AGENDA

State Interagency Missouri River Authority (SIMRA)
Wednesday, October 24, 2018; 10:00 a.m. - Noon
Betty Strong Encounter Center,
900 Larsen Park Road, Sioux City, Iowa

Conference Call Information:

Dial (866) 685-1580. When the call is answered follow the prompts by entering the conference code of **4510673319** followed by #.

10:00 Welcome & Introductions
SIMPCO Chair – Jon Winkel, Mayor, City of Sergeant Bluff
SIMPCO Vice Chair – Dan Moore, Mayor, Pro Tem City of Sioux City
Department of Natural Resources – Ed Tormey, Acting Environmental Services Division Administrator

Business Items:

- Approve Agenda
- Approve Meeting Summary – June, 2017

Presentations:

10:20 Skip Meisner, SIMPCO, "Water Resources Committee Update"

10:30 John Remus, Chief, Missouri River Basin Water Management Division at U.S. Army Corps of Engineers, Northwestern Division – "Missouri River Basin Water Management Update"

Agency Updates:

10:55 Justin Glisan, State Climatologist with Iowa Dept. of Agriculture and Land Stewardship – "Current Trends in Precipitation in the Missouri River Basin"

11:20 Craig Markley, Director, Office of Systems Planning Iowa Dept. of Transportation –"Missouri River Navigation Update" Overview of recent investigations into the viability of container-on-vessel on the inland waterway system. Link: https://www.workboat.com/news/coastal-inland-waterways/inland-container-vessels-highlight-project/)

11:45 Chris Larson, DNR Fisheries Supervisor for western Iowa – "Current Status of Iowa DNR Missouri River Fish Management"

12:00 Lunch – A sandwich bar luncheon will be available for purchase on site for $11 cash. Receipts will be provided to those who need one. An RSVP to Sharon.Tahtinen@dnr.iowa.gov is requested if you wish to purchase a lunch. Luncheon Presentation: Lewis and Clark Interpretive Center

TOUR: Sioux City Riverfront, Floyd Monument, Big Sioux River – subject to time– a 20 passenger bus will be available

Comments from Don “Skip” Meisner
SIMRA – October 24, 2018

Good morning.
We are happy you are here.

SIMPCO has a long and effective history in Missouri River issues and water resources including flood control projects, bridges, and flood plain clearance projects and flood plain development controls. Our work has also included Missouri River policy activities, bank erosion control, Missouri River technical studies concerning navigation and many other issues and MRRIC.

We are in another very wet year. We are over 9 inches above average precipitation in this area. The Gavins Point discharge is 58,000 cfs almost double of normal. The annual runoff above Sioux City is above 40 MAF. We are in a very wet cycle as you will hear from John and Justin.

We are happy that SIMRA was created to have a voice in the actions of MORAST and hope that limited scope of that enabling legislation is expanded as a mechanism for Iowa’s input in the many Missouri River issues:
Missouri River Recovery activities of the Corps, USFWS and MRRIC,
Missouri River Operations
Missouri River policy issues including the Master Manual
Soil moisture studies to better forecast runoff
Reservoir storage charges
Surplus water withdrawal charges
Legal actions and water suits
Invasive species
Channel bed degradation
State boundary issues

Comments from Shawn Shouse for Oct. 24, 2018 SIMRA Meeting

MRRIC Update

The Missouri River Recovery Implementation Committee (MRRIC) met in March and May of 2018, with a follow-up meeting by webinar in June. At these meetings, the committee interacted with the Army Corps of Engineers and the Fish and Wildlife Service through the development of the final Environmental Impact Statement and release of the final Biological Opinion for the Missouri River Recovery Program (MRRP). The committee also presented recommendations to the agencies related to the draft strategic plan for the program. The recommendations addressed a range of issues including actions for the three threatened and endangered species (pallid sturgeon, piping plover, least interior tern), suggestions for best scientific and adaptive management practices, and support for communication and collaboration. Ryan Hupfeld of Iowa DNR and Mary Kay Solberg of Iowa DOT participated in the work groups that developed those recommendations. Many thanks for their valuable contributions.

In August, the final Environmental Impact Statement (EIS) was released and is available at http://www.nwo.usace.army.mil/mrrp/mgmt-plan/ While there is not an official public comment period for the final EIS, there is a mandatory waiting period, which has been extended until November 9, 2018. During that waiting period, additional comments can be submitted online at: http://parkplanning.nps.gov/MRRMP (preferred method) or attached via email to cenwo-planning@usace.army.mil A Record of Decision for the MRRP is expected in November.

I am watching with particular interest the discussions of design and construction details for Interception and Rearing Complex (fish rearing habitat) projects in the lower Missouri River (all downstream of Iowa at this point) and potential flow releases from the dams in support of fish spawning studies in the upper river.

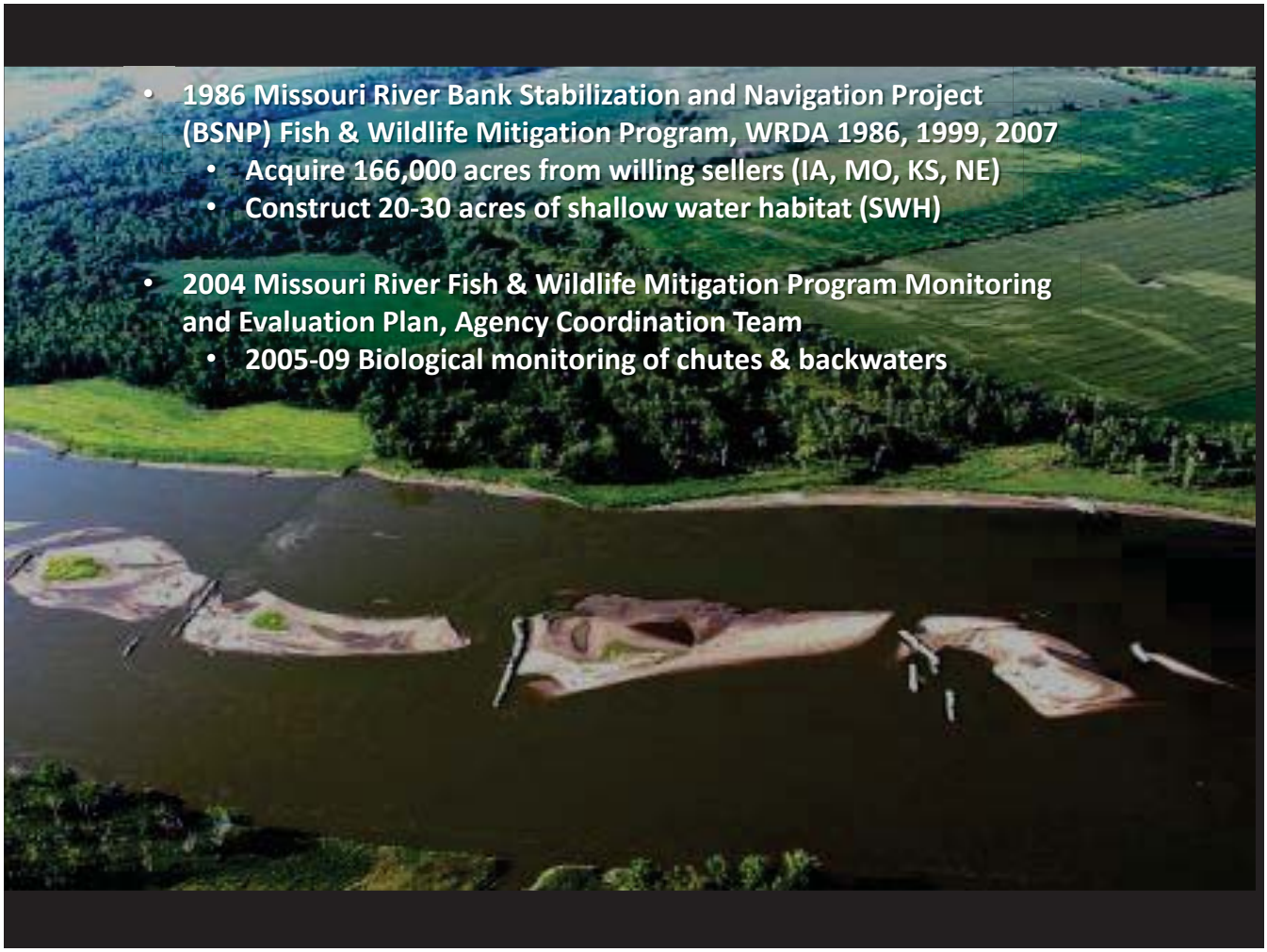
If you would like more background, there are several good brief fact sheets on the MRRP web page http://www.nwo.usace.army.mil/mrrp/ and follow links at the left to general information, then library.

MRRIC will meet again November 27-29 in Kansas City. Please contact me with any questions or comments.

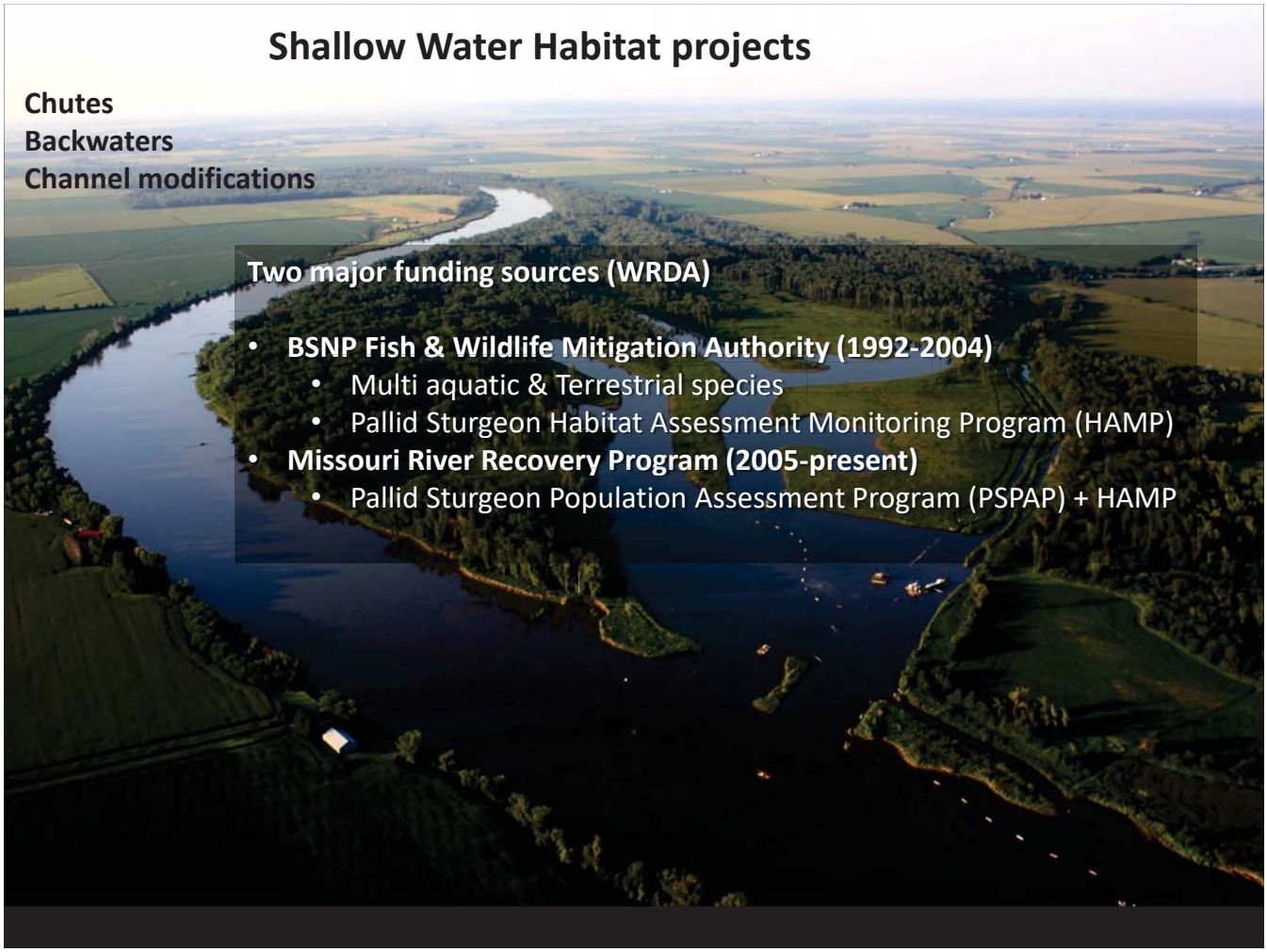
Shawn Shouse, Iowa representative to MRRIC

Iowa DNR
Missouri River Fish Management

- 35,000 acre of SWH lost along Iowa's border
- 51 of the 67 native fish species listed as rare, uncommon or decreasing in all or part of their range
- Pallid sturgeon listed as endangered, currently two other chub species being investigated



- 1986 Missouri River Bank Stabilization and Navigation Project (BSNP) Fish & Wildlife Mitigation Program, WRDA 1986, 1999, 2007
  - Acquire 166,000 acres from willing sellers (IA, MO, KS, NE)
  - Construct 20-30 acres of shallow water habitat (SWH)
- 2004 Missouri River Fish & Wildlife Mitigation Program Monitoring and Evaluation Plan, Agency Coordination Team
  - 2005-09 Biological monitoring of chutes & backwaters

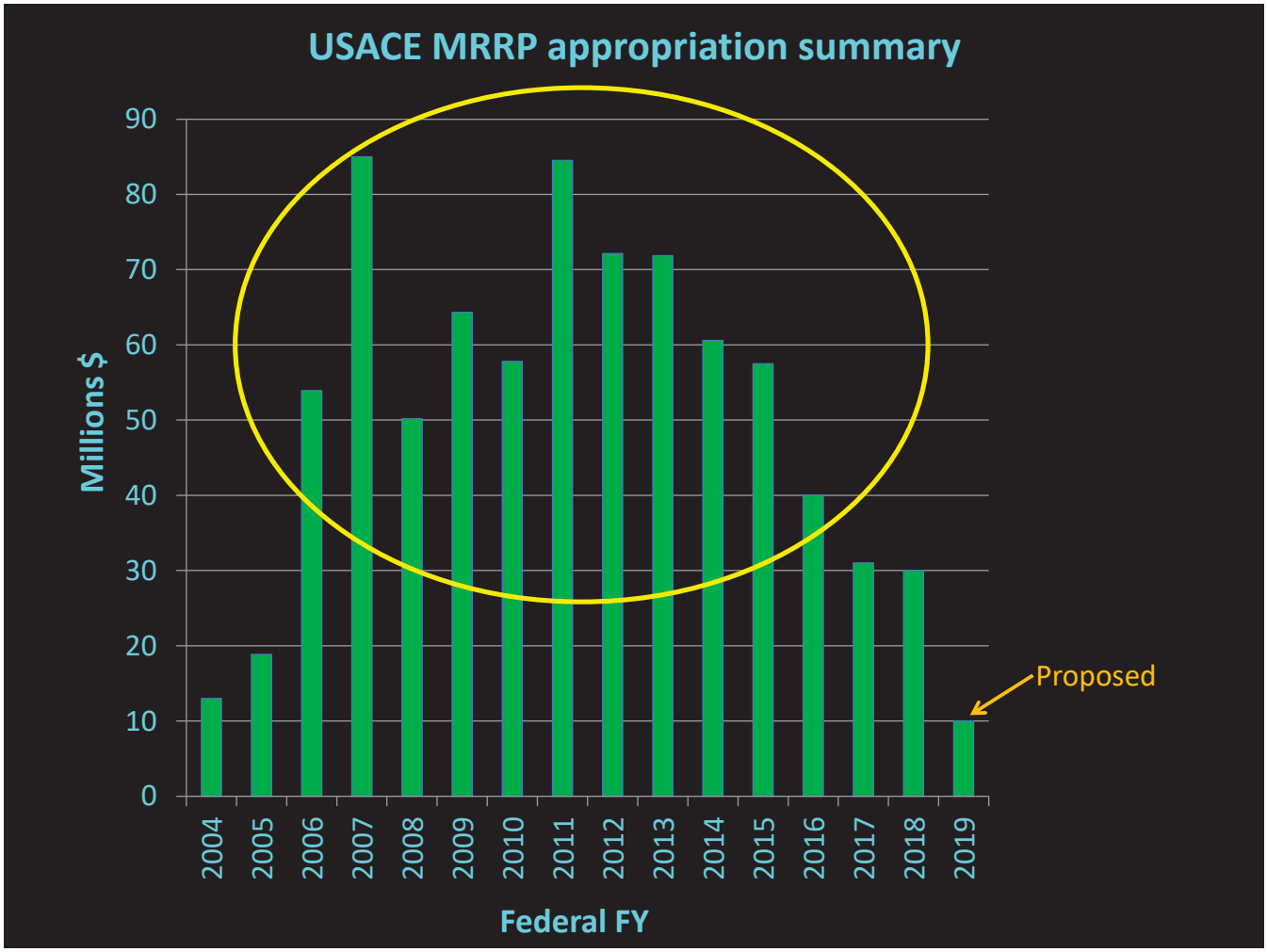


Shallow Water Habitat projects

Chutes
Backwaters
Channel modifications

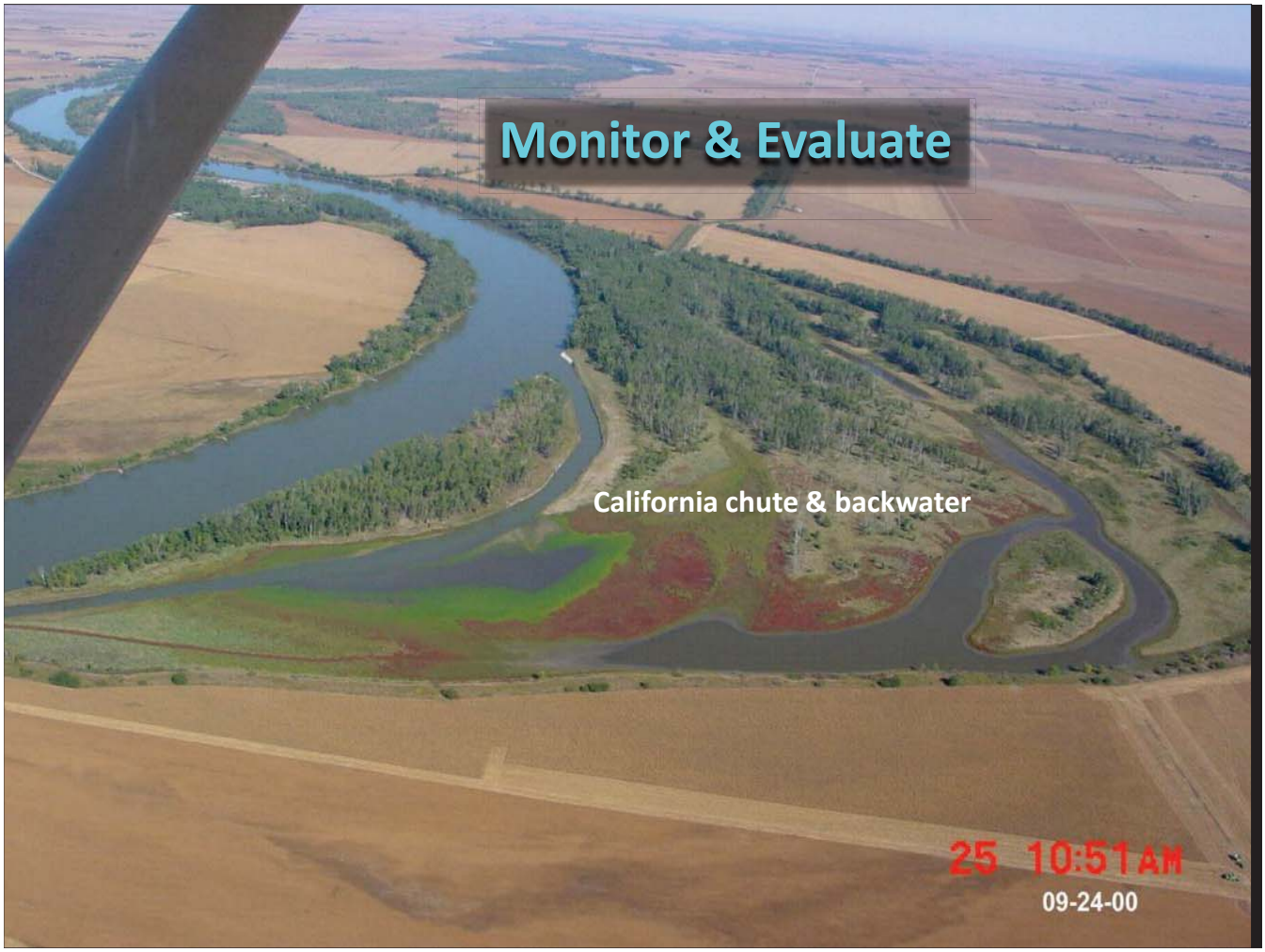
Two major funding sources (WRDA)

- **BSNP Fish & Wildlife Mitigation Authority (1992-2004)**
  - Multi aquatic & Terrestrial species
  - Pallid Sturgeon Habitat Assessment Monitoring Program (HAMP)
- **Missouri River Recovery Program (2005-present)**
  - Pallid Sturgeon Population Assessment Program (PSPAP) + HAMP



Missouri River Fish Management Station history

- **2005** – Iowa DNR Fisheries Management Team established on the Missouri River stationed in Onawa
- **2006-2009** - SWH (chutes & backwaters)monitoring and evaluation, 100% federal funds
- **2010-2013** – Continued SWH biological monitoring in addition to catfish & paddlefish long-term population monitoring (no fed. Funds)
- **2014-2017** - Deer Island channel width widening project biological monitoring in addition to catfish & paddlefish monitoring (some fed. Funds)
- **2015** – Paddlefish season established
- **2018** – Pallid Sturgeon monitoring
- **2019** – Continue focus on popular game fish species


Monitor & Evaluate
California chute & backwater
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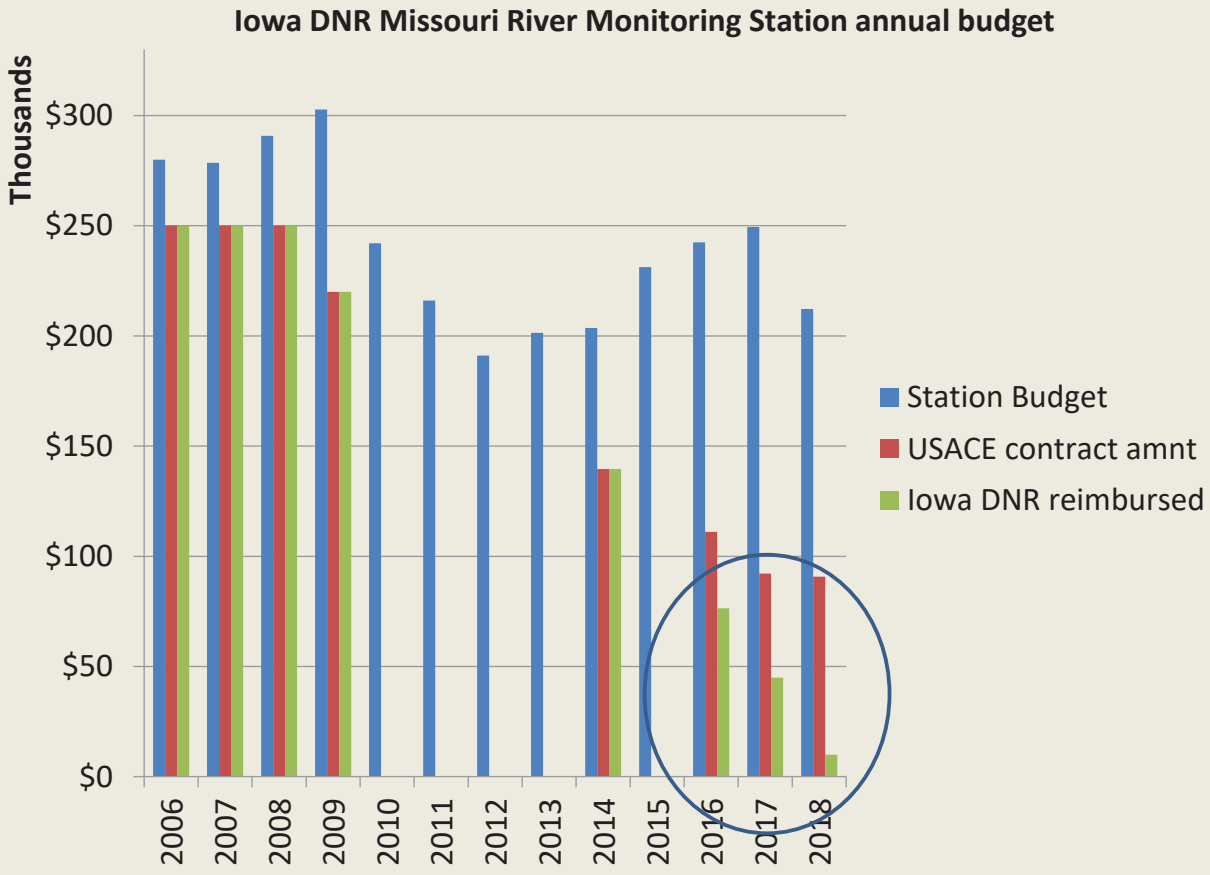
Deer Island


2009
2015
Make General Recommendations



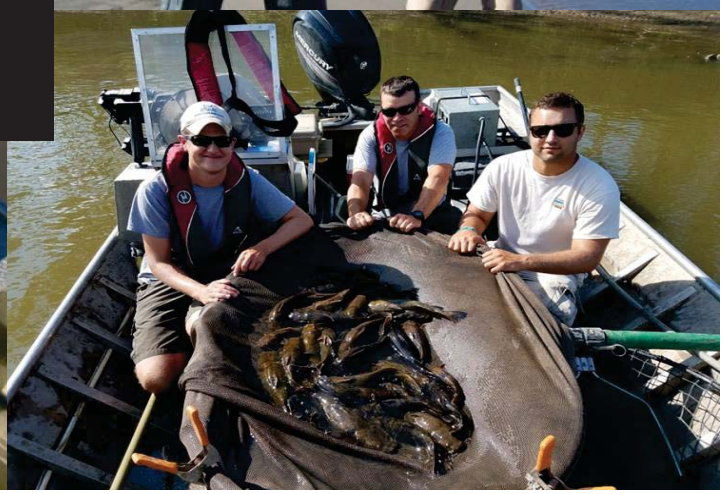
Future Fish Management Plans

- Continue working with USACE on future SWH projects and O & M of existing projects
- Work with NE G & P Commission and UNL to develop long-term catfish and paddlefish monitoring plans
- Pursue a reciprocal agreement with the state of NE in regards to catfish regulations and paddlefish snagging
- Work with partners on Missouri River Basin Asian Carp Control Strategy Framework
- Continue to engage Missouri River natural resource stakeholders on priorities for future management
- Work to help establish and angling group that can be the non-agency champion for the fisheries needs along Iowa's Western border.
- Continue participation on MRRIC fish work group

Fisheries challenges

- Lack of floodplain connectivity
- Reduced number of shallow water habitat construction projects
- Lack of funding for the BSNP F&W Mitigation Project
- Increasing Asian carp population & Zebra mussels
- Corps focus on just one species

?



Missouri River Navigation

State Interagency Missouri River Authority (SIMRA)

Fall Meeting - Sioux City, Iowa

October 24, 2018

Craig Markley | Director, Office of Systems Planning
craig.markley@iowadot.us | 515.239.1027

Missouri River Navigation Update

- Recap of the 2018 Missouri River Navigators Meeting
- Viability of container-on-vessel on the inland waterway system

Missouri River Navigators Meeting

- February 14, 2018 in Kansas City, MO
- U.S. Army Corps of Engineers, U.S. Coast Guard, and Navigators
- Growth in tonnage moving on the Missouri River
- New facilities coming on line
  - Howard/Cooper Port Authority – Booneville, MO
  - St. Joe Port Authority – St. Joseph, MO
- Oversize shipment to Sioux City in 2017 (Big Soo Terminal)
- Shipments to a new cement plant in Omaha
- "Missouri River has a reputation problem - all these good things are happening but everyone says you can't move freight on the Missouri because of water levels and other issues which is simply not true. We need to change the public perception."

  - Cheryl Ball, MoDOT

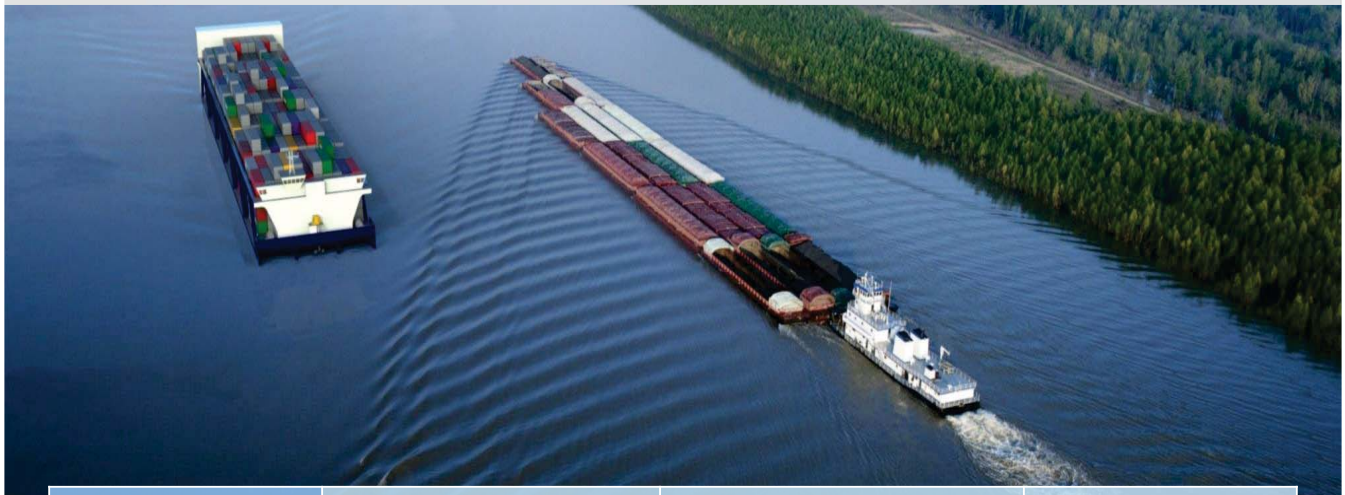
American Patriot Holdings Container on Vessel

American Patriot Holdings Container on Vessel

Vessel Features:

- Exoskeleton Hull (Patent) - optimizes cargo payload
- Minimum Resistance Bow (Patent) - optimizes speed / minimizes wake
- Upriver speeds of 13 MPH vs. 5 MPH head current
- Parallel docking without assist tugs
- Environmental features (no wake, low emissions)
- Ability to turn in own length
- Redundant propulsion & take me home power

American Patriot Holdings Container on Vessel (Liner Vessel)



Length Overall	595+ ft.	Ballast Tanks	Eight (8)
Beam	134 ft.	Fuel	LNG
Height Above Water	48 ft.	Fuel Capacity	1000cm (3 trips)
Speed (Upriver)	13 MPH	Power Plant	Diesel Electric
Operating Draft	Up to 10 ft.	Main Generators	Four (4) – 2880 kW each
DWT	12.7k-14.8k LT	Horsepower	14,850
TEU Capacity	2500	Propulsion Drives (Stern)	Three (3) Drives
Reefer TEU Capacity	500+ Electric power as needed	Bow Drives	Two (2) (1000kw Each)
Crew Size	Expect 10-12	Deck Machinery	Electric
Trading Range	Mississippi River	Gross Registered Tons	> 10,000

American Patriot Holdings Container on Vessel (Hybrid Vessel)

Length Overall	595 ft.	Ballast Tanks	Eight (8)
Beam	100 ft.	Fuel type	LNG
Height Above Water	Approx: 40-42 ft.	Fuel Capacity	3 trips
Speed (Upriver)	13 MPH	Power Plant	Diesel Electric
Operating Draft	Up to 10 ft.	Main Generators	TBD
DWT	9000+ LT	Horsepower	TBD
TEU Capacity	1800+	Propulsion Drives (Stern)	Three / Four Drives
Reefer TEU Capacity	300+ Electric Power as Needed	Bow Drives	TBD
Crew Size	Expect 10-12	Deck Machinery	Electric
Trading Range	Tributary Rivers	GRT	TBD

IOWA DOT
SMARTER | SIMPLER | CUSTOMER DRIVEN

Questions?

Craig Markley | Director, Office of Systems Planning
craig.markley@iowadot.us | 515.239.1027

Current Trends in Precipitation in the Missouri River Basin

Justin Glisan, Ph.D.
State Climatologist of Iowa
Iowa Department of Agriculture and Land Stewardship
Climatology Bureau

Outline

- Current Basin-Wide Conditions
- Precipitation and Temperature Trends
- Seasonal Outlooks
- ENSO Outlook
- Drought Monitor and Outlook

Current Conditions

- Recent rainfall has significantly improved drought in IA-KS-MO, with surplus rainfall between 5-10” in some locals
- River levels at or above flood stage due to anomalous rains in the lower basin
- Expansion of drought in the upper basin over the last two months
- Groundwater recovery NW MO, western/southern IA

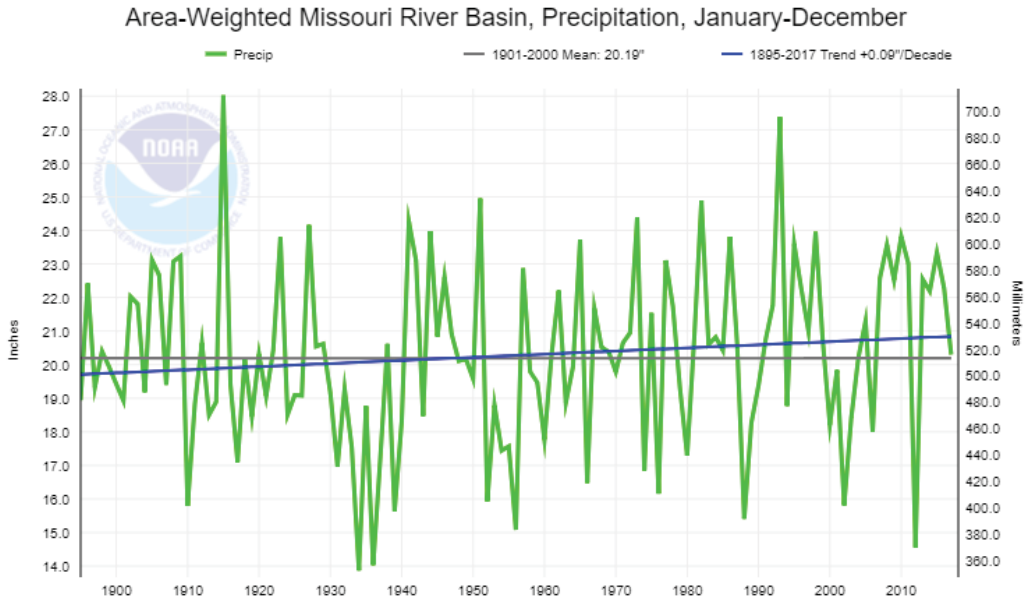
Precipitation and Temperature Trends

Historical

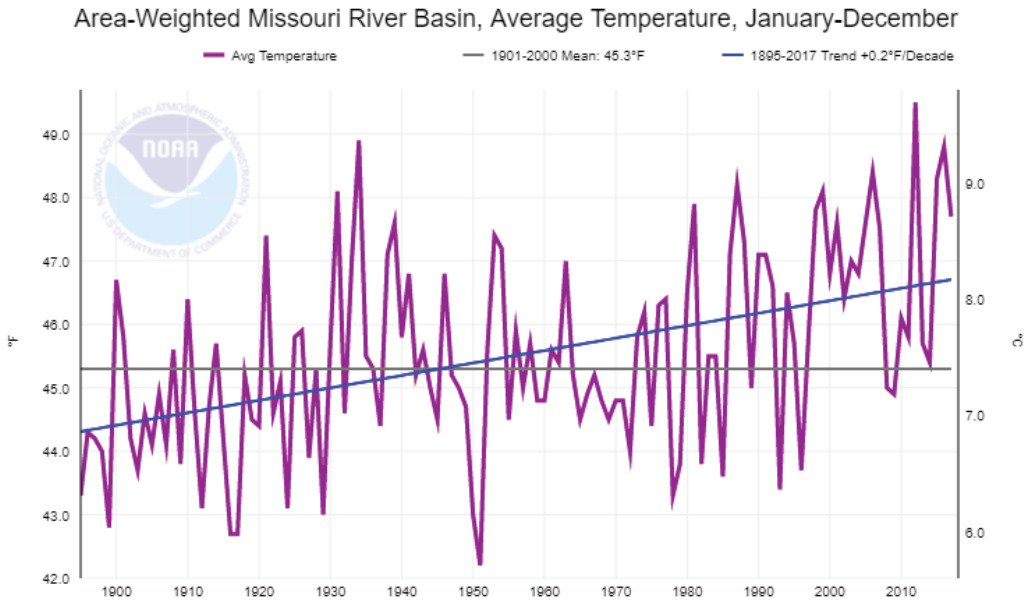
30-Year

Recent

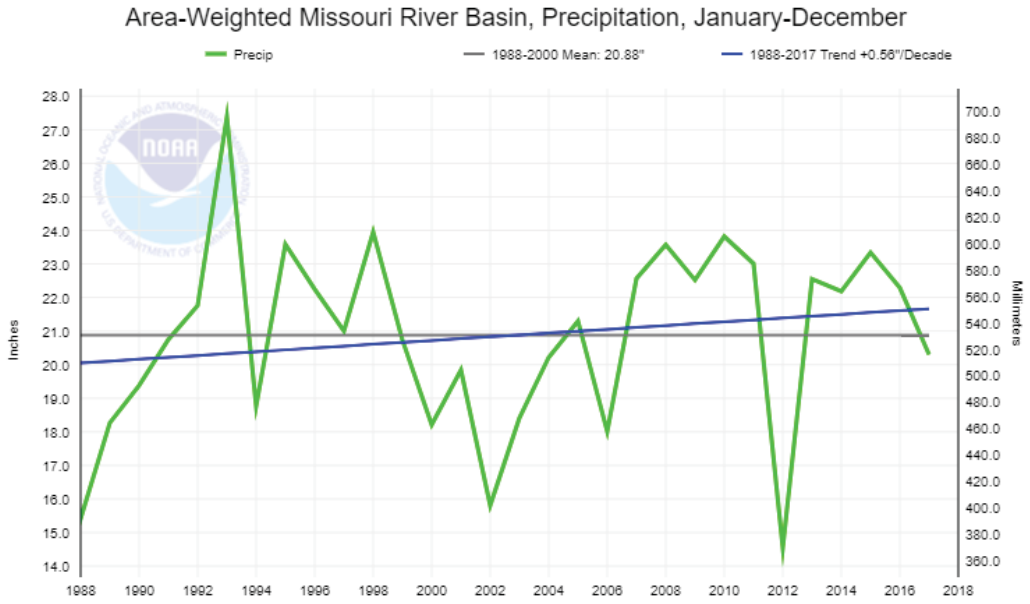
Precipitation Trend Since 1895



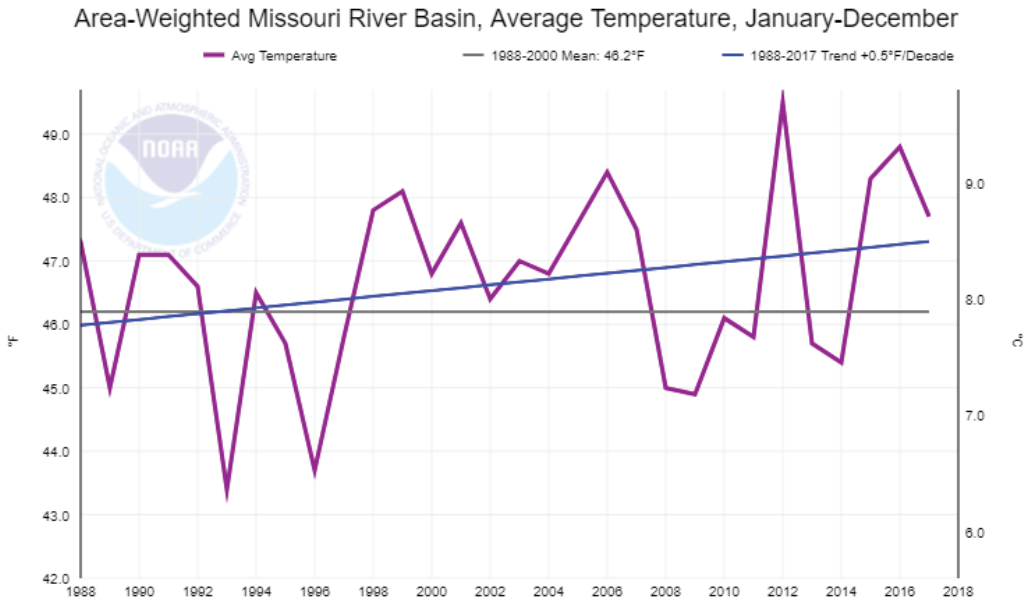
Temperature Trend Since 1895



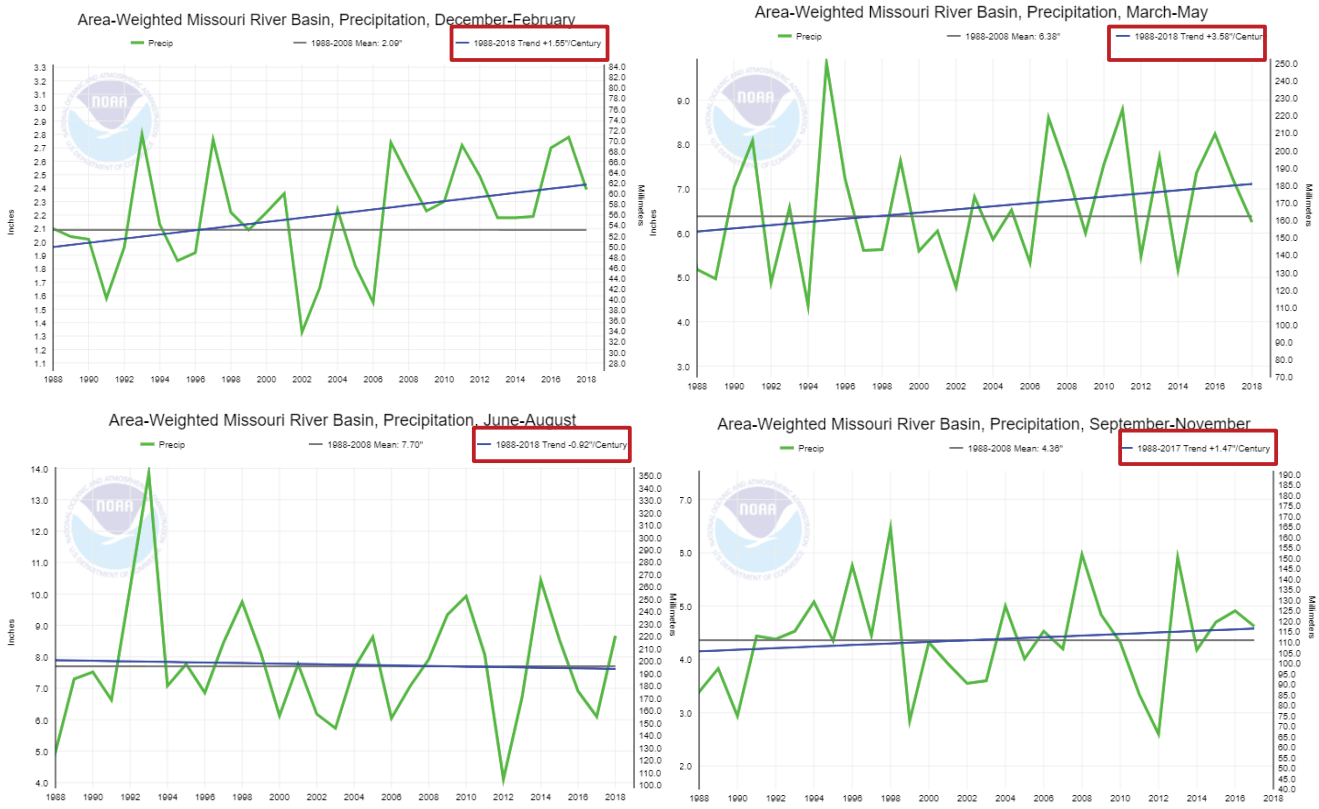
30-Year Precipitation Trend



30-Year Temperature Trend



30-Year Seasonal Trends



Trend Summary

- Long-term and 30-year trends show an increase in temperature and precipitation across the basin
- Higher intensity events are on the increase
- Spring season rainfall is increasing and occurring earlier in the season
- Summer rains are on the decline, right when crops need them most
- Autumn rainfall is becoming more pronounced, especially during harvest in some locations

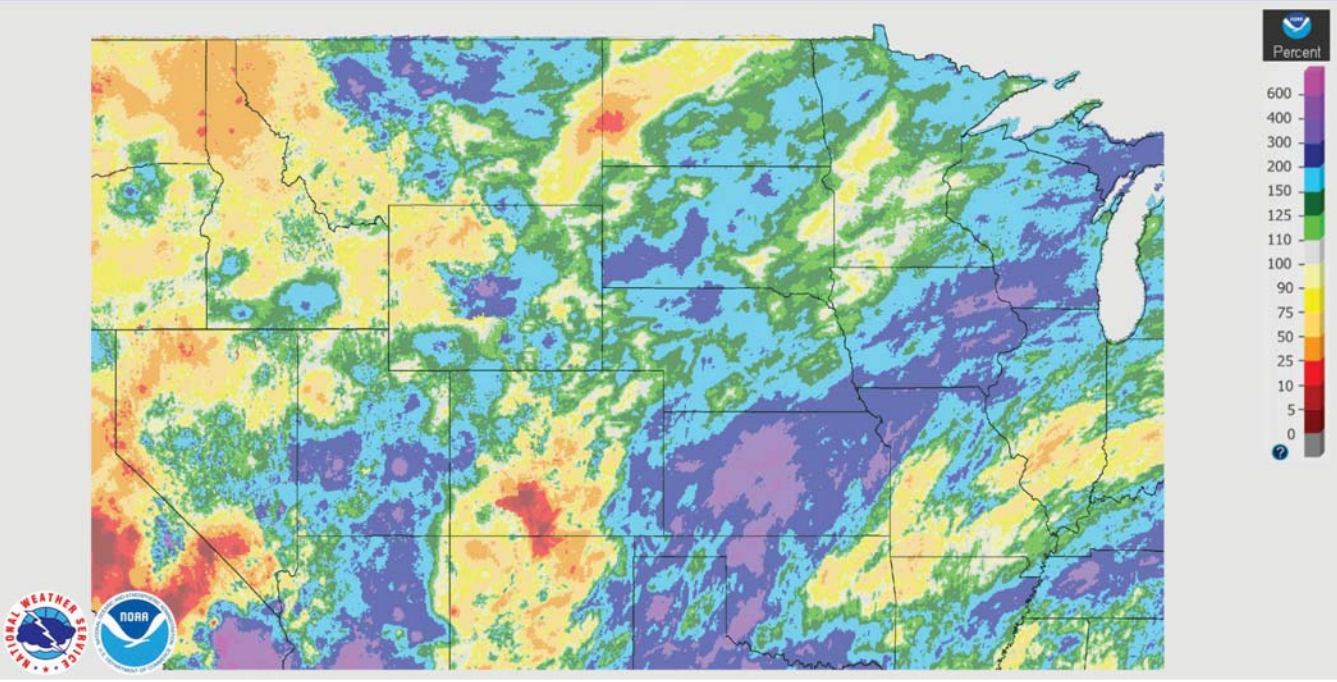
Precipitation Coverage

Rainfall training

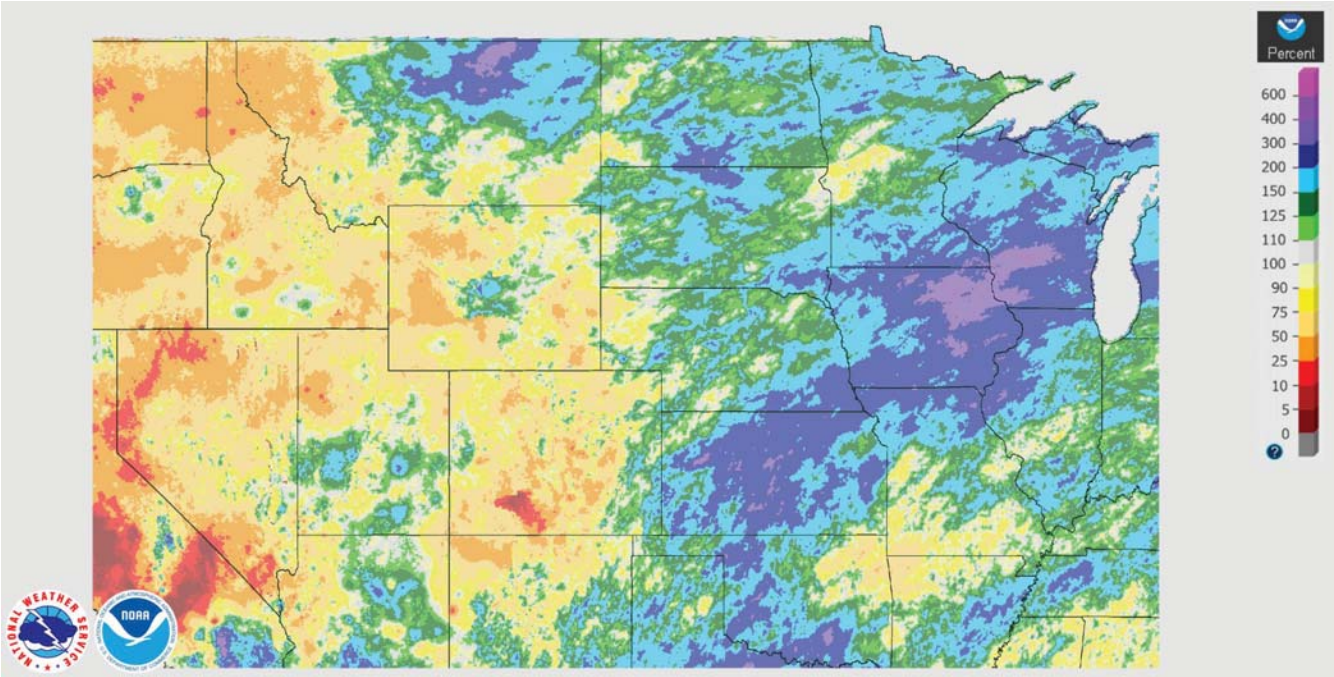
Drought Considerations (L vs. S)

Flooding

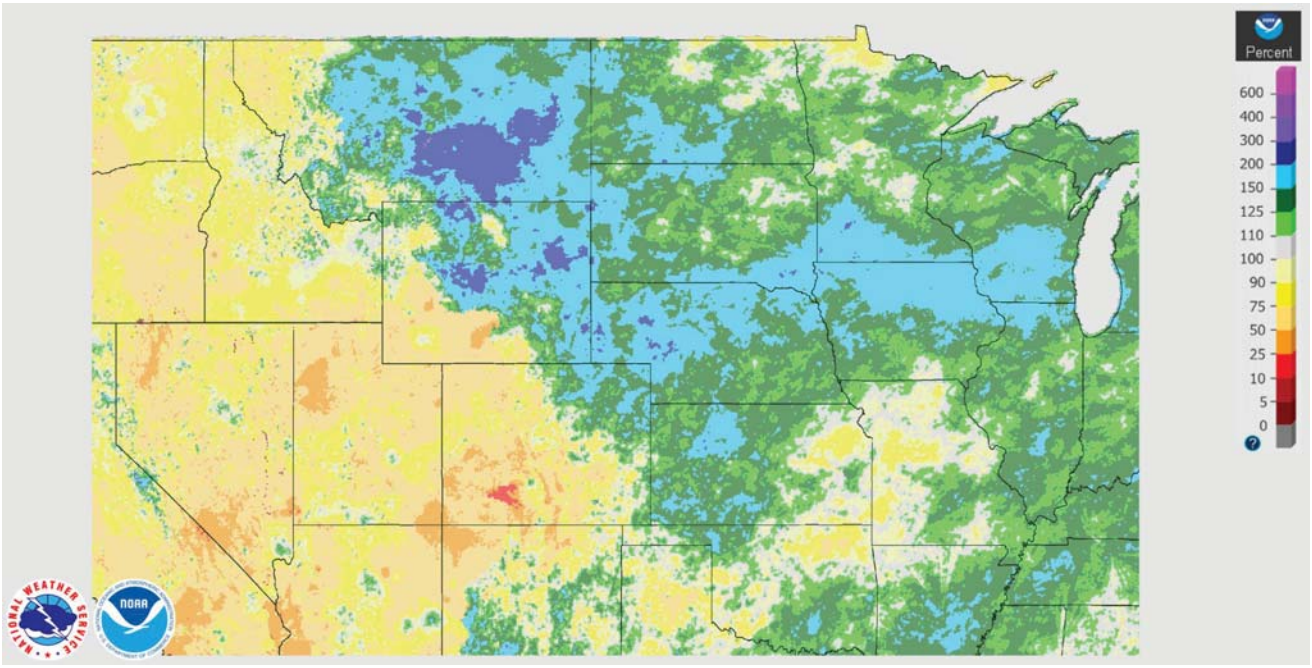
30-Day Precipitation



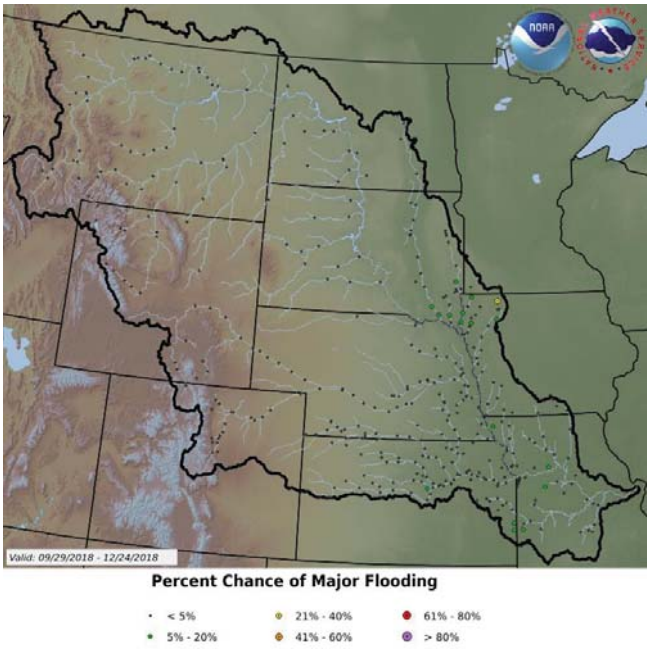
60-Day Precipitation



YTD Precipitation



Probabilities of Exceeding Major Flood Levels
(valid 09/29 – 12/24)



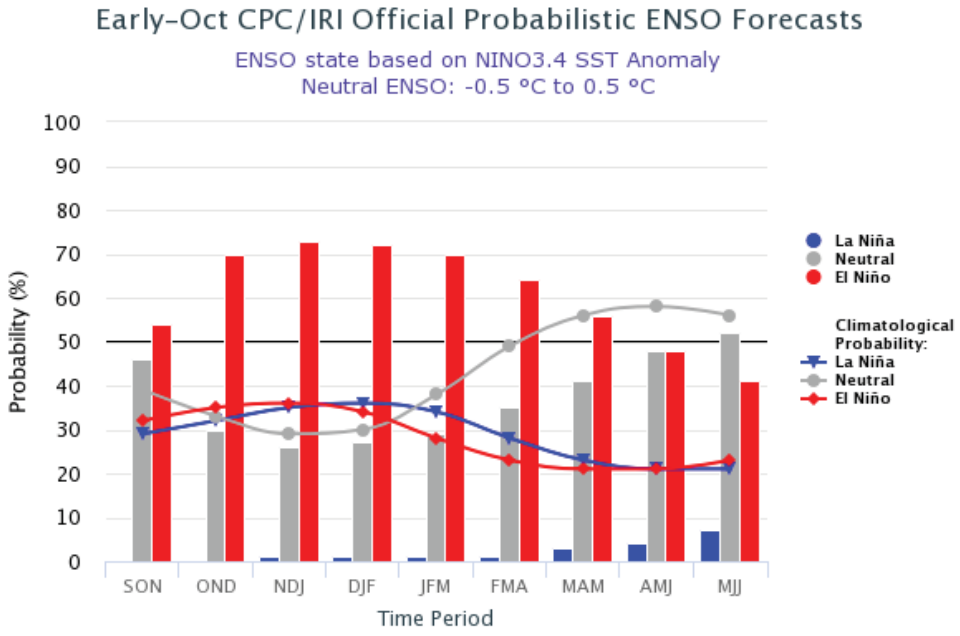
ENSO Outlook

Probability of Formation

Precipitation/Temperature Behavior

Upper and Lower Basin Outlooks

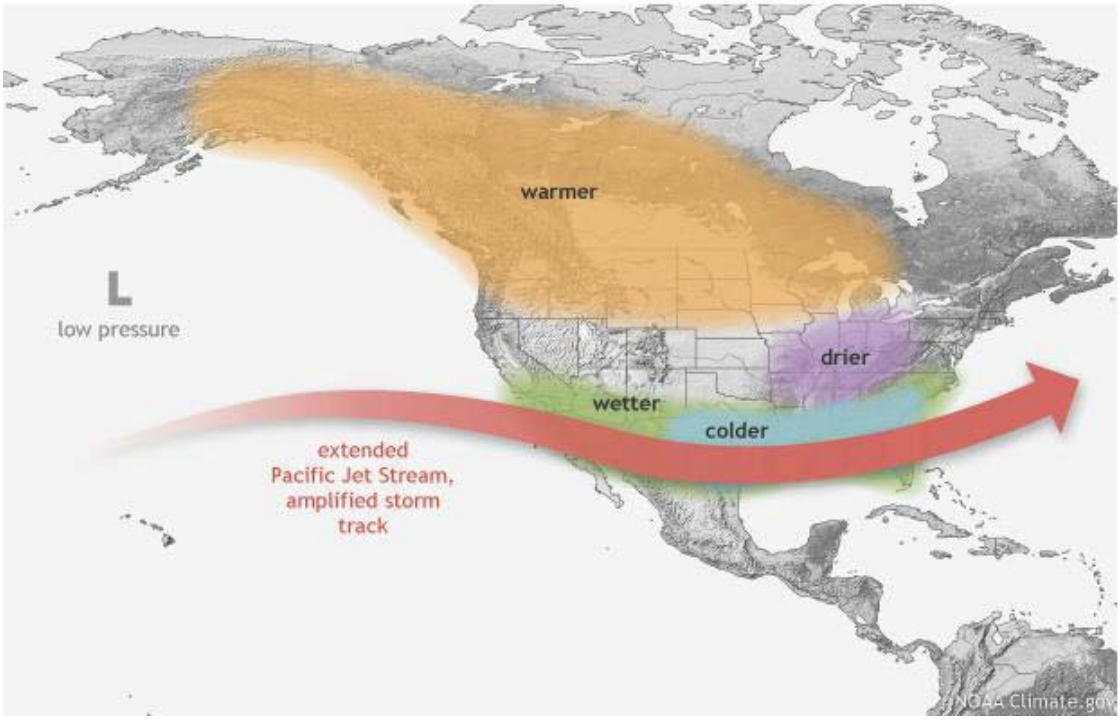
ENSO Forecast



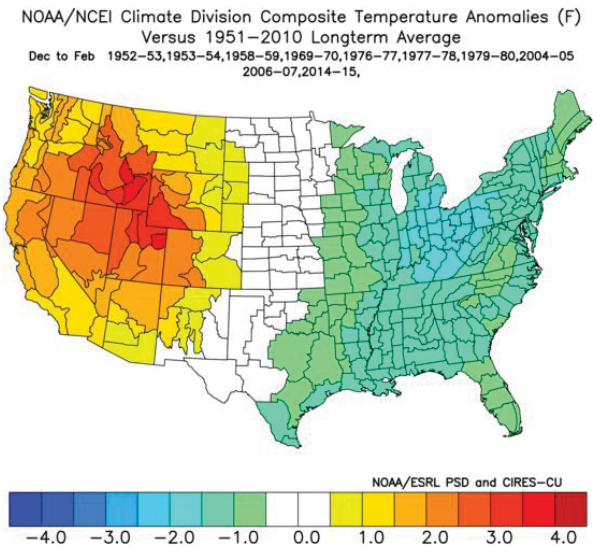
ENSO Outlook

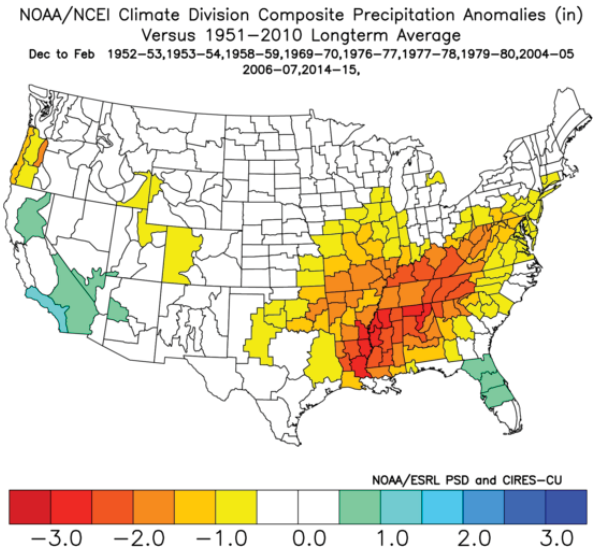
- NOAA CPC: 70-75% probability that a weak El Niño will occur during winter into spring 2019
- El Niño impacts to the Missouri Basin during DJF:
  - Upper Basin:
    - Precipitation: Generally near normal behavior
    - Temperature: Higher probabilities for warmer than average DJF
  - Lower Basin:
    - Precipitation: Generally near normal behavior
    - Temperature: Generally near normal behavior

El Nino Circulation

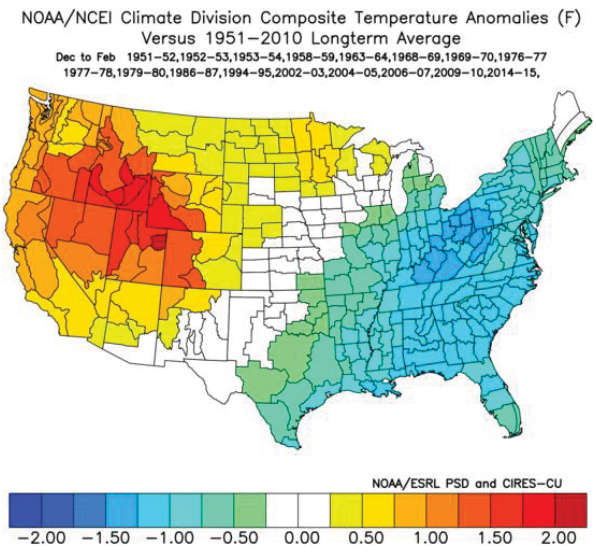


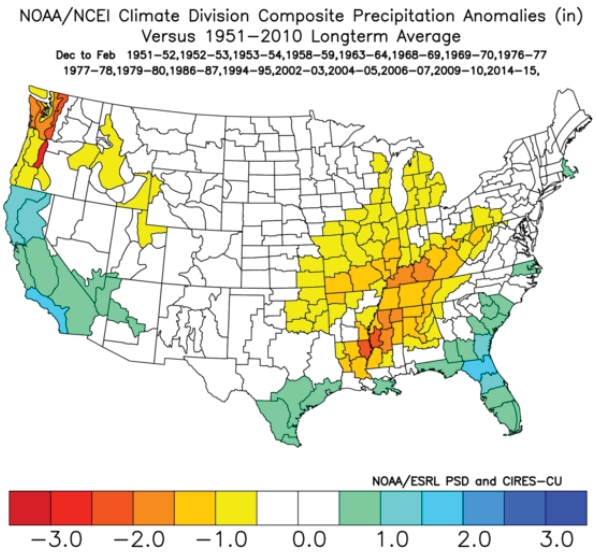
Weak El Nino Composite
(1951 – 2010 Average)



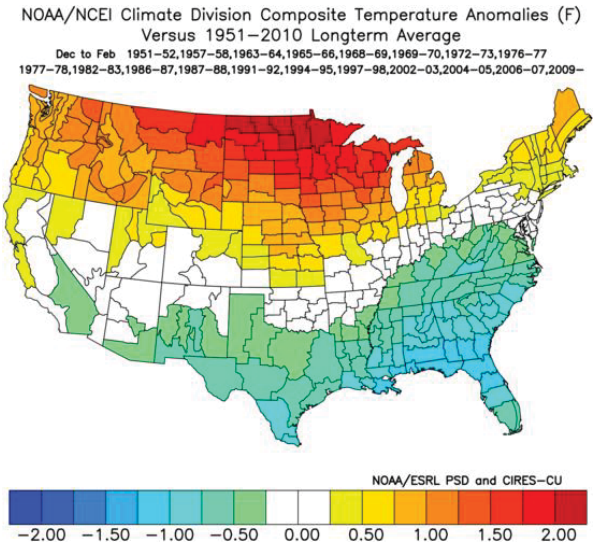


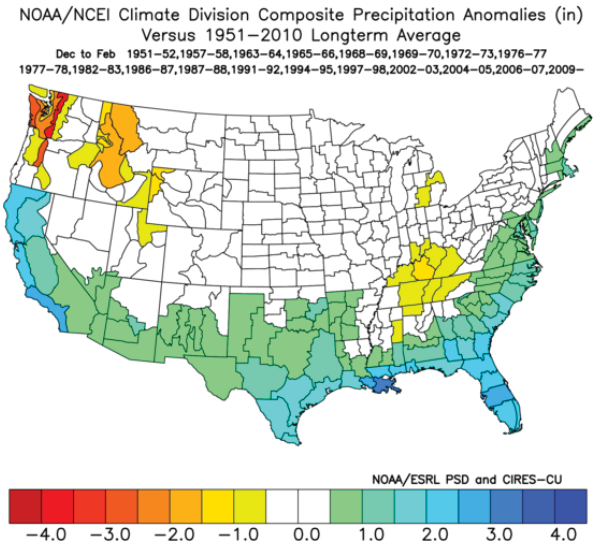
Weak/Moderate El Nino Composite
(1951 – 2010 Average)



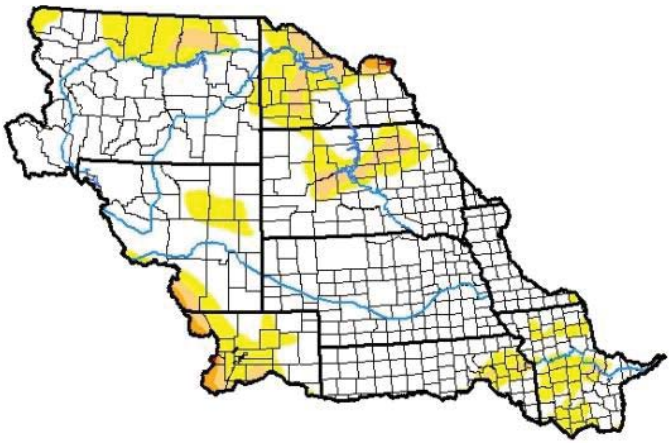


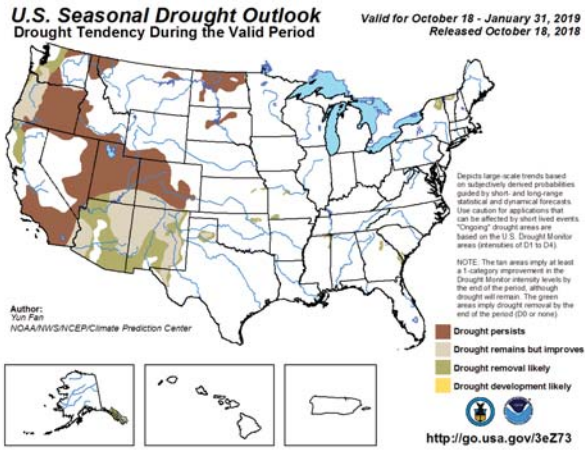
All El Nino Composite
(1951 – 2010 Average)





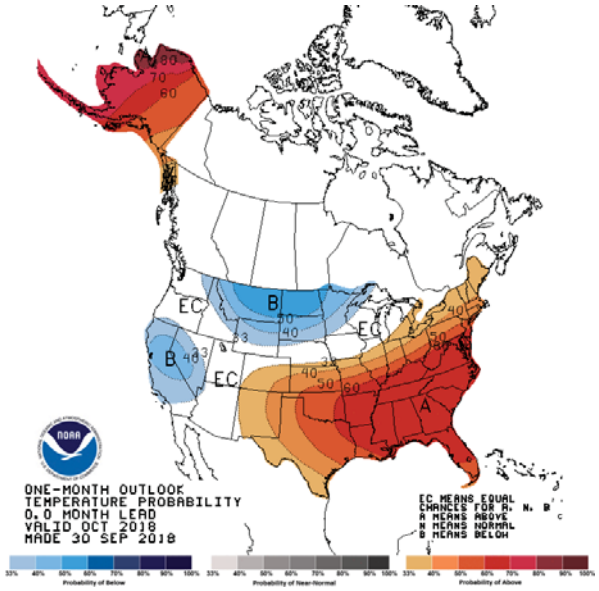
Drought Conditions and Outlook

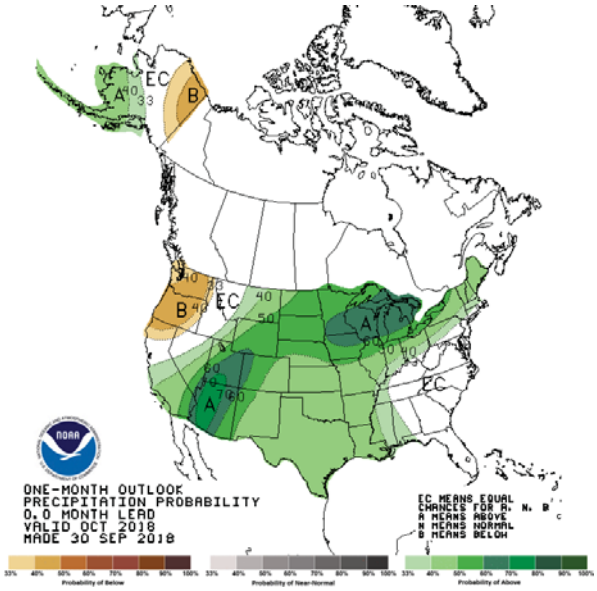




- Lower basin rainfall over the last two months has been a drought buster
- Drought conditions have substantially improved
- Seasonal outlook has drought persisting in ND, MT, CO, and WY

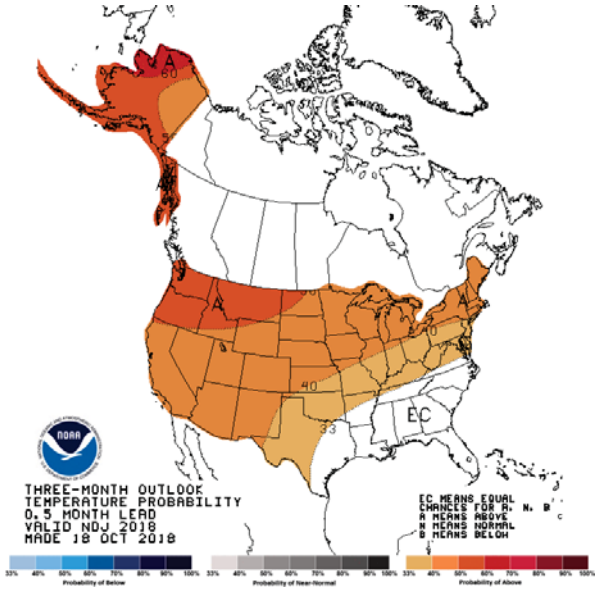
October 2018

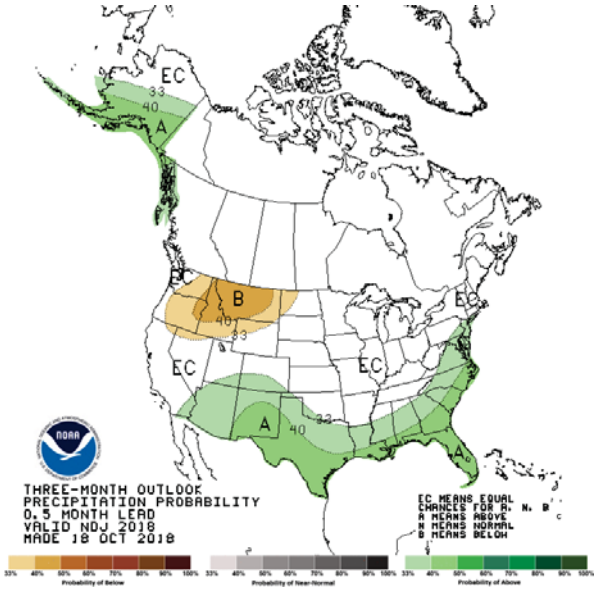




- October outlooks have generally verified
- Rainfall probabilities front-loaded

November-December-January





Thank you!

Email:
Justin.Glisan@IowaAgriculture.gov
Tel: 515-281-8981

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

MISSOURI RIVER BASIN WATER MANAGEMENT

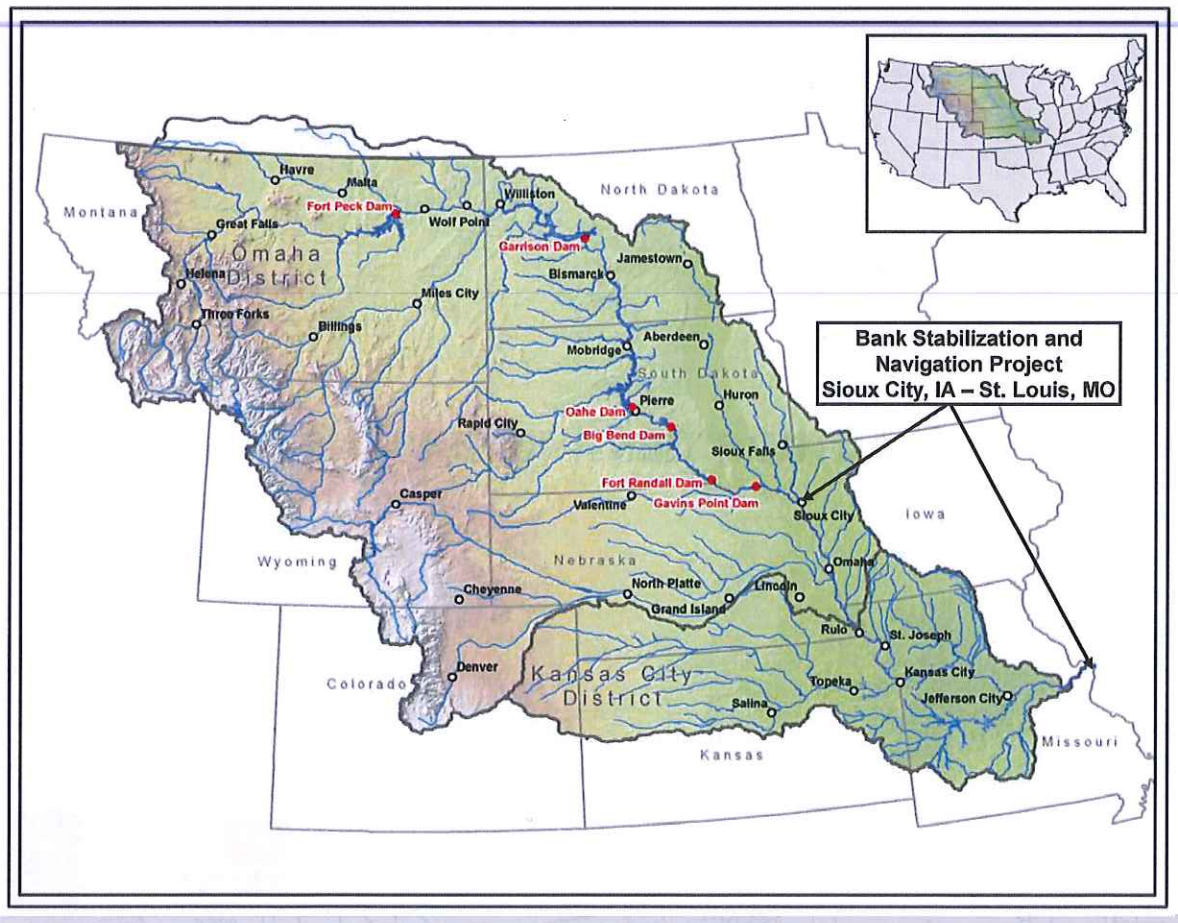
State Interagency Missouri River Authority Meeting

John Remus
Chief, Missouri River Basin Water Management Division

October 24, 2018

US Army Corps of Engineers.

U.S.ARMY



OUTLINE

- Authorities
- The System
- Runoff (where does it come from)
- Purposes
- Operations
  - General
  - 2018

US Army Corps of Engineers.

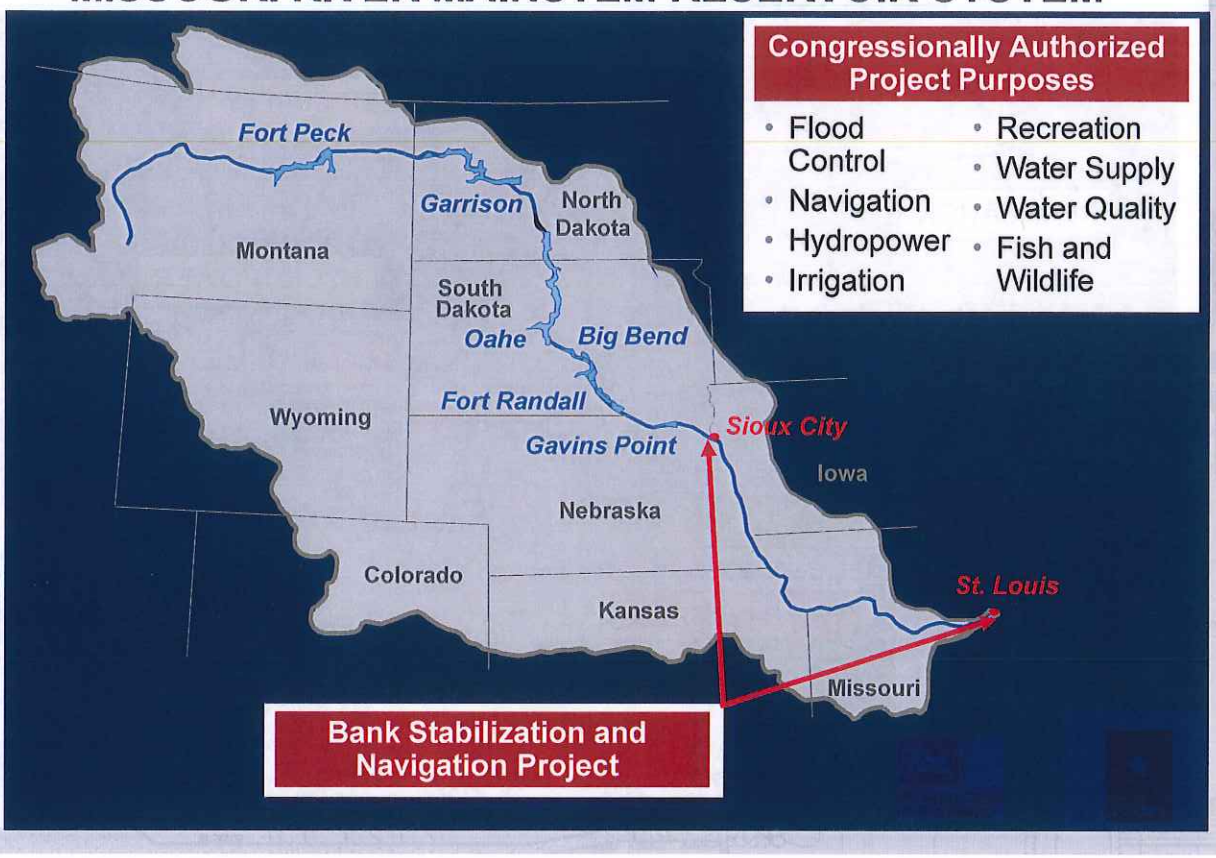
U.S.ARMY

AUTHORITIES AND GUIDANCE

US Army Corps of Engineers.

U.S.ARMY

MISSOURI RIVER MAINSTEM RESERVOIR SYSTEM



Congressionally Authorized Project Purposes

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

-CONGRESS-
Flood Control Act (FCA) of 1944

- Authorized 8 purposes for Missouri River Mainstem
- Required Army to develop and operate IAW regulations for use of storage allocated for flood control or navigation

O'Mahoney-Millikin Amendment

- Water use for navigation not to interfere with upstream consumptive uses

8th Circuit-2003

- Flood control & navigation are "dominant purposes"
- Manual binds Corps' discretion
- Corps must consider impacts to all purposes

-CORPS-
Master Manual 2004/06

- Establishes operational procedures
- Balances all 8 purposes
- Result of 14-year public process
- Must comply with NEPA/ESA

8th Circuit-2005

- 2004 Manual balancing of interests complied with FCA
- More limited degree of support for flood control and/or navigation in future may not

-CORPS-
Annual Operating Plan

- Adjustments to operations based on current & projected annual conditions
- Inputs from public in fall & spring
- Must comply with NEPA/ESA

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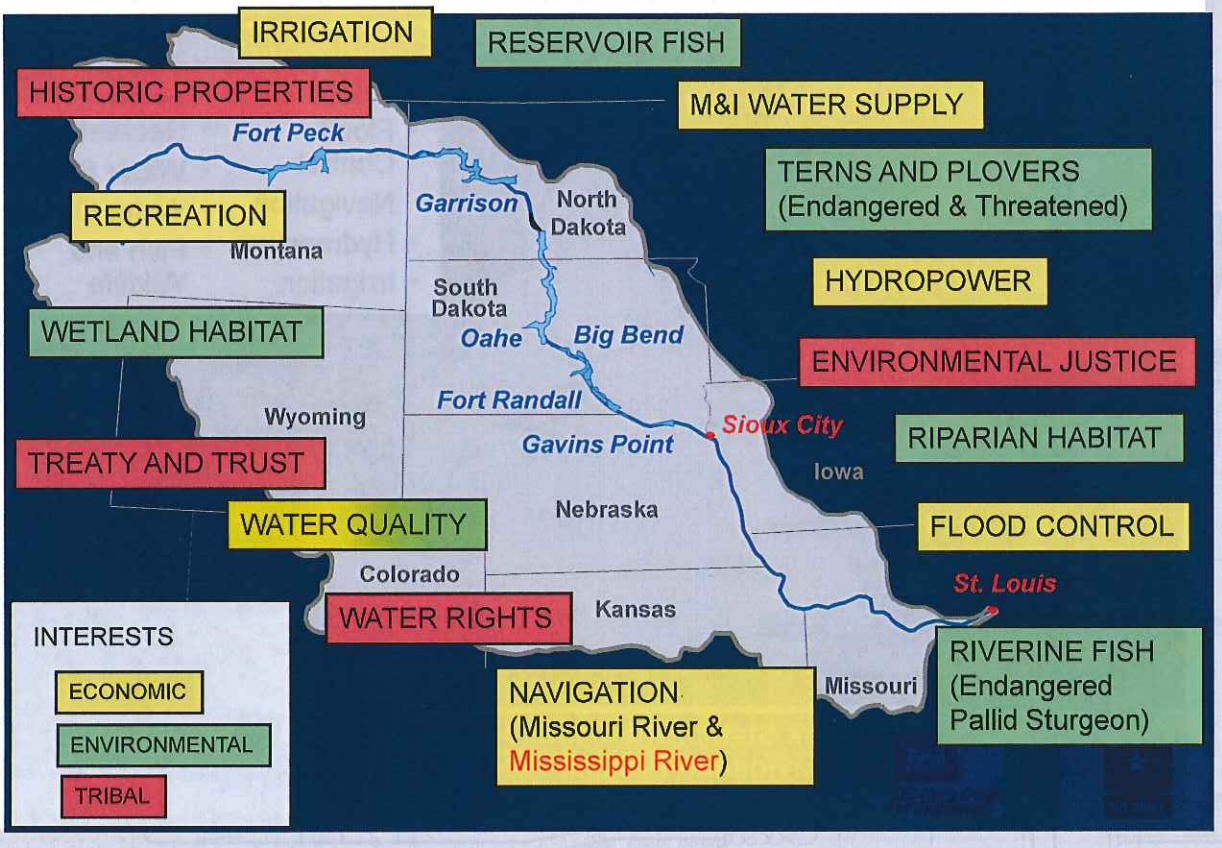
MISSOURI RIVER: MULTIPLE PURPOSES, MULTIPLE INTERESTS



OPERATION FOR THE MISSISSIPPI RIVER

HQUSACE OC Legal Opinion:

- Operation is governed by Section 9 of the Flood Control Act of 1944
- Corps is statutorily bound to operate the Mainstem Reservoirs for their authorized purposes within the Missouri River Basin
- Authorization recognized projects would provide incidental benefits to the Mississippi River
- Nothing in Congress' statutory authorization or the Eighth Circuit's subsequent interpretation of that authorization ever indicated an expectation that the system would be operated to provide anything other than incidental benefits to the Mississippi

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THE SYSTEM

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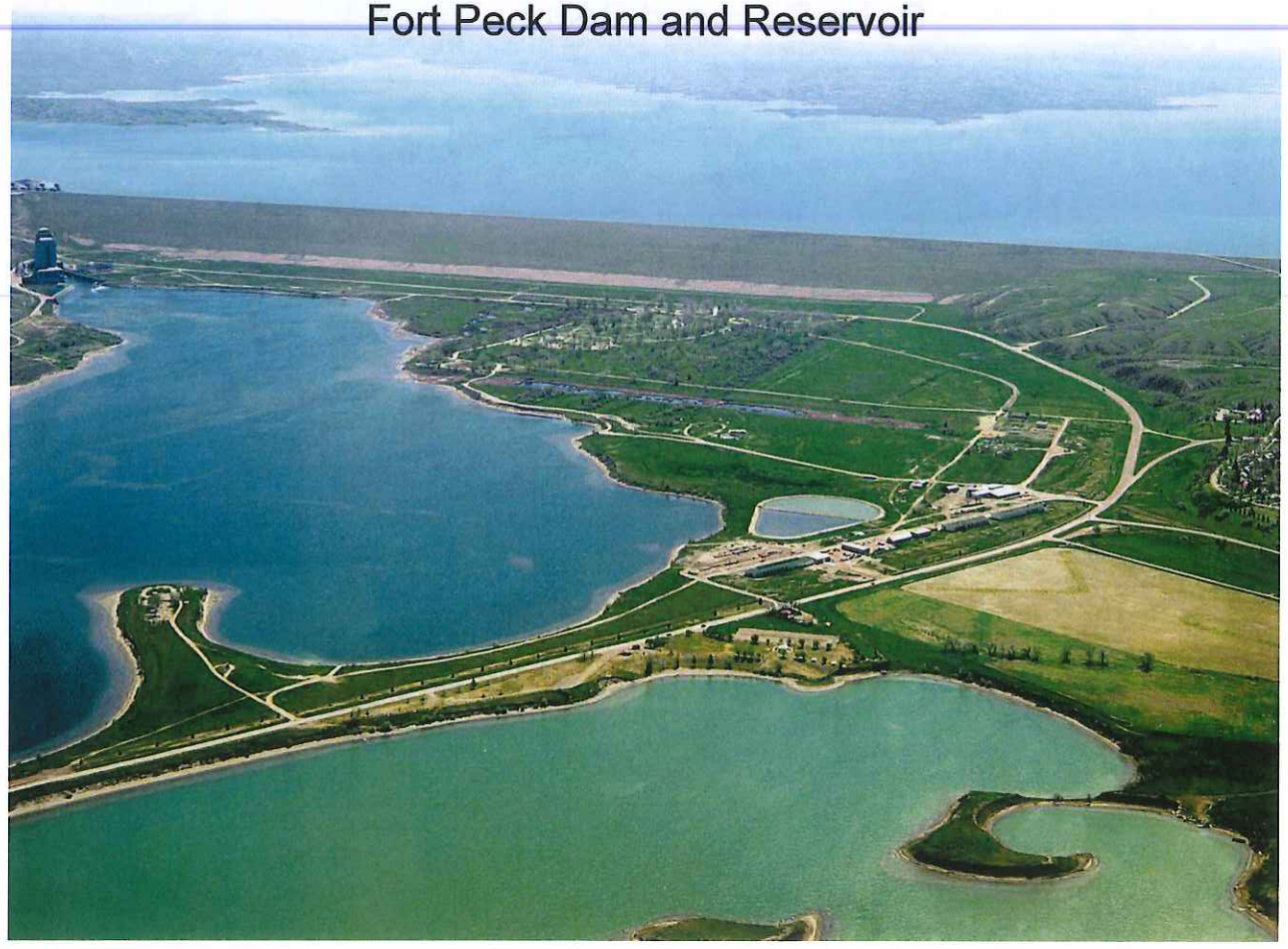
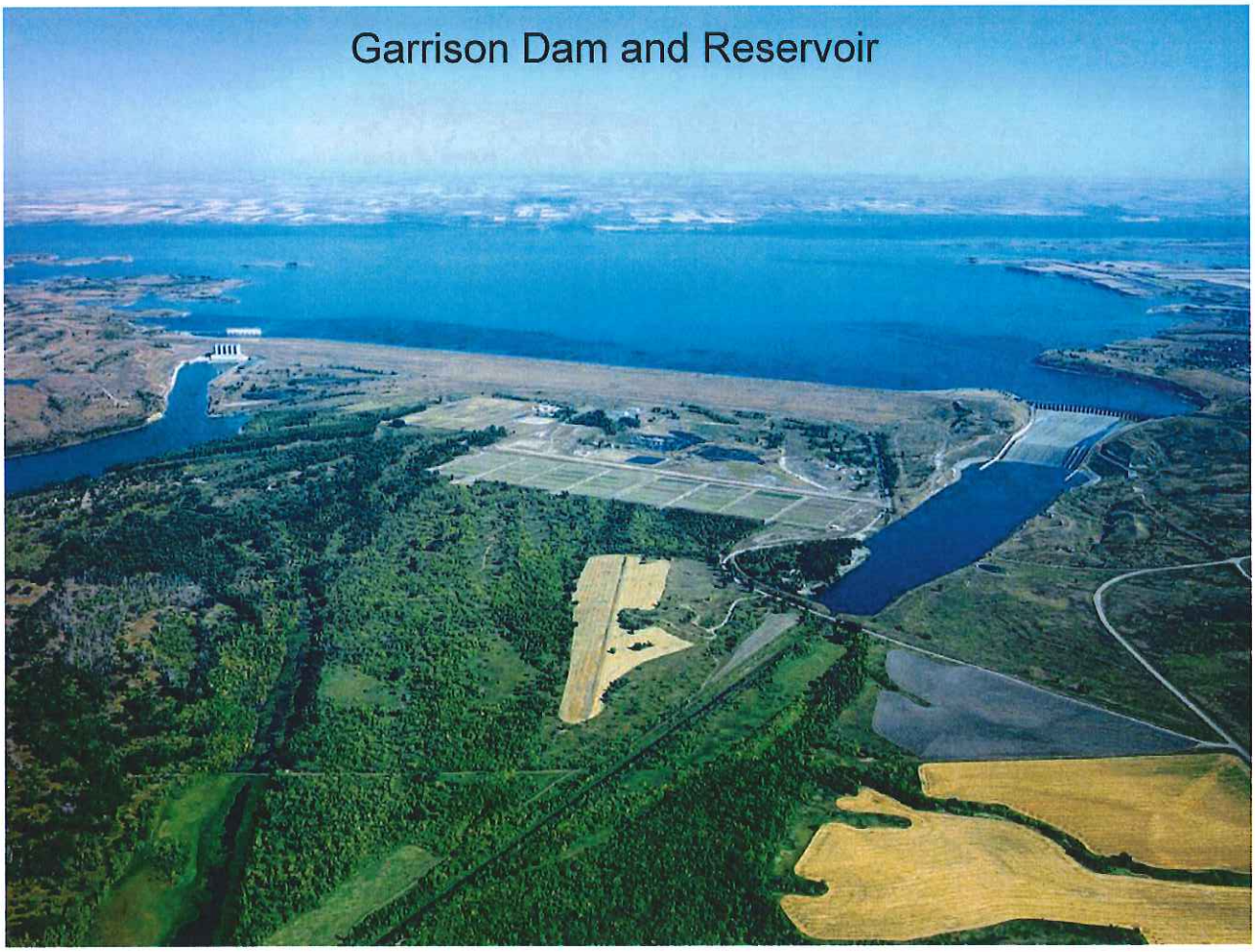
Fort Peck Dam and Reservoir



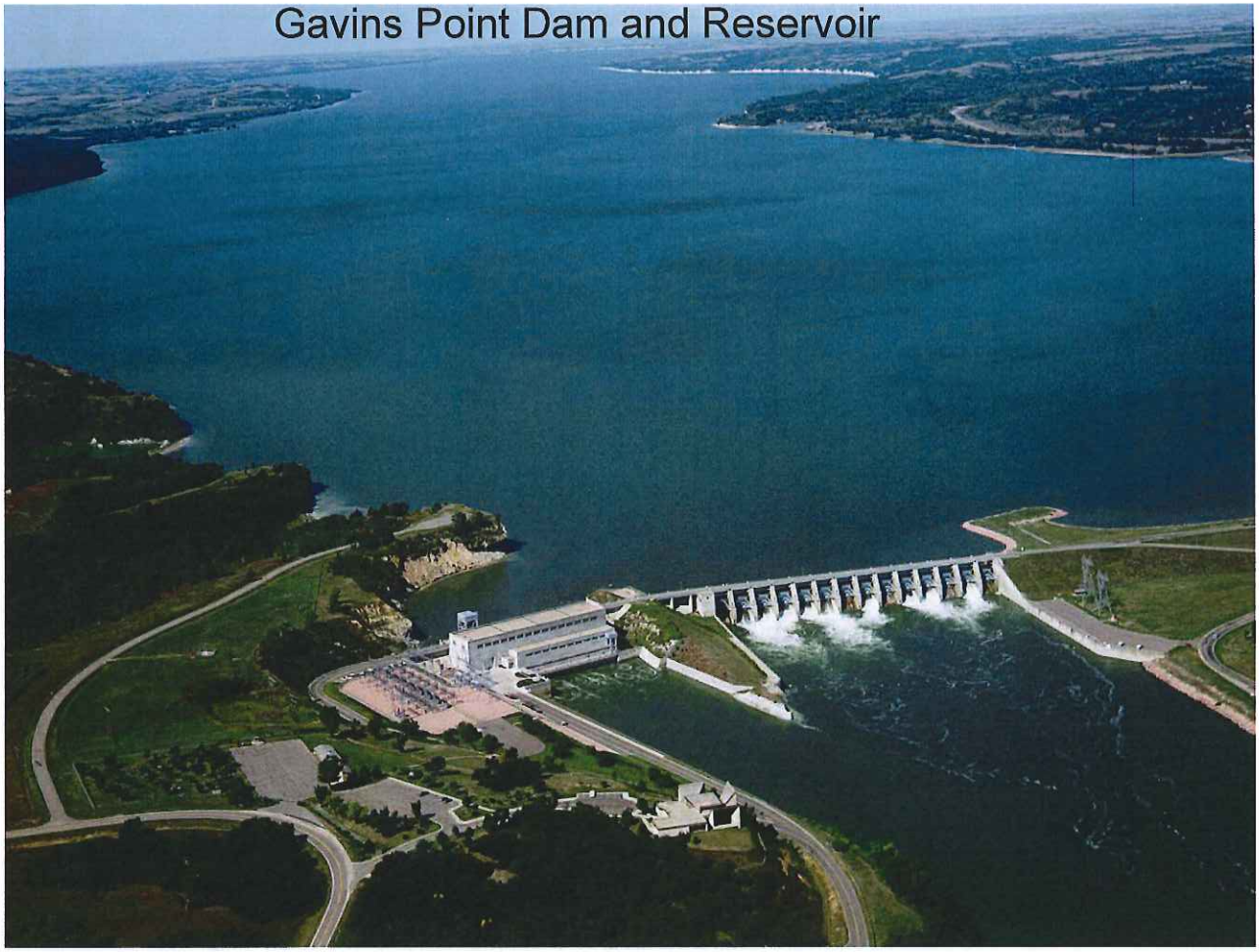
Garrison Dam and Reservoir

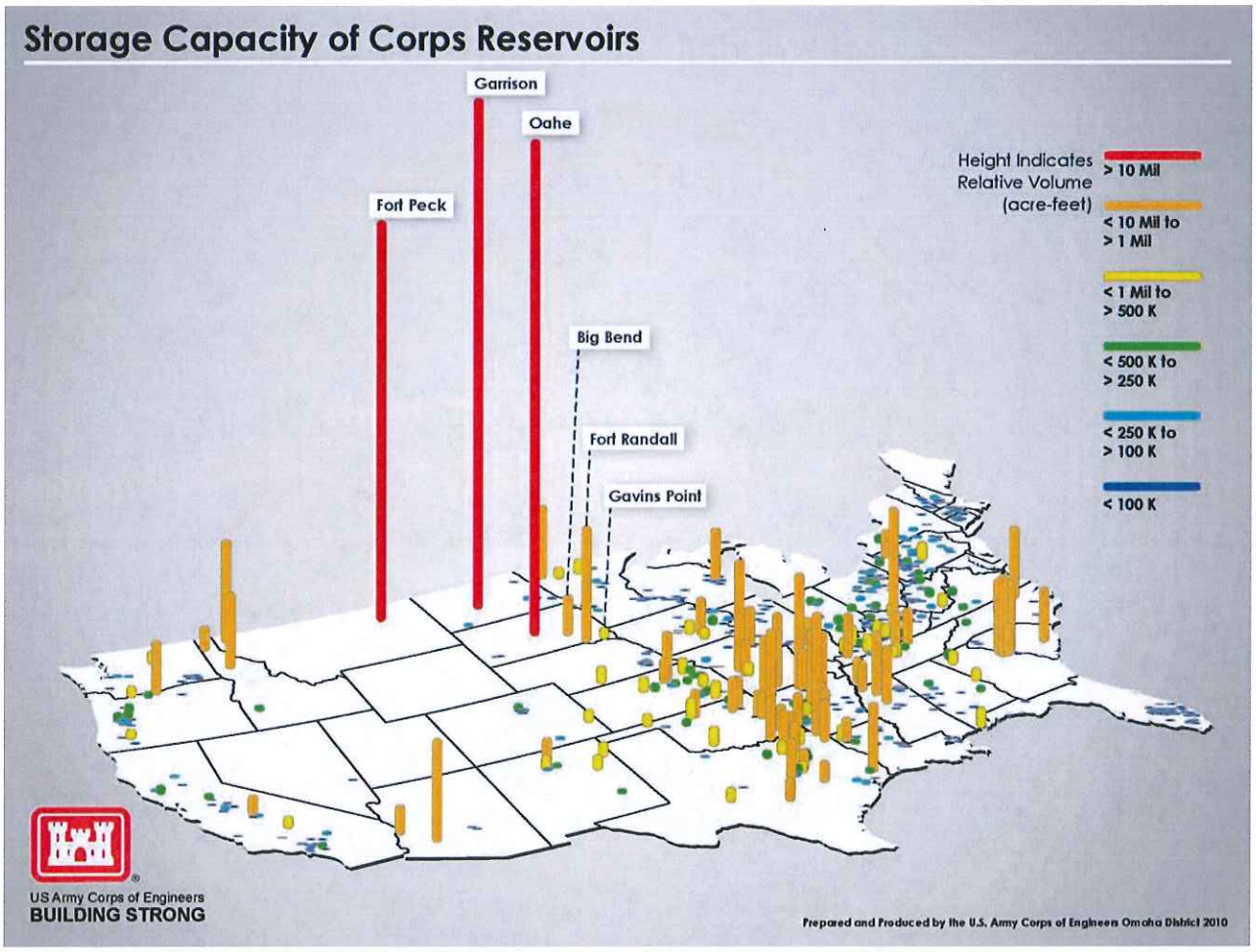


Oahe Dam and Reservoir

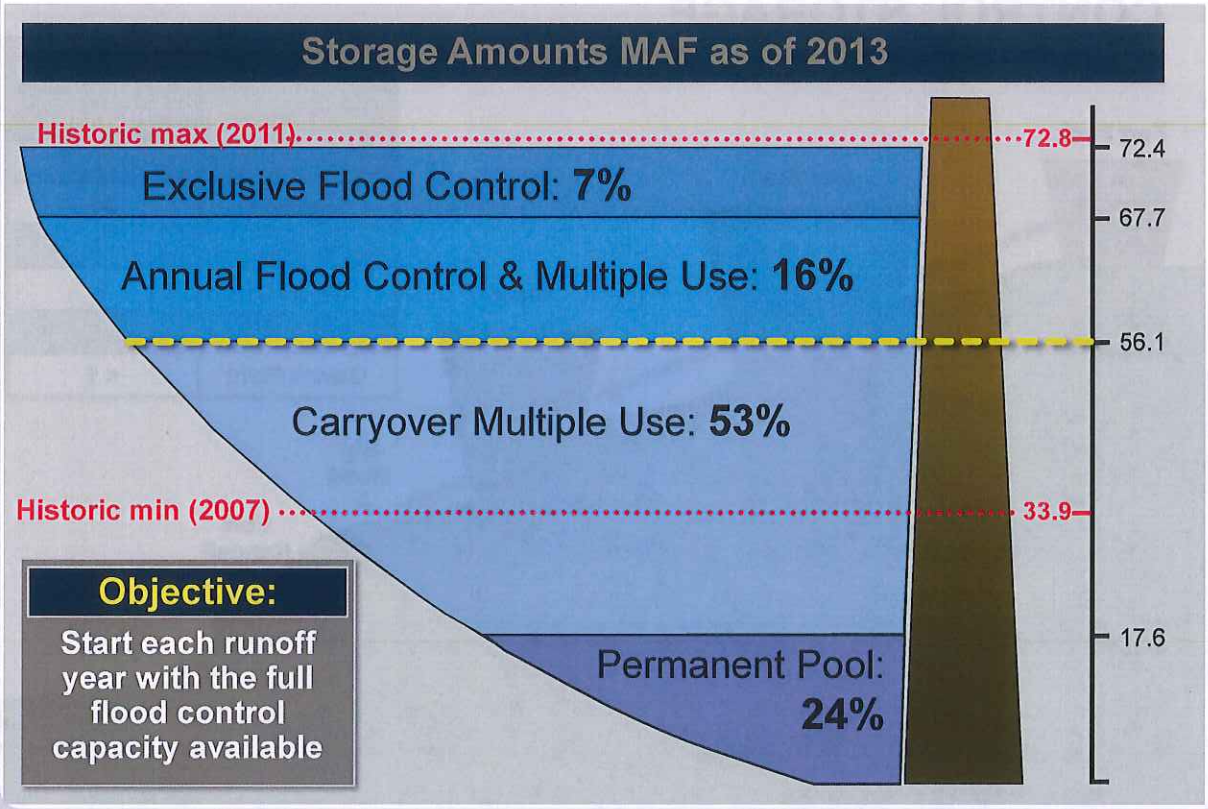
Big Bend Dam and Reservoir

Fort Randall Dam and Reservoir

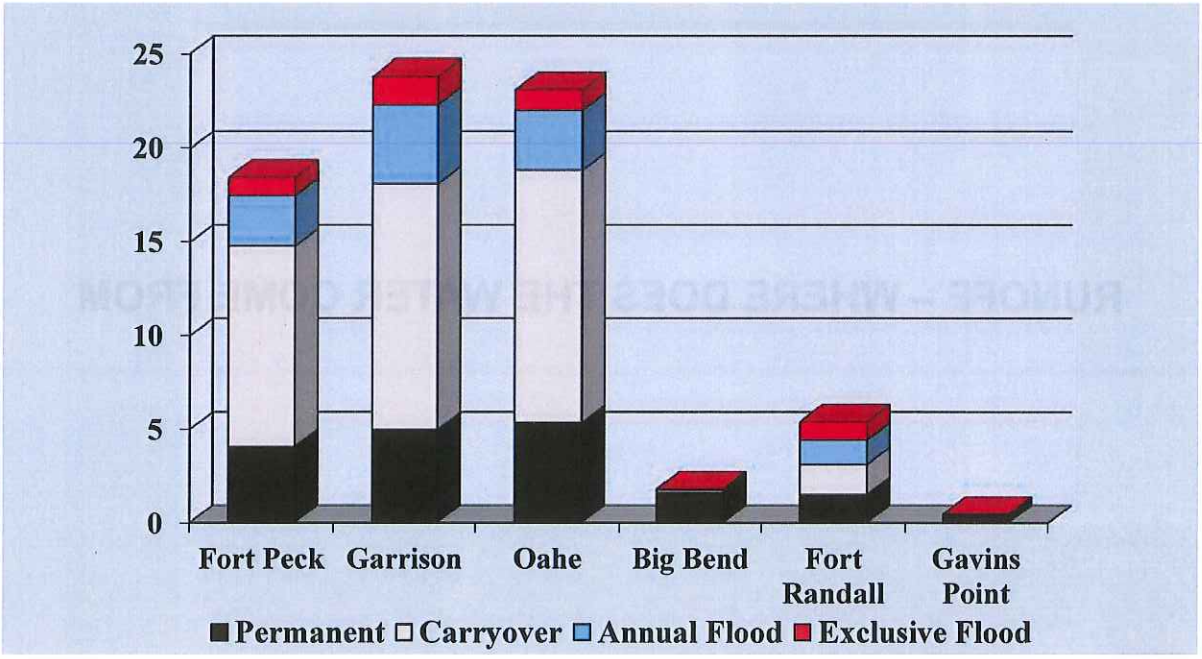

Gavins Point Dam and Reservoir


Storage Capacity of Corps Reservoirs
Garrison
Oahe
Fort Peck
Big Bend
Fort Randall
Gavins Point
Height Indicates Relative Volume (acre-feet)
> 10 Mil
< 10 Mil to > 1 Mil
< 1 Mil to > 500 K
< 500 K to > 250 K
< 250 K to > 100 K
< 100 K
US Army Corps of Engineers
BUILDING STRONG
Prepared and Produced by the U.S. Army Corps of Engineers Omaha District 2010

STORAGE ZONES



MAINSTEM RESERVOIR STORAGE CAPACITY BY PROJECT



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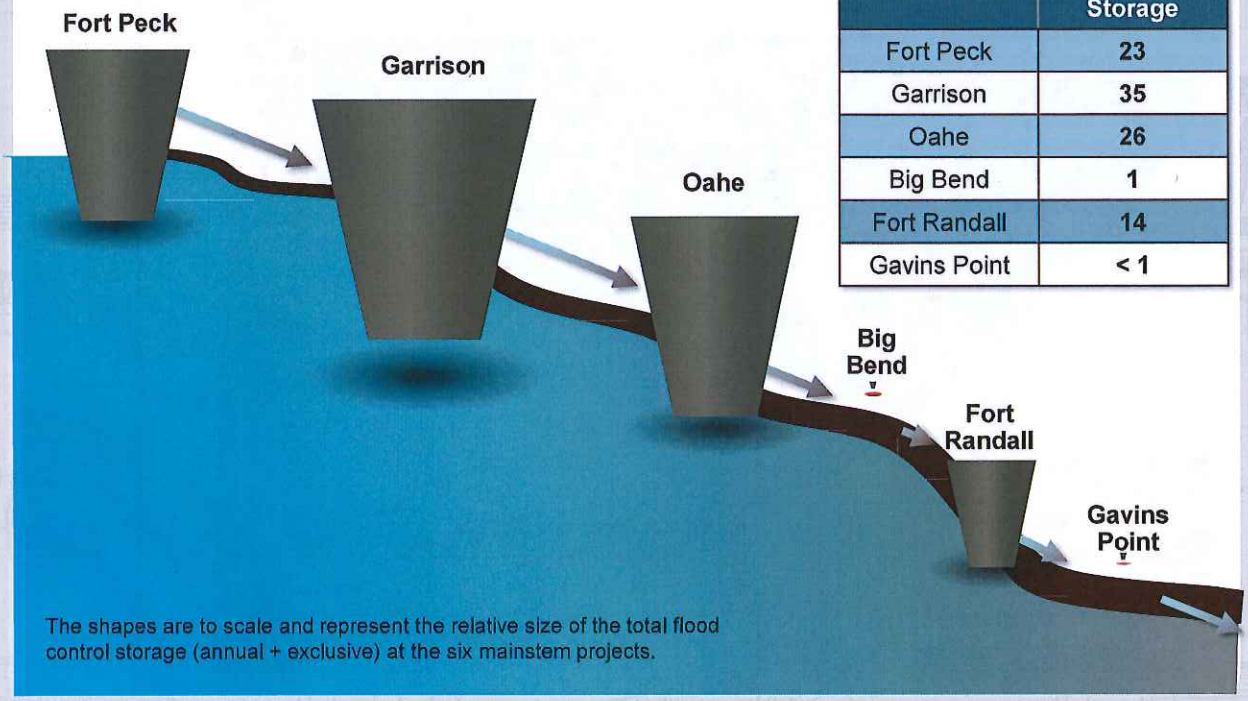
MAINSTEM RESERVOIR SYSTEM FLOOD CONTROL STORAGE

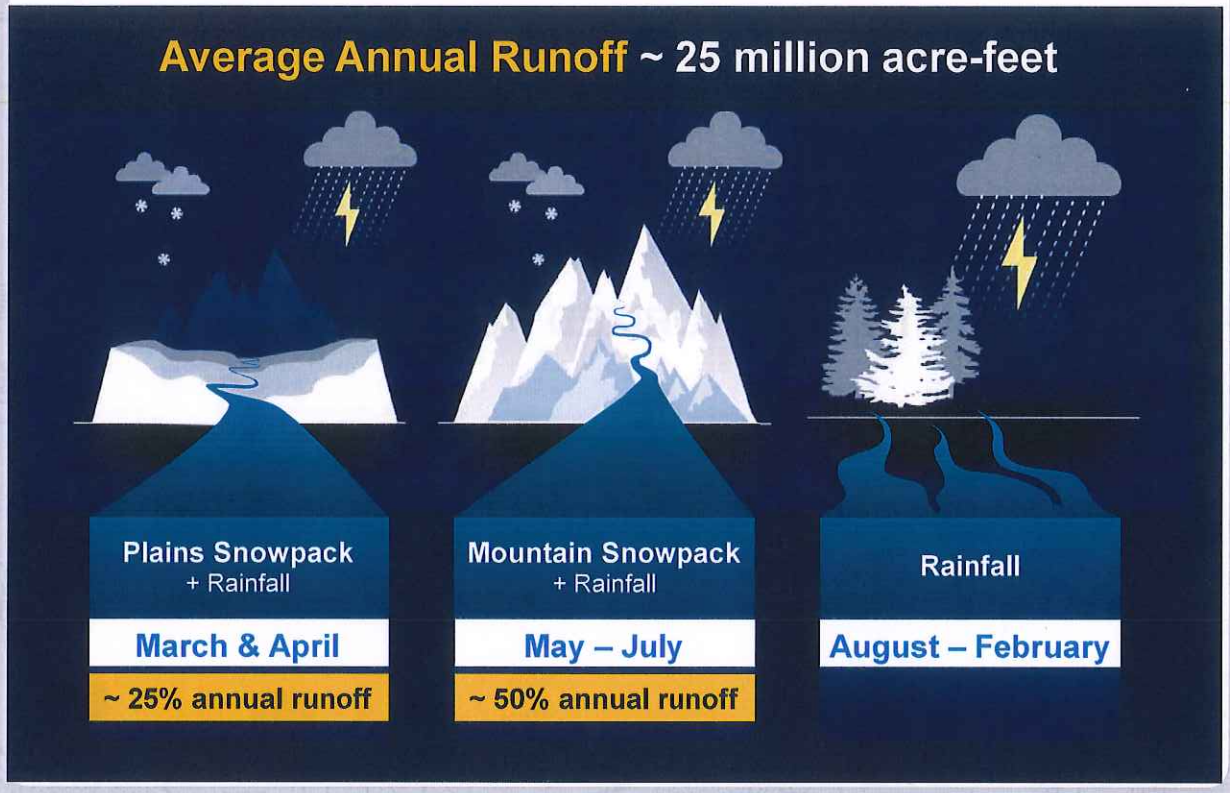
Project	% of Total Flood Storage
Fort Peck	23
Garrison	35
Oahe	26
Big Bend	1
Fort Randall	14
Gavins Point	< 1



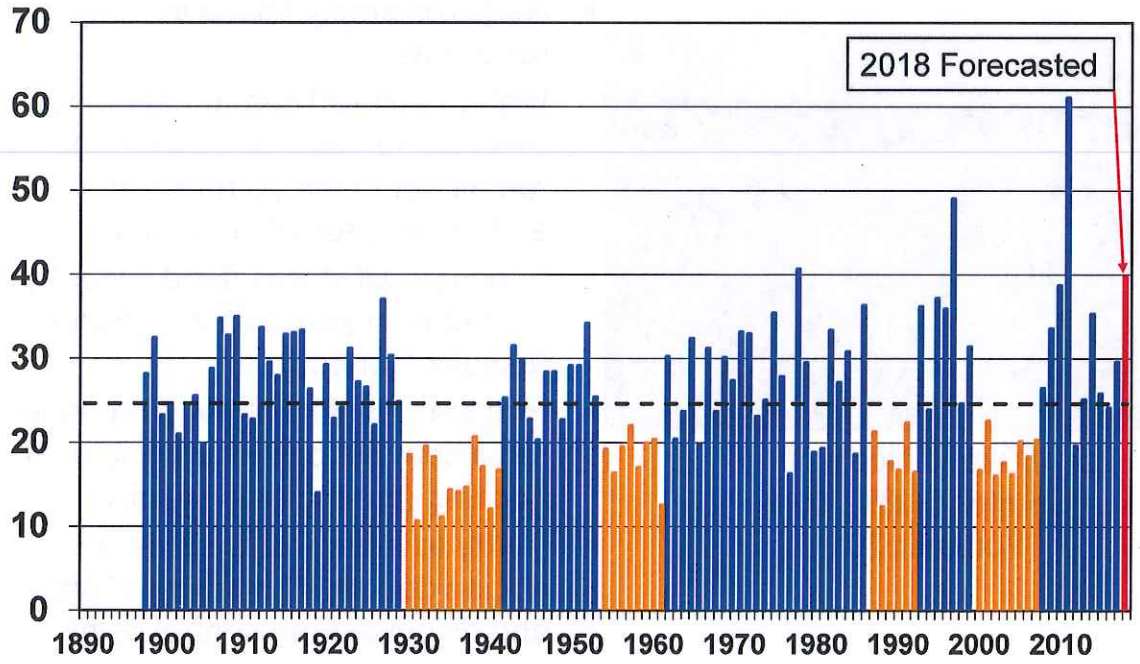
The shapes are to scale and represent the relative size of the total flood control storage (annual + exclusive) at the six mainstem projects.

RUNOFF – WHERE DOES THE WATER COME FROM

COMPONENTS OF RUNOFF ABOVE SIOUX CITY, IA



HISTORIC ANNUAL RUNOFF ABOVE SIOUX CITY, IA



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THE AUTHORIZED PURPOSES

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FLOOD CONTROL

I80-I680 North of Council Bluffs, Iowa Summer 2011

- Requires empty space in reservoirs
- Water captured during high runoff events and metered out through remainder of the year to serve authorized project purposes
- Evacuate all stored flood water by start of next year's runoff season (usually 1 March)
- Provides significant flood damage reduction, but cannot eliminate all flooding (unregulated runoff)
- Ability to reduce downstream stages depends on timing of peak and distance from control point

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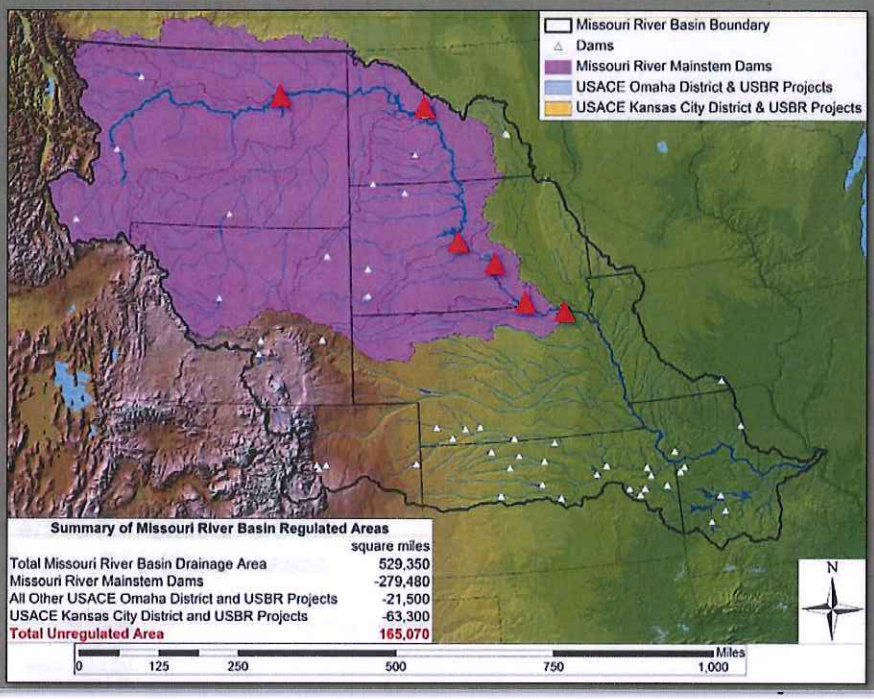
REGULATED/UNREGULATED AREAS

Runoff from approximately half of the drainage basin is regulated by the Mainstem Dams



Summary of Missouri River Basin Regulated Areas

	square miles
Total Missouri River Basin Drainage Area	529,350
Missouri River Mainstem Dams	-279,480
All Other USACE Omaha District and USBR Projects	-21,500
USACE Kansas City District and USBR Projects	-63,300
Total Unregulated Area	**165,070**

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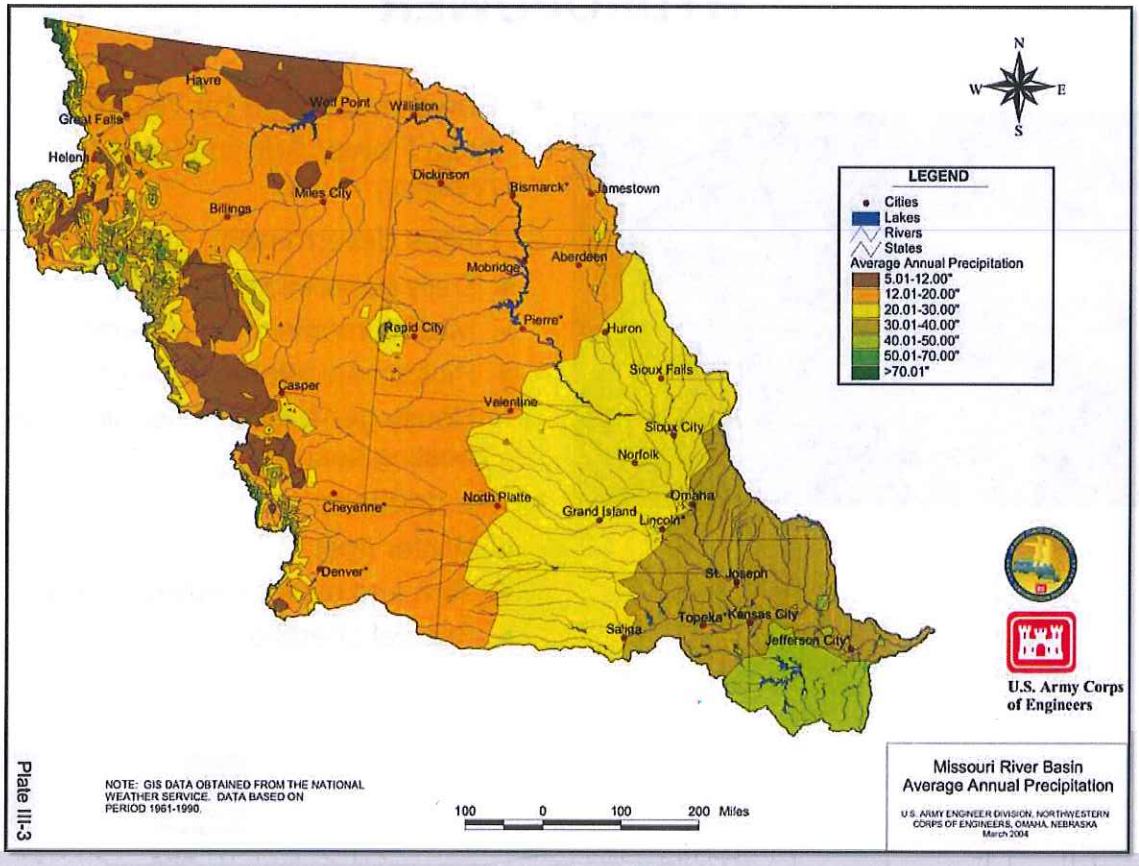
AVERAGE ANNUAL PRECIPITATION



NAVIGATION

- Navigation channel extends from Sioux City, IA to St. Louis, MO
- Flow support provided by releasing water from the reservoirs to meet target flows along the river
  - Self scouring navigation channel constructed with dikes and revetments
  - Not a series of "locks and dams"
- Flow support dependent on total volume of water in the reservoir system on two dates
  - March 15 – determine the "Service Level" for the first half of the navigation season
  - July 1 – determine the "Service Level" for the second half of the navigation season and the "Season Length"

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HYDROPOWER

- Power marketed by Western Area Power Administration (WAPA)
- Corps determines:
  - Daily generation total
  - Maximum/minimum generation
  - Plus/minus tolerance on generation
  - Hourly generation schedule during nesting season
- Restrictions
  - Winter (ice)
  - Tern and plover nesting season
  - Special operations

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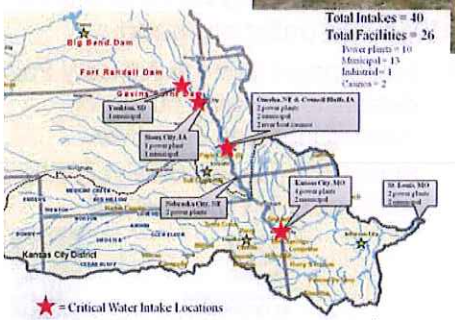
IRRIGATION – RECREATION
WATER SUPPLY – WATER QUALITY



- All require access to water
- Users located on the reservoirs, on the river reaches between the reservoirs, and on the river below the reservoir system
- Access affected by
  - Lack of water (low pools or low downstream stages)
  - Too much water (high pools or high downstream stages)
  - Ice jams

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FISH AND WILDLIFE

- Rising reservoir levels during forage fish spawn
  - Rotate emphasis if runoff is insufficient to keep all 3 upper reservoirs rising
- Minimum Releases
  - Below Fort Peck for trout fishery
  - Minimize hours of zero releases from Fort Randall for invertebrates
- Cold Water Habitat at Garrison
  - Adjust operations to minimize loss of cold water from reservoir during droughts for fishery
- ~~Intrasystem unbalancing for reservoir habitat~~

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THREATENED AND ENDANGERED SPECIES

Interior Least Tern

Piping Plover

Pallid Sturgeon

Elements of the Biological Opinion

- Habitat Construction / Channel Modification
- Propagation / Hatchery Support
- Research, Monitoring, and Evaluation
- Adaptive Management
- Public Involvement
- Flow Modifications
  - ► Release adjustments for nesting birds from May through August
  - ► Gavins Point spring pulse in March and May for pallid sturgeon
    - ✓ Independent Science Advisory Panel determined existing pulse not meeting intended objectives
    - ✓ Spring pulse temporarily suspended while new plan is developed

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OPERATIONS
(HOW WE DO OUR MISSION)

GENERAL

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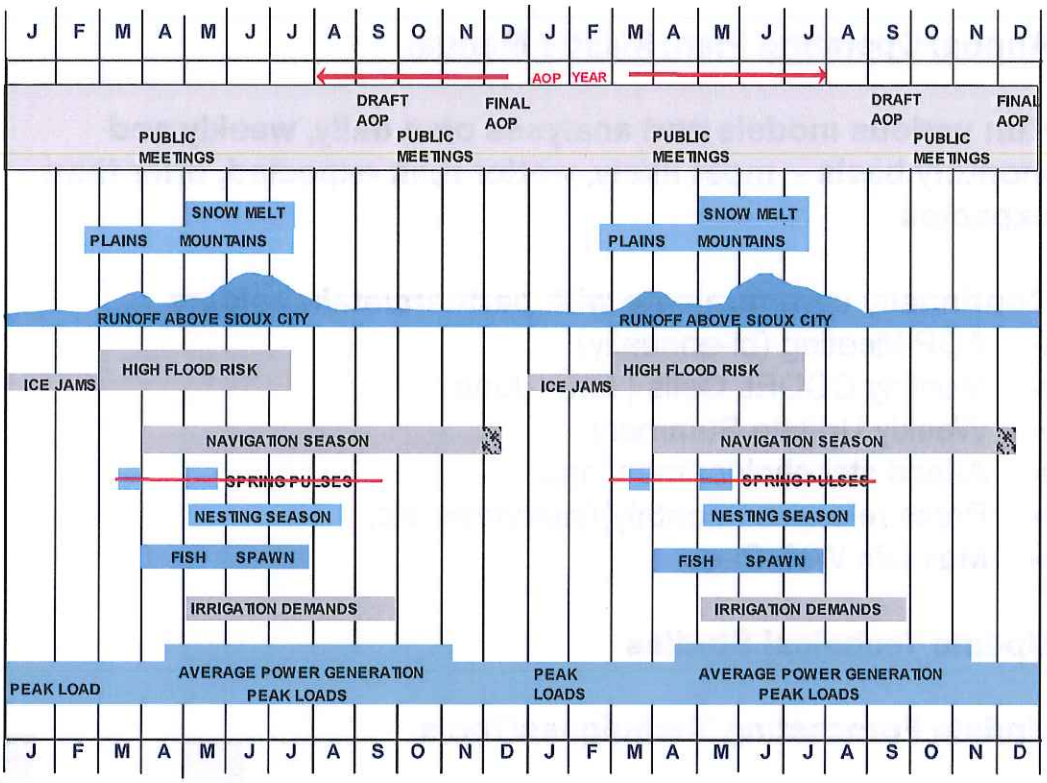
CALENDAR OF EVENTS



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

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ACTIVITIES

- **Annual Operating Plan; Master Manual**
- **Run various models and analyses on a daily, weekly and monthly basis - most likely, wetter than expected, drier than expected**
- **Continually communicate with partners/stakeholders**
  - AOP Meeting (bi-annually)
  - Monthly CODEL Calls (Jan – June)
  - Weekly Update Summary
  - Attend stakeholder meetings
  - Press releases (monthly)/interviews/etc.
  - Maintain Web Page
- **Update Technical Studies**
- **Update Forecasting Techniques/Tools**
- **Update Water Control Manuals**

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TRIGGERS FOR HEIGHTEN AWARENESS

- **Antecedent (Fall) Conditions**
- **Mountain Snowpack**
- **Plains Snowpack**
- **Monthly Studies**
- **Climate Condition Outlooks**

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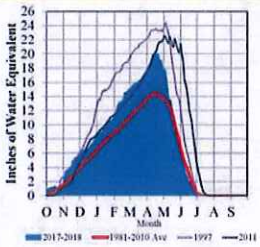
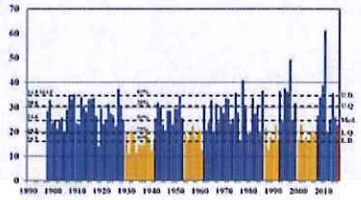
TRIGGER SPECIFICS

- **Antecedent Conditions**
  - 1995-96-97, 2009-10-11 – consecutive years of high runoff
  - Wet fall/winter soil conditions = increased spring runoff
- **Mountain Snowpack – peak SWE**
  - ± 10% - within normal ranges
  - ± 20% - will affect total runoff
  - ±> 30% - will significantly affect total runoff



- **Plains Snowpack Classification**
  - "heavy" – will affect total runoff
  - "very heavy" – will significantly affect total runoff
- **Monthly Studies**
  - Runoff estimate > Upper Decile (34.5 MAF)
  - Service level adjustments in March-April-May
  - Full conservation pool at start of runoff season



- **Spring Climate Conditions**
  - ENSO Neutral and/or Weak La Niña - normal precip variability
  - Moderate or Strong La Niña – higher precip variability
  - Oscillations - North Atlantic/Arctic

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OPERATIONS
(HOW WE DO OUR MISSION)

2018

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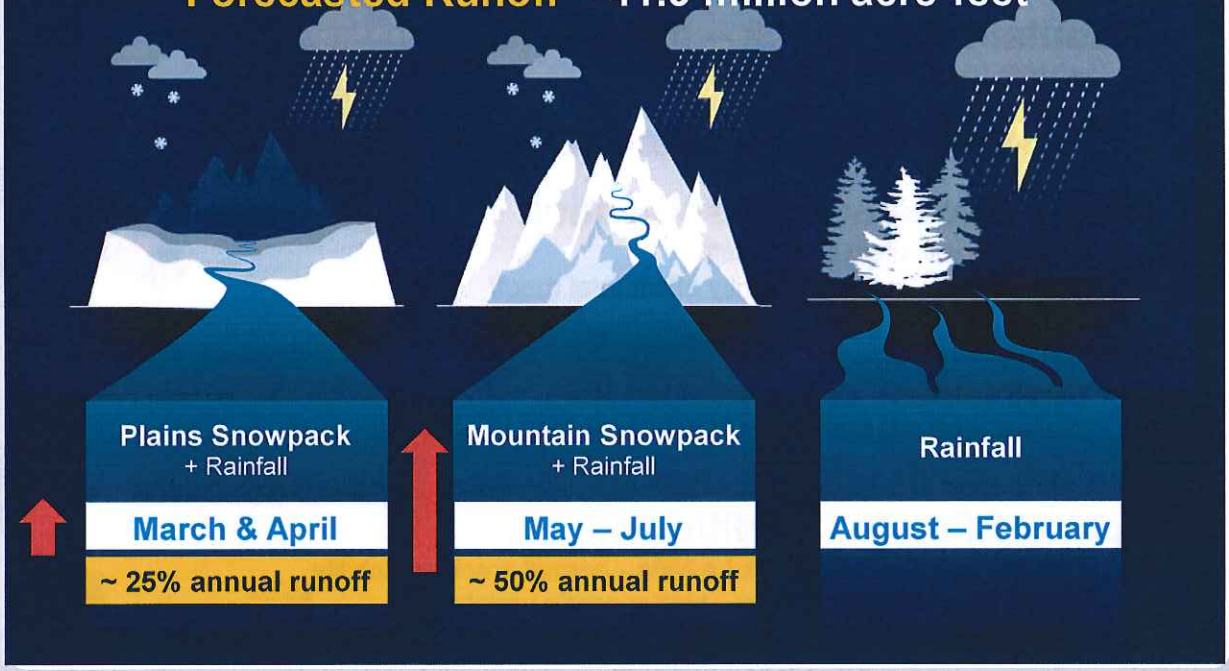
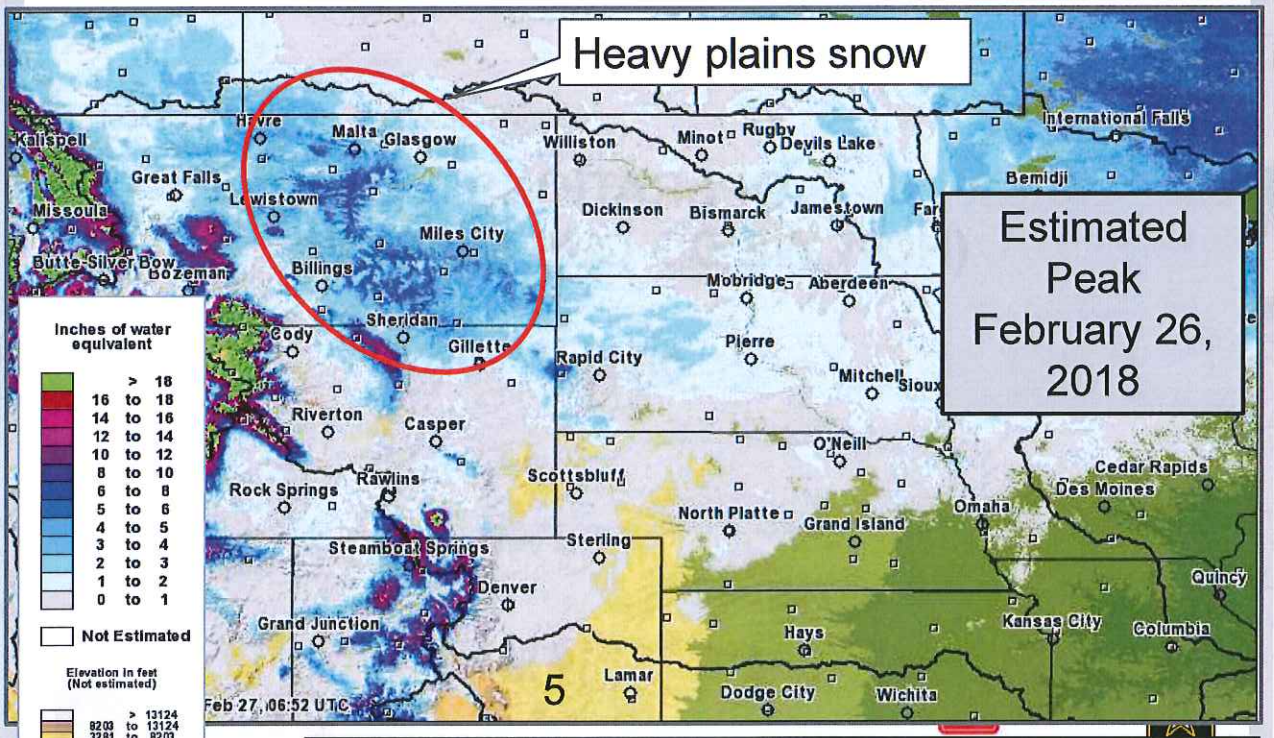
2018 FORECASTED RUNOFF ABOVE SIOUX CITY, IA

Average Annual Runoff ~ 25 million acre-feet
Forecasted Runoff ~ 41.3 million acre-feet

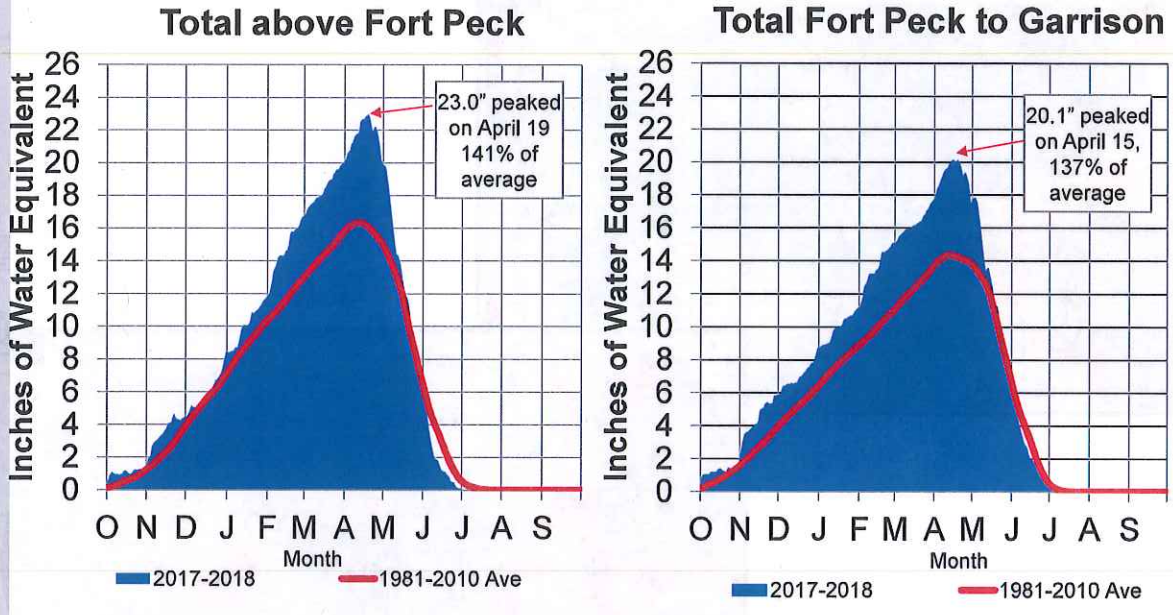


PLAINS SNOWPACK



Source: NOAA National Operational Hydrologic Remote Sensing Center (NOHRSC)

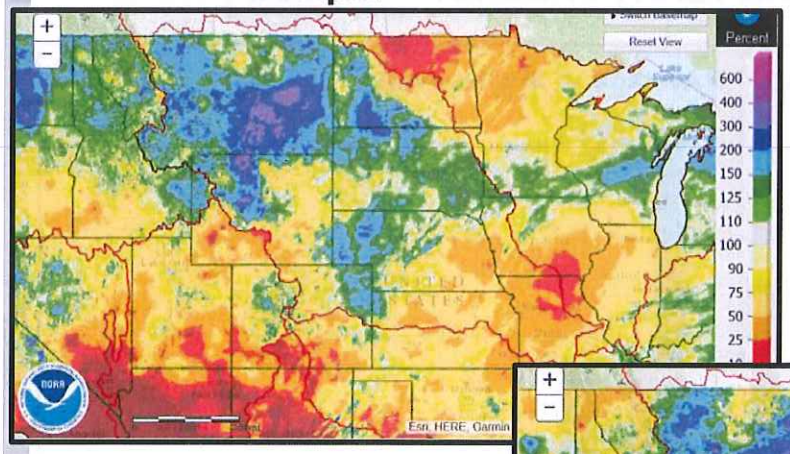
Missouri River Basin
Mountain Snowpack Water Content
2017-2018



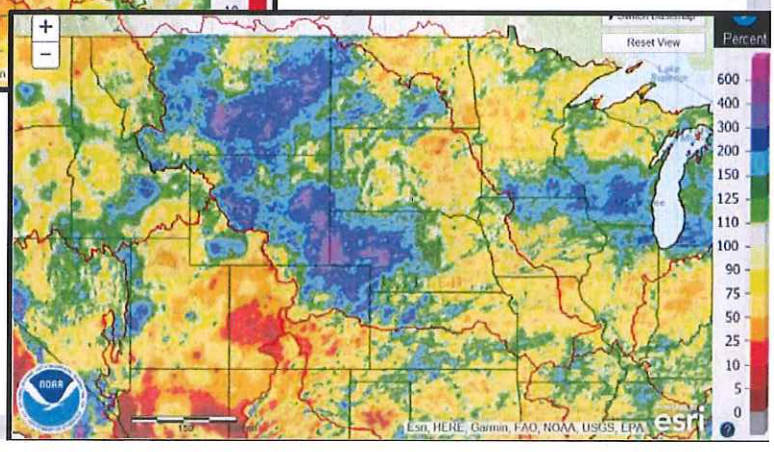
The mountain snowpack normally peaks near April 15 in both reaches.

OBSERVED PRECIPITATION - PERCENT OF NORMAL

April

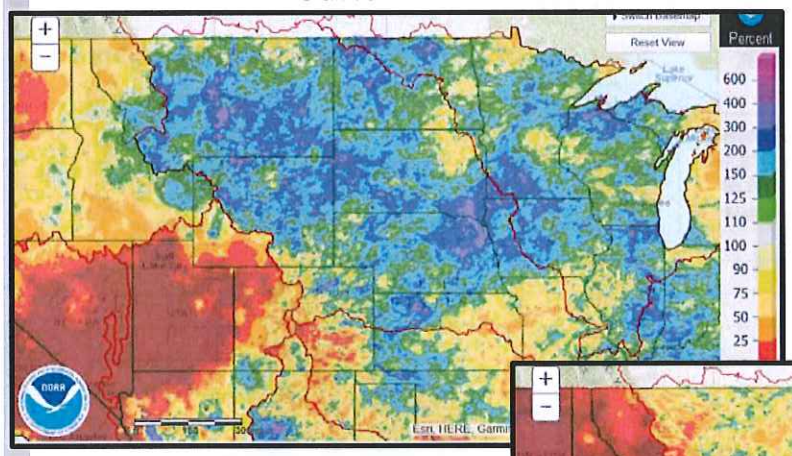


May

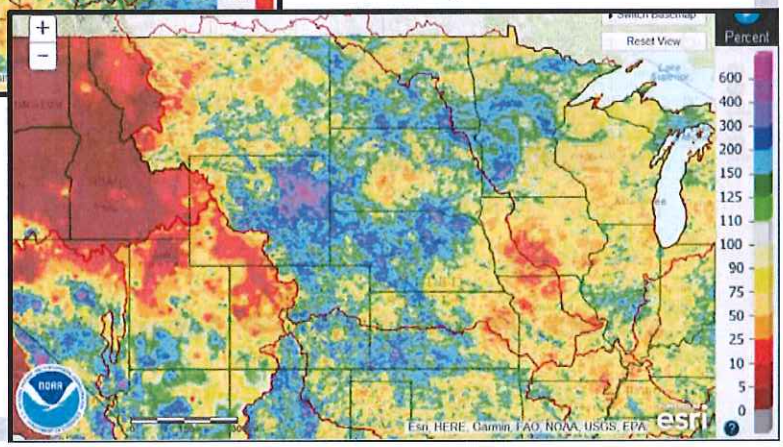


OBSERVED PRECIPITATION - PERCENT OF NORMAL

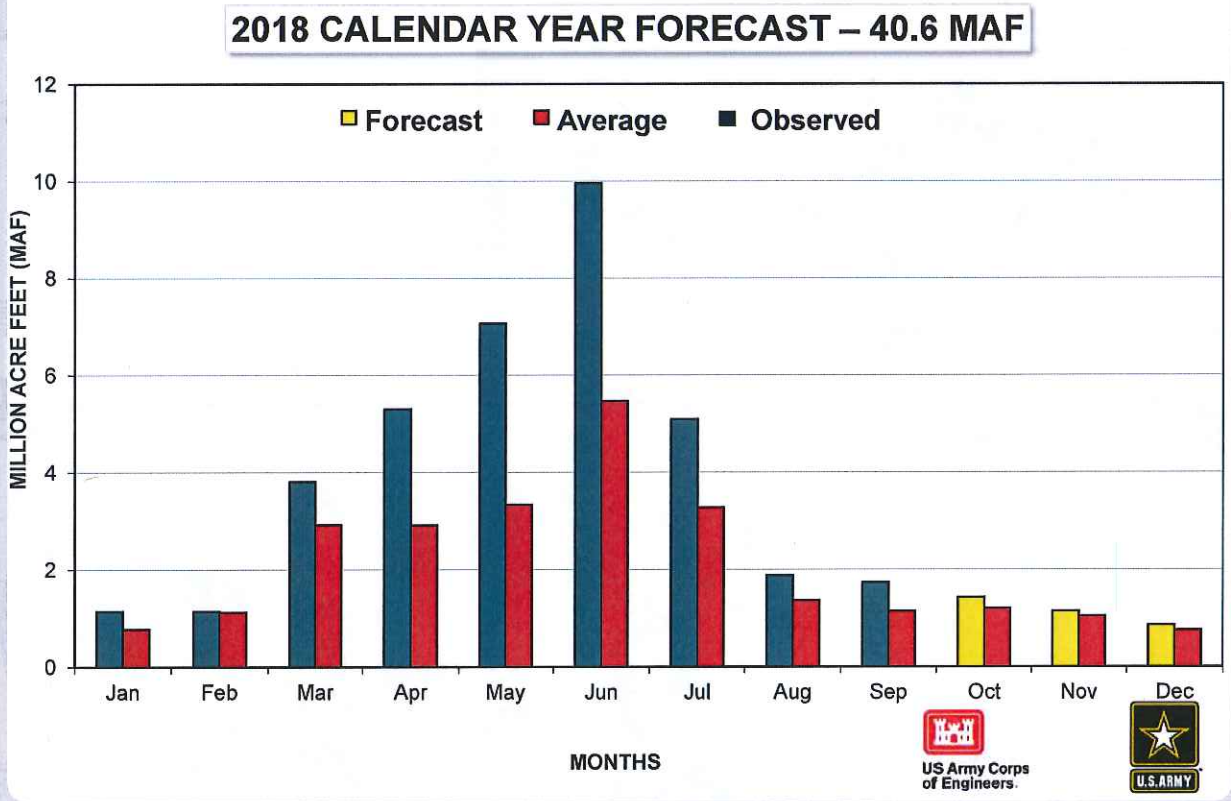
June



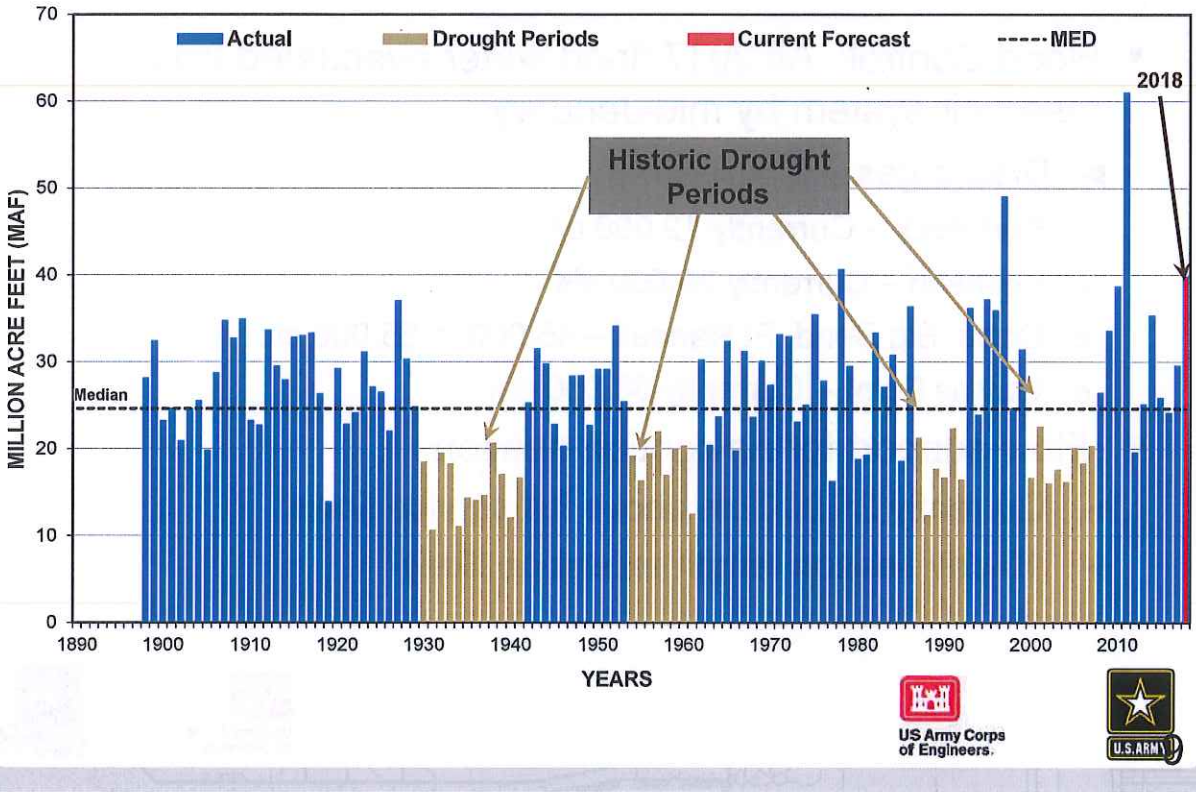
July



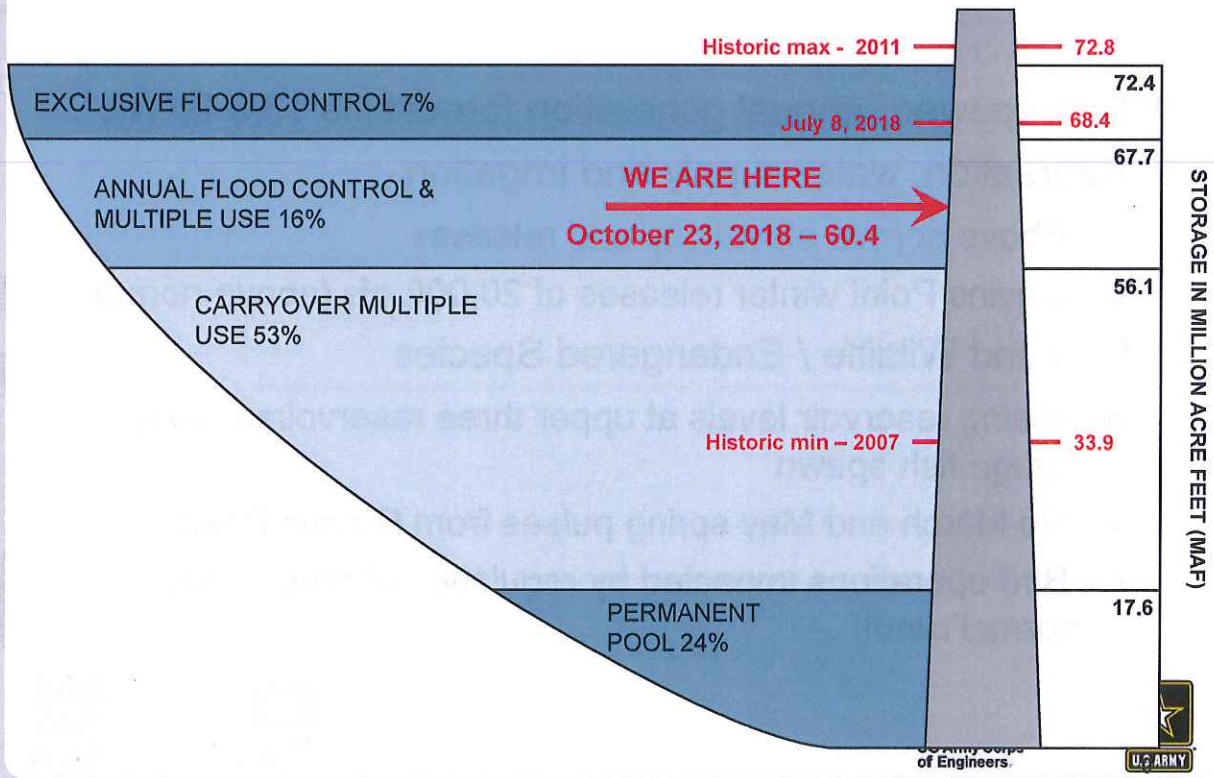
MONTHLY RUNOFF ABOVE SIOUX CITY, IA



ANNUAL RUNOFF ABOVE SIOUX CITY, IA



MISSOURI RIVER MAINSTEM SYSTEM STATUS



2018 MAINSTEM RESERVOIR OPERATIONS

- Flood Control: All 2017 flood water evacuated from reservoir system by mid-January
  - Discharges
    - Fort Peck – Currently 12,000 cfs
    - Garrison – Currently 29,000 cfs
    - Oahe, Big Bend, Ft Randall – 45,000 to 55,000 cfs
    - Gavins Point – Currently 58,000 cfs
- Flow support for navigation season
  - Currently 25,000 cfs above full service flows
  - 10-day season length extension likely

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2018 RESERVOIR OPERATIONS

- Hydropower: annual generation forecast is 13.3 BkWh
- Recreation, water supply and irrigation
  - Above normal elevations and releases
  - Gavins Point winter releases of 20,000 cfs (above normal)
- Fish and Wildlife / Endangered Species
  - Rising reservoir levels at upper three reservoirs during forage fish spawn
  - No March and May spring pulses from Gavins Point
  - Bird operations impacted by regulation of much above normal runoff

US Army Corps of Engineers.

http://www.nwd-mr.usace.army.mil/rcc/reports/pdfs/weeklyupdate.pdf

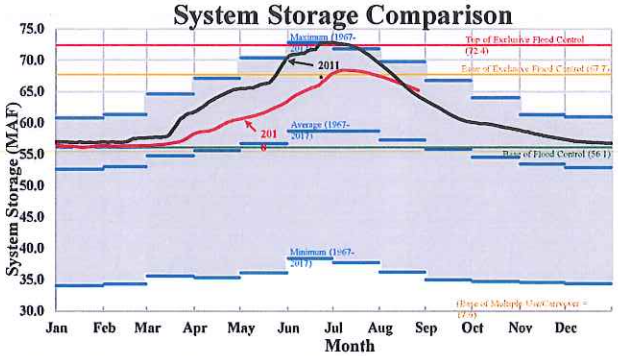
Missouri River Basin – Weekly Update – 28 Aug 2018

Mainstem Reservoir Status:

- System storage is currently 65.1 MAF, 9.0 MAF above the base of the Annual Flood Control and Multiple Use Zone.
- Since August 1st, 2.3 MAF of stored flood waters have been evacuated.
- Releases from all System projects will be higher than average during the summer and fall to evacuate all water stored in the designated flood control storage zones.
- The updated precipitation outlook for September indicates equal chances for above-normal, normal, and below-normal precipitation throughout the entire Basin.
- Gavins Point releases are expected to be about 58,000 cfs for the next several months, but will be adjusted if downstream conditions warrant.
- The Gavins Point release schedule and forecasted Missouri River flows and stages can be found here:

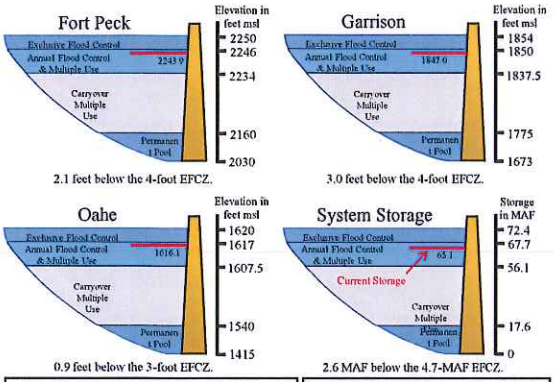
Click Here for Missouri River releases, flows & stages

System Storage Comparison



*In January 2011, the Base of Flood Control was 56.8 MAF, and the Top of Exclusive Flood Control was 73.1 MAF.

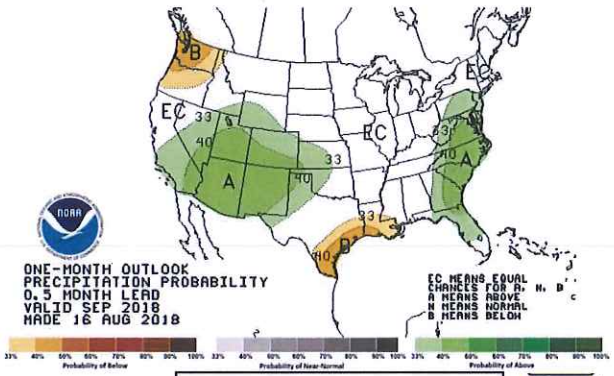
Current Reservoir Levels



Click Here for Latest 3-Week Forecast

Click Here for Comparison Plots

September Precipitation Outlook



Source: http://www.cpc.ncep.noaa.gov/

THANK YOU!

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Email: Missouri.Water.Management@usace.army.mil

Website: www.nwd-mr.usace.army.mil/rcc/

nwd.usace.army.mil/MRWM

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