



Mississippi River Forecasting



David Welch

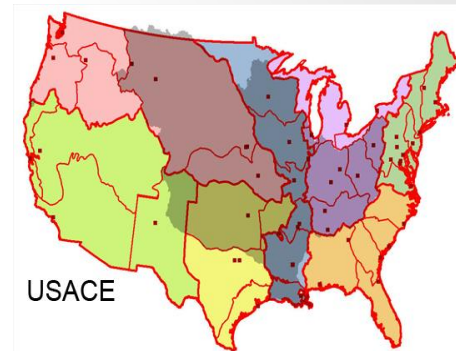
Wednesday, Mar 13th 2019



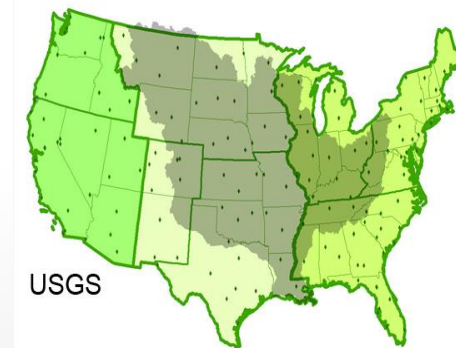
Building a Weather-Ready Nation



- ❖ **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**



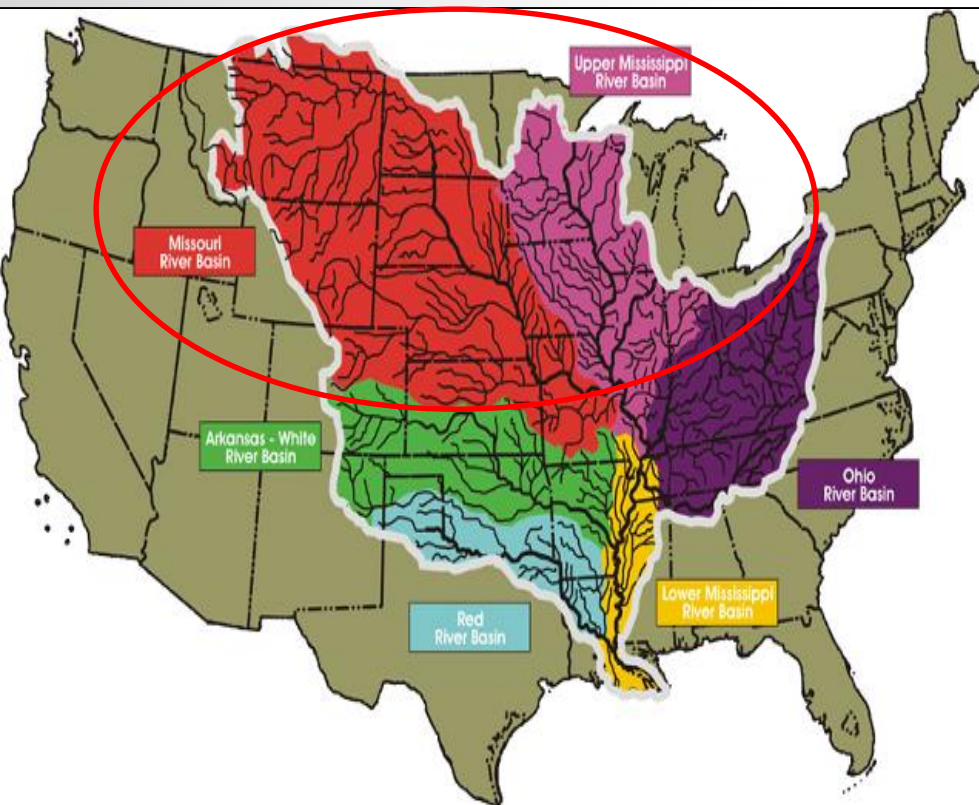
USACE



USGS

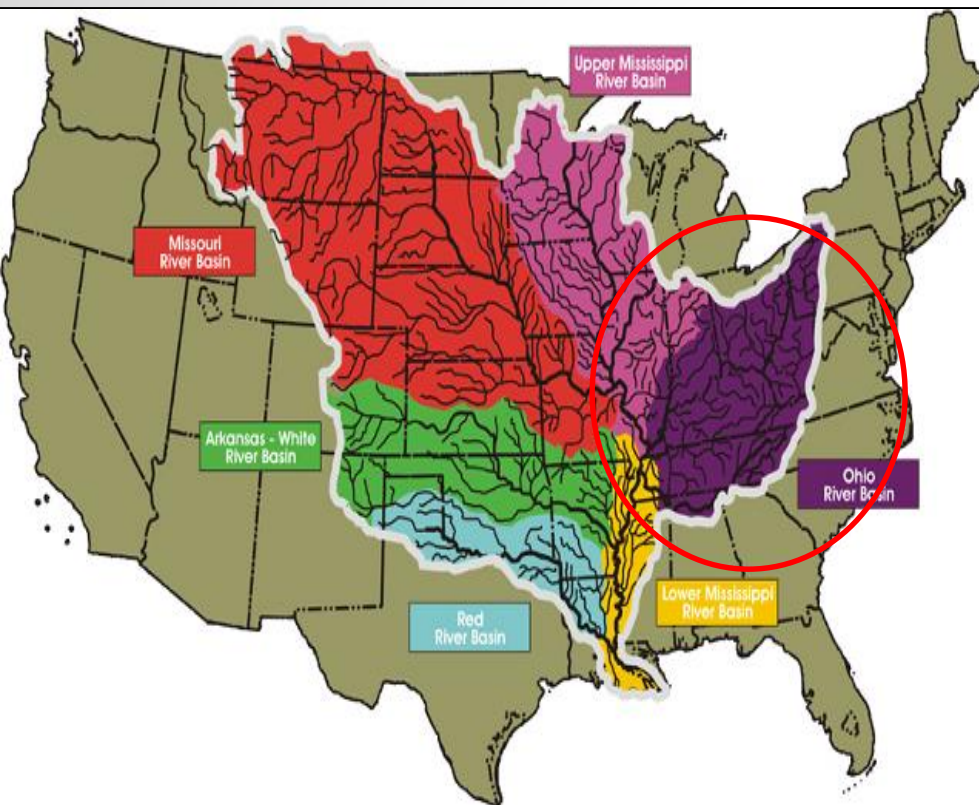


Missouri and Upper Mississippi Basins



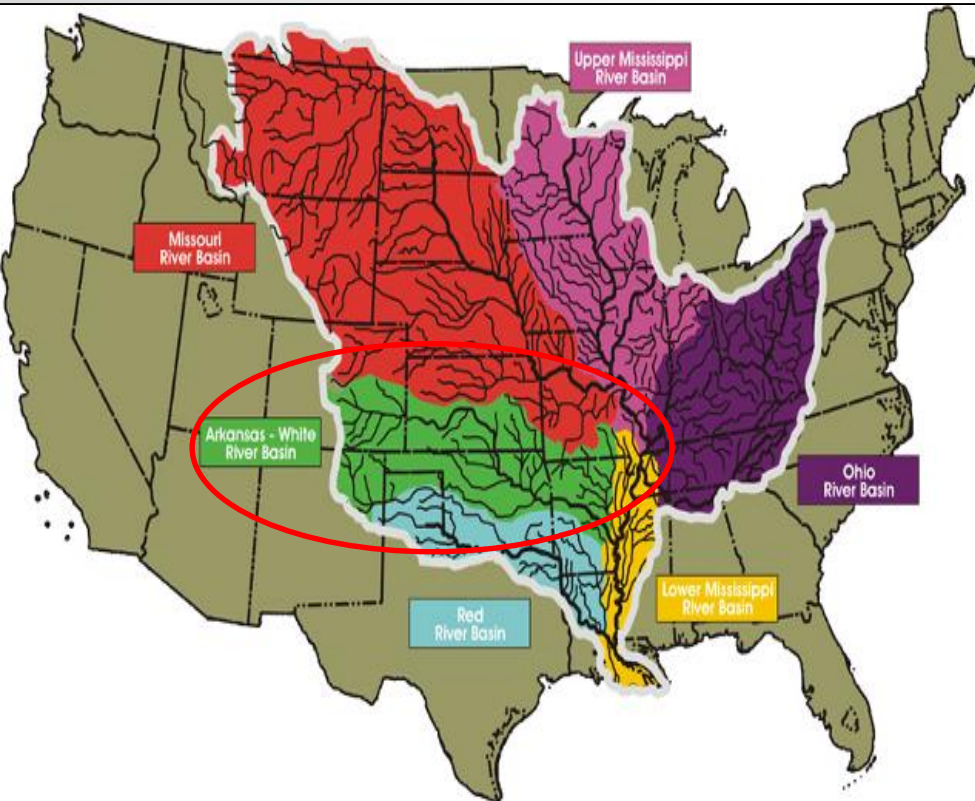
- Rainfall and Temperature Forecasts (snowmelt) play key roles
- Typically less precipitation in this basin so provides less total flow to Cairo, IL
Exception (1993)
- Upper MS snowmelt generally between mid Mar – mid Apr
- Missouri snowmelt generally mid Apr – mid May

Ohio and Tennessee Basins



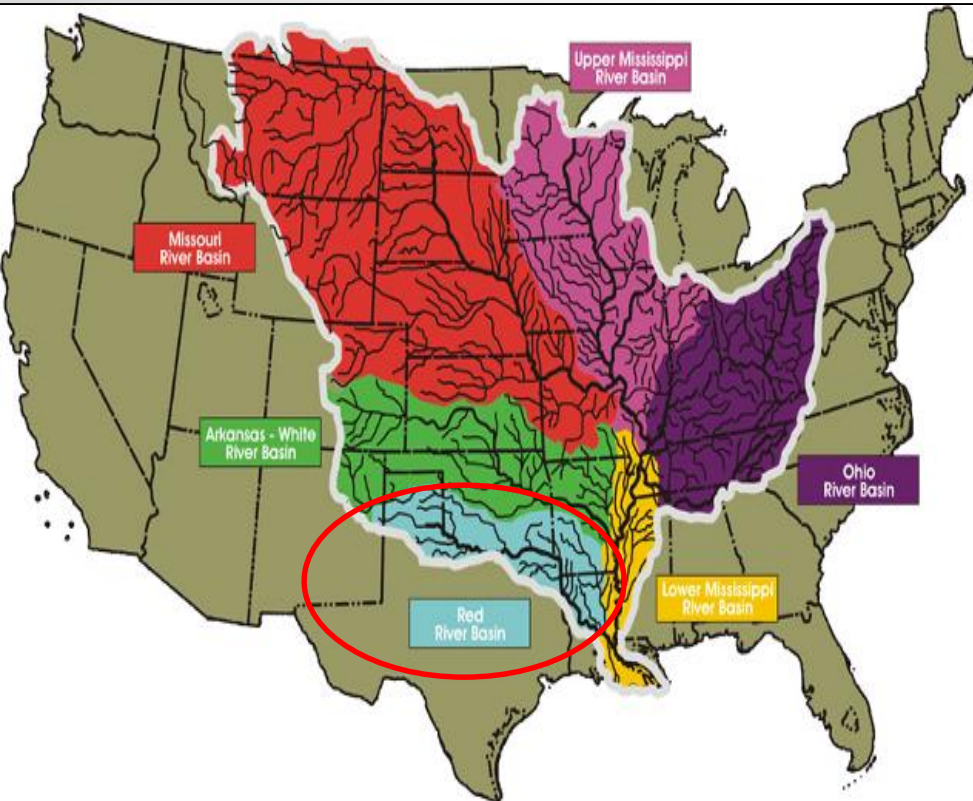
- Rainfall Forecasts play key role
- Typically more precipitation in this basin so provides more total flow to Cairo, IL
- TVA forecasts the TN River
- USACE Flood Control Operations when Cairo, IL is above 40' or 35' and forecast to $\geq 40'$

Arkansas and White Basins



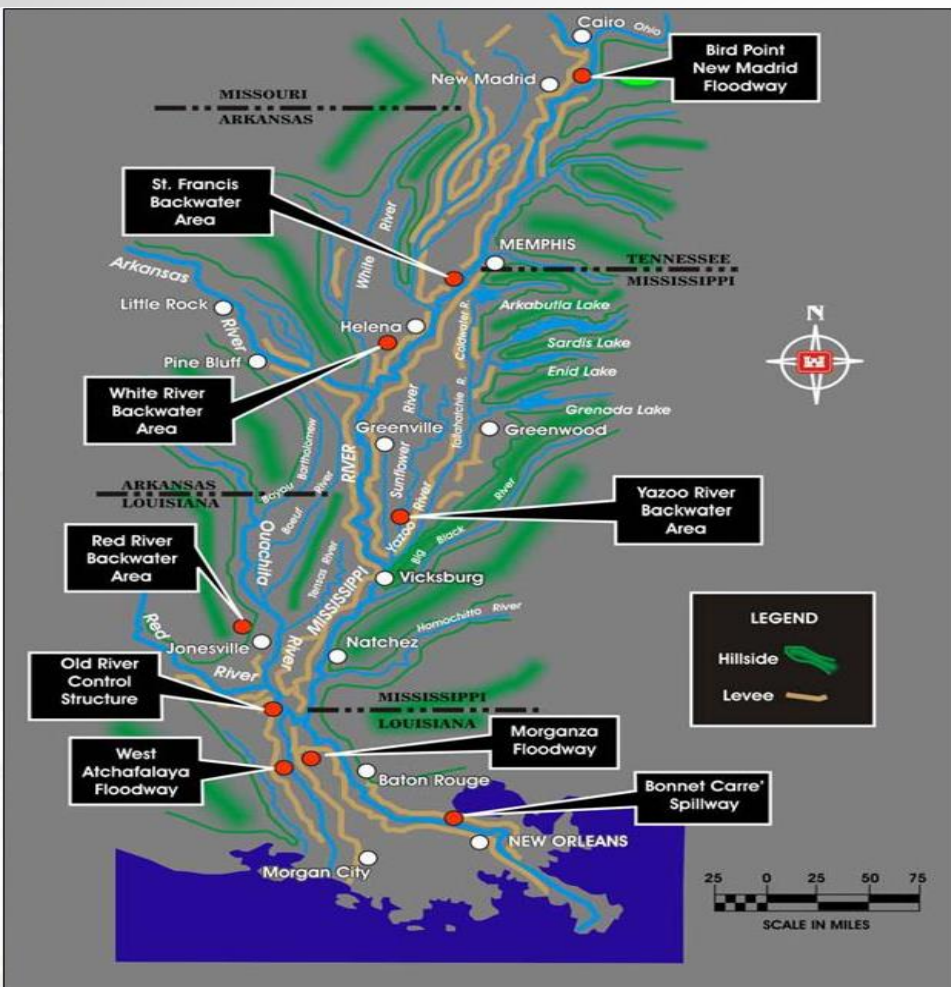
- Since much of the flow is in the MS River by the time it reaches the AR River outlet, this basin plays a smaller role in total flow for the MS River
- Can add 2-3 feet to crests from Arkansas City, AR southward
- When forecasting MS River crests, usually have to estimate AR River flows 2 to 3 weeks out

Red and Ouachita Basins



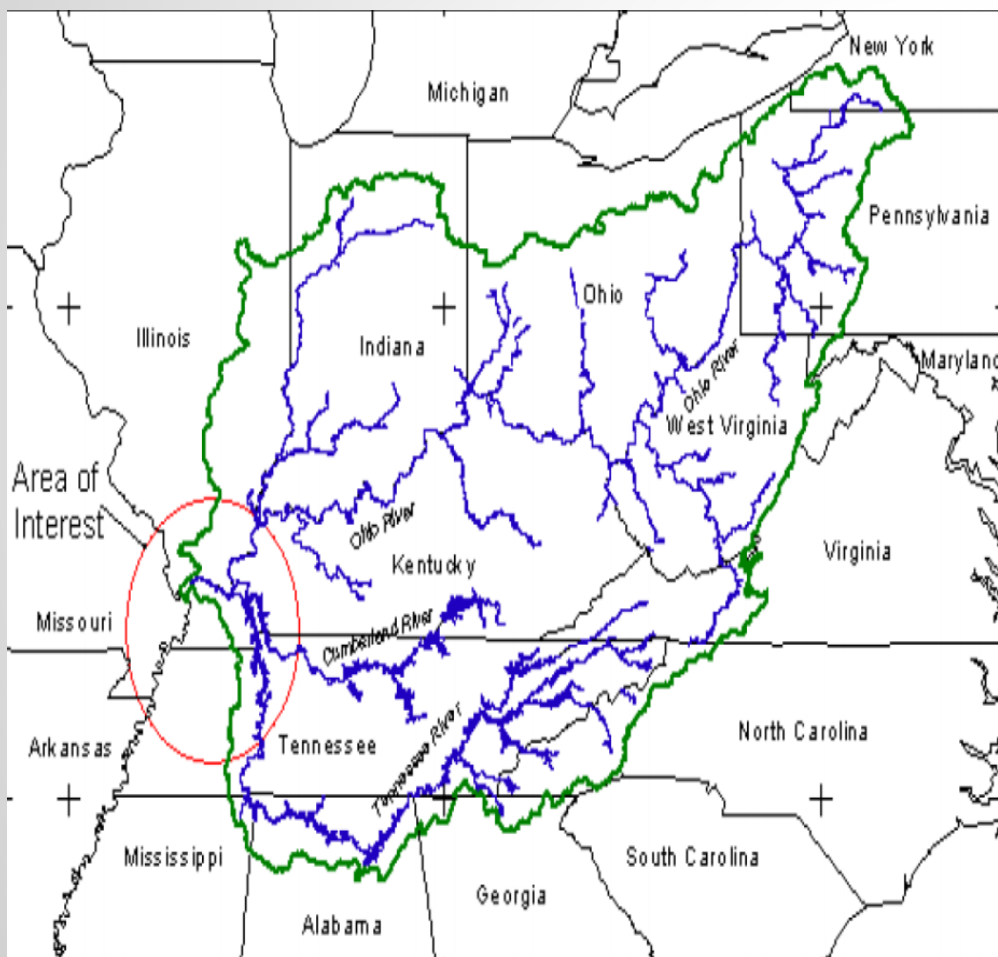
- Since much of the flow is in the MS River by the time it reaches the outlet, this basin plays a smaller role in forecasting the lower MS River
- Can add a couple of feet to crests from Red River Landing, LA southward & Atchafalaya River
- When forecasting MS River Crests, usually have to estimate flows 3 to 4 weeks out

Floodways and Backwater Areas



- Birds Point New Madrid 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
- Bonnet Carre reduces stages for Reserve & New Orleans
- Morganza reduces stages for Baton Rouge through New Orleans

Barkley and Kentucky Dams



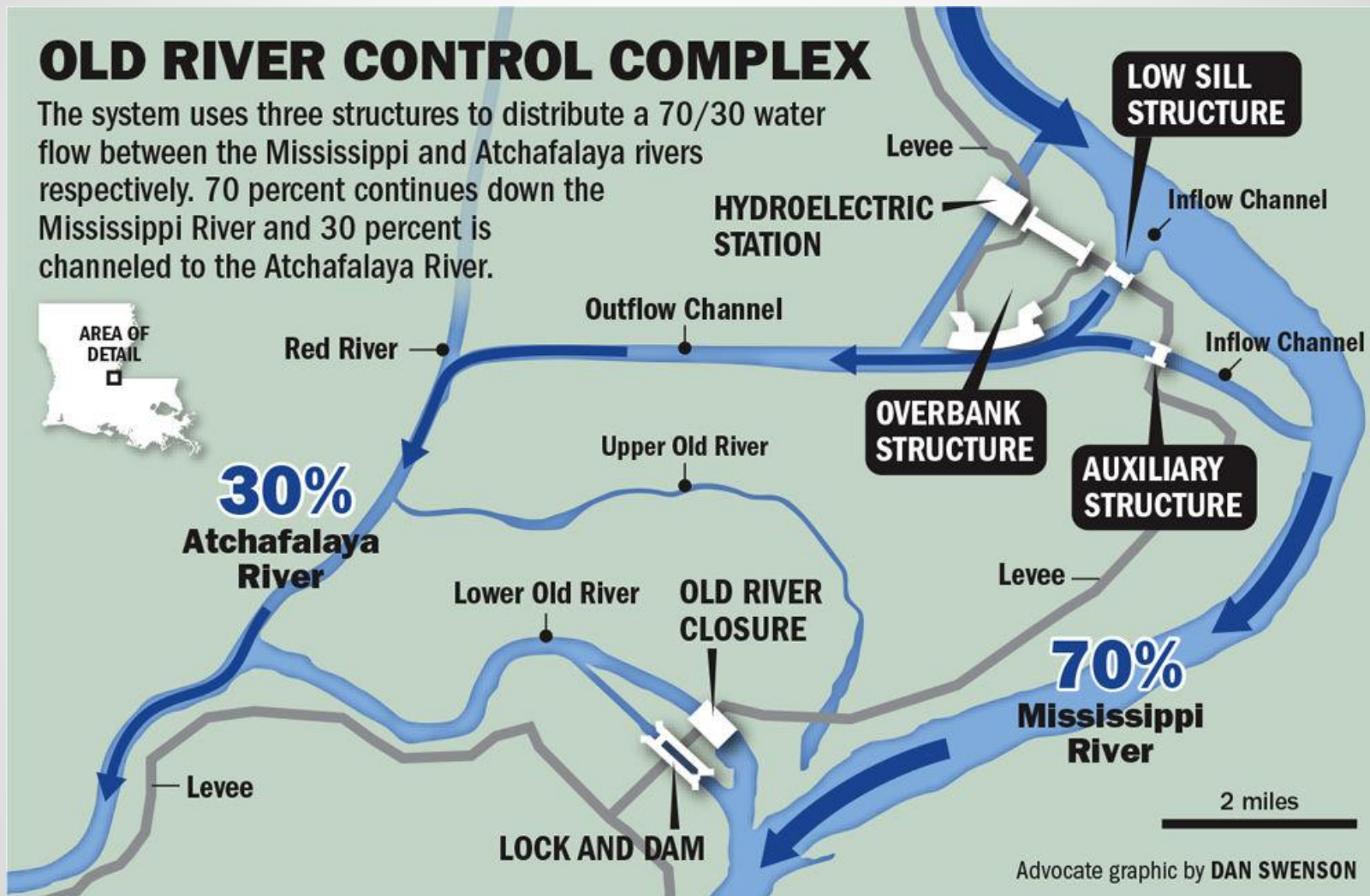
- USACE manages both lakes to minimize flood impacts at Cairo, IL and upstream of lakes
- If storage allows, discharges can be managed to reduce crest at Cairo, IL by several feet
- Also, discharges can be managed to help the White River Backwater Levee when Ark City, AR exceeds 48'

- Operated in 1937 and 2011.
- In 2011, detonation of 11 mile section of fuse plug on the upper end.
- Followed by detonations of 5+ miles on the Middle and Lower ends.



OLD RIVER CONTROL COMPLEX

The system uses three structures to distribute a 70/30 water flow between the Mississippi and Atchafalaya rivers respectively. 70 percent continues down the Mississippi River and 30 percent is channeled to the Atchafalaya River.





Morganza and Bonnet Carre

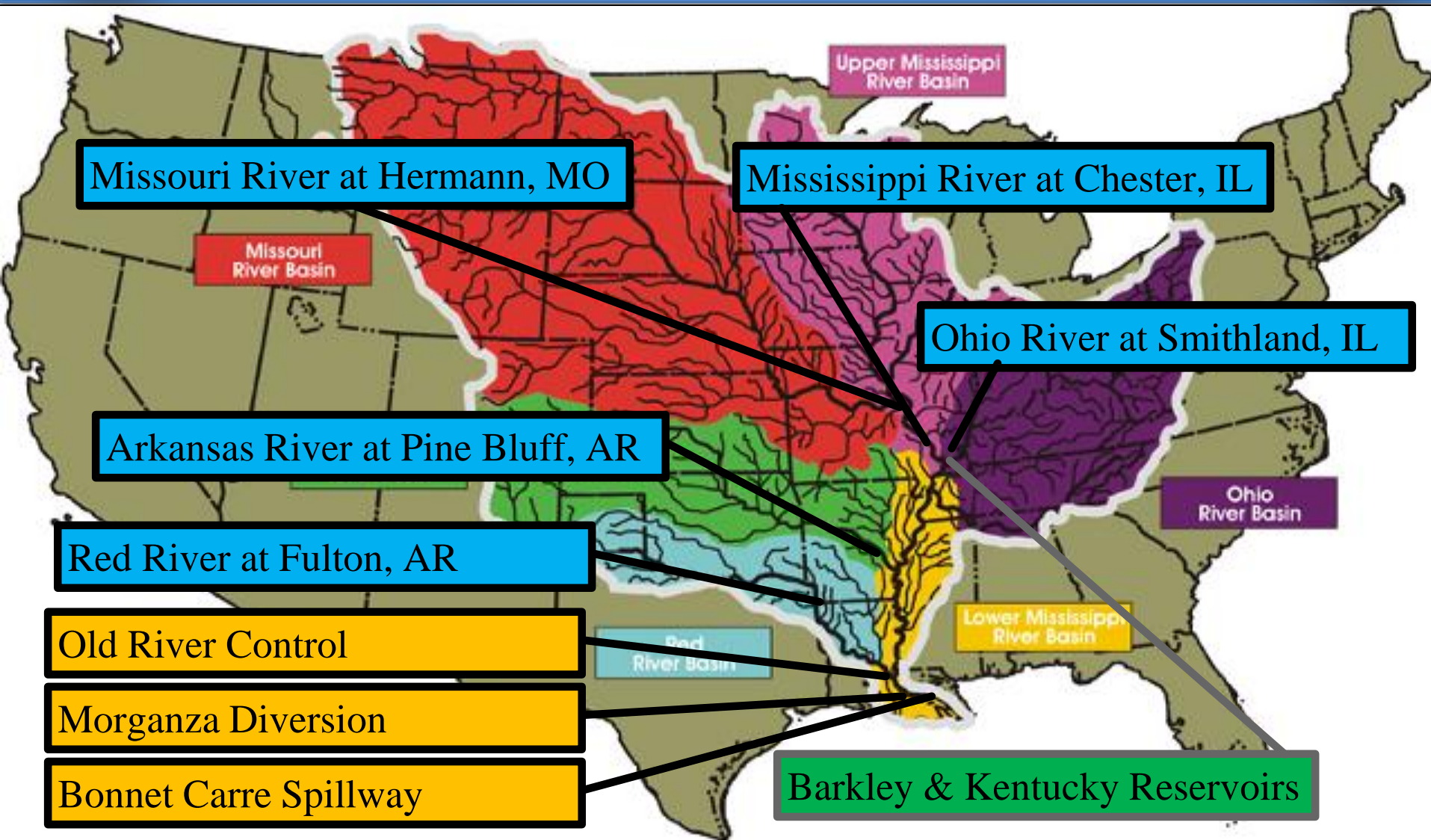


- Bonnet Carre Diversion has only been opened 12 times since construction in 1931.
- Morganza Diversion has only been opened 2 times since 1954. Only once due to flow exceeding thresholds.



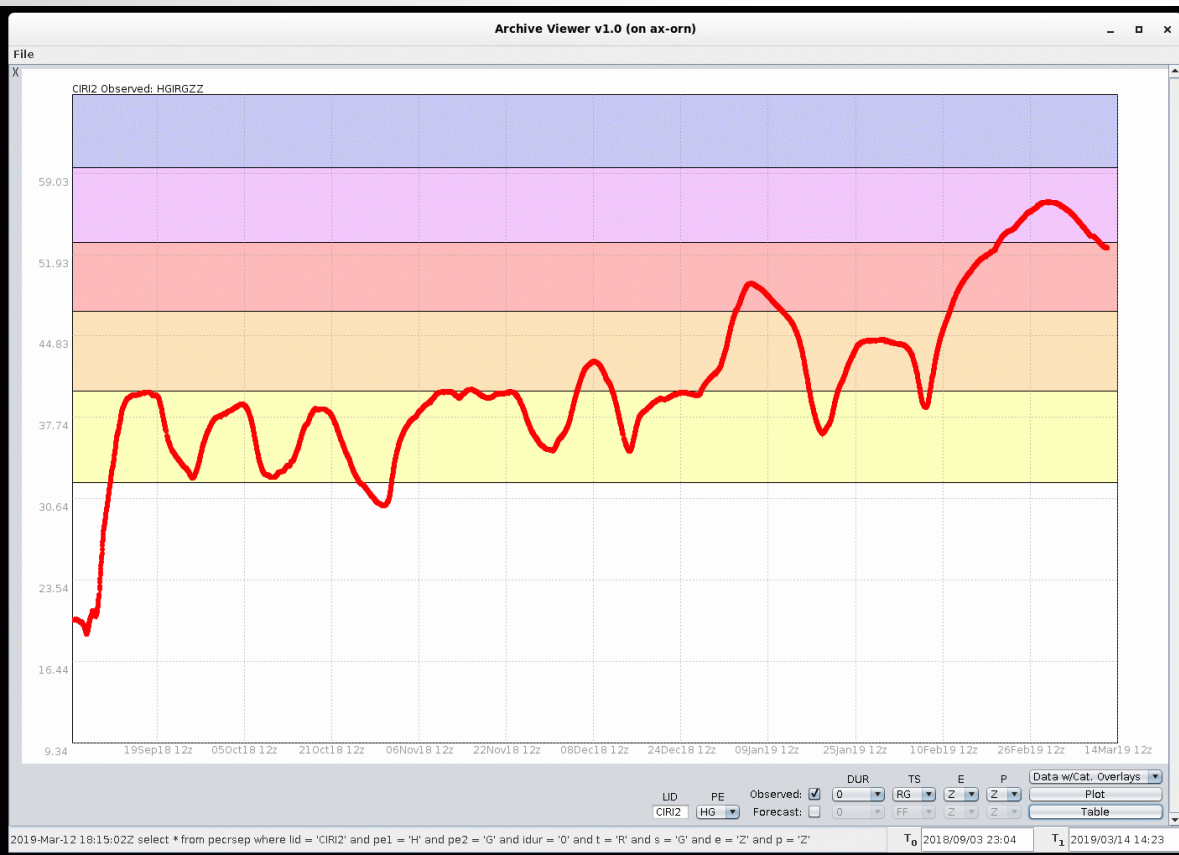


Mississippi Forecast





2019 Flood Summary



- ▶ Ended 2018 in Moderate flood on the Lower Ohio and stayed in minor flood through early February when additional heavy rains over the Ohio, Cumberland and Tennessee started. December is typically low flow.
- ▶ Peaked at the confluence of the Ohio/Miss at Cairo at 56.5 ft stage, ties the 3rd highest recorded crest height.
- ▶ Major contributions were significant flows on the Lower Ohio (850 KCFS) and extreme flows for the Cumberland/Tennessee (600 KCFS combined).





2019 Flood Summary



- **Peak flows on the Middle Mississippi ~1.95 MCFS.**
- **Old River Diversion diverting ~ 530 KCFS off the Mississippi down the Atchafalaya.**
- **The Morganza Floodway protects Baton Rouge to maintain stages < 45.0 feet and flows < 1.5 MCFS. Not in use now with 1.45 MCFS below Old River.**
- **Opened Bonnet Carre Diversion early on Feb 28, 2019 due to Mardi Gras. Diverting ~200 KCFS at peak to regulate stages < 17.0 feet at New Orleans and flows <1.25 MCFS. Will probably stay open into April.**

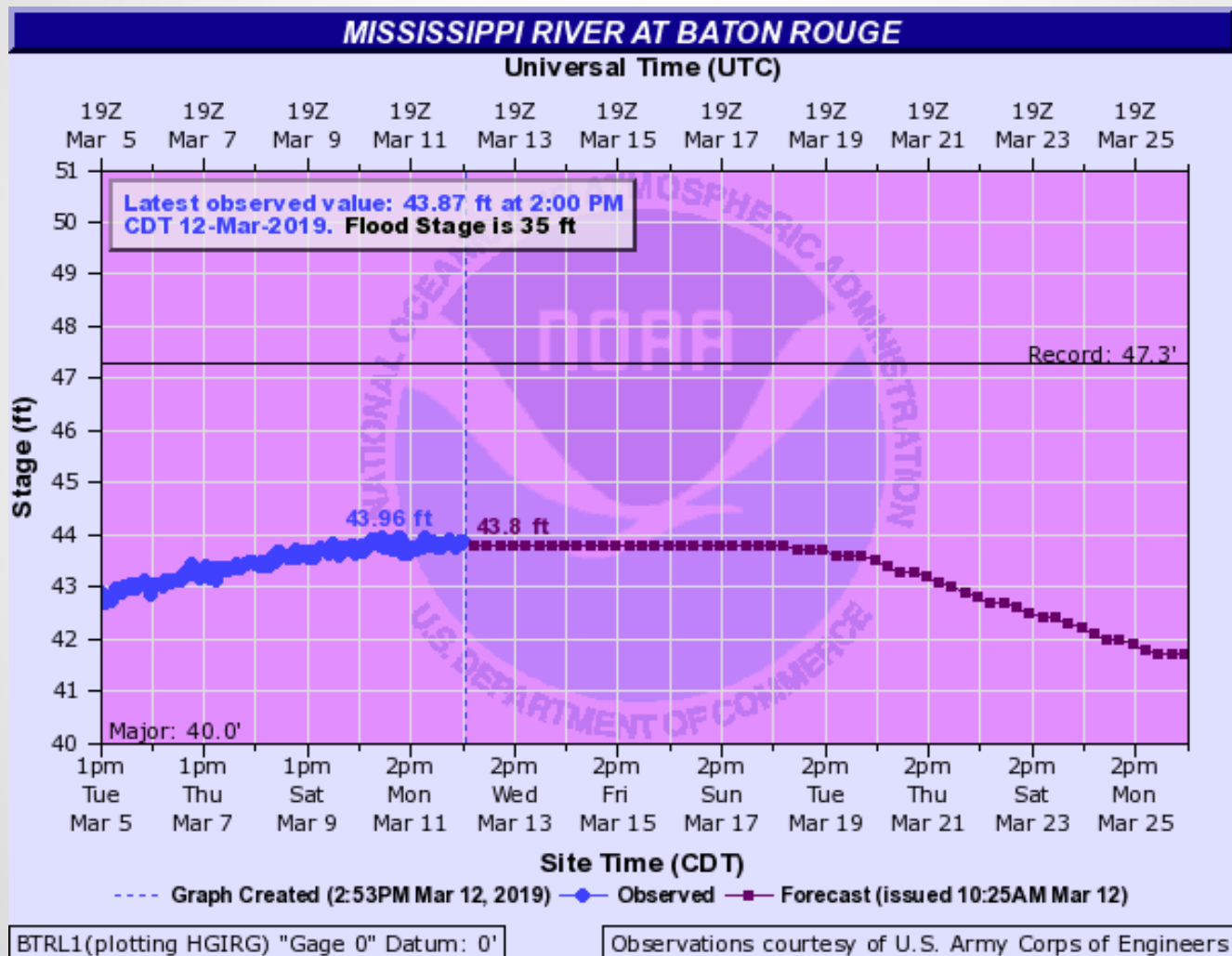




2019 Flood Summary



- Baton Rouge cresting at 44.0 ft (6th highest crest year).

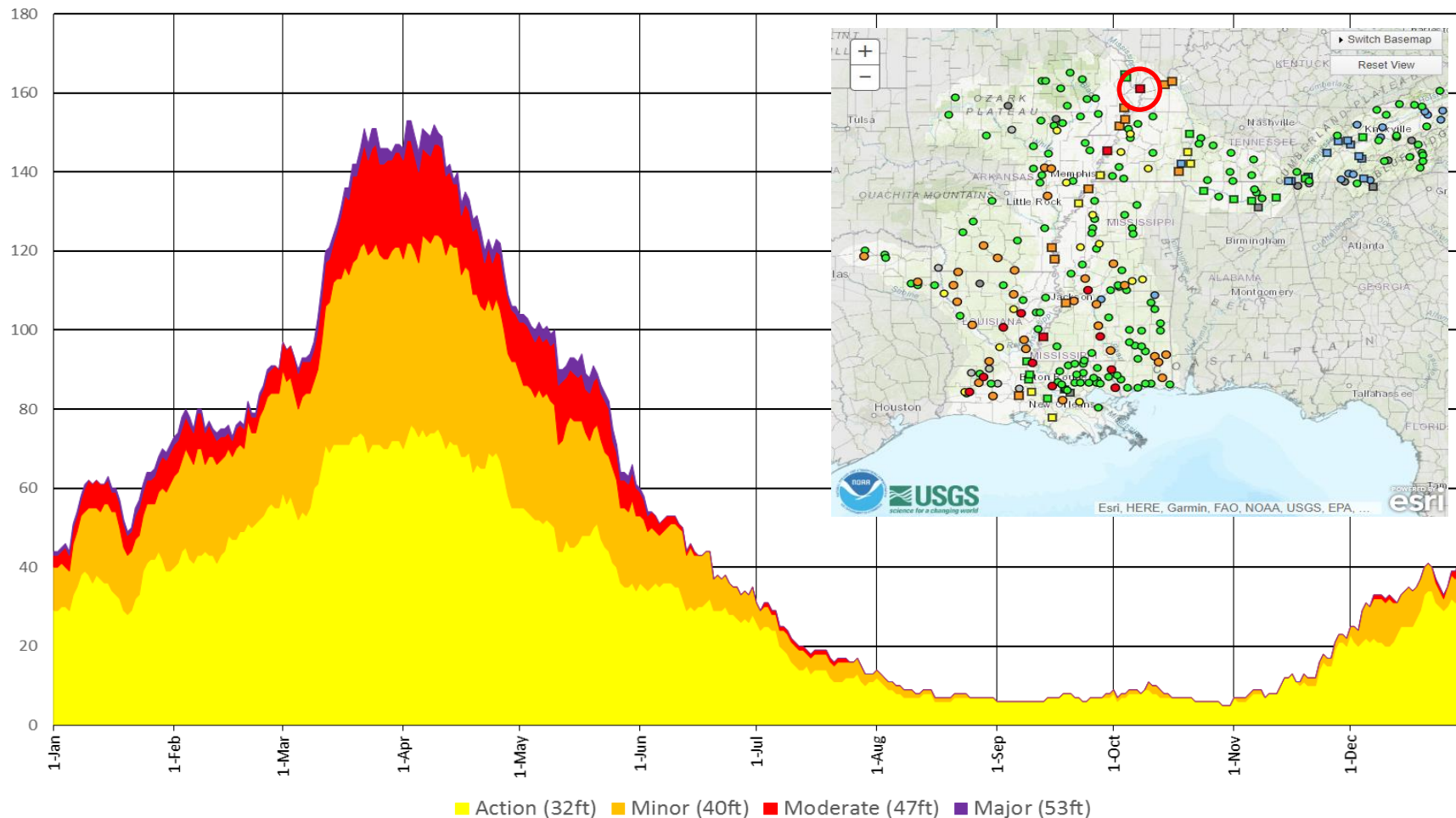




Average Category/Timing of Flooding at Cairo, IL



Number of Events per 117 Years for Cairo, IL on the Ohio River





Questions about LMRFC Overview



Building a Weather-Ready Nation