

MISSOURI RIVER BASIN WATER MANAGEMENT

SPRING 2019 PUBLIC MEETINGS

April 9	11:00 a.m.	Fort Peck, MT
April 9	6:00 p.m.	Bismarck, ND
April 10	10:00 a.m.	Pierre, SD
April 10	4:00 p.m.	Sioux City, IA
April 11	11:00 a.m.	Smithville, MO
April 11	5:00 p.m.	Nebraska City, NE



US Army Corps
of Engineers®



NATIONAL WEATHER SERVICE

SPRING FLOOD OUTLOOKS



National Weather Service Issues two “Spring Flood Outlooks” every year

- 21 February 2019
- 06 March 2019

Outlooks consists of a text product, as well as graphics.

Two associated webinar briefings are provided to State and Local officials, congressional staff, FEMA, Coast Guard, USACE, USGS, Bureau of Reclamation, and the National Guard. (22 Feb and 07 March).

Covers entire Mississippi River drainage

- North Central River Forecast Center
- Missouri Basin River Forecast Center
- Ohio River Forecast Center
- Arkansas-Red River Forecast Center
- Lower Mississippi River Forecast Center

21 February 2019 outlook indicated “enhanced” risk over eastern portion of Missouri River basin, and highlighted potential major flooding along the James, Vermillion, Little and Big Sioux Rivers. Model runs indicated risk for major at Brownville, St. Joseph, and Glasgow on the Missouri.

06 March 2019 outlook indicated “greatly enhanced” risk over eastern portion of Missouri River basin, and highlighted potential major flooding along James, Vermillion, Little and Big Sioux, North Fork Elkhorn, Wood, Floyd, and Tarkio Rivers. Model runs indicated risk for major at Brownville, Rulo, St. Joseph, Atchison, Leavenworth, Sibley, Miami, and Glasgow on the Missouri River.



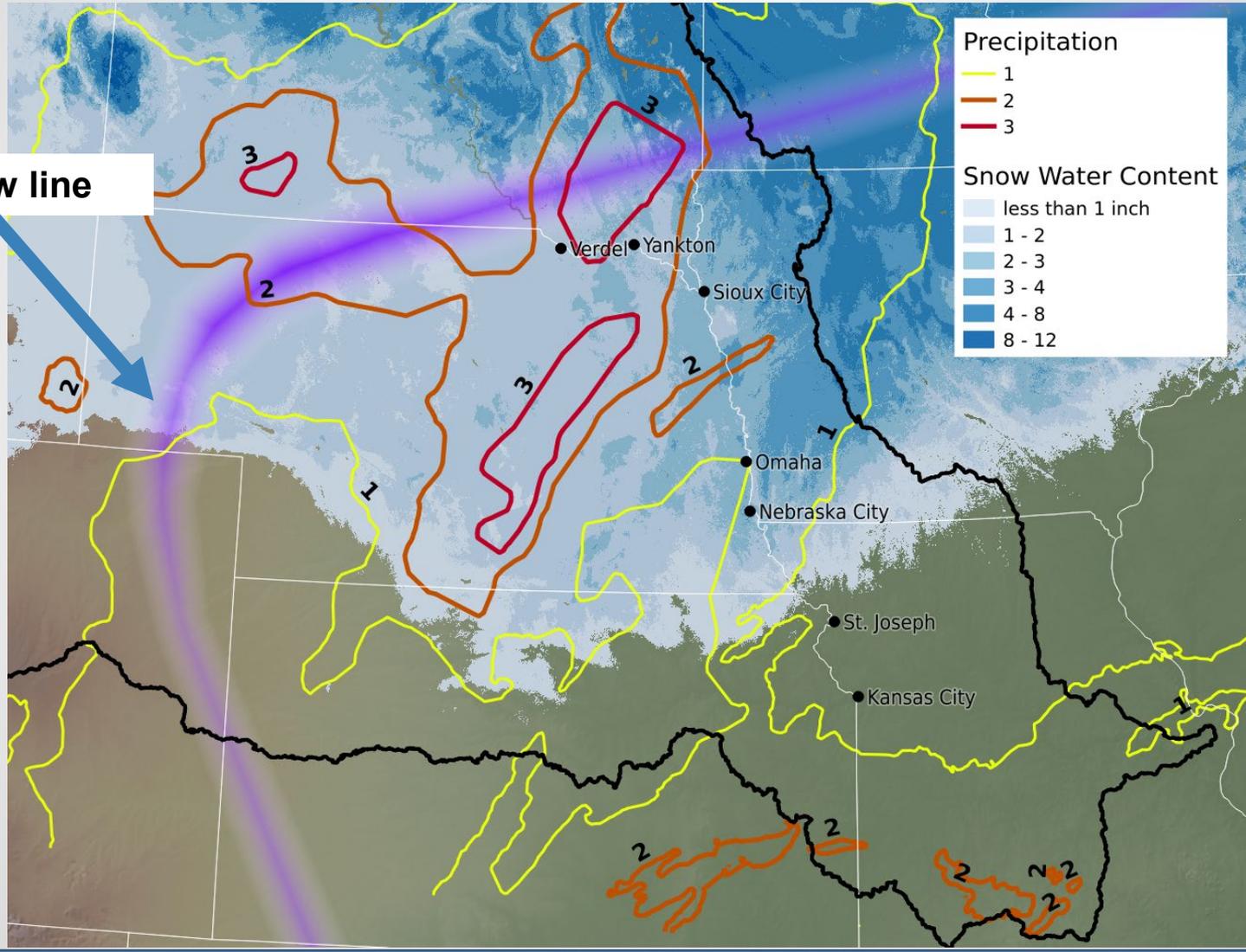


NATIONAL WEATHER SERVICE



Rain-on-Snow Event of March 12th-14th 2019

Rain-Snow line



Precipitation

- 1
- 2
- 3

Snow Water Content

- less than 1 inch
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 8
- 8 - 12

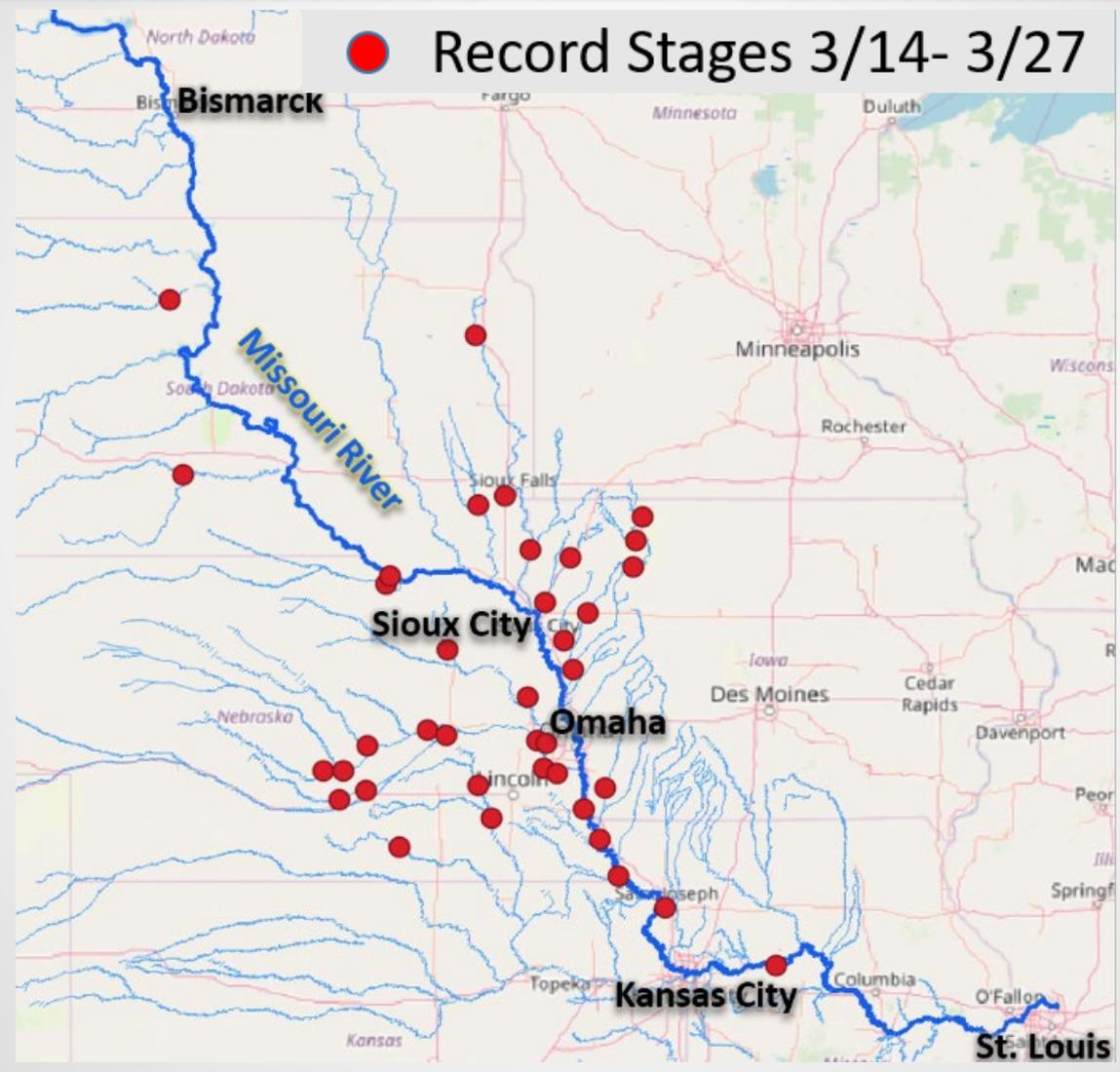




NATIONAL WEATHER SERVICE

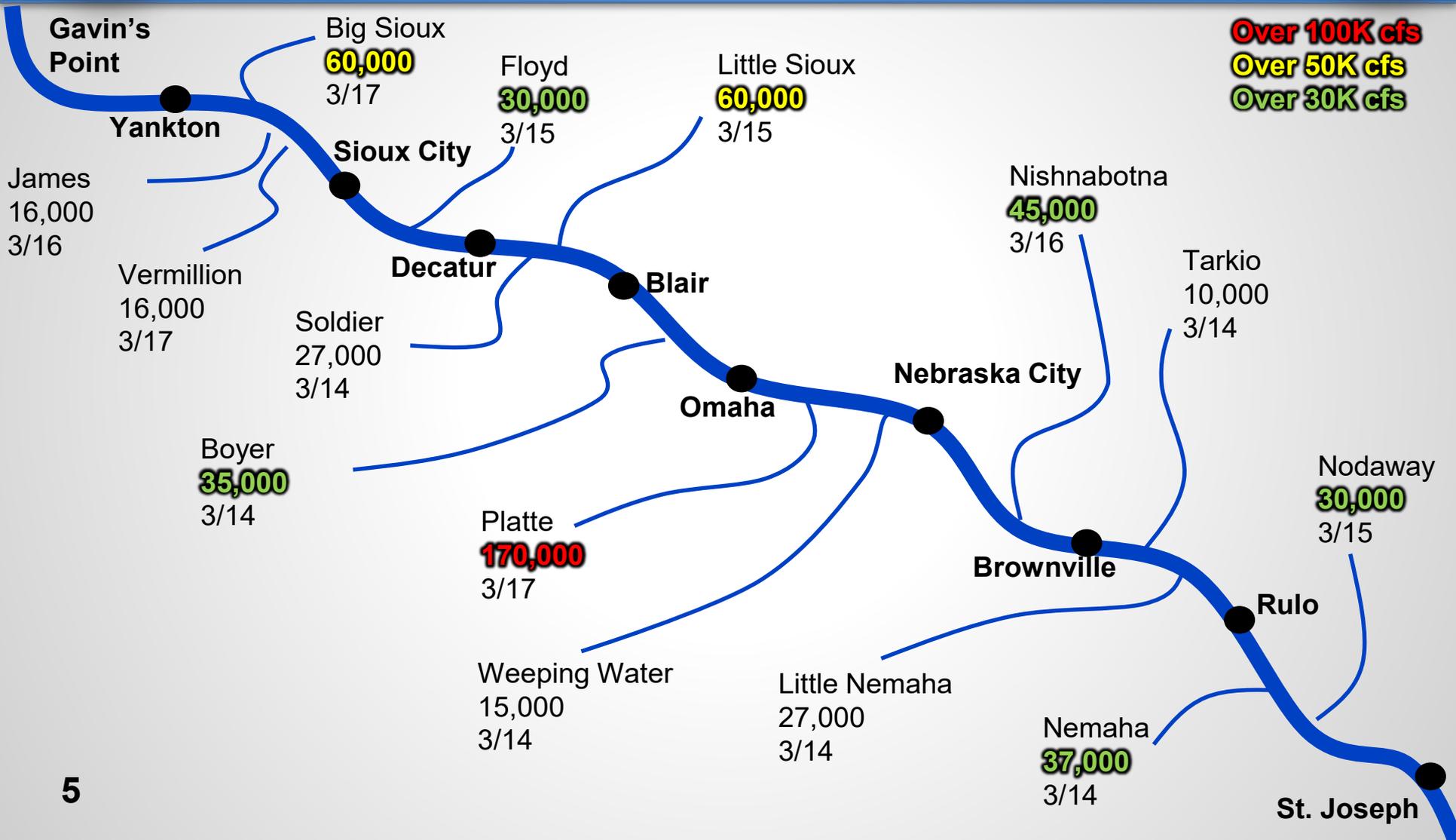


Mid-March 2019 Event





National Weather Service Estimated Tributary Peak Flows



Over 100K cfs
Over 50K cfs
Over 30K cfs





NATIONAL WEATHER SERVICE



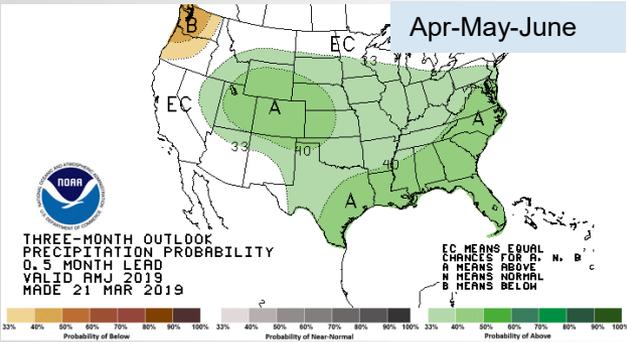
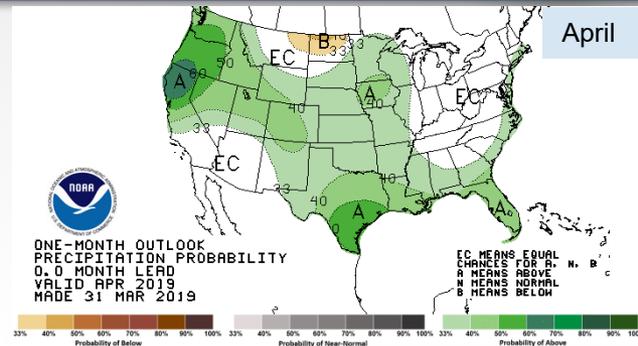
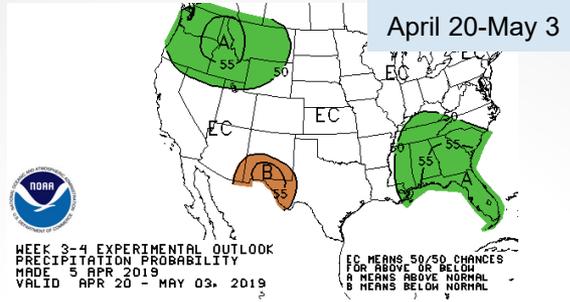
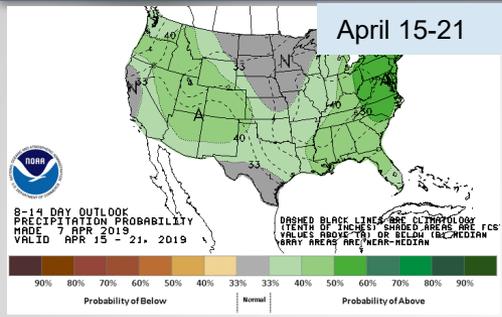
Mid-March 2019 Event

- The Missouri Basin River Forecast Center issues daily forecasts for 22 locations on the Missouri and Kansas Rivers. Another 400 locations are monitored each day, with forecasts issued when flood conditions are expected or are occurring. The River Forecast Center is also capable of providing inflow forecasts for 81 reservoirs.
- Short-term river and reservoir inflow forecasts utilize 48-hours of anticipated precipitation Oct 1- March 31. (From April 1- September 30 24-hours of anticipated precipitation is used).
- Mid-March rain-on-snow event began overnight hours of Tuesday-Wednesday, March 12th-13th.
- Initial forecasts:
 - Missouri River (Nebraska City—Atchison) issued Saturday 9:56 AM
 - Nishnabotna River issued Saturday 7:22 PM
 - Platte River issued Sunday 12:04 PM
 - Gavins Point inflow issued Tuesday 10:33 AM
 - Niobrara River issued Wednesday 9:33 AM
- River forecasts are updated at least twice per day during flooding.
- Gavins Point inflow forecasts issued 2X day beginning Tuesday, March 12th
- Oahe, Big Bend, and Ft. Randall inflow forecasts began Tuesday, March 19th
- MBRFC in daily communications with USACE Missouri Basin Water Management regarding reservoir plans, and the 2 USACE Districts regarding levee status. USACE engineer embed 20-23 March.





NATIONAL WEATHER SERVICE Outlooks



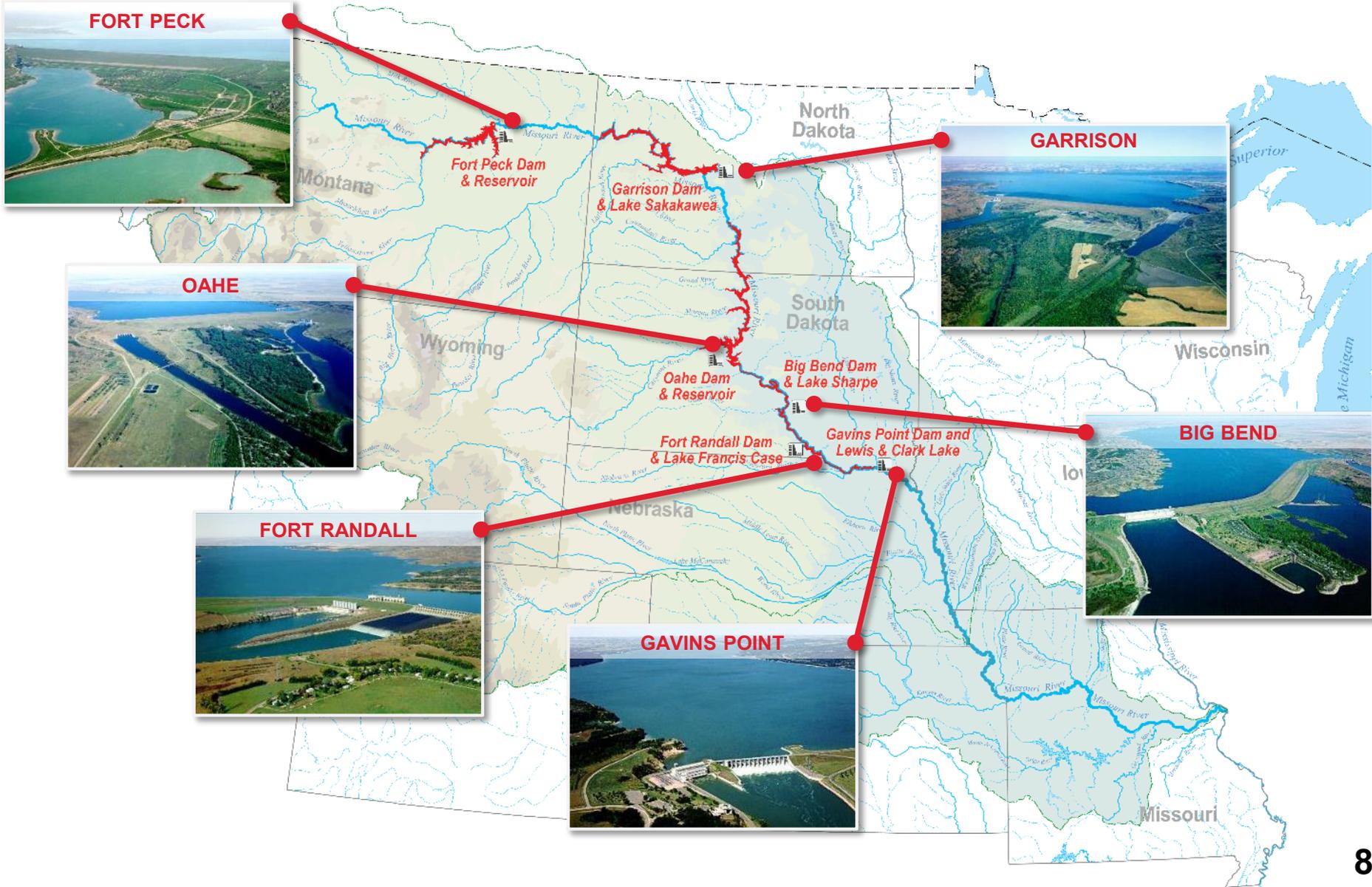
RIVER OUTLOOKS

- Mountain snowpack nearing accumulating peak; significant flooding due to snowmelt not likely.
- Plains snowpack all but gone.
- River ice conditions improving.
- Missouri River Basin above Ft. Peck cresting early June.
- Yellowstone River Basin cresting early June.
- Milk River Basin has already experienced its seasonal crest.
- James River: North Dakota cresting now; South Dakota crest mid-to-late April. Mouth will remain steady-to-falling.
- Little and Big Sioux have already experienced seasonal crest. Lower Big Sioux now experiencing second, much lower crest.
- Platte River system cresting mid June.
- Plains soils are wet; plains are vulnerable to renewed flooding.
- Eastern portion of basin remains at enhanced risk for flooding next 3 months, including the Missouri River below Nebraska City.





MISSOURI RIVER MAINSTEM RESERVOIR SYSTEM





OUR MISSION



Regulate Missouri River Mainstem Reservoirs to Support Congressionally Authorized Purposes



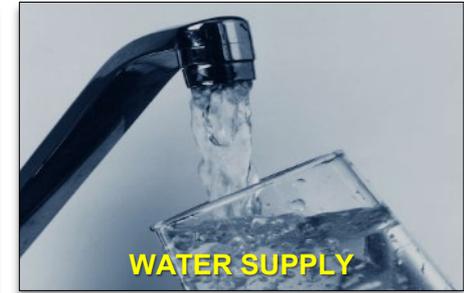
FLOOD CONTROL



NAVIGATION



HYDROPOWER



WATER SUPPLY



FISH & WILDLIFE (T&E)



IRRIGATION



WATER QUALITY CONTROL



RECREATION



Flood Control



Navigation



Hydropower



Water Supply



Fish & Wildlife
including
Threatened &
Endangered
Species



Irrigation



Water Quality
Control

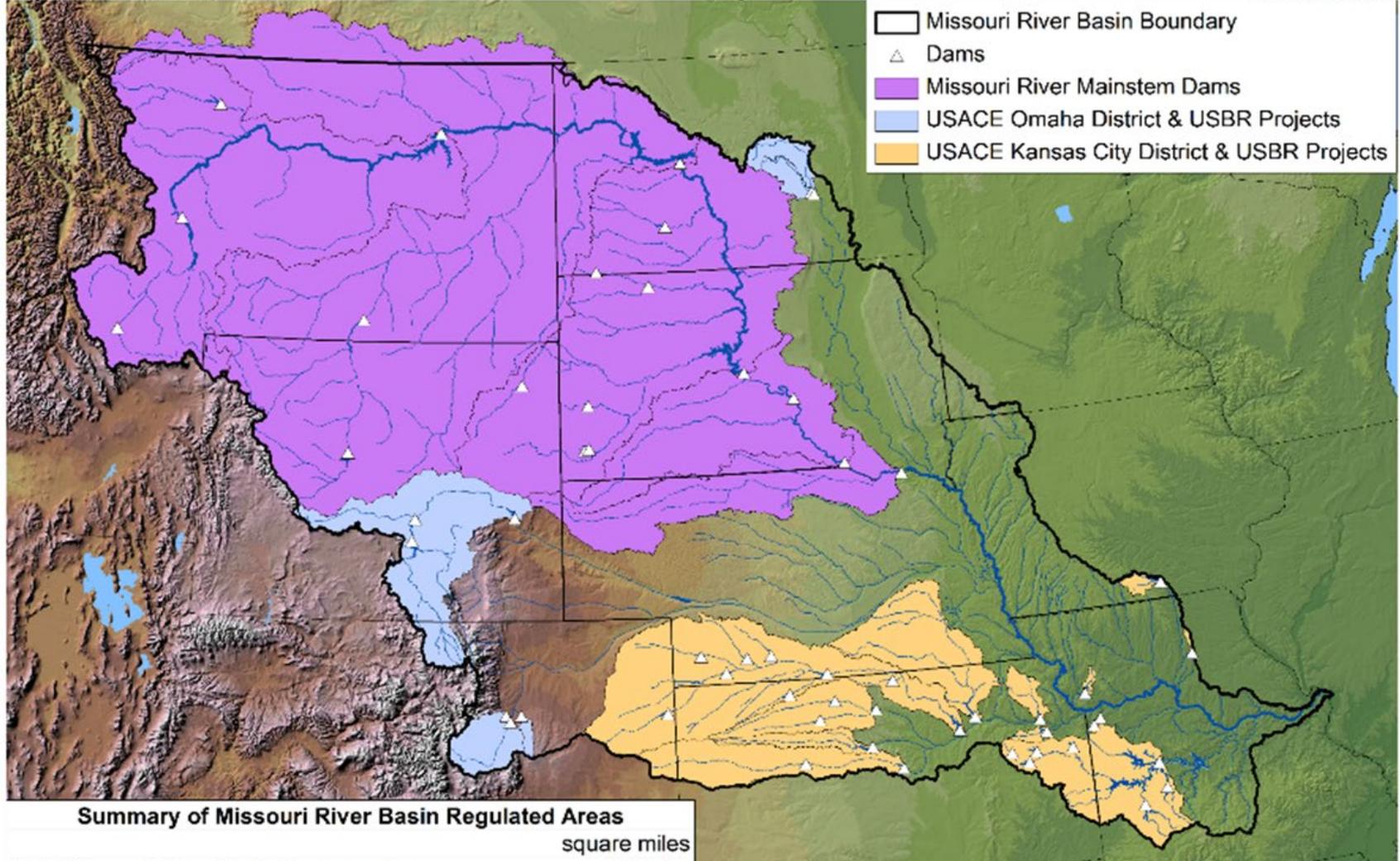


Recreation

Missouri River Basin Regulated Watersheds

Background: North America Relief Map

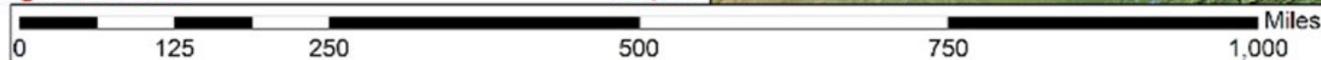
USACE NWO March 2016



- Missouri River Basin Boundary
- Dams
- Missouri River Mainstem Dams
- USACE Omaha District & USBR Projects
- USACE Kansas City District & USBR Projects

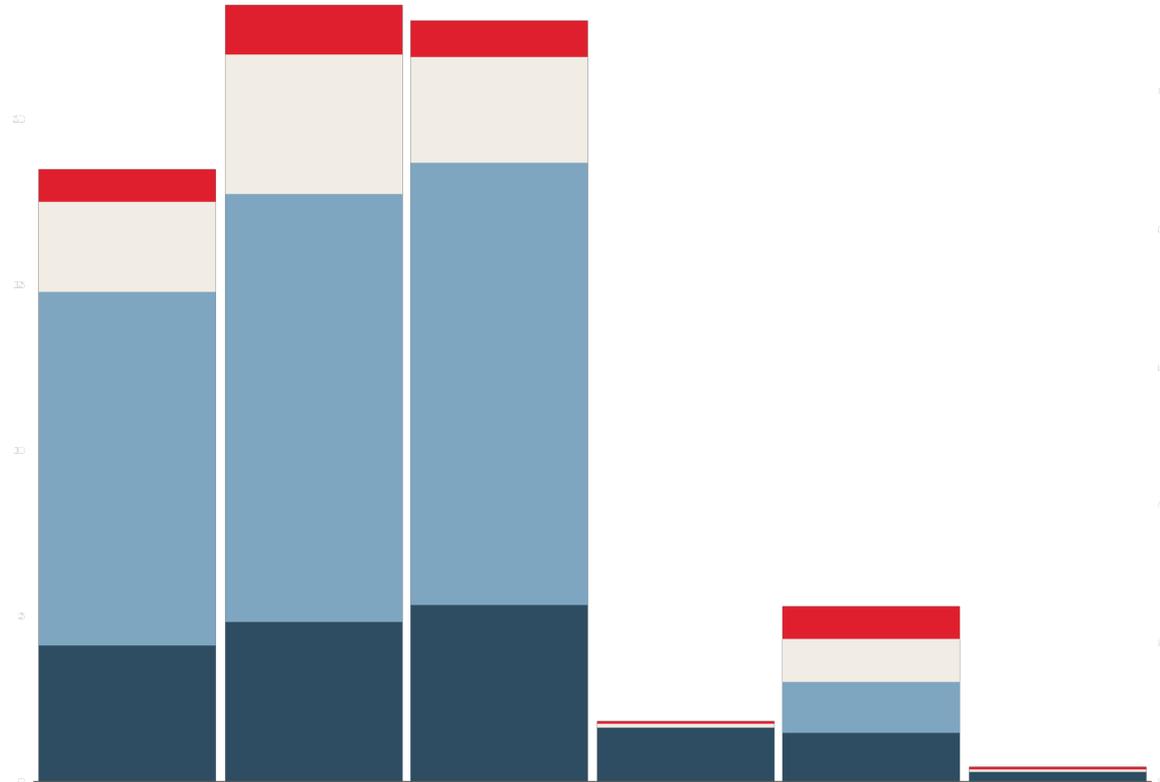
Summary of Missouri River Basin Regulated Areas

	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





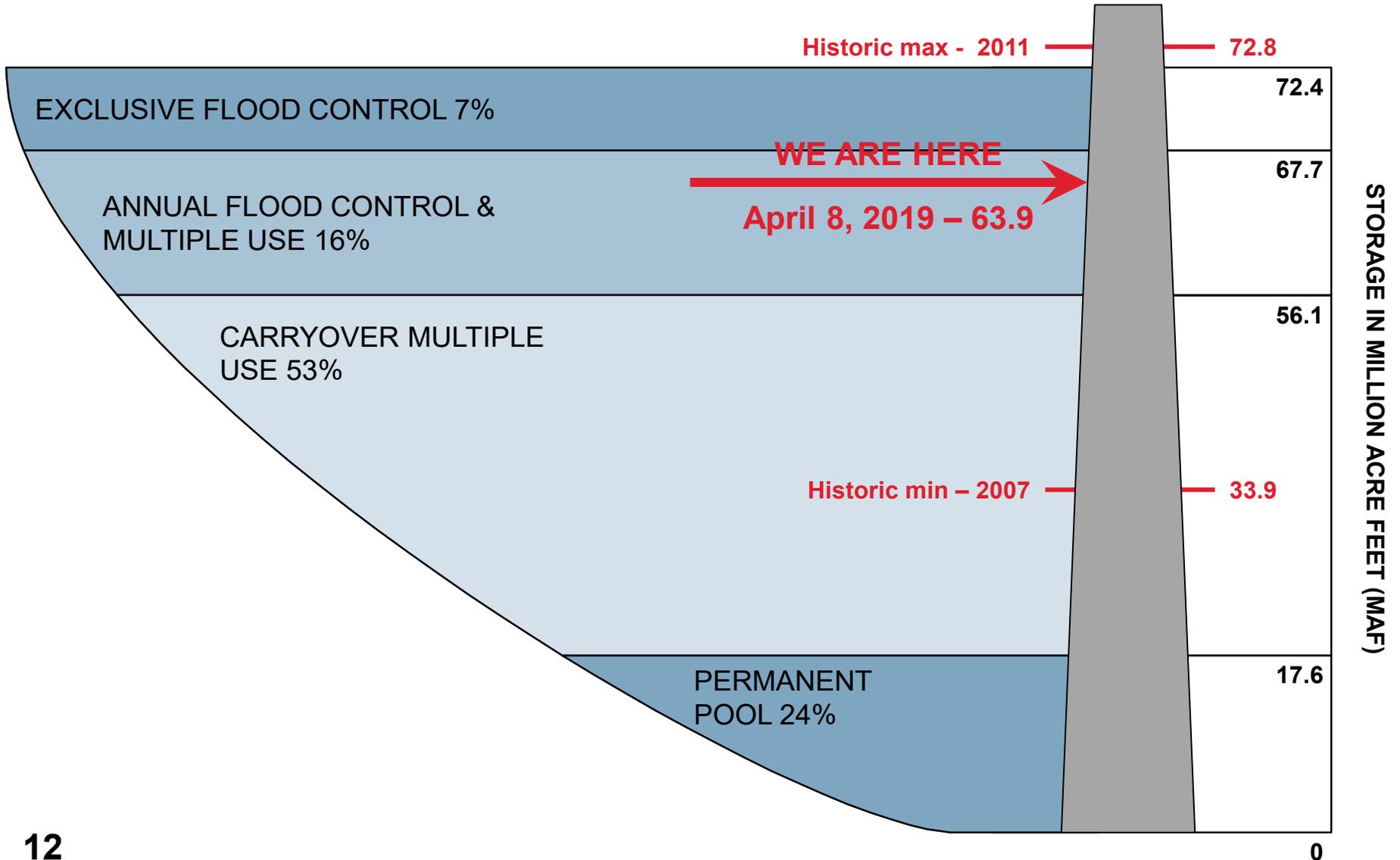
MAINSTEM PROJECTS - STORAGE



	Fort Peck	Garrison	Oahe	Big Bend	Fort Randall	Gavins Point
■ Exclusive Flood	0.971	1.495	1.107	0.061	0.986	0.054
■ Annual Flood	2.704	4.211	3.208	0.118	1.306	0.079
■ Carryover	10.7	12.951	13.353		1.532	
■ Permanent	4.088	4.794	5.315	1.631	1.469	0.295
Gross Storage in MAF	18.463	23.451	22.983	1.81	5.293	0.428
72.4 MAF System Storage	25%	32%	31%	3%	8%	1%
Accumulative %	25	57	88	91	99	100

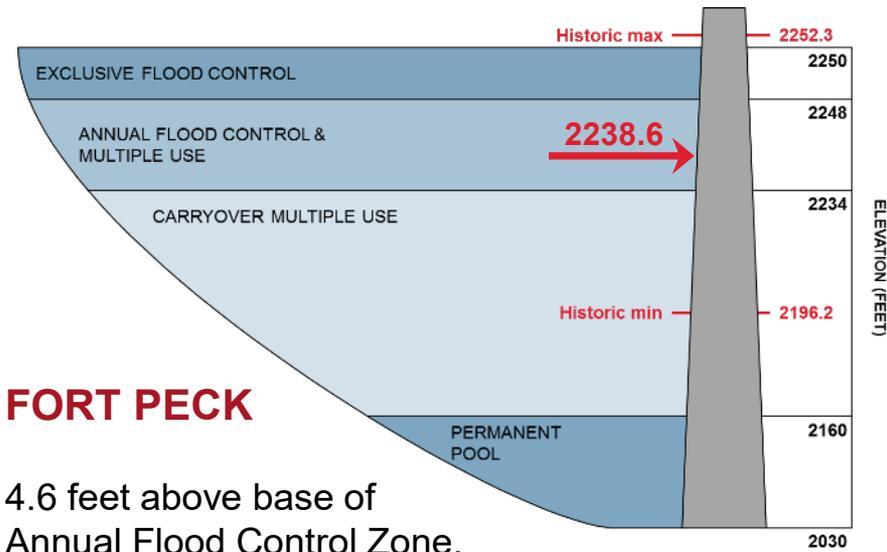


MISSOURI RIVER MAINSTEM SYSTEM STORAGE ZONES AND ALLOCATIONS

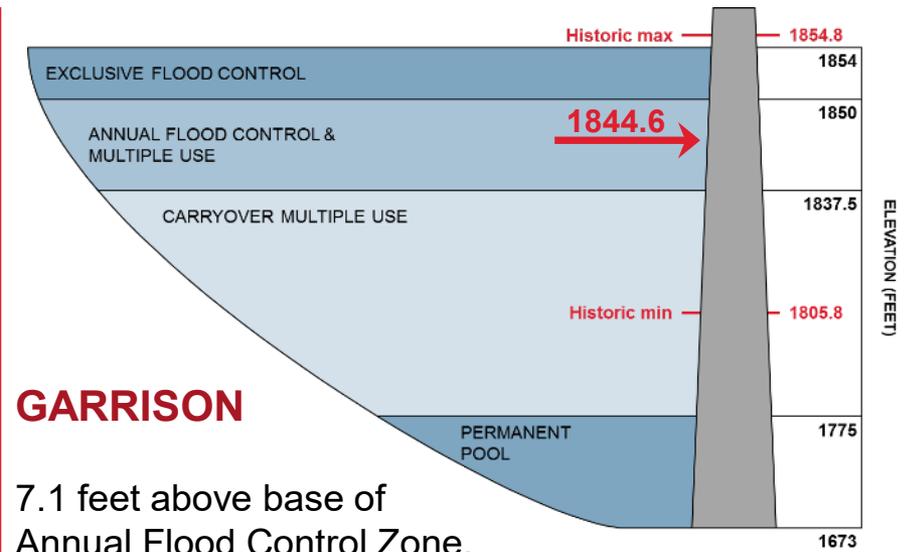




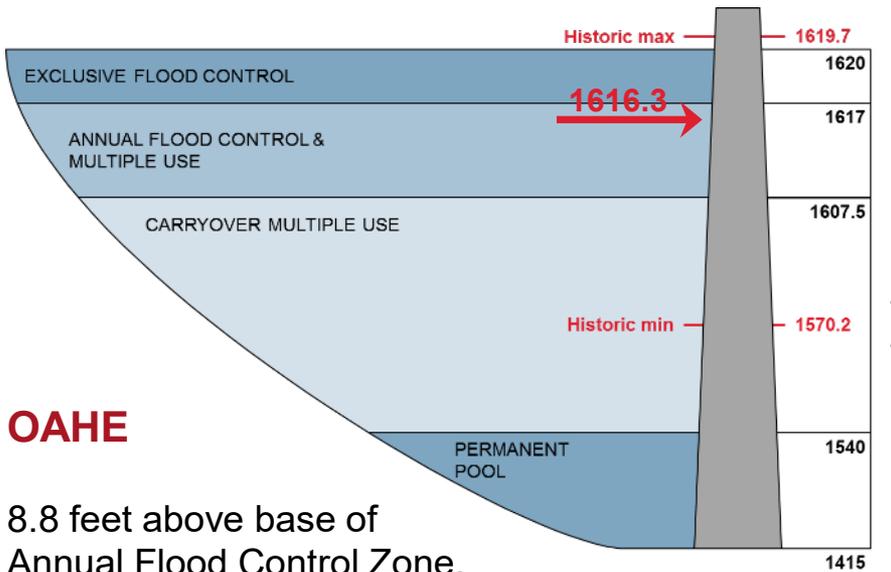
CURRENT RESERVOIR LEVELS – APRIL 8, 2019



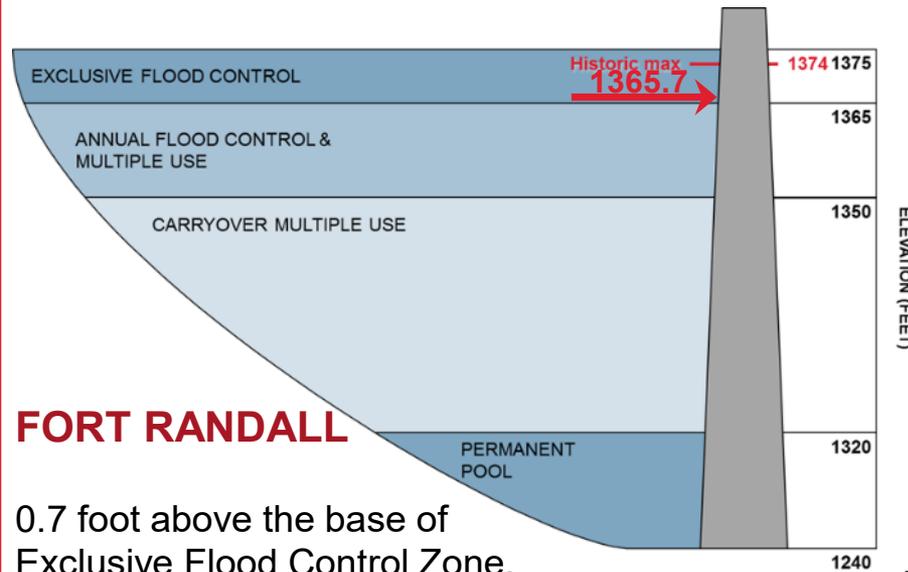
4.6 feet above base of Annual Flood Control Zone.



7.1 feet above base of Annual Flood Control Zone.



8.8 feet above base of Annual Flood Control Zone.



0.7 foot above the base of Exclusive Flood Control Zone.



RUNOFF COMPONENTS



PLAINS SNOWPACK

MOUNTAIN SNOWPACK

RAINFALL

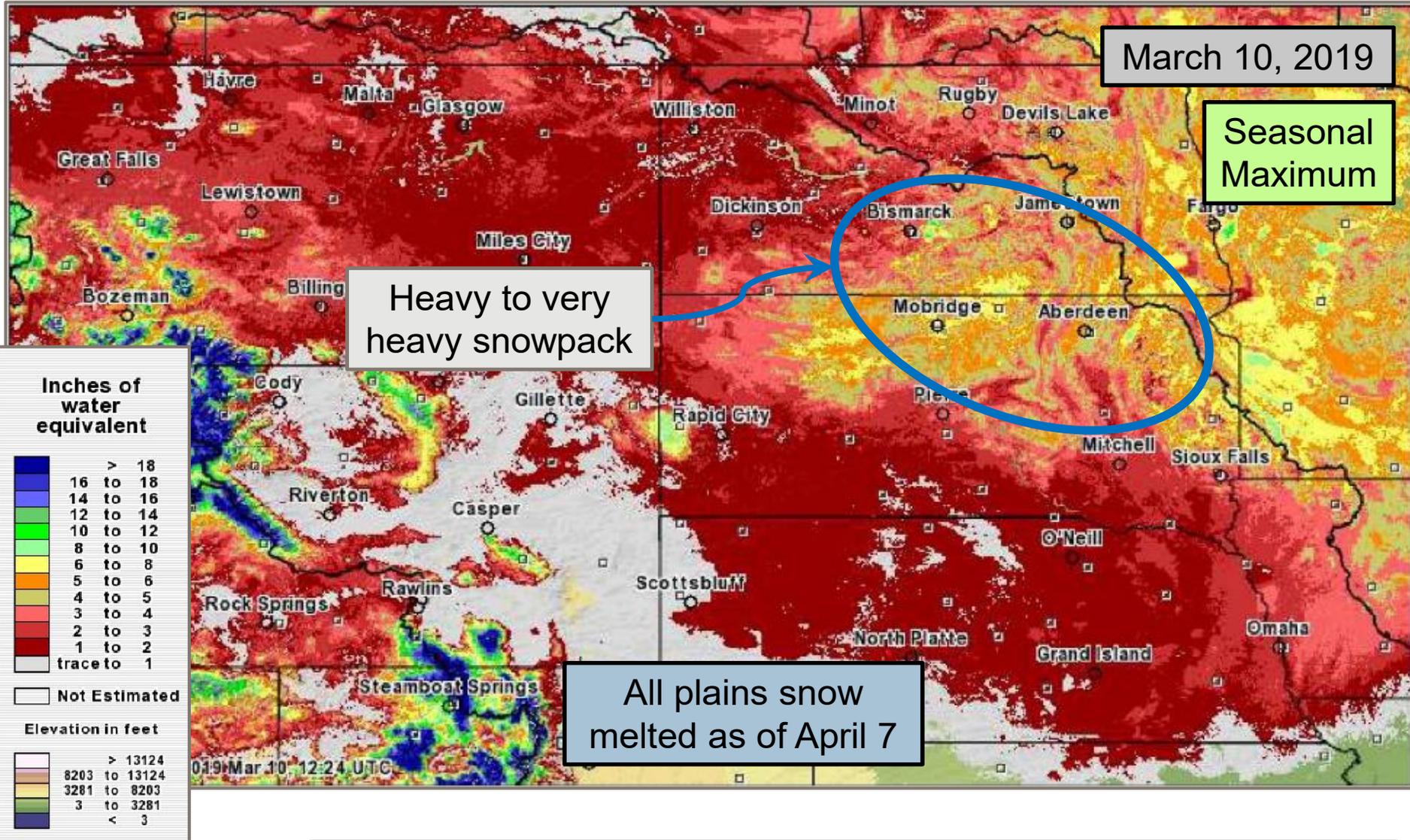


2019 FORECAST* = 38.2 MILLION ACRE FEET (MAF)

***APRIL 1 FORECAST – 151% OF AVERAGE**



PLAINS SNOWPACK



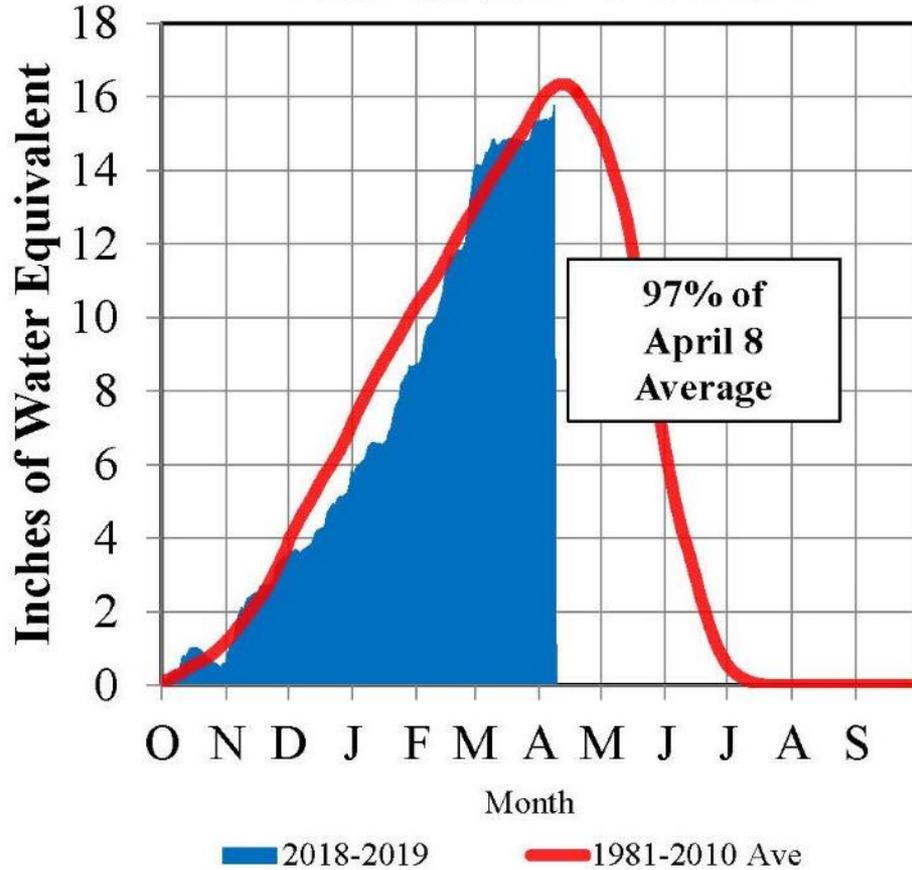


MOUNTAIN SNOWPACK - APRIL 8, 2019

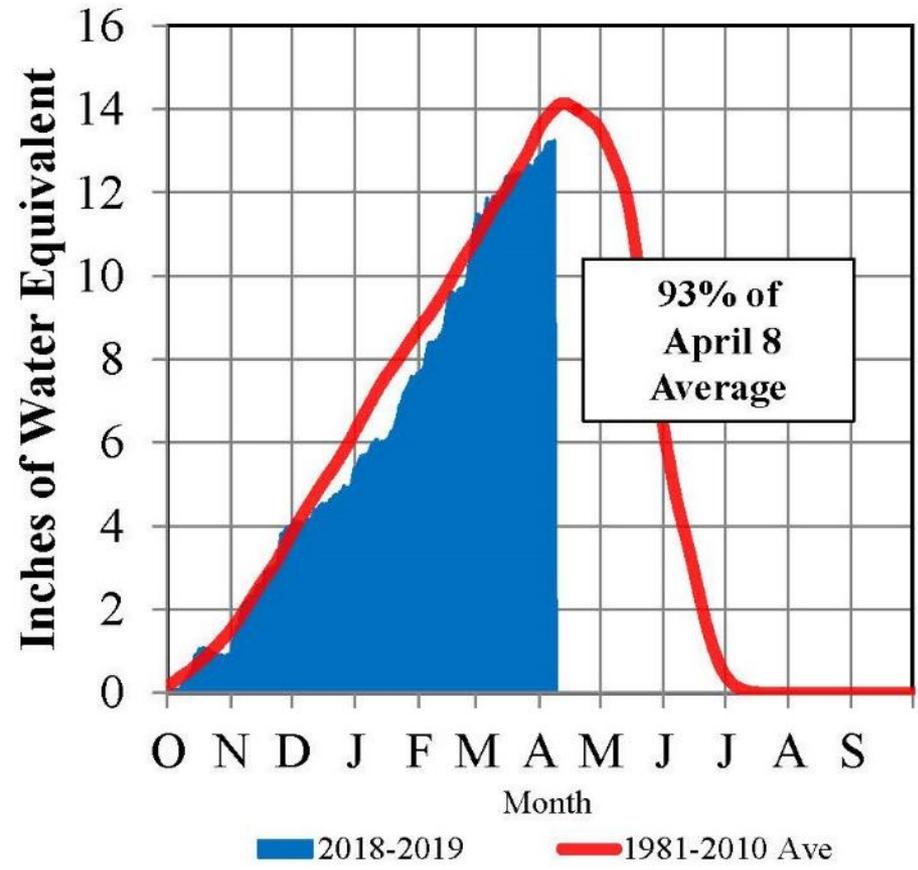


The Missouri River basin mountain snowpack normally peaks near April 15.

Total above Fort Peck



Total Fort Peck to Garrison

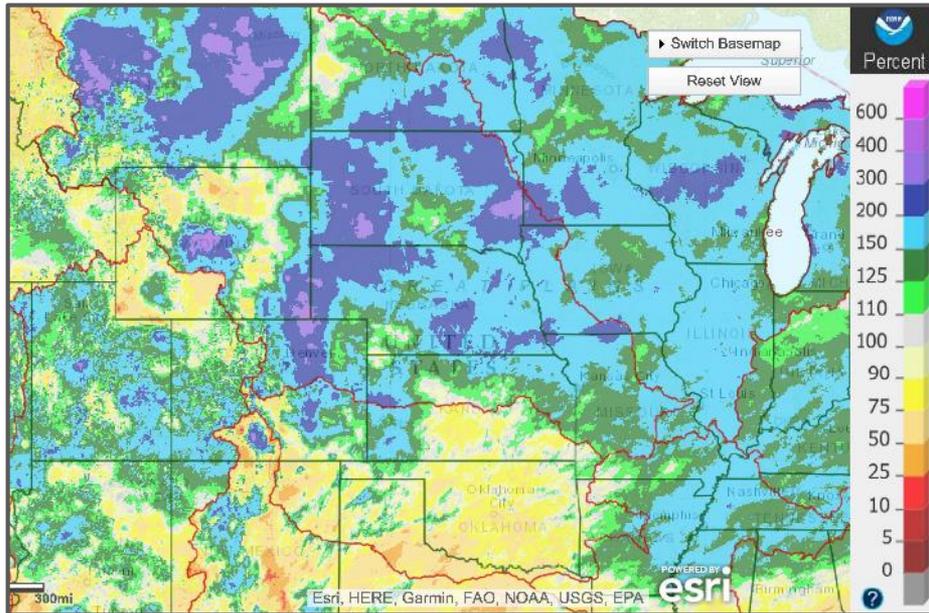




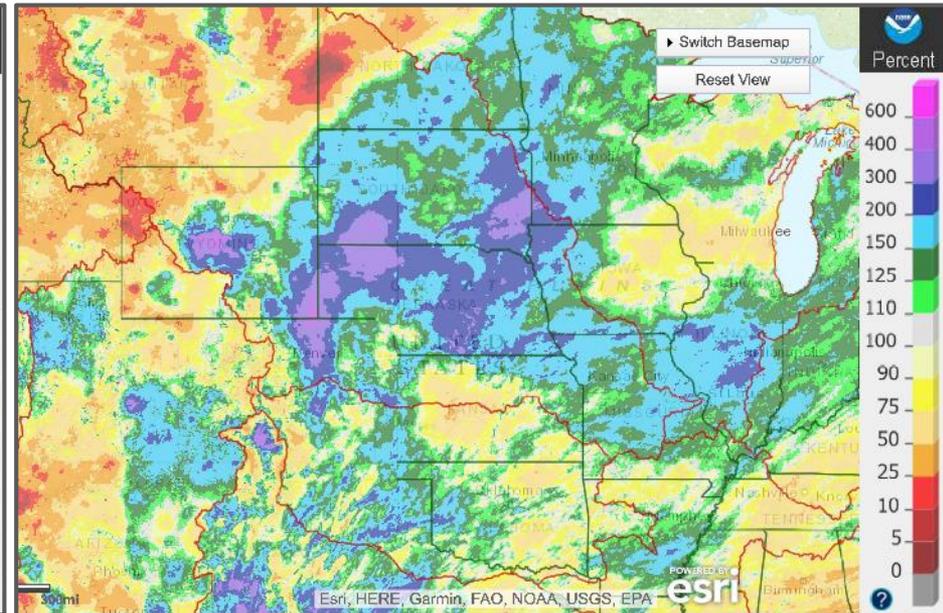
OBSERVED PRECIPITATION



Previous 90 Days

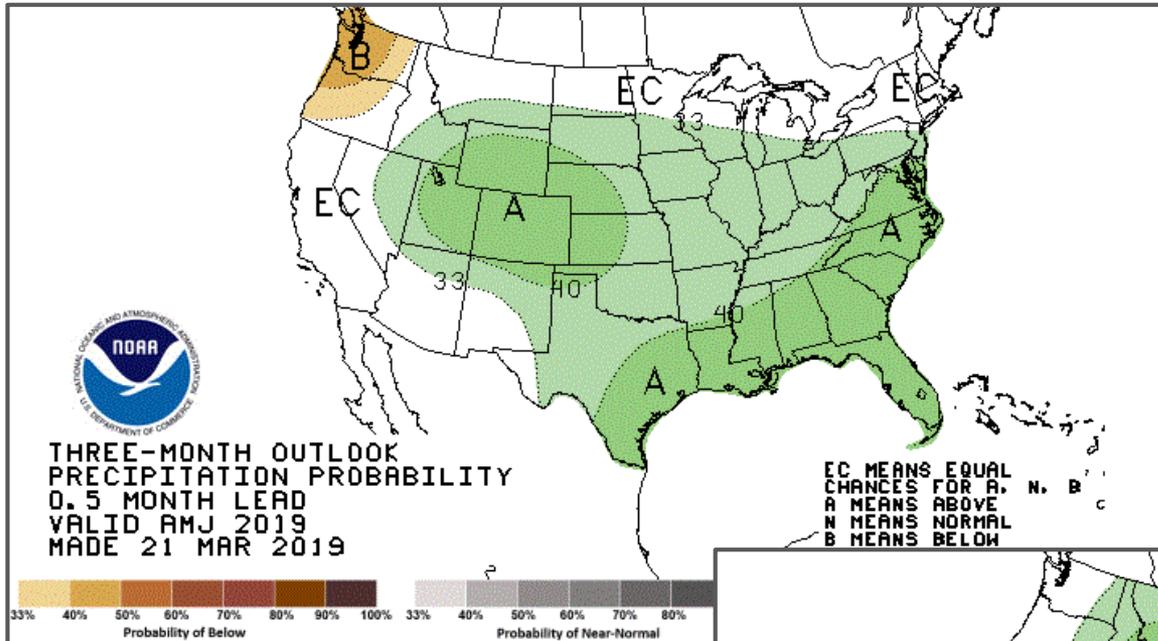


Previous 30 Days

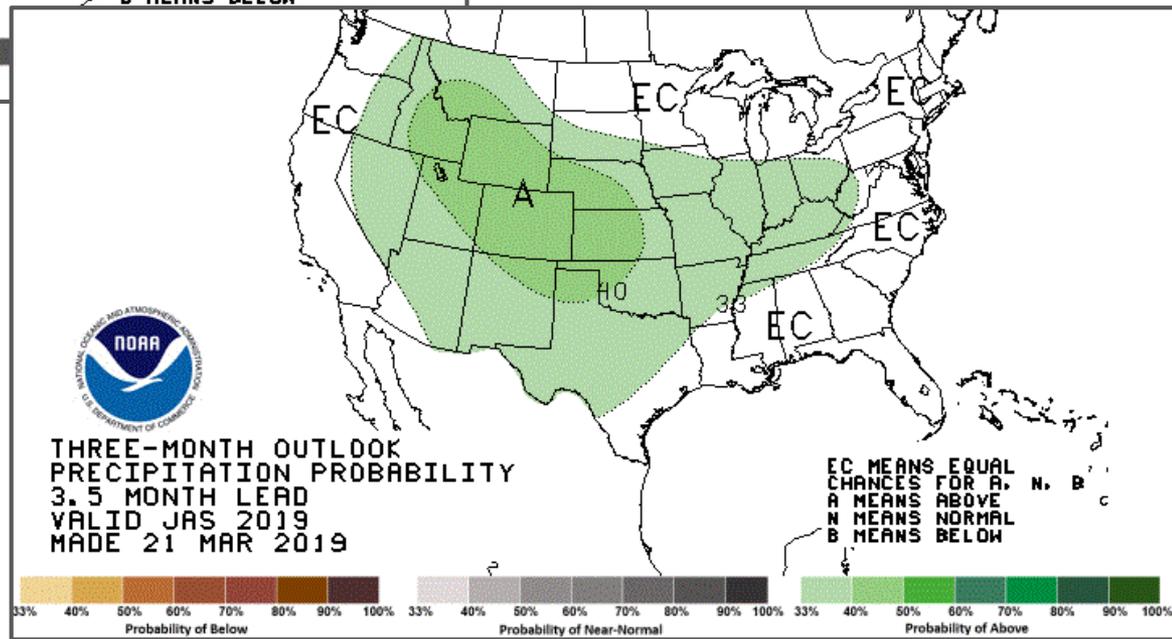




PRECIPITATION OUTLOOKS



Apr - May - Jun



Jul - Aug - Sep

Source: NOAA Climate Prediction Center

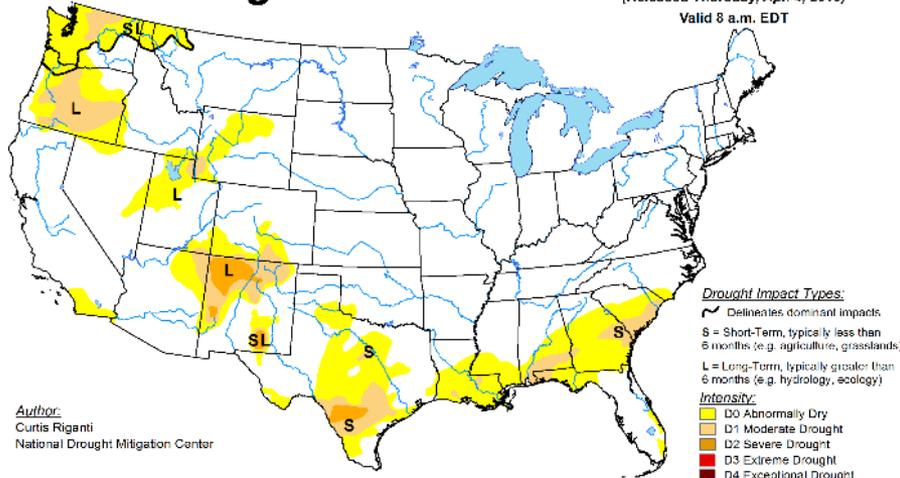


BASIN SOIL CONDITIONS

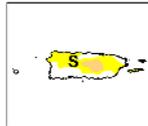
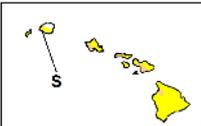
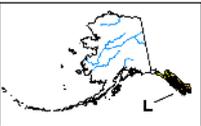


U.S. Drought Monitor

April 2, 2019
(Released Thursday, Apr. 4, 2019)
Valid 8 a.m. EDT

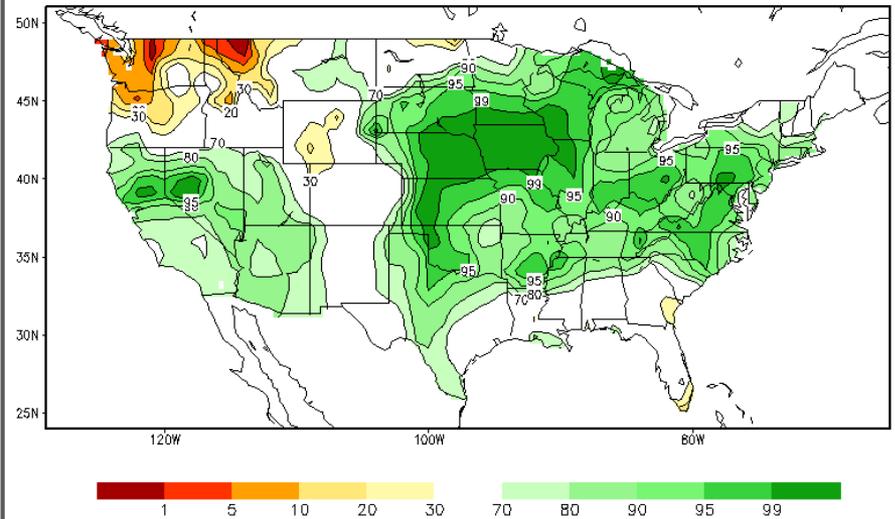


Author:
Curtis Riganti
National Drought Mitigation Center



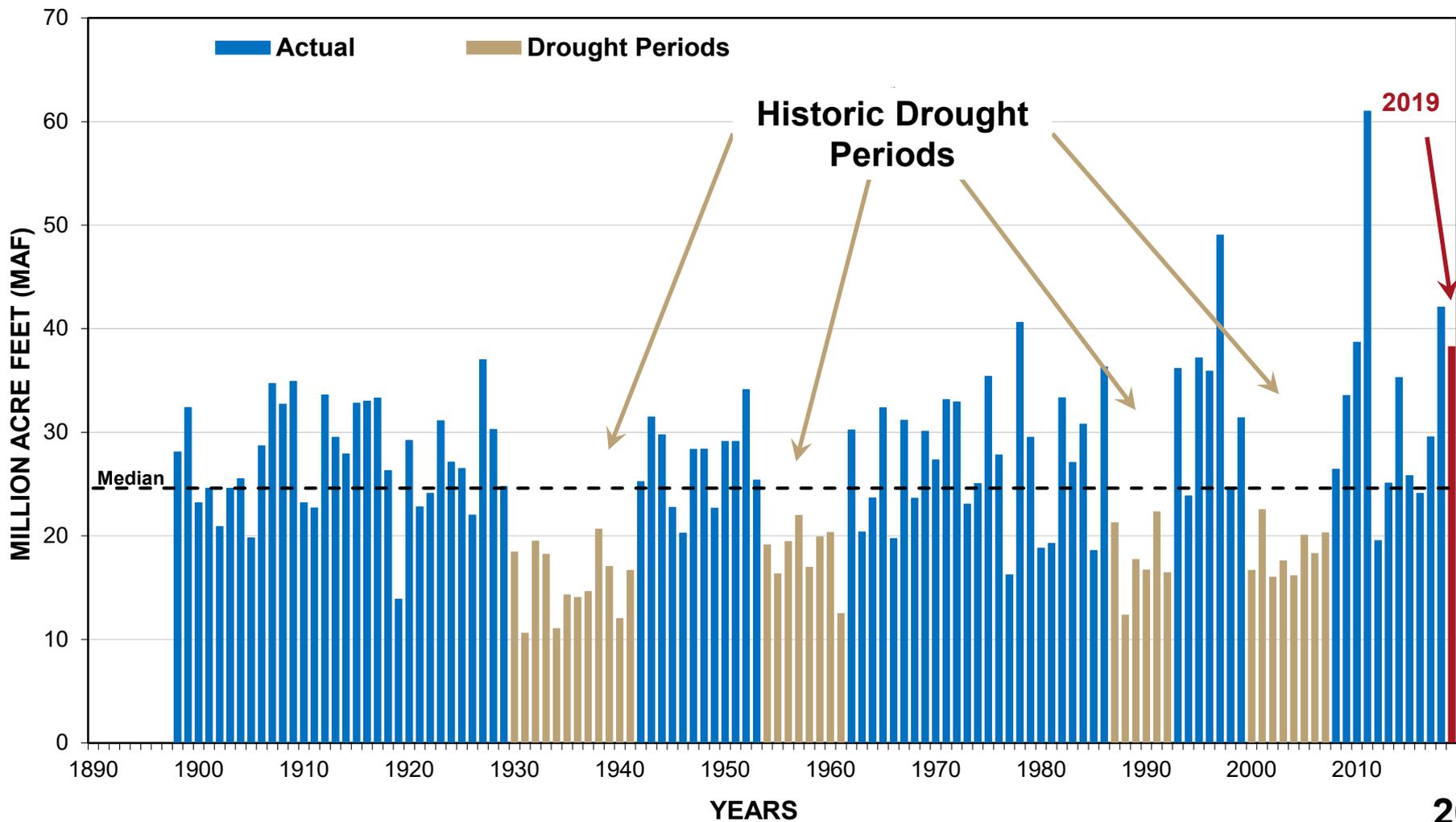
<http://droughtmonitor.unl.edu/>

Calculated Soil Moisture Ranking Percentile APR 06, 2019





ANNUAL RUNOFF ABOVE SIOUX CITY, IA

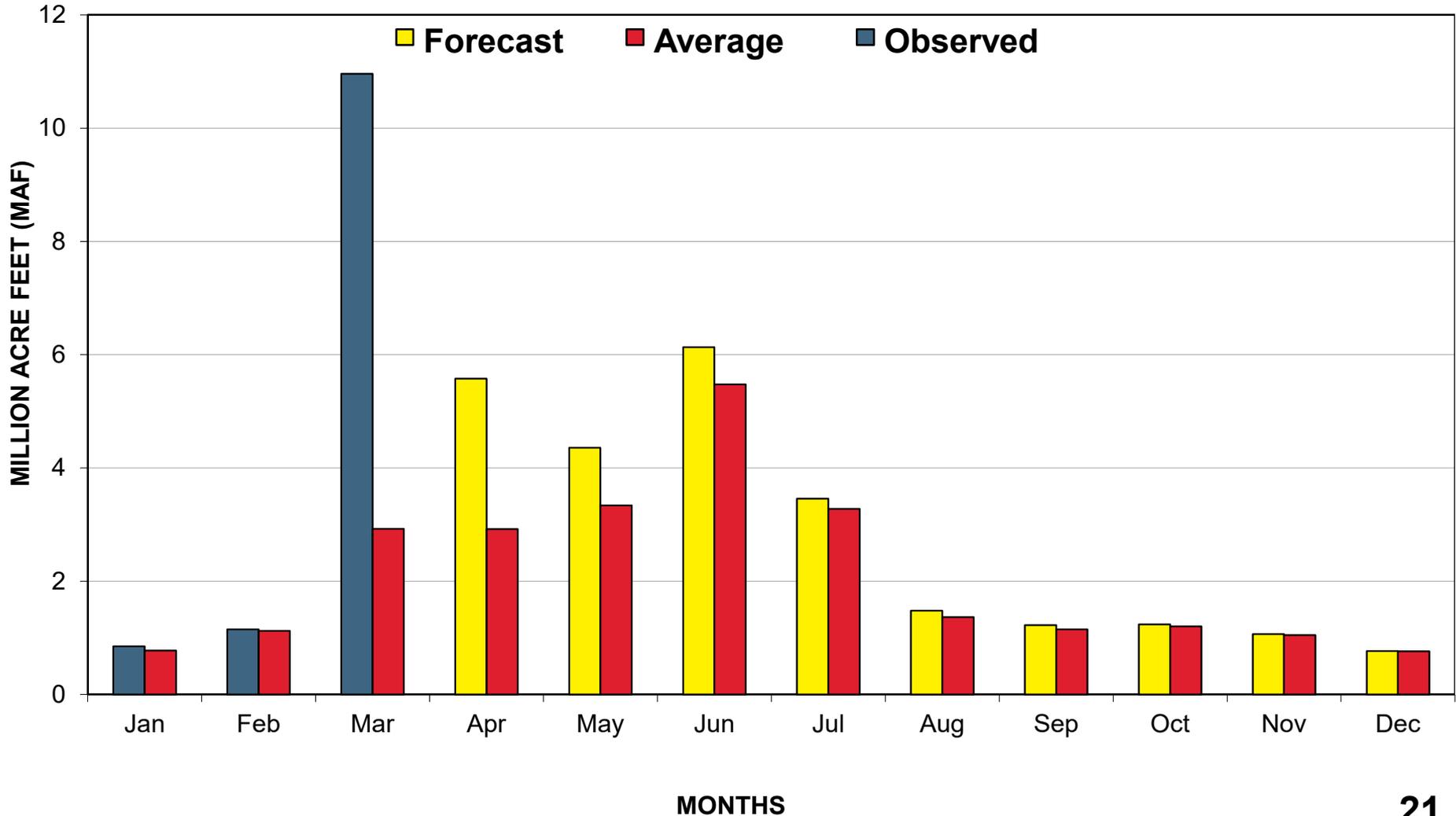




MONTHLY RUNOFF ABOVE SIOUX CITY, IA



2019 CALENDAR YEAR FORECAST – 38.2 MAF





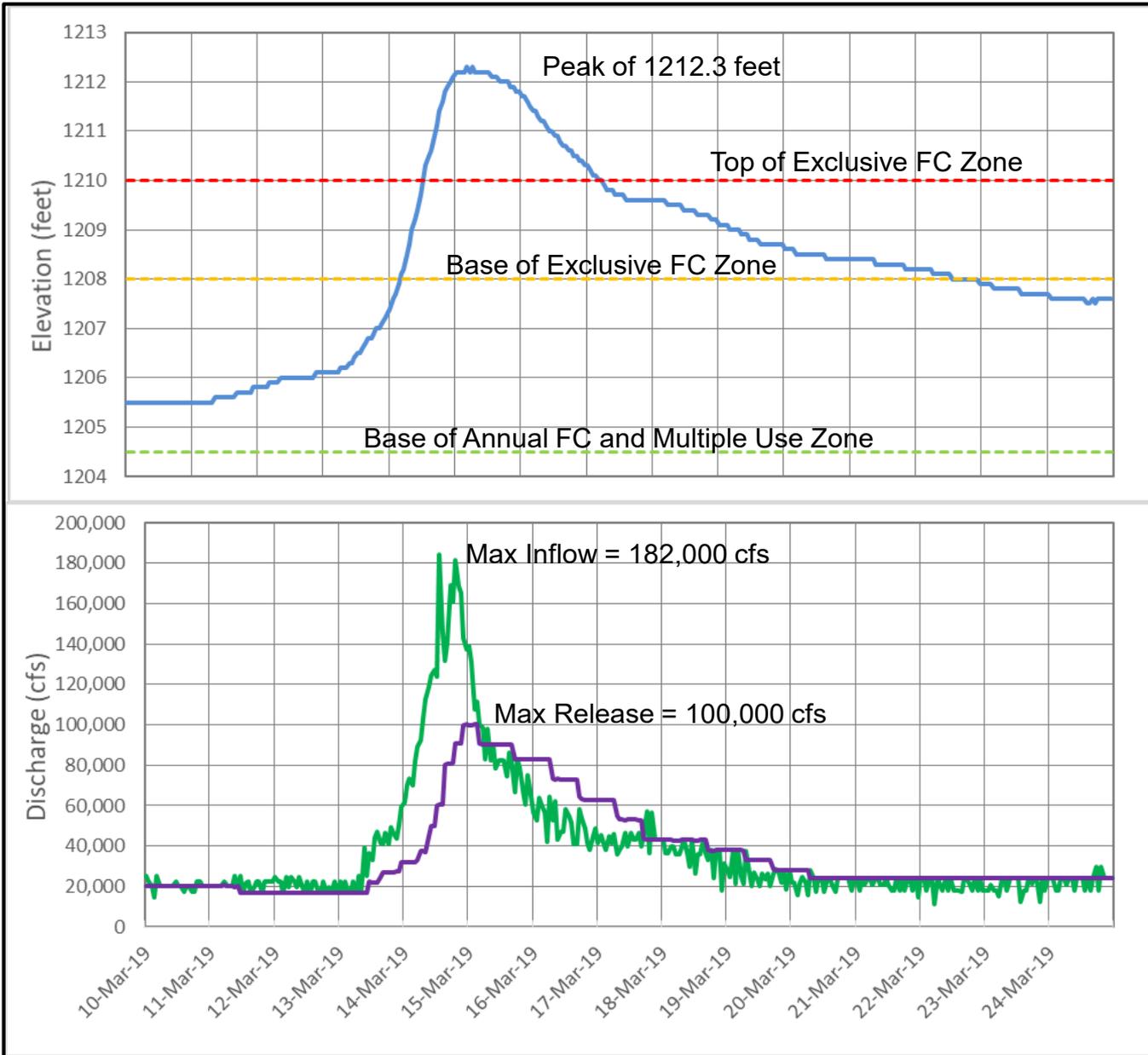
MARCH RUNOFF



- ❑ Largest March runoff volume (11.0 MAF) since record-keeping began in 1898. Previous record was 7.3 MAF in 1952.
- ❑ Nearly 4 times the average monthly runoff.
- ❑ Record highest volume in the Oahe to Fort Randall reach. More than the average annual runoff for this reach.
- ❑ Record highest volume in the Fort Randall to Gavins Point reach. More than doubled the previous record.
- ❑ Record highest volume in the Gavins Point to Sioux City reach. More than the average annual runoff for this reach.

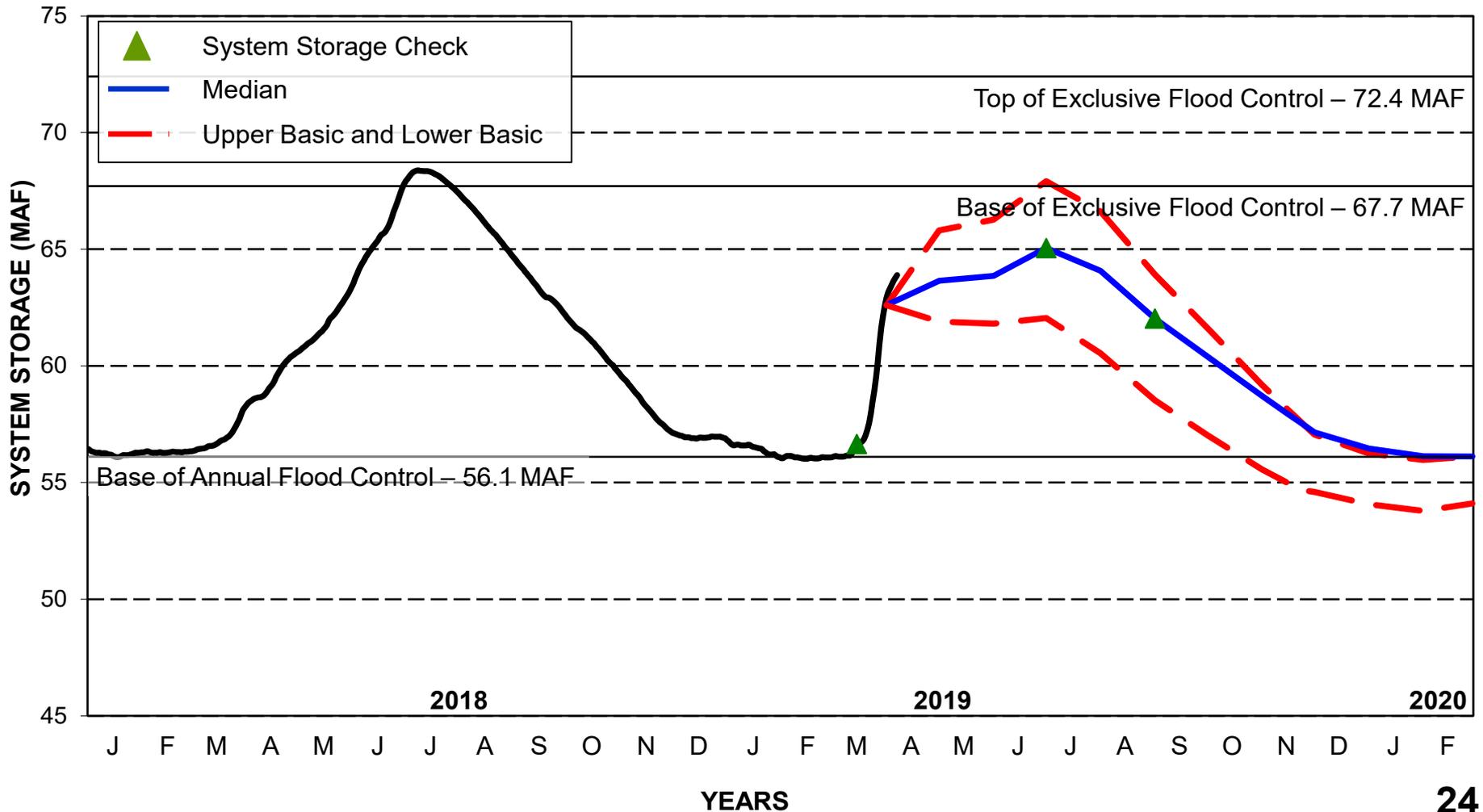


MARCH 2019 - GAVINS POINT OPERATIONS



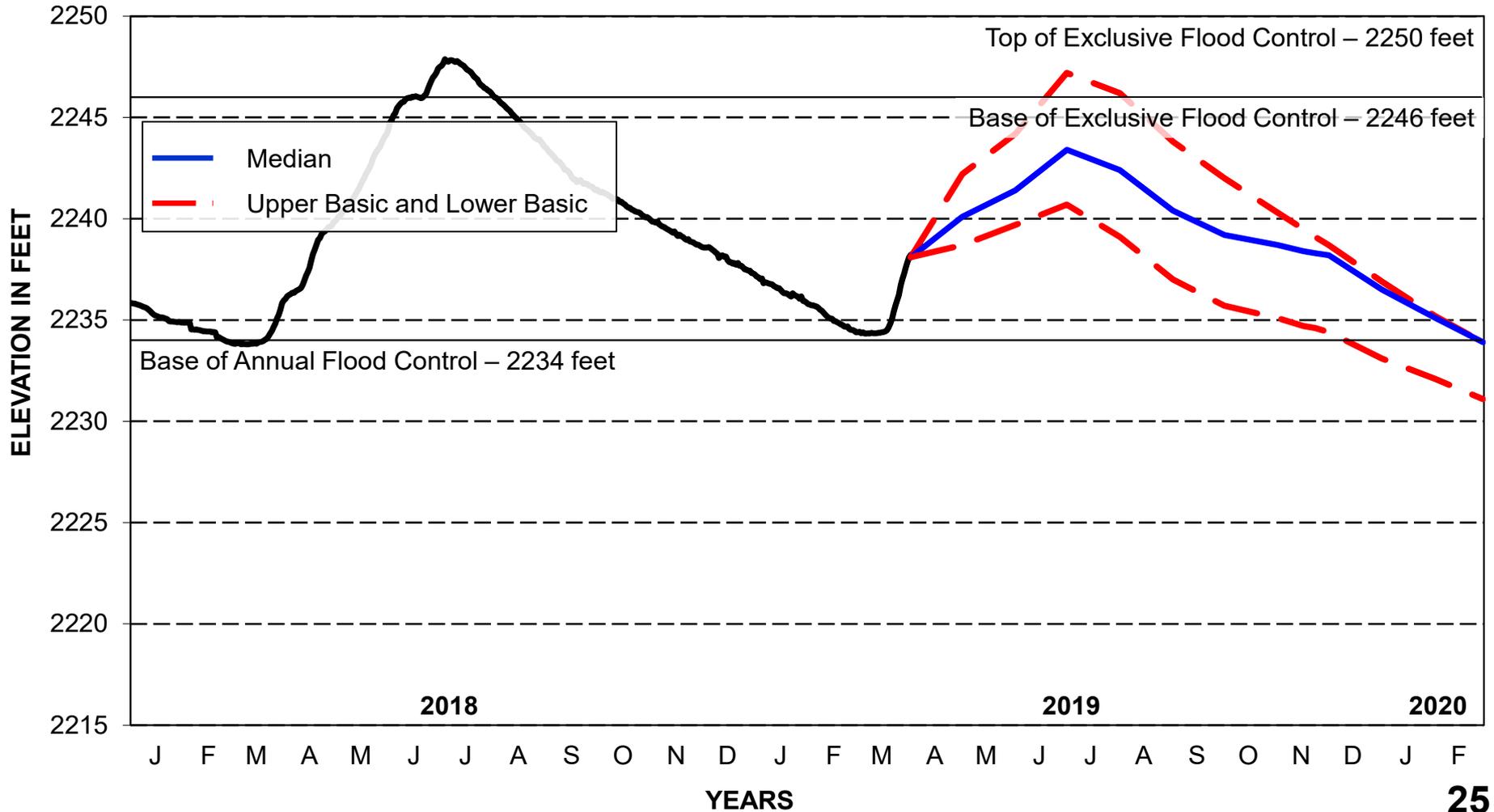


SYSTEM STORAGE - APRIL 1 FORECAST



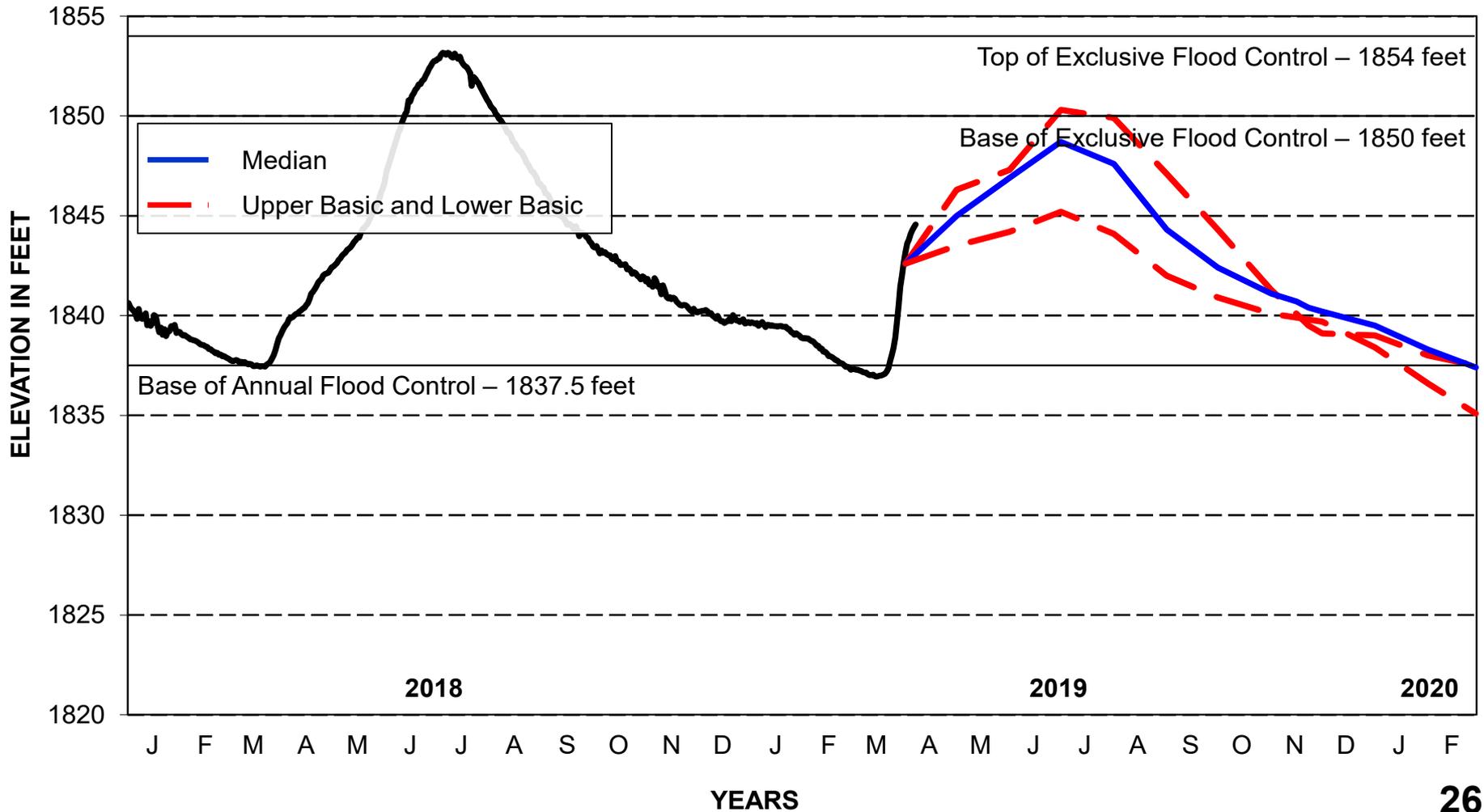


FORT PECK - APRIL 1 FORECAST



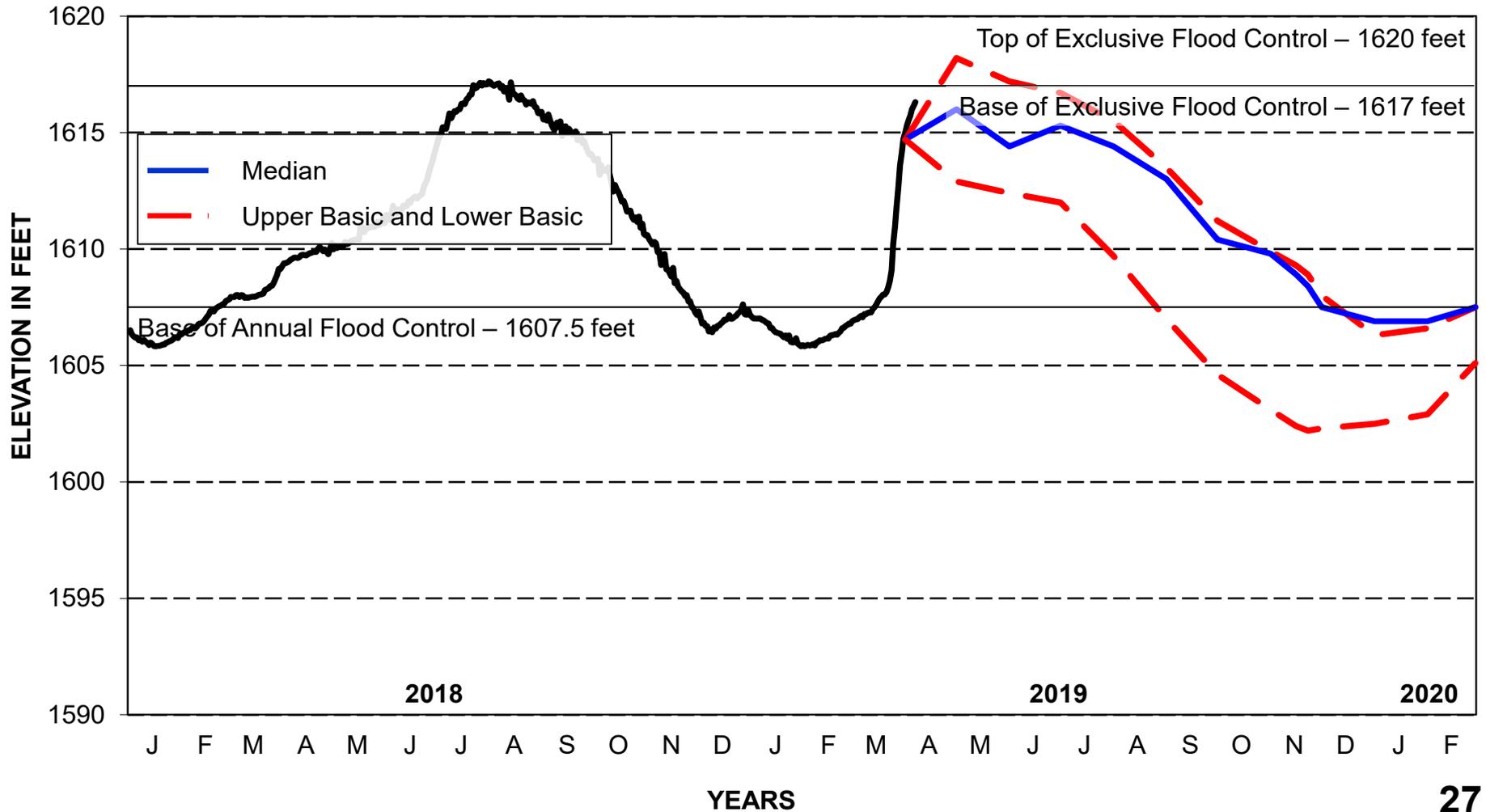


GARRISON - APRIL 1 FORECAST





OAHE - APRIL 1 FORECAST





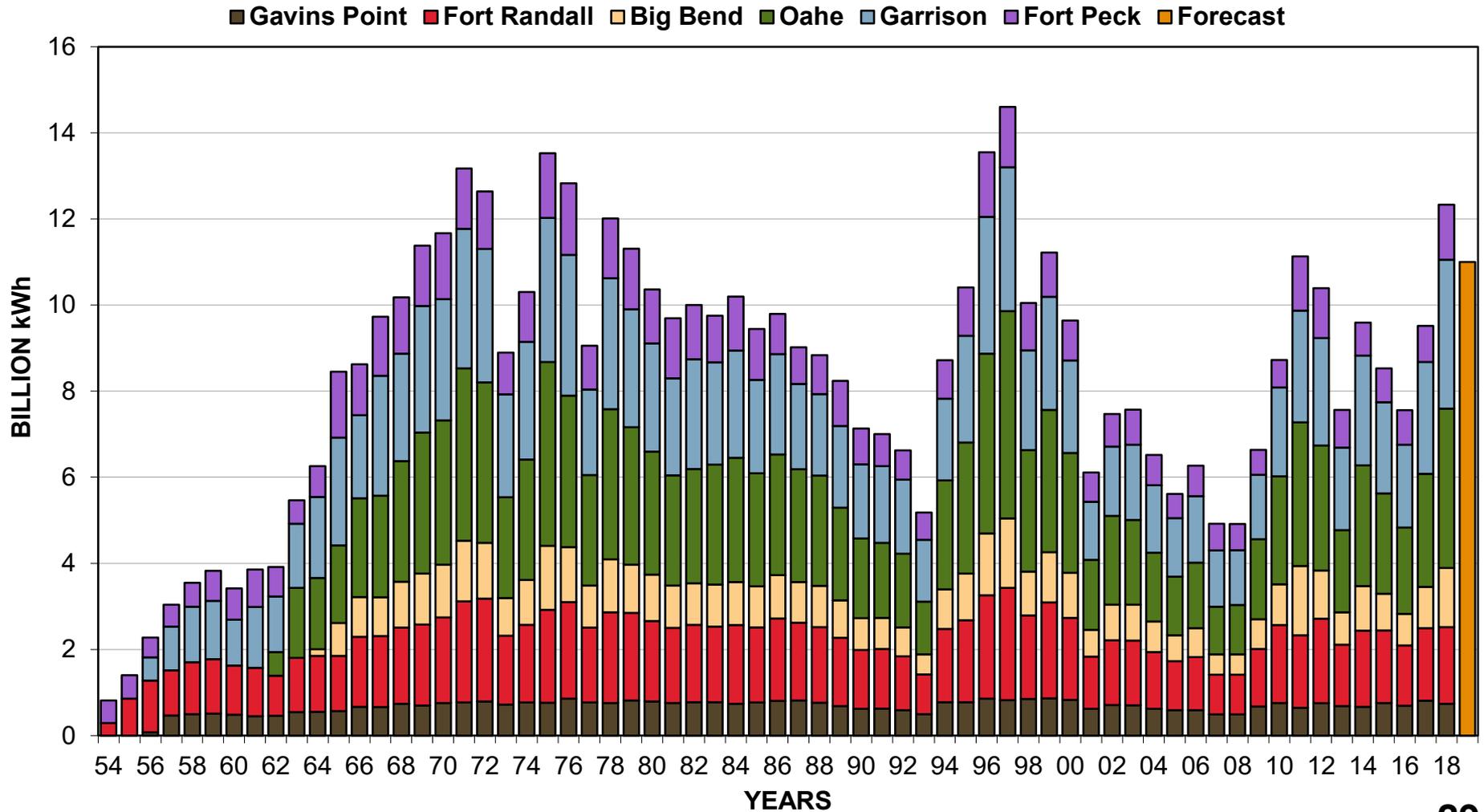
FLOOD CONTROL



- All 2018 flood water evacuated from reservoir system by mid-January
- Releases increased to evacuate water from Exclusive Flood Control Zones
 - Higher-than-average releases to restore flexibility to respond to spring and summer rainfall events
- Storage space available in Fort Peck and Garrison to capture mountain snowmelt
- Flooding can still occur – our ability to reduce downstream stages diminishes the farther downstream – due to increased travel times and uncontrolled drainage area



HYDROPOWER





NAVIGATION



- Flow support from April 1 – July 1
 - 15,000 cfs above full service (expanded service level)
 - April 1 service level check
 - Additional adjustments may be made during spring and summer
 - Revised target flows
 - Sioux City = 46,000 cfs Nebraska City = 52,000 cfs
 - Omaha = 46,000 cfs Kansas City = 56,000 cfs
- Flow support from July 1 – December 1
 - July 1 storage check
 - Expanded service level likely
 - 10-day flow support extension likely



WATER SUPPLY – WATER QUALITY IRRIGATION – RECREATION



- Above average elevations and releases
- No impacts expected to irrigation and recreation
- Water supply (April 1 Forecast)
 - Gavins Point winter releases - 20,000 cfs and 22,000 cfs for basic and upper basic, respectively
 - Winter releases - 15,500 cfs for lower basic runoff
 - No access issues expected



2019 FISH AND WILDLIFE



- Goal: steady-to-rising pool levels at upper three reservoirs during forage fish spawn (April-May)
 - Rising reservoirs likely at Fort Peck and Garrison
 - Oahe – Not likely, we need to evacuate storage to restore flexibility in spring and summer
- Minimize periods of zero releases at Fort Randall, to the extent reasonably possible



THREATENED AND ENDANGERED SPECIES

PIPING PLOVER AND LEAST TERN



- Gavins Point releases
 - Steady release – flow to target
 - Daily release cycle
 - Expanded service level will drive releases
- Intra-day peaking patterns – Garrison
- 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 deleting 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 runoff forecast
- Reservoir levels higher than average
- Reservoir releases higher than average



THANK YOU!

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