United States Department of Agriculture

NRCS

Natural Resources Conservation Service
P.O. Box 2890
Washington, D.C. 20013

Weekly Report - Snowpack / Drought Monitor Update Date: March 22, 2007

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snowpack: For the 2007 Water Year, near normal snow water-equivalent (SWE) persists over the Northern Cascades and Colorado Front Range (Fig. 1). Conditions continue to deteriorate over California, Arizona, and Utah. During this week, SWE decreased significantly over Colorado and Utah and to a lesser extent over the Northern Rockies (Fig. 1a). Warmth and the lack of precipitation also resulted in continued decrease in snow cover over the West with the exception of the Washington Cascades (Fig. 1b).

Temperature: During the past seven days, temperatures ranged from over 10°F above normal over the Southwest to near normal over Washington (Fig. 2). Record warmth on March 18 was reflected by the large number of SNOTEL sites setting or approaching record average temperatures (Fig. 2a).

Precipitation: During this report period, precipitation (rain and snow) was significant over the Washington Cascades with lesser amounts over the Southern Cascades, Northern and Colorado Rockies (Fig. 3). Elsewhere, negligible amounts predominated. For the Water Year, precipitation has been near normal over the Pacific Northwest and Colorado Front Range but much below normal and one travels to the southern half of the West (Fig. 3a).

WESTERN DROUGHT STATUS

The West: Reminiscent of March 2004, record-setting warmth engulfed the West. From March 10 to March 20, several monthly record highs and nearly one thousand daily record highs were set or tied. Among the monthly records was a high of 91°F at Utah's Zion National Park on March 17 (previously, 90°F on March 20 and 21, 2004). With a high of 80°F on March 12, Reno, Nevada, experienced its earliest 80° warmth on record (previously, 80°F on March 14, 1994). Elsewhere in Nevada, Las Vegas collected five consecutive daily record highs (90, 89, 87, 89, and 91°F) from March 13 to March 17; experienced its earliest 90° heat (previously, 90°F on March 20, 2004); and just missed its monthly record of 92°F, set on March 21, 2004. In California, Bishop notched seven consecutive daily record highs (83, 85, 84, 82, 84, 84, and 82°F) from March 12 to March 18. Meanwhile in Arizona, Yuma (101°F on March 17) logged its earliest reading above 100°F (previously, 102°F on March 21, 2004).

Compounding the effect of early-season warmth was continuing dryness. Downtown Los Angeles, with records going back to 1877, remained on a pace for its driest year (July 1 – June 30) on record. Through March 20, L.A.'s season-to-date rainfall stood at just 2.45 inches, or 19 percent of normal. L.A.'s driest season on record, 2001-02, featured 4.42 inches of rain. Farther inland at Palmdale, California, July 1 – March 20 precipitation totaled 0.65 inch, or 10 percent of normal.

Changes in the Western drought depiction reflected gradual changes associated with steadily worsening water-supply forecasts. Early-season warmth and premature melting is disruptive to the Western water cycle and forces water managers to make careful decisions regarding

competing interests—such as agricultural, environmental, industrial, municipal, and recreational users. Abnormally dry (D0) conditions crept northward through the Intermountain region and eastward toward the central and southern Rockies, and correspondingly minor changes in drought coverage were introduced as well (Figs. 4, 4a, and 4b).

A comprehensive narrative describing drought conditions for the nation can be found at the end of this document.

DROUGHT IMPACTS DEFINITIONS (http://drought.unl.edu/dm/classify.htm)
The possible impacts associated with **D4 (H, A)** drought include widespread crop/pasture losses and shortages of water in reservoirs, streams, and wells creating water emergencies. The possible impacts associated with **D3 (H, A)** drought include major crop/pasture losses and widespread water shortages or restrictions. Possible impacts from **D2 (H, A)** drought are focused on water shortages common and water restrictions imposed and crop or pasture losses likely. The possible impacts associated with **D1 (H, A)** drought are focused on water shortages developing in streams, reservoirs, or wells, and some damage to crops and pastures (Fig. 4, 4a, and 4b).

SOIL MOISTURE
Soil moisture (Fig. 5), is simulated by the VIC macroscale hydrologic model. The detailed, physically-based VIC model is driven by observed daily precipitation and temperature maxima and minima from approximately 2130 stations, selected for reporting reliably in real-time and for having records of longer than 45 years (and various other criteria).

OBSERVED FIRE DANGER CLASS
The National Interagency Coordination Center provides a variety of products that describe the current wildfire status for the U.S. - http://www.nifc.gov/information.html. The latest Observed Fire Danger Class is shown in Fig. 6.

U.S. HISTORICAL STREAMFLOW
This map, (Fig. 7) shows the 7-day average streamflow conditions in hydrologic units of the United States and Puerto Rico for the day of year. The colors represent 7-day average streamflow percentiles based on historical streamflow for the day of the year. Thus, the map shows conditions adjusted for this time of the year. Only stations having at least 30 years of record are used. Sub-regions shaded gray indicate that insufficient data were available to compute a reliable 7-day average streamflow value. During winter months, this situation frequently arises due to ice effects. The data used to produce this map are provisional and have not been reviewed or edited. They may be subject to significant change.
http://water.usgs.gov/cgi-bin/waterwatch?state=us&map_type=dryw&web_type=map.

STATE ACTIVITIES
State government drought activities can be tracked at the following URL: http://drought.unl.edu/mitigate/mitigate.htm. NRCS SS/WSF State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SS/WSF information - http://www.wcc.nrcs.usda.gov/cgibin/bor.pl. Additional information describing the products available from the Drought Monitor can be found at the following URL: http://drought.unl.edu/dm/

FOR MORE INFORMATION
The National Water and Climate Center Homepage provide the latest available snowpack and water supply information. Please visit us at http://www.wcc.nrcs.usda.gov. This document is available from the following location on the NWCC homepage - http://www.wcc.nrcs.usda.gov/water/drought/wdr.pl

This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/ DANIEL MEYER
Acting Director, Conservation Engineering Division

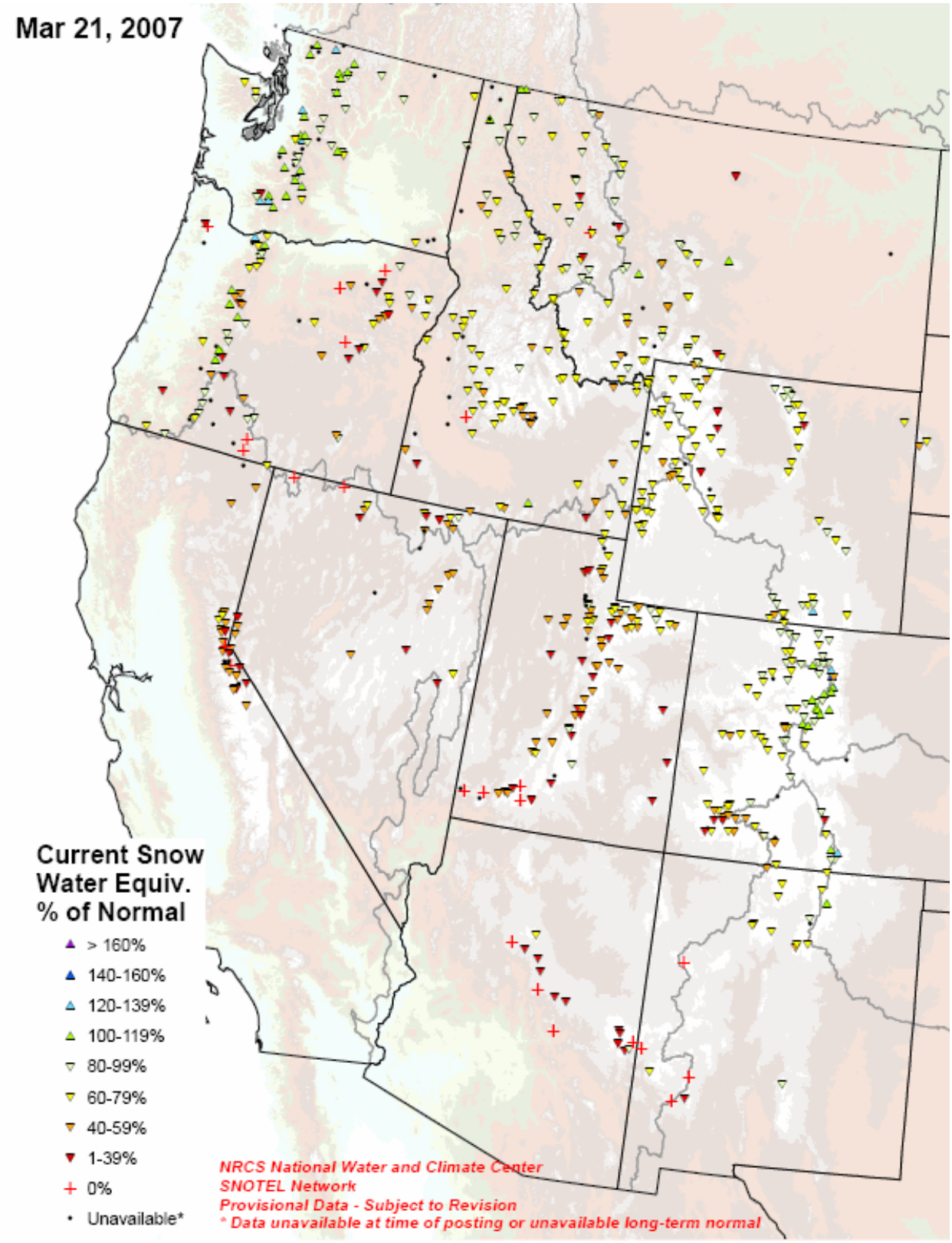


Fig. 1: Snow Water-Equivalent as a percent of normal for Water Year 2007.
Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideSWEPercent.pdf

Weekly SWE Change

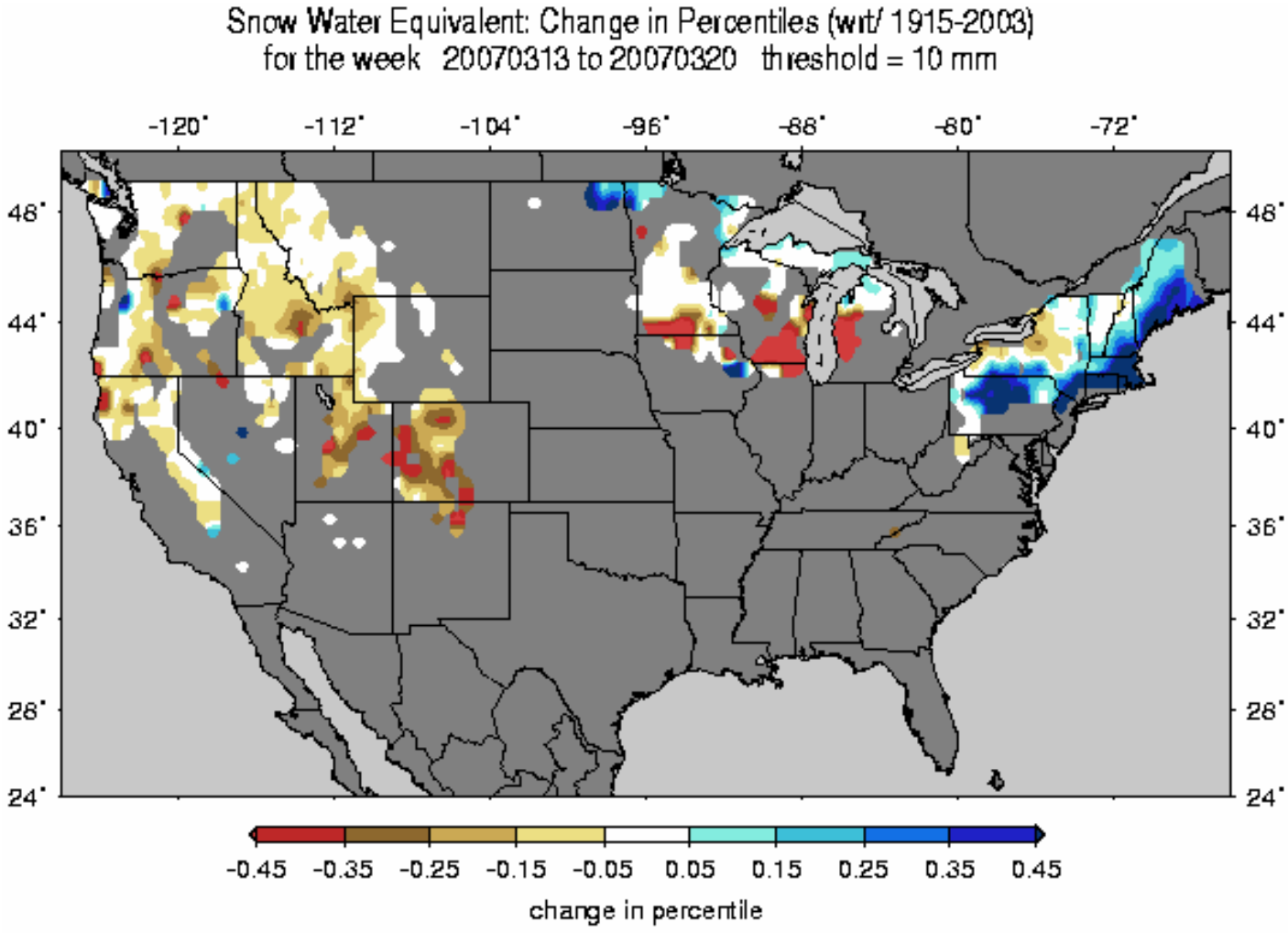


Fig. 1a. Snow Water-Equivalent changes as a percent during the period 13 to 20 March 2007 based on 1915-2003 climatology. **Ref:** http://www.hydro.washington.edu/forecast/monitor/index.shtml

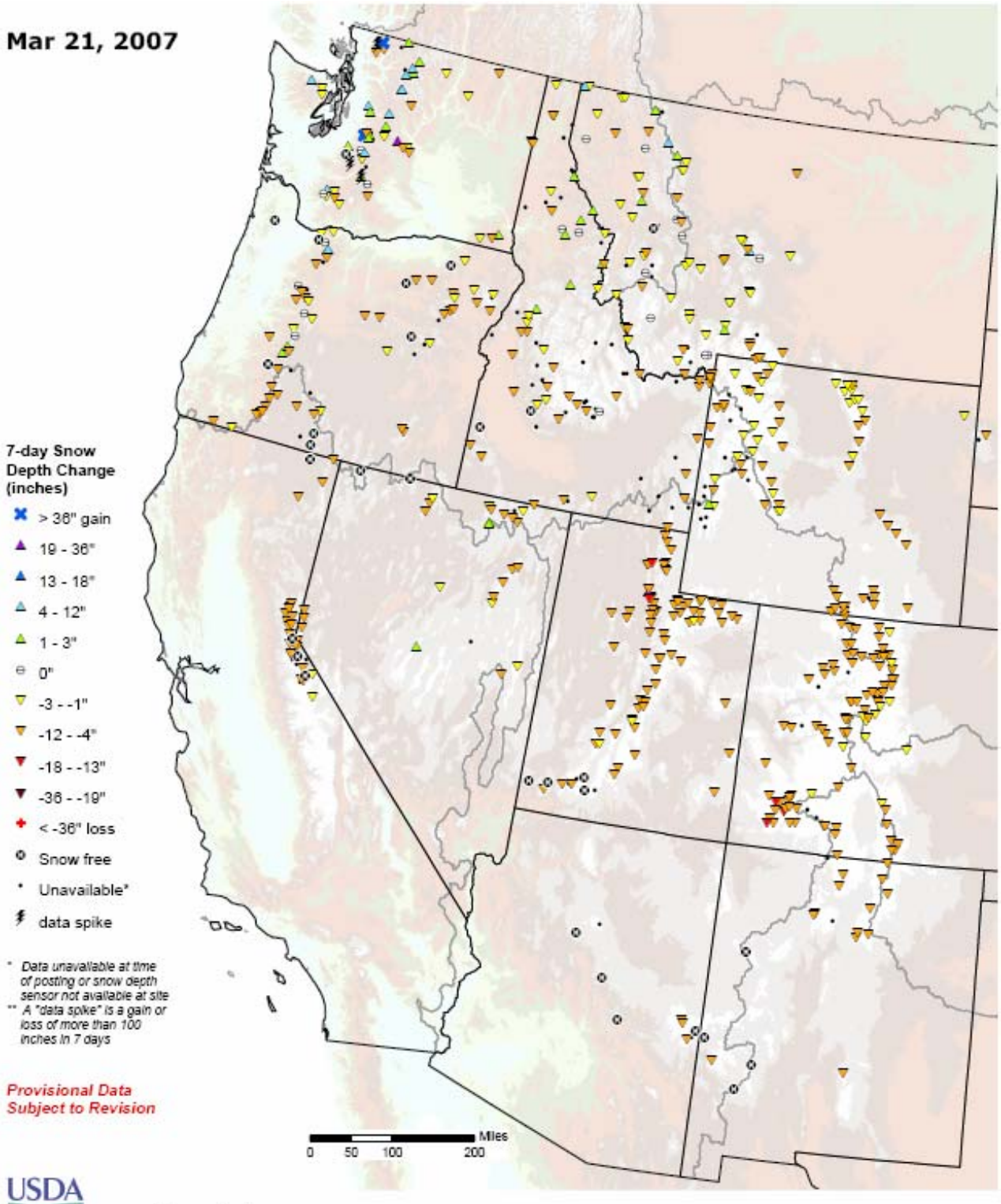


Fig. 1b. SNOTEL 7-day snow depth change.
Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomaly.pdf

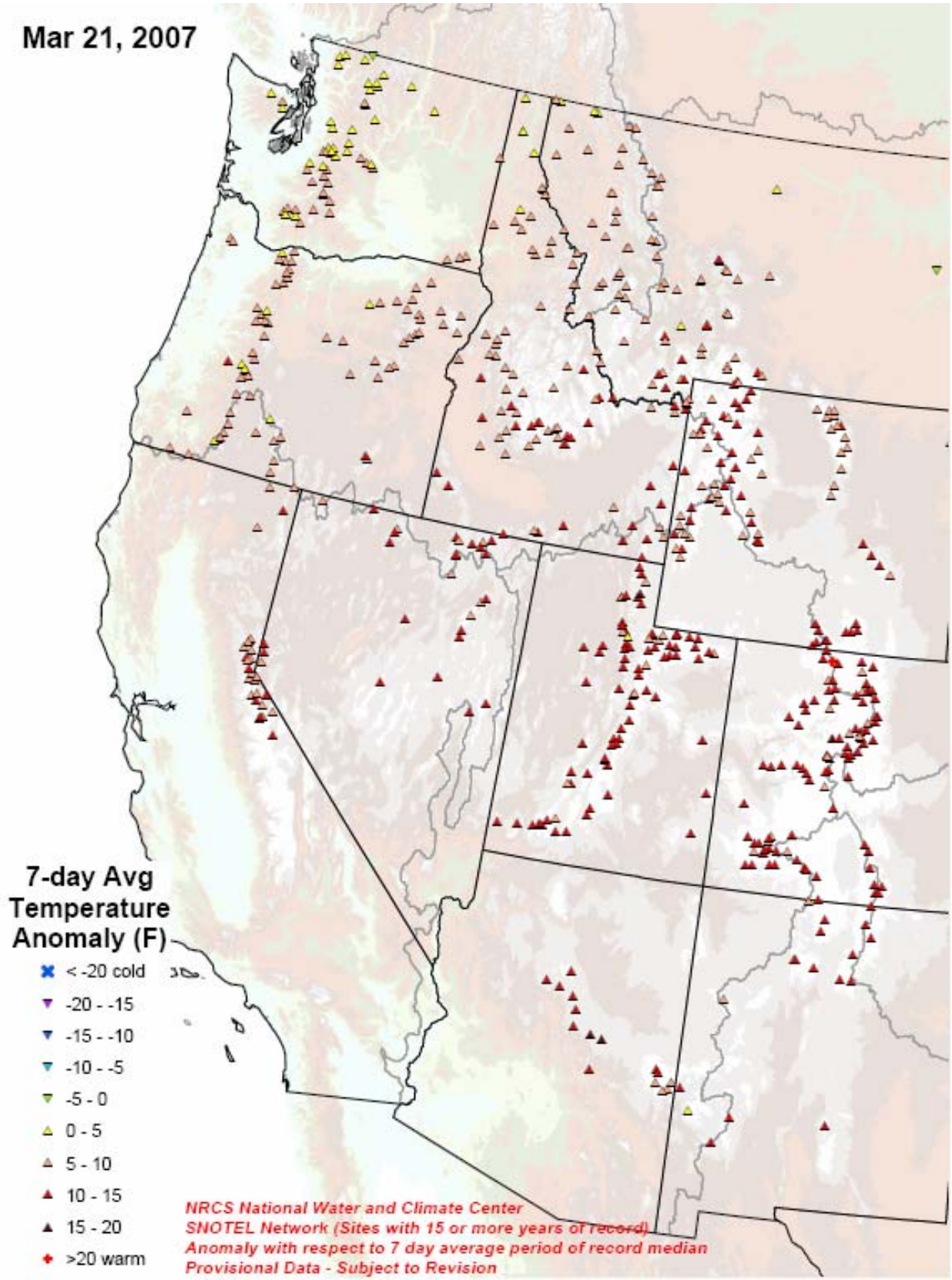


Fig. 2. SNOTEL 7-day average temperature anomaly.
Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomaly.pdf

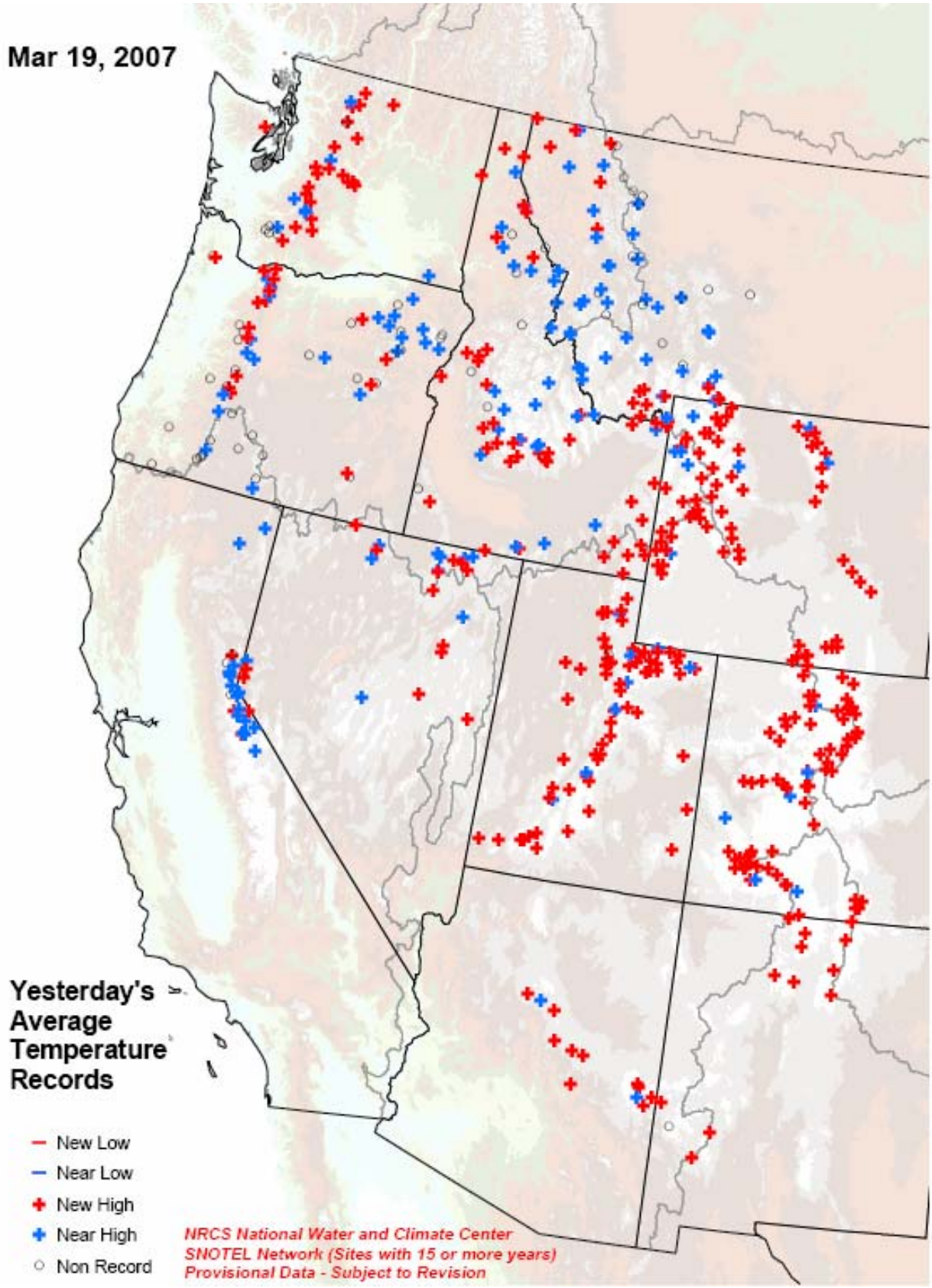


Fig. 2a. SNOTEL average temperature records on 18 March 2007.

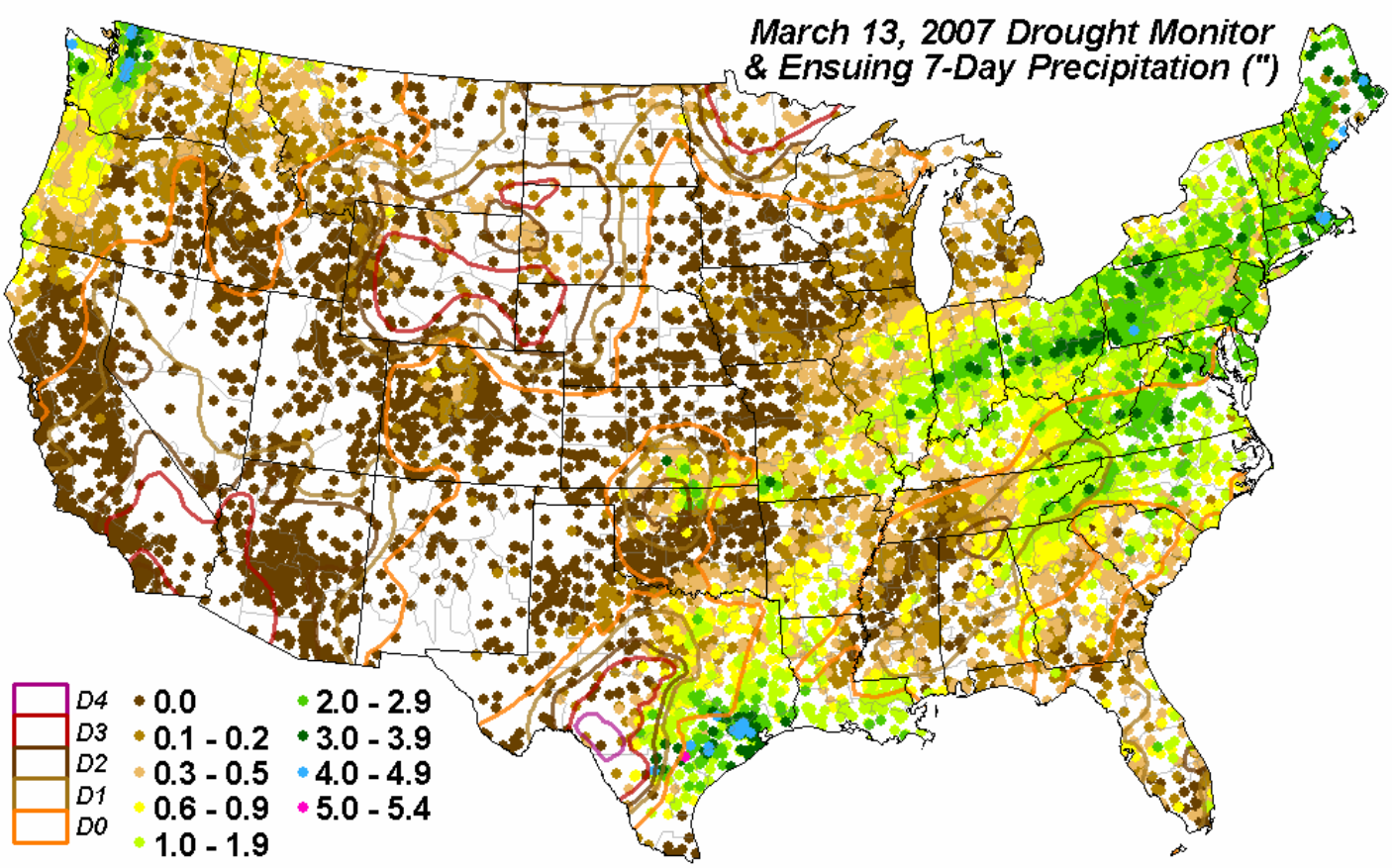


Fig. 3. Preliminary estimates of precipitation totals (inches) for the 7-day period ending March 20, 2007.
Ref: http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/usdm-precip-overlay.gif

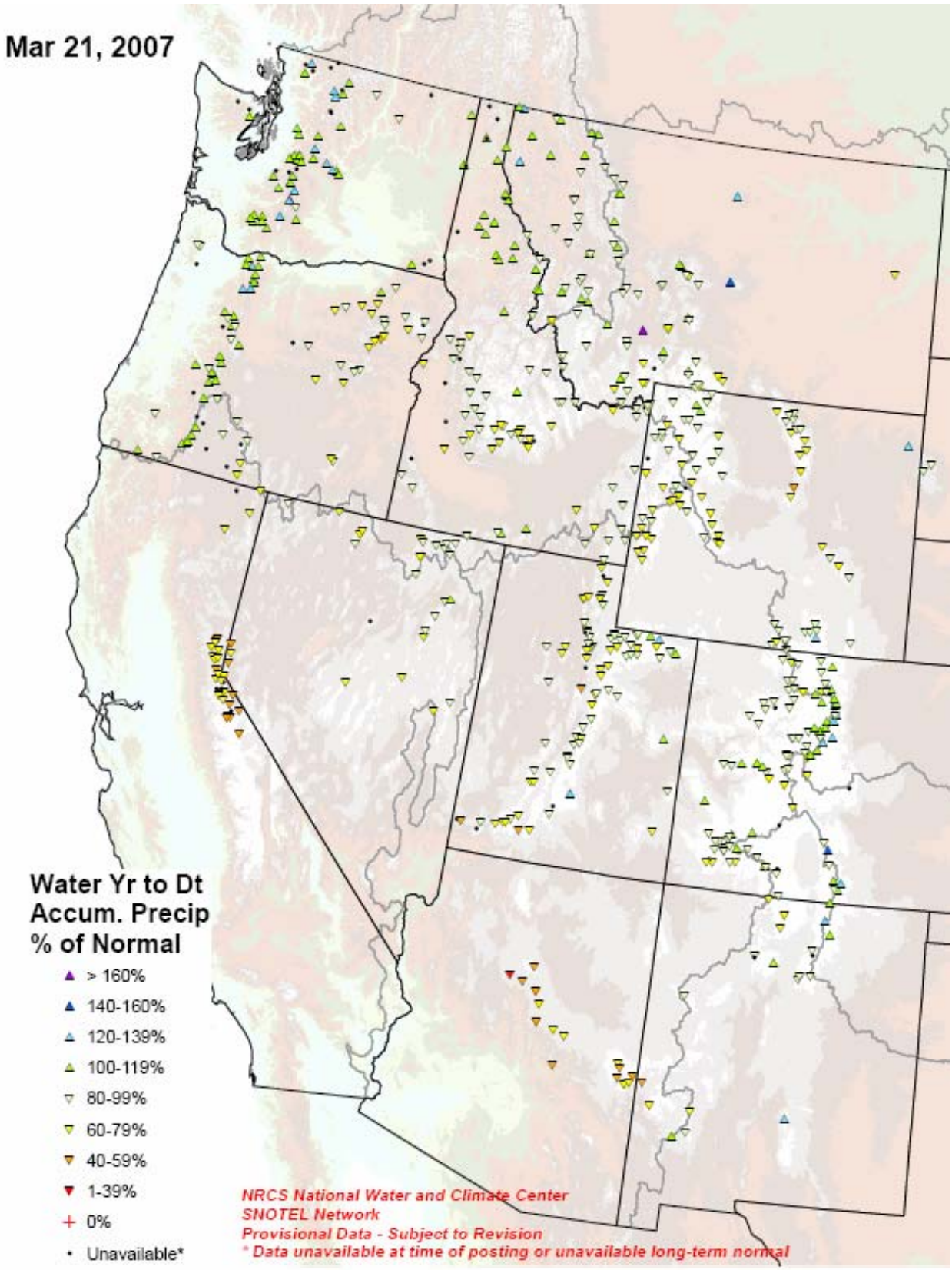


Fig. 3a. SNOTEL station water year (since October 1) precipitation as a percent of normal.
Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideWYTDPrecipPercent.pdf

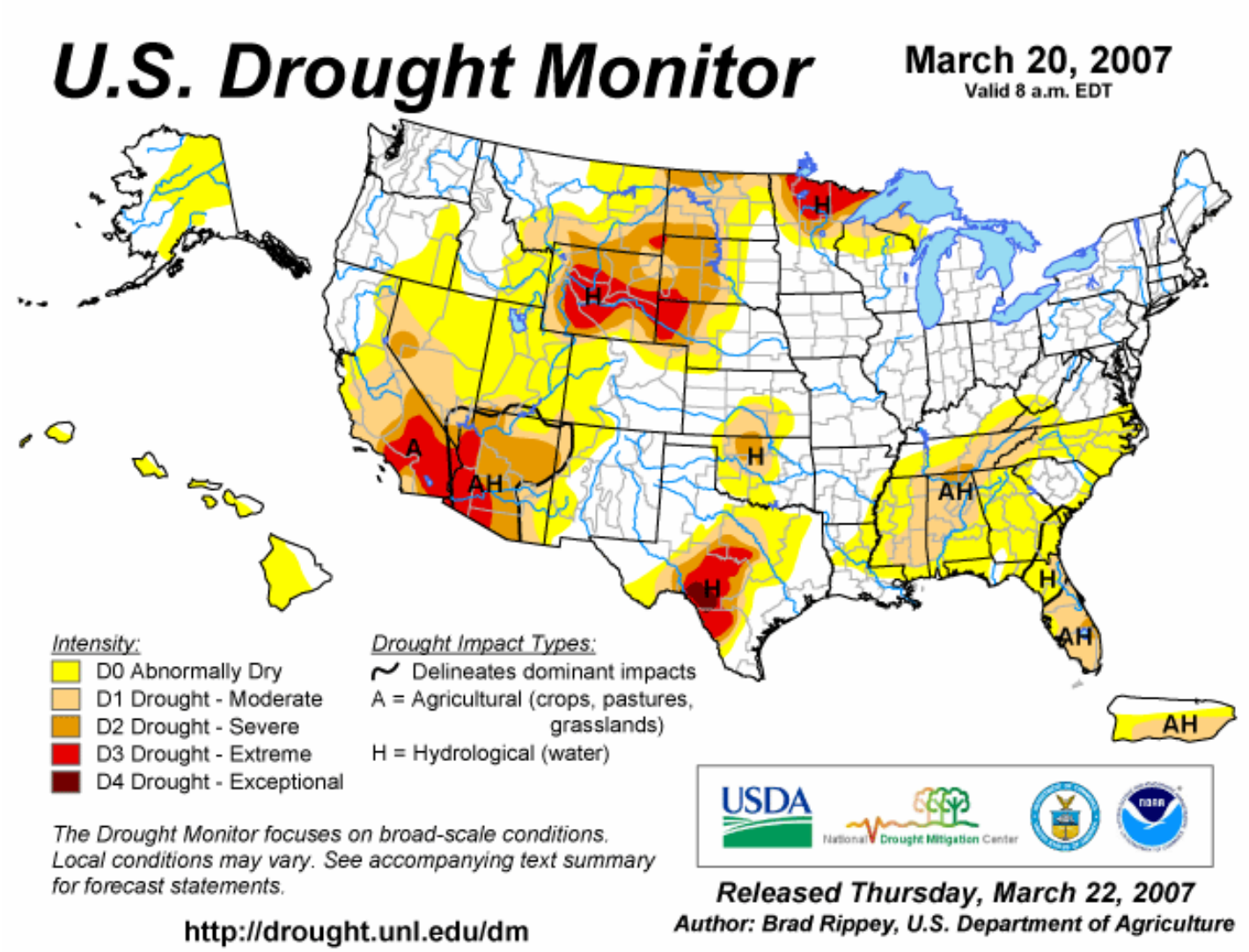


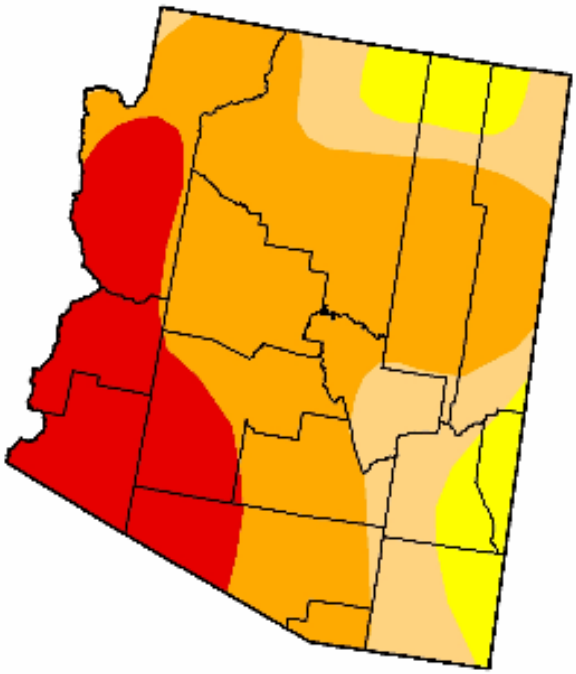
Fig. 4. Current Drought Monitor weekly summary.
Ref: ***National Drought Mitigation Center (NDMC) -*** **http://www.drought.unl.edu/dm/monitor.html**

U.S. Drought Monitor
Arizona

March 20, 2007
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.0	100.0	90.5	72.2	21.7	0.0
Last Week (03/13/2007 map)	0.0	100.0	89.2	68.9	21.7	0.0
3 Months Ago (12/26/2006 map)	1.0	99.0	77.1	22.7	3.0	0.0
Start of Calendar Year (01/02/2007 map)	1.0	99.0	77.3	22.7	3.0	0.0
Start of Water Year (10/03/2006 map)	5.4	94.6	75.9	28.5	7.3	0.0
One Year Ago (03/21/2006 map)	0.0	100.0	91.6	76.3	27.8	0.0



Intensity:

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

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

http://drought.unl.edu/dm

USDA National Drought Mitigation Center

Released Thursday, March 22, 2007

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

Fig 4a. Drought Monitor for the Arizona with statistics over various time periods.
Ref: ***http://www.drought.unl.edu/dm/DM_west.htm***

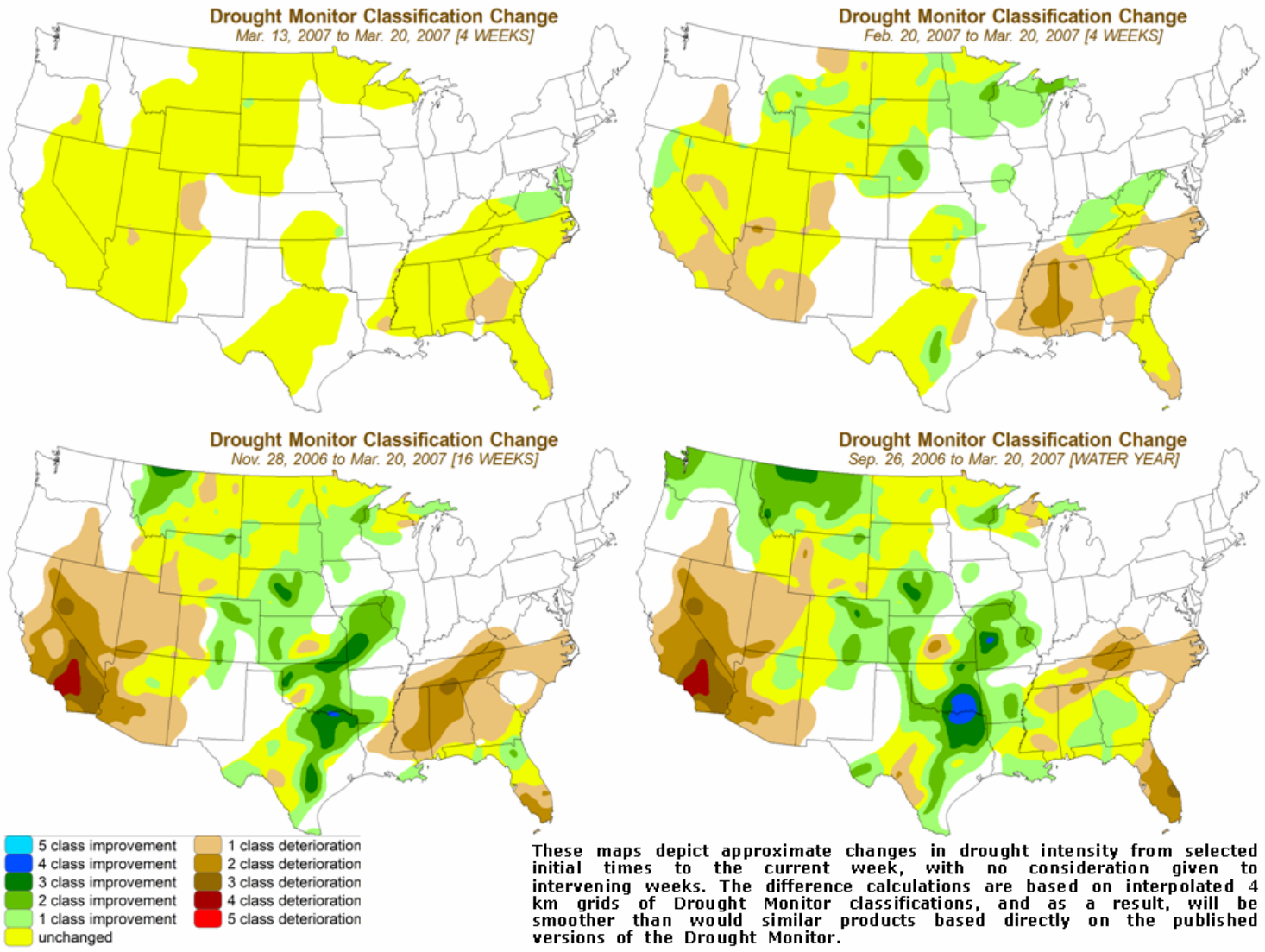


Fig 4b. Drought Monitor classification changes during various time periods.

Ref: ***http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/dm-change-4maps.png***

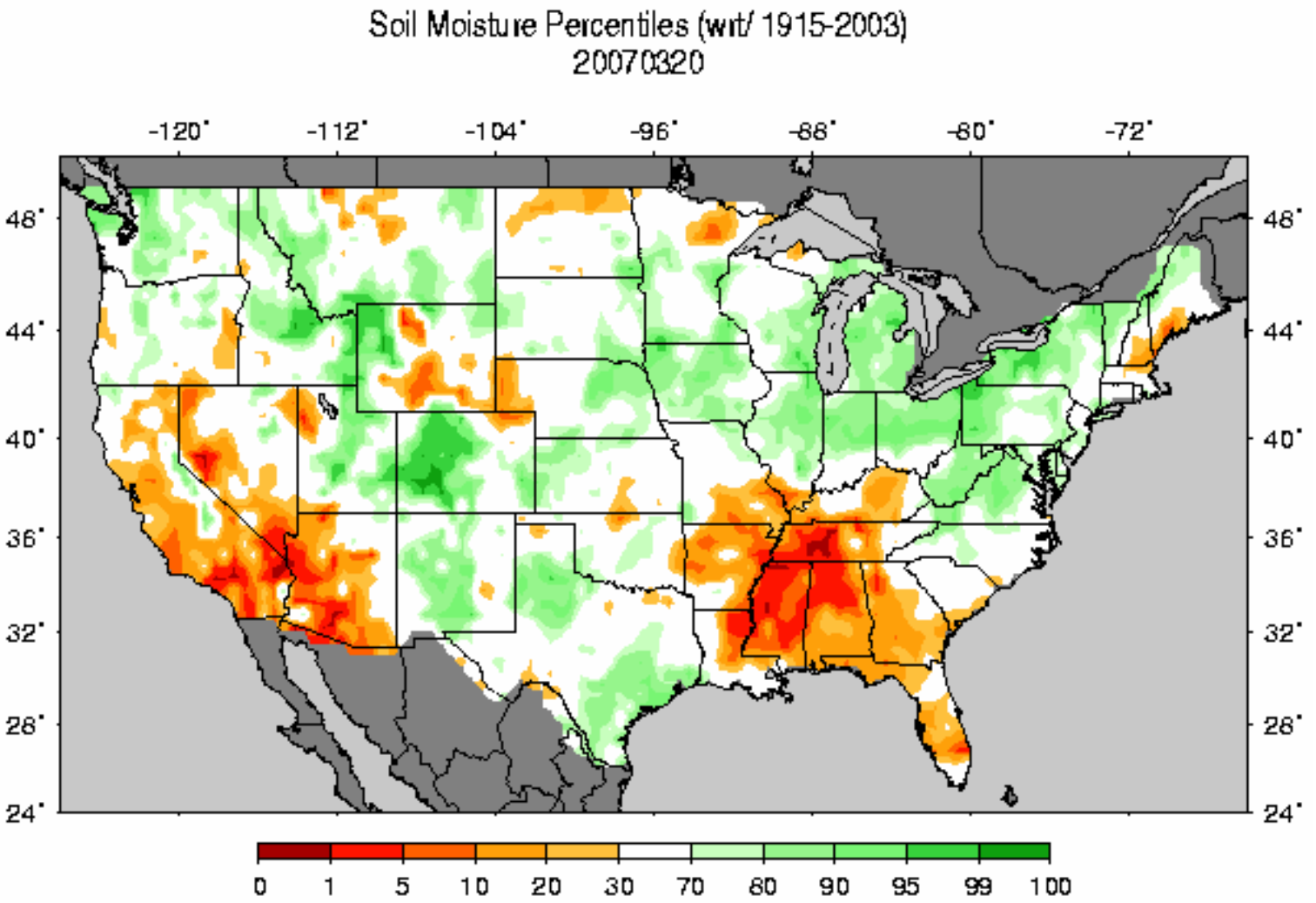


Fig. 5: Soil Moisture Ranking Percentile based on 1915-2003 climatology. Note continued severe dryness over southern California, Nevada, and Arizona (source: Univ. of Washington).
Ref: http://www.hydro.washington.edu/forecast/monitor/curr/CONUS.sm_gnt.gif

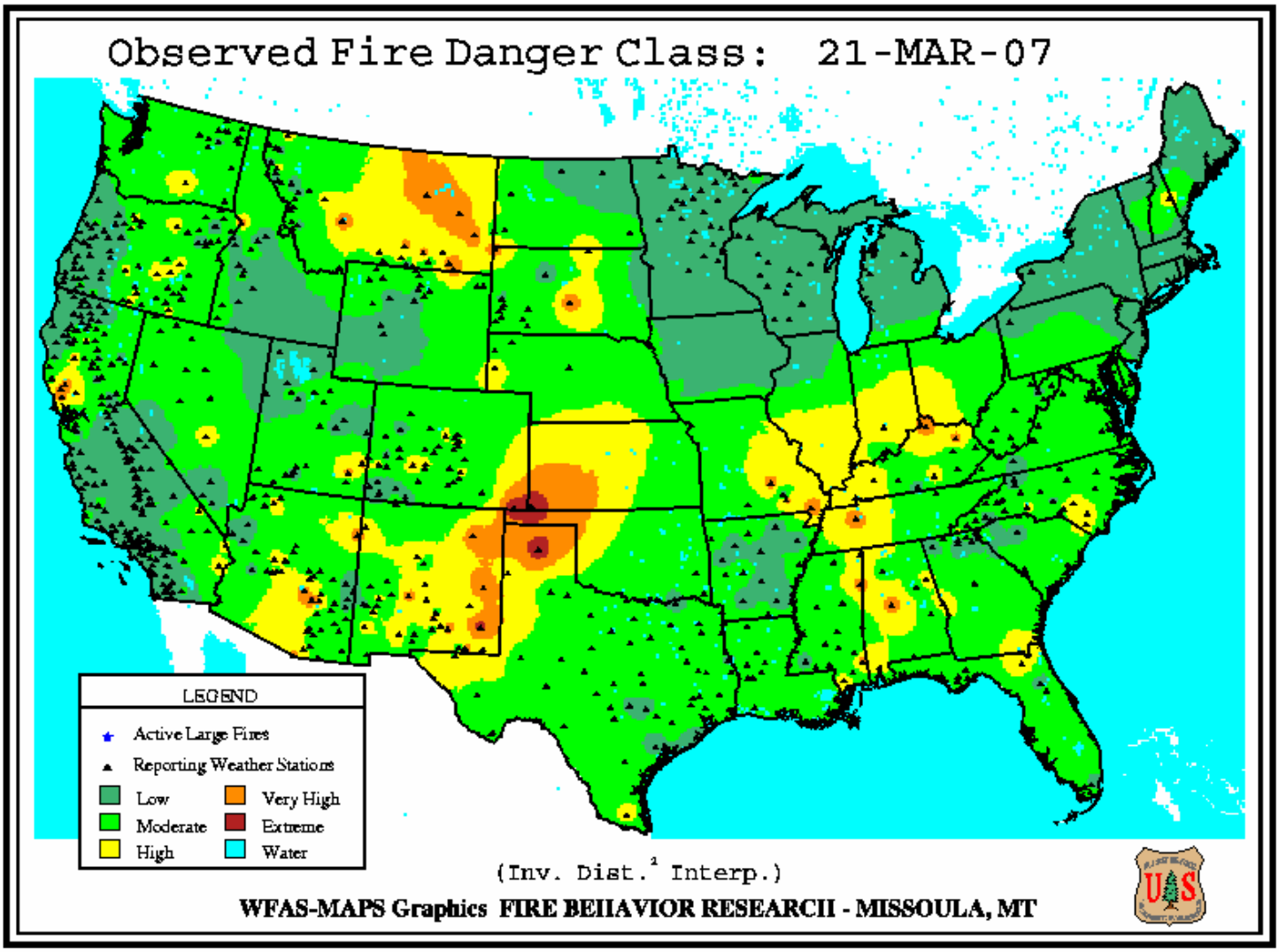


Fig. 6. Observed Fire Danger Class. Source: Forest Service Fire Behavior Research – Missoula, MT
Ref: *http://www.fs.fed.us/land/wfas/fd_class.gif*

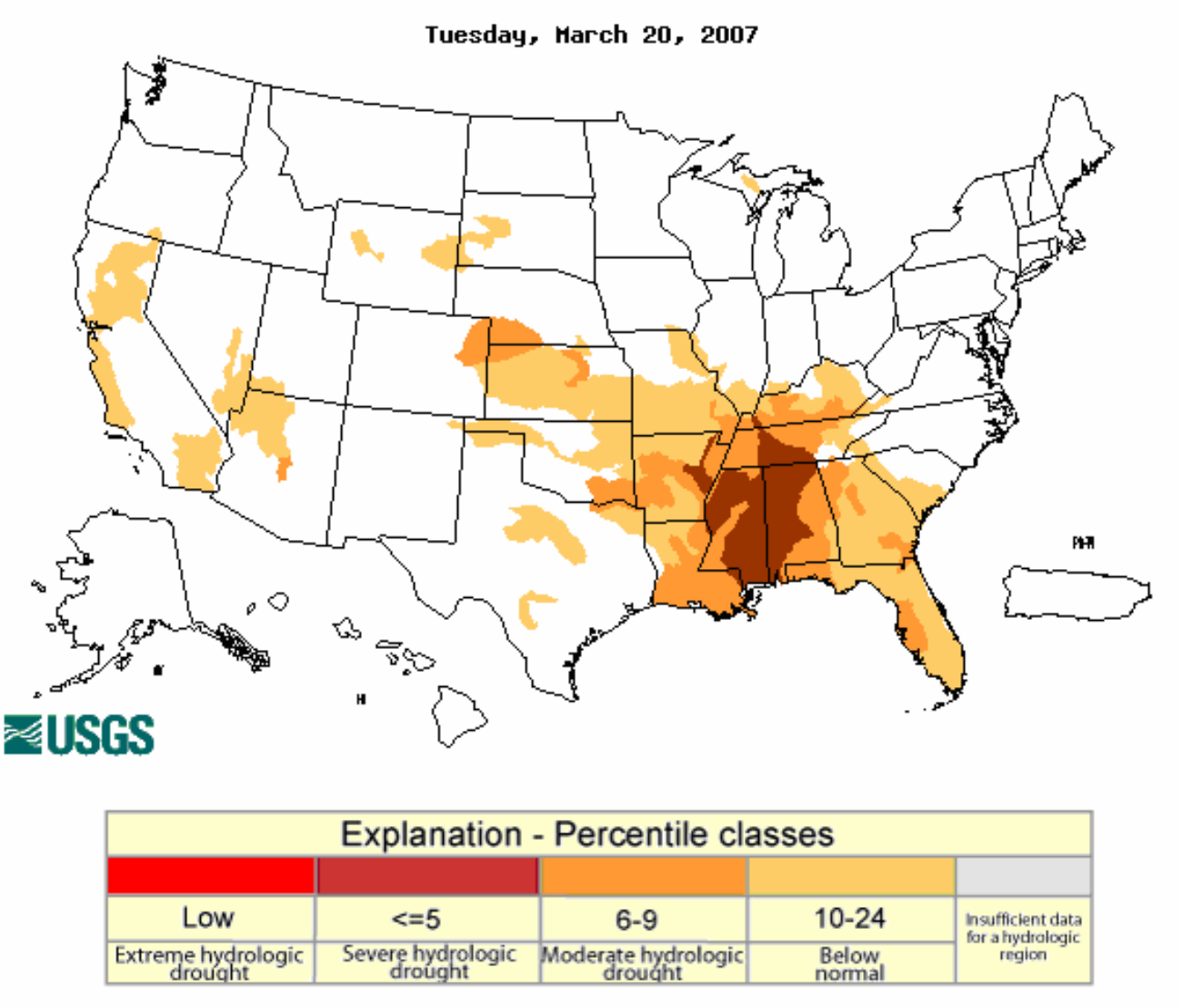


Fig. 7. Map of below normal 7-day average streamflow compared to historical stream flow for the day of the year. **Ref: USGS** http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us

National Drought Summary -- March 20, 2007

The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature progs, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is: http://www.cpc.ncep.noaa.gov/products/forecasts/.

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The Plains and Upper Midwest: Warmth also expanded across the northern Plains, where Rapid City, South Dakota, posted a March record-tying high of 82°F on March 12. In North Dakota, Bismarck reached 75°F nine days earlier than ever before (75°F on March 12; previously, 78°F on March 21, 1910). Meanwhile, no significant changes in the drought depiction were observed in the western Great Lakes region, where mostly dry weather prevailed. Farther south, heavy rain lingered into March 14 across eastern Texas, resulting in some minor additional reductions of dryness (D0) and drought (D1 and D2) along the eastern fringe of the drought-affected area. At the end of the monitoring period (the night of March 19-20), locally heavy showers and thunderstorms developed in parts of northern Oklahoma and southeastern Kansas. Some refinements, including a reduction in D0 coverage in southeastern Kansas, were introduced due to that heavy rain.

Southeast: Warm weather and drought conditions were a double-edged sword from the lower Mississippi Valley to the southern Atlantic Coast. Dry soils favored spring planting and other fieldwork but increased stress on vegetation and boosted irrigation demands. By March 18, corn planting advanced to 54 percent in Louisiana, compared to the five-year average of 19 percent. In Texas, 46 percent of the corn was planted, versus the 2002-06 average of 29 percent. Corn planting reached the halfway mark in Mississippi. In the Southeast, USDA rated topsoil moisture 32 percent short in Georgia and 82 percent short in Florida. The portion of pastures rated very poor to poor included 17 percent in Georgia, 19 percent in Mississippi, 44 percent in Texas, and 70 percent in Florida. Through March 20, year-to-date precipitation totals were less than 40 percent of normal and more than 9 inches below normal in several locations, including Meridian, Mississippi (39 percent of normal and 9.62 inches below normal), and Mobile, Alabama (39 percent and 9.43 inches). In addition, Southeastern streamflows remained significantly below normal, while the threat of wildfires increased. In fact, during the first half of March, wildfires charred more than 66,000 acres of vegetation across the South. In Florida, the average surface elevation of Lake Okeechobee fell to 10.76 feet (by March 20), the lowest level since 2001. That year, the lake fell to a record-low elevation of 8.97 feet on May 24, shortly before the beginning of southern Florida's rainy season onset.

General deterioration in the Southeast resulted in an expansion of abnormal dryness (D0) and moderate to severe drought (D1 to D2). In contrast, a late-winter storm affected the Mid-Atlantic States in mid-March, dropping as much as two to three inches of liquid equivalent (rain and melted snow and sleet) across formerly dry (D0) areas stretching from central West Virginia to the Delmarva Peninsula.

Alaska, Hawaii, and Puerto Rico: Cold, dry conditions persisted across mainland Alaska, where the depiction of abnormal dryness (D0) was unchanged. Likewise, no changes were introduced in Puerto Rico, since locally heavy showers were mostly confined to unaffected northern areas. In Hawaii, however, the coverage of abnormal dryness was reduced in eastern Molokai and parts of northern and eastern Kauai. During the first 20 days of March, 6.56 inches of rain pelted Lihue, Kauai, boosting its year-to-date total to 9.75 inches (95 percent of normal).

***Looking Ahead**:* From March 21 to March 26, the complex interaction between a nearly stationary front and an upper-level disturbance will produce widespread precipitation. Significant precipitation, totaling as much as 1 to 3 inches, may fall in the Four Corners states, while even higher totals may occur in Texas and Oklahoma. Severe thunderstorms will accompany heavy rain across the south-central U.S. Meanwhile, locally heavy showers and thunderstorms will also develop along the stationary front from the central Plains eastward into the Mid-Atlantic States. However, unfavorably dry conditions will persist in most areas from the lower Mississippi Valley to the southern Atlantic Coast. Elsewhere, little or no precipitation will fall across California, the Great Basin, and the northern Plains.

The NWS 6- to 10-day outlook for March 27-31 calls for a strong likelihood of warmer-than-normal weather from the Plains eastward, while near- to below-normal temperatures will prevail in the West. Wetter-than-normal conditions will affect the central and western U.S., excluding southern California, Texas, and the Four Corners states, while mostly dry weather will prevail in the Atlantic Coast states.

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

Dryness Categories

D0 ... Abnormally Dry ... used for areas showing dryness but not yet in drought, or for areas recovering from drought.

Drought Intensity Categories
D1 ... Moderate Drought
D2 ... Severe Drought
D3 ... Extreme Drought
D4 ... Exceptional Drought

Drought or Dryness Types
A ... Agricultural
H ... Hydrological

Updated March 21, 2007