

Local Precipitation Variability

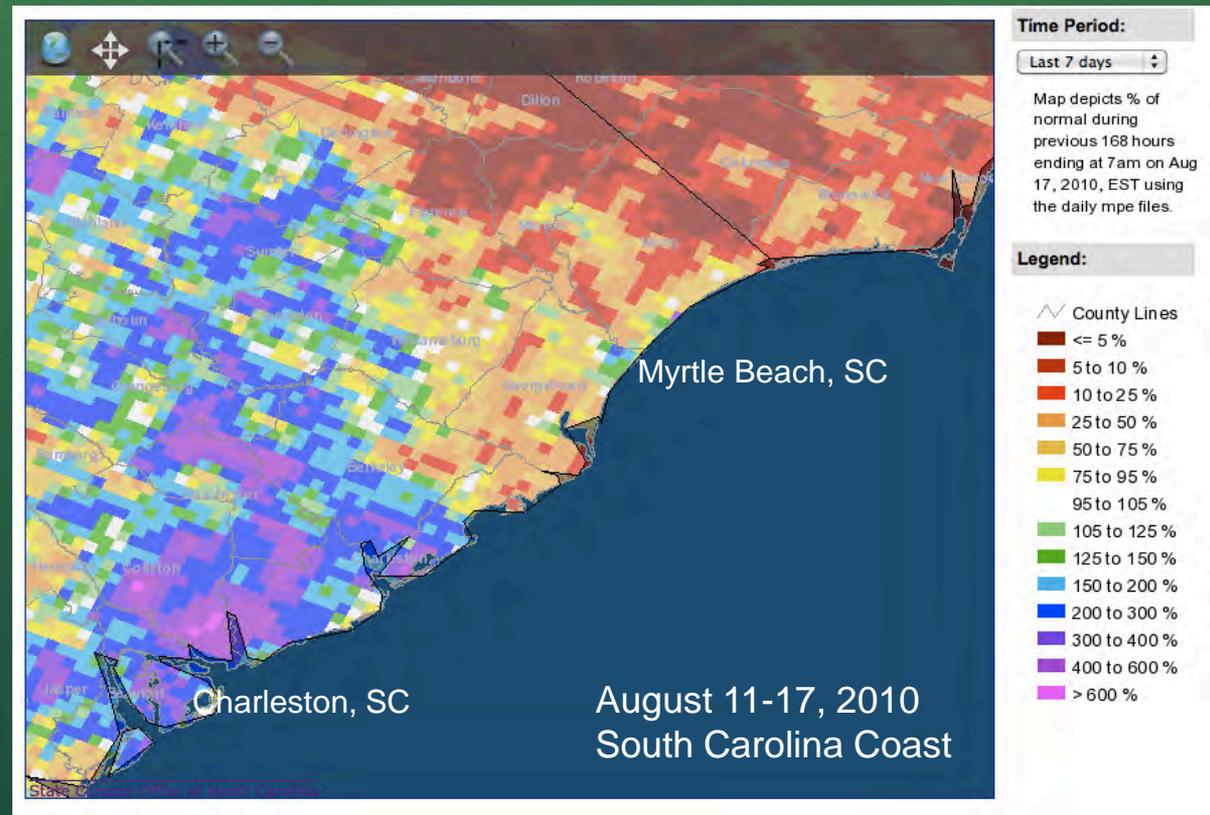
Precipitation from one storm can vary from neighborhood to neighborhood. What falls in your yard may not fall in the next. The next time it rains see how the precipitation amounts differ in parts of your community.



Large local variations in summer precipitation are common

Summertime convective storms can dump heavy rains over one area and leave other nearby spots completely dry.

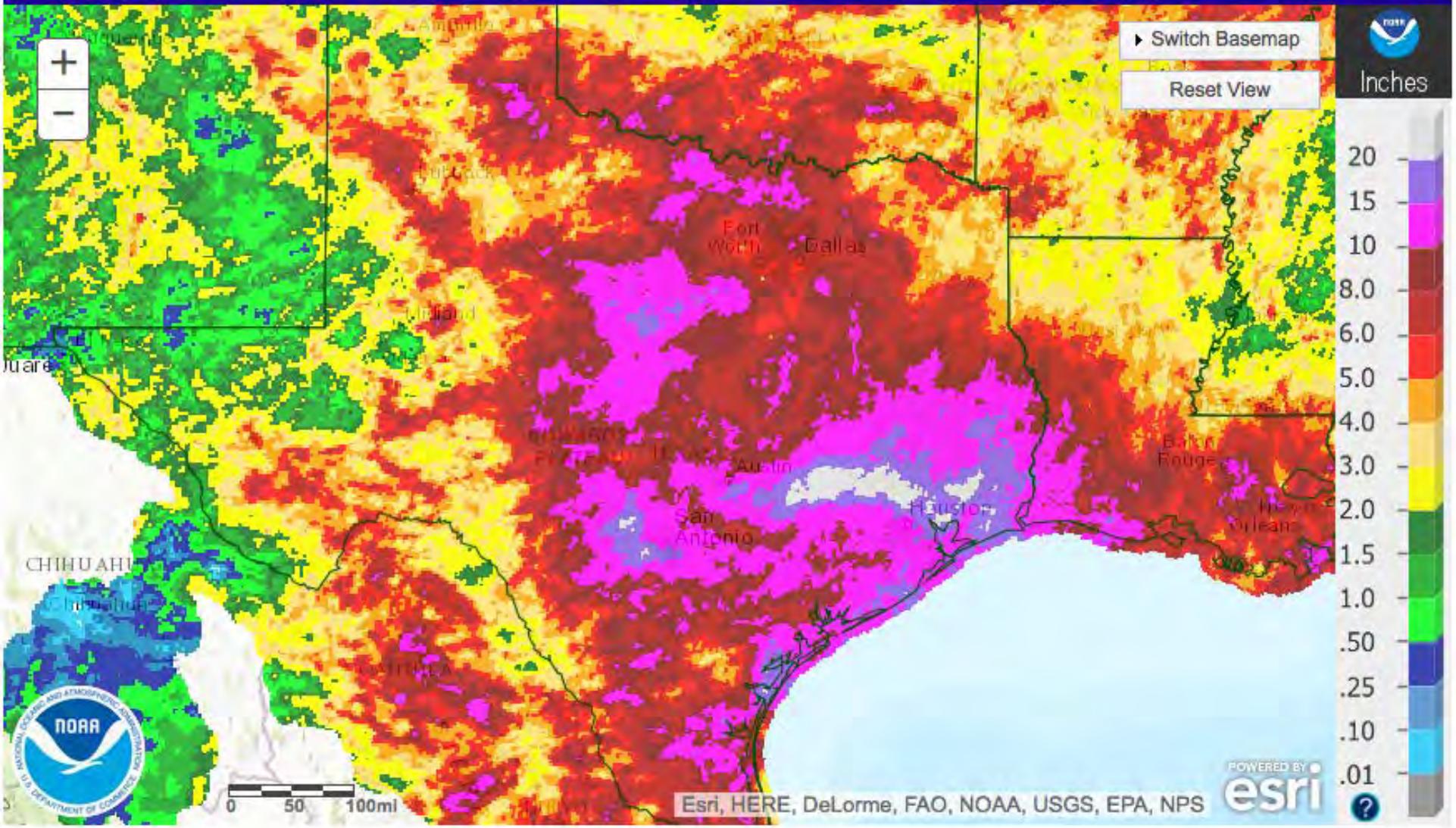
This map by the State Climate Office of NC shows the % of normal precipitation that has fallen over the South Carolina coast during the last seven days. Note where it has rained and where it has not.



Displaying Last 30-Day Observed Precipitation
Valid on: June 09, 2016 12:00 UTC

What is UTC time? Map Help

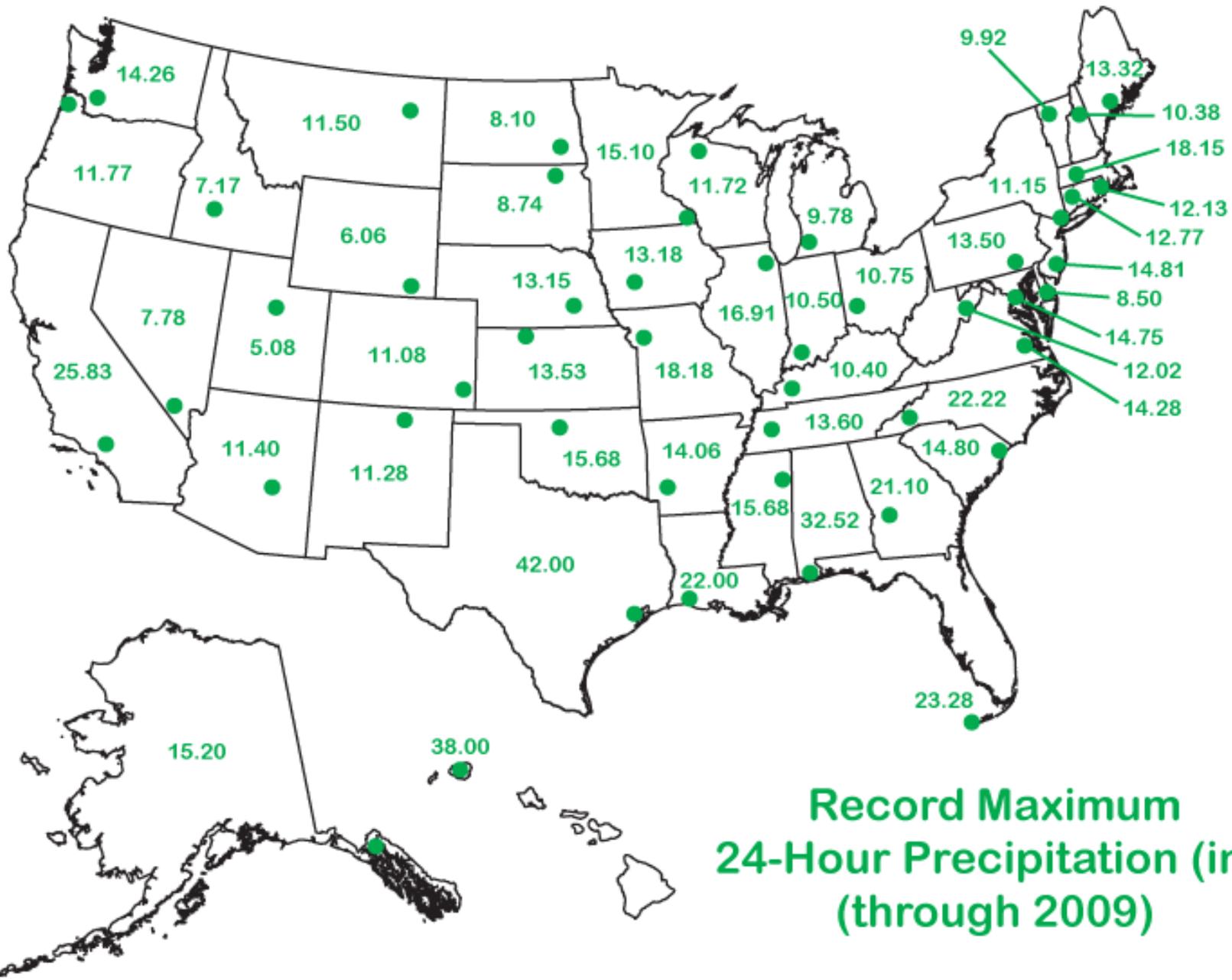
Find address or location

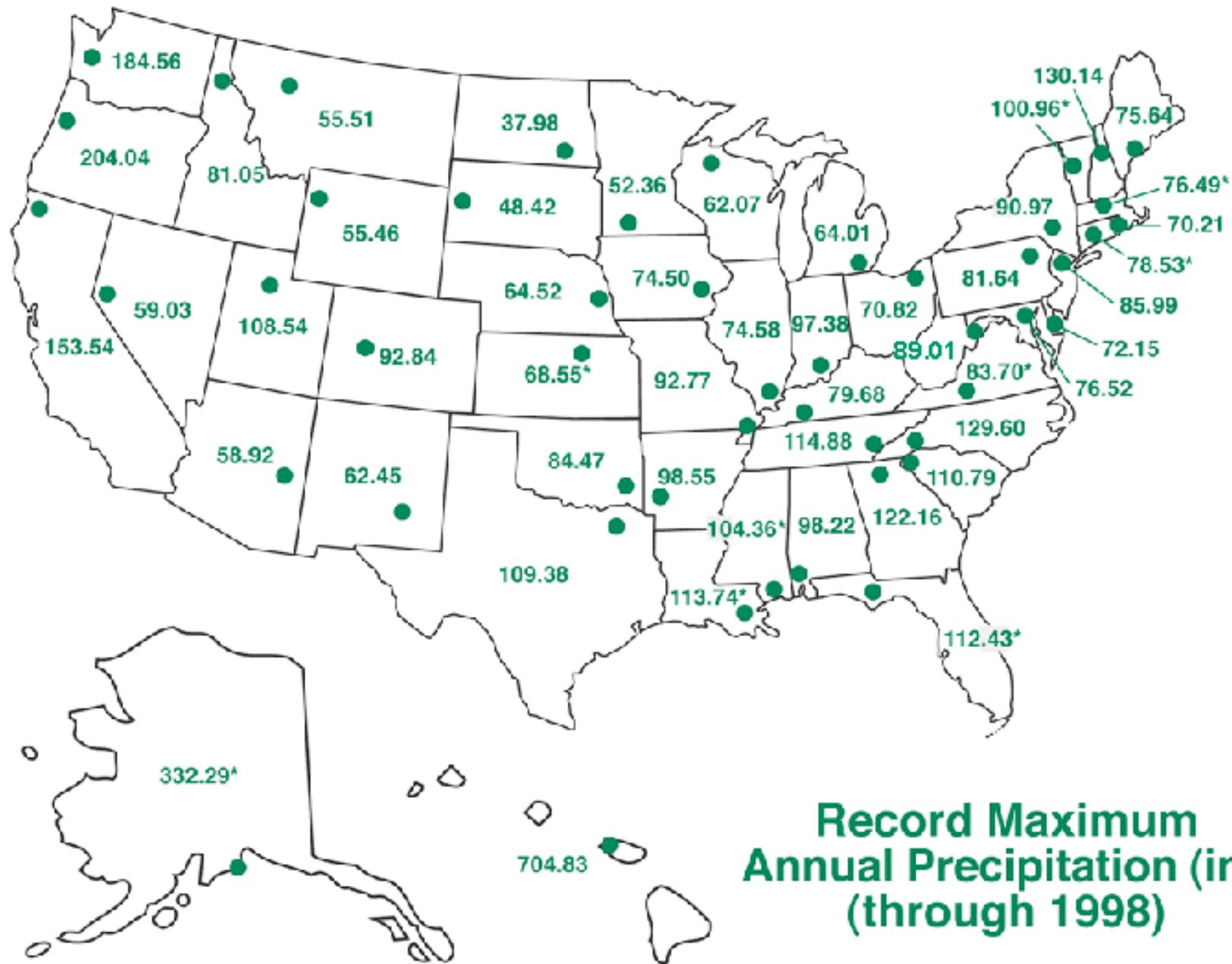


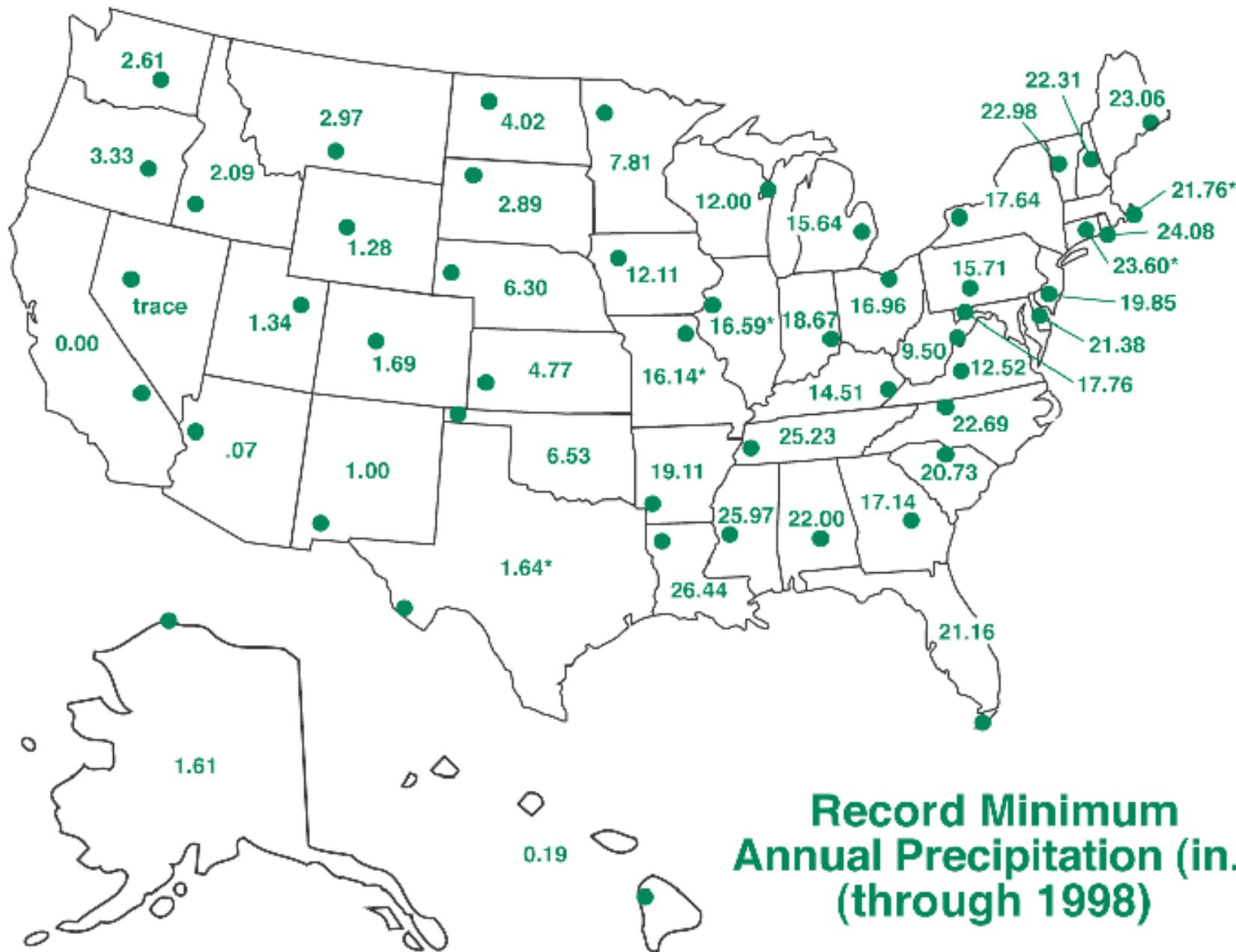
Precipitation Records

Sometimes it may seem like the rain in your area may never let up. Here are the record precipitation amounts for each state.









Courtesy of NCDC

Profile of Atmosphere

- Layers based on:
 - Composition
 - Temperature
 - Function

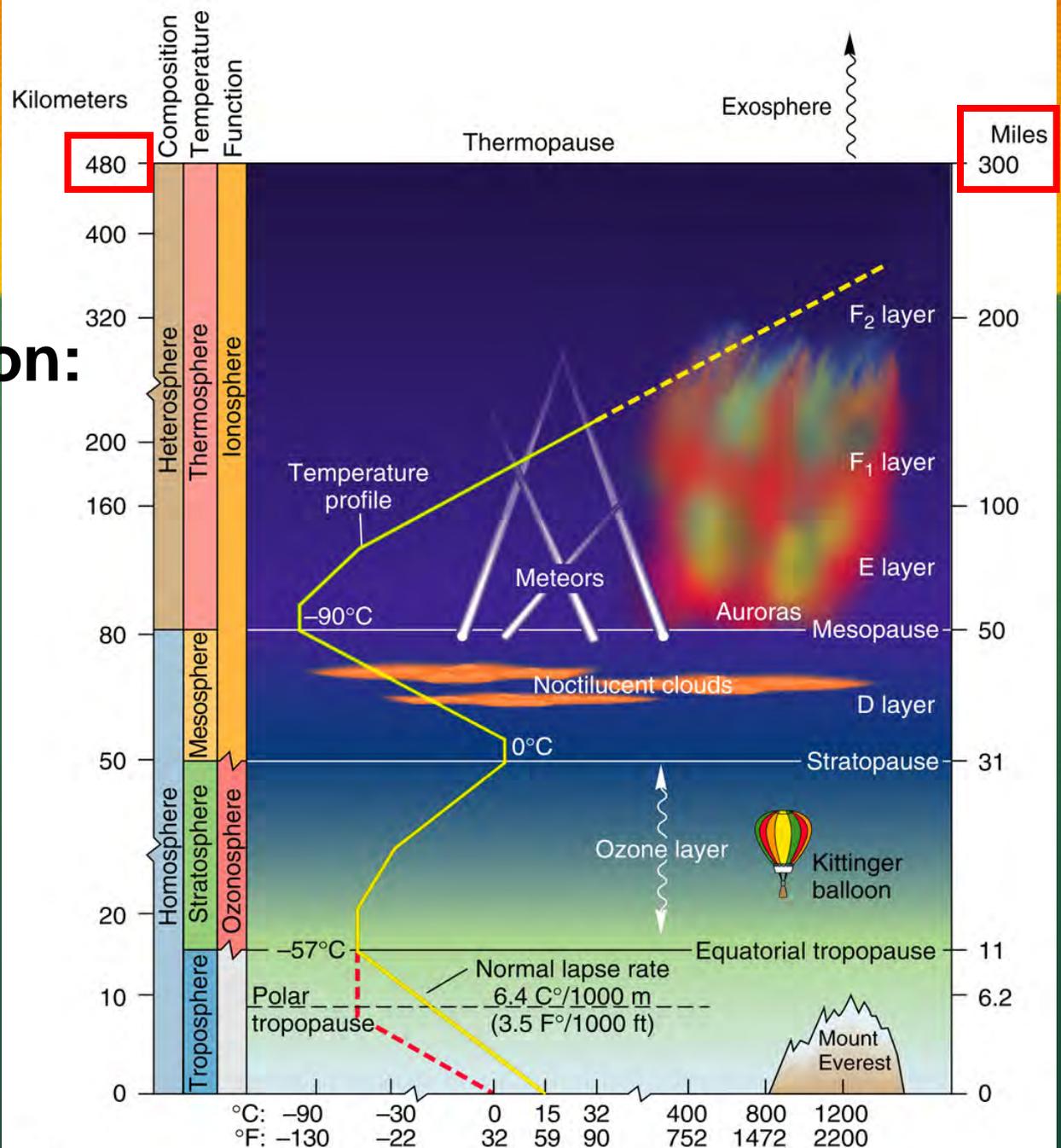


Figure 3.2

(a)

Cirrus = thin and wispy



Composed of ice crystals; average thickness = ~1 mi

Stratus = flat clouds in layers



(f)

Cumulus = puffy clouds in heaps



(h)

Nimbostratus = rain



(e)

Cumulonimbus = thunderstorm



(d)

Cirrostratus



(c)

Alto cumulus



(a)

Altostratus



(g)

Advection Fog



Figure 7.25

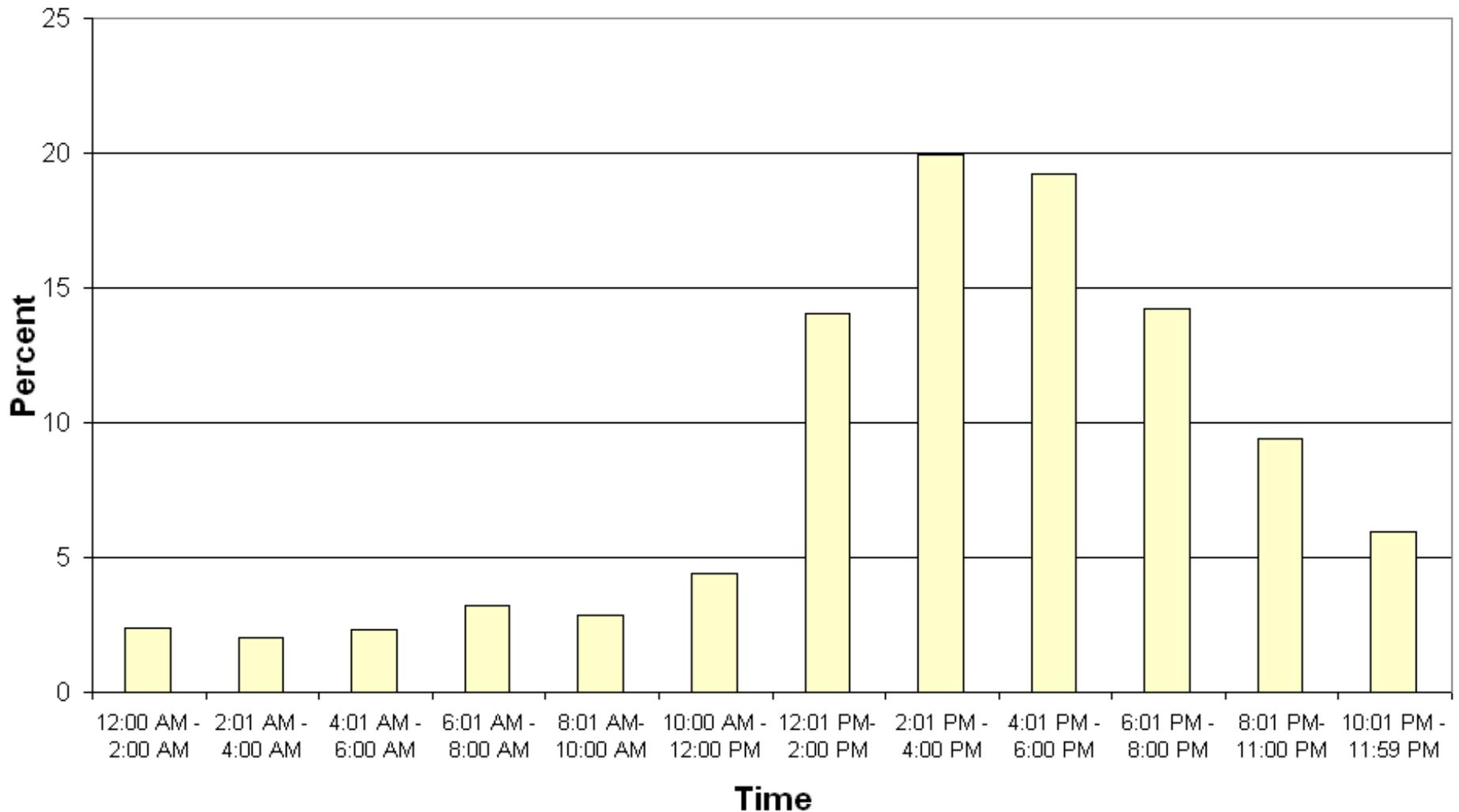
What about Hail?



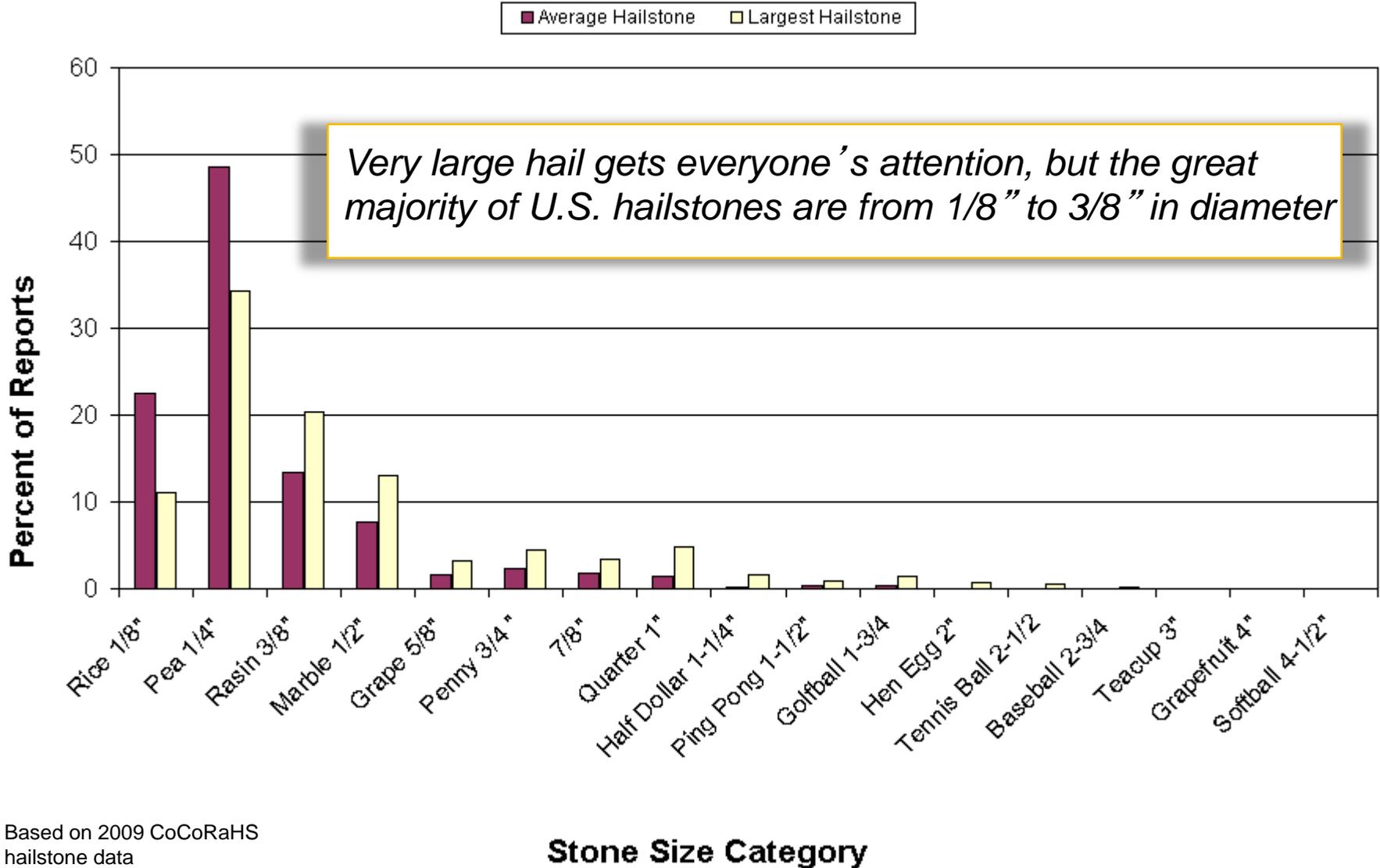
Credit: Carol Slusser

Just a few minutes of hail can bring a painful interruption or even a quick end to your garden.

Time of day when hail occurs – based on 2009 nationwide CoCoRaHS Data



Nationwide Stone Size Distribution for 2009



Based on 2009 CoCoRaHS
hailstone data

Stone Size Category

Drought

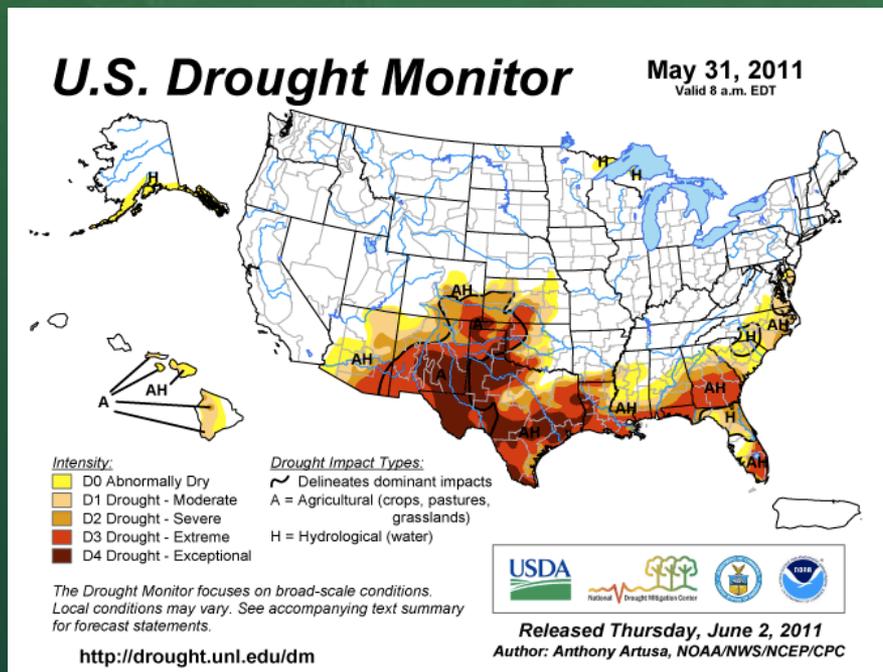
“No friend to the Gardener”



The American Meteorological Society's Glossary of Meteorology states that *“drought is a period of abnormally dry weather sufficiently long enough to cause a serious hydrological imbalance.”*

What about Drought?

At almost anytime of year some portions of the U.S. are experiencing shortages in precipitation.



The U.S. Drought Monitor continuously monitors precipitation and receives local advice to put the status of precipitation received into context and notify the public about the risk and severity of drought. Some cities or states put watering restrictions into place during drought conditions.

<http://www.drought.unl.edu/dm/monitor.html>

It's the "Lack-a-water"

There are many ways to enjoy gardening even in the face of drought!

- Native species may be better suited to withstand drought
- Watering in the early morning or evening
- Watering enough, but not too much
- Drip irrigation
- Xeriscape gardening

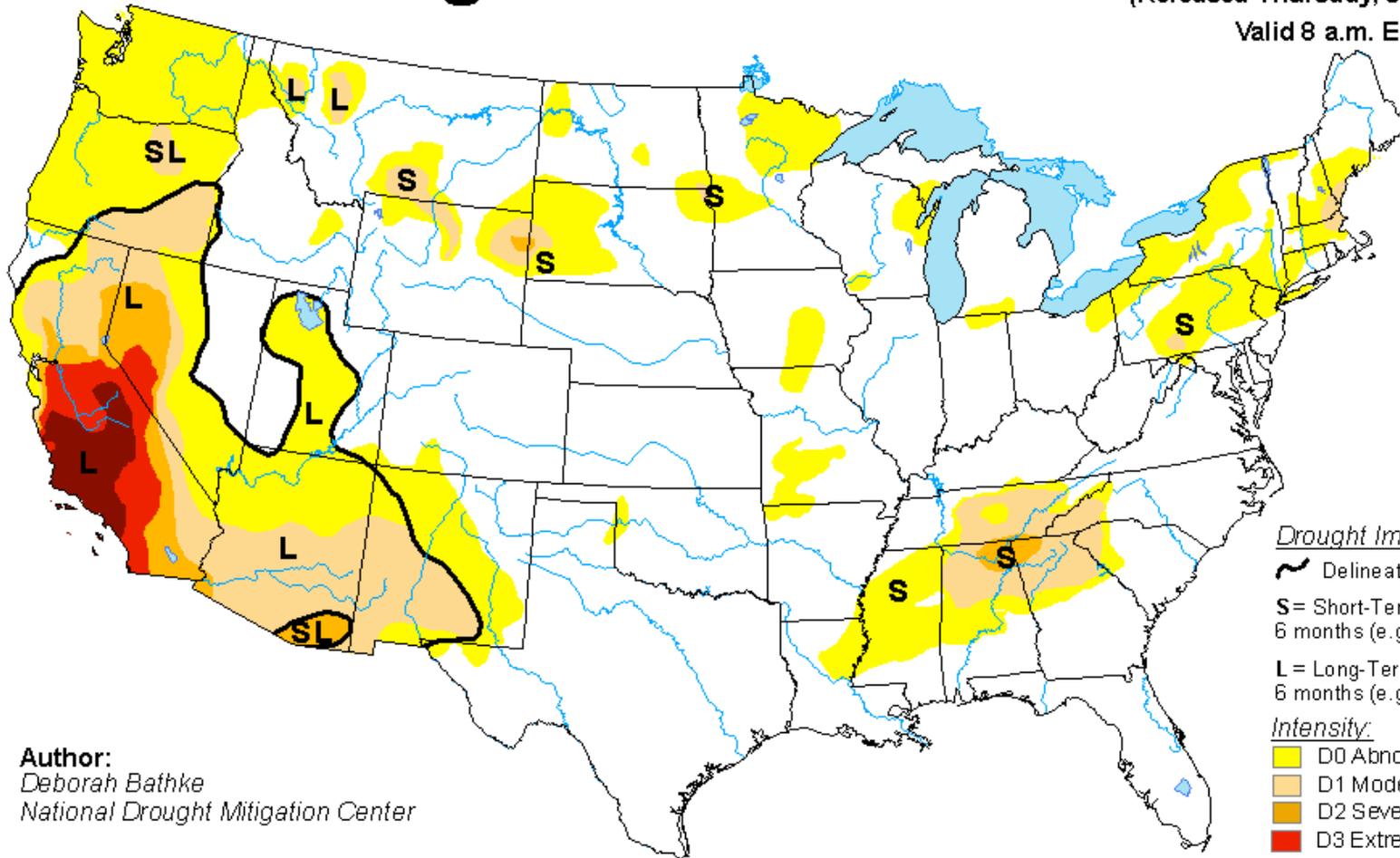


U.S. Drought Monitor

June 7, 2016

(Released Thursday, Jun. 9, 2016)

Valid 8 a.m. EDT



Author:
Deborah Bathke
National Drought Mitigation Center

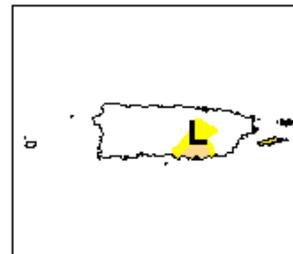
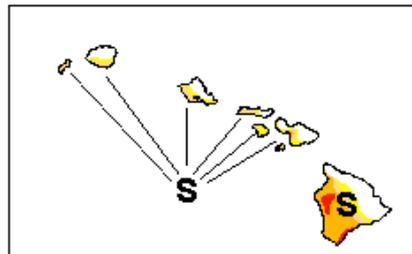
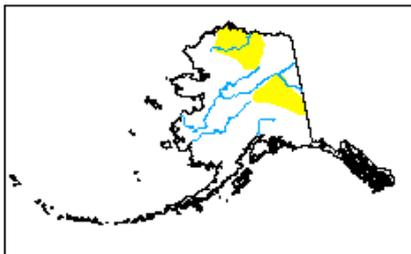
Drought Impact Types:

-  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.

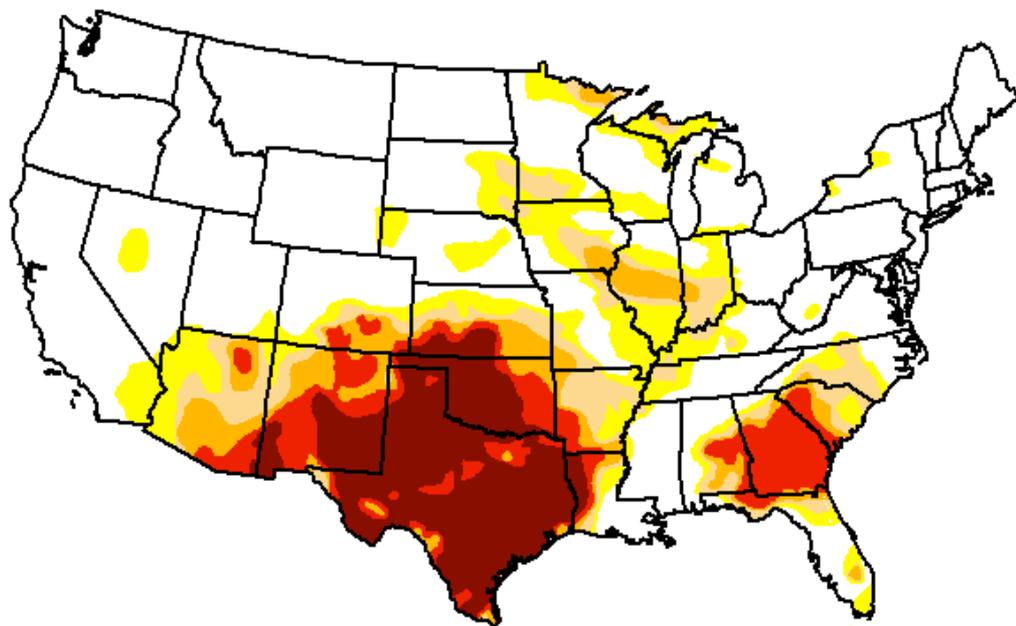


<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor

CONUS

September 20, 2011
 (Released Thursday, Sep. 22, 2011)
 Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	57.22	42.78	30.46	23.64	17.99	11.34
Last Week <i>9/13/2011</i>	55.36	44.64	30.86	24.10	18.54	11.75
3 Months Ago <i>6/21/2011</i>	67.29	32.71	27.29	22.36	18.00	11.84
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>9/21/2010</i>	63.94	36.06	12.21	2.93	0.30	0.00

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



Section Six: Wind

The Wind



breeze
Calm
strong gale



“Who has seen the wind, neither I nor you . . .”

Wind



*“Air in motion relative
to the surface of the earth.”*

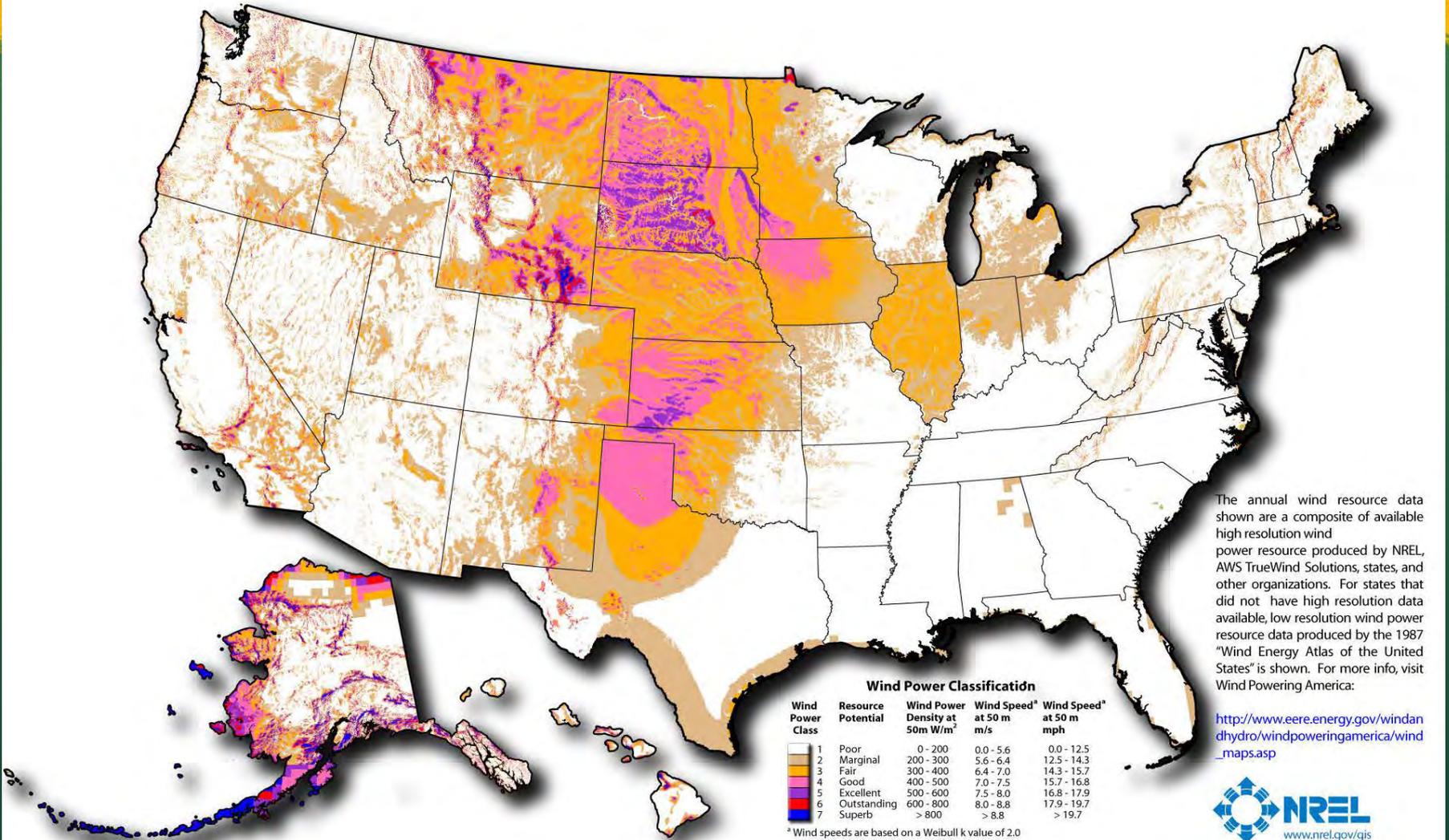
- AMS Glossary of Meteorology

Thar she blows!

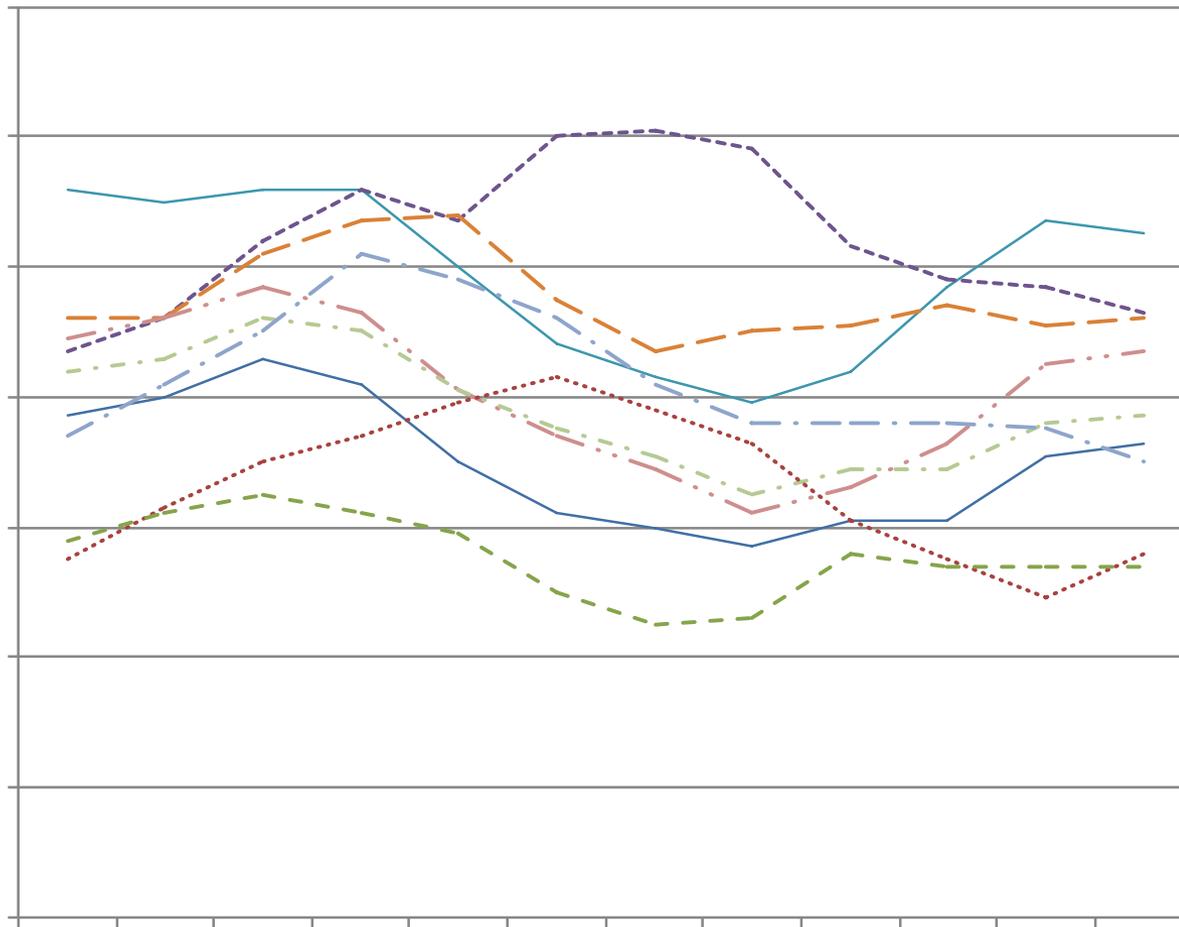


- Wind can have an affect on growing certain kinds of crops
- Wind can mix the atmosphere preventing frost on clear nights
- Wind can erode topsoil and dry out surface moisture
- Wind can damage young plants and seedlings
- Wind scatters seeds (both good and bad)
- Wind increases plant water use
- Wind may cool the gardener on a hot day

Wind Energy Atlas

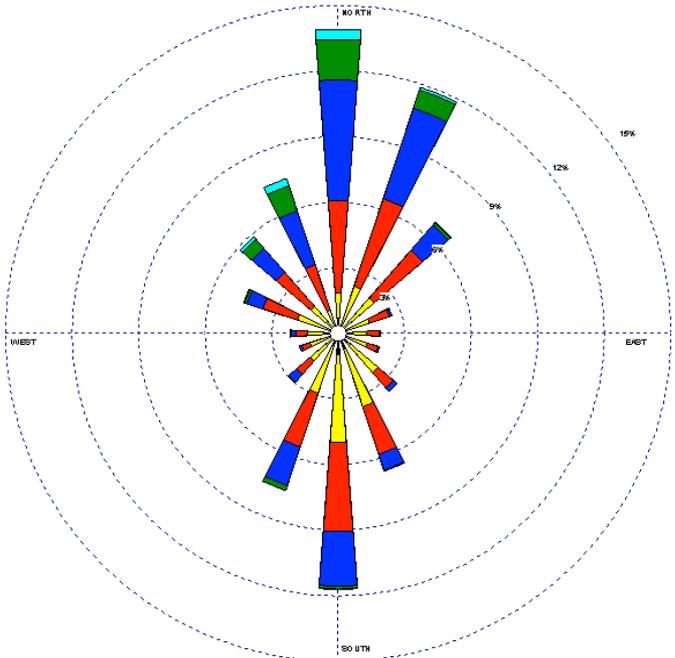


Patterns of Wind



- ck, AR
- Albuquerque, NM
- Sacramento, CA
- Tallahassee, FL

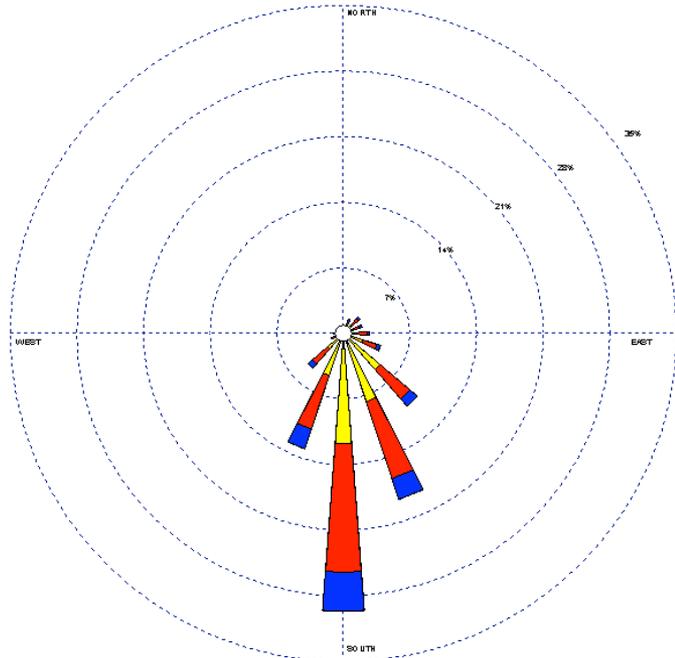
WIND ROSE PLOT
Station #13958 - AUSTIN MUNICIPAL ARPT, TX



Wind Speed (m/s)	NO. SLEER Sara West	DATE 8/29/2002	COMPANY NAME USDA-ARS
> 11.06 8.49 - 11.06 5.40 - 8.49 3.24 - 5.40 1.20 - 3.24 0.51 - 1.20	DISPLAY Wind Speed	UNIT m/s	COMMENTS
	AVG. WIND SPEED 4.60 m/s	CALM WINDS 6.83%	
	ORIENTATION # Direction (blowing from)	PLOT YEAR-DATETIME 1961 Jan 1 - Jan 31 Midnight - 11 PM	

PPPP OF APP-3.3 by Cadac Environmental Services - www.cadac-environmental.com

WIND ROSE PLOT
Station #13958 - AUSTIN MUNICIPAL ARPT, TX



Wind Speed (m/s)	NO. SLEER Sara West	DATE 8/29/2002	COMPANY NAME USDA-ARS
> 11.06 8.49 - 11.06 5.40 - 8.49 3.24 - 5.40 1.20 - 3.24 0.51 - 1.20	DISPLAY Wind Speed	UNIT m/s	COMMENTS
	AVG. WIND SPEED 3.74 m/s	CALM WINDS 5.14%	
	ORIENTATION # Direction (blowing from)	PLOT YEAR-DATETIME 1961 Jul 1 - Jul 31 Midnight - 11 PM	

PPPP OF APP-3.3 by Cadac Environmental Services - www.cadac-environmental.com

Section Seven: Evapotranspiration (ET)

Evapotranspiration



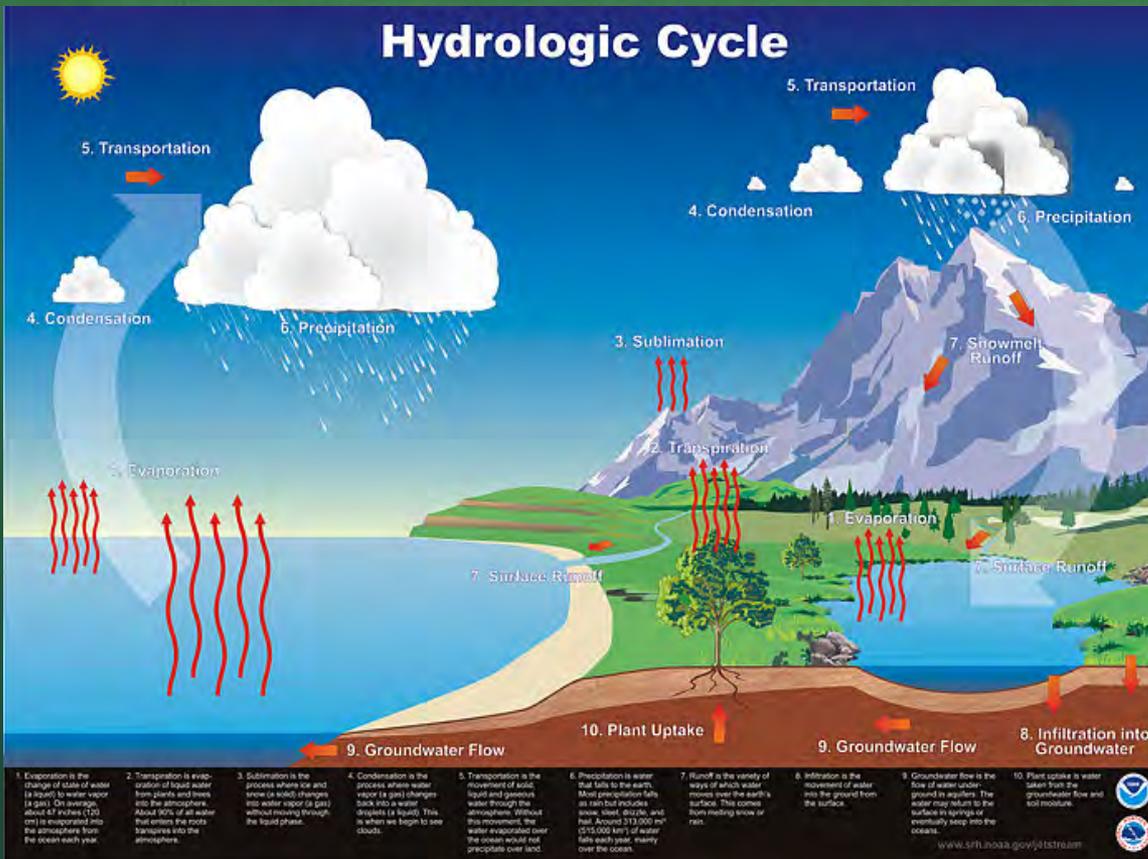
ET
WATER
Atmometer



“The invisible side of the Hydrologic Cycle”

Evapotranspiration

“The invisible side of the water cycle”



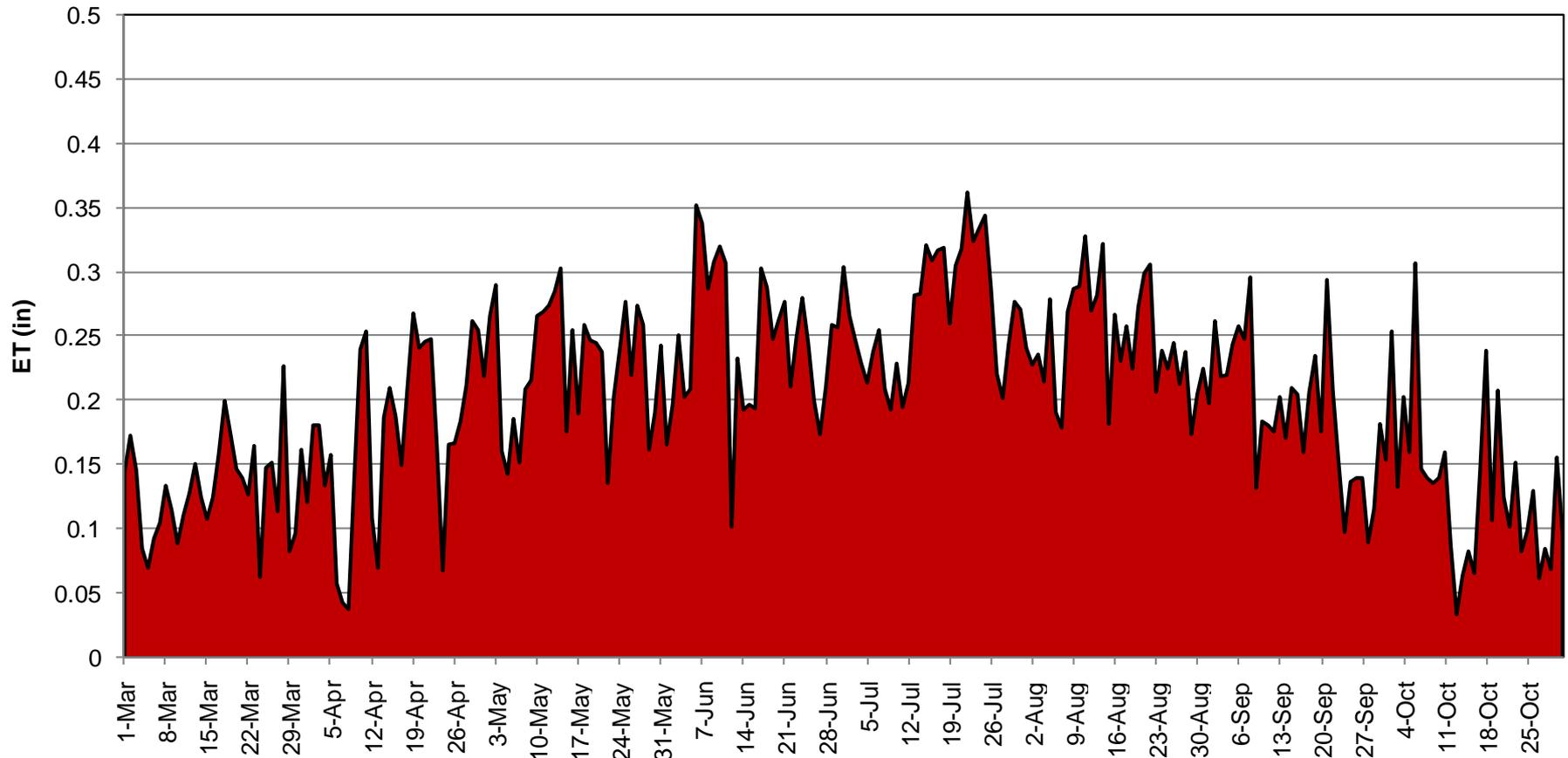
“The combined processes through which water is transferred to the atmosphere from open water and ice surfaces, bare soil, and vegetation that make up the earth’s surface.”

- AMS Glossary of Meteorology

Example of Growing Season Cycle of Evapotranspiration

Ault Daily Reference ET (2007)

Colorado



What Affects Evapotranspiration?

There are several factors that affect evapotranspiration:



Wind

Temperature

Relative Humidity

Sunshine

ET and Stress on Plants

Evapotranspiration can affect plant health and cause stress on plants



Low ET = more “less stressed/healthy” plants



High ET = possible stressed plants
“Can I afford to pay the water bill this month?”

Section Eight: Climate Resources

Climate Resources



noaa
CoCoRaHS
state climate offices



“Where to go for local, regional and national info”

NOAA

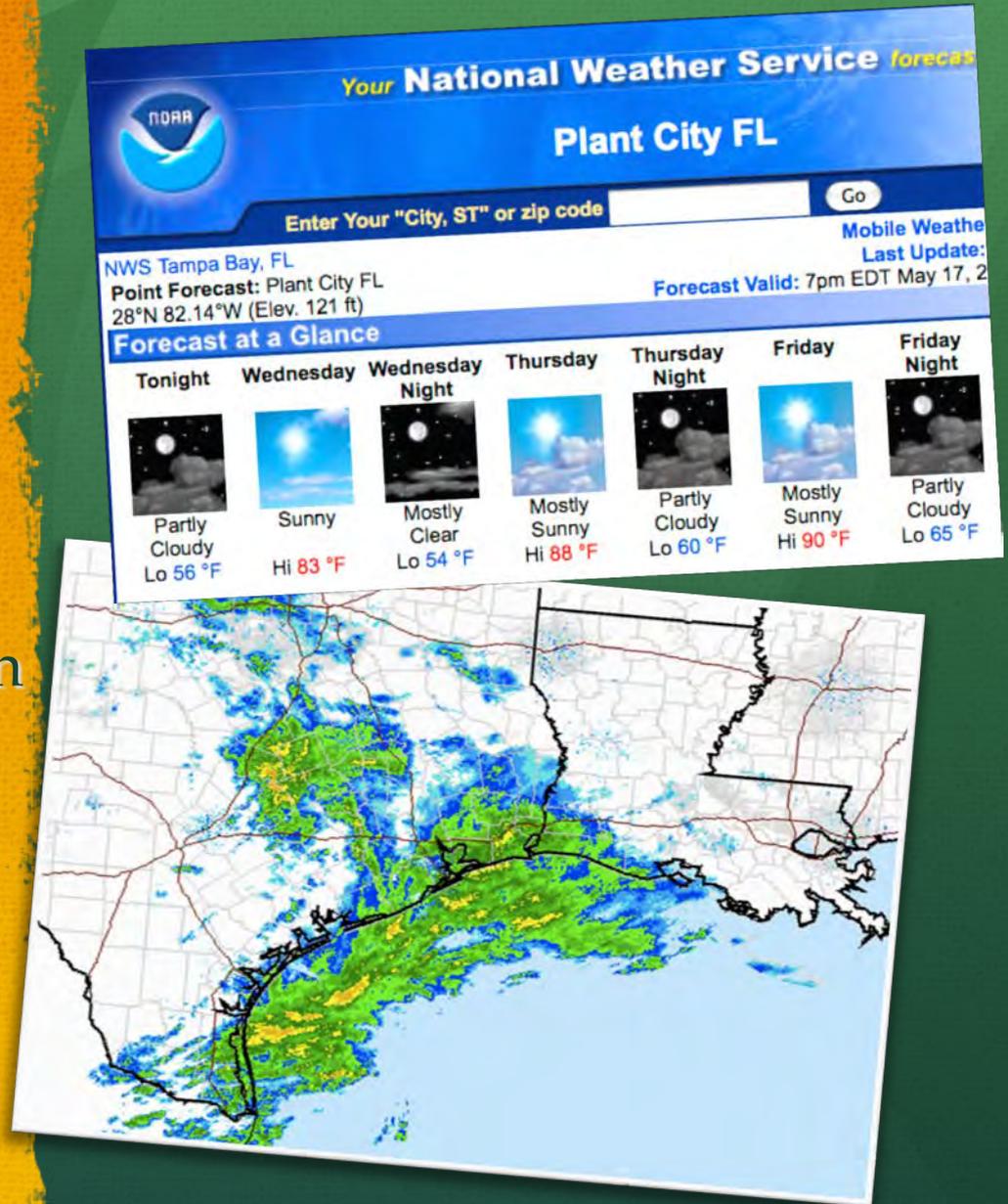


NOAA provides important weather and climate information for gardeners

- National Weather Service
- Climate Prediction Center
- National Climatic Data Center
- National Climate Services

National Weather Service

Daily Forecasts
Current Radar
Frost/Freeze Information
Climate Information



www.weather.gov/

Important Data for Gardeners

CLIMATE REPORT
 NATIONAL WEATHER SERVICE GRAY ME
 440 PM EDT MON MAY 2 2011

...THE PORTLAND ME CLIMATE SUMMARY FOR MAY 2 2011...
 VALID TODAY AS OF 0400 PM LOCAL TIME.

CLIMATE NORMAL PERIOD 1971 TO 2000
 CLIMATE RECORD PERIOD 1941 TO 2011

WEATHER ITEM	OBSERVED VALUE	TIME (LST)	RECORD VALUE	YEAR	NORMAL VALUE	DEPARTURE FROM NORMAL	LAST YEAR
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TEMPERATURE (F)

TODAY							
MAXIMUM	57	205 PM	91	2001	58	-1	75
MINIMUM	35	358 AM	25	1964	40	-5	52
AVERAGE	46				49	-3	64

PRECIPITATION (IN)

TODAY	0.00		3.41	2006	0.13	-0.13	0.00
MONTH TO DATE	0.00				0.26	-0.26	T
SINCE MAR 1	11.22				8.66	2.56	12.74
SINCE JAN 1	17.73				15.89	1.84	21.83

SNOWFALL (IN)

TODAY	0.0		T	1961	0.0	0.0	0.0
MONTH TO DATE	0.0				T	0.0	0.0
SINCE MAR 1	9.3				16.2	-6.9	0.1
SINCE JUL 1	78.6				66.4	12.2	37.1
SNOW DEPTH	0						

DEGREE DAYS

HEATING							
TODAY	19				16	3	1
MONTH TO DATE	33				32	1	8
SINCE MAR 1	1606				1666	-60	1259
SINCE JUL 1	6551				6873	-322	6005

COOLING

TODAY	0				0	0	0
MONTH TO DATE	0				0	0	0
SINCE MAR 1	0				0	0	0
SINCE JAN 1	0				0	0	0

WIND (MPH)

HIGHEST WIND SPEED	14	HIGHEST WIND DIRECTION	E (80)
HIGHEST GUST SPEED	16	HIGHEST GUST DIRECTION	S (180)
AVERAGE WIND SPEED	5.1		



National Weather Service Forecast Office Seattle, WA

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Text only version

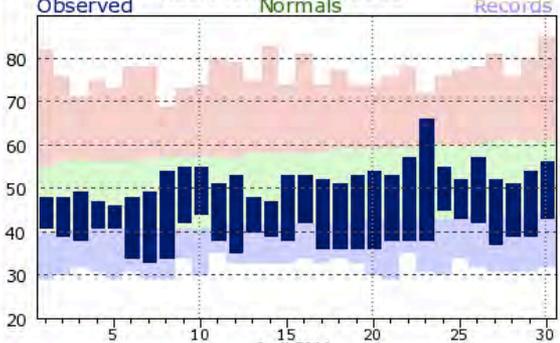
Current Warnings
[RSS](#) [XML](#)
 ...Local or USA
 Mt St. Helens
 NOAA Watch
 Tsunami Info

Forecasts
 Wrn Wa Zone Fcst
 Fcst Discussion...
[Text](#) | [Graphical](#)
 Public Text Fcsts
 Aviation | Marine
 Fire Weather
 Mountains
 Hydrology
 Model Forecasts
 Digital / Gridded
 Wx Point Matrix...
 Marine | Fire Wx
 GIS Shapefiles
 Canada | Int'l

Current Conditions
 Observations
 Obs Maps...
[State](#) | [Pgt Sound](#)
[Satellite](#) | [Radar](#)
 AHPs: Rivers/Lks
 NWS SEA webcam
 Local Storm Report

Temp Graphs Page

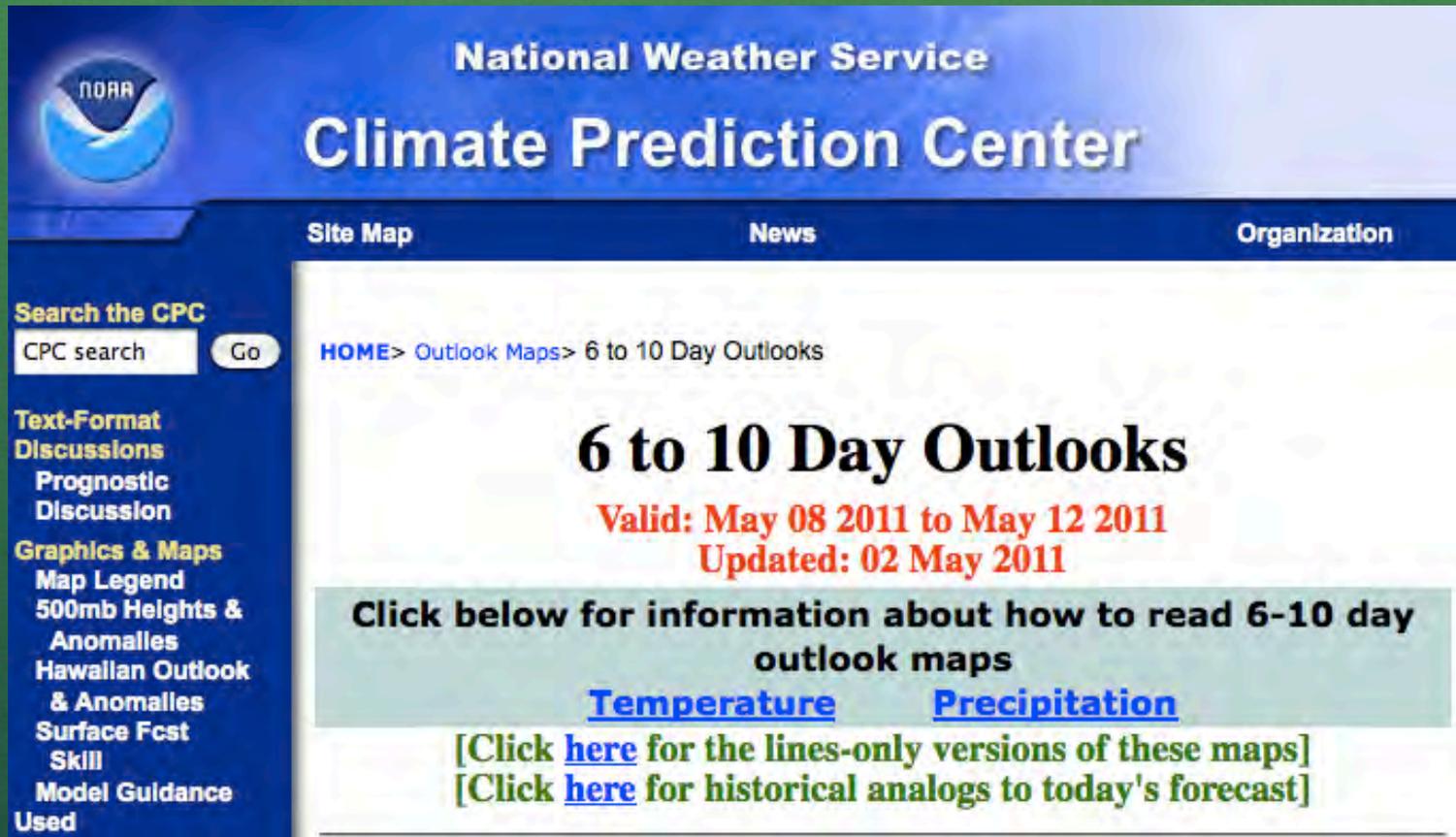
KSEA Temps for 4/2011



April 2011

KSEA April, 2011										
Date	Observed Low (F)	Observed High (F)	Normal Low (F)	Normal High (F)	Record Low (F)	Year	Record High (F)	Year	Observed Precipitation (Inches)	Record Precipitation (Inches)
1	41	48	40	55	29	1953	82	1987	1.13	1.13 2011
2	39	48	40	56	30	1976	76	1992	.37	.92 2009
3	38	49	41	56	32	1948	71	2004	.06	1.46 1991
4	41	47	41	56	31	1948	75	1966	.24	2.64 1991
5	41	46	41	56	29	1975	73	1977	.23	.79 1972
6	34	48	41	56	31	1956	78	2007	.12	.63 1963
7	33	49	41	57	29	1952	78	1996	.08	.63 1984
8	34	54	41	57	29	1952	69	1996	0	.83 1993

Temperature and Precipitation Outlooks



The screenshot shows the National Weather Service Climate Prediction Center website. The header includes the NOAA logo and the text "National Weather Service Climate Prediction Center". Navigation links for "Site Map", "News", and "Organization" are visible. A search bar on the left is labeled "Search the CPC" with a "Go" button. The main content area displays "HOME > Outlook Maps > 6 to 10 Day Outlooks" and a large heading "6 to 10 Day Outlooks". Below this, it states "Valid: May 08 2011 to May 12 2011" and "Updated: 02 May 2011". A call to action says "Click below for information about how to read 6-10 day outlook maps" with links for "Temperature" and "Precipitation". At the bottom, there are two green links: "[Click here for the lines-only versions of these maps]" and "[Click here for historical analogs to today's forecast]".

National Weather Service
Climate Prediction Center

Site Map News Organization

Search the CPC
CPC search

Text-Format
Discussions
Prognostic
Discussion

Graphics & Maps
Map Legend
500mb Heights &
Anomalles
Hawallian Outlook
& Anomalles
Surface Fcst
Skill
Model Guidance
Used

HOME > Outlook Maps > 6 to 10 Day Outlooks

6 to 10 Day Outlooks

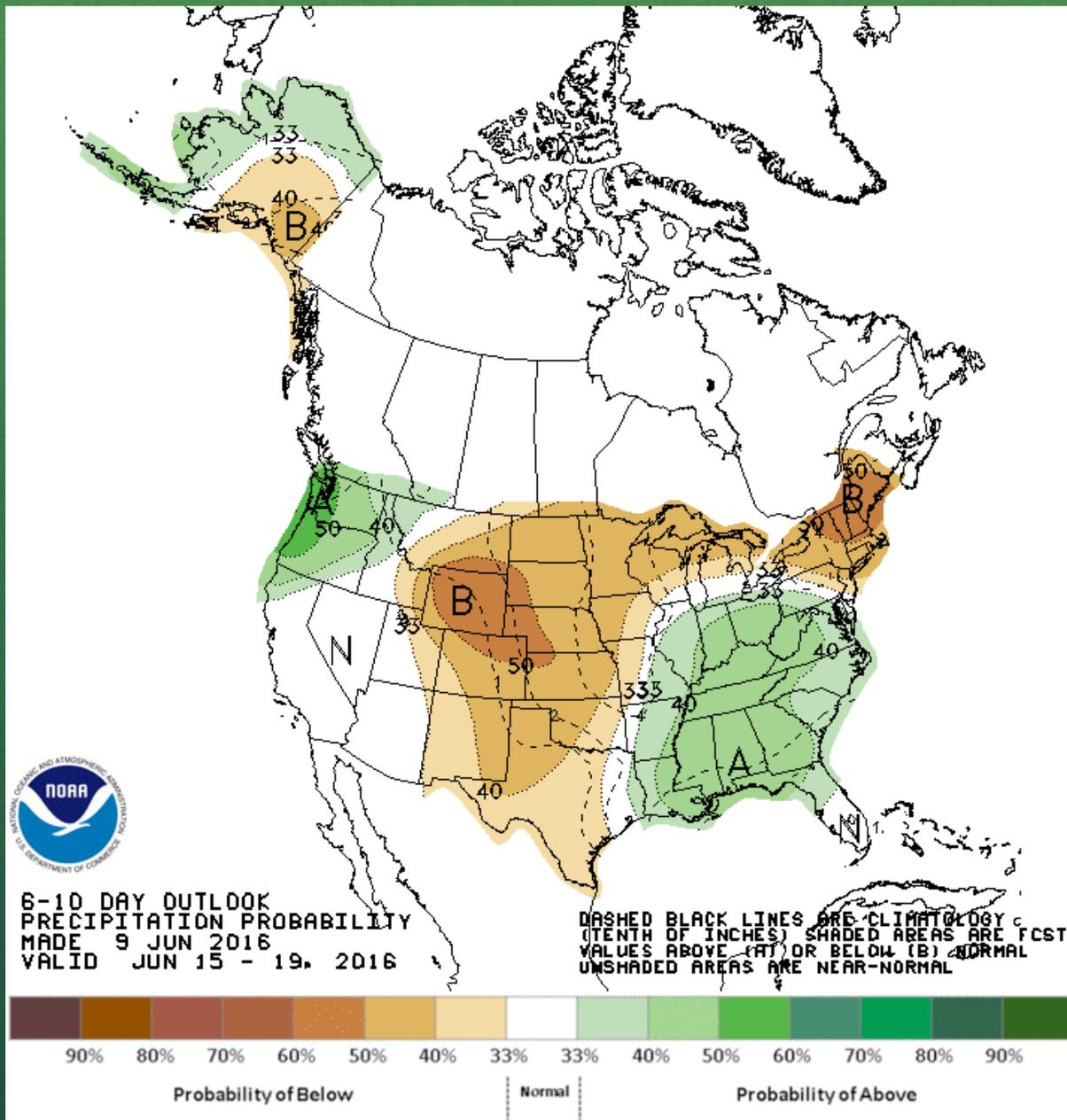
Valid: May 08 2011 to May 12 2011
Updated: 02 May 2011

Click below for information about how to read 6-10 day outlook maps

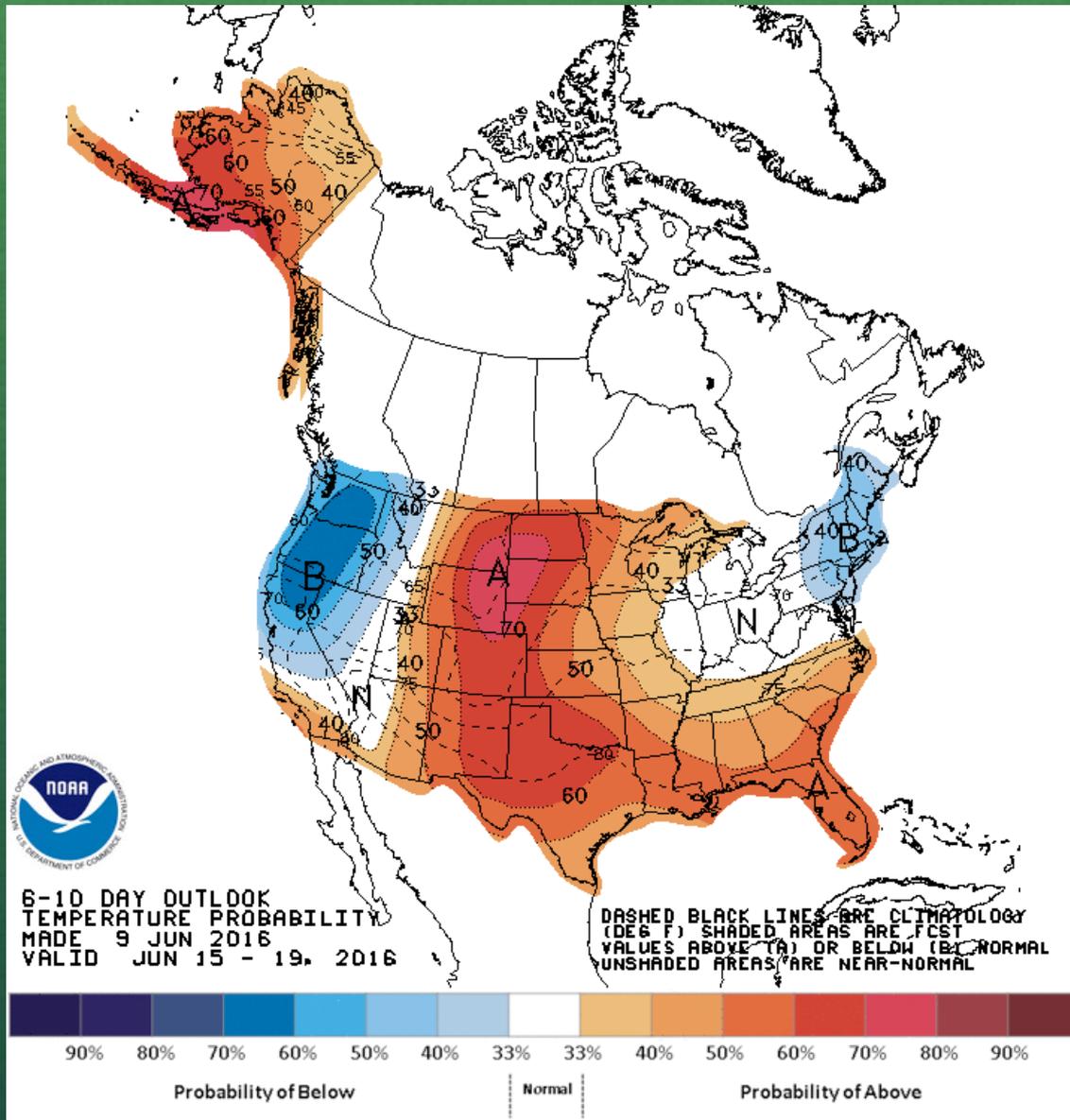
[Temperature](#) [Precipitation](#)

[Click [here](#) for the lines-only versions of these maps]
[Click [here](#) for historical analogs to today's forecast]

www.cpc.noaa.gov/



6 -10 Day Precipitation Outlook



6 -10 Day Temperature Outlook

NCDC



NCDC is the world's largest active archive of weather data. NCDC produces numerous climate publications and responds to data requests from all over the world.

www.ncdc.noaa.gov/

NOAA's Climate Portal



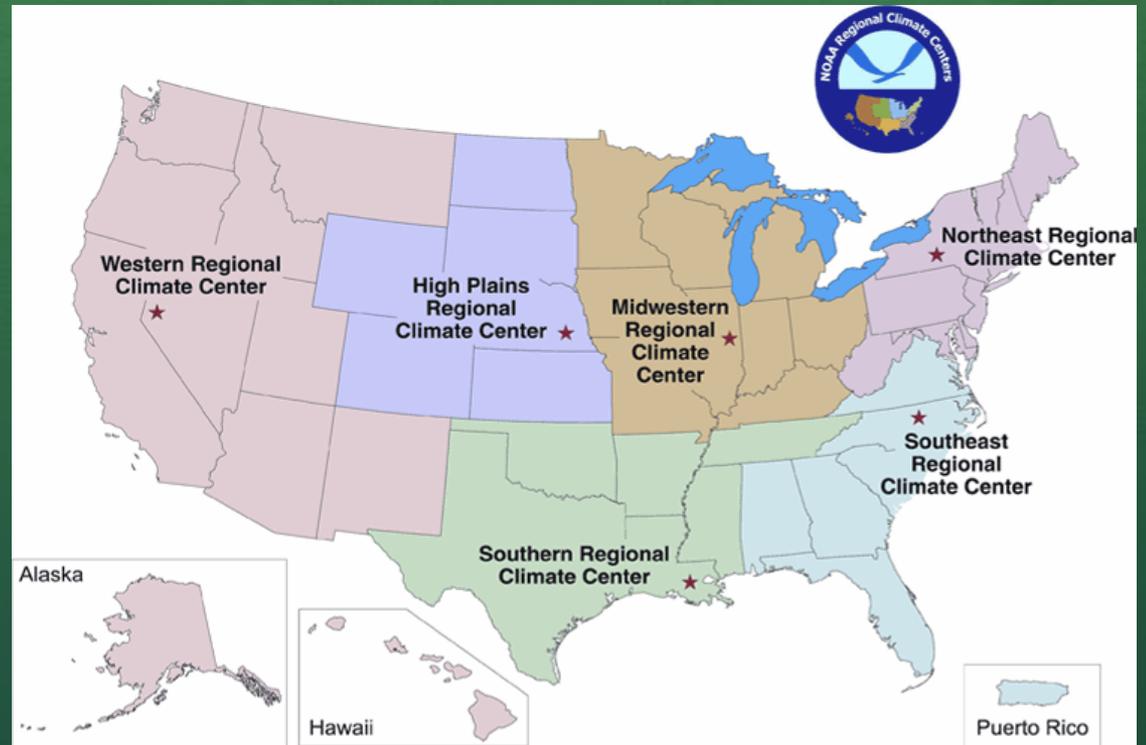
NOAA CLIMATE SERVICES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NOAA's Climate Services Portal showcases a wide breath of climate information. With the click of a mouse the user has easy access to climate data and services, timely articles and information, education resources, and tools for engagement and decision-making.

www.climate.gov

Regional Climate Centers

NOAA's Regional Climate Centers provide general and user-defined regional and local climate products and services, as well as regional and local expertise and assistance to a wide range of customers.



www.wrcc.dri.edu/rcc.html

Texas State Climate Office

Your best resource for looking at “local climate details” in your state. Most states have a state climate office which can provide custom climate data and information.

For more info visit:

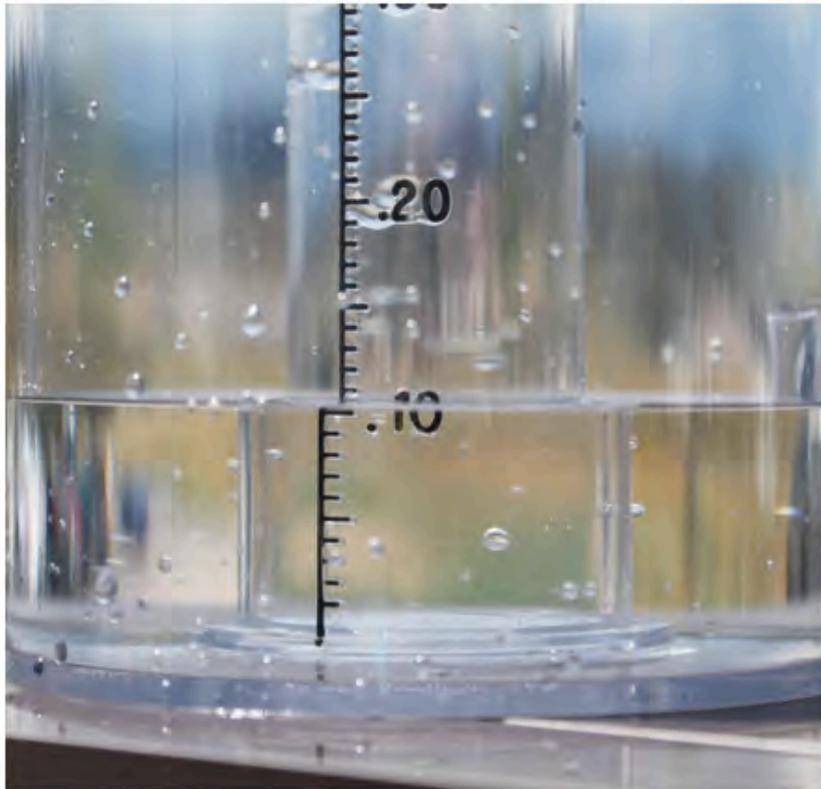
<http://climatexas.tamu.edu/>



The screenshot shows the website for the Office of the State Climatologist at Texas A&M University. The header features a map of Texas and the text "OFFICE OF THE STATE CLIMATOLOGIST" and "ATMOSPHERIC SCIENCES TEXAS A&M UNIVERSITY". A navigation menu includes links for Home, Drought, Monthly Reports, Data, Resources, Publications, About Us, FAQs, News, and Search. The main content area displays a photograph of a lightning storm with the caption: "An early summer thunderstorm shatters lightning across the College Station sky in May." Below the photo is a "News Highlights" section with the heading "The OSC is Now on Facebook!" and a Facebook logo. The text in this section encourages following the office on Facebook for updates on drought, weather, and climate information.

Section Ten: CoCoRaHS, an opportunity for Master Naturalists!

CoCoRaHS



rain
Hail
snow



"Precipitation measurements in your own backyard!"

CoCoRaHS – an opportunity to participate



Here at the very end of our guide we want to present you with an opportunity to track the most variable element of our climate . . . The precipitation that falls on your garden. **What better way to find out how precipitation affects your garden than to track it yourself!** After all, every gardener should know how much rain falls in their own yard.

It's much easier than you might think, only five minutes each day. It's more affordable than you might imagine . . . just the cost of a rain gauge. We provide the website, a specific station number, great detailed maps, educational materials (such as on-line training) and user support. Plus your observations help fill in gaps across the country and are used by scientists, educators, municipalities, the National Weather Service and many more . You can make a difference while learning from the experience as well.

HOW CAN YOU BECOME PART OF THE NETWORK?

A clear plastic rain gauge is mounted on a wooden post in a grassy field. In the background, a vibrant rainbow is visible against a hazy sky. The rain gauge is cylindrical and has a small opening at the top. The wooden post is weathered and stands in a field of tall grass.

Five easy steps

Sign-up on the
CoCoRaHS Web page
www.cocorahs.org

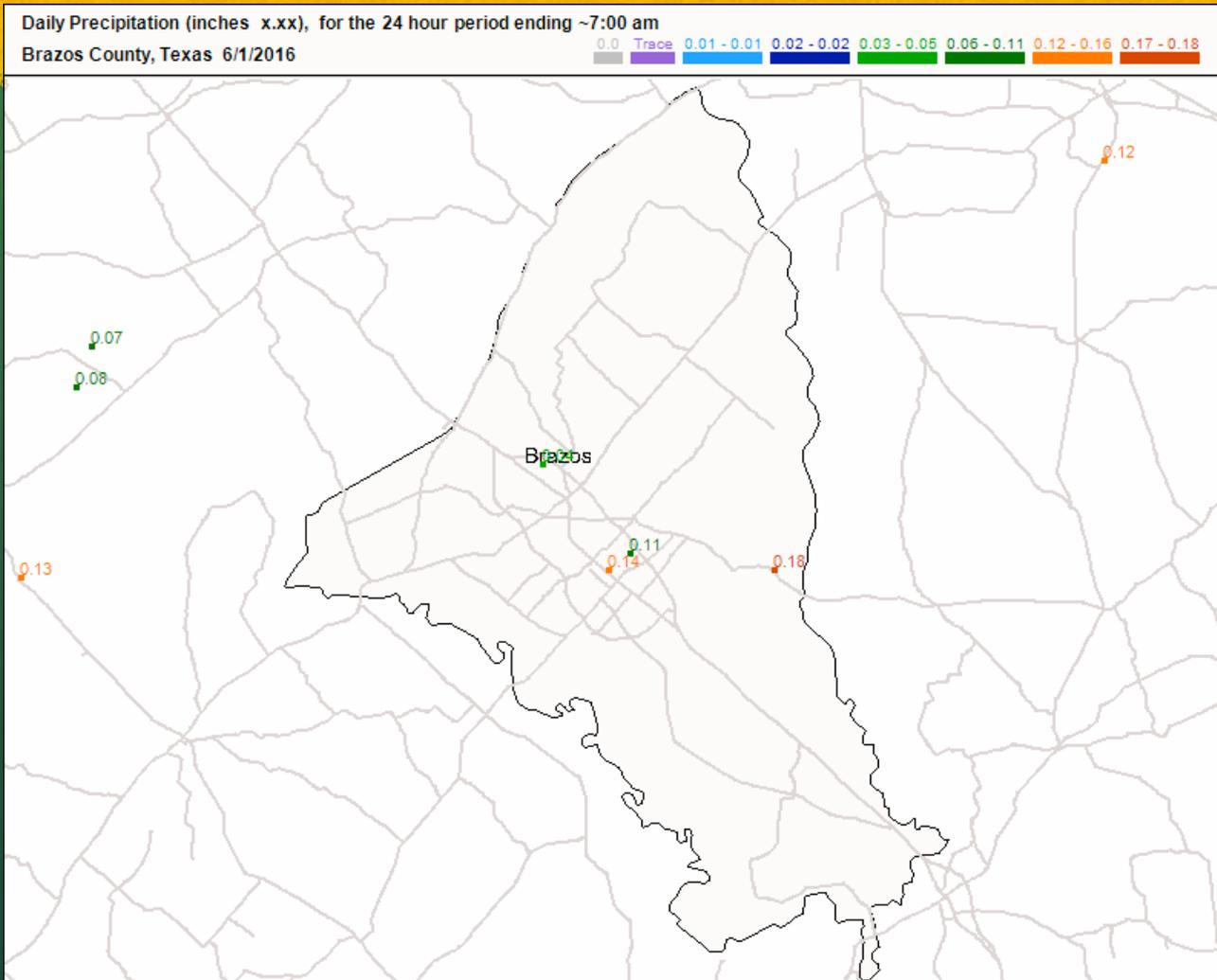
Obtain a 4" diameter plastic rain gauge
(info available on web site)

View the "training slide show" or
attend a training session

Set-up the gauge in a "good"
location in your yard

Start observing precipitation
and report on-line daily

Even if you don't participate



CoCoRaHS is a great way to find out about local precipitation even if you don't participate. All maps and education materials are free to the public.

The maps are updated everyday and are viewable on a national, statewide and county level.

Thanks!

Contact Info:

Steven Quiring, Texas A&M University

squiring@tamu.edu

<http://geography.tamu.edu/class/squiring/>

(979) 458-1712