clearance as 164 feet minus the Reserve Gage which is located at Mile 138.7 AHP meaning it is 7.2 miles downriver of the bridge. The USACE also lists the Minimum Vertical Clearance as 138 feet with a corresponding Reserve Gage reading of 26 feet. The highest reading of the Reserve Gage was 26.0 feet recorded on June 11, 1929.
C) USCG list matches that of the USACE, vertical clearance is 164 feet minus the Reserve Gage, minimum vertical clearance of 138 feet at a Reserve Gage of 26 feet.
D) NOBRA list the vertical clearance of this bridge as 164.9 feet minus the Reserve Gage.

4) **HALE BOGGS MEMORIAL BRIDGE: Louisiana State Highway 310 (Luling, LA):** spans the Ship Channel at Mile 121.6 AHP and was opened to vehicular traffic in October 1983.

A) NOAA's published chart 11370 documents a vertical clearance of 133 feet.
B) USACE list the vertical clearance as 158 feet minus the Reserve Gage which is located at Mile 138.7 AHP meaning it is 17.10 miles upriver of the bridge.
*It is important to note that there are several other gages listed on RiverGages.com that are closer to this bridge. For instance, the Mississippi River at Bonnet Carré (01280) is at Mile 126.9 AHP or 5.3 miles upriver of the Hale Boggs Bridge.
The USACE also lists the Minimum Vertical Clearance as 132 feet with a corresponding Reserve Gage reading of 26 feet. The highest reading of the Reserve Gage was 26.0 feet recorded on June 11, 1929.
C) USCG list matches that of the USACE, vertical clearance is 158 feet minus the Reserve Gage, minimum vertical clearance of 132 feet with a corresponding Reserve Gage reading of 26 feet.
D) NOBRA list the vertical clearance of this bridge as 158.4 feet minus the Reserve Gage.

5) **HUEY P. LONG BRIDGE, Louisiana State Highway 90 and Railroad Bridge (Jefferson, LA):** spans the Ship Channel at Mile 106.1 AHP. This bridge was the first to cross the Mississippi River south of St. Louis, Missouri when it opened to vehicular traffic on December 16, 1935. The bridge was recently modernized, and the roadway widened, the renovated bridge was opened to vehicular traffic on June 16, 2013.

A) NOAA's published chart 11370 documents a vertical clearance of 132 feet.
B) USACE list the vertical clearance as 153 feet minus the Carrollton Gage which is located at Mile 102.8 AHP meaning it is 3.3 miles downriver of the bridge. The USACE also lists the Minimum Vertical Clearance as 133 feet with a corresponding Carrollton Gage reading of 20 feet. The highest reading ever recorded on the Carrollton Gage was 21.27 feet recorded on April 25, 1922.
C) USCG list matches that of the USACE, vertical clearance is 153 feet minus the Carrollton Gage, the USCG does not appear to list a minimum vertical clearance for the Huey P. Long Bridge.
D) NOBRA list the vertical clearance of this bridge as 152.26 feet minus the Carrollton Gage.

The Huey P. Long Bridge is equipped with a NOAA Physical Oceanic Real-Time System (PORTS®) air gap sensor. The Air Gap Sensors not only provides real-time accurate data but removes the need to calculate the air gap and the accurate readings update approximately every 6 minutes.

6) **CRESCENT CITY CONNECTION (CCC):** There are two bridges crossing the Ship Channel at New Orleans with the upriver span at Mile 95.8 AHP. This bridge was opened to vehicular traffic in April 1958.

7) **CRESCENT CITY CONNECTION (CCC):** The downriver bridge crosses the Ship Channel at Mile 95.7 AHP. This bridge was opened to vehicular traffic in September 1988.

The following information is accurate for both of the identical bridges:

A) NOAA's published Chart 11368 documents a vertical clearance of 150 feet
B) USACE list these two vertical clearances as identical with a clearance formula listed of 171 feet minus the Carrollton Gauge (New Orleans). The Carrollton Gauge is located at Mile 102.8 AHP, making it 7.10 miles away from the southernmost of the two Crescent City Connection spans.
C) USCG lists the clearance formula for calculating the vertical clearance of these two bridges as 170 feet minus the Carrollton Gauge.
D) NOBRA listing matches that of the USCG with 170 feet minus the Carrollton Gauge.

The lower span of the CCC is equipped with a NOAA Physical Oceanic Real-Time System (PORTS®) air gap sensor.

The following quotes are also reproduced from Marine Accident Brief # DCA19FM003:

…"A bridge inspector for the Louisiana Department of Transportation Development (LADOTD) arrived about 0230, viewed the underside of the bridge by boat, determined that the damage was extensive, and closed the bridge to vehicular traffic."

"Subsequent inspections and strength calculations of the damaged bridge areas found that the section struck by the crane could have collapsed, but, because of secondary load redistributions, catastrophic failure was avoided. The bridge was completely closed until December 2018, at which point single-lane, two-way traffic was permitted until March 2019, when all repairs were complete."…

…"However, the NTSB reviewed the available data for the Sunshine Bridge and other bridges with multiple spans on the Lower Mississippi River and found inconsistencies in the vertical clearances provided for all navigable spans."…

BIG RIVER COALITION

The Big River Coalition is committed to ensuring the future of navigation on the Mississippi River Ship Channel (MRSC) as one of the nation's fundamental natural resources and true economic superhighway. The Coalition believes that the Marine Accident Brief # DCA19FM003 sufficiently documents the challenges related to calculating the vertical clearances at bridges crossing navigable waterways. The Big River Coalition believes that air gap sensors, such as those utilized by the NOAA PORTS® program, offer accuracy and clarity to the vertical clearance discussion. These sensors provide an accurate measurement from low steel elevations to the waterline and the readings are updated every six minutes and posted onto the Lower Mississippi River PORTS weblink by NOAA. The Big River Coalition is committed to protecting and promoting waterborne commerce and strongly believes that the vertical clearances obtained by air gaps sensors are devices that offer clarity which should be embraced and promoted.

Sincerely,

Sean M. Duffy, Sr.

Sean M. Duffy, Sr.
Executive Director

CC: Christopher DiVeglio, NOAA PORTS®
Lt. Commander Thao Nguyen, U.S. Coast Guard
Ralph Scheid, U.S. Army Corps of Engineers
Captain Toby Wattigney, New Orleans – Baton Rouge Steamship Pilots Association

BIG RIVER COALITION

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November 1, 2021

The following information is reproduced from an email received from Ralph Scheid the USACE MVN representative serving as the Chief of the Design Service Branch.

"Mr. Duffy,

The New Orleans Geospatial Engineering Team ("the mapping team") reviewed the document that was sent by you (Sean Duffy of Big River Coalition) on 19-Oct-2021. The mapping team reviewed the USACE 2015 Lower Mississippi Navigation Book, Chart No. 74 and the chart figure called "Chart No. 74 Supplement A" showing bridge clearance for I-10 Hwy Bridge at Baton Rouge.

In regard to the "Port Allen Lock River Side Gage", the mapping team concurs that this reference is misleading. This is an issue of nomenclature. The chart should more clearly refer to the gage as "Mississippi River at Baton Rouge".

The USACE RiverGages.com www site states that this "Mississippi River at Baton Rouge" gage is physically located on the river side forebay wall of the Port Allen Lock. Again, this is an issue of nomenclature. The intent of the chart book was to refer to this same gage.

Courses of Action:

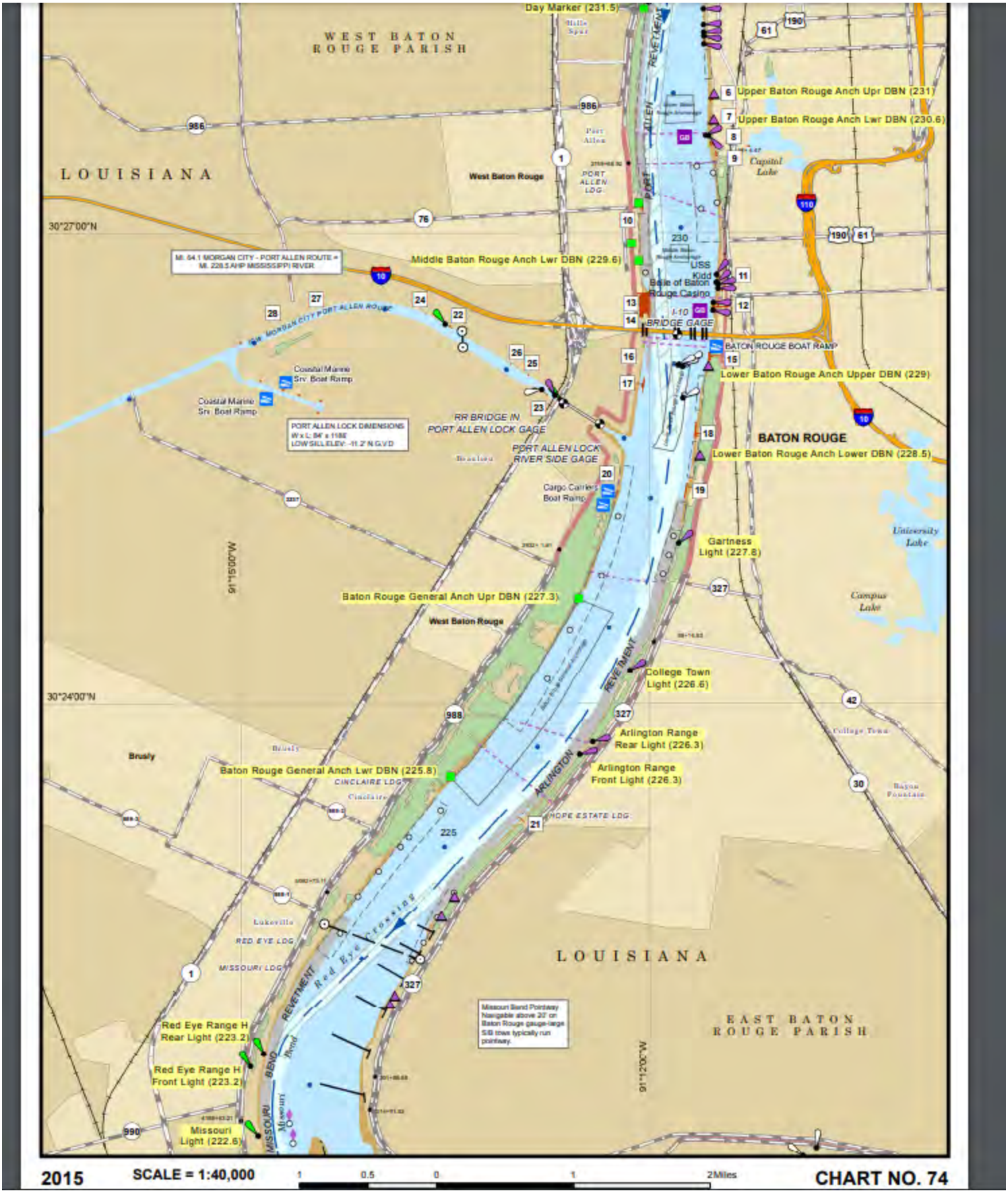
1. Change the USACE chart gage name to show "Mississippi River Baton Rouge Gage (01160)". The 01160 Gage ID will be very definitive for correlation of river stage to a specific 01160 gage via the publicly available information on RiverGages.com.

2. As the publication cycle for this chart book is not fixed, it cannot be determined when chart corrections would be available to the public via a printed chartbook. Therefore, USACE New Orleans will issue a "Navigation Bulletin" with this chart correction. The Navigation Bulletin will become part of a later USCG Local Notice to Mariners (LNM). It is incumbent on mariners to update their charts with this information from the LNM.

3. USACE New Orleans will also coordinate with NOAA and the USCG to resolve the discrepancy in low steel elevations that exists between the NOAA chart and the USACE chart.

Please see the attached screen shots for reference.

Ralph Scheid
Chief, Design Services Br.
USACE New Orleans District, Attn: CEMVN-EDD"


Day Marker (231.5)
WEST BATON ROUGE PARISH
LOUISIANA
West Baton Rouge
Port Allen
PORT ALLEN LOG
ALLEN REVETMENT
Upper Baton Rouge Anch Upr DBN (231)
Upper Baton Rouge Anch Lwr DBN (230.6)
Capitol Lake
30°27'00"N
MI. 64.1 MORGAN CITY - PORT ALLEN ROUTE = MI. 228.5 AHP MISSISSIPPI RIVER
Middle Baton Rouge Anch Lwr DBN (229.6)
USS Kidd
Belle of Baton Rouge Casino
I-10 BRIDGE GAGE
BATON ROUGE BOAT RAMP
Lower Baton Rouge Anch Upper DBN (229)
MORGAN CITY PORT ALLEN ROUTE
Coastal Marine Srv. Boat Ramp
Coastal Marine Srv. Boat Ramp
PORT ALLEN LOCK DIMENSIONS
RR BRIDGE IN PORT ALLEN LOCK GAGE
PORT ALLEN LOCK RIVER SIDE GAGE
BATON ROUGE
Lower Baton Rouge Anch Lower DBN (228.5)
Cargo Carriers Boat Ramp
MISSISSIPPI
Gartness Light (227.8)
University Lake
Baton Rouge General Anch Upr DBN (227.3)
West Baton Rouge
Campus Lake
REVETMENT
College Town Light (226.6)
30°24'00"N
Arlington Range Rear Light (226.3)
Arlington Range Front Light (226.3)
Brusly
Baton Rouge General Anch Lwr DBN (225.8)
CINCLAIRE LOG
ARLINGTON
HOPE ESTATE LOG
College Town
Bayou Fountain
Lukeville
RED EYE LOG
MISSOURI LOG
Red Eye Crossing
LOUISIANA
EAST BATON ROUGE PARISH
Missouri Bend Pointaway
Red Eye Range H Rear Light (223.2)
Red Eye Range H Front Light (223.2)
BEND
Missouri Light (222.6)
91°12'00"W
2015
SCALE = 1:40,000
1 0.5 0 1 2Miles
CHART NO. 74

Louisiana
West Bank

Louisiana
East Bank

Channel Span - Center 500'
Vertical Clearance = 174' - Port Allen Gage
Minimum Vertical Clearance = 127' at Port Allen Gage = 47'

I-10 Highway Bridge
Baton Rouge, LA
Lower Mississippi River
Mile 229.3 AHP
Clearance Data

NOT TO SCALE
VIEW LOOKING UPRIVER

Water Levels By:

Choose An Option

National Weather Service Products

Bookmark

Google Earth | What's This? | Google Map

Upstream

Mississippi River at Baton Rouge (01160)

Downstream

Stream Name: Mississippi River
Gage Zero: 0 Ft. NGVD
Flood Stage:35 Ft.
Record High Stage:47.28 Ft.

Longitude: -91.20694444
Latitude: 30.42916667
River Mile: 228.4
Record High Stage Date: 05/15/1927

Location of Gage :

On forebay wall of Port Allen Lock at river mile 228.4, natural flow affected by tides at low water.

Adjustment for vertical datum NAVD88 (OPUS 2019): -0.71 ft.
(e.g. for data relative to NAVD88 subtract 0.71 ft.)

To adjust NAVD88 (OPUS 2010) values to 2007 Low Water Reference Plane (LWRP) datum relative to NAVD88, subtract 2.5 ft.

** Raw data, subject to change **

Latest Data
11/01/2021 11:00 Central

Latest Stage	8.70 Ft.
24 Hr. Change	-0.04 Ft.
Tomorrow's Forecast (Issued 11/01/2021 15:25)	8.80 Ft. Plot Forecast
24 Hr. Precip Total	M View Precip
Latest Air Temp	M
Atmospheric Pressure	30.22 In

7 Days | Stage

Plot | Tabulate

Daily Historic Data
(08:00 Central Reading)

Choose A Parameter

From JAN 1 2021
To DEC 31 2021

Stage

Plot | Tabulate | Tabulate (Yearly Formatted)

Additional Links:
View Record Stage High / Lows
Yearly Stage Hydrograph
River Velocity Table
DECODES XML
Annual Hi / Low Stages

US Army Corps of Engineers - New Orleans District - Water Control Center - Contact Us

DEPARTMENT OF THE ARMY
Corps of Engineers, New Orleans District
7400 Leake Avenue
New Orleans, Louisiana 70118

CEMVN-ODT-C 17 November 2021

NAVIGATION BULLETIN NO. 21-135

MISSISSIPPI RIVER
2015 USACE LOWER MISSISSIPPI RIVER NAVIGATIONAL CHARTS
CHART UPDATE, BATON ROUGE GAGE

Mariners are advised that an update to the 2015 U.S. Army Corps of Engineers (USACE) Lower Mississippi River Navigational Chart folio, Chart No. 74 and Chart No. 74 Supplement A, is currently available. On both pages, the label, "Port Allen Lock Riverside Gage" is revised to state, "Mississippi River at Baton Rouge Gage (01160)".

Refer to http://www.rivergages.com to correlate to the real-time gage readings for gage, "Mississippi River at Baton Rouge Gage (01160)".

Contact the USACE New Orleans District at 504-862-1358 for more information regarding this notice.

//signed//

MICHELLE C. DAIGLE
Chief, Technical Support Branch
Operations Division