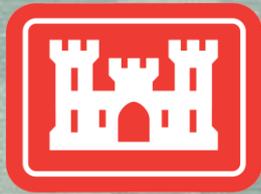


# Missouri River Flood Recovery EWN Projects

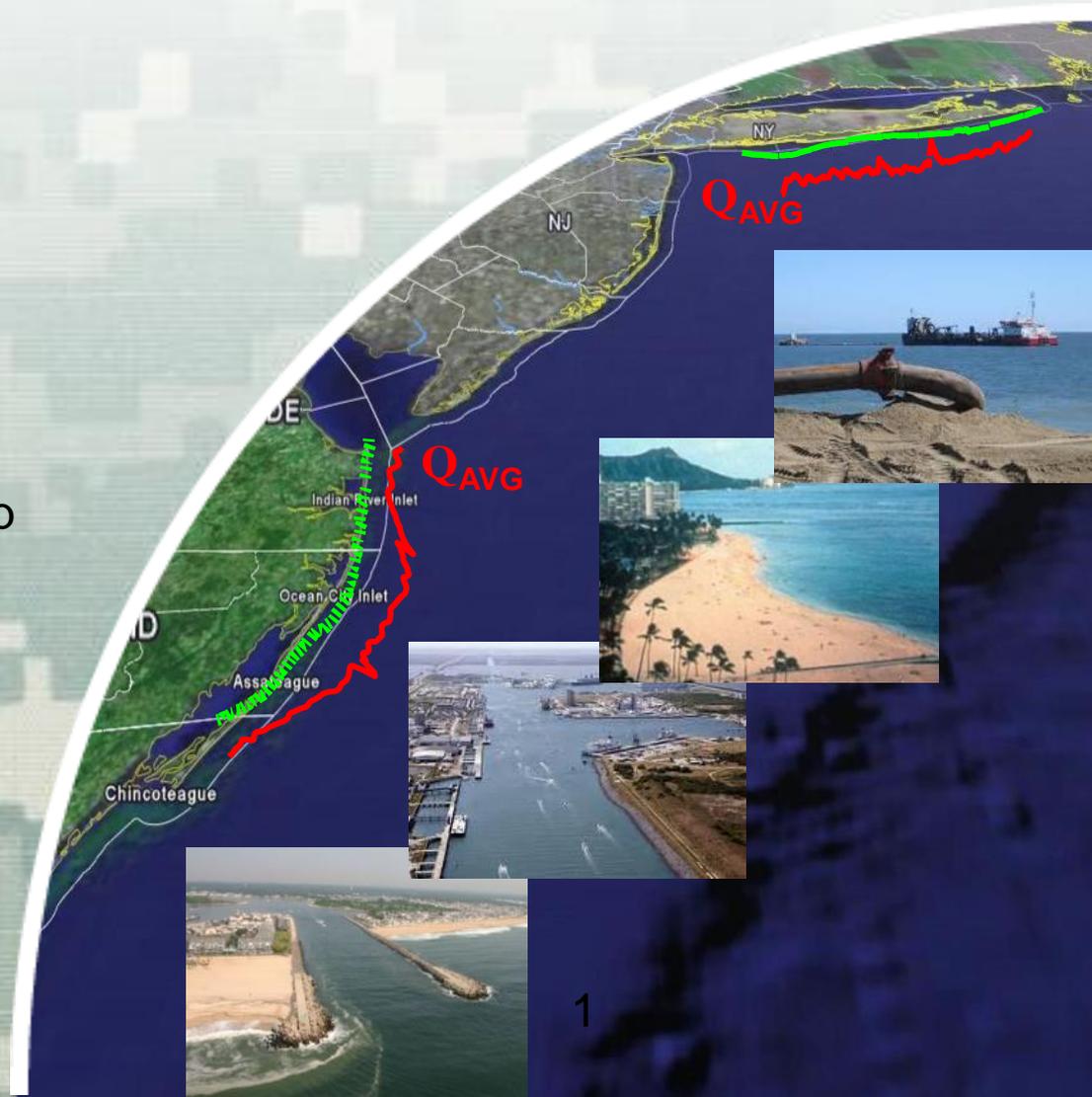
Paul M. Boyd, Ph.D., P.E.  
Hydraulic Engineer, Omaha District

RSM and EWN Inland Workshop  
29 April – 1 May 2014  
Omaha, Nebraska



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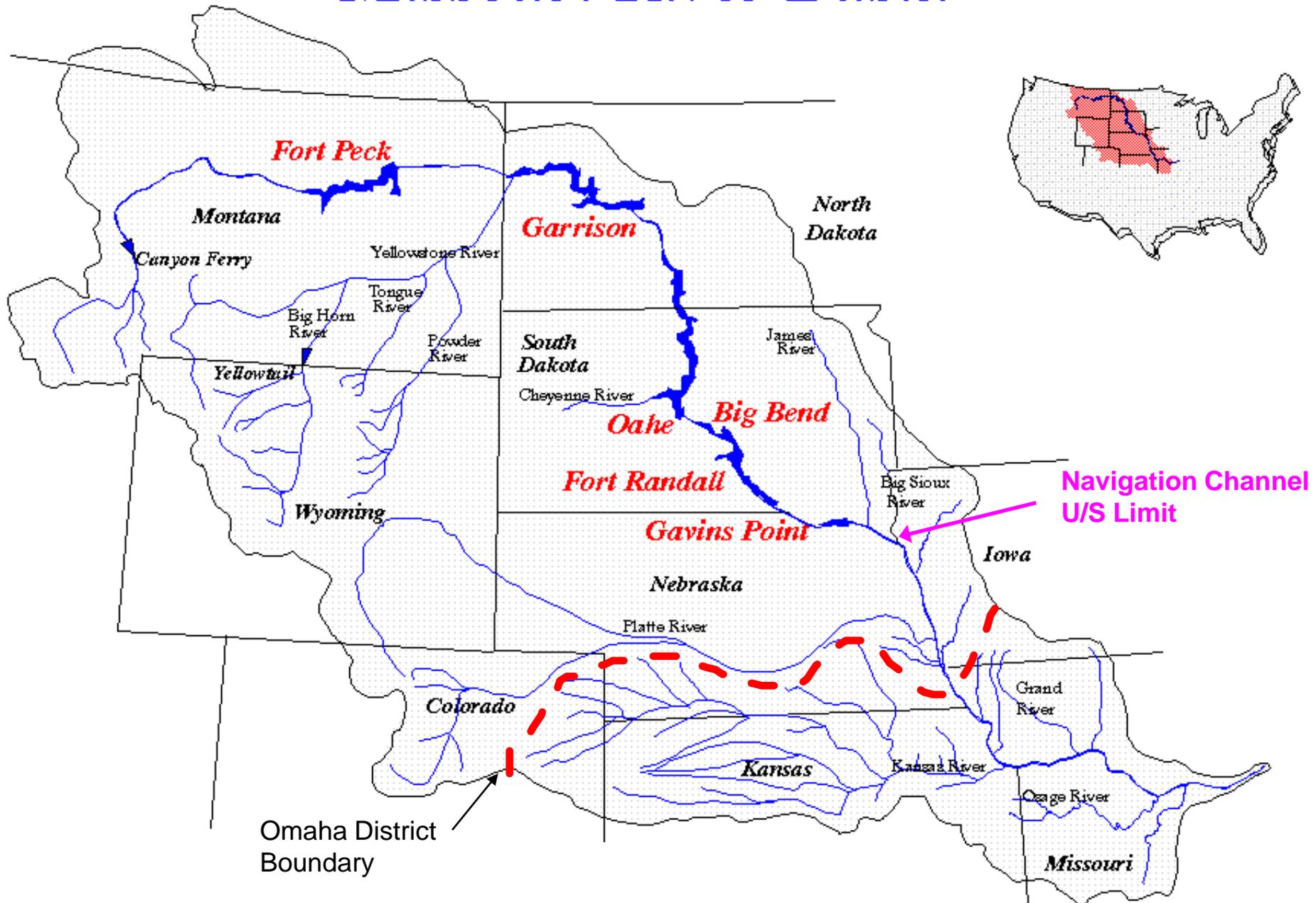


# RSM and EWN in Omaha District

- EWN meshes with Missouri River Recovery Program objectives
- Missouri River 2003 BiOp - create both emergent sandbar habitat (ESH) and shallow water habitat (SWH)
- Missouri River - Self sustaining navigation channel from Sioux City to St Louis (738 RM) with rock structures, without locks or annual dredging
- Unprecedented 2011 flood event created many sediment management needs



# Missouri River Basin



# RSM FY12 IPR

## Omaha District, RSM Opportunities in Flood Recovery, Dan Pridal/Paul Boyd

### Description

- The 2011 Missouri River flood resulted in overbank flows from Mid-June through Mid-September
- Maximum dam discharge reached 160,000 cfs at 5 of 6 mainstem dams (previous max  $\approx$ 70k)
- Discharge mostly confined to channel in the reservoir reach with the aid of temporary levees
- Within Navigation Channel reach, flows inundated federal levees for prolonged period
- Levee breaches of multiple federal levees resulted in extensive flooding (mainly between Omaha and KC)
- High discharges redistributed sediment within the system
- Large amounts of sediment were left on farm fields, deposited in the navigation channel

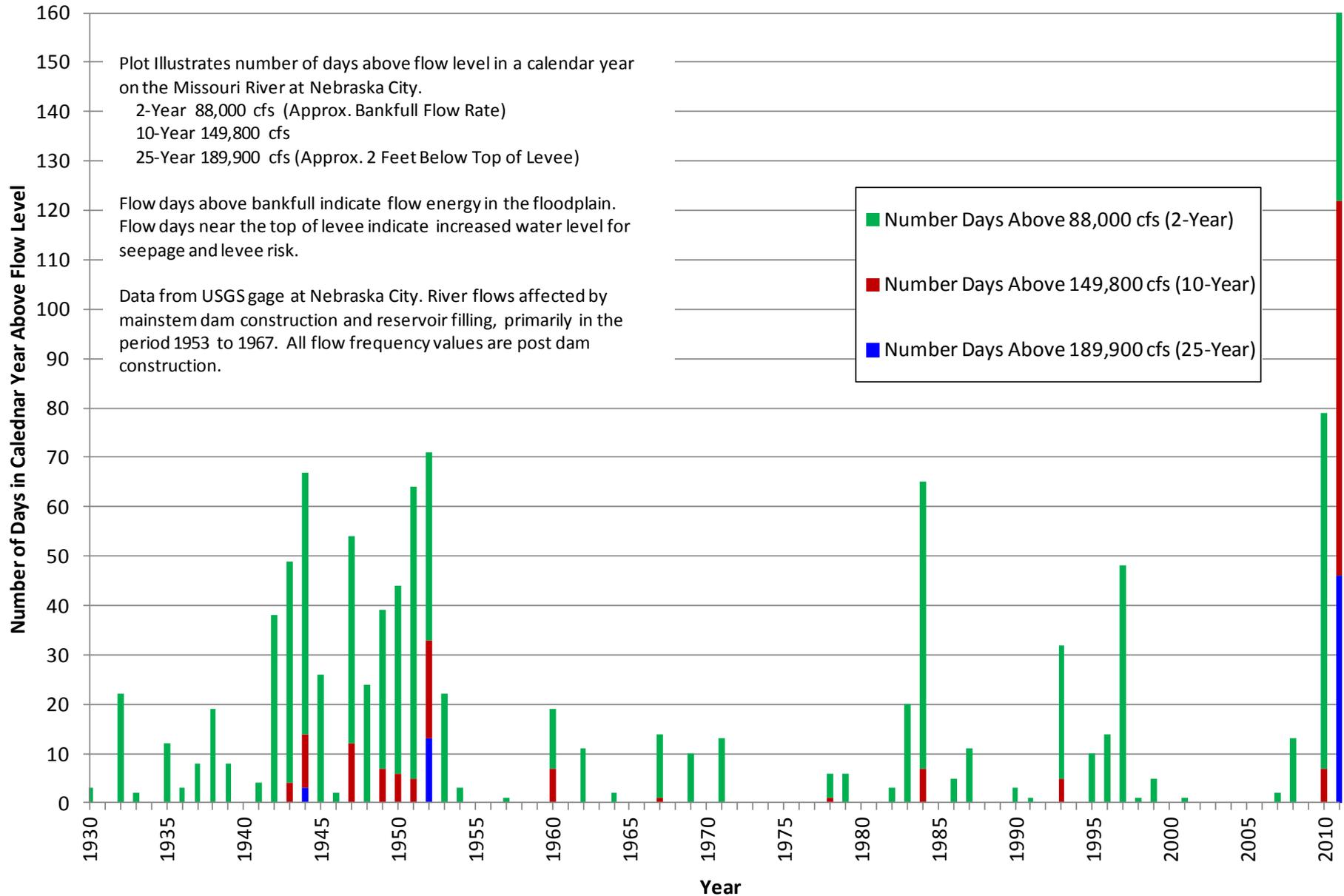


### Challenges

- Rebuilding Flood Protection Infrastructure
  - ▶ Hamburg Bend Levee and Decatur Bridge
- Restoring Mainstem Dam System Capacity
  - ▶ Garrison and Oahe Dam Spillways
- Opening the Navigation Channel
  - ▶ Infrastructure Assessment and Decatur Bend Channel
- Managing the Return of Sediment to the River
  - ▶ Developing Emergency Permits for In-Channel Sediment Disposal



# Nebraska City Days Above Flow Value By Year



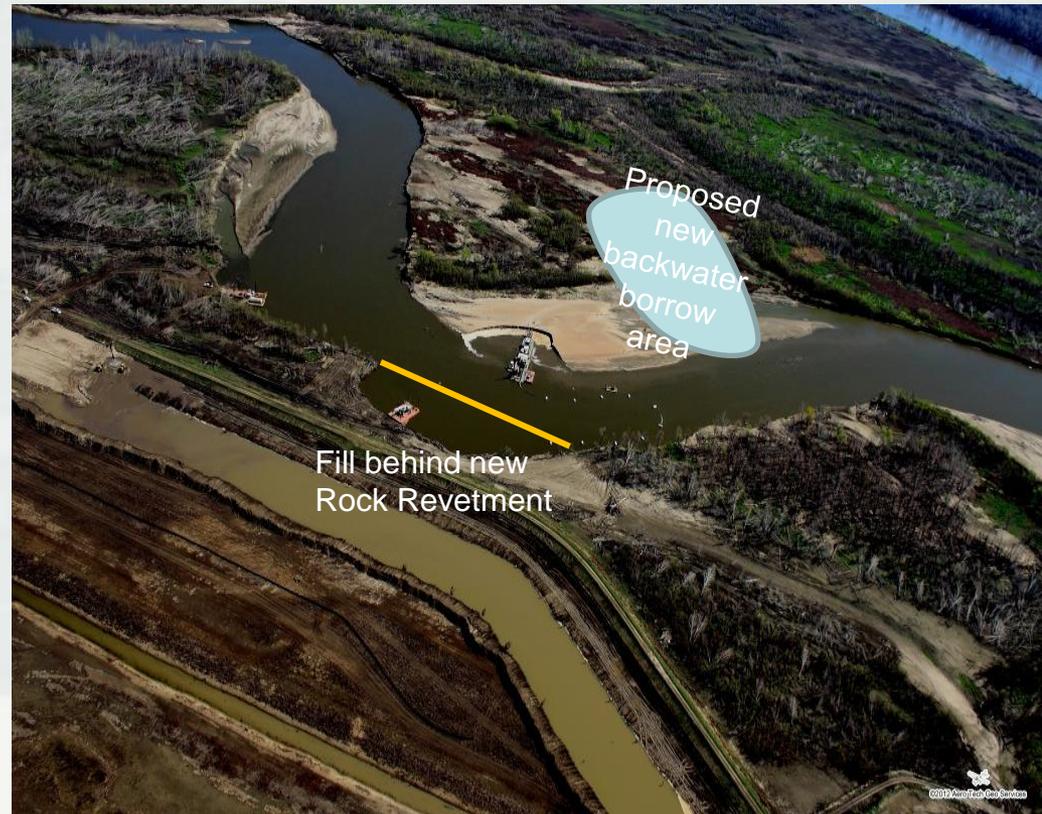
### Hamburg Bend Chute Levee

#### Goals/Issues to Address

- Missouri River erosion in Upper Hamburg Bend Chute, which encroached on the toe of the Federal levee
- Reconstruction and protection of the levee toe required

#### RSM Integrated Solution

- To prevent further damage to levee, a rock revetment was added at the failure point
- 40,000 tons of riprap placed to create fill area, dredge backfill. Also dredge to create seepage berm
- Initial dredging from point bar, additional dredging done to create backwater for shallow water habitat



**BLUE** Dredging of backwater for shallow water habitat provides fill for repair at less cost as other sources while supporting habitat creation for the MRRP



### Decatur Bridge Repair

#### Goals/Issues to Address

- Bridge abutment toe eroded during flood
- Repair of bridge abutment required significant fill material
- Repair needs to minimize damage in future floods

#### RSM Integrated Solution

- USACE worked with Iowa Dept Natural Resources, IA DOT to develop plan to armor abutment and create habitat ponds
- Flood deposition impacted SWH/wetlands nearby in Tieville Bend
- Dredged material used to build control structures and bank stabilization near bridge abutment
- Project restored depth to SWH / wetlands, increasing function at lower cost than other borrow material sources



**BLUE** State of Iowa adds wetland habitat at similar cost to other sediment sources



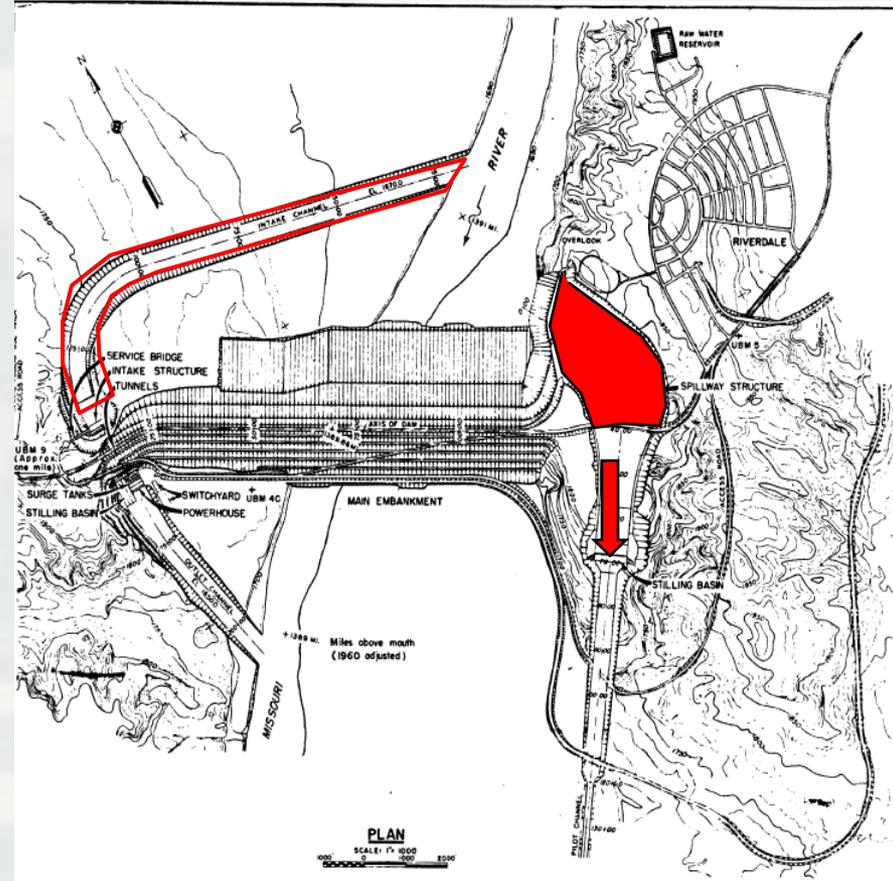
### Garrison Dam Spillway

#### Goals/Issues to Address

- Current spillway capacity reduced by 7-10%
- Additional 100,000 CY deposited during flood
- Spillway bank stabilization removed in 1960's
- Ogee weir loses 22% spillway capacity with maximum sediment deposition
- Impact to bubble / stoplogs / gates

#### RSM Integrated Solution

- Disposal of 900,000 CY from spillway proposed in submerged pilot channel to powerhouse.
- Reduce/eliminate loss of cold water during drought – ND sued USACE over issue in 2005
- Also proposed in blown-out channel below spillway to create wetland habitat and backwater
- Both options much less expensive than upland and provide fisheries habitat benefits



**BLUE** Placement of dredge material in in-lake channel or downstream spillway channel provides aquatic habitat value and is significantly less expensive than upland disposal



# Questions ?



RSM 2012  
Missouri River Flood Recovery and RSM  
Paul Boyd / Dan Pridal  
Omaha District Corps of Engineers



# Additional Photos









- Hamburg Bend Chute Levee Repair





2 May 2012



Scour fill  
7 May 2012





# Garrison Spillway

