Upper Mississippi River Regional
Flood Risk Management Hydraulic Model Release
Overview Presentation:

"The views, opinions and findings contained in this report are those of the authors(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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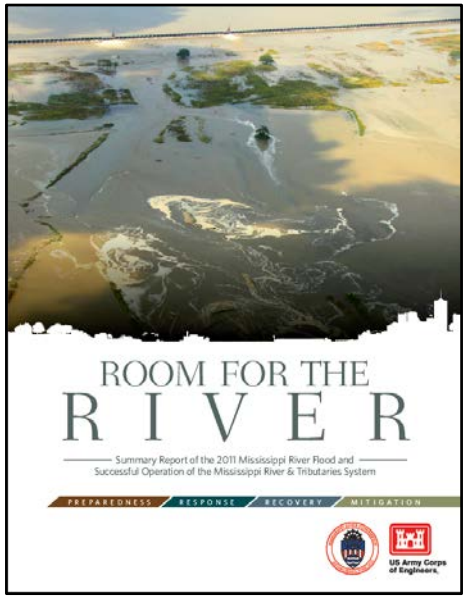
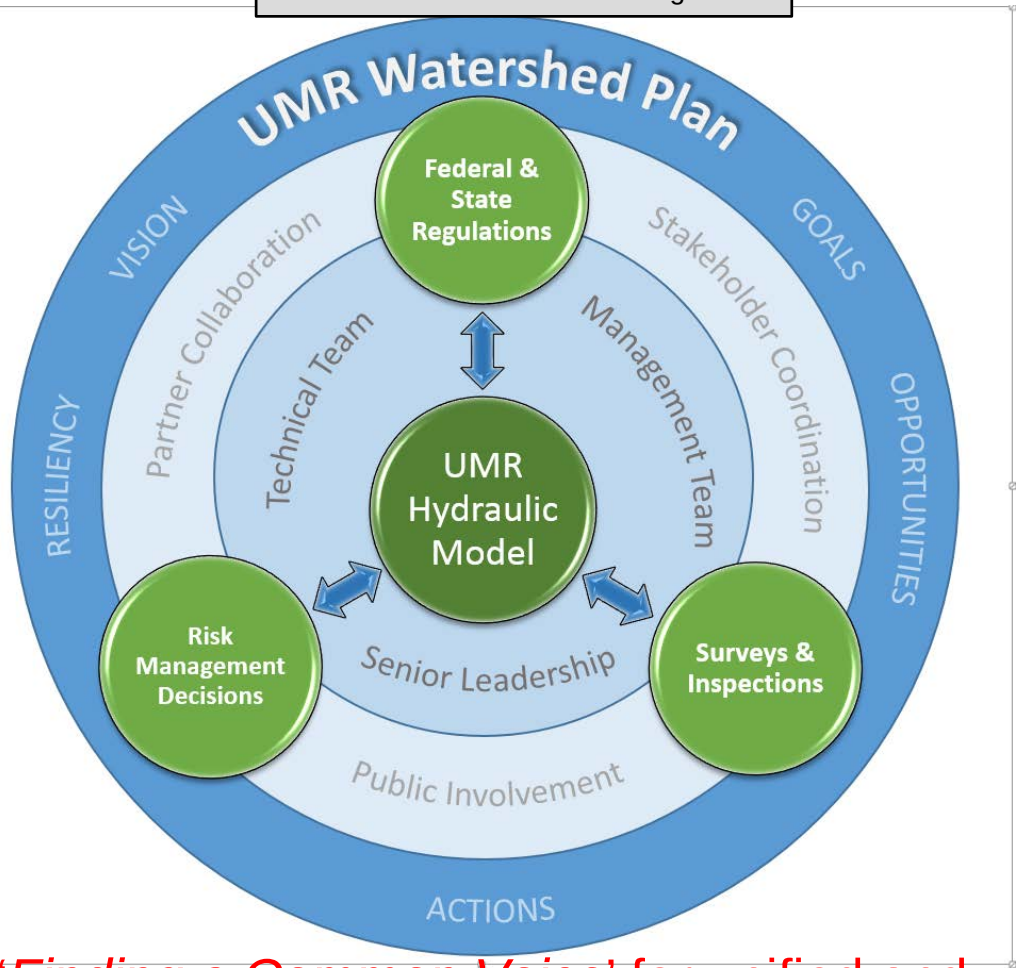
FLOOD RISK MANAGEMENT

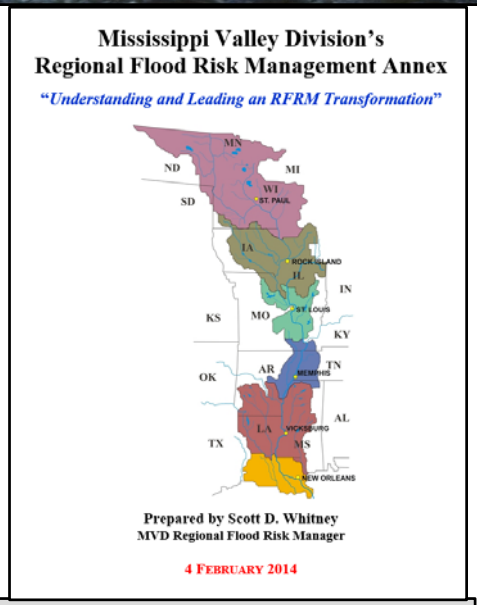
VISION: An implementable UMR Flood Risk Management Strategy; goal is a predictable system



- Winning the Next Flood
- Innovate, Adapt and Improve
- Roadmap to the FUTURE

- Shared Responsibility
- Flood Risk Management Life Cycle
- Risk Informed Decision making





- Inform, transform & guide
- Integrated, holistic & resilient
- COLLABORATIVE

'*Finding a Common Voice*' for unified and holistic UMR Flood Risk Management

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Objective: Develop an updated Upper Mississippi River System Hydraulic (UMR) HEC-RAS model to **provide a tool for UMR system floodplain management** in support of flood risk management and 408 Levee Modification requests (using system performance analysis). Develop methodology to analyze historic and proposed changes to Mississippi River main-stem levees.

Coordination with other Partners USACE Districts, federal, and state agencies will be required ~ Interagency Team ~

MN, WI, IA, IL, MO DNR's; FEMA; NWS; USGS;
Rock Island District USACE, St. Louis District USACE,
Mississippi River Valley Division USACE

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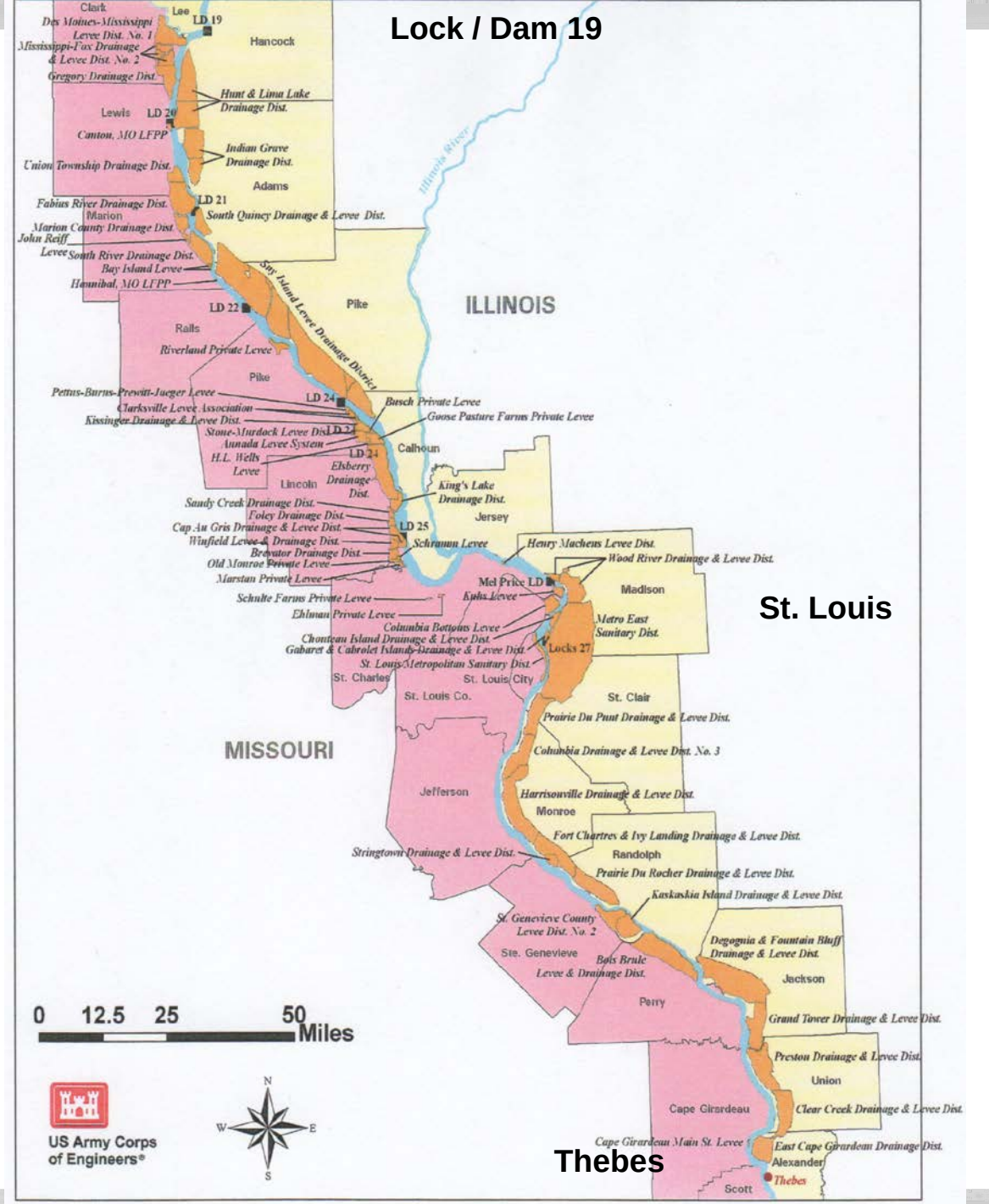

REACH I

Mississippi River LD19 to Thebes, Illinois

River Miles 320
7 Dams

Note: *Funding for remaining 3 reaches uncertain and most likely will require special appropriation or cost-share under feasibility or watershed study.*

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HYDRAULIC MODEL Status & UPDATES (Since July 17, 2017)

Updates to Model and Report:

- Report and hydraulic model reviews preformed by USACE Centers of Expertise and State and Federal Agency partners.
- Added HWM data to profile plots [Neighbors of the Mississippi and Great Rivers Habitat Alliance].
- Incorporated new NLD levee data for 6 systems in the MVS reach of the model.
- Included 1993 model water surface profile computations.
- Scope change to focus exclusively on model development, remove comparative analysis.

Deliverables:

- Hydraulic Model [Upon request, provide external hard drive]
- Technical Report
  - Source Data, Methods, Assumptions, Limitations
  - NLD data is public domain
  - Visualization tool: Updated UMR hydraulic model kmz file

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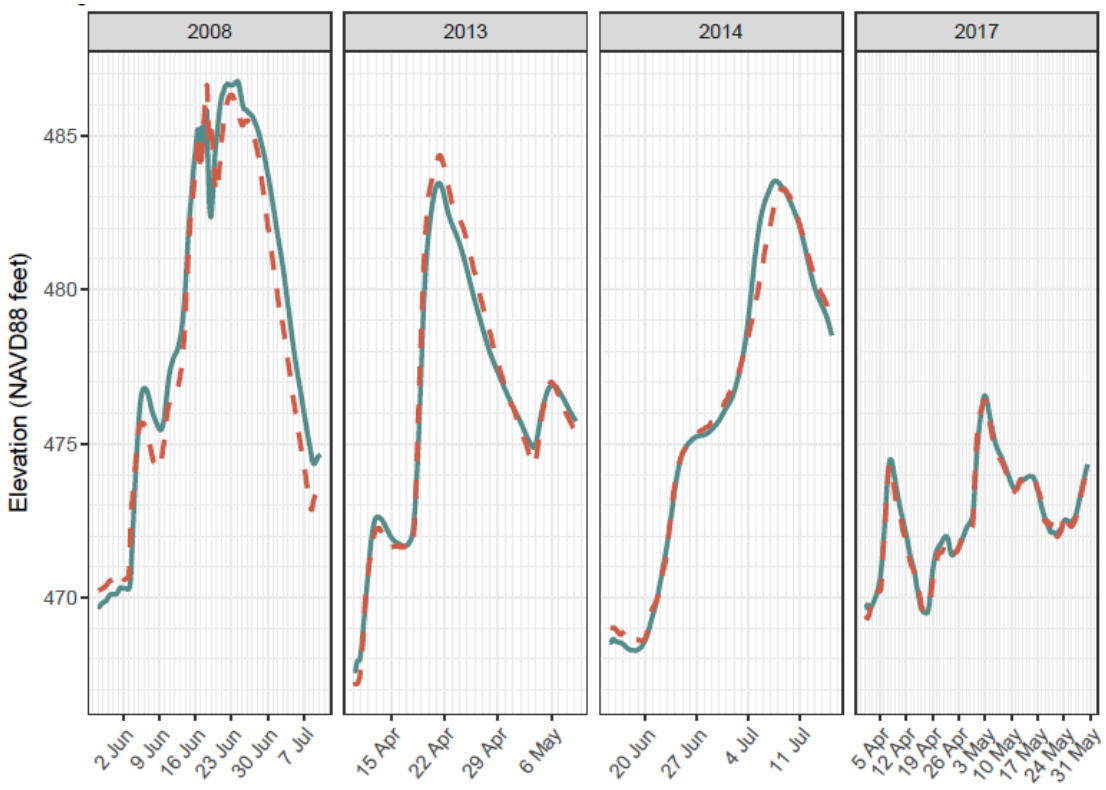
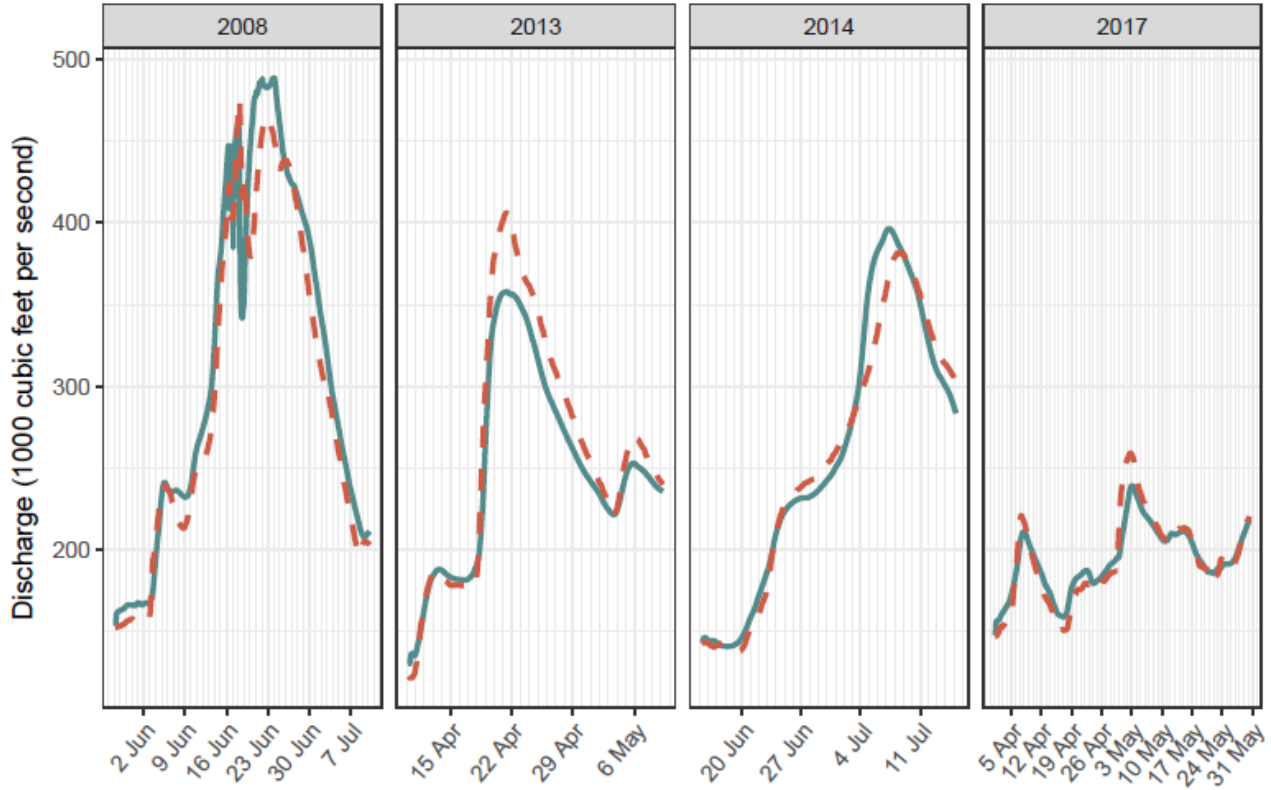
Mississippi River, Wyaconda to Fabius Reach
River Station 324.81, Gauge L&D 21 Tail
Existing Levee Elevation Calibration





Modeled Observed

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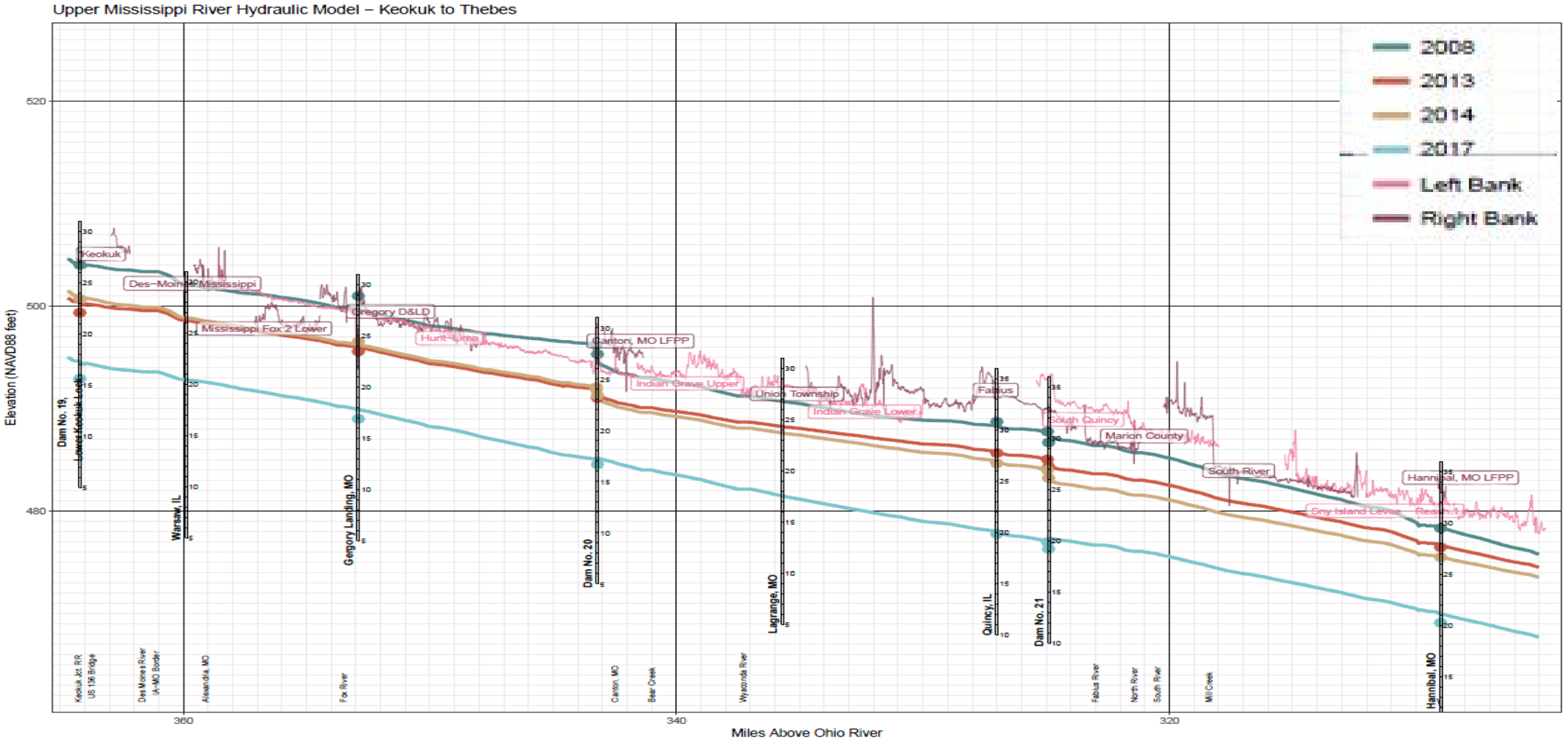
HYDRAULIC MODEL – COMMUNICATING RESULTS

Water surface profile Comparison – Existing Conditions Model Run



Existing Conditions Model Run

Table 10 Model Run Peak Elevations at Gage Locations (ft. NAVD88)

River Mile	Gage Name	Flood Stage (in elevation)*	1993	2008	2013	2014	2017
364.2	LD 19 Tailwater	493.27	504.93	504.59	499.51	501.61	493.25
352.9	Gregory Landing, MO	487.12	499.92	499.40	495.32	497.01	489.48
343.25	LD 20 Pool	N/A	495.97	495.67	491.41	492.73	485.19
343.2	LD 20 Tailwater	481.88	495.51	495.17	490.82	492.00	484.75
335.7	La Grange, MO	481.95	492.81	492.00	487.91	488.68	481.76
327	Quincy, IL	474.89	489.80	488.64	484.89	485.19	478.14
324.95	LD 21 Pool	N/A	488.87	487.66	484.04	484.28	477.17
324.9	LD 21 Tailwater	474.14	487.86	486.77	483.45	483.53	476.56
309	Hannibal, MO	464.85	479.07	478.11	475.65	475.47	469.72
301.25	LD 22 Pool	N/A	475.83	474.86	472.44	472.23	465.52
301.2	LD 22 Tailwater	461.53	474.97	474.14	471.86	471.66	465.05
282.9	Louisiana, MO	452.03	465.28	464.37	461.89	461.70	456.39
273.5	LD 24 Pool	N/A	459.52	458.86	457.03	456.91	452.21
273.2	LD 24 Tailwater	446.57	459.10	458.54	456.72	456.61	451.73
260.3	Mosier Landing, IL	440.54	452.25	451.88	450.55	450.46	446.21
241.5	LD 25 Pool	N/A	445.59	444.17	441.88	441.53	438.77
241.2	LD 25 Tailwater	432.47	445.26	443.83	441.35	440.94	438.40
203	Alton, IL	420.66	437.62	428.39	427.07	422.42	430.60
201.1	Mel Price LD Pool	N/A	437.59	427.79	426.45	421.51	430.31
200.5	Mel Price LD Tailwater	416.48	437.30	427.30	425.95	420.83	430.11
194.16	Locks 27 Pool	N/A	435.80	424.85	423.42	481.04	428.92
190.28	Chain of Rocks	N/A	432.74	421.64	420.21	414.66	426.26
185.1	Locks 27 Tailwater	N/A	430.77	419.33	417.62	412.20	424.07
179.6	St. Louis, MO	409.57	427.29	416.91	415.34	410.51	421.74
176.8	Engineers Depot	N/A	425.63	415.46	413.95	409.19	420.31
168.7	Jefferson Barracks	N/A	421.82	412.20	410.83	406.10	417.34
135.5	Brickeys	383.38	403.11	394.65	393.71	388.43	400.17
125.5	Little Rock Landing	N/A	396.93	388.77	388.06	382.29	394.43
109.9	Chester, IL	367.75	387.70	379.53	379.25	372.71	385.61
94.1	Red Rock Landing, MO	359.38	379.82	371.83	371.55	364.65	377.66
81.9	Grand Tower, IL	349.44	372.39	364.31	364.02	357.28	370.26
66.3	Moccasin Springs, MO	341.33	362.33	355.03	354.83	347.79	360.13
52	Cape Girardeau, MO	336.36	353.38	346.31	346.19	338.71	350.51
43.7	Thebes, IL	332.79	346.78	340.65	340.66	333.34	342.82

*Source of flood stage from either the National Weather Service or USACE.

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KEY POINTS: UMR FRM Hydraulic Model

(1) The newly developed UMR FRM hydraulic model is now available for partner, stakeholder and public use. Its development was facilitated by USACE Rock Island and St. Louis Districts for a 320-mile stretch of the river from Lock and Dam 19 at Keokuk, Iowa (River Mile 364) to Thebes, Illinois (River Mile 44), including all leveed and storage areas in the model geometry.

(2) Developed and tested collaboratively with State and Federal technical experts using the very latest guidance, expertise, technology and data. Its predictive capacity was validated by running the historic hydrology from four significant flood events: 2008, 2013, 2014 and 2017. Broader application and testing of the model by expanded stakeholder group may identify further refinements in coming months.

(3) Provides users with a key tool to accurately and realistically predict changes in water movement and depth profiles in response to a variety of "what if" land-use variables. Such information is integral to the risk-informed planning, evaluation and decision-making processes.

(4) National Levee Database survey data incorporated into this model does not alter the congressionally authorized elevation for individual Federal levee systems or constitute retroactive USACE approval of altered levees.

(5) This was a model development effort not a traditional USACE study authority which compare alternatives, consequences of courses of action. Since this tool is likely to be used for future studies or evaluations, it was developed in a highly transparent manner with external expert reviews to ensure the greatest degree of trust, credibility and confidence from our partners, stakeholders and public.

Hydraulic Model User Guide ~ The Upper Mississippi River (UMR) Flood Risk Management (FRM) hydraulic model was developed by the U.S. Army Corps of Engineers (USACE) Rock Island and St. Louis Districts for the intended purpose of using it as a tool for UMR system floodplain management and 408 Levee Modification requests.

Model Use ~ This model is available by request to federal, state, and local agencies and their engineering consultants as well as nongovernmental organizations (NGOs). **Only experienced and qualified hydraulic engineers with advanced HEC-RAS training should run this model using appropriate model inputs and ensure accurate model results**. This model's associated report and user guide are not intended to be a substitute for the HEC-RAS User Manual or formal HEC-RAS training.

Ecological analyses regarding water velocities, water depths, where water goes in the floodplain and how long it stays in the floodplain may be possible with the UMR hydraulic model. **A trained and experienced HEC-RAS hydraulic modeler should be consulted to determine whether the model is appropriate for the intended ecological analyses.**

As stated above, this model was developed as a floodplain management tool and is **not currently designed or calibrated for sediment transport, water quality, or steady state flow modeling**. It also was not developed for a flow frequency study or follow-on floodway computations. This model can provide a base condition for the aforementioned modeling efforts, but will require appropriate changes and updates by an experienced HEC-RAS hydraulic modeler.

Hydraulic Model User Guide ~

Model Changes ~ It is anticipated that the requesting organizations may use this model for a variety of different applications. Therefore, some changes to the model may be desired.

One common practice may be to parse this regional model to a reach of the river that encompasses the specific area of interest. When the model is parsed in this way, an experienced HEC-RAS modeler will need to define the appropriate upstream and downstream boundary conditions.

Another application may be to explore alternative actions and “what if” scenarios and compare them to the baseline or “no action” options. These scenarios often involve modifying structures in the channel or floodplain (islands, closing dikes, levees, etc.) For these model runs, an HEC-RAS hydraulic modeler will need to make a copy of the model geometry and then incorporate the changes into the model geometry to create the alternative scenario. The base model provided by USACE should always be considered the “no action” or “without project” condition. It is not acceptable practice to remove any regulatory structures from the model and analyze that altered model as the “without project” condition.

Model Updates ~ Future updates to the UMR hydraulic model may require a source of funding. USACE will periodically evaluate the model to determine when it needs updating. The need to update the model would require significant changes in system hydrology or topography.

QUESTIONS
OR
COMMENTS?

REQUEST THE HYDRAULIC MODEL:
CALL 309-794-5729

- Model documentation will be served on MVR website: **https://go.usa.gov/xnf6V**
- Model transmittal will require sending us remote hard-drive

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