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Picturesque High Plains landscape near Murdo, SD (photo courtesy Crystal Stiles)

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Message From The Interim Director

By Ms. Natalie Umphlett

Hi, and welcome back to *The Prairie Post* newsletter! The winter and early spring is always busy with conferences, outreach events, and requests for data in advance of the growing season, and this year has been no exception. A true highlight of the past few months was participating in two workshops that brought together an array of folks at the local, state, and regional levels to discuss climate and agricultural tools. These two USDA Northern Plains Regional Climate Hub Climate and Agriculture Tools Workshops were held in Brookings, SD and Casper, WY. The Brookings workshop focused on row crops, such as corn and soybeans, while the Casper workshop focused on wheat and rangeland. The HPRCC was able to highlight many agricultural-related products they produce and some that are currently under development. My favorite outcome of the workshops was that many opportunities for future collaboration were identified. You can read more about these workshops on page 6.

In other Center news, a new staff member, Haylie Mikulak, joined the HPRCC this month to assist with general climate services and applied climate research projects. Haylie is a junior Meteorology/ Climatology major who is interested in pursuing a graduate degree in paleoclimate. You can read more about Haylie in the section below. In the area of research, HPRCC was a co-author on a paper led by hydrologist Dr. Tiejun Wang, from the University of Nebraska-Lincoln. The article appears in the *Journal of Hydrology* and is titled, "Feasibility analysis of using inverse modeling for estimating natural groundwater recharge from a large-scale soil moisture monitoring network." This work helps advance our knowledge of groundwater recharge, and the results of the study could have implications for water resources management. This highlights just one aspect of the expertise housed within the Center. We hope you enjoy reading about our recent activities here at *The Prairie Post*.



Meet Our Intern, Haylie Mikulak



Haylie is a junior majoring in Meteorology/Climatology and minoring in Mathematics and Physics at UNL. She is a very active student, as she is a member of the Students of Earth and Atmospheric Sciences, the Nebraska Storm Chase Team, Phi Sigma Pi, the UNL Swim Club, the UNL Curling Club, and the Scarlet Guard. Haylie began her intern duties for the HPRCC in April. She will be responding to client requests for climate data and information, writing weekly drought updates for the HPRCC's website and social media, and working on special projects.

A native of New Jersey, Haylie is accustomed to all types of weather, from blizzards to hurricanes. She grew up with a passion for winter weather. During her sophomore year, Haylie took a course titled Antarctic Geosciences and became very interested in polar climate. After graduating from UNL, Haylie hopes to pursue a graduate degree and study paleoclimate through ice cores from Antarctica.



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HPRCC Becomes A Weather-Ready Nation Ambassador

In early February, the HPRCC became an ambassador for the Weather-Ready Nation (WRN) program. This initiative is an effort by the National Oceanic and Atmospheric Administration (NOAA) to recognize NOAA partners for contributing to the nation's resilience to extreme weather and climate events. WRN Ambassadors are charged with promoting WRN messages to their stakeholders, collaborating with NOAA personnel on potential projects that support the initiative, communicating examples of successful preparedness and resiliency activities, and educating colleagues on workplace preparedness. In return, NOAA will provide various means of support for these efforts.



Natalie Umphlett, Regional Climatologist and Interim Director of the HPRCC, applied on behalf of the Center to become a Weather-Ready Nation Ambassador because the HPRCC believes it is important for people to be prepared for the weather and climate challenges we face now and will face in the coming years. "I thought this was a perfect opportunity to have formal recognition of current HPRCC efforts, many of which support the goals of Weather-Ready Nation," Umphlett said. The HPRCC houses many climate decision-support tools on its website that help people stay informed of the recent, current, and future climate conditions, including customizable data summaries, climate summary maps, monthly/quarterly outlooks and impacts reports, and webinars.

The WRN initiative began in 2011 as a result of the tornado outbreaks that impacted locations such as Joplin, Missouri and Birmingham, Alabama. The high number of fatalities prompted NOAA's National Weather Service, the agency that is responsible for issuing severe weather warnings to the public, to begin exploring how to improve the public's response to such warnings. The initiative has been successful thus far and several efforts by NOAA have emerged, such as providing wireless emergency alerts directly to cell phones and joining the National Drought Resilience Partnership to provide better public access to drought information. The WRN Ambassador initiative is open to academic, government, non-government, and private business organizations, as the program is intended to unify efforts and result in partnerships across sectors.

Umphlett said that collectively, this network of partnerships has the potential to reach millions of people – millions who may not be aware of the WRN program and the importance of preparedness. "The HPRCC will continue to support the goals of Weather-Ready Nation in order to build a society that is truly resilient in the face of extreme weather and climate events."

For more information on NOAA's Weather-Ready Nation initiative, please go to: <http://www.nws.noaa.gov/com/weatherreadynation/>. (This story was previously printed by *Inside SNR*, the online newsletter of the UNL School of Natural Resources.)

HPRCC's Work With Wind River Tribes Featured In NET Story



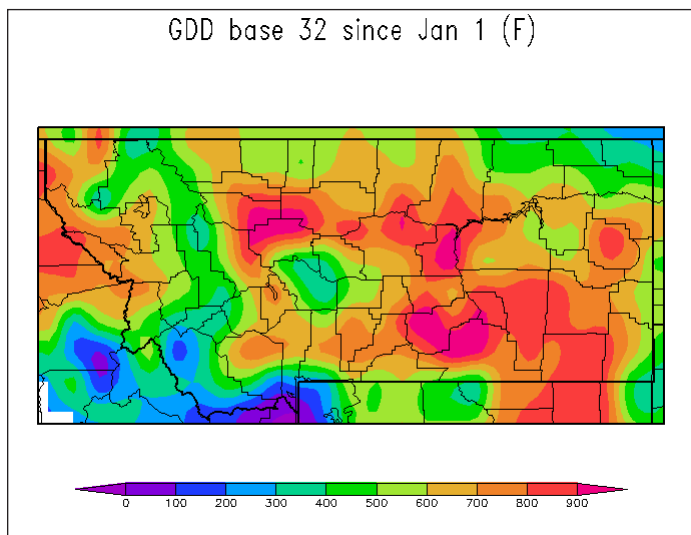
Ray Lake, Wind River Indian Reservation. (Photo courtesy Natalie Umphlett)

HPRCC staff and several partners have been working with the Northern Arapaho and Eastern Shoshone tribes of the Wind River Indian Reservation in Wyoming for nearly two years to address concerns about climate and drought in their region. One outcome of this collaboration was the development of a quarterly climate and drought summary that focuses on the Wind River reservation and surrounding area. The summary is being used as a decision support tool by water managers and irrigators.

The Wind River project was featured in a story by Nebraska Educational Telecommunications (NET) in February. The story discusses the importance of the climate and drought summary to natural resource managers at Wind River, as well as the climate training that tribal water technicians are receiving to eventually take ownership of the summary. The story also includes commentary from Wind River Tribal Water Engineer Mitch Cotennoir, HPRCC Applied Climatologist Dr. Crystal Stiles, and Nebraska State Climatologist Dr. Martha Shulski. To read or listen to the story, please go to: <http://netnebraska.org/article/news/1007845/nebraska-climate-centers-train-tribes-climate-data>.

tenoir, HPRCC Applied Climatologist Dr. Crystal Stiles, and Nebraska State Climatologist Dr. Martha Shulski. To read or listen to the story, please go to: <http://netnebraska.org/article/news/1007845/nebraska-climate-centers-train-tribes-climate-data>.

Product Highlight: Growing Degree Days Maps



The HPRCC is supporting efforts by Dr. Jessica Torrion and Dr. Robert Stougaard at the Northwestern Agricultural Research Center (NWARC) at Montana State University (MSU) by providing spatially interpolated Growing Degree Day (GDD) maps of Montana. GDDs are a measure of heat units based on maximum and minimum temperatures and are often used to predict the growth stages of plants. They can also be used to model plant pathogen appearance and the incidence of various insects and their corresponding biological control.

NWARC is using the GDD data provided by the HPRCC to monitor orange wheat blossom midge. Maps are generated on a daily basis with base temperatures of 32, 40, and 50 degrees Fahrenheit. The maps show the accumulated GDD for each of these bases since the first of January, February, March, and April. The image to the left is a map of GDDs with a base temperature of 32 degrees Fahrenheit and a start date of January 1 for the state of Montana. MSU and HPRCC will enhance this information in the future with the addition of text-based station-specific products. Base temperatures and starting dates will be flexible.

If you are interested in seeing more of these GDD maps from Montana, please contact Dr. Jessica Torrion: jessica.torrion@montana.edu.

Partnership Spotlight: National Weather Service



The Regional Climate Centers (RCCs) have a long history working with the National Weather Service (NWS) on the national level through the Climate Services Division, the regional level through the NWS regional headquarters, and the local level through individual field offices. This relationship has largely been data-centric, with the RCCs providing data to and through the NWS via tools like NOWData and xmACIS.

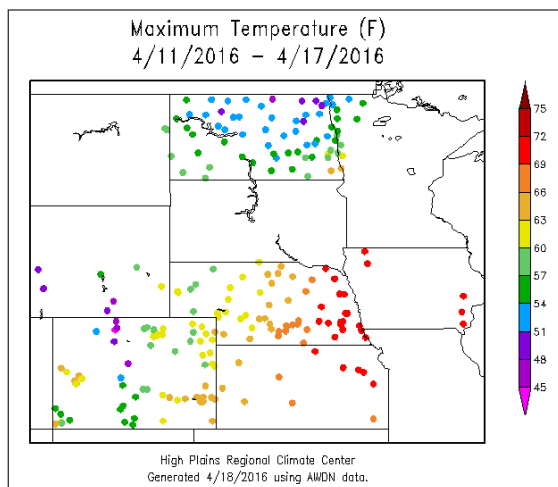
Of late, the HPRCC has been working with local and regional offices to build awareness of climate tools and find opportunities for collaboration. In partnership with the NOAA Central Region Collaboration Team, the HPRCC led a 2.5-day workshop for NWS Climate Focal Points in the NOAA Central Region in September of last year. Representatives from nine different offices stretching from Grand Junction, CO through LaCrosse, WI attended the workshop in order to learn about Regional Climate Services, gain hands-on experience with climate tools, learn about mesonets in the region, and discuss exploring opportunities for future collaborations. They even got to see an AWDN station in operation (see image at right). Outcomes of the meeting included a request for xmACIS tool enhancement, a need for supporting NWS participation at state fairs, assistance with developing presentation templates for climate engagement with a variety of sectors, and sharing information such as through NWSchat.

The workshop proved to be a huge success and the HPRCC, along with the NOAA Central Region Collaboration Team, will be hosting another workshop this fall. Planning is now underway for this workshop, which will have a focus on the upper Missouri River Basin states. More details to come, so stay tuned!



Participants of the NWS workshop take a trip to the pecan orchard on UNL's East Campus to see a weather station. (Photo courtesy Martha Shulski)

Learn More About The Automated Weather Data Network

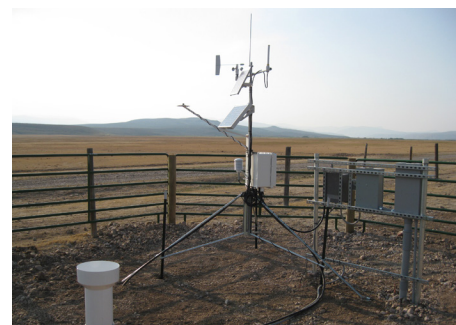


AWDN Product Highlight: Soil Temperature Data and Maps

Soil temperature is an important climate variable used in crop production, as well as home gardening. Soil temperature helps determine when seeds will germinate and is critical to determine when to start planting. All of the state mesonets in the High Plains region collect soil temperature at a depth of 10 centimeters, or 4 inches. Data and maps of the data for those states participating in the AWDN can be accessed on the HPRCC website here: <http://www.hprcc.unl.edu/maps.php?map=AWDNMaps>. Maps are available for the last day and for an average over the last week. Both contour and dot maps are available. The example to the left is a dot map of average maximum soil temperature during the one-week period of April 11-17 for reporting stations across the High Plains region. HPRCC also works with groups in the region to access and display the data on their own websites. An example of this collaboration is with the University of Nebraska Extension's CropWatch website: <http://cropwatch.unl.edu/cropwatchsoiltemperature>. CropWatch displays HPRCC one-day and seven-day maps of soil temperature for Nebraska, along with weekly station data.

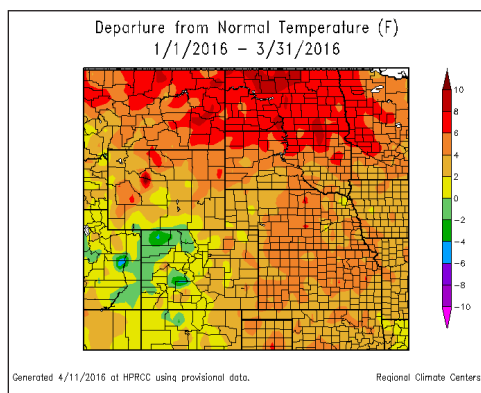
State Network Highlight: Wyoming Mesonet

The Wyoming mesonet is operated by the Wyoming State Engineer's Office. This mesonet consists of 10 sites that collect hourly and daily data and is one of the newer networks to join the AWDN, with the oldest currently operating stations having a start date in 2007. Geographically, stations range from Budd Ranch in western Wyoming near Grand Teton National Park to Lingle near the Nebraska-Wyoming border on the North Platte River. Three more Wyoming mesonet stations are projected to be added this year. The winter weather in the high country is winding down, allowing for updates and repairs to be done on the current stations. For a number of years, the HPRCC maintained the stations in Wyoming, however these services were transitioned to the Wyoming State Engineer's Office in 2015.



Budd Ranch, WY station. (Photo courtesy Glen Roebke)

Drought Expanded During A Very Warm Start To The New Year



The warmth experienced during the fall continued into the winter across most of the High Plains region. Temperatures ranged from approximately 2-8°F above normal during the January-March period, with some locations in North Dakota exceeding 10°F above normal. Except for Colorado, each state in the region ranked in the top 10 warmest January-March on record. The warmth caused an early onset to spring in many places, as trees and flowers were blooming much earlier than normal and farmers were getting out into their fields early to prepare them for spring planting. There were even reports of bears coming out of hibernation early in Yellowstone, WY. While some aspects of an early spring are welcome, there are concerns about the winter wheat crop in areas such as Kansas. Warm temperatures caused the wheat to break dormancy early, but several hard freezes following that warmth could have potentially damaged the crop.

In regards to precipitation, the Dakotas and Kansas were particularly dry January through March, which prompted the development and expansion of drought in these locations. In North Dakota, dry soils and low water levels in ponds were observed as a result of the warmth and dryness. Warm, dry, and windy conditions caused numerous wildfires to spread rapidly throughout parts of southwestern Kansas and southeastern Colorado, and in March, Kansas experienced one of its largest wildfires on record as nearly 400,000 acres were burned. While snowpack fared well in Colorado during the winter, it suffered in Wyoming, especially in the Bighorn Mountains where severe drought developed in February. Fortunately, a wet March helped improve the snowpack situation and alleviated drought conditions in that area.

Outreach And Stakeholder Engagement Activities

Nature Night at Pershing Elementary, Lincoln, NE

Crystal and Natalie participated in Nature Night at Pershing Elementary in January. They brought a manual rain gauge and an automated rain gauge to demonstrate how rainfall is collected. The kids had fun pouring water into the gauges to simulate rainfall and learning how to measure precipitation.

Doane College Class Visit, Lincoln, NE

In March, environmental science students from Doane College in Crete, NE made a visit to the HPRCC. The class, led by Dr. Russ Soucek, is learning about the science of climate change and how societies are developing solutions to dealing with the climate change challenges they face. HPRCC staff were able to share some of their expertise in providing data and engaging stakeholders on a wide variety of climate-related issues. This allowed the class to learn about concrete, real-world examples and provided a good basis for discussion.



Crystal shows students how to read a manual rain gauge during Nature Night at Pershing Elementary. (Photo courtesy Natalie Umphlett)



Natalie shows a parent a handout on how to make a homemade barometer. (Photo courtesy Crystal Stiles)

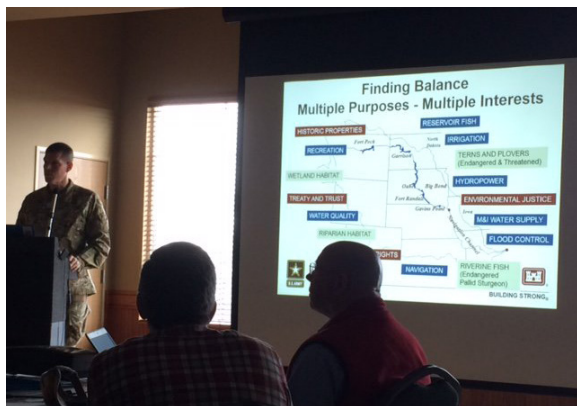
Weatherfest and Central Plains Severe Weather Symposium, Lincoln, NE

The Annual Family Weatherfest and Central Plains Severe Weather Symposium was held on UNL's campus in April. This event brought weather enthusiasts from all around the region, as there were several booths and activities for kids. Crystal and Natalie represented the HPRCC booth, which featured learning about rain gauges and answering weather and climate trivia. Other organizations represented included the National Weather Service; the Lincoln-Lancaster County Emergency Management; weathercasters from KOLN/KGIN and KLKN of Lincoln, NE and KSNB of Grand Island, NE; and the National Drought Mitigation Center. Spotter training was provided for the public, and participants got a special treat with a weather balloon launch in the morning. Weatherfest is now a host location for the Nebraska Science Festival (NE SCIFEST), which brings in a larger audience to the event. More information on this event can be found here: <http://snr.unl.edu/cpsws/>.

Great Plains Tribal Water Alliance Meeting, Fort Pierre, SD

Crystal attended and presented at the Great Plains Tribal Water Alliance (GPTWA) Meeting in April. The GPTWA currently consists of the Oglala Sioux Tribe, Standing Rock Sioux Tribe, Rosebud Sioux Tribe, and Flandreau Santee Sioux Tribe, but they are exploring the idea of expanding to include other tribes in South Dakota. The GPTWA is an independent organization that addresses technical and policy issues regarding tribal water resources and serves as an advisory committee to the Great Plains Tribal Chairman's Association. (For more information on the GPTWA, please visit their website: <http://www.gptribalwater.org/>.)

There were several presentations given during the meeting covering various tribal water resources issues from tribal members, federal agencies, and tribal colleges. Crystal presented on the HPRCC's tribal projects in the Missouri River Basin as part of a panel session titled, "Opportunities for Tribal Climate Resilience in the Northern Great Plains." One outcome of the meeting included interest from the GPTWA Board of Directors to pursue a grant opportunity through the Bureau of Indian Affairs that would address climate change adaptation planning on tribal lands, of which the HPRCC would be a partner and collaborator.



Col. John Henderson, U.S. Army Corps of Engineers Omaha District, explains the many competing uses for water in the Missouri Basin at the GPTWA meeting. (Photo courtesy Crystal Stiles)

Recent And Upcoming Travel And Activities



Stakeholders from the NIDIS meeting share ideas on drought. (Photo courtesy Kathy Bogan)

NIDIS Midwest DEWS Kickoff Meeting, St. Louis, MO (February 9-11)

Crystal attended the NIDIS Midwest Drought Early Warning System (DEWS) meeting in February to assist the National Drought Mitigation Center with kickoff activities. The meeting brought together stakeholders from across the Midwest and included speakers from sectors such as agriculture, water resources, navigation, natural resources management, energy, and public health. The major themes for each day of the meeting centered on laying the foundation for a Midwest DEWS; discussing current climate outlook and forecasting, drought impacts and vulnerabilities, and drought preparedness resource needs; and identifying drought early warning and preparedness priorities and actions. A report is being written on the outcomes of the kickoff meeting, which will inform the Midwest DEWS Strategic Plan.

USDA Northern Plains Regional Climate Hub Climate & Agriculture Tools Workshops, Brookings, SD and Casper, WY (March 2-3 and March 16-17)

March was a busy month for meetings, as Natalie, Bill, and Jamie traveled to Brookings, SD and Crystal traveled to Casper, WY for workshops focused on climate and agricultural tools. The workshops were held in conjunction with the USDA Northern Plains Regional Climate Hub "Building Blocks" workshops and were a team effort between the HPRCC, the AASC, NOAA, and the USDA. The goals of the workshops were to 1) build awareness and partnerships within the state and federal agricultural community, 2) discuss existing and future products and tools, and 3) discuss effectiveness of the current weather and climate early warning information system. The workshops allowed for fruitful discussion, and many opportunities for future collaborations via tool development and hands-on training were identified.



Jamie Lahowetz talks about AWDN at the Brookings USDA meeting. (Photo courtesy Natalie Umphlett)

Upcoming: National Weather Service Meeting, Silver Spring, MD (May)

In May, Natalie will be attending the first-ever national meeting of the National Weather Service's Climate Services Program. Over 200 National Weather Service staff will be attending the meeting, including Climate Focal Points and Regional Climate Services Program Managers, as well as staff from National Centers and National Weather Service Headquarters. Natalie will be attending as a partner, which includes representatives from other NOAA line offices, Regional Climate Centers, State Climatologists, and others.

Upcoming: Managing and Utilizing Precipitation Observations from Volunteer Networks, Estes Park, CO (May)

Bill plans to attend this conference on volunteer weather observer networks, the purpose of which is to offer a forum where attendees can discuss and strategize how to manage, educate, maintain, and improve volunteer weather observer networks used to collect valuable precipitation data in the U.S., its Territories, and Canada. This includes the National Weather Service Cooperative Observer Network and the Community Collaborative Rain, Hail and Snow (CoCoRaHS) Network, CoCoRaHS Canada, as well as other existing local, regional, and state/provincial volunteer networks. There is more information on the conference web site: <http://www.cocorahs.org/WERA-2016A/Home.html>.

Upcoming: Urban Sustainability Directors Network Heartland Region Annual Meeting, Lincoln, NE (June)

In June, Natalie will be attending the Heartland Regional Network Meeting, which is a meeting of the Heartland Sustainability Directors Network. This network is a sub-region of the Urban Sustainability Directors Network (<http://usdn.org/home.html>) whose goal is to build and strengthen connections to achieve effective outcomes and develop the next generation of sustainable communities. Natalie is excited to learn about some of the climate change mitigation and adaptation strategies that communities in this region have been implementing.

Upcoming: American Association of State Climatologists Annual Meeting, Sante Fe, NM (June)

Natalie, Bill, and Crystal are attending the AASC meeting this year in beautiful Sante Fe, New Mexico. The meeting brings together state climatologists, staff from Regional Climate Centers, and other climate partners to provide opportunities to discuss data and product needs across the nation and within regions. These discussions may also include potential collaboration on projects.