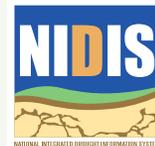


Drought Impacts: How Things Have Changed

Kelly Helm Smith

Missouri River Basin User Forum:
Drought Early Warning for the Lower Basin
March 8, 2017, Nebraska City, Nebraska



What has stayed the same

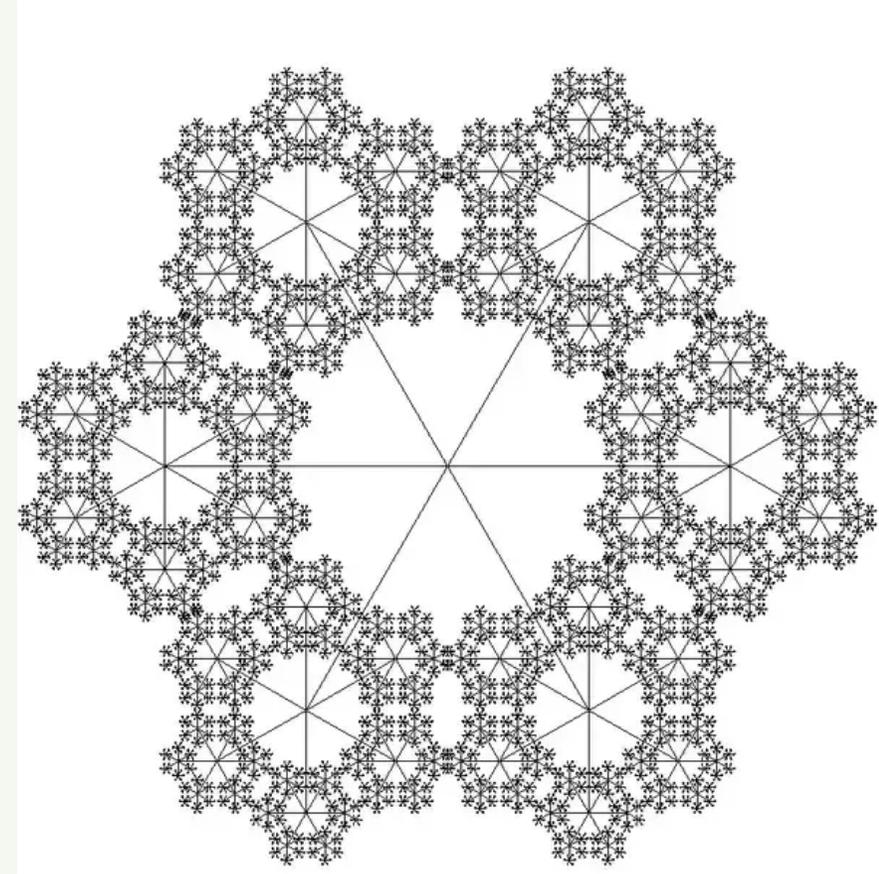
- Calls for a universal database of drought impacts

What has changed

- We've tried more stuff. We've learned some stuff.

What else has stayed the same

- Still haven't connected all the dots on "why?"



<https://www.quora.com/Why-is-the-Mandelbrot-set-a-fractal>

Diagnosing drought -- scales



Photo: Compiled by Chuck Nelson. "A true-color cropped image of portion of the Sacramento-San Joaquin River Delta. This image was taken from a California Department of Fish and Game website available to the public as a GIS file and is part of a U.S. Department of Agriculture National Agricultural Imagery Program flight." <http://www.csuchico.edu/inside/2012-05-10/bigpicture-2.shtml>



From Bandera: Cowboy Capital of the World, Palo Alto College, San Antonio, Texas

<http://pacweb.alamo.edu/InteractiveHistory/projects/rhines/StudentProjects/1999/bandera/>

“In essence, as with rainbows, each person experiences their own drought.”

Redmond, Kelly T. “The Depiction of Drought: A Commentary.” *Bulletin of the American Meteorological Society*, August 2002, Vol. 83, Issue 8, p. 1143.



<http://121clicks.com/gallery-category/nature-subtle>

Why track drought impacts?

- **Response & Recovery:** To know where to direct relief
- **Mitigation & Recovery:** Impacts point to underlying vulnerability. Tracking drought impacts can help decision makers figure out where to focus efforts to reduce vulnerability to the next drought.
- **Research:** Improve our understanding of how biophysical indicators relate to social and environmental indicators. Need time series data!





Wisdom (Policy)

Knowledge

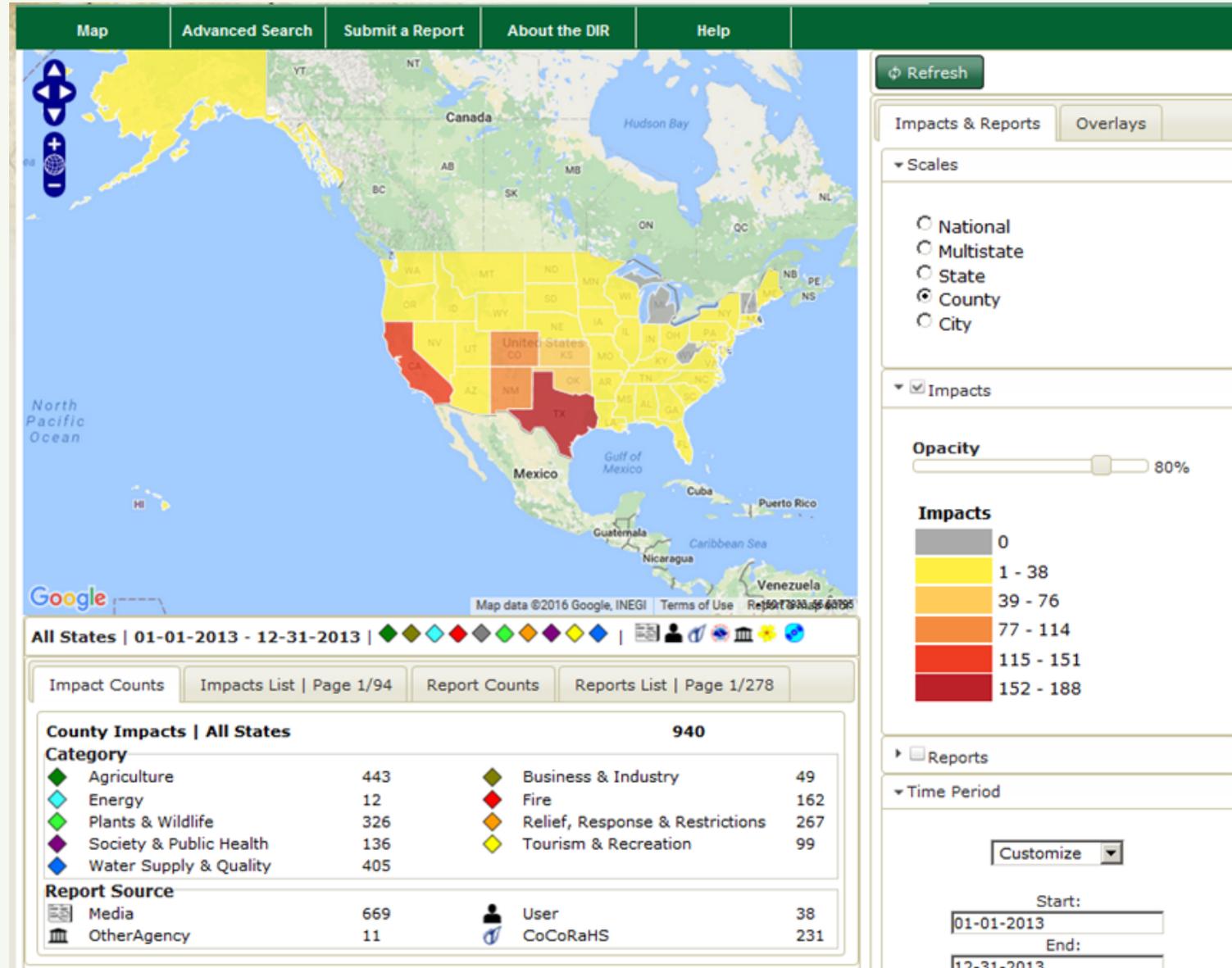
Information

Data

<http://fractalfoundation.org/resources/fractivities/sierpinski-triangle/>

Droughtreporter.unl.edu

- Launched in 2005 as nation's on-line archive of drought impacts
- Reports from media, individual observers ("Users," CoCoRaHS), agencies
- Searchable by time, place, scale, category, term
- Moderated @ NDMC



Wilhite, Donald A., Mark D. Svoboda, and Michael J. Hayes. "Understanding the complex impacts of drought: a key to enhancing drought mitigation and preparedness." *Water resources management* 21.5 (2007): 763-774. <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1042&context=droughtfacpub>

Impacts: Unpacking the definition

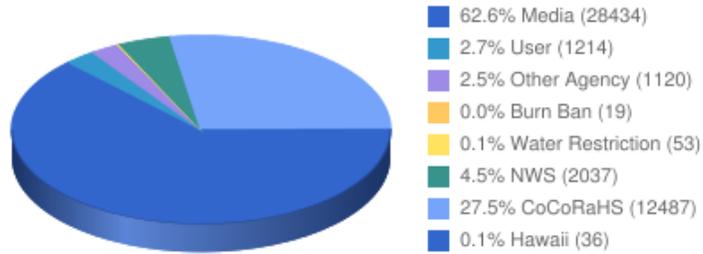
“An observable loss or change that occurred at a specific place and time due to drought.”

- “Loss or change” – implies an expectation of what should happen, based on past experience
- “Due to drought” – the attribution question – how do we know drought caused it?

Welcome to the Drought Impact Reporter!

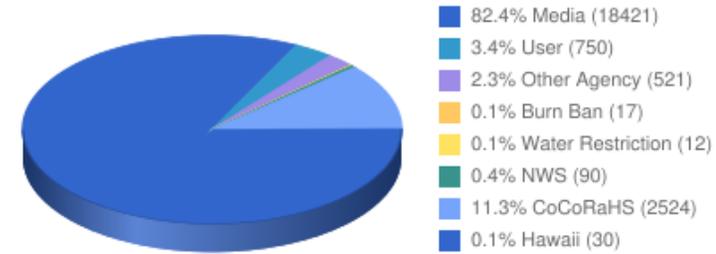
Report Composition

45,400 reports

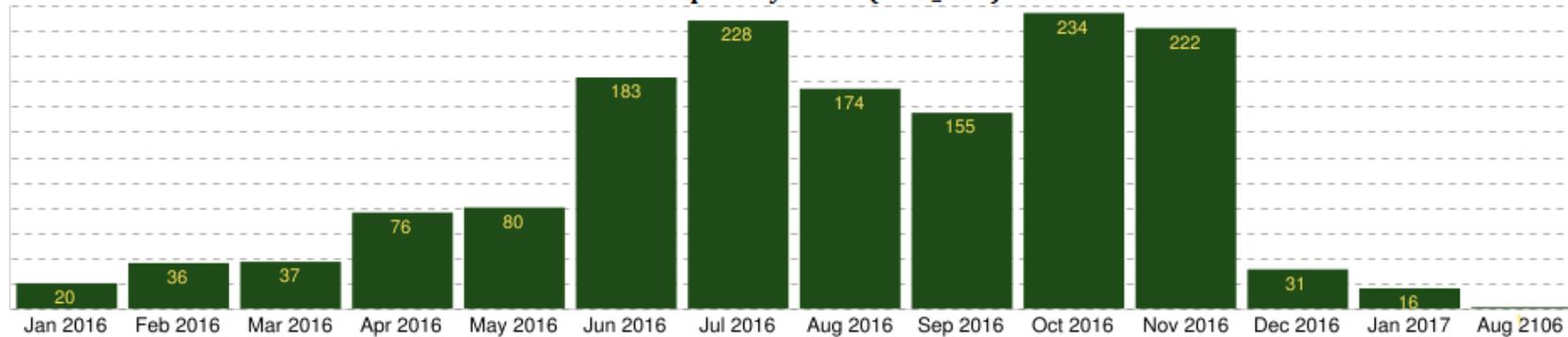


Impact Composition

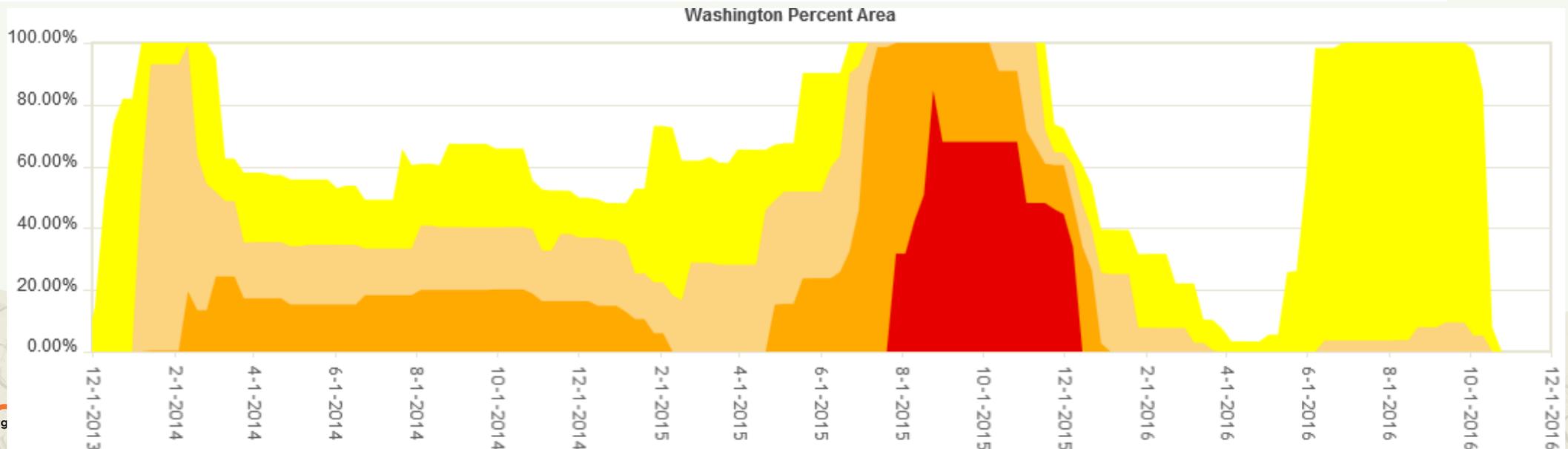
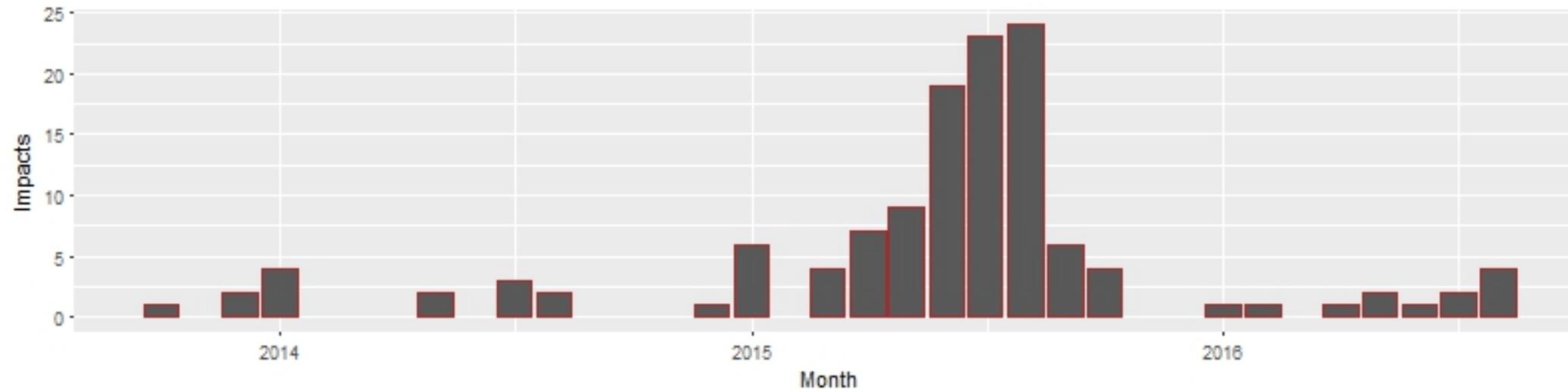
21,973 impacts



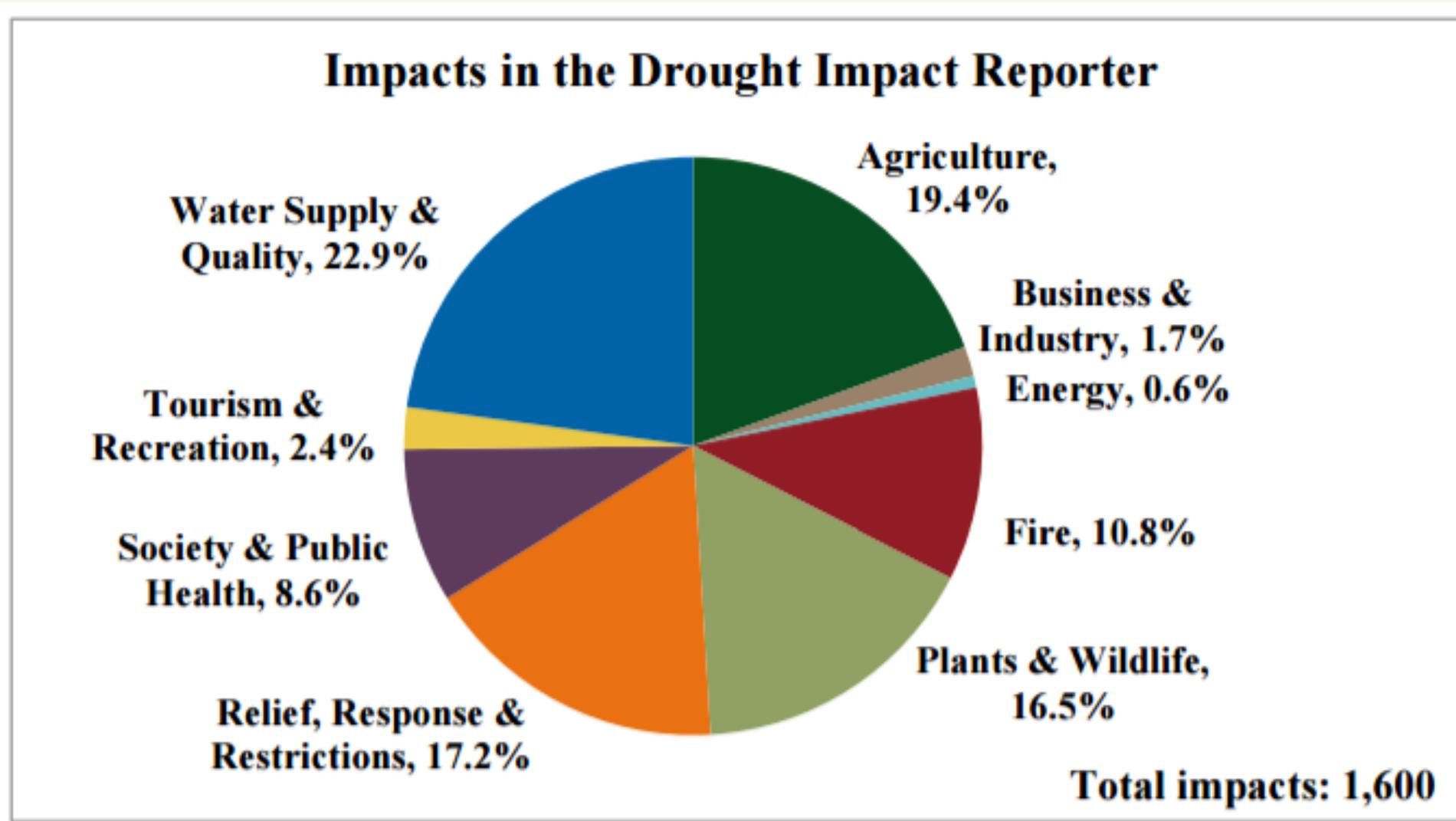
Impacts by month (start_date):



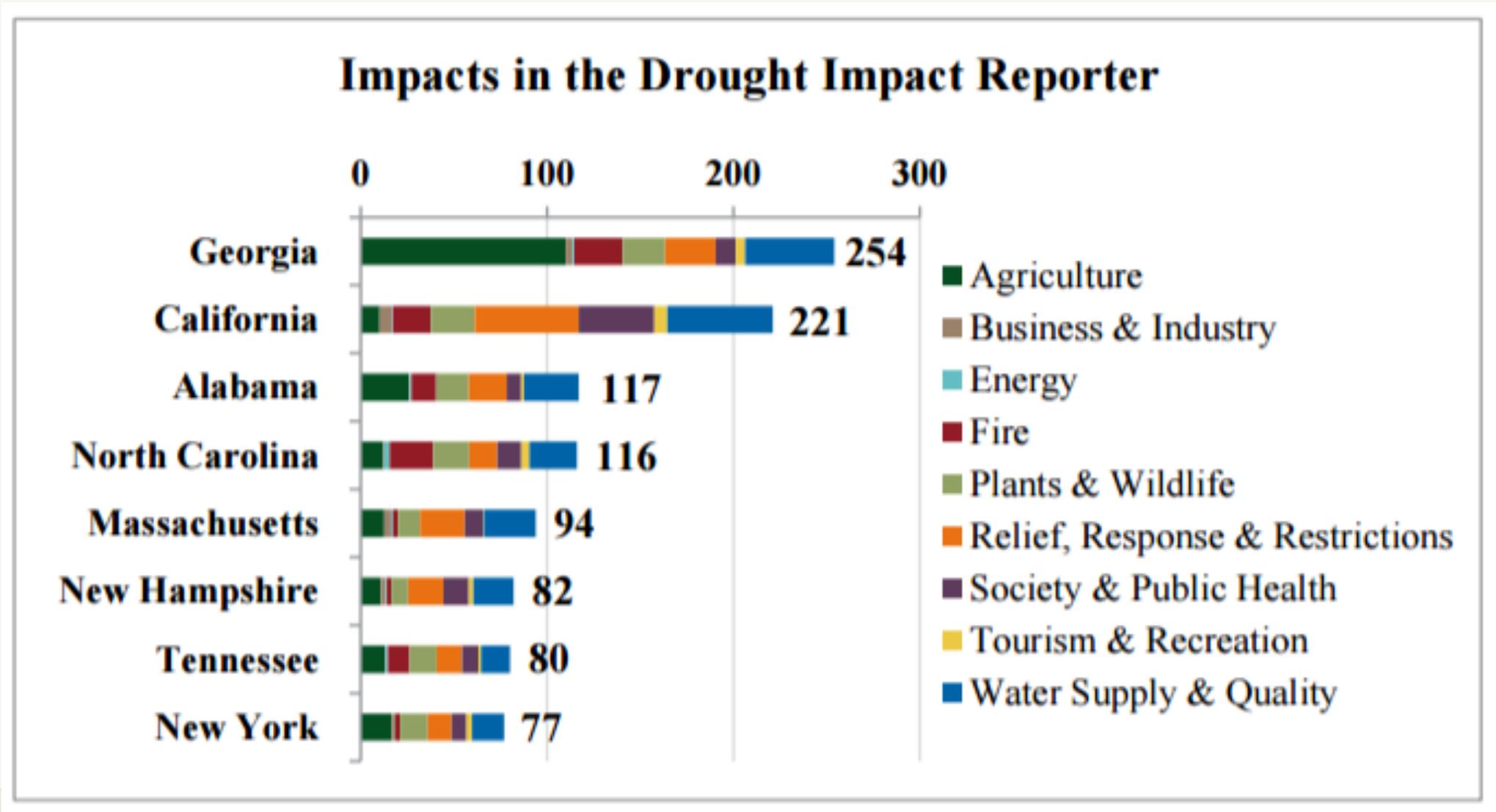
Washington impacts, state, county & city, & USDM



Impacts by category, 2016



Impacts by state and category, 2016



Questions & Challenges

- No methodology for valuing or quantifying drought impacts
 - Even in agriculture
- No units
- Easier to list than to summarize impacts
- “Angst index”
- Disincentives to sharing some info
 - Proprietary
 - Competitive



On the up side ...

- Resource for drought historians
- Impacts include attribution – we know drought caused it
- Using media's agenda-setting function to ID impacts that matter
- Awareness – of what? Is there data re/ underlying trend?

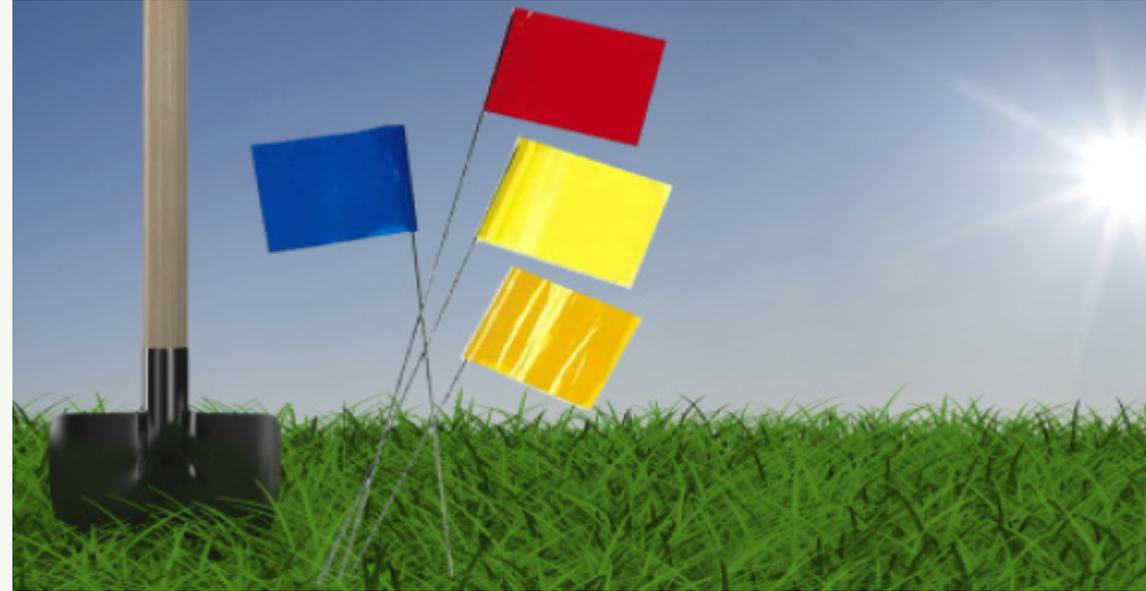
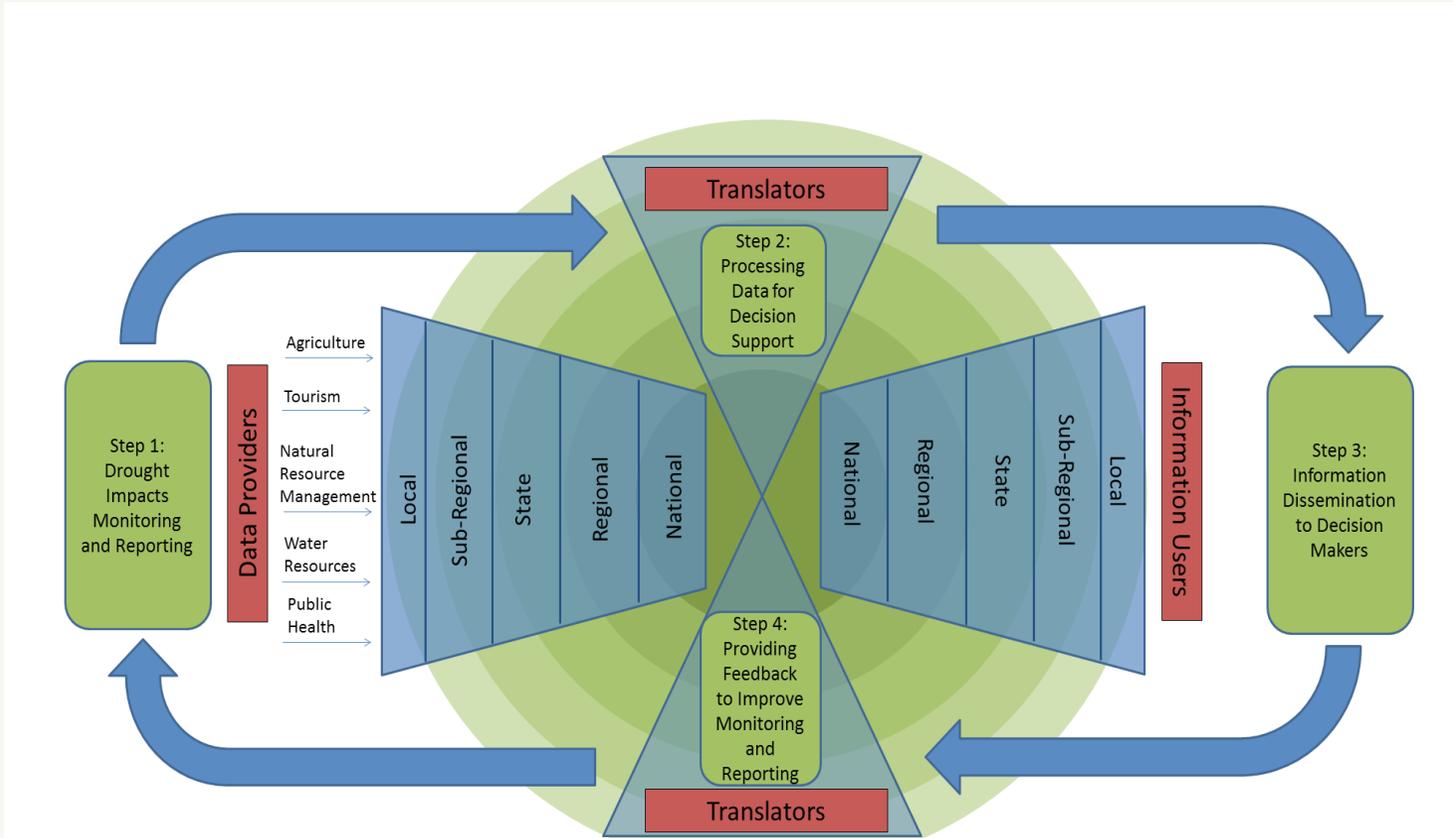


Image courtesy of Muscatine Power and Water
<https://www.mpw.org/news-events/news/tips-from-the-pros/the-flags-and-paint-mean>

Impacts Reporting, full circle

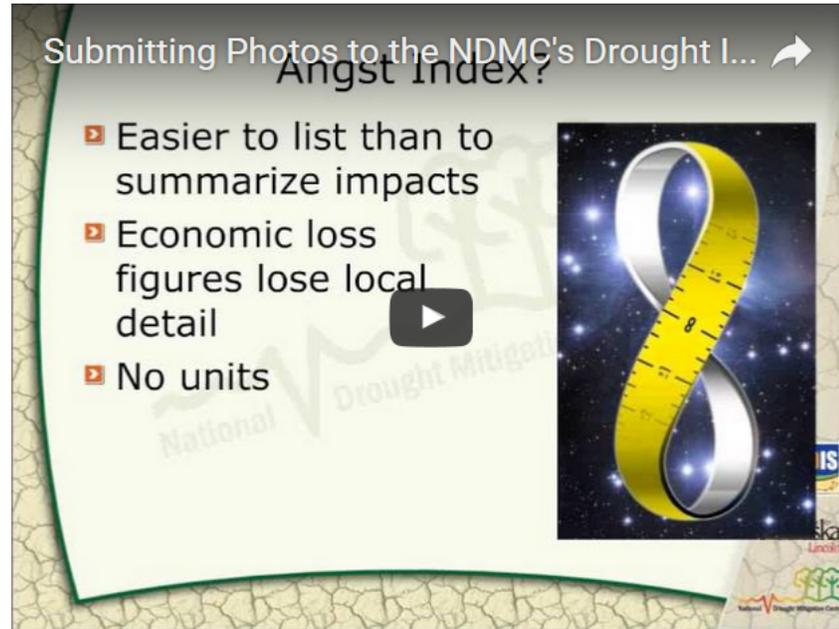


Lackstrom, K., et al. (2013). The Missing Piece: Drought Impacts Monitoring. Report from a drought impacts community of practice workshop in Tucson, AZ, March 2013.

Drought impact resources for ranchers

Uploading ranch impact photos to the Drought Impact Reporter

Kelly Helm Smith, National Drought Mitigation Center, talks about how and why ranchers can contribute their photos to the Drought Impact Reporter, a national, web-based archive of drought impacts. ([slides](#), [pdf](#))



- Tracking Drought Impacts on Rangeland

<http://drought.unl.edu/ranchplan/Overview/Resources/TrackingDroughtImpacts.aspx>

<http://droughtreporter.unl.edu/submitreport/>

Map

Advanced Search

Submit a Report

About the DIR

Help

Submit a Report

You can submit a report either by sending email to DIRinfo@unl.edu or by filling out the form below. To send an impact by [email](#), please be sure to include:

--a **description** of the impact (how drought is affecting you, your livelihood, your activities, etc.)

--an approximate **start date**. When did you first notice this impact? If the impact is no longer affecting you, please estimate when it stopped.

--the **location** of the impact—what city/cities or county/counties are being affected? Don't forget to include the name of the state!

We welcome photos as well; please note the conditions specified in the "Images" section below.

Description

Please provide a **Description** of how drought is affecting you, your livelihood, your activities, etc.

If there is a report online that helps illustrate your observation, please use the **Related Link** box to provide the link.

We encourage regular observations, rain or shine, related to some aspect of your environment or experience that is affected by drought. For more information, please read about [Condition Monitoring Reports](#).

[Learn how your report becomes an impact.](#)

Impact Description*

Related Link

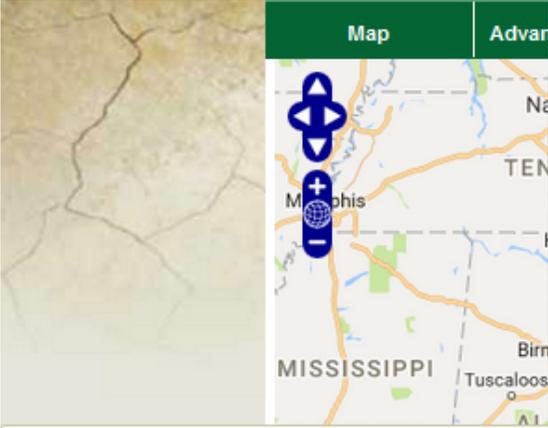
Description A d
has occurred sin
15 miles south o
rangeland is mu
year in several y
From Brian Guye
28, 2015.

Source Federal
Pictures



|<< < 1





Reports | Wilkes County, GA
09-23-2016 - 10-23-2016
Page 1 of 2

Lack of rain causing problems for agriculture in Wilkes County, Georgia



Publication Date: 10-10-2016

Affected Areas Wilkes County; Washington

Description The reach of Hurricane Matthew was about 30 miles east of Wilkes County. The clouds were not enough to settle the dust so another day went by with no rain. The focus of many community-related meetings is centered on how to find alternative rations for cattle. The nights are clear that winter grazing could be planted without worms but it's just too dry to plant and no rain is forecast.

From an agricultural extension agent in Wilkes County, Georgia, on October 10, 2016

Source Extension Agency

Pictures



Title: Picture shows nothing remaining in pasture. This is the most pastures in Wilkes County in the northern half.

Location: Northern Wilkes County
Photographer: photo by Frank Watson
Date: 10-10-2016



Report Source

User 11

Legacy

OK

Reports List

All-States View

68583-0988



Via CoCoRaHS: Promoting drought impact reporting to volunteers...

* **19,000+** volunteers covering all 50 states!!

* CoCoRaHS “Message of the Day”

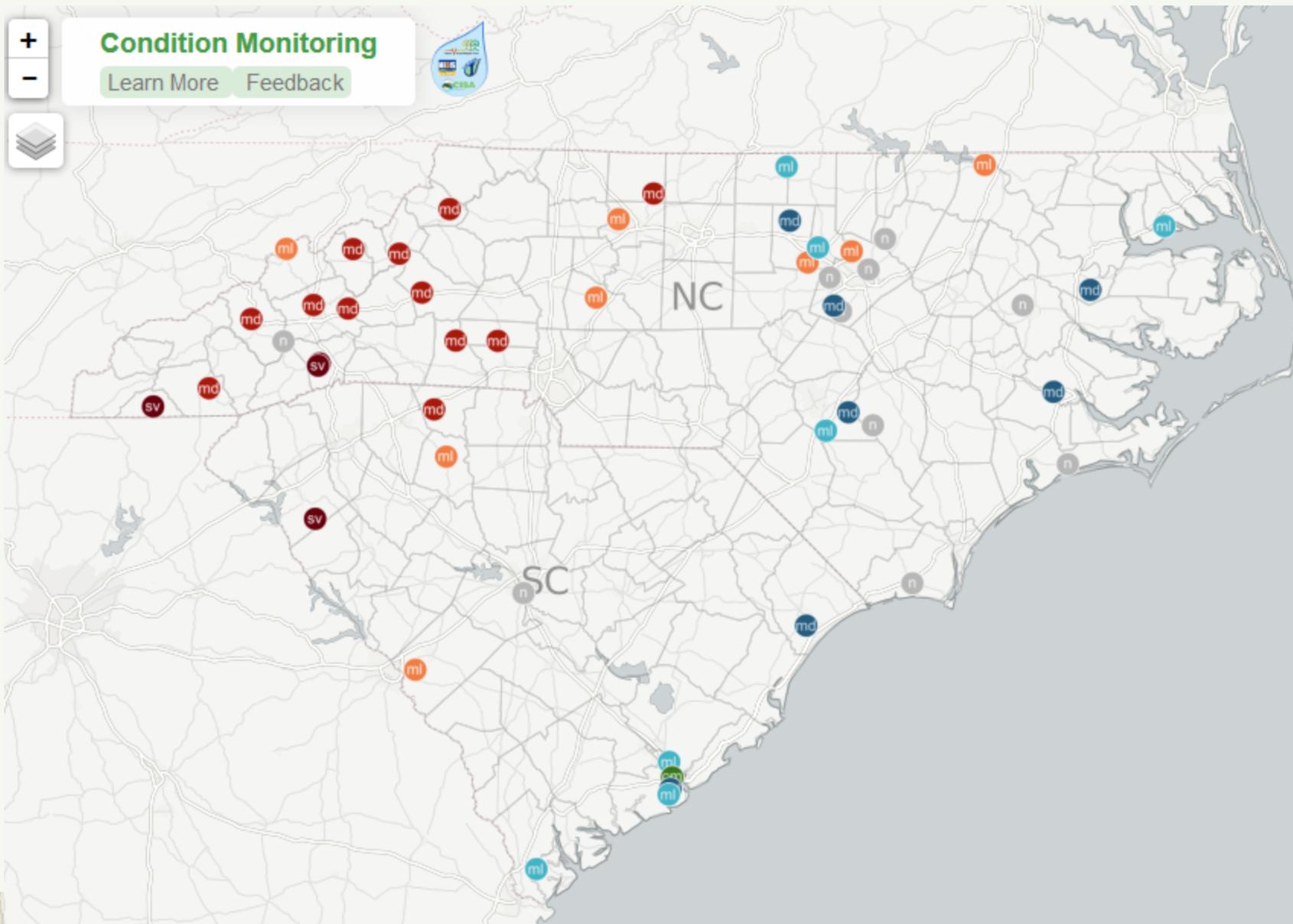
* Monthly e-mail reminders

* Guide to reporting drought impacts

* Banners on the Web



Courtesy: Henry Reges,
Colorado State University



Public Policy Institute of California



PPIC

PUBLIC POLICY
INSTITUTE OF CALIFORNIA

August 2015

PPIC WATER POLICY CENTER

What If California's Drought Continues?

Ellen Hanak | Jeffrey Mount | Caitrin Chappelle | Jay Lund | Josué Medellín-Azuara | Peter Moyle |
Nathaniel Seavy

Research support from Emma Freeman, Jelena Jedzimirowic, Henry McCann, and Adam Soliman

Supported with funding from the California Water Foundation, an initiative of the Resources Legacy Fund

- Urban areas
- Farmers, “growers”
- Low-income communities
- Habitat/biodiversity

Other recent efforts: Washington ag in 2015

2015 Drought and Agriculture

A Study by the Washington State Department of Agriculture

February 2017

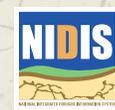


Washington State Department of Agriculture

Derek I. Sandison, Director

AGR PUB 104-495 (N/2/17)

- Washington State Department of Agriculture
- Grant from WA Dept. of Ecology
- Review by Washington Academy of Sciences
- Economic damage: \$633 to \$773 million, statewide (gross, not net)
- Limitations:
 - Drought vs. heat
 - Regional focus, self-reported data
 - NASS data doesn't cover all crops, not available in a timely fashion
- Recommendation:
 - Ongoing data collection

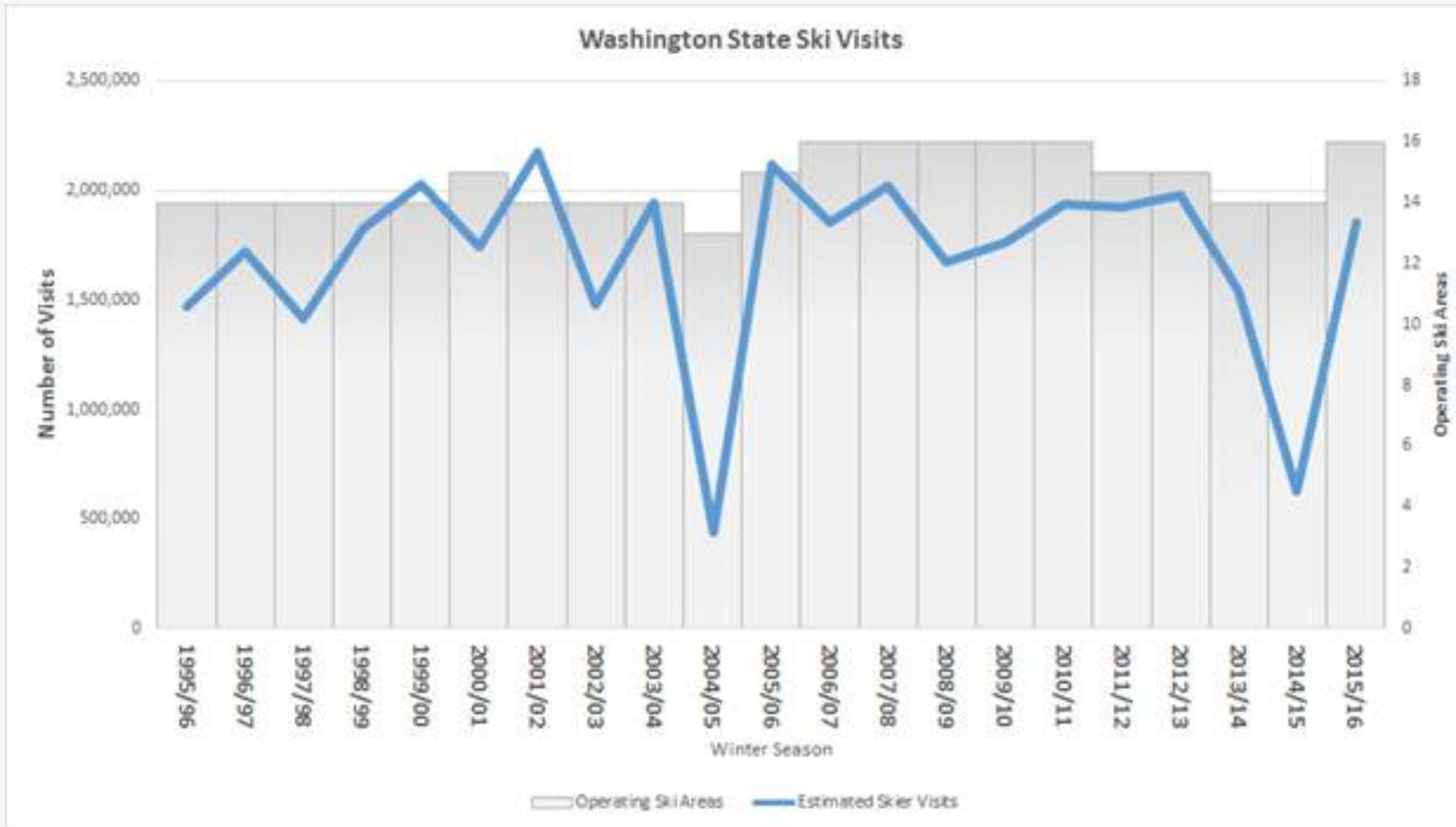


Washington State Academy of Sciences recommendations

- Use net, not gross income. “... net farm income for Washington in 2015 was higher than in any of the previous four years by a significant amount.”
- Use a defined economic foundation, i.e.,
 - Economic Welfare
 - Input/Output
 - Computable General Equilibrium
- Be clear about whether the objective of the study is to calculate net impacts to agriculture or costs to farmers negatively impacted by the drought

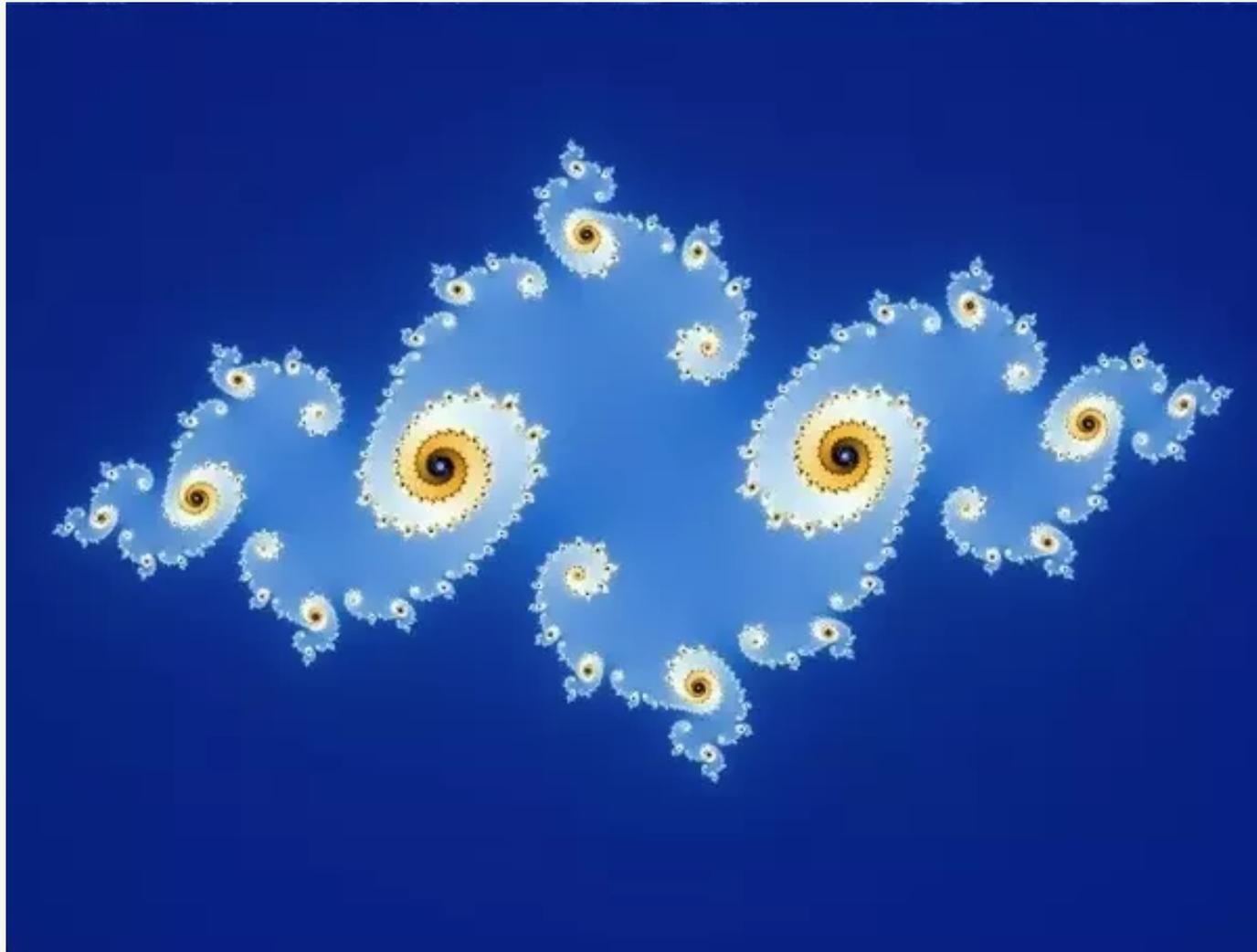
“The report needs to be clear about whether the study’s objective was to quantify net effect of the drought at the state level or to quantify losses to negatively affected farms without including an offset for farms that may have increased their net returns compared to a year when there was no drought. **It is a political question for WSDA, DOE, and the Legislature** as to whether they are more interested in quantifying the harm to farmers that were negatively affected. Much of farm policy at the federal level is focused on creating stability in the farming sector by providing assistance through price supports or subsidized yield insurance. Another way to say this is that **there is a distributional goal that is politically defined and which supersedes a goal based on economic efficiency.**”

-- WSAS



WASHINGTON STATE SKI VISITS (SOURCE: NATIONAL SKI AREAS ASSOCIATION)
 From them Washington State drought plan revision, vulnerability chapter

In the winter of 2004/2005, visitation to Washington State ski resorts dropped by 1.5 million visits from the prior year, a decrease of 77 percent. During the 2014/2015 winter, visitation numbers dropped by more than 900,000 visits from the previous year, a decrease of 59 percent.



<https://www.quora.com/Why-is-the-Mandelbrot-set-a-fractal>

Plan mapping ... next generation



Home > Planning > Drought Plans

Login

Drought Plans and Planning

State Drought Plans

Get information about current and historical state drought plans

Tribal Drought Planning

A listing of tribal drought plans.

Watershed Level Drought Planning

A listing of watershed/basin drought plans.

Local Level Drought Planning

A listing of municipal and other local level drought plans.

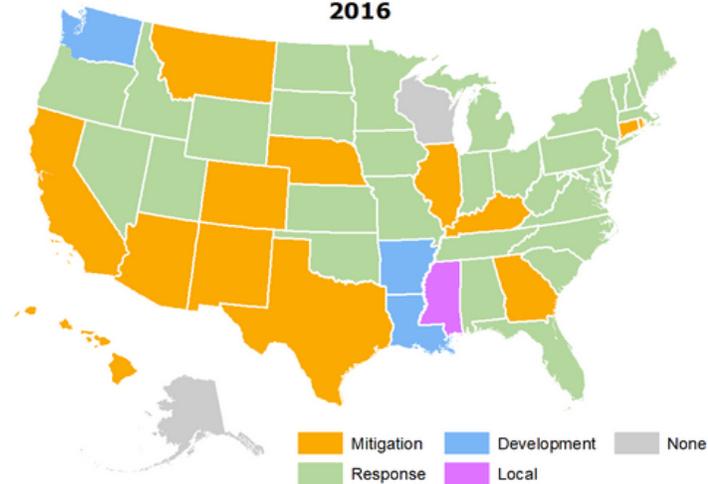
County Level Drought Planning

A listing of county level drought plans.

International Drought Planning

See this portion of the NDMC website which deals with drought planning on an international scale.

Status of State Drought Plans 2016



The information displayed on this map is from an evaluation based upon a set of established criteria.

States' use of three types of planning to reduce drought vulnerability

Drought Plan

Monitoring

Response

Mitigation

Agency Connections

Local Connection

HazMit/EM Plan

incl. dgt in haz profiles

Mitigation

Monitoring

Agency Connections

Local Connection

Water Policy/Plan

water shortage /dgt

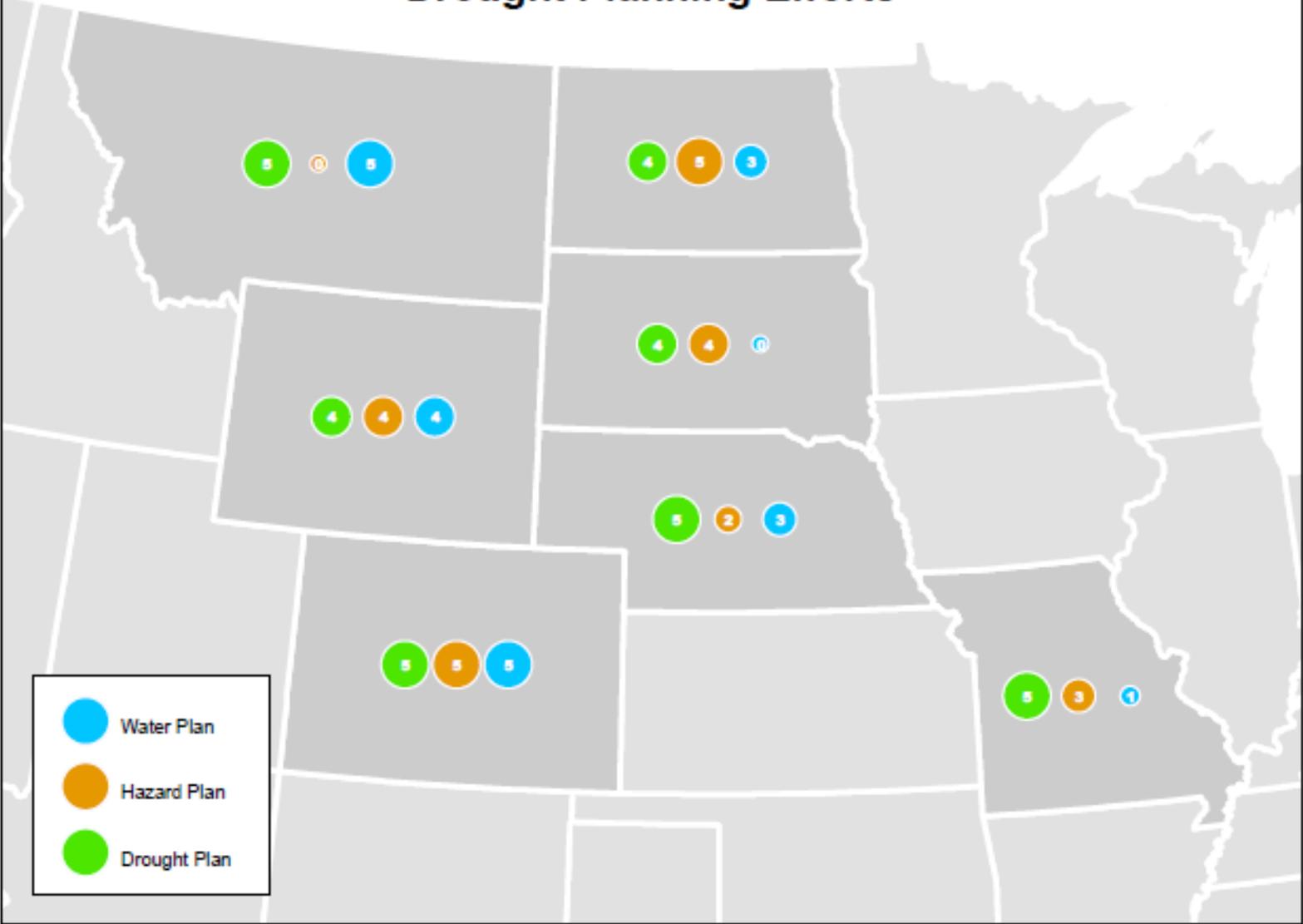
Response

Mitigation

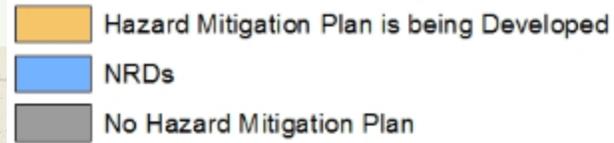
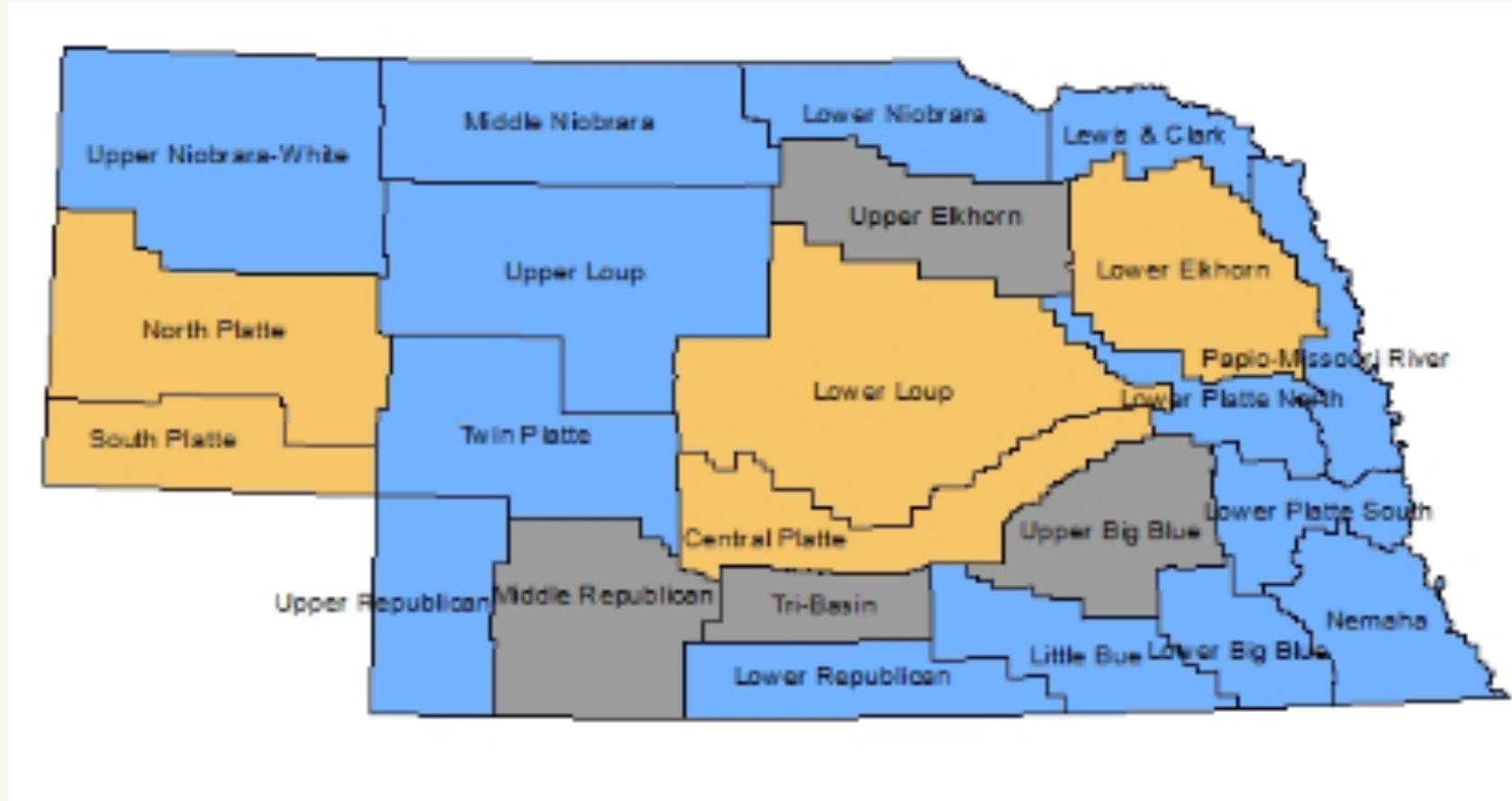
Agency Connections

Local Connection

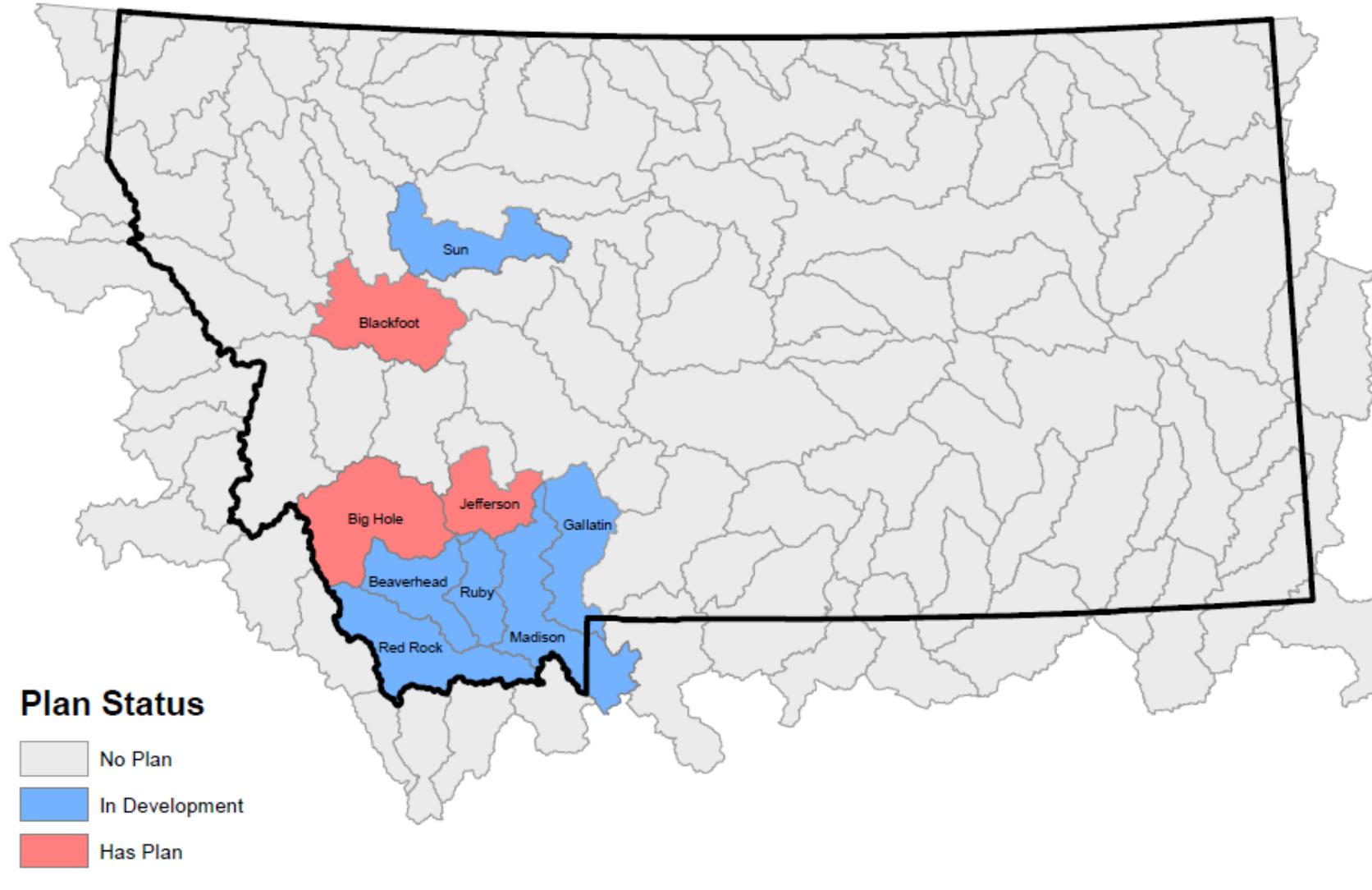
Drought Planning Efforts



And at sub-state levels



Montana Watershed Drought Plan Status



Plan Status

-  No Plan
-  In Development
-  Has Plan

Questions, comments?



Kelly Helm Smith

ksmith2@unl.edu, 402-472-3373