Forecasting the Mississippi River During Hurricane Season

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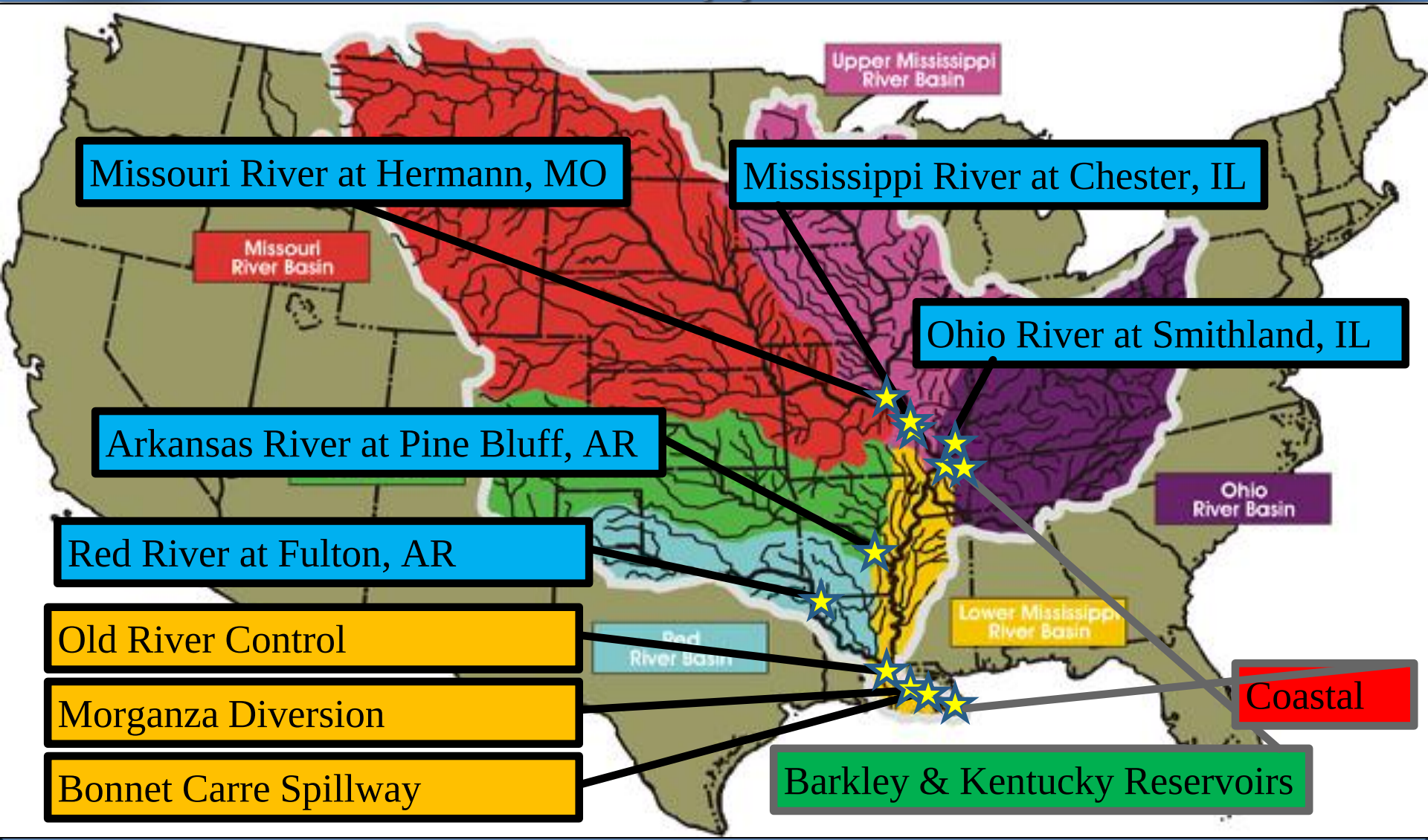
Overview

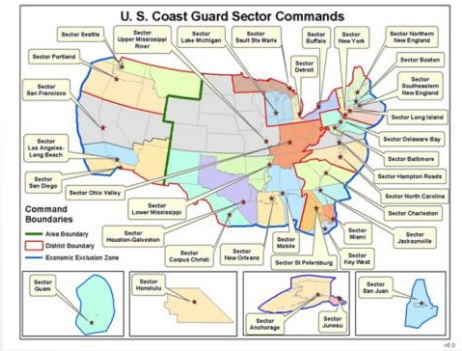
- The Greater Mississippi River Basin.
- Regulation/Flood Control.
- Hurricane Storm Surge Forecasts.

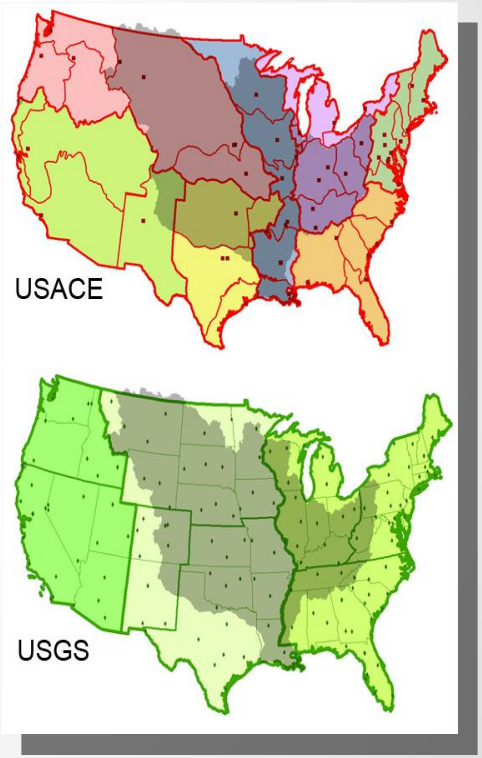
Major Tributaries of the Mississippi River



Partners Involved in Lower Mississippi River Forecast Coordination

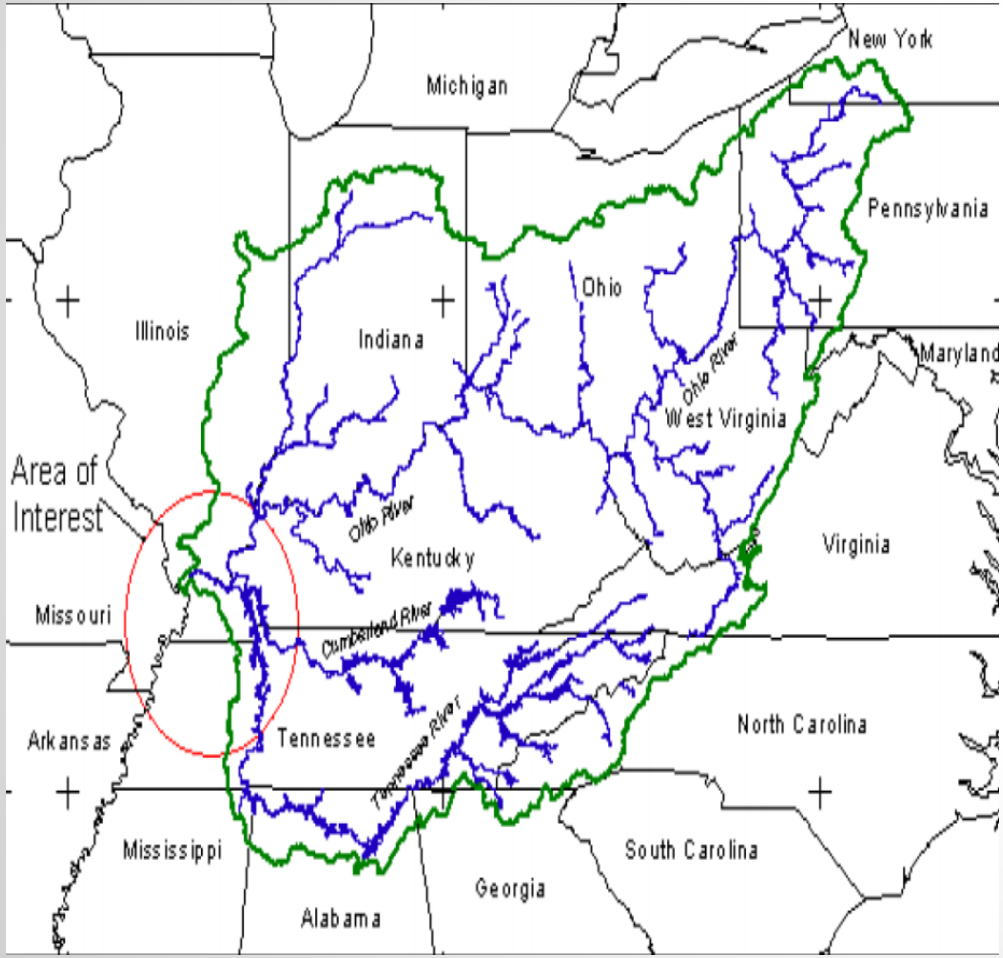
- **Inter-Agency Coordination**
  - ❖ NWS – 4 Upstream RFCs / 3 WFOs
  - ❖ USACE - 3 Divisions and 7 Districts
  - ❖ TVA - Tennessee River
- **USGS – 12 District Offices**
- **USCG – 1 District and 9 Sectors**
- **FEMA - 3 Regions**
- **State Ems**
- **Navigation**
- **HAZMAT**
- **More**





USACE Flood Control Operations

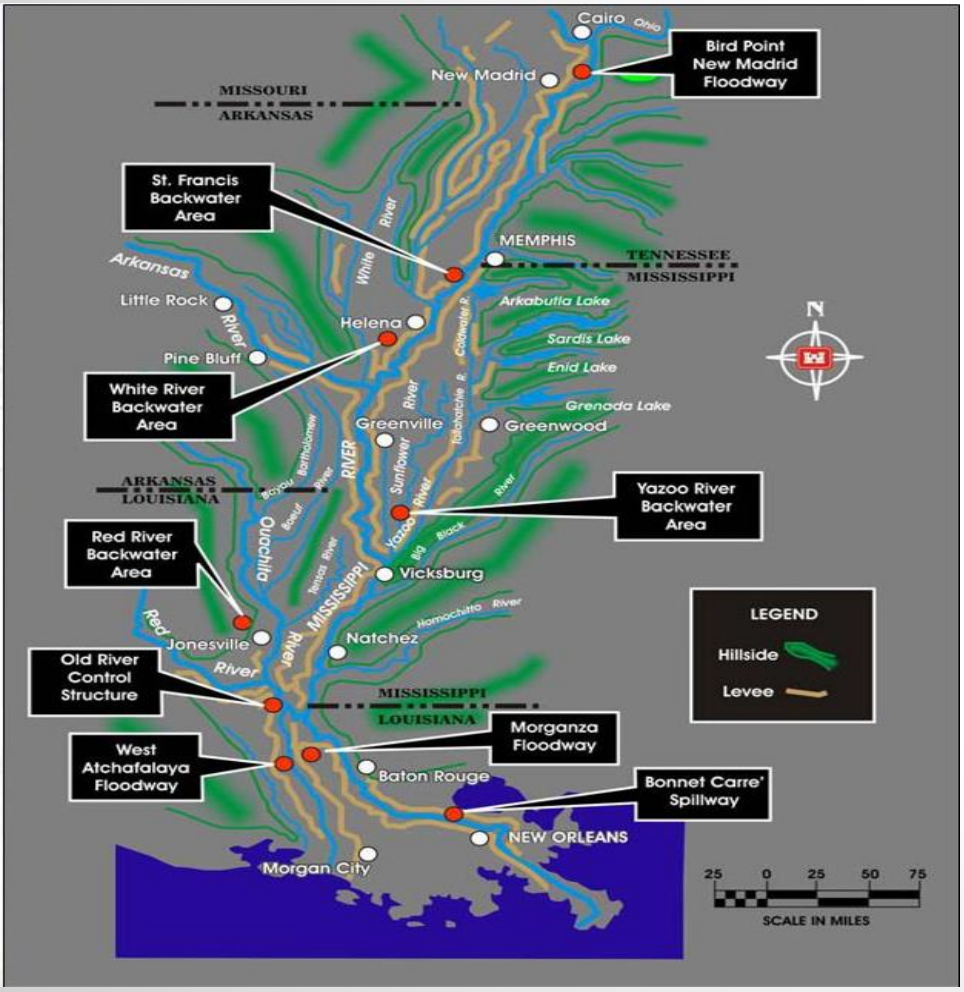
Barkley and Kentucky Dams



- When Cairo, IL gage exceeds 40 ft, USACE manages both lakes to minimize flood impacts on Ohio/Mississippi River and upstream of lakes.
- If storage allows, discharges can be managed to reduce crest at Cairo by several feet.

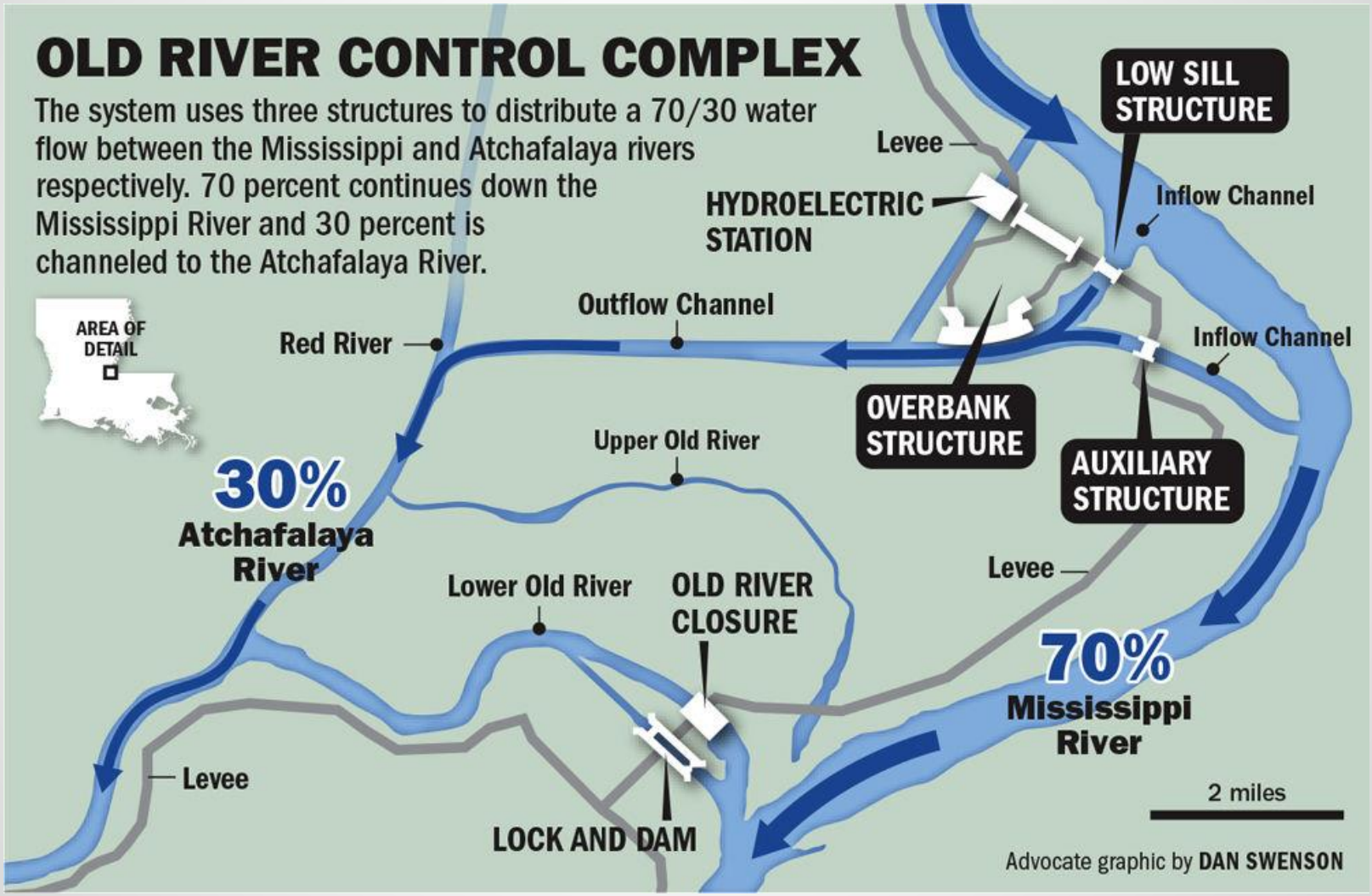
USACE Flood Control Operations

Floodways and Backwater Areas



- Birds Point New Madrid Floodway reduces stages at Cairo, IL
- Backwater areas store flow and reduce stages on the Mississippi River
- Old River Control Structure distributes water between the Mississippi and Atchafalaya Rivers
- Morganza reduces stages for Baton Rouge through New Orleans
- Bonnet Carre reduces stages for Reserve & New Orleans

Old River Control Structure



Morganza Spillway Operation

- Operational Trigger is 1.5 MCFS passing Tarbert Landing.
- Regulates stages to 45 ft at Baton Rouge with ~ 2 ft of freeboard.
- Designed to pass up to 600 KCFS.
- Operated twice since construction in 1954 in 1973 and 2011.

Bonnet Carre Spillway Operation

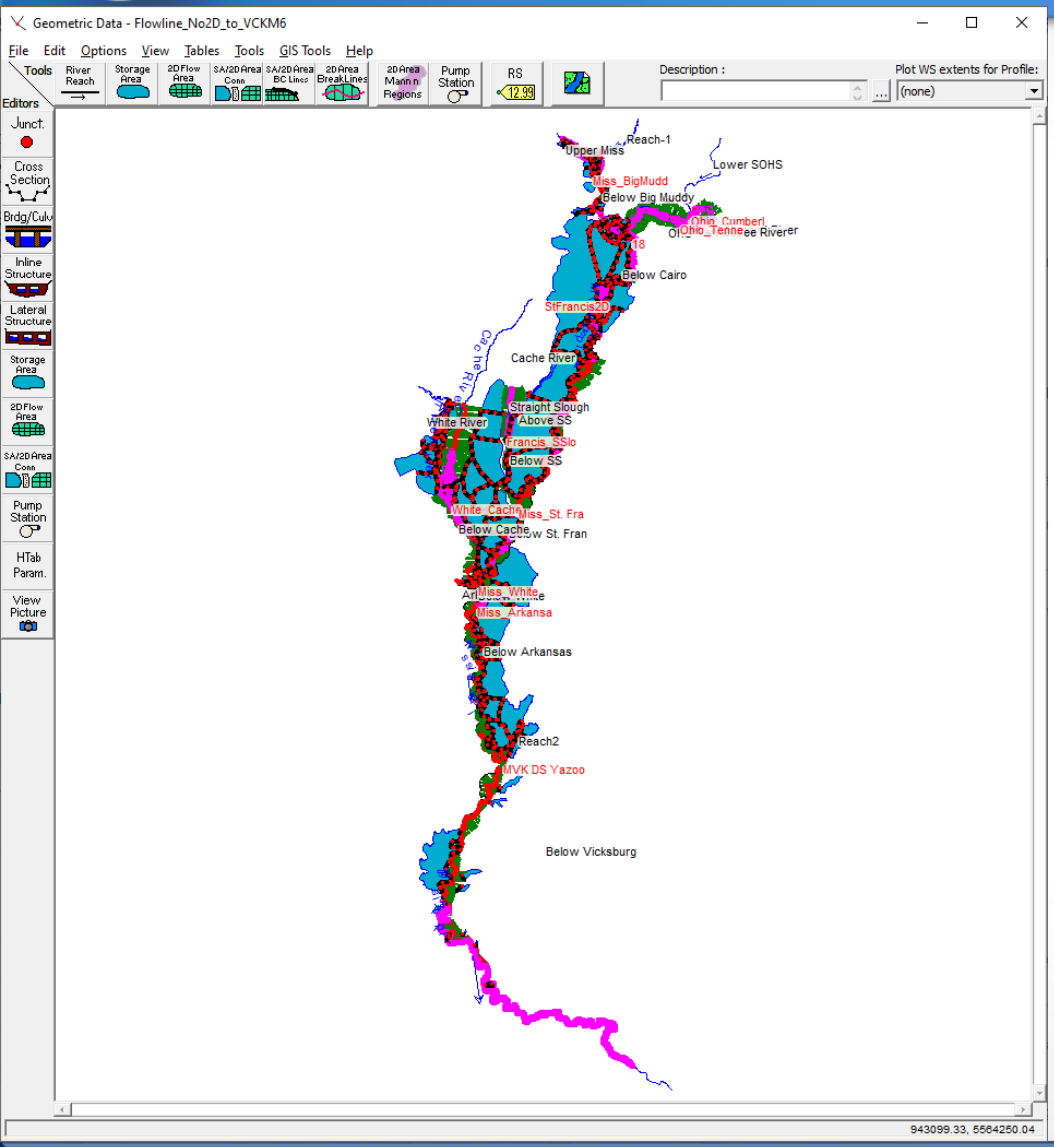
- Operational Trigger is 1.25 MCFS passing New Orleans.
- Regulates stages to 17 ft at New Orleans.
- Operated 15 times since construction in 1931 (7 times since 2008).
- Designed to pass ~250 KCFS

Hurricane Surge Impacts

Hurricane Betsy, September 11, 1965

- Hurricane Surges occur rapidly causing ship groundings.
- Numerous flood gates and docks must be closed which takes time to complete. USACE needs 3-5 days lead time.

HEC-RAS Model



- 1-D USACE HEC-RAS Unsteady Flow Model.
- 22 Dynamic Tributaries and lateral inflows/outflows.
- Coordinate regulation scenarios for the major dams/diversions with TSCHNG modifiers.
- Select Coastal Boundary via a TS-Option Modifier at West Point a la Hache, LA.

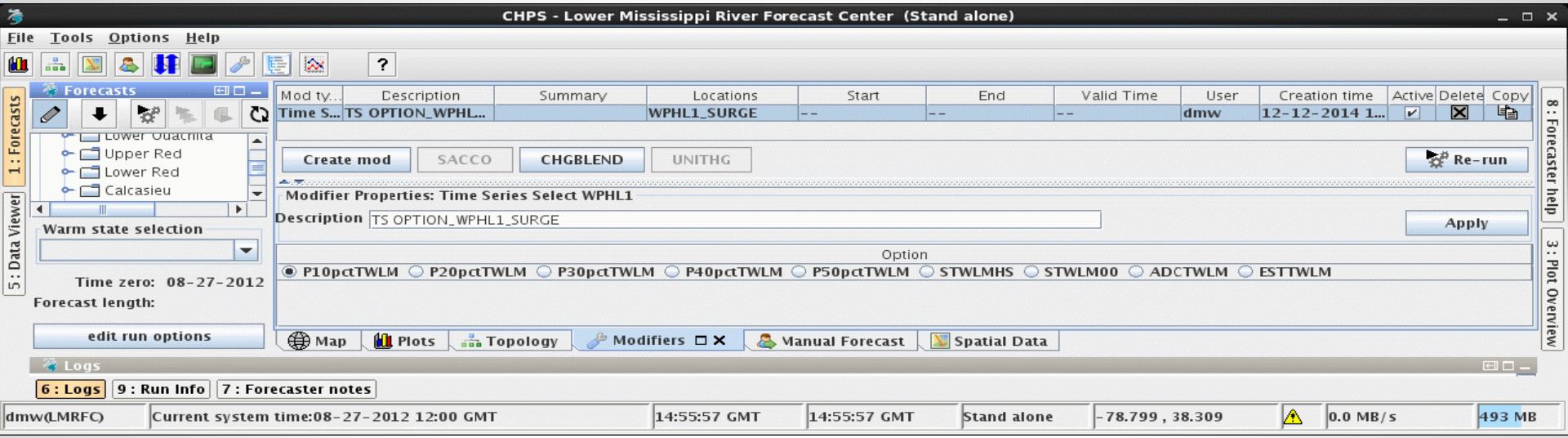
Mississippi River Hurricane Surge Zone

Coastal Boundary Data

- National Ocean Service Tide (default)
- National Ocean Service ESTOFS (ADCIRC)
- National Weather Service P-ETSS (SLOSH)
  (10/20/30/40/50 Pct Exceedances)
- National Hurricane Center PSURGE (SLOSH)
  (10/20/30/40 Pct Exceedances)
- Louisiana State University ADCIRC
  (NHC/50/100% left/right of NHC track)
- Local library of 1,500 Hypothetical storms (SLOSH)

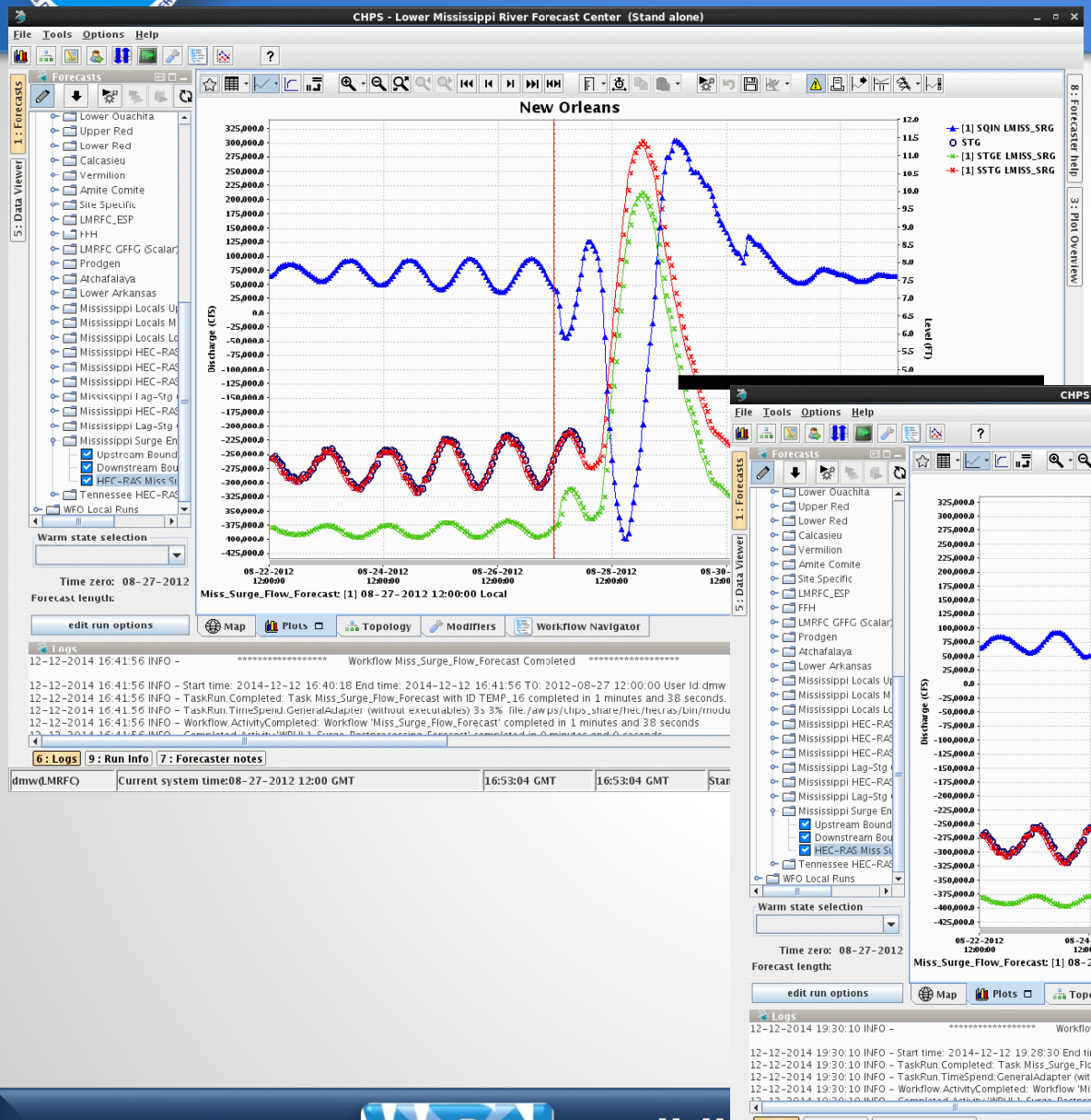
- Direction of Storm: W, WNW, NW, NNW, N, NNE, NE, ENE, E
- Size of Storm (RMW): 25, 40 nm
- Intensity (Saffir Simpson category): 1, 2, 3, 4, 5
- Forward Speed: 5, 15, 28 kt
- Track Offset: nm left, right of New Orleans

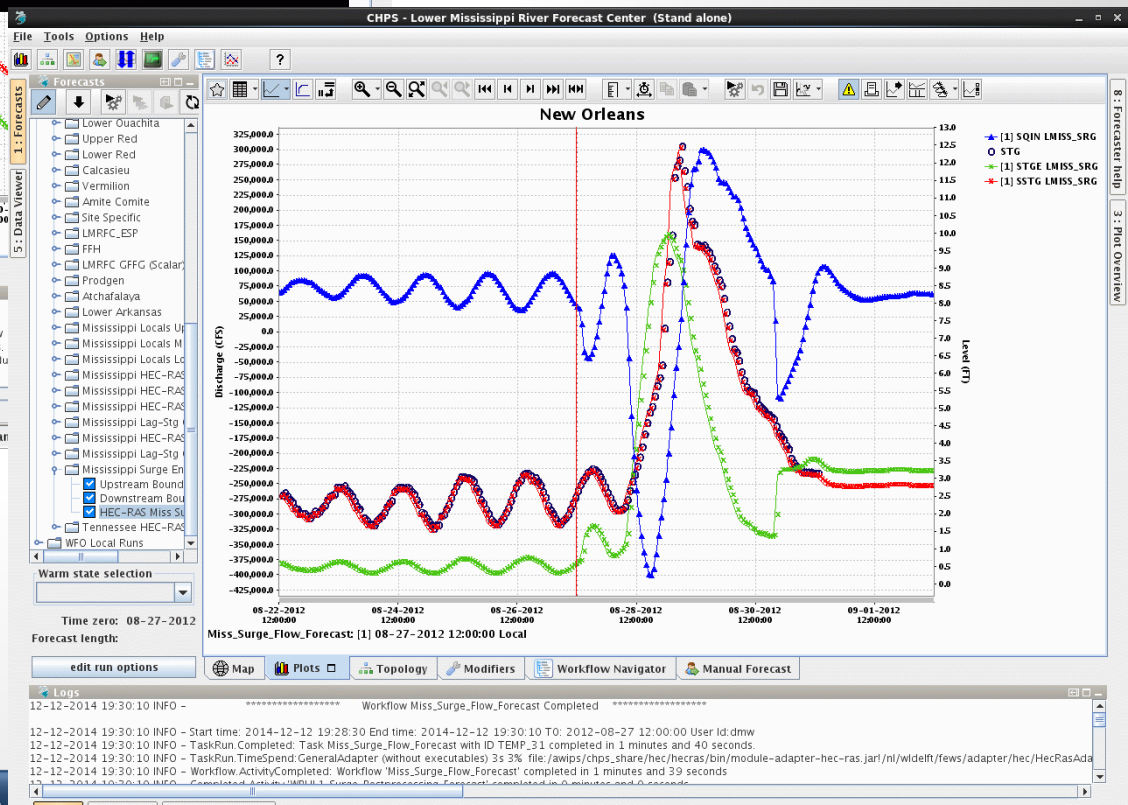
Mississippi River at New Orleans Surge



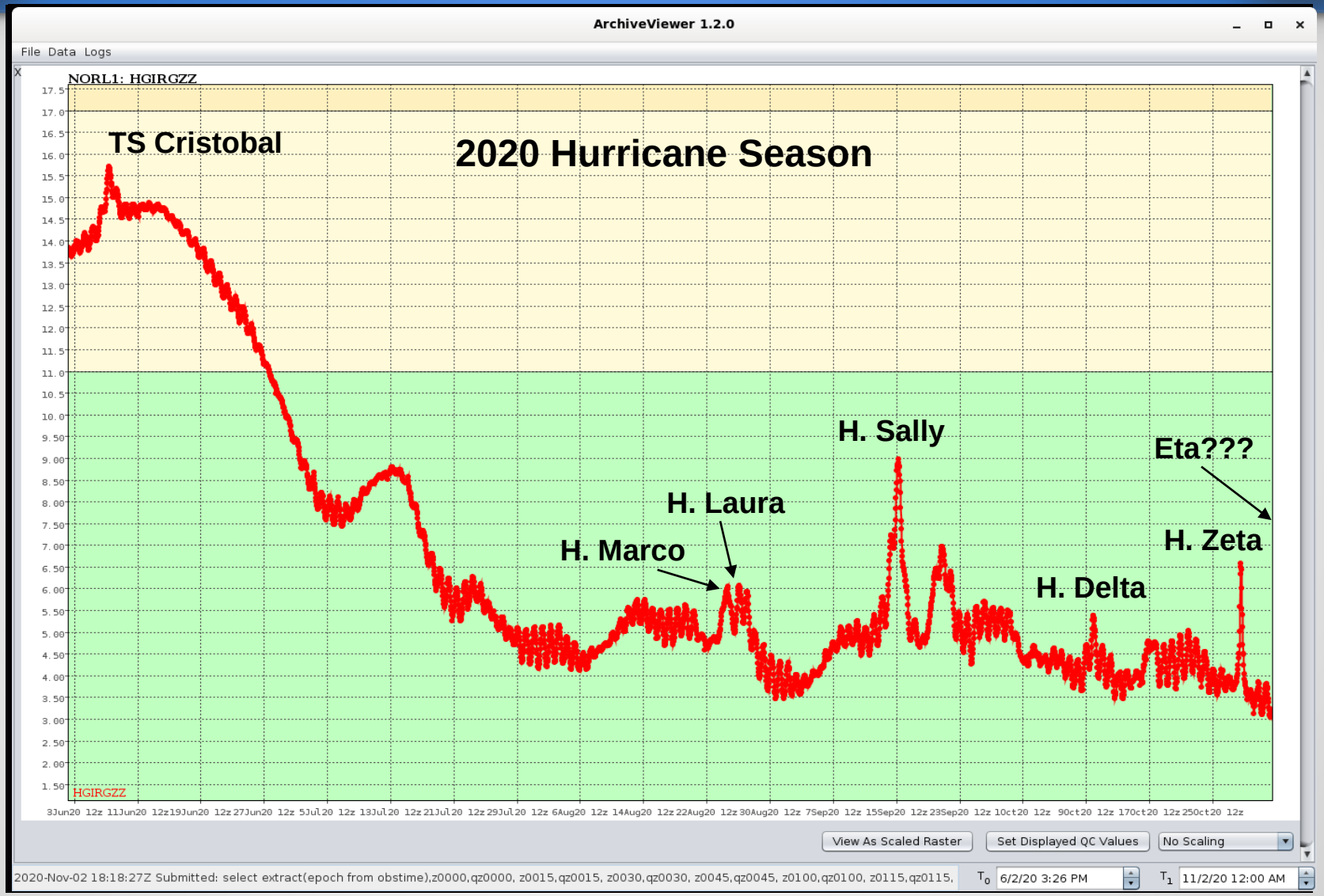
Downstream Boundary selection via a TS_Option Modifier at West Pointe a la Hache, LA

New Orleans PSURGE 10pct Exceedance

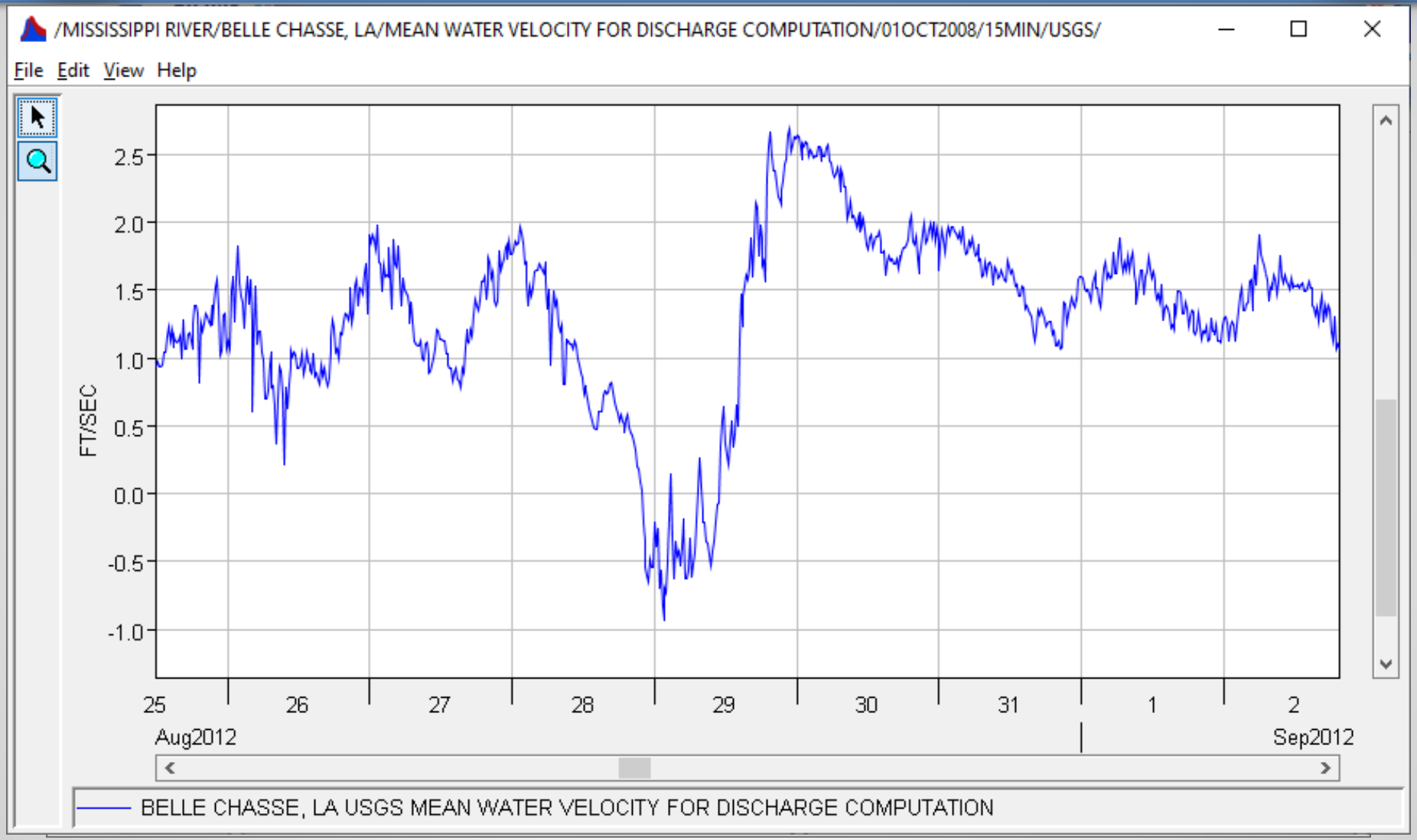




Notable Storm Surges



Discharge and Velocity with Surge



Questions