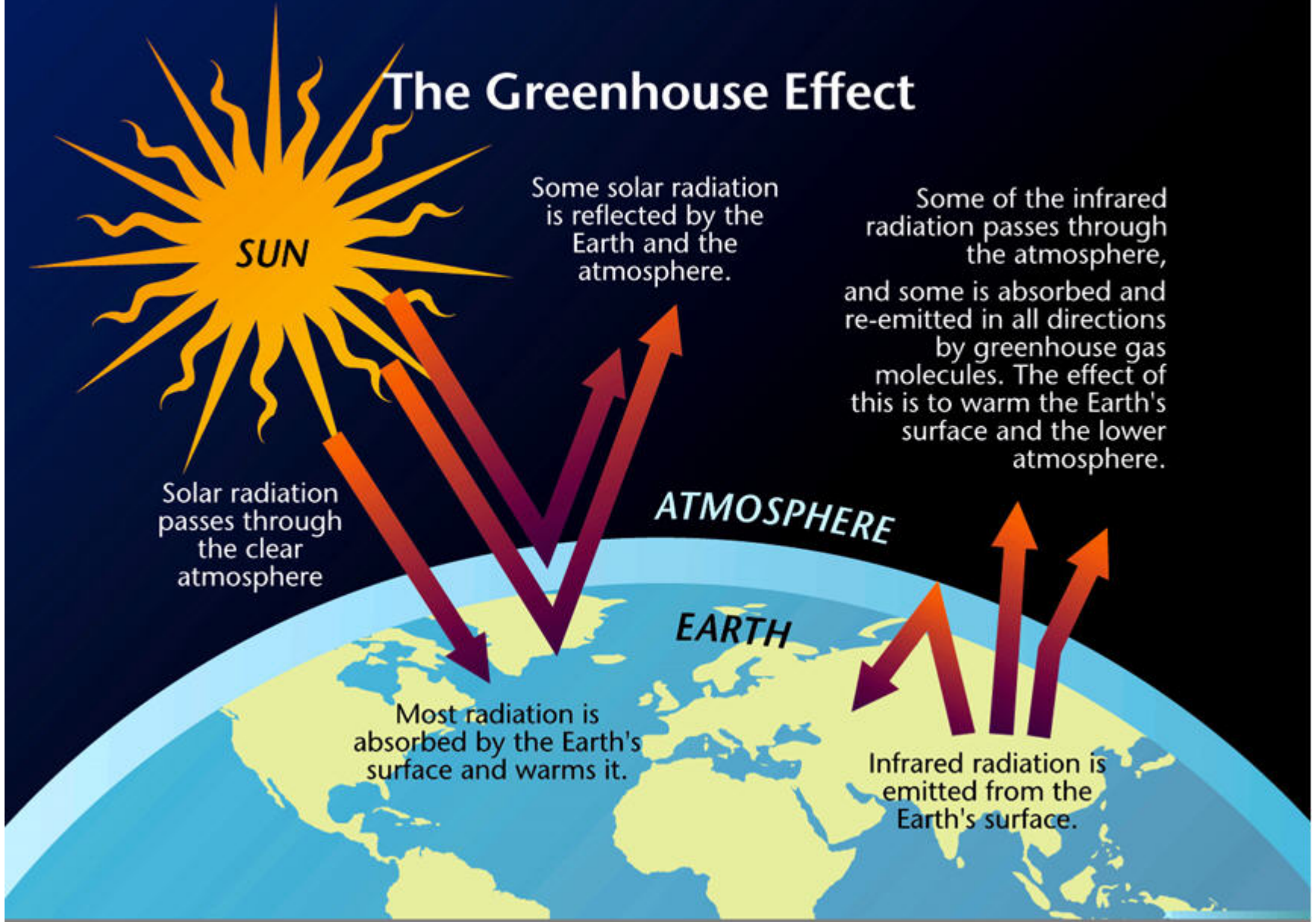
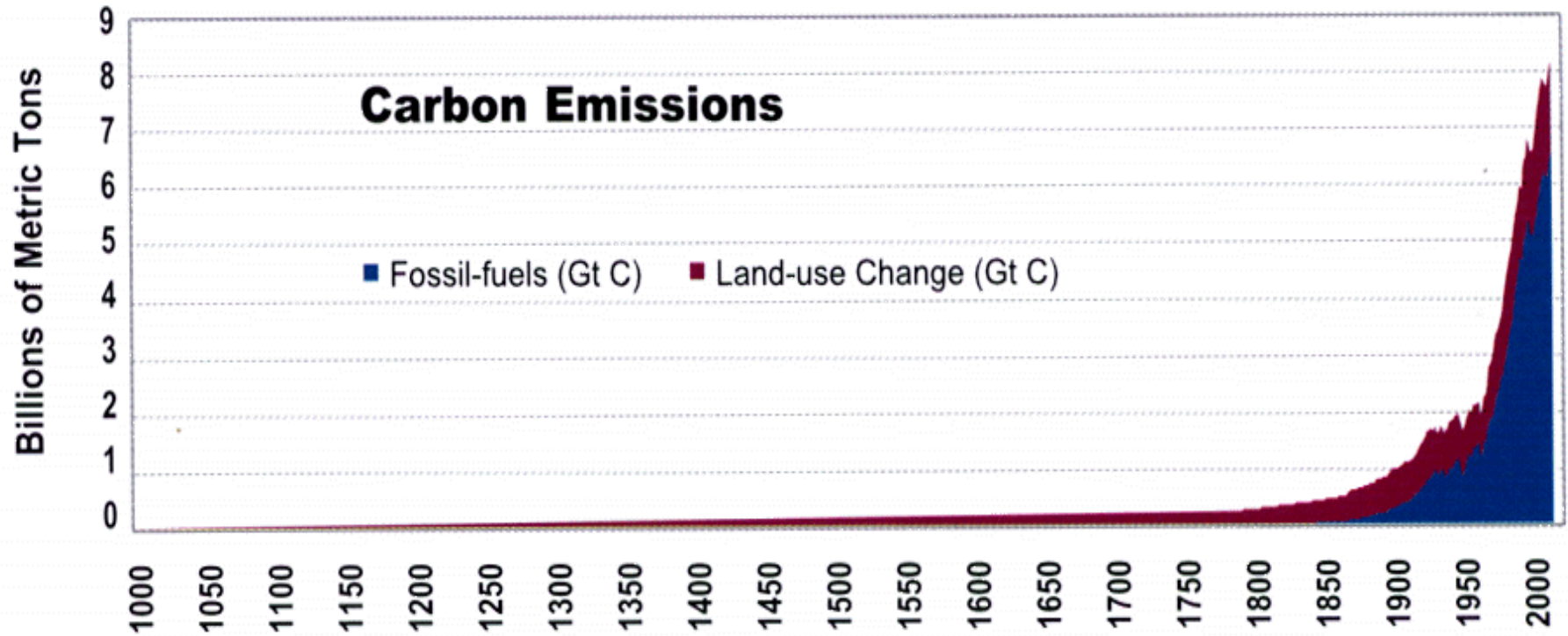


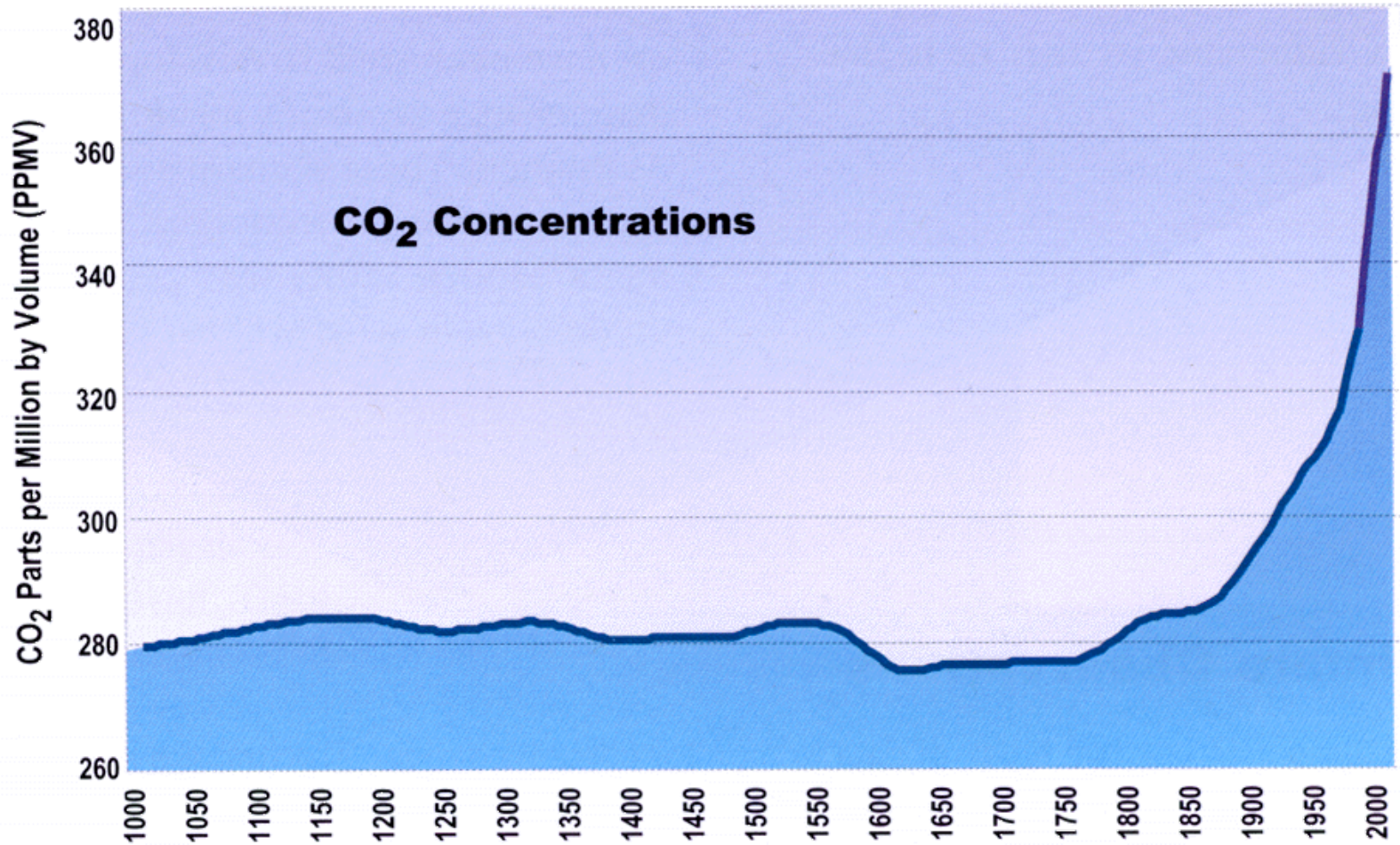
The Greenhouse Effect



Northern Hemisphere Carbon Emissions

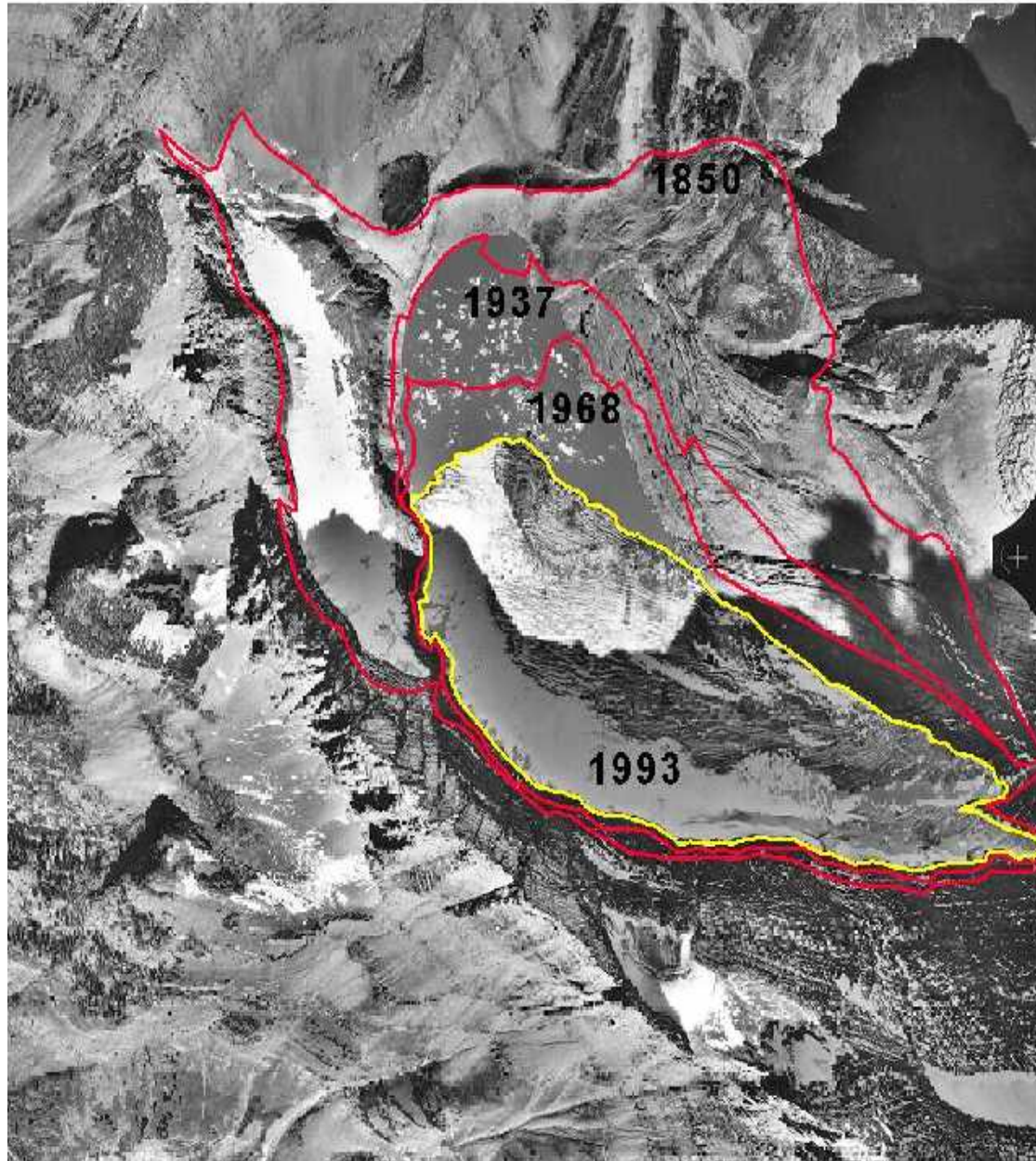


Atmospheric CO₂ Concentrations



Grinnell Glacier 1850-1993

Aerial View



Coral reef bleaching in Australia



Sinking infrastructure in Russia



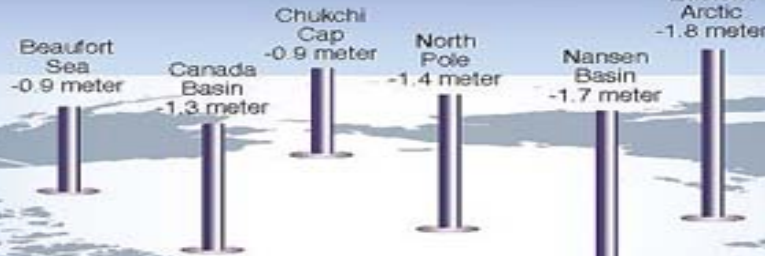
2/6/2015

Thinning of the Arctic sea-ice

The height of the bars represent the reduction of ice thickness (draft) from the period 1958-1976 to 1993-1997

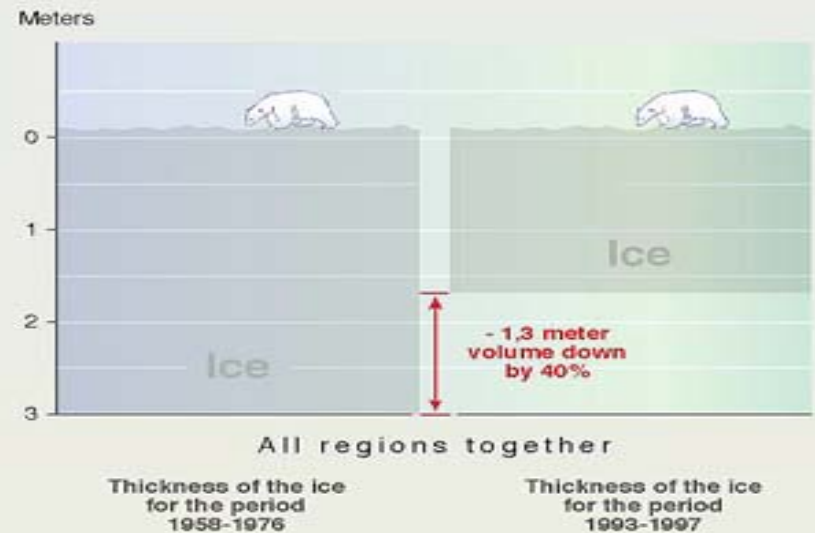
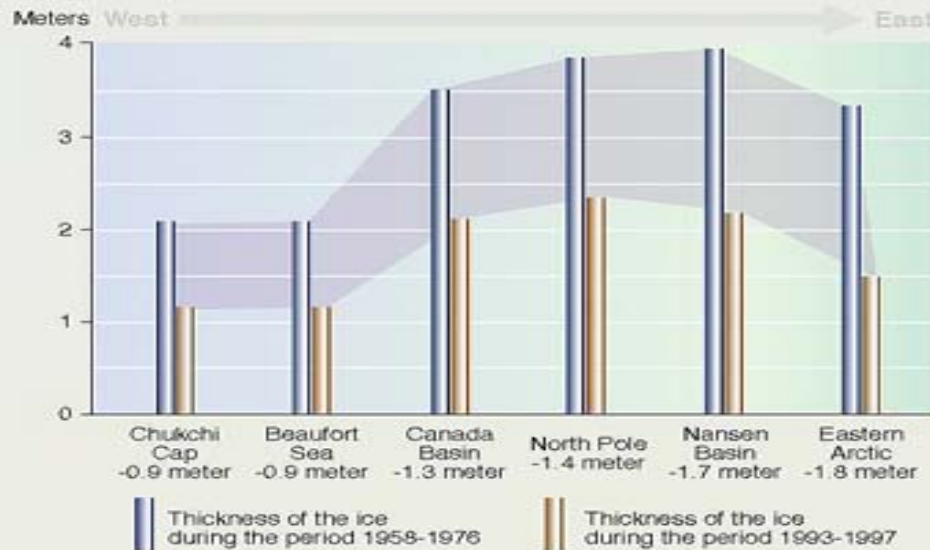
Location of the sampling points

Ice draft in the 90s is over a meter thinner than three decades earlier



GRAPHIC DESIGN: PHILIPPE PERAGENOZ

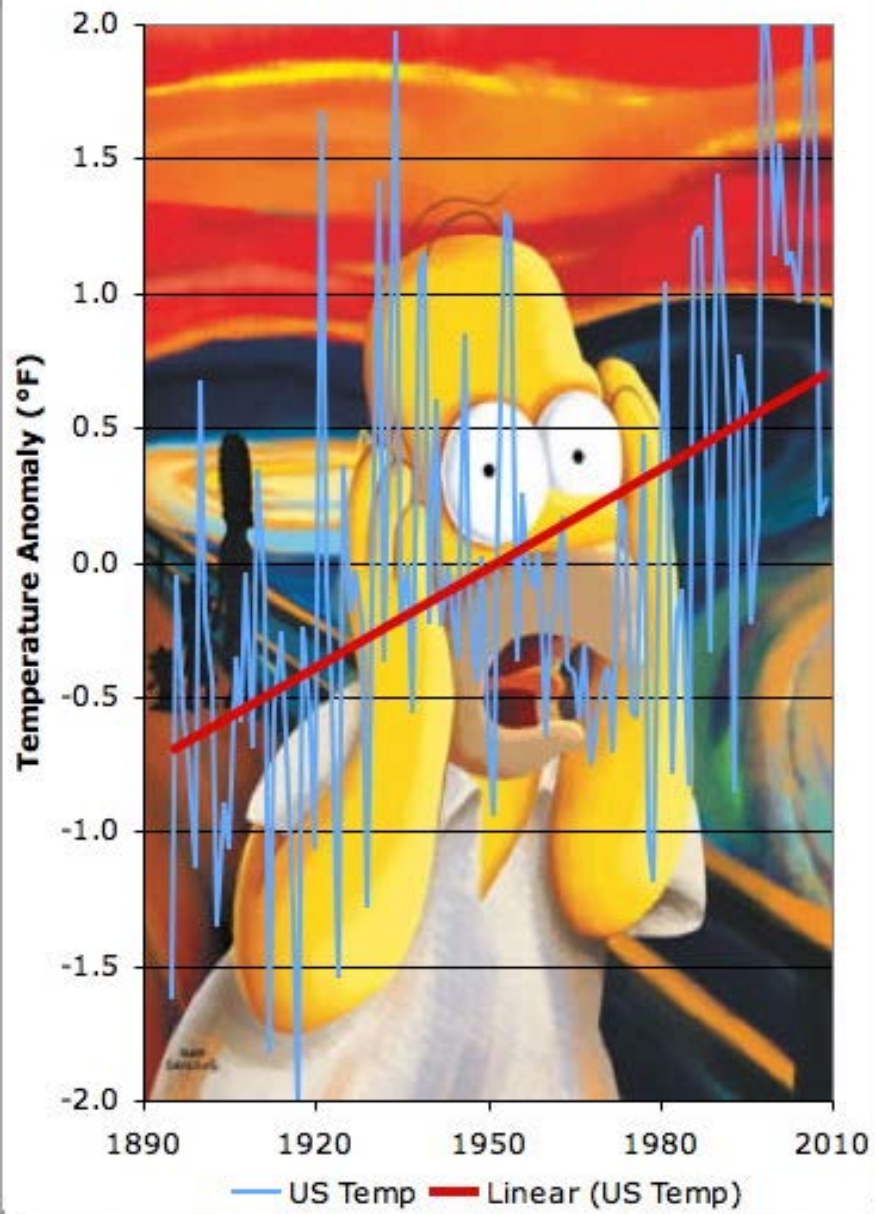
Thinning of the Arctic sea ice cover



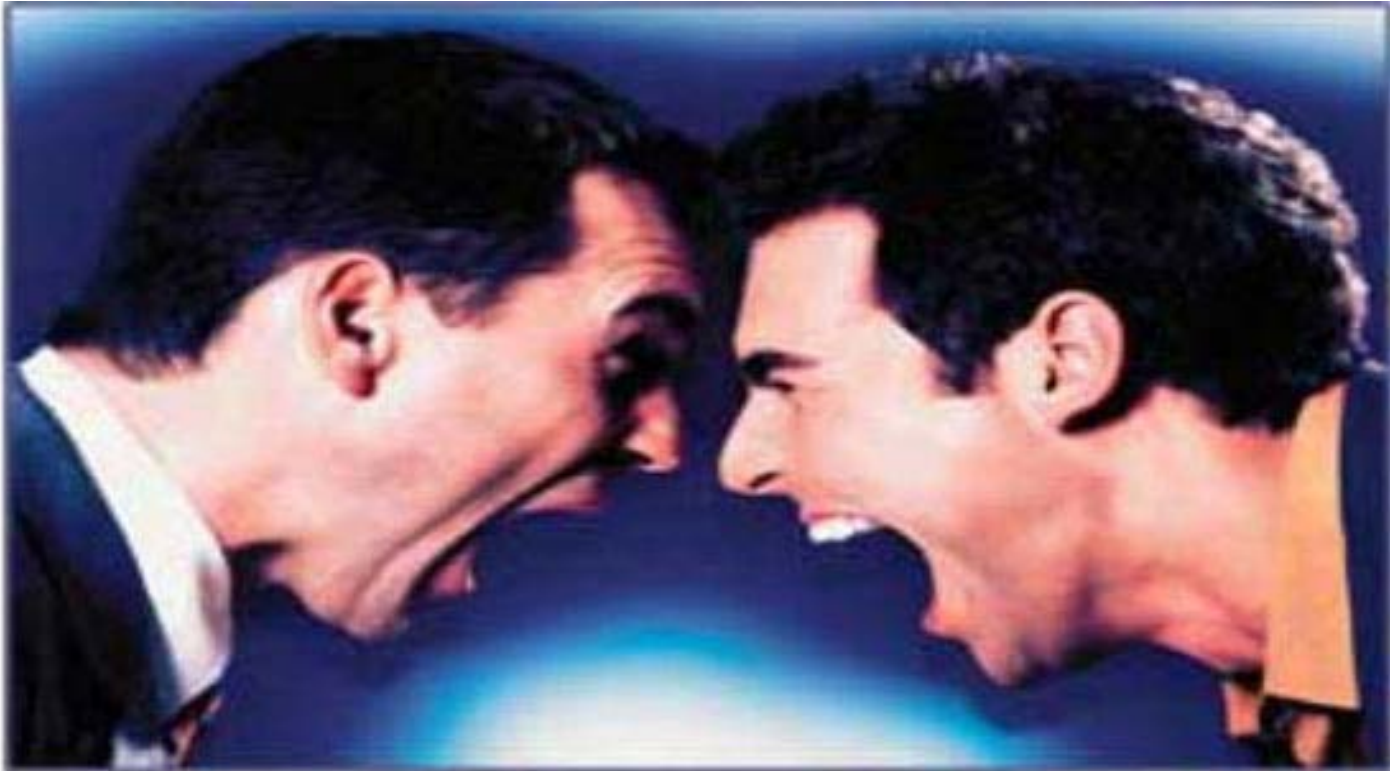
Polar bears stranded on ice



Change in Annual US Temperature



Climate Change



If you are a land manager,
by now there is a good chance that:

A. you have been bored silly with the number of times you have seen dire climate change predictions but not sure how polar bears will impact your job

B. you are really concerned that climate change is occurring but not sure what to do about it because the issue seems too big to deal with

C. think this is all a bunch of BS and you are only listening because your supervisor told you to

The standard off the shelf
climate change presentation ...

Is not effective with land managers

So what to do??!!

Try a different approach





Reaching Common Ground: Communicating the Impacts and Options of Climate Variability for Working Land Managers

Steven McNulty
smcnulty@fs.fed.us

Try the ELFLAND Approach

- Establish contact
- Listen
- Find commonality
- Lessen mistrust
- **Assess needs**
- **Nurture ongoing projects**
- **Deliver**



An example using the Southeastern US

1. Establish Contact

- Huge network of climate information tool and data providers already exists for the SE. Examples include:
 - NRCS staff for each county
 - State Extension
 - South East Climate Consortium
 - Southern Group of State Foresters
 - Southeast Climate Science Center
 - LCCs (9 are part of SE region)
 - Delta Farm Press
 - Southeast Farm Press
 - Minority Landowner Magazine
 - CISA

2. Listen

- Attend a lot of meetings and eat lots of BBQ
 - listen to meeting topics and concerns
- Host webinars to solicit input
 - a series of a dozen webinars were conducted to hear from land managers and TAIP (Tool Assistance and Information Providers)
- Contact tool and information developers to hear what they have already developed or could develop with additional assistance

3. Find Commonality

- 90% of southeast foresters do not believe in AGW
- The percentage of (non-organic) southeast farmers believing in AGW is likewise very low
 - However, all believe in climate variability
 - so use a "ice breaker survey"

A quick survey

Q1. Has climate always varied in the past, will climate always vary in the future, and would we experience climate variability now regardless of anything that people may or may not do?

Foresters yes USDA yes

Q2. Is current climate variability negatively impacting some forests?

Foresters yes USDA yes

Q3. Will future climate variability likely impact forests in the future?

Foresters yes USDA yes

Q4. If you could manage your forests to better adapt to current and future climate variability would you?

Foresters yes USDA yes

4. Lessen Mistrust

- Most (if not all) of audience now considers the presenter to be tricky and expects that climate change will soon become the center of discussion
 - So begin by showing national variability of drought
 - Followed by a map illustrating that they are (largely) correct in believing that warming has not occurred in the South
 - This elicits much smiling and head bobbing
 - It also elicits a sense that the presenter is giving a "fair and balanced" presentation

Who to believe?

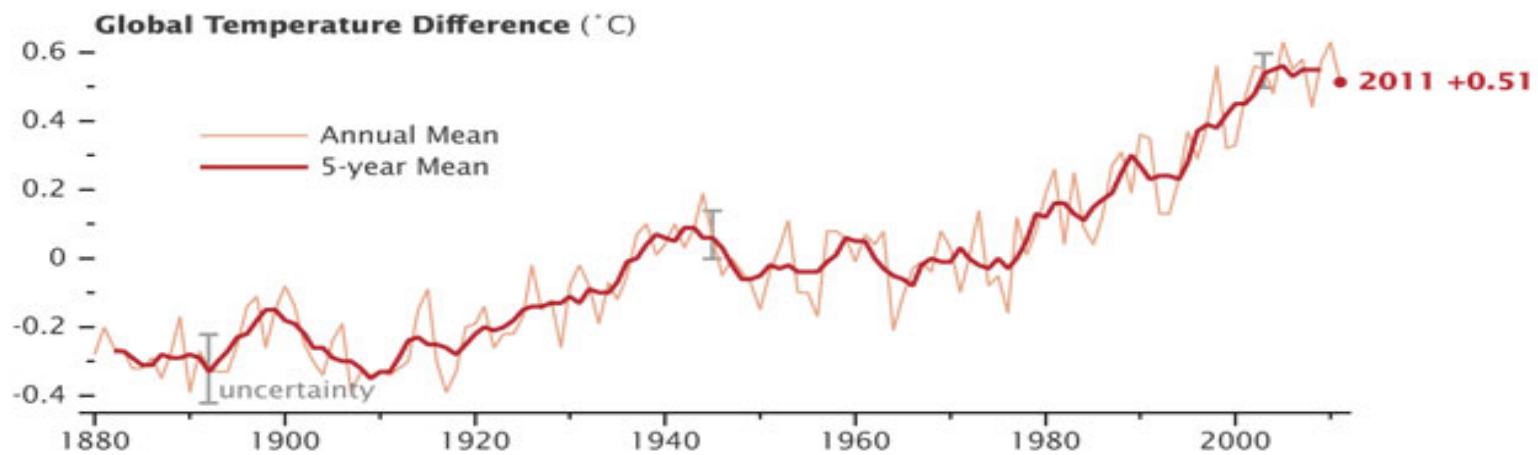
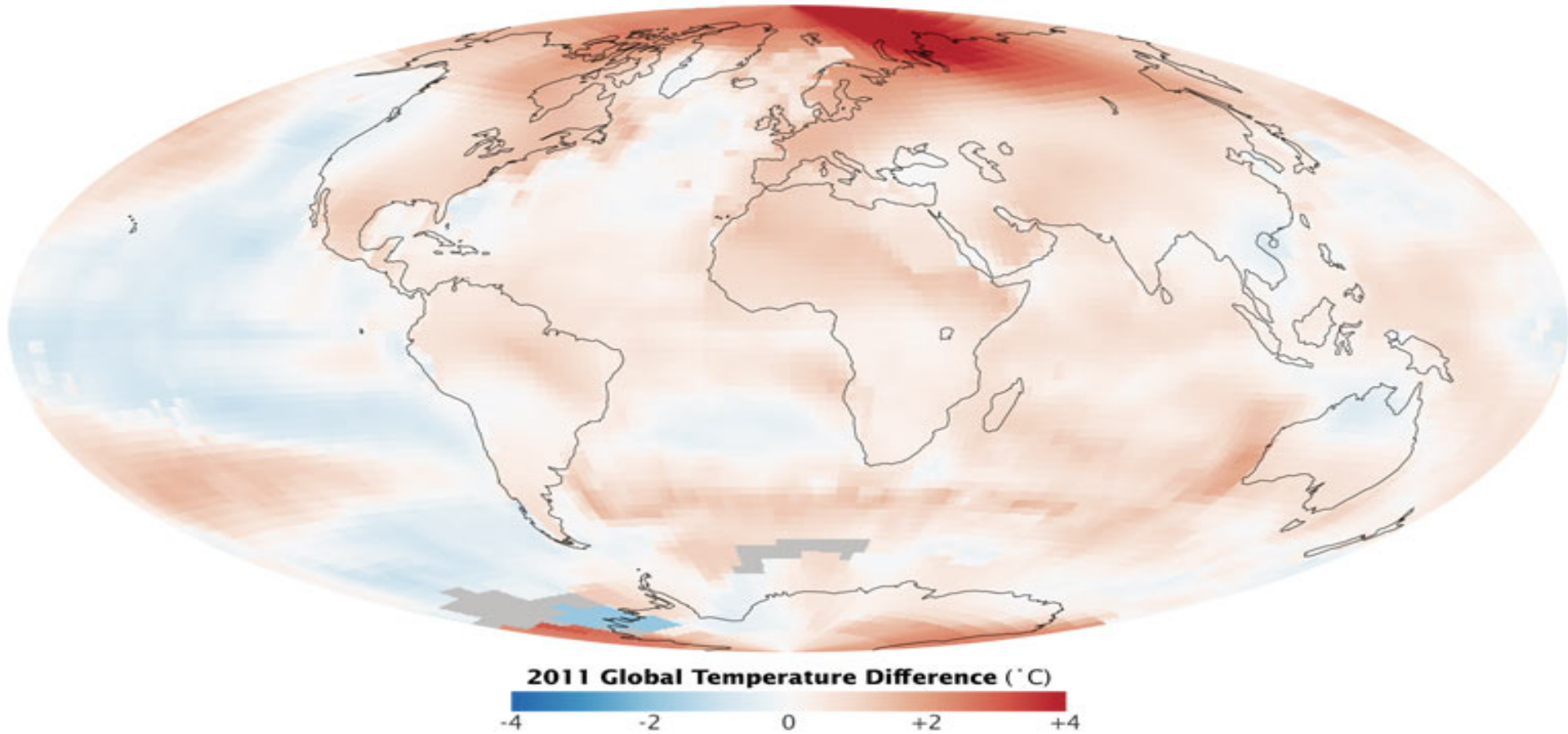
The scientists who study the climate

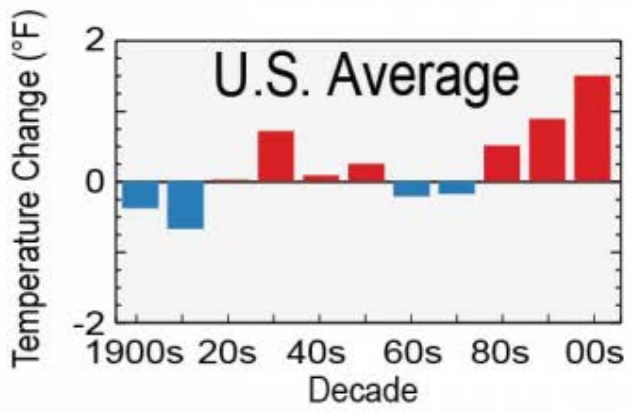
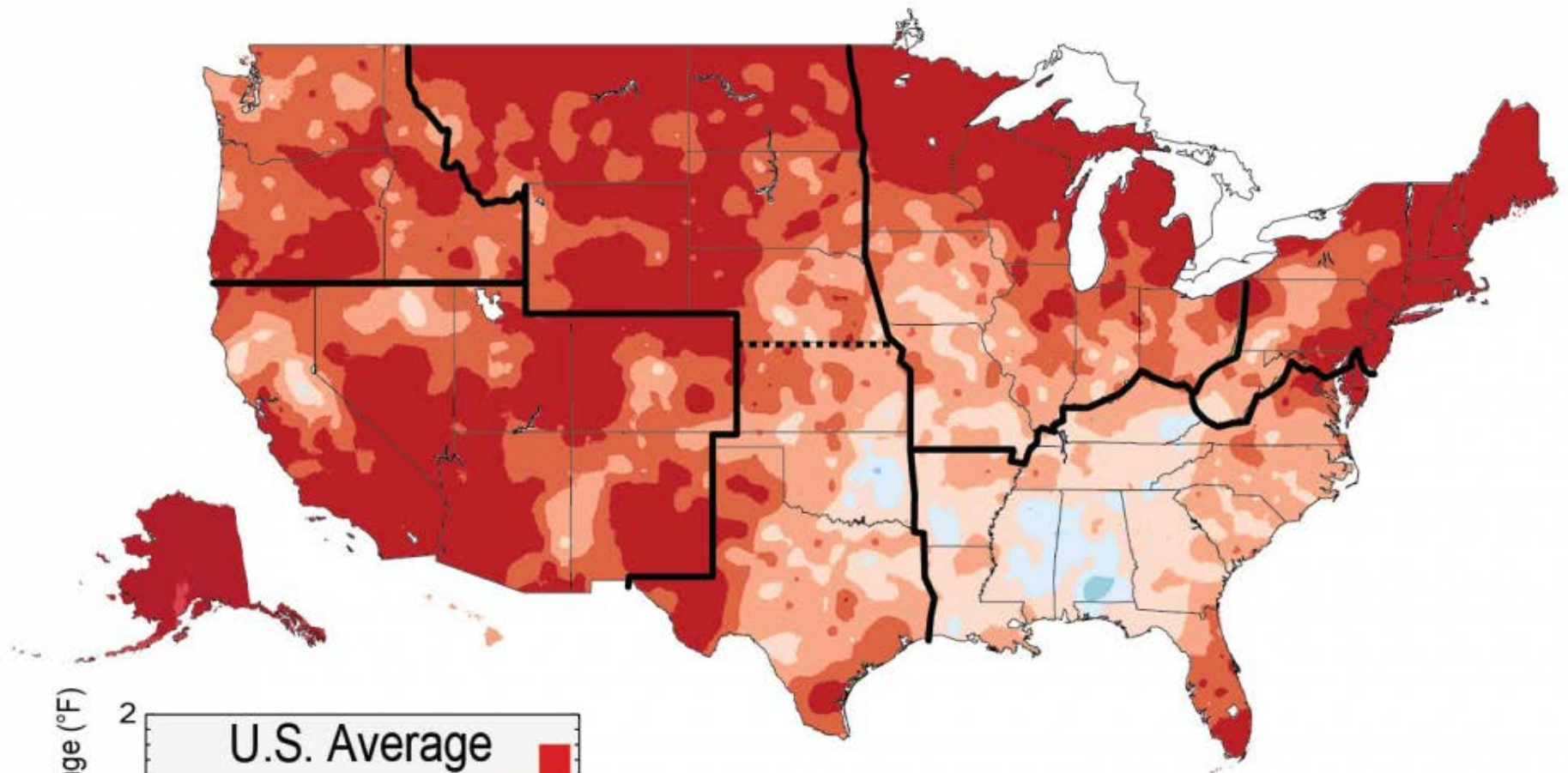
9,135 out of 9,136 scientists (99.999%) believe man-made climate change is happening based on study of peer reviewed papers published between 2011 and 2013.

LINDSAY ABRAMS

The foresters who live and work in the climate every day

Recent PINEMAP Survey: Only 10% of surveyed southeast foresters thought that man-made global warming was occurring.



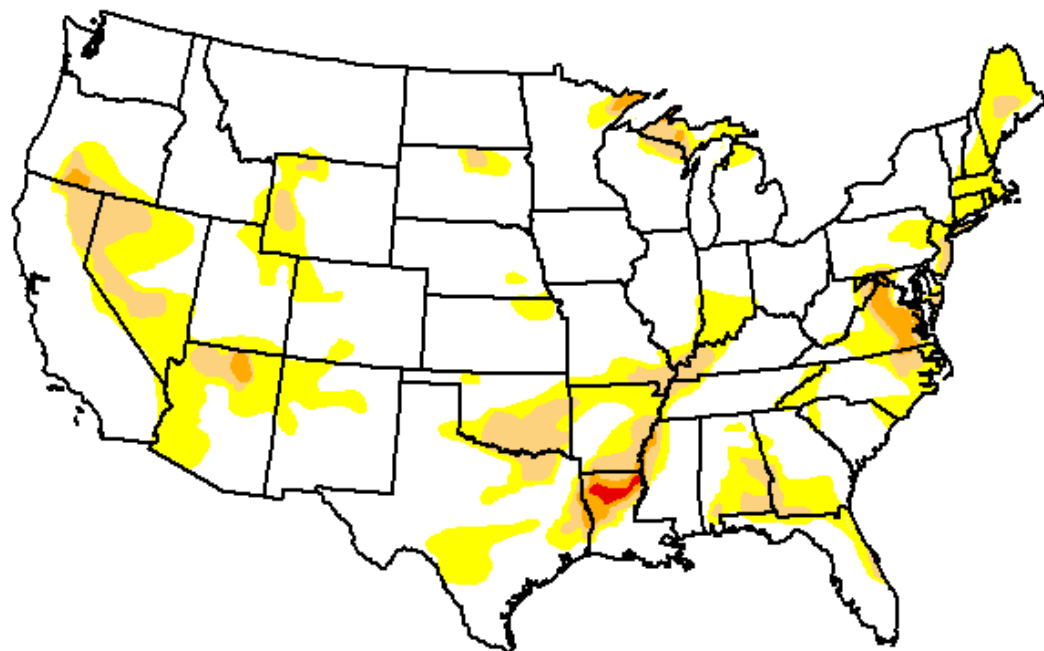


U.S. Drought Monitor CONUS

August 24, 2010
(Released Thursday, Aug. 26, 2010)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	73.99	26.01	8.01	1.44	0.14	0.00
Last Week <i>8/17/2010</i>	72.40	27.60	8.46	1.66	0.14	0.00
3 Months Ago <i>5/25/2010</i>	76.25	23.75	9.26	2.48	0.18	0.00
Start of Calendar Year <i>12/29/2009</i>	72.07	27.93	12.40	4.24	0.19	0.00
Start of Water Year <i>9/29/2009</i>	63.99	36.01	14.98	6.18	1.30	0.28
One Year Ago <i>8/25/2009</i>	68.13	31.87	14.13	6.02	2.33	1.66



Intensity:



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

Author(s):

Brian Fuchs

National Drought Mitigation Center



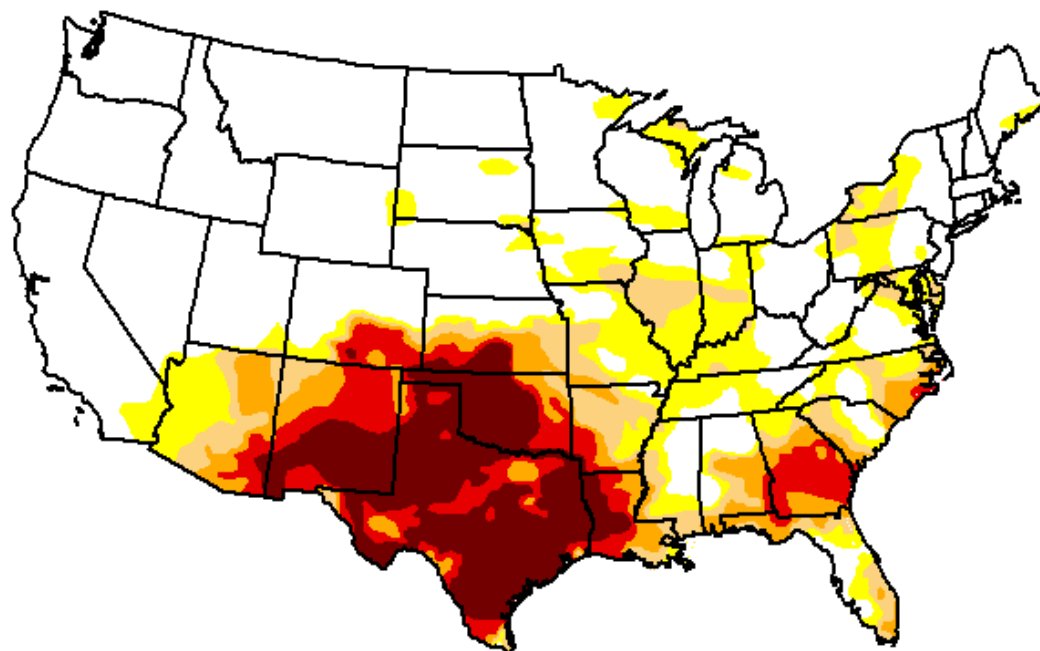
U.S. Drought Monitor

CONUS

August 16, 2011
(Released Thursday, Aug. 18, 2011)
 Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	55.14	44.86	31.00	23.43	17.37	10.83
Last Week <i>8/9/2011</i>	55.01	44.99	32.86	24.74	18.48	11.46
3 Months Ago <i>5/17/2011</i>	67.69	32.31	26.35	20.68	13.18	6.04
Start of Calendar Year <i>1/4/2011</i>	60.50	39.50	21.74	8.50	2.60	0.00
Start of Water Year <i>9/28/2010</i>	60.05	39.95	13.16	3.09	0.30	0.00
One Year Ago <i>8/17/2010</i>	72.40	27.60	8.46	1.66	0.14	0.00



Intensity:



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

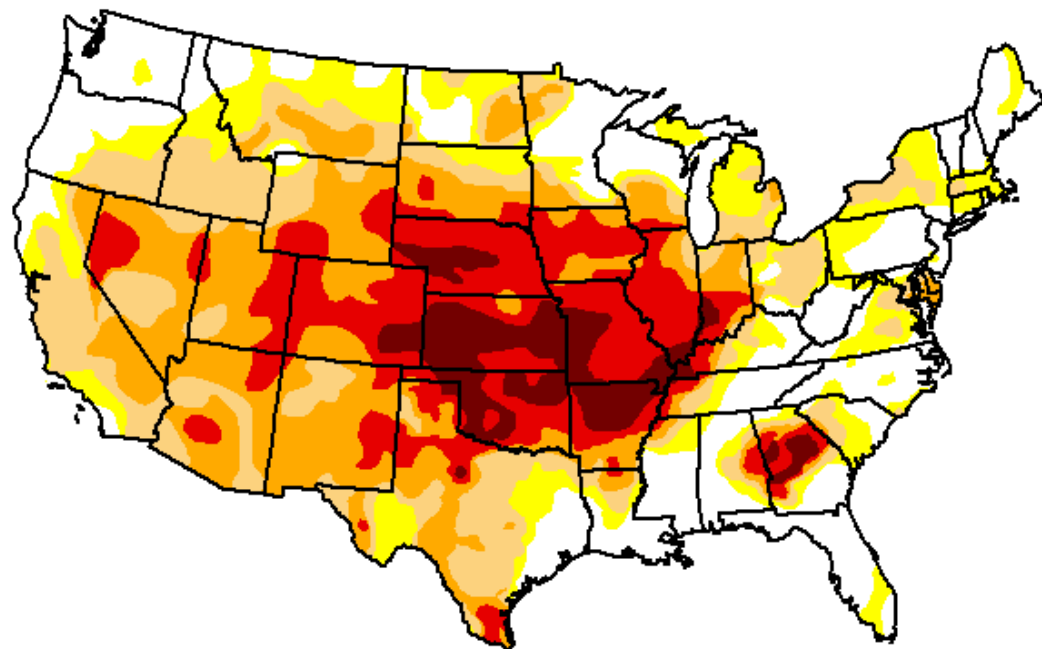
Author(s):

*Laura Edwards
 Western Regional Climate Center*



U.S. Drought Monitor CONUS

August 21, 2012
(Released Thursday, Aug. 23, 2012)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	22.72	77.28	63.20	44.03	23.01	6.31
Last Week <i>8/14/2012</i>	22.32	77.68	61.77	45.54	23.68	6.26
3 Months Ago <i>5/22/2012</i>	37.68	62.32	35.30	19.46	5.95	0.95
Start of Calendar Year <i>1/3/2012</i>	50.41	49.59	31.90	18.83	10.18	3.32
Start of Water Year <i>9/27/2011</i>	56.45	43.55	29.13	23.44	17.80	11.37
One Year Ago <i>8/23/2011</i>	54.81	45.19	30.95	23.43	17.24	11.14

Intensity:



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

Author(s):

Michael Brewer
NCDC/NOAA



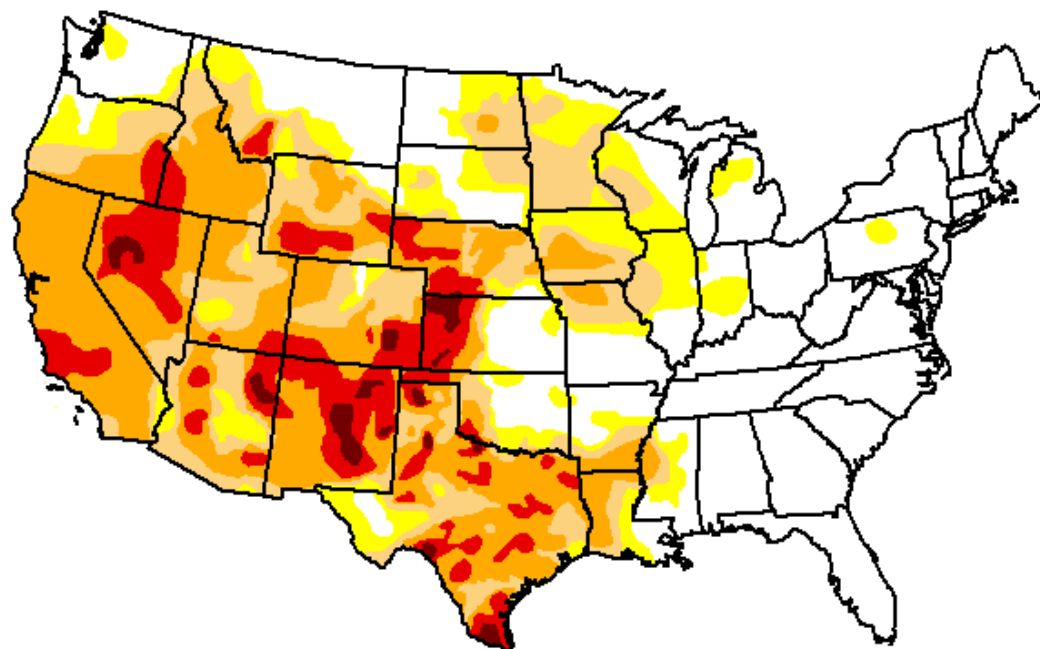
U.S. Drought Monitor

CONUS

August 27, 2013
 (Released Thursday, Aug. 29, 2013)
 Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	37.66	62.34	50.04	33.37	10.53	1.32
Last Week <i>8/20/2013</i>	40.02	59.98	45.61	32.23	10.54	1.32
3 Months Ago <i>5/28/2013</i>	43.13	56.87	44.34	29.56	11.75	4.74
Start of Calendar Year <i>1/1/2013</i>	27.22	72.78	61.09	42.05	21.31	6.75
Start of Water Year <i>9/25/2012</i>	23.41	76.59	65.45	42.12	21.48	6.12
One Year Ago <i>8/28/2012</i>	22.31	77.69	62.89	42.34	23.18	6.04



Intensity:



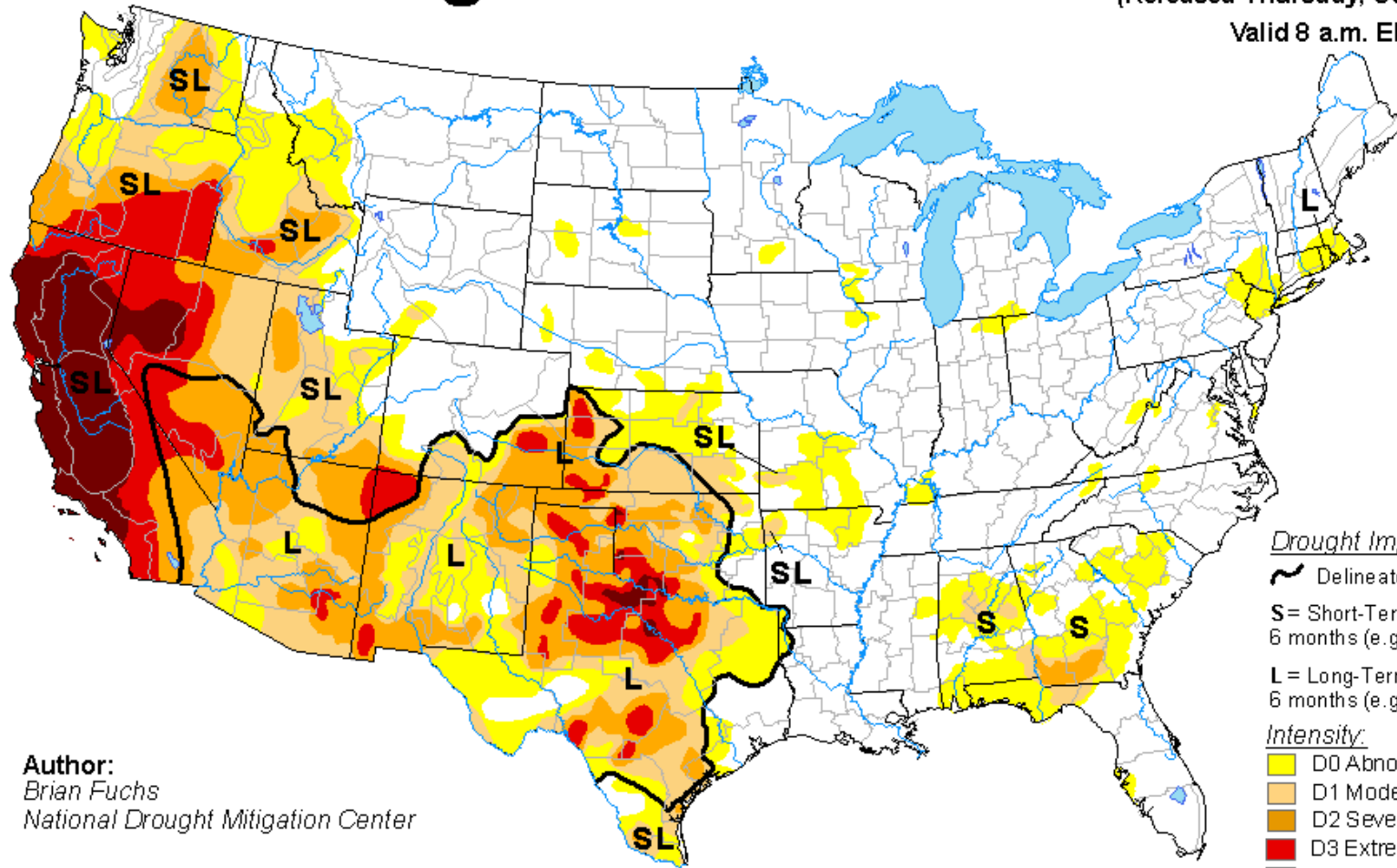
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author(s):
 Anthony Artusa
 NOAA/NWS/NCEP/CPC



U.S. Drought Monitor

September 9, 2014
(Released Thursday, Sep. 11, 2014)
Valid 8 a.m. EDT



Author:
Brian Fuchs
National Drought Mitigation Center

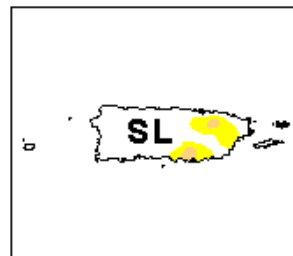
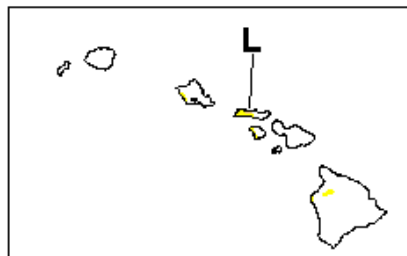
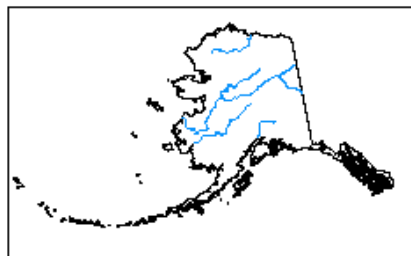
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

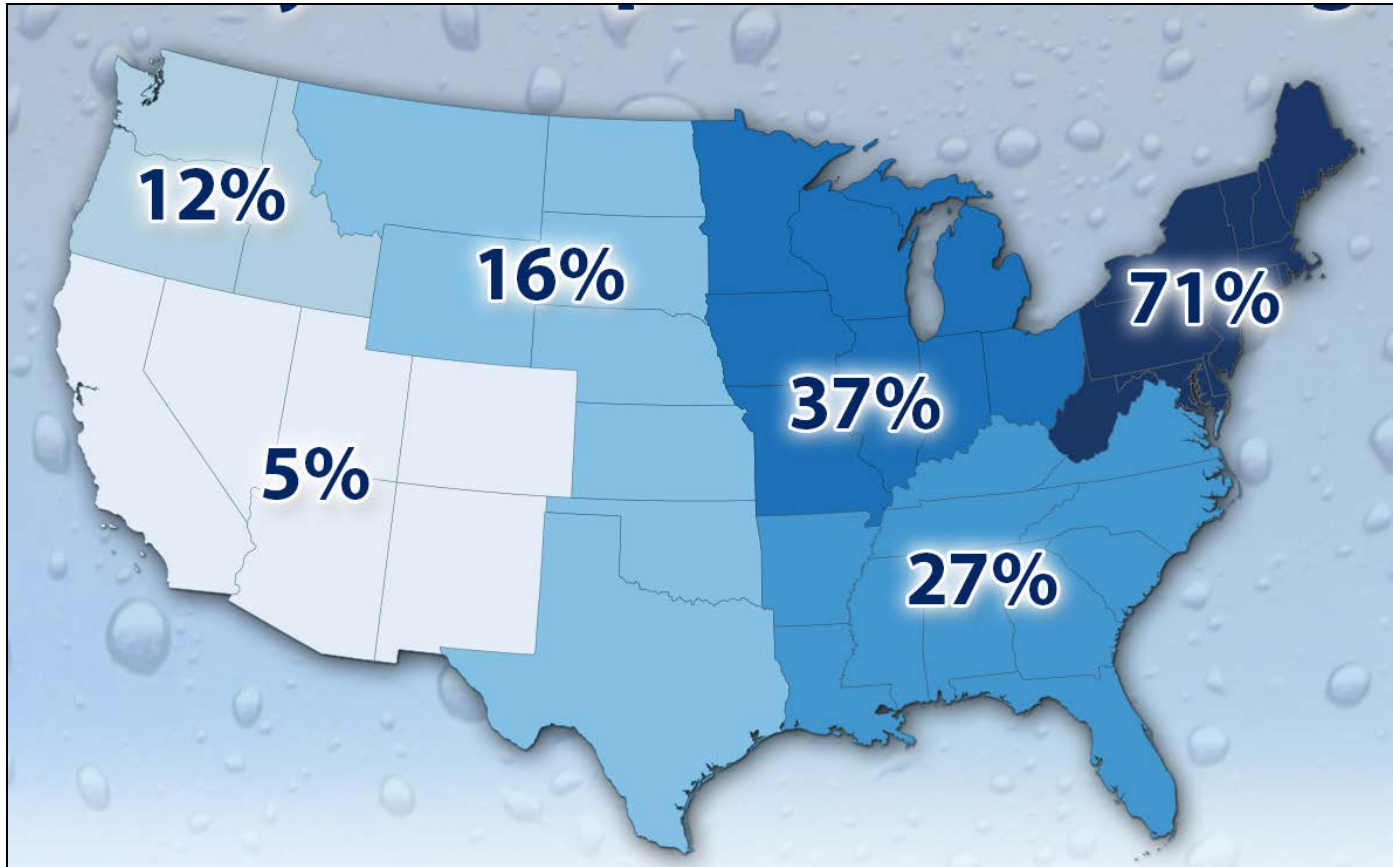
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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



<http://droughtmonitor.unl.edu/>

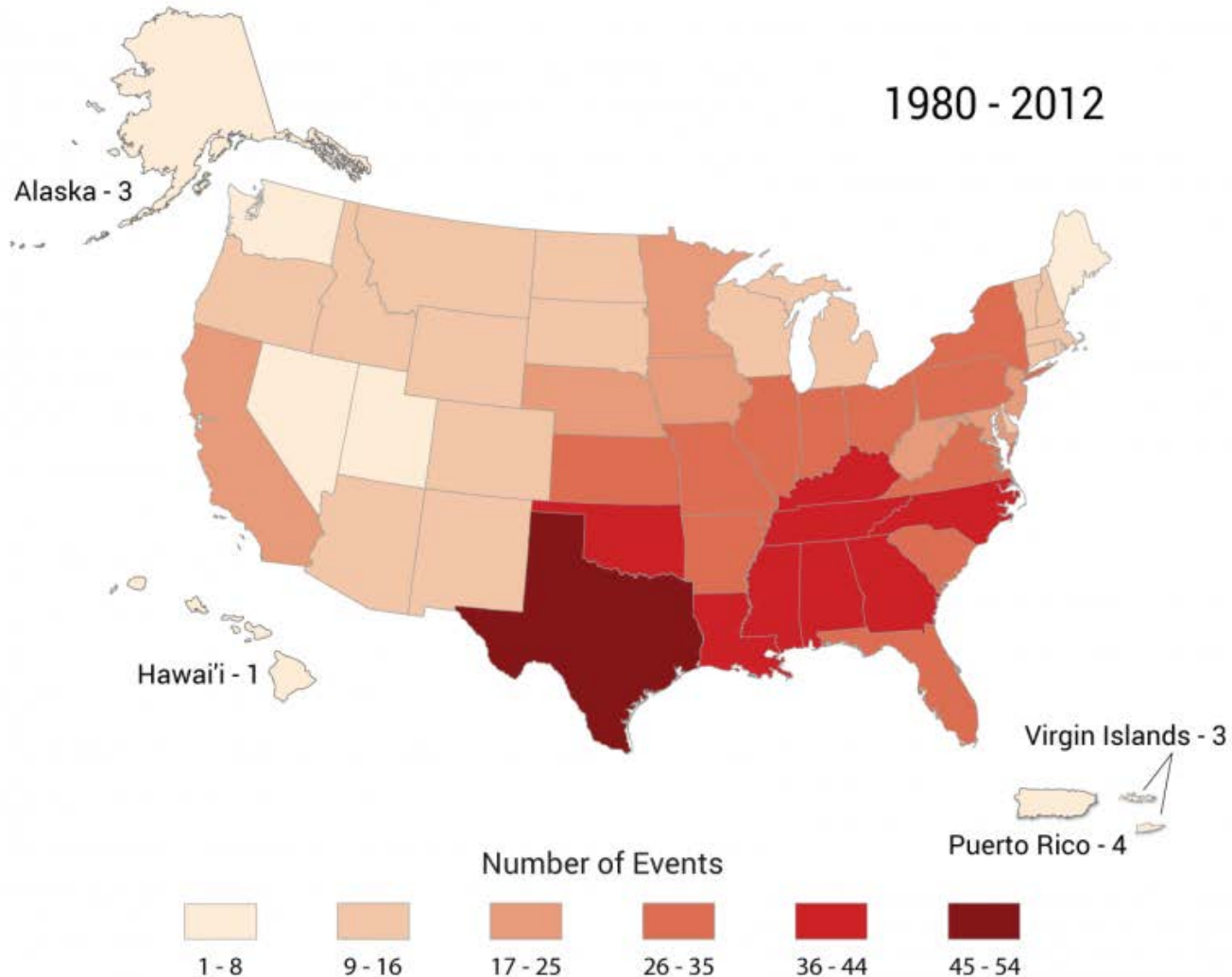
Trends in Extreme Precipitation



Increase in the number of 2" rainfalls per year from 1958 to 2011

You don't need warming to have major disasters

Billion Dollar Weather/Climate Disasters



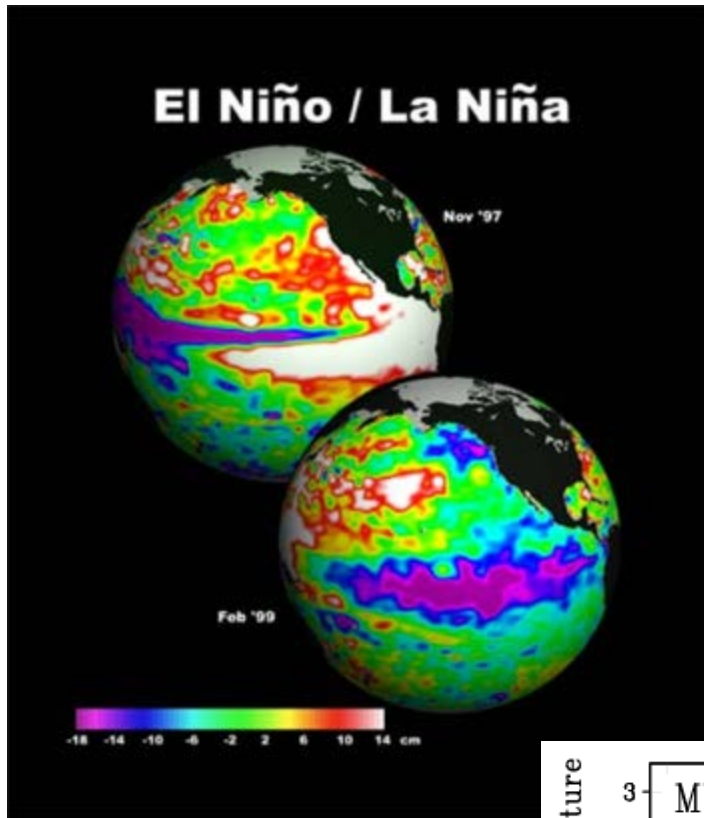
5. Assess Needs

- Acknowledge that despite the lack of temperature increase in the Southeast, there is much climate variability
- For this and other reasons, the Southeast region leads the nation in \$billion+ disasters
- Present the variability and discuss the problem that this variability is causing on working land sustainability and operation

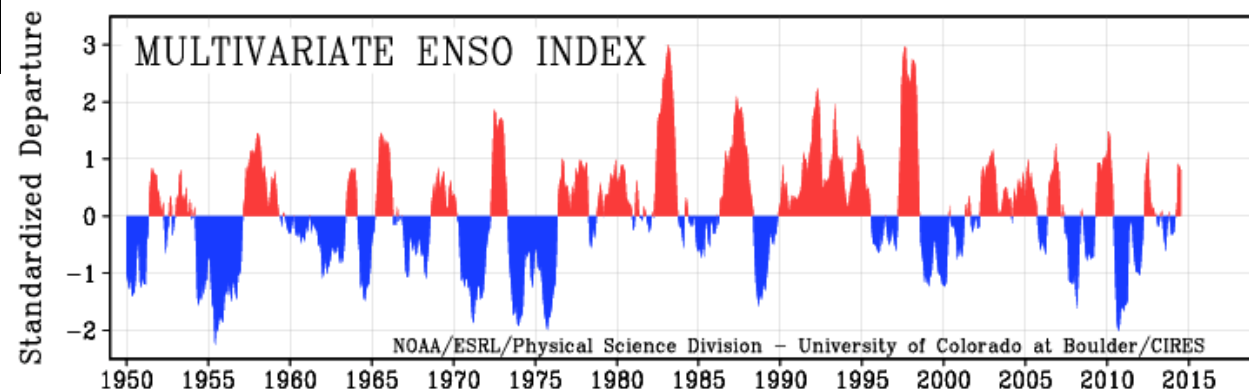
Needs Include

- Better forecasting of seasonal climate
 - for ordering seed type
 - for harvest and planting schedules
 - for controlled burning
- Better forecasting of local conditions
- Better alert systems

El Niño and La Niña

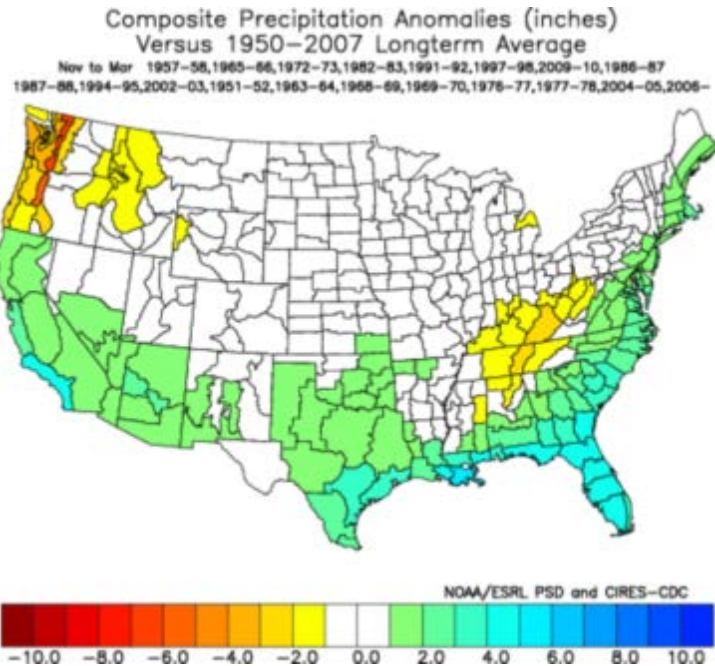


El Niño is associated with unusually warm water in the eastern Pacific Ocean, usually observed near Christmas (so associated with the coming of "The Child"). La Niña is the opposite phase of El Niño, with unusually cool water in the eastern Pacific Ocean.

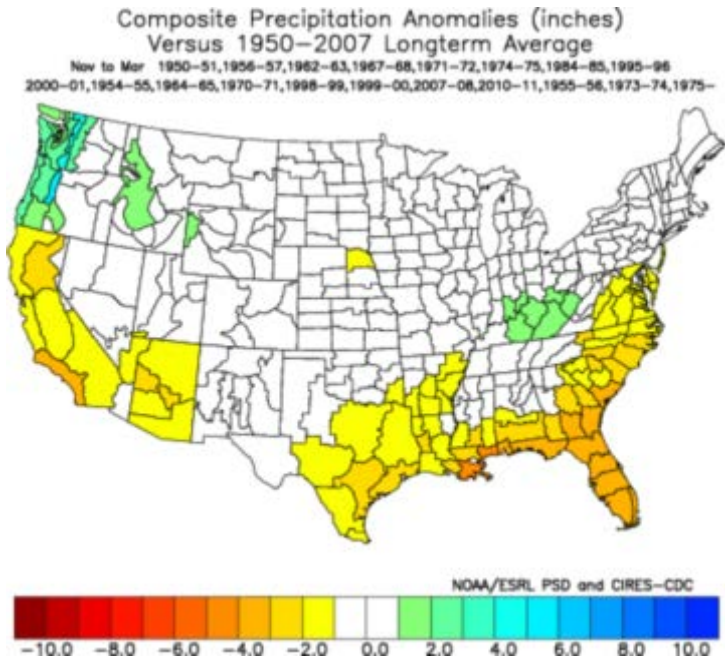


El Niño and La Niña

Precipitation



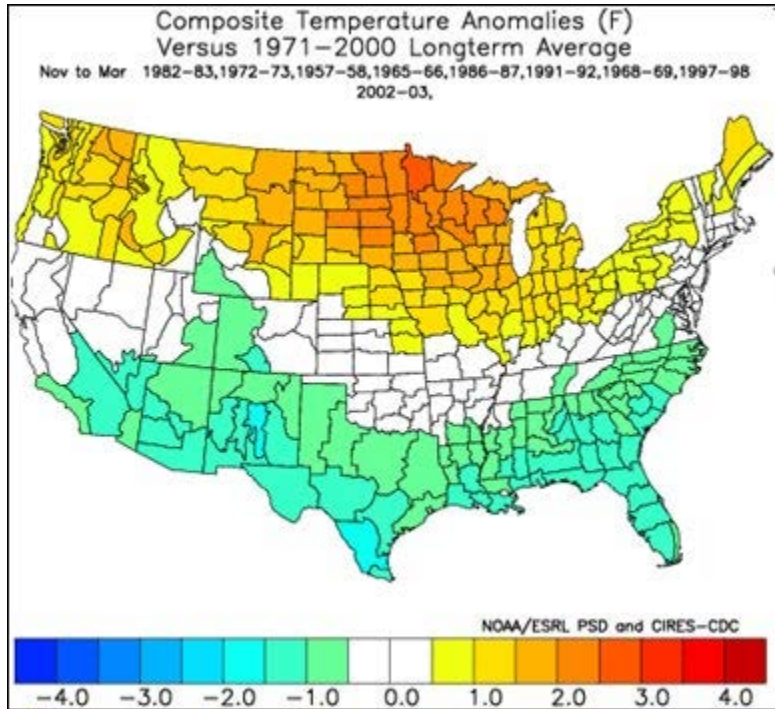
El Niño



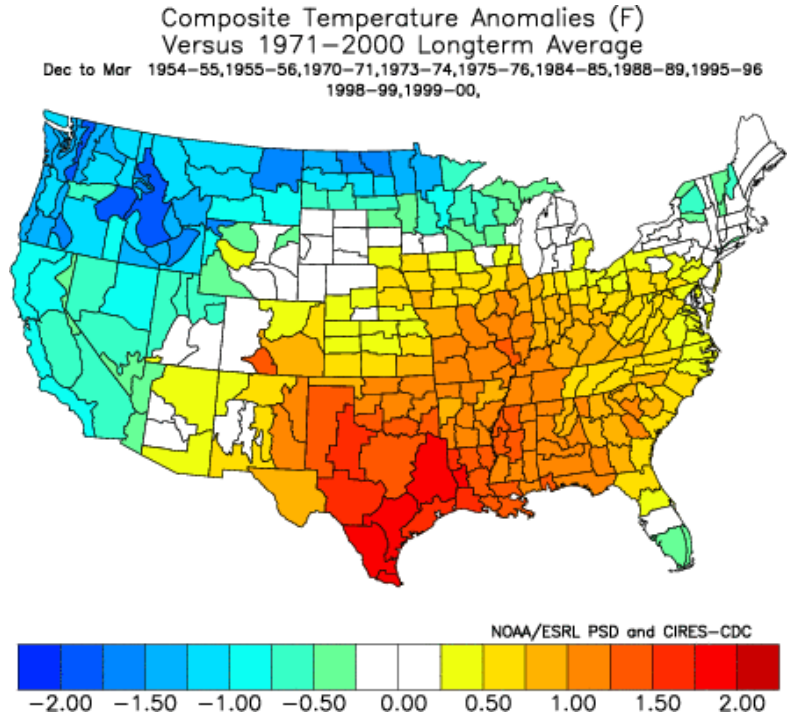
La Niña

El Niño and La Niña

Temperature



El Niño



La Niña

6. Nurture Projects

- Many good tools are already available from private, state, and federal groups
 - expand geographic range (e.g., Agroclimate)
 - expand easy access through app development
 - expand number of species for application
- Other tools could be jointed together to form a better single tool (e.g., control burning index and emissions dispersal)
- Other tools could be developed but need coordinated leadership (e.g., TAIP alert system)
- Currently assessing existing tools and databases

7. Deliver

- Follow up with TAIP and land managers regarding their needs and product deliverables
- Listen to their thoughts and concerns regarding tool effectiveness and be prepared to work with tool developer on additional modifications
- Continue to assess the situation for change and further development



Conclusions

There is a BIG difference between giving a one time “information sharing” presentation to the local garden club and land managers.

- With land managers, you need to build a trusting relationship before many are willing to take REAL action.

Do NOT focus on the cause or the trend of climate.

Do NOT drone on about the impacts of “climate change” – instead talk about the impacts of too much or too little rain, timing of rain, and interactions with other Stresses.

Try to be entertaining. For many, the topic of climate change is like a bad movie you are forced to watch again and again.

Don't be surprised if your first (second, third) attempt at communication fails. Land managers are a tight community, and you are presenting information that is not necessarily welcome. Build the relationships in a non-threatening way.

Remember that your work is extremely important so DON'T GIVE UP!