Drought Communication: Southwest

Climate Diagnostics and Prediction Workshop
NOAA MAPP Drought Task Force Meeting
Session 15: Drought Information and Services
Ft. Collins, CO – 25 October 2012

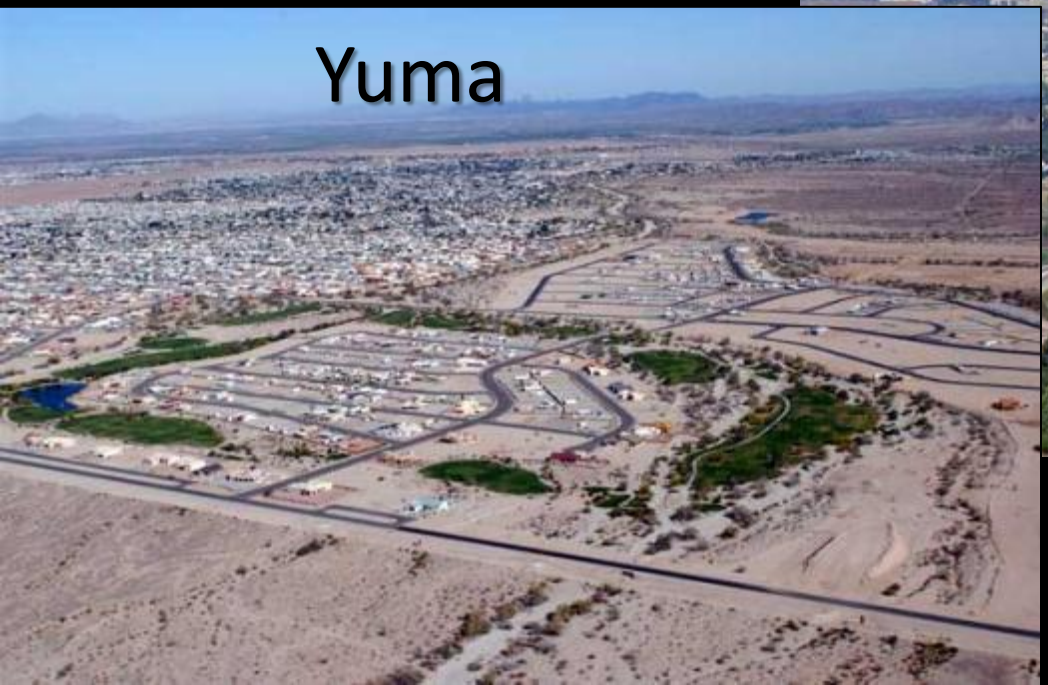
Gregg Garfin

Institute of the Environment
CLIMAS Climate Assessment for the Southwest

Who is Vulnerable?


Tucson


Phoenix


Yuma

Source: 2001 Arizona Agricultural Statistics Bulletin
www.nass.usda.gov/az/

Massive pinyon pine dieback 2002-2004

Increased temperatures, decreased soil moisture, result in greater stress, longer insect breeding cycles. Once a threshold is crossed massive mortality occurs.

Near Flagstaff
N.S. Cobb

25 October 2012 – NOAA Climate Diagnostics and Prediction Workshop, Ft. Collins, CO

Top 10 Arizona Fires

Fire Name	Start Date	Cause	Acres
Wallow	5/29/2011	H	538,049
Rodeo/Chediski	6/18/2002	H	468,638
Cave Creek	6/21/2005	L	248,310
Horseshoe 2	5/8/2011	H	222,954
Willow	6/24/2004	L	119,500
Aspen	6/17/2003	H	84,750
Edge Complex	7/15/2005	L	71,625
Tank Complex	7/19/2005	H	69,934
Lone	4/27/1996	H	61,370
Warm	6/8/2006	L	58,630

July 5, 2011
A dust storm rolls over Phoenix
Rob Schumacher / AP

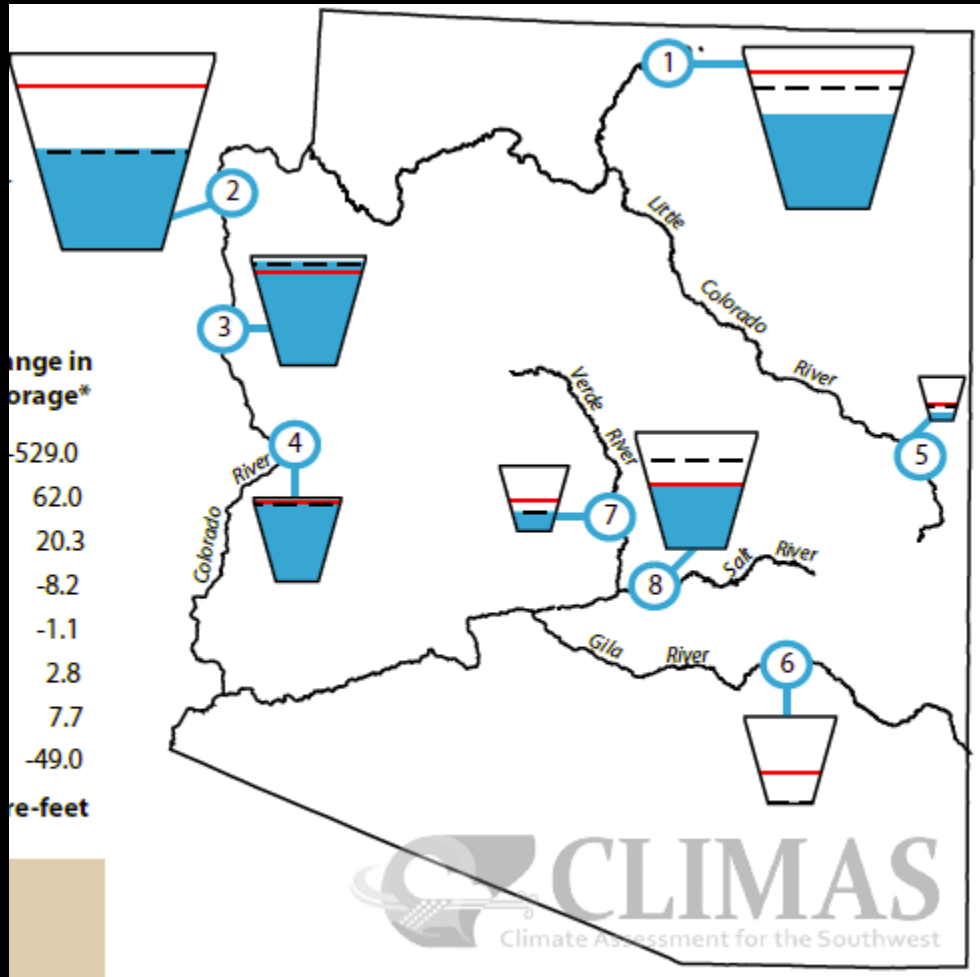
Lake Powell

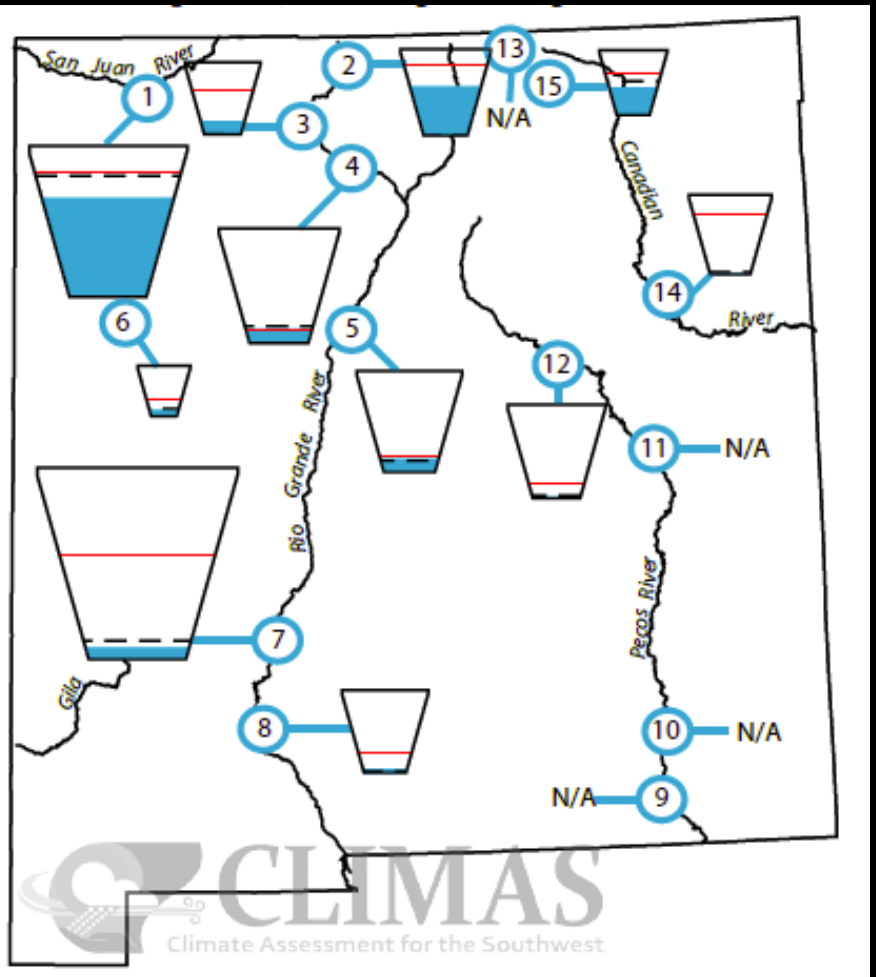
2000

2002

AZ - 4060

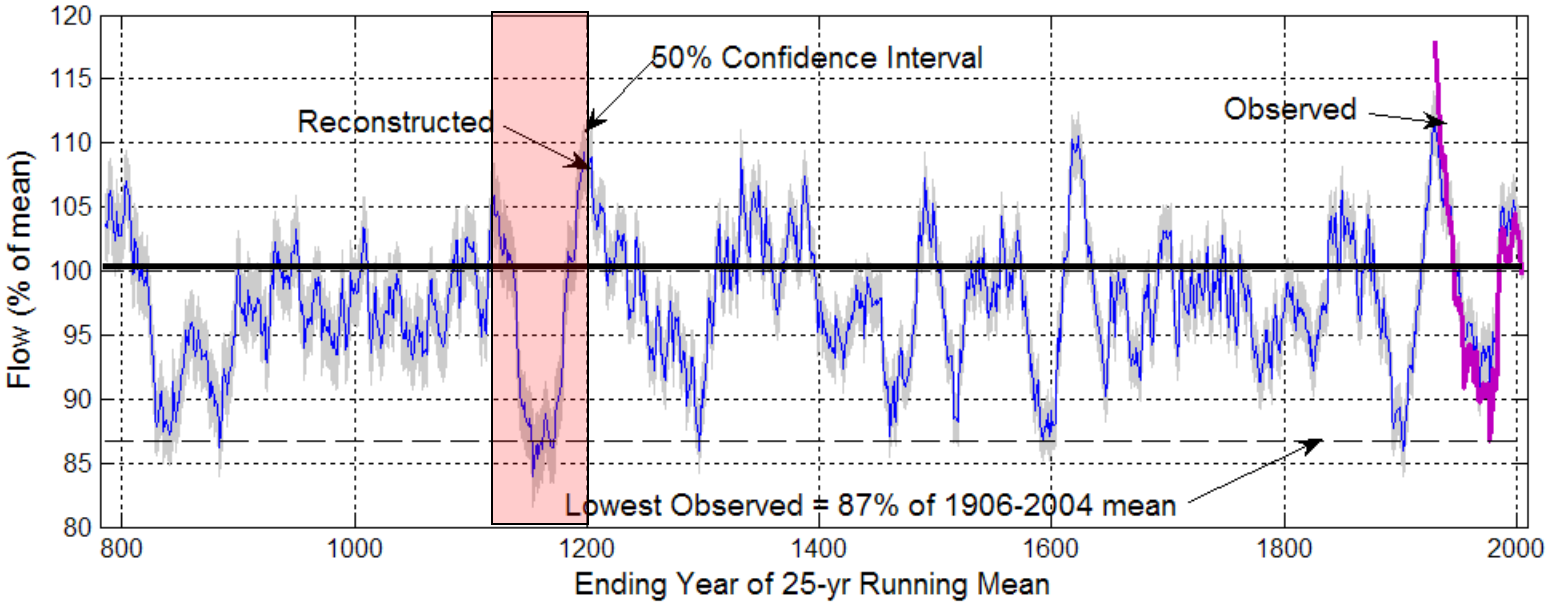
NM - 1647





Paleo

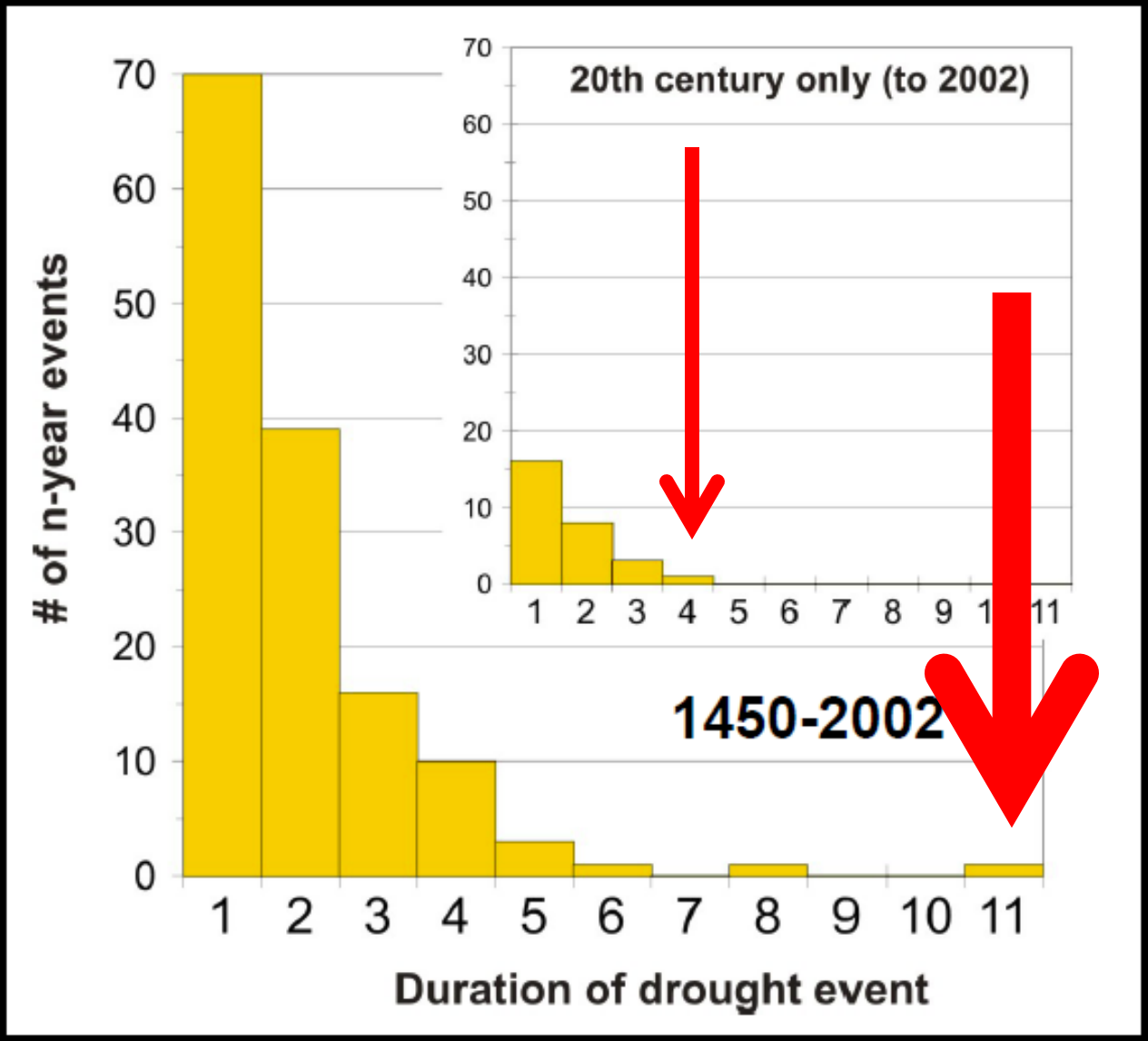
Colorado River Flow, 762-2005



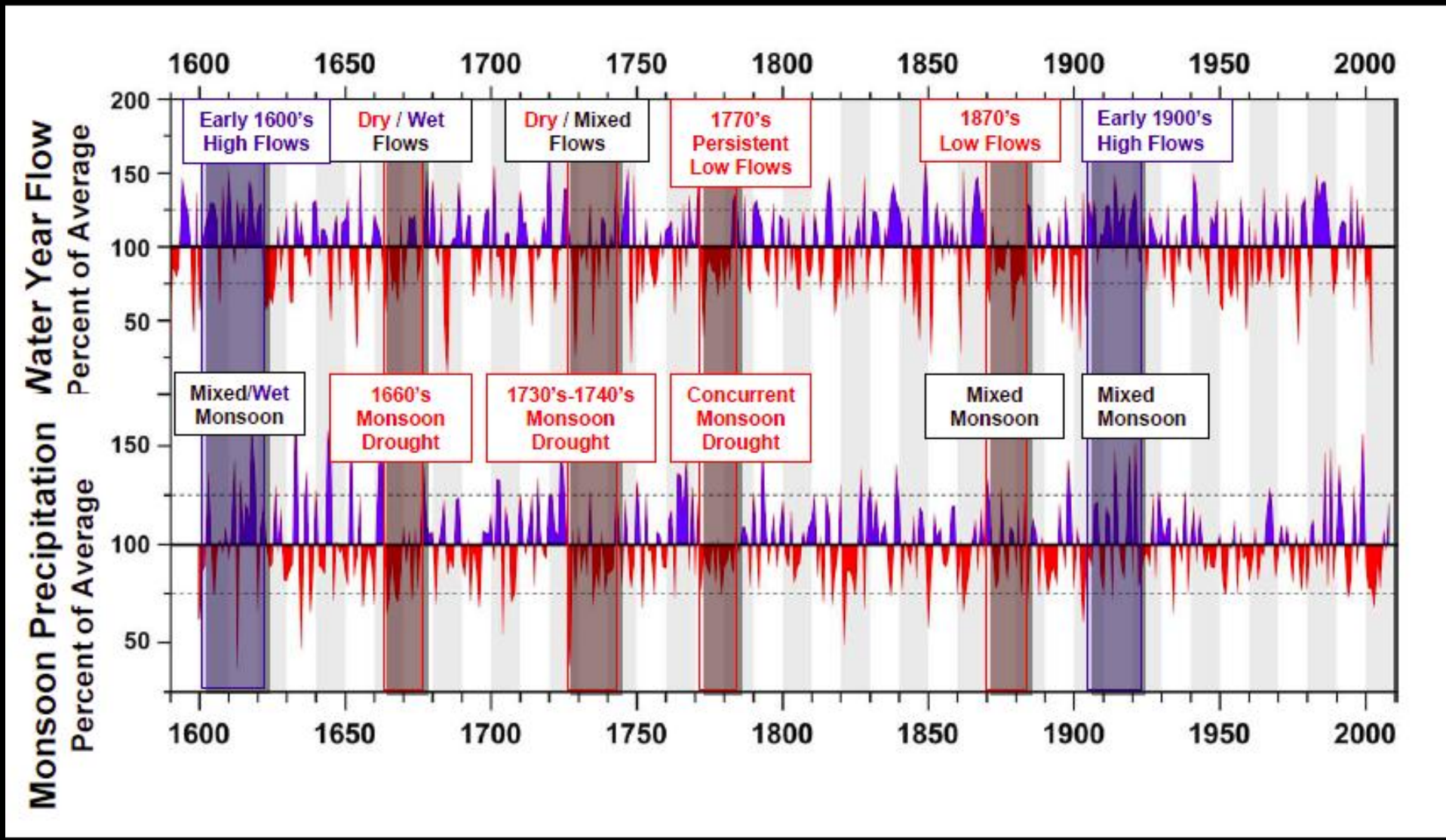
Meko et al. 2007, *Geophysical Research Letters*

Drought Duration and Frequency, Otowi

Drought is defined as a single year or set of consecutive years below the long-term median



Middle Rio Grande Reconstructions



Connie Woodhouse, CLIMAS

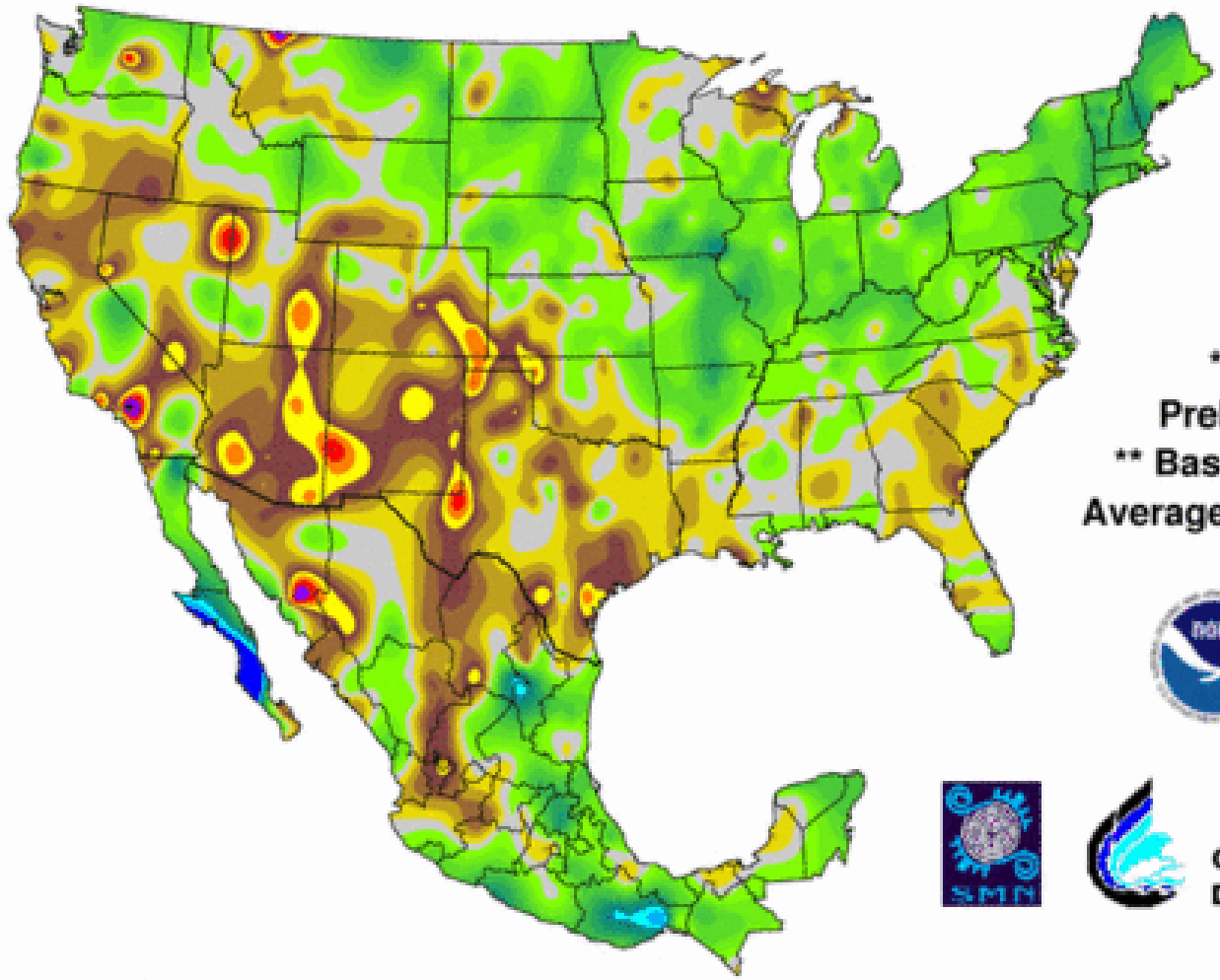
TreeFlow

streamflow reconstructions from tree rings

http://treeflow.info

Connie Woodhouse, CLIMAS
Jeff Lukas, WWA

Percent of Long–Term Average Precipitation, 60–Month
October 2007 – September 2012



* Based on Preliminary Data
** Base Period for Averages 1951 – 2001

COMISION NACIONAL DEL AGUA

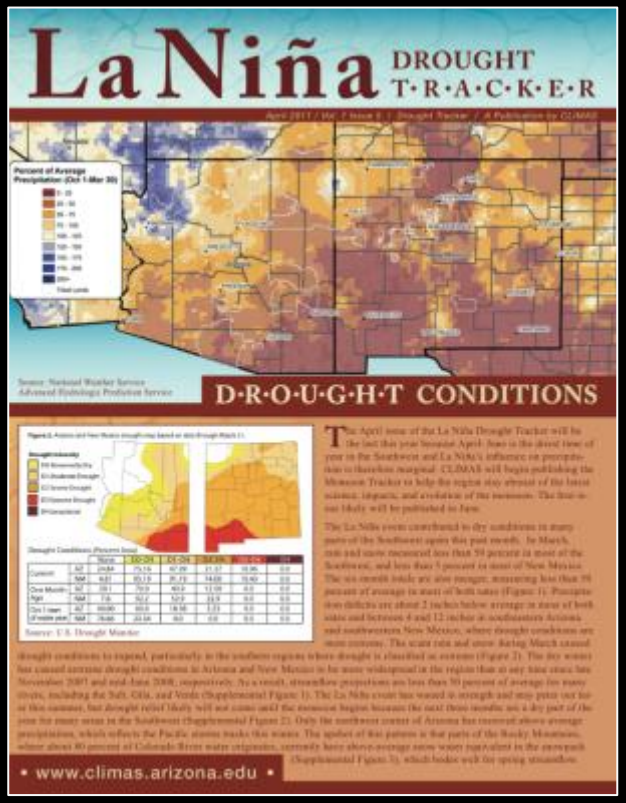
< 50 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 > 150

Percent of Long–Term (1951–2001) Average

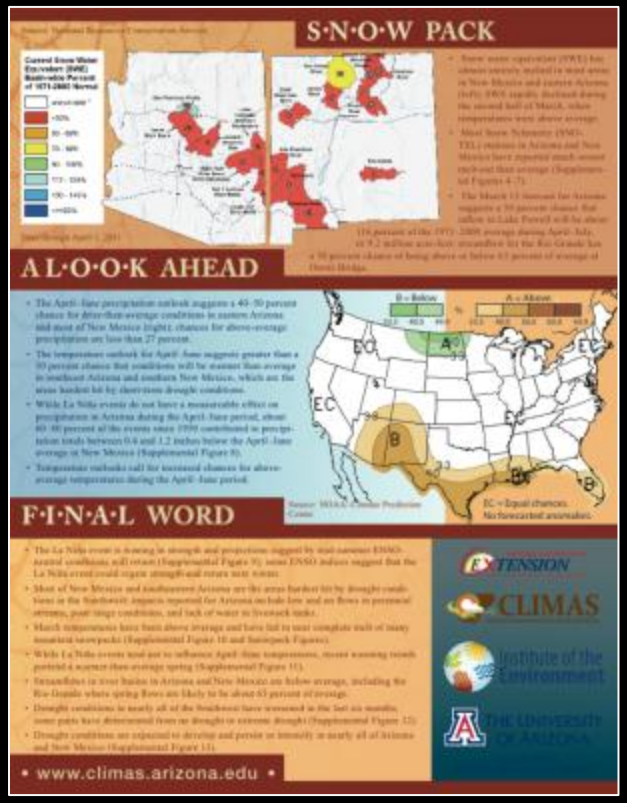
Synthesis

La Niña Drought Tracker

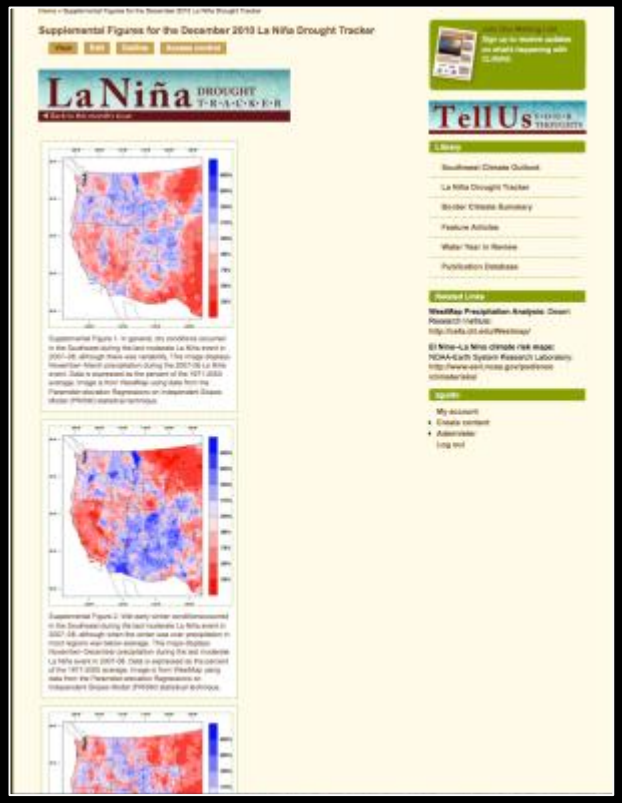
Current



Future

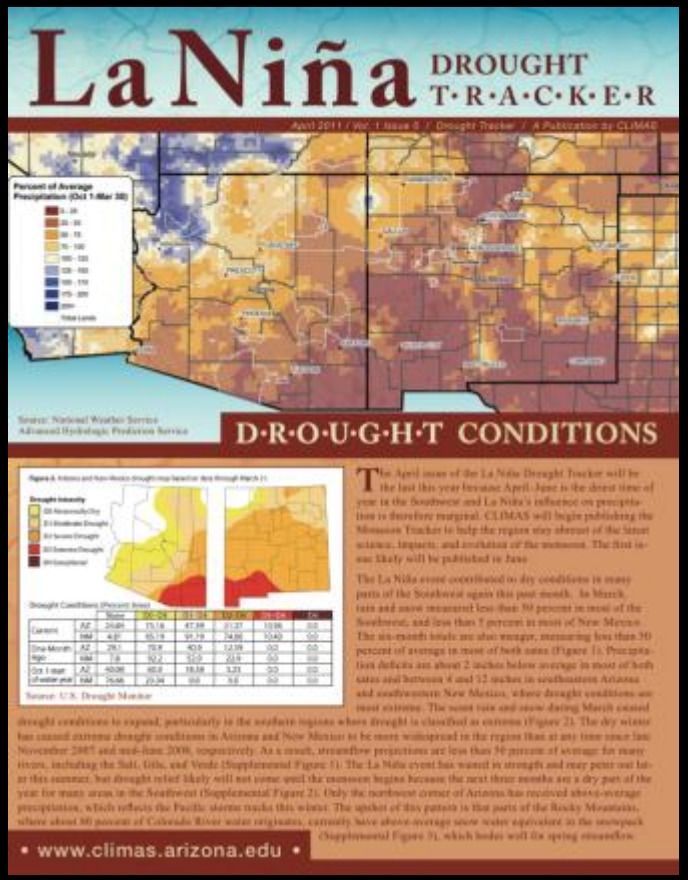


Supplement



Zack Guido, CLIMAS

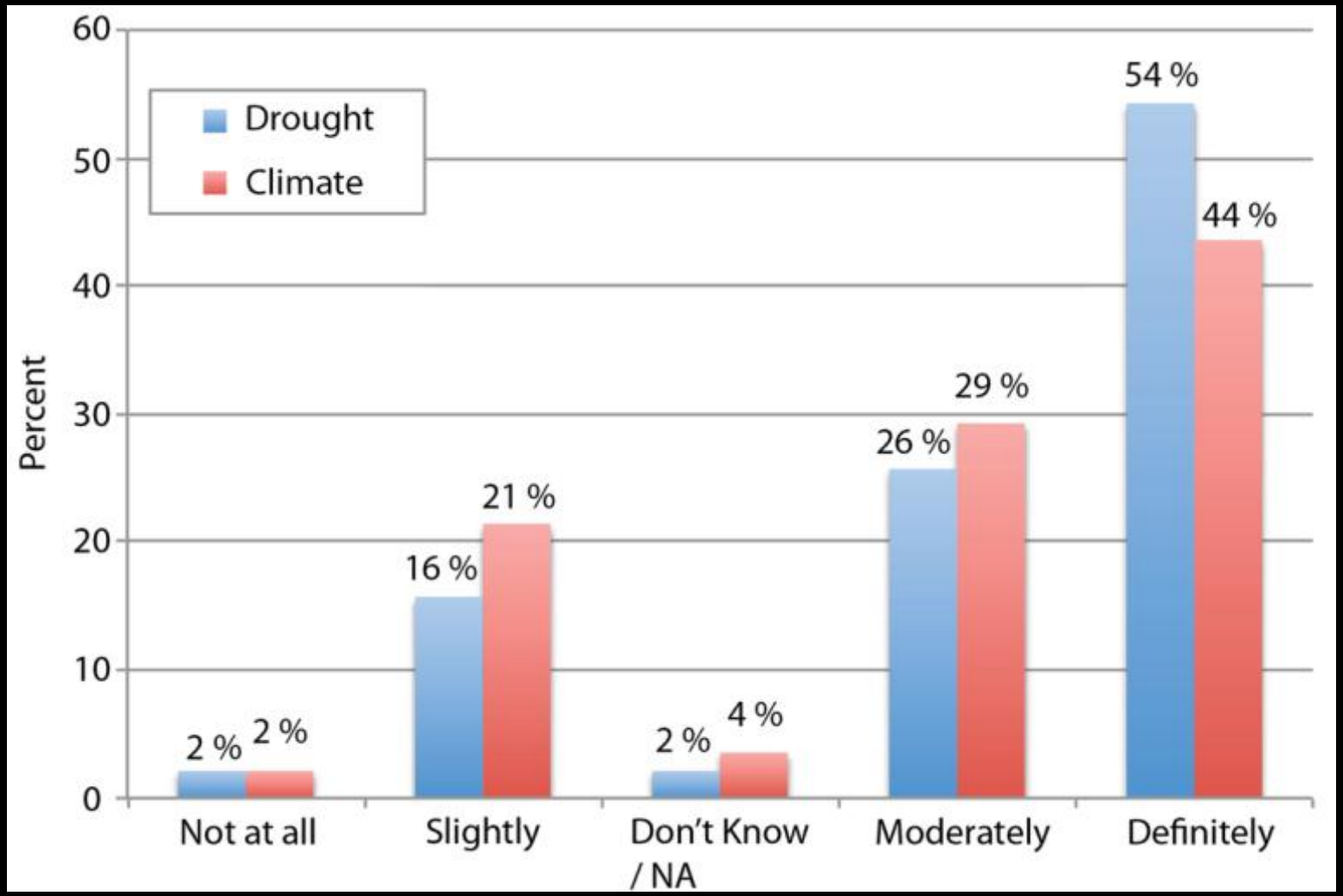
Goals



1. Increase preparedness
2. Increase understanding
3. Evaluate communication

Zack Guido, CLIMAS

Did *The Tracker* improve understanding of climate & drought?

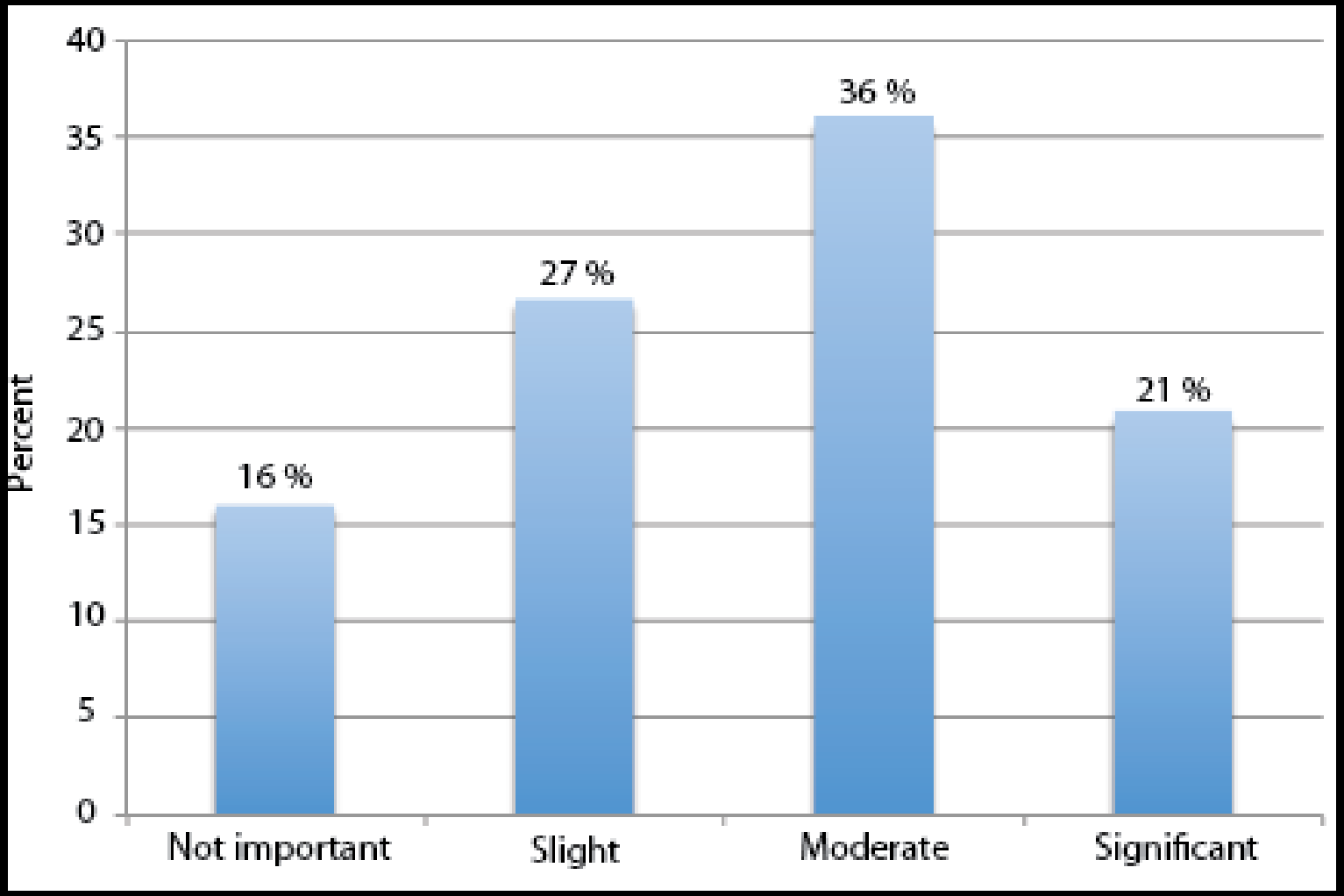


Zack Guido, CLIMAS

Survey Question: “Can you provide an example of how you used the Tracker?"
1. Keep track of evolving drought conditions
2. Learn about seasonal precipitation forecasts
3. Stay abreast of weather conditions
4. Aid in teaching and communicating climate and weather to others
5. Assess water supply

Zack Guido, CLIMAS

Of all the information used to make decisions, how important was *The Tracker?*



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Decisions informed by *The Tracker*

- **Drafting a tribal nation drought affirmation** [Significant]

- **Assisting local farmers and ranchers** [Significant]

- **Postponed large capital expenditures** [Moderate]

- **Water system operations and budget** [Significant]

Zack Guido, CLIMAS

Ease of Use Themes

- **Regionally specific**
- **Easy to understand**
- **Combines information from multiple sources**

Zack Guido, CLIMAS

Transborder Climate

TRANSBORDER CLIMATE:
Adaptation without Boundaries

United States-Mexico border region

Vol. I Issue I February, 2012

TABLE OF CONTENTS:

VISION:

TRANSBORDER CLIMATE reports on research and forecasts related to climate and its impacts in the transboundary United States-Mexico border region.
TRANSBORDER CLIMATE provides brief reports and pointers to information useful to resource management and policy – with a special emphasis on information relevant to adaptation to climate variations and trends. It is produced quarterly, in English and Spanish.

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www.climas.arizona.edu/outlooks/bcs

CLIMA TRANSFRONTERIZO:
Adaptación sin fronteras

Frontera de México y los Estados Unidos

Vol. I Num . I Febrero, 2012

TABLA DE CONTENIDOS:

VISIÓN:

CLIMA TRANSFRONTERIZO informa sobre la investigación climática y los pronósticos relacionados con el clima y sus impactos en la region transfronteriza de México y los Estados Unidos. **CLIMA TRANSFRONTERIZO** proporciona informes breves y enlaces con información útil para el manejo de recursos y política publica -con un énfasis especial en la información pertinente a la adaptación a las variaciones climáticas y sus tendencias. Se produce trimestralmente, en Inglés y Español.

CONTÁCTENOS:

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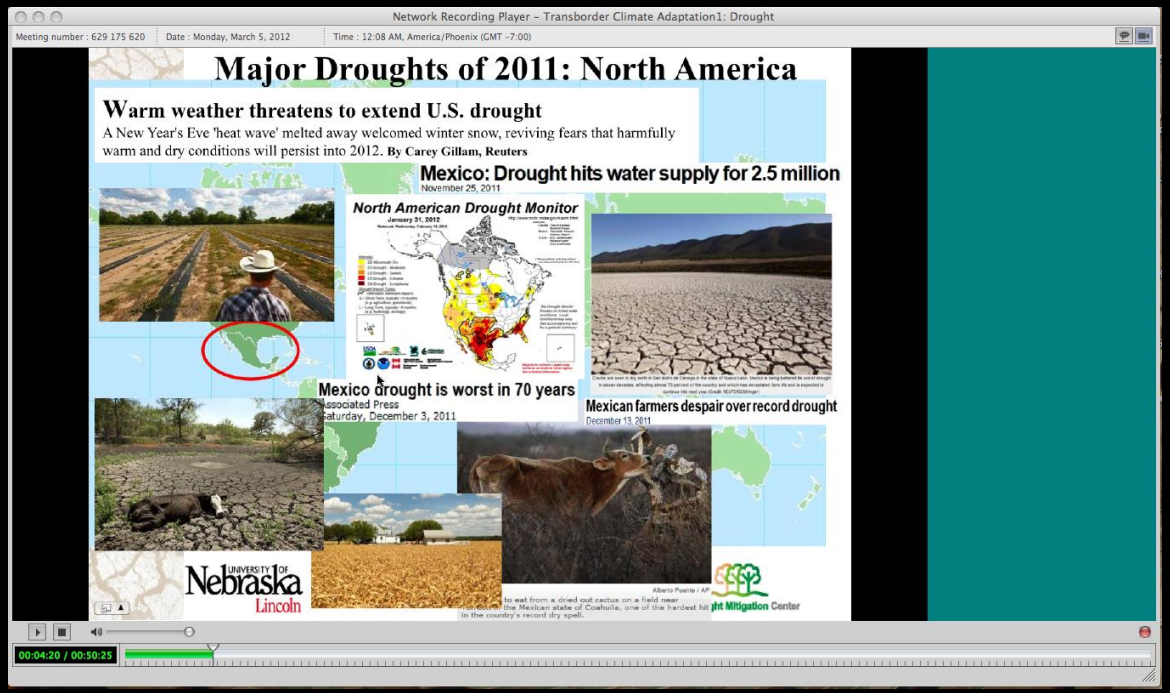
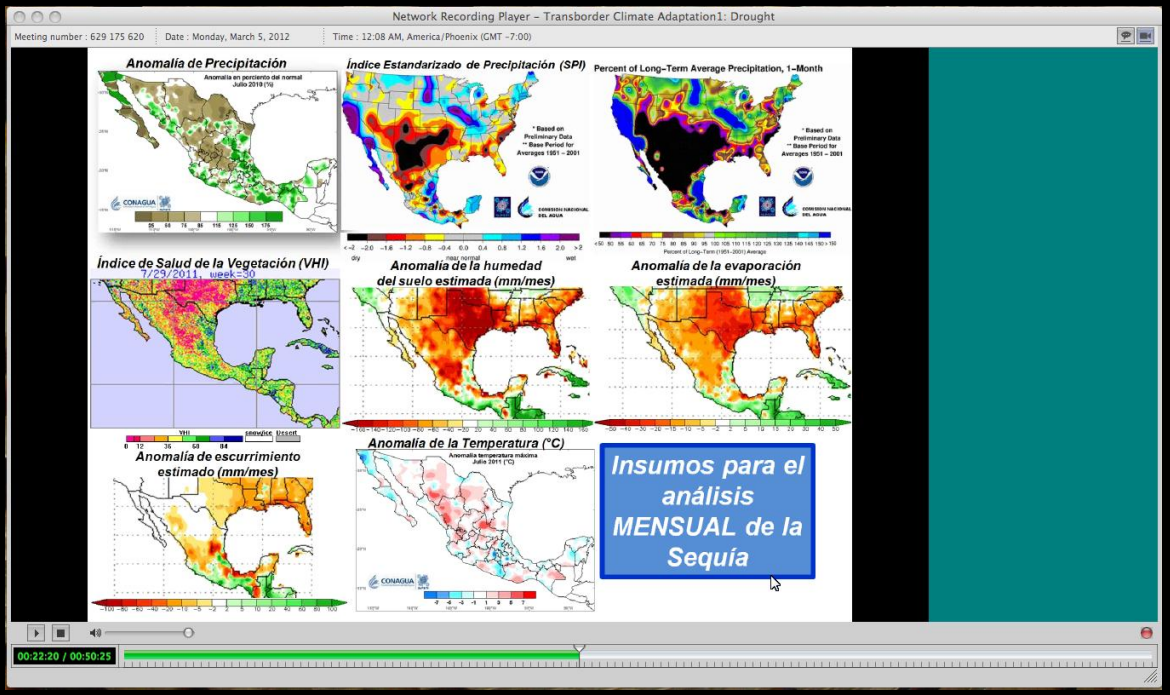
www.climas.arizona.edu/outlooks/bcs

http://www.climas.arizona.edu/outlooks/tbc





March 5, 2012

U.S. Drought and Impacts: 2011-2012

Mark Svoboda
National Drought Mitigation Center

Drought in Northern Mexico

Martin Ibarra
Comisión Nacional del Agua (CONAGUA)

Learning about Media

Media Experiments

- TRANSBORDER CLIMATE: Adaptation without Boundaries – HTML & PDF
- Webinars
  - Co-developed with advisory group
- twitter news of the week
- SurveyMonkey™

Impact Reporting

ARIZONA'S DROUGHT IMPACT REPORTING SYSTEM

AZDROUGHT WATCH

HOME | MY DROUGHTWATCH | ABOUT | REGISTER

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 meterological and hydrological data to characterize drought conditions.

BLOG

Welcome to the AZ DroughtWatch Blog!

Thursday, February 03, 2011 10:35:00 AM

Welcome to the Arizona DroughtWatch blog! This will be the place to discuss drought related topics for Arizona. We will review drought impact reports posted through http://azdroughtwatch.org and discuss weather and climate events impacting drought across Arizona. Please join the discussions!

Jun-Jul/2012:

Apr-May/2012:

Summary Reports

County and watershed tables

Detailed impact reports

Impacts Reported

- in 0 of 6 categories
- 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
- in 6 of 6 categories
- No reports made

Categories

- Water
- Agriculture
- Livestock
- Society
- Tourism
- Ecology

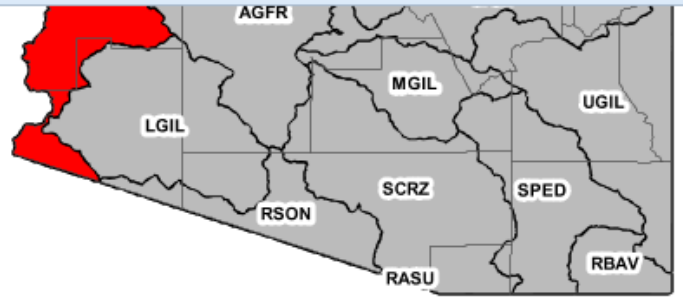
Watershed Abbreviations	
AGFR	Agua Fria River-Lower Gila River
BILL	Bill Williams River
LGIL	Lower Gila River below Painted Rock Dam
LICR	Little Colorado River
LOCR-LEES	Lower Colorado River, Lees Ferry to Lake Mead
LOCR-MEAD	Lower Colorado River below Lake Mead
LSJN	Lower San Juan River
MGIL	Middle Gila River (Local Drainage)
RASU	Rio Asuncion
RBAV	Rio Bavispe
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
USJN	Upper San Juan River
VERD	Verde River

http://azdroughtwatch.org

Firefox | tastytrade - a real financial network - ... | Ajax

azdroughtwatch.org/faces/xhtml/reports/monthSummary.xhtml

- Many impacts across multiple categories may indicate more widespread drought conditions versus many impacts in one category alone.
- A large number of surveys indicates that impacts are distributed across many geographic locations.
- A large number of unique observers indicates that surveys are being made by different people rather many surveys submitted by one observer.
- Use the 'Observer Type' filter at the top of the page to examine potential relationships between observer type and impact totals in each category



LDIG

Show Only Reports From...

County: no filter

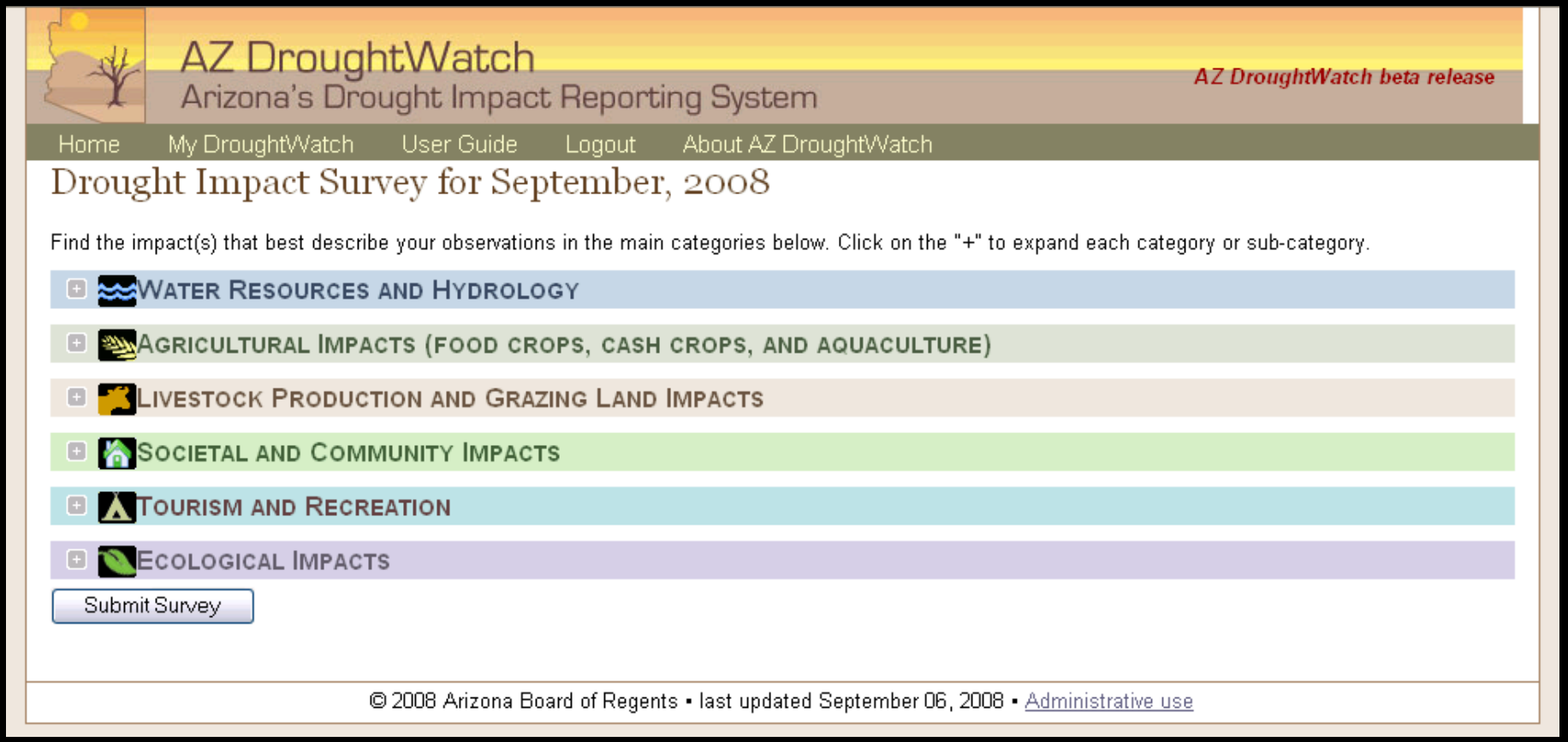
Observer Type: no filter — Filter

- no filter
- Citizen Volunteer/Watershed Group
- Resource Manager/Field Technician
- University Researcher
- Municipal Official
- Consultant
- Agricultural Producer
- Private Business Owner
- Community Water System Operator
- Agency Scientist
- Media
- Extension Agent
- N/A

Abbreviation						society	tourism	ecology	Total number of impacts	Total number of surveys	Number of unique observers
AGFR	A… R… R…					0	0	0	0	0	0
BILL	B… R…					0	0	0	0	0	0
LICR	Little Colorado River	0	0	0	0	0	0	0	0	0	0
LOCR-MEAD	Lower Colorado River below Lake Mead (Local Drainage)	7	8	6	0	0	11	32	3	1	
LOCR-LEES	Lower Colorado River, Lees Ferry to Lake Mead	8	6	6	0	0	9	29	3	1	
LGIL	Lower Gila River	0	0	0	0	0	0	0	0	0	

(4:49) 12:53 PM 8/14/2012

Add Impact Reports



Mike Crimmins, CLIMAS

Lower Colorado River Watershed	April 2010	The annuals are vigorously growing. We have the start of a good spring; All water tanks are full to the max at this time; Rain was perfect timing to continue plant growth, range looks the best it has in 5 yrs.
Rio Bavispe Watershed	April 2011	Many ponds that normally have water at this time are dry; Little to no green forage exists in the grasses or forbs.
Santa Cruz River Watershed	April 2011	For the first time (in the period 1984-2011) I have seen browsing (probably by white-tailed deer) on Agave schottii (shindagger) and Yucca schottii (Schott yucca). On agaves, leaves are eaten down to about 4"; on yuccas, younger growth in center of plants has been eaten.

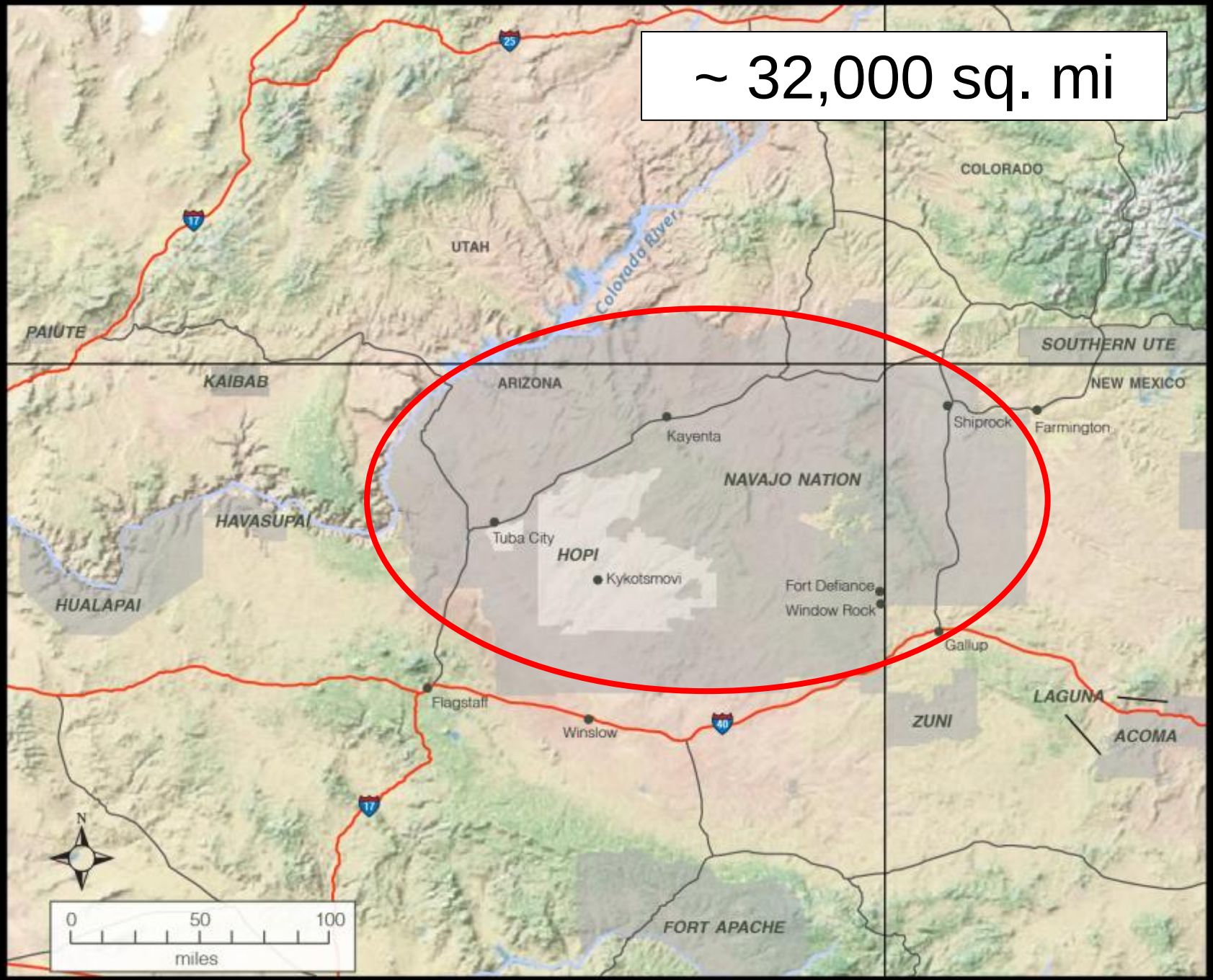
Challenges

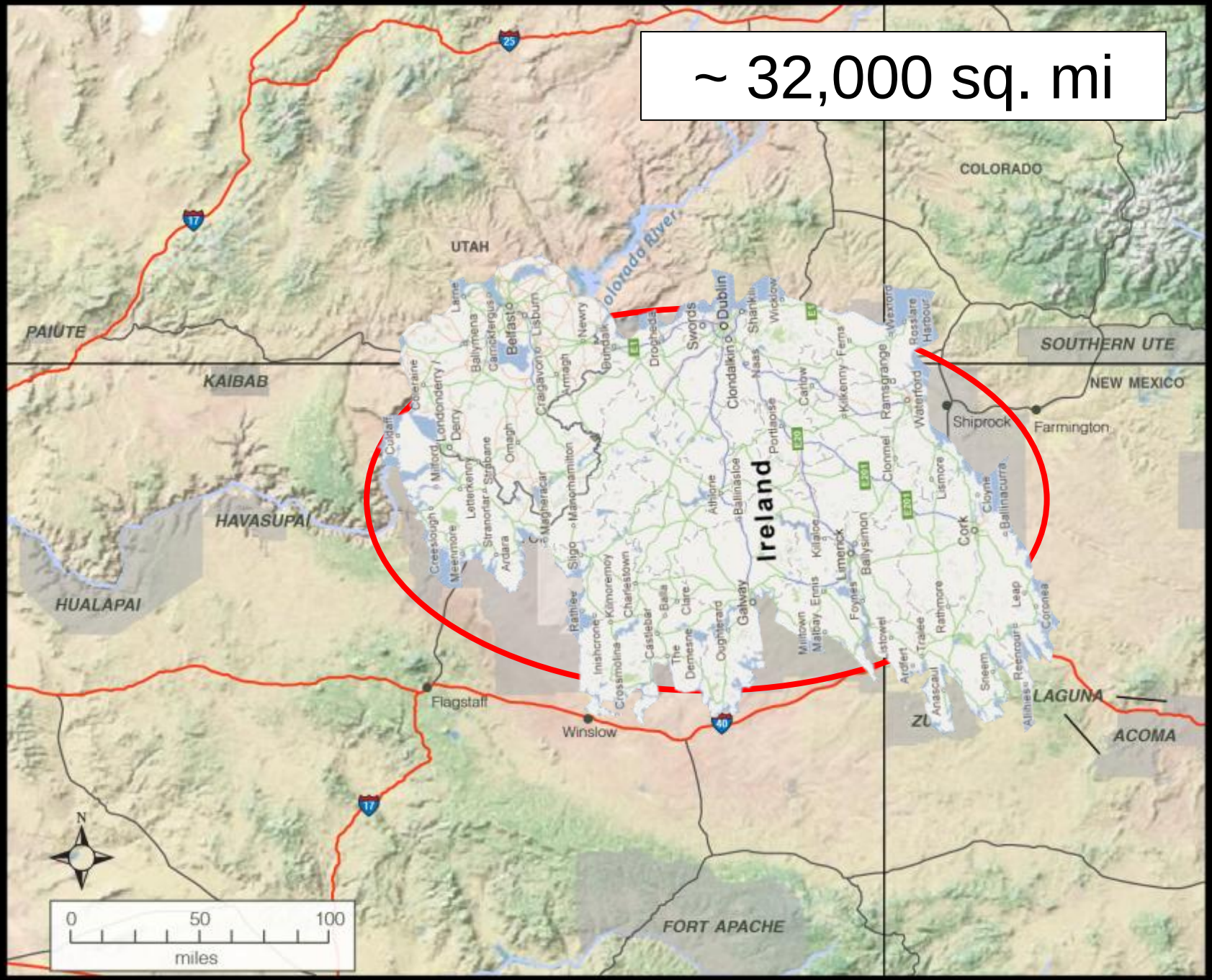
- **Inconsistent reporting**
  - Lack of “steady” or “improved” reports
- **Attribution…to drought?**
- **Lack of** $$$
- **Lack of incentives**

- **Field of Dreams → Dream Team**

Mike Crimmins, CLIMAS

Dan Ferguson, CLIMAS
Mike Crimmins, CLIMAS


~ 32,000 sq. mi
UTAH
COLORADO
Colorado River
PAIUTE
SOUTHERN UTE
KAIBAB
ARIZONA
NEW MEXICO
Shiprock
Farmington
Kayenta
NAVAJO NATION
HAVASUPAI
Tuba City
HOPI
Kykotsmovi
Fort Defiance
Window Rock
HUALAPAI
Gallup
LAGUNA
ACOMA
ZUNI
Flagstaff
Winslow
FORT APACHE
N
0
50
100
miles


~ 32,000 sq. mi
UTAH
COLORADO
NEW MEXICO
PAIUTE
KAIBAB
HAVASUPAI
HUALAPAI
SOUTHERN UTE
Ireland
Dublin
Belfast
Cork
Shiprock
Farmington
Flagstaff
Winslow
LAGUNA
ACOMA
FORT APACHE
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50
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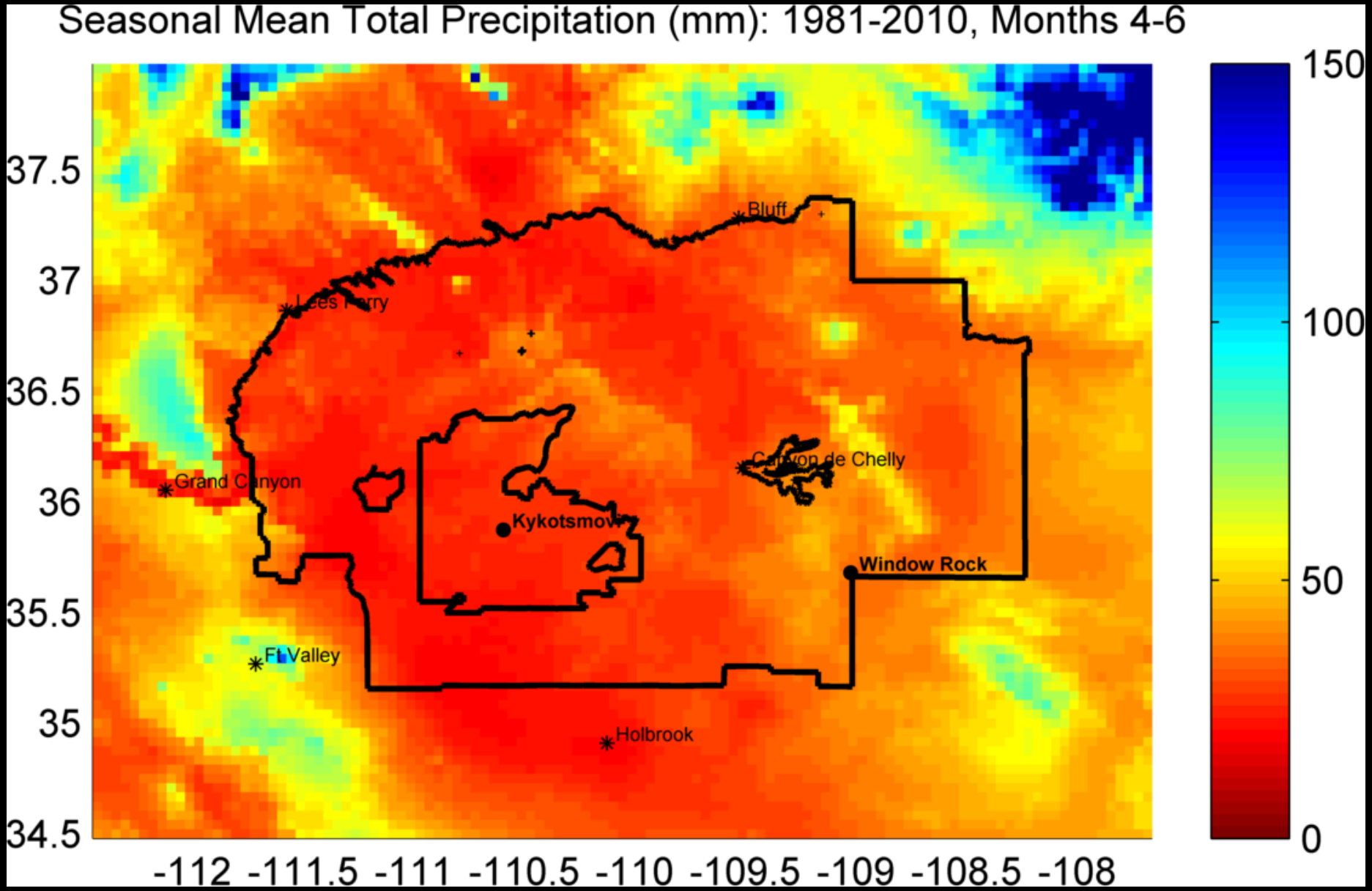
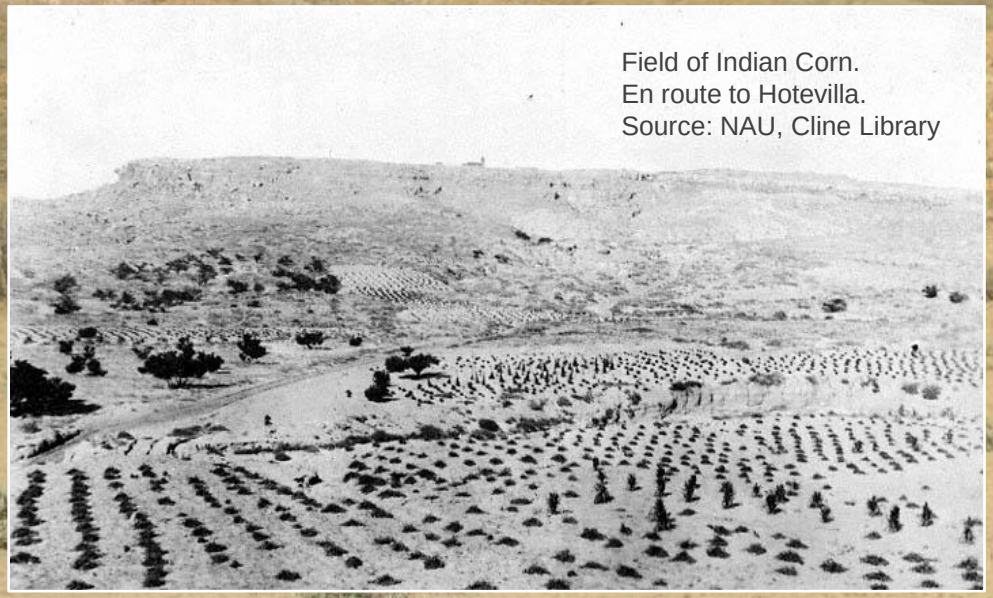
miles



Dan Ferguson, CLIMAS
Mike Crimmins, CLIMAS

Hopi cattle sale, October 1953, Keams Canyon, Arizona.
Photograph by Milton Snow. Source: NAU, Cline Library



Field of Indian Corn.
En route to Hotevilla.
Source: NAU, Cline Library

Dan Ferguson, CLIMAS
Mike Crimmins, CLIMAS

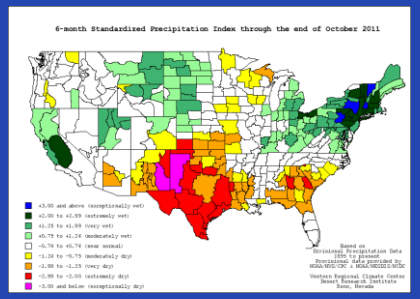
Concerns from Hopi DNR:

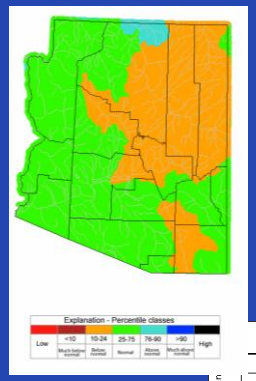
- Few instruments to monitor drought
- Hopi drought plan not useful

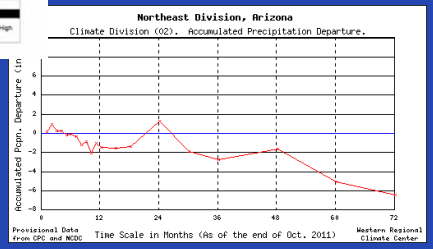
photos courtesy Hopi Dept of Natural Resources

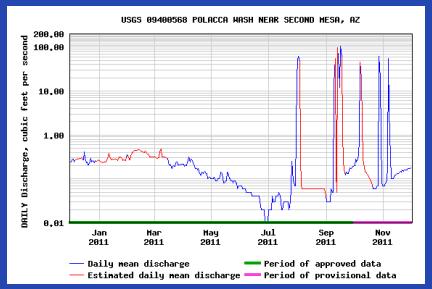
typical drought monitoring

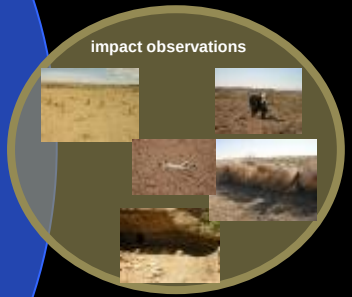
hydroclimate data







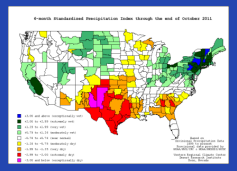


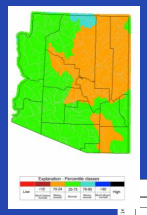


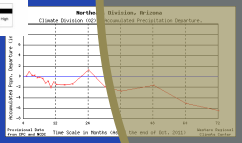
Dan Ferguson, CLIMAS
Mike Crimmins, CLIMAS

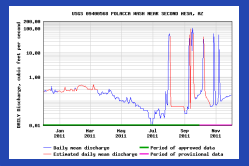
Hopi drought monitoring?

hydroclimate data (external)









impact observations

Key Points

- Who is vulnerable?
- Paleoclimate reconstructions
- Synthesis products
- Impact reporting

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