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# New Assessment Tools in Monitoring Drought

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Climate Prediction Center,**

**NCEP/NWS/NOAA**

**Washington, D.C.**

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**Prepared for:**

**USDA's 84<sup>th</sup> Agricultural Outlook Forum**

**Session 38: Food Risk & Security,**

**U.S. Drought Monitor & Disaster Declarations**

**February 22, 2008, 1:45 p.m. – 3:15 p.m.**



As Brad Rippey has just discussed, the weekly U.S. Drought Monitor has undergone numerous changes (improvements) from it's inception in 1999.



Over time, the main focus has been to SIMPLIFY the map for the end user (although with increased information available to the author, the author's tasks have gotten a tad more *COMPLEX*).

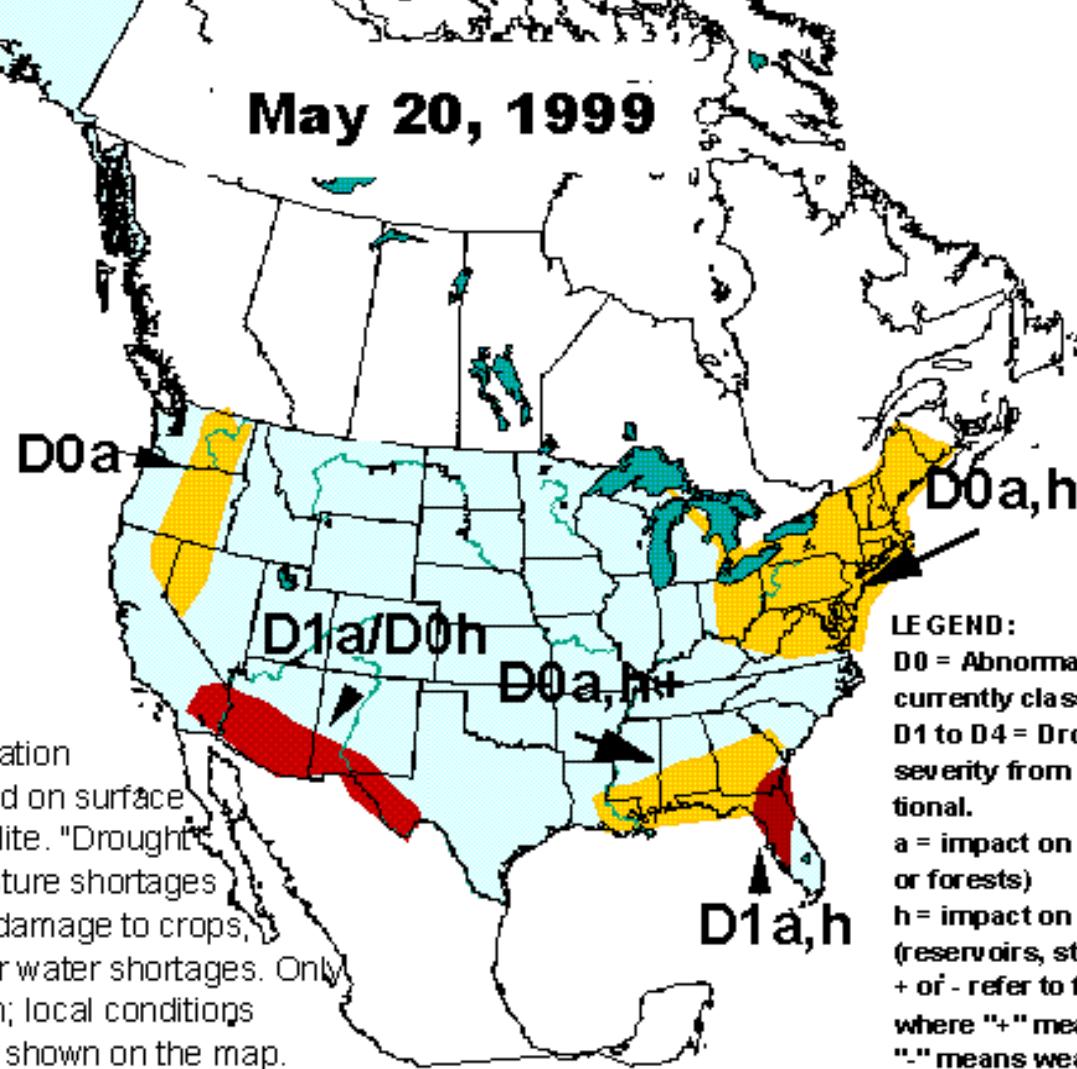
Major changes to the USDM since 1999.....

# EXPERIMENTAL **DROUGHT MONITOR**

May 20, 1999



Areas depicted on chart are derived by consolidating information from a number of sources based on surface observation networks and satellite. "Drought" is used to mean abnormal moisture shortages resulting in imminent or actual damage to crops, or pastures; high wildfire risk; or water shortages. Only relatively large areas are shown; local conditions may differ markedly from those shown on the map.



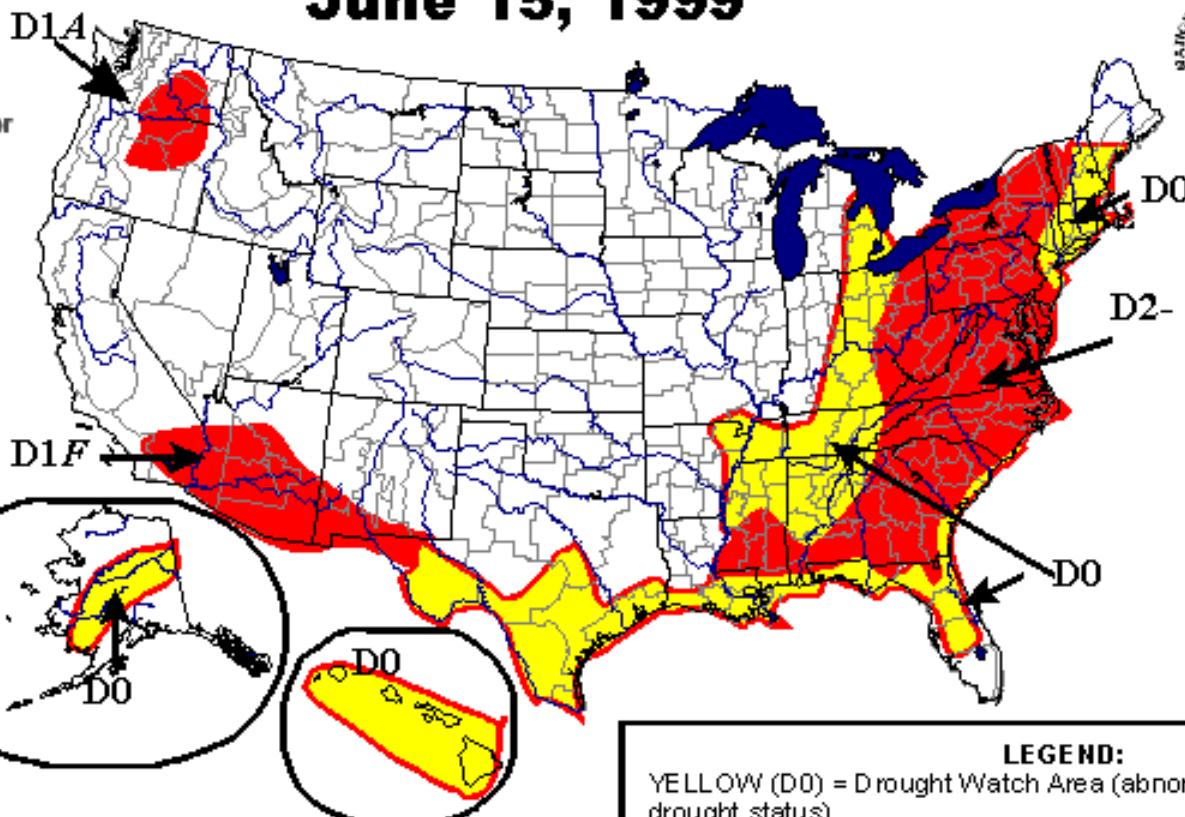
LEGEND:

D0 = Abnormal dryness but not currently classified as a drought.  
D1 to D4 = Droughts ranging in severity from standard to exceptional.  
a = impact on plant life (agric. or forests)  
h = impact on water supplies (reservoirs, streams, wells)  
+ or - refer to forecast 2-wk trend, where "+" means intensifying and "-" means weakening. No sign means no significant change.



# Experimental U.S. DROUGHT MONITOR

June 15, 1999



Areas depicted on map are derived by consolidating information from a number of sources based on surface observations and satellite products. "Drought" is used to mean abnormal moisture shortages resulting in imminent or actual damage to crops or pastures; high wildfire risk; or water shortages. Only relatively large areas are shown; local conditions may differ markedly from those shown on the map.

**LEGEND:**  
YELLOW (D0) = Drought Watch Area (abnormally dry but not full drought status)

RED (D1-D 4) = Current drought ranging in severity from standard (D1) to severe (D2-D 3) to extreme (D4)

Drought Type: *Used when impacts differ*

A = agricultural (crops, grasslands)

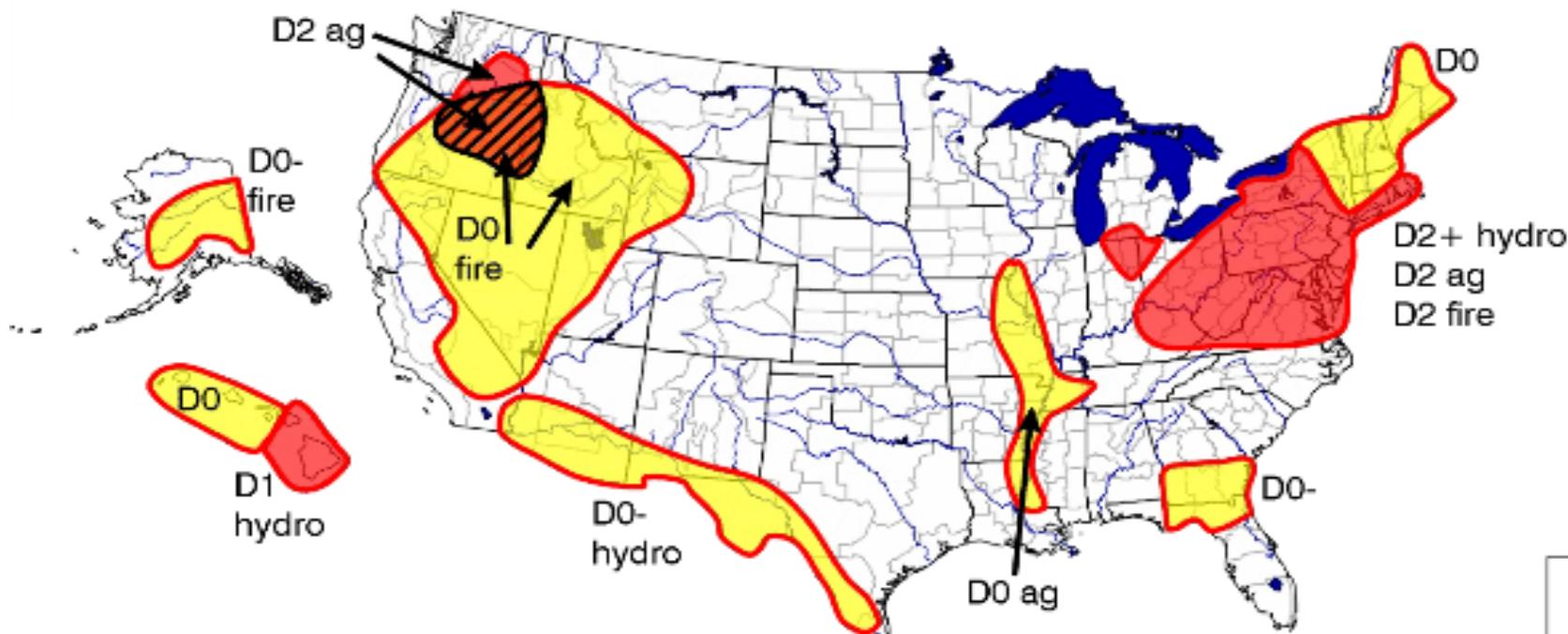
F = forestry (wildfire potential)

H = hydrological (rivers, wells, reservoirs)

Plus = Forecast to intensify, Minus = Forecast to diminish

July 20, 1999

# Experimental U.S. Drought Monitor



"Drought" means moisture shortages leading to damaged crops or pastures, high wildfire risk, or water shortages. The map is based on information from many sources, including both satellite and surface data, and it focuses on widespread drought. Local conditions may vary.

**Yellow (D0)** = Drought Watch Area (abnormally dry but not full drought status)

**Red (D1–D4)** = Current drought ranging in severity from standard (D1) to severe (D2–D3) to extreme (D4)

Crosshatching (▨) = Overlapping drought type areas

Drought type: Used when impacts differ

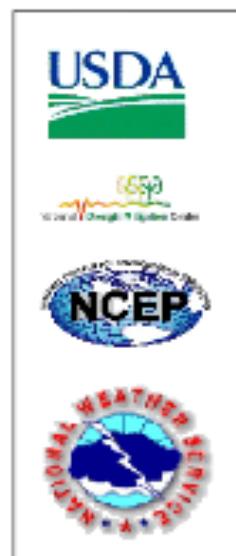
Ag = agricultural (crops, grasslands)

Fire = forestry (wildfire potential)

Hydro = hydrological (rivers, wells, reservoirs)

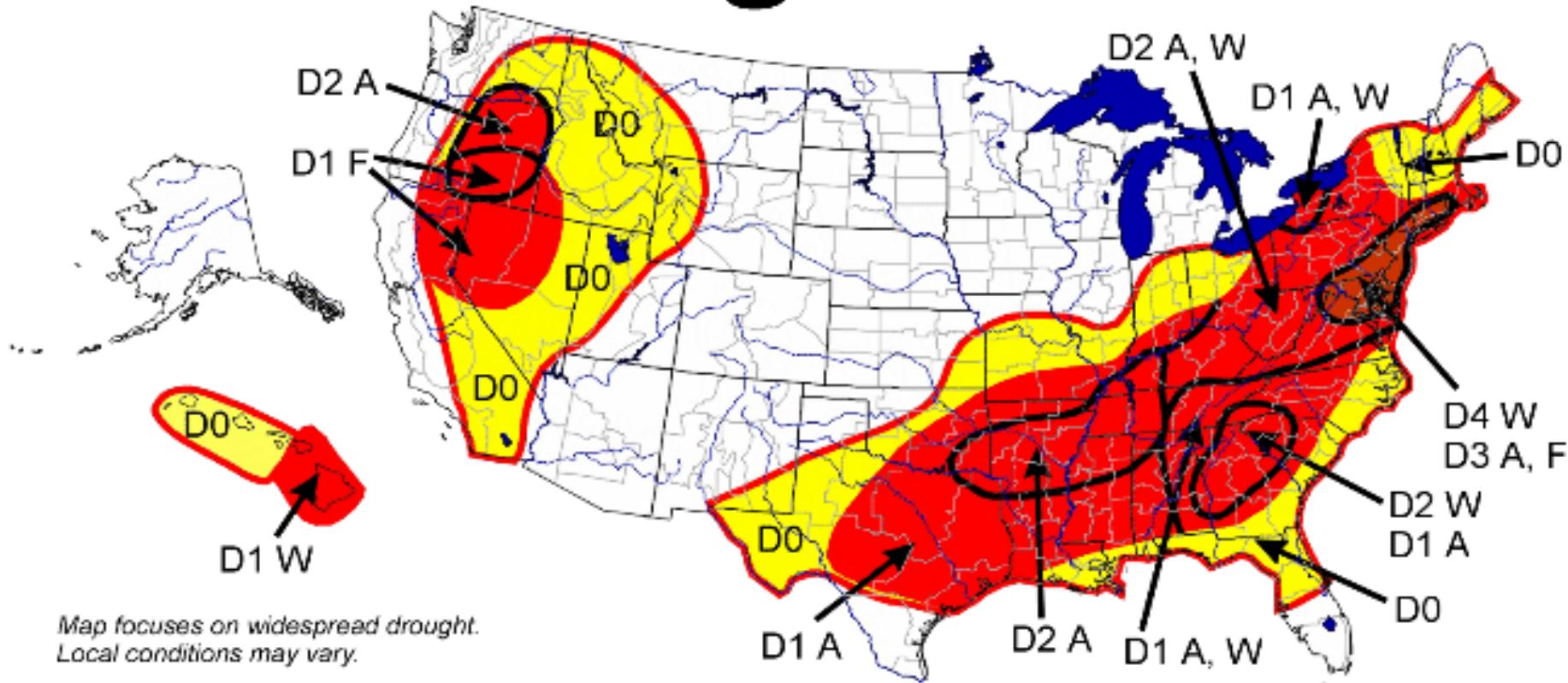
Plus (+) = Forecast to intensify

Minus (-) = Forecast to diminish



August 24, 1999

# U.S. *Drought Monitor*



Map focuses on widespread drought.  
Local conditions may vary.

- D0 Watch
- D1 Drought
- D2 Drought-Severe
- D3 Drought-Extreme
- D4 Drought-Exceptional

Drought type: used only when impacts differ  
A = Agriculture  
W = Water  
F = Forest fire danger

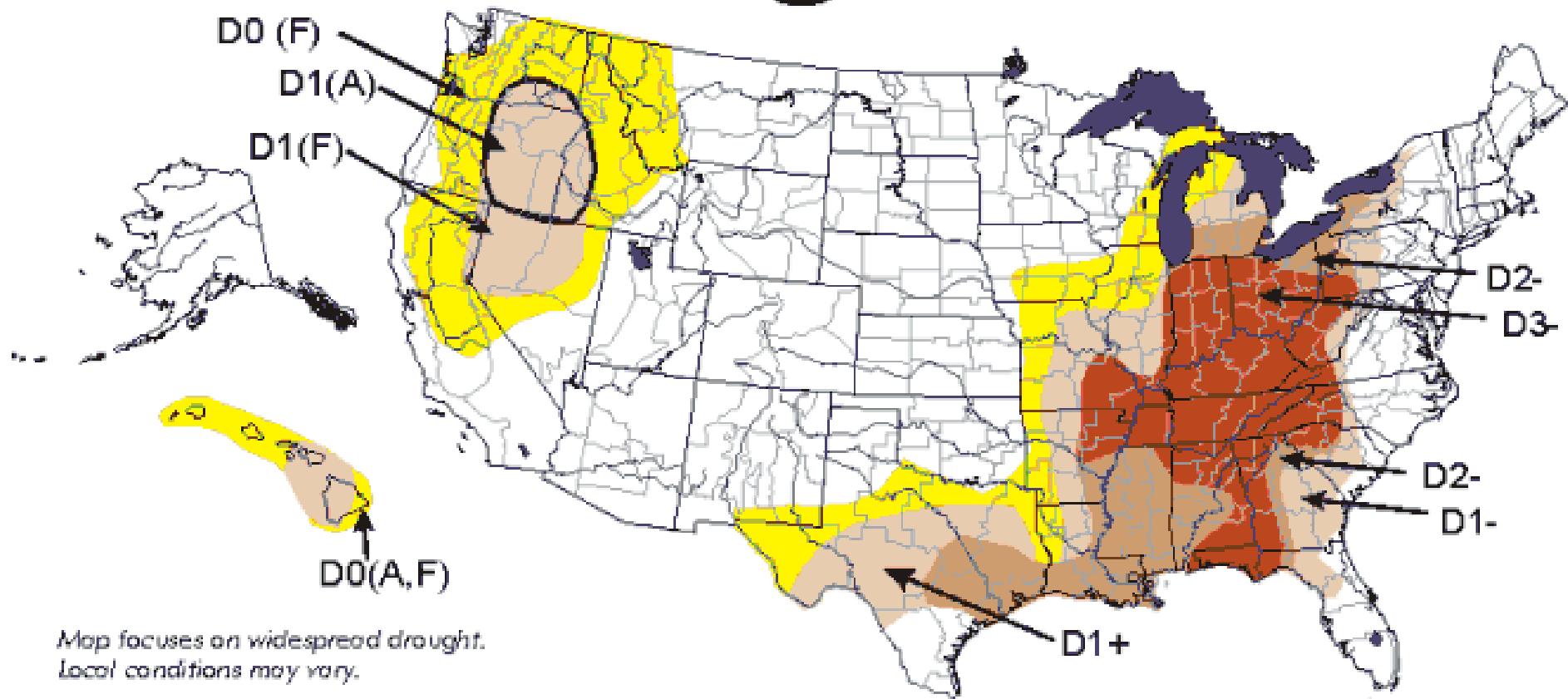
Plus (+) = Forecast to intensify next two weeks  
Minus (-) = Forecast to diminish next two weeks  
No sign = No change in drought classification forecast



• **Updated every Thursday morning** •

September 28, 1999

# U.S. Drought Monitor



Map focuses on widespread drought.

Local conditions may vary.

	D0 Watch
	D1 Drought
	D2 Drought-Severe
	D3 Drought-Extreme
	D4 Drought-Exceptional
	Delineates Overlapping Areas

Drought type: used only  
when impacts differ

A = Agriculture  
W = Water  
F = Forest fire danger

Plus (+) = Forecast to intensify next two weeks

Minus (-) = Forecast to diminish next two weeks

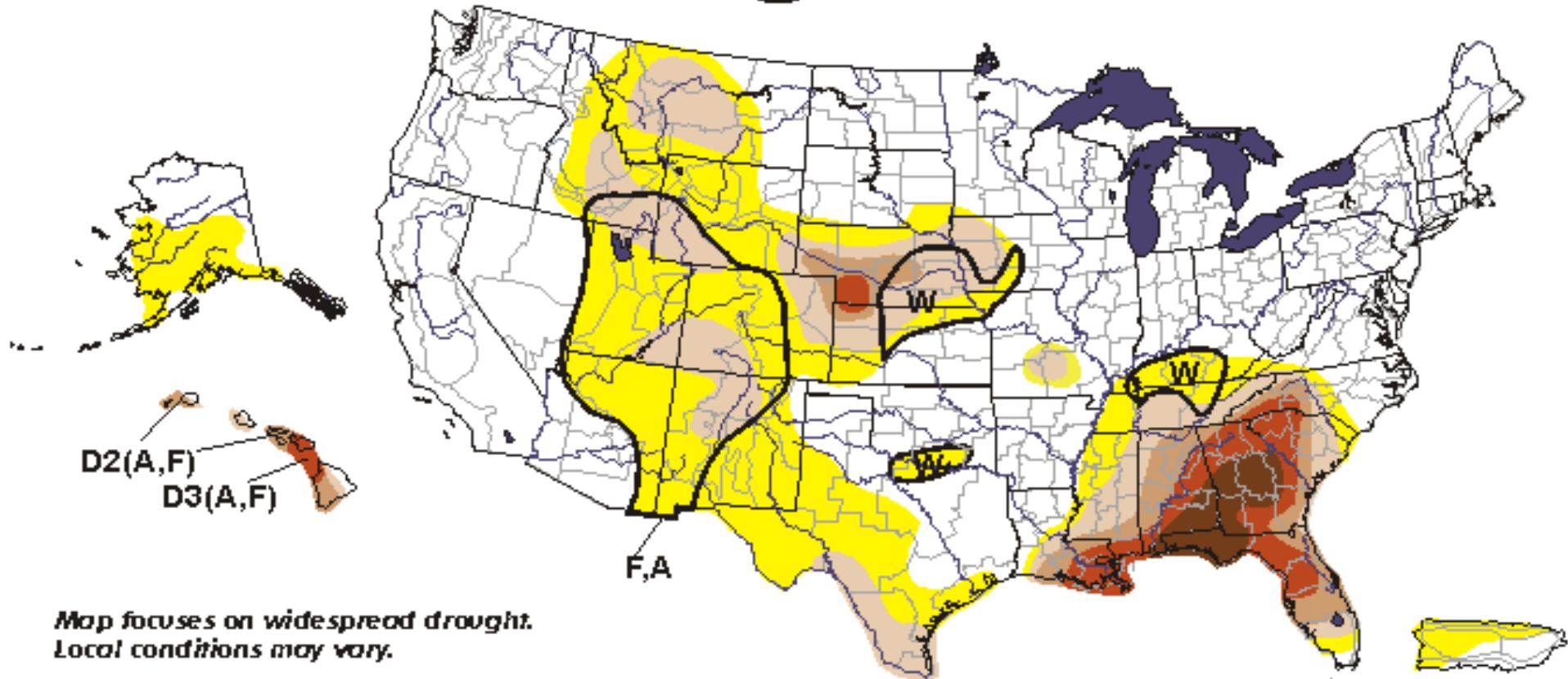
No sign = No change in drought classification forecast



• Released Thursday, Sep 30, 1999 •

July 11, 2000 Valid 7 a.m. EST

# U.S. Drought Monitor



Yellow	D0 Abnormally Dry
Light Brown	D1 Drought-First Stage
Brown	D2 Drought-Severe
Dark Brown	D3 Drought-Extreme
Dark Red	D4 Drought-Exceptional
 Delineates Overlapping Areas	

Drought type: used only when impacts differ  
A = Agriculture  
W = Water  
F = Wildfire danger

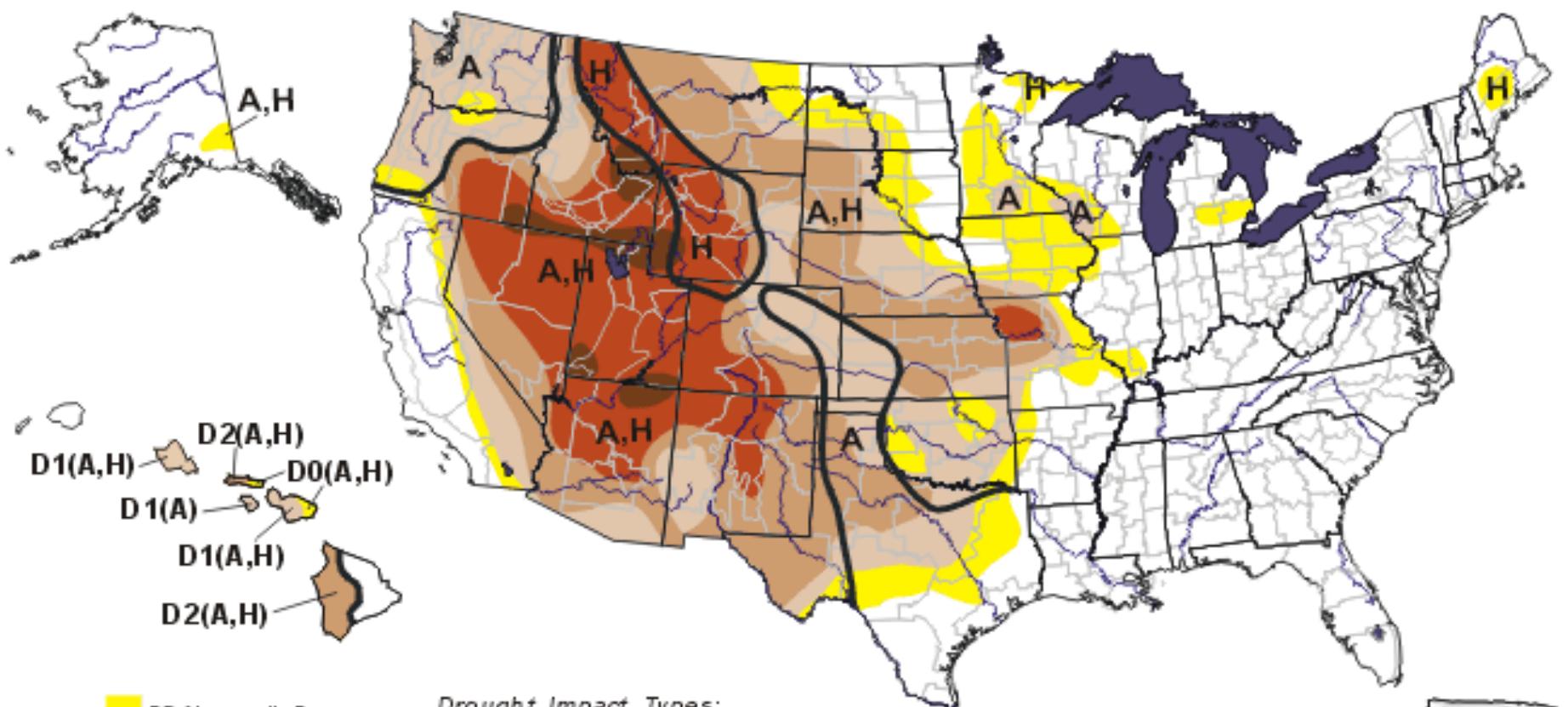
See accompanying text summary  
for forecast statements



• Released Thursday, July 13, 2000 •

# U.S. Drought Monitor

August 12, 2003  
Valid 8 a.m. EDT



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

Drought Impact Types:

- A= Agricultural (crops, pastures, grasslands)
- H= Hydrological (water)
- No type = both impacts

— Delineates dominant impacts

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

<http://drought.unl.edu/dm>



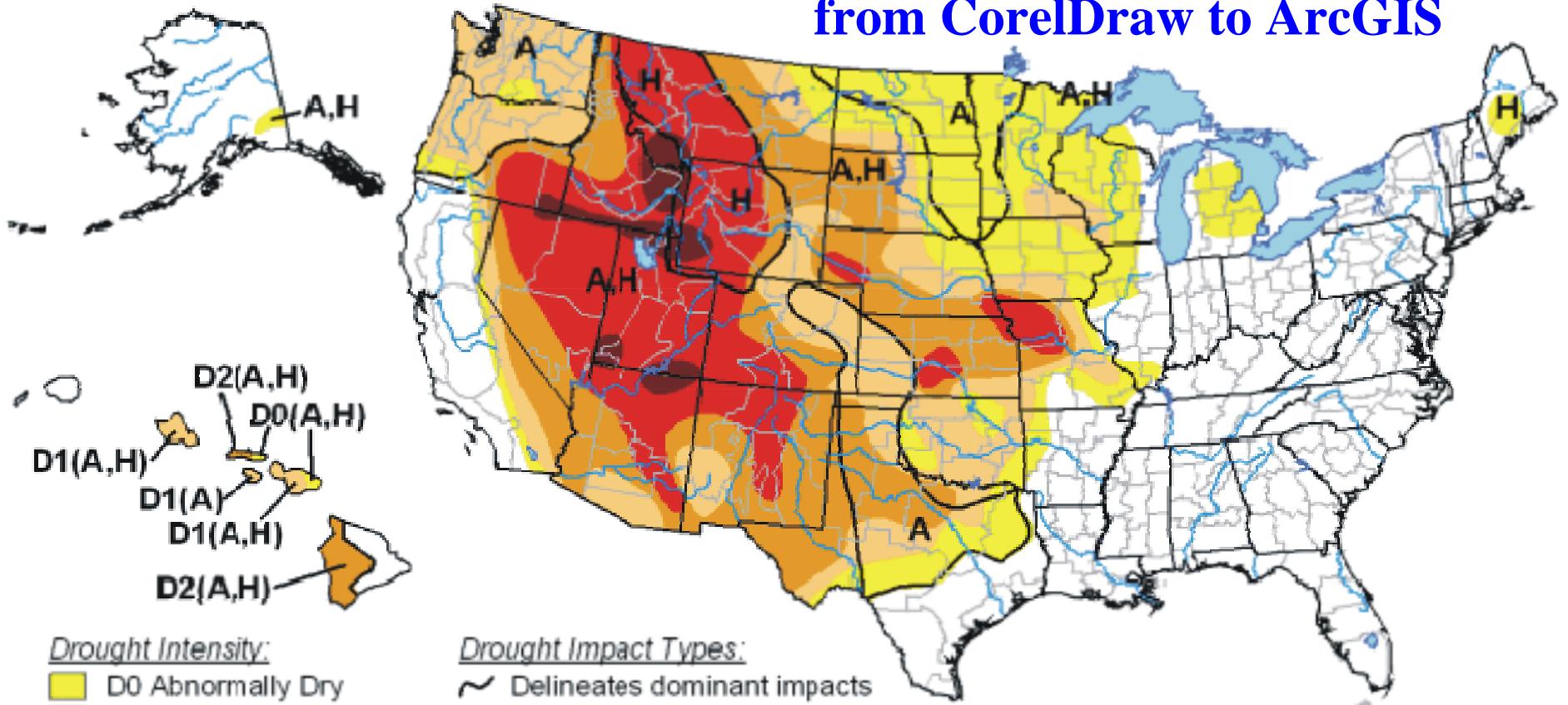
Released Thursday, August 14, 2003

Author: Douglas Le Comte, NOAA/CPC

# U.S. Drought Monitor

August 19, 2003  
Valid 8 a.m. EDT

from CorelDraw to ArcGIS



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

<http://drought.unl.edu/dm>

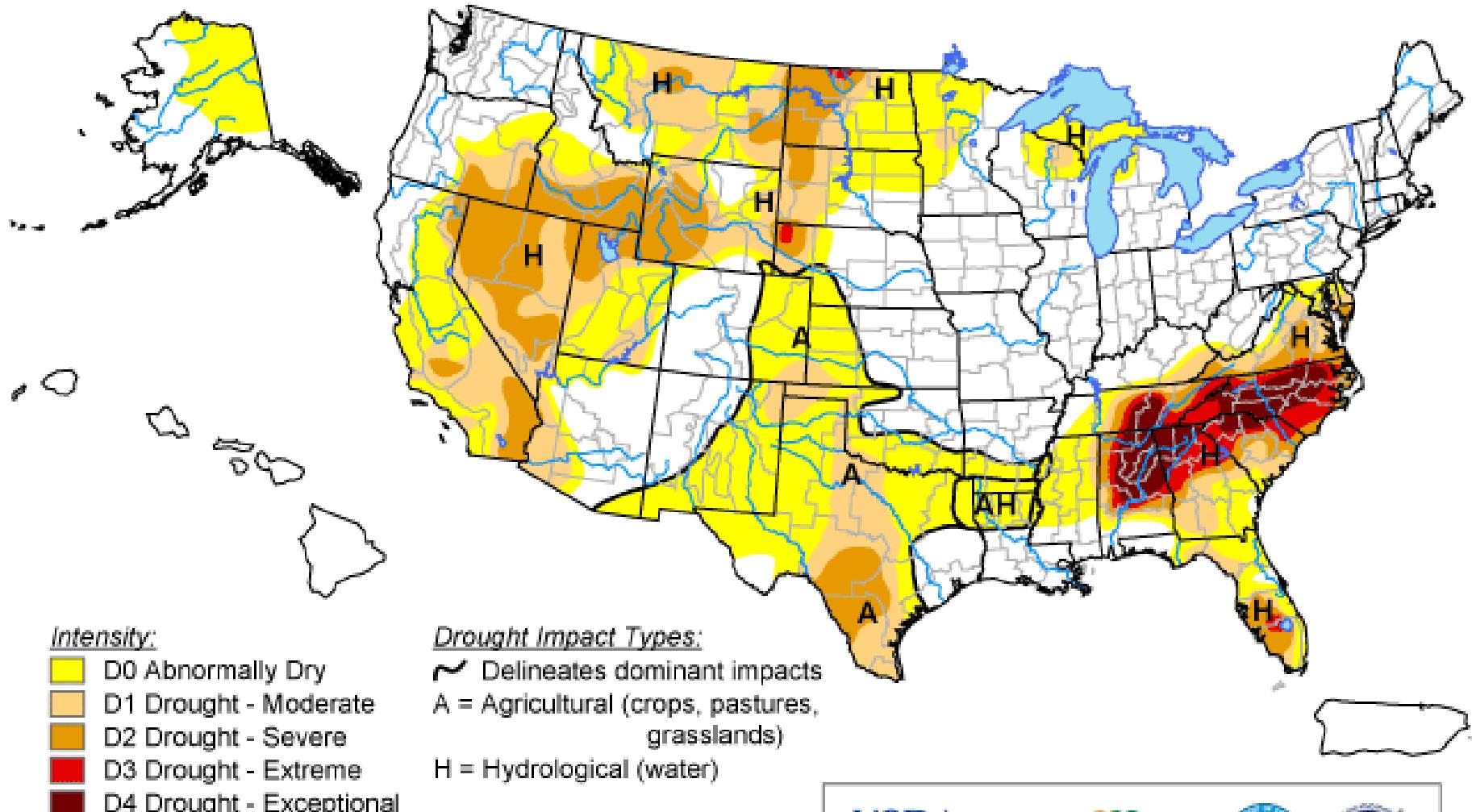


Released Thursday, August 21, 2003

Author: Candace Tankersley/Richard Heim, NOAA/NCDC

# U.S. Drought Monitor

February 12, 2008  
Valid 7 a.m. EST



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, February 14, 2008

Authors: Jay Lawrimore/Liz Love-Brotak, NOAA/NESDIS/NCDC



# BACKGROUND

While trying to keep the USDM 'simple' for the consumer, the author(s) require as much current and past information as possible (e.g. multiple indices, products, local expertise, etc.) in order to determine this week's drought analyses .... since no single definition of drought or index works for all circumstances.

So, as technology continues to improve, we have tried to utilize these upgrades to assist us in creating the weekly USDM.

(Each of the following slides could be made into its own presentation)

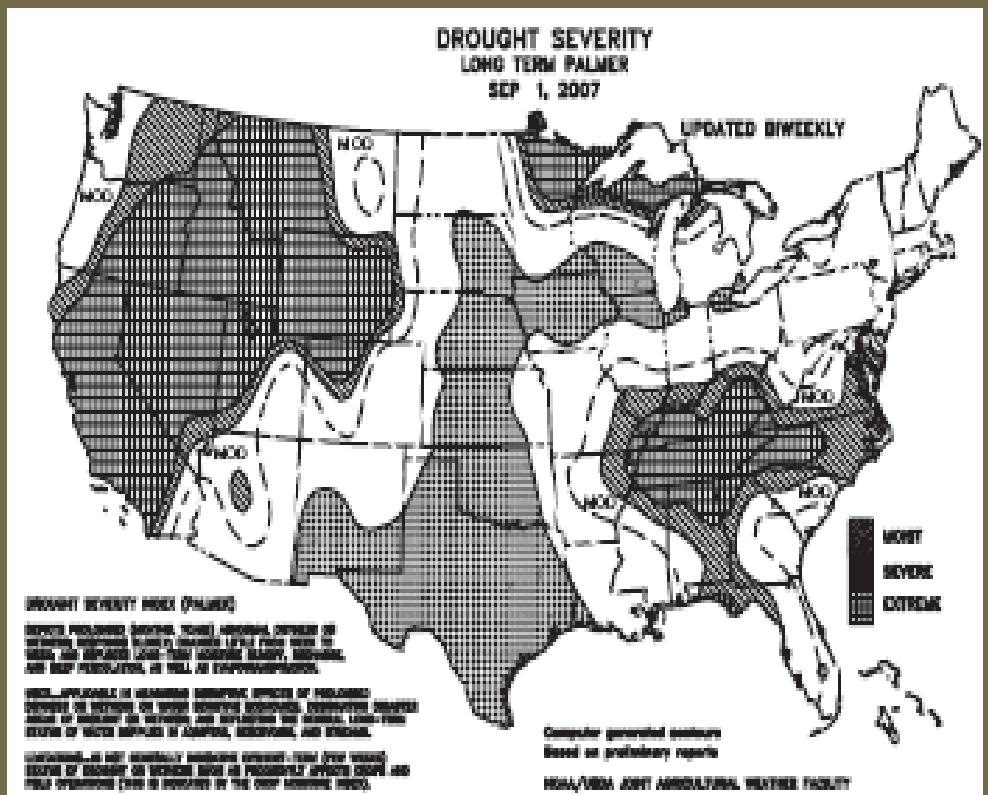
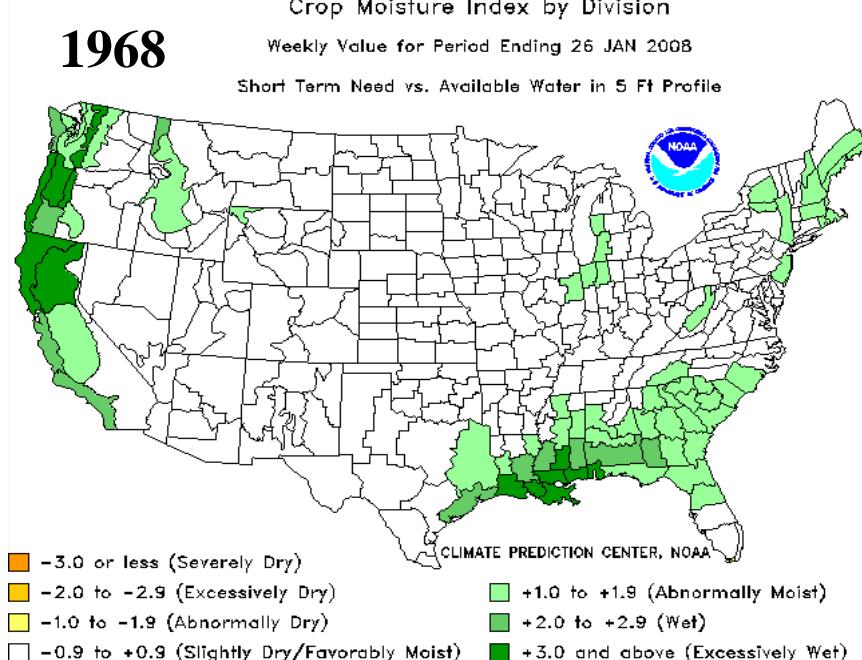
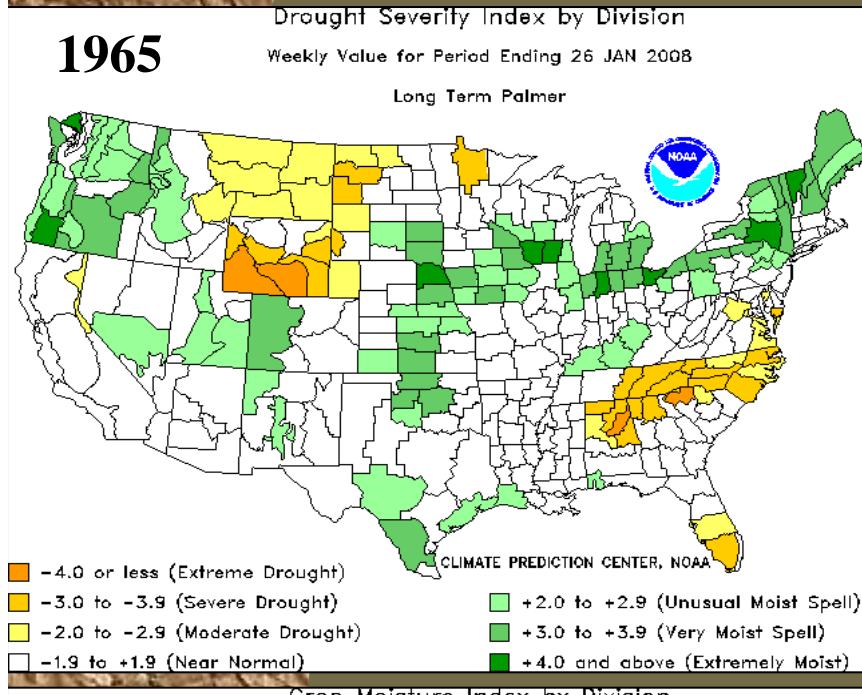


# OVERVIEW

Modified or New Tools used in the Assessment of Drought in the Production of the USDM:

- 1) Improving Input Data Quality & Quantity;
- 2) Creating New Products, Indices, or Blends for a more Objective Analyses, inc. Soil Moisture Models;
- 3) Differentiating between Temporal (Short vs. Long) & Regional (East vs. West) Drought Distinctions;
- 4) Migrating USDM Analyses & Production to State-of-the-Art Software (ArcGIS);
- 5) Consolidating all drought-related information to a “one-stop drought shop” (NIDIS & Drought Portal);
- 6) Expanding Drought Monitoring Beyond the U.S.;
- 7) Forecasting Drought (U.S. Seasonal Drought Outlooks);

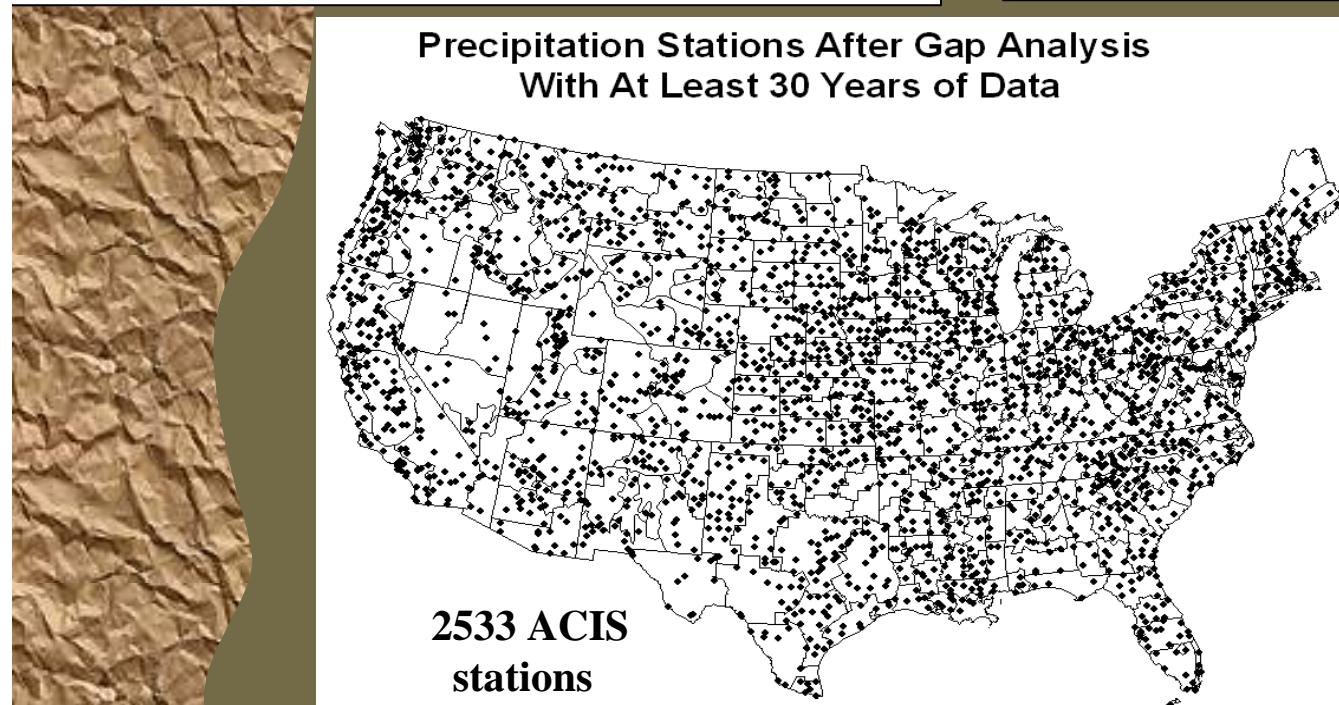
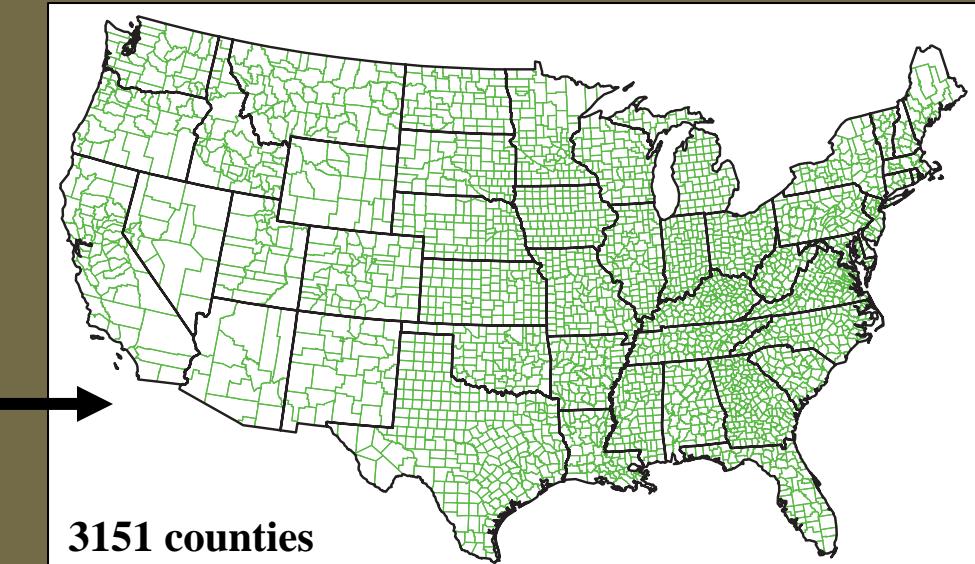
# 1) Improving Input Data Quality & Quantity;



In the past, the **Palmer Drought Index** had been the standard for measuring drought in the U.S. (the **CMI** was developed 3 years later for short-term [ag] dryness)...

...but we've come a long way recently; increasing data quality & quantity, dissemination speed, user flexibility, and creating new products ....

# 1) Improving Input Data Quality & Quantity;



...although we still need to transition from a rather low-resolution (climate divisions) to higher resolution (e.g. county level) or to individual stations (e.g. ACIS) ...where there is enough past quality data for statistics.

# 1) Improving Input Data Quality & Quantity;

ACIS data

High Plains  
Regional Climate Center

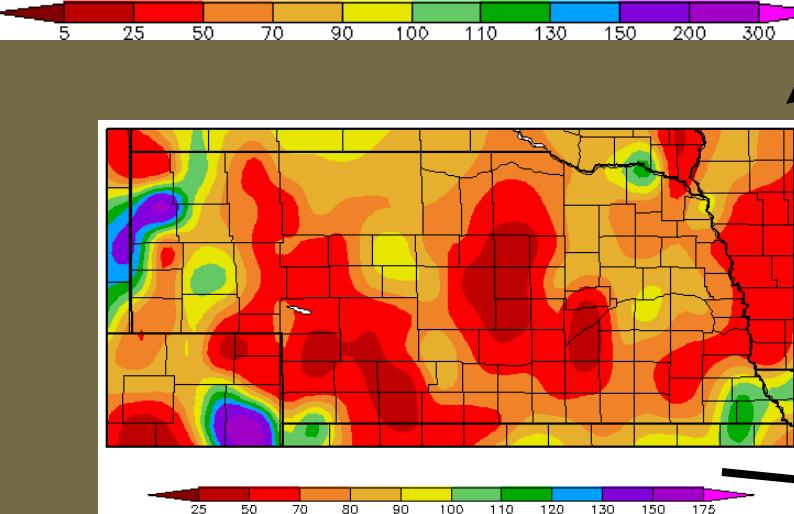
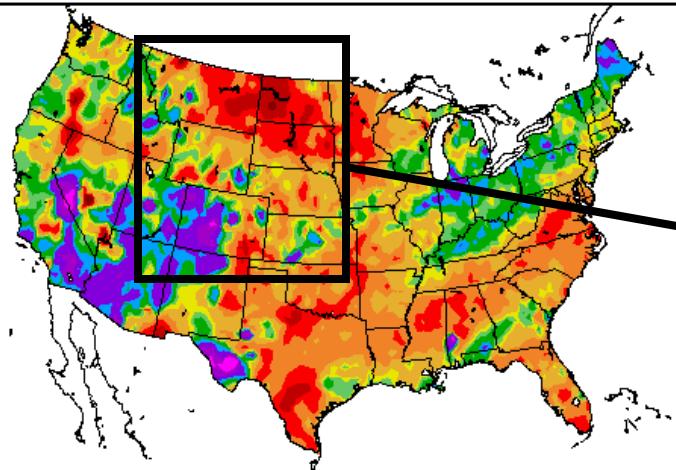
Home About US

Current Climate Summary

Options

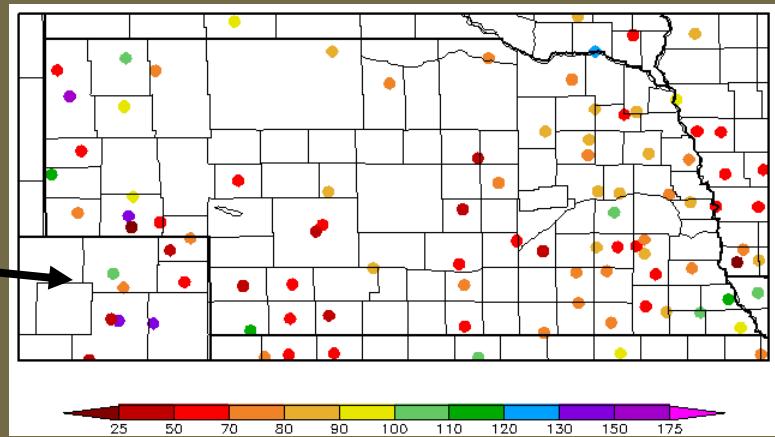
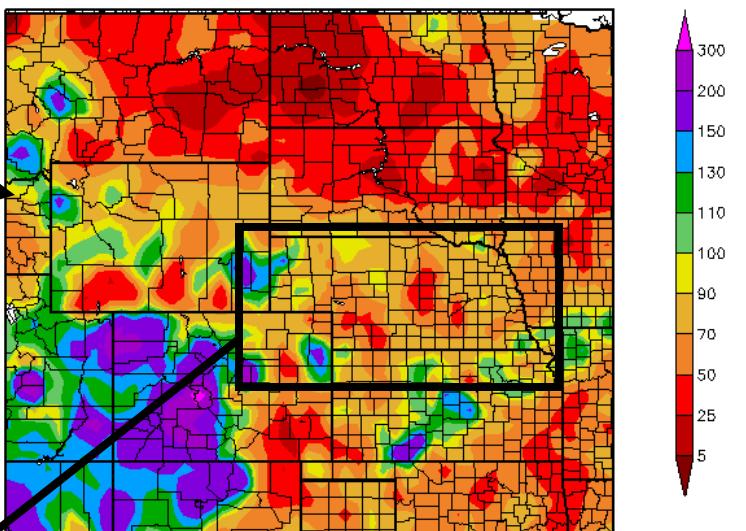
- Select Product
  - Total Precipitation
  - Precip Departure from Normal
  - Precip % of Normal
  - Average Temperature
  - Temperature Departure from Normal
  - HDD - Heating Degree Days
  - HDD Departure from Normal
  - CDD - Cooling Degree Days
  - CDD Departure from Normal
  - SPI
- Products Not Available for Selected Timescale.
- Select a Timescale/Date Range
- Select a Region
- Select Map Style
  - Shaded
  - Dot
- Selected Options

Percent of Normal Precipitation (%)  
11/1/2007 - 1/31/2008



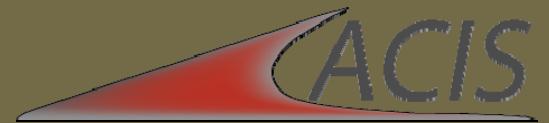
3-Month (Nov'07-Jan'08) PNP

Percent of Normal Precipitation (%)  
11/1/2007 - 1/31/2008



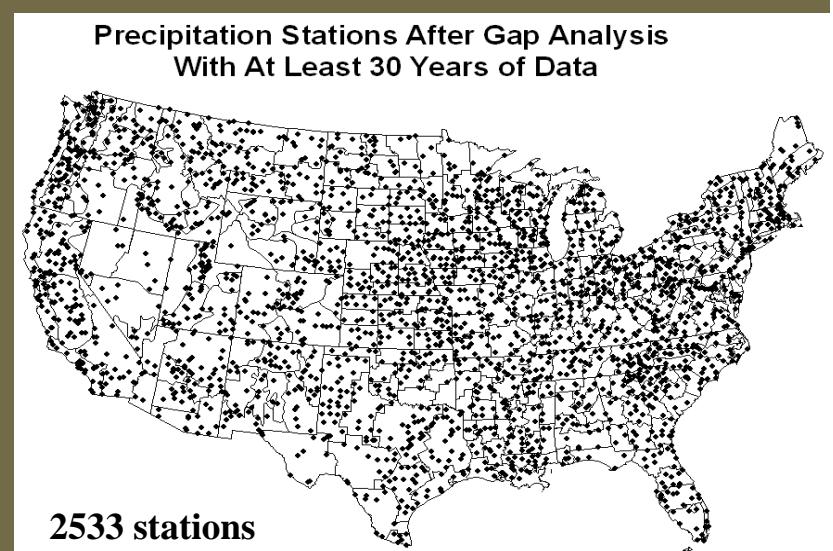
# Applied Climate Information System

- Applied Climate Information System (ACIS)
  - NOAA Regional Climate Centers (RCCs)
- A framework for management of metadata and climate data:
  - Ingest, Quality Control, and Archive
  - Multiple Datasets
  - Networked/Robust System
  - Distributed Data Management
  - Manages climate data (so you don't have to!)



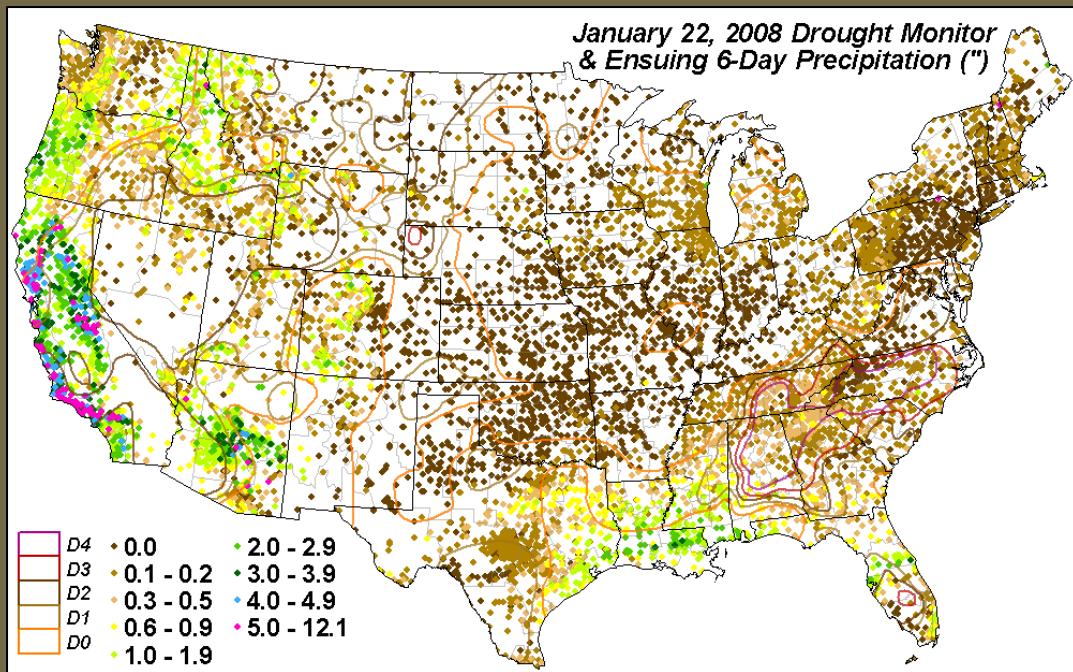
ACIS provides a platform for suites of climate products:

- \* CLIMOD (RCCs)
- \* xmACIS (NWS)
- \* NOWData (NWS)
- \* AgACIS (NRCS)

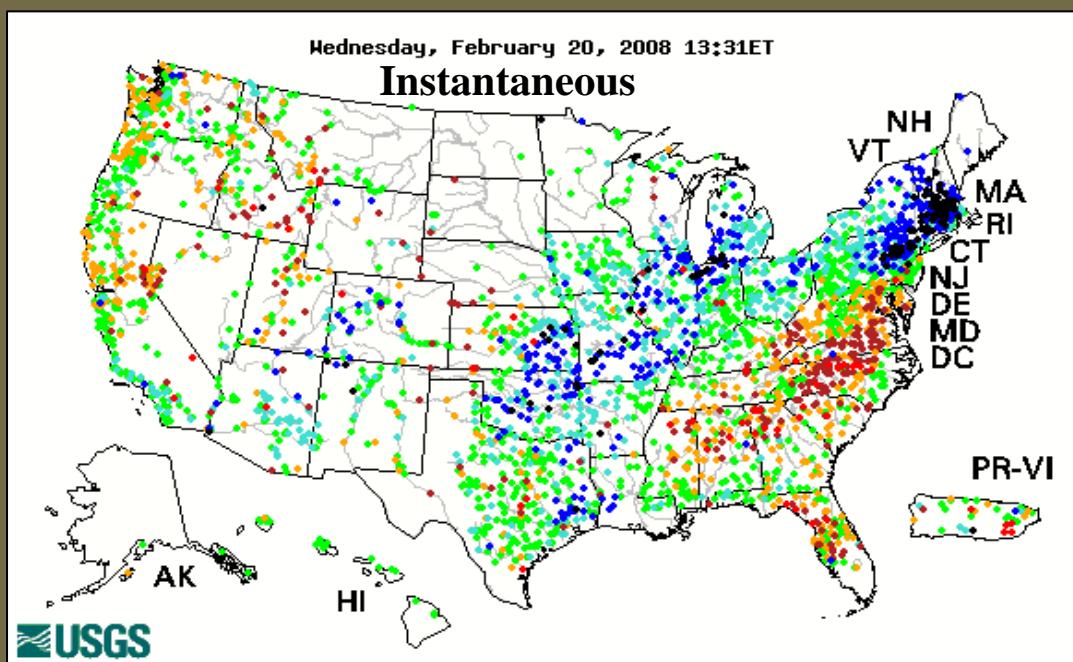


# 1) Improving Input Data Quality & Quantity;

RFC  
Network  
(n-days)



USGS  
Stream flow  
Network  
(Instant, 1-,  
7-, 14-, and  
28-days)

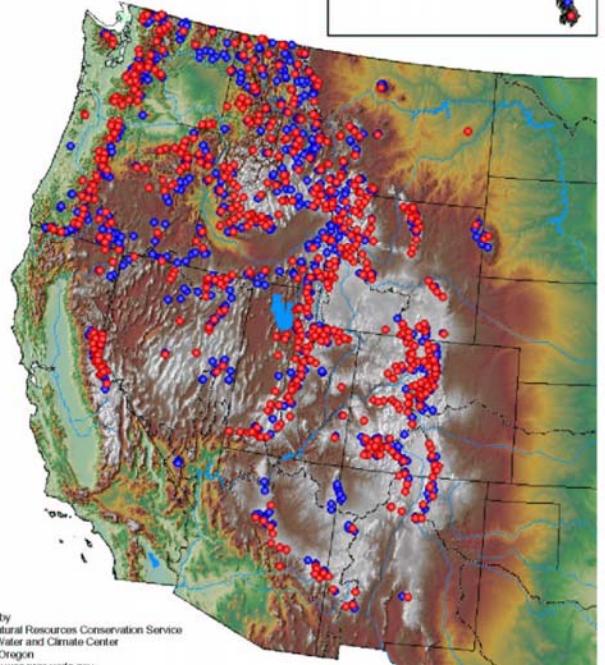
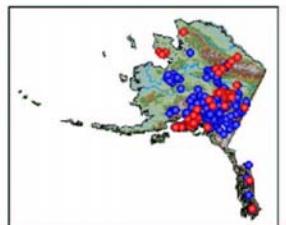


# 1) Improving Input Data Quality & Quantity;

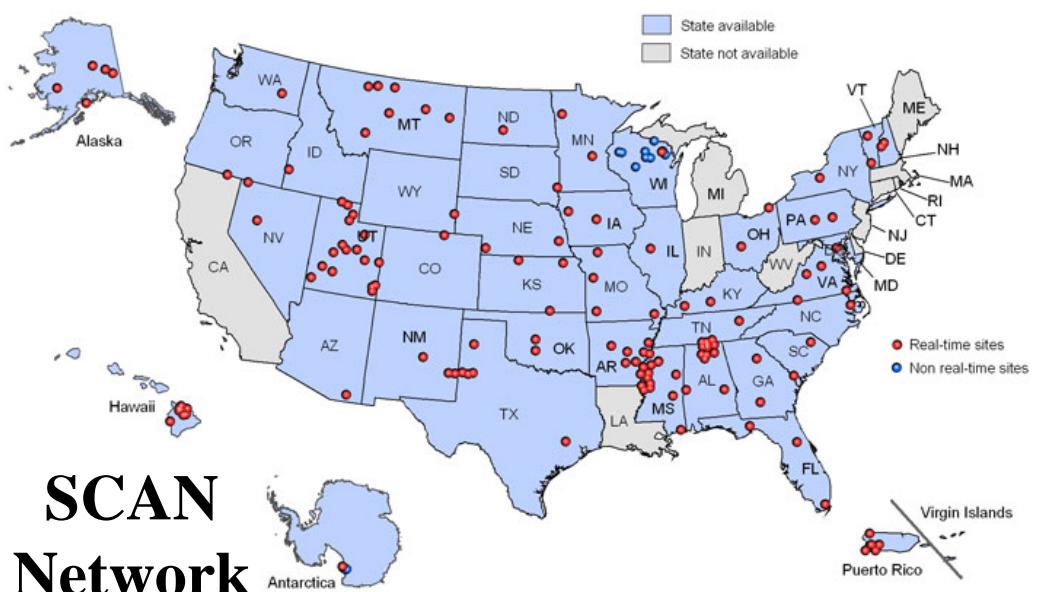
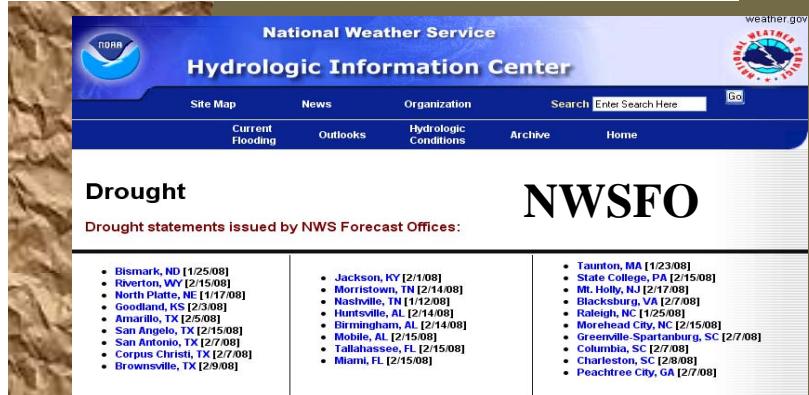
## SNOTEL Site and Snow Course Locations

### Legend

- SNOTEL
- Snow Course



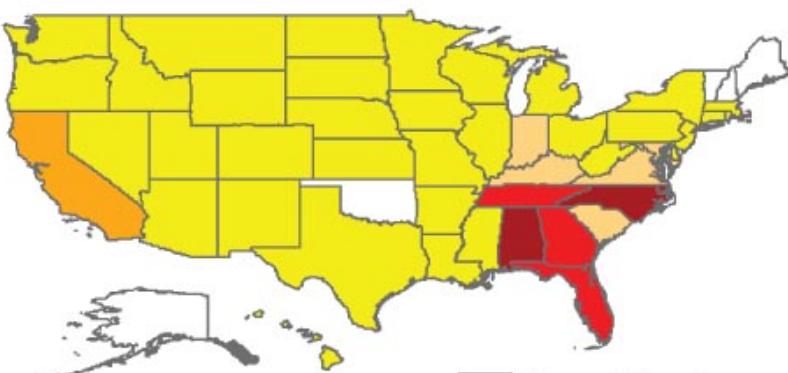
## SNOTEL Network



## Drought Impact Reporter

National Drought Mitigation Center

May - October 2007

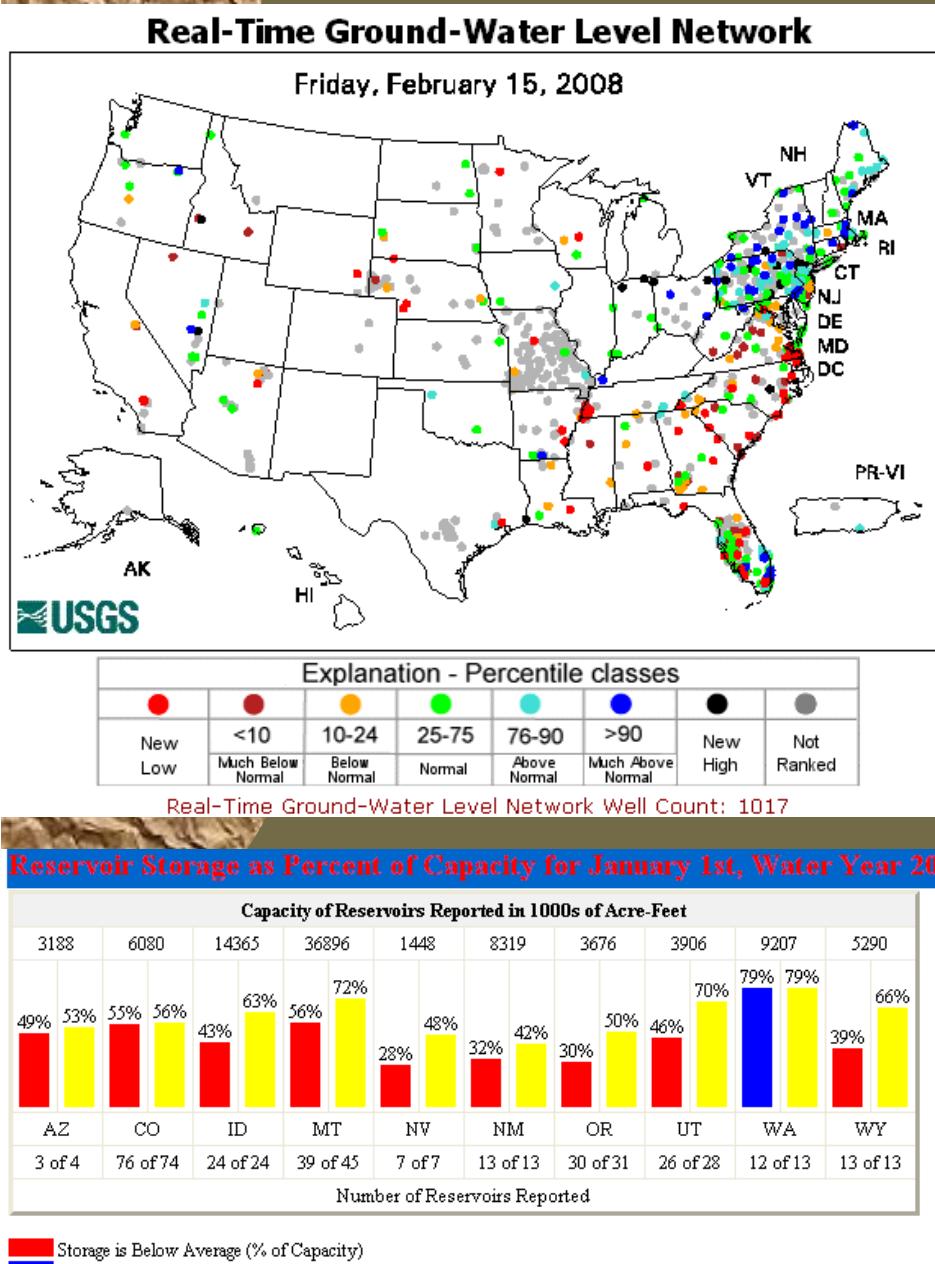


**NDMC**

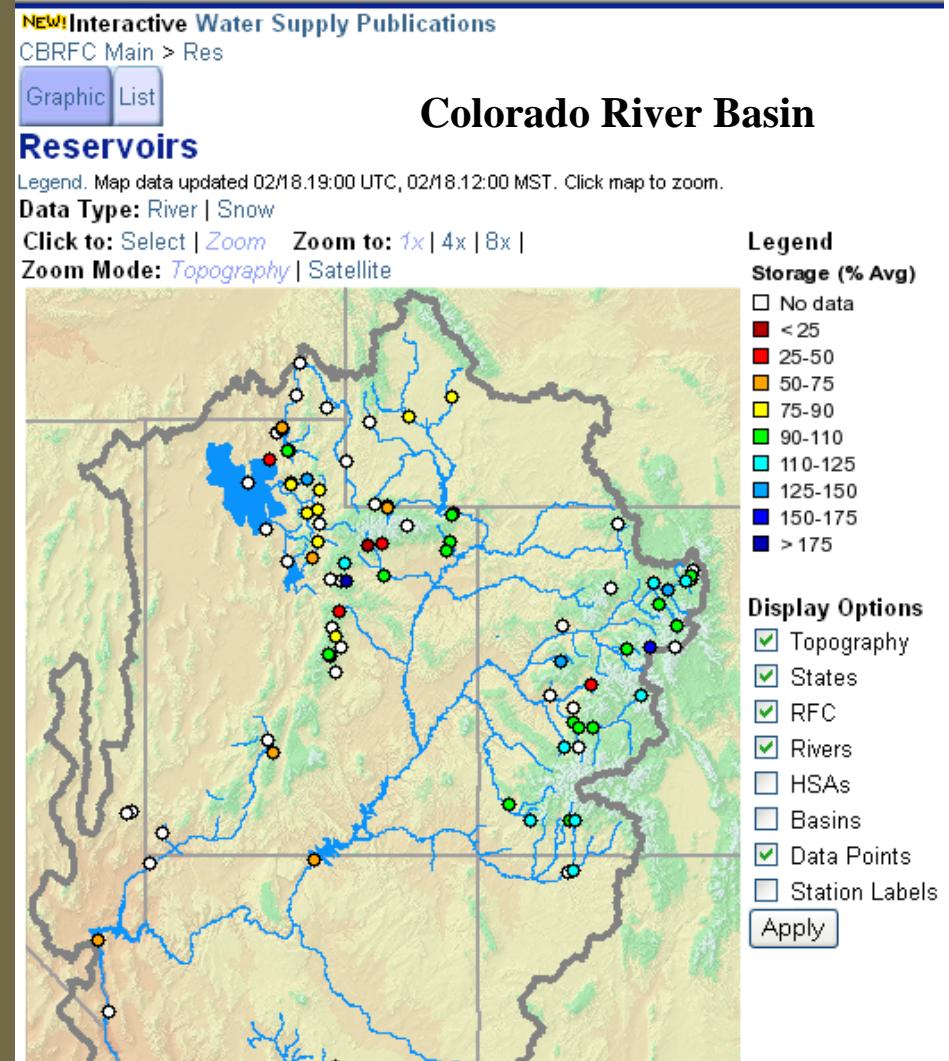


- No reported impacts
- 1-19 reported impacts
- 20-37 reported impacts
- 38-55 reported impacts
- 56-73 reported impacts
- 74-92 reported impacts

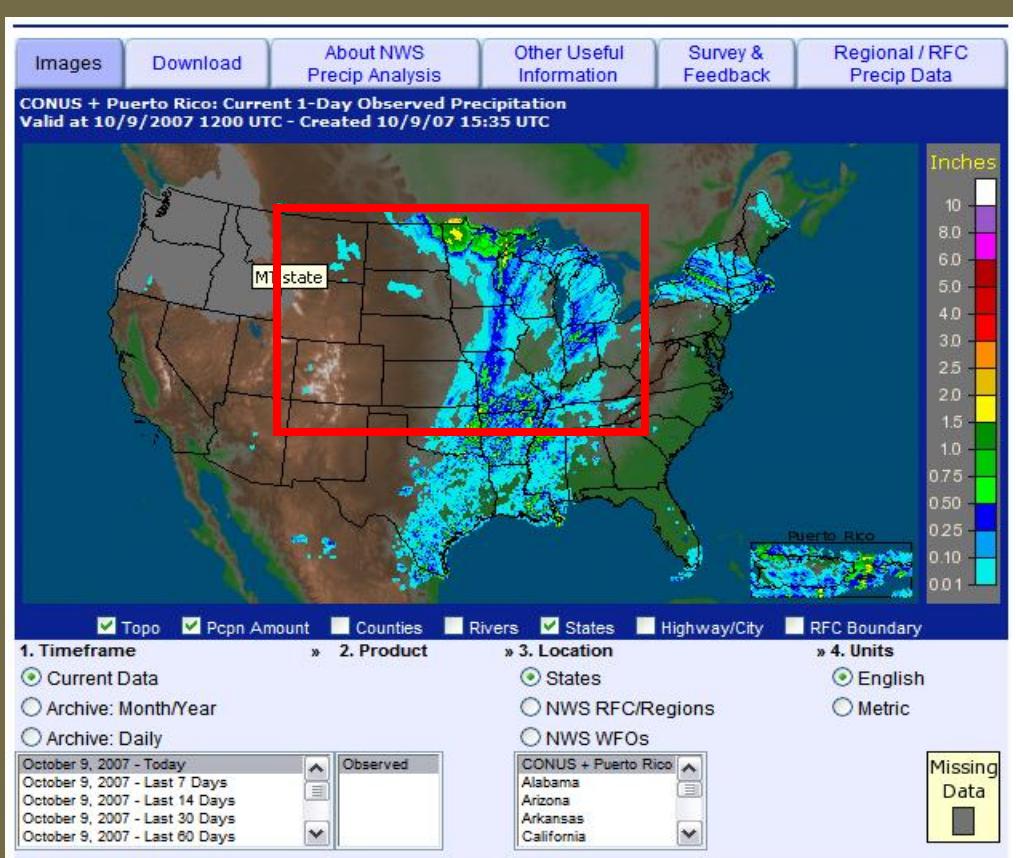
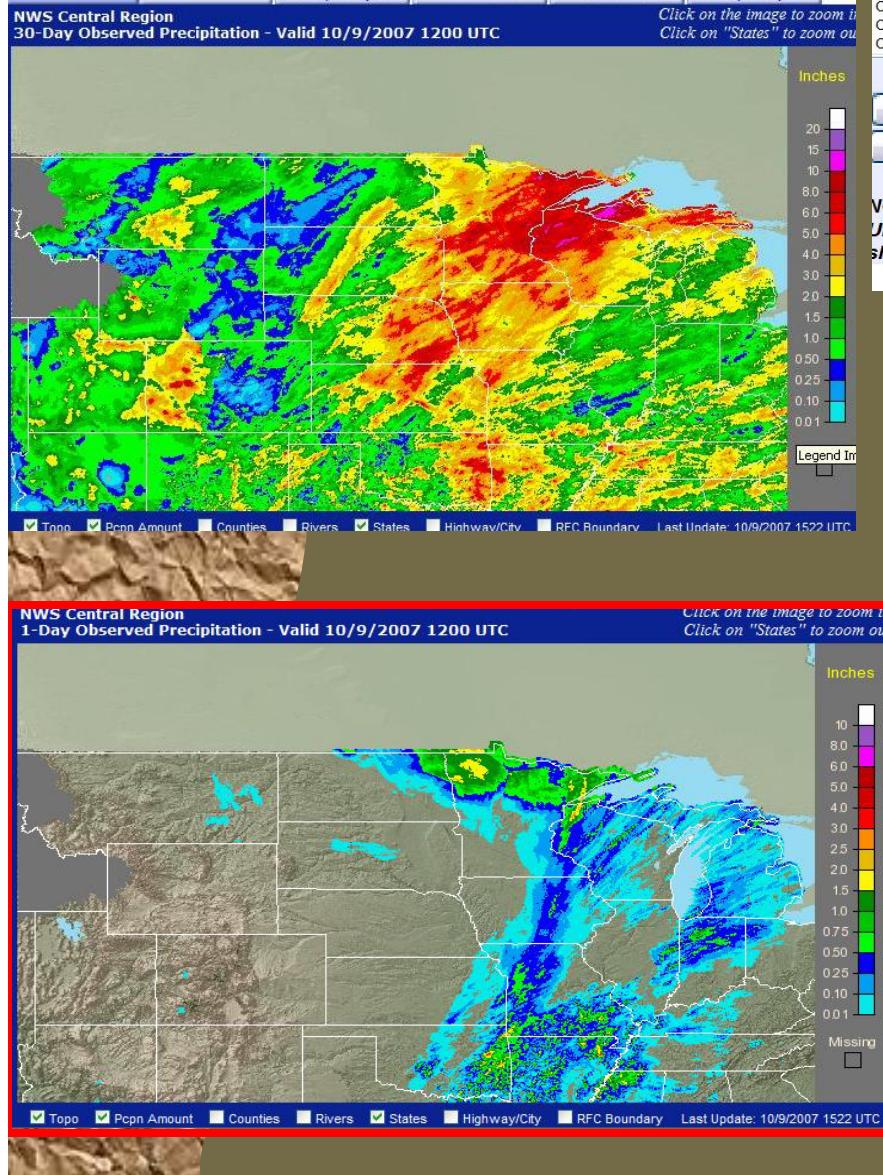
# 1) Improving Input Data Quality & Quantity;



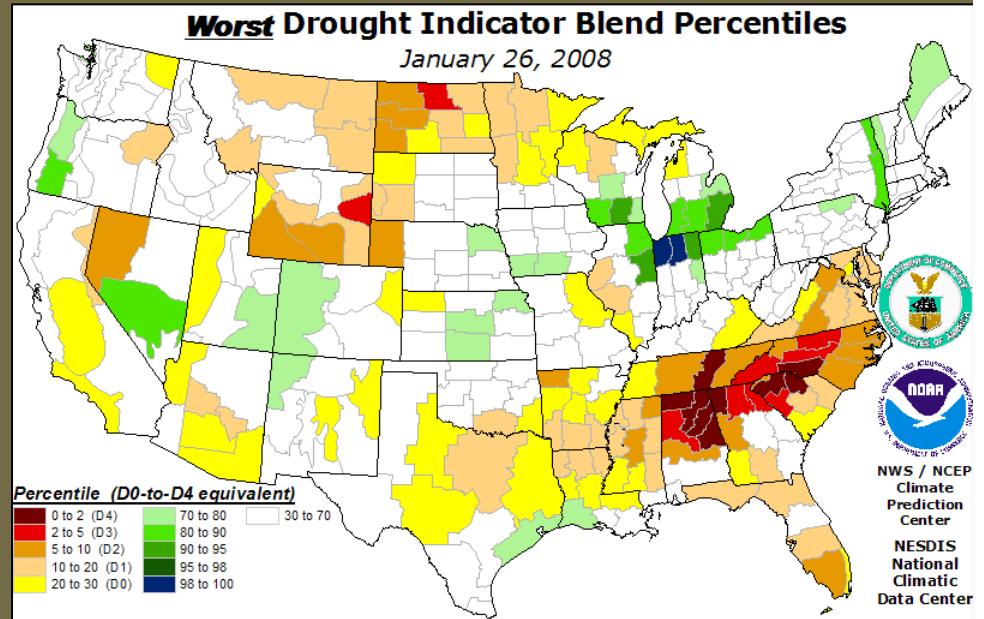
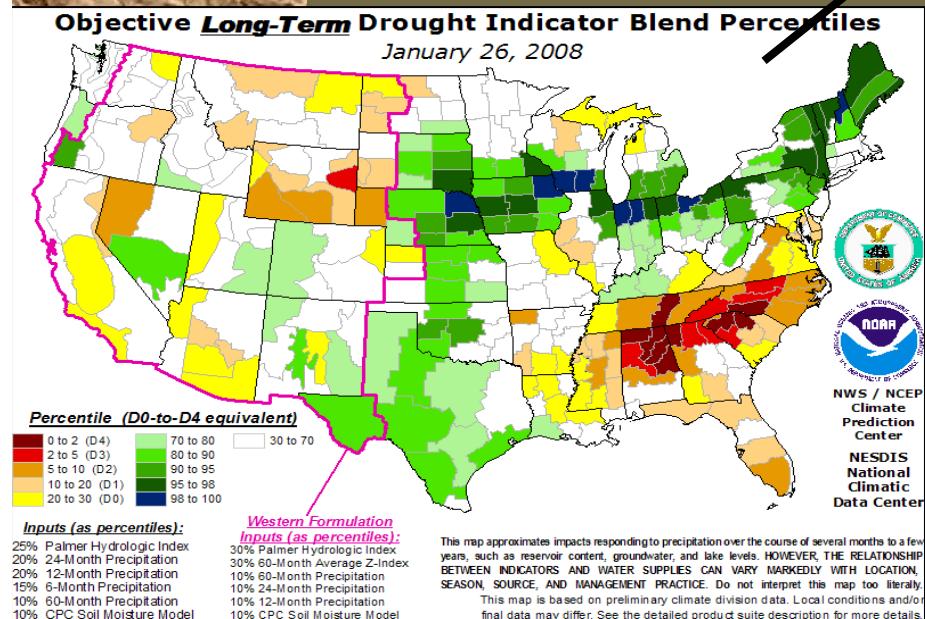
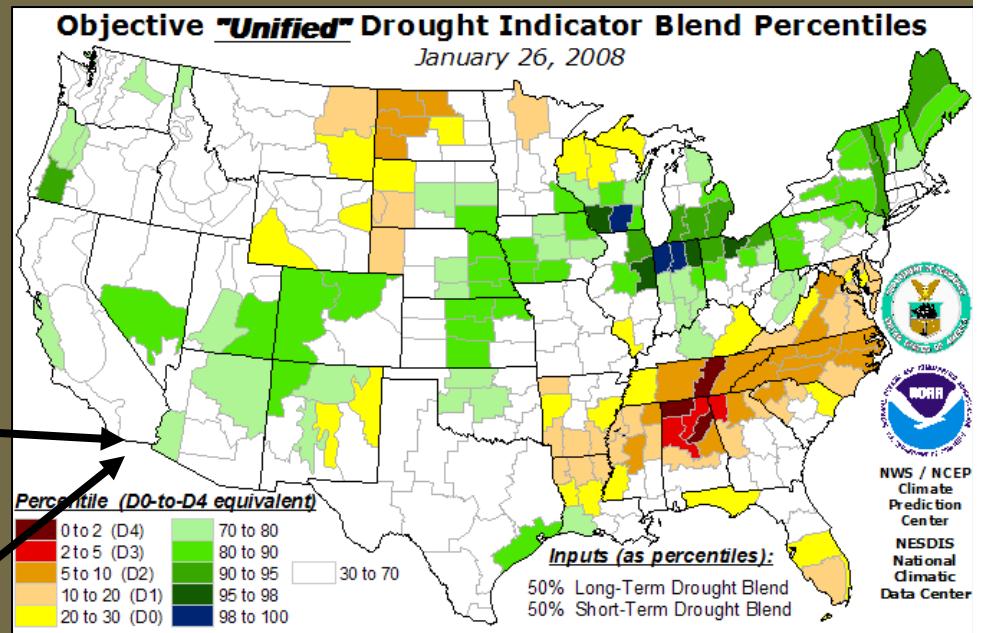
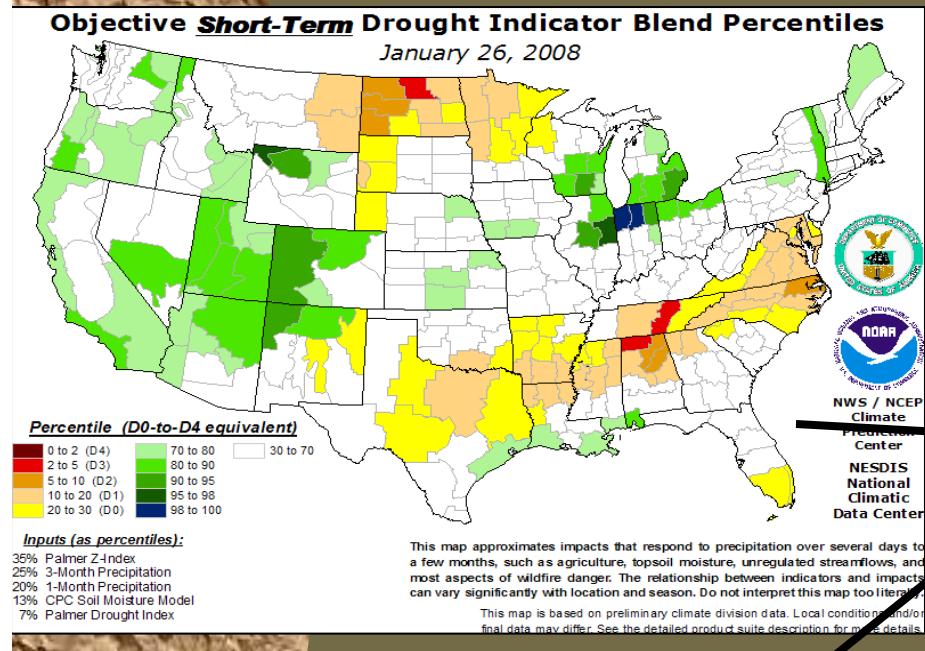
## NWS RFC Reservoir Network



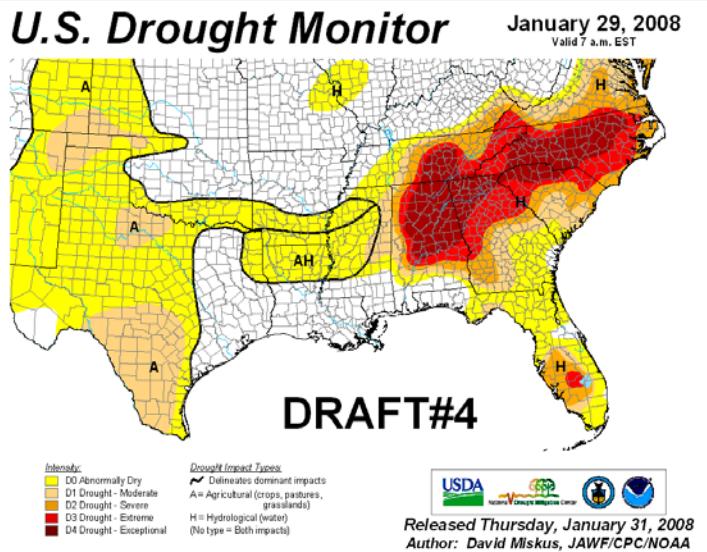
# 1) Improving Input Data Quality & Quantity;



## 2) New Products, Indices, Blends for a more Objective Analyses, including Soil Moisture Models;

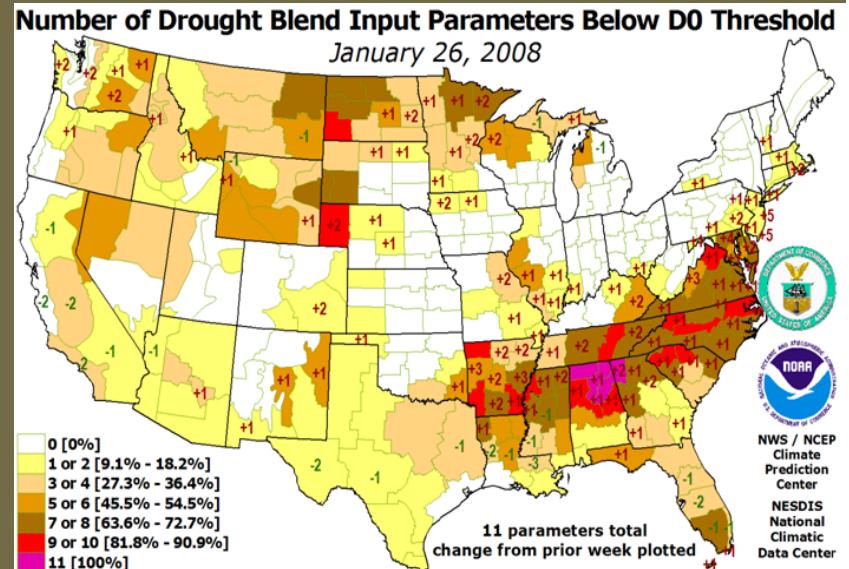


## 2) New Products, Indices, Blends for a more Objective Analyses, including Soil Moisture Models;

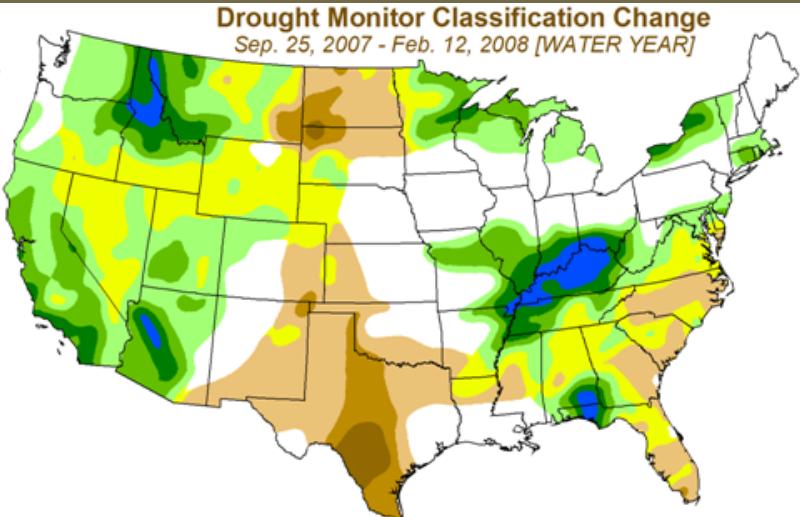
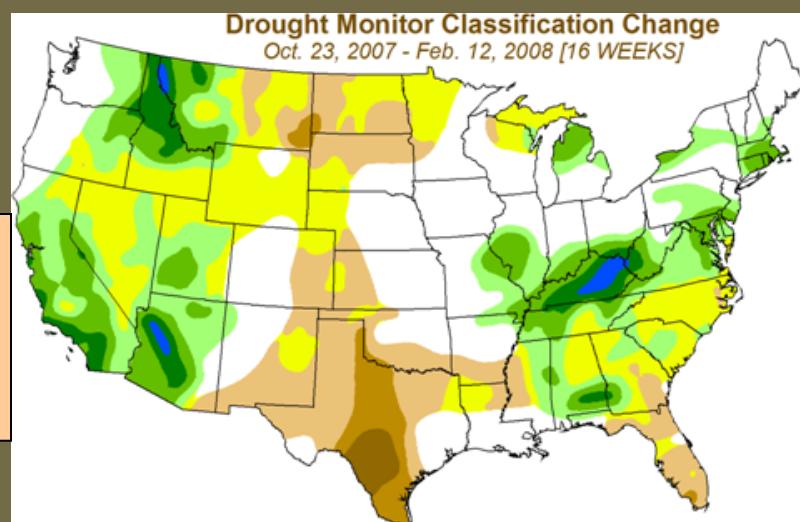


For D0-D4; 11  
parameters &  
change from  
last week →

## Four regional draft maps with counties

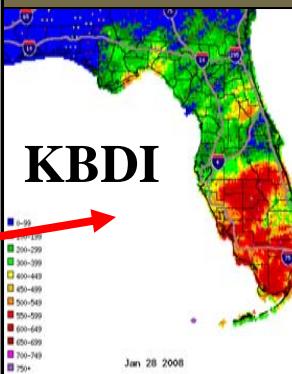
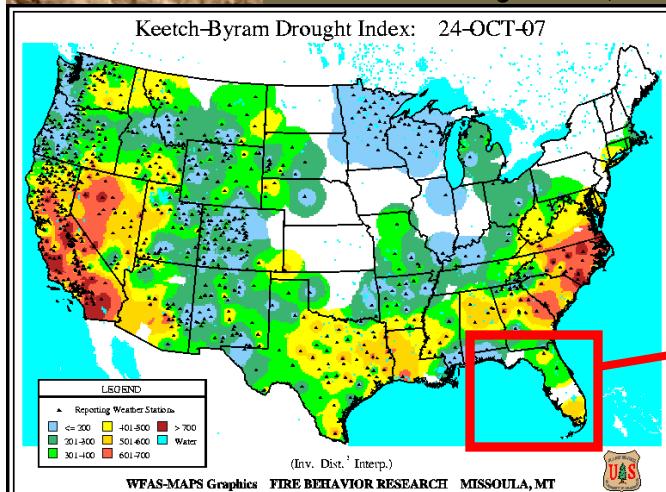


## For 1-, 4-, 16- weeks & Water Year comparisons

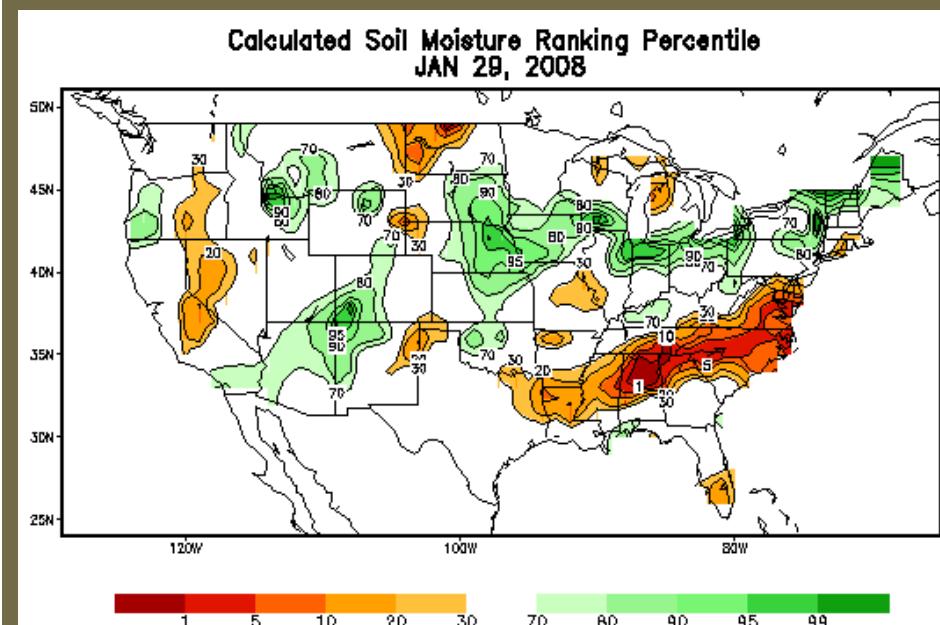
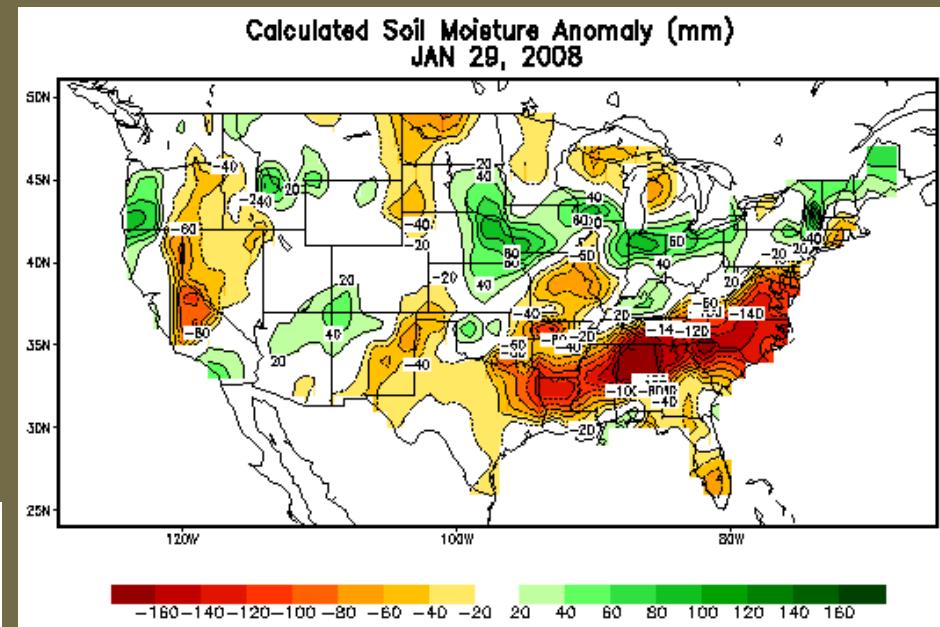
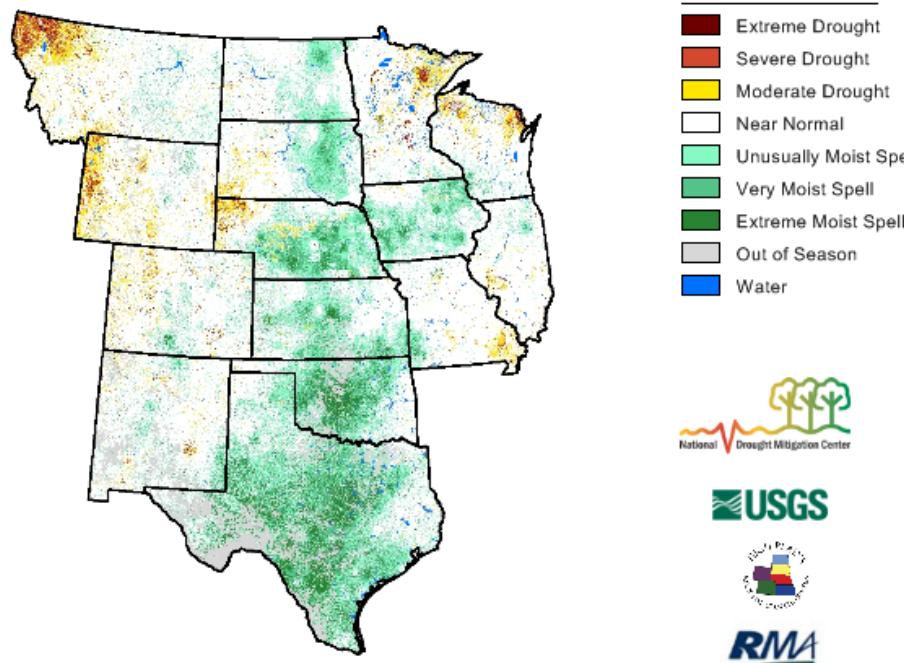


These maps depict approximate changes in drought intensity from selected initial times to the current week, with no consideration given to intervening weeks. The difference calculations are based on interpolated 4 km grids of Drought Monitor classifications, and as a result, will be smoother than would similar products based directly on the published versions of the Drought Monitor.

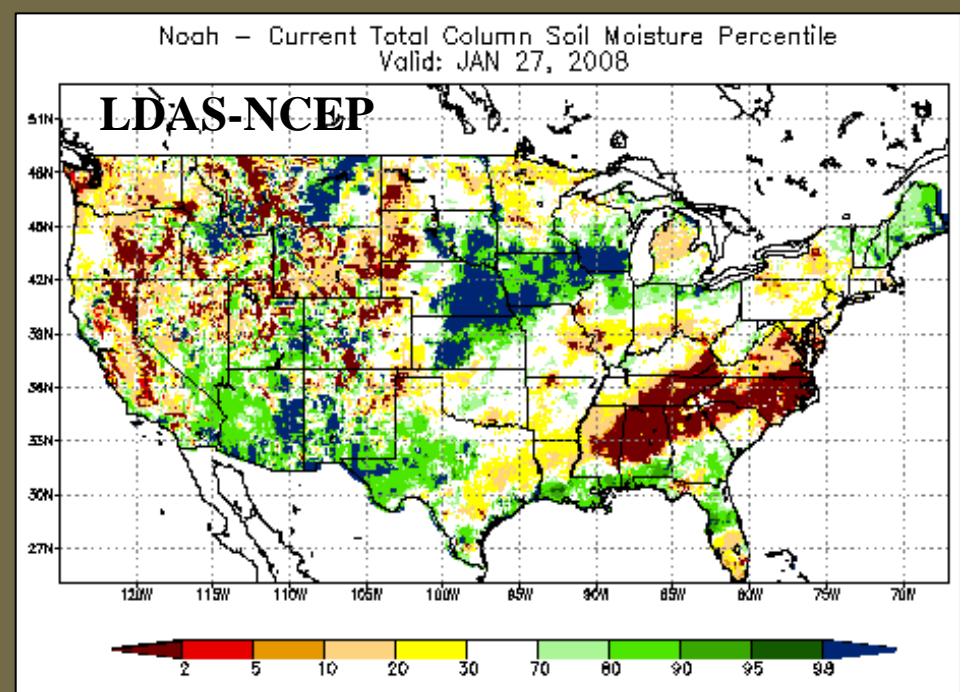
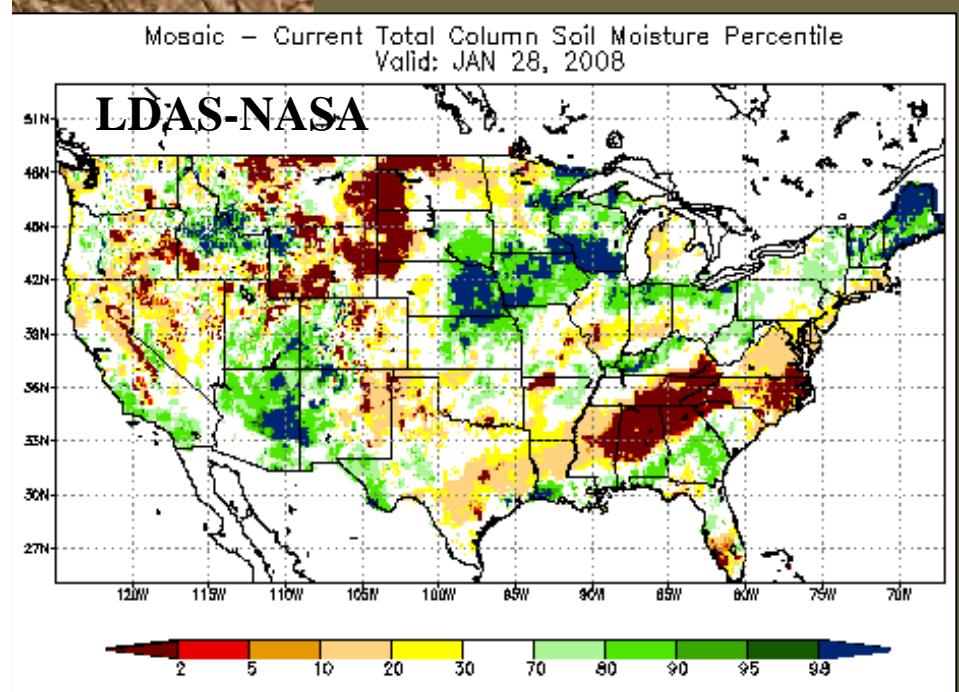
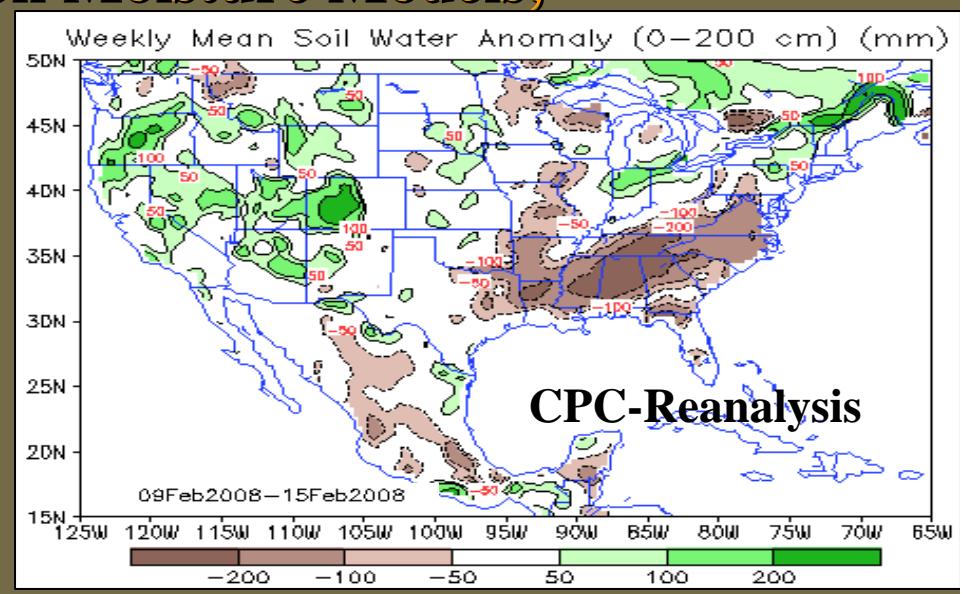
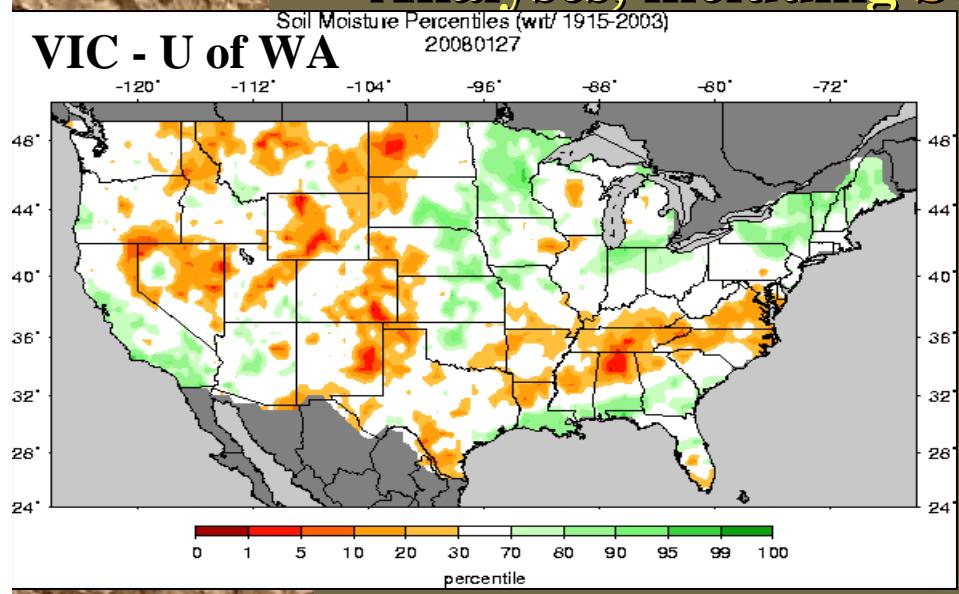
## 2) New Products, Indices, Blends for a more Objective Analyses, including Soil Moisture Models;



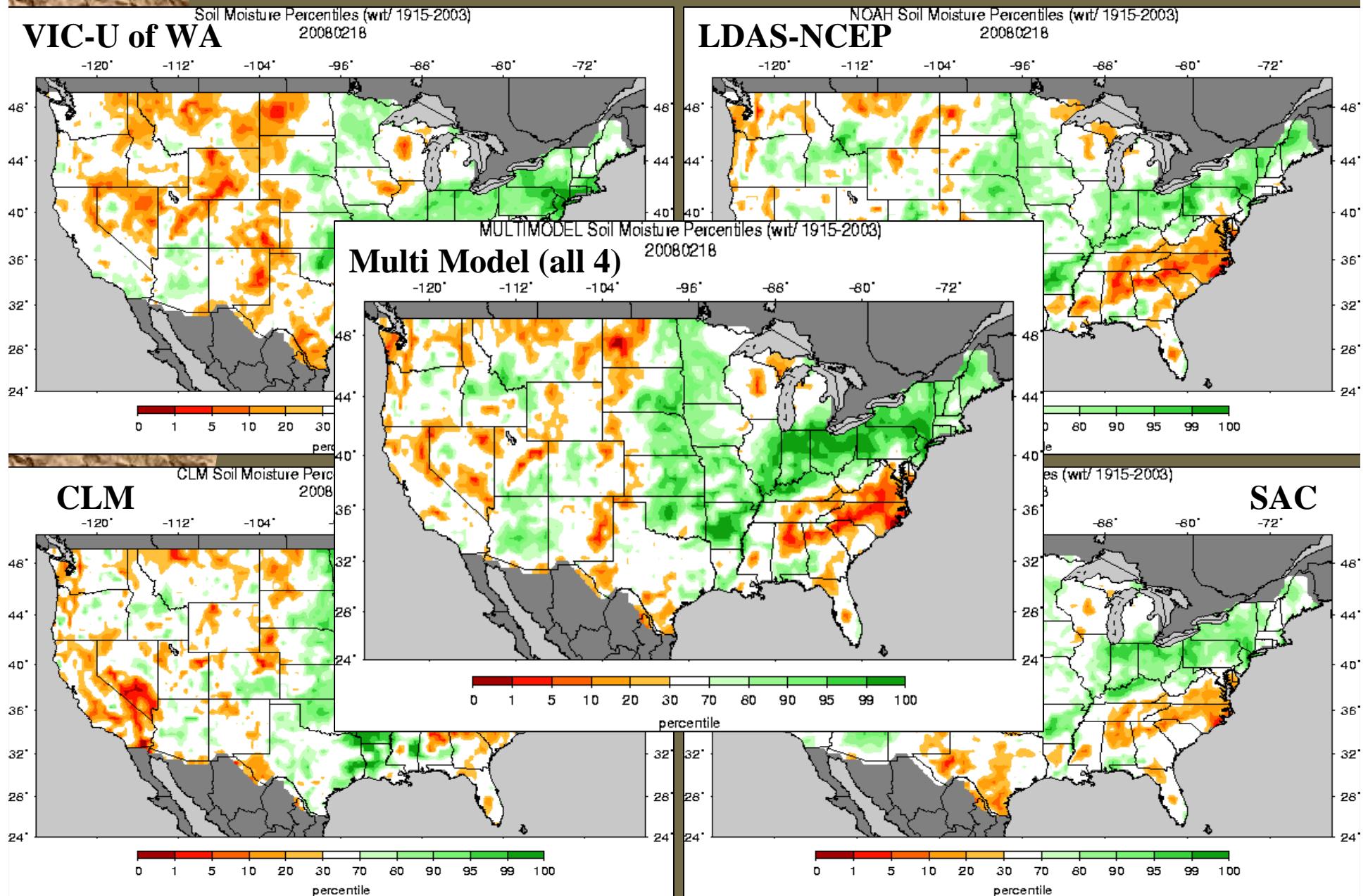
Vegetation Drought Response Index  
Complete



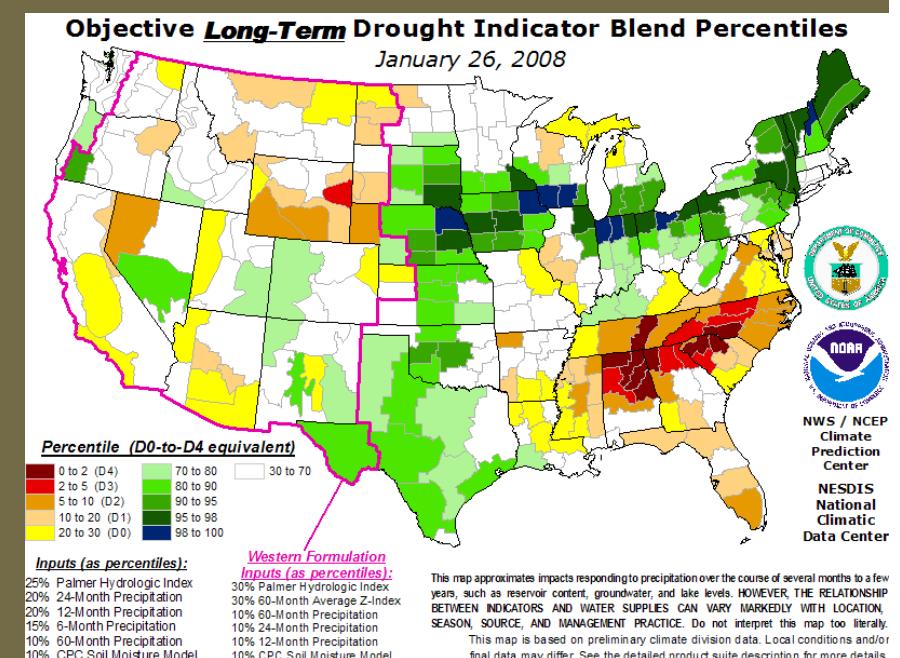
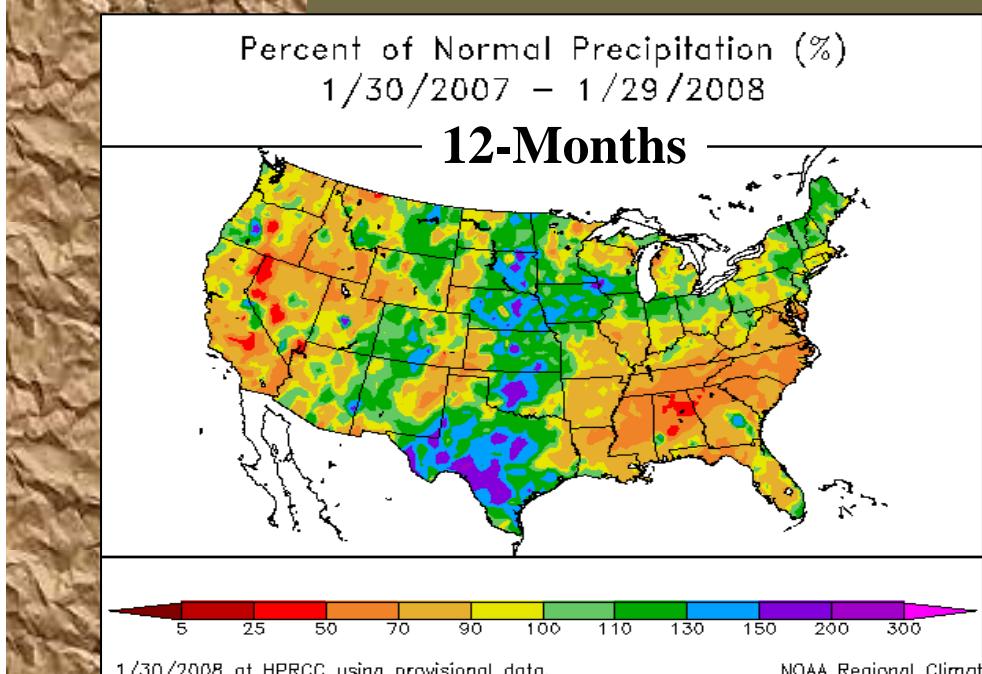
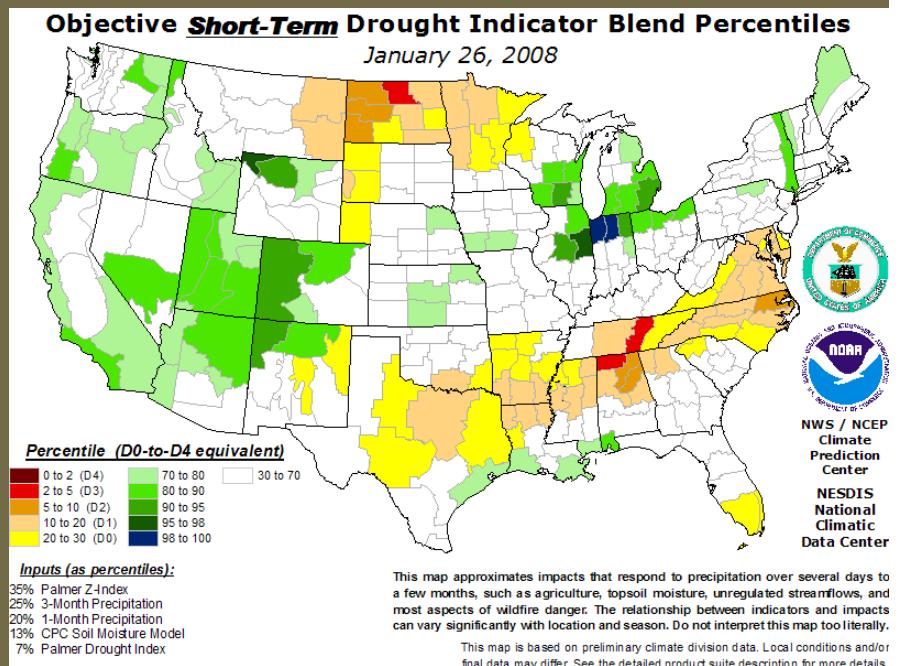
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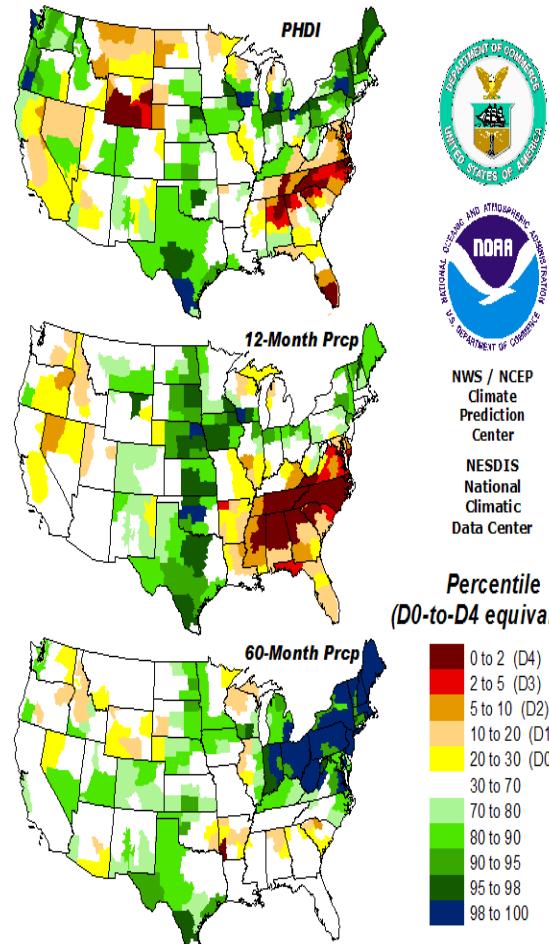


### 3) Temporal & Regional Drought Distinctions;

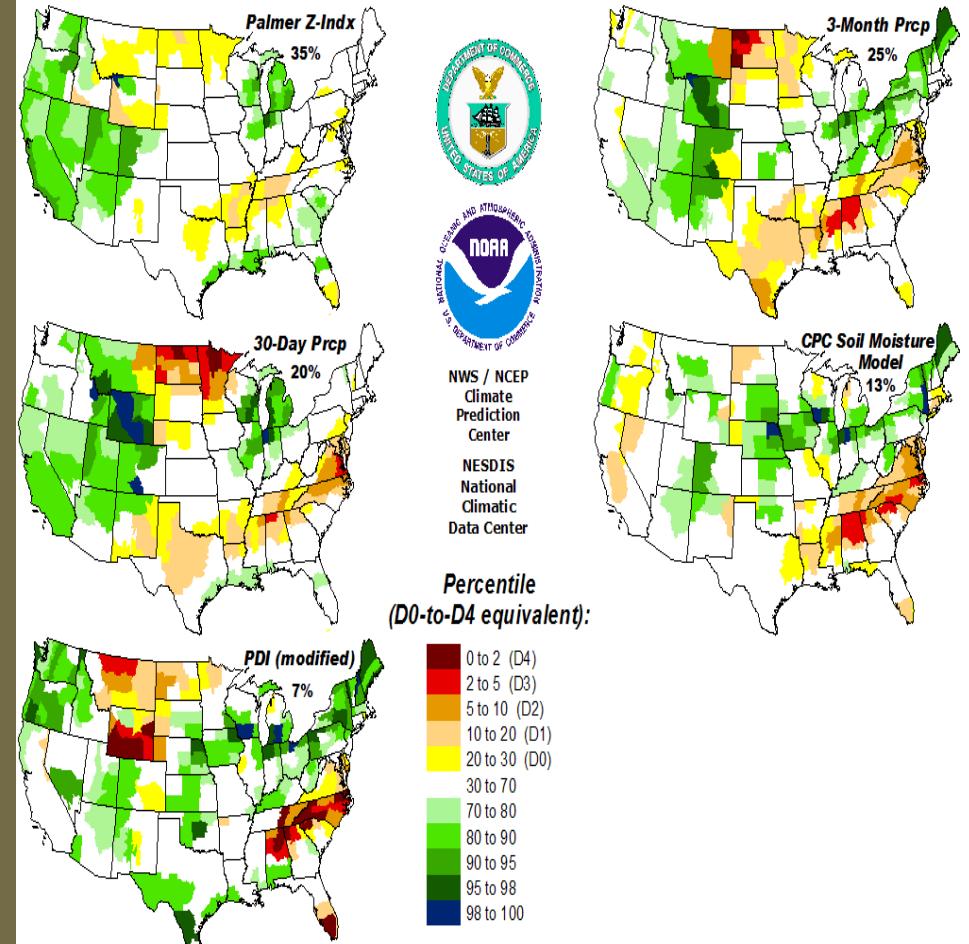


### 3) Temporal & Regional Drought Distinctions;

Objective Long-Term Drought Indicator Blend Percentiles -- January 26, 2008



Objective Short-Term Drought Indicator Blend Percentiles -- January 26, 2008



#### Inputs (as percentiles):

- 25% Palmer Hydrologic Index
- 20% 24-Month Precipitation
- 20% 12-Month Precipitation
- 15% 6-Month Precipitation
- 10% 60-Month Precipitation
- 10% CPC Soil Moisture Model

#### Western Formulation

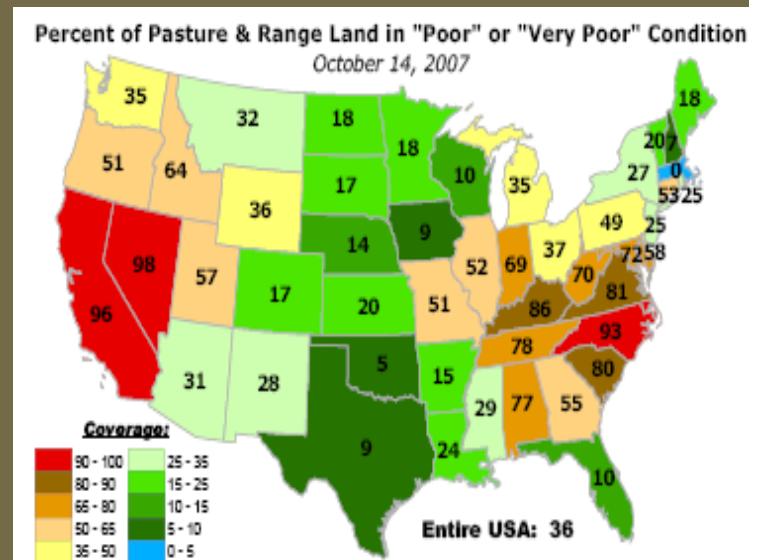
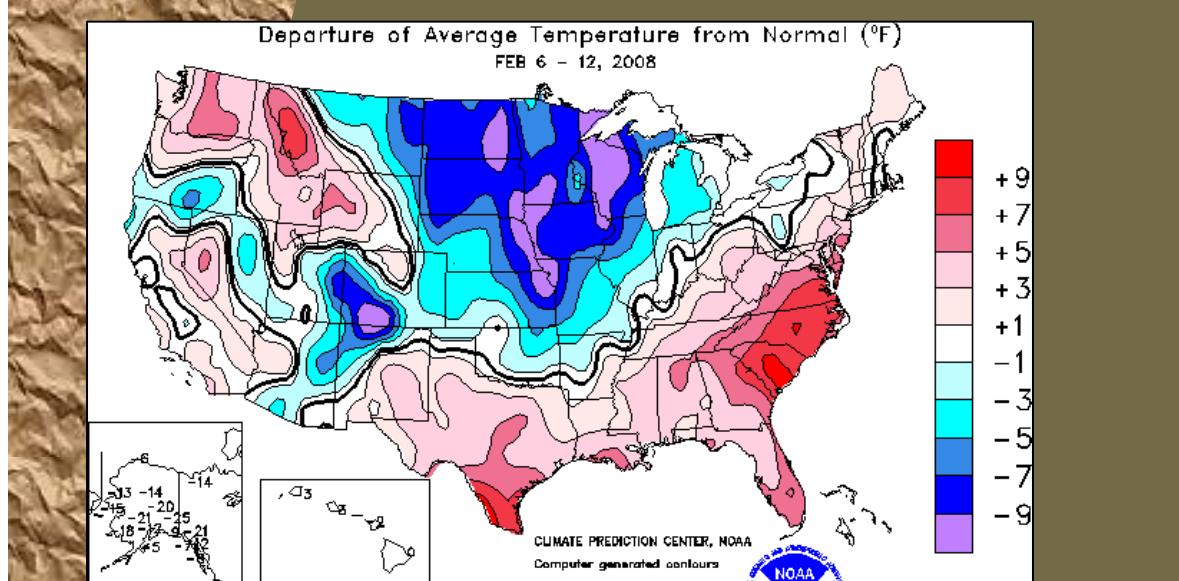
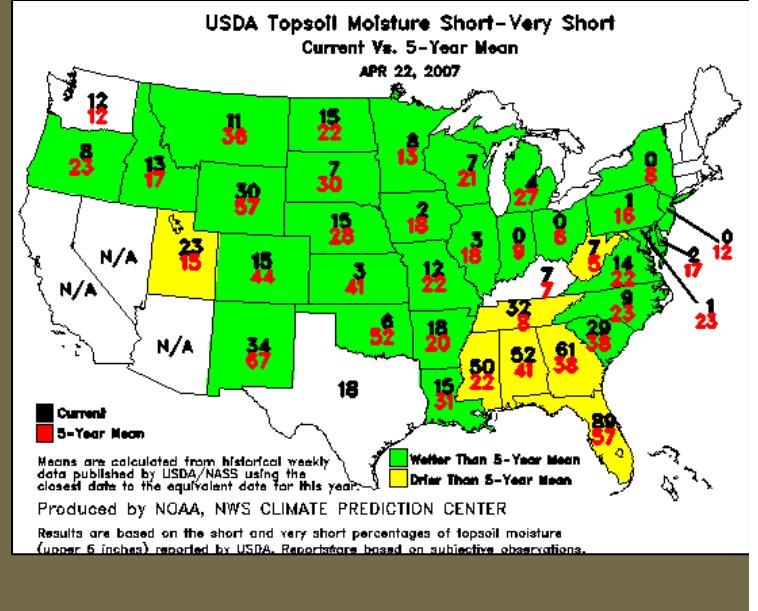
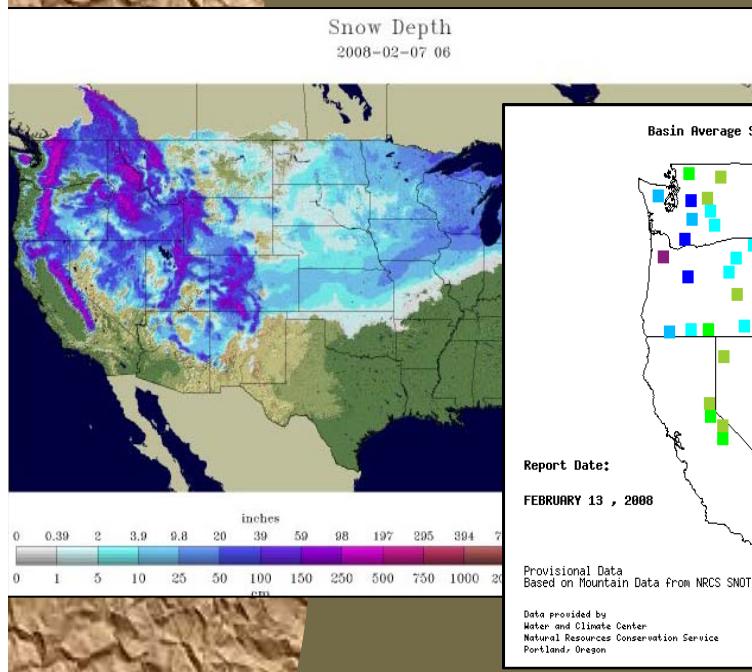
#### Inputs (as percentiles):

- 30% Palmer Hydrologic Index
- 30% 60-Month Average Z-Index
- 10% 60-Month Precipitation
- 10% 24-Month Precipitation
- 10% 12-Month Precipitation
- 10% CPC Soil Moisture Model

#### Inputs (as percentiles):

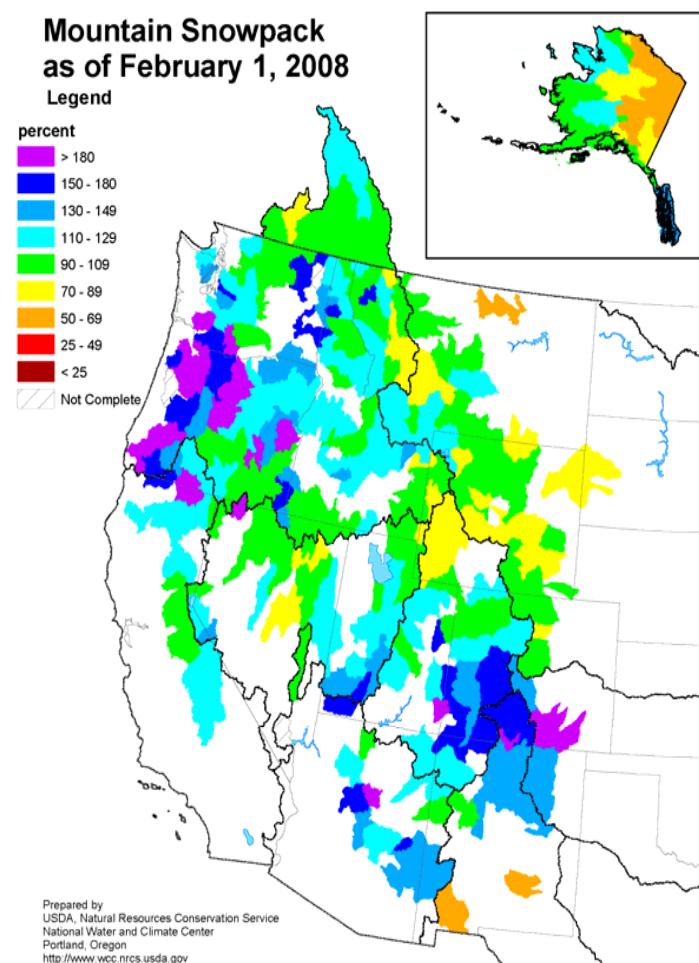
- 35% Palmer Z-Index
- 25% 3-Month Precipitation
- 20% 1-Month Precipitation
- 13% CPC Soil Moisture Model
- 7% Palmer Drought Index

### 3) Temporal & Regional Drought Distinctions; Seasons ... Winter vs. Summer



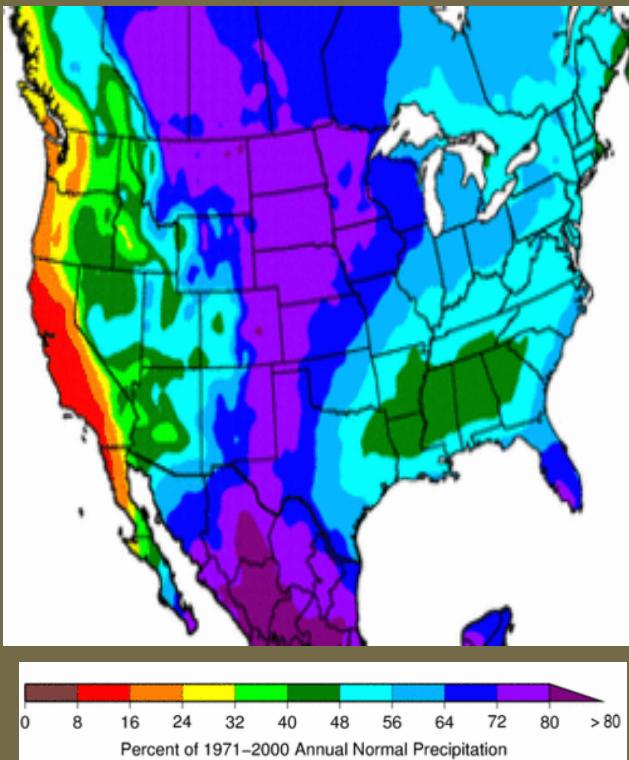
### 3) Temporal & Regional Drought Distinctions;

West



Winter Mountain  
Snowpack

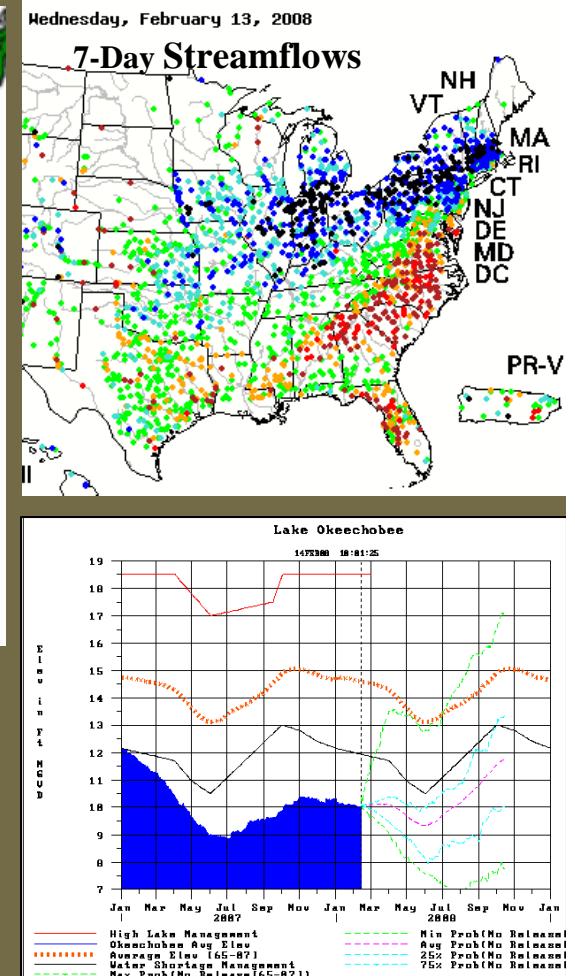
Plains



Percent of Normal Annual  
Precipitation (Apr-Sep)

Spring & Summer  
(Growing Season)

East & South

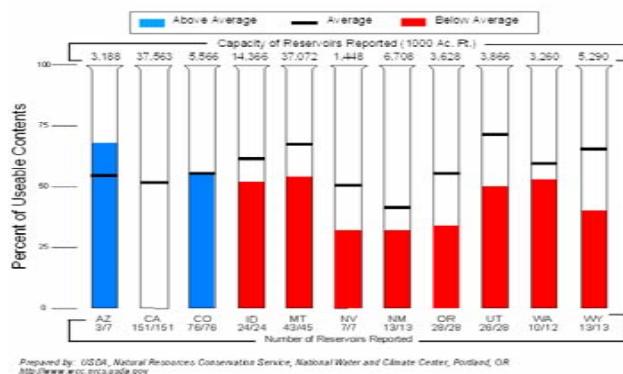


Year-Round (Even  
Precip Distribution)

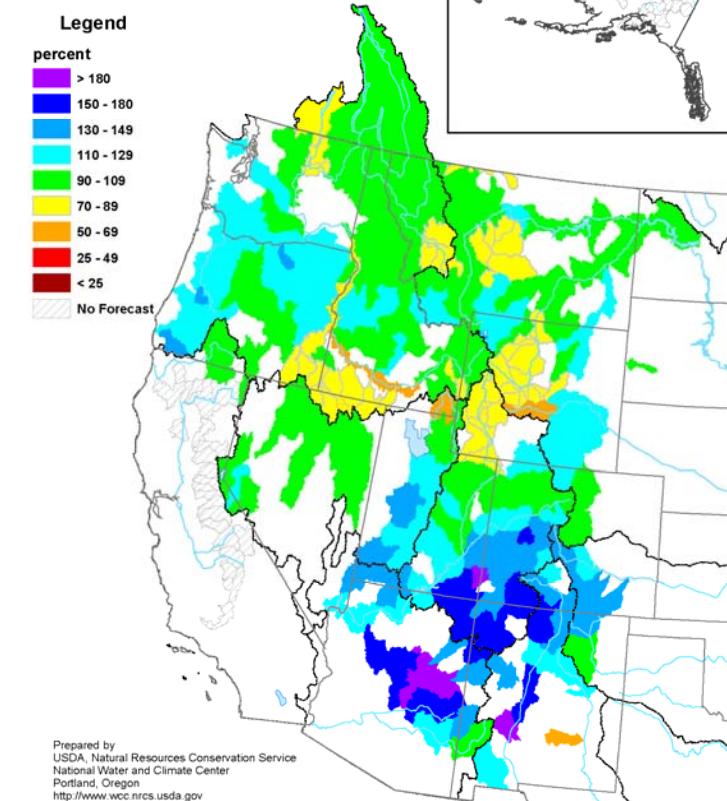
### 3) Temporal & Regional Drought Distinctions;

West

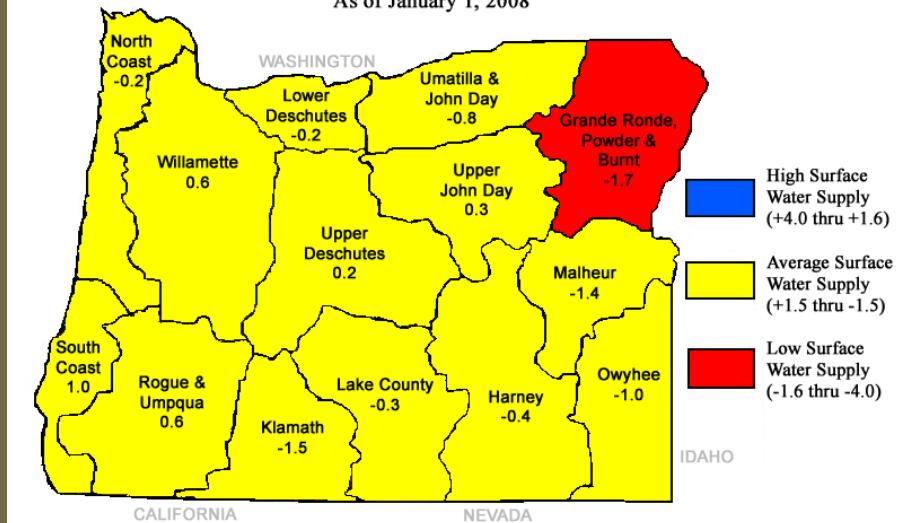
Reservoir Storage as of February 1, 2008



Spring and Summer  
Streamflow Forecasts  
as of February 1, 2008

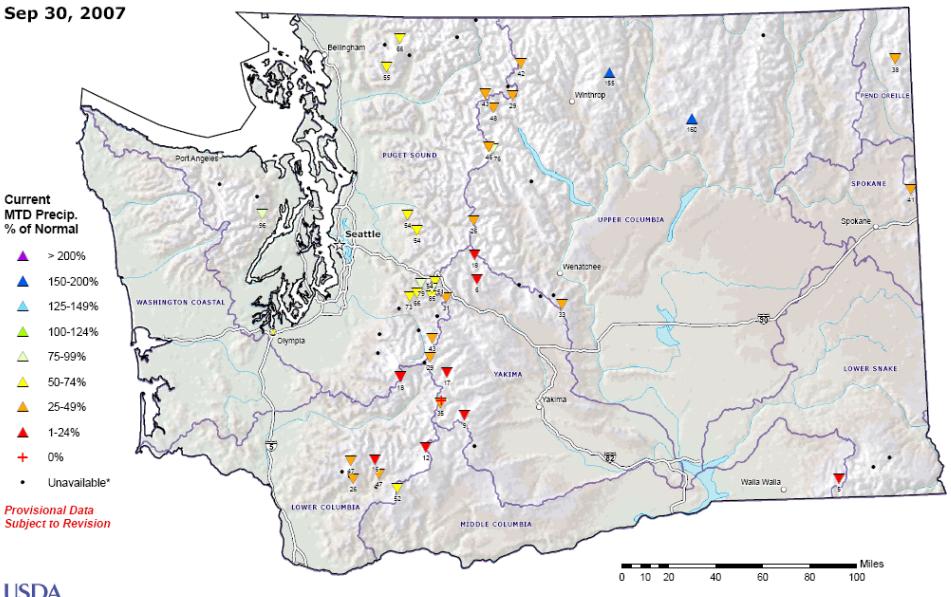


OREGON SURFACE WATER SUPPLY INDEX (SWSI)  
As of January 1, 2008

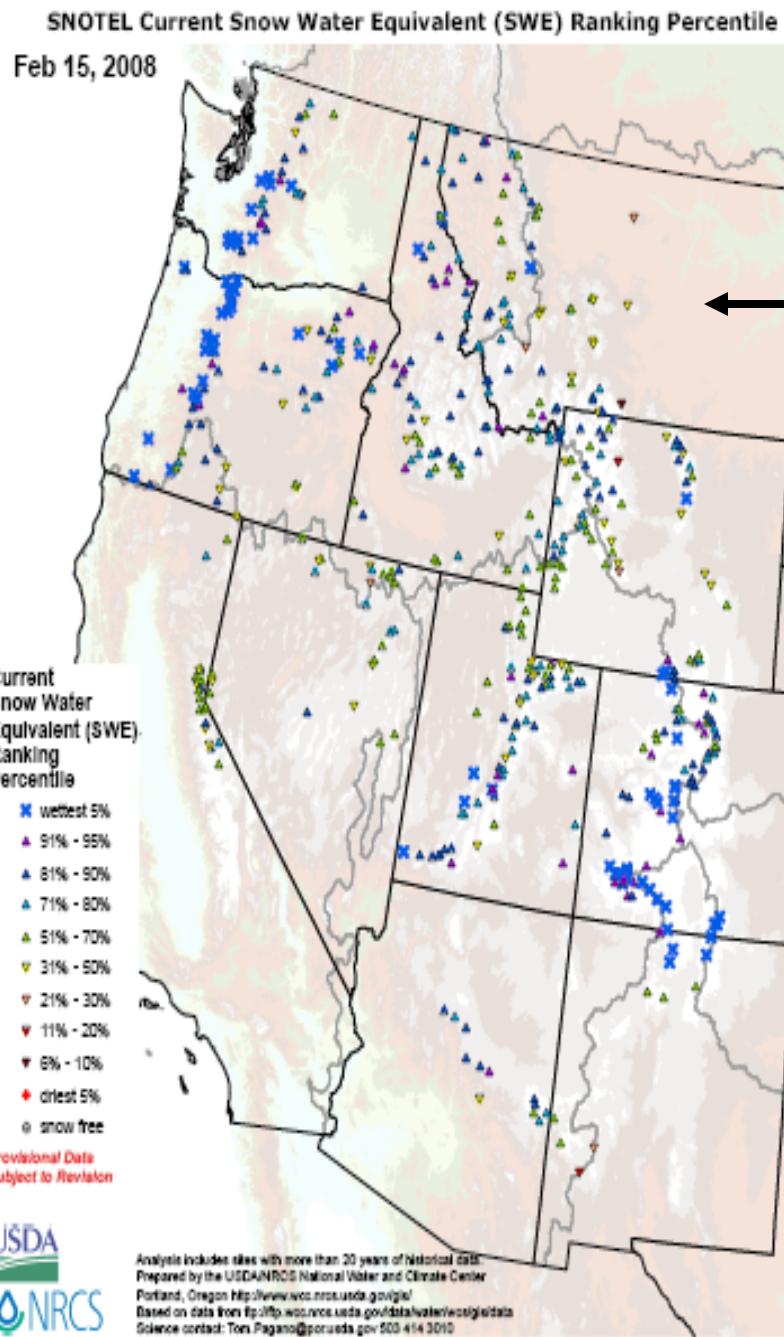


Washington  
SNOTEL Month to Date (MTD) Precipitation  
% of Normal

Sep 30, 2007

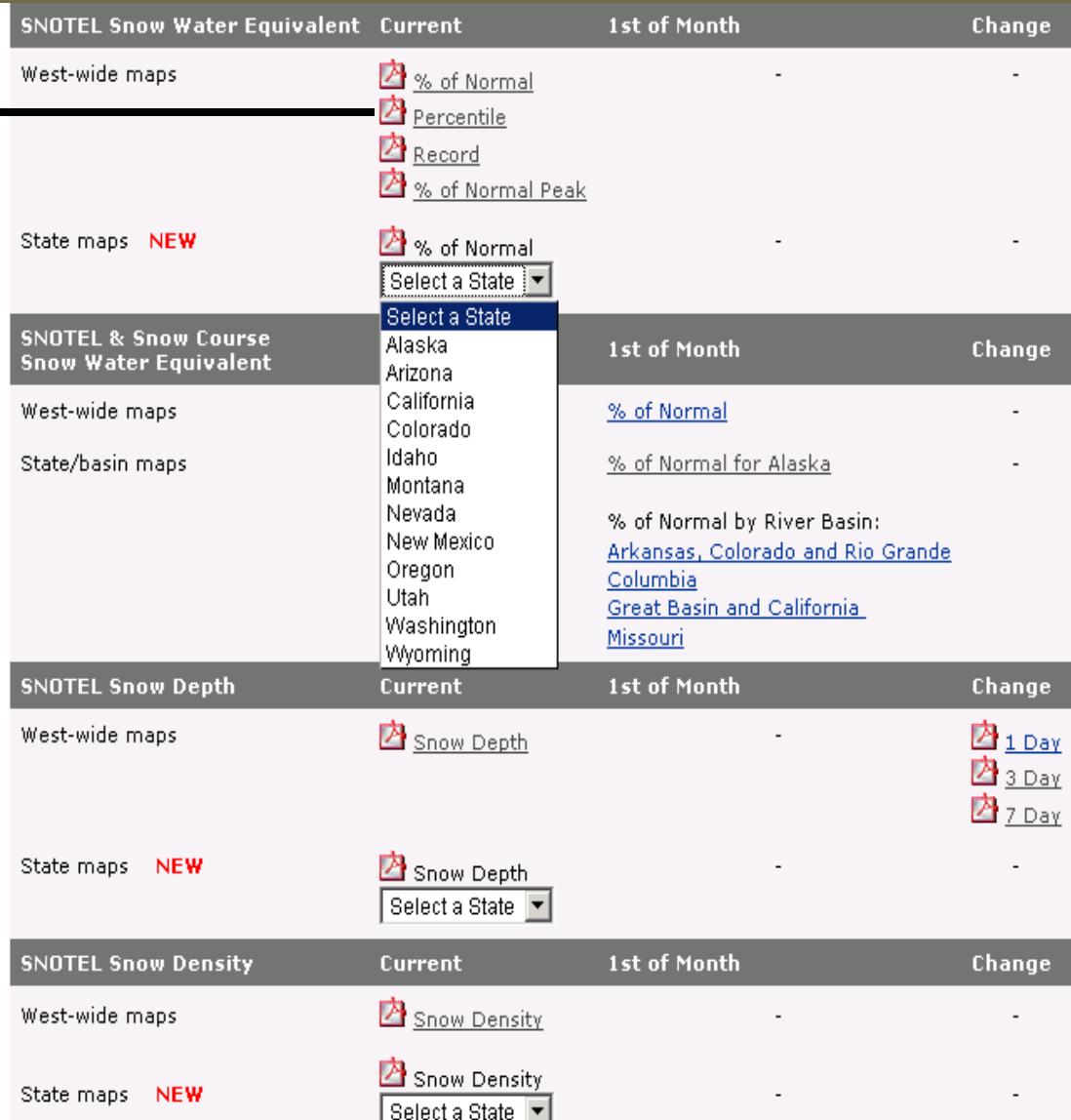


### 3) Temporal & Regional Drought Distinctions;

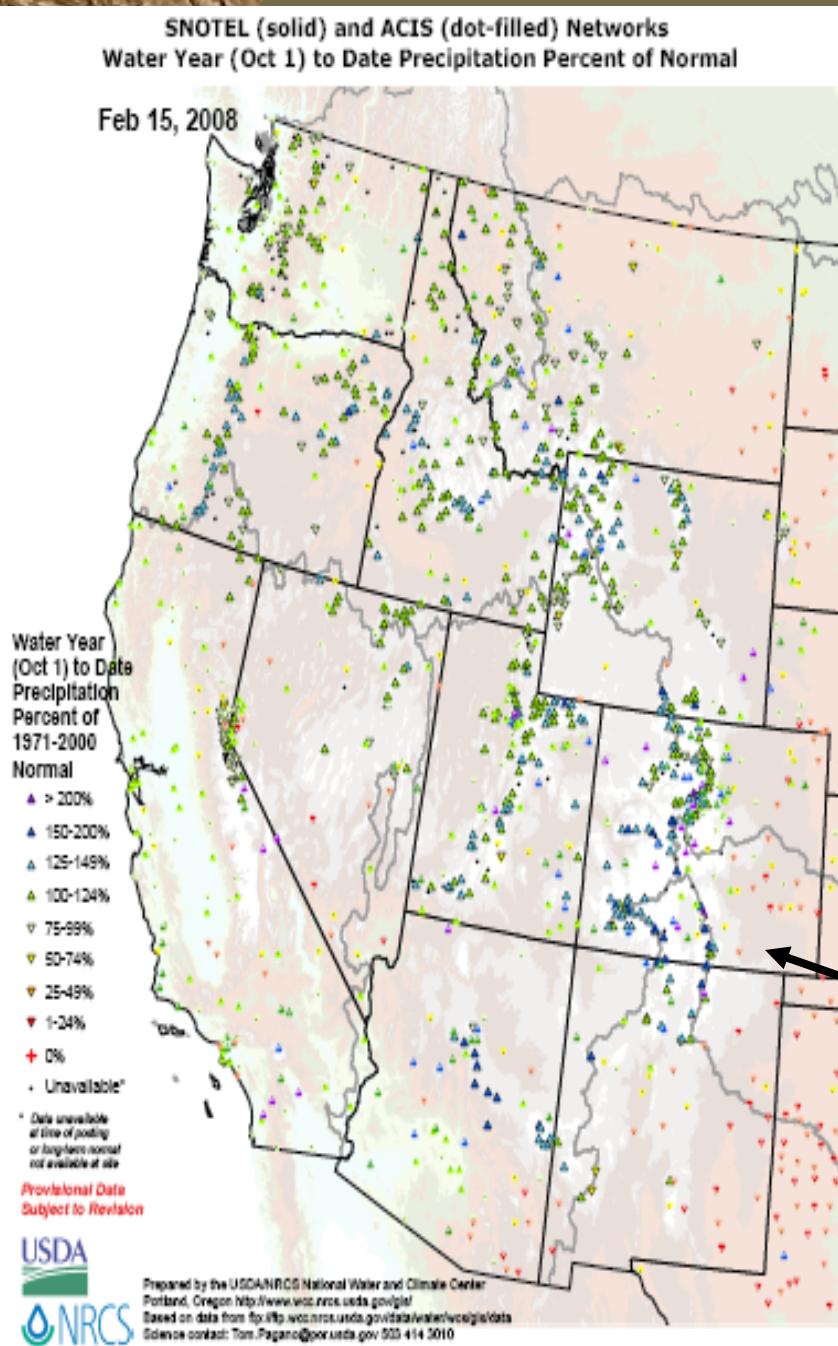


West

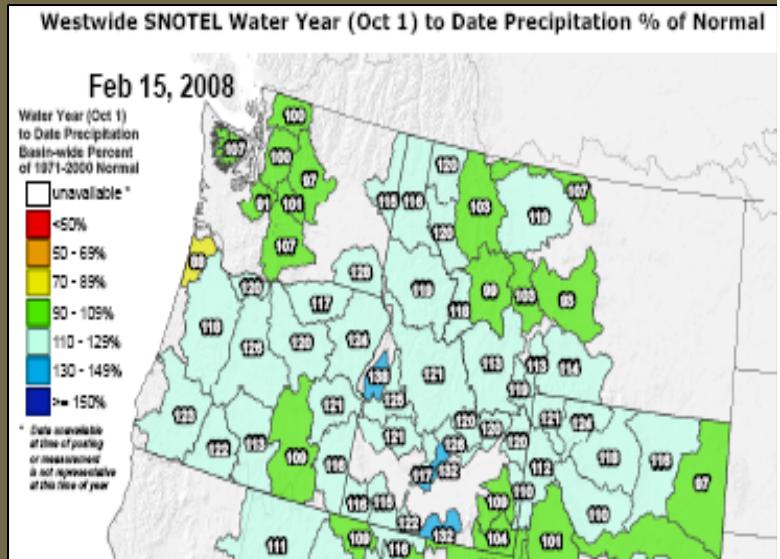
Snow



### 3) Temporal & Regional Drought Distinctions;



West



## Precipitation

### GIS Products

#### Precipitation

Note: Please manually reload .PDF files in internet browser to ensure you have the latest data.

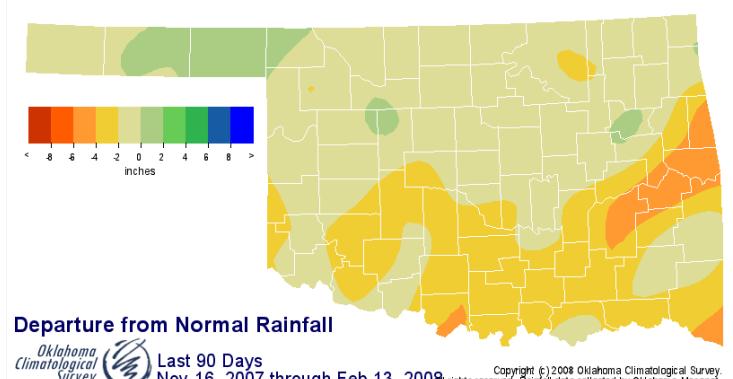
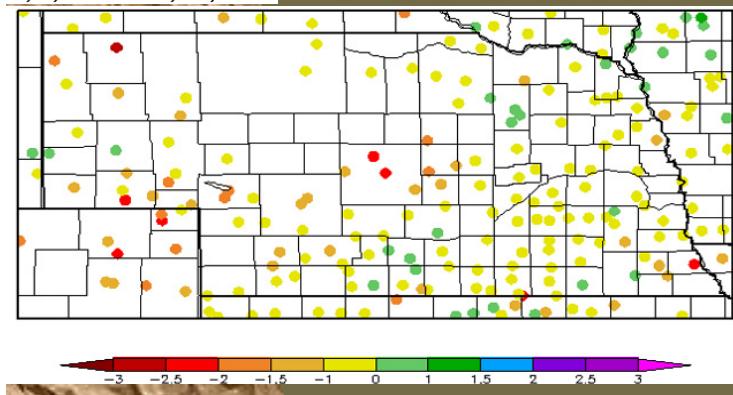
### ACIS + SNOTEL data

SNOTEL Precipitation	Month to Date	Water Year to Date
West-wide Maps	<input type="checkbox"/> % of Normal <input type="checkbox"/> % of Monthly Total Normal	<input type="checkbox"/> % of Normal <input type="checkbox"/> % of Annual Total Normal <input type="checkbox"/> Percentile <input type="checkbox"/> Record
State Maps <b>NEW</b>	<input type="checkbox"/> % of Normal <input type="checkbox"/> Select a State	<input type="checkbox"/> % of Normal <input type="checkbox"/> Select a State
SNOTEL & ACIS Precipitation	Month to Date	Water Year to Date
West-wide Maps	<input type="checkbox"/> % of Normal	<input type="checkbox"/> % of Normal
PRISM Precipitation	Month to Date	Water Year to Date
U.S. Maps	<a href="#">Total Monthly</a> <a href="#">Monthly % of Average</a>	-

### 3) Temporal & Regional Drought Distinctions;

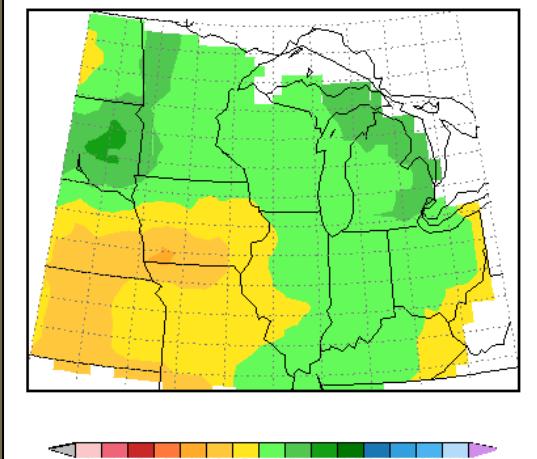
12-Month SPI  
9/1/2005 – 8/31/2006

#### Plains



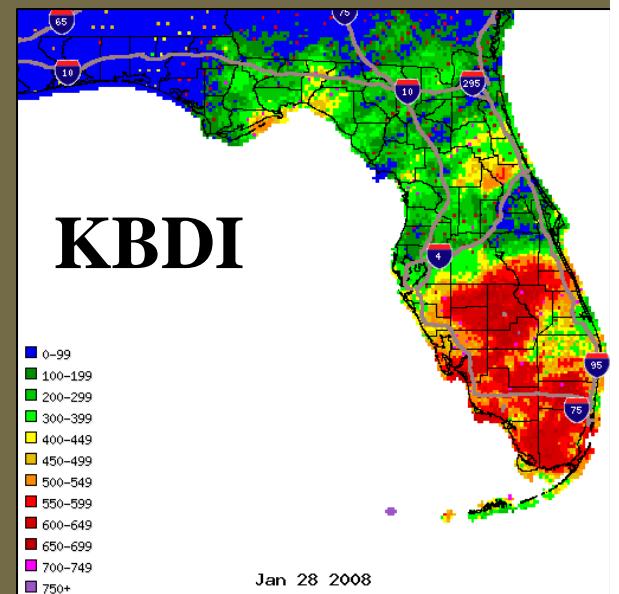
#### Midwest

Current Soil Moisture Deviation (inches), Depth = 0-12  
2-21-2006

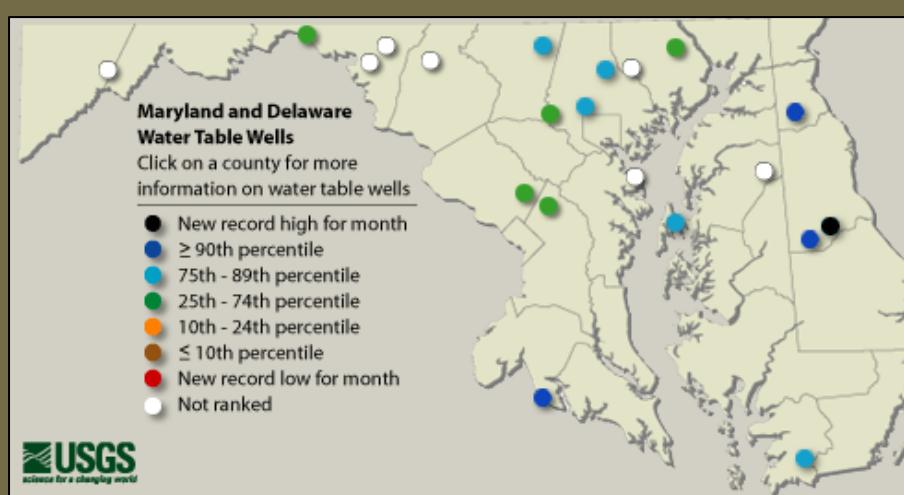


Midwestern Regional Climate Center  
Illinois State Water Survey  
Champaign, Illinois

#### East & South



30-Day Precip for Texas											
Jan 15, 2008 through Feb 13, 2008											
Climate Division	Total Rainfall from Normal	Departure	Pct of Normal	Driest since	Wettest since	Rank of 55 such periods	Driest on Record	Wettest on Record	30-day SPI (Arndt Score)	Most Like	
Texas Statewide	1.25"	-0.37"	77 % 2003 (0.71") 2006 (1.78")	2006 (1.78")	12th driest	D0 0.42" (1943)	4.74" (1992)	-0.70 D0	1929 (9.38)		
TX-CD1 (High Plains)	0.06"	-0.52"	11 % 1942 (0.04") 2006 (0.25")	2006 (0.25")	2nd driest	D3 0.04" (1942)	2.57" (1968)	-1.93 D3	1942 (9.77)		
TX-CD2 (Low Rolling Plains)	0.09"	-0.93"	9 %	-- 2006 (1.61")	1st driest	D4 0.24" (1963)	4.76" (1990)	-2.96 D4	1988 (9.16)		
TX-CD3 (N. Central)	1.15"	-0.91"	56 % 2003 (0.82") 2006 (3.07")	2006 (3.07")	9th driest	D1 0.54" (1988)	6.20" (1990)	-1.24 D1	1967 (9.52)		
TX-CD4 (East Texas)	3.46"	-0.25"	93 % 2003 (1.45") 2006 (4.96")	19th wettest		D2 0.62" (1943)	7.43" (2004)	+0.49	1966 (9.15)		
TX-CD5 (Trans Pecos)	0.29"	-0.17"	63 % 1996 (0.24") 2006 (0.90")	2006 (0.90")	4th driest	D2 0.14" (1943)	3.96" (1992)	-1.64 D3	1962 (9.86)		
TX-CD6 (Edwards Plateau)	0.32"	-0.84"	28 % 1996 (0.23") 2006 (1.48")	2006 (1.48")	2nd driest	D3 0.23" (1996)	6.23" (1992)	-2.20 D4	1943 (9.54)		
TX-CD7 (S. Central)	2.06"	-0.16"	93 % 2006 (1.02") 2005 (2.94")	25th wettest		D1 0.29" (1996)	7.14" (1992)	+0.13	1930 (9.27)		
TX-CD8 (Upper Coast)	6.29"	+2.69"	175 % 2006 (2.40") 2004 (6.69")	3rd wettest		D0 0.69" (1998)	8.20" (1992)	+1.75	1980 (8.22)		
TX-CD9 (South)	0.92"	-0.26"	78 % 2006 (0.20") 2005 (1.52")	22nd driest		D1 0.04" (1996)	4.94" (1941)	-0.20	1985 (9.44)		
TX-CD10 (Lower Valley)	1.90"	+0.50"	136 % 2006 (0.19") 2001 (2.00")	18th wettest		D0 0.02" (1943)	4.40" (1988)	+0.58	1989 (8.97)		



## 4) Utilizing State-of-the-Art Software (ArcGIS);

usdm-080129.mxd - ArcMap - ArcView

File Edit View Insert Selection Tools Window Help

1:22,728,066 56% Task: Create New Feature Target: 1 2 3 4 5 6 7 8 9 10

Editor

Task: Create New Feature Target: 1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

Hawaii

- Drought\_Impacts\_Type
- Drought\_Impacts\_US
  - stateHI
  - maskHI
  - Drought\_Areas\_US\_D2
  - Drought\_Areas\_US\_D1
  - Drought\_Areas\_US\_D0

Puerto Rico

- Drought\_Impacts\_Type
- cntryPR
- maskPR
- Drought\_Areas\_US\_D1
- Drought\_Areas\_US\_D0

CONUS

- Drought\_Impacts\_Type
- lakesCONUS
- stateCONUS
- riversCONUS
- climdivCONUS
- maskCONUS
- Drought\_Impacts\_US

Can overlay a multitude of information

**U.S. Drought Monitor**  
January 29, 2008  
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
- 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, January 31, 2008  
Author: David Miskus, JAWF/CPC/NOAA

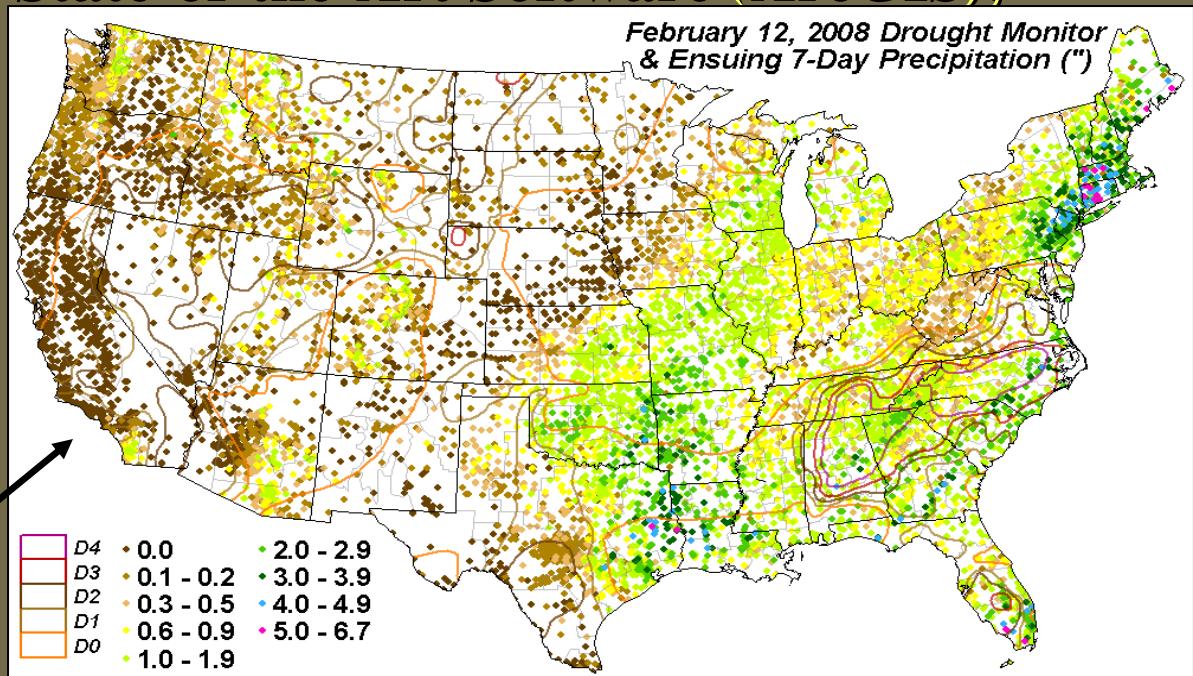
Display Source Selection

Drawing A Arial 24 B I U A 13.31 0.66 Inches

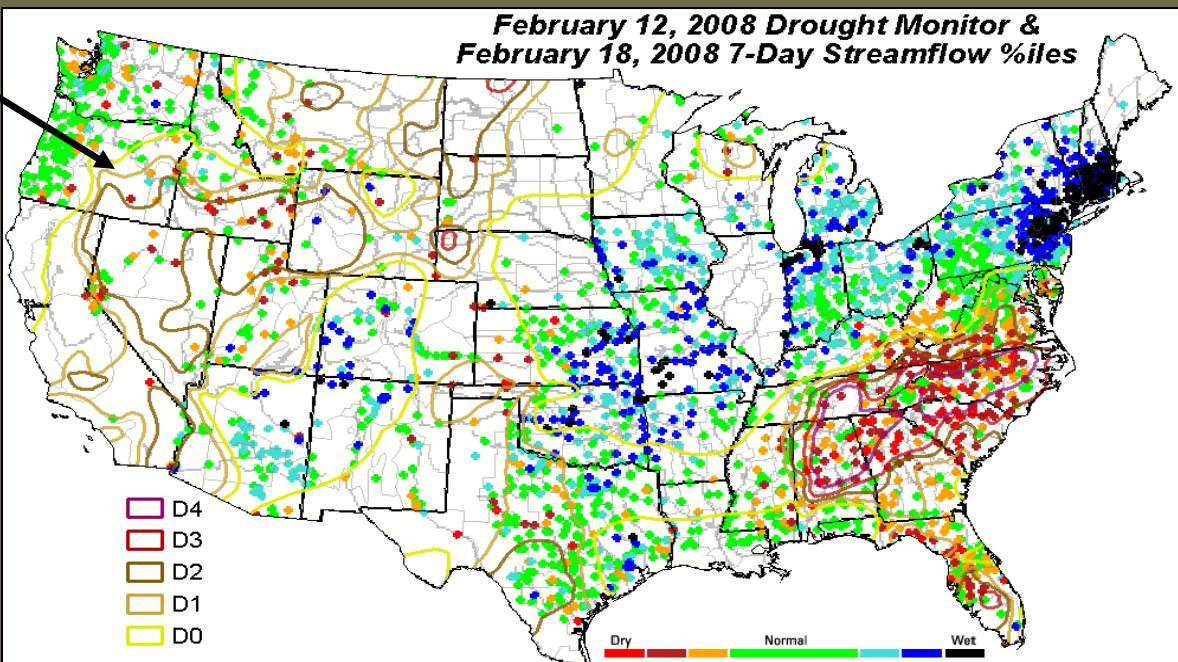
start DM-2008\_AgOutlook... usdm-080129.mxd - ... 2:35 PM

#### 4) Utilizing State-of-the-Art Software (ArcGIS);

Some of our routine weekly GIS overlay products includes the past week's D0-D4 contours on the 7-day precipitation dot plot & on the 7-Day USGS stream flow percentiles



The same could be done to many of these other new USDM tools.



## 4) Utilizing the USDM with ArcGIS Applications;

### U.S. Beef Cow Areas Experiencing Drought

Reflects January 29, 2008  
U.S. Drought Monitor data

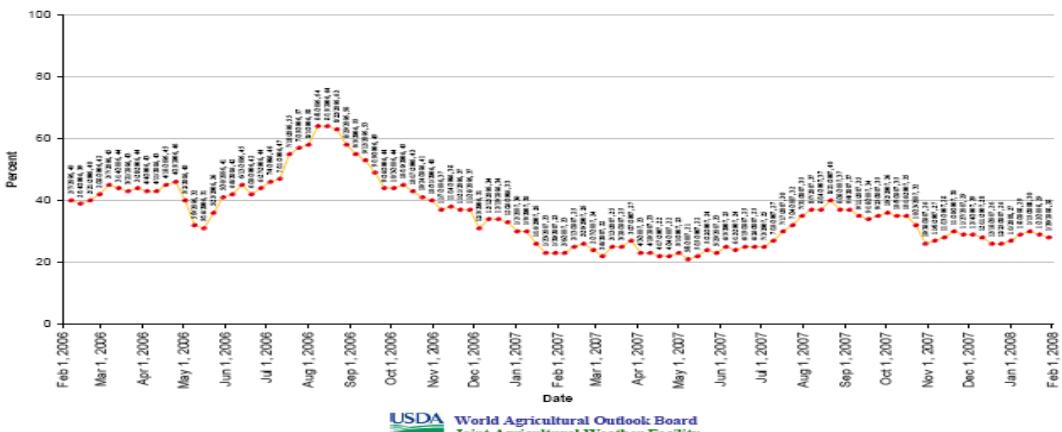
Approximately 28% of the domestic beef cow  
inventory is within an area experiencing drought,  
based on NASS 2002 Census of Agriculture data.



Mapped drought areas are derived from the U.S. Drought Monitor product and do not depict the intensity of drought in any particular location. More information on the Drought Monitor can be found at: <http://www.drought.unl.edu/dm/monitor.html>.

USDA World Agricultural Outlook Board  
Joint Agricultural Weather Facility

### United States Beef Cow Areas Located in Moderate or More Intense Drought (D1+)



Shapefiles of the weekly USDM where drought  $\geq$ D1 are overlaid on U.S. Beef Cow area shapefiles, and weekly statistics are made.

## 5) One-Stop Drought Shopping = NIDIS;

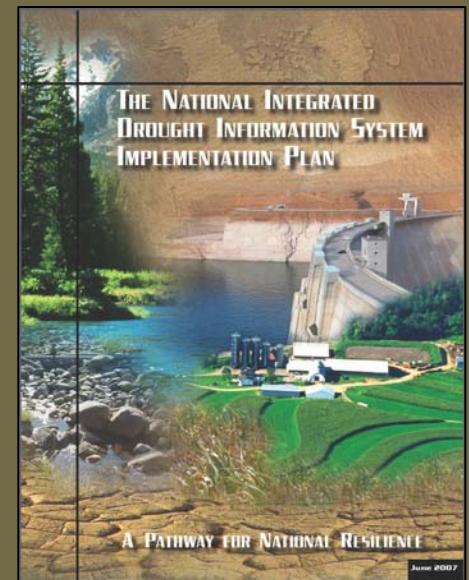
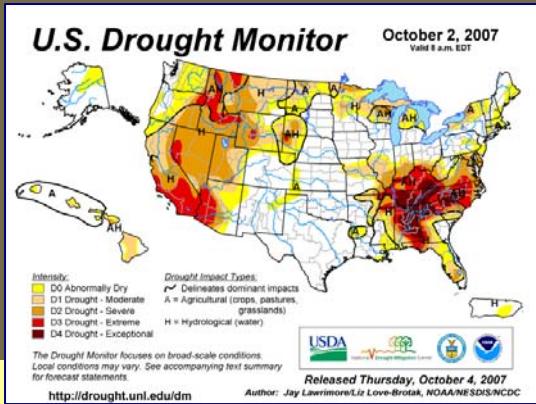
### What is NIDIS?

#### *A National Integrated Drought Information System (NIDIS)*

#### **National Integrated Drought Information System**

**NIDIS:** An integrated, **interagency** national drought monitoring and forecasting system that provides:

- An **early warning** & forecast system for drought.
- Drought impact and causation **education**.
- Information for drought **mitigation**.
- An interactive, web-based **drought portal**.
- Improved **observational** capabilities.



**NIDIS Builds Upon Collaborative Successes!**

# NIDIS Interagency Partners

## *Federal Level*

**U.S. Department of Agriculture (USDA):** Agricultural Research Service, Cooperative State Research, Education, Farm Service Agency, Forest Service, National Agricultural Statistics Service, Natural Resources Conservation Service, Risk Management Agency

**U.S. Department of Commerce (DoC):** International Trade Administration, National Oceanic and Atmospheric Administration

**U.S. Department of Energy (DoE):** Office of Electricity Delivery and Energy Reliability, Office of Energy Efficiency & Renewable Energy, Office of Science

**U.S. Department of Homeland Security (DHS):** Federal Emergency Management (FEMA) Directorate

**U.S. Department of the Interior (DoI):** Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, National Park Service, U.S. Fish and Wildlife Service, U.S. Geological Survey,

**U.S. Department of Transportation (DoT):** Federal Aviation Administration, Federal Highway Administration, Surface Transportation Board

Environmental Protection Agency (EPA)

Farm Credit Administration (FCA)

Federal Energy Regulatory Commission (FERC)

Internal Revenue Services

International Trade Commission (USITC)

National Aeronautics and Space Administration (NASA)

National Science Foundation (NSF)

Small Business Administration (SBA)



# NIDIS Interagency Partners

## *Regional, State, Tribal, and Local Levels*

Western Governors' Association – a key sponsor of early NIDIS development efforts and ongoing concerns representing drought in the Western States;

Western States Water Council – represents water managers in the Western United States;

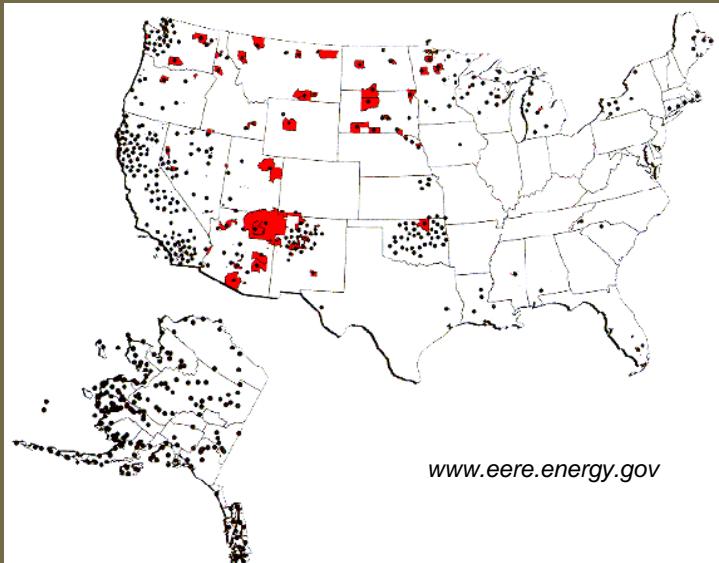
National Conference of State Legislatures – drought monitoring and mitigation activities will require state support, much of which require state legislative involvement

National League of Cities – water availability and quality issues

American Association of State Climatologists – an organization state-appointed individuals, many of whom are active participants in the Drought Monitor or serve on drought monitoring committees within their respective states. Most are housed at universities and also conduct applied climate research;

National Drought Mitigation Center – A national clearinghouse for drought-related information, research, mitigation measures, and operational home of the Drought Monitor and operational home of the Drought Monitor and Drought Impact Reporter;

Native American tribal governments – mostly located in arid regions in which water is a vital concern:



5) One-Stop Drought Shopping = Drought Portal;  
**NIDIS – U.S. Drought Portal**

**drought.gov: A Window on Drought Information**

### Why a Portal?

A Web site and services that improve the access, processing, and sharing of structured and unstructured information within and across a given “enterprise” through:



Portlets - Components of a portal web site that provide aggregated, reusable access to specific information sources or applications (e.g., remote web services, search engines). Access is standardized and reusable (using APIs [application programming interfaces]).

Web Services - Applications and utilities that allow data exchange in a highly interoperable, standardized language/vendor/platform-neutral manner. Crawlers and other content aggregation are supported.

Communities - A virtual workspace of a portal for collaboration, communication, and information dissemination/collection. Communities contain portlets and projects.

Projects - Workspaces within a community that involves subsets of Portal membership. Projects contain portlets and can be part of one or more communities, facilitating collaboration via overviews, discussions, and document/project management.

Wildberry Client Review - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Address [http://www.wildberrygroup.com/Client/NIDIS/web\\_mockup\\_rd4\\_2.html](http://www.wildberrygroup.com/Client/NIDIS/web_mockup_rd4_2.html) Go Links

## NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

Search Everywhere

1. Current Drought 2. Impacts 3. Drought-Related Research Contact Us | Log In

**Current Drought**

**U.S. Drought Monitor** August 28, 2007

**Where are Drought Conditions Now?**

The U.S. Drought Monitor integrates many types of data into a single map each week. It shows drought's location and intensity. Drought trackers look at climate and water data, satellite imagery, and reported impacts. Local resource managers establish their own criteria for stages of drought.

**Impacts**

**How is the Drought Affecting Me?**

Drought affects many activities, like agriculture, water supply and quality, energy, tourism, ecosystems, and communities. The Drought Impact Reporter compiles accounts from different sources, such as media, extension agents, the National Weather Service, and agricultural producers.

**Forecast**

**U.S. Seasonal Drought Outlook** Drought Tracking During the Past Year Last Update: 18 August 2007 Released: August 14, 2007

**Will the Drought Continue?**

Forecasting drought in the continental United States is still highly experimental. The U.S. Seasonal Drought Outlook is released each month, looking three months ahead. The Drought Outlook identifies areas where forecasters expect drought to appear, continue, get better or get worse.

**What's New**

The U.S. Drought Monitor provides comprehensive information on the nation's drought conditions. The National Integrated Drought Information System (NIDIS) was established in 2004 and enacted into law in 2005.

More about NIDIS

The NIDIS Implementation Plan, published in June 2007, provides a detailed overview of the NIDIS initiative (pdf version).

### Showcase Portlets:

- 1.) U.S. Drought Monitor (NOAA, USDA, NDMC)
- 2.) Drought Impacts Reporter (NDMC)
- 3.) Climate Prediction Center Seasonal Drought Outlook (NOAA)

**Administration: (July 17, 2007)**  
2007 Starts Warmer, Drier Than Average for Much of U.S., Global Average

Done Internet

# U.S. Drought Portal Home Page

## Showcase Portlets and Key Themes

Wildberry Client Review - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Favorites Go Links

Address [http://www.wildberrygroup.com/Client/NIDIS/web\\_mockup\\_rd4\\_2.html](http://www.wildberrygroup.com/Client/NIDIS/web_mockup_rd4_2.html) Go Links

Google EROS Go Bookmarks Check AutoLink AutoFill Send to EROS

Y! Search Web Bookmarks Mail My Yahoo! Fantasy Sports Football Games Music Answers Personals

NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM DROUGHT.GOV

1 2 3 4 5 6

Search: Everywhere

What is NIDIS? Current Drought Drought-Related Forecasts Impacts Planning Educational Resources Drought-Related Research Contact Us | Log In

**Current Drought**  
**U.S. Drought Monitor** August 28, 2007  
  
The U.S. Drought Monitor integrates many types of data into a single map each week. It shows drought's location and intensity. Drought trackers look at climate and water data, satellite imagery, and reported impacts. Local resource managers establish their own criteria for stages of drought.

**Impacts**  
  
How is the Drought Affecting Me?  
Drought affects many activities, like agriculture, water supply and quality, energy, tourism, ecosystems, and communities. The Drought Impact Reporter compiles accounts from different sources, such as media, extension agents, the National Weather Service, and agricultural producers.

**Forecast**  
**U.S. Seasonal Drought Outlook** Drought Tracking During the Monsoon Period August 16, 2007 Released August 15, 2007  
  
Will the Drought Continue?  
Forecasting drought in the continental United States is still highly experimental. The U.S. Seasonal Drought Outlook is released each month, looking three months ahead. The Drought Outlook identifies areas where forecasters expect drought to appear, continue, get better or get worse.

**What's New**  
The U.S. Drought Portal was officially launched on November 1, 2007. It was created to provide comprehensive information on emerging and ongoing droughts, and to enhance the nation's drought preparedness. The Drought Portal is part of the National Integrated Drought Information System (NIDIS), which was recommended by the Western Governors Association in 2004 and enacted into law in 2006.  
More about NIDIS...  
The NIDIS Implementation Plan, published in June 2007, provides a detailed overview of the NIDIS initiative (pdf version).

**Media Resources**  
**National Oceanic and Atmospheric Administration: (August 15, 2007)**  
Record Warmth in Western U.S. in July, Drought Severity Worsened, Global Temperature 7th Warmest for July... (view article)  
**National Oceanic and Atmospheric Administration: (July 17, 2007)**  
2007 Starts Warmer, Drier Than Average for Much of U.S., Global Average

Done Internet

### Key Themes

- 1) Current Drought
- 2) Forecasts
- 3) Impacts
- 4) Planning
- 5) Education
- 6) Research

# U.S. Drought Portal Key Theme Example

## *Current Drought*

**NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM**

**NIDIS**

Search Site:  Everywhere

What is NIDIS? Current Drought Drought-Related Forecasts Impacts Planning Educational Resources Drought-Related Research

**Supporting Data and Information**  
(Expand all / Collapse all)

- Drought Indices
- Hydrological Monitoring
- Remote Sensing
- Wildfire
- Paleo-Climatic Data
- Local, State and Regional
- Water Quality
- Map Viewer

**What areas are in drought now?**

**U.S. Drought Monitor** September 11, 2007

The U.S. Drought Monitor is a blend of numeric measures of drought and experts' best estimate. It was started in 1999 as a federal and academic partnership out of a Western Governor's Association initiative to provide timely and understandable information on water supply and drought for policy makers.

The Monitor is produced by a group of authors from the National Climatic Data Center, the Department of Agriculture, the National Oceanic and Atmospheric Administration, and the National Drought Mitigation Center. It incorporates review from over 250 climatologists, extension agents, and others across the country.

The U.S. Drought Monitor is based on broad-scale conditions. Local conditions may vary. See accompanying 'Local Summary' for forecast information.

http://drought.unis.edu/dm

Released Thursday, September 13, 2007

Author: Rita Tushar, Climate Prediction Center, NOAA

week the author revises the previous map based on rain, snow and other events, or reports of how drought is affecting crops, wildlife and other indicators. Authors balar data and reports to come up with a new map every Wednesday afternoon. It is released following Thursday morning.

Visit the US Drought Monitor for the current drought conditions...

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**North American Drought Monitor** July 31, 2007

The North American Drought Monitor is a monthly monitoring map for the entire continent that has been produced in cooperation with Canada and Mexico since 2003.

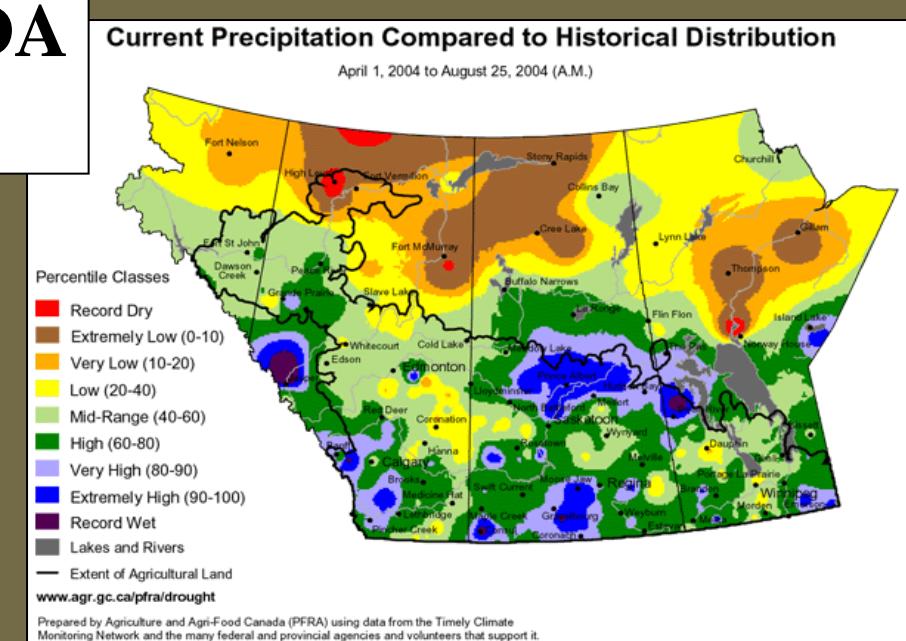
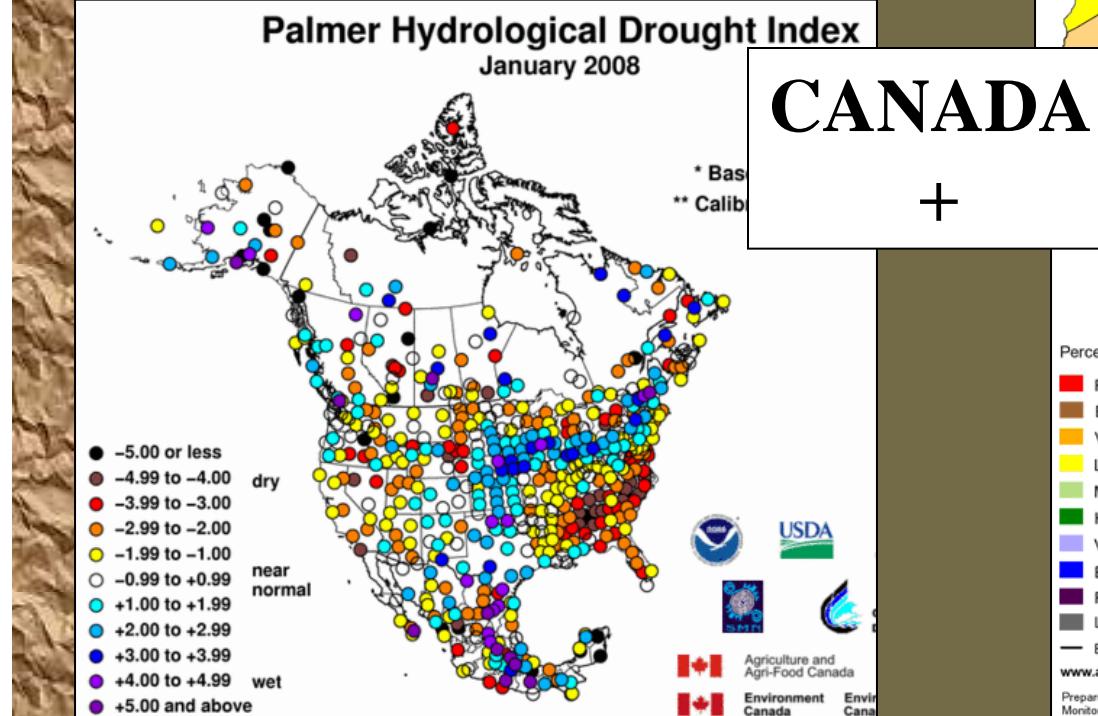
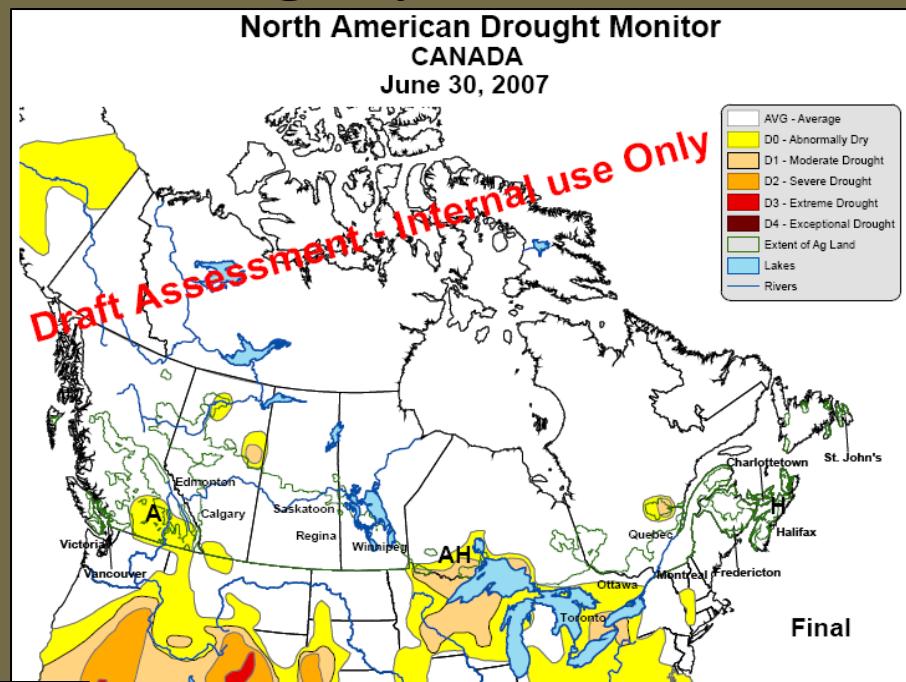
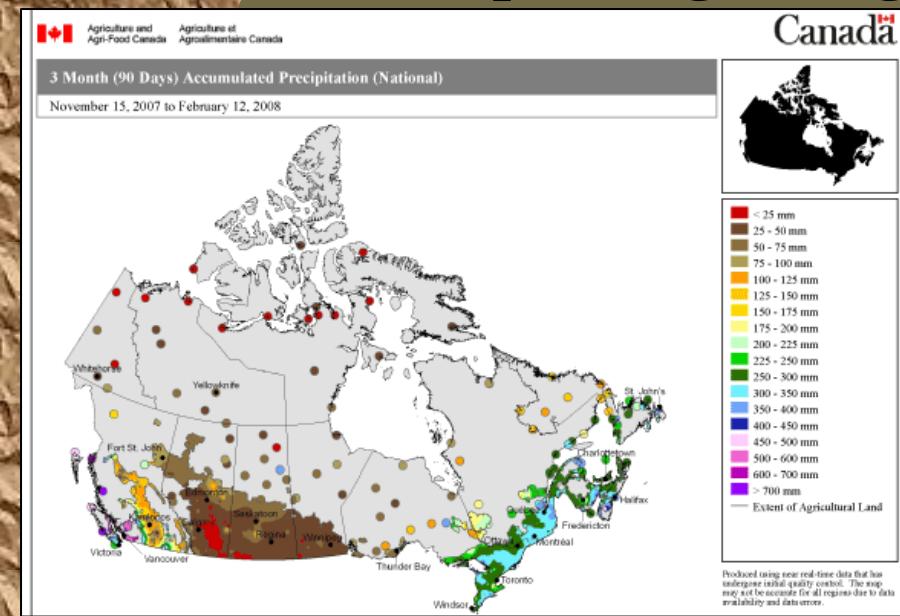
http://drought.unis.edu/nadm

Released Friday, August 14, 2007

Author: Rita Tushar, Climate Prediction Center, NOAA

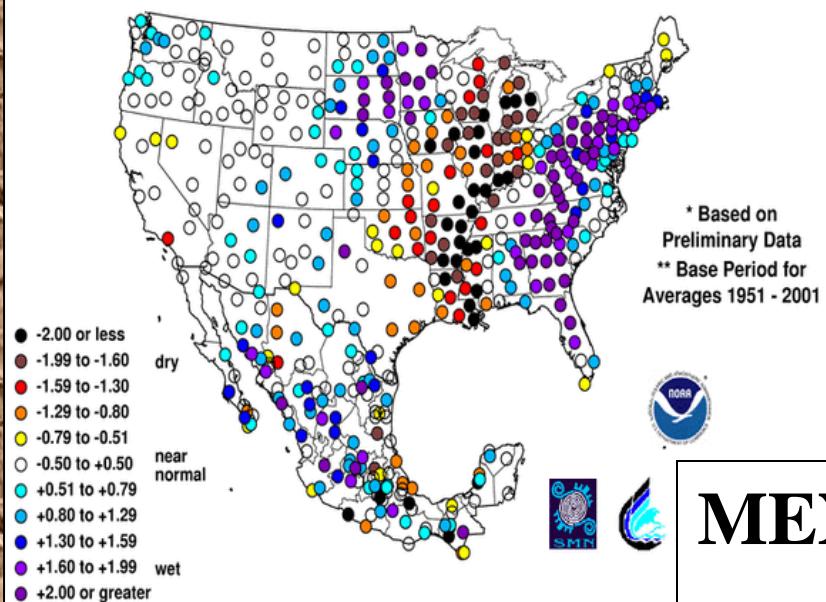
Plenty of related info to view

## 6) Expanding Drought Monitoring Beyond the U.S.;

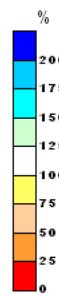
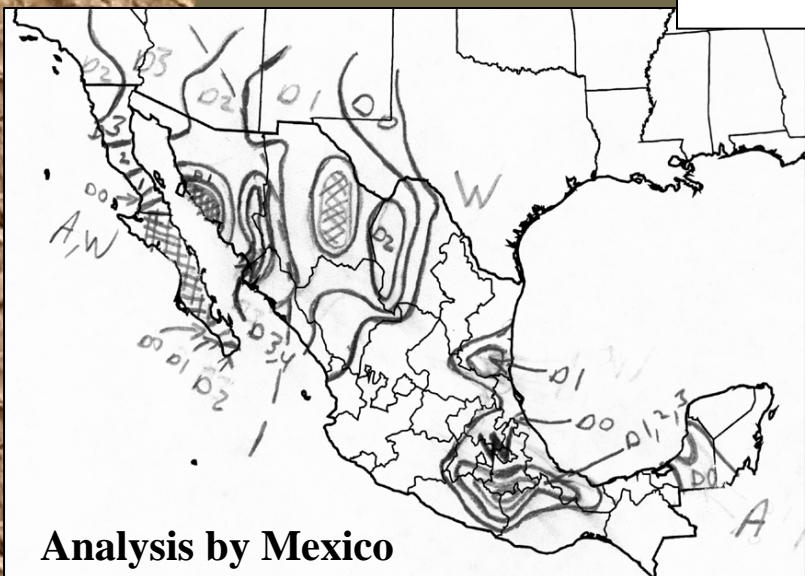
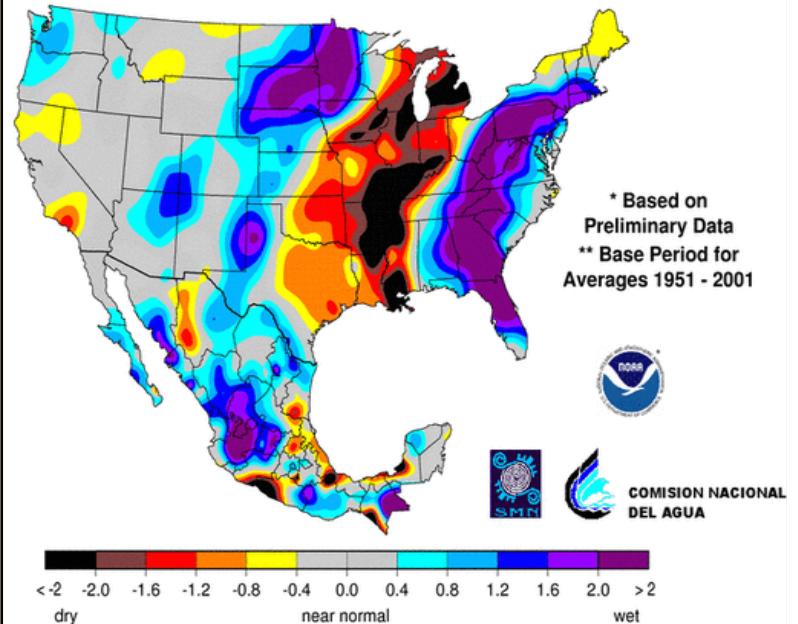


## 6) Expanding Drought Monitoring Beyond the U.S.;

1-Month Standardized Precipitation Index  
September 2004



1-Month Standardized Precipitation Index  
September 2004



17% Debajo de la climatología

United States

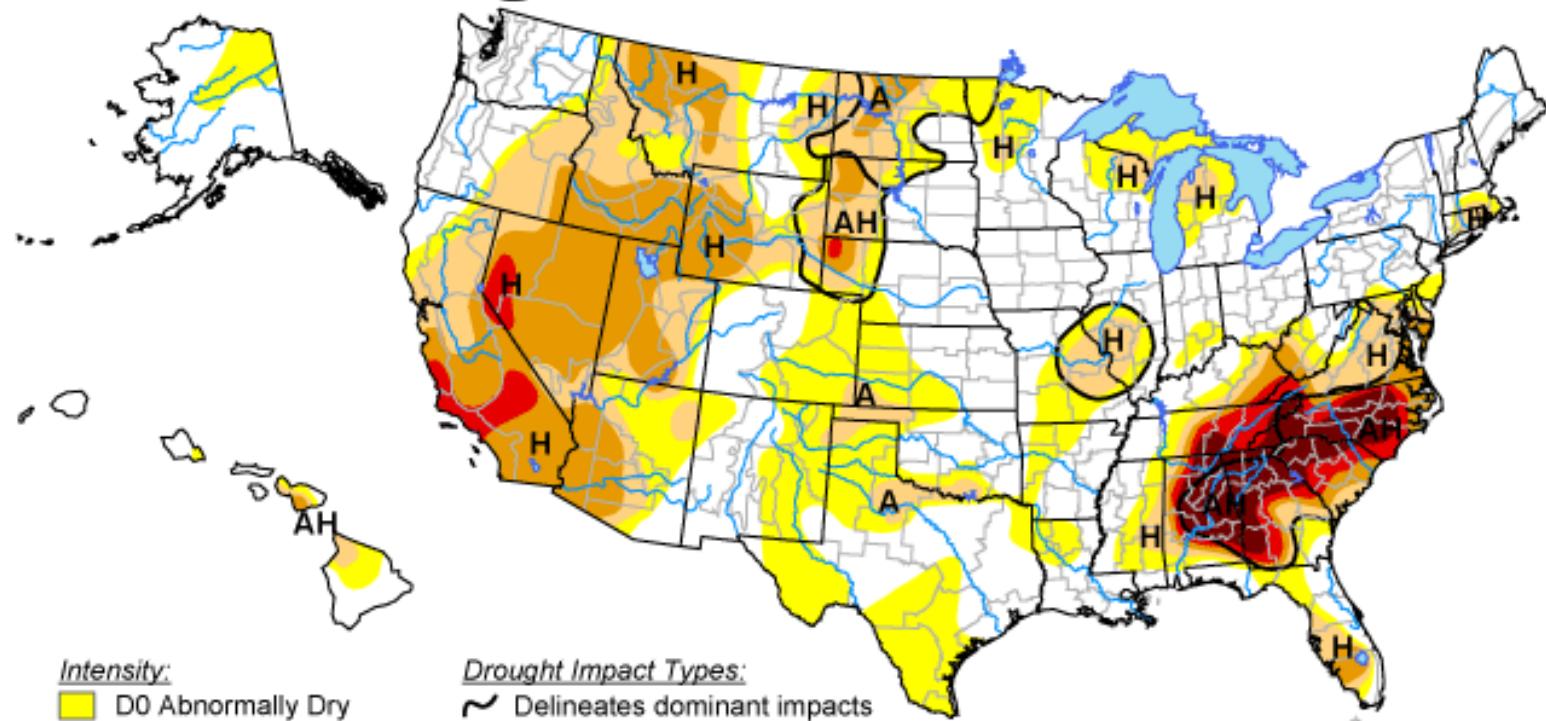
=

(USDM: end of month  
or start of next month)

# U.S. Drought Monitor

December 4, 2007

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
- 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, December 6, 2007

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

# North American Drought Monitor

December 31, 2007

Released: Wednesday, January 16, 2008

<http://www.ncdc.noaa.gov/nadm.html>

Analysts:

Canada - Trevor Hadwen  
Dwayne Chobanik  
Mexico - Valentina Davydova  
Adelina Albalil  
Elvia Delgado  
Fernando Romero  
U.S.A. - Richard Heim  
Jay Lawrimore\*  
Liz Love-Brotak

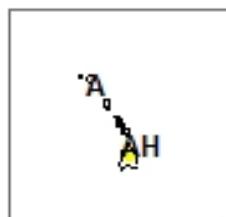
(\* Responsible for collecting analysts' input & assembling the NA-DM map)

Intensity:

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

Drought Impact Types:

- ~ Delineates dominant impacts
- A = Agriculture
- H = Hydrological (Water)



Available in  
English

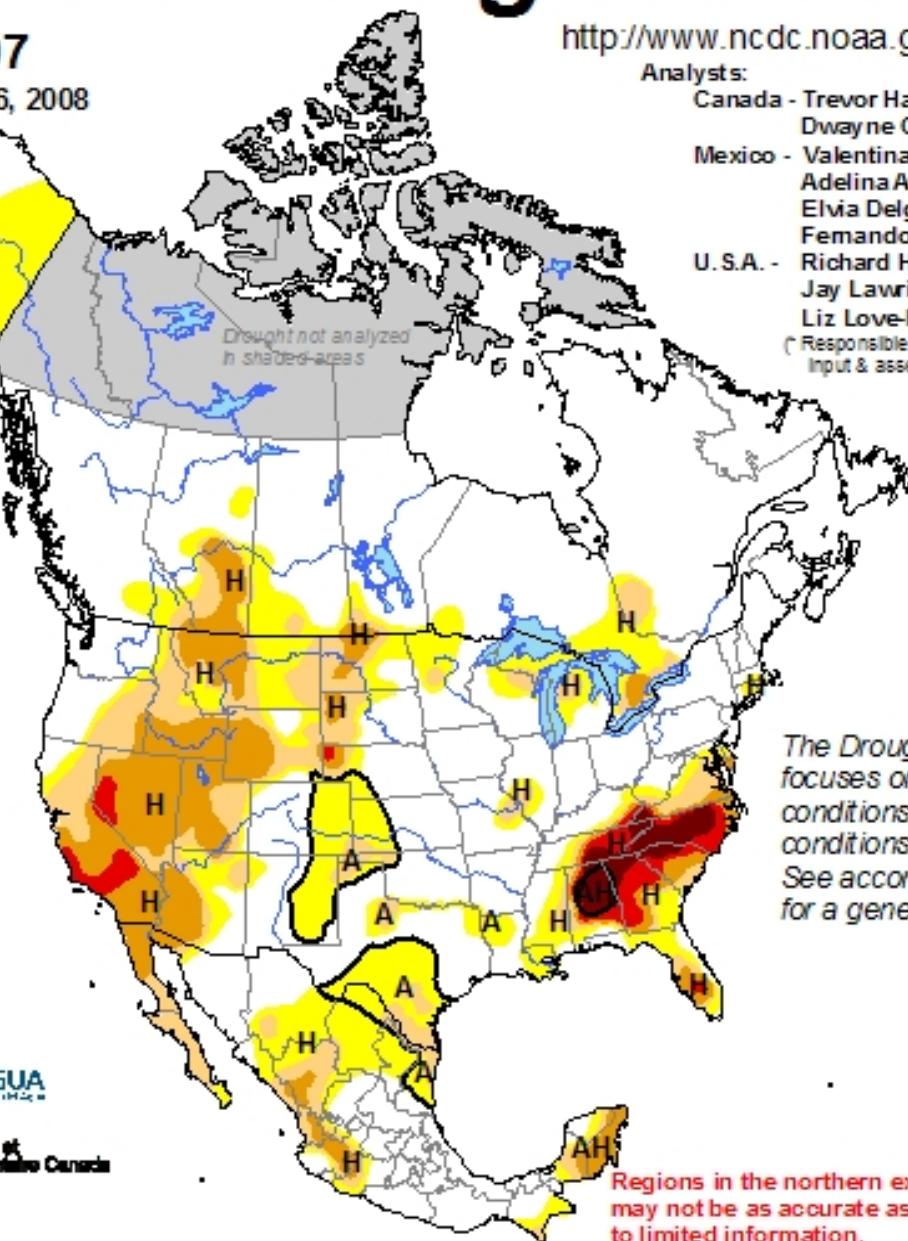


CONAGUA  
CONSEJO NACIONAL  
DE AGUA



Agriculture and  
Agri-Food Canada  
Environment  
Canada

Agriculture et  
Agroalimentaire Canada  
Environnement  
Canada



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



Regions in the northern extremes of Canada  
may not be as accurate as other regions due  
to limited information.

# Monitor de Sequía de América del Norte

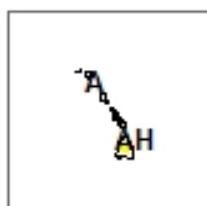
Diciembre 31, 2007

Liberado: Miércoles, 16 de Enero de 2008

## Intensidad de la Sequía:

- D0 Anormalmente Seco
- D1 Sequía - Moderada
- D2 Sequía - Severa
- D3 Sequía - Extrema
- D4 Sequía - Excepcional

- Delimita impactos dominantes
- A = Agrícola
- H = Hidrológica



Available in  
Spanish



CONAGUA  
Consejo Nacional del Agua

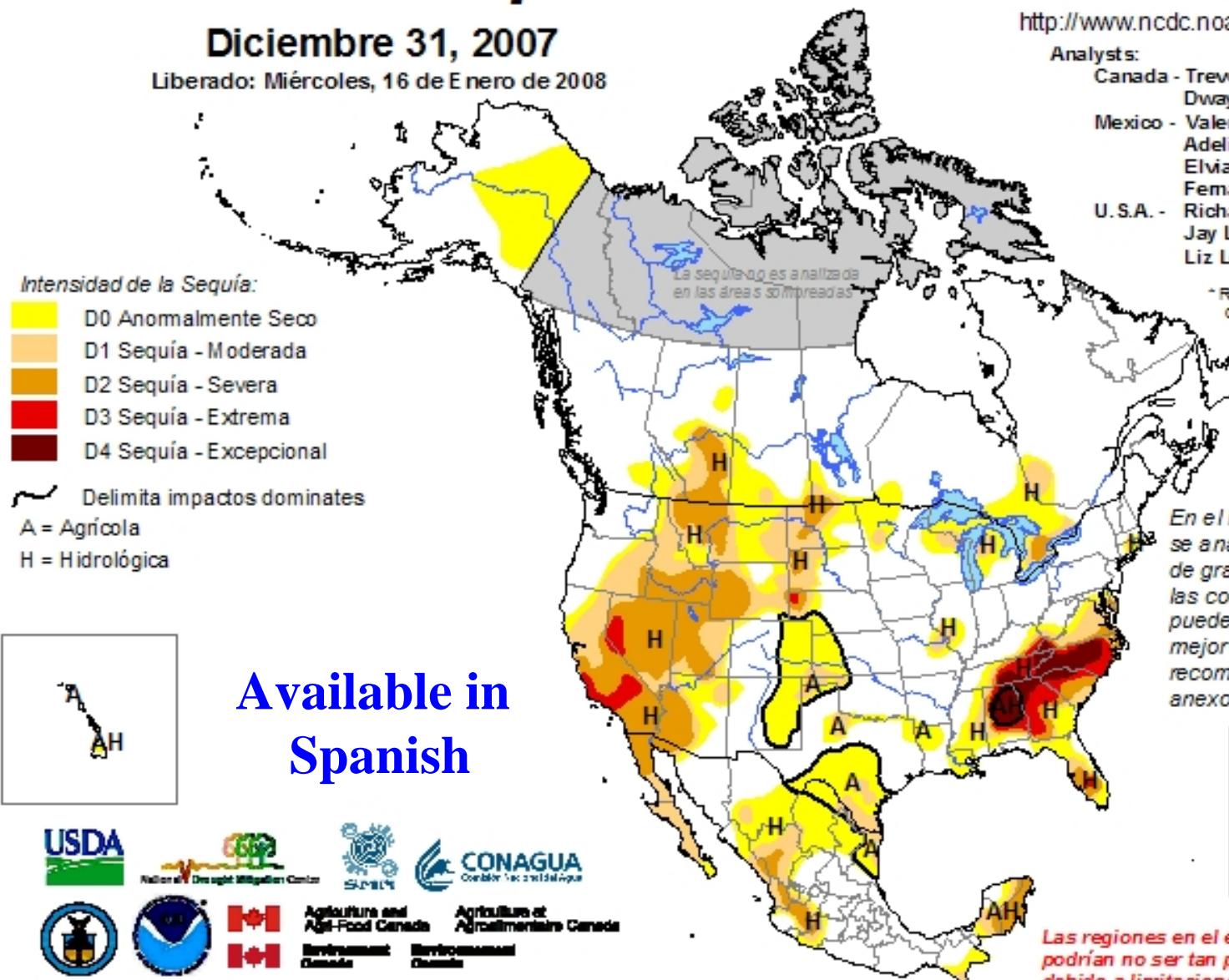


Agriculture and  
Agri-Food Canada

Environment  
Canada

Agriculture et  
Agroalimentaire Canada

Environnement  
Canada



<http://www.ncdc.noaa.gov/nadm.html>

## Analysts:

- Canada - Trevor Hadwen  
Dwayne Chobanik
- Mexico - Valentina Davydova  
Adelina Albanil
- Elvia Delgado
- Fernando Romero
- U.S.A. - Richard Heim  
Jay Lawrimore\*  
Liz Love-Brotak

\* Responsable de la Integración  
del mapa

En el Monitor de Sequía  
se analizan condiciones  
de gran escala, por lo que  
las condiciones locales  
pueden variar. Para una  
mejor interpretación se  
recomienda ver el texto  
anexo.

Las regiones en el extremo norte de Canadá  
podrían no ser tan precisas como el resto,  
debido a limitaciones en la información.

# Outil de surveillance des sécheresses à l'échelle nord-américaine

<http://www.ncdc.noaa.gov/nadm.html>

31 Décembre 2007

Parution : Mercredi, le 16 Janvier, 2008

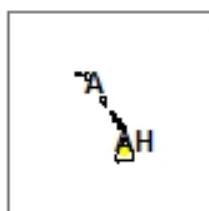
Intensité de la sécheresse :

- D0 Sécheresse anomale
- D1 Sécheresse modérée
- D2 Sécheresse grave
- D3 Sécheresse extrême
- D4 Sécheresse exceptionnelle

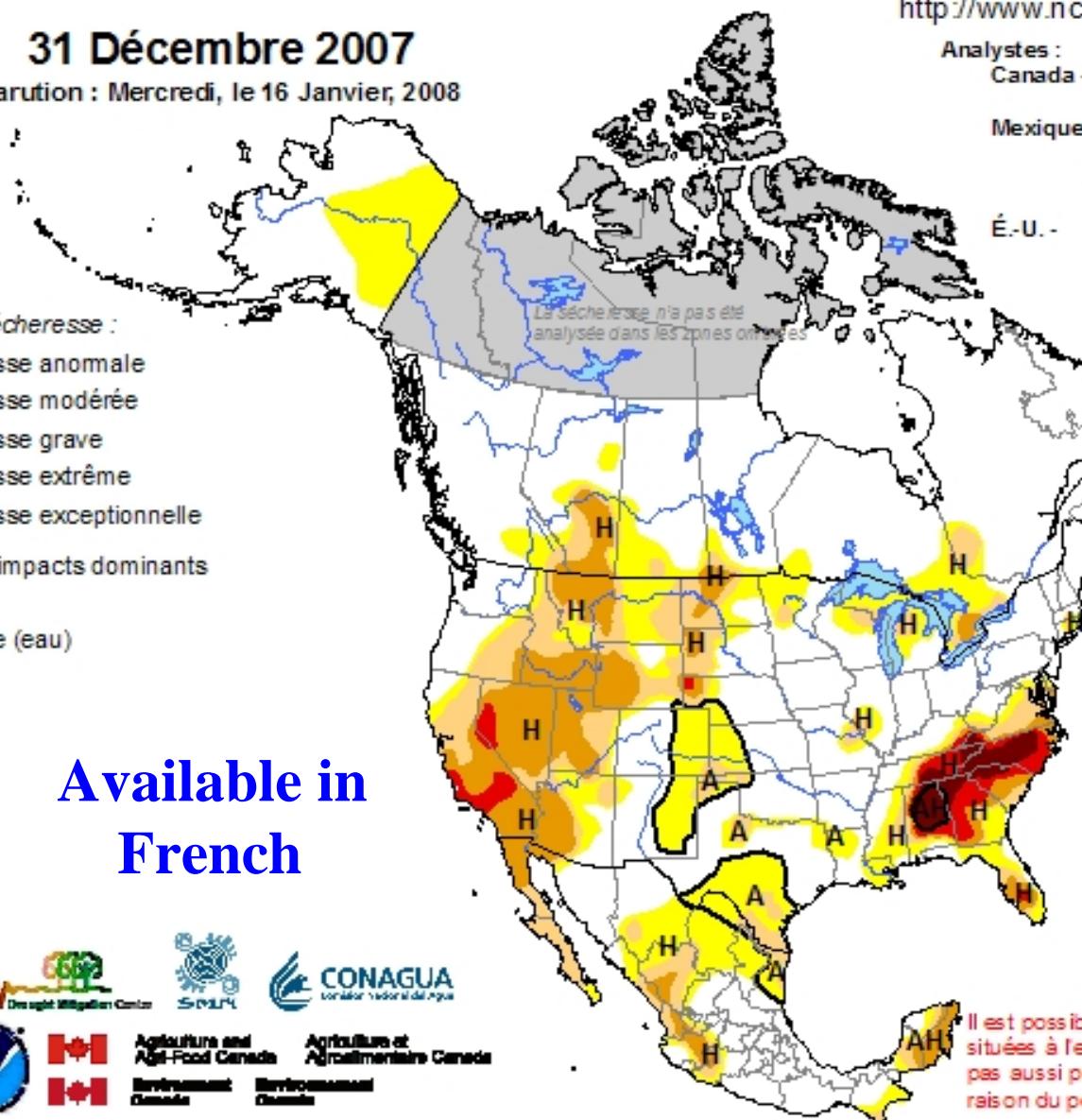
— Délimite les impacts dominants

A = Agriculture

H = Hydrologique (eau)



Available in  
French



Analystes :

Canada - Trevor Hadwen  
Dwayne Chobanik  
Mexique - Valentina Davydova  
Adelina Albalil  
Elvia Delgado  
Fernando Romero  
Richard Heim  
Jay Lawrimore\*  
Liz Love-Brotak

\* Responsable d'assembler la carte de NA-DM et le texte

L'outil de surveillance des sécheresses s'attarde aux conditions à grande échelle. Les conditions locales peuvent varier. Voir le texte d'accompagnement pour un sommaire général.

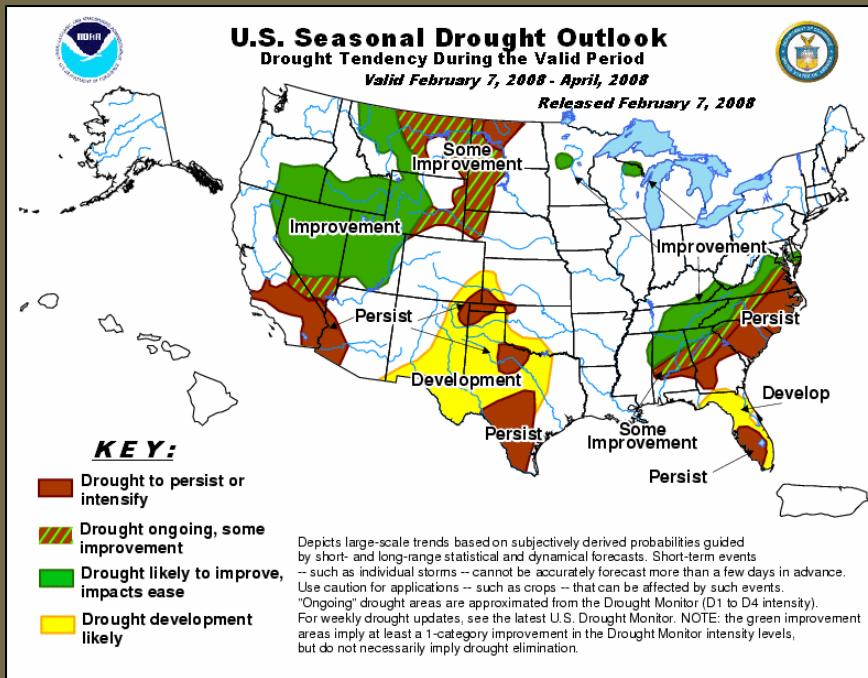
Il est possible que les données sur les régions situées à l'extrême nord du Canada ne soient pas aussi précises que les autres régions en raison du peu d'information disponible.



## 7) Drought Forecasts;

# Short and Long-Term Forecast Contributions

(see Douglas LeComte for more information)



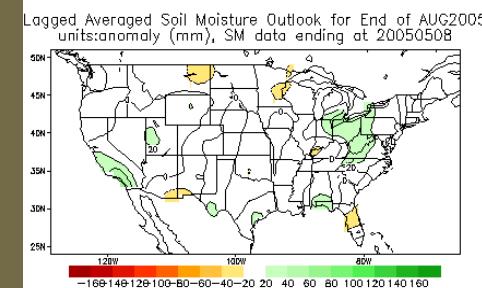
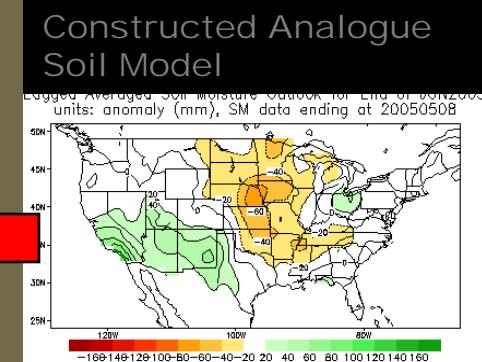
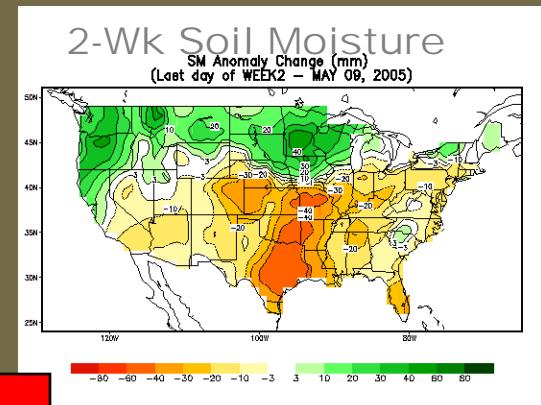
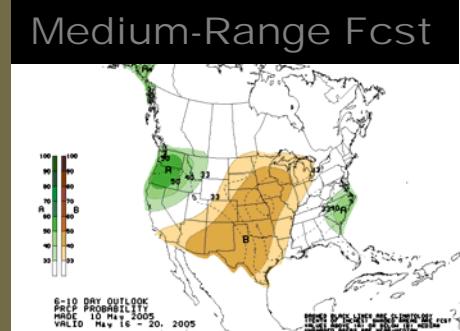
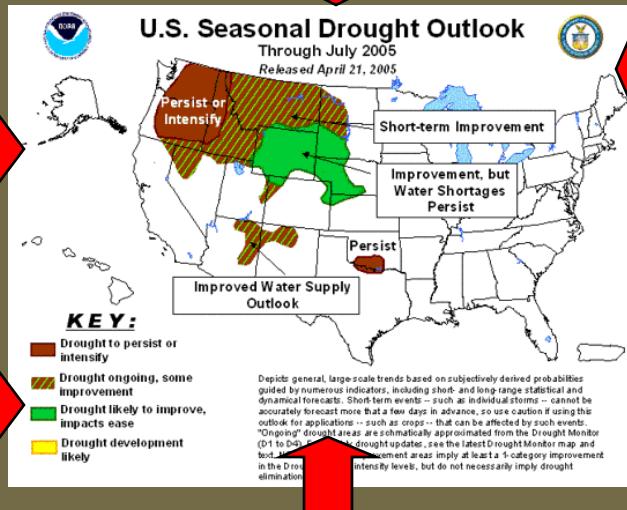
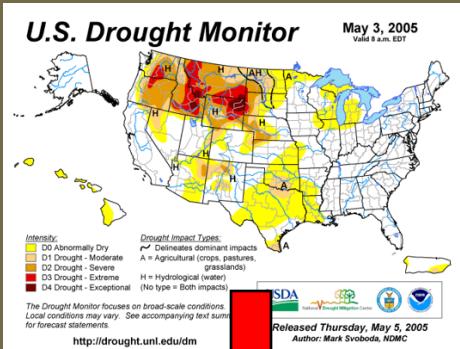
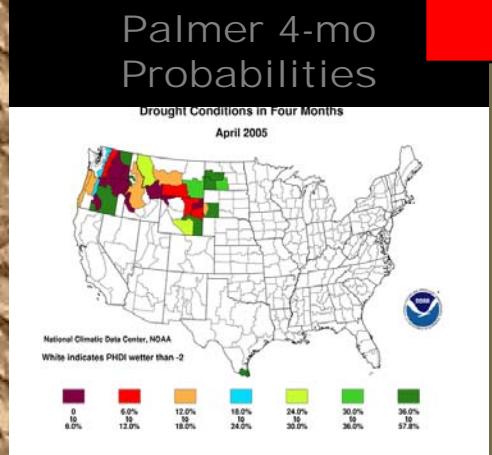
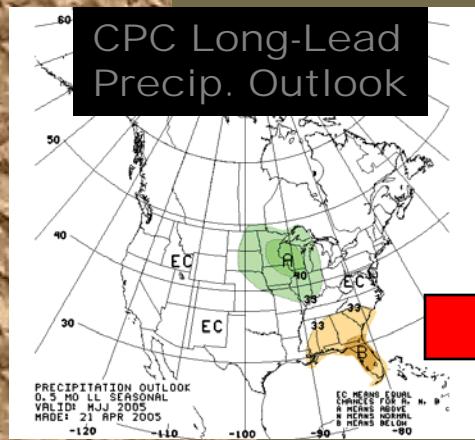
Start with  
latest U.S. Drought  
Monitor D1 areas

2-week  
Soil Moisture  
Forecasts

3-month  
Precipitation and  
Temperature  
Outlooks

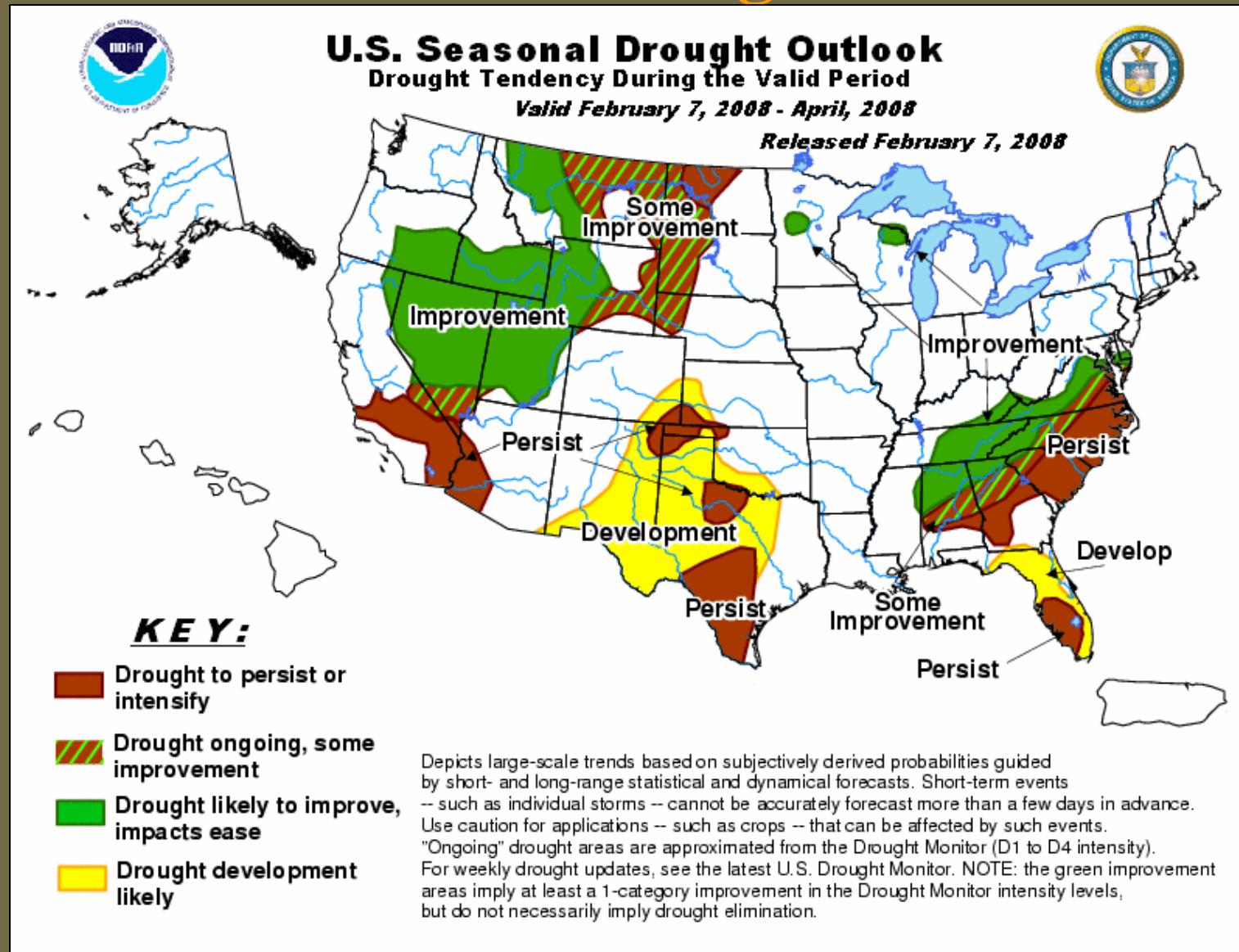


# 7) Drought Forecasts; Principal Drought Outlook Inputs





## 7) Drought Forecasts; Latest Seasonal Drought Outlook



# Thank You!

and to the many contributors  
of this presentation



Feb. 21-22, 2008