HPRCC

October 2020

The Prairie Post Quarterly Newsletter of the High Plains Regional Climate Center

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Message from the Director

By Dr. Rezaul Mahmood

Hello from fall-like Lincoln! It has been nice weather-wise for a while, which also means that it has been dry for an extended period of time. As you know, since March our staff have largely been working remotely due to the COVID-19 pandemic. Nevertheless, the Center has remained fully operational, services have remained uninterrupted, and we have continued to assist our stakeholders, partners, and users of data and tools at large. I noted in our previous issue that we released our new website in July. I am still enjoying navigating through this new website. I hope you are also finding it more efficient and useable.

Otherwise, the Center's staff have remained busy engaging with partners and stakeholders and assisting in a variety of ways. These include, for example, development of a new online climate decision dashboard for tribes and Standardized Precipitation-Evapotranspiration Index (SPEI) data for the entire country in collaboration with the National Drought Mitigation Center (Page 2). In addition, recently our Center received funding from the National Centers for Environmental Information (NCEI) to better understand the needs of users regarding Climate Normals data (Page 4). This will lead to the development and testing of a prototype tool by the HPRCC for accessing these data. In the meantime, I hope you, your families, and friends are continuing to be safe and healthy. Thanks for reading *The Prairie Post*!

Meet Our Grad Student, Emilee Lachenmeier

Emilee is completing a Master's degree in Natural Resource Sciences with a specialization in Climate Assessments and Impacts. She received a Bachelor of Science degree in Meteorology/Climatology and Water Science (Hydrology) from UNL. Emilee is expected to defend her thesis this semester and graduate in December. The topic of her research is an overview of the results from the Great Plains Irrigation Experiment (GRAINEX), a field campaign conducted over the summer of 2018 during which near surface and upper atmospheric measurements were collected over irrigated and non-irrigated regions.

In her spare time, Emilee likes to ride her motorcycle, hunt, fish, camp, golf, and watch her boyfriend race his dirt track car. She has been teaching herself to play the accordion since she is a huge fan of polka music and loves learning new and challenging things. She is originally from North Dakota, which means she naturally loves winter and cannot wait for the first snowflakes to fall. Emilee would like to thank the HPRCC for all of their help and support throughout her Master's degree!

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Goldenrod blooming during fall (photo courtesy Crystal Stiles)

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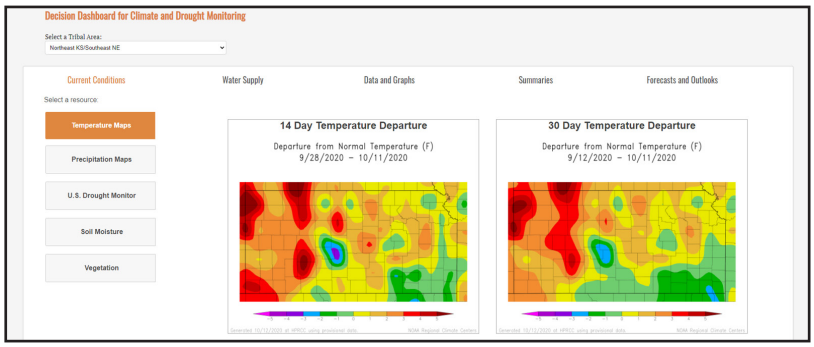
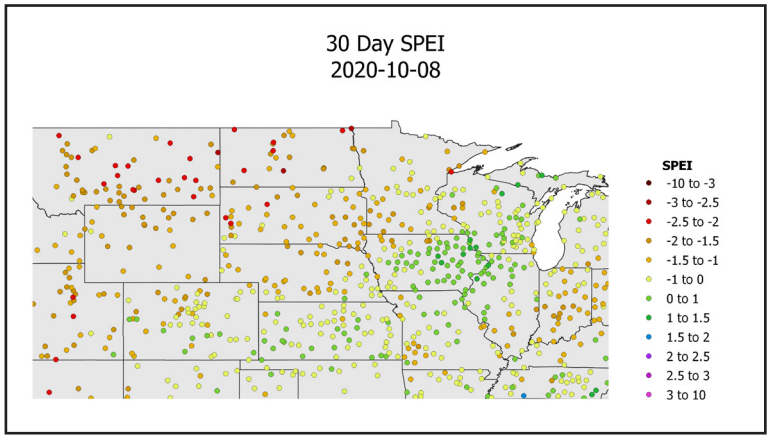
Tribal Climate Dashboard Aids in Climate, Drought Monitoring



The HPRCC just wrapped up a Bureau of Indian Affairs-funded project with the nine tribes in the Environmental Protection Agency (EPA) 7 region: Iowa Tribe of Kansas and Nebraska, Kickapoo Tribe in Kansas, Omaha Tribe of Nebraska, Ponca Tribe of Nebraska, Prairie Band Potawatomi Nation, Sac and Fox Nation of Missouri in Kansas and Nebraska, Sac and Fox Tribe of the Mississippi in Iowa, Santee Sioux Tribe of Nebraska, and Winnebago Tribe of Nebraska. As part of this project, HPRCC staff conducted a workshop last spring focused on putting together reservation-specific climate summaries. The other part of the project involved developing an online climate decision dashboard for these tribes. The dashboard is divided into three tribal areas – Northeast Kansas/Southeast Nebraska, Northern Nebraska, and Iowa – so that the tribes can access climate data and information for their respective regions.

The dashboard contains a wide variety of information, such as data on temperature and precipitation, drought, soil moisture and vegetation, water supply, and forecasts and outlooks. Based on feedback from our tribal partners over the years, many have found it helpful to have all the information they need in one easily accessible location in order to save time looking for information on the Web. HPRCC staff will hold a webinar for project team members in November to go over the features of the dashboard in more detail. Staff are considering expanding this dashboard to include all tribal lands in the Missouri River Basin. The dashboard is housed on HPRCC's website and you can check it out here: https://hprcc.unl.edu/tribal-dashboards/dashboard.php.

Coming Soon: HPRCC, NDMC Team Up to Generate Nationwide SPEI Values

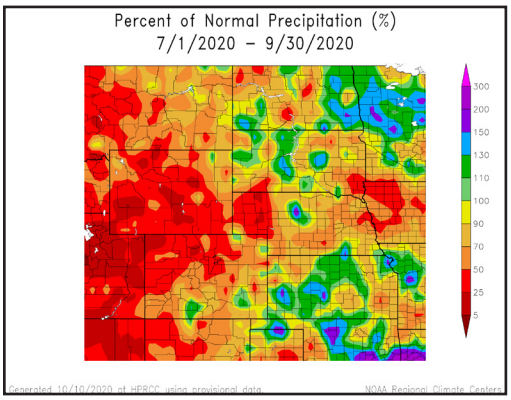


The HPRCC has been developing Standardized Precipitation-Evapotranspiration Index (SPEI) values for the entire country in collaboration with the National Drought Mitigation Center. SPEI is an extension of the Standardized Precipitation Index (SPI), which is a broadly-used index for drought monitoring that utilizes historical precipitation records for its calculations at various timescales. In addition to precipitation, the SPEI takes temperature into account, which makes it a more comprehensive index for drought monitoring. The SPEI is useful in drought determination by characterizing the water balance of a specified time period based on historical data. These values are being evaluated and are not yet available to the public but are expected to be included in our ACIS maps in the coming months. If you would like to learn more about these indices, as well as other drought indices and indicators, check out the World Meteorological Organization's and Global Water Partnership's *Handbook of Drought Indicators and Indices* here: https://library.wmo.int/doc_num.php?explnum_id=3057.

Did You Know?

The revamping of the HPRCC website included updates and additional information on the Automated Weather Data Network (AWDN): https://hprcc.unl.edu/awdn/index.php. The AWDN is a partnership between state mesonets and the HPRCC. The data collected by each state mesonet are critical to understanding the climate and weather of the entire HPRCC region. The HPRCC strives to develop regional products based on these data and make the information available to decision makers. To learn more about state mesonets, visit the mesonet websites for the region.

Overview of Regional Climate Conditions



Drought, Temperature Swings, Early Snowfall Highlight Late Summer, Early Fall

Drought conditions expanded and intensified across much of the High Plains from July through September. By the end of September, over 62 percent of the region was in drought. The drought has had a variety of impacts to agriculture and livestock. For instance, "catastrophic" crop losses were reported in western Nebraska, and ranchers in western Kansas and Colorado were reporting that there was very little to no green grass left for cattle. The dry conditions, along with strong winds, also contributed to the spread of wildfires across portions of the High Plains. At the time of this writing, the Cameron Peak Fire in northern Colorado was the largest wildfire in the state's history, surpassing the Pine Gulch Fire, which just set the record for largest wildfire in September. The Mullen Fire, burning not far from the Cameron Peak Fire in southern Wyoming, had destroyed more than 176,000 acres by mid-October. The smoke from these fires created extended periods of hazy skies and poor air quality.

September started off warm before a storm system brought colder temperatures, and in some places, snowfall. Several locations experienced daily record highs abruptly followed by daily record lows, as well as record early snowfall. Alamosa, CO had its 2nd earliest snowfall and snowiest September on record. See the table below for more earliest snowfall records. To learn more about the current state of the climate in the High Plains, check out our monthly, quarterly, and annual climate summaries here: https://hprcc.unl.edu/climatesummaries.php.

Earliest Snowfall (>=0.1 inch) Rankings			
Location	**Value (in) / Date / Ranking**	**Value (in) / Record Earliest**	**Period of Record**
Goodland, KS	0.5 / 09-09-2020 / EARLIEST	3.8 / 09-20-1995	1895-2020
Pueblo, CO	0.8 / 09-09-2020 / EARLIEST	7.3 / 09-17-1971	1888-2020
Casper, WY	2.3 / 09-07-2020 / EARLIEST	0.2 / 09-08-1962	1939-2020
Cheyenne, WY	1.1 / 09-08-2020 / EARLIEST (tie)	0.8 / 09-08-1929	1883-2020
Alamosa, CO	8.8 / 09-08-2020 / 2nd earliest	4.2 / 09-03-1961	1906-2020
Denver, CO	1.0 / 09-08-2020 / 2nd earliest (tie)	4.2 / 09-03-1961	1874-2020
Colorado Springs, CO	1.3 / 09-08-2020 / 3rd earliest	4.2 / 09-03-1961	1894-2020

Check Out Our New ENSO Page for Info on the Current La Niña

According to NOAA's Climate Prediction Center, La Niña conditions have formed and are likely to continue through the winter. La Niñas develop when sea surface temperatures are below average in the equatorial Pacific for an extended period of time, which is important because these conditions can impact our weather patterns, especially in the winter. Although no two La Niña events are alike, the general patterns are predictable. For instance, in the Missouri Basin, we typically have increased chances for below-normal temperatures across the upper Basin, with the northern Rockies having an increased chance for an above-normal snowpack.

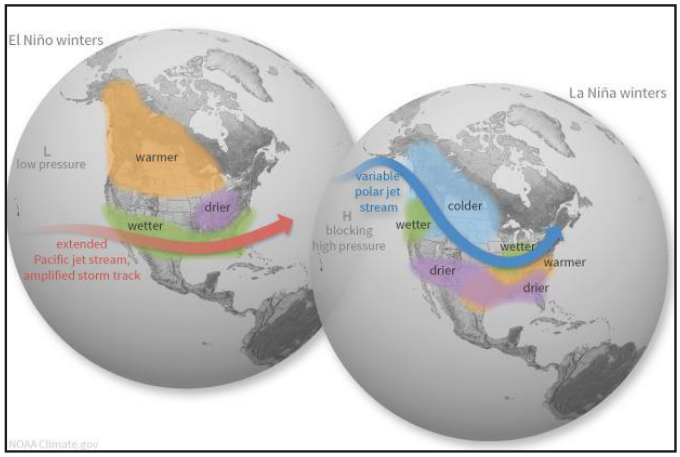
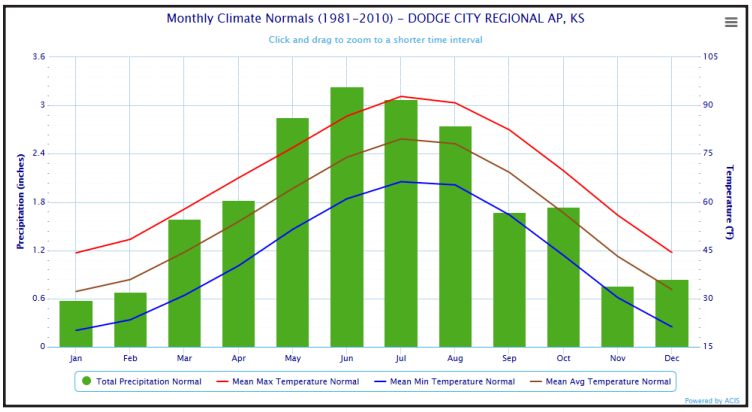


Image courtesy NOAA climate.gov

Within the next month, the HPRCC will be releasing a 2-page summary of the latest outlooks and potential impacts for the Missouri River Basin. This will be accessible from our new ENSO Impacts and Outlook Reports page: https://hprcc.unl.edu/enso_reports.php.

Staff Take On New Climate Normals Project



Every ten years, the National Centers for Environmental Information (NCEI) provides an update to the Climate Normals dataset. Climate Normals are 30-year averages of climatological variables such as temperature, precipitation, and snowfall, which are calculated from observations at thousands of stations across the country. The current Normals period is 1981-2010, which means that an update will be developed and released in the near future. The new Normals period will be 1991-2020. For a quick refresher, the climograph to the left is from Dodge City, Kansas. It shows the 1981-2020 temperature and precipitation Normals for the area.

In preparation for the release of the new Normals, we are working with NCEI to understand the needs of the people that use Climate Normals data and, subsequently, develop and test a prototype tool for accessing these data. If you have any questions or concerns regarding the new Climate Normals dataset, please let us know! https://hprcc.unl.edu/contact.php

Staff Publishes on 2017 Northern Plains Drought

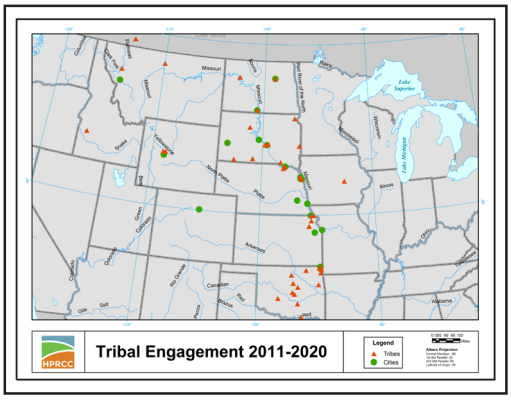
Congratulations to Natalie, who was a co-author on an article recently published in the *Bulletin of the American Meteorological Society*! This article describes the onset and progression of the 2017 Northern Plains drought, as well as its impacts on several sectors, response measures taken, and lessons learned that can help inform future drought monitoring, forecasting, communication, planning, and research.

Hoell, A., Parker, B-A., Downey, M., Umphlett, N., Jencso, K., Akyuz, F.A., Peck, D., Hadwen, T., Fuchs, B., Kluck, D., Edwards, L., Perlwitz, J., Eischeid, J., Deheza, V., Pulwarty, R., and Bevington, K., 2020. Lessons Learned from the 2017 Flash Drought Across the U.S. Northern Great Plains and Canadian Prairies. *Bull. Amer. Meteor. Soc.*, doi: https://doi.org/10.1175/BAMS-D-19-0272.1.

Recent and Upcoming Activities

SciComm 2020, Virtual (August 14-16)

In August, Natalie attended SciComm 2020, which brought together communicators from across the country in order to share and learn effective ways to communicate science. This year, the conference was held in a remote format and featured a number of interesting talks and events. For more information, please see: http://www.scicommcon.org/.



National Tribal and Indigenous Climate Conference, Virtual (September 14-17)

Natalie and Crystal attended the first National Tribal and Indigenous Climate Conference, held virtually in September by the Institute for Tribal Environmental Professionals. They participated in the Climate Café, where there were several "booths" that attendees could drop in on to learn about a particular project or activity. Natalie and Crystal provided a demo of the tribal decision dashboard (see Page 2 for more details on this tool): https://hprcc.unl.edu/tribal-dashboards/dashboard.php.

Upcoming: American Meteorological Society Annual Meeting, Virtual (January)

Paul plans to present three research projects at the American Meteorological Society Annual Meeting, covering topics from precipitation variability in future climate simulations, the impact of near-future simulated land-use land-cover change, and the climate of extreme precipitation. This research investigates the impact of future changes of climate in the central United States, primarily in the Missouri River Basin and Northern Great Plains, while also taking a look back at climatological shifts in the nature of extreme precipitation events, such as the heavy precipitation event in March 2019, which led to historic floods across Nebraska, Iowa, and South Dakota.