

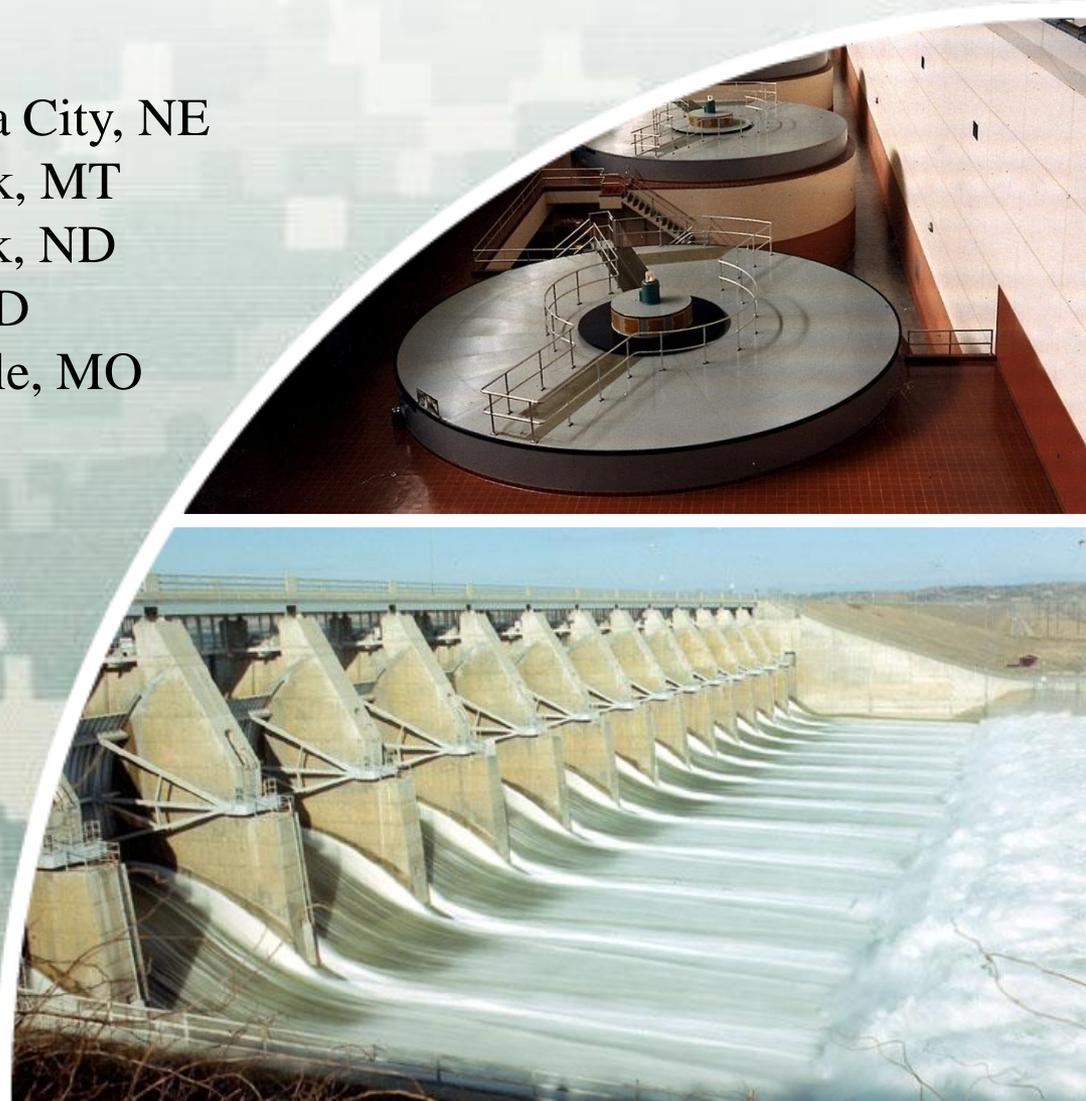
# Missouri River Basin Water Management Spring 2013 Public Meetings

April 8 <sup>th</sup>	7:00 p.m.	Nebraska City, NE
April 9 <sup>th</sup>	11:00 a.m.	Fort Peck, MT
April 9 <sup>th</sup>	7:00 p.m.	Bismarck, ND
April 10 <sup>th</sup>	11:00 a.m.	Pierre, SD
April 11 <sup>th</sup>	11:00 a.m.	Smithville, MO



®

US Army Corps of Engineers  
**BUILDING STRONG**®



# Missouri River Mainstem Reservoir System



# Our Mission

## Regulate Missouri River Mainstem Reservoirs to Support Congressionally Authorized Purposes

**Flood Control**



**Hydropower**



**Water Supply**



**Water Quality Control**



**Recreation**



**Navigation**



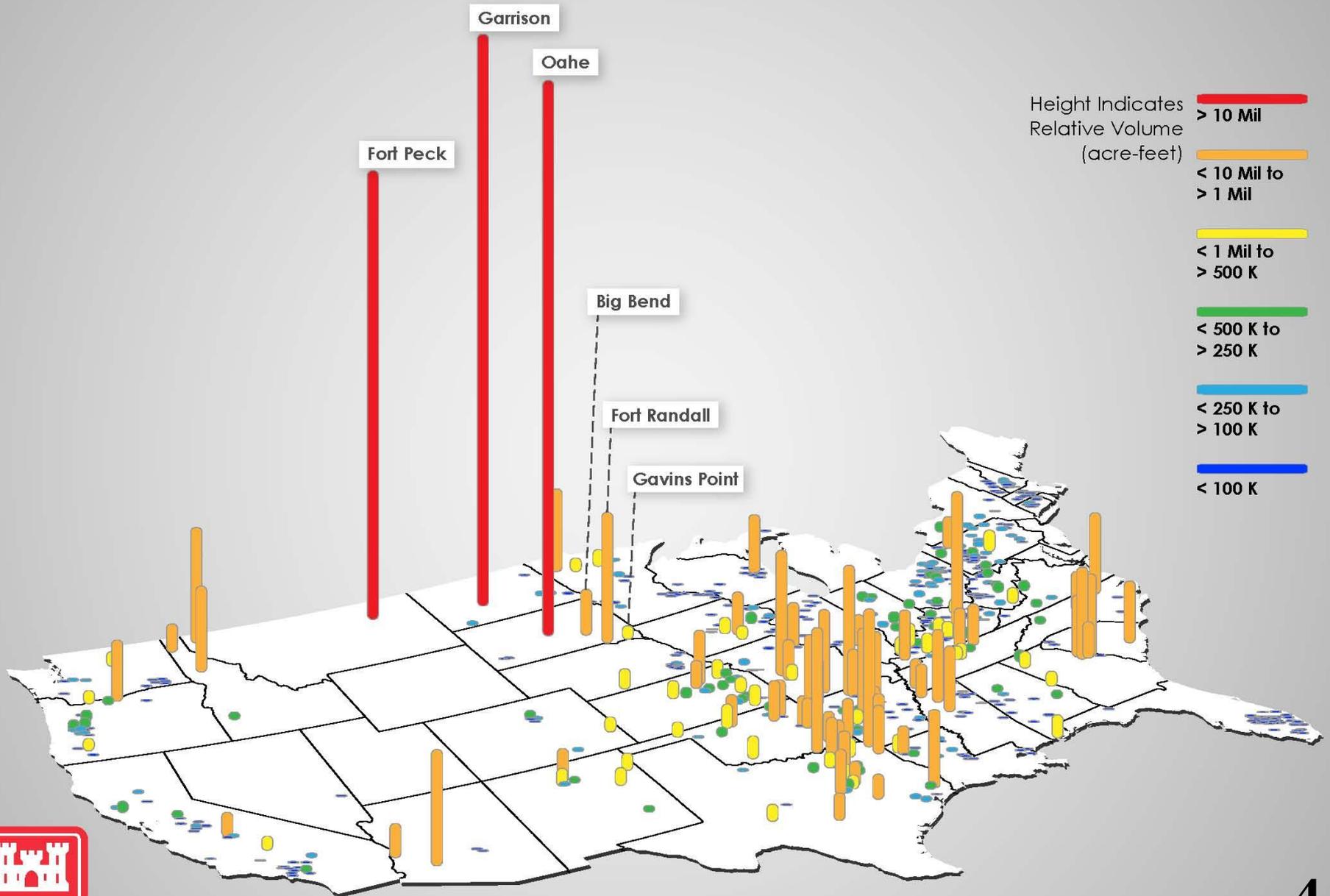
**Fish and Wildlife  
Including Threatened and  
Endangered Species**



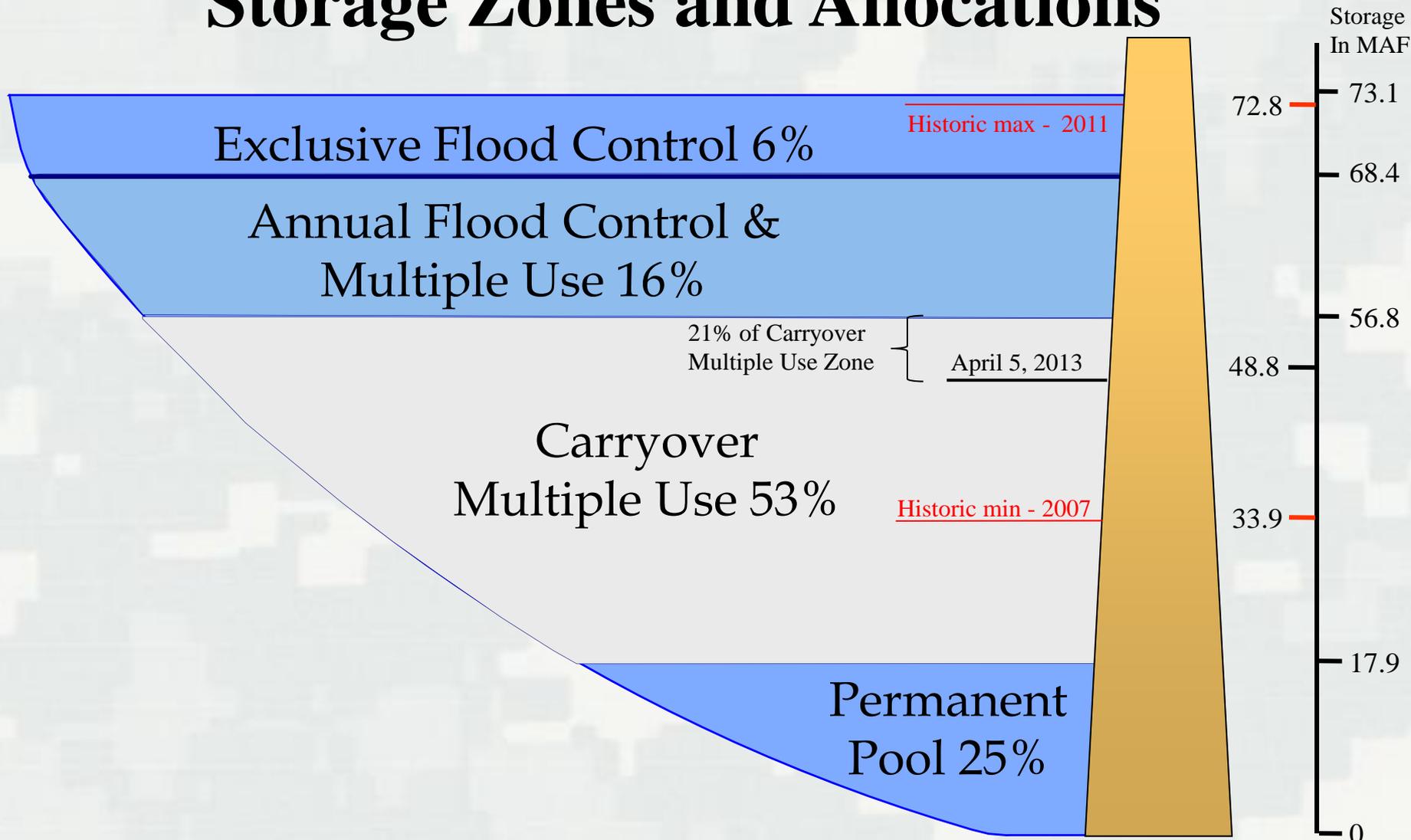
**Irrigation**



# Storage Capacity of Corps Reservoirs

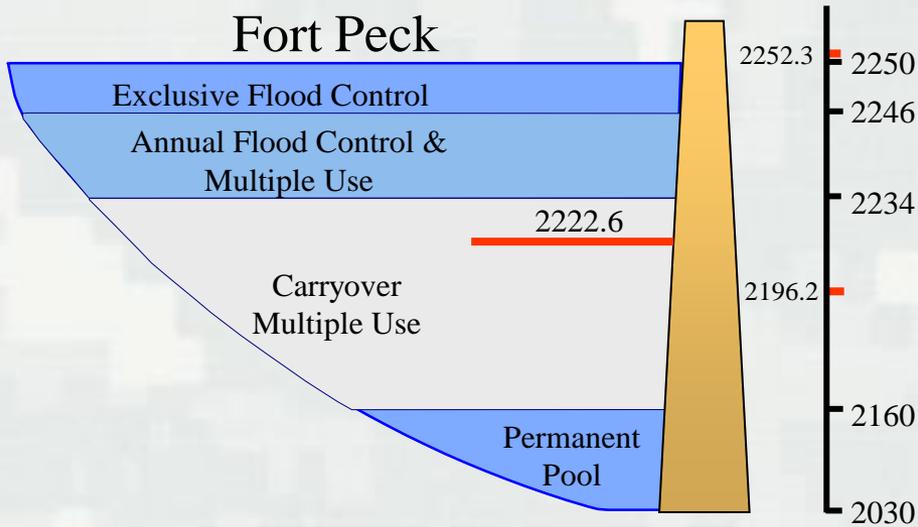


# Missouri River Mainstem System Storage Zones and Allocations

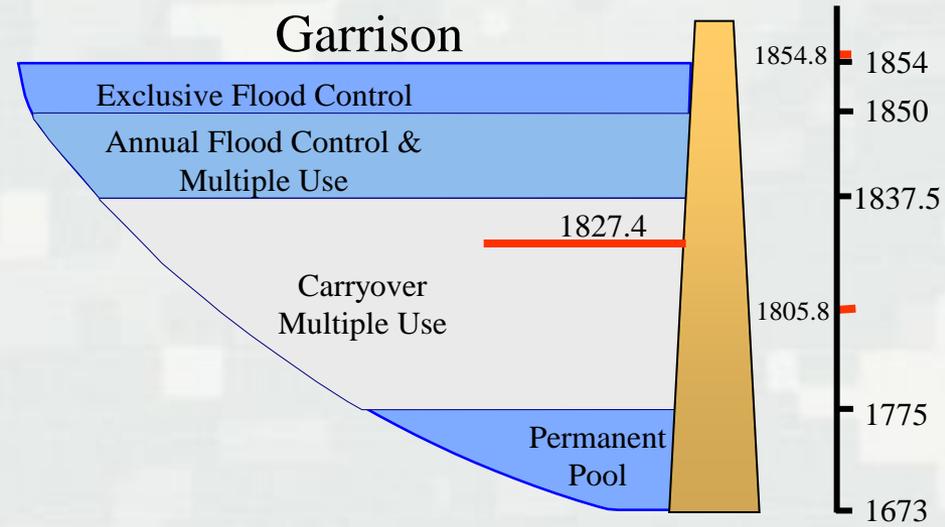


# Current Reservoir Levels – April 5, 2013

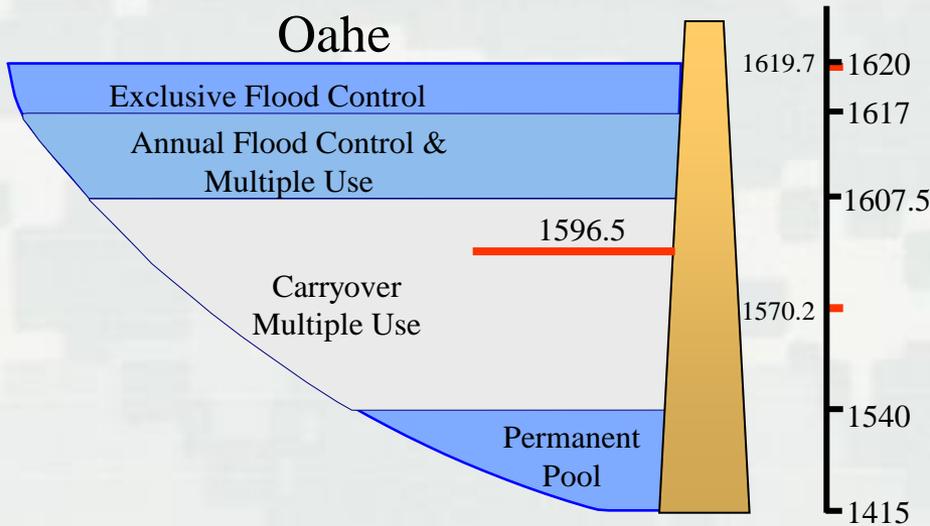
## Fort Peck



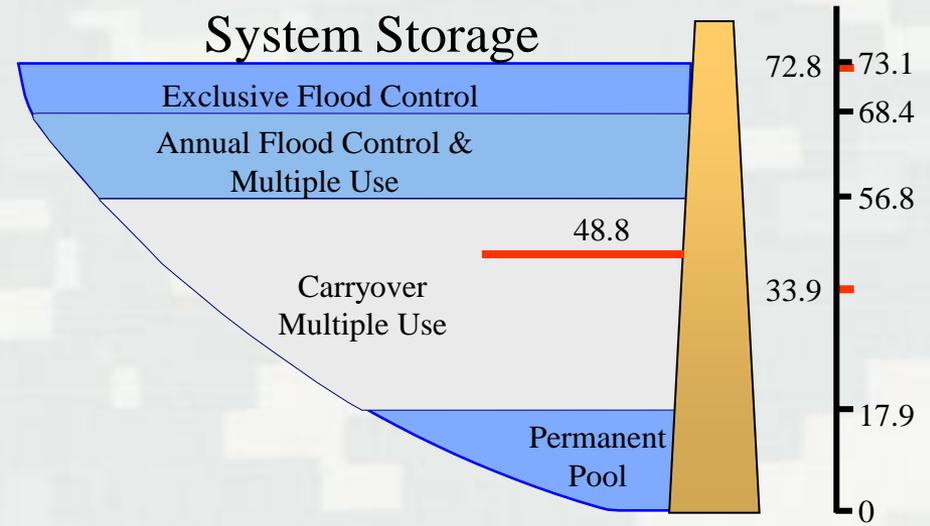
## Garrison



## Oahe



## System Storage



11.4 feet into Carryover Multiple Use Zone.

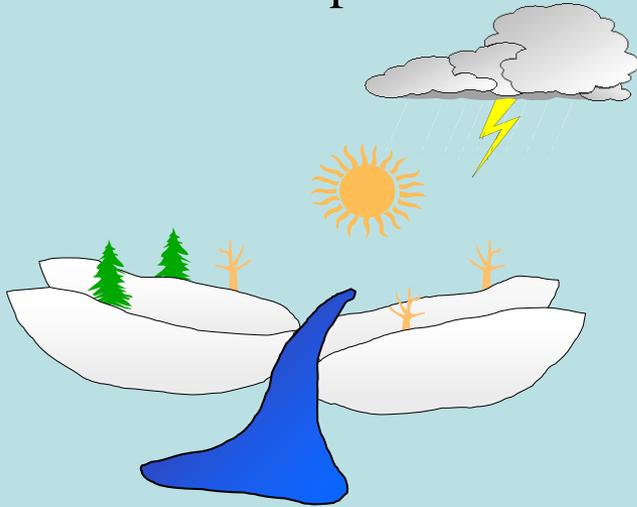
10.1 feet into Carryover Multiple Use Zone.

11.0 feet into Carryover Multiple Use Zone.

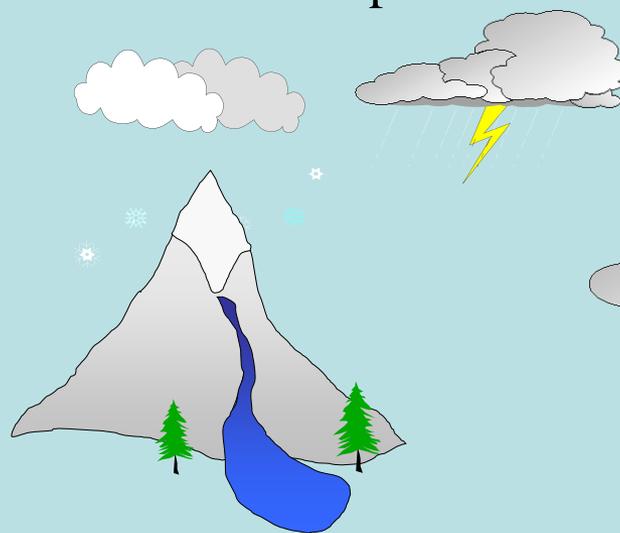
8.0 MAF into Carryover Multiple Use Zone.

# Runoff Components

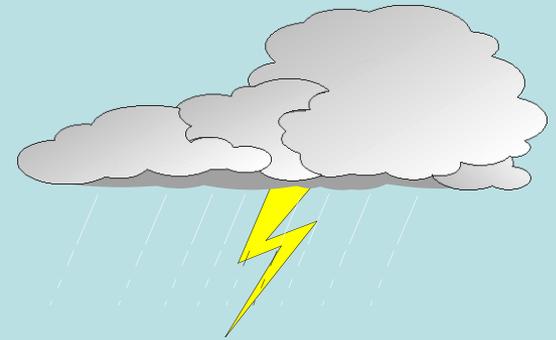
Plains Snowpack



Mountain Snowpack



Rainfall



March and  
April

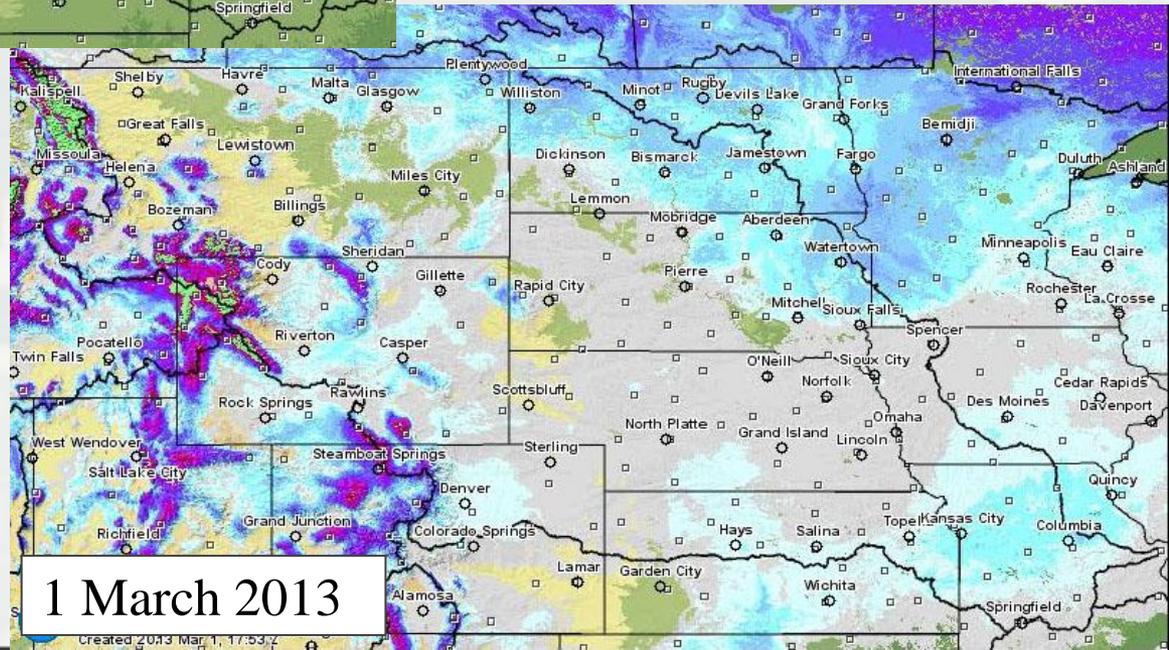
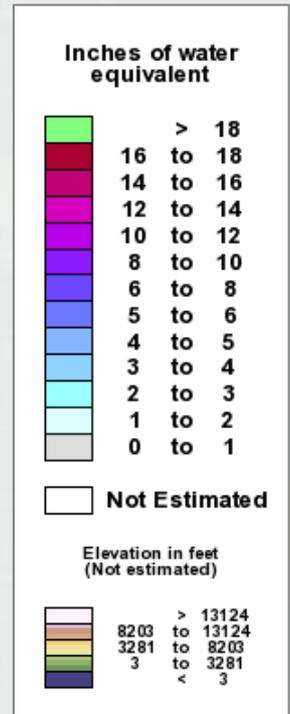
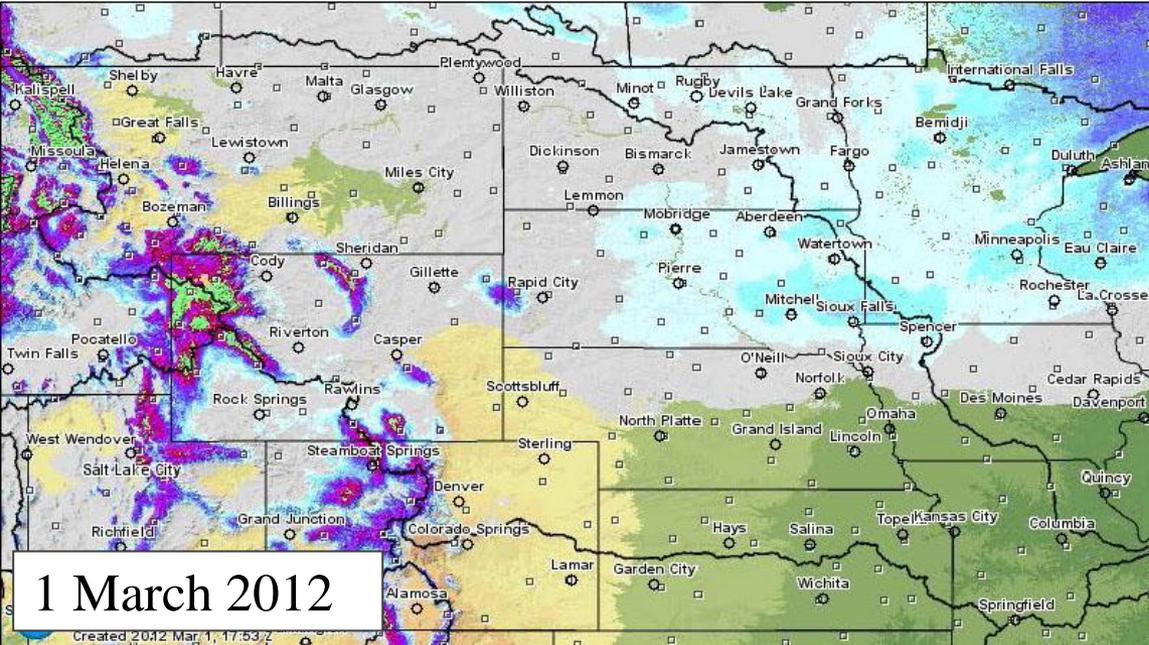
May, June  
and July

March through  
October

2013 Forecast\* = 20.5 MAF

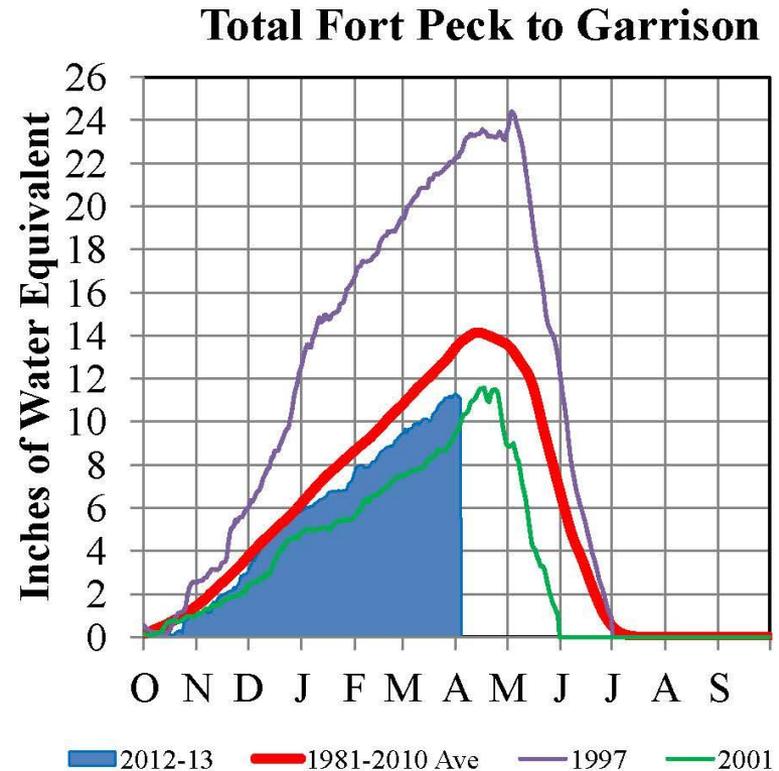
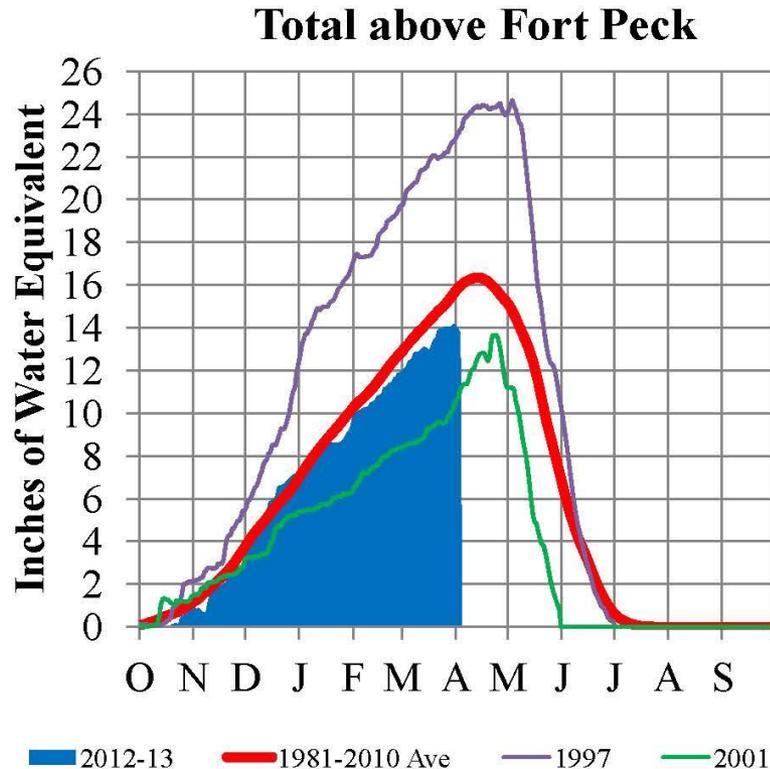
\*April 1 Forecast

# Plains Snowpack



# Missouri River Basin – Mountain Snowpack Water Content 2012-2013 with comparison plots from 1997\* and 2001\*

April 3, 2013



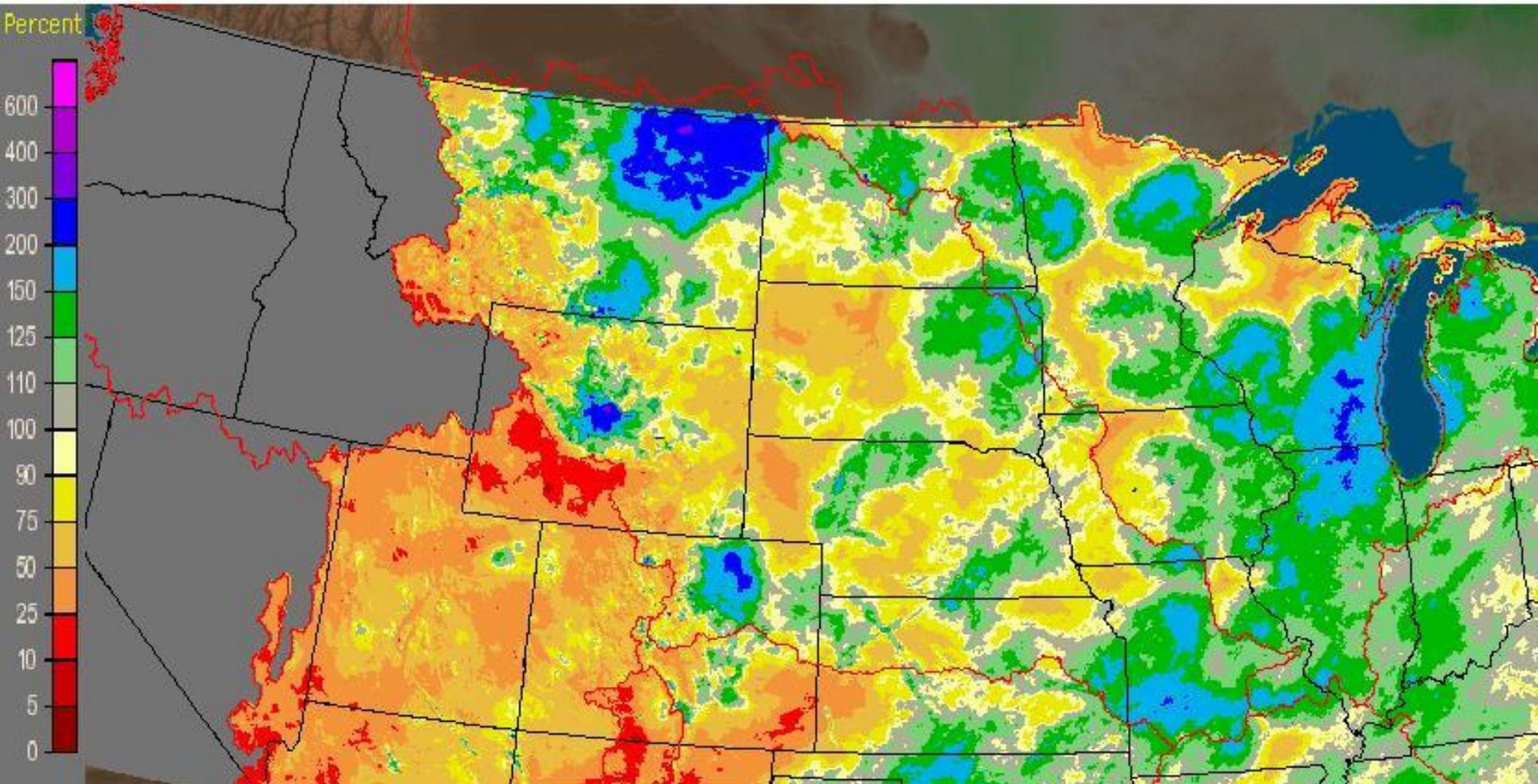
The Missouri River basin mountain snowpack normally peaks near April 15. By April 1, normally 97% of the peak has accumulated. On April 3, 2013 the mountain snowpack SWE in the “Total above Fort Peck” reach is currently 13.7”, 86% of average. The mountain snowpack SWE in the “Total Fort Peck to Garrison” reach is currently 11.1”, 81% of average.

\*Generally considered the high and low year of the last 20-year period.

Provisional data. Subject to revision.

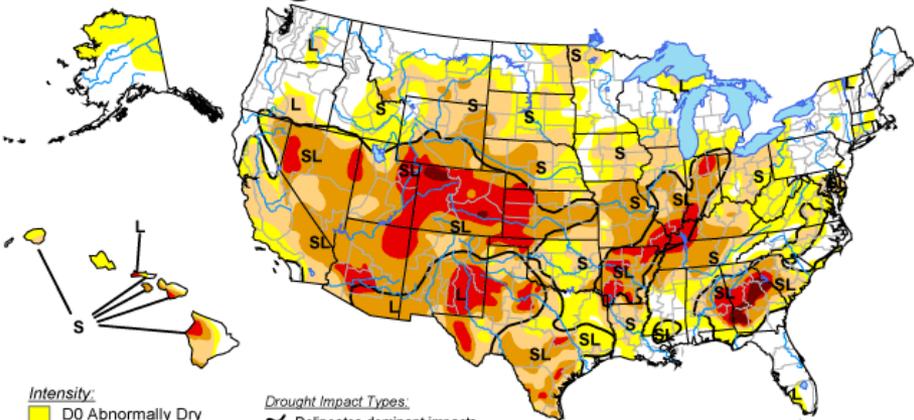
# Jan-Feb-Mar Precipitation Percent of Normal

Missouri Basin RFC Pleasant Hill, MO: Current 90-Day Percent of Normal Precipitation  
Valid at 4/4/2013 1200 UTC- Created 4/4/13 15:38 UTC



# U.S. Drought Monitor

July 3, 2012  
Valid 7 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  
S = Short-Term, typically <6 months  
(e.g. agriculture, grasslands)  
L = Long-Term, typically >6 months  
(e.g. hydrology, ecology)



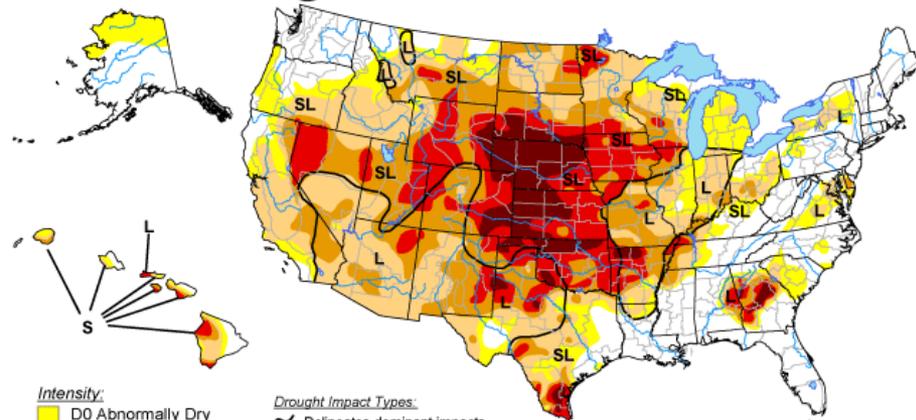
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Released Thursday, July 5, 2012  
Author: Rich Tinker, NOAA/NWS/NCEP/CPC

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

# U.S. Drought Monitor

October 2, 2012  
Valid 7 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  
S = Short-Term, typically <6 months  
(e.g. agriculture, grasslands)  
L = Long-Term, typically >6 months  
(e.g. hydrology, ecology)



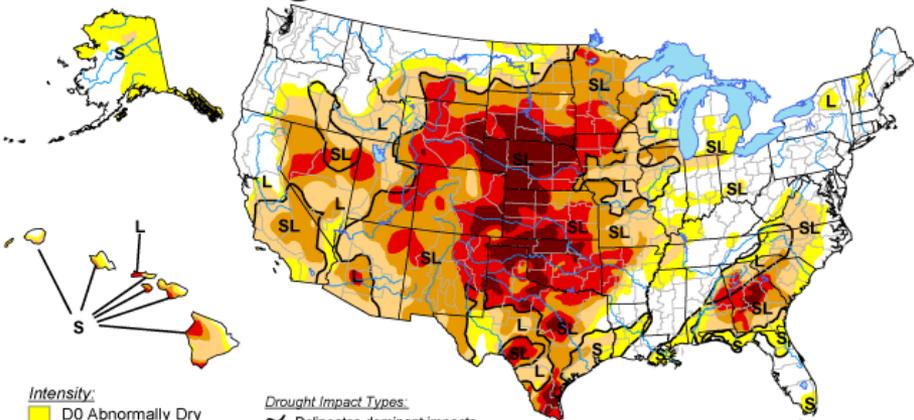
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Released Thursday, October 4, 2012  
Author: Anthony Artusa, NOAA/NWS/NCEP/CPC

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

# U.S. Drought Monitor

January 1, 2013  
Valid 7 a.m. EST



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

**Drought Impact Types:**  
~ Delineates dominant impacts  
S = Short-Term, typically <6 months  
(e.g. agriculture, grasslands)  
L = Long-Term, typically >6 months  
(e.g. hydrology, ecology)



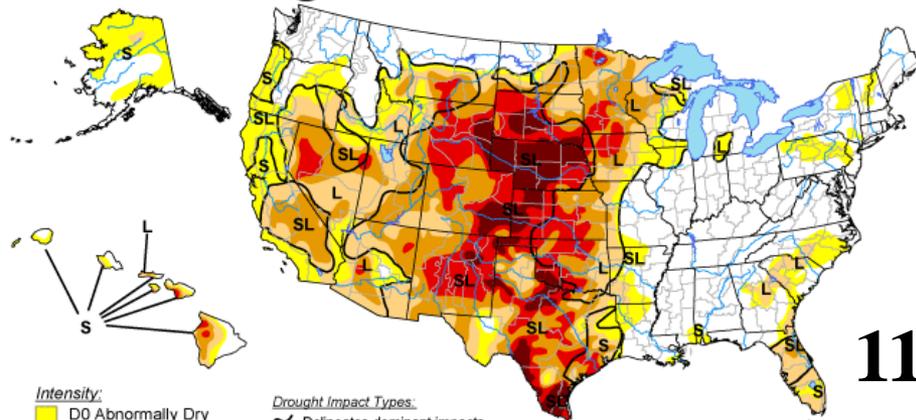
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Released Thursday, January 3, 2013  
Author: Richard Heim, NOAA/NESDIS/NCDC

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

# U.S. Drought Monitor

April 2, 2013  
Valid 7 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  
S = Short-Term, typically <6 months  
(e.g. agriculture, grasslands)  
L = Long-Term, typically >6 months  
(e.g. hydrology, ecology)



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

Released Thursday, April 4, 2013  
Author: Rich Tinker, NOAA/NWS/NCEP/CPC

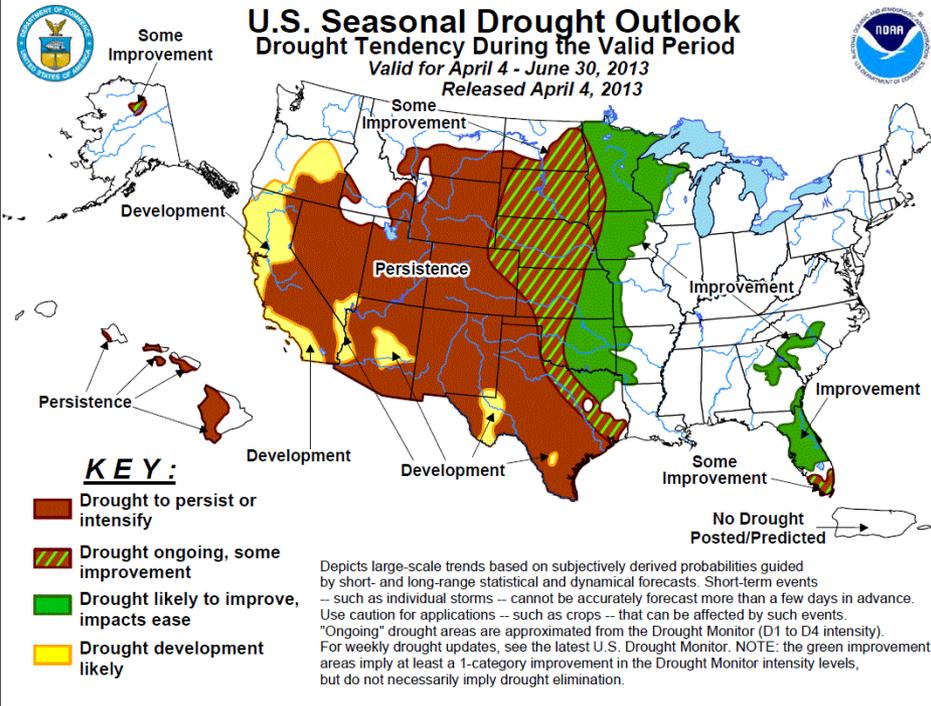
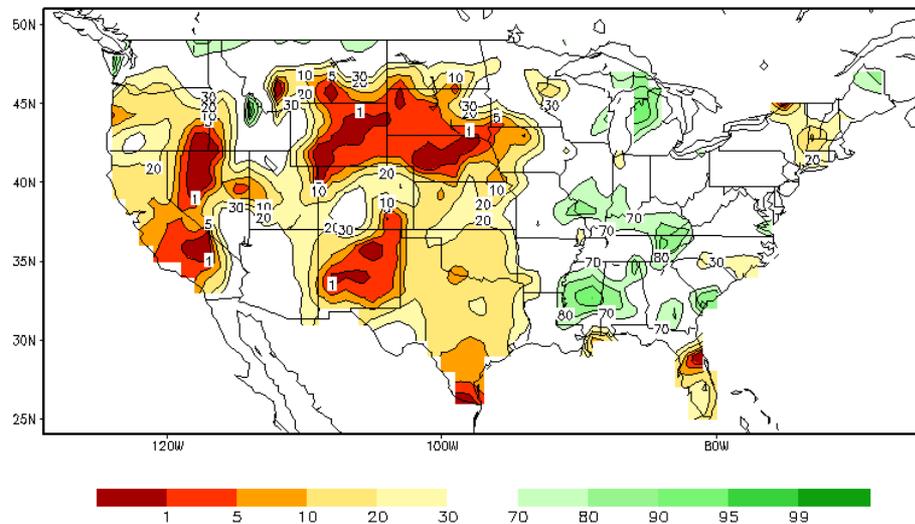
<http://droughtmonitor.unl.edu/>

# Basin Conditions

## Soil Moisture

## Drought Outlook

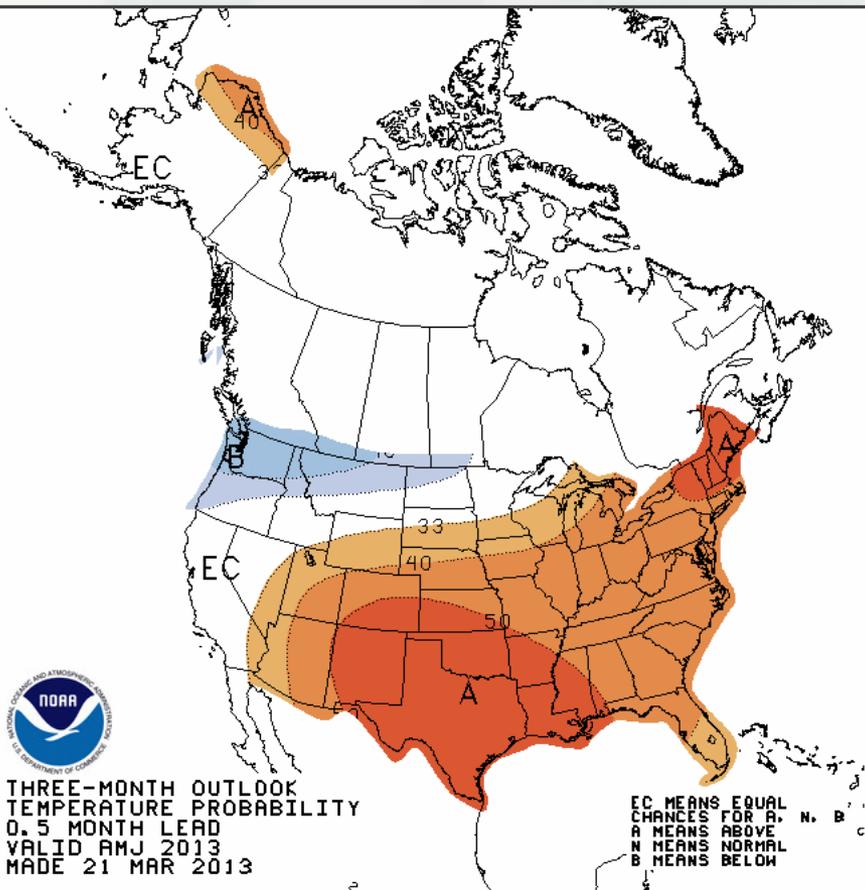
Calculated Soil Moisture Ranking Percentile  
MAR 31, 2013



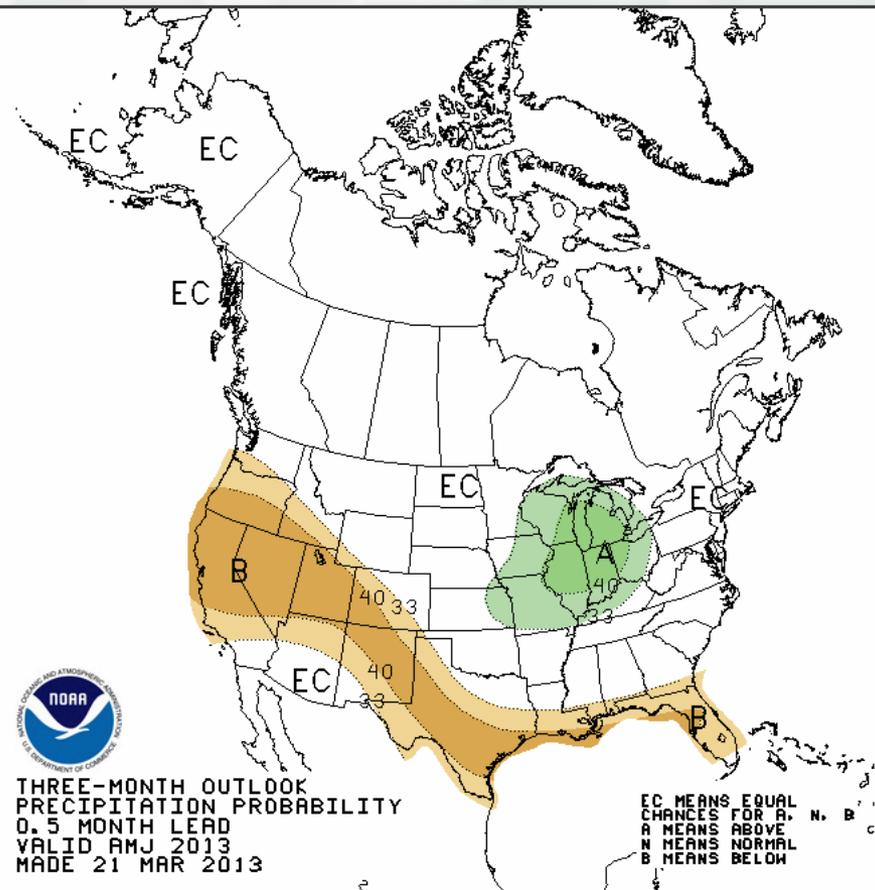
# Climate Outlooks

## Apr-May-Jun

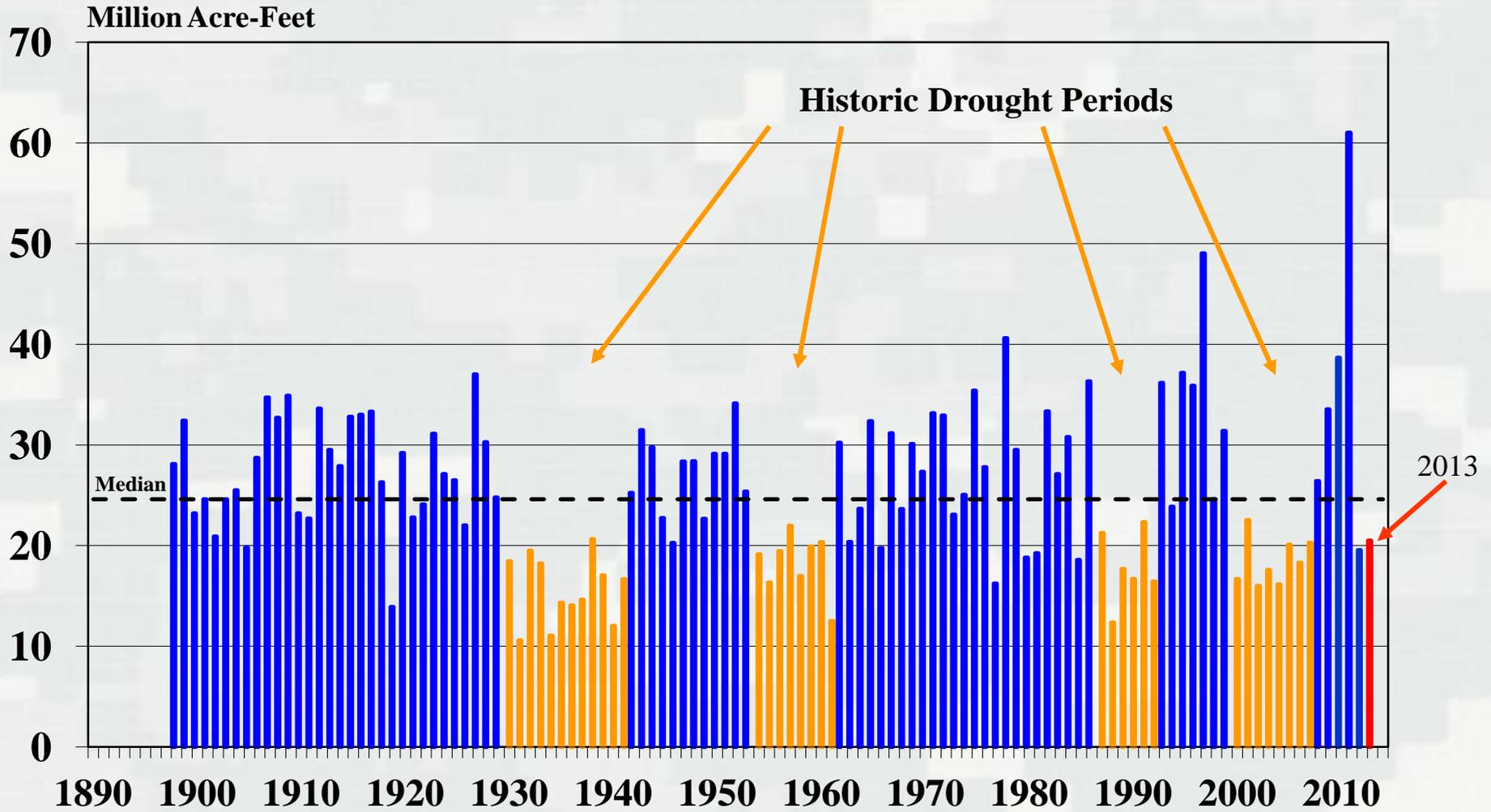
### Temperature



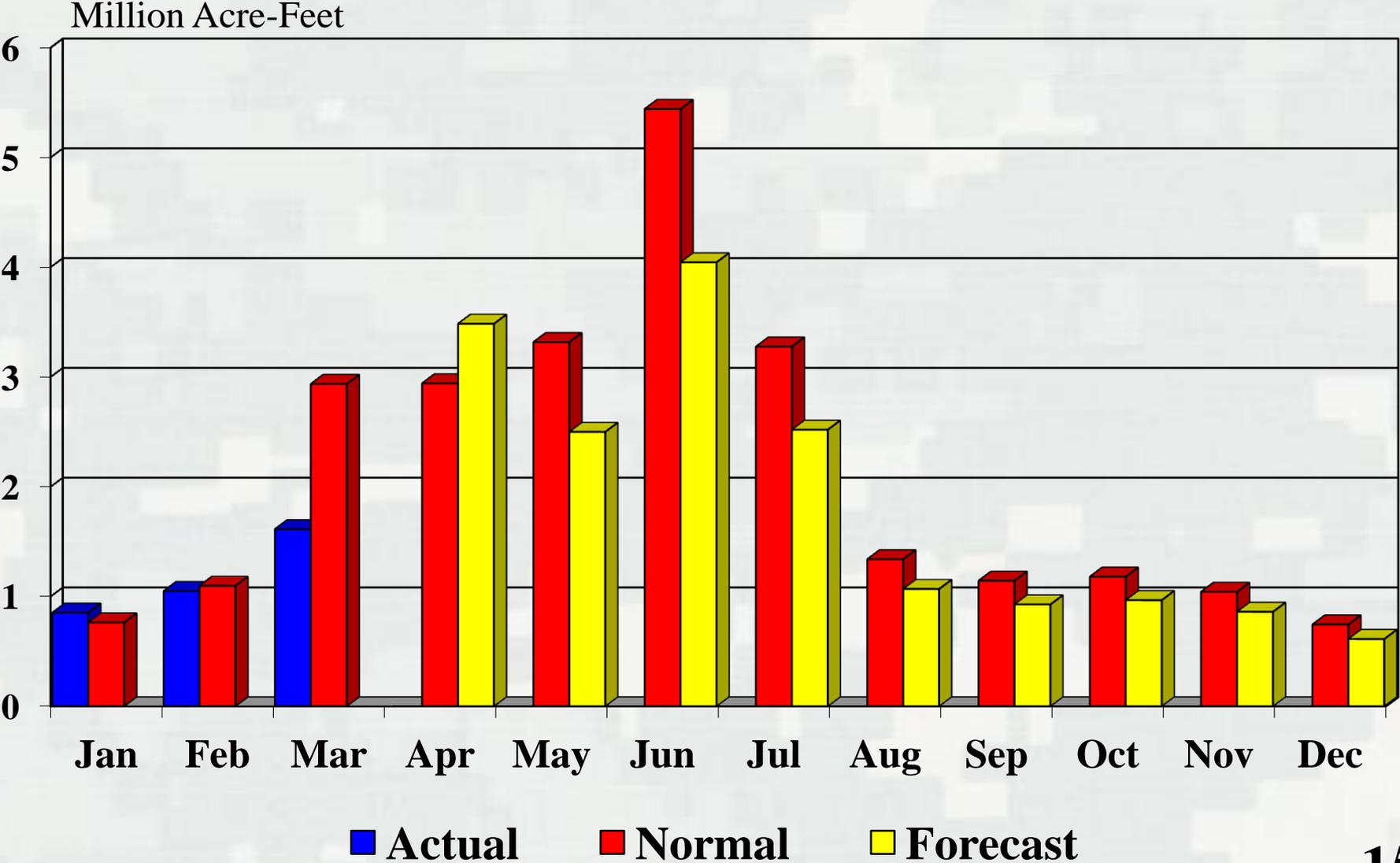
### Precipitation



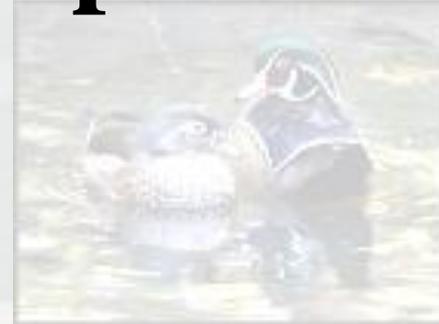
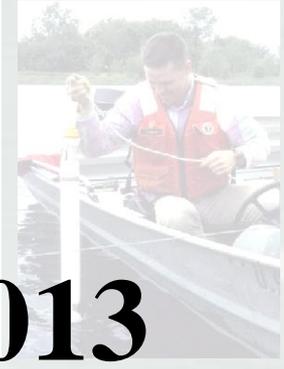
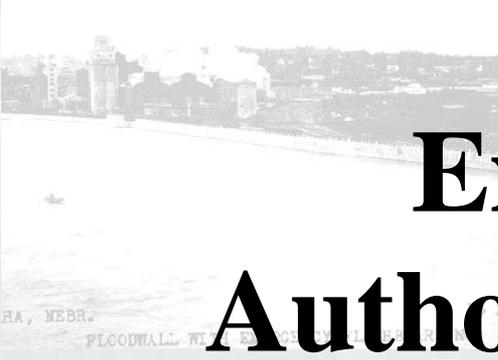
# Annual Runoff above Sioux City, IA



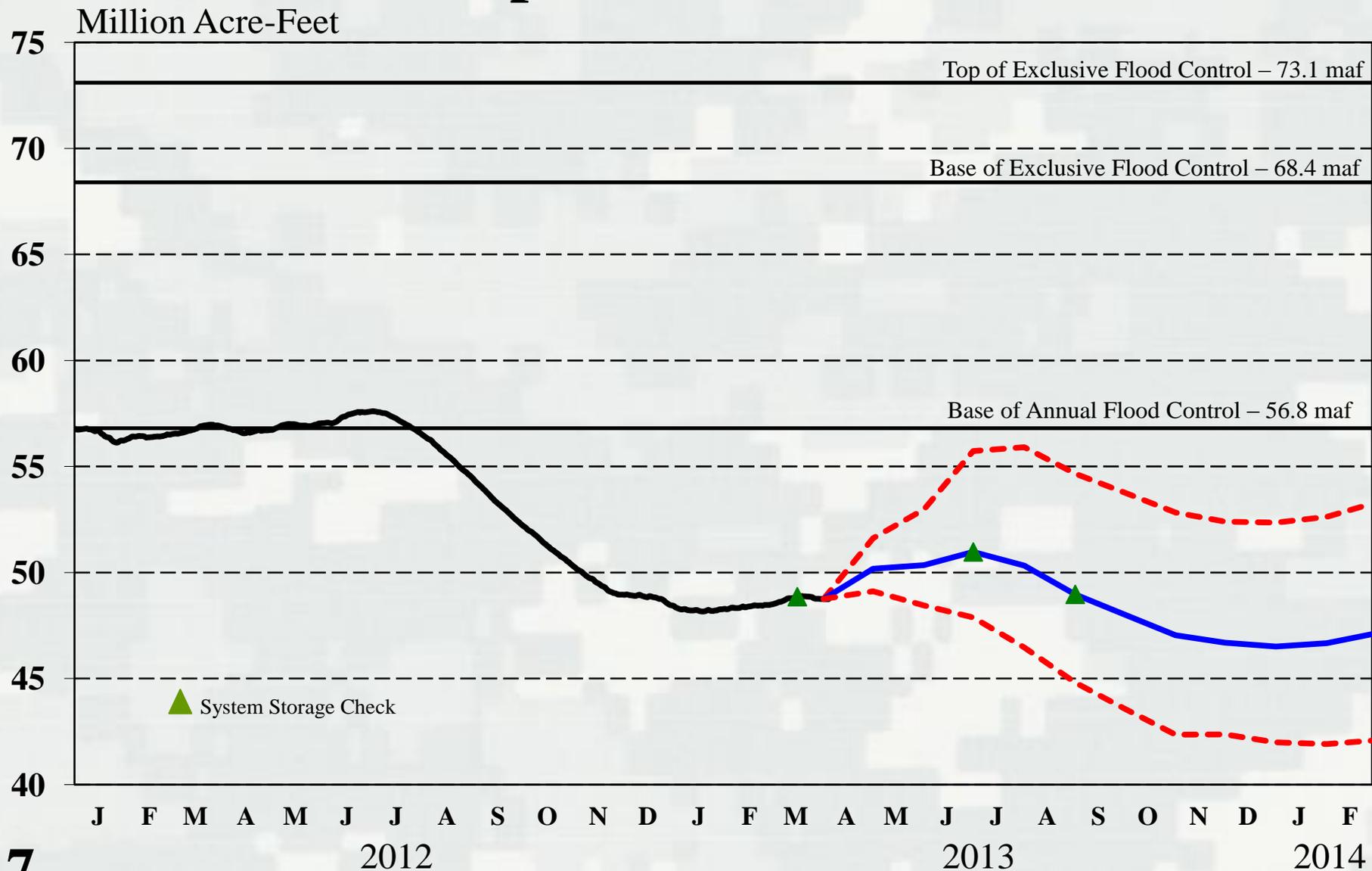
# Missouri River Runoff above Sioux City, IA 2013 Actual and Forecasted



# Expected Results for Authorized Purposes in 2013



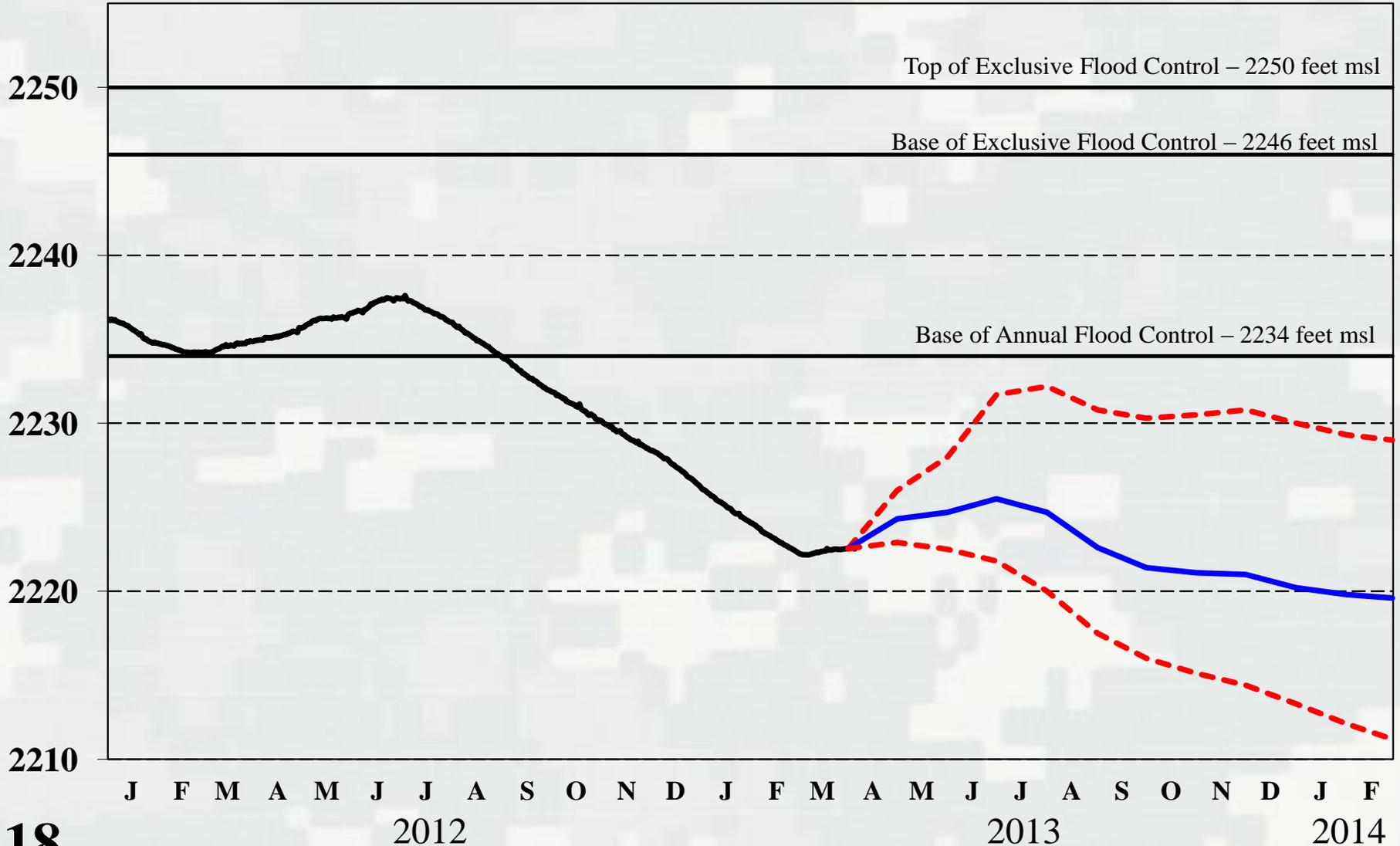
# System Storage April 1 Forecast



# Fort Peck

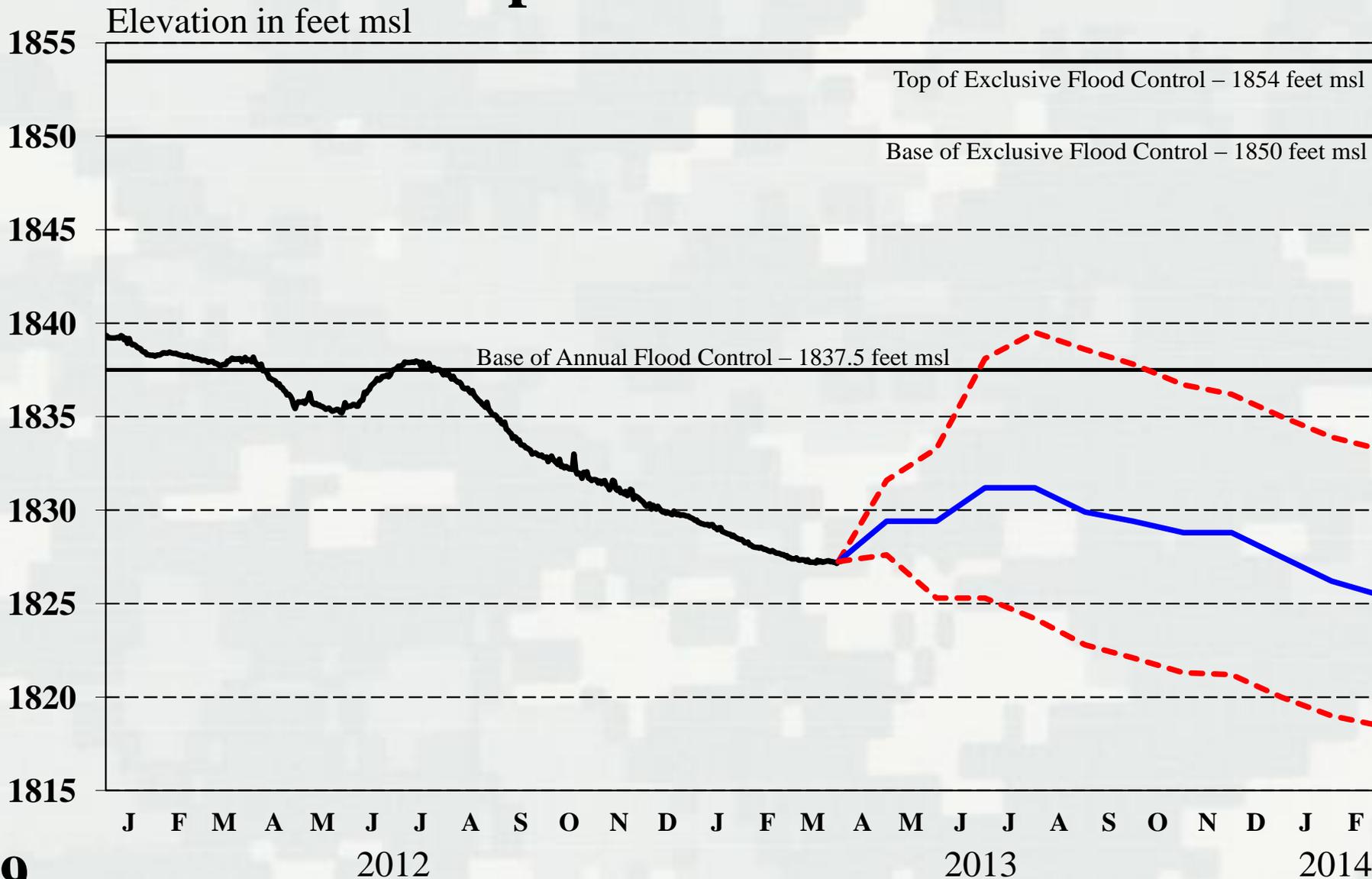
## April 1 Forecast

Elevation in feet msl



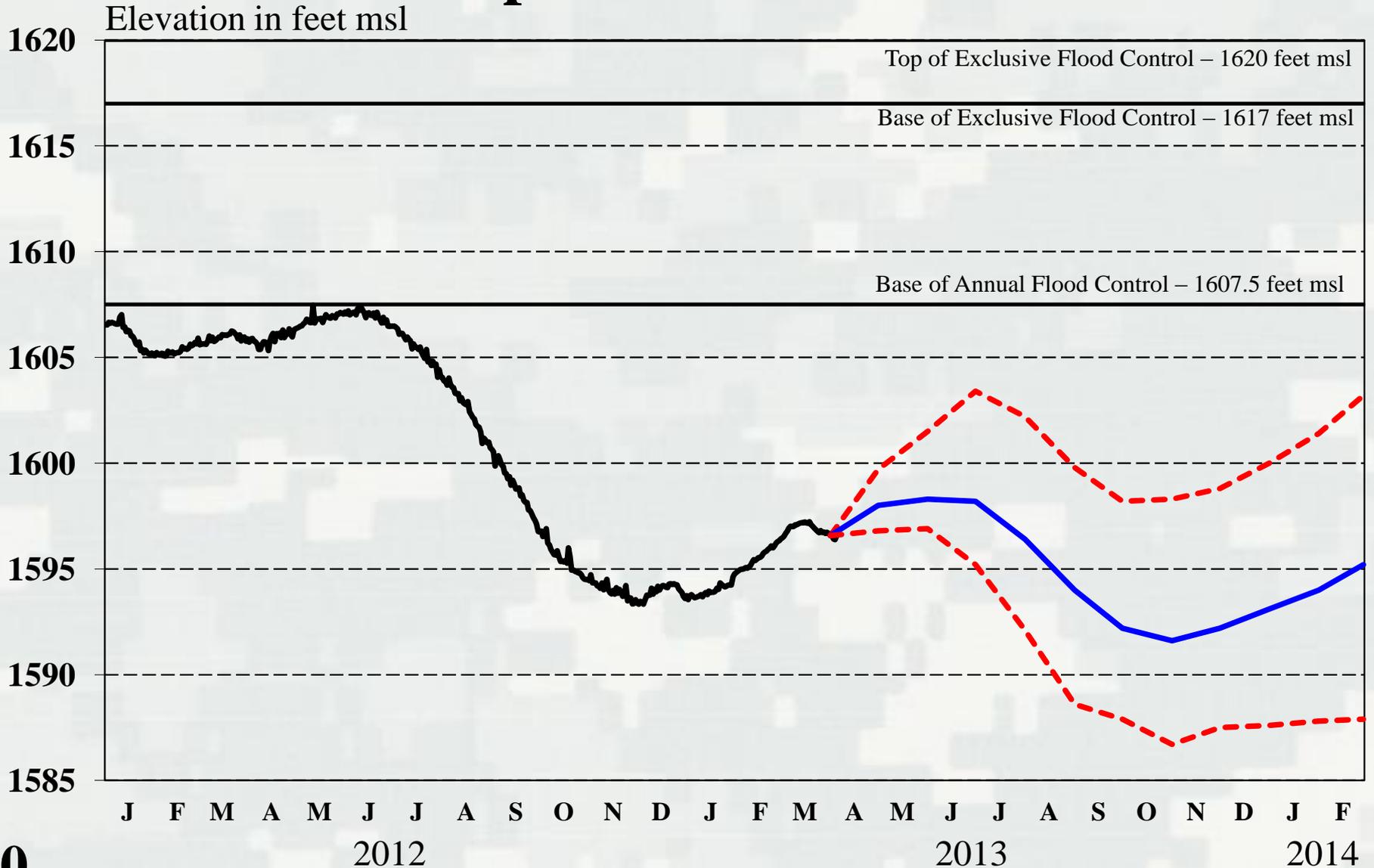
# Garrison

## April 1 Forecast



# Oahe

## April 1 Forecast



# Flood Control

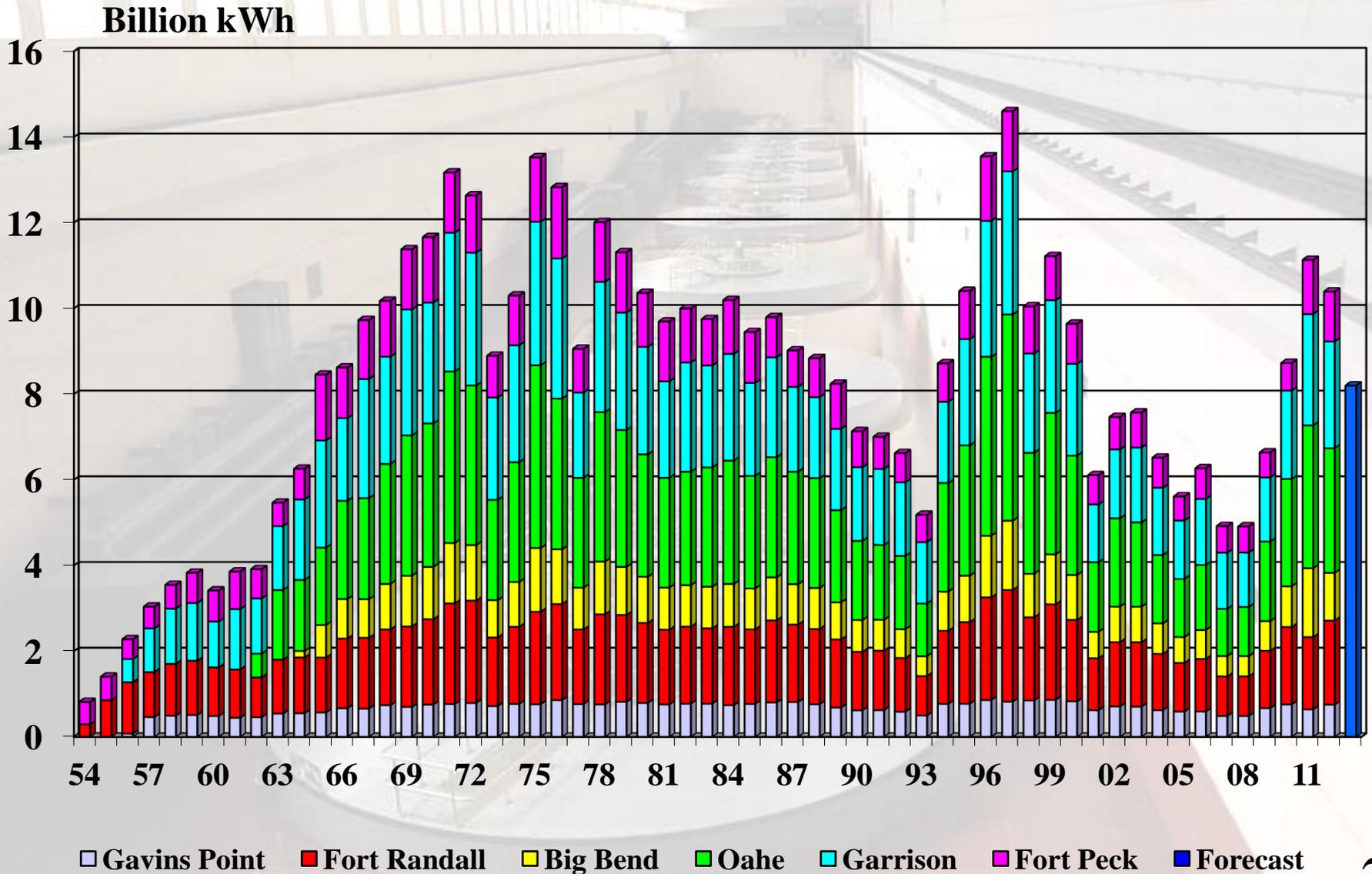
- Additional 8 MAF of flood control storage available due to drought
- Fort Peck, Garrison and Oahe 10-12 feet below base of flood control zone
- Flooding can still occur even during droughts

HA, NEBR.

13

FLOODWALL WITH EMERGENCY FLASH BOARDING

# Hydropower



# Navigation

- March 15 storage check
  - ▶ Minimum service flow support
  - ▶ Flows to support 8 x 200 ft channel
  - ▶ Target locations: Sioux City, Omaha, Nebraska City and Kansas City
- July 1 storage check
  - ▶ Minimum or near minimum service support for Lower Basic and Basic runoff
  - ▶ 3-day shortening Basic, 23-day shortening Lower Basic runoff
- Conservation Measures
  - ▶ Not meeting targets in reaches without commercial navigation
  - ▶ Use of Kansas River reservoirs

# Water Supply – Water Quality

## Irrigation – Recreation

- Some issues expected due to lower than normal reservoir levels and releases
  - ▶ Water supply intakes, recreation areas, irrigation, marinas
- Gavins Point releases
  - ▶ Winter release of 12,000 cfs under all three runoff scenarios
  - ▶ Fall release of 9,000 cfs with shortened navigation season

# Fish and Wildlife

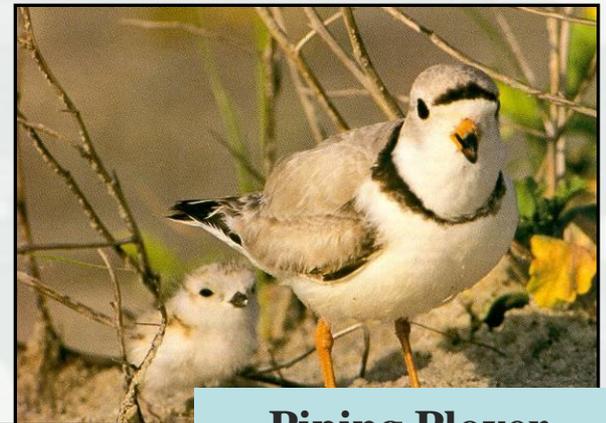
- Steady to rising levels at upper three reservoirs during forage fish spawn
  - ▶ Favor Fort Peck and Oahe if runoff not sufficient
- Minimize hours of zero releases at Fort Randall to the extent possible
- Cold water habitat will be monitored

# 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



**Piping Plover**  
Listed "Threatened" 1986

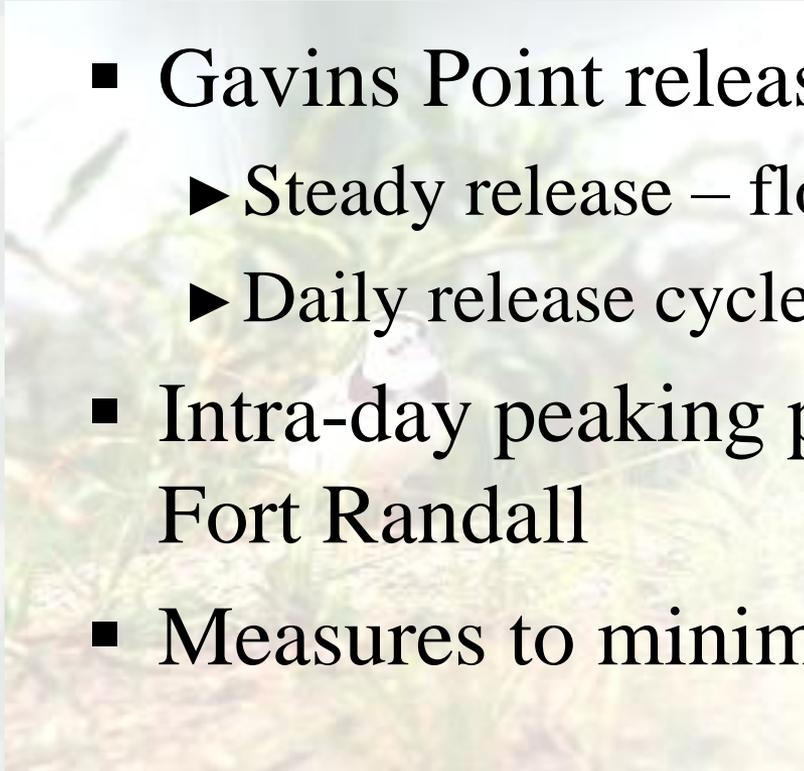


**Pallid Sturgeon**  
Listed "Endangered" 1990

# Threatened and Endangered Species

## 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



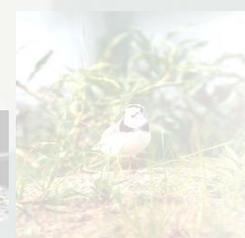
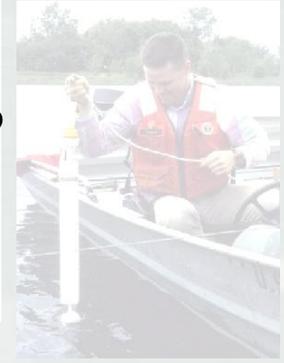
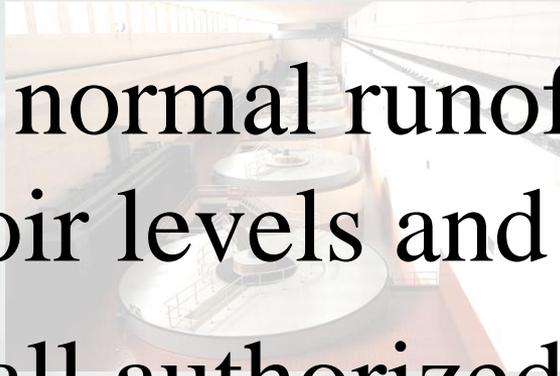
# Threatened and Endangered Species

## Bi-Modal Spring Pulse – Pallid Sturgeon

- 2003 Amended Biological Opinion – Reasonable and Prudent Alternative
- March and May spring pulses – not implemented in 2013
  - ▶ Independent science advisory panel (ISAP) determined implemented pulses not accomplishing intended outcomes
  - ▶ Forego 2013 spring pulse while pursuing ISAP recommendations

# Summary

- Below normal runoff forecast, reservoir levels and releases
- Serve all authorized purposes
- Water conservation measures have been implemented



# Thank You!

Missouri.Water.Management@usace.army.mil

<http://www.nwd-mr.usace.army.mil/rcc/>



**BUILDING STRONG®**