SCIPP
A NOAA RISA TEAM

Southern Climate Monitor

December 2019 | Volume 9, Issue 4

In This Issue:

Page 2: Rating Fire Danger from the Ground Up
Page 3-4: NOAA's Winter Outlooks
Page 5: Simple Planning Tool Receives Two Awards
Page 6: What is Wind Chill?
Page 7: About SCIPP Team: Margret Boone
Page 8: From Our Partners

The Southern Climate Monitor is available at
www.srcc.lsu.edu & www.southernclimate.org

OU LSU N
KU INSTITUTE FOR POLICY & SOCIAL RESEARCH
The University of Kansas

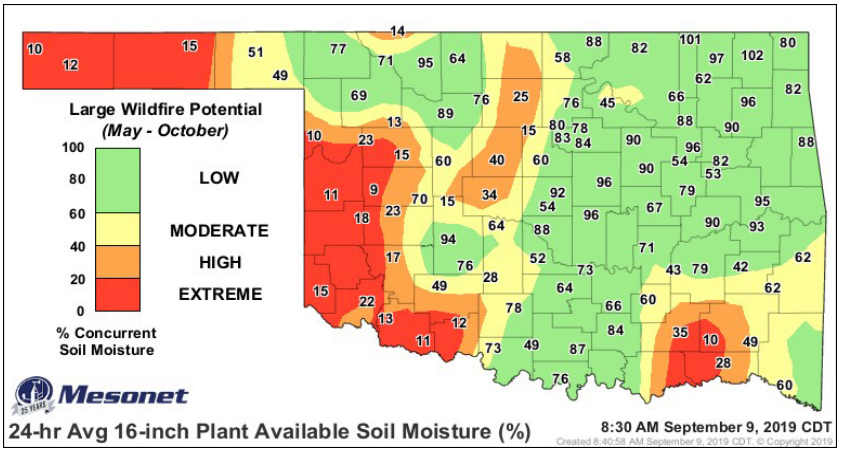
Rating Fire Danger from the Ground Up

James Cuellar, Student Assistant, SCIPP

An article published on Eos: Earth and Space Science News details the progress of relating soil moisture and vegetation moisture to wildfire potential. The purpose of this research is to create accurate fire danger indicies as it is known that these are the primary aspects that aid in the spread of wildfires. Researchers utilized the soil moisture measurements taken by the Oklahoma Mesonet as a proxy for fire danger to confirm the link between soil moisture and wildfires.

Wildfires are a destructive phenomenon that are not unique to the United States, and affect nations across the globe. Research into various ways to rate the level of fire danger prior to wildfire events has been a key focus for bringing awareness said fire danger. The parameter in particular that is known to be vital to wildfire initiation and maintenance is top-layer soil moisture. In this article written by Levi et al. (2019), they describe the importance of knowing soil moisture content and how to model this parameter for the purpose of predicting the likelihood of wildfires in an area, given the appropriate atmospheric conditions suitable for the spread and maintenance of wildfires. While the connection between soil moisture, moisture contained within vegetation, and wildfires is known and has been thoroughly studied, Levi et al (2019). emphasize that challenges still remain with collecting data of these parameters. Fortunately, an increase in coverage of in-situ measurements and satellite have provided the opportunity for these parameters to be measured, which has given the ability to put fire danger indices into practice. One of the best in-situ networks that has allowed for the experimentation of fire danger indices is the Oklahoma Mesonet. The Oklahoma Mesonet measures the soil moisture at various depths at most of the sites in the state. Along with the coverage of the network, its longevity and the state's vulnerability to wildfires provides an optimal setup for researchers to test their theories on the best way to quantify fire danger.

For more information on this ongoing research, read the article from this link, and contact Matthew Levi at matthew.levi@uga.edu.



Map showing the estimated large wildfire potential across Oklahoma based on in situ soil moisture observations from the Oklahoma Mesonet on 4 September 2019. Numbers indicate the FAW, expressed as a percentage, for the soil layer from 0 to 16 inches (0–41 centimeters) depth. Extreme growing season wildfire potential occurs when FAW drops below 20%. Credit: Oklahoma Mesonet

NOAA's Winter Outlooks

Margret Boone, SCIPP Program Manager

On October 17, 2019, the NOAA Climate Prediction Center (CPC) released its Winter Outlook for the United States. There are two outlooks included: US Temperature Outlook and the US Precipitation Outlook.

The U.S. Temperature Outlook (Figure 1) for this Winter illustrates the probability of regions seeing either cooler than normal (blue colors), or warmer than normal temperatures (red colors). Areas shaded in white have equal chances of cooler than normal or warmer than normal temperatures. There is a greater than 33% chance of warmer than normal temperatures across much of the northern, western and southern U.S., with areas of the southwest, southern plains, southeast and northeast having greater than 40% chance of warmer than normal temperatures. Areas of Alaska and Hawaii have a greater than 50-60% chance of warmer than normal temperatures. No part of the U.S. is expected to be cooler than normal.

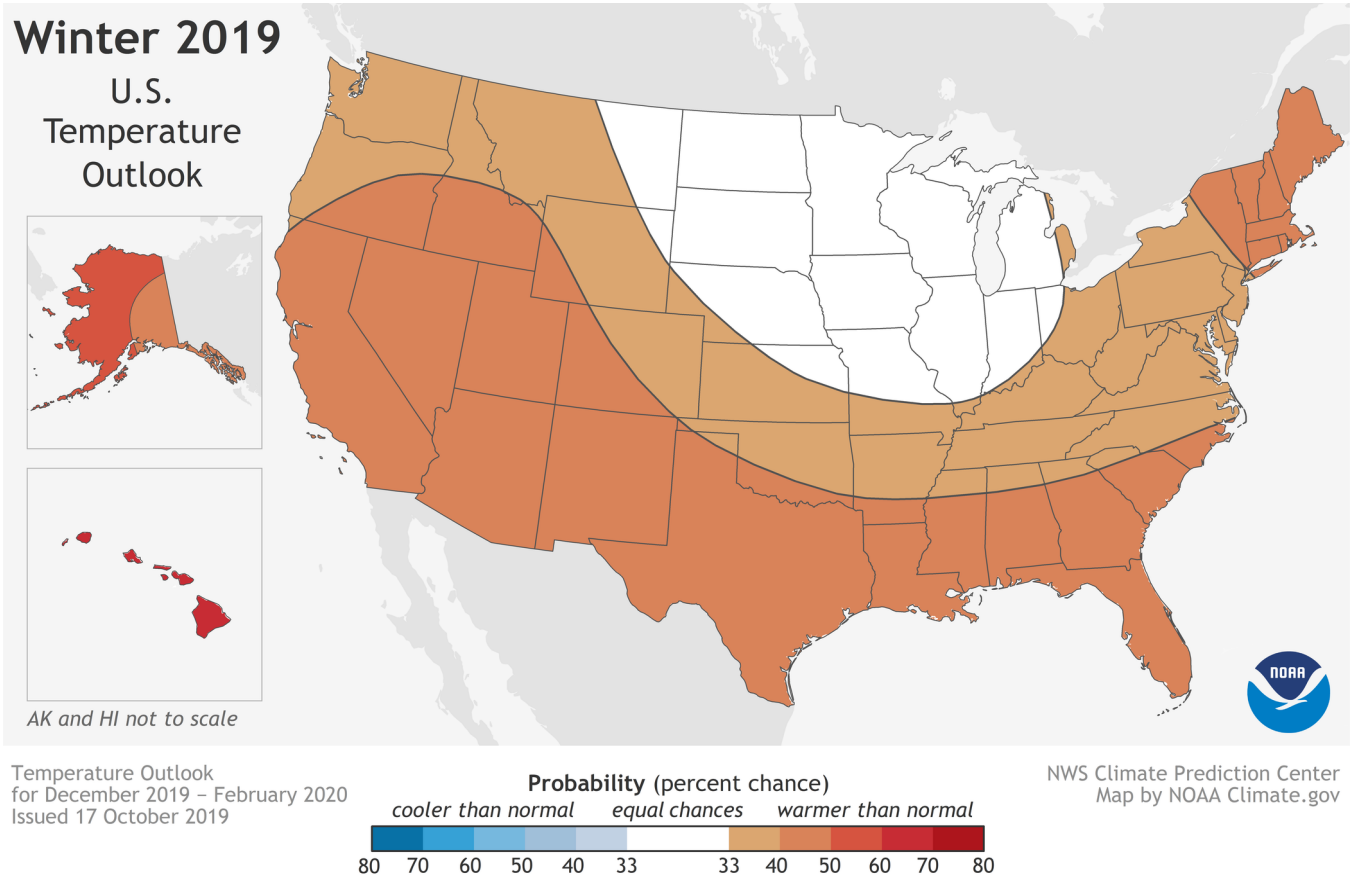


Figure 1: 2019 Atlantic tropical cyclone names. (NOAA) Image courtesy (https://www.noaa.gov/media-release/noaa-predicts-near-normal-2019-atlantic-hurricane-season)

The U.S. Precipitation Outlook (Figure 2) for this Winter visualizes the probability of drier than normal or wetter than normal conditions across the United States. Like the Temperature Outlook, areas in white have equal chances of drier than normal or wetter than normal conditions. Wetter than normal conditions are possible across the northern portion of the U.S. and Great Lakes regions, Alaska and Hawaii, with greater than 30-40% probability. Portions of California, Texas, Louisiana and small portions of Oklahoma, Arkansas and Mississippi may see drier than normal conditions this Winter. The rest of United States has equal chances of either drier than normal or wetter than normal conditions.

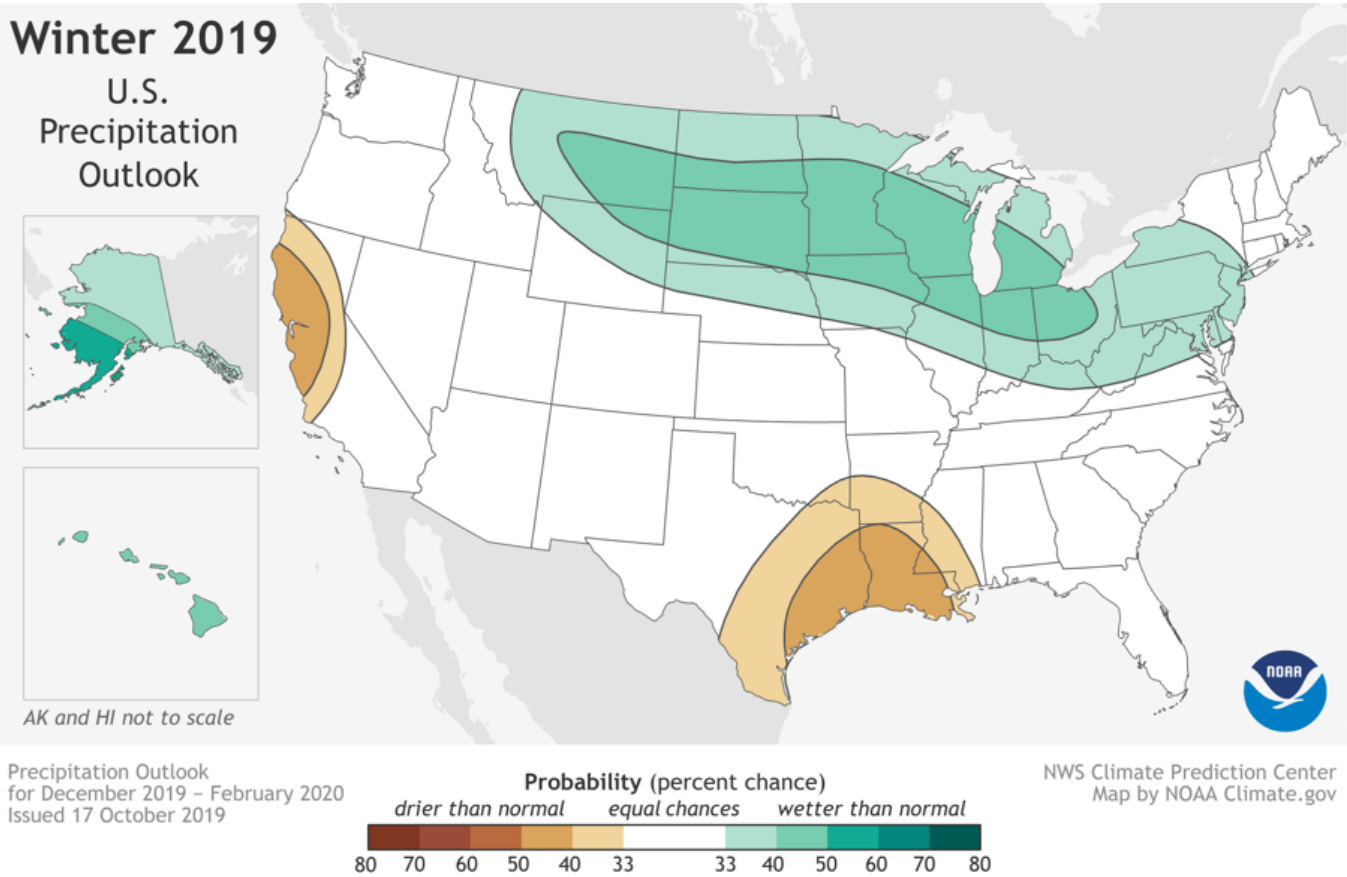


Figure 1: 2019 Atlantic tropical cyclone names. (NOAA) Image courtesy (https://www.noaa.gov/media-release/noaa-predicts-near-normal-2019-atlantic-hurricane-season)

Simple Planning Tool Receives Two Awards

Margret Boone, SCIPP Program Manager

Collaborating with stakeholders to produce usable science and information has been central to SCIPP's mission since its inception. This Fall, one product of that collaboration was recognized at state and national levels. SCIPP recently received two awards for developing the Simple Planning Tool (SPT) for Oklahoma Climate Hazards, a tool that assists planners, emergency managers (EMs) and related officials across Oklahoma with assessing their long-term climate risks. Described in a previous issue of this publication, the SPT was developed to meet a need identified by planners and EMs at workshops in 2017. SCIPP has also developed a version for Arkansas.

This past October SCIPP received the award for Outstanding Public Outreach, Program, Project, Tool, or Community Initiative from the Oklahoma Chapter of the American Planning Association (APA). The award category emphasizes results and demonstrates how innovative and state-of-the-art planning methods and practices help create communities of lasting value. City of Stillwater, Oklahoma Assistant City Manager Paula Dennison and Emergency Management Director Rob Hill, key stakeholders involved in the development of the SPT, nominated the tool for the award. Jurors from Oklahoma, Arkansas, Texas, North Carolina and Vermont reviewed the nominations. The award was presented to SCIPP Deputy Director Rachel Riley during the Quad State APA conference in Tulsa, Oklahoma on October 10. Hill joined Riley at the awards gala to accept the award.

The SPT was also the foundation of another award. On November 20, Riley, Hill and Dennison received a Route Fifty Navigator Award in The Tech Innovators category. The trio received the award at a ceremony in San Antonio, Texas during the National League of Cities' Summit. The award was given for "developing the Simple Planning Tool for planners and emergency managers to asses the local, long-term climate risks in Oklahoma communities." Awards were given across five categories: The Electeds, The Leaders, The Next Generation, The Tech Innovators, and The Allies (Fig. 1). More details about the rest of the winners are available here. The Route Fifty awards honor individuals and teams who work in or with state, county and municipal governments across the United States.

Figure 1. Paula Dennison, Rachel Riley, and Rob Hill receiving The Tech Innovator award from Alisha Powell Gillis, Route Fifty Senior Editor.

What is Wind Chill?

Barry Keim, Louisiana State Climatologist

I think most of realize that on chilly days, we feel a whole lot colder when its windy. This is caused by the wind chill effect. Wind chill can be defined as the perceived decrease in air temperature felt by humans or animals due to airflow, and it is measured using the wind chill index. The basis for the index is that as cool (or cold) air flows across your body, it makes you colder by stripping away energy from around your body. It also cools you through evaporation of moisture and oils from your skin surface, and through conduction — direct contact of your skin with the colder air molecules.

The concept of a wind chill was first devised in 1940 by Paul A. Siple and Charles F. Passel. They were explorers in the Antarctic who came up the idea while braving the elements in the coldest and windiest continent. The idea formed while performing experiments on how fast a cup of water would freeze in Antarctica while the cup sat on the expedition hut roof. They did this while monitoring the starting temperature of the water, the outside temperature, and the wind speed. Through repeated experiments, they quickly realized that with the same initial water temperature and outside temperature, the cup of water would freeze more quickly as wind speeds increased. The scale that Siple and Passel derived was first used by the National Weather Service in the 1960s and 1970s and note that the original experiments never included humans and their perceptions. There have been revisions since that have included a human element, but the scale hasn't really changed dramatically since its inception.

There are attributes of the scale that are worth pointing out. First, the scale doesn't take effect until there is about a 4-5 mph wind (Figure 1). The average walking speed for most people is about 3 mph and the argument I've heard is that we at least need to exceed that before considering a wind chill effect. Also note that once winds get to about 40 mph, there is little additional cooling effect. In other words, a 40 mph wind will strip energy from your body at nearly the same level, as winds at 50 mph, 75 mph, or even 100 mph. I have actually been on the summit of Mt. Washington, New Hampshire in early spring when the temperature was near 0°F, with winds gusting to 100 mph. It was quite miserable, harsh, and scary in one sense, and quite amazing, exhilarating, and beautiful in another. When facing such conditions, it helps to be prepared, as any faulty moves could be your last. Please contact me with any questions or complaints at keim@lsu.edu.

Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T = Air Temperature (°F) V = Wind Speed (mph) Effective 11/01/01

Figure 1. Wind chill chart from the National Weather Service found at http://www.nws.noaa.gov/om/windchill/images/windchillchart3.pdf.

Margret Boone

Margret Boone, SCIPP Program Manager

Margret Boone joined the SCIPP team in 2011 as the SCIPP Program Manager. Margret grew up in Broken Arrow, Oklahoma, a suburb of Tulsa. Growing up in Tornado Alley, she saw all forms of extreme weather conditions, which led to her deciding at 5 years old she wanted to be a meteorologist. Margret went on to attend the University of Oklahoma (OU), where she received her B.S. in meteorology and minors in mathematics and history. She continued her education at OU where she received her M.S. in meteorology as well.

Before joining the SCIPP team in 2011, Margret spent several years as a Water Quality Specialist with the Oklahoma Department of Environmental Quality. Her specialty was monitoring industrial wastewater discharges, and gained valuable experience on how industries handled water quality issues during flooding and drought conditions. This knowledge carried over to her work with SCIPP, which initially focused heavily on drought and water resource managers.

As SCIPP's Program Manager, Margret is responsible for managing the administrative side of NOAA grant, which includes corresponding with NOAA Program Managers, answering NOAA requests, and SCIPP Annual Reports. Her research interests in include extreme events and mitigation, especially drought and flooding.

Margret has authored several SCIPP reports. She also served on the Steering Committee for the Gulf Coast Prairie Landscape Conservation Cooperative from 2015 — 2018.

Southern Climate Monitor Team

James Cuellar, Student Assistant SCIPP (OU)

Margret Boone, Program Manager SCIPP (OU)

From Our Partners

Texas Resilience 2020

South Central Climate Adaptation Science Center

This conference will provide a platform for Texas communities and organizations to come together and share experiences, opportunities, tools, resources, and knowledge to build a more resilient Texas. Communities across Texas often confront the stresses of economic and social inequality, aging infrastructure, and a changing natural landscape. Challenges related to climate variability and change, including but not limited to sea level rise, extreme heat, wildfire, drought, and floods, exacerbate the existing stressors that communities face. Building resilience empowers Texans to invest in their communities in ways that allows them to emerge in a stronger position after tough times and live better in good times.

Call for session proposals is OPEN! Click here to learn more. Submissions are due by Feb 7, 2020. The inaugural Texas Resilience conference is a two-day event focused on enhancing resilience across the State by strengthening and providing a platform to share experiences, tools, resources, and knowledge. The conference will be held May 20-21, 2020 at the Palmer Events Center in Austin, TX. To see sponsorship opportunities, click here.

For further questions, contact the South Central Climate Adaptation Science Center at info@southcentralclimate.org.

Contact Us

To provide feedback or suggestions to improve the content provided in the Monitor, please contact us at monitor@southernclimate.org. We look forward to hearing from you and tailoring the Monitor to better serve you. You can also find us online at www.srcc.lsu.edu & www.southernclimate.org.

For any questions pertaining to historical climate data across the states of Oklahoma, Texas, Arkansas, Louisiana, Mississippi, or Tennessee, please contact the Southern Regional Climate Center at (225)578-5021.

For questions or inquiries regarding research, experimental tool development, and engagement activities at the Southern Climate Impacts Planning Program, please contact us at (405)325-7809 or (225)578-8374.

Monthly Comic Relief