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

Weekly Report - Snowpack / Drought Monitor Update Date: April 19, 2007

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snowpack: For the 2007 Water Year, snow water-equivalent (SWE) is below normal everywhere across the West with the exception of portions of the Northern Cascades (WA) and Colorado Front Range (Fig. 1). For the week, SWE did rebound a bit over most of the northern half of the West as an active cold front moved through the area (Fig. 1a). Snow depths increased between six to 20 inches across the Northern Rockies (MT, ID) during the past three days (Fig. 1b).

Temperature: During the past seven days, temperatures ranged from up to 5°F above normal over the northern half of the West excluding portions of the Cascades where temperatures averaged 5°F below normal (somewhat colder than average temperatures also appeared over the Colorado Rockies (Fig. 2)). The impact of this strong cold front can be seen in Fig. 2a where temperatures have decreased by more than 20°F during the past 24 hours.

Precipitation: During this report period, precipitation (rain and snow) was above normal over Nevada, California, Oregon, and the Northern and Southern Rockies (Fig. 3). A lack of precipitation occurred in Wyoming and western Arizona and western Utah. For the Water Year, precipitation is still slightly above normal over the Cascades, Northern Rockies, Bighorn Mountains (WY), and portion of the Colorado and New Mexico Rockies (Fig. 3a).

WESTERN DROUGHT STATUS

The West: After hoping for a wet and cool March, the opposite occurred instead – unseasonably dry with near-record warmth – and nearly every Western basin registered a decline in snow packs with significant meltouts. According to NRCS' April 1 *Western Snowpack Conditions and Water Supply Forecasts,* (ftp://ftp.wcc.nrcs.usda.gov/downloads/wsf/200704wsfwww.pdf), the losses were greatest in the Southwest and central Oregon, where snow packs declined more than 30%. A similar March decline was also observed in 2004. As a result, snow packs are extremely low in Arizona, Utah, Nevada, California, and eastern Oregon. As of April 16, many long-term NRCS SNOTEL sites in central Arizona, Utah, northern Nevada, and eastern Oregon had already melted out, with several nearby stations reporting only 1-39% of its snow water equivalent (SWE). This was also true in California's Sierra Nevada, and should result in a very poor spring and summer stream flow and runoff. Fortunately, April 1 reservoir storages are above seasonal averages in California, Colorado, Idaho, Nevada, and Washington, and only slightly below-normal in Oregon and Utah, providing some cushion from the expected poor 2007 stream flow and runoff forecast. In contrast, Arizona, Montana, New Mexico, and Wyoming reservoirs are at below-normal capacities (http://www.wcc.nrcs.usda.gov/cgibin/resv-graph-west.pl).

After March's disappointing precipitation (except for above-normal precipitation in northwestern Washington and the eastern halves of Montana, Wyoming, and New Mexico), season-to-date totals (since October 1) were less than 50% in southern California, southern Nevada, and western Arizona; between 50-69% in northern California and western Nevada; and between 70-89% in eastern Nevada, southeastern Oregon, south-central Idaho, western Utah, and eastern

Arizona. This week, light precipitation and slightly below-normal temperatures briefly halted the recent parade of dry and warm days, but did little to improve conditions except to slow the snow melt. During the past 6 months, deficits of 4 to 8 inches have accumulated throughout much of California and central Arizona, with shortages exceeding a foot around the Los Angeles area, in parts of the Sierra Nevada, and north-central California. At 4 southern California stations, downtown Los Angeles (2.67 in), Los Angeles Airport (2.27 in), Long Beach (1.62 in), and Burbank (2.39 in), this rainy season (since July 1, 2006) is currently the driest to date since records began at each location, or about 20% of normal, justifying a D3(A) expansion in the area. Similarly, moderate and severe non-hydrologic (A) drought increased and edged northward with many California communities already requesting that residents voluntarily reduce water usage. According to USDA/NASS, some northern California foothill pastures benefited from the rain, but others had dried beyond the point of being helped by moisture. In central California, pastures were dry and feeder cattle were being shipped elsewhere. Farther north, the recent dryness, warmth, and rapidly declining basin SWE (between 50-75%) warranted an extension of D0(A) into the rest of eastern Oregon, central Idaho, and southwestern Montana. In southwestern Wyoming, little or no precipitation plus basin SWE between 54-63% deteriorated conditions by one category. Additionally, the Impact lines were redrawn to emphasize short to medium-term drought (A) in westernmost areas since hydrologic concerns (e.g. reservoirs) are currently adequate; H was placed in easternmost areas where long-term hydrologic concerns lingered but short-term moisture was adequate or excessive; and AH was labeled in transitional areas where both short- and long-term drought impacts were occurring (Figs. 4 and 4a).

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, and 4a).

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

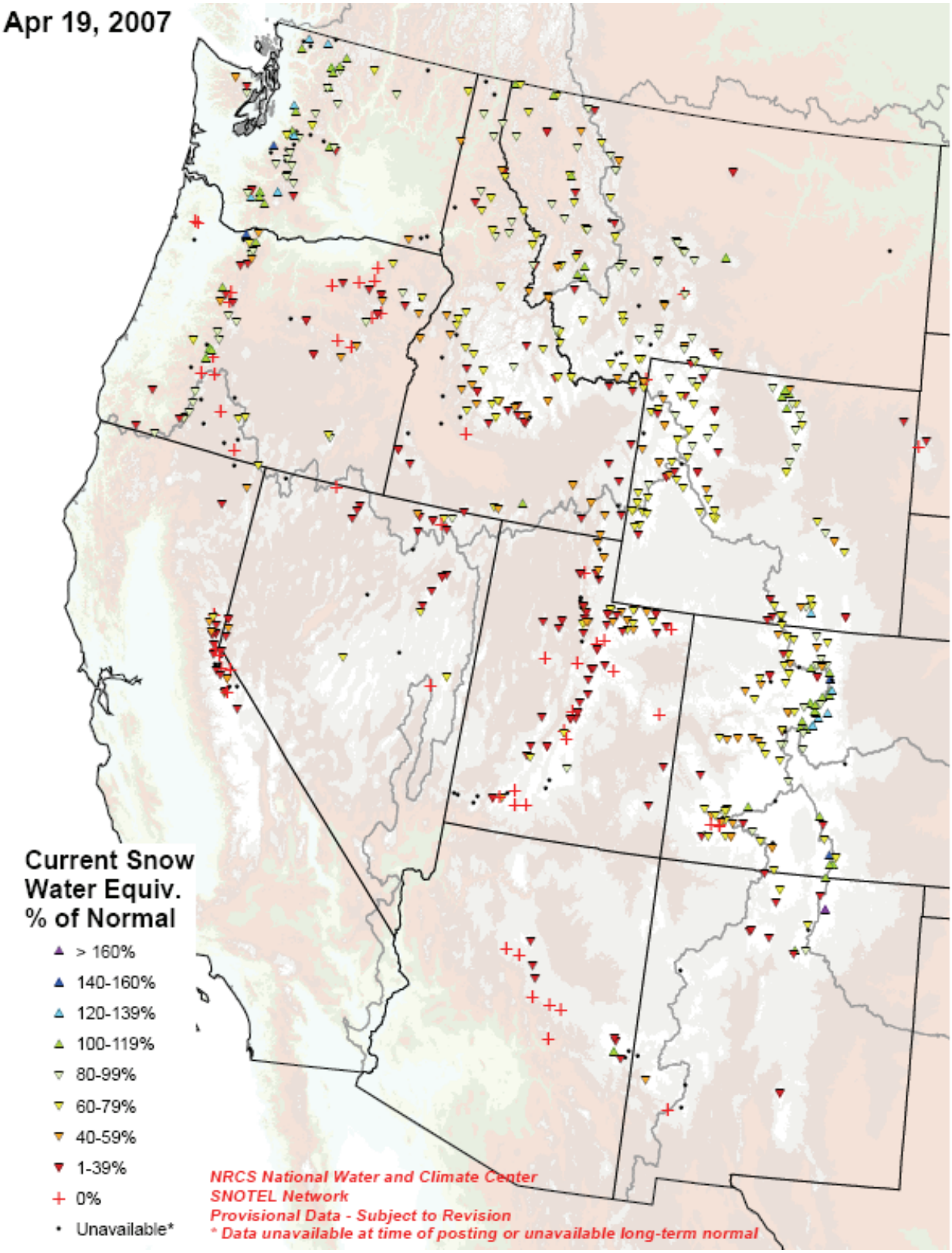


Fig. 1: Snow Water-Equivalent as a percent of normal for Water Year 2007.
Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideSWEPercent.pdf

Weekly SWE Change

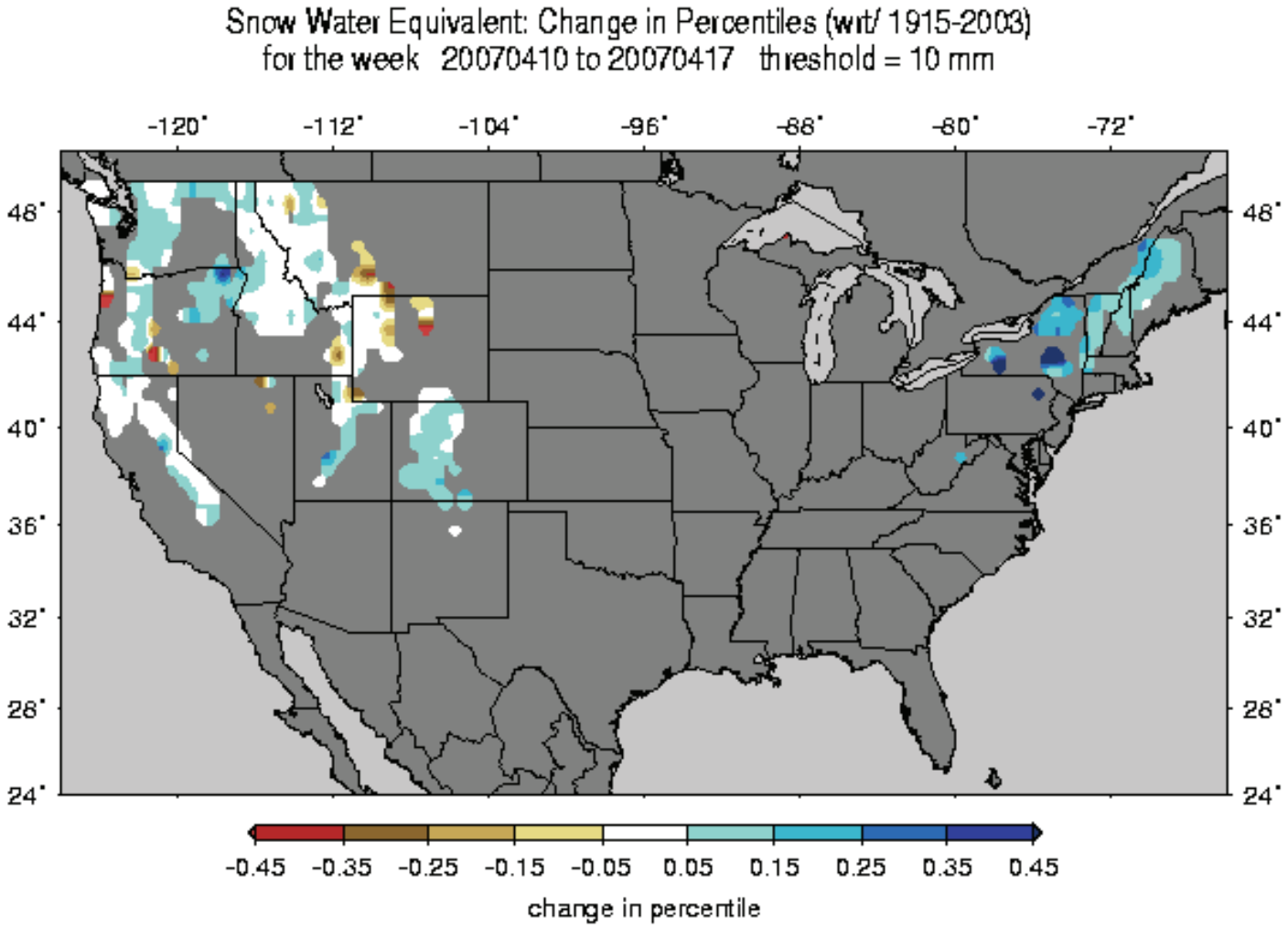


Fig. 1a. Snow Water-Equivalent changes as a percent during the period 10 to 17 April 2007 based on 1915-2003 climatology. Note enhanced SWE over the Pacific Northwest, Utah, and Colorado due to the passage of an active cold front earlier this week.
Ref: http://www.hydro.washington.edu/forecast/monitor/index.shtml

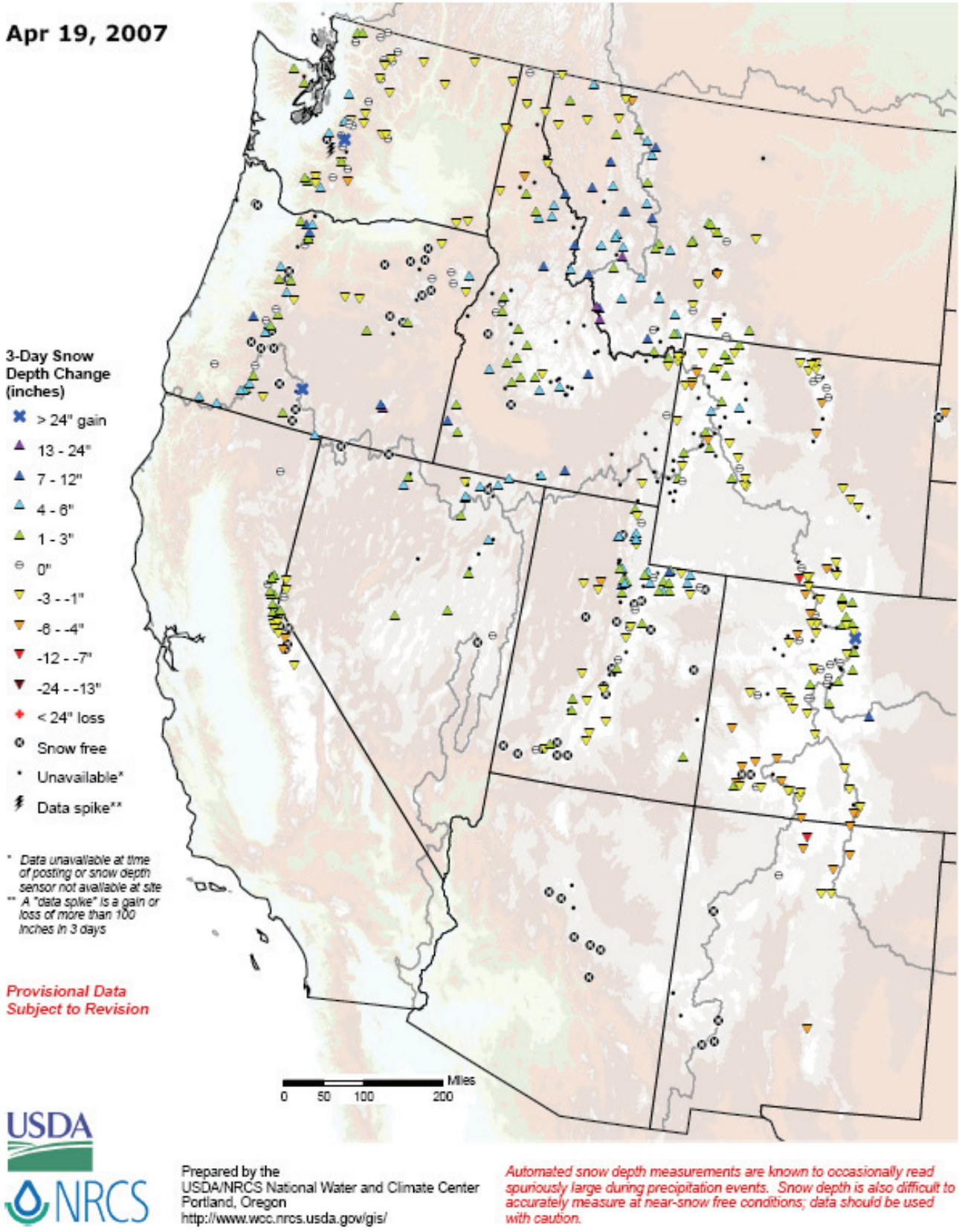


Fig. 1b. SNOTEL 3-day snow depth change reflects recent Northern Rockies spring snowstorm.
Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomaly.pdf

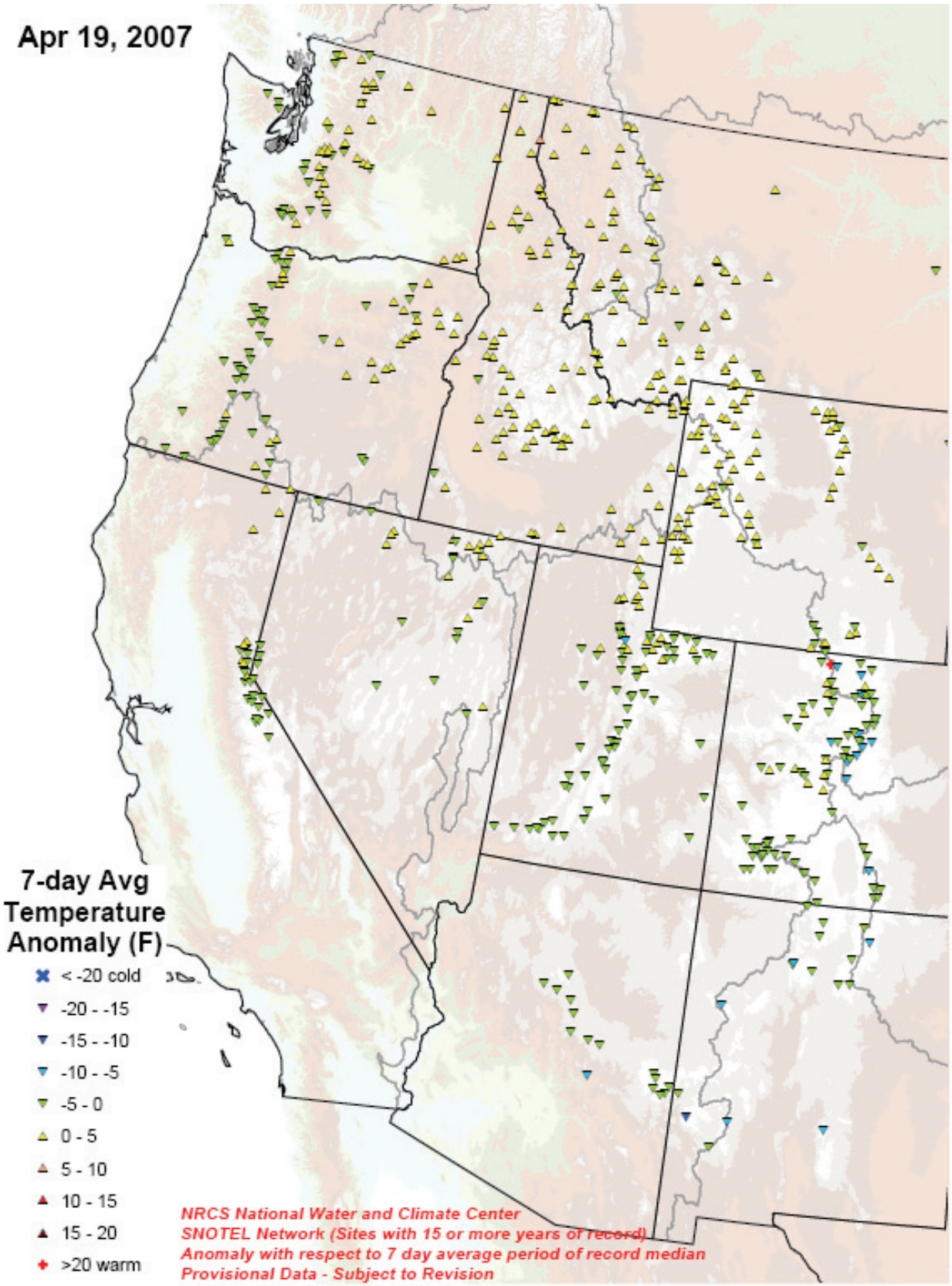


Fig. 2. SNOTEL 7-day average temperature anomaly.
Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomaly.pdf

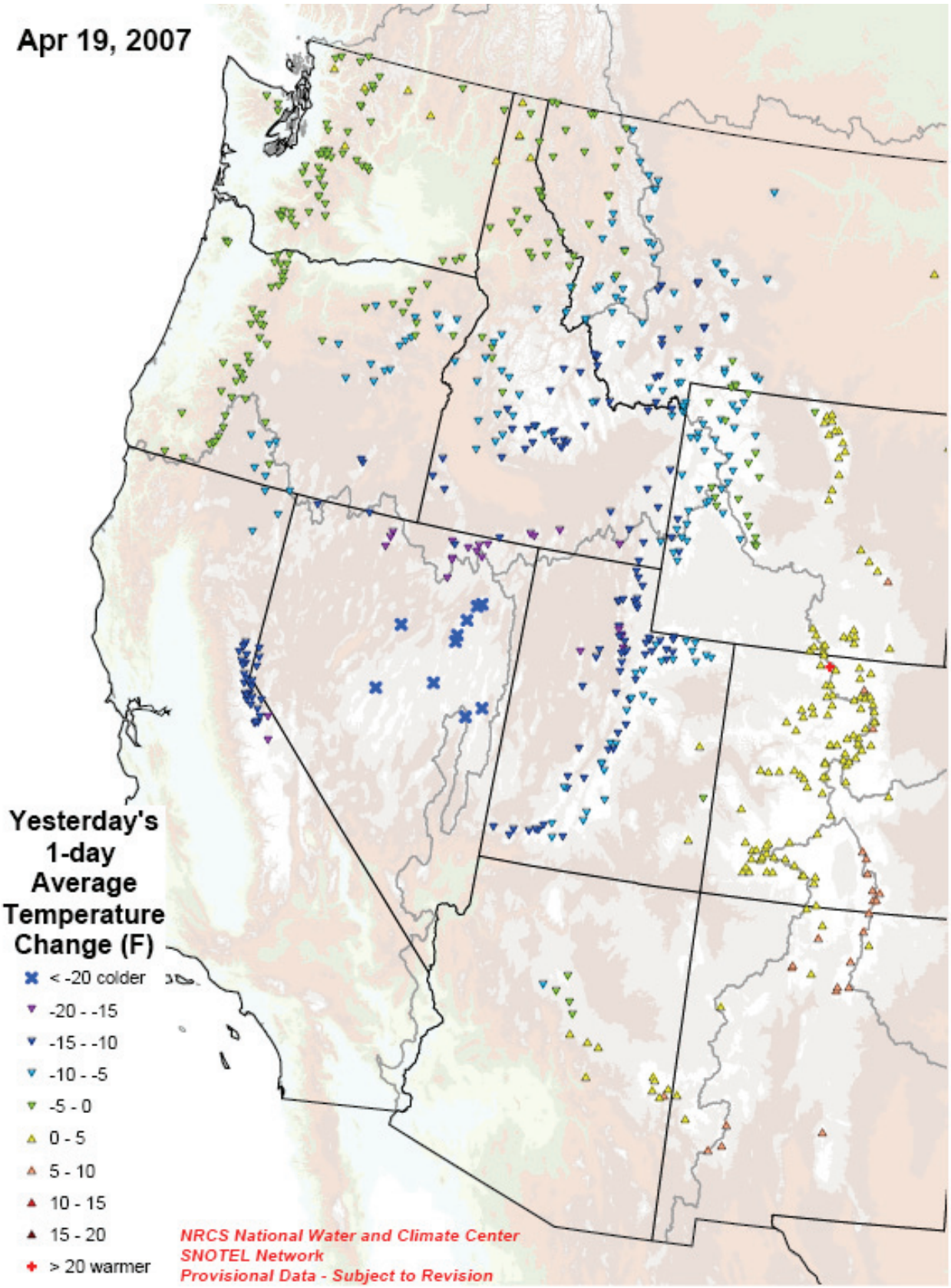


Fig. 2a. SNOTEL average temperature change from 18 to 19 April 2007. Note the large temperature drops due to the passage of a strong cold front.

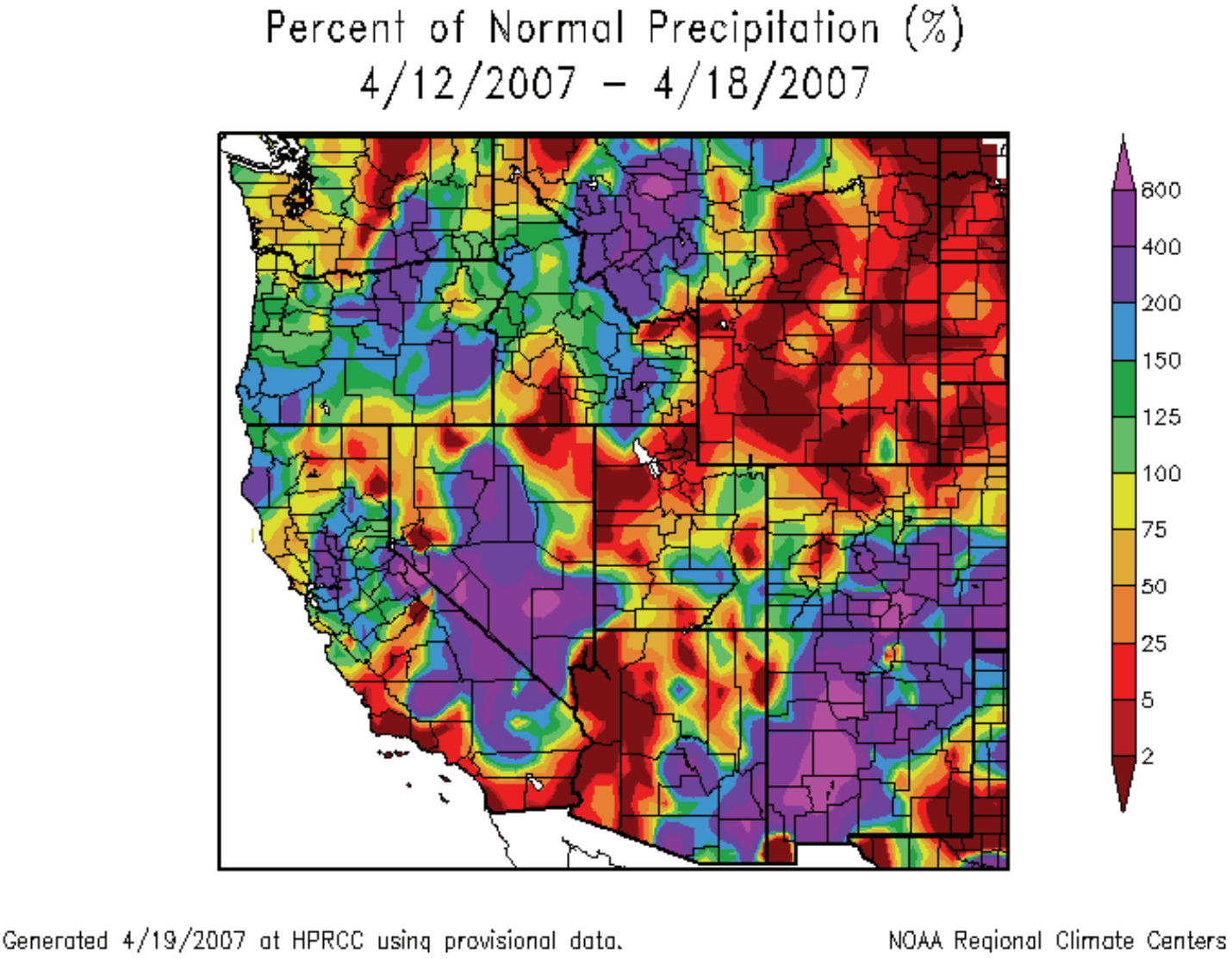


Fig. 3. ACIS preliminary precipitation totals as a percent of normal for the 7-day period ending 18 April 2007. **Ref:** http://www.hprcc.unl.edu/acis/program/acis_maps

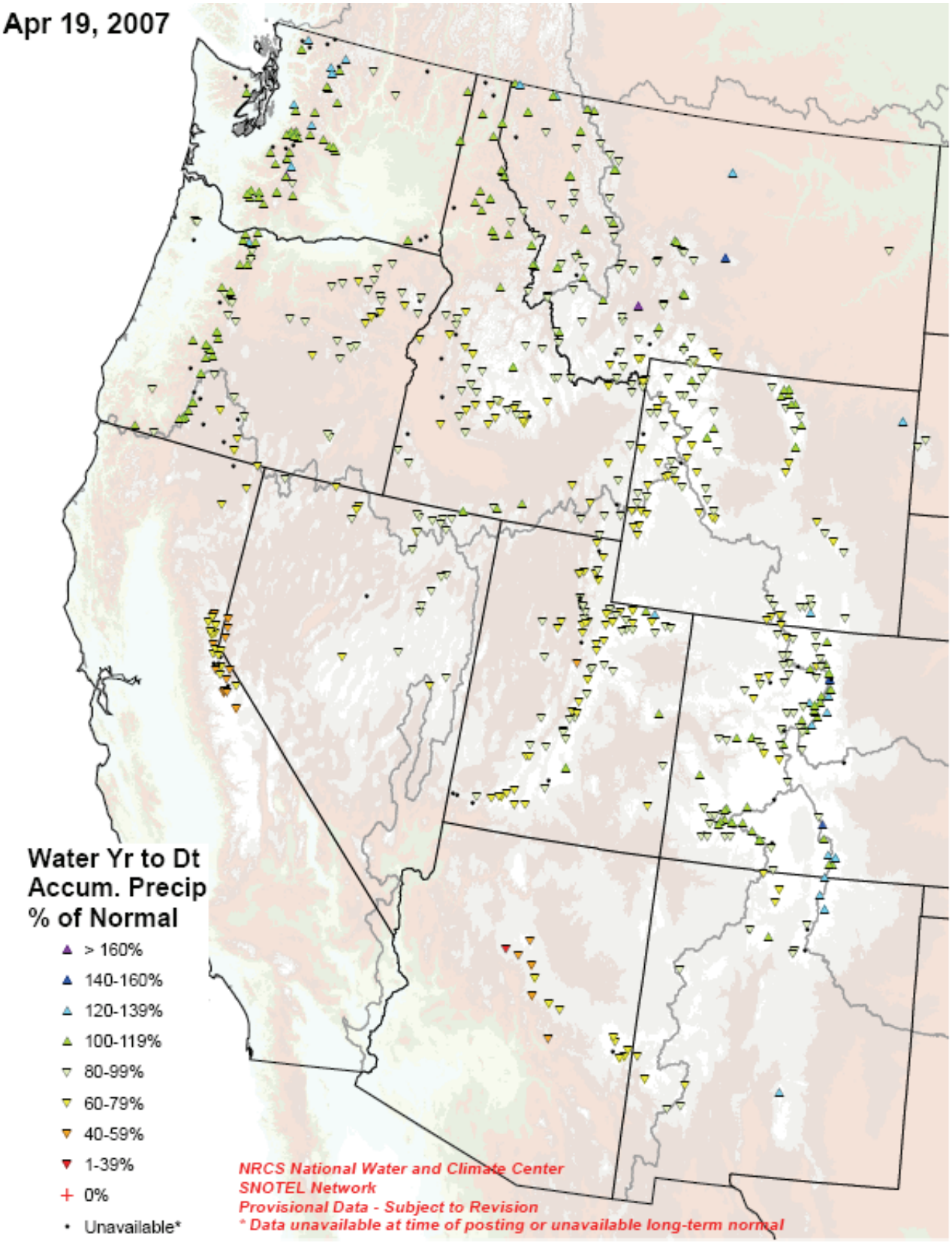


Fig. 3a. SNOTEL station water year (since October 1) precipitation as a percent of normal.
Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideWYTDPrecipPercent.pdf

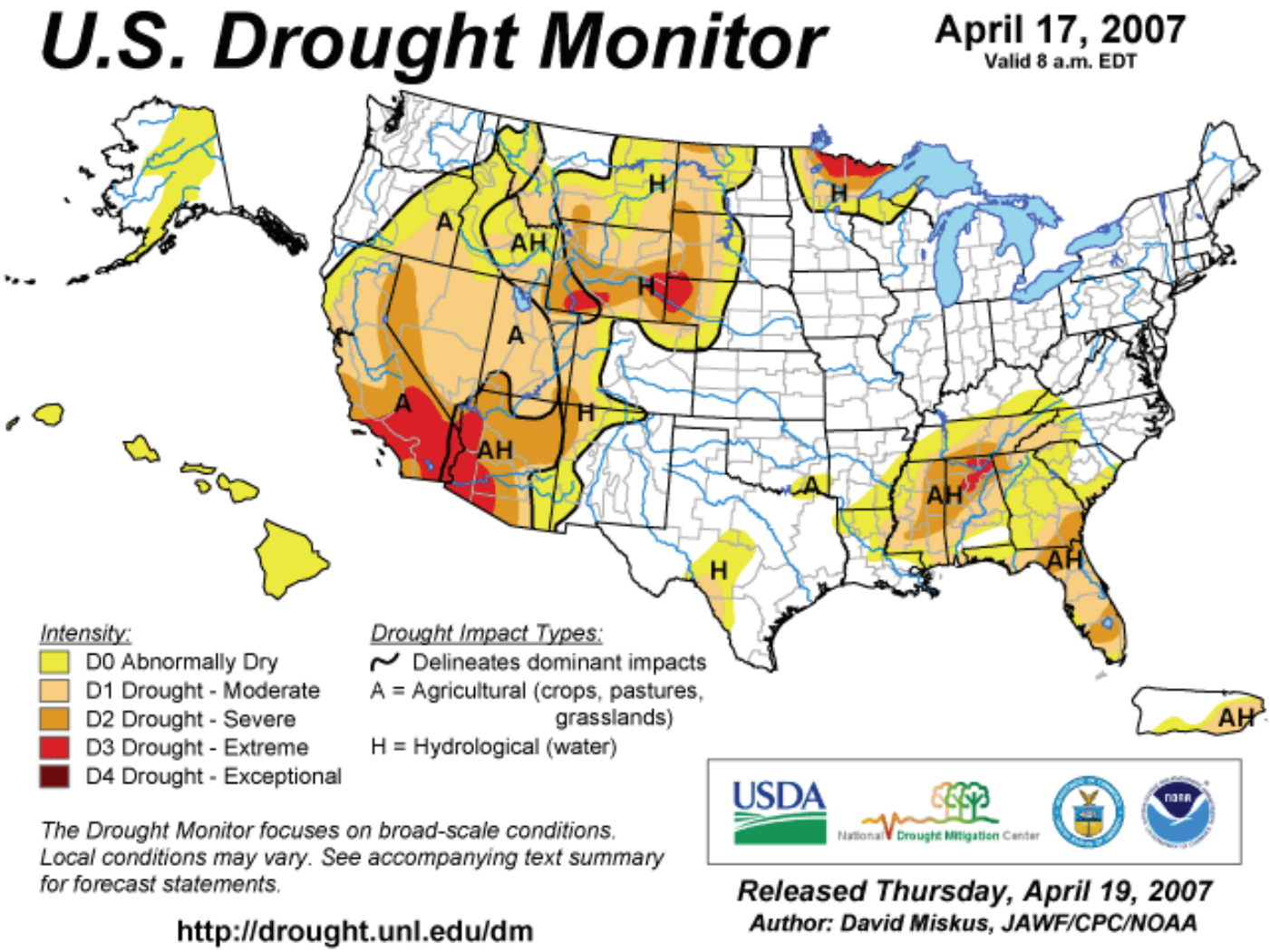


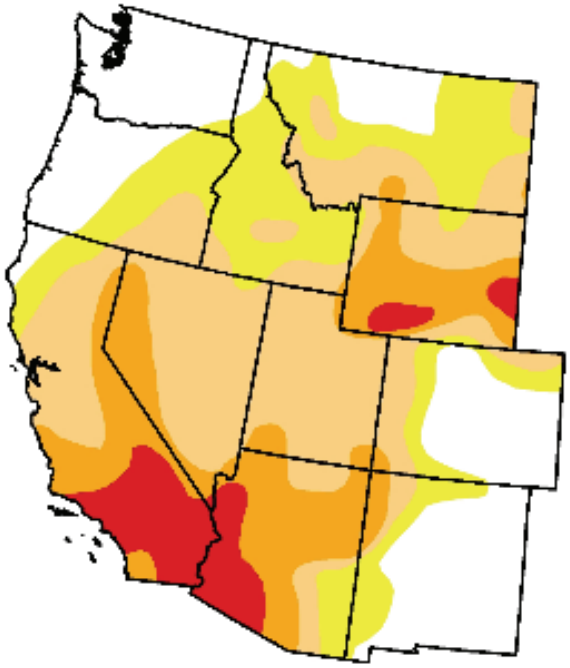
Fig. 4. Current Drought Monitor weekly summary.
Ref: ***National Drought Mitigation Center (NDMC) -*** http://www.drought.unl.edu/dm/monitor.html

U.S. Drought Monitor
West

April 17, 2007
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	25.5	74.5	54.7	23.4	6.9	0.0
Last Week (04/10/2007 map)	30.8	69.2	51.7	19.1	5.6	0.0
3 Months Ago (01/23/2007 map)	48.7	51.3	30.5	14.9	4.9	0.0
Start of Calendar Year (01/02/2007 map)	51.2	48.8	25.8	9.4	4.0	0.0
Start of Water Year (10/03/2006 map)	43.5	56.5	33.5	16.9	5.2	0.0
One Year Ago (04/18/2006 map)	62.7	37.3	26.8	16.8	5.8	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, April 19, 2007
Author: David Miskus, JAWF/CPC/NOAA

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

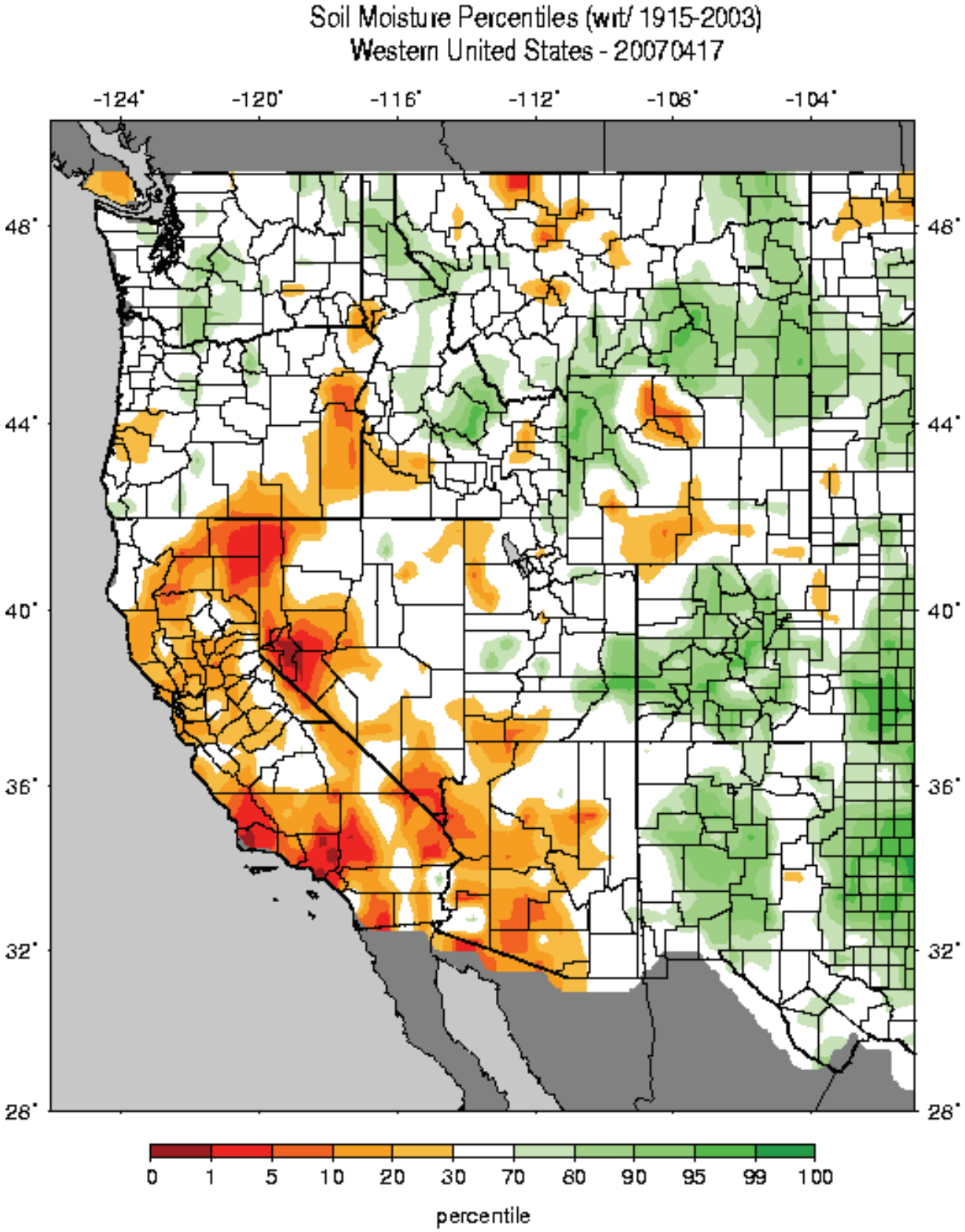


Fig. 5: Soil Moisture Ranking Percentile based on 1915-2003 climatology. (source: Univ. of Washington). **Ref:** http://www.hydro.washington.edu/forecast/monitor/curr/CONUS.sm_qnt.gif

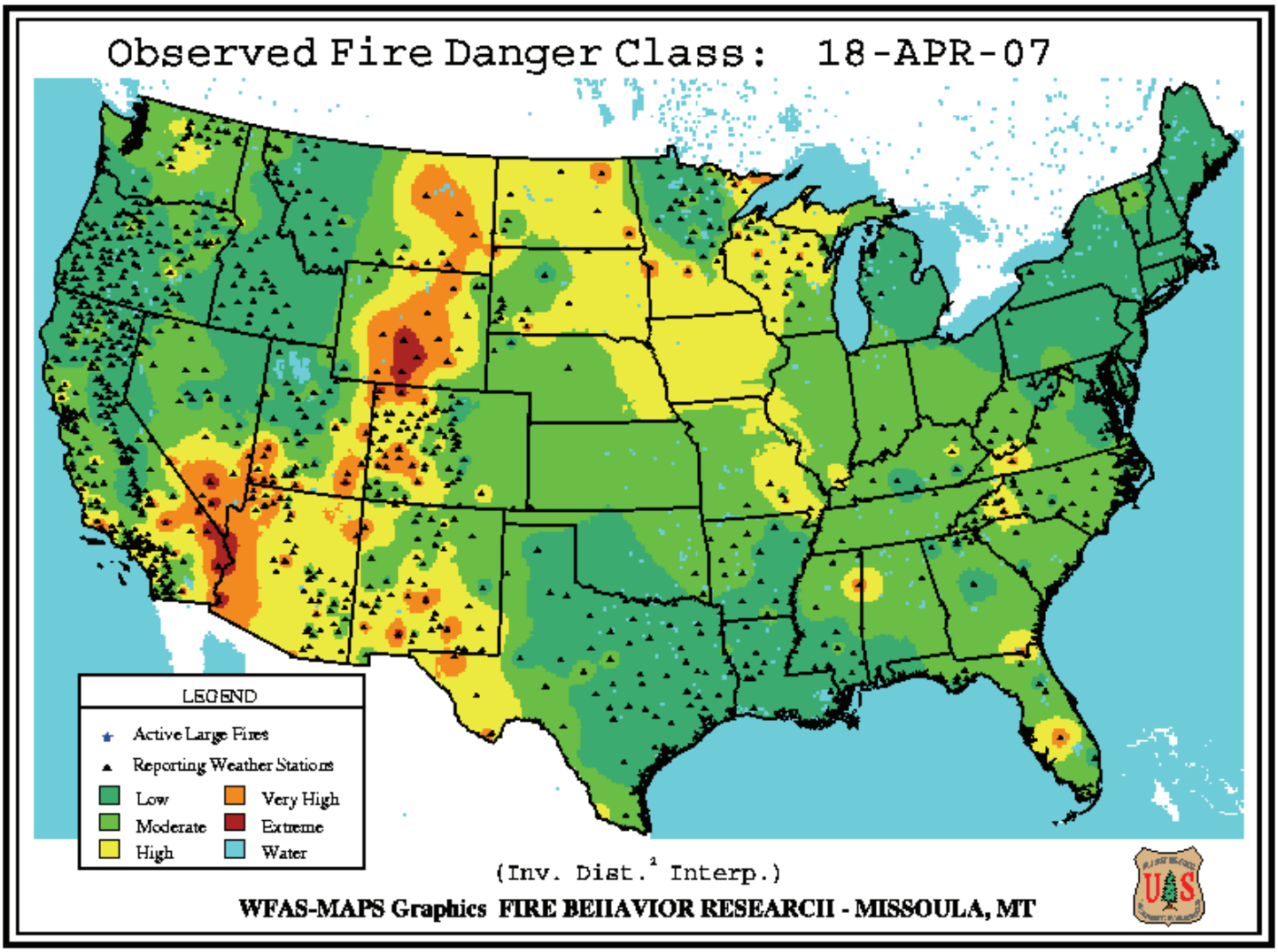


Fig. 6. Observed Fire Danger Class. Source: Forest Service Fire Behavior Research – Missoula, MT
Ref: *http://www.fs.fed.us/land/wfas/fd_class.gif*

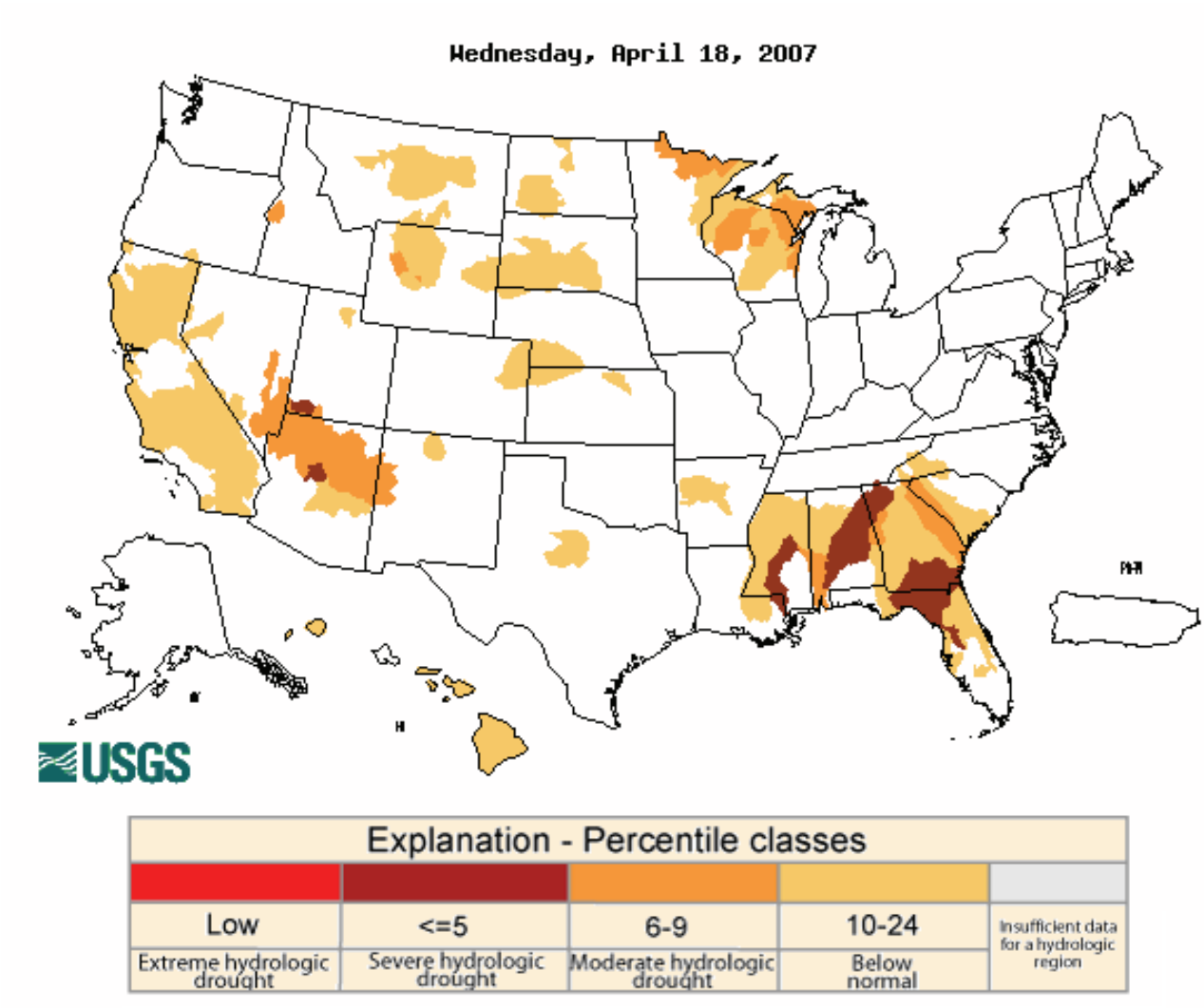


Fig. 7. Map of below normal 7-day average streamflow compared to historical stream flow for the day of the year. **Ref: USGS** http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us

National Drought Summary -- April 17, 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/.

Stormy and chilly weather, with temperatures averaging more than 4°F below normal, enveloped much of the nation, particularly east of the Rockies. Weekly departures exceeded -8°F in the south-central Plains, Midwest, and Northeast. A series of storm systems traversed the country, including a strong Nor'easter that dumped excessive rains on coastal New Jersey and New York, and blanketed interior New England with heavy snow. Very strong and persistent winds accompanied the system, affecting much of the East Coast. The storms, however, did bring beneficial rains to the Delta and Southeast. Light precipitation also fell on most of the West and Rockies, but after a very dry and warm March, short-term conditions continued to decline. Dry weather prevailed in the northern Plains, upper Midwest, Rio Grande Valley, and most of Puerto Rico, Alaska, and the leeward side of Hawaii.

The West: After hoping for a wet and cool March, the opposite occurred instead – unseasonably dry with near-record warmth – and nearly every Western basin registered a decline in snow packs with significant meltouts. According to NRCS's April 1 *Western Snowpack Conditions and Water Supply Forecasts*, the losses were greatest in the Southwest and central Oregon, where snow packs declined more than 30%. A similar March decline was also observed in 2004. As a result, snow packs are extremely low in Arizona, Utah, Nevada, California, and eastern Oregon. As of April 16, many long-term NRCS SNOTEL sites in central Arizona, Utah, northern Nevada, and eastern Oregon had already melted out, with several nearby stations reporting only 1-39% of its snow water equivalent (SWE). This was also true in California's Sierra Nevada, and should result in a very poor spring and summer stream flow and runoff. Fortunately, April 1 reservoir storages are above seasonal averages in California, Colorado, Idaho, Nevada, and Washington, and only slightly below-normal in Oregon and Utah, providing some cushion from the expected poor 2007 stream flow and runoff forecast. In contrast, Arizona, Montana, New Mexico, and Wyoming reservoirs are at below-normal capacities.

After March's disappointing precipitation (except for above-normal precipitation in northwestern Washington and the eastern halves of Montana, Wyoming, and New Mexico), season-to-date totals (since October 1) were less than 50% in southern California, southern Nevada, and western Arizona; between 50-69% in northern California and western Nevada; and between 70-89% in eastern Nevada, southeastern Oregon, south-central Idaho, western Utah, and eastern Arizona. This week, light precipitation and slightly below-normal temperatures briefly halted the recent parade of dry and warm days, but did little to improve conditions except to slow the snow melt. During the past 6 months, deficits of 4 to 8 inches have accumulated throughout much of California and central Arizona, with shortages exceeding a foot around the Los Angeles area, in parts of the Sierra Nevada, and north-central California. At 4 southern California stations, downtown Los Angeles (2.67 in), Los Angeles Airport (2.27 in), Long Beach (1.62 in), and Burbank (2.39 in), this rainy season (since July 1, 2006) is currently the driest to date since records began at each location, or about 20% of normal, justifying a D3(A) expansion in the

area. Similarly, moderate and severe non-hydrologic (A) drought increased and edged northward; with many California communities already requesting that residents voluntarily reduce water usage. According to USDA/NASS, some northern California foothill pastures benefited from the rain, but others had dried beyond the point of being helped by moisture. In central California, pastures were dry and feeder cattle were being shipped elsewhere. Farther north, the recent dryness, warmth, and rapidly declining basin SWE (between 50-75%) warranted an extension of D0(A) into the rest of eastern Oregon, central Idaho, and southwestern Montana. In southwestern Wyoming, little or no precipitation plus basin SWE between 54-63% deteriorated conditions by one category. Additionally, the Impact lines were redrawn to emphasize short to medium-term drought (A) in westernmost areas since hydrologic concerns (e.g. reservoirs) are currently adequate; H was placed in easternmost areas where long-term hydrologic concerns lingered but short-term moisture was adequate or excessive; and AH was labeled in transitional areas where both short- and long-term drought impacts were occurring.

The Plains and upper Midwest: Across the upper Midwest, all of the snow had finally melted this week, even though temperatures averaged below normal. Although little or no precipitation fell, conditions remained static as the subsoil remained frozen and the topsoil was very moist from the melted snow.

In the southern Plains, little or no rain fell on south-central Texas where long-term drought (at 12 to 24 months) still lingered. Farther north, moderate to heavy precipitation was measured across much of Oklahoma and Kansas, alleviating abnormal dryness in eastern Oklahoma except in the far southeast where less than 0.5 inches fell, and D0(A) remained. In the Dakotas and Nebraska, light precipitation (0.1 to 0.5 inches) and subnormal temperatures did little to dent long-term (H) drought; however, in North Dakota, moist topsoil, frozen subsoil (5-27 inches), and cold weather has delayed the start of fieldwork. In addition, a reassessment of products and indices indicated adequate to surplus moisture in central South Dakota and south-central North Dakota, and the D0(H) area was shifted westward.

The Delta and Southeast: A vigorous storm system that tracked across the Southeast and eventually morphed into a Nor'easter generated widespread, beneficial showers and thunderstorms, although numerous reports of severe weather accompanied the moderate to heavy rainfall. The rains tended to fall in stripes, with many areas receiving over 2 inches while others measured under an inch. Heavy rains (2 to 6 inches) and a general one-category improvement occurred from northern Louisiana/southern Arkansas northeastward into southern West Virginia, from southern Louisiana northeastward into North Carolina, and in the southern half of Florida. In the southern Appalachians, however, rainfall tended to be somewhat lighter (1 to 2.5 inches), and USGS stream flows, after an initial rapid rise, had started to drop back down into the lower 25th percentile by early Wednesday. In addition, 30-, 60-, and 90-day deficits still remained, and with 75 small wildfires still active in western North Carolina on Tuesday, D0 and D1 were retained in the western Carolinas.

In contrast, an inch or less was measured in central Louisiana, central Mississippi, north-central Alabama, northwestern and southeastern Georgia, northern Florida, and extreme southern South Carolina, including some locations in the aforementioned areas where less than 0.5 inches fell. Accordingly, drought conditions were maintained or even expanded where rainfall was meager. The latter included D2 across north-central Florida, southeastern and northwestern Georgia, and southwestern Mississippi where USGS stream flow values (1-, 7-, 14-, and 28-days) remained in the lower 10th percentile. Even with the recent rains, 60-day deficits were still 6 to 10 inches, and some locales had still measured less than 25% of normal precipitation. The D3 was shifted south and east in alignment with the drought blends, CPC soil

moisture, 30-, 60-, 90-, and 6-month precipitation anomalies, and near-record low USGS stream flows. In southern Florida, the rains were welcome and provided some slight relief, especially in far southern sections, but more was needed. Lake Okeechobee's level had dropped to 10.02 feet on April 17 (4 feet below average), and the wells around the lake and west coast areas were in the lowest 10th percentile. The South Florida Water District implemented Phase 3 for the Lake Okeechobee area (only 1 day watering/week), and Phase 2 for the east and west coast metro areas of south Florida (only 2 days watering/week). The Governor of Florida asked the people of South Florida to obey the water restrictions and to conserve water.

Hawaii, Puerto Rico, and Alaska: With typical trade wind conditions, the windward locations experienced light showers (0.1 to 0.5 inches, isolated 1-2 inches) while mostly dry conditions were observed on leeward sides (isolated 0.1-0.5 inches), maintaining abnormally dry conditions across Hawaii.

In Puerto Rico, after unseasonably heavy late March rains (2-4 inches) fell across the island and provided some relief, April has been relatively dry across the southern and eastern sections. As a result, short-term deficits have accumulated, with year-to-date rainfall less than 75% and about half of normal in the southeast. Accordingly, the D1 was redrawn to reflect where shortages exceeded 6 inches since January 1.

Above-normal temperatures and dry weather prevailed across much of Alaska, except along the southeastern Panhandle where light to moderate precipitation and subnormal readings occurred. According to the April 1 NRCS Water Supply Forecast Summary and Alaskan SWE sites, mountain snow pack was 50-69% of normal across central and southwestern Alaska after a very cold March that was dry (<50%) in the west but had ample snows in the northeast (snow pack increased by more than 20% between March 1 and April 1, easing D0 there). In addition, with season-to-date (since Oct. 1, 2006) precipitation less than 70% across the southwestern Panhandle, D0 was extended into this area.

Looking Ahead: During the next 5 days (April 19-23), an upper-air trough of low pressure will settle over the West and bring in a series of Pacific storms to the region. Precipitation will fall on most of the West (including snow in the northern Rockies, Utah's Wasatch Range, and Sierra Nevadas) and eventually the northern half of the Plains, but will miss the Southwest. Temperatures should remain below-normal from the Rockies westward. In the East, leftover showers from the departing Nor'easter will fall over coastal New England while two weak low pressure centers will produce light rain in parts of the Corn Belt and Southeast. As the last system finally departs by late Friday, subnormal readings will slowly moderate to above-normal levels by Sunday. Only the north-central states will observe above-normal temperatures during most of this period.

The NWS 6-10 day outlook (April 24-28) calls for subnormal precipitation in the West and across most of Florida, with wetter-than-normal conditions expected from southern Plains and western half of the Gulf Coast northeastward into the Great Lakes region and Northeast, and the southern third of Alaska. Temperatures will average above-normal in the Far West and eastern third of the nation, with cooler-than-normal weather in the southern halves of the Rockies and Plains.

Author: David Miskus, Joint Agricultural Weather Facility, CPC/NCEP/NWS/NOAA

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 April 18, 2007