April 2020

The Prairie Post

Quarterly Newsletter of the High Plains Regional Climate Center

Inside this issue:

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Cattle in Loomis, NE (photo courtesy Tyler Williams, UNL Extension)

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Message from the Director

By Dr. Rezaul Mahmood

Happy Spring! I hope you, your families, and friends are healthy and well. I recognize that it is a difficult period for all of us due to the COVID-19 pandemic. Under the circumstances, and considering everyone's health and safety, in mid-March we decided that all our faculty, staff, and students would work remotely. But, this transition to remote work has not impacted our mission and we continue to provide climate services to our stakeholders and partners. In fact, the very week we started working from home, our staff converted an in-person workshop to an online workshop (see Page 2 for more information). Now that we have a few weeks down, I am pleased to inform you that our operations have remained "business as usual" and I am proud of our staff for this accomplishment.

With our minds on the COVID-19 pandemic, it is truly hard to believe that it has been over a year since the "bomb cyclone" event that kicked off a memorable year of flooding in the North Central U.S. As a way to look back at this historic year, the HPRCC, along with NOAA's National Centers for Environmental Information and the USDA's Midwest Climate Hub, have assembled a report that provides an overview of some of the major events and impacts from 2019. You can learn more about this report on Page 3. Other notable activities this quarter include talks at the Northeast Oklahoma Tribal Resilience Workshop in Quapaw, OK (see Page 2) and progress on a new HPRCC website, which will feature an updated design and new climate tools (stay tuned for more details!).

Despite current challenges due to the COVID-19 pandemic, I expect that the HPRCC will continue to serve everyone effectively. I also hope that we will move past this national and global emergency soon. Be safe, and enjoy reading *The Prairie Post*!

Meet Our Doctoral Student, Kierstin Blomberg

Kierstin is a doctoral student in the School of Natural Resources, pursuing a Ph.D. in Natural Resource Sciences with a specialization in Climate Assessment and Impacts. Under the direction of our Director Rezaul Mahmood, Kierstin is using modeling to study the impacts of irrigation on precipitation in Nebraska and surrounding areas. She holds a Bachelor's and a Master's degree in Meteorology from Iowa State University. And, Kierstin very much enjoys music! She has been playing the clarinet since she was in 5th grade, and she was in the Marching Band and Concert Band at ISU. Her love for music and meteorology came together in high school when she saw her first tornado while attending band camp! After earning her Meteorology degree, Kierstin learned that it was likely a landspout, which is a type of non-supercell tornado.

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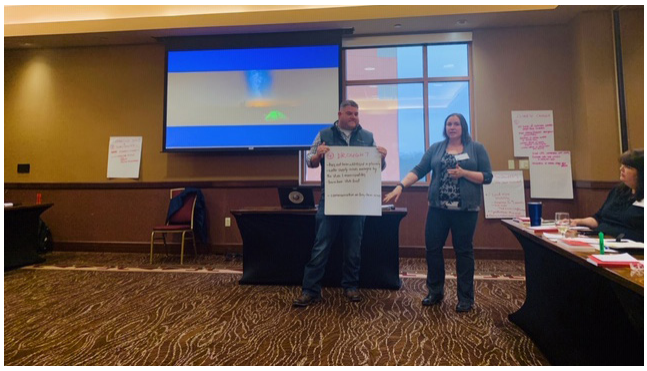
HPRCC Staff Invited to Present at Tribal Workshop in Oklahoma

Attendees gather at the Northeast Oklahoma Tribal Resilience Workshop in Quapaw, OK. (Photo by Nikki Cooley)

In February, Crystal attended and presented at the Northeast Oklahoma Tribal Resilience Workshop in Quapaw, OK. Hosted by the Institute for Tribal Environmental Professionals (ITEP) and the Quapaw Nation, the workshop aimed to provide tribal leaders, program coordinators, planners, and managers with the opportunity to develop skills for addressing extreme events in northeast Oklahoma. The following eight focus areas were highlighted during the workshop: climate change, drought, earthquakes, expansive soils and subsidence, flooding, severe weather, tornadoes, and wildfires. Tribal case studies, regional science, and Traditional/Indigenous Knowledges (TK/IKs) were presented and/or incorporated into the workshop, as well as large- and small-group discussions and activities. The information presented was intended for tribal emergency managers to use to develop their own FEMA-approved Hazard Mitigation Plans, using the Quapaw Nation's plan as an example.



Crystal presents on drought issues and emergency management operations after small-group discussion at the workshop. (Photo by Nikki Cooley)

Crystal was invited to present an introduction to drought and tools as they relate to northeast Oklahoma. She was also given the opportunity to present on behalf of Mark Junker, Tribal Response Coordinator for the Sac and Fox Nation of Missouri in Kansas and Nebraska, regarding the quarterly climate summaries that he puts together for the nine tribes in EPA Region 7 (Iowa, Kansas, Missouri, and Nebraska). In 2017, climate summary training was provided to the four tribes of northeastern Kansas/southeastern Nebraska by HPRCC staff that ultimately led to the development of this quarterly summary, which is a 100 percent tribally-led effort. While outside of the typical region that the HPRCC focuses on, Crystal was very excited to be invited to speak at this workshop intended for tribes in northeast Oklahoma. "The capacity-building projects that we work on with tribes can be applied anywhere," she said. "We are happy to engage with tribes outside the Missouri Basin region and share our experiences conducting climate workshops and putting together reservation-specific climate summaries."

HPRCC Staff Conduct Climate Summary Workshop for Tribes in the Region

As part of a Bureau of Indian Affairs-funded tribal resilience project, HPRCC staff developed and conducted the "Lower Missouri River Tribes Resilience Training Climate Summary Workshop" in mid-March for tribal environmental professionals from nine tribes in EPA Region 7: 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. The workshop was one in a series of workshops that are part of a larger project aiming to increase tribal resilience to climate change and extremes. While the workshop was supposed to take place on the Winnebago Reservation in Sloan, IA, the workshop ended up being conducted remotely via Zoom due to the COVID-19 pandemic.

The workshop began with a series of presentations that introduced participants to basic climate concepts, the climate of the region, including trends and projections, and the process for creating a climate summary. Much of the rest of the workshop was hands-on, as participants had the opportunity to explore tools and obtain data on general climate conditions, drought and vegetation, streamflow and snowpack, and climate outlooks. As a next step, HPRCC staff will be developing an online climate dashboard for the tribes, which was previewed during the workshop. This dashboard will allow users to obtain the most recent information on climate and water resources for their reservation. An example of a similar dashboard that HPRCC staff developed for the Eastern Shoshone and Northern Arapaho Tribes of the Wind River Indian Reservation in Wyoming can be found here: https://hprcc.unl.edu/windriver.php.

HPRCC Publishes 2019 Flooding Retrospective with Regional Partners


Extreme Wetness of 2019
Missouri River Basin
April 2020
The Platte River, between Columbus and Schuyler, Nebraska, in June 2019. Photo courtesy Jim Hoppe.
The Historic Year of 2019
Summary
In 2019, precipitation and flooding reached historic levels in the Missouri River Basin. Starting in March with the "bomb cyclone" event, portions of the Missouri River and its tributaries were above flood stage for the majority of the year. Impacts from the heavy precipitation and subsequent flooding were widespread. Communities were evacuated. Farmland was inundated. Critical infrastructure, such as roads, bridges, and levees, were damaged or destroyed. The mental toll from these events is ongoing. Ultimately, 16 major disasters were declared across the region due to the weather and climate events of 2019. Although the calculation of losses is not finalized, the total certainly will reach into the billions of dollars.
50+ record river crests
125+ precipitation records
300+ days in flood
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Extreme Wetness of 2019 | April 2020
https://hprcc.unl.edu/pdf/2019Extremes.pdf

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In this brief report, you can learn more about the record-setting precipitation and flooding events of 2019, along with select impacts. This report was produced in partnership with NOAA's National Centers for Environmental Information and the USDA's Midwest Climate Hub. Many partners across the region also contributed to the report by providing data, information, and/or a review of the materials. The report can be accessed at the following link: https://hprcc.unl.edu/pdf/2019Extremes.pdf.

HPRCC Director Attends Conference in Bangladesh

Rezaul was invited to give two presentations at the International Conference on Earth and Environmental Sciences & Technology for Sustainable Development, hosted by the University of Dhaka in Bangladesh in late January. Rezaul gave the keynote speech, which was focused on land use/land cover change and irrigation impacts on the planetary boundary layer atmosphere. In this presentation, he shared his research on the impacts of irrigation on growing season surface temperatures and atmospheric moisture content, as well as early results from his NSF-funded Great Plains Irrigation Experiment (GRAINEX) project. Rezaul's second presentation was about mesonets and mesoscale weather and climate observations in the United States. For this talk, he shared his experience in building a mesonet. He also discussed critical aspects of instrumentation, their exposure, data quality assurance, data transfer, and applications of data.

Rezaul gives a presentation at the conference at the University of Dhaka. (Photo by Tsegaye Tadesse)

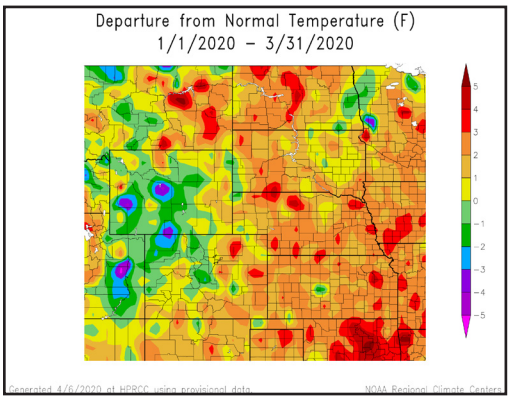
HPRCC Says Farewell to our Two Graduating Interns

Two of our interns, Emily Brown and Dalton Van Stratten, are graduating with their Bachelor's degrees in May. They are both moving on to bigger and better things – Emily starts a position as a Cartographic Technician for Garmin International in Olathe, KS in July, and Dalton begins graduate school in the Geosciences program at East Tennessee State University in the fall. We thank them for their service to HPRCC and wish them the best in their future endeavors!

From Emily: I spent my time at the HPRCC working with data services, outreach events, and GIS-related projects. Over the past three years, I worked on improving my technical writing skills and implementing concepts learned from my Meteorology and Geography courses. I'll also never forget all the fun conversations and pranks between coworkers that occurred while working there. Thanks HPRCC!

From Dalton: As an intern, my primary duties were to do tool testing and contribute to various projects. A few of these projects included testing the GIS Portal, testing the AWDN system, and researching how scientists in other fields are utilizing data from HPRCC. The most useful skill that I have acquired from my time at HPRCC is how to utilize GIS to design and publish a map to display scientific data. This skill has opened up many doors, including additional coursework and a graduate assistantship position with East Tennessee State University. I am incredibly thankful for everyone at HPRCC for sharing their knowledge and love of science with me each day!

Overview of Regional Climate Conditions



Mild Start to the Year

In contrast to last year, the first three months of this year were characterized by relatively mild temperatures and featured fewer bouts of intense cold. Temperatures for the January-March period were above normal for much of the High Plains, with departures of up to 4.0°F above normal. There were, however, some areas that had below-normal temperatures across portions of Wyoming and northwestern Colorado, which was largely due to well-below-normal temperatures that occurred in this area during the month of February. For instance, Riverton, WY tied for its 8th coldest February on record (period of record 1907-present).

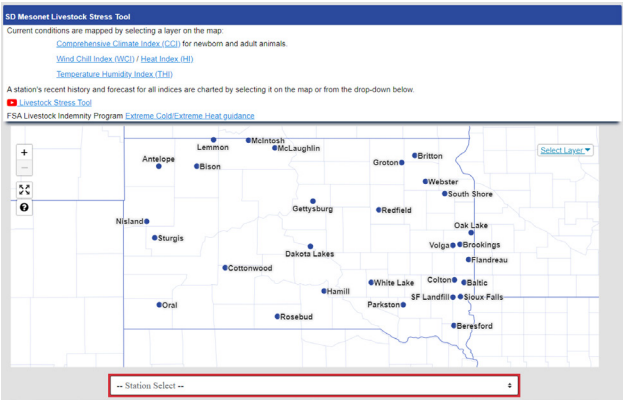
Several notable storm systems tracked across the region during the January-March period. In January, a storm system brought a mix of snow, sleet, and freezing rain to much of Kansas and Nebraska on the 17th-18th, creating travel difficulties on Interstates 70 and 80. This same system brought blizzard conditions to the Dakotas, causing many schools to close, as well as forcing the closure of portions of I-29, I-90, and I-94. Snowfall from this storm was in the range of 4.0-8.0 inches. In February, a storm system tracked across portions of Kansas and brought a very narrow band of impressive snowfall to the central part of the state on the 25th. Locations within this band of snow observed accumulations as high as 13.0 inches, while locations just a few miles outside of this snow band had little or no snow at all. In March, a large system tracked across portions of central Colorado on the 19th and brought heavy snowfall and strong winds. Denver recorded 6.0 inches from this storm. 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.

Did You Know?

You can download a shapefile with station locations using our Station Tool! Simply enter your location (either a specific town or even a whole state) and in a few clicks, your shapefile will be ready for your GIS program of choice. Even stations in Canada are included! Check it out: https://hprcc.unl.edu/stationtool.php

Product Highlight: Livestock Stress Tool

Weather conditions in the Northern Plains can present more than a few challenges for livestock producers. From below zero or blizzard conditions during winter or even spring, to heat waves in the summer months, farmers and ranchers need to be prepared for rapidly changing conditions to provide the best care for their livestock and minimize their risks of losses. SDSU Extension and the South Dakota Mesonet have teamed up to provide the Livestock Stress Tool: https://climate.sdstate.edu/tools/livestock/. This tool uses data collected from 29 Mesonet sites across South Dakota to provide different measures of livestock environmental stress: Wind Chill Index (WCI)/Heat Index (HI), Temperature Humidity Index (THI), and Comprehensive Climate Index (CCI).



To use the tool, a user first selects one of five different map layer options: CCI (Newborn), CCI (Adult), WCI/HI, or THI. Once selected, the current values will appear on the map. Those values will also be color coded to correspond with risk categories. Specific information about the risk categories can be found by clicking the descriptive links at the top of the page, but in general orange, red, or purple colors indicate greater risk while gray or yellow colors indicate conditions with little or no environmental stress. The Livestock Stress Tool also offers environmental stress forecasts for the next 48 to 72 hours for any station. To access the available forecasts, simply click on one of the Mesonet station names on the map or select from the dropdown menu below and then scroll down to view the charts showing recent history and forecast for that site. (*Adapted from "Livestock Stress Tool," Warren Rusche, SDSU Extension:* https://extension.sdstate.edu/sd-mesonet-livestock-stress-tool)