

Monitoring drought on the Colorado Plateau

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The University of Arizona



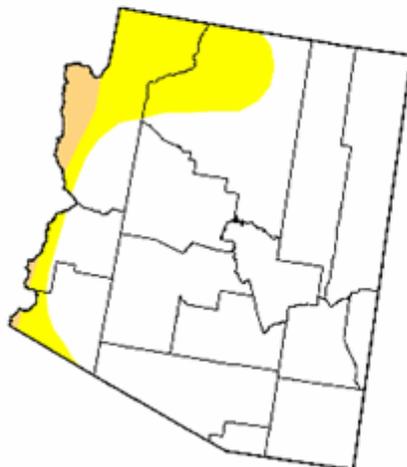
U.S. Drought Monitor

Arizona

August 26, 2008
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	83.2	16.8	2.3	0.0	0.0	0.0
Last Week (08/19/2008 map)	83.2	16.8	2.3	0.0	0.0	0.0
3 Months Ago (06/03/2008 map)	44.3	55.7	18.9	0.0	0.0	0.0
Start of Calendar Year (01/01/2008 map)	23.1	76.9	48.7	30.8	0.0	0.0
Start of Water Year (10/02/2007 map)	12.9	87.1	63.6	40.5	27.2	0.0
One Year Ago (08/28/2007 map)	11.4	88.6	67.9	50.8	27.2	0.0



Intensity:

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

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



Released Thursday

Author: J. Lawrimore/L. Love-Brown

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

Drought creeping back into Arizona?

U.S. Drought Monitor

Arizona

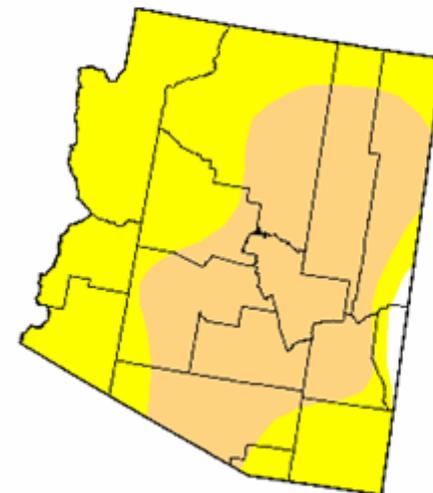
September 1, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.2	98.8	47.3	0.0	0.0	0.0
Last Week (08/25/2009 map)	10.3	89.7	47.3	0.0	0.0	0.0
3 Months Ago (06/09/2009 map)	35.2	64.8	7.2	0.0	0.0	0.0
Start of Calendar Year (01/06/2009 map)	62.3	37.7	1.0	0.0	0.0	0.0
Start of Water Year (10/07/2008 map)	83.1	16.9	0.8	0.0	0.0	0.0
One Year Ago (09/02/2008 map)	83.2	16.8	5.1	0.0	0.0	0.0

Intensity:

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



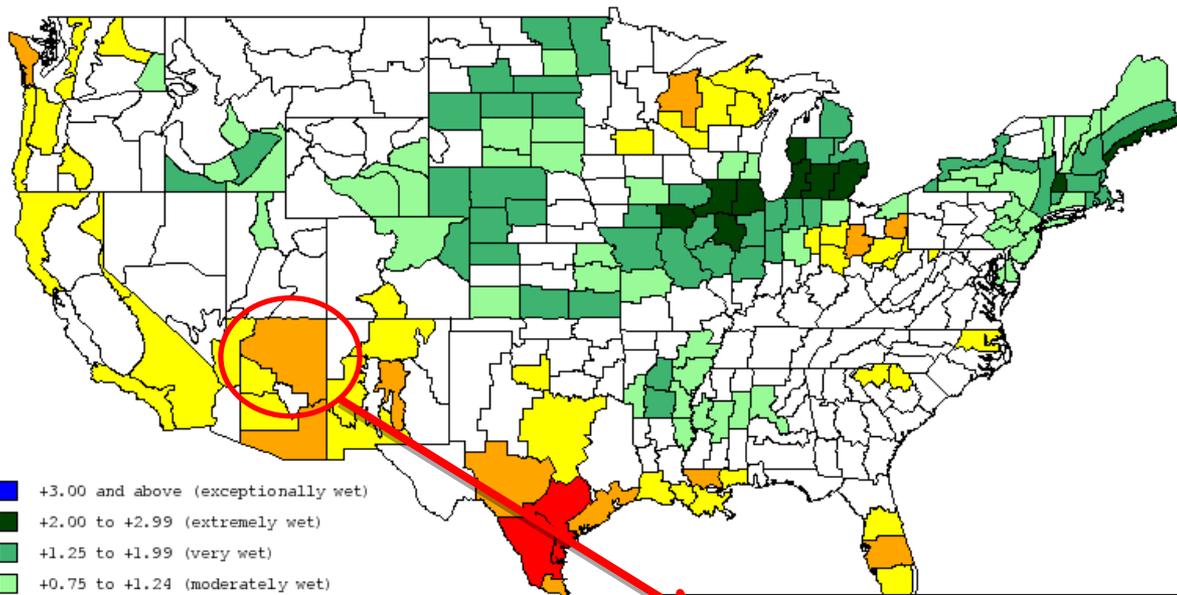
Released Thursday, September 3, 2009
Author: Brad Rippey, U.S. Department of Agriculture

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



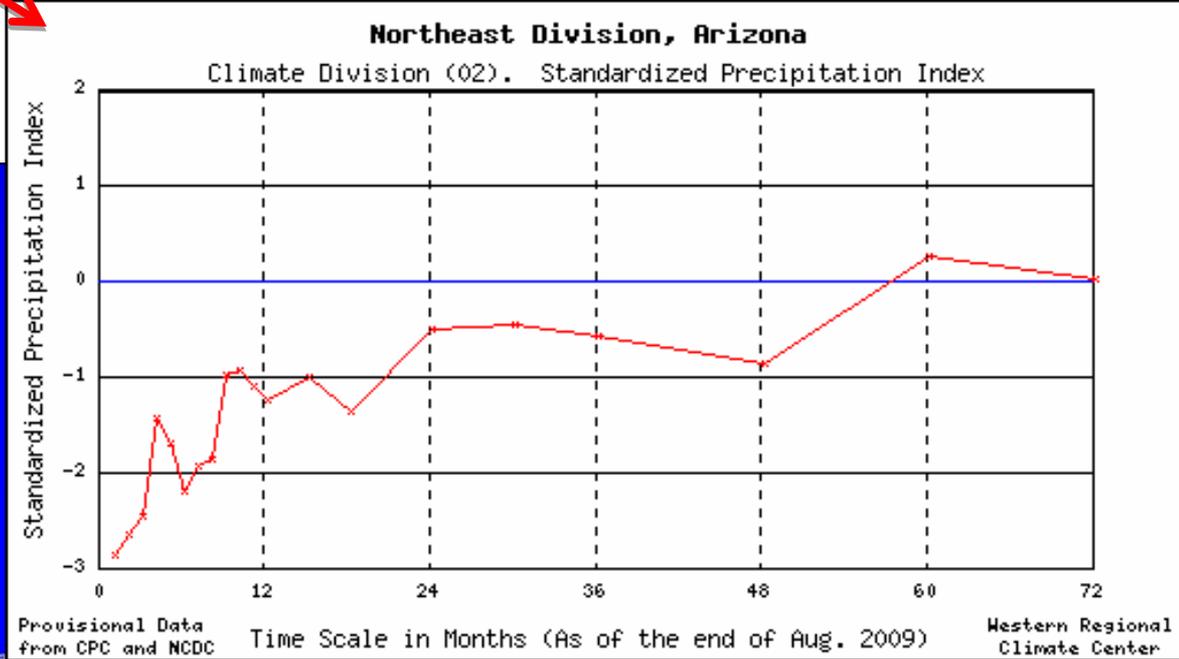
Climate Science Applications Program - Arizona Cooperative Extension

12-month Standardized Precipitation Index through the end of August 2009



- +3.00 and above (exceptionally wet)
- +2.00 to +2.99 (extremely wet)
- +1.25 to +1.99 (very wet)
- +0.75 to +1.24 (moderately wet)
- -0.74 to +0.74 (near normal)
- -1.24 to -0.75 (moderately dry)
- -1.99 to -1.25 (very dry)
- -2.99 to -2.00 (extremely dry)
- -3.00 and below (exceptionally dry)

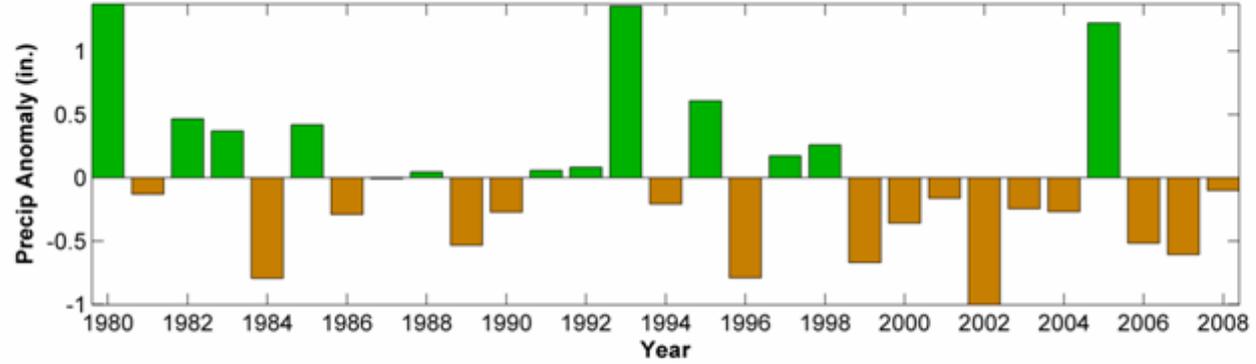
It never really left!



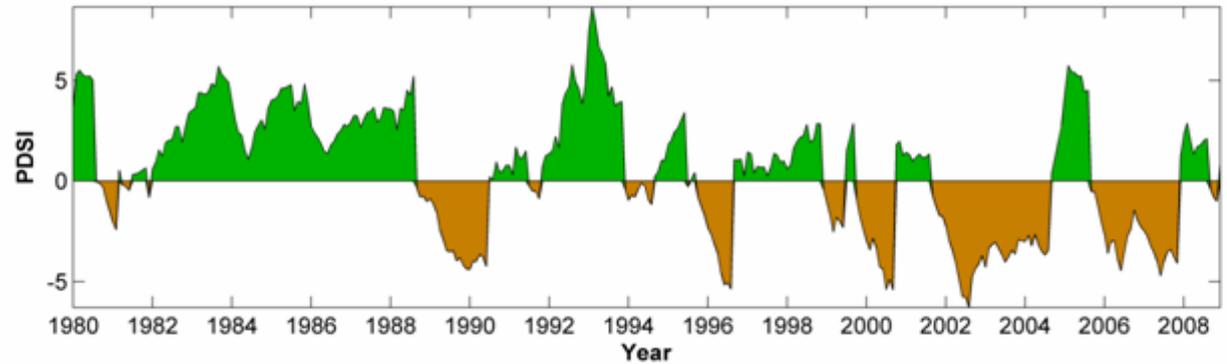
Persistent, below-average winter precipitation on Colorado Plateau



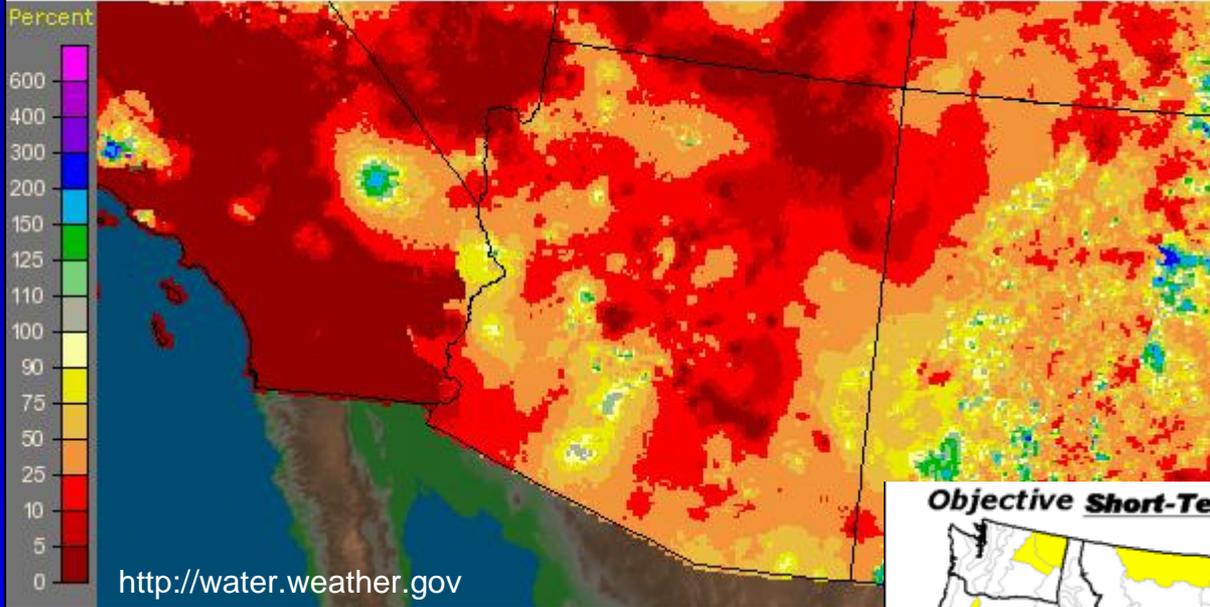
Winter Precipitation (Jan-Apr) Departures from Average, 1980-2008
Arizona Climate Division #2



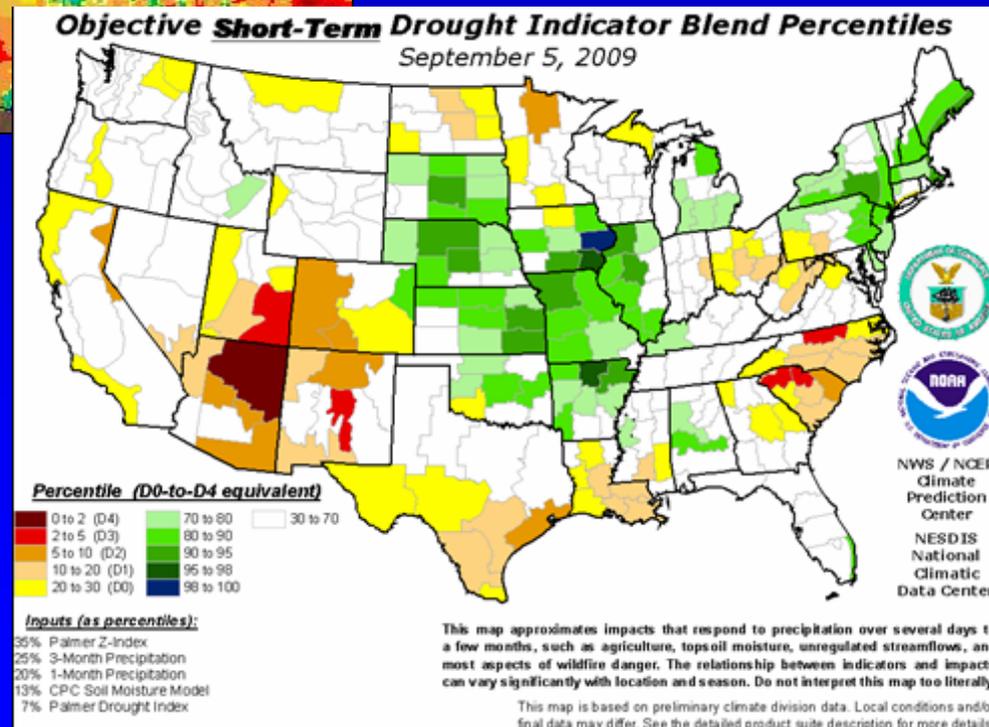
Monthly Palmer Drought Severity Index, 1980-2008
Arizona Climate Division #2

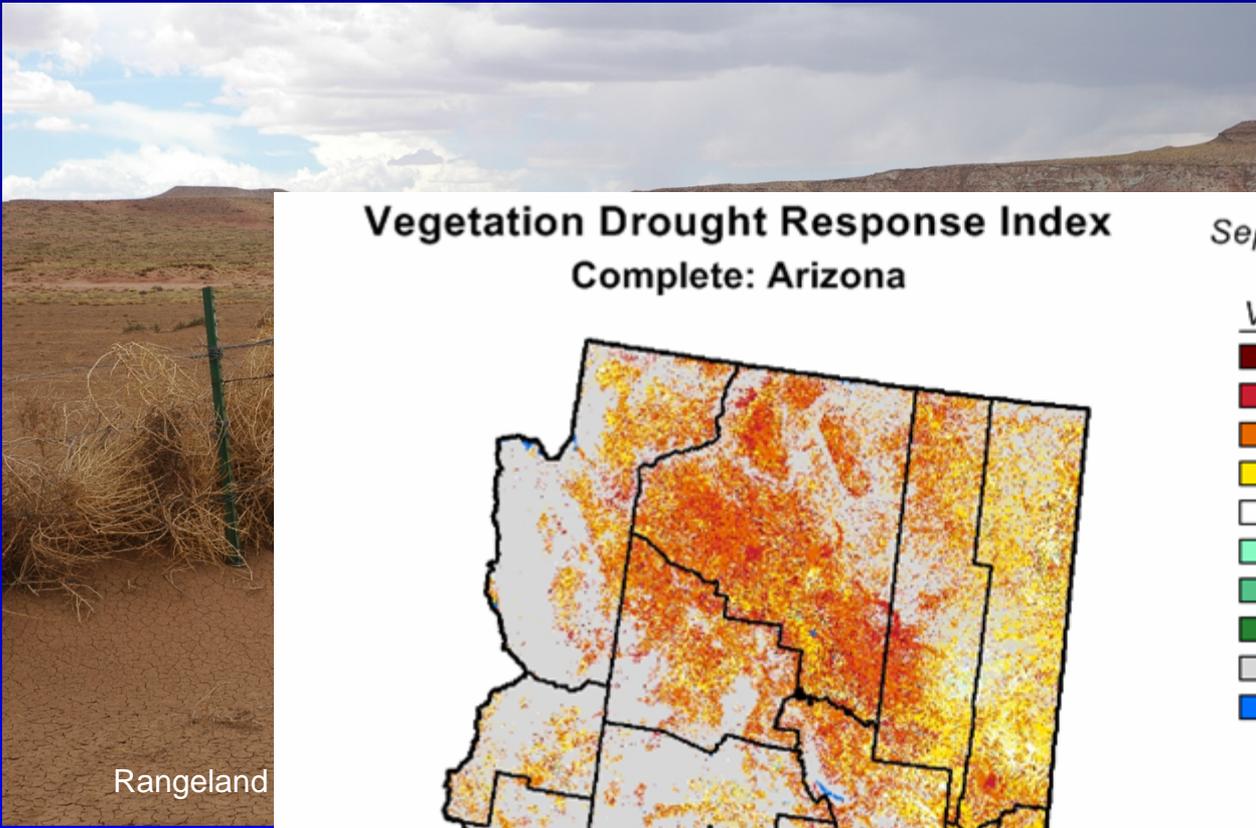


Arizona: August, 2009 Monthly Percent of Normal Precipitation
 Valid at 9/1/2009 1200 UTC- Created 9/1/09 22:49 UTC



Exceptionally dry
 2009 summer
 monsoon season



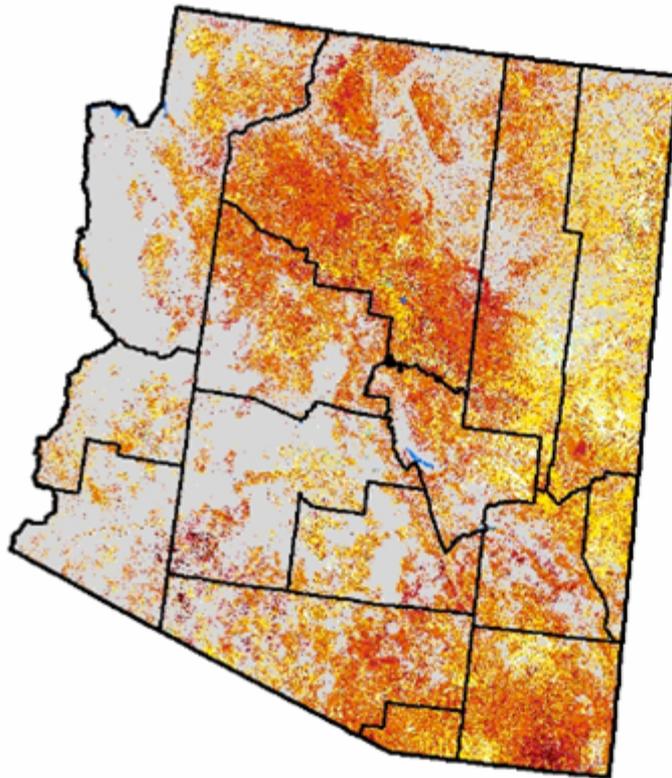


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from
long-term drought

Vegetation Drought Response Index Complete: Arizona

September 7, 2009

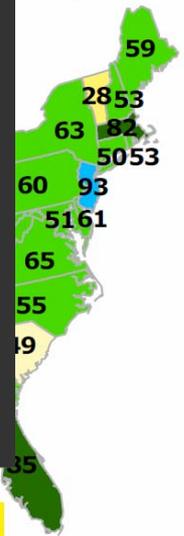


Vegetation Condition

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



PERCENTILE



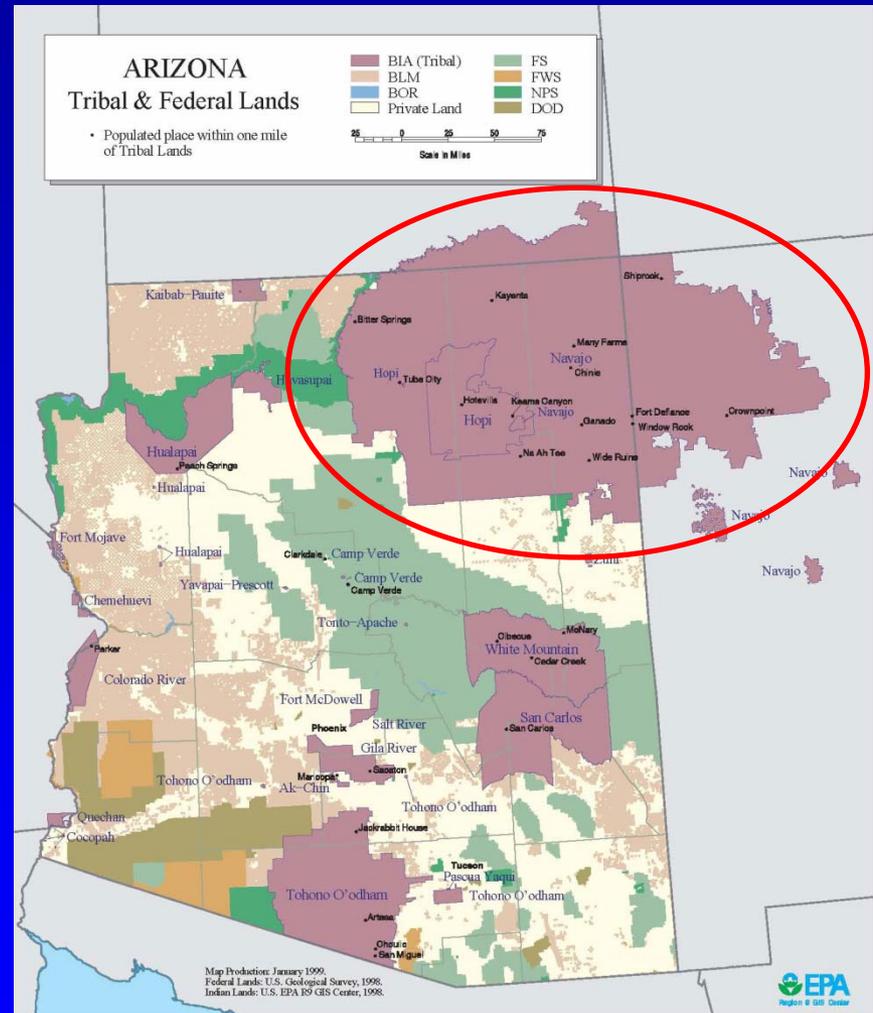
Range Condition – USDA-NRCS

Entire USA: 59
RELATIVE TO ALL WEEKS
ON RECORD (1995-2008)
[371 data points per state]

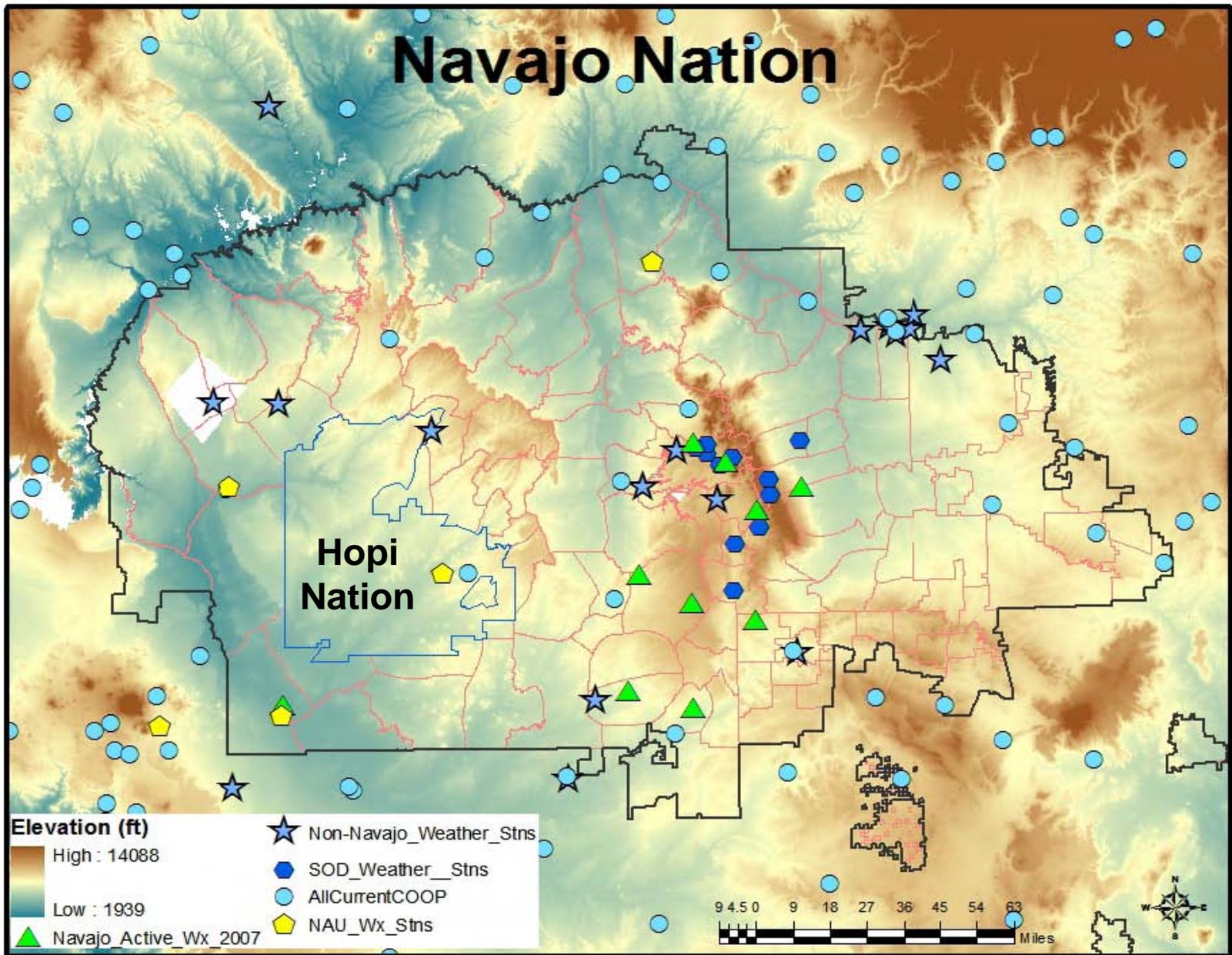


Challenging geography for monitoring drought

- Hopi and Navajo Nations cover >30,000 mi²
- Elevation varies between less than 1200 meters along CO River to over 2500 meters in Chuska Mountains
- Vegetation communities from desert scrub to conifer forests



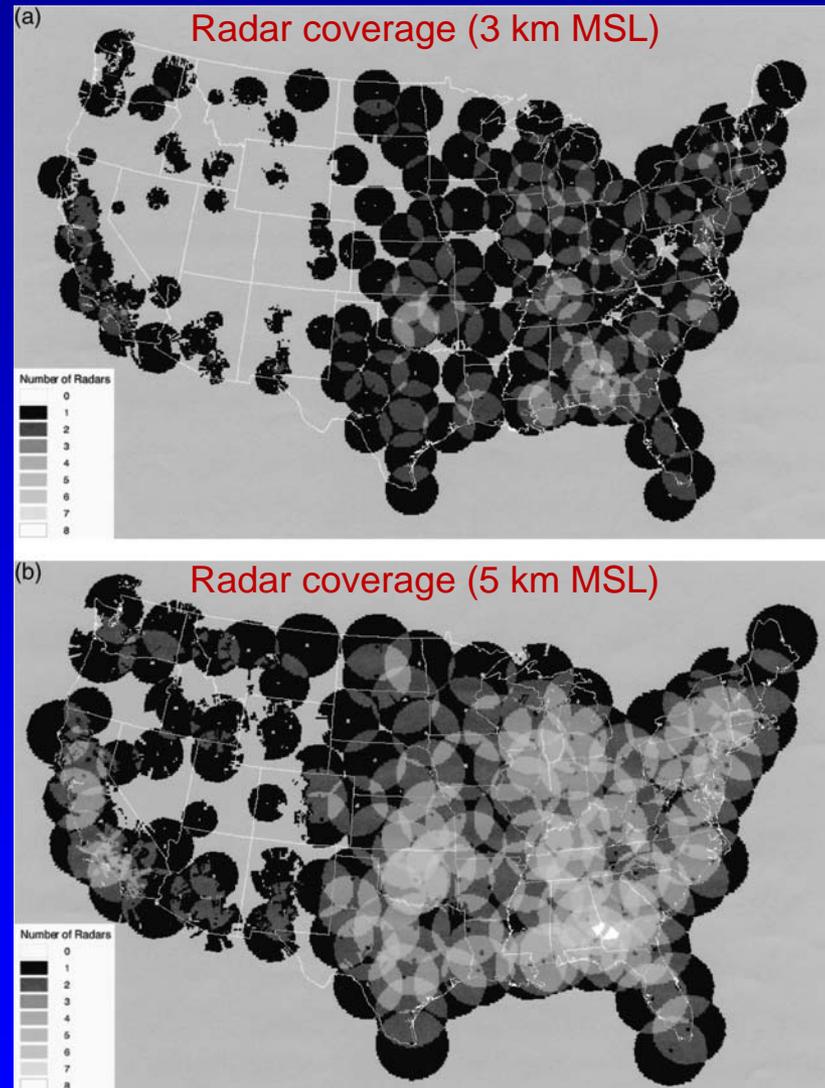
http://www.epa.gov/region/air/maps/images/mapaz_lg.jpg



From Garfin et al. 2007 (Assessment of the Navajo Nation Hydroclimate Network)

Desperate need for better monitoring

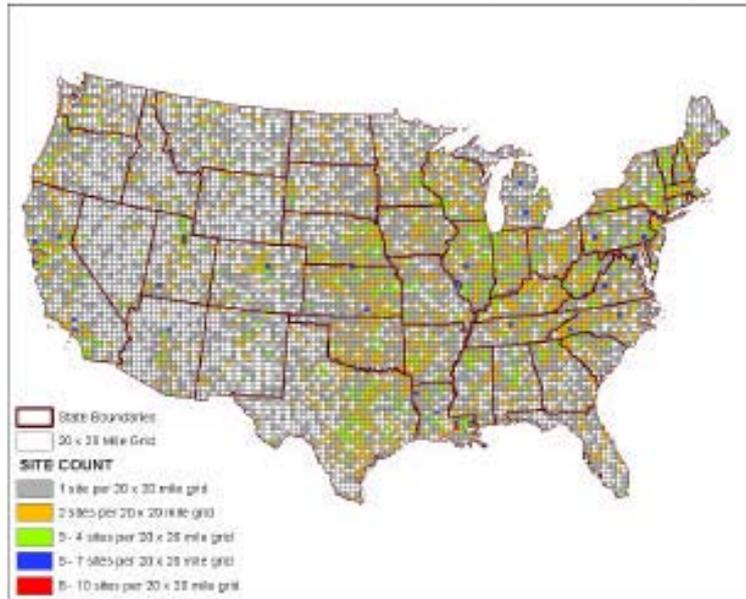
- Huge area of interior west with very limited monitoring infrastructure
- Very climate sensitive populations and ecosystems in this region
- Significant portion of the lower Colorado River watershed
- ‘Ground-zero’ for global-change-type drought (Breshears et al. 2005)



Maddox et al. 2002

What's the plan?

Current NWS COOP Sites (20x20 mile grid)



Del Greco and Smith 2002

NWS COOP modernization requirements:

- One COOP site per 20x20 mile grid
- One enhanced COOP site with soil temperature and moisture measurements per 60x60 mile grid

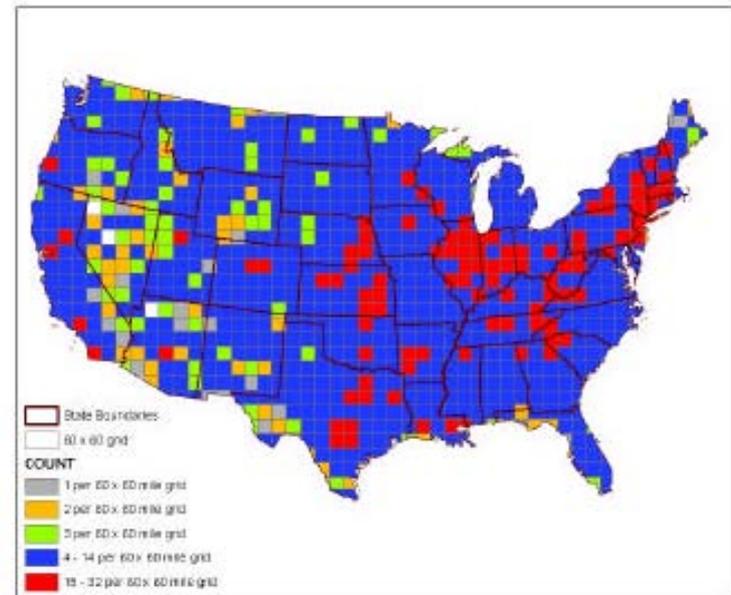
COOP Modernization: Building
The National Cooperative Mesonet

Program Development Plan
March 2004



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service

Current NWS COOP Sites (60x60 mile grid)

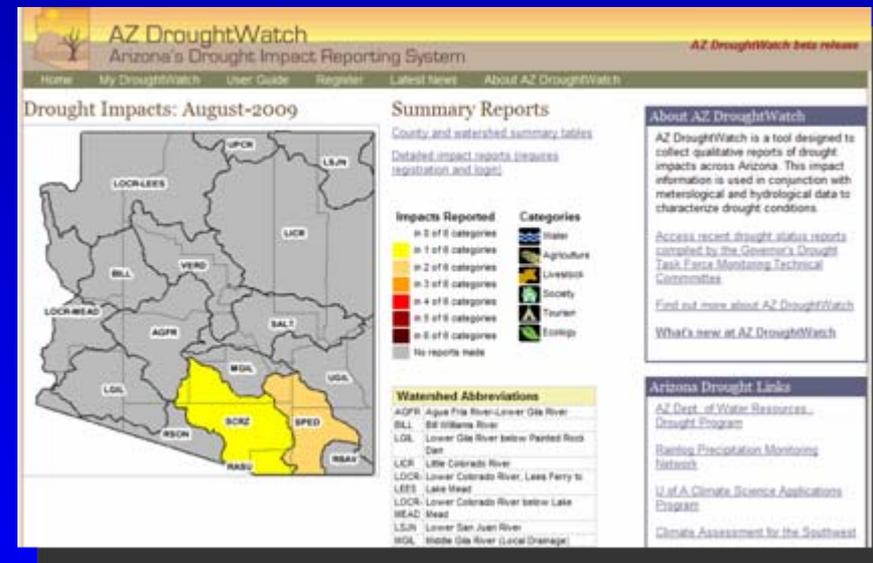


Del Greco and Smith 2002

CSAP

Drought Monitoring: More than just rain gauges...

- Building partnerships between information consumers and producers
- Improving communication mechanisms (e.g. tools to share information)
- Developing better tools to synthesize different types of drought monitoring information (e.g. Drought.gov)



<http://azdroughtwatch.org>