

MISSOURI RIVER BASIN WATER MANAGEMENT

FALL 2019 PUBLIC MEETINGS

Oct. 22 nd	11:00 a.m.	Fort Peck, MT
Oct. 22 nd	6:00 p.m.	Bismarck, ND
Oct. 23 rd	10:00 a.m.	Fort Pierre, SD
Oct. 23 rd	4:00 p.m.	Sioux City, IA
Oct. 24 th	11:00 a.m.	Smithville, MO
Oct. 24 th	5:00 p.m.	Nebraska City, NE
Oct. 25 th	1:00 p.m.	Jefferson City, MO



US Army Corps
of Engineers®



MISSOURI RIVER MAINSTEM RESERVOIR SYSTEM



FORT PECK



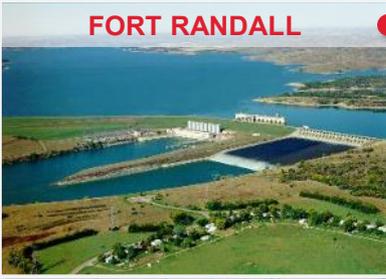
GARRISON



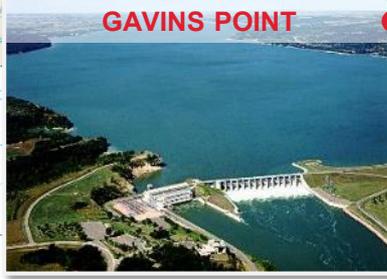
OAHE



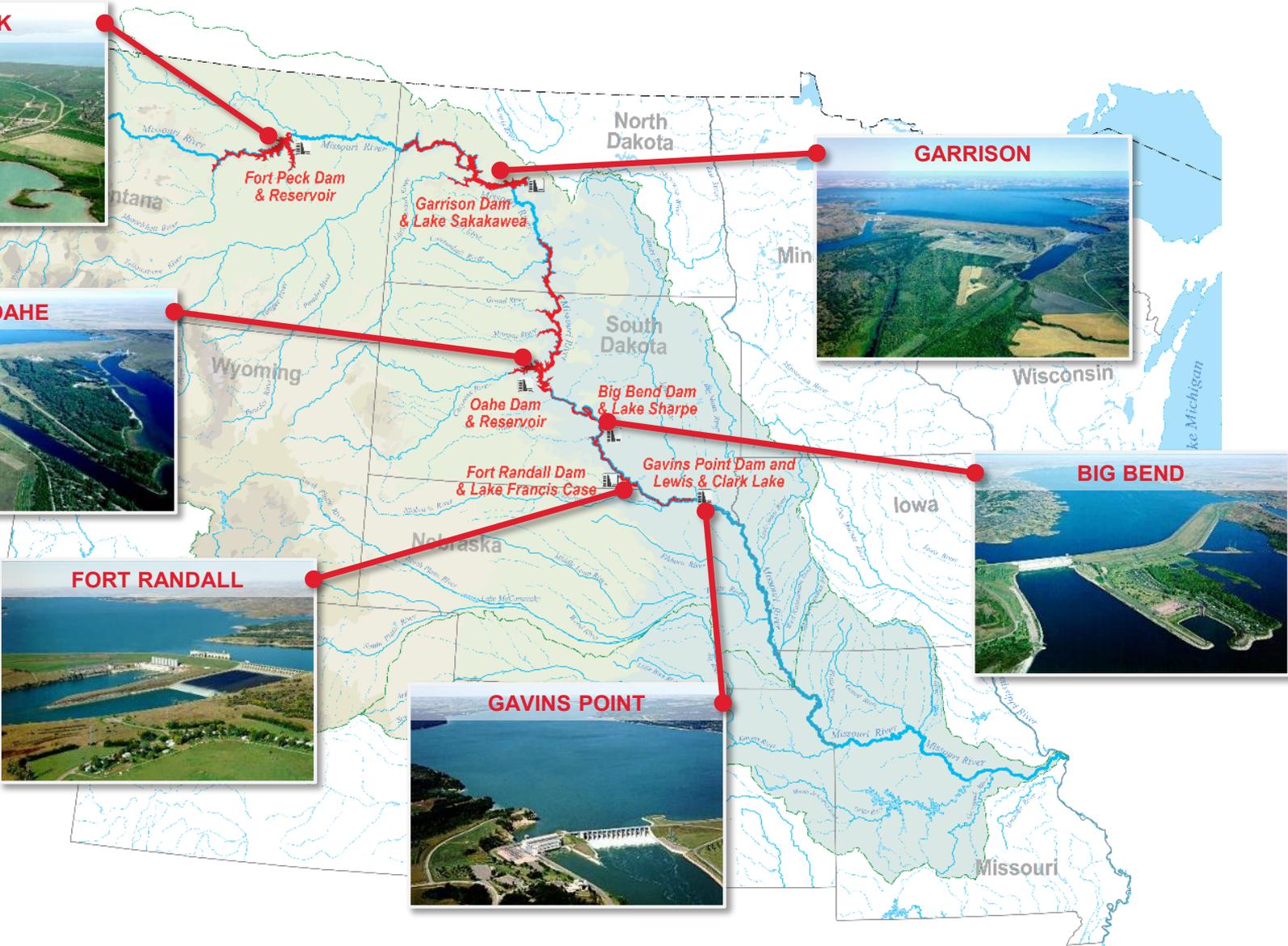
BIG BEND



FORT RANDALL



GAVINS POINT





OUR MISSION

REGULATE MISSOURI RIVER MAINSTEM RESERVOIRS



- **Priority:** Life and Safety
- **Operational Decisions:** Driven by Annual Runoff Conditions

Water captured in System flood control storage zones each year must be evacuated prior to the start of the following year's runoff season.

- **Master Manual:** Storage and release decisions designed significantly around **Flood Control, Navigation & Water Supply** purposes
- **Authorized Purposes:**



Flood Control



Navigation



Hydropower



Water Supply



Fish & Wildlife



Irrigation



Water Quality Control



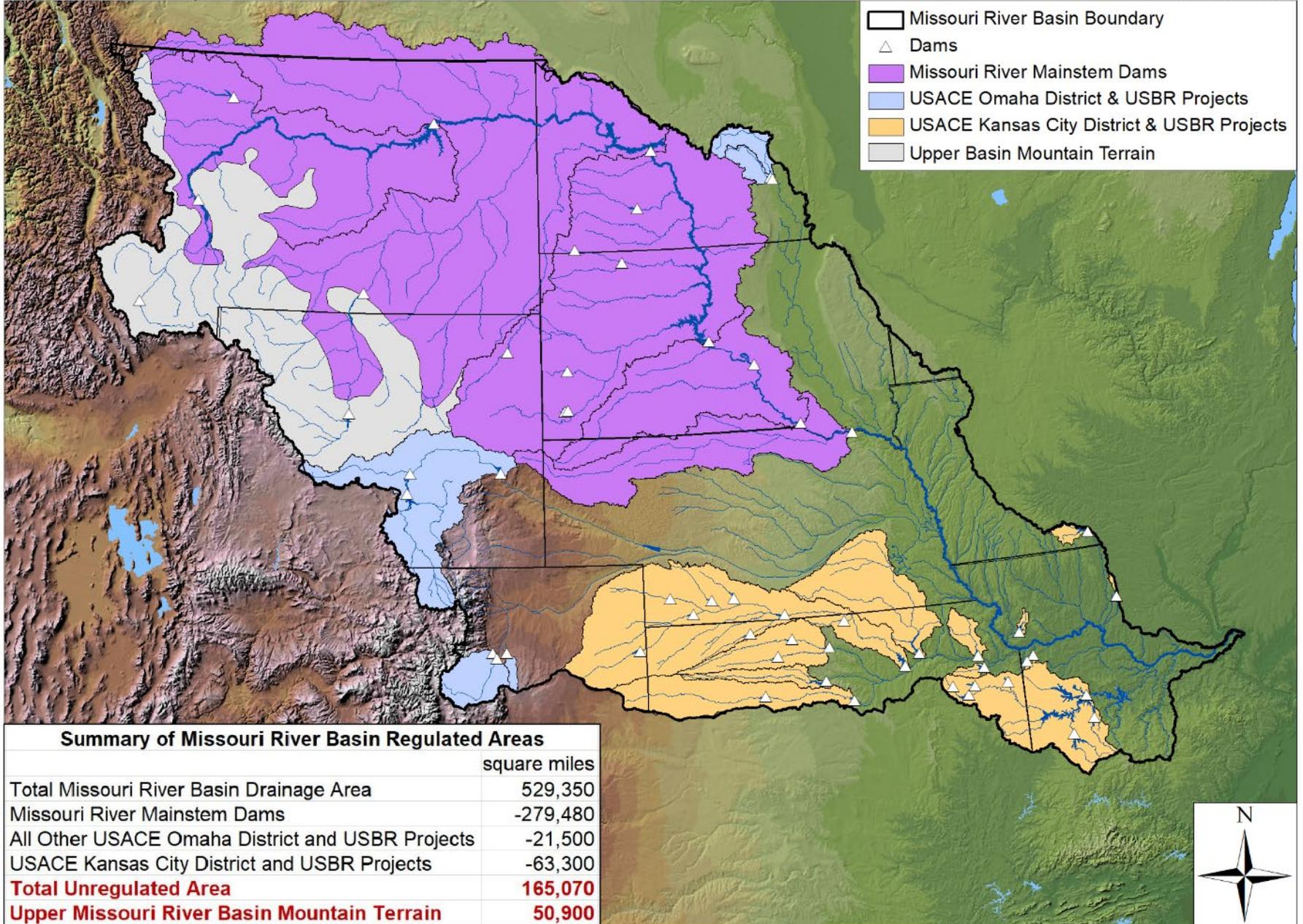
Recreation

- **Federal Laws:** the Corps complies with all federal laws.

Missouri River Basin Regulated Watersheds

Background: North America Relief Map

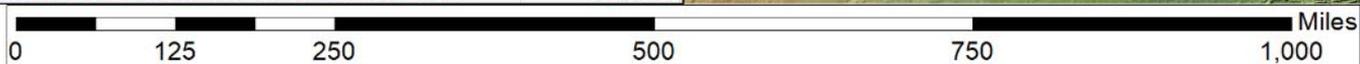
USACE NWO March 2016



Summary of Missouri River Basin Regulated Areas

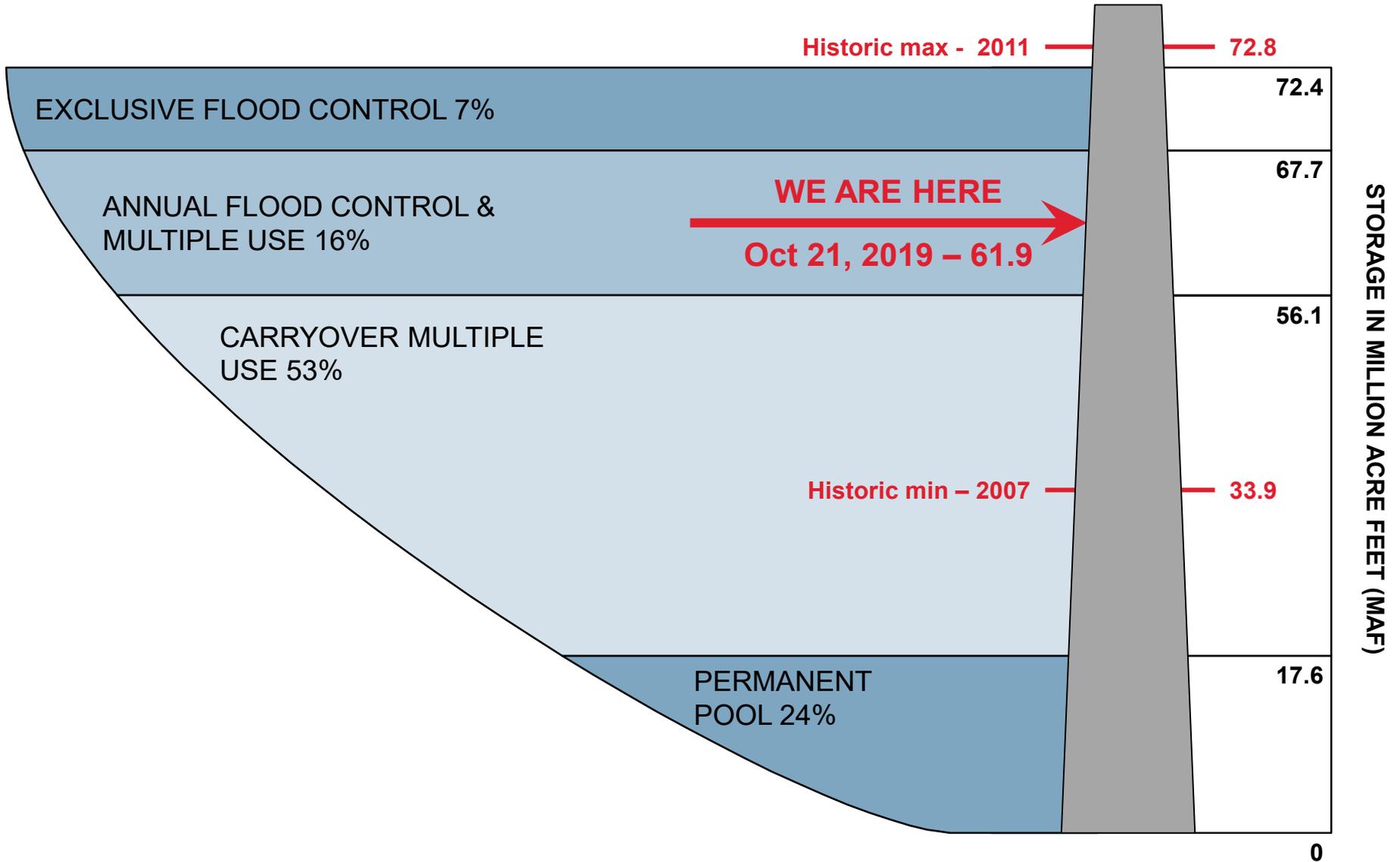
square miles

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
Upper Missouri River Basin Mountain Terrain	50,900





MISSOURI RIVER MAINSTEM SYSTEM STORAGE ZONES AND ALLOCATIONS

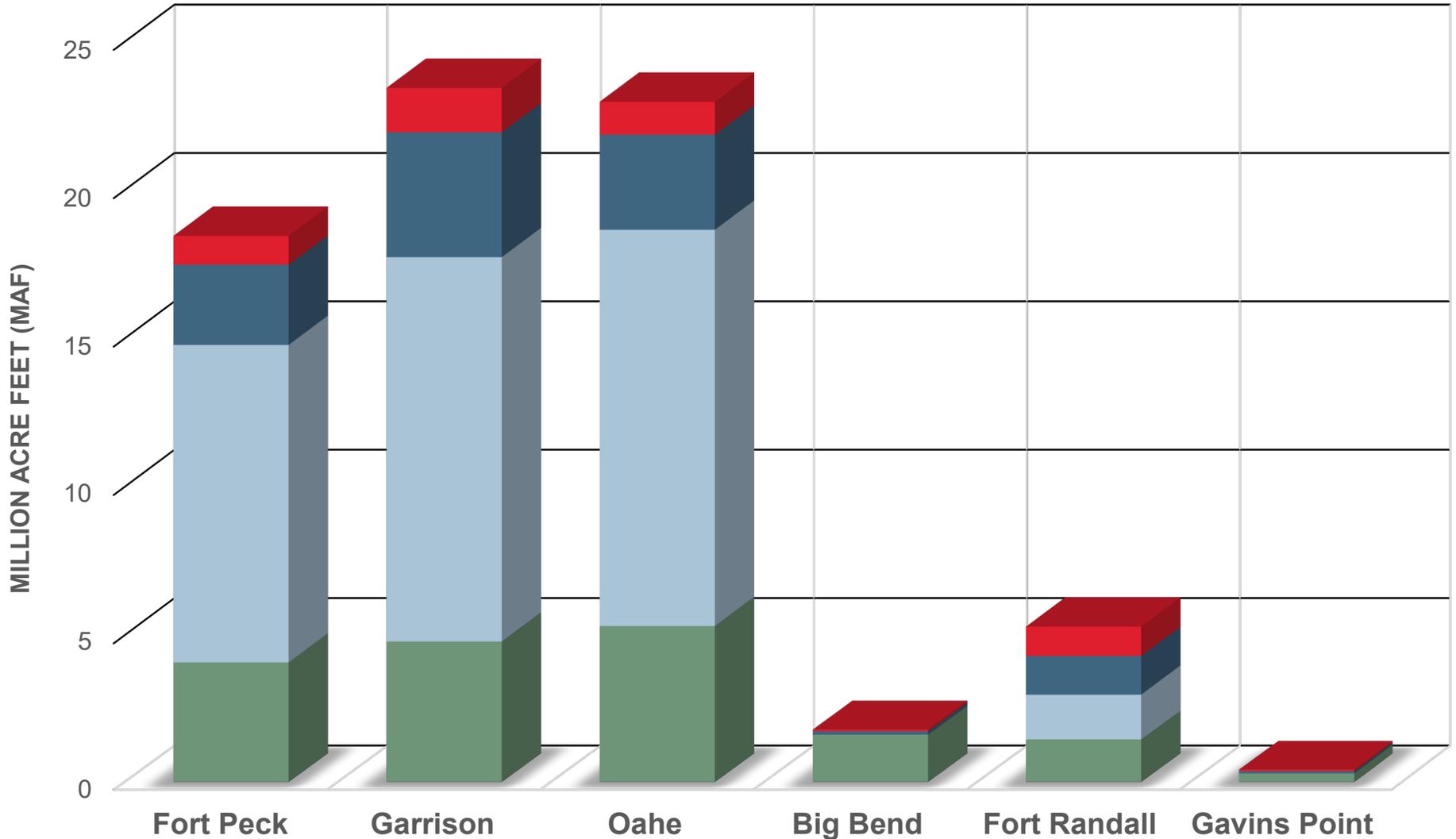




MAINSTEM RESERVOIR STORAGE CAPACITY



■ Permanent ■ Carryover ■ Annual Flood ■ Exclusive Flood





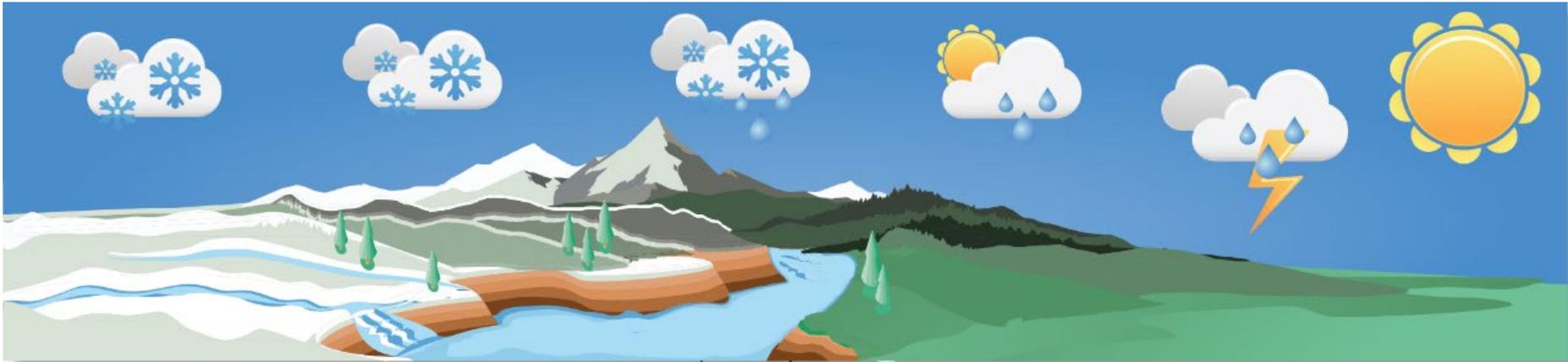
RUNOFF COMPONENTS



PLAINS SNOWPACK

MOUNTAIN SNOWPACK

RAINFALL



2019 FORECAST* = 61.0 MILLION ACRE FEET (MAF)**

***OCTOBER 1 FORECAST – AVERAGE ANNUAL RUNOFF IS 25.3 MAF**

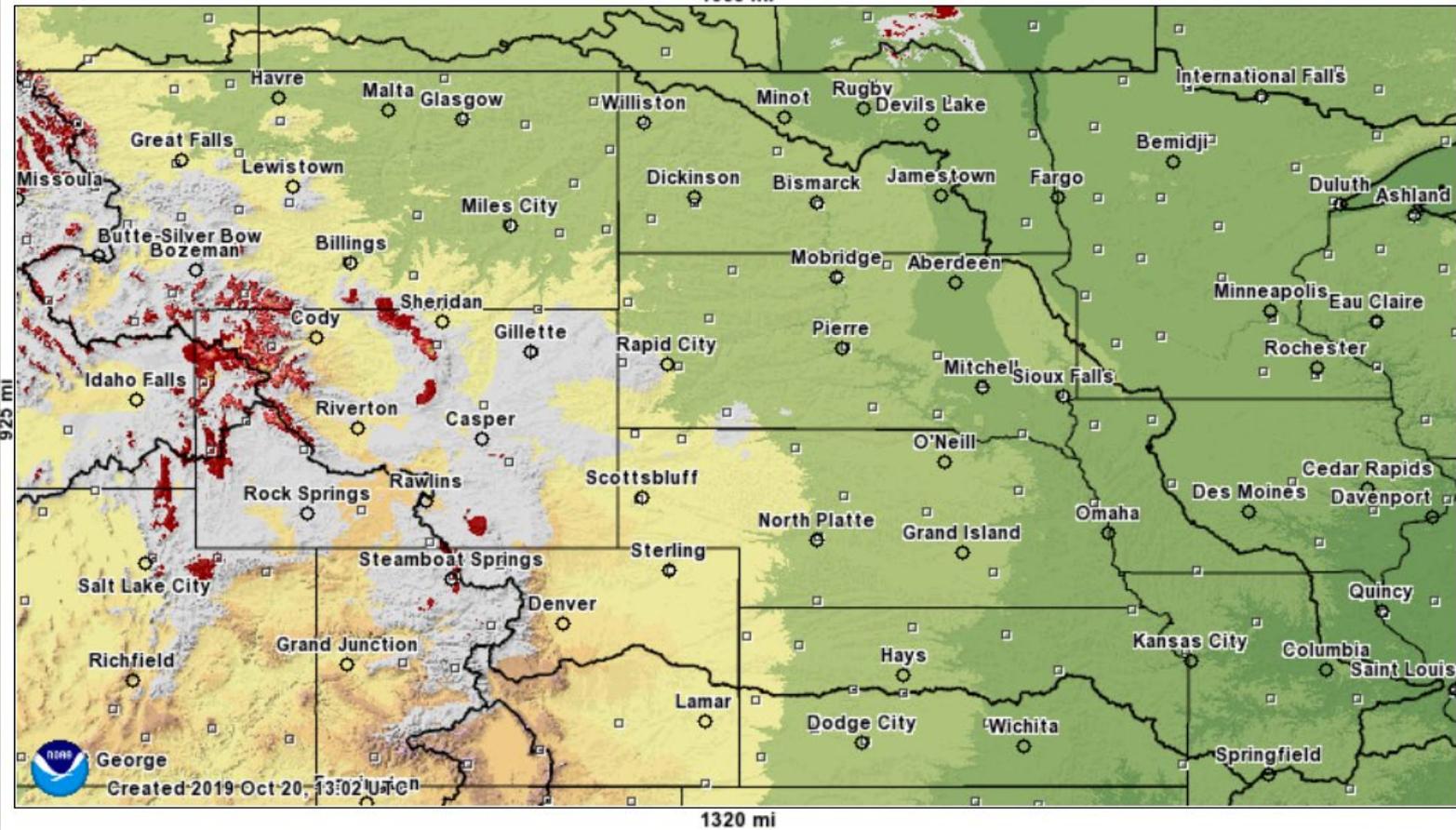
****IF REALIZED, THE 2019 RUNOFF WOULD BE THE HIGHEST IN 121 YEARS OF RECORD-KEEPING, TYING THE RECORD RUNOFF OBSERVED IN 2011**



PLAINS SNOWPACK



Modeled Snow Water Equivalent (Shallow-snow Legend) forecasted for 2019 October 21, 12:00 UTC



Inches of water equivalent



Not Estimated

Elevation in feet



Source: NWS National Operational Hydrologic Remote Sensing Center



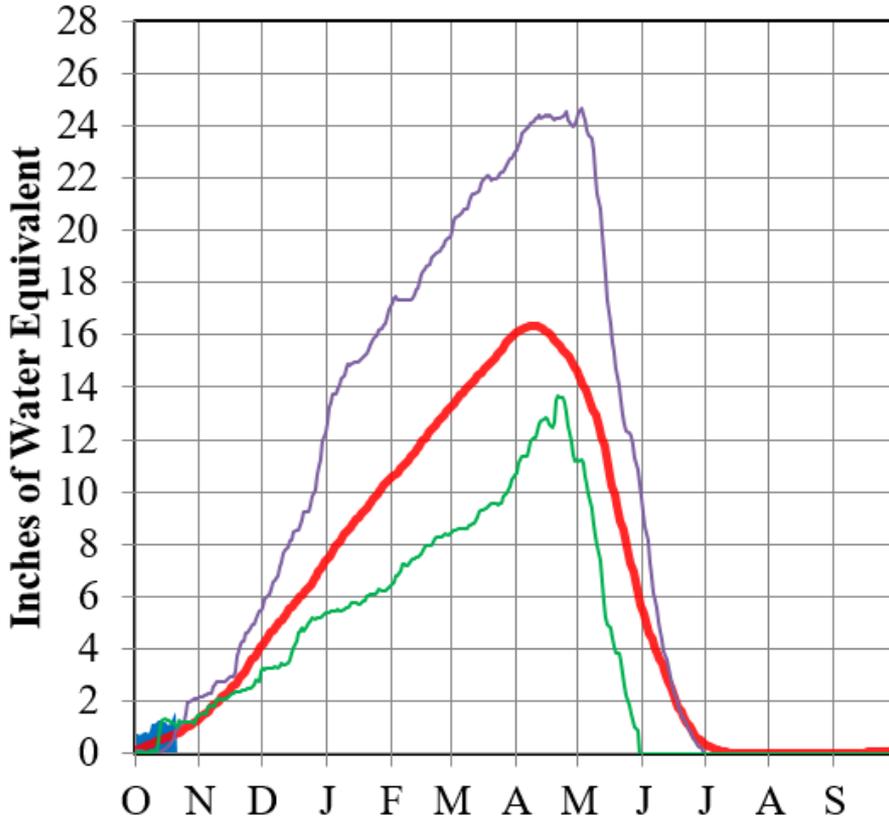
MOUNTAIN SNOWPACK



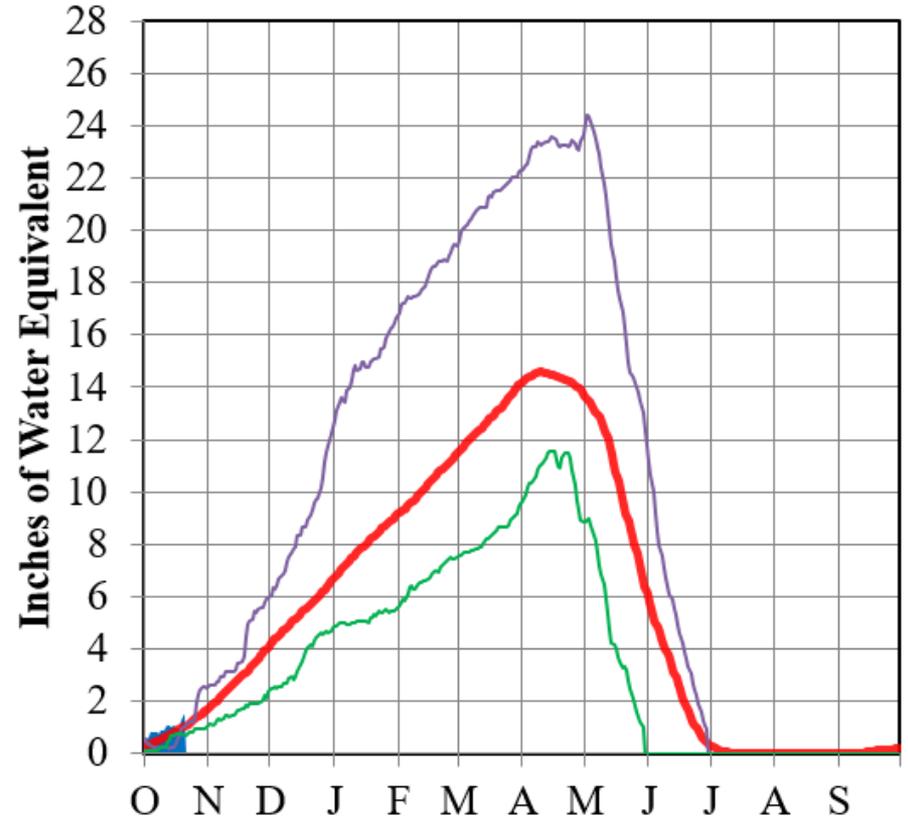
The Missouri River basin mountain snowpack normally peaks near April 15.

20-Oct-2019

Total above Fort Peck



Total Fort Peck to Garrison



2019-2020 1981-2010 Ave 1997 2001

2019-2020 1981-2010 Ave 1997 2001

Source: USDA, Natural Resources Conservation Service

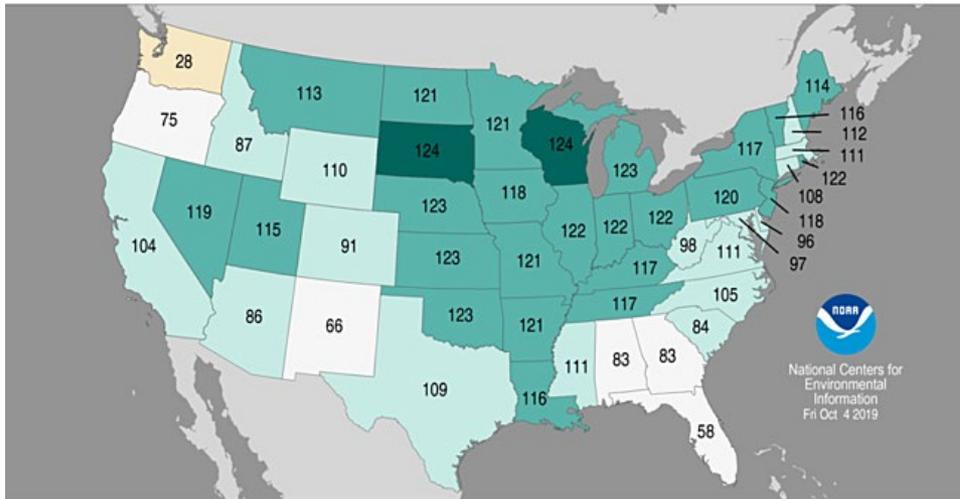


RAINFALL



Last 12 months

Statewide Precipitation Ranks
October 2018–September 2019
Period: 1895–2019

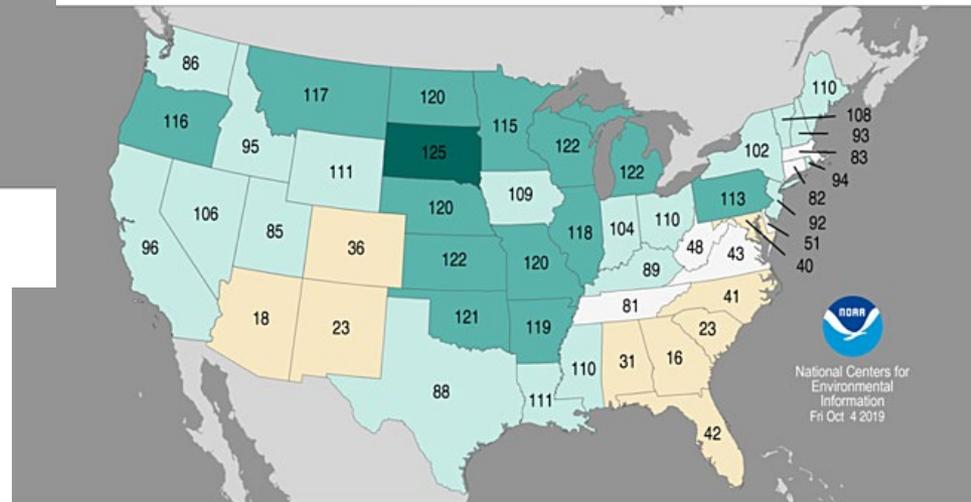


NOAA
National Centers for
Environmental
Information
Fri Oct 4 2019

- Record Driest (1)
- Much Below Average
- Below Average
- Near Average
- Above Average
- Much Above Average
- Record Wettest (124)

Last 6 months

Statewide Precipitation Ranks
April–September 2019
Period: 1895–2019



NOAA
National Centers for
Environmental
Information
Fri Oct 4 2019

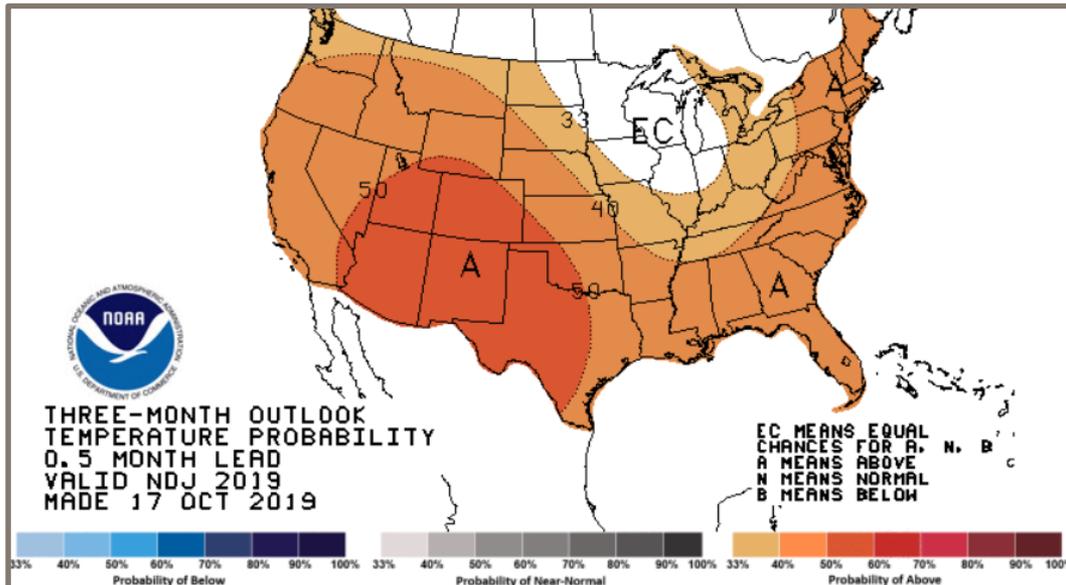
- Record Driest (1)
- Much Below Average
- Below Average
- Near Average
- Above Average
- Much Above Average
- Record Wettest (125)



TEMPERATURE AND PRECIPITATION OUTLOOKS Nov-Dec-Jan

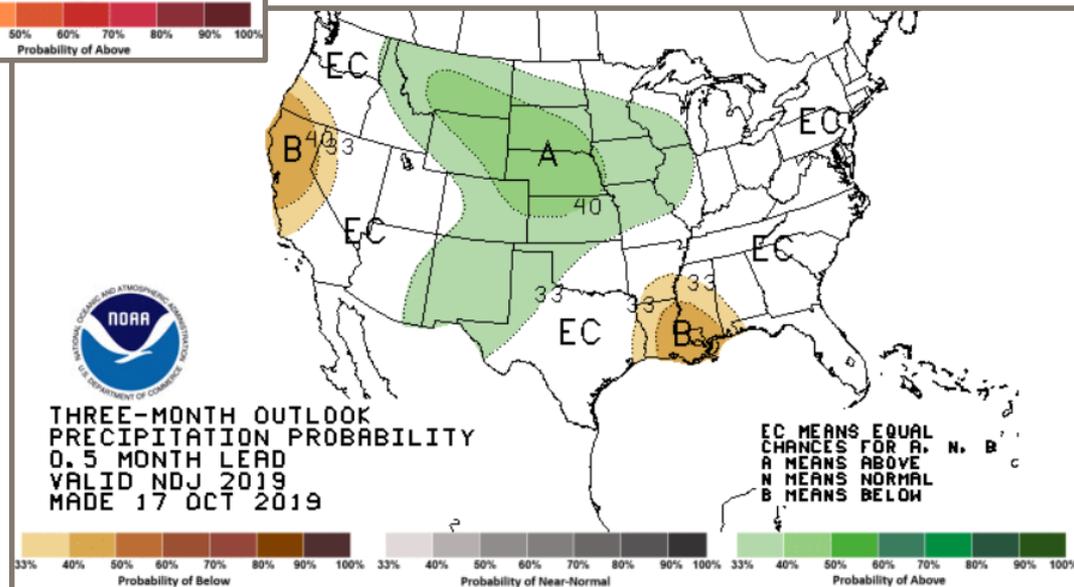


Temperature



Increased chances for warmer-than-average temperatures in the Basin.

Precipitation

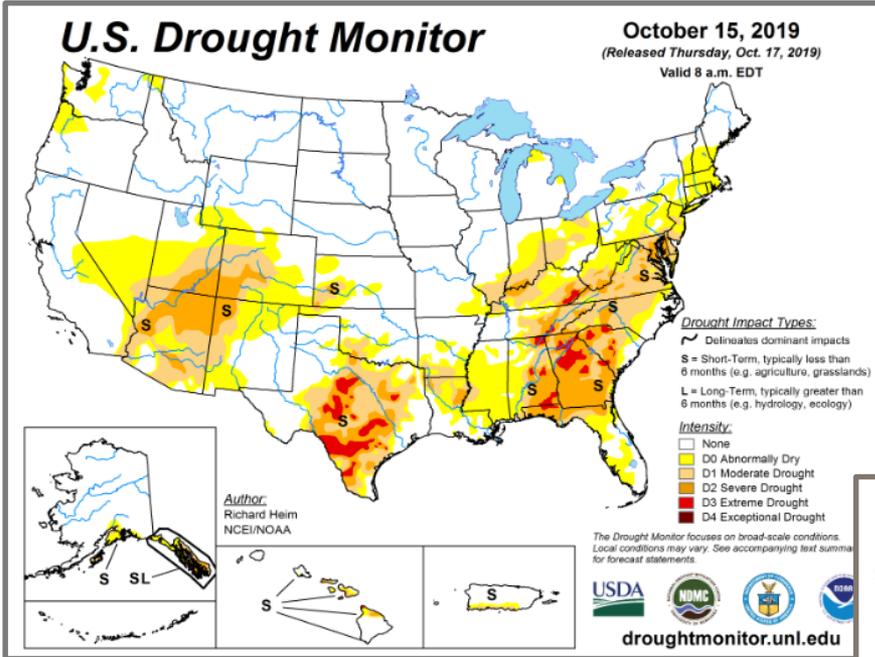


Source: NWS Climate Prediction Center

Increased chances for wetter-than-average precipitation in the Basin.



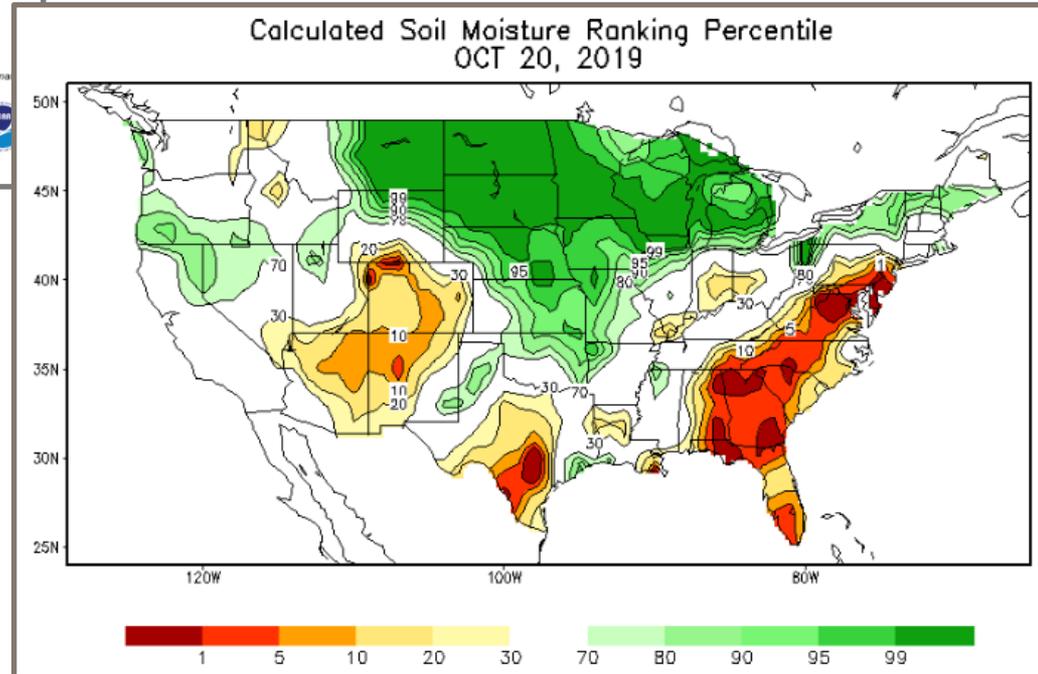
DROUGHT CONDITIONS AND SOIL MOISTURE



No drought conditions in the Missouri River Basin.

Source: National Drought Mitigation Center

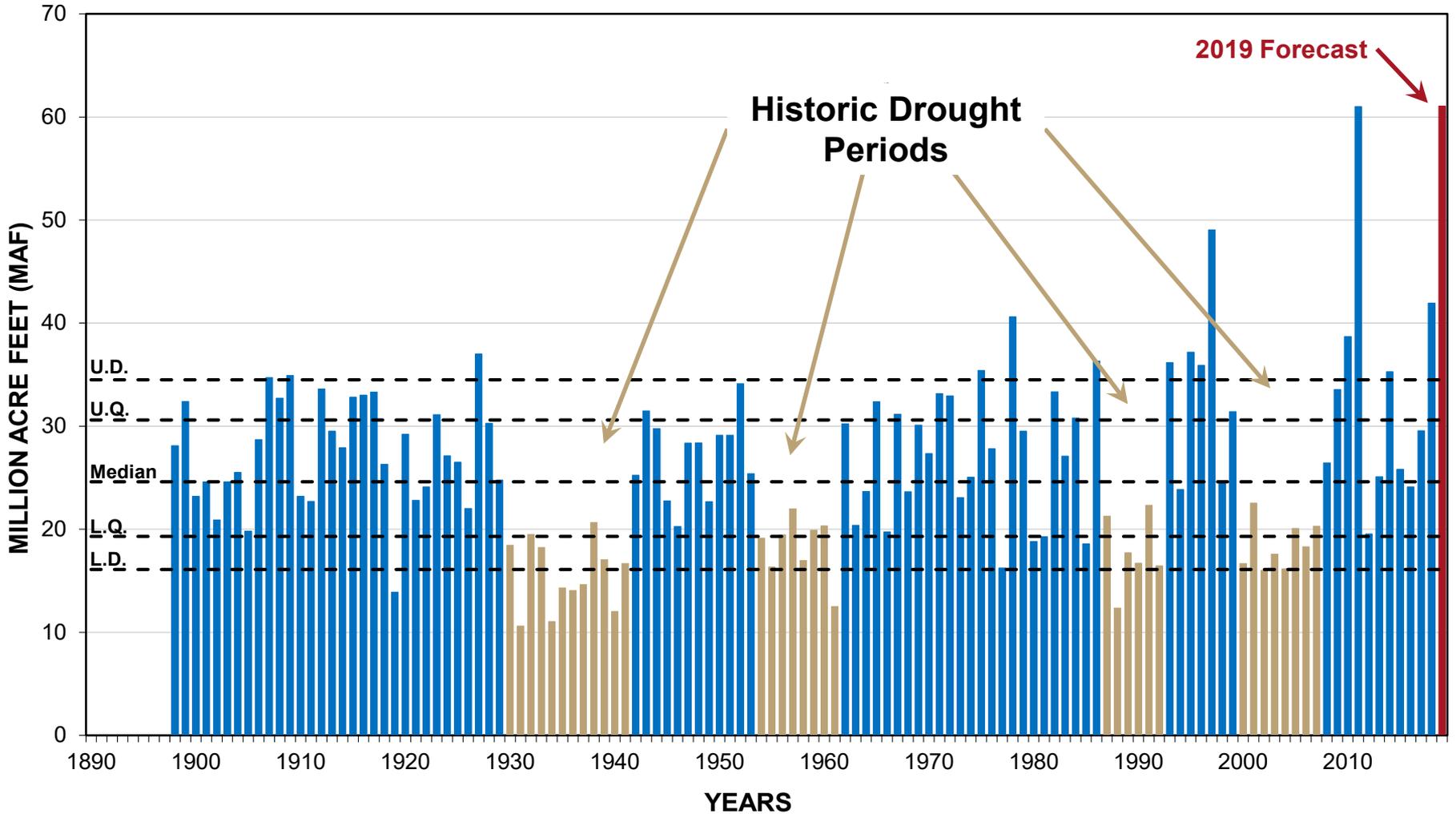
VERY wet soil conditions, particularly in the upper Missouri River Basin.



Source: NWS Climate Prediction Center



ANNUAL RUNOFF ABOVE SIOUX CITY, IA

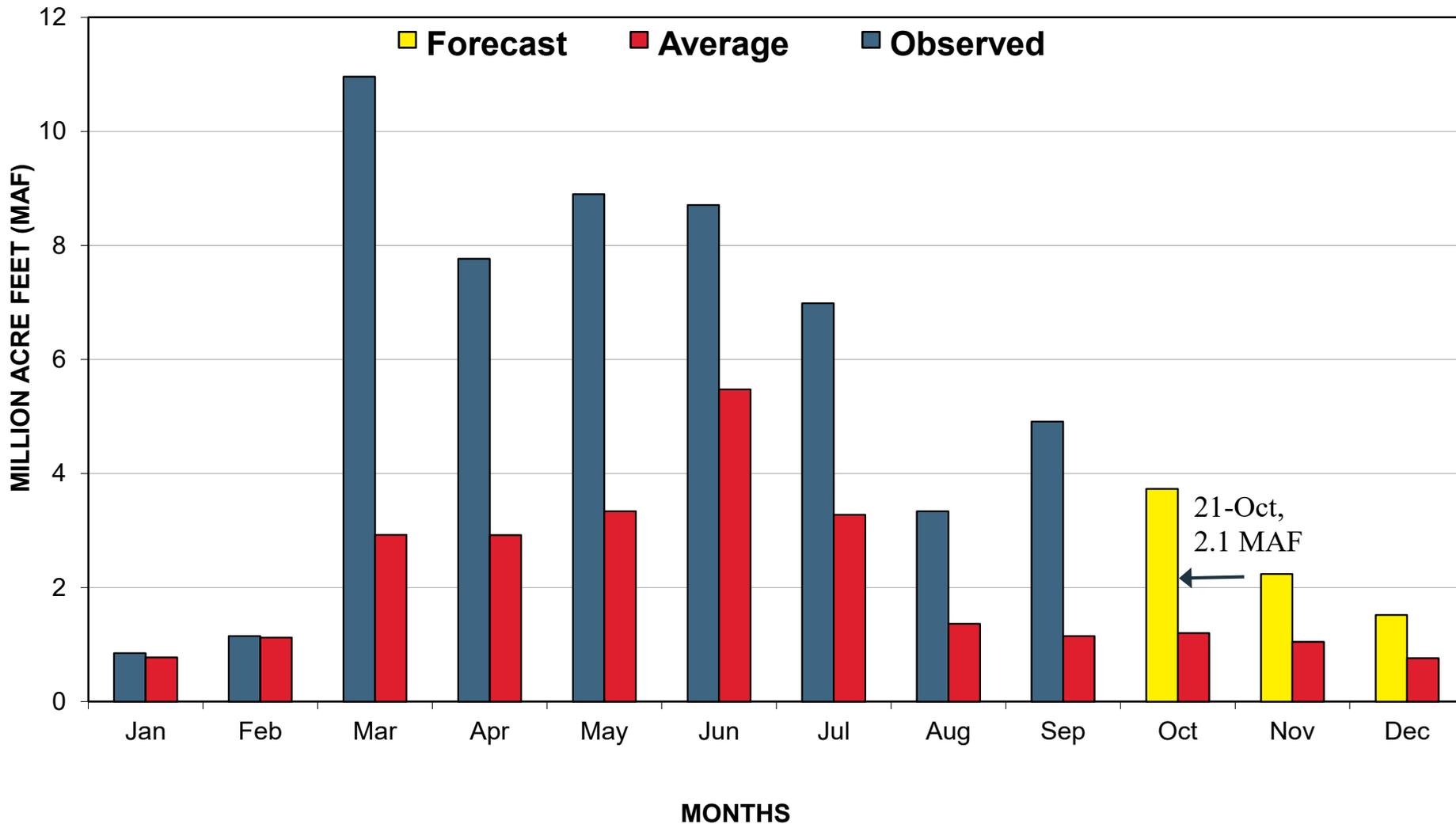




MONTHLY RUNOFF ABOVE SIOUX CITY, IA



2019 CALENDAR YEAR FORECAST – 61.0 MAF





FALL / WINTER RELEASES

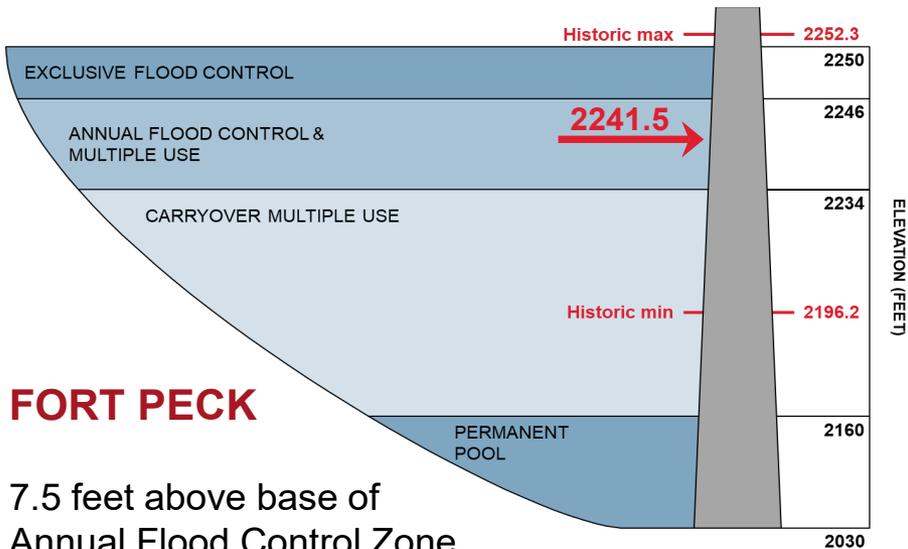


- Gavins Point Dam releases will be reduced to winter rate by mid-December (includes 10-day extension)
- Corps will closely monitor channel/ice conditions between reservoirs and downstream of Gavins Point Dam
- Above-average winter releases needed to complete evacuation of stored flood waters
- Expected releases (in 1000 cfs):

	Nov	Dec	Jan	Feb
• Fort Peck	15.0	13.0	13.0	13.0
• Garrison	40.5	20.0	24.5	24.5
• Gavins Point	80.0	25.4	22.0	22.0

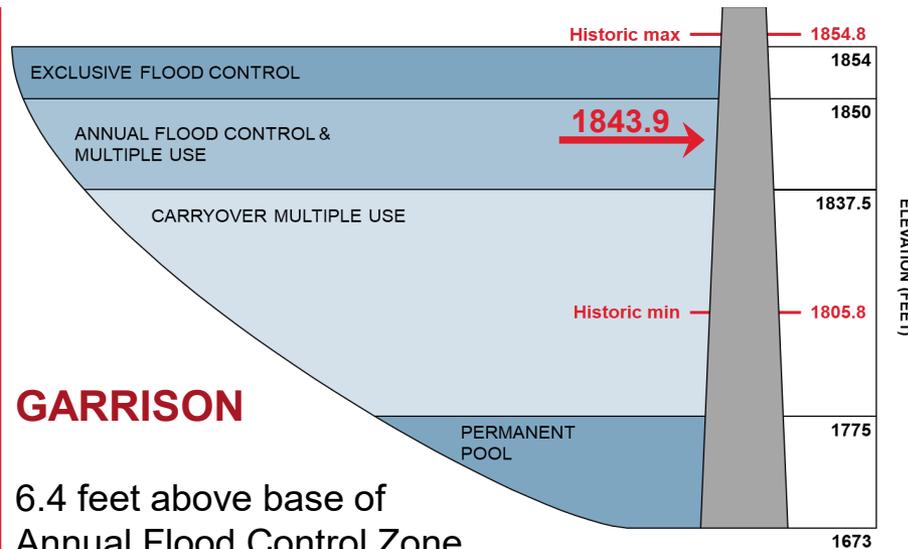


CURRENT RESERVOIR LEVELS – OCT 21, 2019



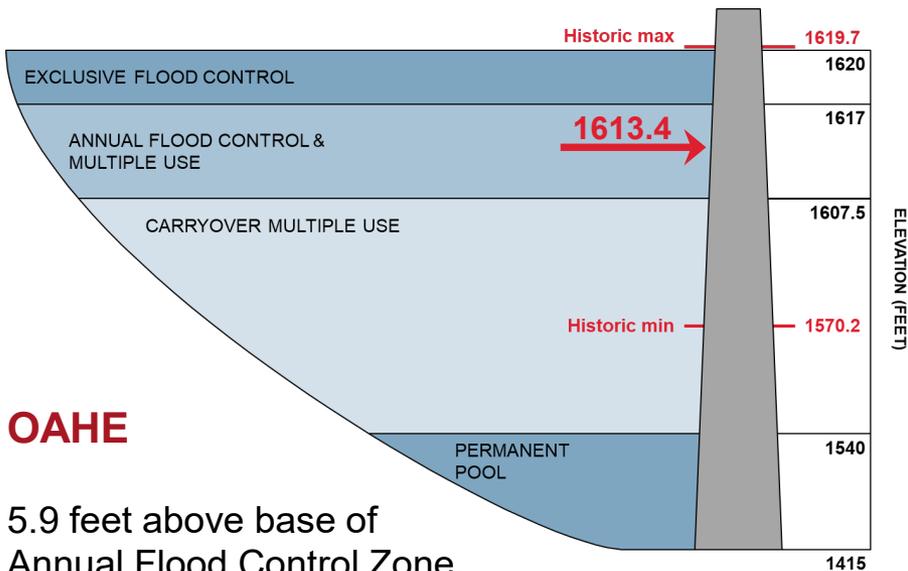
FORT PECK

7.5 feet above base of Annual Flood Control Zone.



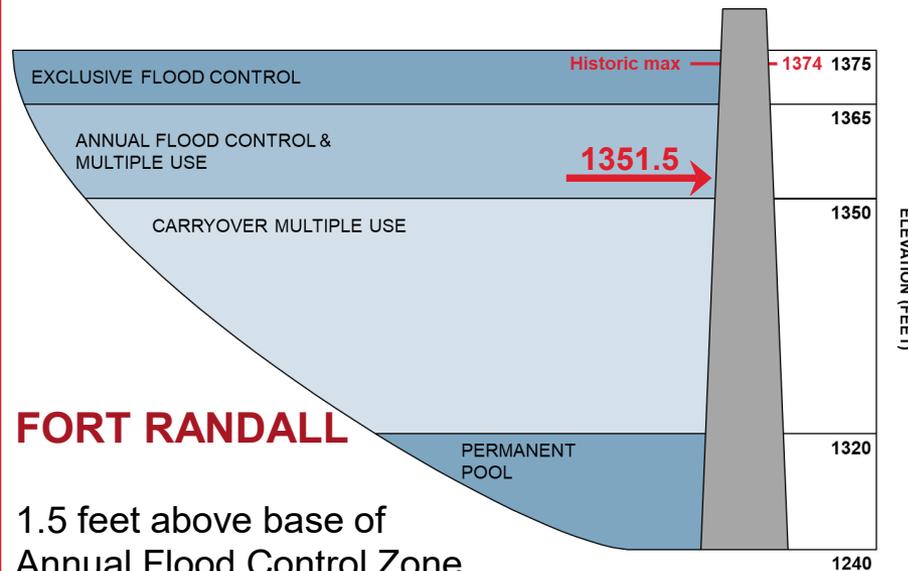
GARRISON

6.4 feet above base of Annual Flood Control Zone.



OAHE

5.9 feet above base of Annual Flood Control Zone.

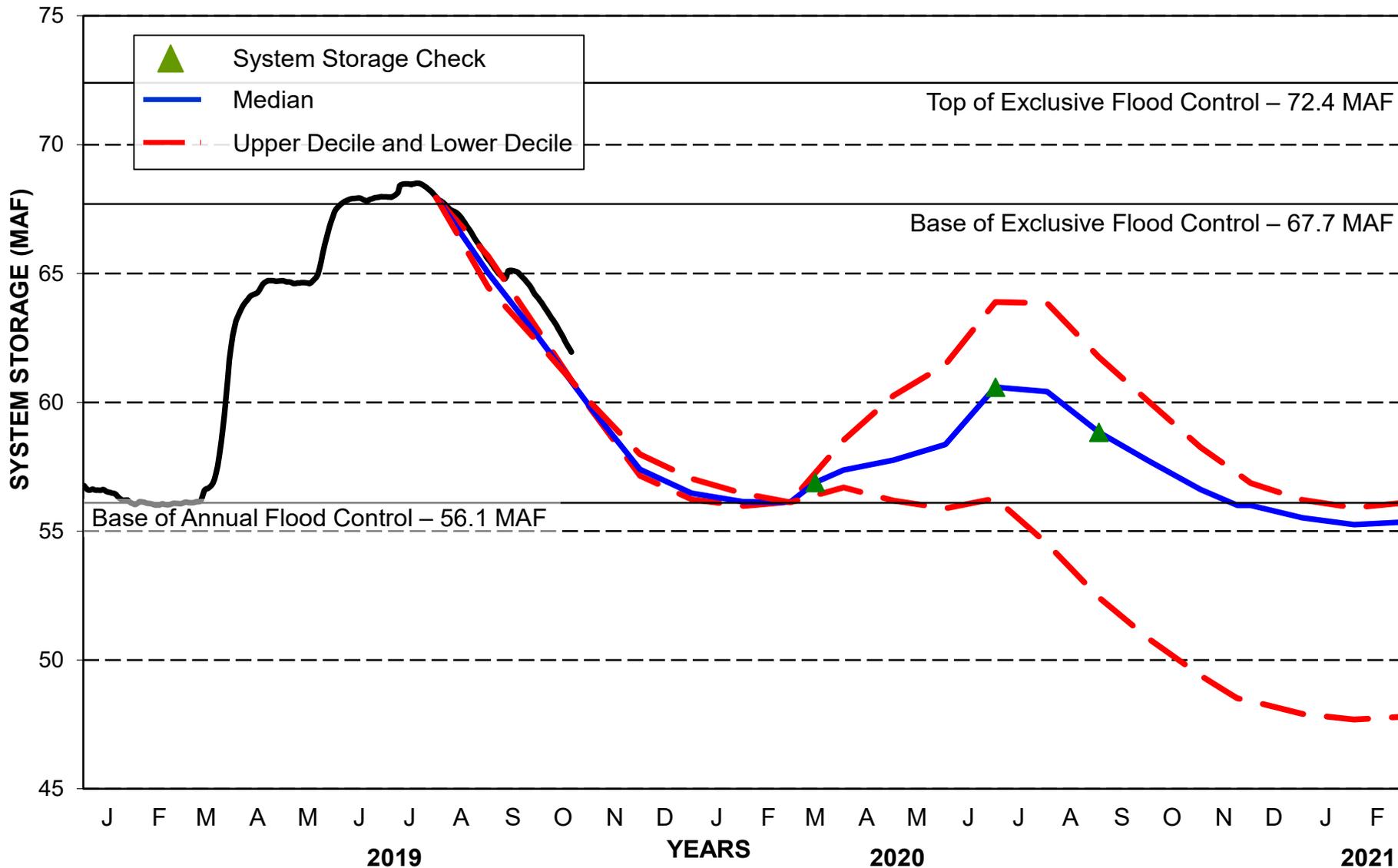


FORT RANDALL

1.5 feet above base of Annual Flood Control Zone.

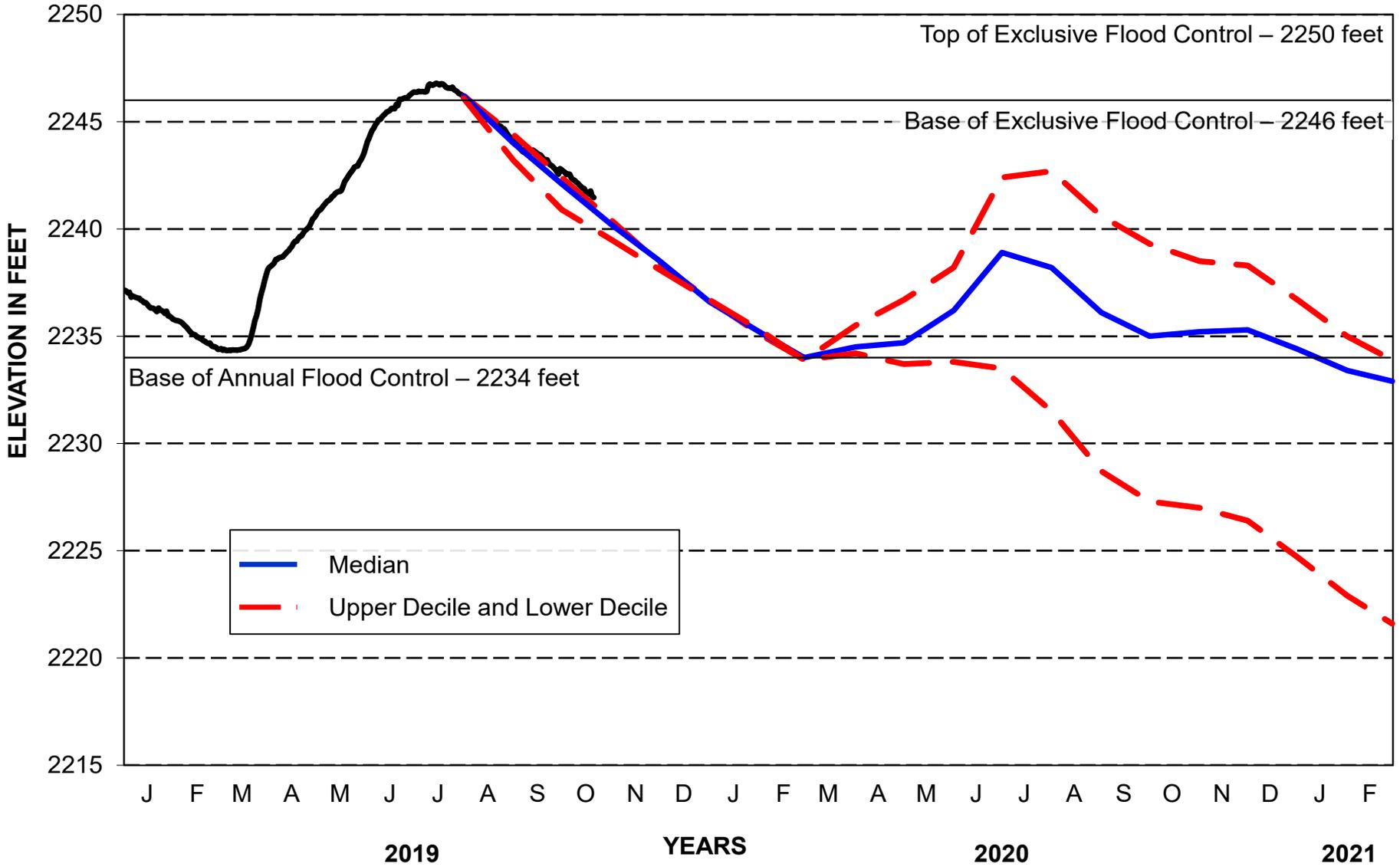


SYSTEM STORAGE - 2019-2020 DRAFT AOP



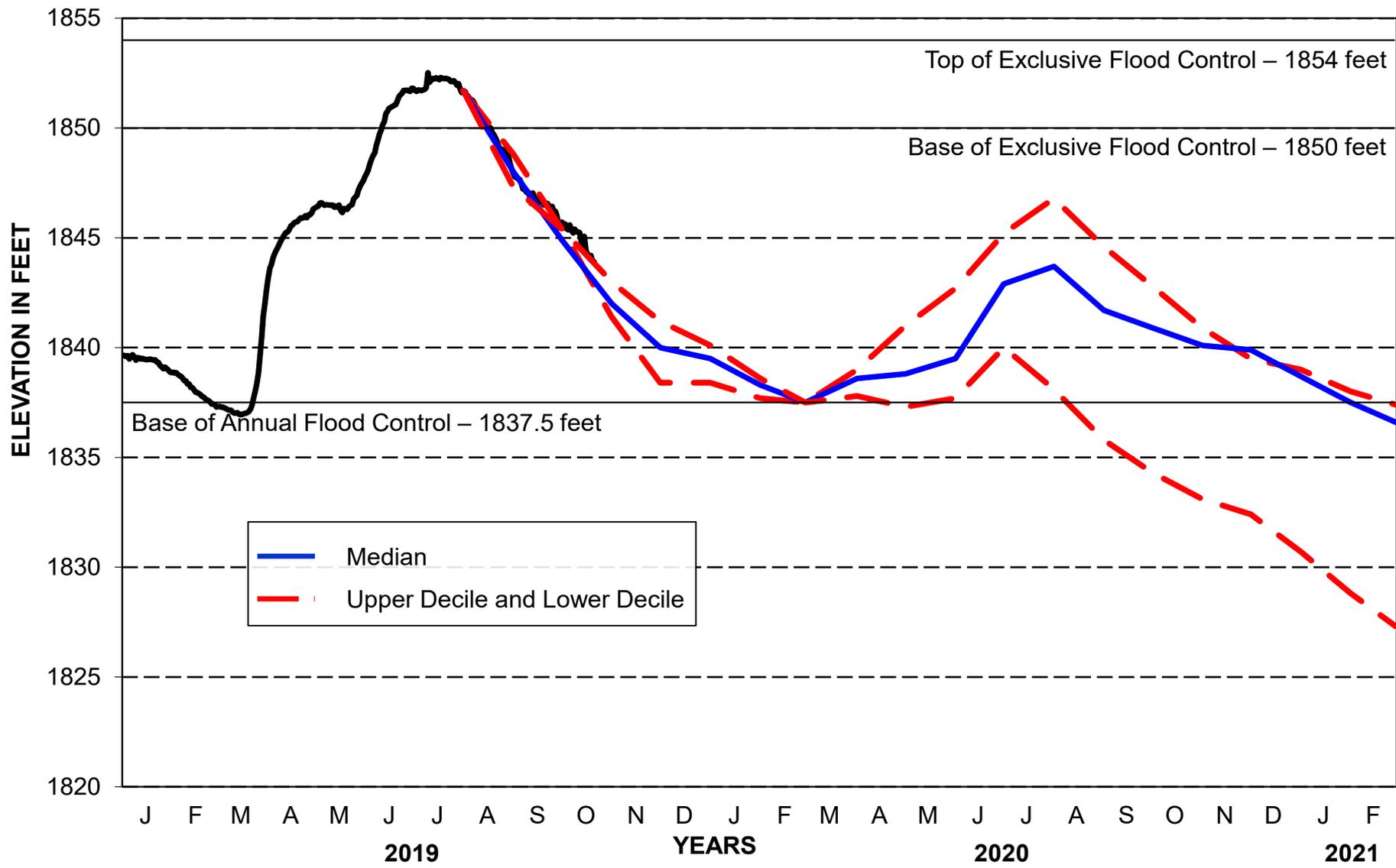


FORT PECK - 2019-2020 DRAFT AOP



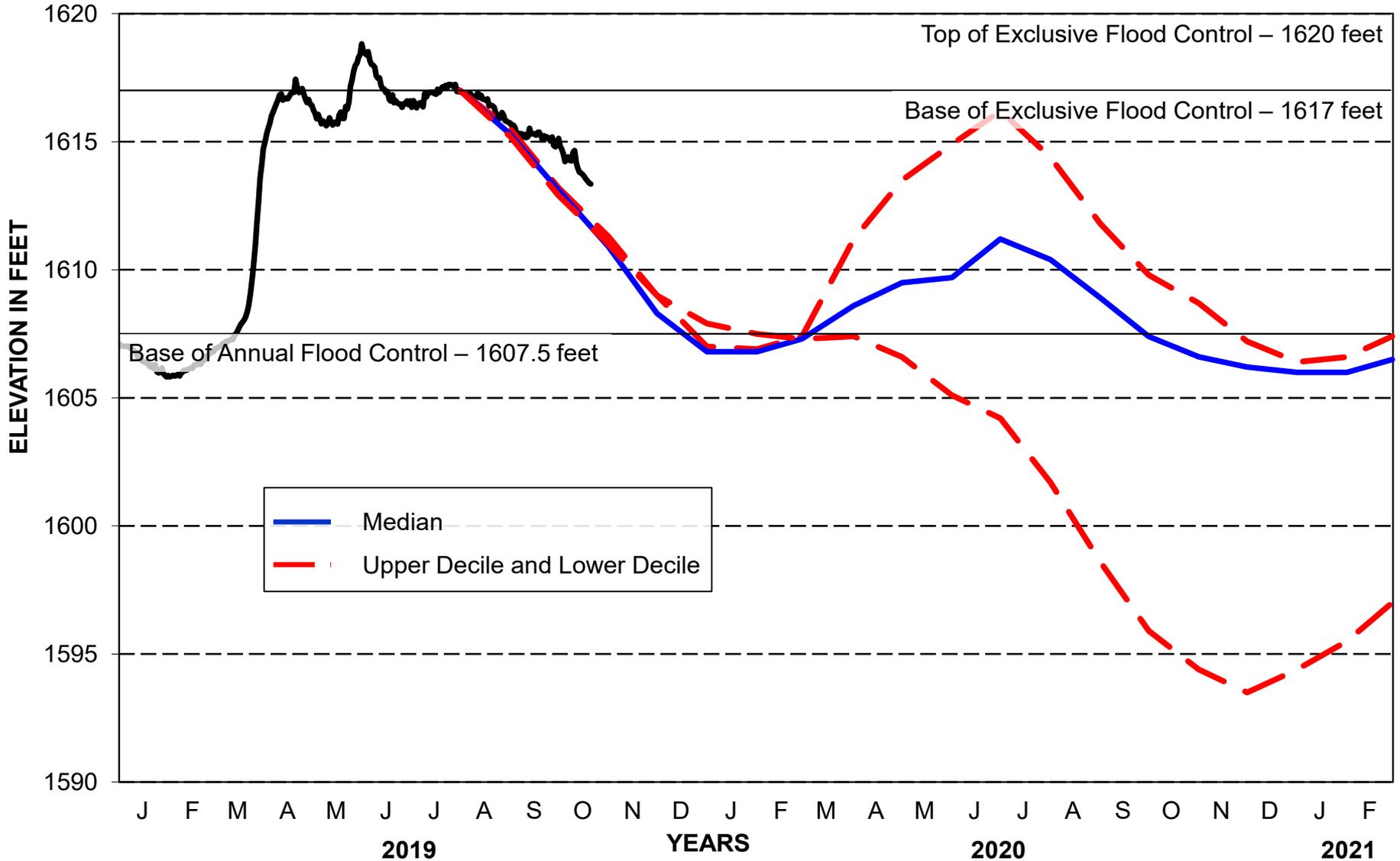


GARRISON - 2019-2020 DRAFT AOP



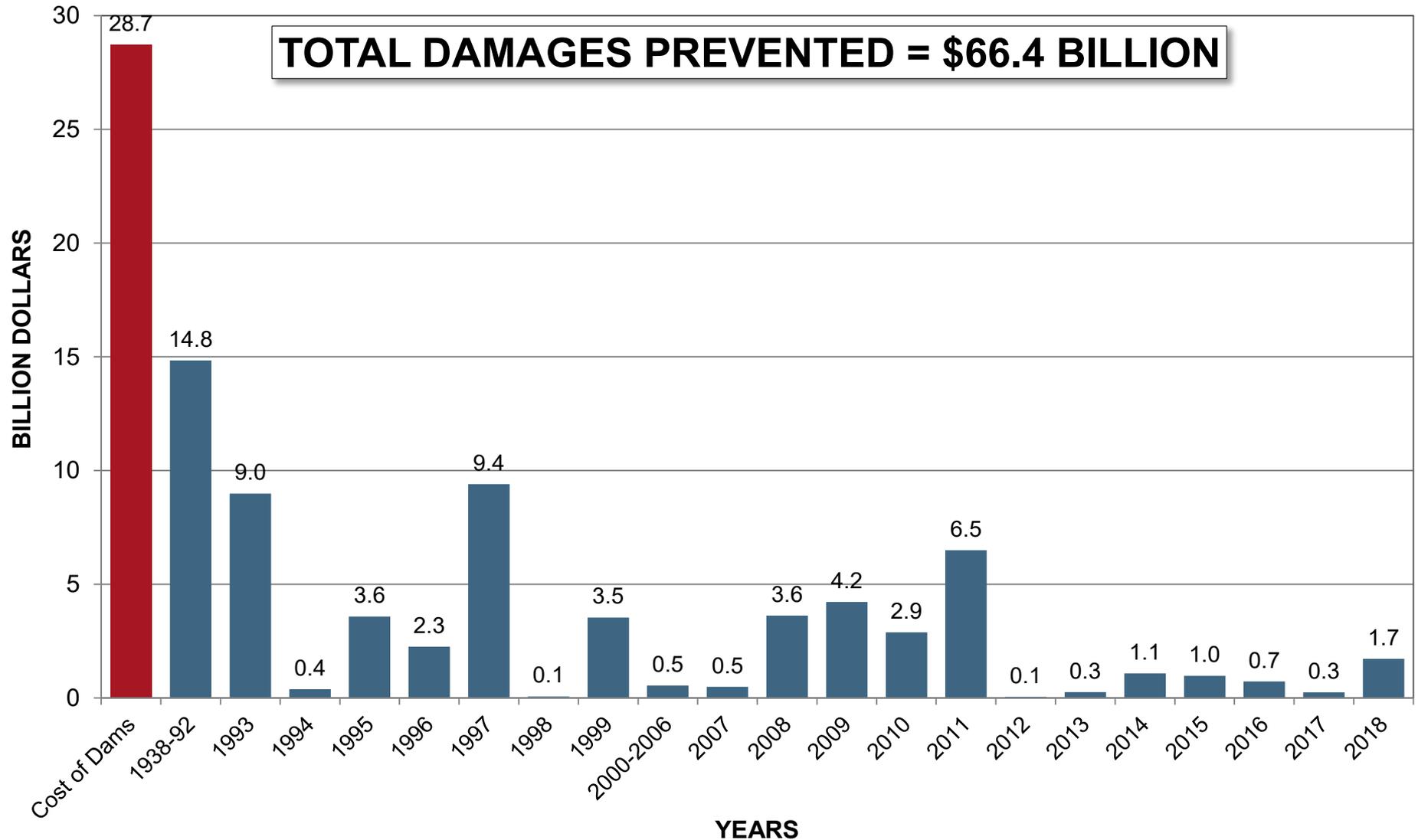


OAHE - 2019-2020 DRAFT AOP





FLOOD DAMAGES PREVENTED BY MAINSTEM DAMS INDEXED TO 2018 LEVELS





FLOOD CONTROL



- 2019
 - All 2018 flood water evacuated from reservoir system by mid-January
 - System storage peaked on July 20 at 68.5 MAF, utilizing 77 percent of the System's flood control storage

- 2020
 - All scenarios start next year's runoff season at the base of the annual flood control zone
 - Flooding can still occur due to downstream rainfall
 - Ability to reduce downstream stages diminishes as you move downstream due to increased travel times and uncontrolled drainage area



NAVIGATION



- 2019 – Full service(+), 10-day extension to flow support
- 2020 – March 15 storage check
 - Full service flow support
- 2020 – July 1 storage check
 - Full length season (all runoff scenarios)
 - Full service(+), 10-day extension for upper quartile and upper decile runoff
 - Full service level flow support for lower quartile and median runoff
 - Slight reduction in flow support for lower decile runoff



WATER SUPPLY – WATER QUALITY IRRIGATION – RECREATION



- 2019
 - Above average elevations and releases
 - Water supply intakes, recreation areas, irrigation and marinas

- 2020
 - No access issues expected
 - Gavins Point winter releases of 17 kcfs with median runoff



FISH AND WILDLIFE



- Steady to rising pool levels at upper three reservoirs during forage fish spawn
 - Favor Garrison if runoff not sufficient
- Minimize periods of zero releases at Fort Randall, to the extent possible
- Coldwater habitat will be monitored



ENDANGERED SPECIES ACT OF 1973



*Each Federal Agency shall...
ensure that any action authorized, funded, or carried out by such
agency...*

*is not likely to jeopardize the continued existence of any endangered or
threatened species or result in the destruction or adverse modification of
habitat...*



Interior Least Tern
Listed "Endangered" 1986



Pallid Sturgeon
Listed "Endangered" 1990



Piping Plover
Listed "Threatened" 1986



THREATENED AND ENDANGERED SPECIES

2019 PIPING PLOVER AND LEAST TERN



- High runoff in 2019 resulted in accelerated sandbar erosion and many flooded nests on reservoirs and in river reaches
- High runoff resulted in reduced habitat on reservoirs and in river reaches
 - High nesting density and predation limited productivity, especially in the southern region
- Counts of adult birds declined from previous years, but populations remain high



THREATENED AND ENDANGERED SPECIES

2020 PIPING PLOVER AND LEAST TERN



- Gavins Point releases
 - Steady release – flow to target
 - Daily release cycle
- Intra-day peaking patterns – Garrison & Fort Randall
- Measures to minimize take



THREATENED AND ENDANGERED SPECIES BI-MODAL SPRING PULSE – PALLID STURGEON



Missouri River Recovery Management Plan and EIS completed in November 2018

- Analyzed impacts of removing current spring pulse criteria
- Following the MRRMP-EIS Record of Decision, the Gavins Point bi-modal spring pulse was removed from the revised Master Manual
- Reservoir unbalancing removed from revised Master Manual



SUMMARY



- Above-average releases during the fall and winter to evacuate stored flood waters
- All designated flood storage available to start 2020 runoff season
- Will closely monitor mountain and plains snowpack accumulation this winter
- Snowpack melt in 2020 spring will likely be on very wet soils



THANK YOU!

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nwd.usace.army.mil/MRWM

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