

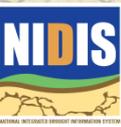
# The National Drought Mitigation Center: Usable Research into Usable Information

Mark Svoboda, Climatologist  
Monitoring Program Area Leader

National Drought Mitigation Center  
School of Natural Resources  
University of Nebraska-Lincoln

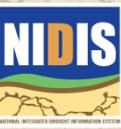


Missouri Basin Extreme Events and Drought Resiliency, Rapid City, SD, September 17-18, 2014



# National Drought Mitigation Center

- ***Bridge and translate science*** to policy/decision makers and the public
- Developing ***usable*** information and services
- Research, Applications, Operational, Education/Outreach (***End-to-End***)
- Involve users from the ***beginning...***



# Education, Feedback and Outreach



10 am Central Time

January - May, 2013

Last Wednesday  
of each month

Each session will include a briefing on current drought status, followed by a session on a specific topic or tool related to drought planning.

**January 30:** Managing Drought Risk on the Ranch: The Planning Process

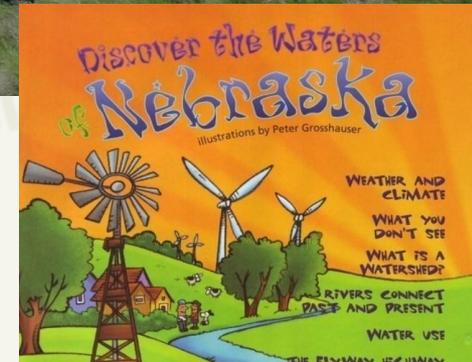
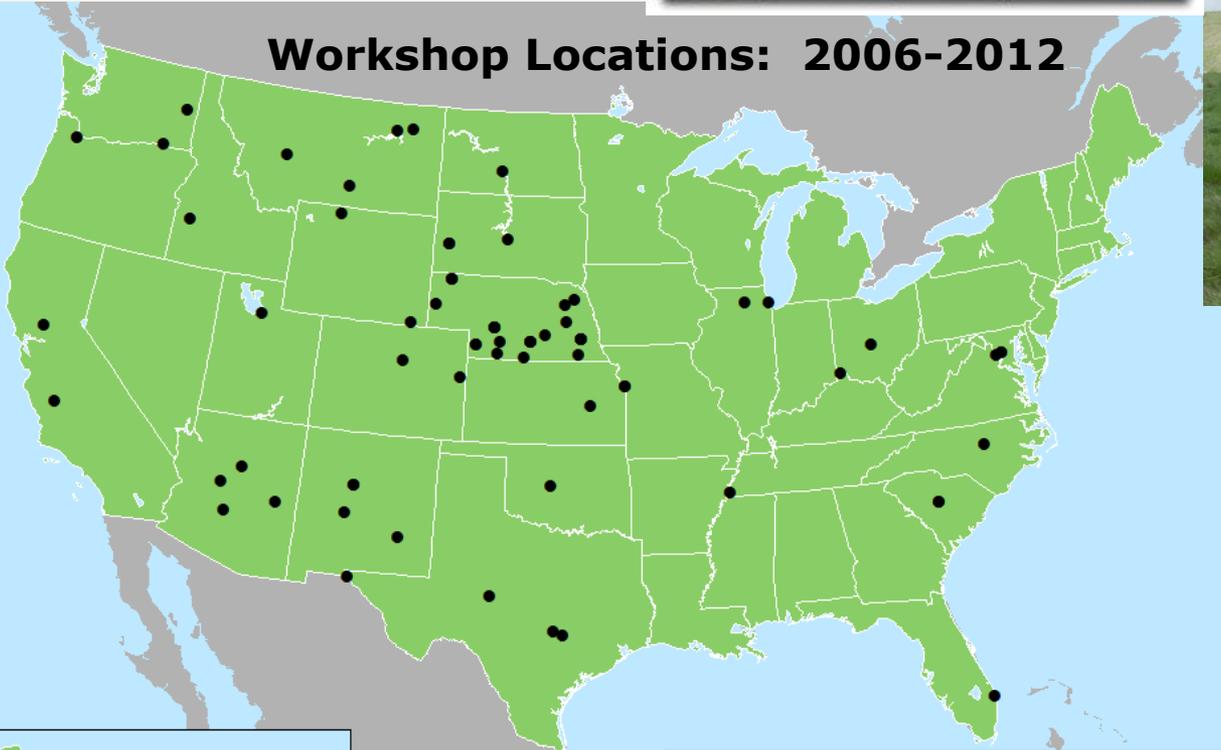
Jerry Volesky, Range and Forage Specialist at the West Central Research and Extension Center, and Lynn Myers, Tippets-Myers Ranch

**February 27:** Avoiding Analysis Paralysis: Monitoring and Setting Critical Dates for Decision Making During Drought

Dwayne Rice, Rangeland Management



Workshop Locations: 2006-2012



**EDEN**  
EXTENSION DISASTER EDUCATION NETWORK

Reducing the Impact of Disasters Through Education

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**Hazards & Threats**

EDEN > Topics > Hazards & Threats > Drought > extension

**Drought**

**Key & Emerging Issues**

- Individuals & Families
- Crop and Livestock
- Community
- Quick Find Key Current and Future Issue
- Resources
- National VOAD Drought and Wildfire Taskforce

**eXtension**

The Drought articles and FAQs on eXtension can be reached through the

- eXtension Drought pages

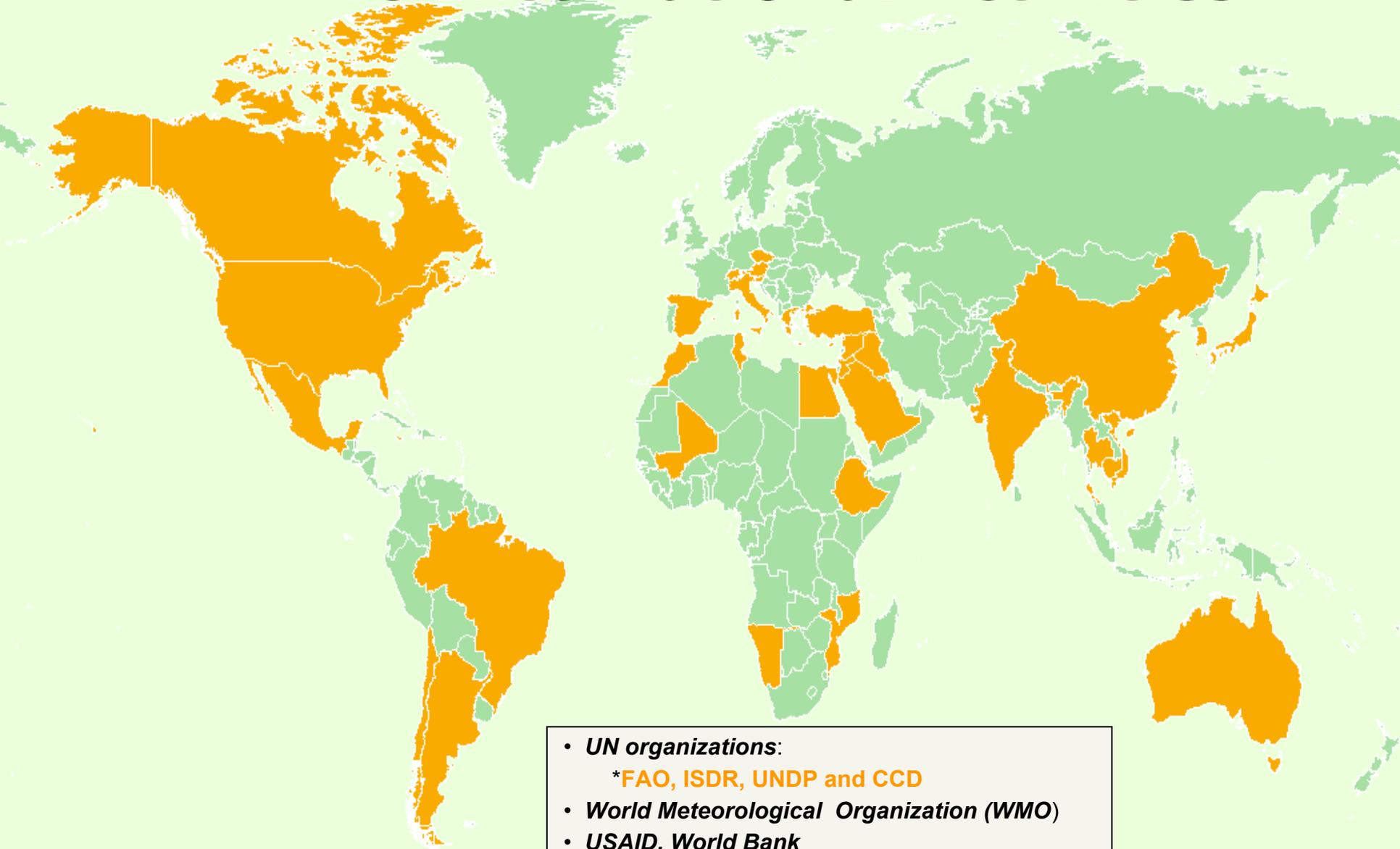
Articles are grouped under the following headings:

- Livestock and Pasture
- Crops
- Home and Landscape

**extension**  
more mind reach

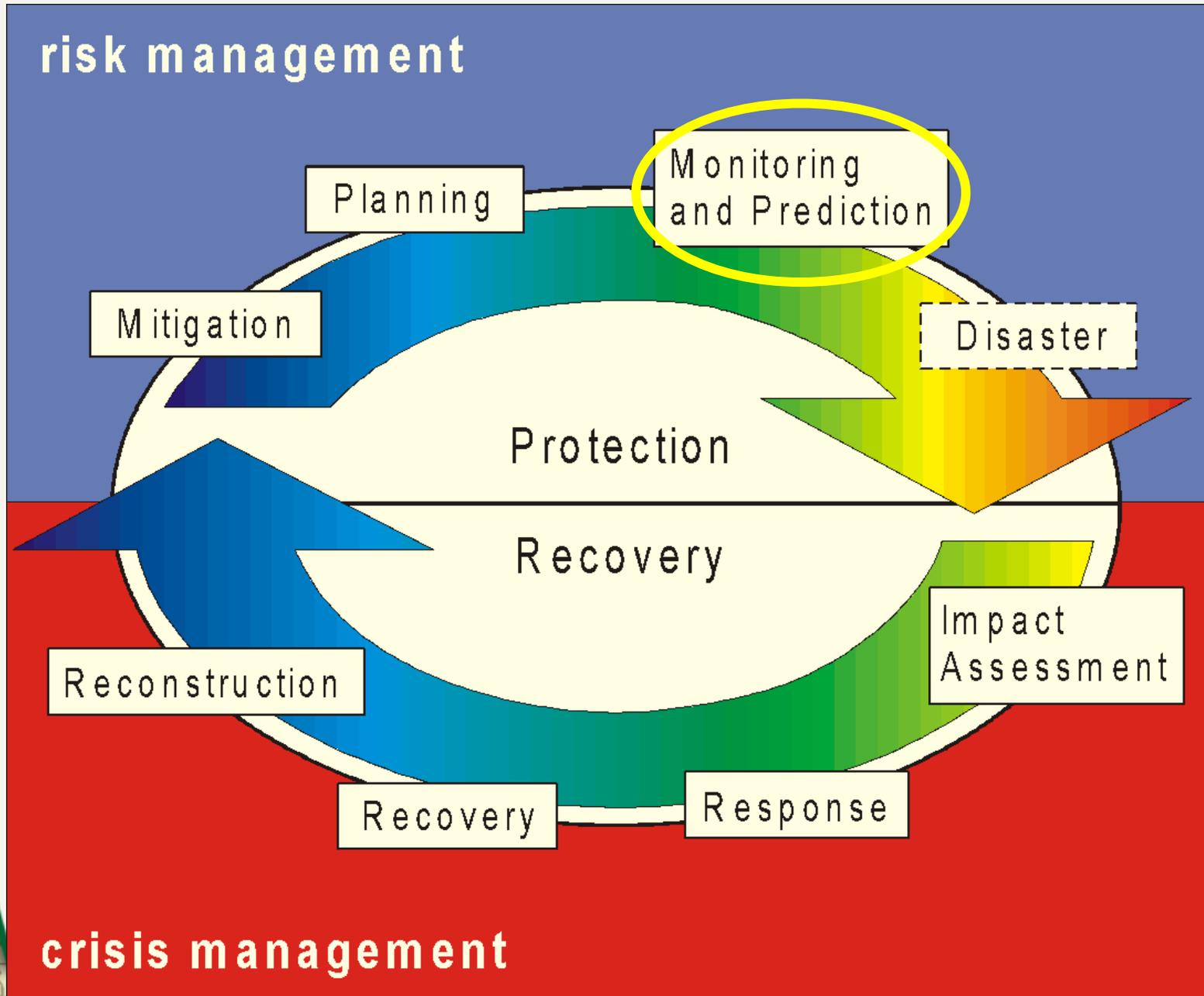
Agroecological Disasters  
Families & Communities  
Hazards & Threats  
Human Health

# NDMC International Activities



- **UN organizations:**
  - **\*FAO, ISDR, UNDP and CCD**
- **World Meteorological Organization (WMO)**
- **USAID, World Bank**
- **Various regional and national drought centers**
- **Numerous government agencies and universities in different countries**

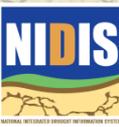
# The Cycle of Disaster Management



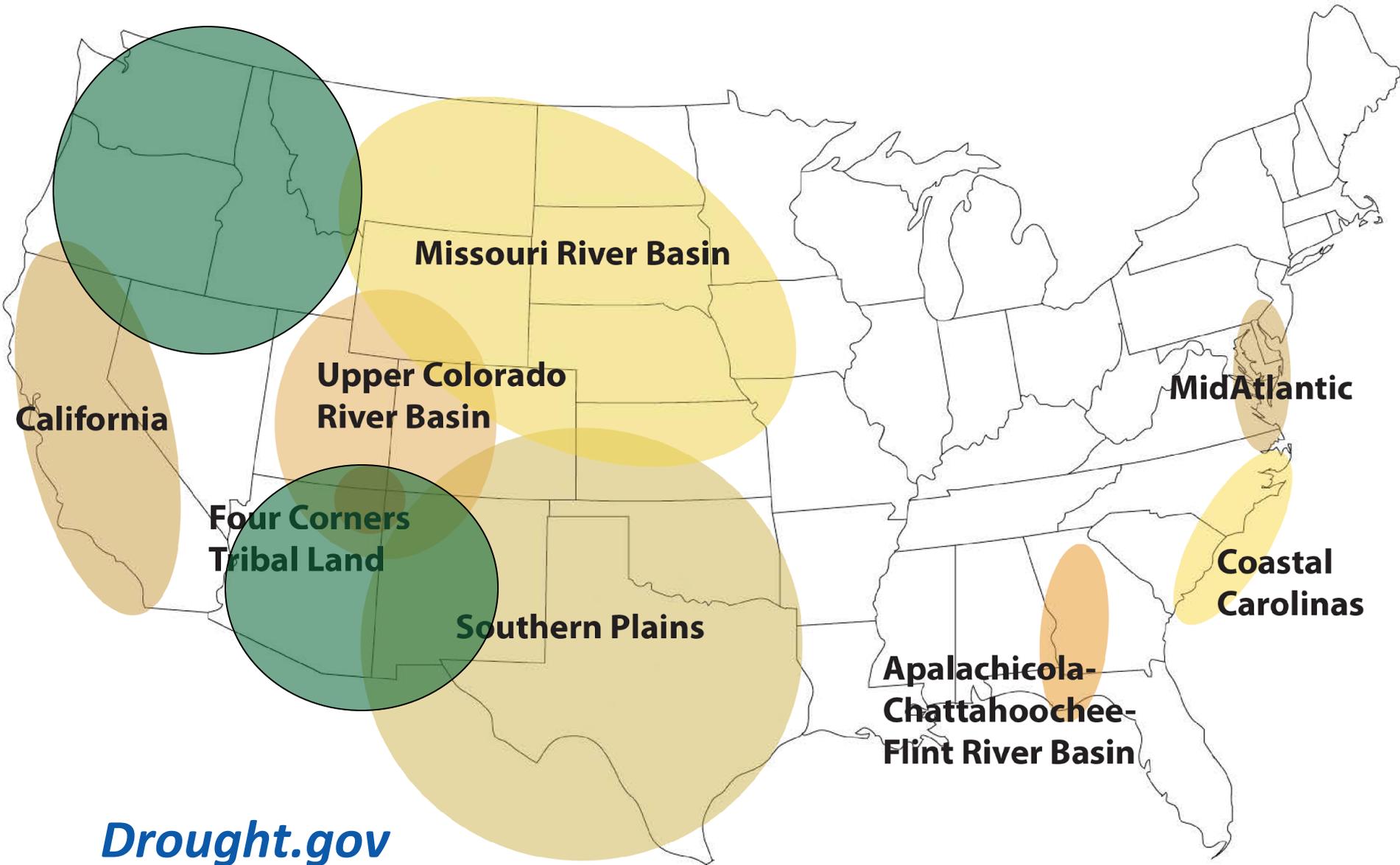
# Components of a Drought Early Warning and Information System (DEWIS)



- Monitoring **AND** Forecasting
- Access to **timely** data (including **impacts**) and “value added” **information**
- **Synthesis/analysis** of data used to “trigger” set actions within a drought plan
- **Tools** for decision makers
- Efficient **dissemination/communication** (WWW, media, extension, etc.)
- Drought risk assessment and **planning**
- **Education** and Awareness



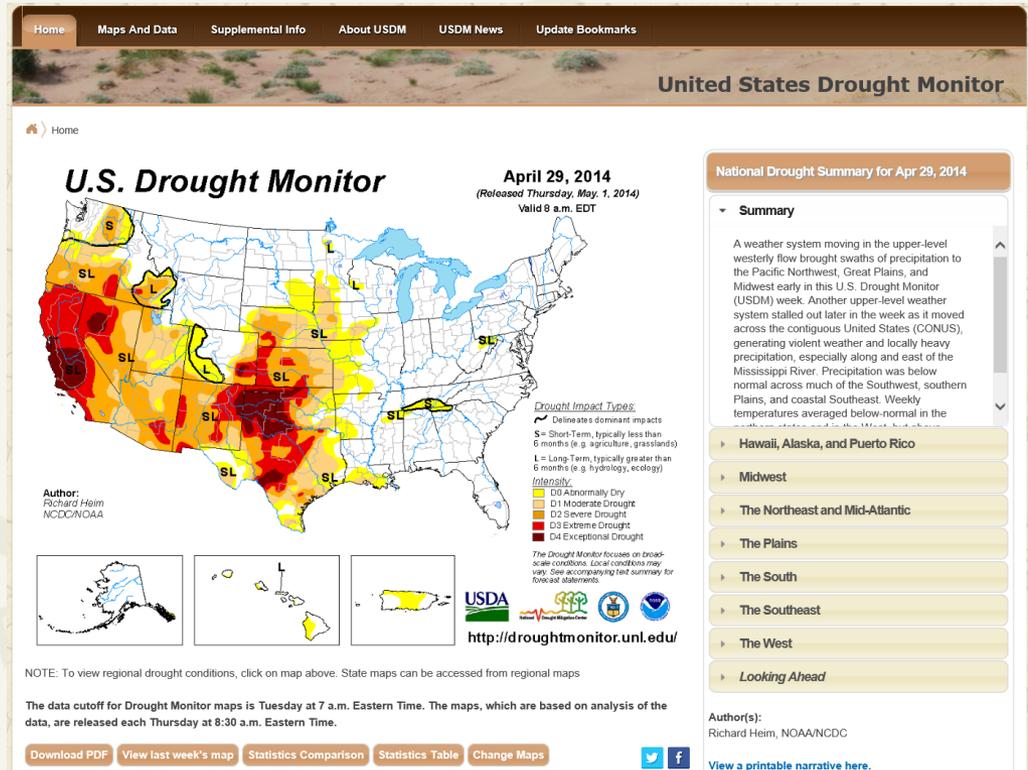
# Regional Drought Early Warning Systems



# U.S. Drought Monitor (USDM):

- **State-of-the-art** drought assessment in the U.S. since 1999
  - Collaborative effort between NOAA, USDA and NDMC
- **Composite** indicator blends objective indicators and indices with field input from over **350+ experts**
- **Policy implications** in Farm Bill (USDA), IRS, NOAA-NWS and several state drought plans and task forces
- **"Go to source"** for media and the public

• [droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

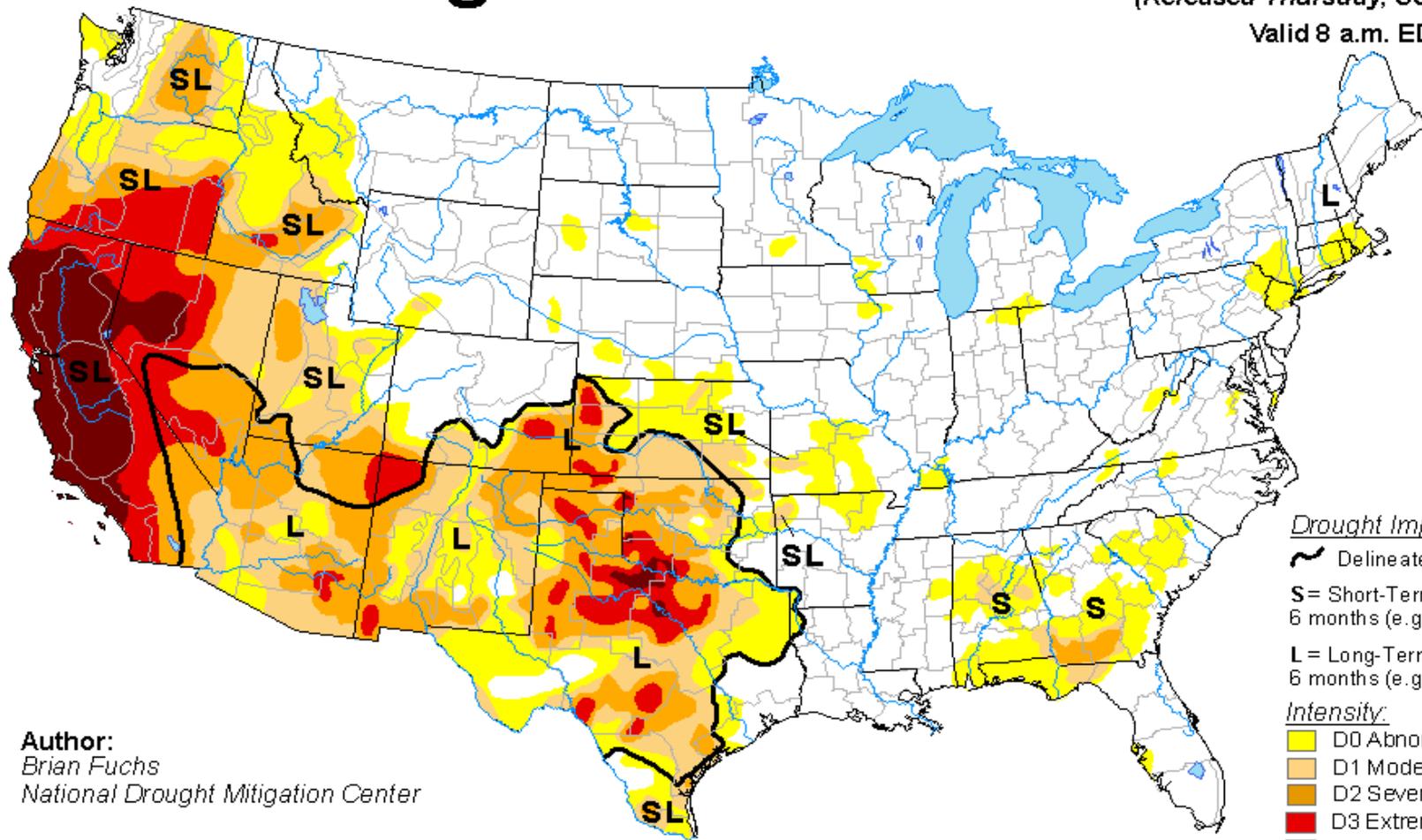


UNIVERSITY OF  
**Nebraska**  
Lincoln



# U.S. Drought Monitor

September 9, 2014  
(Released Thursday, Sep. 11, 2014)  
Valid 8 a.m. EDT



Author:  
Brian Fuchs  
National Drought Mitigation Center

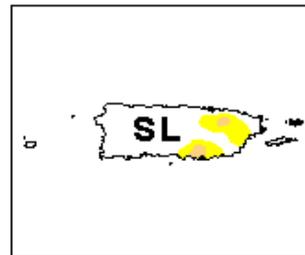
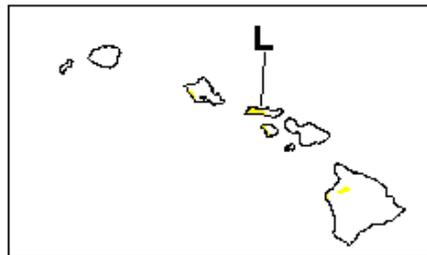
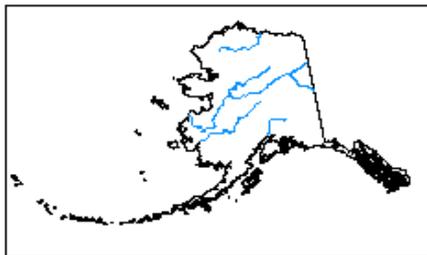
### Drought Impact Types:

- Delineates dominant impacts
- S** = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L** = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

### Intensity:

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

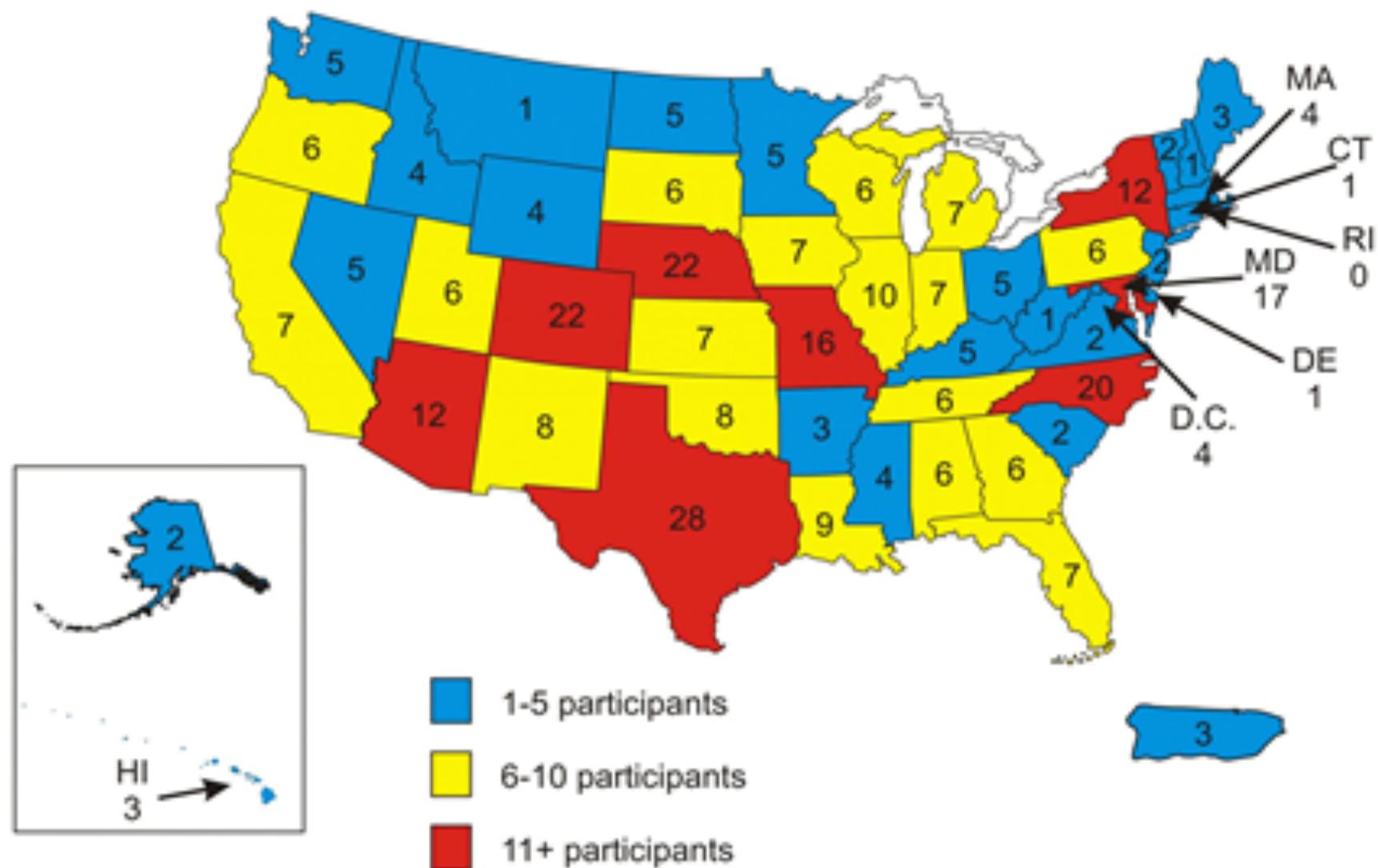
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



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

# USDM Listserve Subscribers

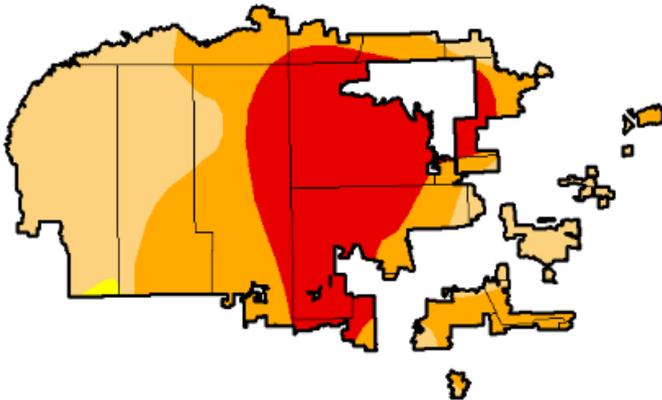
(as of September 4, 2014)



Total: 351 (does not include 1 participant from Canada and 2 participants from Brazil)

## Four Corners Tribal Land Region

### U.S. Drought Monitor 4 Corners



**July 22, 2014**

(Released Thursday, Jul. 24, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
<b>Current</b>	0.00	0.40	35.28	32.92	31.41	0.00
<b>Last Week</b> 7/15/2014	0.00	0.40	35.24	41.23	23.14	0.00
<b>3 Months Ago</b> 4/22/2014	0.00	0.51	43.86	55.63	0.00	0.00
<b>Start of Calendar Year</b> 1/01/2013	7.22	24.84	46.57	21.38	0.00	0.00
<b>Start of Water Year</b> 7/01/2013	4.57	16.47	36.65	42.32	0.00	0.00
<b>One Year Ago</b> 7/23/2013	0.00	0.00	0.52	21.88	65.59	12.00

Intensity:

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

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

**Author:**  
David Miskus  
NOAA/NWS/NCEP/CPC



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

## FCTL Announcements

New report documents changes in Navajo Nation lands, offers hope for resilience

Mon, Apr 7 2014, 3:00pm

Navajo Nation declares drought emergency

Mon, Jul 8 2013, 12:00pm

Also see:

Navajo Drought Monitor Depiction

Hopi Drought Monitor Depiction

# U.S. Drought Monitor

## Navajo

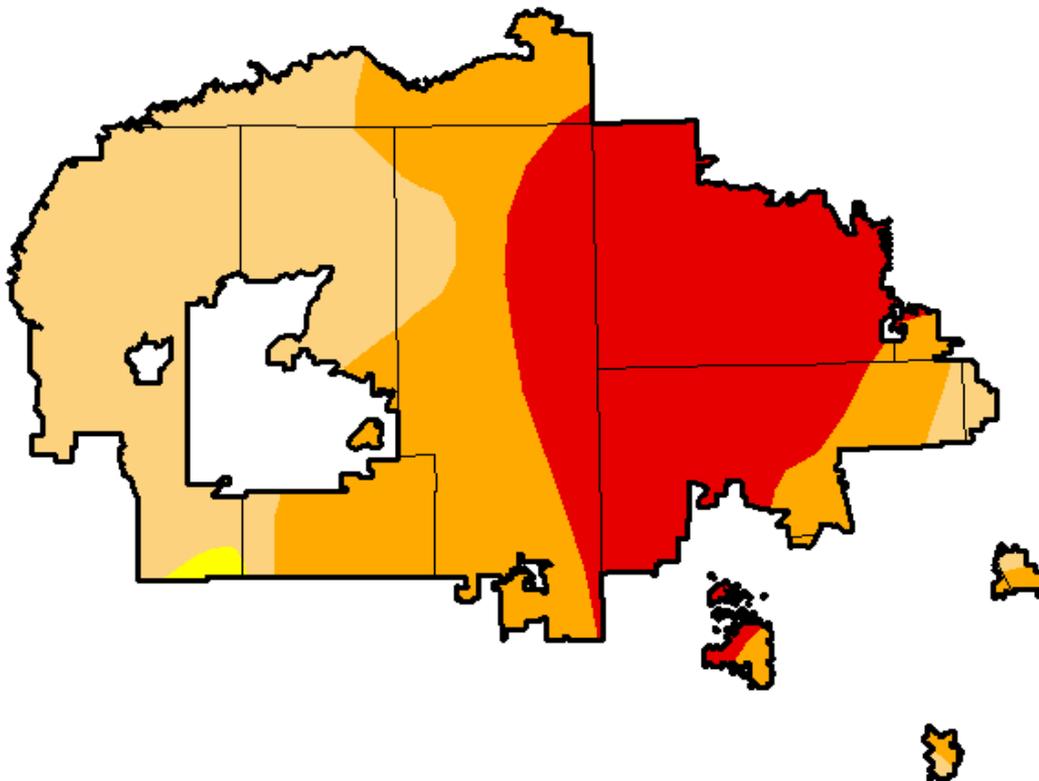
**July 22, 2014**

(Released Thursday, Jul. 24, 2014)

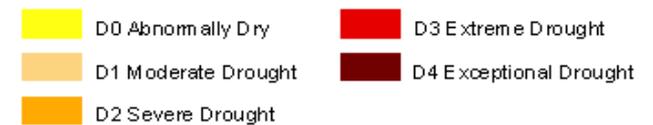
Valid 8 a.m. EDT

*Drought Conditions (Percent Area)*

	None	D0	D1	D2	D3	D4
<b>Current</b>	0.00	0.53	33.71	30.74	35.01	0.00
<b>Last Week</b> <i>7/15/2014</i>	0.00	0.53	33.71	40.29	25.47	0.00
<b>3 Months Ago</b> <i>4/22/2014</i>	0.00	0.53	42.40	57.07	0.00	0.00
<b>Start of Calendar Year</b> <i>12/31/2013</i>	7.31	21.56	47.82	23.32	0.00	0.00
<b>Start of Water Year</b> <i>10/1/2013</i>	6.04	14.36	29.06	50.53	0.00	0.00
<b>One Year Ago</b> <i>7/23/2013</i>	0.00	0.00	0.70	23.58	65.63	10.08



Intensity:



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

**Author:**

David Miskus

NOAA/NWS/NCEP/CPC



# U.S. Drought Monitor

## Hopi

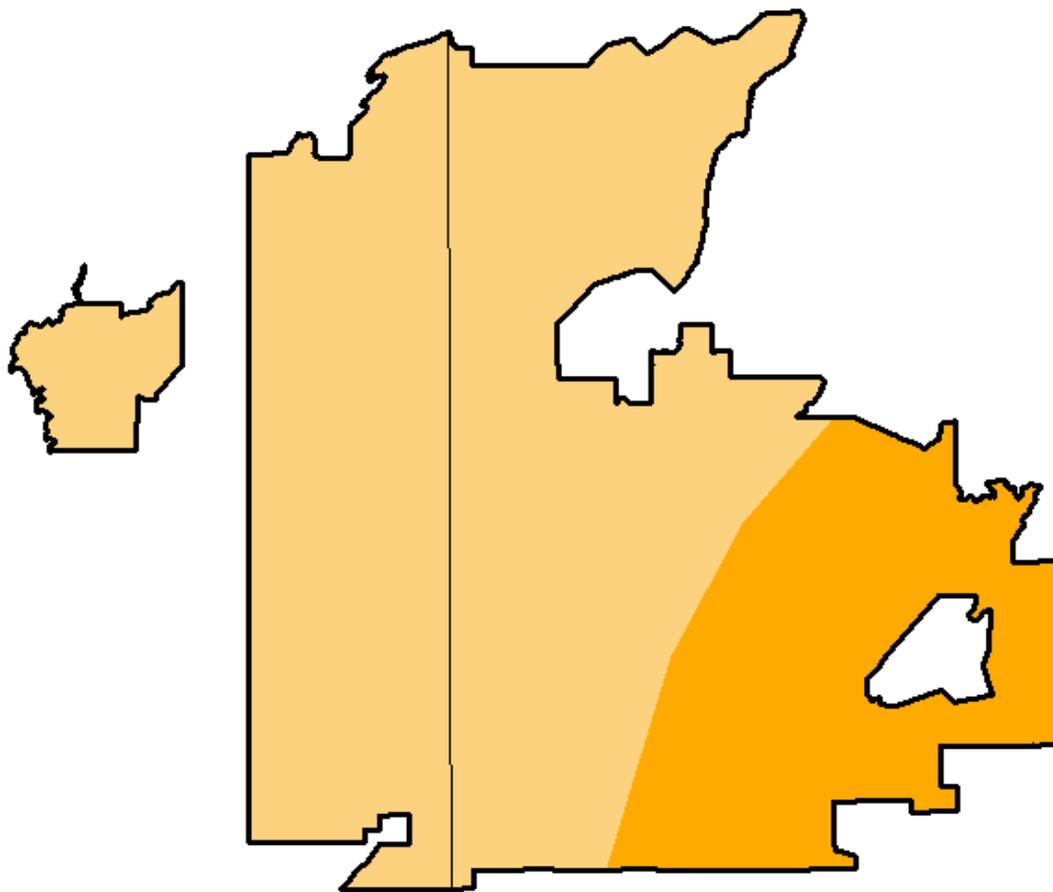
**July 22, 2014**

(Released Thursday, Jul. 24, 2014)

Valid 8 a.m. EDT

*Drought Conditions (Percent Area)*

	None	D0	D1	D2	D3	D4
<b>Current</b>	0.00	0.00	75.20	24.80	0.00	0.00
<b>Last Week</b> <i>7/15/2014</i>	0.00	0.00	75.20	24.80	0.00	0.00
<b>3 Months Ago</b> <i>4/22/2014</i>	0.00	0.00	77.10	22.90	0.00	0.00
<b>Start of Calendar Year</b> <i>12/31/2013</i>	0.08	33.28	43.92	22.72	0.00	0.00
<b>Start of Water Year</b> <i>10/1/2013</i>	0.75	24.42	51.45	23.39	0.00	0.00
<b>One Year Ago</b> <i>7/23/2013</i>	0.00	0.00	0.00	40.48	34.44	25.08



Intensity:

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

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

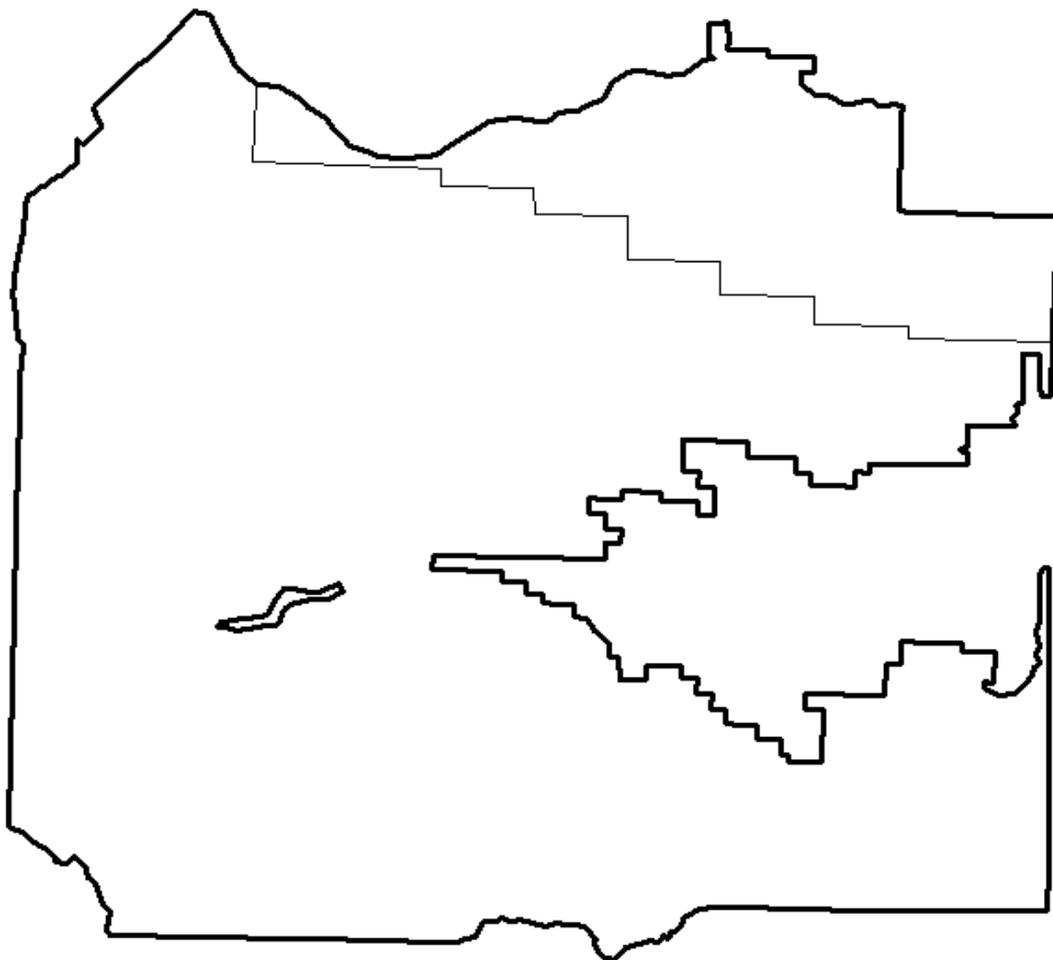
**Author:**

David Miskus  
NOAA/NWS/NCEP/CPC



# U.S. Drought Monitor

## Wind River



**August 12, 2014**  
 (Released Thursday, Aug. 14, 2014)  
 Valid 8 a.m. EDT

*Drought Conditions (Percent Area)*

	None	D0	D1	D2	D3	D4
<b>Current</b>	0.00	0.00	0.00	0.00	0.00	0.00
<b>Last Week</b> <i>8/5/2014</i>	-	-	-	-	-	-
<b>3 Months Ago</b> <i>5/13/2014</i>	-	-	-	-	-	-
<b>Start of Calendar Year</b> <i>12/31/2013</i>	-	-	-	-	-	-
<b>Start of Water Year</b> <i>10/1/2013</i>	-	-	-	-	-	-
<b>One Year Ago</b> <i>8/13/2013</i>	-	-	-	-	-	-

*Intensity:*

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

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

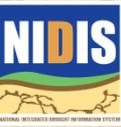
**Author:**  
 Richard Tinker  
 CPC/NOAA/NWS/NCEP



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

# Why Track Drought Impacts?

- Establish an impacts **baseline** for monitoring
  - Face of drought (vulnerability)
  - Climate change
- To know where to direct **relief**
- To reduce **risk** in advance of the next drought
- "**Ground truth**" indices and models
- No single method exists for collecting and/or **quantifying** drought losses
- Very little in the way of **environmental** or **qualitative** collection



# Promoting the “drought impact reporting” idea to volunteers...

- \* **14,000+ volunteers covering all 50 states and now into Canada!!**

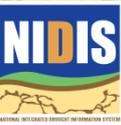
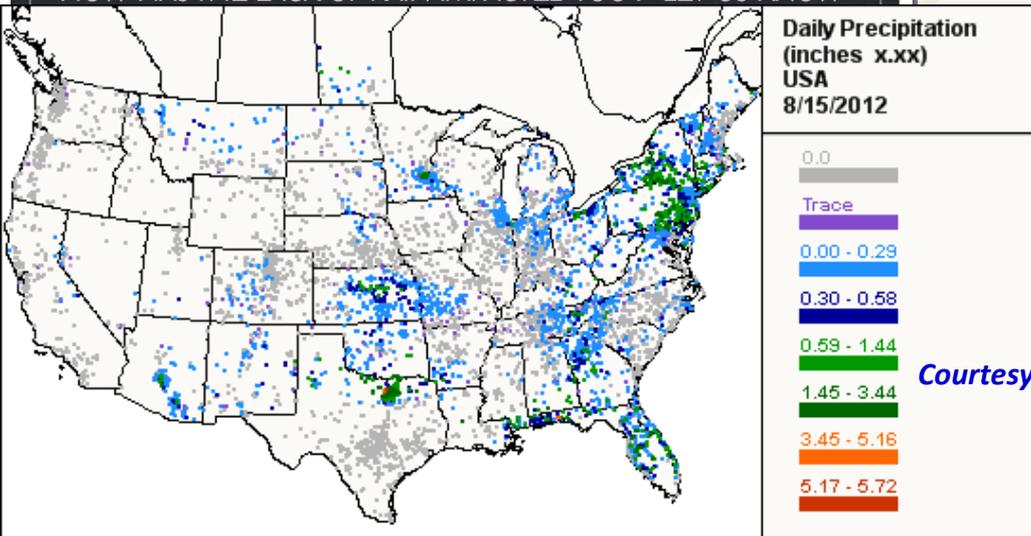
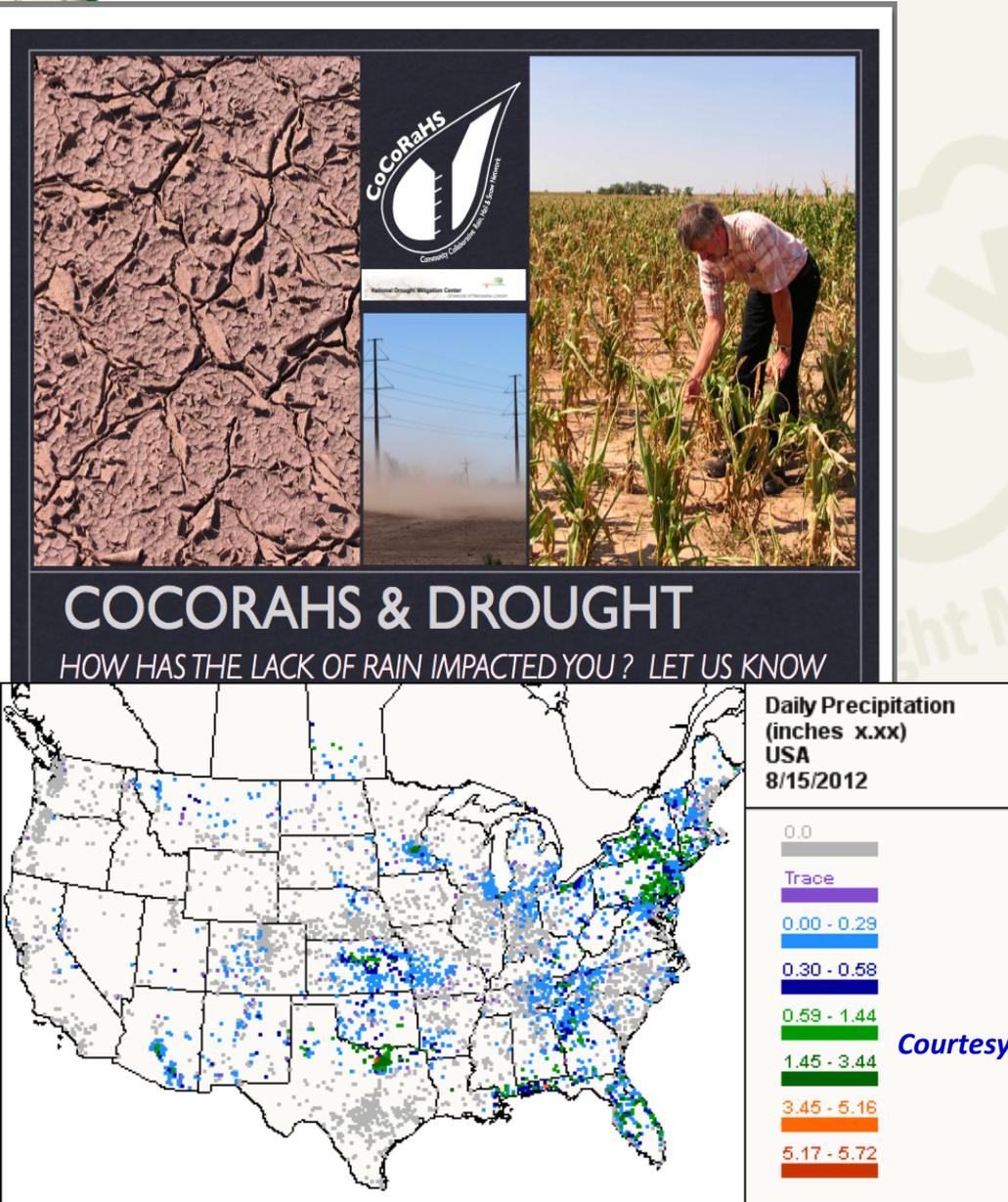
- \* **CoCoRaHS “Message of the Day”**

- \* **Monthly e-mail reminders**

- \* **Guide to reporting drought impacts**

- \* **Banners on the Web**

*Courtesy: Henry Reges, Colorado State University*



# Drought Impact Reporter (DIR):

- On-line since **2005**
- **28,000+** media reports and **18,000+** impacts in our database to date and growing
- Establishing a **"baseline"** of impacts due to droughts over time
  - "Face of drought"
  - Risk/vulnerability
  - Climate change
- **Ground truth** indices/RS
- Quantitative **AND** qualitative
- Direct **AND** Indirect

• [droughtreporter.unl.edu](http://droughtreporter.unl.edu)

Map | Advanced Search | Submit a Report | About the DIR | Help

Refresh

Impacts & Reports | Overlays

Impacts

Opacity: 80%

Impacts Legend:

- 0
- 5 - 8
- 9 - 11
- 12 - 14
- 15 - 17
- 18 - 20

Reports

Time Period

Location

Categories

Report Types

All States | 01-01-2013 - 02-01-2013

Impact Counts | Impacts List | Page 1/8 | Report Counts | Reports List | Page 1/27

Total Impacts | All States: 73

Category	
Agriculture	43
Business & Industry	6
Fire	8
Plants & Wildlife	7
Relief, Response & Restrictions	50
Society & Public Health	7
Tourism & Recreation	4
Water Supply & Quality	20

Report Source	
Media	41
User	2

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phone: (402) 472-6707 | fax: (402) 472-2946 | Contact Us

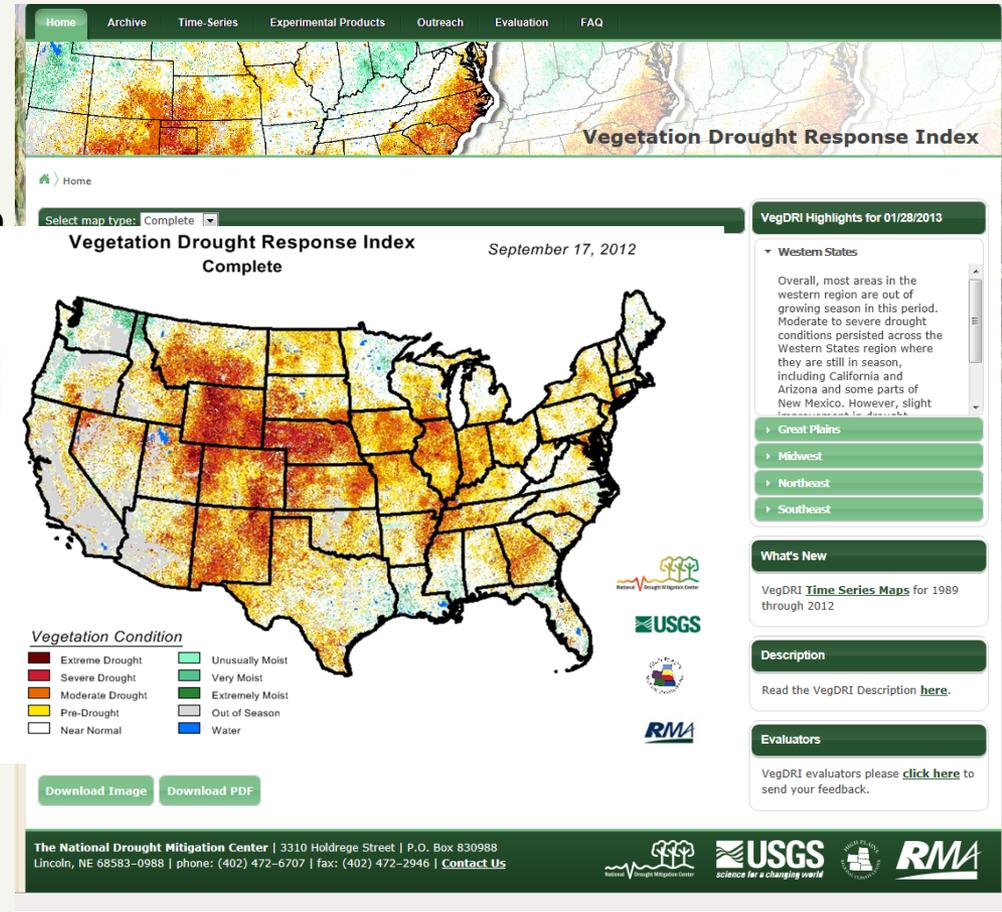
UNIVERSITY OF Nebraska Lincoln

National Drought Mitigation Center

# Vegetation Drought Response Index (VegDRI):

- **Partnership** w/ USGS + HPRCC
- **20+ year archive** back to 1989
- **Augment *in situ* obs**
- **Hybrid** indicator combines satellite, biophysical and climate indicators together to detect **vegetation stress**
- **Weekly (MODIS) & bi-weekly (AVHRR)** production over contiguous U.S.
- **Value-added products:**
  - National, state and sub-state maps
  - Change maps
  - Area statistics
  - Descriptive narrative
  - Animations

• [veg dri.unl.edu](http://veg dri.unl.edu)



# Vegetation Drought Response Index for South Dakota

Select map type: Complete

## Vegetation Drought Response Index Complete: South Dakota

September 8, 2014

Download Image

Download PDF

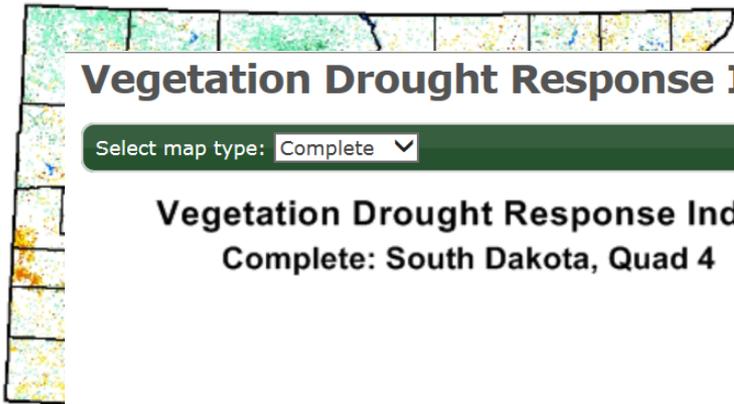
View Statistics

### Vegetation Condition

- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-Drought
- Near Normal

### Reference Map

(Click a region to zoom in further.)



## Vegetation Drought Response Index for South Dakota, Region 4

Select map type: Complete

## Vegetation Drought Response Index Complete: South Dakota, Quad 4

September 8, 2014

Download Image

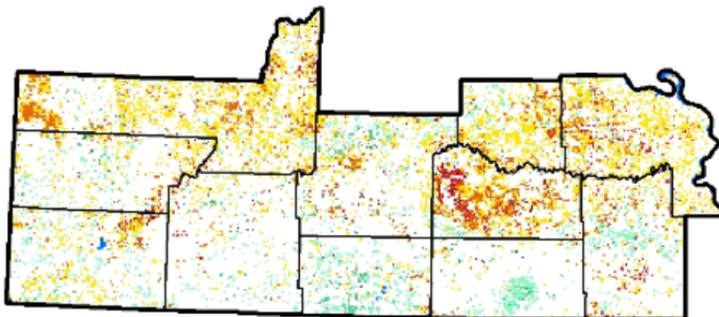
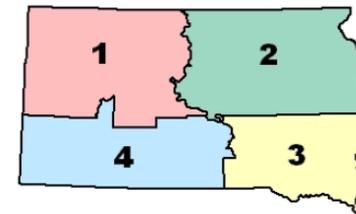
Download PDF

### Vegetation Condition

- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-Drought
- Near Normal
- Unusually Moist
- Very Moist
- Extremely Moist
- Out of Season
- Water

### Reference Map

(Click a region to zoom in further.)



Return to the State map

# Drought Risk Atlas (DRA):

- Launched March 2014
- **~3000** stations archived
  - 139 clusters/regions developed and analyzed
  - SPI, SPEI, PDSI, sc-PDSI and Deciles through 2010
  - Weekly gridded maps for all parameters back to early 1900s
- Created to answer questions about the **characteristics of drought:**
  - Frequency/return periods
  - Duration
  - Trends
  - Intensity
  - Spatial extent

- ***OPEN for business!***
- ***Droughtatlas.unl.edu***

Friday, February 01, 2013

**Drought Risk Atlas**

Home | Climate | Data | Methodology | About | Help

Current Location » Home

### Welcome to the Drought Risk Atlas

#### Introduction

The idea of updating and expanding a national drought atlas was developed from the original Drought Atlas that was done in conjunction with United States Army Corps of Engineers by Hoskings, Wallis and Guttman in the early 1990s. The original Drought Atlas consisted of those stations in the Historical Climate Network (HCN), numbering approximately 1,000 stations. The period of record at the time was limited, as many stations only had records from the 1940s to present, and these data points were put into their respective climate divisions. A monthly time step was used to calculate the Palmer Drought Severity Index (PDSI). With the new Drought Atlas, bringing precise data down to spatial scales that would allow decision makers to use this tool to better understand drought in their respective region and to make a better decision.

For the new National Drought Atlas, the idea was to expand the data both in the number of stations analyzed and the period of record to include the most complete long-term stations, some of which are not part of the HCN. Using a weekly time-step to calculate multiple drought indices at each station location, not on a climate division scale, allows for a more precise representation of drought histories. The Standardized Precipitation Index (SPI), Palmer Drought Severity Index (PDSI), Deciles, the United States Drought Monitor and other Climatological data are included in the new drought atlas. Along with the Climatological data, gridded maps created on a weekly time-step are available for the entire United States.

#### Climate Data Map

The National Drought Mitigation Center | 3310 Holdrege Street | P.O. Box 830988 | Lincoln, NE 68583-0988  
phone: (402) 472-6707 | fax: (402) 472-2946 | Contact Us

UNIVERSITY OF Nebraska Lincoln

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Similar Stations

### 390559: BELLE FOURCHE

#### Latitude

44.671

#### Longitude

-103.851

#### Elevation (ft)

3020

#### State

South Dakota

#### County

Butte

#### Climate Division

1

#### Time Period

6/1/1908 - 12/31/2009

#### Years on Record

104

#### Precipitation

No

[Download Metadata](#)

## Atlas Region



Welcome to the Drought ... Web Slice Gallery



#### Date

1/1/1908 to 12/31/2009

Period of Record

Station start date: 6/1/1908

#### Aggregate

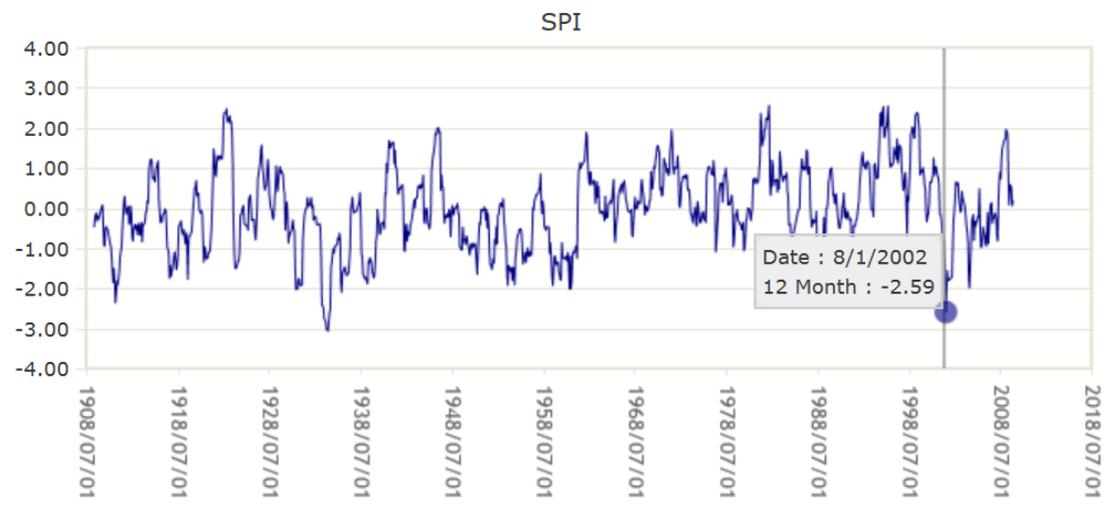
Month

#### Timestep

Select one or more timesteps to compare.

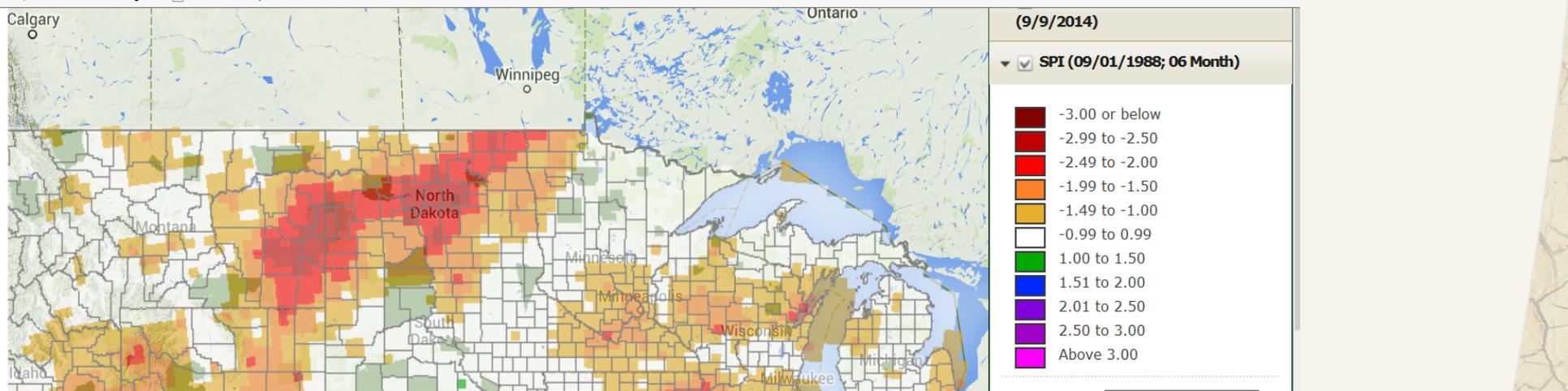
- 1 month
- 2 month
- 3 month
- 4 month
- 5 month
- 6 month
- 7 month
- 8 month
- 9 month
- 10 month
- 11 month
- 12 month
- 18 month
- 24 month
- 36 month
- 48 month

Results for **BELLE FOURCHE (390559)** for the 12 Month timestep(s) between 6/1/1908 and 12/31/2009 and aggregated by month.



- |   |  |  |  |   |
|---|--|--|--|---|
| <span style="color: blue;">■</span> 1 Month       | <span style="color: yellow;">■</span> 5 Month  | <span style="color: green;">■</span> 9 Month     | <span style="color: orange;">■</span> 18 Month | <span style="color: red;">■</span> 60 Month       |
| <span style="color: lightgreen;">■</span> 2 Month | <span style="color: magenta;">■</span> 6 Month | <span style="color: pink;">■</span> 10 Month     | <span style="color: teal;">■</span> 24 Month   | <span style="color: darkgreen;">■</span> 72 Month |
| <span style="color: red;">■</span> 3 Month        | <span style="color: brown;">■</span> 7 Month   | <span style="color: purple;">■</span> 11 Month   | <span style="color: blue;">■</span> 36 Month   | <span style="color: grey;">■</span> 84 Month      |
| <span style="color: cyan;">■</span> 4 Month       | <span style="color: olive;">■</span> 8 Month   | <span style="color: darkblue;">■</span> 12 Month | <span style="color: brown;">■</span> 48 Month  | <span style="color: black;">■</span> 96 Month     |

To zoom in on the chart, click and drag across the chart area. To return to the complete chart, double-click in the chart area.



Calgary

Winnipeg

Montana

North Dakota

Minnesota

South Dakota

Wisconsin

Illinois

Michigan

Indiana

Ohio

Ontario

Washington

Utah

Oregon

Idaho

Wyoming

Nebraska

Kansas

Missouri

Arkansas

Louisiana

Alabama

Georgia

Florida

South Carolina

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Virginia

West Virginia

Maryland

Delaware

Pennsylvania

New Jersey

New York

Connecticut

Rhode Island

Massachusetts

Vermont

New Hampshire

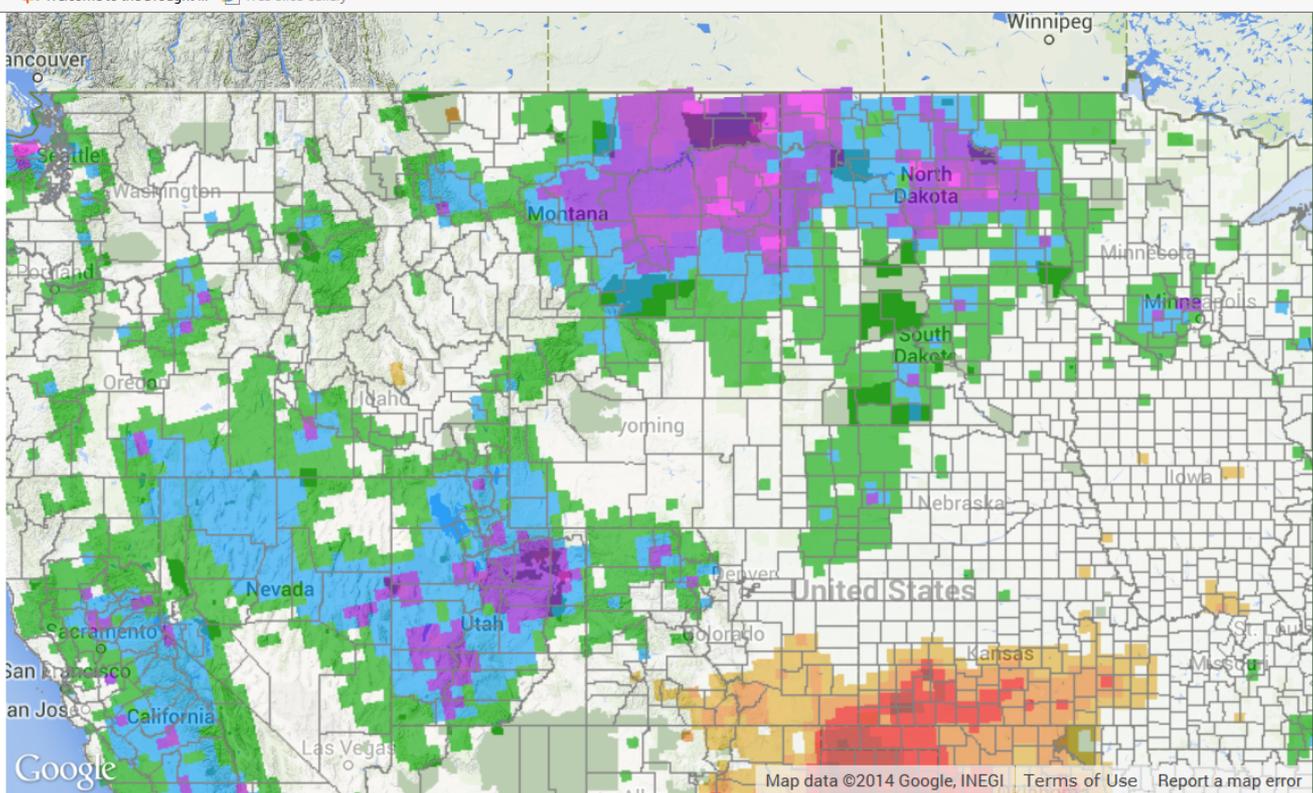
Maine

Hawaii

Alaska

Google

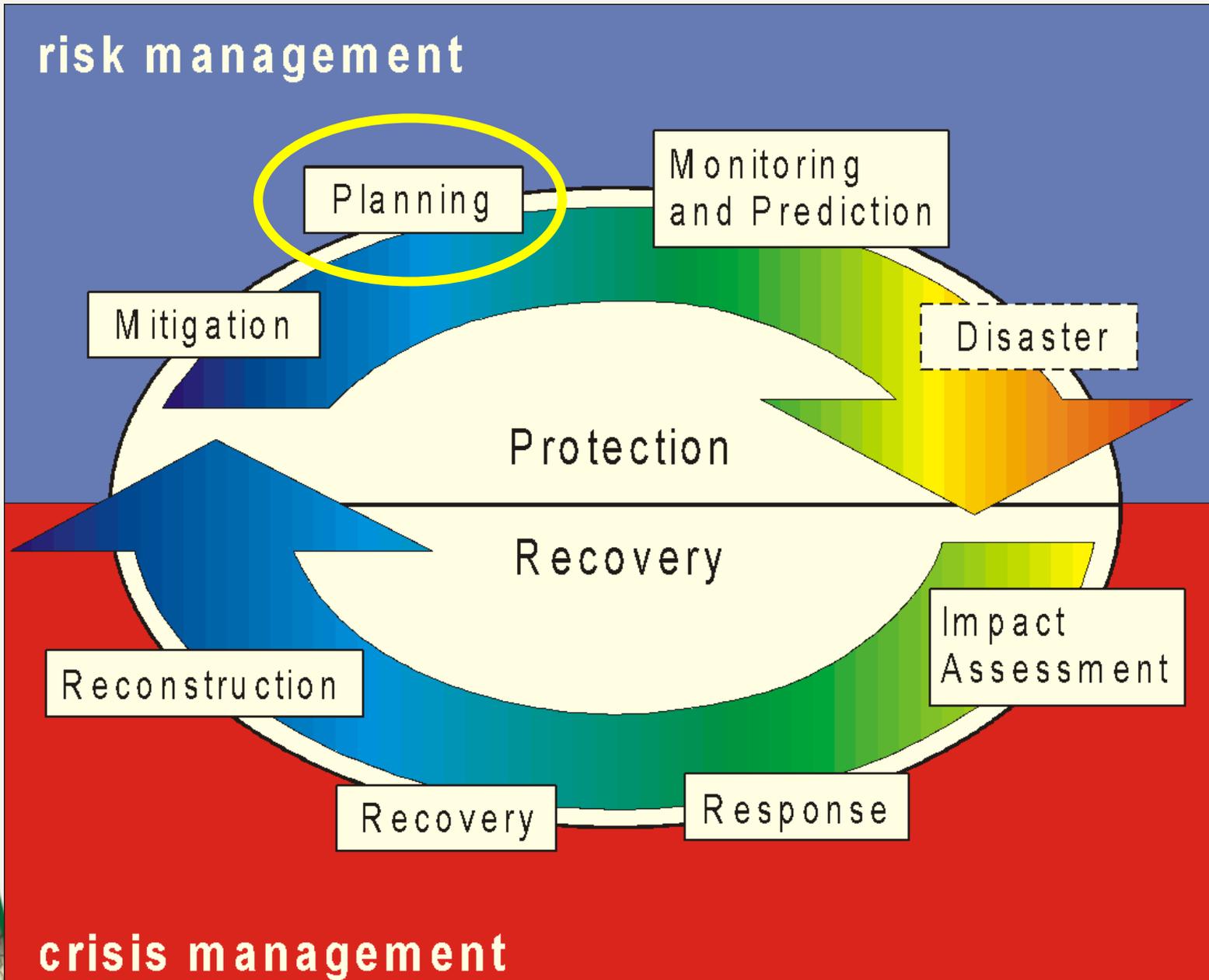
The National Drought Mitigation Center  
phone: (402) 472-6707



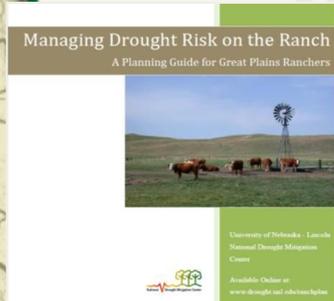
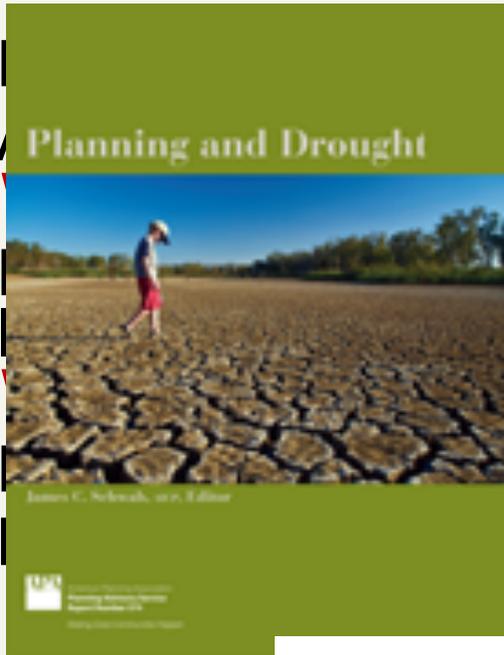
The National Drought Mitigation Center | 3310 Holdrege Street | P.O. Box 830988 | Lincoln, NE 68583-0988  
phone: (402) 472-6707 | fax: (402) 472-2946 | Contact Us



# The Cycle of Disaster Management



# Planning Tools



Friday, November 22, 2013

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**National Drought Mitigation Center**

Home

## Drought Management Database

### Introduction

This is a growing collection of information about what has been tried in responding to and preparing for drought in the United States. It's categorized by sector, that is, information of interest for farming, livestock production, water supply and quality, energy, recreation and tourism, fire, plants and wildlife (environment), and society and public health. Each sector is further divided into subsectors.

The **Full Search** option lets you search by many more criteria, including dates, type of activity (planning, response, monitoring, etc.), decision-making scope (from individual through federal government), by state, and by resource type. You can also do a text search.

Have something to contribute or recommend? Visit the **Submit a Strategy** page.

### Quick Search by Sector

- Farming
- Livestock Production
- Water Supply & Quality
- Energy
- Recreation/Tourism
- Fire
- Plants & Wildlife
- Society & Public Health

### Recent Drought Mitigation News

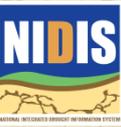
- [State urges steps to prepare for drought in 2014](#)  
Sep. 6, 2013
- [Drought Threat Hampers Hay Crop - Fort Smith Southwest Times Record \(AR\)](#)  
Jul. 21, 2013
- [Mark Keaton: Grazing of toxic plants can be a problem - Baxter Bulletin \(AR\)](#)  
Jul. 17, 2013
- [Fighting wildfires with science - CBS \(NAT\)](#)  
Jul. 7, 2013
- [Nitrate spike tests Des Moines water supplies - Des Moines Register \(IA\)](#)  
Jul. 1, 2013



State

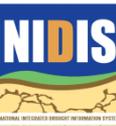
Community

Individual



# Final Thoughts

- ***Boundary organizations*** play a critical engagement and dissemination role in collaboration with many...especially NIDIS
- Developing ***usable*** information and services is critical (trust factor too)
- ***Tools help bridge*** the gap between monitoring/early warning, prediction and preparedness (triggers for decision support)
- Goal is to ***link scientific knowledge w/ the actions*** needed to reduce impacts and future risk



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