Missouri River Mainstem Reservoir System
Drought Operations

NIDIS Kickoff Meeting
February 26-27, 2014
Nebraska City, NE

Jody Farhat, P.E.
Chief, Missouri River Basin Water Management

US Army Corps of Engineers
BUILDING STRONG®

Missouri River Mainstem Reservoir System

Congressionally Authorized

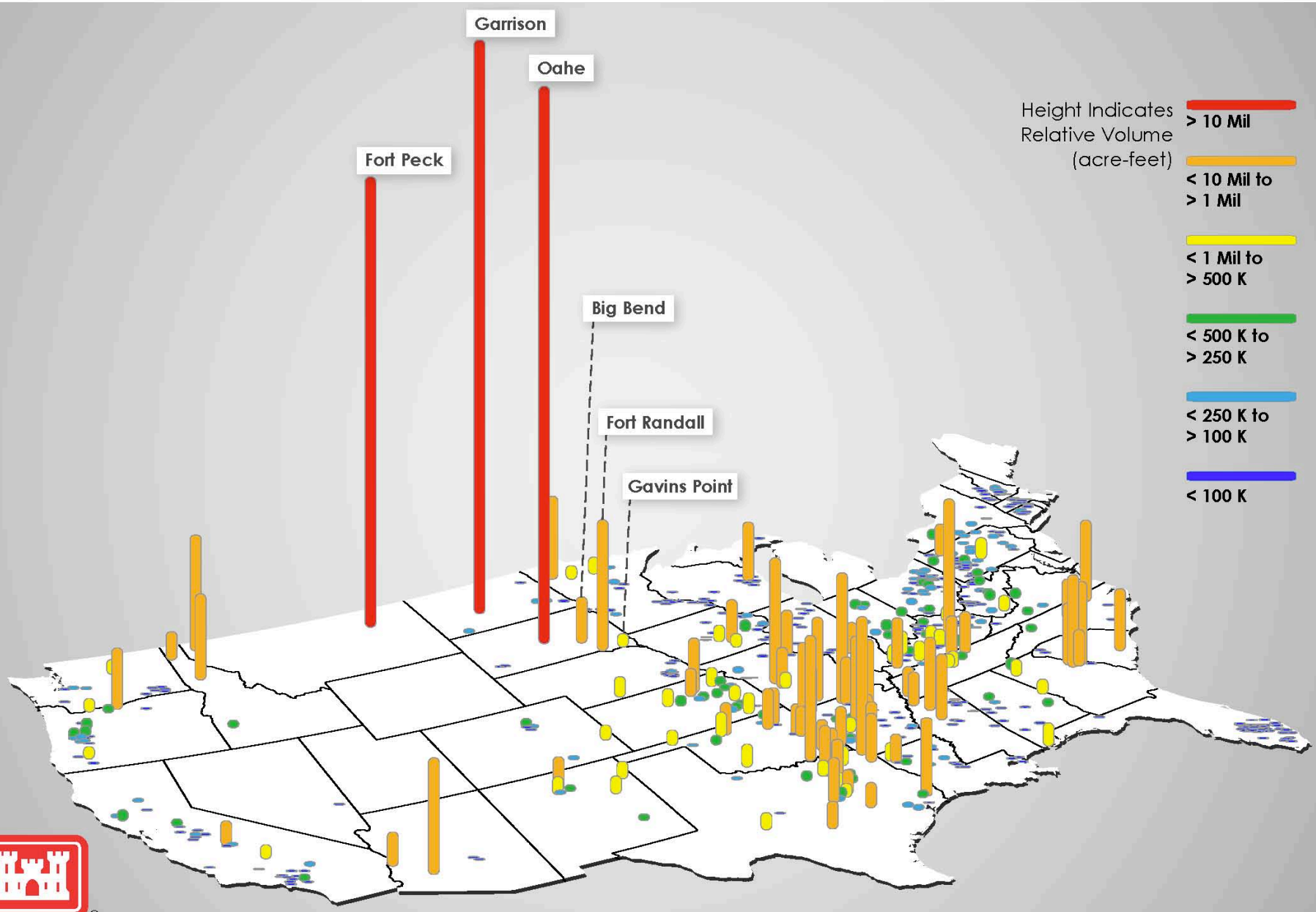
<u>Project Purposes</u>

- Flood Control
- Navigation
- Hydropower
- Irrigation
- Recreation
- Water Supply
- Water Quality
- Fish and Wildlife

(Including endangered species)

Bank Stabilization and Navigation Project
Sioux City, IA – St. Louis, MO

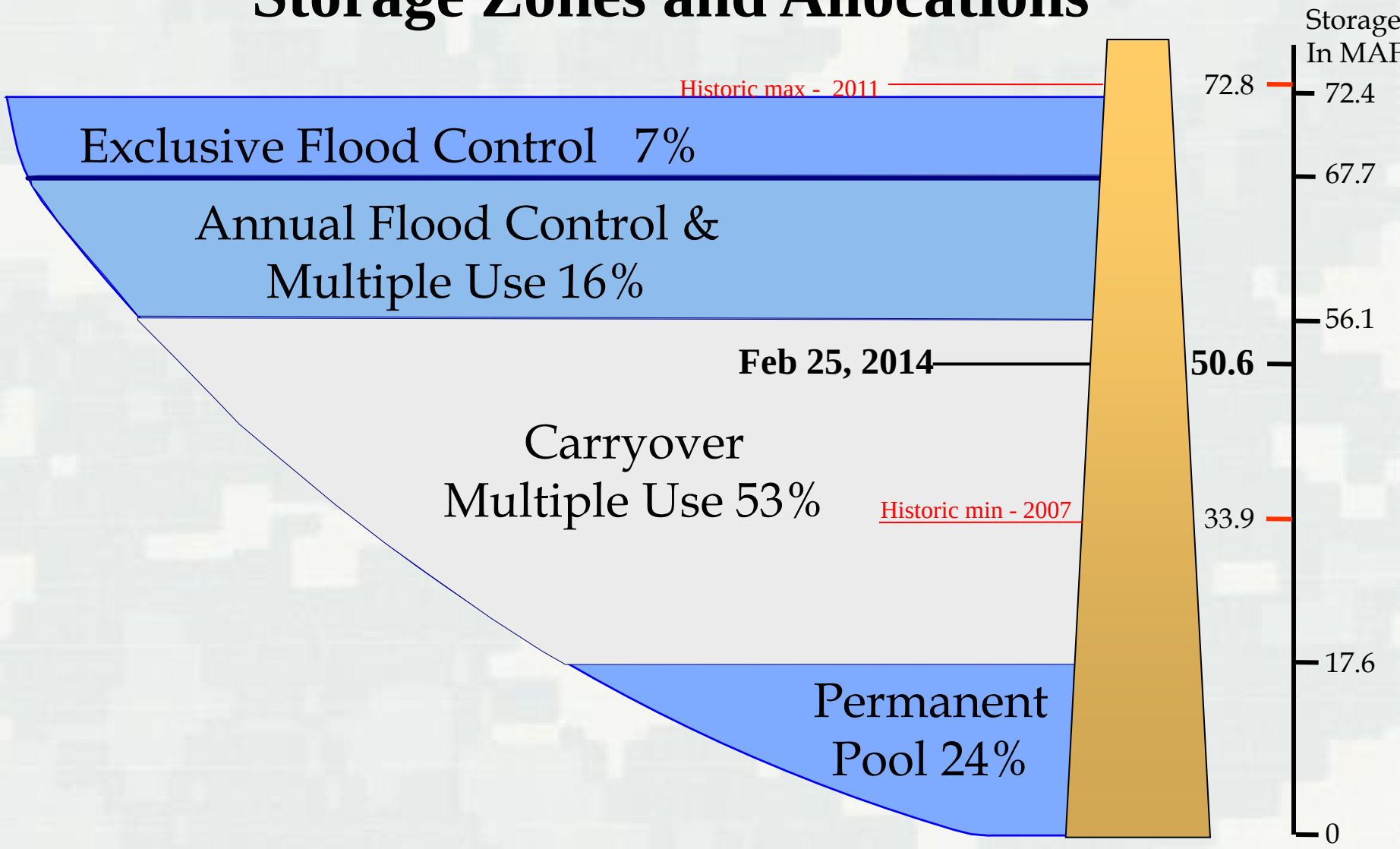
Storage Capacity of Corps Reservoirs



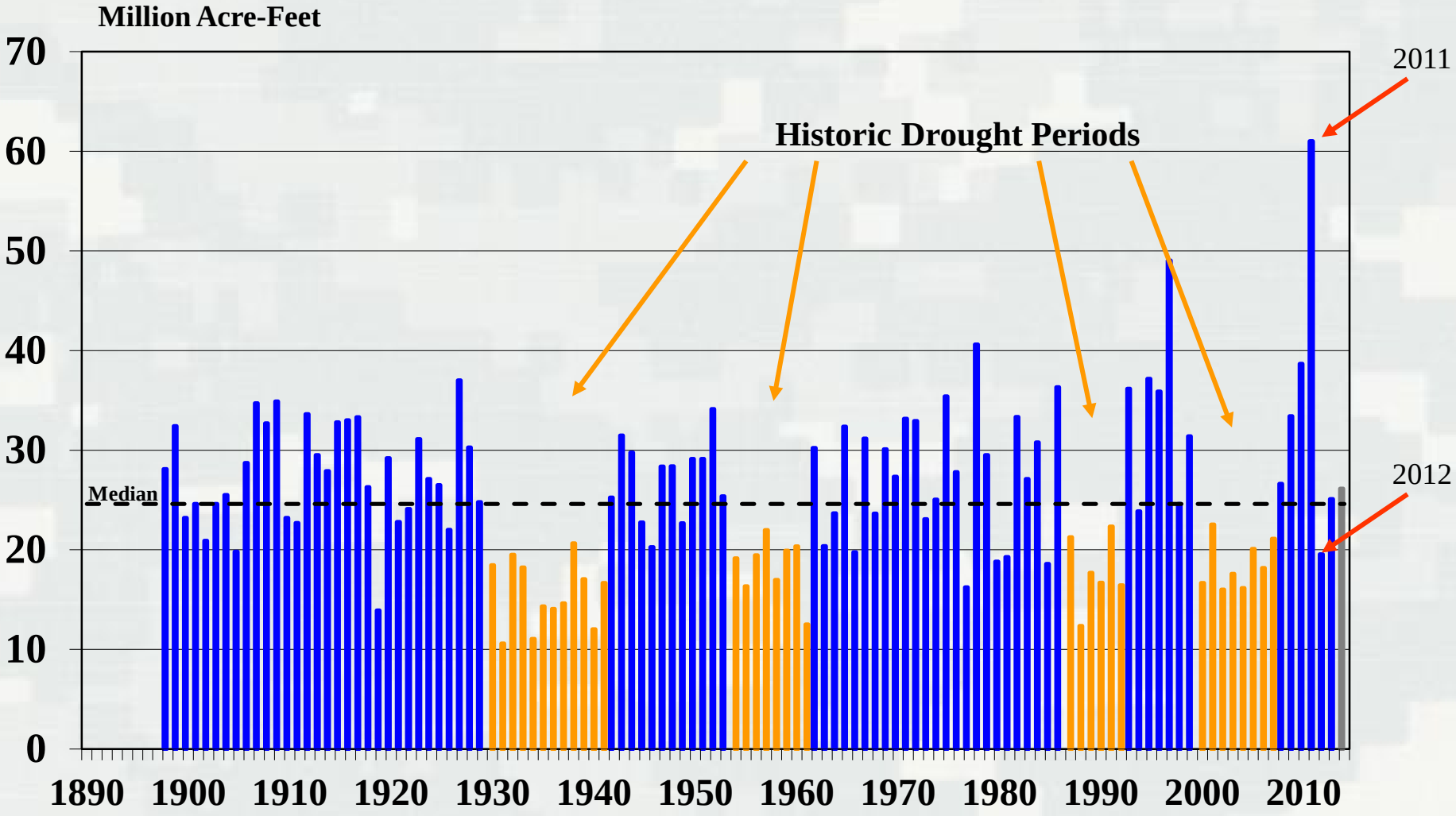
US Army Corps of Engineers
BUILDING STRONG

Prepared and Produced by the U.S. Army Corps of Engineers Omaha District 2010

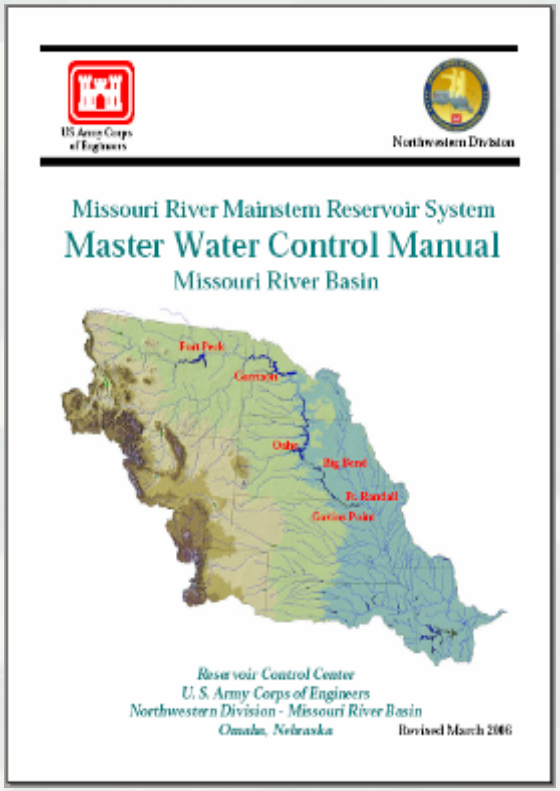
Missouri River Mainstem System Storage Zones and Allocations



Missouri River Mainstem System
Annual Runoff above Sioux City, IA



Missouri River Mainstem Reservoir System Master Manual



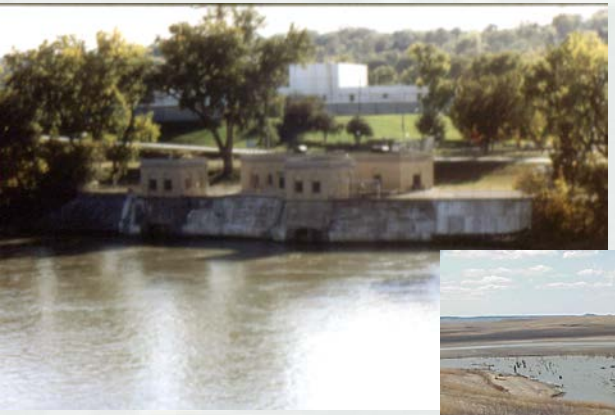
- First published in 1960
- Updated in 1975 and 1979
- Master Manual Review and Update began in November 1989 in response to first major drought
- Amended Biological Opinion received from USFWS in December 2003
- Master Manual was revised for drought conservation in March 2004
- Revised again in March 2006 for Gavins Point spring pulse
- Annual Operating Plan (AOP) developed annually in accordance with Master Manual

2004 Master Manual Revision

- **Key Provision:** More stringent drought conservation measures
  - ► Navigation Service
    - Navigation is served by releasing water from the reservoir system to meet flow targets during the navigation season, which normally extends from April - December
    - During periods of drought, navigation "service level" and "season length" are reduced earlier and more severely in a drought
    - During extended droughts, navigation is suspended at a higher total System storage
  - ► Winter release rates
    - Target releases from Gavins Point dam were increased from 6,000 cfs to 12,000 cfs to reflect changed channel conditions
      - ▷ Includes provision to meet needs of downstream water intakes on the Missouri River to the extent reasonably possible
    - Winter releases reduced to minimum level earlier in a drought

- ***Neither the 2004 or 2006 revision to the Master Manual changed the flood control capacity of the reservoir system or the manner in which it is regulated***

Drought Impacts to Authorized Purposes



- Flood risk reduction is enhanced due to increased “empty space” in reservoirs
- Reduced support to navigation – flow support and season length
- Minimum winter releases impact access to water at lower river intakes
- Declining reservoir levels impact access to water for municipal, industrial and irrigation intakes located on reservoirs
- Reduced hydropower due to lower releases and reservoir levels
- Tribes concerned about exposure of cultural resources with low reservoir levels
- Boat ramps and marinas may become unusable impacting recreation visitation
- Declining reservoir levels impact fisheries
- Reservoir water quality may decline

Reservoir Regulation during Extreme Events

- Flexibility built into Mainstem Reservoir System
  - Reservoir system designed for extreme floods and extended droughts
  - Master Manual provides seamless transition between droughts and floods
  - Operations tweaked over the years to meet new requirements such as the Endangered Species Act and Clean Water Act, but the Missouri River remains a runoff driven system
- Changing conditions on the ground
  - Infrastructure has developed around our projects
    - Municipal and industrial water intakes
    - Recreation facilities
    - Encroachment into flood plain
  - River channel continues to evolve
- Changing Climate
  - Potential to spend more time on both ends of the hydrologic spectrum

Thank You!

Jody Farhat, P.E.
402.996.3840
jody.s.farhat@usace.army.mil

http://www.nwd-mr.usace.army.mil/rcc/
Or Google “Corps Missouri River”