

*Managing volunteer observer networks to  
monitor drought and improve water  
resources management*

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Tucson, Arizona, USA

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Water Augmentation, 13 - 16 December 2010, Valparaíso, Chile

# Challenges to drought monitoring

- Drought monitoring at frequent intervals over large geographic areas usually is cost-prohibitive.
- Remotely sensed data often lack the spatial and/or temporal resolution needed to support decision-making at the watershed or basin scale.

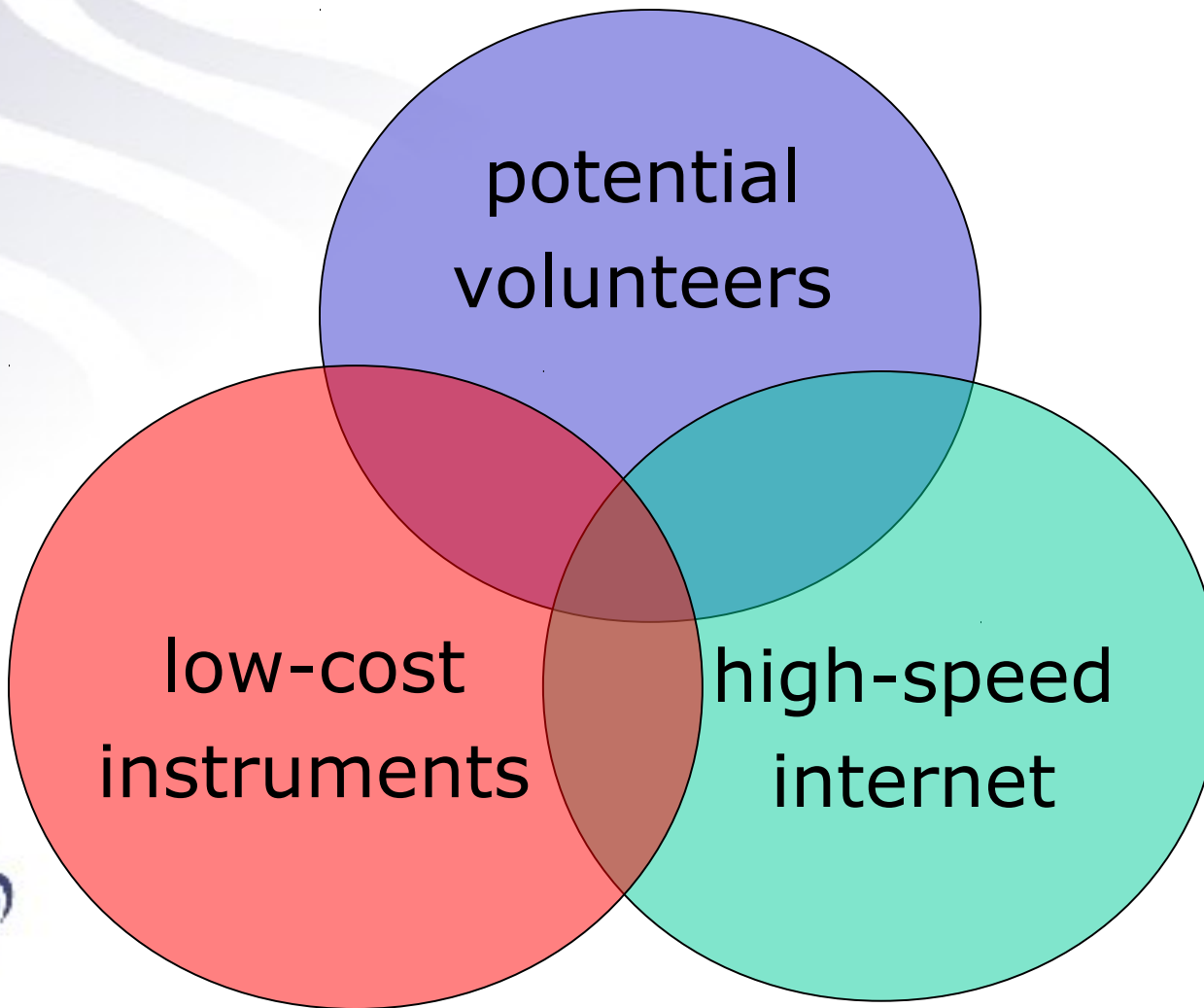
Those monitoring drought conditions often must:

- Use data collected by others for other purposes (e.g., flood early warning)
- Generally do without much soil moisture data
- Attempt to measure parameters that are difficult to quantify, such as vegetation stress

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# Opportunity from convergence of 3 trends:



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# Citizen Scientists for field research can:

- Gather labor-intensive field observations
- Serve as field technicians for instruments
- Become advocates for the science

Examples include:

- Nat'l Weather Service cooperative observers
- Audubon bird surveyors (Christmas census)
- Master Watershed Stewards (AZ)
- Master Well Owners (PA)
- National Phenology Network (AZ)



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# Characteristics of most successful programs

Citizen scientists are recruited, and then they are:

- educated as to the scientific issues being addressed;
- trained to make observations and/or take samples; and
- data reporting mechanisms and quality assurance measures are established.

Volunteers receive positive feedback through:

- opportunities to meet professional researchers;
- seeing their data entered into research databases and graphically visualized; and
- receiving regular updates on the progress of the research and its implications for society.



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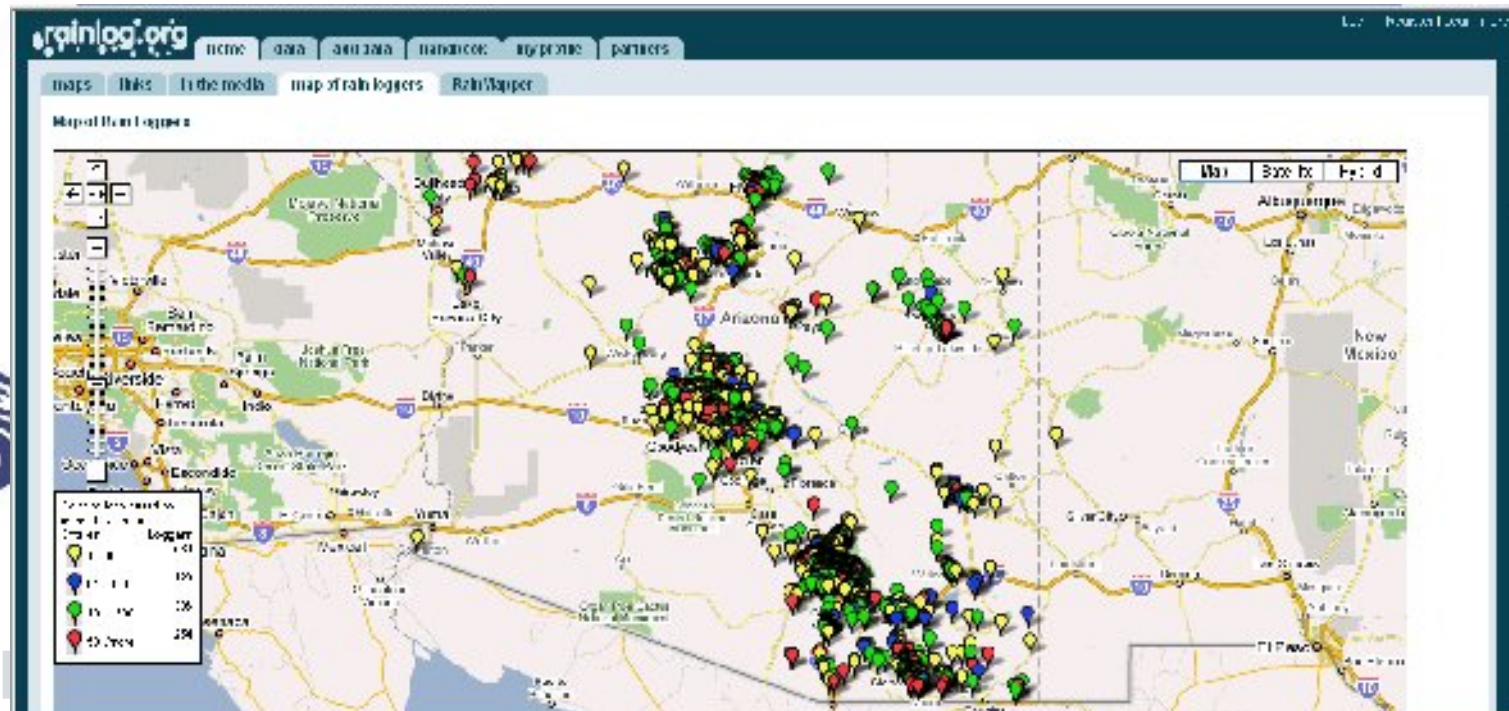
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# RainLog: Volunteer Precipitation Monitoring Network for Arizona

- Has over 1600 volunteers and is continuing to grow
- Additional observations augment existing official networks
- A place for weather fans to post and share their observations
- Network developed to support water resource management and drought monitoring needs
- Opportunity to engage public on climate



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maps

links

in the media

## Report of Rainfall Data for 8/2006



Select predefined region:

Tucson

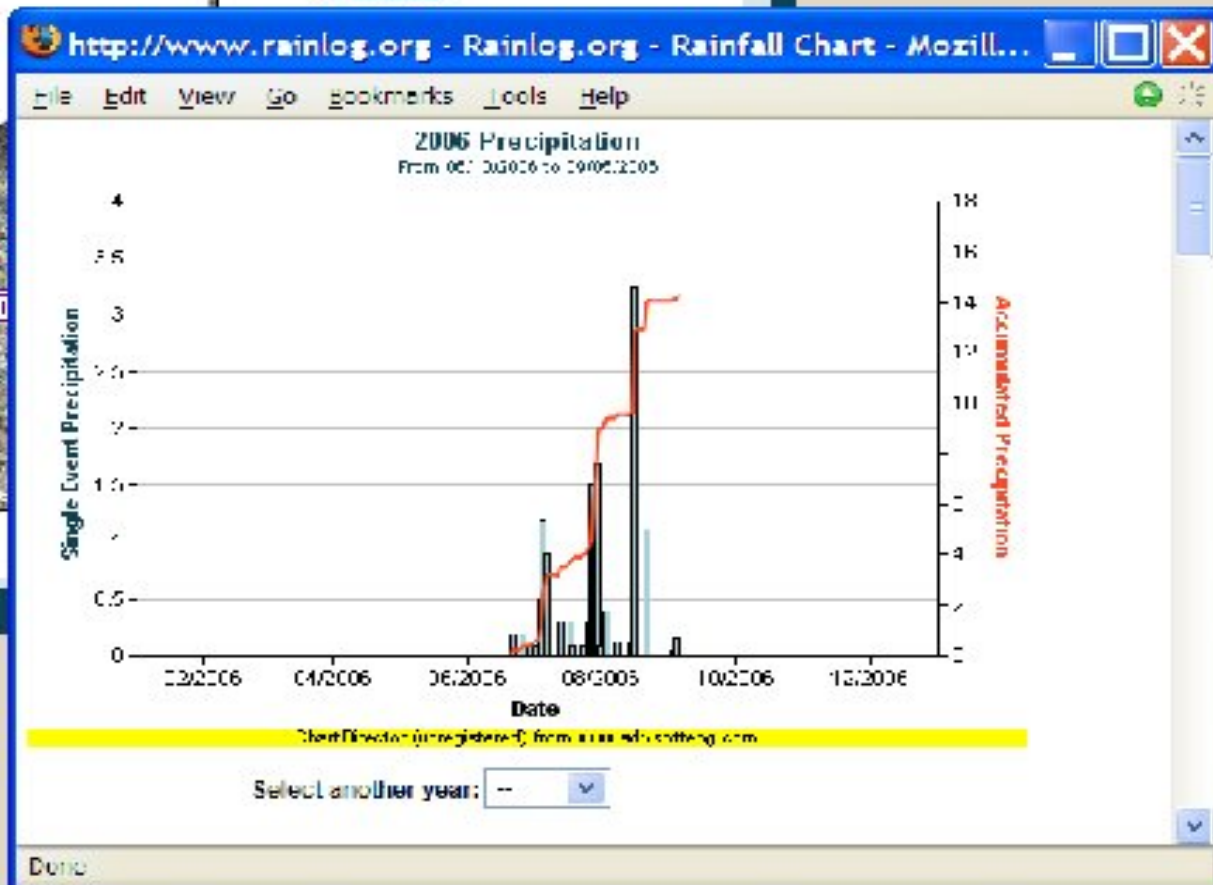
Select a report type:

- Single day
- Date range
- Monthly totals

August

2006

Getreport





# Drought Impact Reporting in Arizona

- Critical link to corroborating observing network data
- Supports better characterization of drought and vulnerability assessments
- Online reporting system developed in coordination with LDIGs
- A cooperative effort between UofA Coop Ext, CLIMAS, OALS, AZ Dept of Water Resources and the GDTF



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# What is a drought impact?

- Drought
  - Cumulative precipitation deficits over a period of time
  - Normal, recurrent climatic phenomena
- Drought Impact
  - Direct impacts to biophysical or environmental systems that rely on water from precipitation (e.g. riparian areas or rangelands)
  - Indirect impacts result from economic and social connections to systems impacted directly (e.g. agricultural production)



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# Why monitor for drought impacts?

- Better characterization of drought in a complex environment
  - Drought declarations and disaster assistance
  - Coordination with national drought monitoring products
- Limited hydro-climatological network in Arizona for drought monitoring
- Impact information can be used for local-level vulnerability assessments and drought planning/mitigation

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# What does it take to observe drought impacts?

- Field expertise (for some impacts)
  - Need to be able to differentiate between 'normal' condition and impact related to drought (e.g. Is vegetation dead or just dormant?)
  - Differentiate between new and old impacts
- Frequent observations of drought sensitive areas and systems
- Interest in tracking down information and local expertise to isolate a new drought impact



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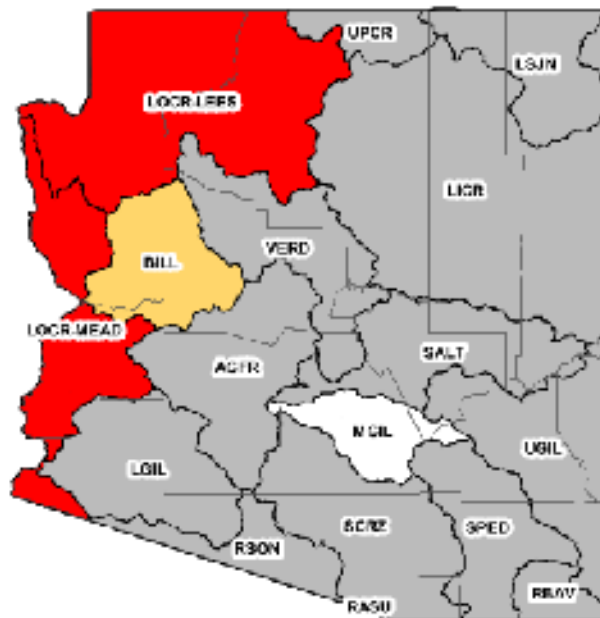
# Arizona DroughtWatch

**AZ DroughtWatch**  
Arizona's Drought Impact Reporting System

*AZ DroughtWatch beta release*

Home My DroughtWatch User Guide Register Latest News About AZ DroughtWatch

## Drought Impacts: November-2010



## Summary Reports

[County and watershed summary tables](#)

[Detailed impact reports](#)

### Impacts Reported

- In 1 of 6 categories
- In 2 of 6 categories
- In 3 of 6 categories
- In 4 of 6 categories
- In 5 of 6 categories
- No reports made

### Categories

- Water
- Agriculture
- Livestock
- Residential
- Tourism
- Ecology

### Watershed Abbreviations

AGLR	Agua Fria River-Lower Gila River
DILL	Dill Williams River
LOCL	Lower Gila River below Painted Rock Dam
LCLR	Little Colorado River
LOCR	Lower Colorado River, Lees Ferry to Lake Mead
LOCM	Lower Colorado River below Lake Mead
LSJR	Lower San Juan River
MGIL	Mohave Gila River (Grand Drought)
RASU	Rio San Juan
RLAV	Rio Lavaca
RSON	Rio Sonoyta
SALT	Salt River
SCRZ	Santa Cruz River
SPED	San Pedro River
UGIL	Upper Gila River
UPCR	Upper Colorado River of Lake Powell Area
USJR	Upper San Juan River

## About AZ DroughtWatch

AZ DroughtWatch is a tool designed to collect qualitative reports of drought impacts across Arizona. This impact information is used in conjunction with meteorological and hydrological data to characterize drought conditions.

[Access report, drought status reports compiled by the Governor's Drought Task Force Monitoring Technical Committee](#)

[Find out more about AZ DroughtWatch](#)

[What's new at AZ DroughtWatch](#)

## Arizona Drought Links

[AZ Dept. of Water Resources - Drought Program](#)

[Rainfall Precipitation Monitoring Network](#)

[U of A Climate Science Applications Program](#)

[Climate Assessment for the Southwest](#)

[AZ State Climate Office](#)

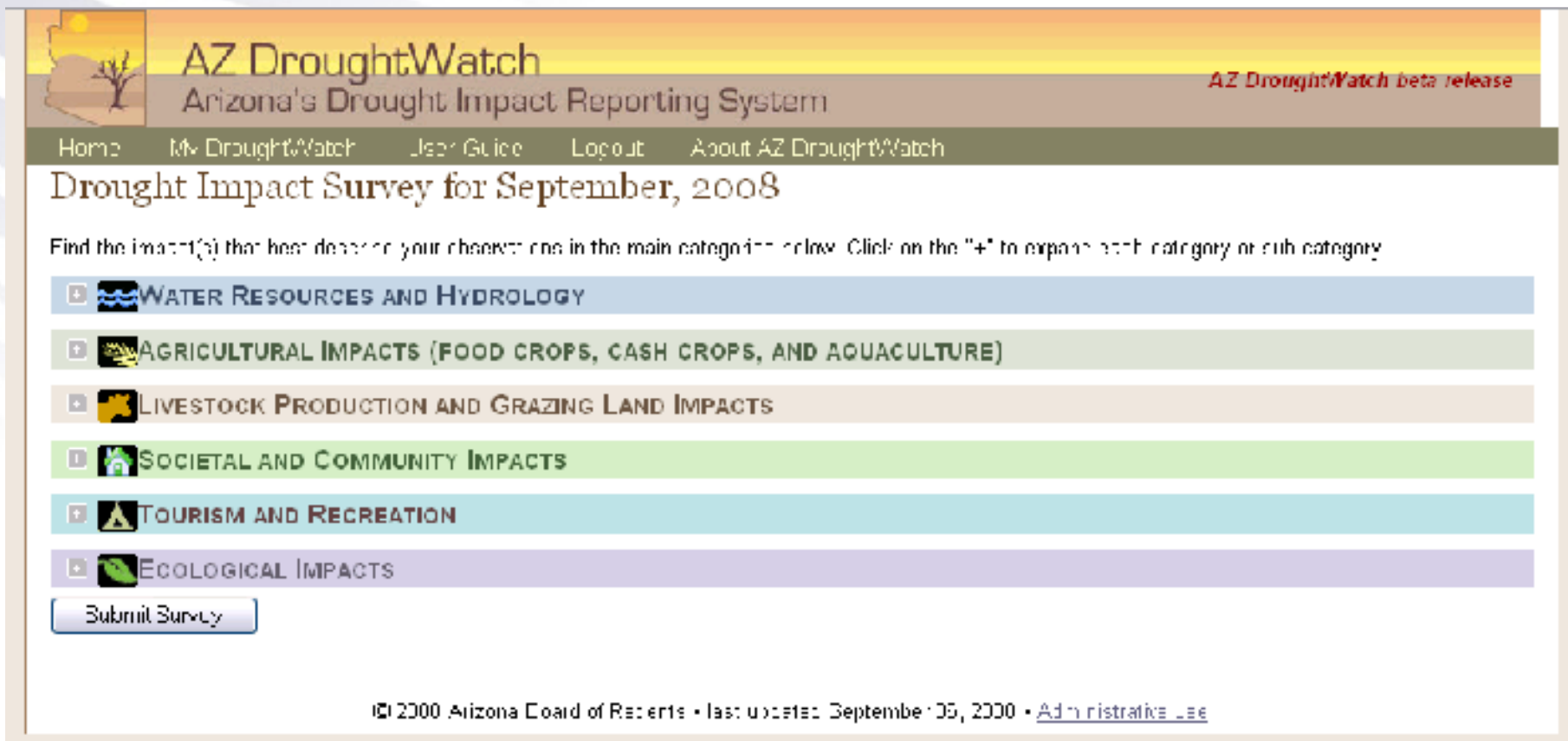
[Arizona Climate Maps - Western Regional Climate Center](#)

[National Integrated Drought Information System](#)

**IRA**

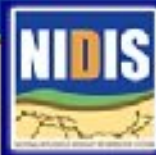
**Center**

# Add Impact Reports



The screenshot shows the AZ DroughtWatch website. At the top left is a logo of Arizona with a tree. The main header reads "AZ DroughtWatch" and "Arizona's Drought Impact Reporting System". On the right, it says "AZ DroughtWatch beta release". Below the header is a navigation bar with links: Home, My DroughtWatch, User Guide, Logout, and About AZ DroughtWatch. The main content area is titled "Drought Impact Survey for September, 2008". Below the title is a paragraph: "Find the impact(s) that best describe your check(s) in the main category or below. Click on the '+' to expand each category or sub category". There are six expandable categories, each with a plus sign icon and a small icon representing the category: 1. WATER RESOURCES AND HYDROLOGY (blue bar, water icon); 2. AGRICULTURAL IMPACTS (FOOD CROPS, CASH CROPS, AND AQUACULTURE) (green bar, crop icon); 3. LIVESTOCK PRODUCTION AND GRAZING LAND IMPACTS (orange bar, cow icon); 4. SOCIETAL AND COMMUNITY IMPACTS (light green bar, house icon); 5. TOURISM AND RECREATION (teal bar, mountain icon); 6. ECOLOGICAL IMPACTS (purple bar, leaf icon). At the bottom left of the main content area is a "Submit Survey" button. At the bottom of the page is a footer: "© 2008 Arizona Board of Regents • last updated: September 05, 2008 • [Administrative Use](#)".





### Area Drought Information

Select State...

Select Region...

### Maps & Tools

- Map Viewer **updated!**
- GIS Resources
- Statewide Portal
- Drought Monitor Graphics
- CRN Soil Data **new!**

### Events & Announcements

- [Southern NIDIS Pilot Call Status Meeting and Southern Climate Outlook Forum - November 28-19, 2010](#)
- [2011 US Drought Risk Assessment Workshop - West 2/2-29, 2011](#)
- [WADW Workshop - Apr 20-25, 2010](#)
- [Workshop on "Wash" - Lake Parkman, GA - Update!](#)

[View Archive](#) | [Print Release Index](#)

### Drought In The News

- [Will 2011 Be A Drought Year? - News Entry - WSF Atlanta](#)
- [Drought predicted for this area | The Post-Standard](#)
- [SDA loans here for drought relief | Central.com](#)
- [Droughts financial impact on state grows a year? - The Courier-Journal](#)
- [Alabama Power to reduce Coosa, Tallapoosa dam flow for forecasted winter drought](#)
- [Drought: areas declared after N.O. drought | Philadelphia Inquirer 11/24/2010](#)

### Featured Products

[Where are Drought Conditions Now?](#)

[How is the Drought Affecting Me?](#)

[Will the Drought Continue?](#)

## U.S. Drought Monitor

November 30, 2010  
Add Print PDF



**Severity**

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

**Drought Impact Types**

- W - California short-term impacts
- A - Agriculture (crops, pasture)
- H - Hydrologic (reservoir, streamflow)
- W - Hydrologic (well)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information, contact your state drought office.

<http://droughtmonitor.com>



### Regional Drought Early Warning Systems



### NIDIS Feature



#### Utah Climate and Water Report

August, 2010



### Drought Information Statements



Click on a highlighted area to view the current NWS Drought Information Statement or click here to select from a list

[View larger map](#)



# Questions?

