

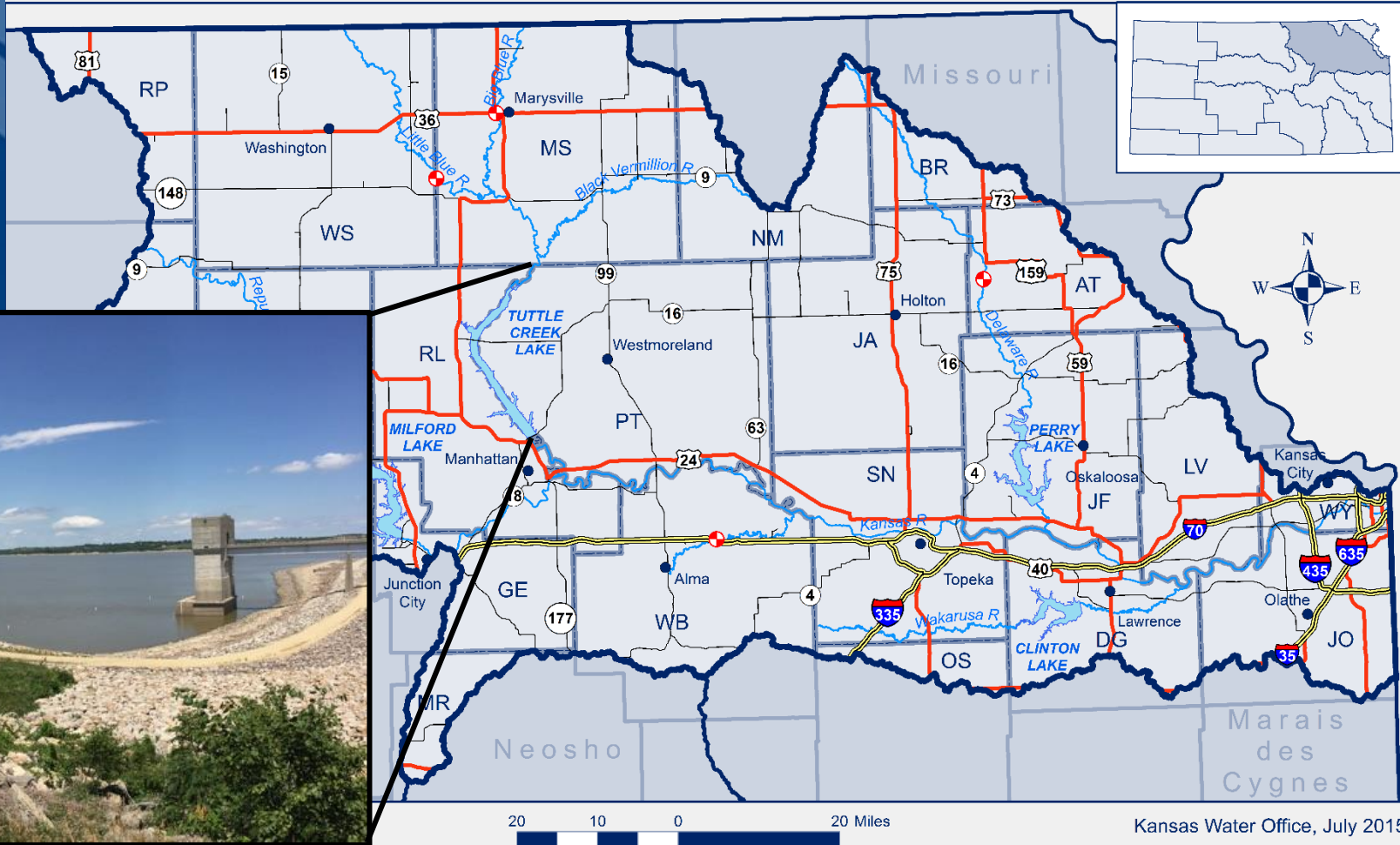
Update on the Tuttle Creek Lake Water Injection Dredging (WID) Demonstration

Governor's Water Conference

November 17, 2022

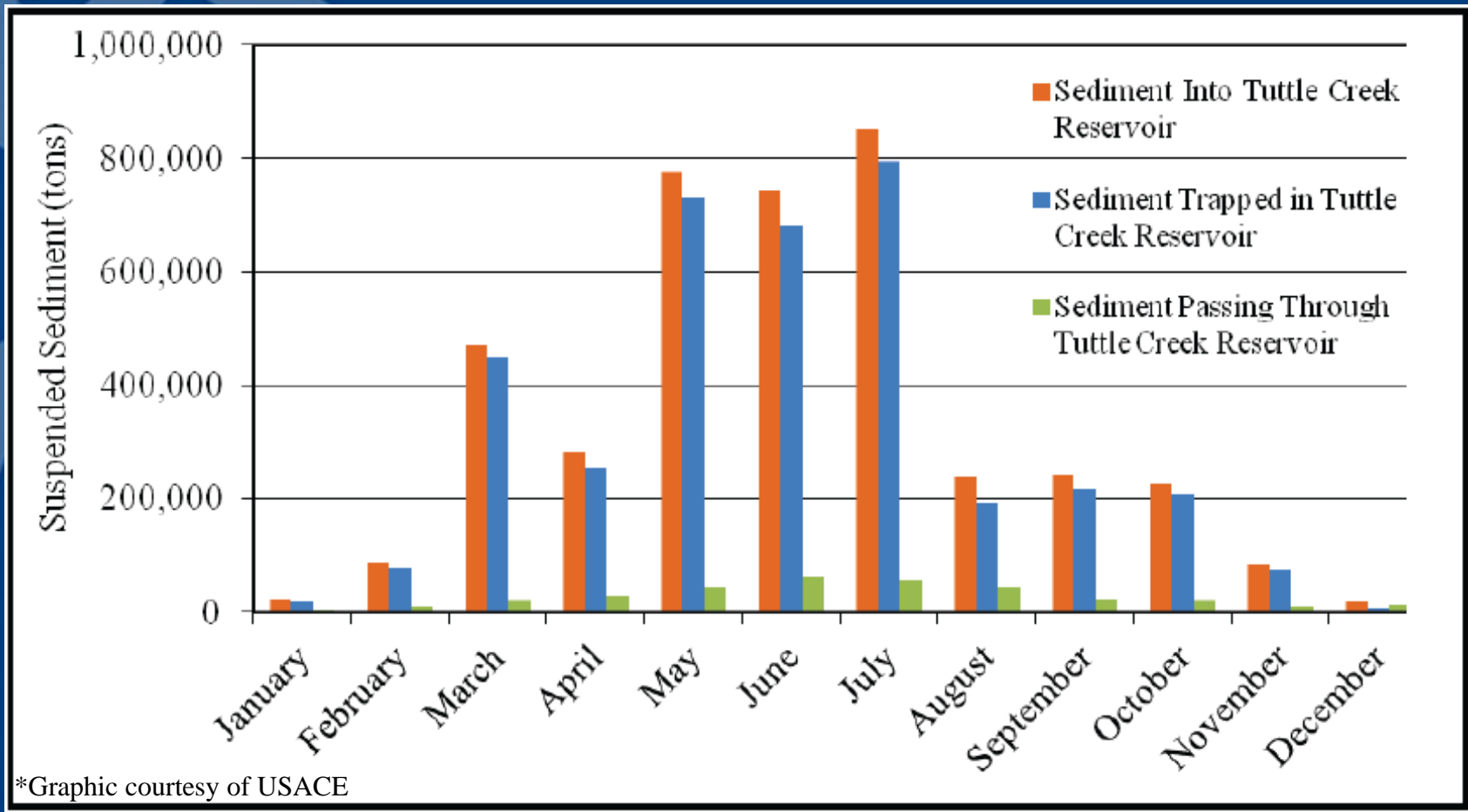
Tuttle Creek Lake

Kansas Regional Planning Area



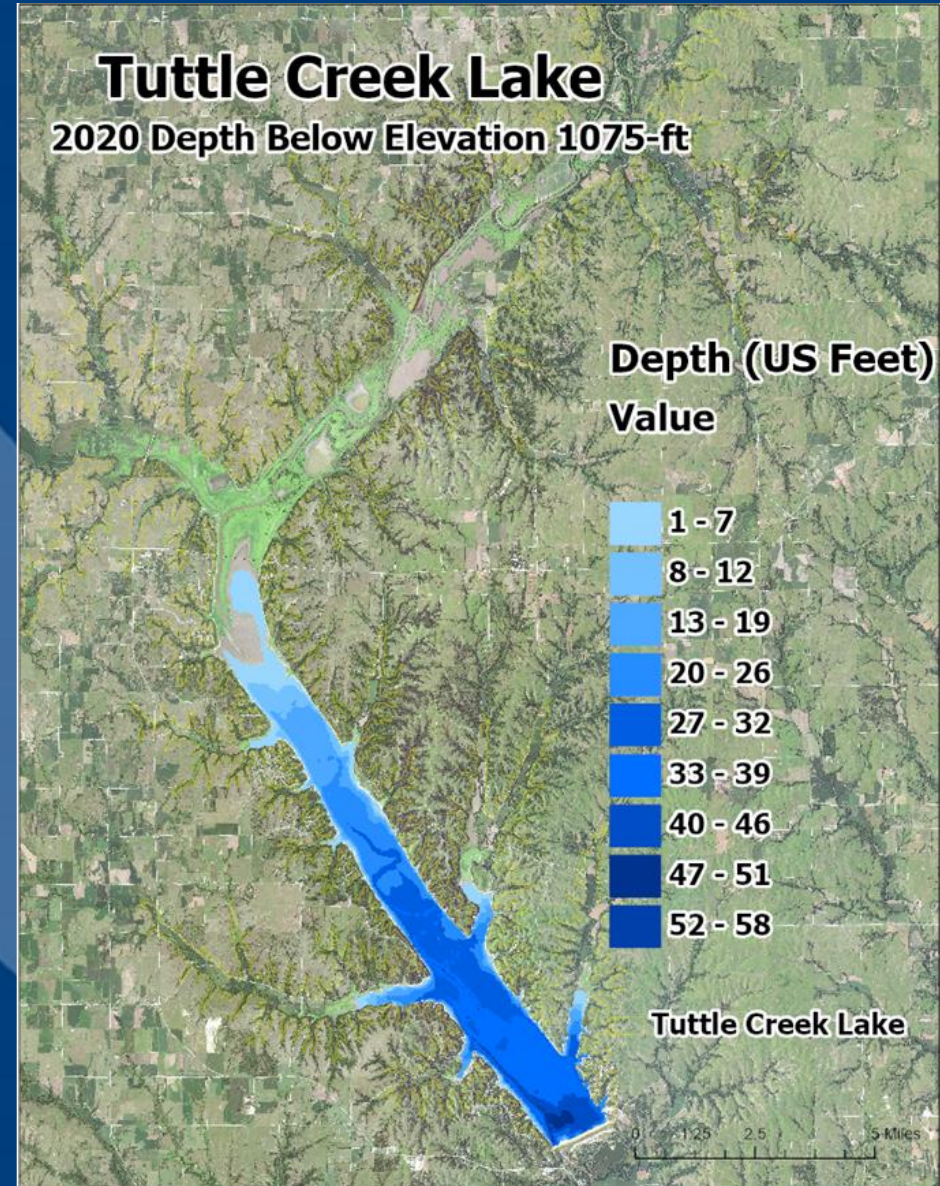
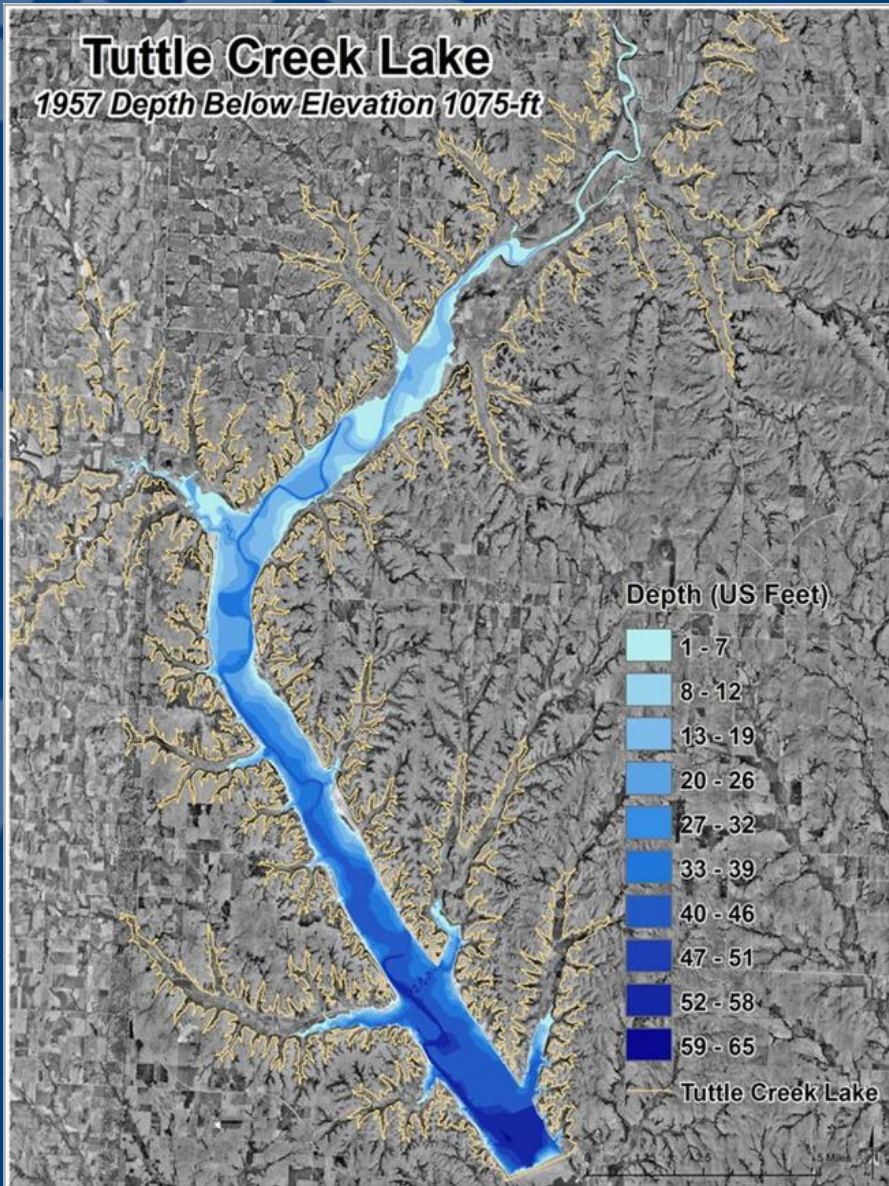
- County Seat
- ⊕ MDS Gage*
- ~ Stream
- ⚡ Interstate Highway
- ⚡ US Highway
- ⚡ Kansas Highway
- 🌊 Federal Lake
- 🗺️ County
- 📏 Kansas Region

Reservoir Sediment Sustainability

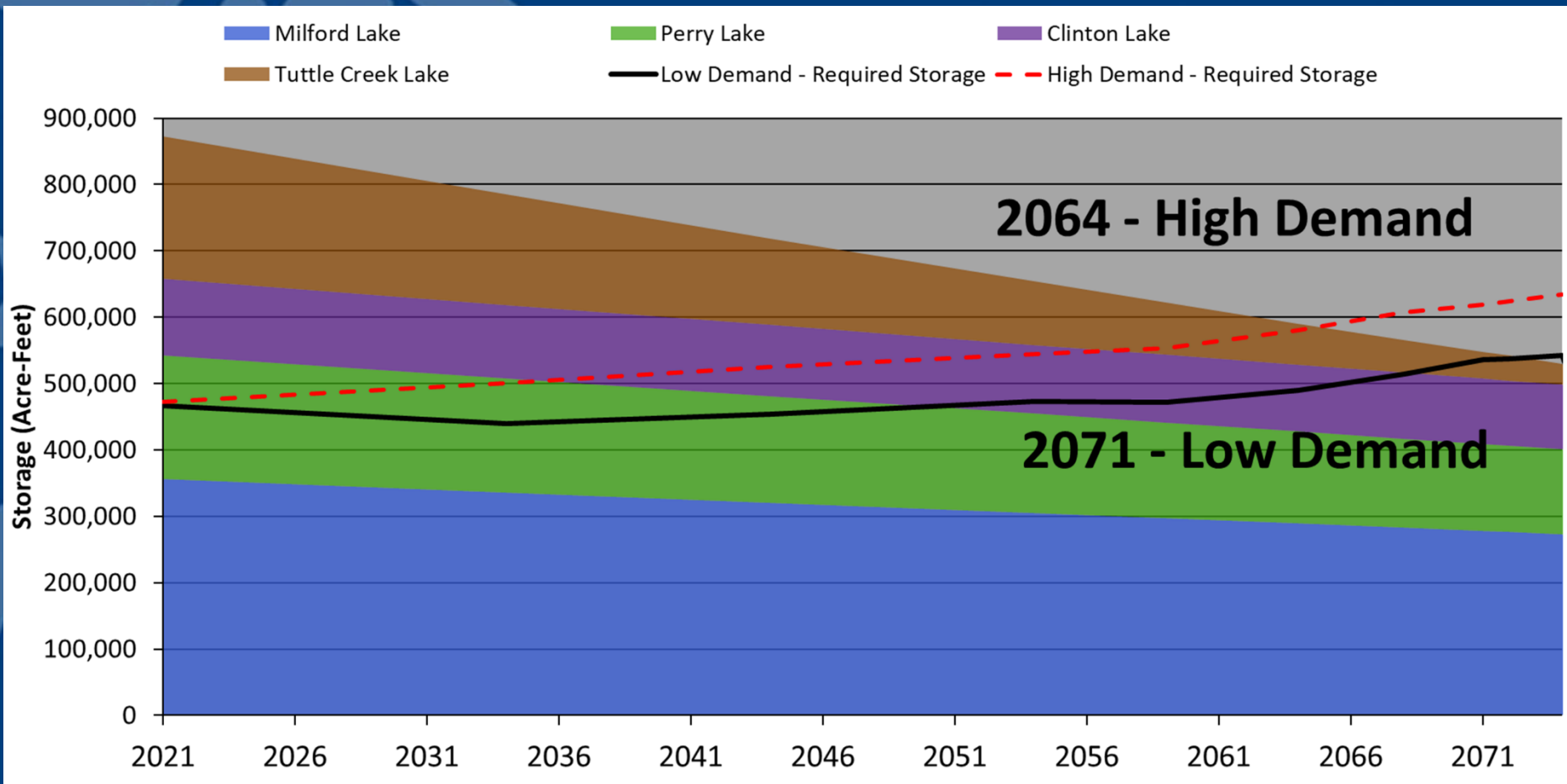


*Graphic courtesy of USACE

Tuttle Creek Lake: 1957 to 2020

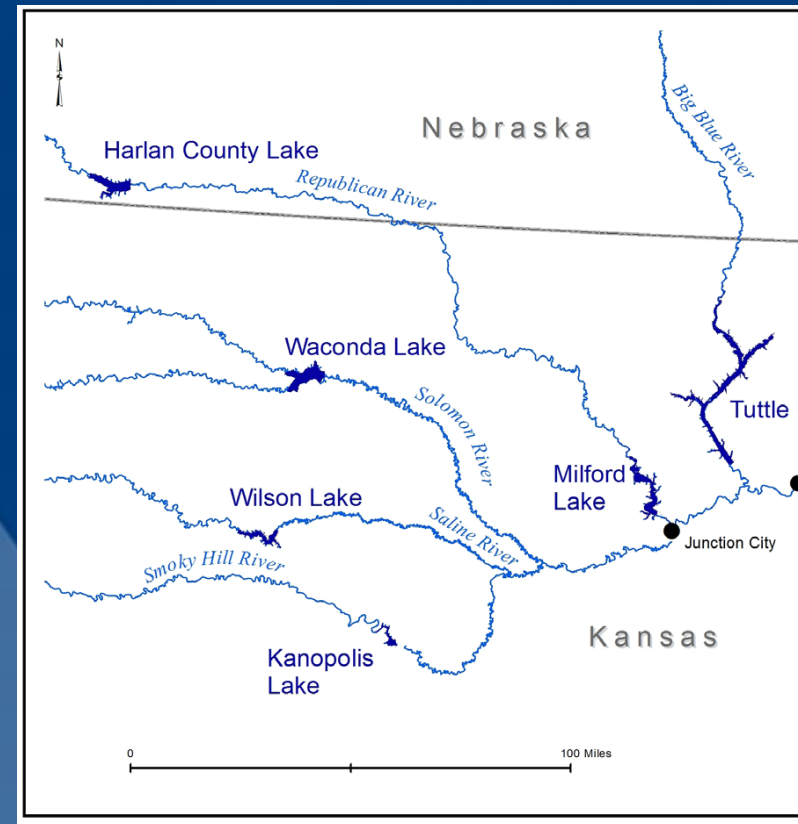


Kansas River Basin Projected Water Supply



Reduced Sediment Load in Kansas River

- Pre-dam Sediment Load:
 - 44 million tons per year
- Post-dam Sediment Load:
 - 13 million tons per year
- A 70% reduction in sediment transport



ERDC/CHL CHETN-XIV-50
June 2016



US Army Corps
of Engineers®

Environmental Benefits of Restoring Sediment Continuity to the Kansas River

by John Shelley, Marvin Boyer, Jesse Granet, and Aaron Williams

PURPOSE: This Coastal and Hydraulics Engineering Technical Note (CHETN) summarizes the environmental benefits that could be gained by restoring sediment continuity from the Kansas River watershed to the Kansas River by passing sediment through, rather than trapping sediment in, large Federal reservoirs. The effort was conducted by the U.S. Army Engineer District, Kansas City (NWK), and supported by the U.S. Army Corps of Engineers (USACE).

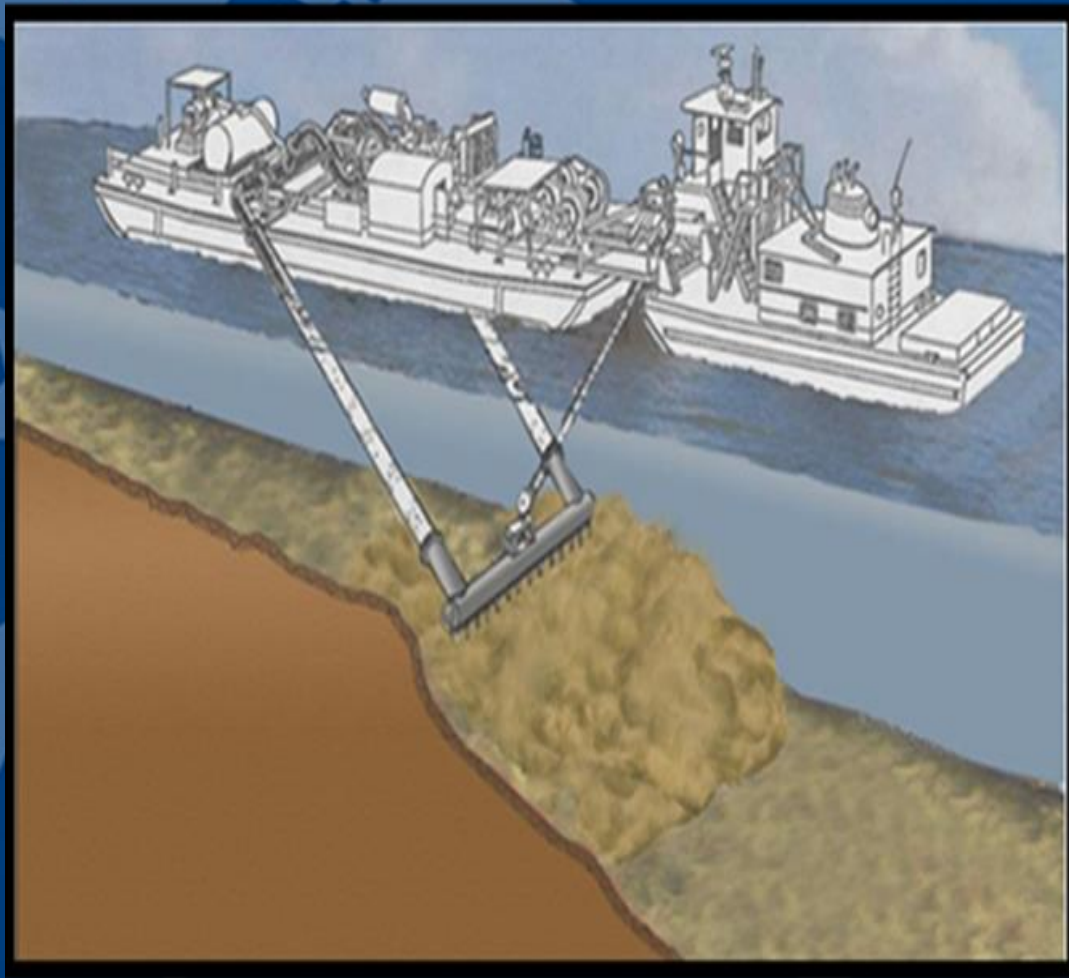
Traditional Dredging with Disposal into a CDF

- 3,800 ac-ft/year into Tuttle's multi-purpose pool
- At \$6.67/yd³ = \$40M/year



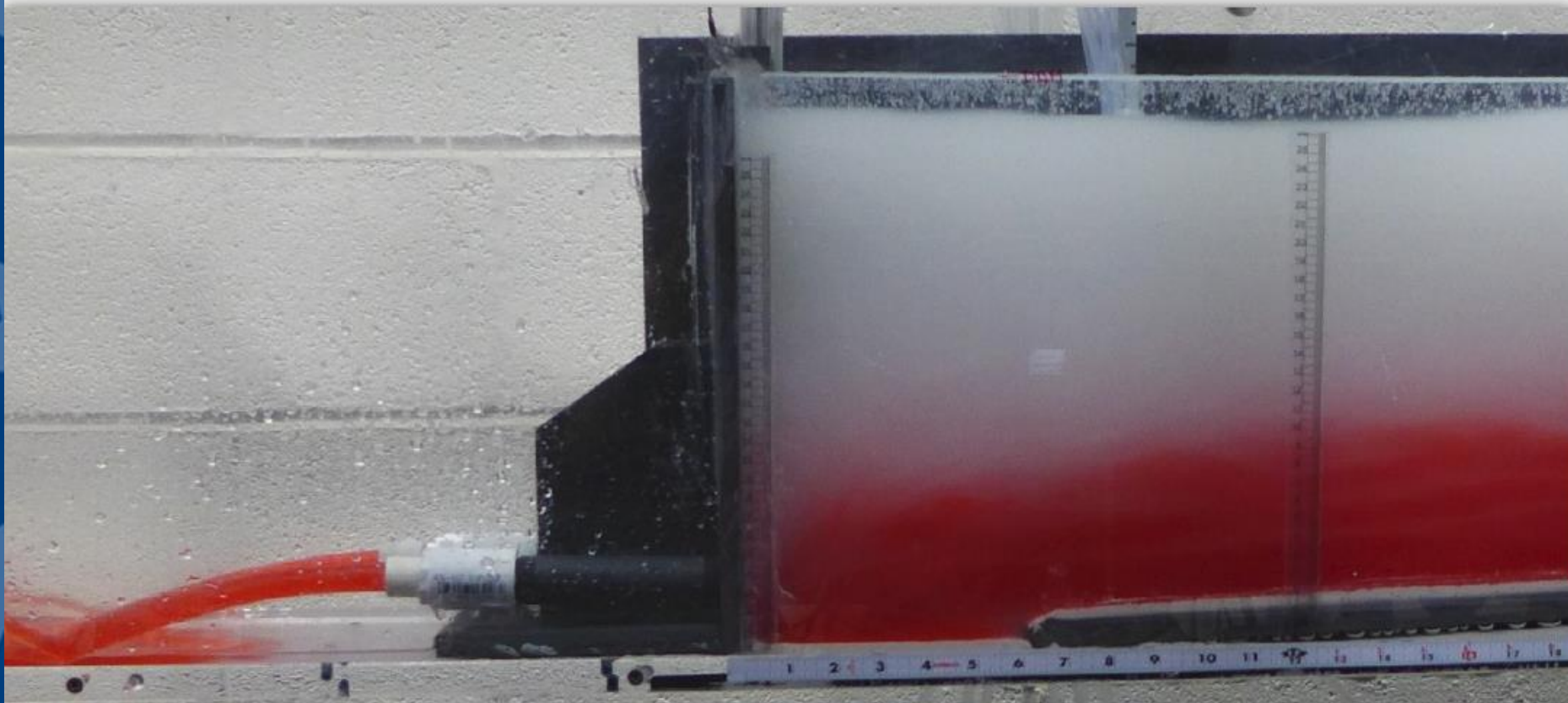
- Cost increases as available disposal sites are filled
- Does not address the sediment deficit downstream

Water Injection Dredging



- Inject water into the sediment deposits to induce a density current
- Open the gates and release the sediment through the existing conduit

Density Current Venting



*Courtesy of U.S. Corps of Engineers

Tuttle WID Demonstration Funding

- State of Kansas
 - \$975,000 appropriated in SFY22
 - \$1,025,000 appropriated in SFY23
 - \$2,000,000 total State funding for demonstration
- Federal
 - USACE received \$1.3 million in FY22
 - Additional Federal funding to cover remaining project need (up to \$2.8 million), contingent on budget process, anticipated in FY23

Sediment Coring and Water Sampling

- Sediment physical property analysis
- Sediment fluidization testing
- Sediment water quality analysis
- Elutriate testing
- Additional samples will be collected and analyzed

	Tuttle Creek Surface Sample ID		
<i>Property</i>	1 to 5	6	7
In situ or natural water content	322.3	329.2	246.9
Liquid Limit, LL	161.9	144.1	110.9
Plastic Limit, PL	61.9	50.8	47.1
Plasticity Index, PI	100.0	93.3	63.9
Liquidity Index, LI	2.60	2.98	3.13
%Clay	62.0	60.0	39.0
%Silt	38.0	40.0	58.0
%Sand	0.0	0.0	3.0
Classification	CH	CH	CH

Additional Efforts

- ADCP surveys to determine areas of preferential flow
- Multibeam survey to delineate stumps/trees
- Kansas River cross sections
- Kansas River sediment transport model
- Preliminary fish surveys
 - ERDC coordinating with KSU for additional study
- ERDC DOER program has FY23 and FY24 funding for project monitoring and analysis

Downstream Monitoring

- Plan to reactivate USGS gage on Big Blue River below Tuttle
- Plan to install new USGS gage on Kansas River at Fort Riley
- Three USGS gage locations downstream currently active
 - Kansas River at Wamego, Kansas (06887500)
 - Kansas River at Topeka, Kansas (06889000)
 - Kansas River at Desoto, Kansas (06892350)

WID Demo Research and Monitoring Needs Workshop

June 2022



AGENDA

- Welcome and Introductions – USACE and KWO
- Meeting Purpose (John Shelley)
- Reservoir Sediment Management – Josh Olson (KWO)
- Water Injection Dredging – John Shelley (USACE), Zach Tyler (ERDC)
- Research and Monitoring Needs – John Shelley (USACE)
- Breakout Groups
 - WID Effectiveness
 - Environmental Effects and Human Considerations
- Who Has Expertise and Availability to Support the WID Demonstration?
- Next Steps

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NCSPA – WID Demo at Port of Wilmington November 2022



Next Steps

- Acquisition of WID equipment and vessel
- Additional project coordination and outreach efforts
- Continued development of environmental compliance and pre-, during, and post-WID demonstration monitoring plans
- Continued development of implementation plan
- Demonstration planned for spring, summer, fall 2024



Questions?

