



Extending Drought Information to Arizona

Mike Crimmins
Climate Science Extension Specialist
Dept. of Soil, Water, & Environmental Science
& Arizona Cooperative Extension
The University of Arizona

Presentation Overview

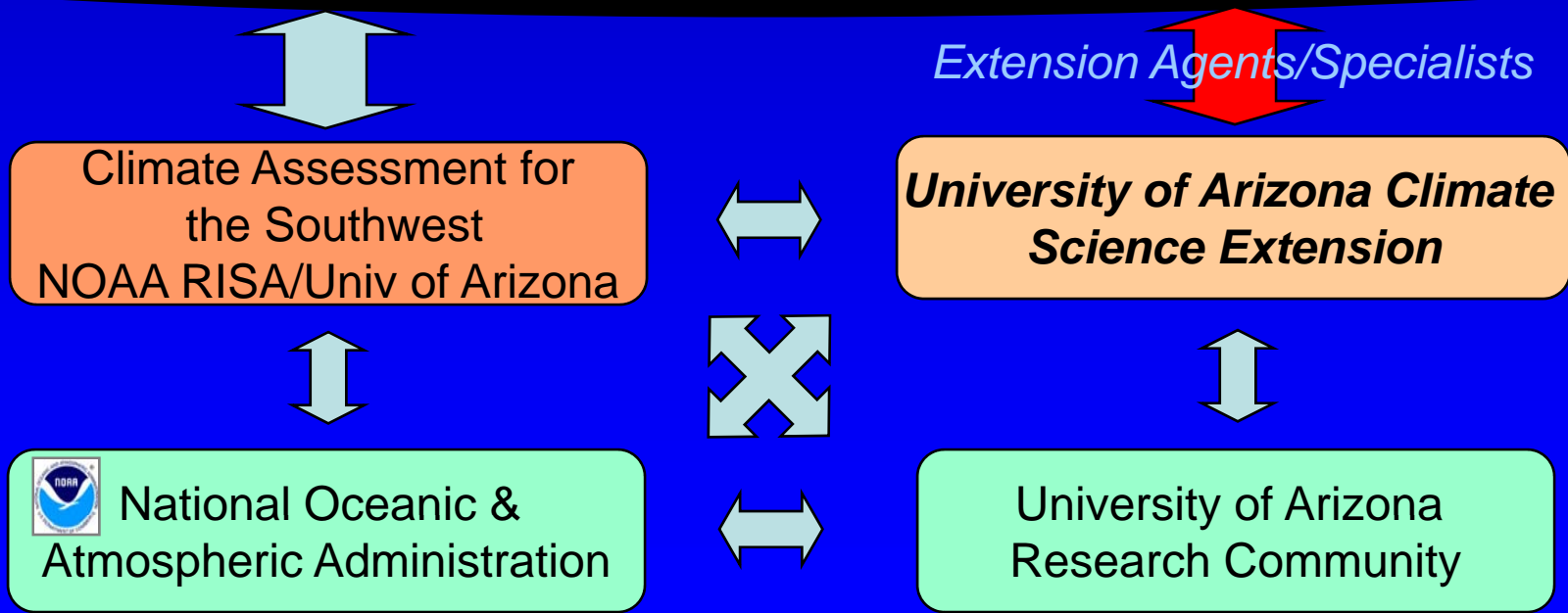
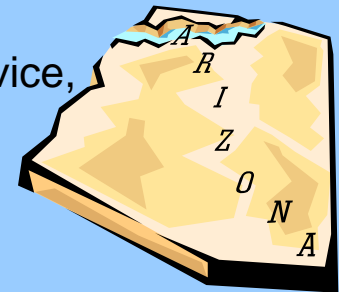
- Climate Science and Cooperative Extension: facilitating partnerships for communicating drought information
- Connecting with diverse stakeholders through volunteer monitoring
- Developing drought decision support tools for rural water management
- Exploring novel communication approaches



Climate Science and Services in Arizona

Snapshot of AZ Climate Science End Users

- **Federal & State Agencies:** U.S. Forest Service, Natural Resources Conservation Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, Arizona Department of Water Resources
- **Professional Societies:** Arizona Society for Range Management, Southwest Vegetation Management Association, Arizona Hydrological Society
- **General Public, Watershed Alliances, Community Groups...**

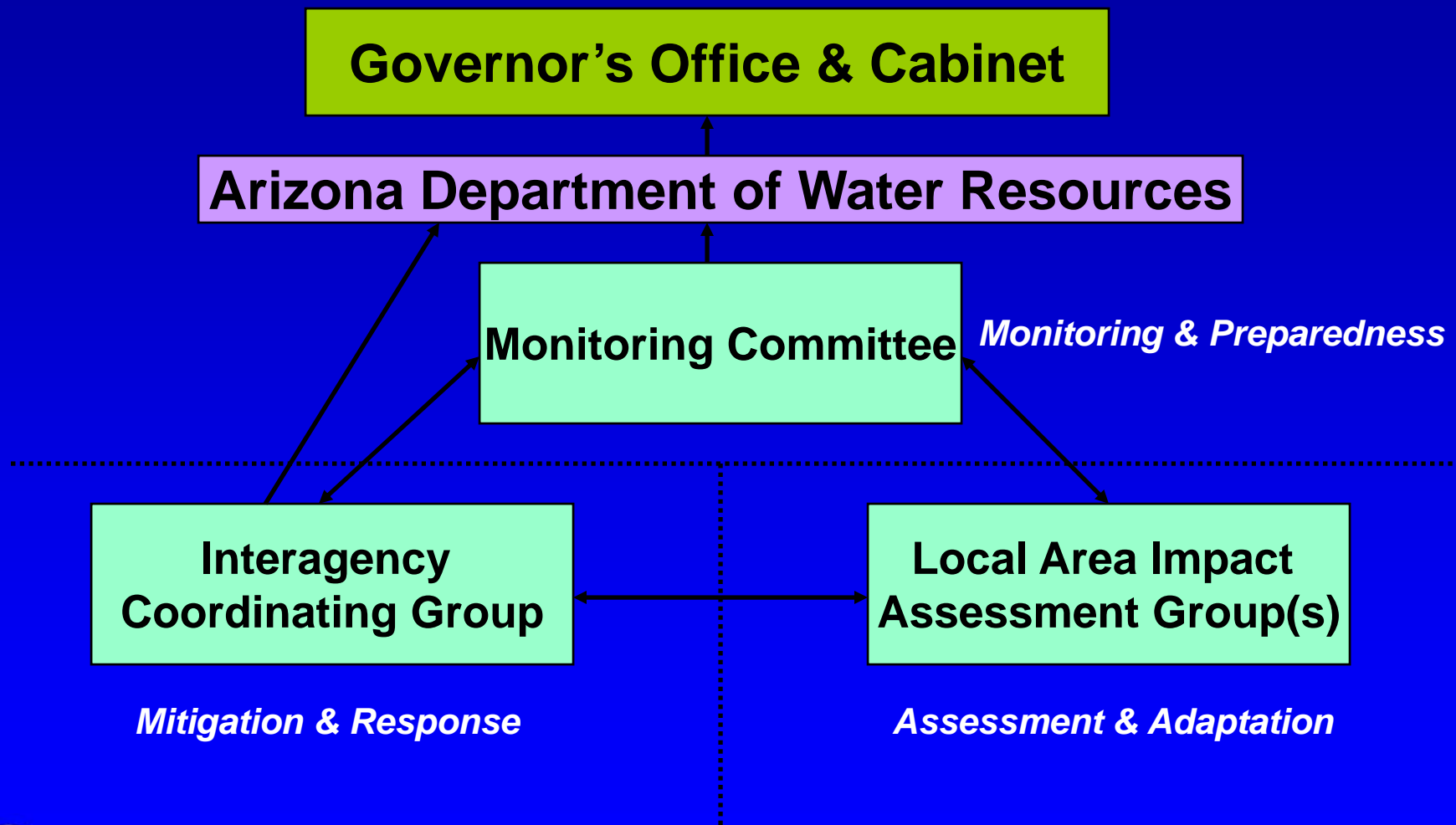


Arizona Drought Preparedness Plan

- Coordinated effort led by ADWR to monitor drought, recommend actions to Governor and provide planning support to citizens of Arizona
- Plan works to empower local communities to develop local drought plans and mitigation strategies
- Growing rural communities are especially vulnerable → organization of Local Drought Impact Groups
- Arizona Cooperative Extension = local coordination and bridging between universities, agencies, and stakeholders



Organizational Structure



From ADWR 2006



Building Bridges: Drought Information Producers and Consumers

- Connect stakeholders with decision-makers and information producers
- Integrate stakeholders into data collection process $\leftarrow \rightarrow$ address information needs
- Efforts underway
 - Rainlog.org - Volunteer precipitation observing network
 - AZ Drought Impact Reporting System
 - Small Community Water System Drought Trigger Development Tool
 - Arizona Hydrologic Information System

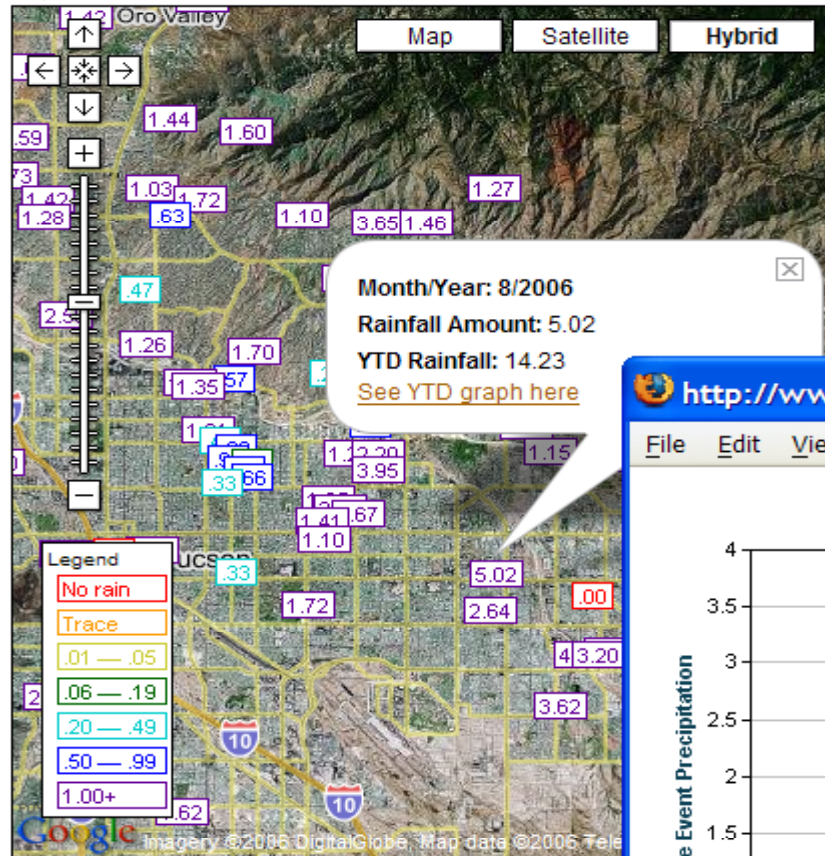


RainLog: Volunteer Precipitation Monitoring Network for Arizona

- Network developed by SAHRA and Arizona Cooperative Extension in support of state drought monitoring needs
- Has over 600 volunteers and is continuing to grow
- Complementary to existing observing networks
- Engages citizens on issues related to drought, climate variability, and data collection (QA/QC, monitoring strategies)



Report of Rainfall Data for 8/2006



Select predefined region:

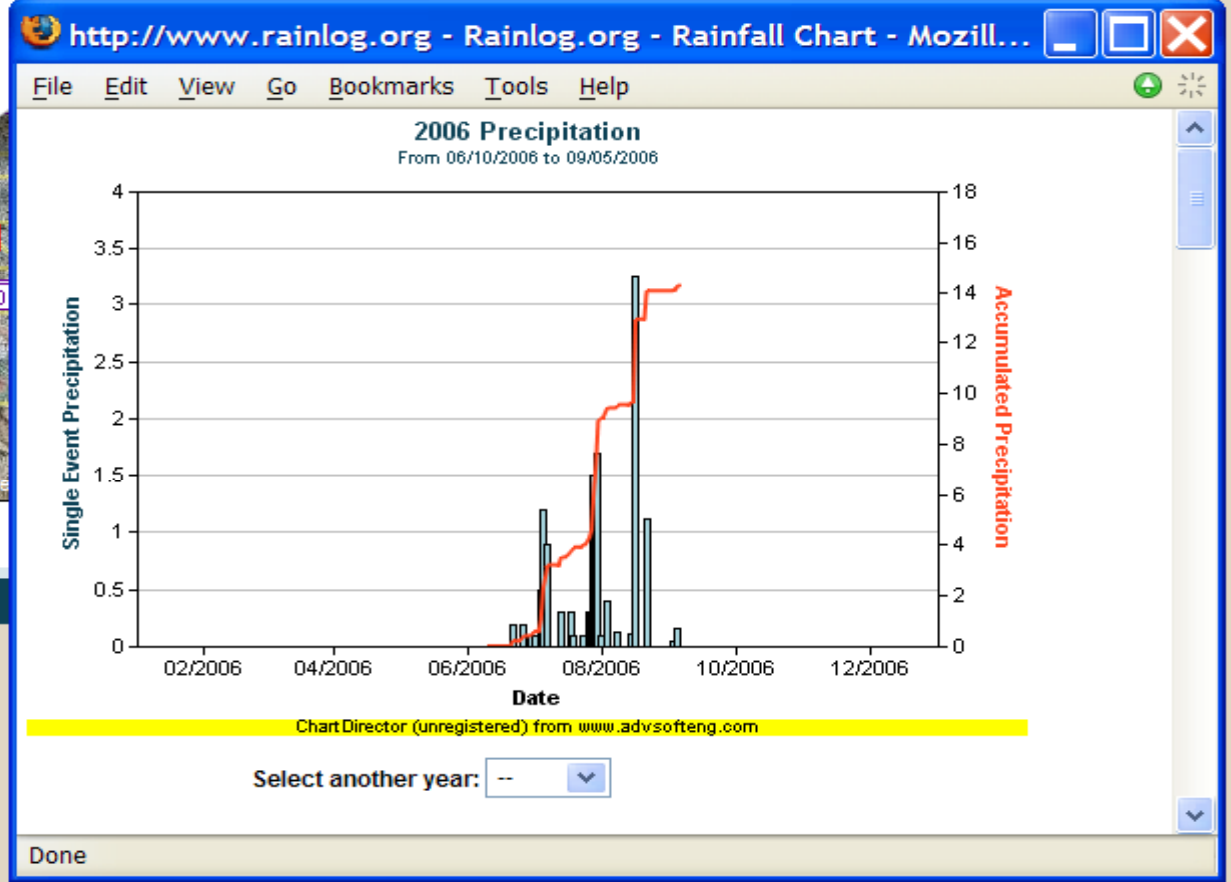
Tucson

Select a report type:

- Single day
- Date range
- Monthly totals

August 2006

Get report



My RainLog

- Encouraging volunteers to submit, store, and manage their own historical data
- Special functions and tools to create reports and graphics
- Historical data allows for calculations of averages and percentiles useful in drought monitoring
- Many detailed records submitted, ongoing solicitation for more historical data

rainlog.org home data add data handbook my profile partners

Log out Mike Crimmins | Learn more

daily month grid monthly entries

Monthly Rain Data for August, 2006

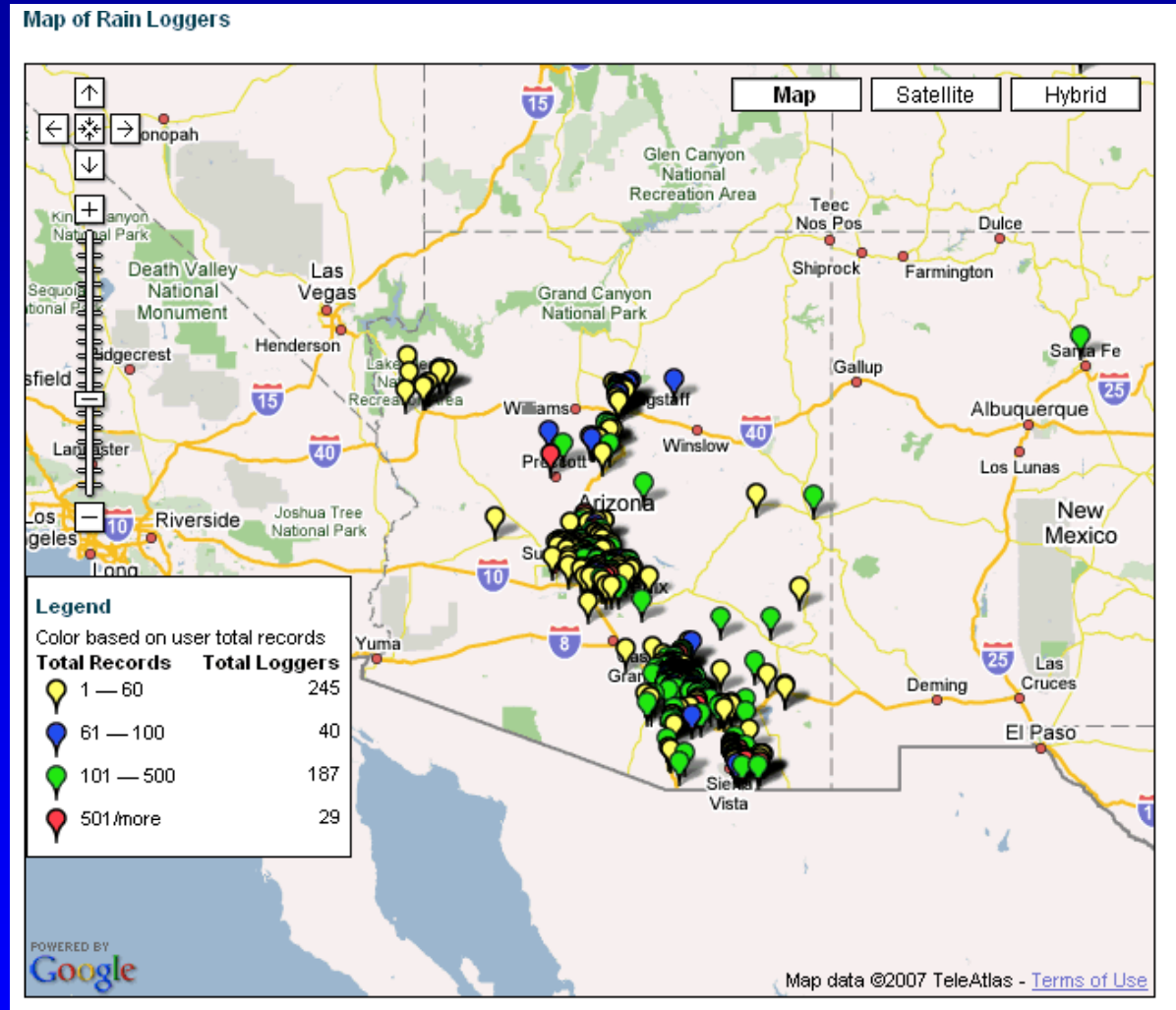
< Previous month
Next month >
jump to: ▾

Enter your rain gauge data below. Red columns are required. Dates in the future are not presented.

Gauge Read On	Will Report On	Check to Save	Total Precipitation	Reading Time 00-23 : 00-59	Quality	Comments
<input type="checkbox"/> Check all						
08/01	07/31	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/02	08/01	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/03	08/02	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/04	08/03	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/05	08/04	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/06	08/05	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/07	08/06	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/08	08/07	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/09	08/08	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/10	08/09	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/11	08/10	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/12	08/11	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/13	08/12	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/14	08/13	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/15	08/14	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/16	08/15	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0
08/17	08/16	<input type="checkbox"/>	0.0	07 : 00	Good ▾	0



Current Rainlog Volunteer Map: 600 members



Rainlog: Low Tech/High Tech Engagement Strategies



...y to seasonal rainfall
...ches (direct reporting to
...fices)

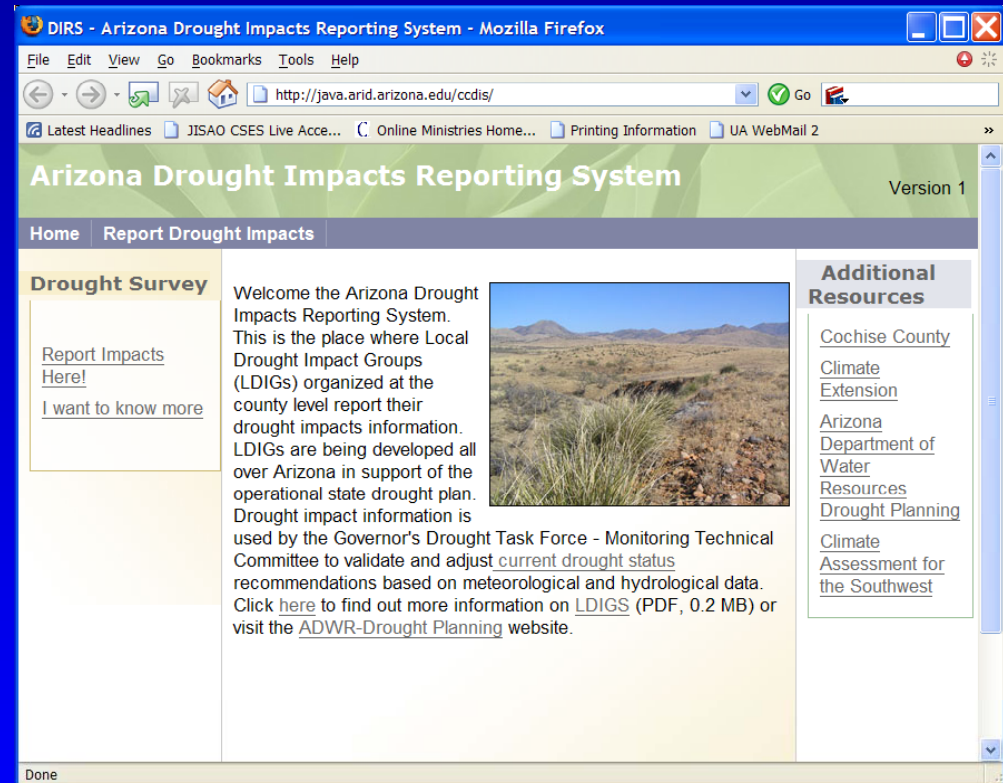
...sive 'home weather
.../...

- Tipping bucket measurement
- Rainlog server
- Developing soil moisture

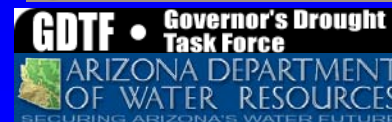


Arizona Drought Impacts Reporting System

- Critical link to corroborating GDTF-MTC monthly drought status reports
- Online reporting system was recommended by county-level drought monitoring volunteers
- Reporting questionnaire developed with guidance from both county-level volunteers and members of GDTF-MTC



OFFICE OF ARID LANDS STUDIES



Climate Science Applications Program - Arizona



Arizona Drought Impacts Reporting System

- Expansion of system is underway
- Enhanced profile management and mapping capabilities being developed
- Integration with Rainlog and AzHIS
- Development is in coordination with NDMC

DIRS Survey - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://java.arid.arizona.edu/ccdis/jsp/survey/

Latest Headlines JISAO CSES Live Acce... Online Ministries Home... Printing Information UA WebMail 2 UofA CSAP - Home Page

DIRS - Survey Version 1

Home Report Drought Impacts

Arizona Drought Impacts Reporting System - Current Drought Impacts

Name Email

Address Phone

Geographic Reporting Area (E.G. Nearest Town, Township/Range, Lat/Long, Hydrologic Unit Code)

Economic

Costs and losses to agricultural producers		
Impact	Observed?	Trend
A1 Damage to crop quality	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Worse <input type="radio"/> Same <input type="radio"/> Better
A2 Income loss to farmers due to reduced crop yield	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Worse <input type="radio"/> Same <input type="radio"/> Better
A3 Reduced productivity of cropland (wind erosion, long-term loss of organic matter, etc.)	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Worse <input type="radio"/> Same <input type="radio"/> Better
A4 Insect infestation	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Worse <input type="radio"/> Same <input type="radio"/> Better
A5 Plant disease	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Worse <input type="radio"/> Same <input type="radio"/> Better
A6 Wildlife damage to crops	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Worse <input type="radio"/> Same <input type="radio"/> Better
A7 Increased irrigation costs	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Worse <input type="radio"/> Same <input type="radio"/> Better
A8 Cost of new or supplemental water resources development (wells, dams, pipelines)	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Worse <input type="radio"/> Same <input type="radio"/> Better

Comments/specific causes

Done



Drought Trigger Development Tool for Small Community Water Systems

- Over 800 water providers in AZ serve populations of less than 1,800 people
- AZ House Bill 2277 mandates that all small water providers develop drought response plans
- Triggering of drought response should be based on specific sensitivity of provider
- Decision support tool under development to assist providers in trigger assessments
 - Hydro-climate/groundwater monitoring analysis
 - Vulnerability self-assessment tool
 - Retrospective analysis of statewide drought status relative to local impacts to providers
 - Integration into AzHIS



Exploring new forms of communication...




Camera and Voice

Climate PPT

El Niño & Winter-Spring 2006-07 Climate Outlook

December 13, 2006

**Ben Crawford
Mike Crimmins
Gregg Garfin**
University of Arizona



Attendee List (12)

My Status

- Michael Crimmins
- Sheila Merrigan
- Anna H. Spitz
- Cado Daily

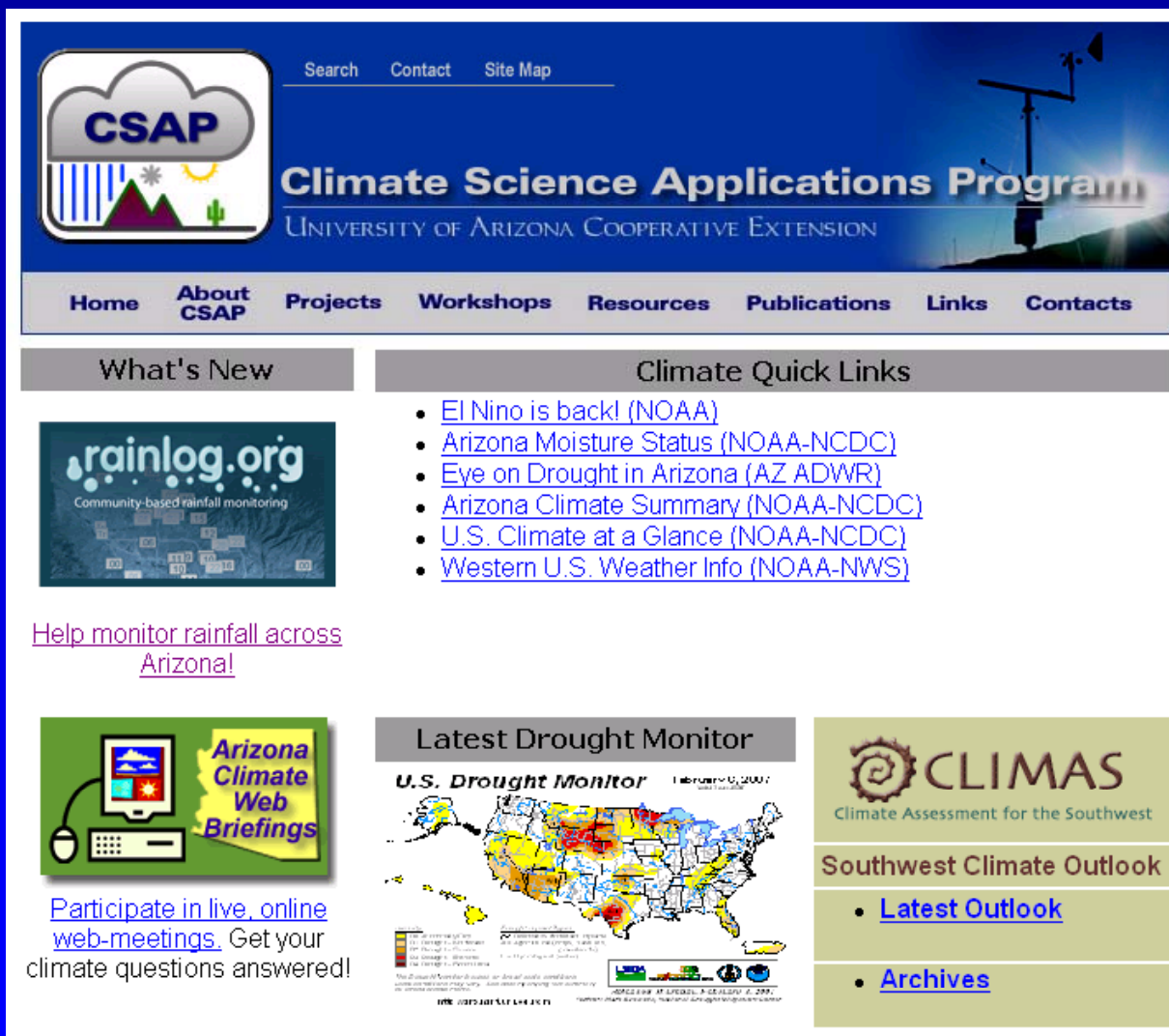
Chat

Tony Haffer: Ahhhhhhhhhhhhh.....
it's MIKE C!!!!

Tony Haffer: how are you guy?

<http://cals.arizona.edu/climate/ws/breeze.htm>

Thanks!



The screenshot shows the CSAP website homepage. At the top left is the CSAP logo, which includes a cloud with 'CSAP' text and icons for rain, snow, sun, and mountains. To the right of the logo are links for 'Search', 'Contact', and 'Site Map'. Below the logo is the text 'Climate Science Applications Program' and 'UNIVERSITY OF ARIZONA COOPERATIVE EXTENSION'. A navigation bar contains links for 'Home', 'About CSAP', 'Projects', 'Workshops', 'Resources', 'Publications', 'Links', and 'Contacts'. The main content area is divided into two columns. The left column is titled 'What's New' and features a 'rainlog.org' banner with the text 'Community-based rainfall monitoring'. Below this is a link: 'Help monitor rainfall across Arizona!'. The right column is titled 'Climate Quick Links' and contains a list of links: 'El Nino is back! (NOAA)', 'Arizona Moisture Status (NOAA-NCDC)', 'Eye on Drought in Arizona (AZ ADWR)', 'Arizona Climate Summary (NOAA-NCDC)', 'U.S. Climate at a Glance (NOAA-NCDC)', and 'Western U.S. Weather Info (NOAA-NWS)'. Below the 'What's New' section is an 'Arizona Climate Web Briefings' banner with a computer icon and the text 'Participate in live, online web-meetings. Get your climate questions answered!'. Below the 'Climate Quick Links' section is a 'Latest Drought Monitor' banner featuring a map of the U.S. with a color-coded drought scale. To the right of the drought monitor is a 'CLIMAS' banner with the text 'Climate Assessment for the Southwest' and 'Southwest Climate Outlook', which includes links for 'Latest Outlook' and 'Archives'.



Climate Science Applications Program - Arizona Cooperative Extension

<http://cals.arizona.edu/climate>



Climate Science Applications Program

University of Arizona Cooperative Extension

A rounded rectangular box with a white background and a black border. At the top, the text "Climate Science Applications Program" is written in blue inside a grey cloud shape. Below this are several weather-related icons: vertical blue lines representing rain, a grey snowflake, a yellow sun with rays, a green mountain range, and a green saguaro cactus. At the bottom, the text "University of Arizona Cooperative Extension" is written in blue.

A consortium of Arizona's three universities focused on water sustainability through research, technical assistance, education and technology.

The Arizona Water Institute logo features a stylized green plant with a yellow sun behind it. The text "ARIZONA WATER INSTITUTE" is displayed in blue and green. To the right, a quote in italics describes the institute as a consortium of Arizona's three universities focused on water sustainability through research, technical assistance, education and technology.