US Army
Corps of Engineers

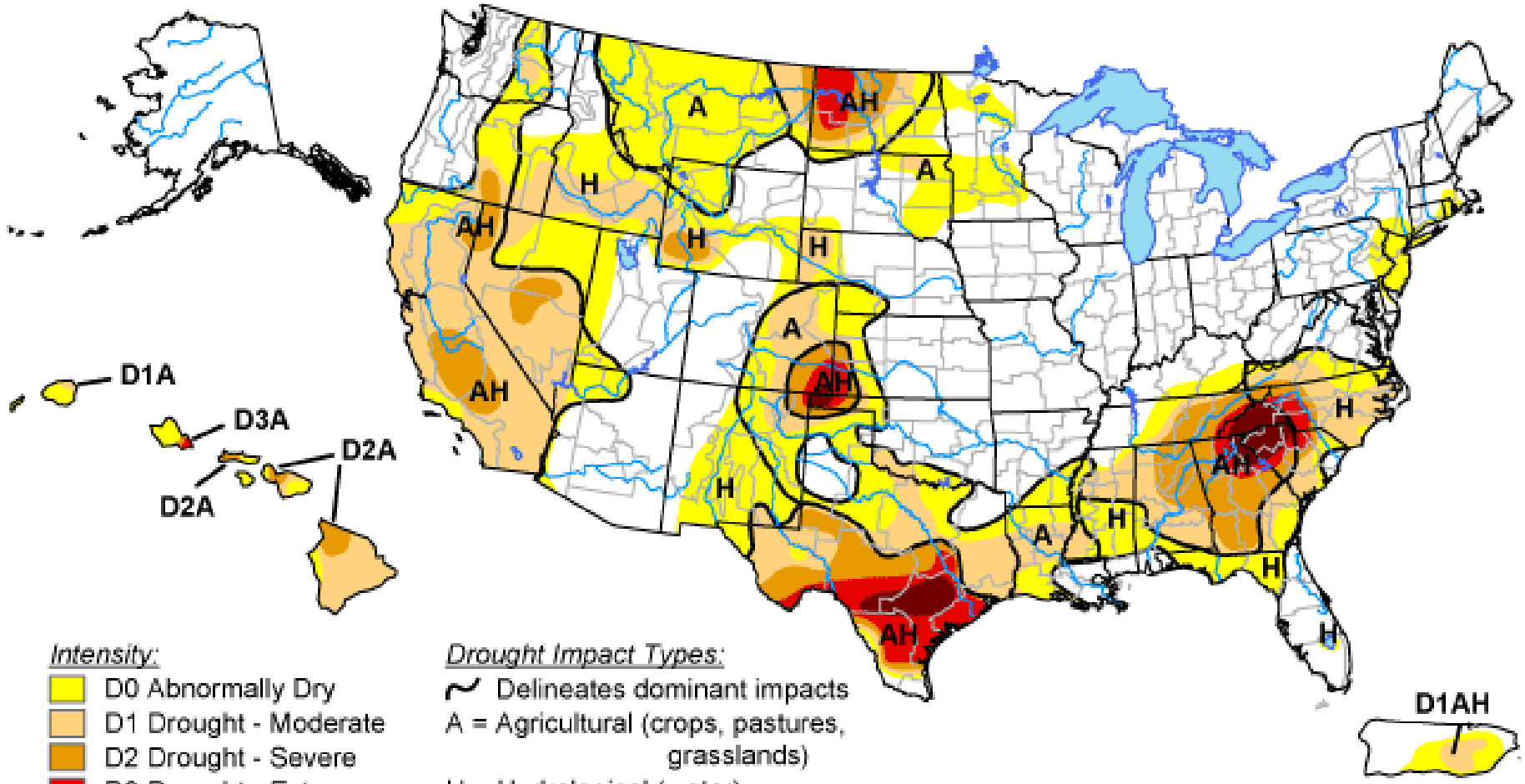
Missouri River Mainstem System

Preliminary Draft Annual Operating Plan

July 2009

U.S. Drought Monitor

July 22, 2008
Valid 8 a.m. EDT



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

Delineates dominant impacts
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

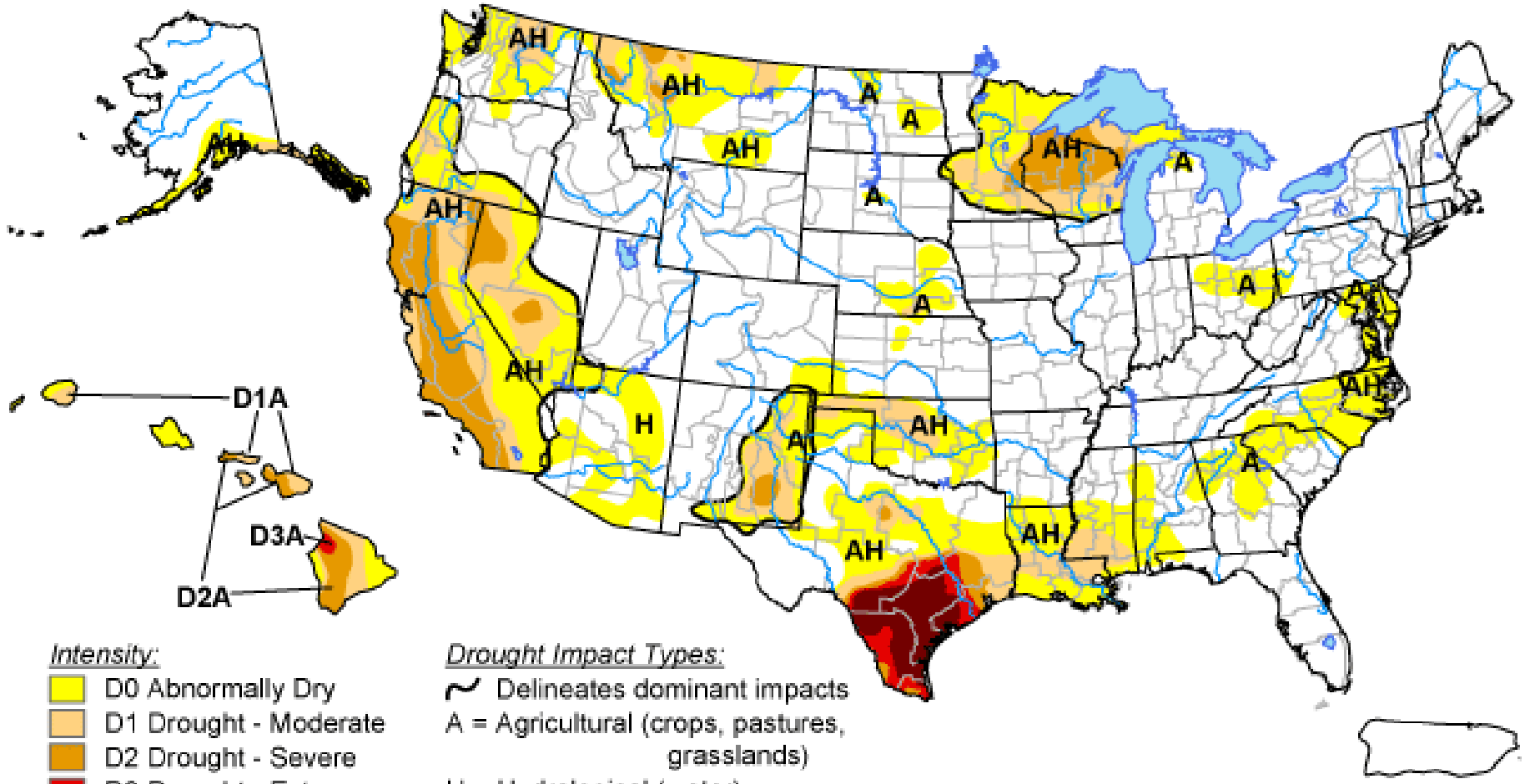
http://drought.unl.edu/dm

Released Thursday, July 24, 2008

Author: Brad Rippey, U.S. Department of Agriculture

U.S. Drought Monitor

July 21, 2009
Valid 8 a.m. EDT



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USDA National Drought Mitigation Center

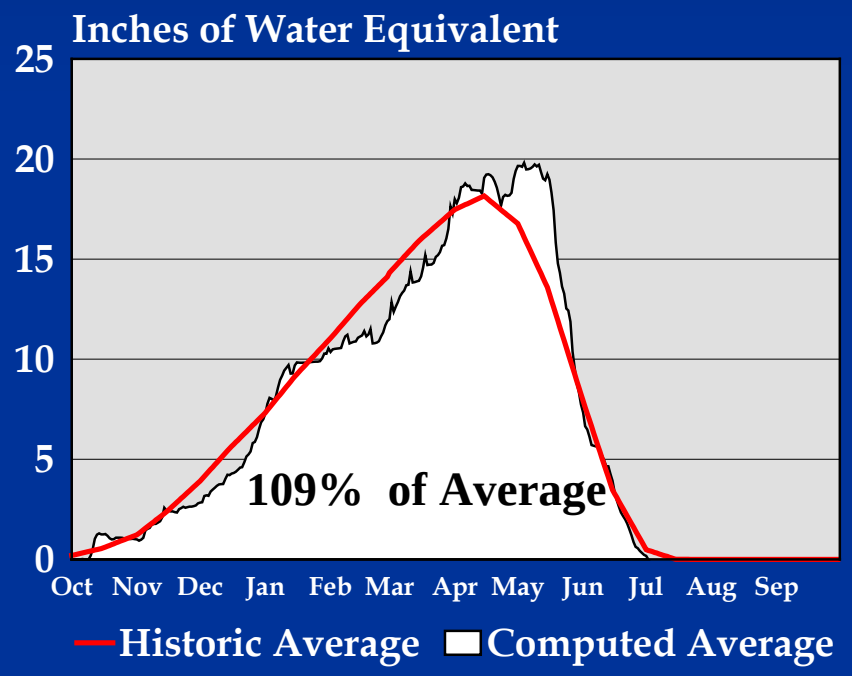
Released Thursday, July 23, 2009

Author: Eric Luebehusen, U.S. Department of Agriculture

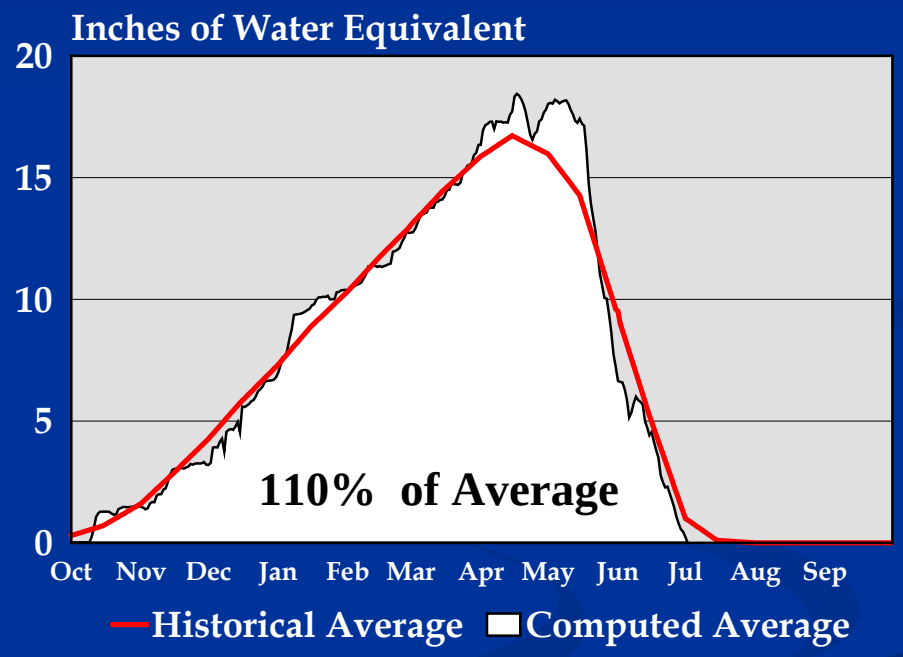
http://drought.unl.edu/dm

Missouri River Basin Mountain Snowpack Water Content 2008-2009

Total Above Fort Peck



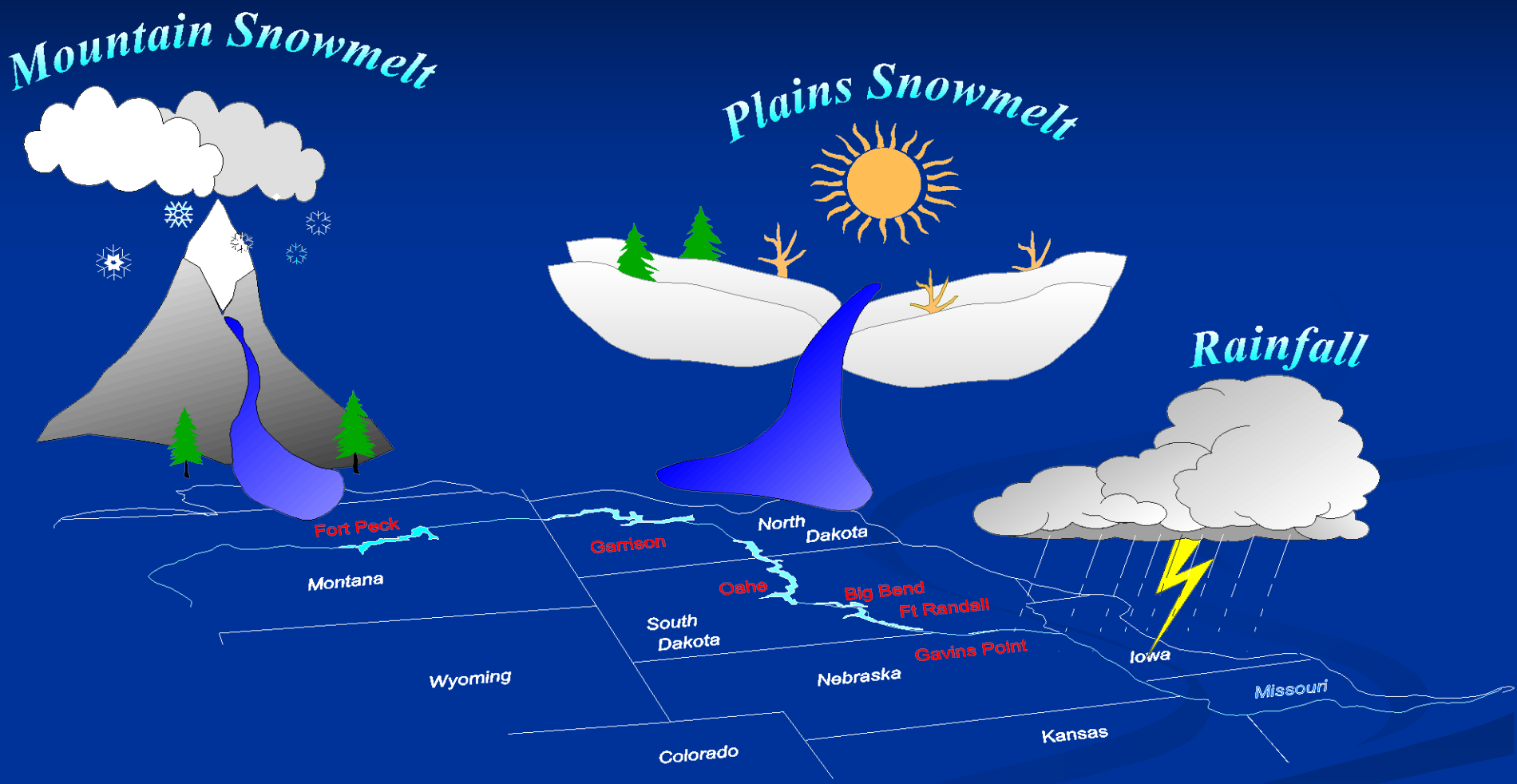
Total Fort Peck to Garrison



The Mountain Snowpack in the reach above Fort Peck peaked at 109% of the normal peak accumulation on May 4. The Mountain Snowpack in the reach between Fort Peck and Garrison appears peaked at 110% of the normal peak accumulation on April 17. The Missouri River basin Mountain Snowpack normally peaks near April 15.

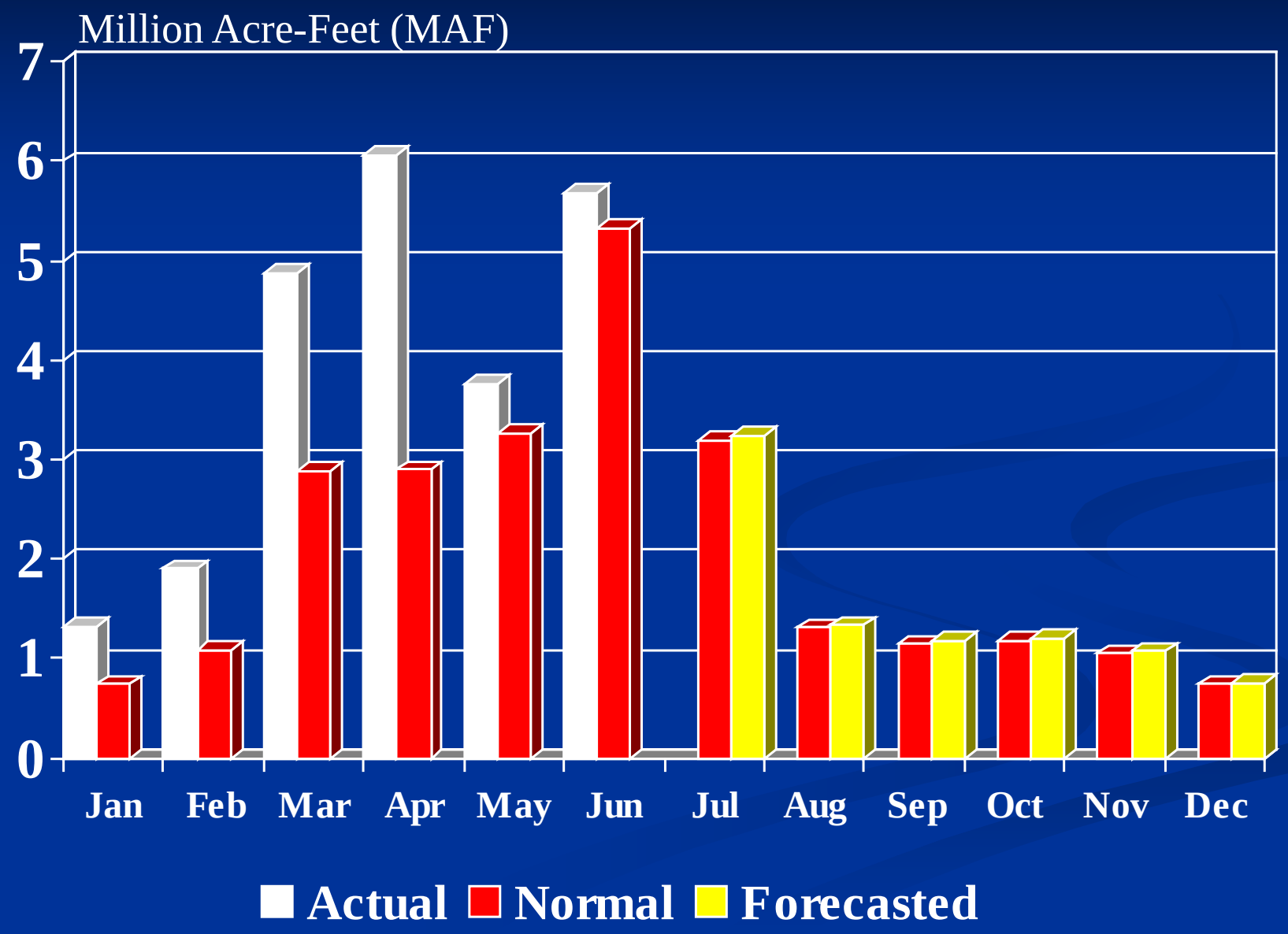
July 1, 2009

Types of Missouri River Basin Runoff

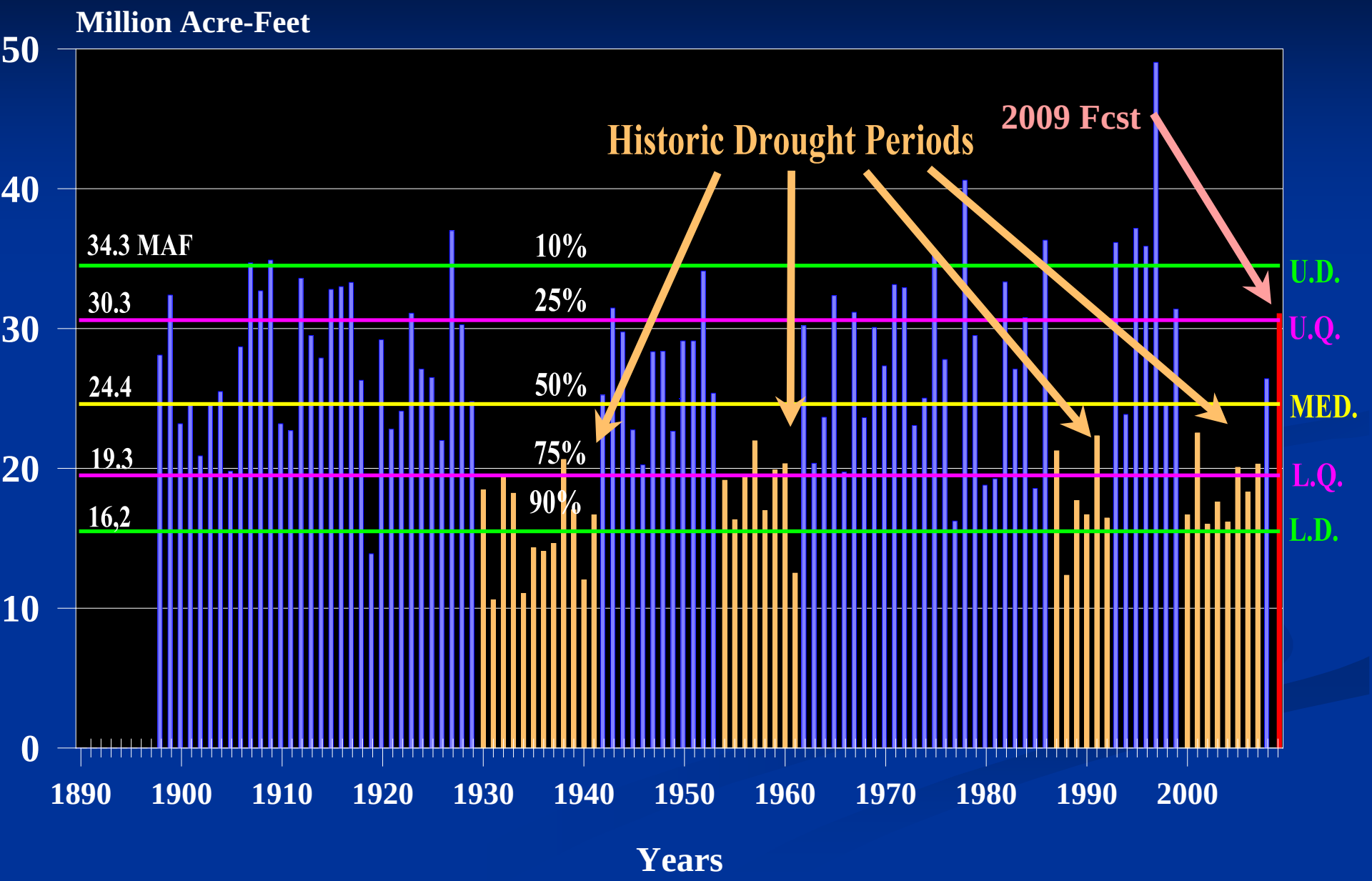


Mountain Snow	+	Plains Snow	+	2009 Rainfall	=	31.9 MAF
109% & 110%		Good plains snow		Generally wet downstream		129% of Normal

2009 Missouri River Runoff Above Sioux City, Iowa

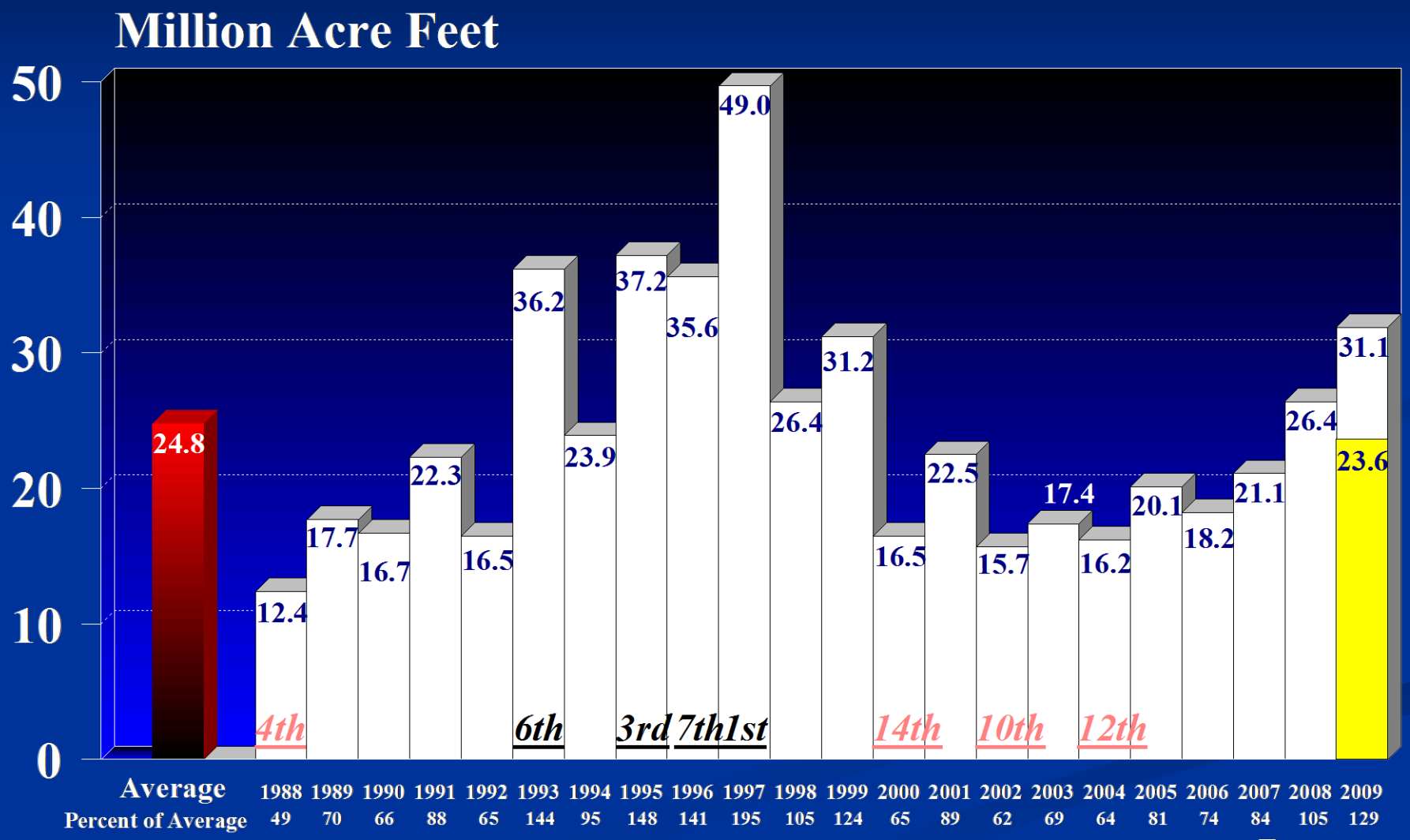


Missouri River Mainstem System Annual Runoff at Sioux City, Iowa



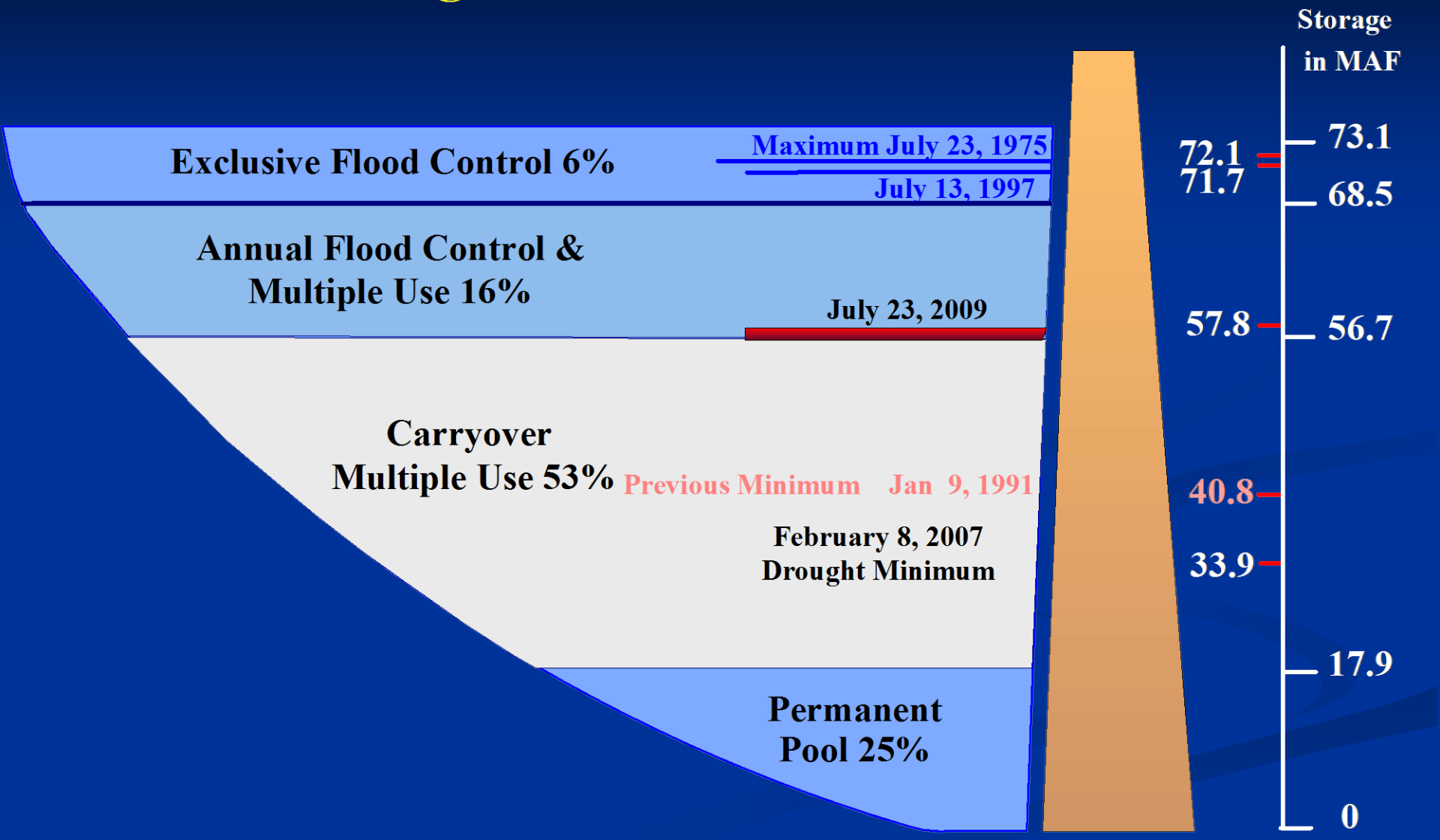
Missouri River Runoff Above Sioux City

CY 1988-2009 vs Average



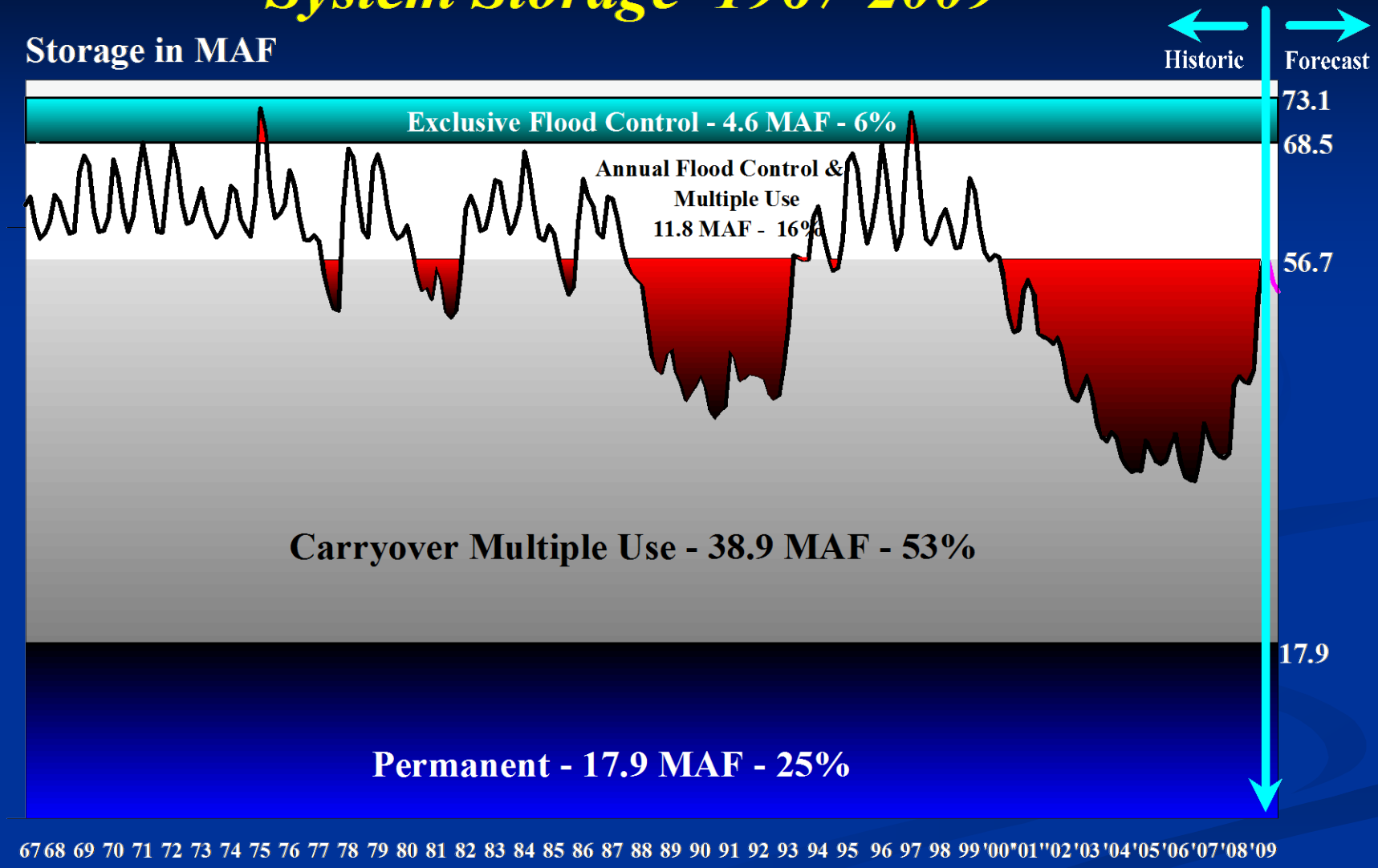
July 2009

Missouri River Main Stem System Storage Allocations



Total Storage = 73.4 MAF

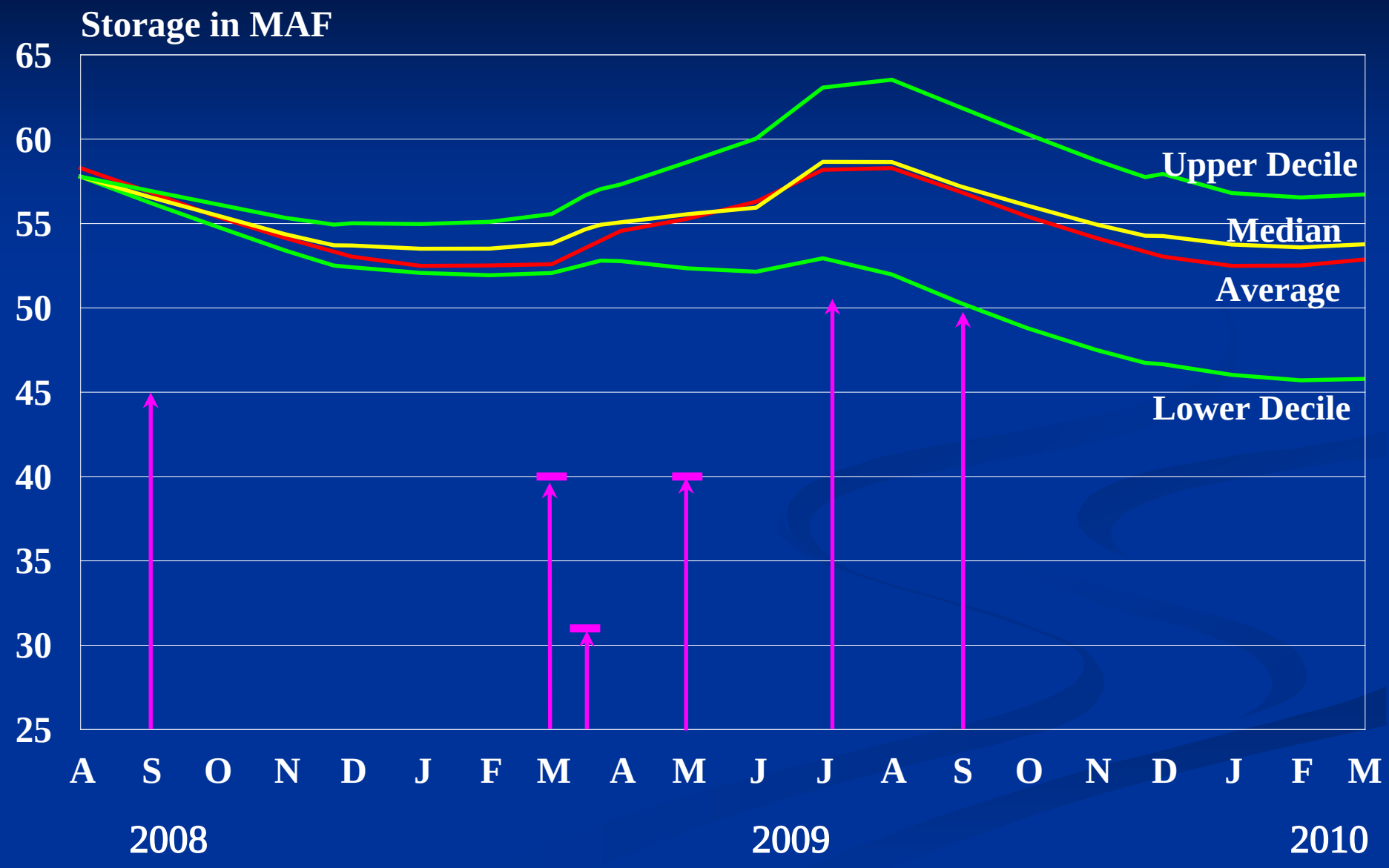
Missouri River Main Stem System Storage 1967-2009



July 2009 Update

System Storage

2009 - 2010 AOP Decision Points



Missouri River Downstream Flow Support Support for 2010 Navigation Season

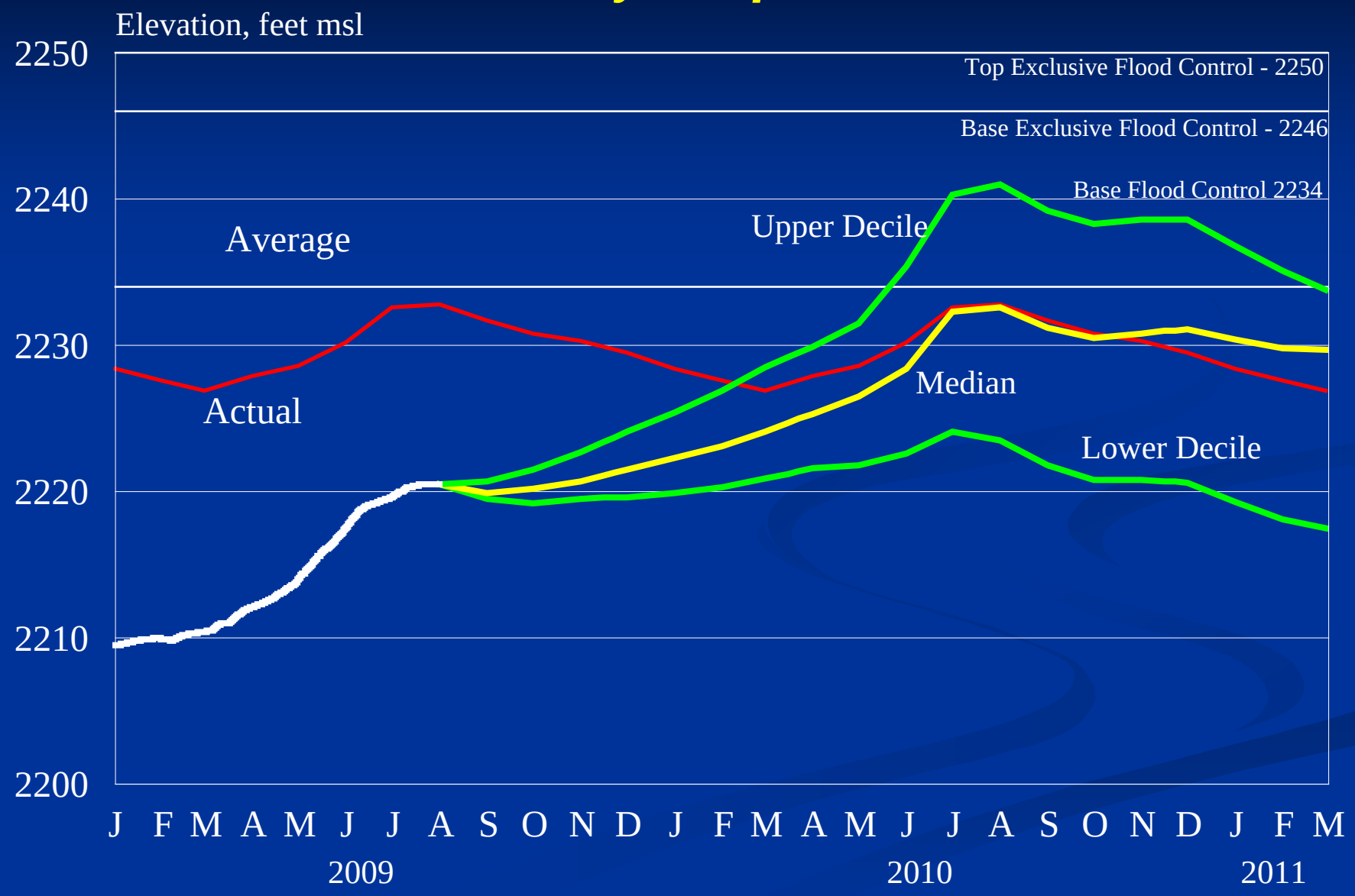
Runoff Scenario	Annual Runoff Volume (MAF)	July 1 System Storage (MAF)	Flow Level Above or Below Full Service (in cfs)		Length of Shortening (Days)
			Spring	Fall	
Upper Decile	34.3	63.1	0	0	0
Median	24.4	58.6	0	0	0
Lower Decile	16.2	52.9	-2000	-3800	0

Missouri River Spring Pulses

Runoff Scenario	Annual Runoff Volume (MAF)	March 1 System Storage (MAF)	March Spring Pulse (kcfs)	May 1 System Storage (MAF)	May Spring Pulse (kcfs)
Upper Decile	34.3	55.6	+5	58.6	+0
Upper Quartile	30.3	55.6	+5	58.6	+20
Median	24.4	53.8	+5	55.6	+16
Lower Quartile	19.3	52.1	+5	52.7	+11.6
Lower Decile	16.2	52.1	+5	52.3	+11.5

Fort Peck

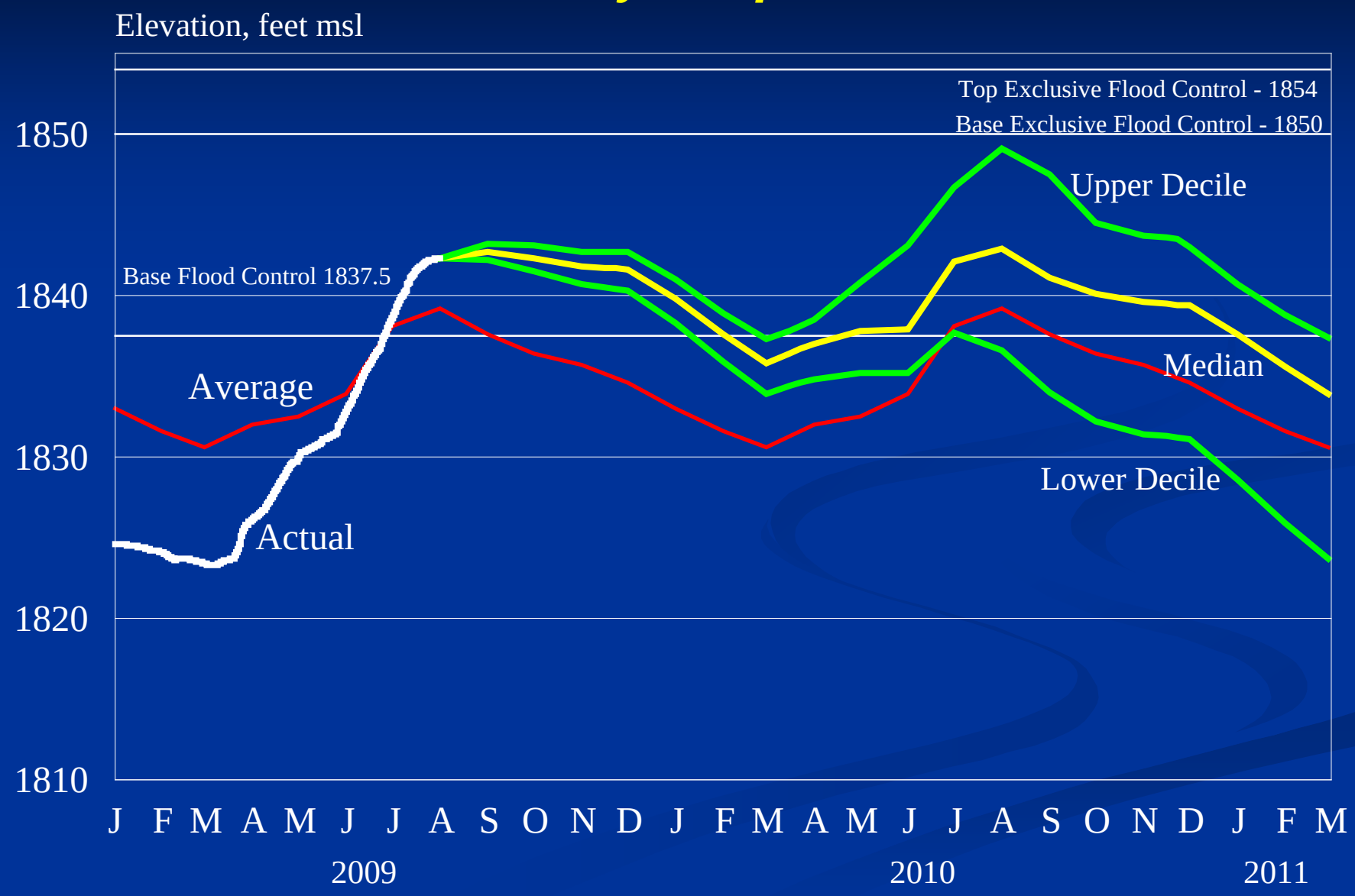
2009-2010 Preliminary Draft AOP Simulations



Average: 1967-2008

Garrison

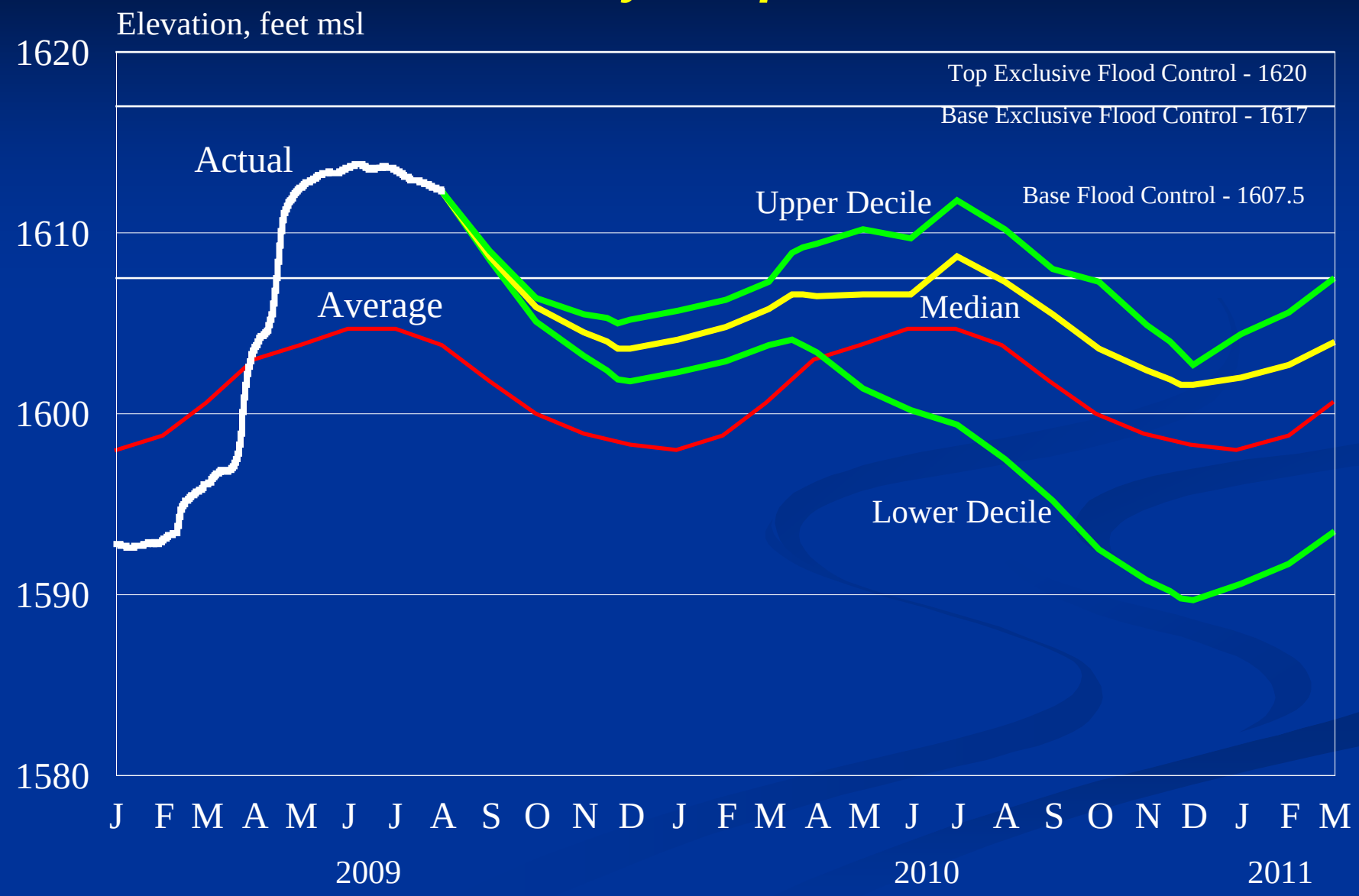
2009-2010 Preliminary Draft AOP Simulations



Average: 1967-2008

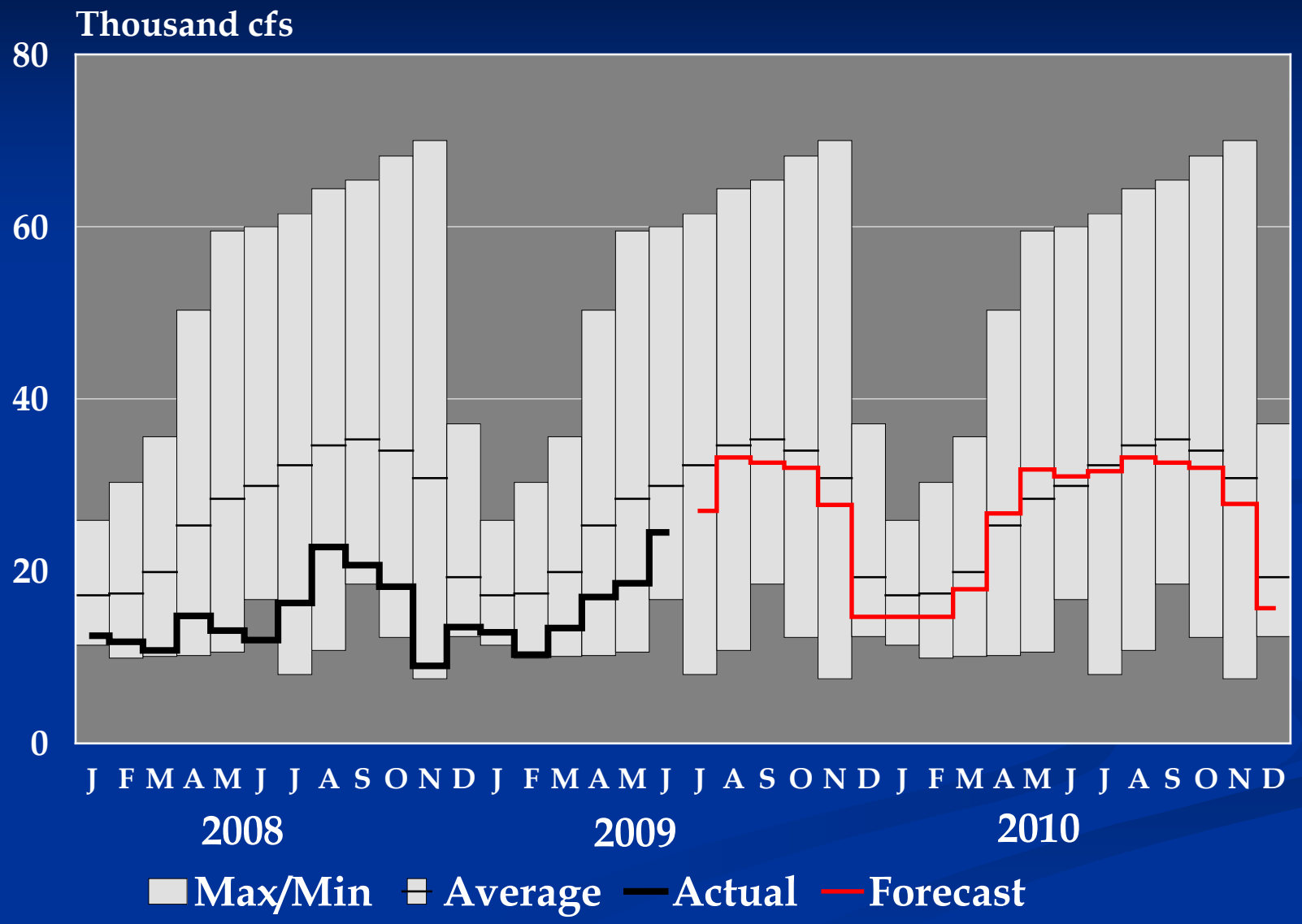
Oahe

2009-2010 Preliminary Draft AOP Simulations



Average: 1967-2008

Gavins Point Monthly Releases
2008 through 2009 & 2009 -2010 AOP Releases



Max, Min, and Avg 1967-2008