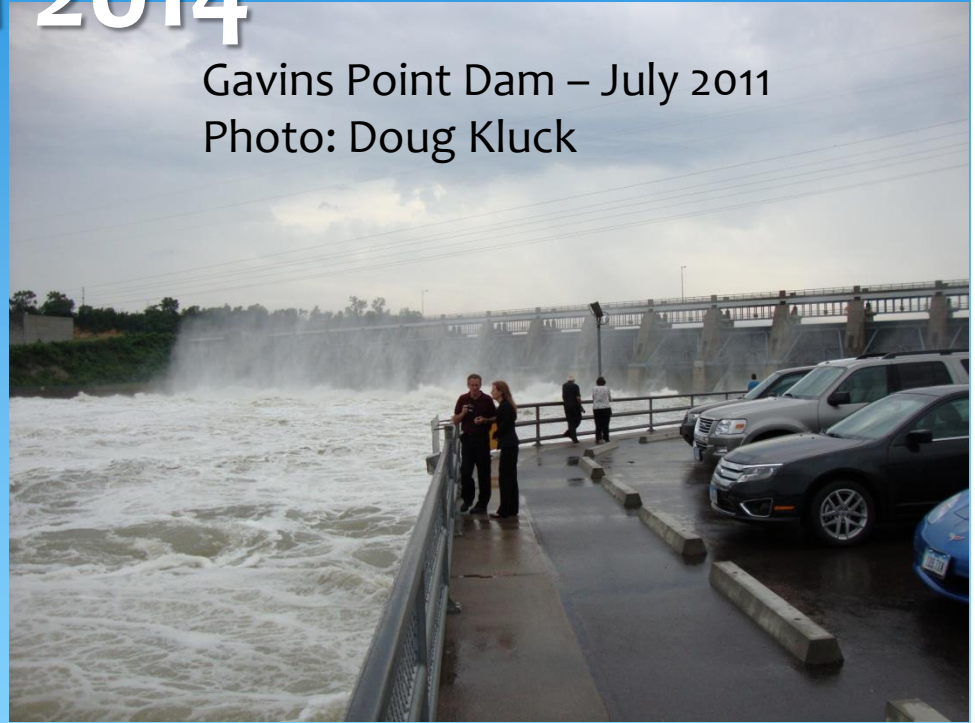


Missouri Basin Climate Outlook

4 April 2014

Dr. Dennis Todey
South Dakota State Climatologist
South Dakota State University
4 April, 2014
Dennis.todey@sdstate.edu
605-688-5141

Gavins Point Dam – July 2011
Photo: Doug Kluck



US Army Corps of Engineers

Northwestern Division
Missouri River Basin Water Management Division

BUILDING STRONG.

General Information

- * **Providing climate services to the Missouri Basin**
 - * NOAA-NWS, MRBRC, USACE, BOR, NRCS, regional and state climatologists and other partners
- * **Next Climate Outlook**
 - * April 17th 2014, next regular Webinar
- * **Access to previous Missouri Basin Webinars and information**
 - * <http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>
 - * <http://mrcc.isws.illinois.edu/webinars.htm>
 - * <http://www.hprcc.unl.edu/webinars.php>
 - * Operator Assistance for questions at the end.

Agenda

- * **Current conditions & comparisons**
- * **River review status**
- * **Predictions**
- * **Drought/El Nino**

Key Points

- * **Current Conditions**

- * Large mountain snow packs. Less so in plains
- * Some frozen soils in plains/some moist
- * Temps still cooler than average

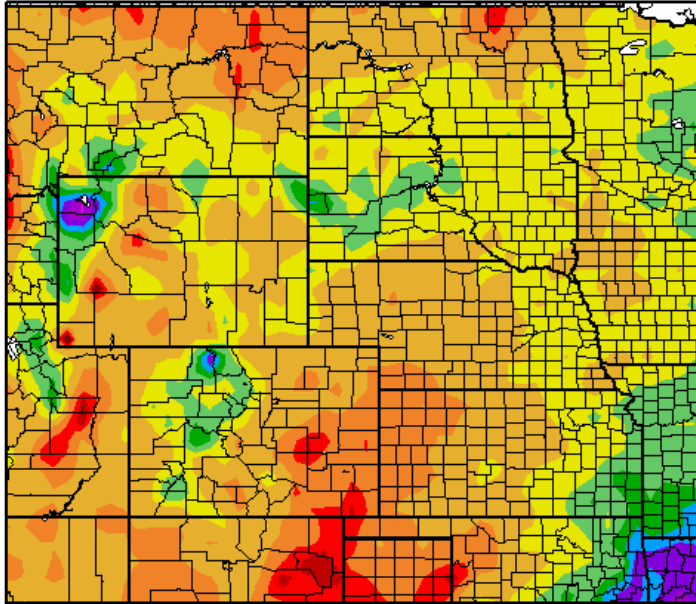
- * **Predictions**

- * Likely cooler still into the spring.
- * Precipitation outlooks – equal chances
- * No indications of specific large events
- * El Nino likely coming – little impact on current situation
- * Some minor tributary flooding expected

- * **Caveat**

- * Near point of peak accumulation – extreme individual events difficult to forecast

Precipitation (in)
10/3/2013 - 4/2/2014

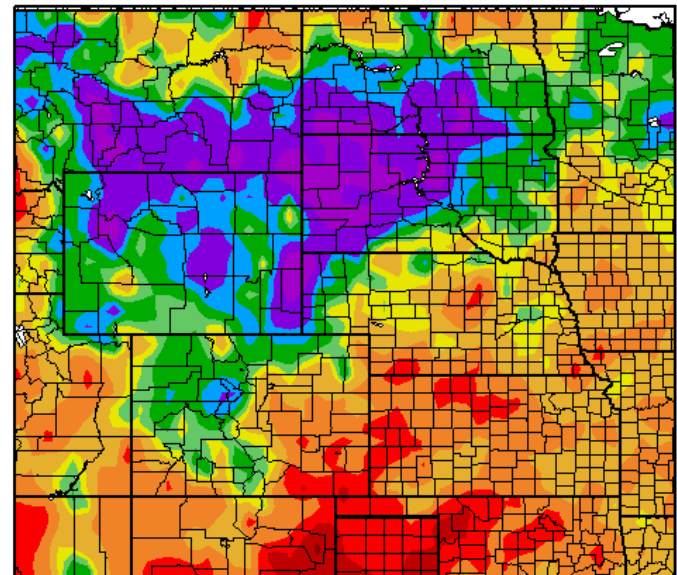


Generated 4/3/2014 at HPRCC using provisional data.

Regional Climate Centers



Percent of Normal Precipitation (%)
10/3/2013 - 4/2/2014

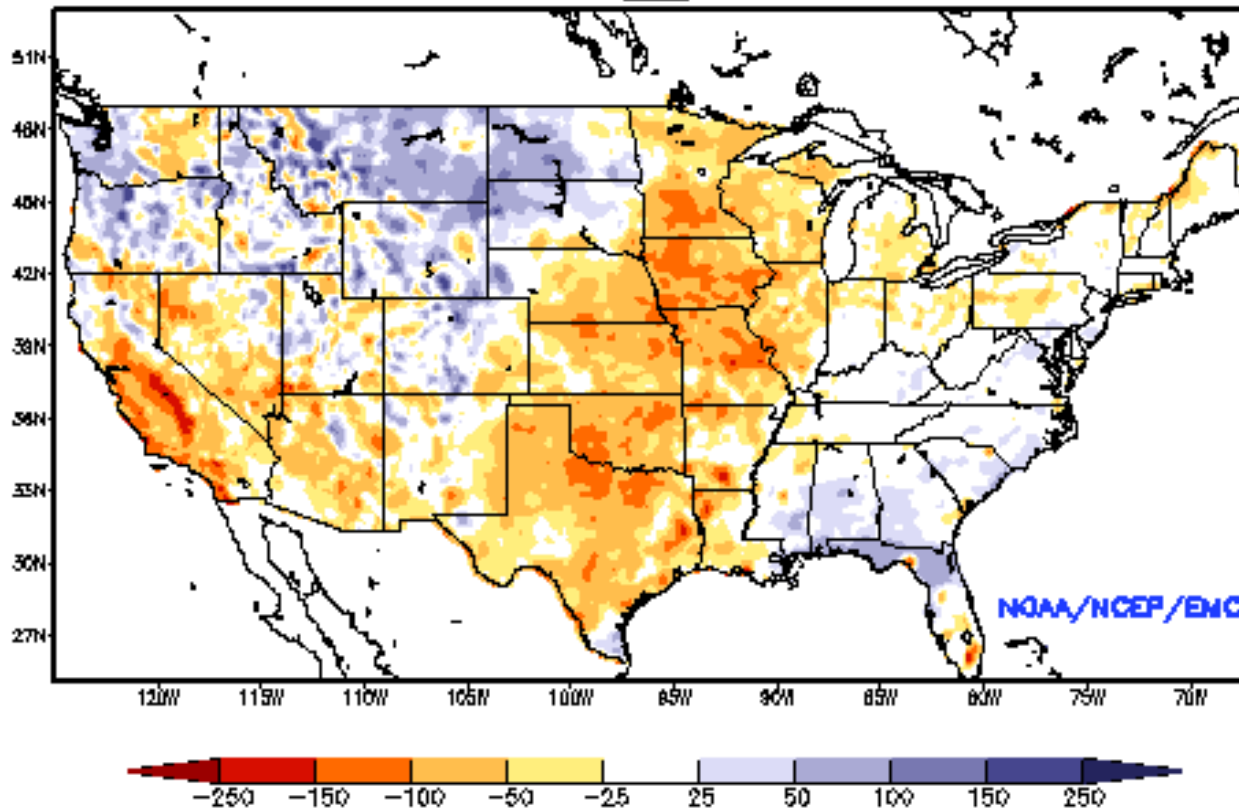


Generated 4/3/2014 at HPRCC using provisional data.

Regional Climate Centers

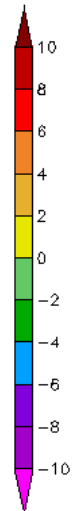
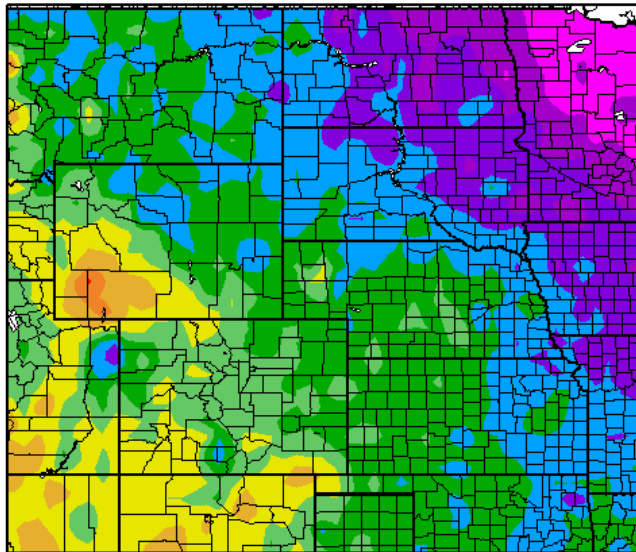
Soil Moisture

Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)
NCEP NLDAS Products ___ Valid: MAR 30, 2014

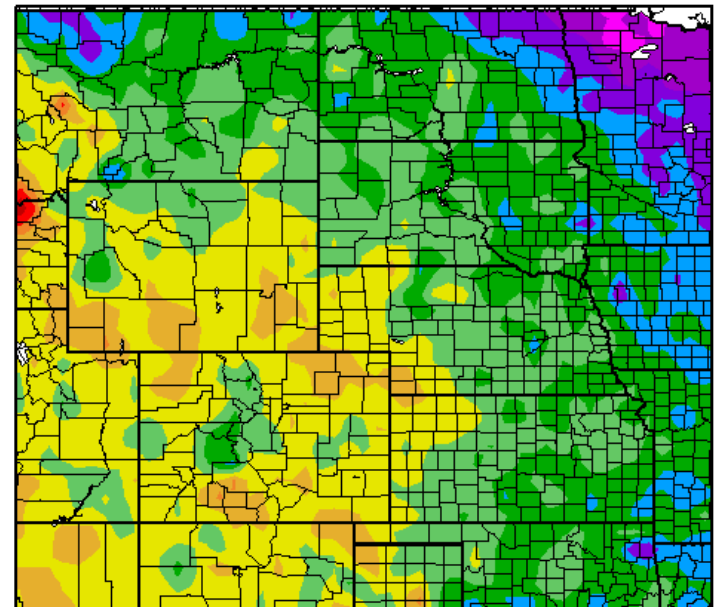


Still area of biggest
need and lack of
detail

Departure from Normal Temperature (F) 12/1/2013 - 2/28/2014



Departure from Normal Temperature (F) 3/4/2014 - 4/2/2014



Generated 3/11/2014 at HPRCC using provisional data.

Regional Climate Centers

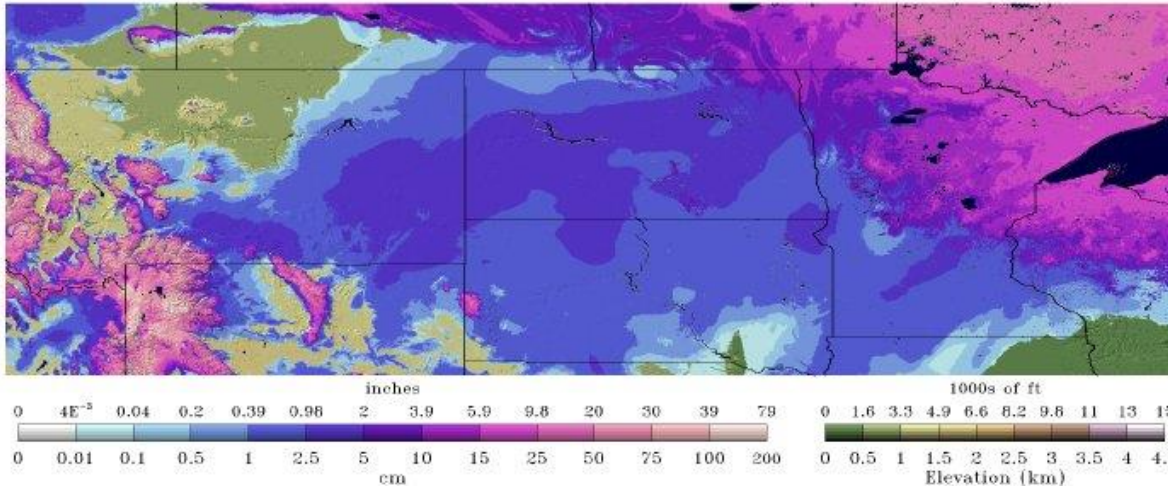
Generated 4/3/2014 at HPRCC using provisional data.

Regional Climate Centers

Northern Basin Snow Water Equivalent Comparison

National Snow 2013-2014 Analysis

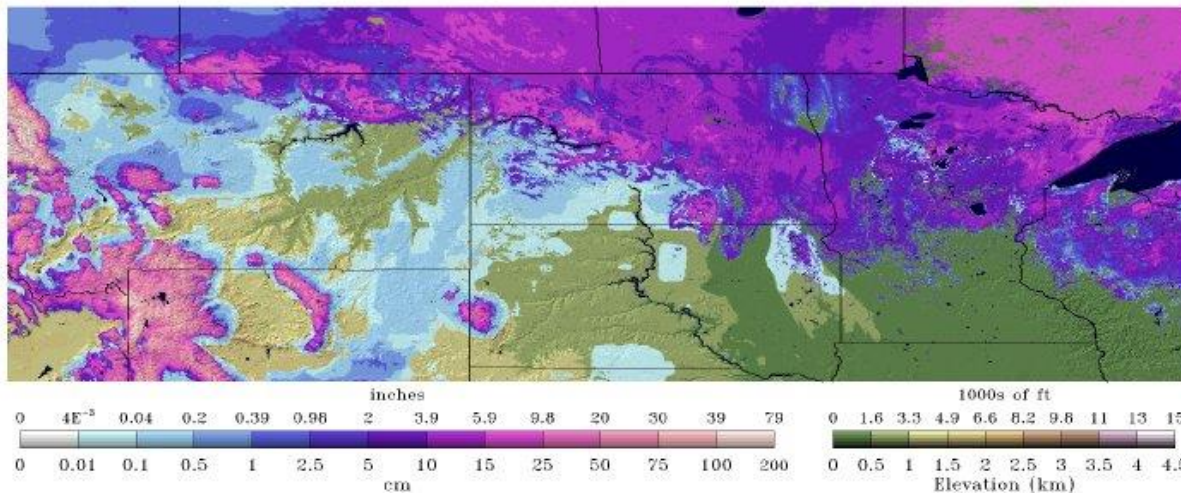
Snow Water Equivalent
2014-04-04 06 UTC



4 April 2014

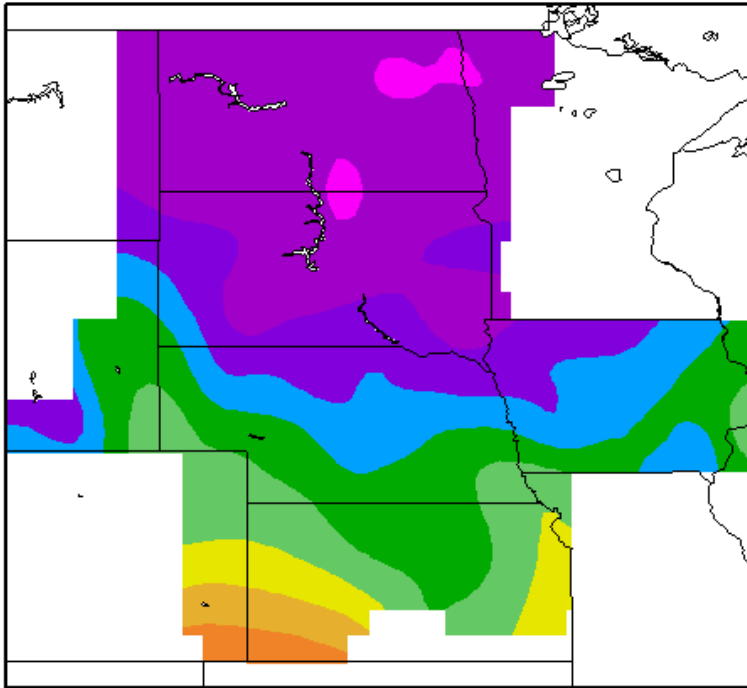
National Snow 2010-2011 Analysis

Snow Water Equivalent
2011-04-04 06



4 April 2011

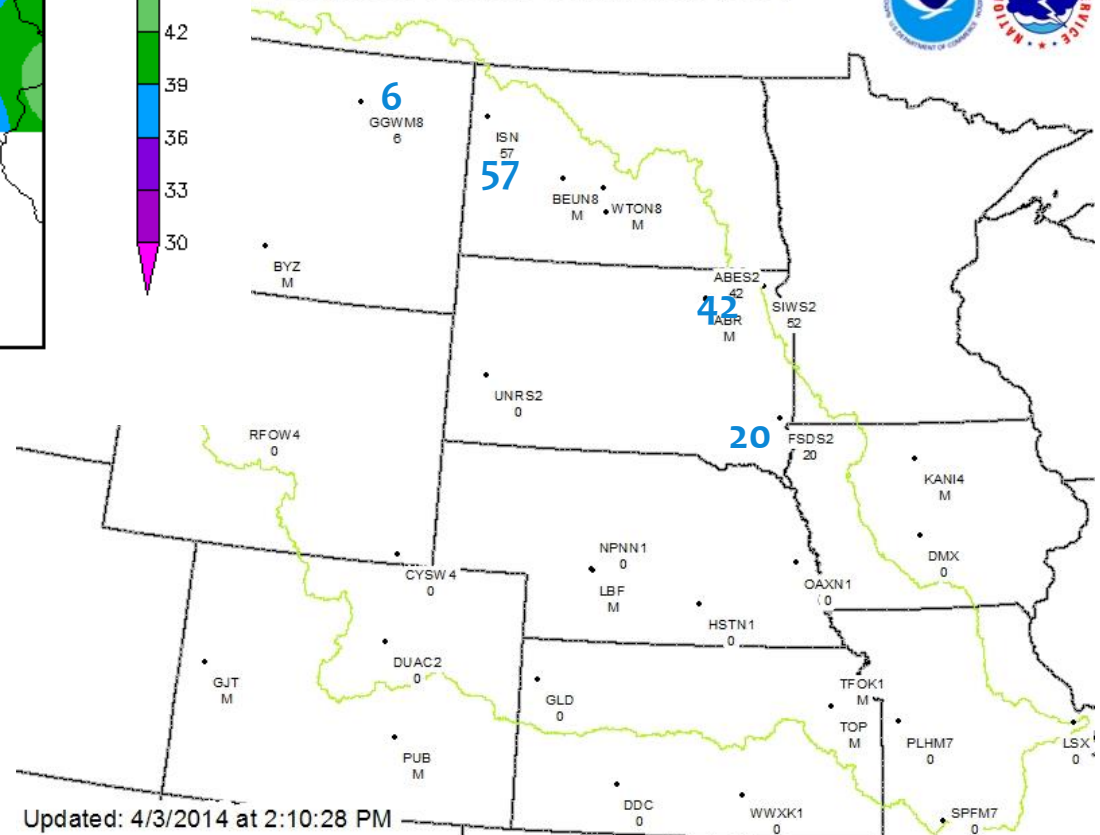
Soil Temperature (F at 4 inches) 4/3/2014 - 4/3/2014



High Plains Regional Climate Center
Generated 4/4/2014 using AWDN data.

Soil temperature/frost

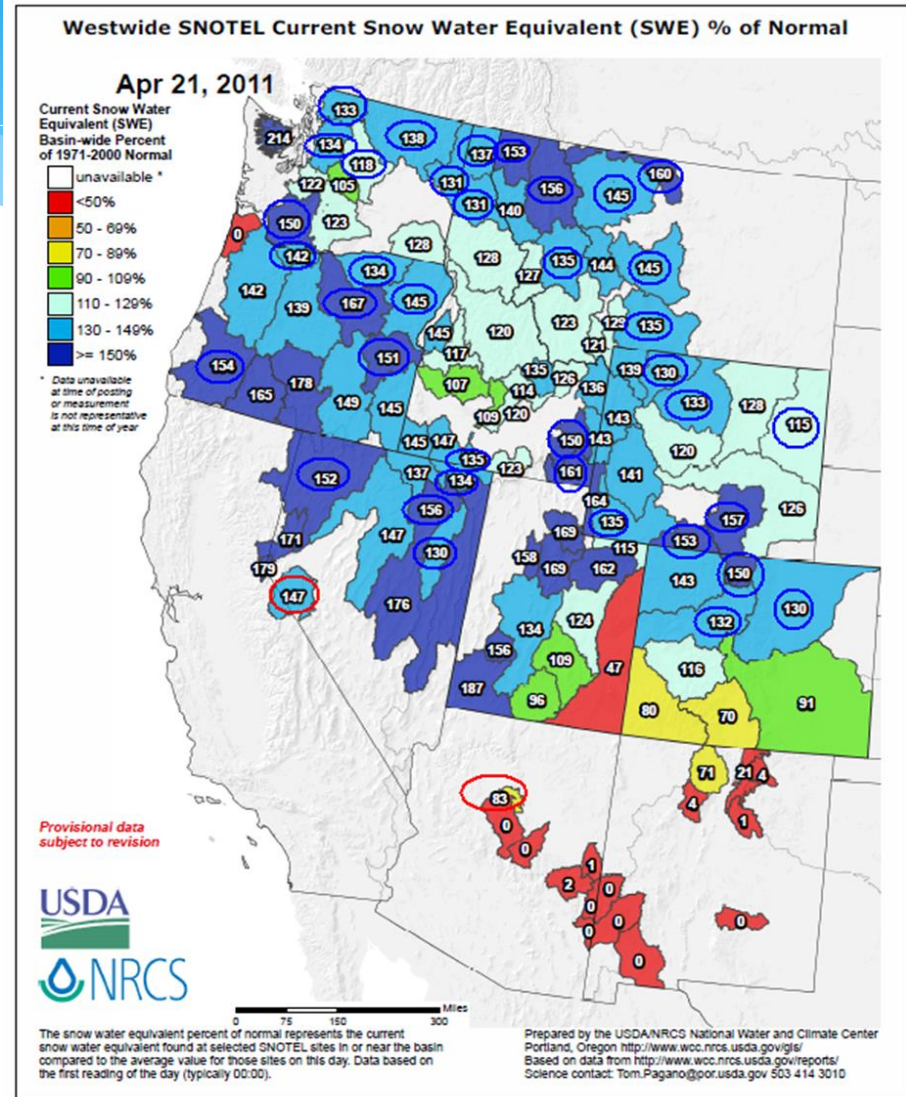
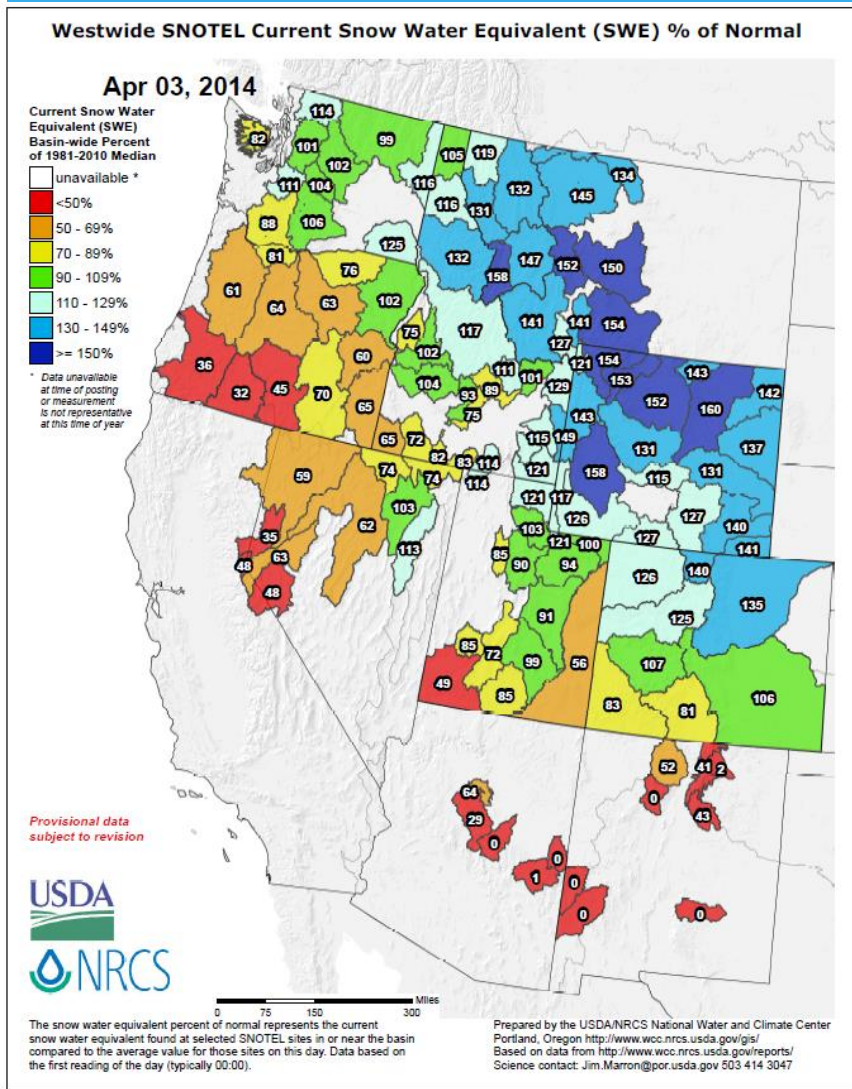
Depth of Frost Penetration (GD)



Updated: 4/3/2014 at 2:10:28 PM

Mountain Snow Comparison

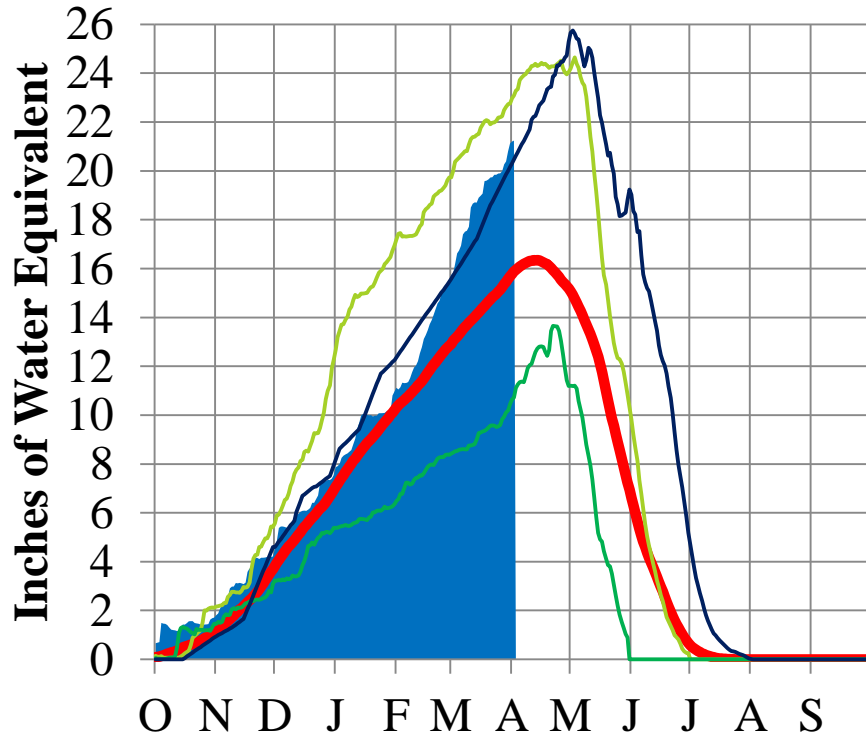
2014 (left) vs 2011 (right)



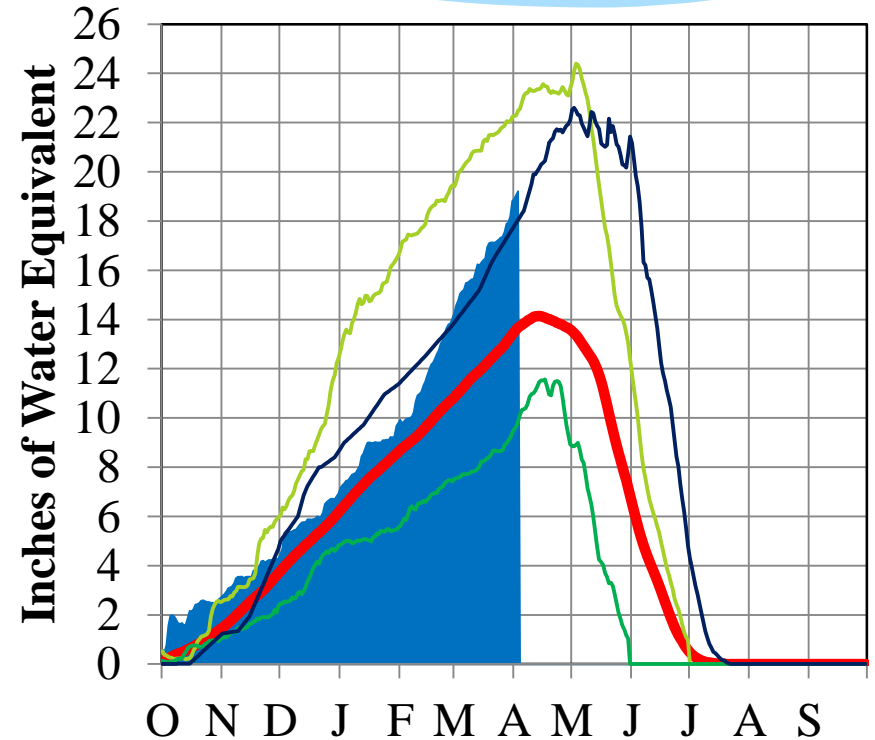
Missouri River Basin – Mountain Snowpack Water Content 2013-2014 with comparison plots from 1997*, 2001*, and 2011

April 3, 2014

Total above Fort Peck



Total Fort Peck to Garrison



■ 2013-14 ■ 1981-2010 Ave ■ 1997 ■ 2001 ■ 2011

■ 2013-14 ■ 1981-2010 Ave ■ 1997 ■ 2001 ■ 2011

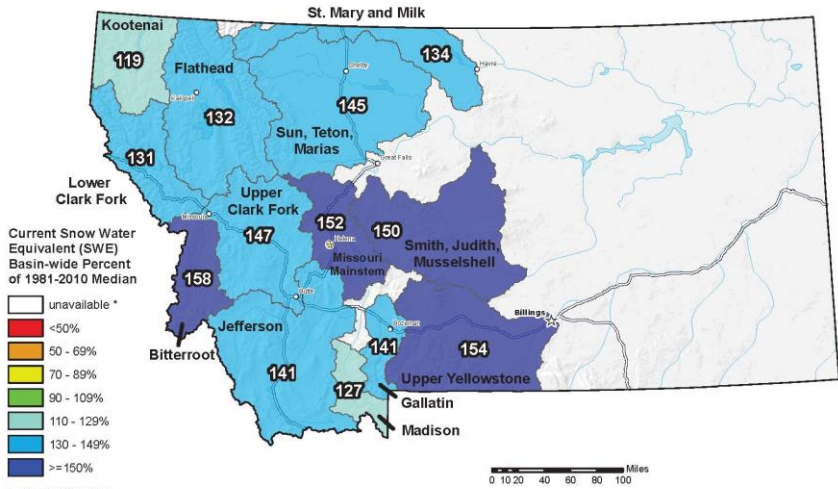
On April 3, 2014 the mountain snowpack in the “Total above Fort Peck” reach was 21.4”, 132% of the 1981-2010 30-year average. The mountain snowpack in the “Total Fort Peck to Garrison” reach was 19.2”, 140% of the 1981-2010 30-year average. By April 1 normally 97% of the peak has accumulated. The Missouri River basin mountain snowpack normally peaks near April 15.

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

Provisional data. Subject to revision.

Montana SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Apr 03, 2014



* Data unavailable at time of posting or measurement is not representative at this time of year.

Provisional Data
Subject to Revision



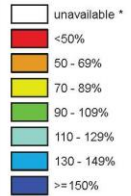
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon <http://www.wcc.nrcs.usda.gov/gis/>
Based on data from <http://www.wcc.nrcs.usda.gov/reports/>
Science contact: Jim.Marron@por.usda.gov 503 414 3047

Wyoming SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Apr 03, 2014

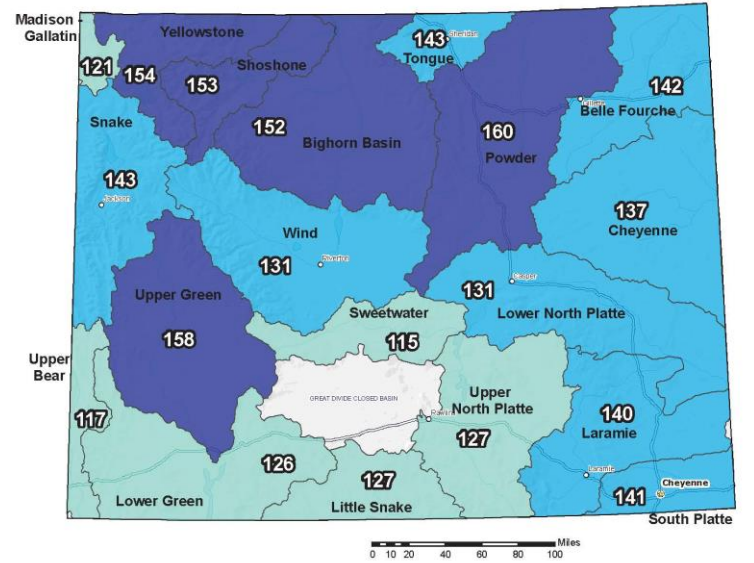
Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median



Provisional Data
Subject to Revision



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).



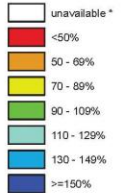
0 10 20 40 60 80 100 Miles

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon <http://www.wcc.nrcs.usda.gov/gis/>
Based on data from <http://www.wcc.nrcs.usda.gov/reports/>
Science contact: Jim.Marron@por.usda.gov 503 414 3047

Colorado SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Apr 03, 2014

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median



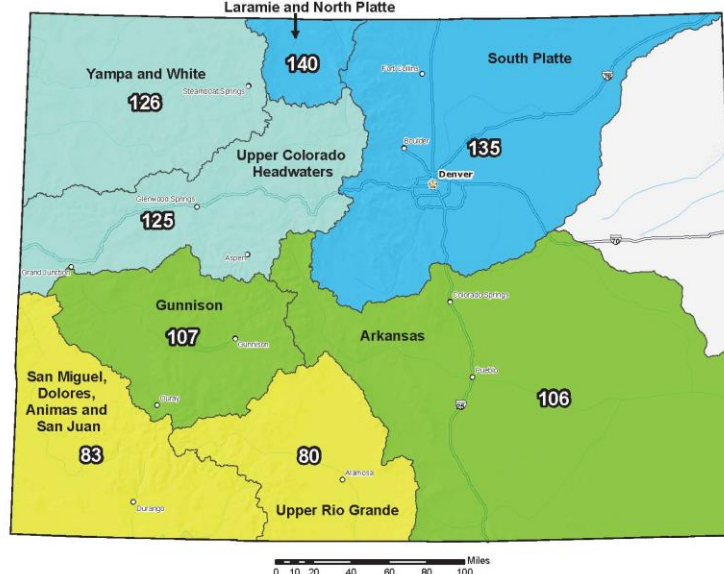
* Data unavailable at time of posting or measurement is not representative at this time of year.

Provisional Data
Subject to Revision



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

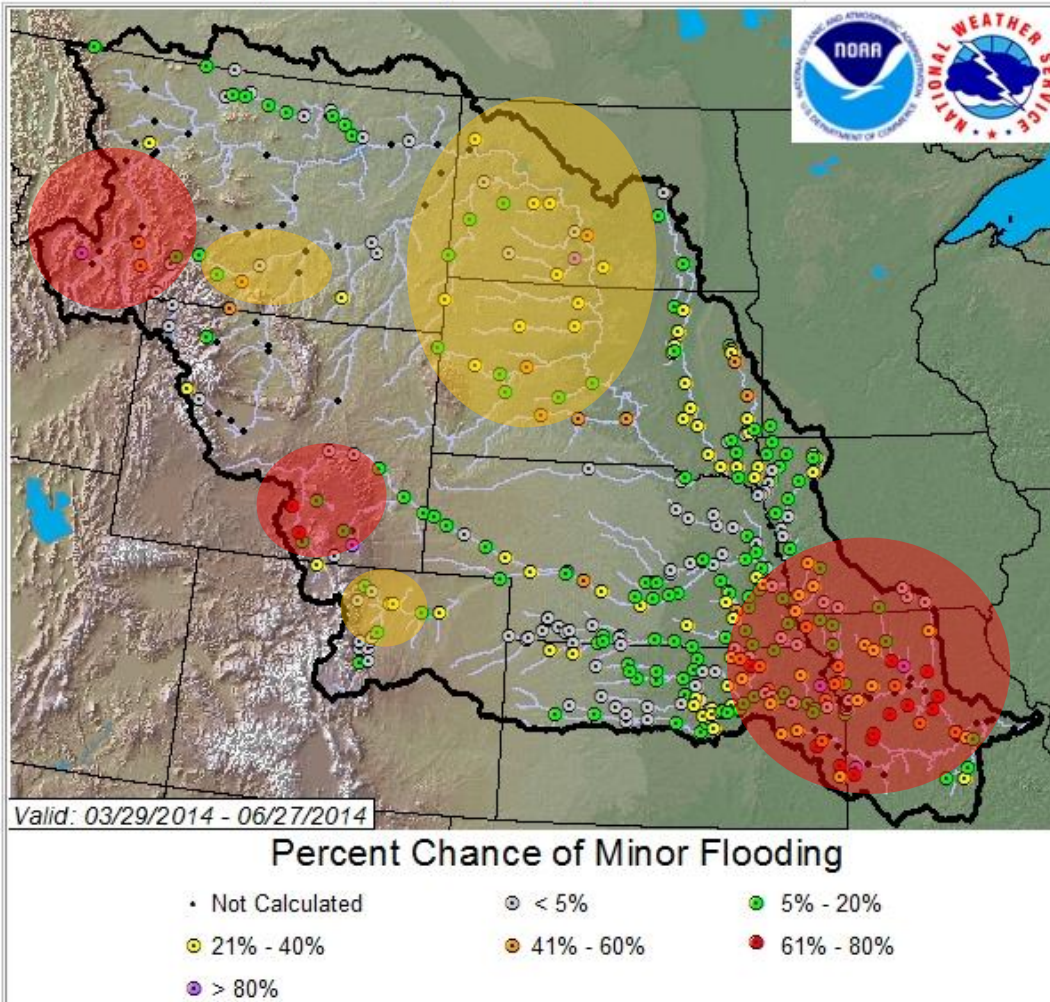
Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon <http://www.wcc.nrcs.usda.gov/gis/>
Based on data from <http://www.wcc.nrcs.usda.gov/reports/>
Science contact: Jim.Marron@por.usda.gov 503 414 3047



0 10 20 40 60 80 100 Miles

MISSOURI BASIN RIVER FORECAST CENTER

Probabilities of exceeding Minor Flood Levels
(click on specific points to view probabilistic outlooks)



Rivers likely to experience minor (and maybe **moderate**) flooding

- Big Hole River, MT
- Gallatin River, MT
- North Platte, WY
- Laramie, WY
- **Marais des Cygnes—Osage River basin, KS & MO**
- **Grand River, MO**
- Chariton River, MO
- Platte River, MO
- Missouri River, some reaches
- **Smaller streams in MO & extreme eastern KS**

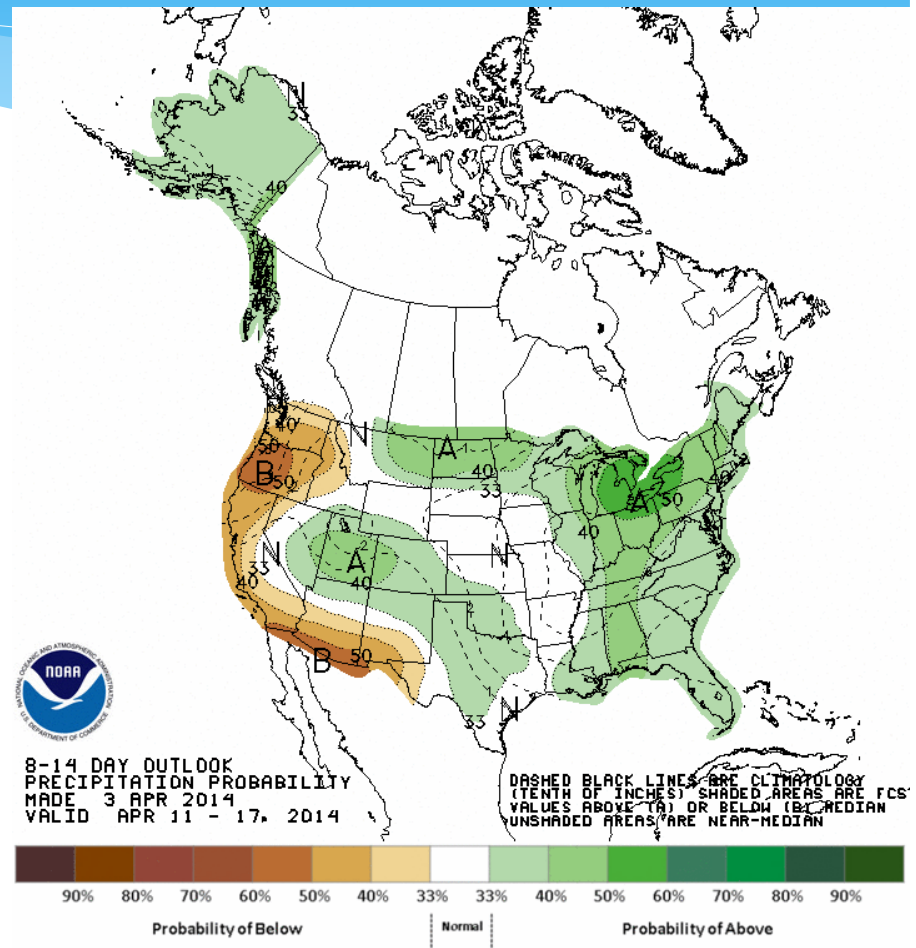
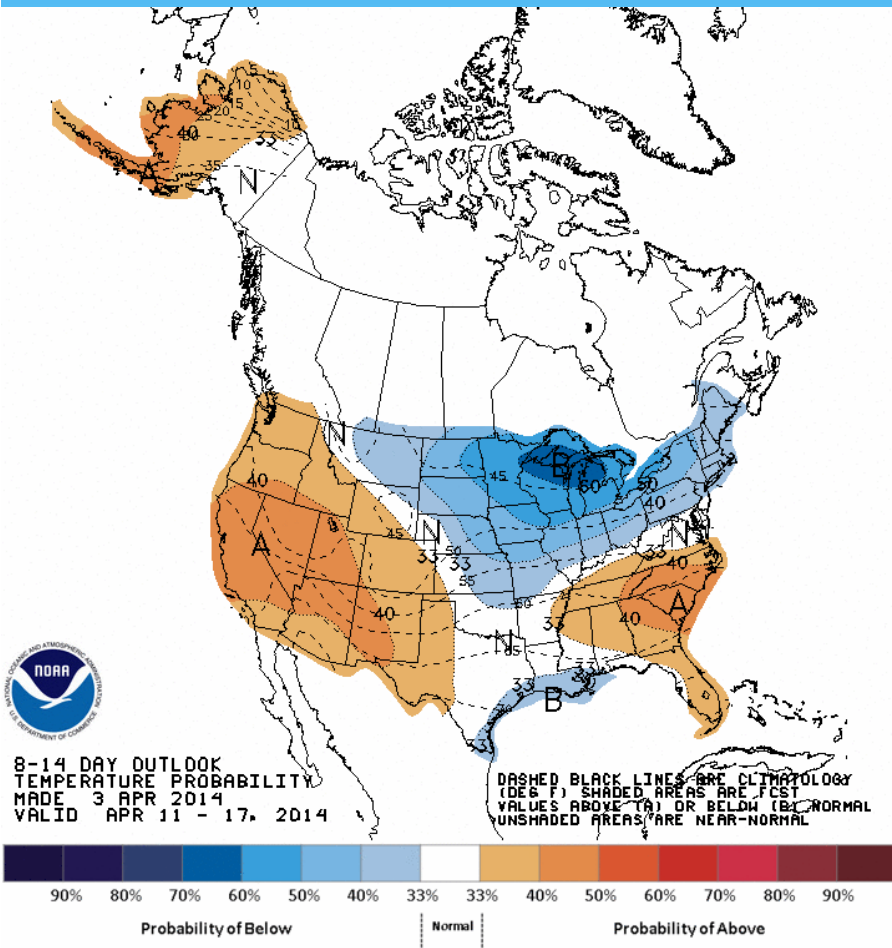
Areas to watch:

- Smaller streams in western Dakotas
- Some tributaries to the Yellowstone, MT
- Colorado foothills

Climate Outlooks

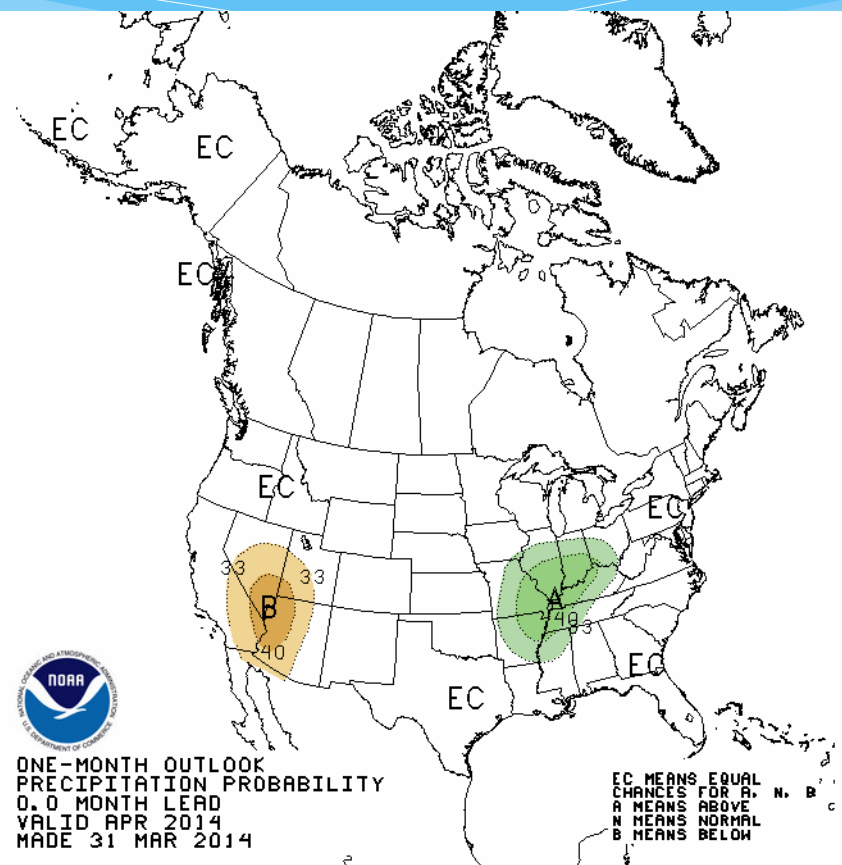
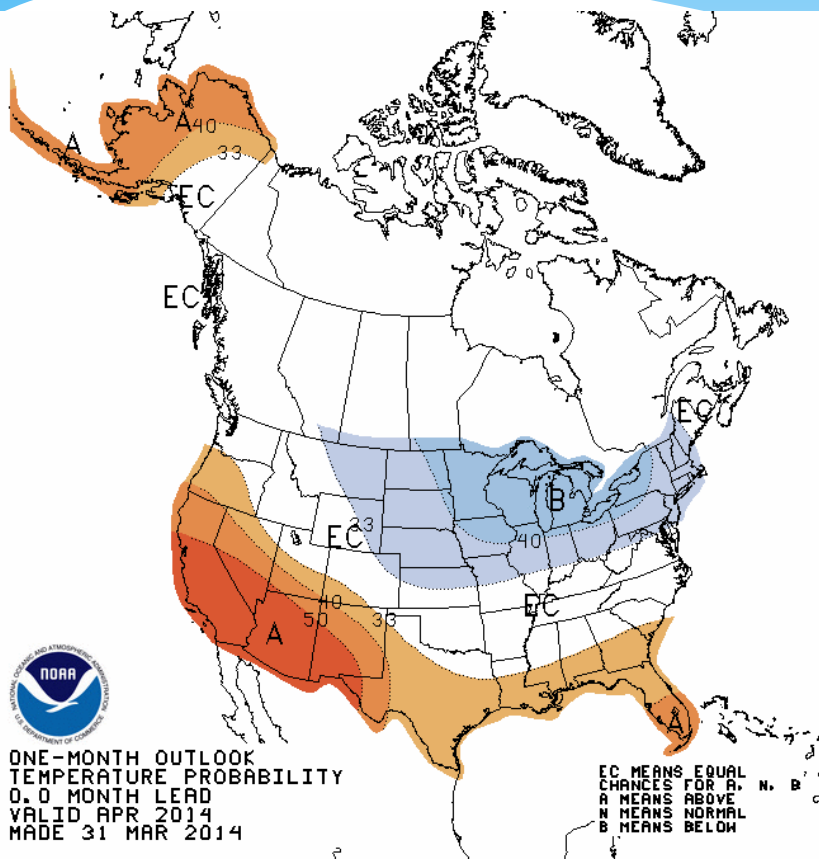
- * **2 weeks out (8-14 days)**
- * **April**
- * **3 Months (April - June)**
- * www.cpc.ncep.noaa.gov

Temperature and Precipitation Probabilities for 4/11- 4/17/11



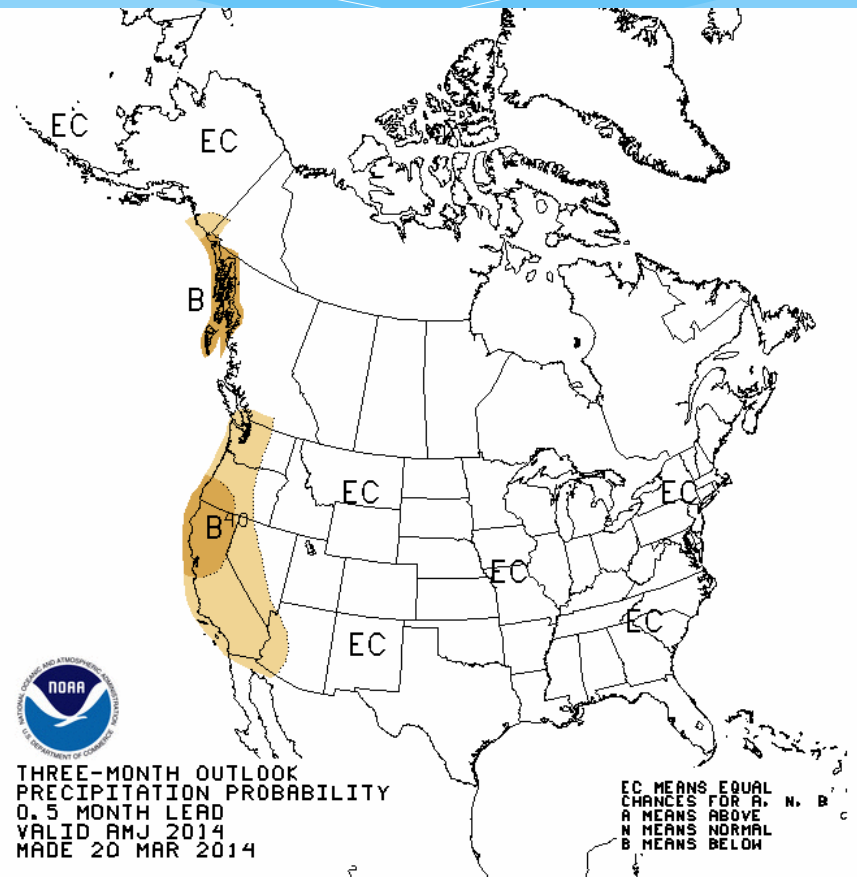
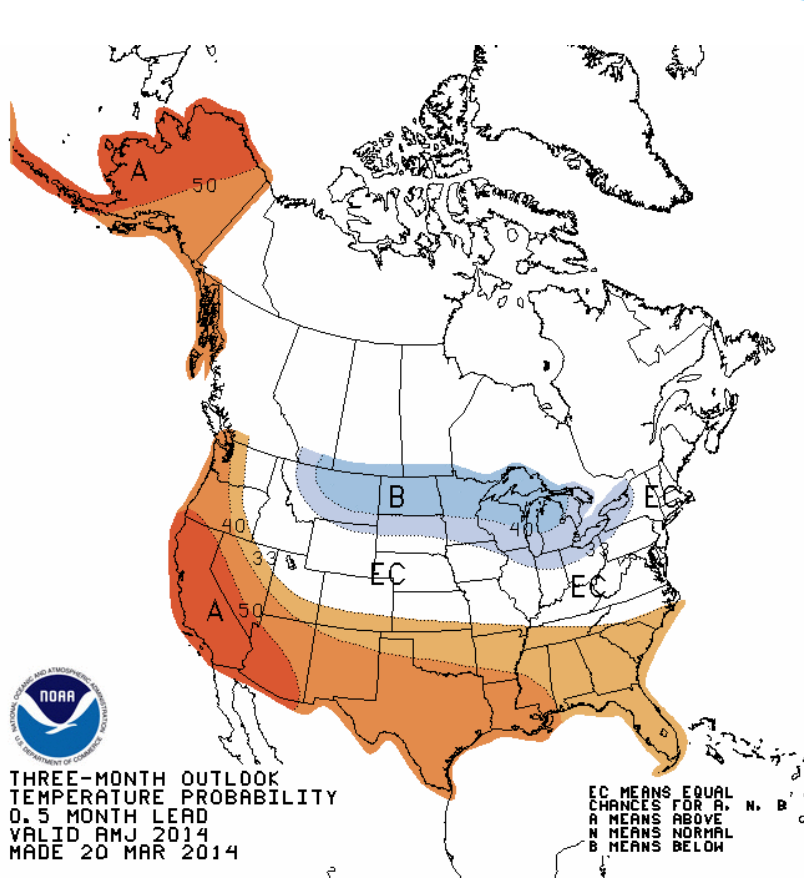
<http://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php>

April Temperature and Precipitation Probabilities



<http://www.cpc.ncep.noaa.gov/products/predictions/30day/>

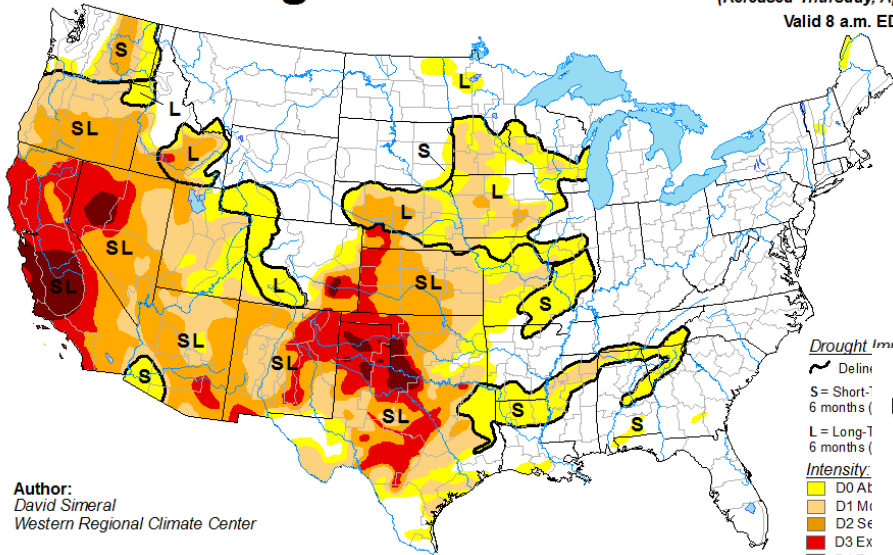
3 Month Temperature and Precipitation Probabilities (April - June)



Drought Update

U.S. Drought Monitor

April 1, 2014
 (Released Thursday, Apr. 3, 2014)
 Valid 8 a.m. EDT



Author:
 David Simeral
 Western Regional Climate Center

Drought Impact Types

Delini
 S = Short-Term
 6 months ()
 L = Long-Term
 6 months ()

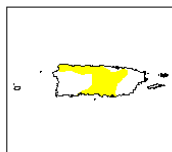
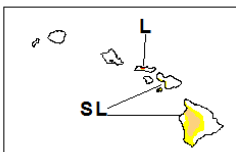
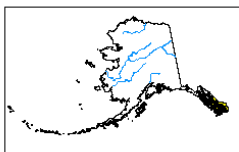


Intensity:
 D0 At
 D1 M
 D2 Se
 D3 Ex
 D4 Ex

The Drought
 scale condit
 vary. See ac
 forecast stat

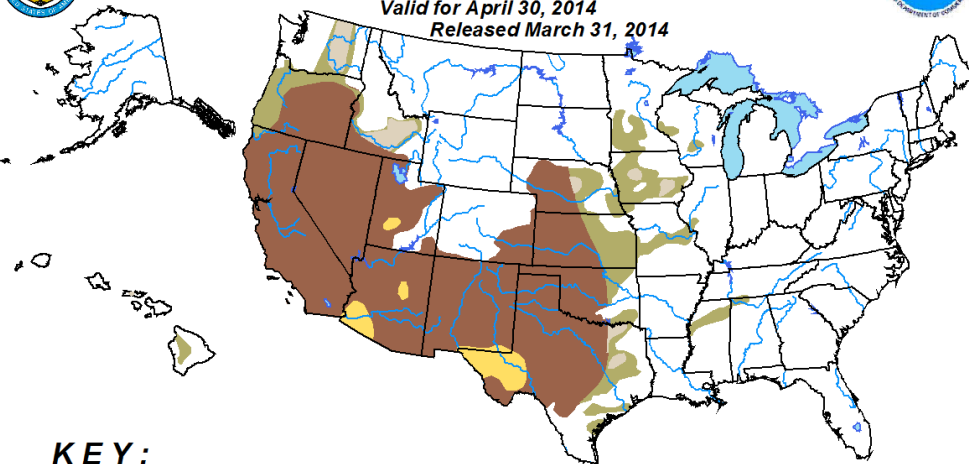


<http://droughtm>



U.S. Monthly Drought Outlook

Drought Tendency During the Valid Period
 Valid for April 30, 2014
 Released March 31, 2014



KEY:

- Drought persists or intensifies
- Drought remains but improves
- Drought removal likely
- Drought development likely

Author: Anthony Artusa, Climate Prediction Center, NOAA
http://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.html

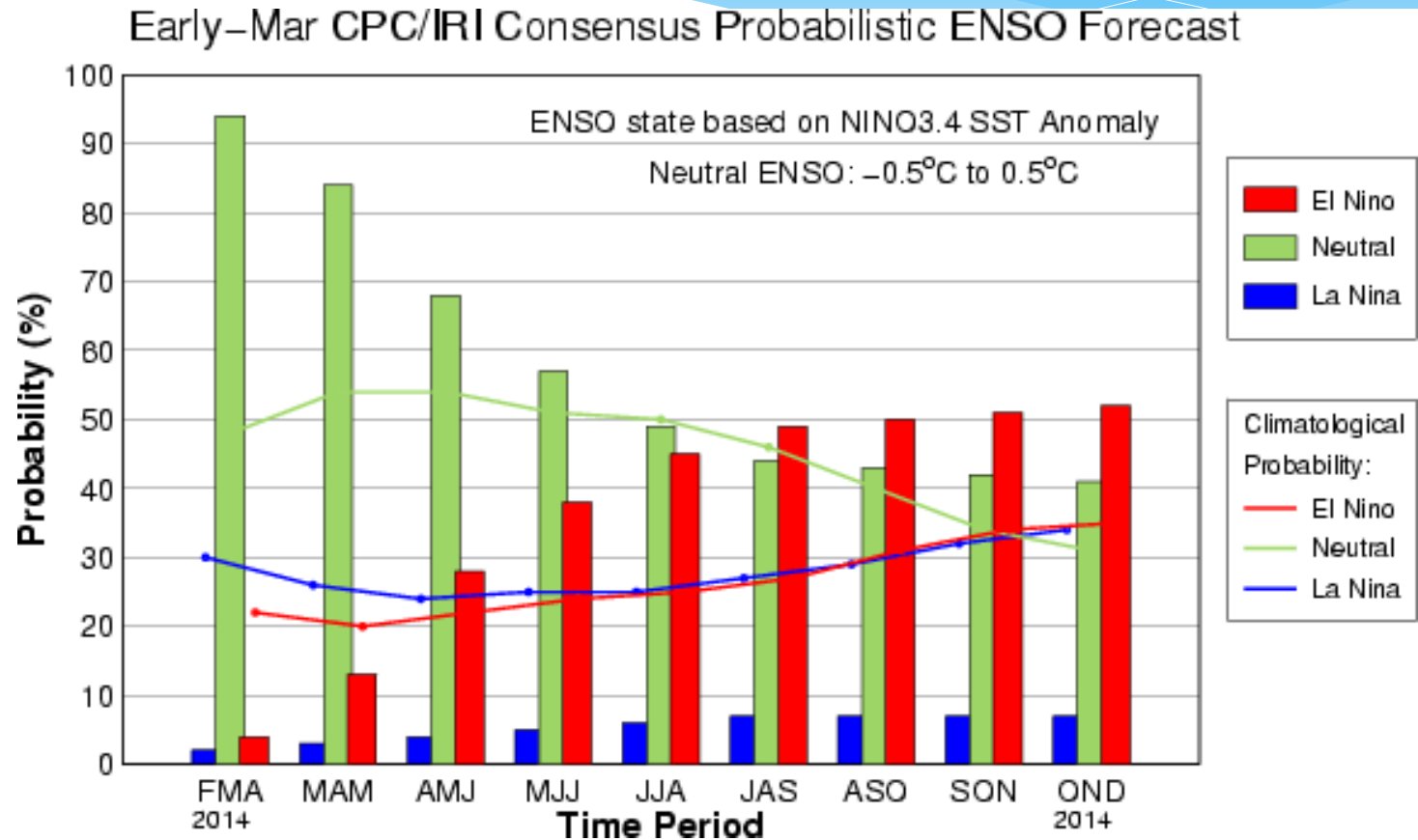
Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor.

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period although drought will remain. The green areas imply drought removal by the end of the period (D0 or none)

CPC/IRI Probabilistic ENSO Outlook

(updated 6 March 2014)

ENSO-neutral is favored through the Northern Hemisphere spring 2014, with a 50% chance of El Niño during the summer or fall 2014.



Key Points

- * **Current Conditions**

- * Large mountain snow packs. Less so in plains - episodic
- * Some frozen soils in plains/moist west
- * Temps still cooler than average

- * **Predictions**

- * Likely cooler still into the spring.
- * Precipitation outlooks – equal chances
- * No indications of specific large events - forecastable
- * El Nino likely coming – little impact on current situation
- * Some minor tributary flooding expected

- * **Caveat**

- * Near point of peak accumulation – extreme individual events difficult to forecast

Further Information - Partners

- **Today's and Past Recorded Presentations and :**
- * <http://mrcc.isws.illinois.edu/webinars.htm>
- <http://www.hprcc.unl.edu>
- NOAA's National Climatic Data Center: www.ncdc.noaa.gov
 - Monthly climate reports (U.S. & Global):
www.ncdc.noaa.gov/sotc/
- NOAA's Climate Prediction Center: www.cpc.ncep.noaa.gov
- Climate Portal: www.climate.gov
- U.S. Drought Portal: www.drought.gov
- National Drought Mitigation Center: <http://drought.unl.edu/>
- State climatologists
 - * <http://www.stateclimate.org>
- Regional climate centers
 - * <http://mrcc.isws.illinois.edu>
 - * <http://www.hprcc.unl.edu>

Thank You and Questions?

- * Questions:

- * **Climate:**

- * Dennis Todey: dennis.todey@sdstate.edu , 605-688-5678

- * Doug Kluck: doug.kluck@noaa.gov, 816-994-3008

- * John Eise: john.eise@noaa.gov, 816-268-3144

- * Kevin Stamm: kevin.d.stamm@usace.army.mil

- * Kevin Low: Kevin.Low@noaa.gov

- * Patrick Erger: perger@usbr.gov

- * **Weather:**

- * crhroc@noaa.gov