FY18 RSM IPR

Rock Island District, Evaluation of the Impact of Reservoir Sedimentation on Project Benefits and Opportunities for Commercial Use of Dredged Materials, Des Moines River, Saylorville Lake and Lake Red Rock

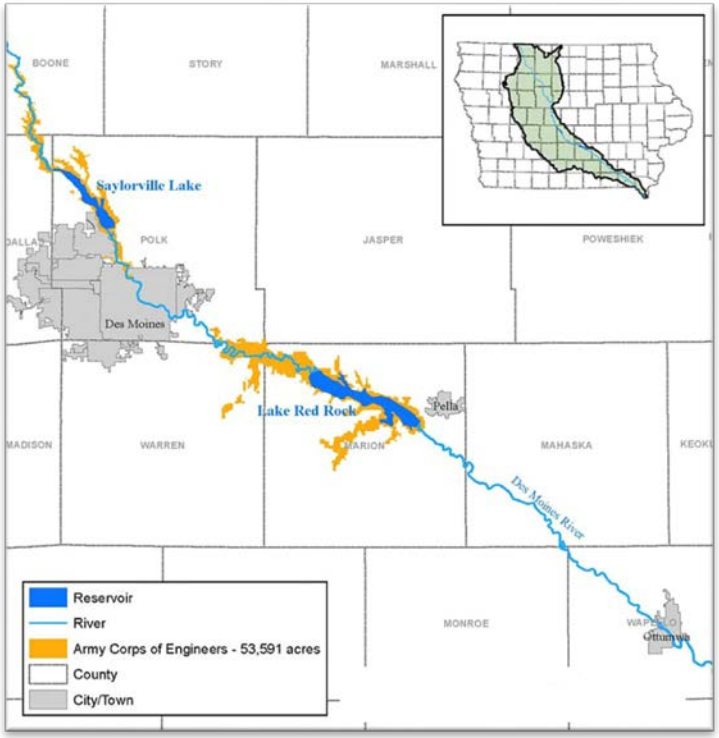
BLUF: Evaluate the impact of reservoir sedimentation on past and future flood damage reduction benefits and reliability of meeting conservation (low-flow augmentation) releases and to evaluate the potential for economically viable uses of dredged materials from the reservoirs.

Description

- Projects beyond 50-year planning horizon
- Ongoing sedimentation reducing capacity
- Impacts to flood risk reduction, drought mitigation, supply, recreation, ecosystem
- Need a method to monetize lost benefits

Approach

1. Original, current, and future storage curves
2. Effect of sedimentation on project benefits (Flow/Damage Curves)
3. Characterization of Sediments and Potential Uses



FY18 RSM IPR

Rock Island District, Evaluation of the Impact of Reservoir Sedimentation on Project Benefits

District USACE PDT Members

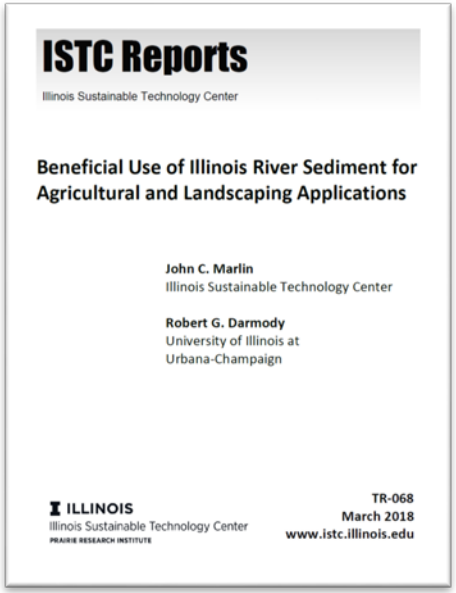
Kevin Landwehr, Engineering
Mindy Grupe, Engineering
Diane Karnish, Economics
Leo Keller, Engineering
Brad Palmer, Engineering

Stakeholders/Partners

Rock Island District
State of Iowa
City of Des Moines Water Works

Leveraging/Collaborative Opportunities

- Daily susp. sed. samples 1968-2011
- Recent sedimentation resurveys, 2011 and 2014
- 2015 – Updated CWMS models of Des Moines River Basin
- 2017 – Initiated study to update water control plans for both reservoirs
- 2018 – Beneficial Use of IL River Sediment Report **(RSM 2016 effort)**



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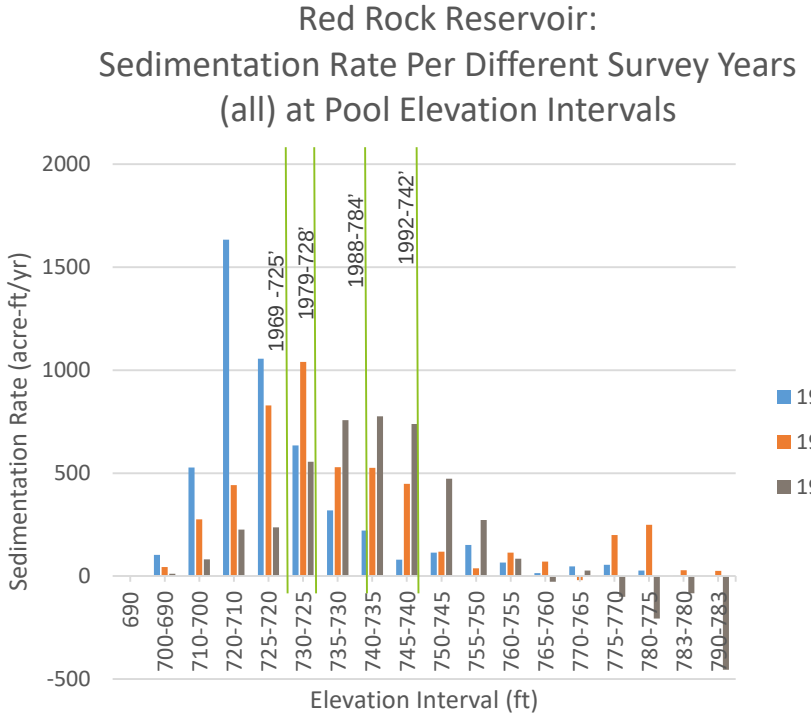
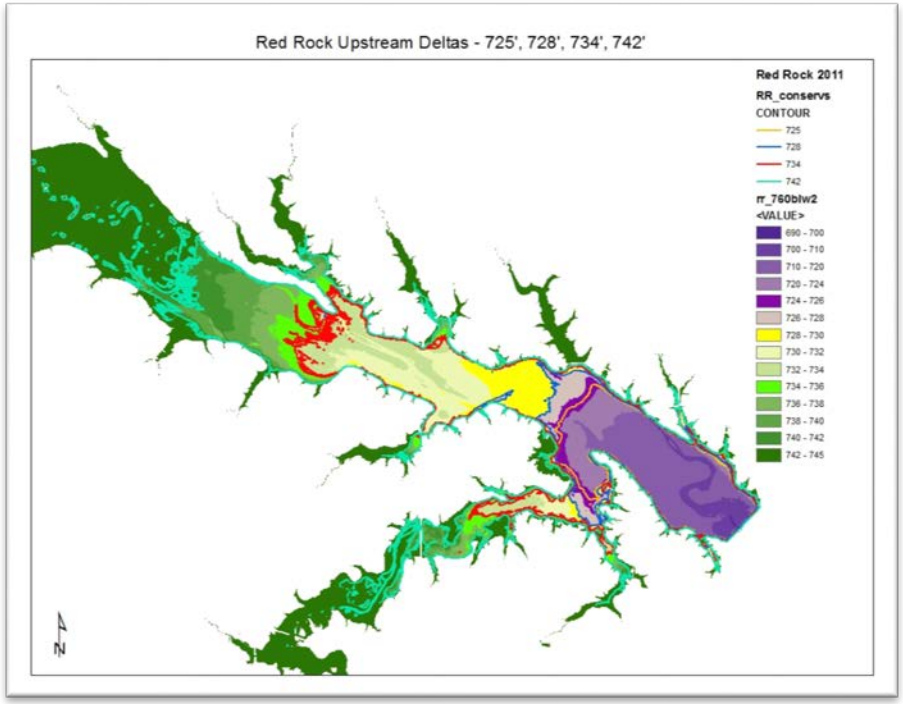
Rock Island District, Evaluation of the Impact of Reservoir Sedimentation on Project Benefits

Challenges

- Pool Raises (moved delta location)
- Changed Water Control Plans
- Change in technology (Transects vs. LiDAR)

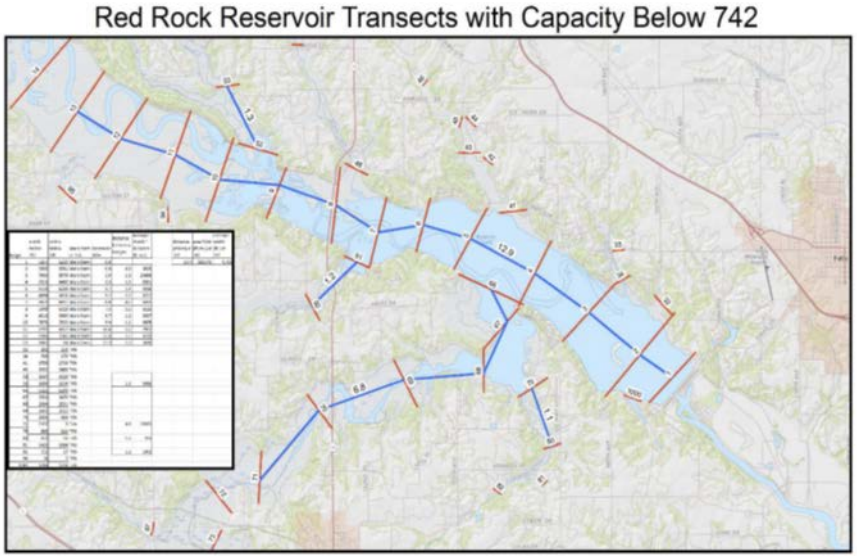


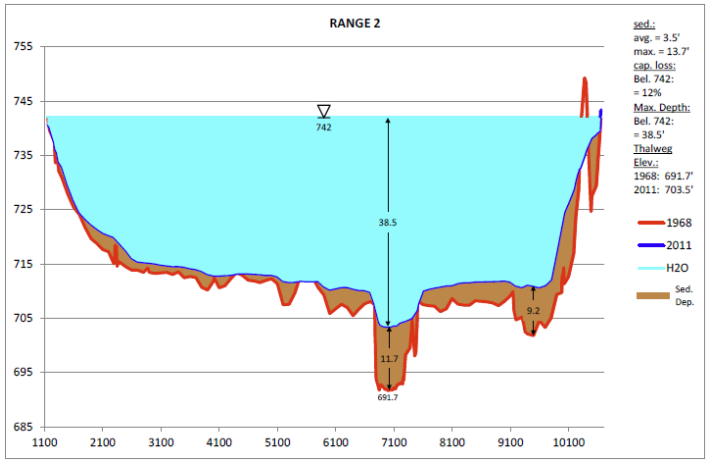


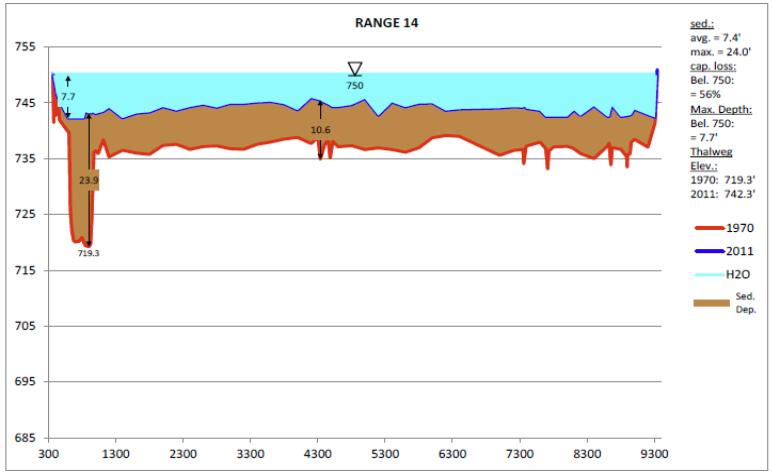
Solutions

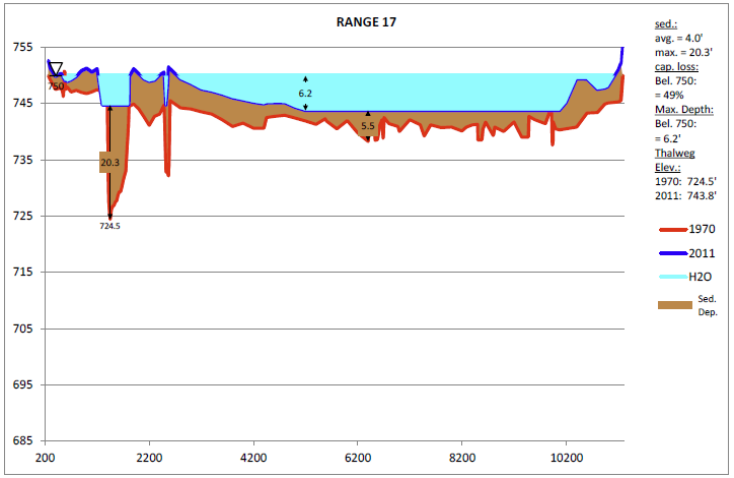
- Used “Current” capacity
- Elevation bands – weighted rates
- Assumed no capacity change at higher elevation bands

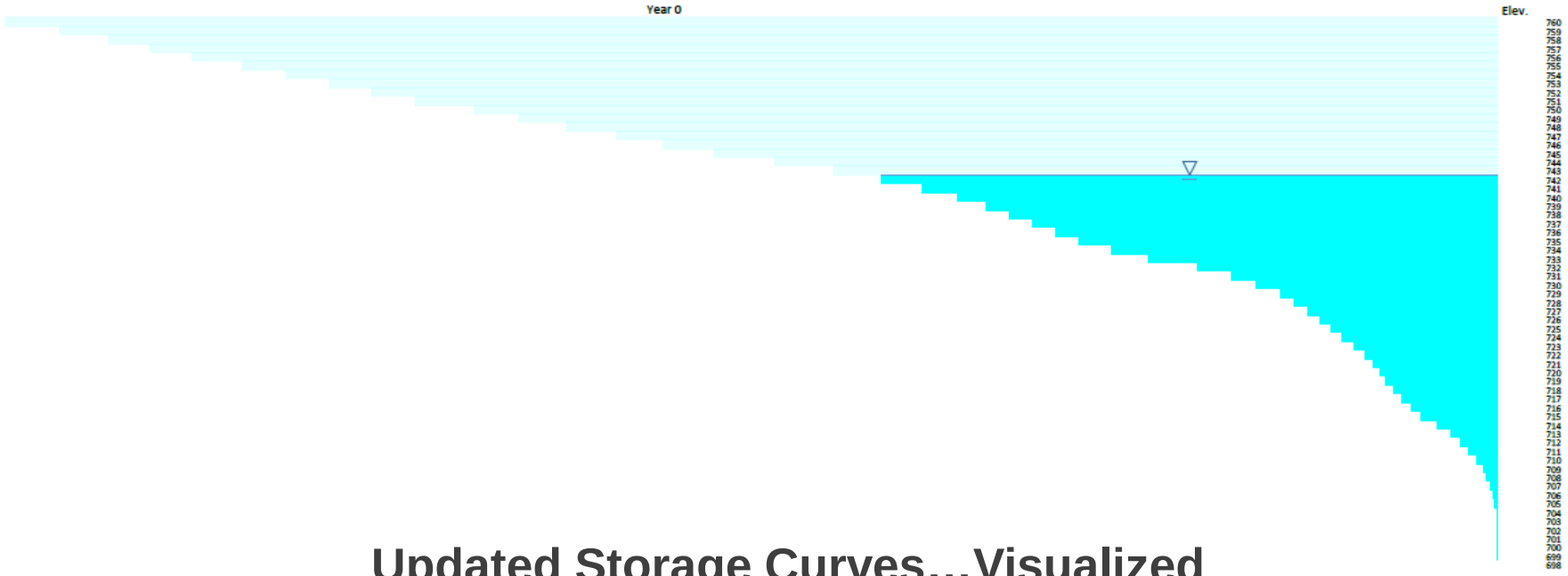
Red Rock Loss of Capacity Below Conservation Pool (1968-2011)



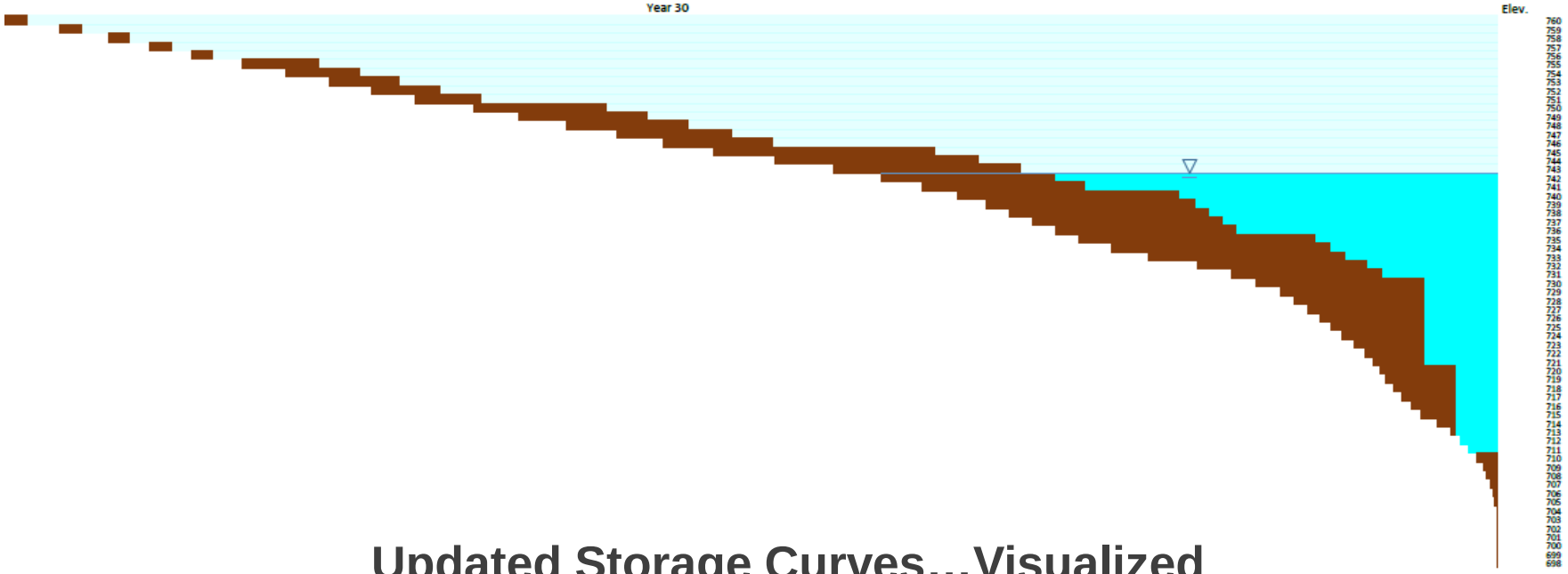




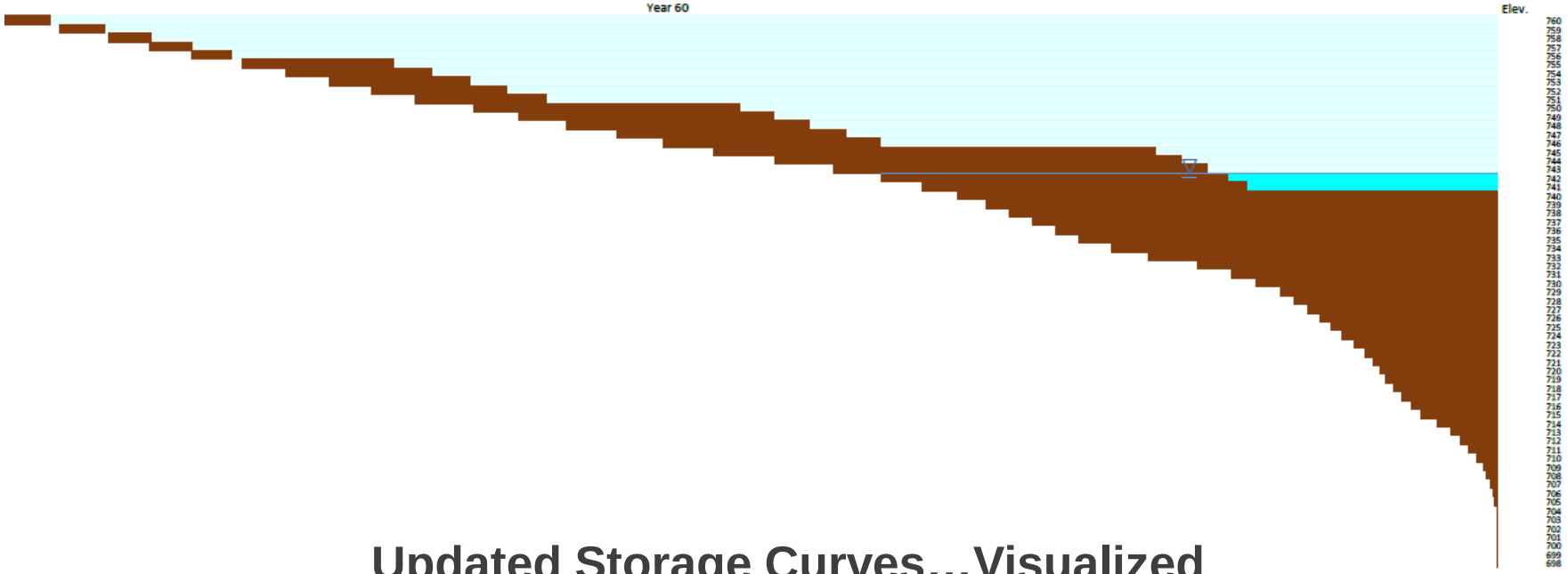




Updated Storage Curves…Visualized
Red Rock T_0 - Current



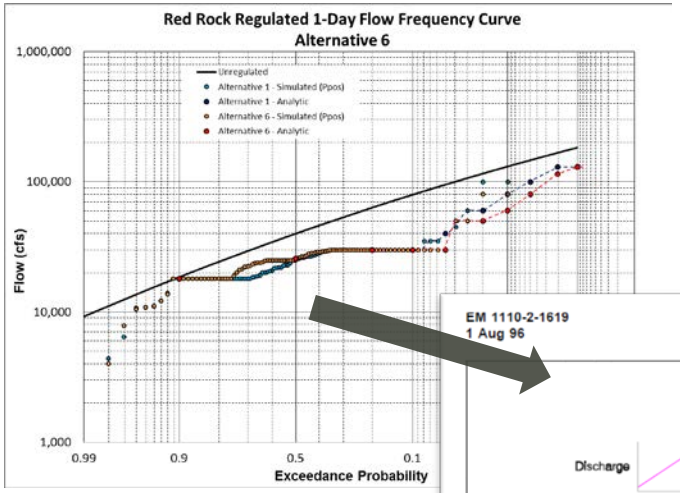
Updated Storage Curves…Visualized
Red Rock Year T_{30}

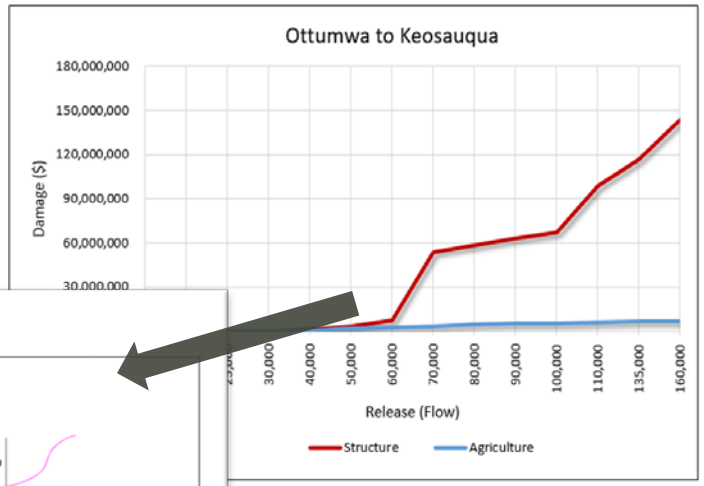


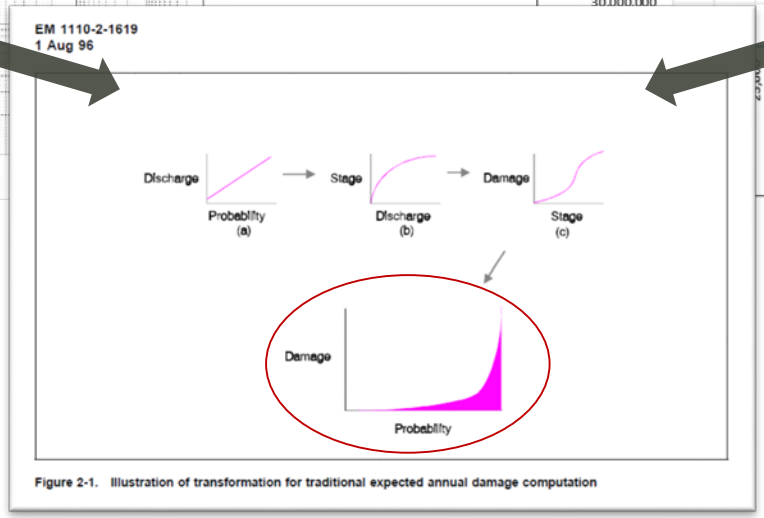
Updated Storage Curves…Visualized
Red Rock T_{60}

Additional Expected Products

- Quantification of impacts of reservoir sedimentation on project benefits







This describes Flood Damage Reduction monetization….will also look at low-flow augmentation changes

Additional Expected Products (cont.)

- Characterization of reservoir sediments and their potential commercial uses
  Physical and chemical tests @ deltas (following in RSM funded report)

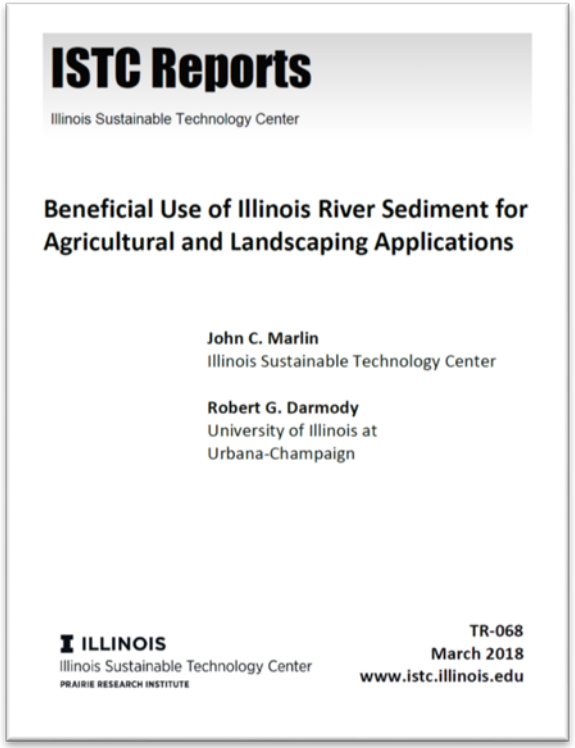
  "Superfund"?

  "Miracle Grow"?

Treatment (Sediment cm)	Yield (g per plot)	
	Corn	Soybeans
0	889	858
8	2,790	878
15	2,567	1,058
30	3,094	932
Average	2,335	931

  Uses: Construction – Fill/Capping
  Agriculture – Soil Amendment
  Soil Blending – Ecosystem

- Technical note


ISTC Reports
Illinois Sustainable Technology Center

Beneficial Use of Illinois River Sediment for Agricultural and Landscaping Applications

John C. Marlin
Illinois Sustainable Technology Center

Robert G. Darmody
University of Illinois at Urbana-Champaign

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Illinois Sustainable Technology Center
PRAIRIE RESEARCH INSTITUTE

TR-068
March 2018
www.istc.illinois.edu

Benefits to USACE and the Nation?

- Advise USACE and stakeholders of potential impacts of reservoir sedimentation
- Feedback to other efforts
    - Sensitivity analysis for updated Regulation Control Plans
    - Simple solution applicable to other reservoirs
- Provide an evaluation of potential commercial opportunities for use of dredged materials
- Better describe sediment testing procedures for other Districts
- Help form future management actions in regards to reservoir storage capacity
- Improve long-term sustainability of the reservoir projects