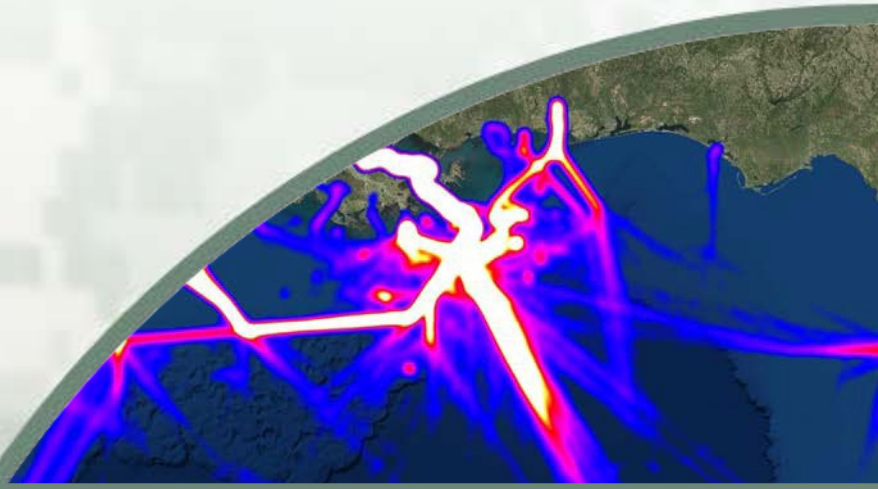
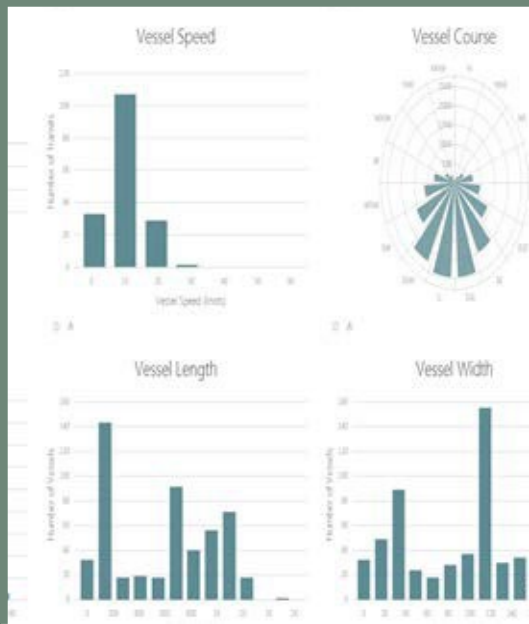
Automatic Identification System

Cory Tabbert
Hydraulic Engineer
USACE – St. Louis District

RRAT 2023



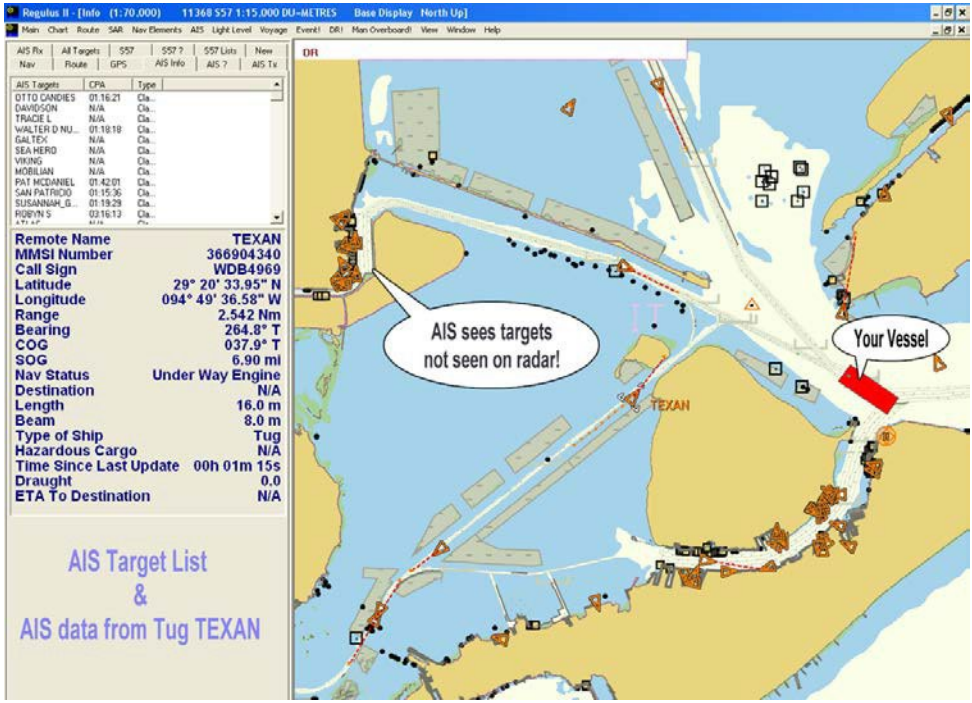


US Army Corps of Engineers®

First, What is AIS?

- Automatic Identification System (AIS) is a real-time shipboard broadcast system, sending signals to other ships and to shore-based receivers
- Designed as collision avoidance system

- Data included in broadcasts:
  - Time stamp
  - Latitude & longitude
  - Speed over ground
  - Course over ground & heading
  - Vessel ID
  - Ship type
  - Dimensions
  - Max draft

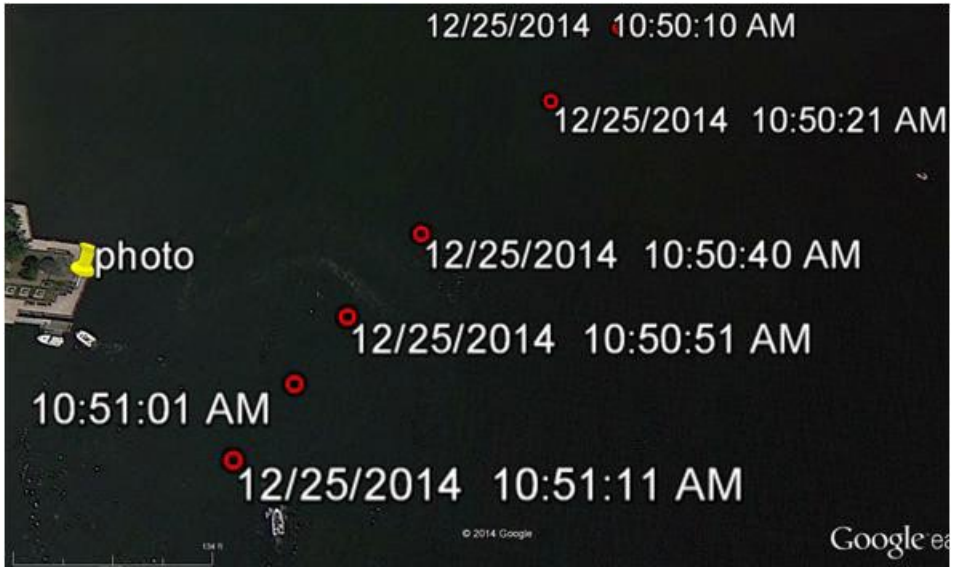


- Mandatory for almost all commercial vessels. Also used by rec. vessels.

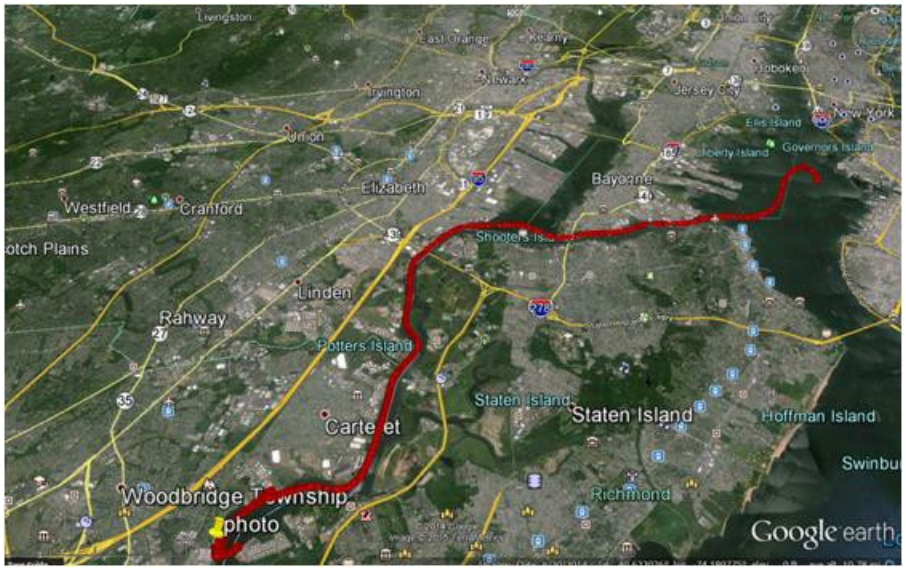
Source: United States Coast Guard Navigation Data Center

AIS Data Example

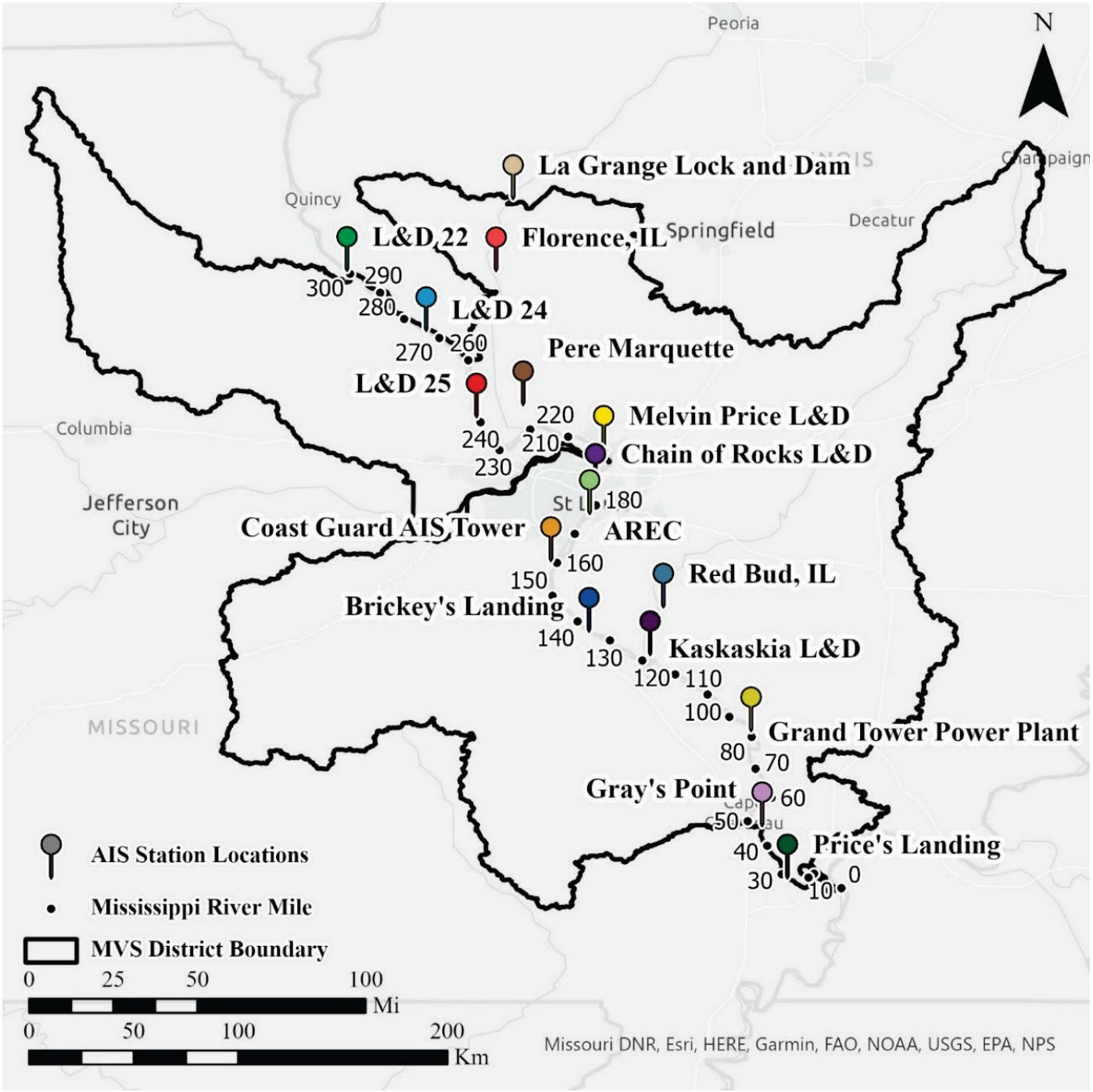
- Example:
  - Vessel name: LR
  - Time: 12/25/14 10:50 am
  - Location: Arthur Kill
    - between New Jersey and Staten Island, New York

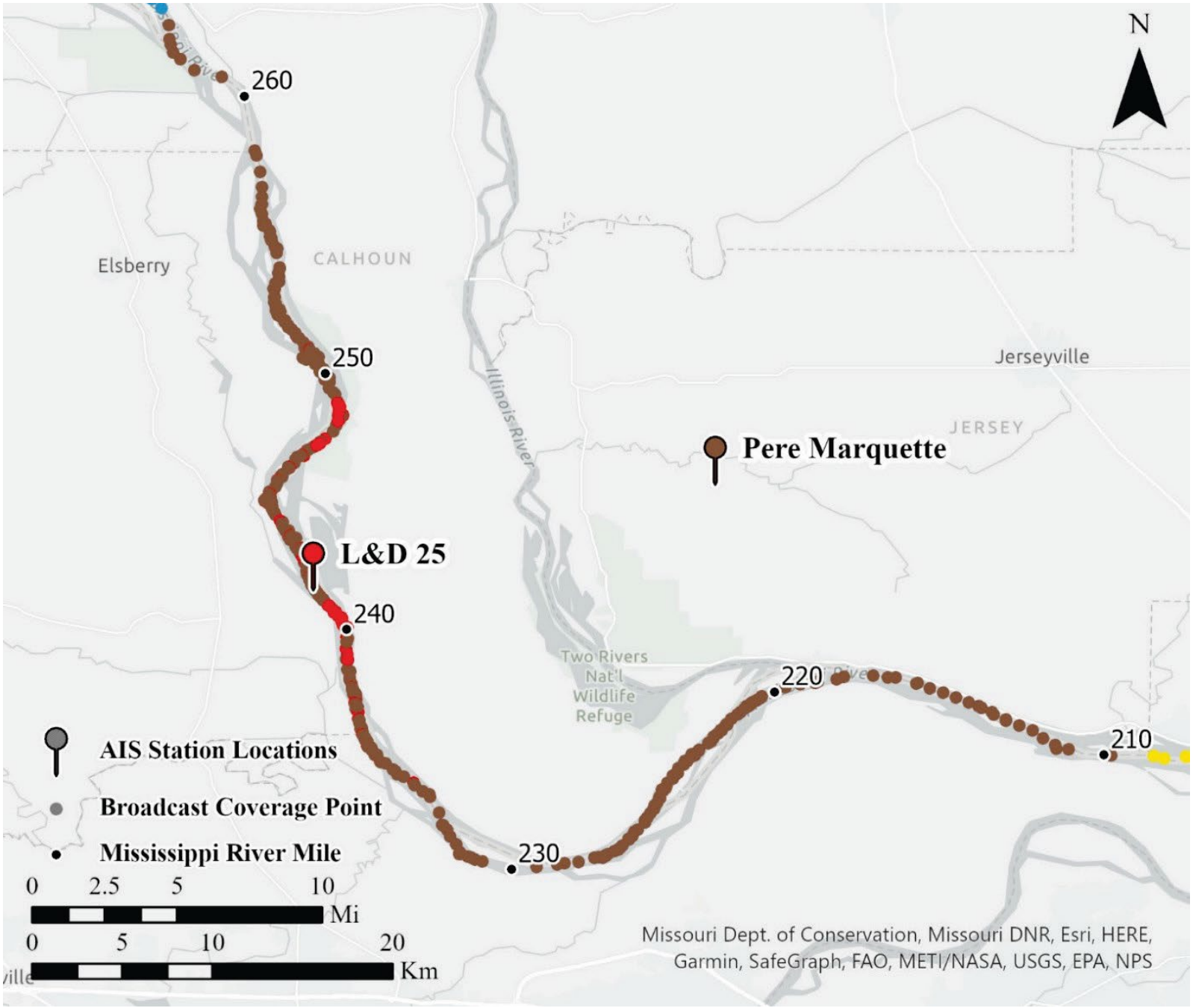


Unique time-stamped AIS vessel position reports (red dots)



Vessel position reports stitched together to make a continuous vessel track line of the LR's voyage through the Arthur Kill channel.


N
Peoria
La Grange Lock and Dam
Quincy
Springfield
Decatur
Champaign
L&D 22
Florence, IL
300
290
280
L&D 24
270
260
Pere Marquette
L&D 25
220
Melvin Price L&D
240
210
Chain of Rocks L&D
230
Columbia
Jefferson City
180
Coast Guard AIS Tower
AREC
160
150
Red Bud, IL
Brickey's Landing
140
130
Kaskaskia L&D
120
110
100
MISSOURI
Grand Tower Power Plant
80
70
Gray's Point
60
50
40
Price's Landing
30
10
0
AIS Station Locations
Mississippi River Mile
MVS District Boundary
0 25 50 100 Mi
0 50 100 200 Km
Missouri DNR, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS


N
260
250
240
220
210
230
Elsberry
CALHOUN
Jerseyville
JERSEY
Illinois River
Pere Marquette
L&D 25
Two Rivers
Nat'l
Wildlife
Refuge
AIS Station Locations
Broadcast Coverage Point
Mississippi River Mile
0 2.5 5 10
Mi
0 5 10 20
Km
Missouri Dept. of Conservation, Missouri DNR, Esri, HERE,
Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

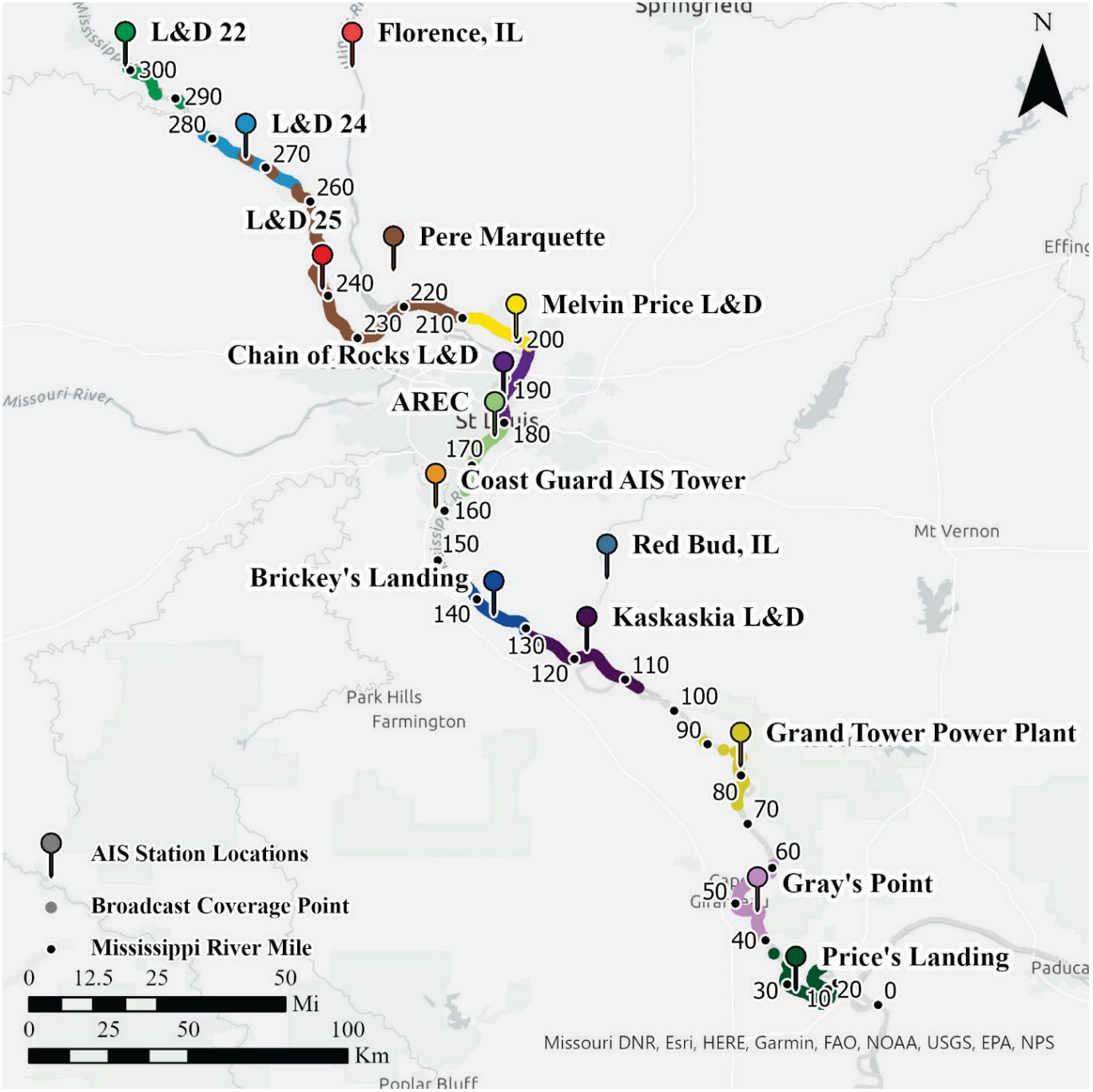

L&D 22
Florence, IL
300
290
280
L&D 24
270
260
L&D 25
Pere Marquette
240
220
230
210
Melvin Price L&D
200
Chain of Rocks L&D
190
AREC
180
170
Coast Guard AIS Tower
160
150
Red Bud, IL
Brickey's Landing
140
Kaskaskia L&D
130
120
110
100
90
Grand Tower Power Plant
80
70
60
Gray's Point
50
40
Price's Landing
30
10
20
0
N
Missouri River
Springfield
Mt Vernon
Park Hills
Farmington
Paducah
Poplar Bluff
AIS Station Locations
Broadcast Coverage Point
Mississippi River Mile
0 12.5 25 50 Mi
0 25 50 100 Km
Missouri DNR, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

Figure 3: Sample image illustrating vessel position points within the Mississippi River at river mile 172. In this picture alone, there is roughly 215,000 points that are attributed to vessel movements during February 2015.

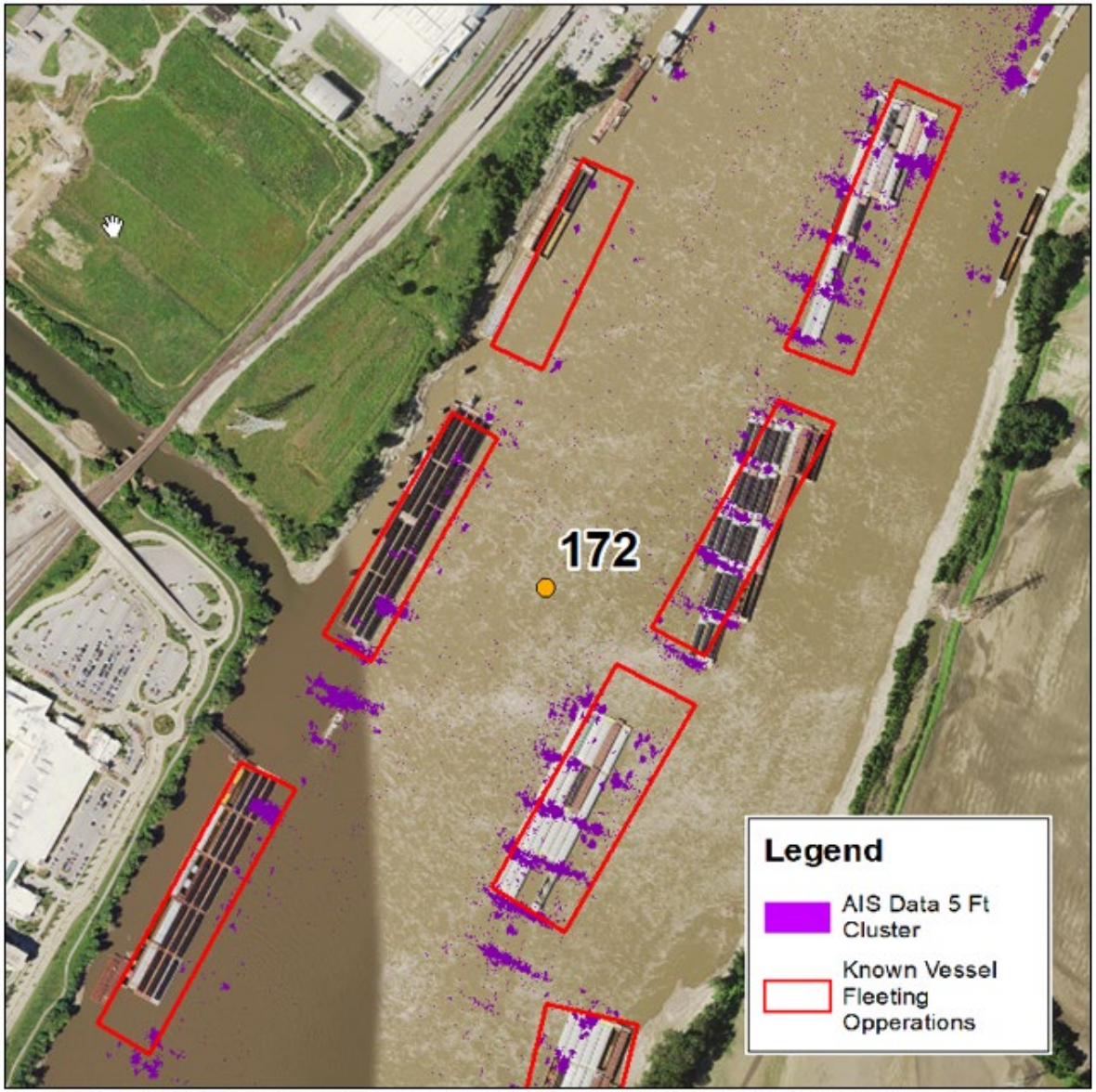


Figure 5: Sample image illustrating 5ft cluster mapping within the Mississippi River to denote highly utilized areas during February 2015. In this picture you can clearly see the various push and pull points associated with fleeting operations.

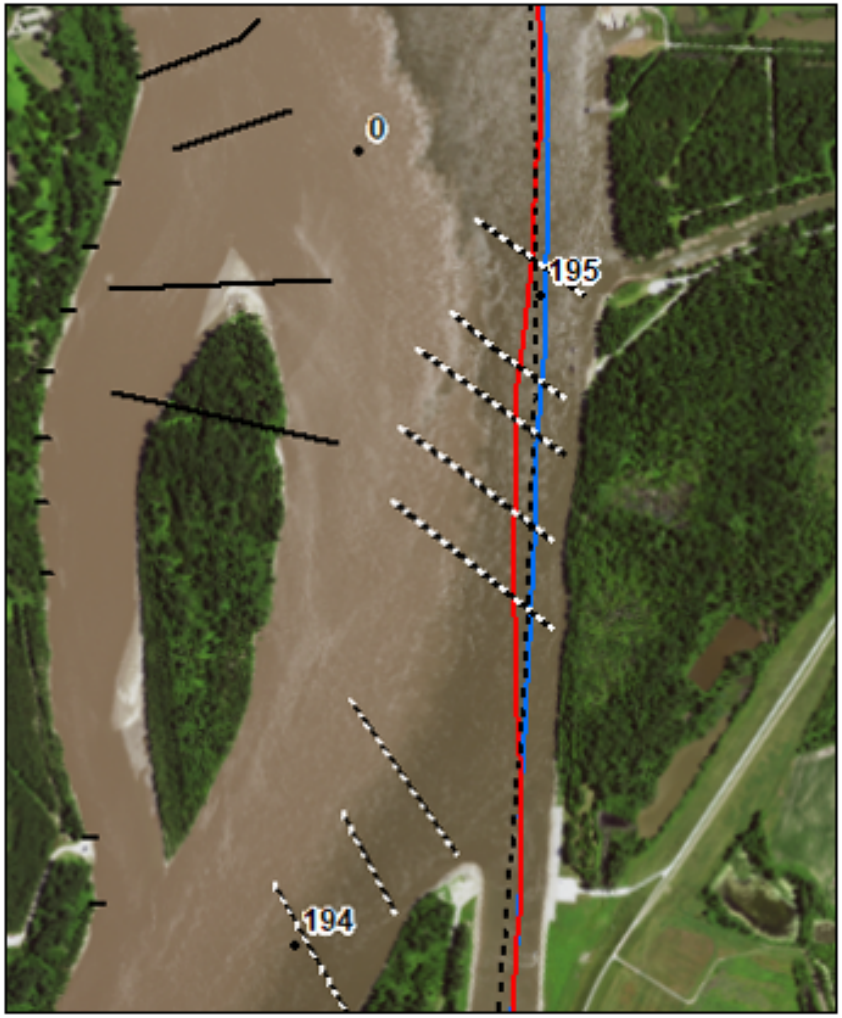


Figure 6: Sample image illustrating up-bound vs. down-bound tow movements at the entrance to the chain of rocks canal. In this image, down-bound tow paths are depicted by the blue line while the up-bound paths are depicted by the red line. This is a simple illustration showing that regardless of direction of travel, vessels don't always use the same path of transit.

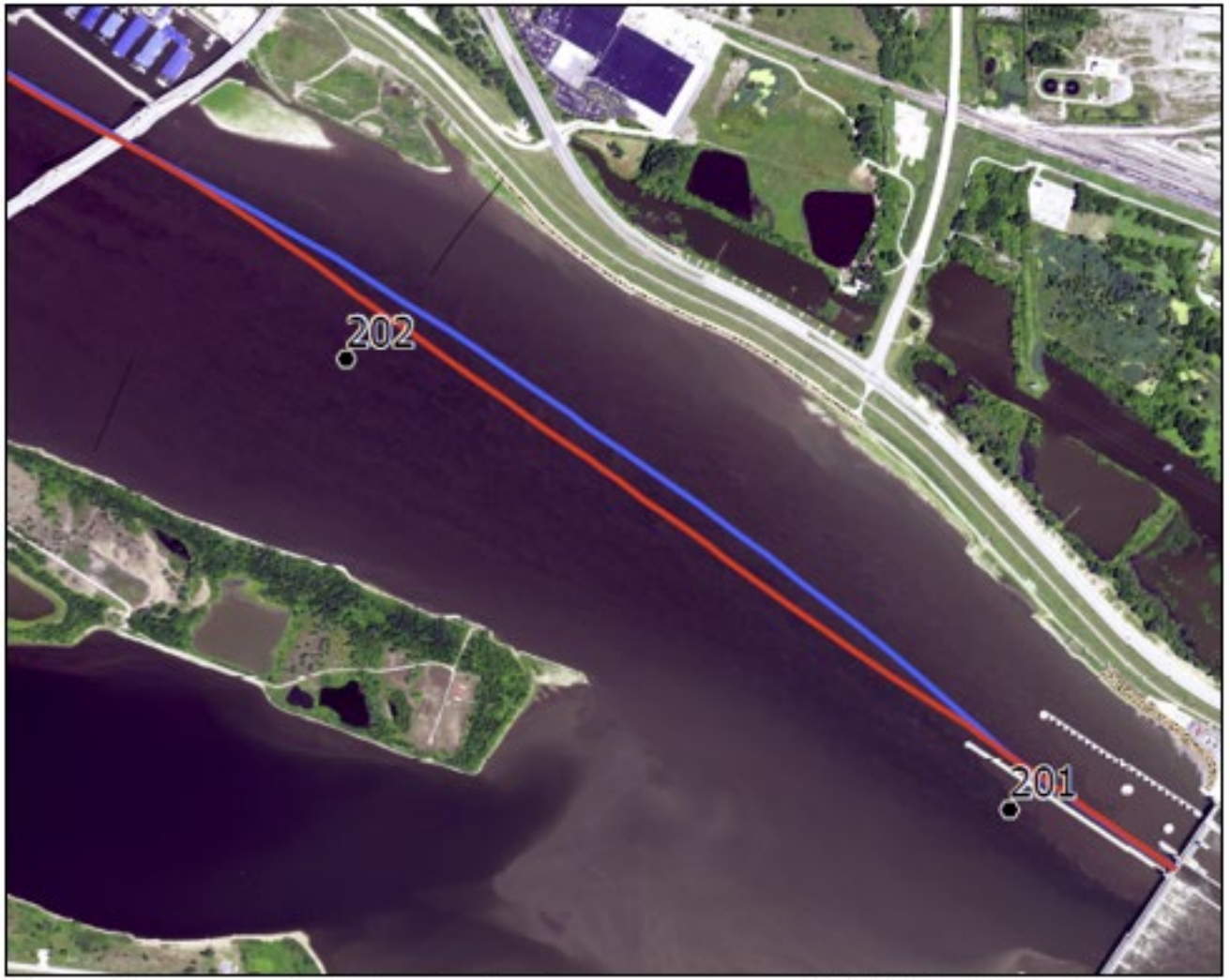
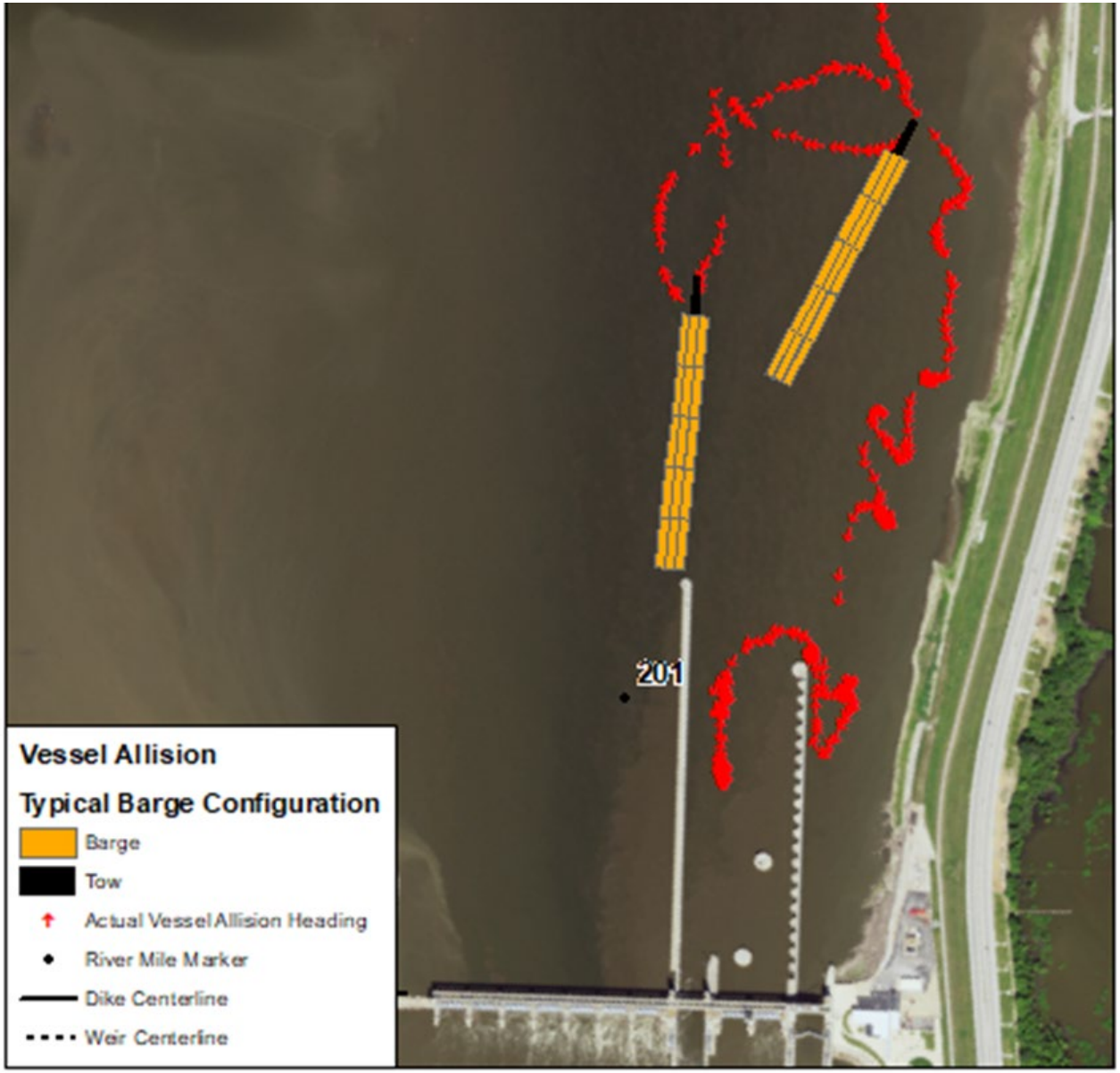
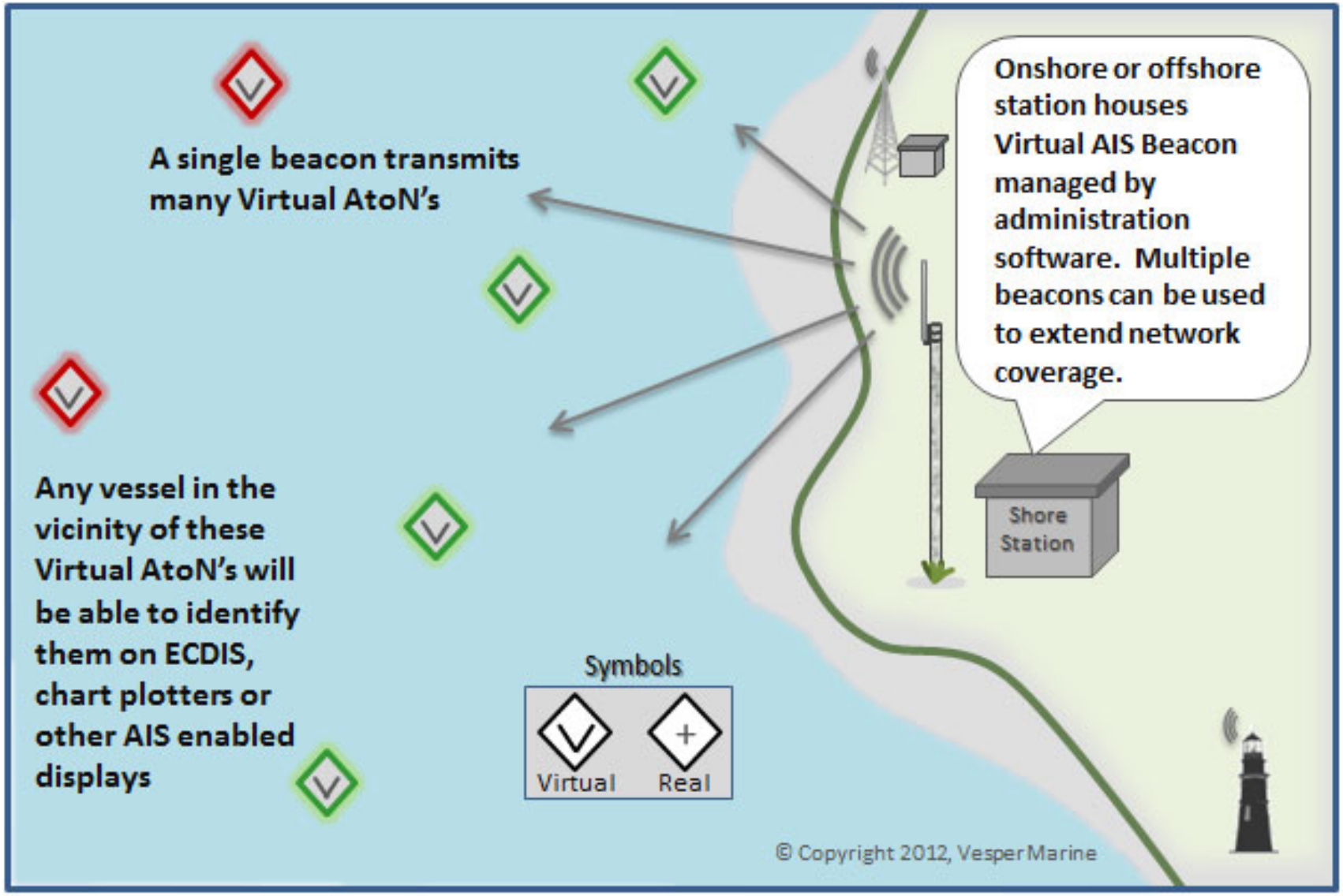


Figure 7: Sample image illustrating up bound vs. down bound tow movements at Melvin Price L&D. In this image, down bound tow paths are depicted by the blue line while the up bound paths are depicted by the red line. This is a sample illustration showing that regardless of direction of travel, vessels don't always use the same path of transit.


201
Vessel Allision
Typical Barge Configuration
Barge
Tow
Actual Vessel Allision Heading
River Mile Marker
Dike Centerline
Weir Centerline


A single beacon transmits many Virtual AtoN's
Onshore or offshore station houses Virtual AIS Beacon managed by administration software. Multiple beacons can be used to extend network coverage.
Shore Station
Any vessel in the vicinity of these Virtual AtoN's will be able to identify them on ECDIS, chart plotters or other AIS enabled displays
Symbols
Virtual
Real
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