July 2015

The Prairie Post

Quarterly Newsletter of the High Plains Regional Climate Center

Inside this issue:

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South Cape May Meadows
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(photo courtesy
Crystal Stiles)

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Message from the Director

By Dr. Martha Shulski

The past few months have been busy as usual at the HPRCC with data requests, educational outreach events, engagement with stakeholders, and conducting research, but probably the highlight for our Center this quarter was the opportunity to visit with a top White House official. Dr. John Holdren, who serves as the Chair of the White House Office of Science and Technology Policy, visited the UNL campus in May and the HPRCC was fortunate enough to spend the afternoon with him and a few of his staff. The discussion centered on climate monitoring and assessments and putting climate into action. Read more about this visit on Page 2.

A new member has joined the HPRCC staff, Dr. Eric Hunt, who was brought on board to produce weekly soil moisture assessments during the growing season. This is to supplement our popular soil moisture products in which sensors observe soil water content at four depths in the soil profile at locations across Nebraska. Eric works for HPRCC part time and comes to us from the company AER (Atmospheric and Environmental Research) with a regional office at Offutt Air Force Base near Omaha, NE. He will be with the Center through next spring and you can read more about his work on Page 4.

In the area of research, HPRCC was co-author on a publication written by the Useful to Usable (U2U, AgClimate4U.org) project team, led by Purdue University. The article will appear in the journal Agricultural Systems and is titled "Using a team survey to improve team communication for enhanced delivery of agro-climate decision support tools" (http://www.sciencedirect.com/science/article/pii/S0308521X15000621). The idea of team communication is a very important one for the U2U project – there are 42 scientists involved in the project across nine institutions. This project is a great example of researchers of various disciplines coming together for the common goal of delivering climate information to the user. We hope you enjoy your stop at *The Prairie Post*!

Meet our Senior Developer, Bill Sorensen

Bill joined the HPRCC in 1995 as a Senior Applications/Systems Programmer. He received his Bachelor of Science degree from UNL where he double majored in Mathematics and Computer Science and minored in Philosophy and Physics. He is responsible for the development and maintenance of software for acquiring, managing, and distributing climate data. He is also involved in the development of climate applications and is the HPRCC's representative on the software development team for the Applied Climate Information System (ACIS) project. Bill is the man behind HPRCC's most popular product, the ACIS Climate Summary Maps. In his free time he enjoys traveling, gardening, fine wines, and good beer. When not at work, you may find Bill riding roller coasters at Disney World, enjoying green chiles in New Mexico, or trying to avoid the extreme weather he often encounters while traveling. Each year, he makes a fabulous salsa from vegetables he grows in his garden and is often seen sharing his bounty with coworkers.

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HPRCC Staff Visit with White House Top Science Advisor

Dr. John Holdren, Director of the White House Office of Science and Technology Policy (OSTP) and President Obama's top science advisor, visited UNL in May to talk with scientists and students about actionable climate science. This visit occurred in conjunction with the one-year anniversary of the release of the third National Climate Assessment report. Dr. Holdren was particularly interested in visiting UNL because of the initiative taken by University leadership, faculty, and staff to put together a report on the implications of climate change for Nebraska (the full report can be found here: http://snr.unl.edu/download/research/projects/climateimpacts/2014ClimateChange.pdf).

Dr. Holdren visits the AWDN weather instrument calibration facility. (Photo courtesy Jill Kruger Brown)

During the visit, Dr. Holdren and two of his staff met with staff members from HPRCC and the National Drought Mitigation Center for an informal discussion on current work and projects of the two centers. Dr. Holdren also provided an update regarding the political environment where climate and climate change are concerned. HPRCC staff took Dr. Holdren and his staff to our Automated Weather Data Network (AWDN) weather instrument calibration facility, and then to an actual weather station that is located on campus. We look forward to future discussions and collaborations with Dr. Holdren and his staff at OSTP.

Dr. Martha Shulski, HPRCC Director, shows Dr. Holdren a weather station. (Photo courtesy Natalie Umphlett)

OSTP is promoting President Obama's Climate Action Plan, which includes the U.S. Climate Resilience Toolkit, a collection of tools and resources designed for decision-makers to use to learn more about climate-related hazards and how to prepare for them. For more information on the background behind Dr. Holdren's visit to UNL, please see the following article published by OSTP staff: https://www.whitehouse.gov/blog/2015/05/06/connecting-america-s-communities-actionable-climate-science.

Office of Science and Technology Policy

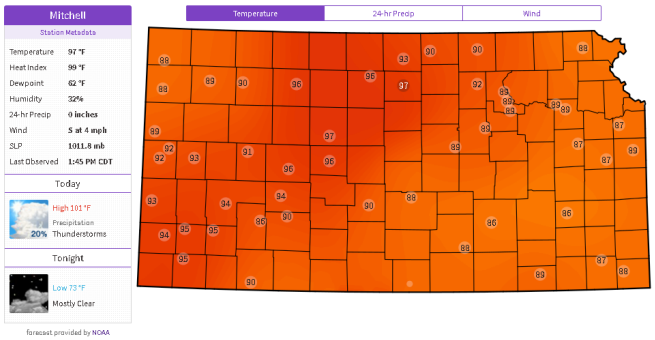
Partnership Spotlight: USDA Northern Plains Climate Hub

The HPRCC is actively engaged with the newly formed U.S. Department of Agriculture (USDA) Northern Plains Climate Hub, based in Ft. Collins, Colorado (http://climatehubs.oce.usda.gov/northernplains). The USDA Climate Hubs were established in early 2014 to "deliver science-based knowledge, practical information, and program support" to various stakeholders "to support decision-making in light of the increased risks and vulnerabilities associated with a changing climate." The Northern Plains Hub covers the states of Montana, Wyoming, Colorado, North Dakota, South Dakota, and Nebraska (see map at right), which overlaps with the HPRCC six-state area of focus. The HPRCC is identified by the Hub as a Key Collaborator and non-federal partner and we have assisted the Climate Hub with various data needs in the region, as requested by scientists. HPRCC staff are using our knowledge of regional stakeholders and their needs to help inform regional meetings the Climate Hub is organizing for early 2016. Furthermore, HPRCC Director Martha Shulski serves as one of the two University of Nebraska-Lincoln Extension points of contact for the Northern Plains Hub and engages with various meetings and activities between the two institutions. Although our partnership is young, we look forward to working with USDA on regional climate projects of mutual interest in the years to come.

Learn More About the Automated Weather Data Network

AWDN Product Highlight: Automated Delivery of Climate Data through the Classic Online Autopilot Feature

The HPRCC has provided a method for delivery of climate data and climate based reports through an automated delivery process since 1997. The Autopilot feature is provided in the HPRCC's Classic Online data system and allows daily, weekly, and monthly delivery of climate reports accessible within the Classic Online service at the HPRCC website. Reports can be sent through email to a provided email address or FTP'ed to a client's own FTP server. The Autopilot can be set up by a client using their Classic Online account login. Delivery is customized by the client using the Independent Delivery menu option. The autopilot feature is one of the most popular HPRCC products and provides climate data, summaries, and agricultural reports such as Crop Water Use to many of our clients on a regular basis. If you are interested in the Autopilot feature and would like to set up an account, please contact us here: http://www.hprcc.unl.edu/contact.php.



The Kansas Mesonet

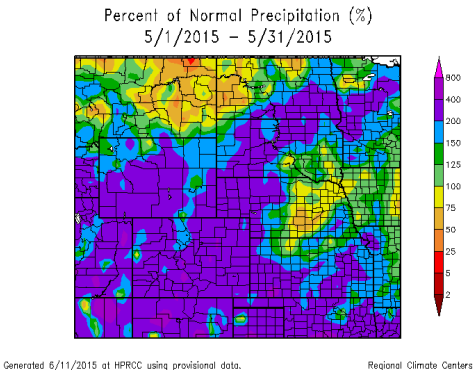
The Kansas Mesonet started in 1986, with stations that were located at Kansas State Research and Extension facilities throughout the state. The network, managed and maintained by the Kansas Office of the State Climatologist, has grown over the years and now includes approximately 50 stations. Data available from the Kansas mesonet sites include air temperature, relative humidity, wind, solar radiation, and soil temperature. Derived data are available as well, including growing degree days for both corn and sorghum, cooling degree days, heating degree days, evapotranspiration, heat index, and wind chill. Real-time and archived data are available at http://mesonet.k-state.edu/.

Sometimes it's Hard being a Weather Station

Rain or shine, weather stations are outside enduring the elements all day and night. Most days are uneventful, but sometimes nature has other plans and our stations get up close and personal with severe weather. Last year during the Mother's Day storm, the Nebraska Mesonet station near Goehner had a close call with the Beaver Crossing tornado. Right near the station, trees were uprooted and center pivots were overturned. Luckily, the station did not sustain any damage and continued to record data through the duration of the event. A 5-second wind gust of 119 mph was recorded! Our stations also contend with hail storms, and as you can see in the picture to the right, sometimes the hail wins. This station near Mead, NE got blasted by hail back in the fall of 2010. Although our weather stations contend with the elements on a daily basis, sometimes it's the living creatures that give our stations trouble. Rain gauges are an easy target for birds who want to build nests or cows who think the gauges are salt licks! Wires that connect the soil temperature and moisture probes are also an easy target for rodents looking for a snack. Luckily, our technician Glen Roebke is at the ready and can quickly fix any problem that arises.

Large hail damaged this rain gauge from a weather station near Mead, NE in fall 2010. (Photo courtesy Todd Schimelfenig)

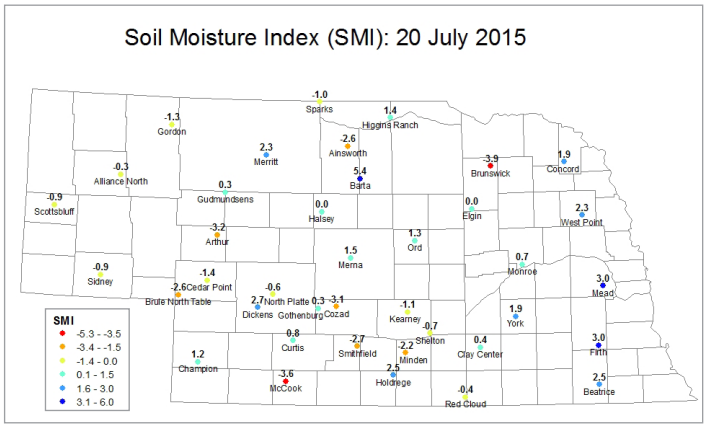
Heavy Rains Bring Both Drought Relief and Flooding to the High Plains Region



After a warm and dry start to the year, the High Plains region experienced an extreme shift from dry to wet conditions this spring. This contrast was best illustrated by South Dakota, which went from driest start to any year (Jan-Apr) to 5th wettest May on record. The wet weather was extensive with the majority of the region receiving over 200% of normal precipitation that month (see map at left). This caused flooding in both urban and rural areas and many locations across the region had their wettest May on record (e.g. Lincoln, NE and Fargo, ND). Additionally, Colorado Springs, CO had its wettest month ever in May. The extreme wet weather was not confined to the High Plains region as both Texas and Oklahoma had their wettest month as well. The heavy precipitation continued into the first half of June and eliminated nearly all of the drought conditions in the region, with only a few pockets of dryness and moderate drought remaining. Outlooks indicate that the wet weather may continue into the fall across Colorado, Kansas, Nebraska, and Wyoming. If you want more information like this for the High Plains Region, be sure to check out the full reports here: http://www.hprcc.unl.edu/publications/. You can also find similar information in the 2-page Missouri River Basin Quarterly Climate Impacts and Outlook that we help produce. See the latest report here: http://www.drought.gov/drought/content/resources/reports.

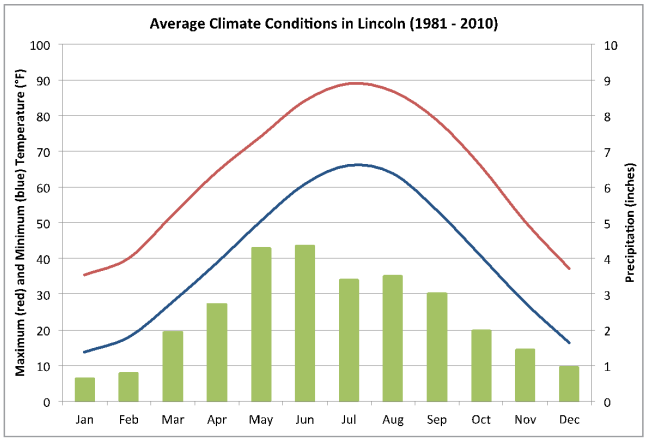
Product Highlight: Weekly Soil Moisture Updates for Nebraska

Dr. Eric Hunt, a consultant for the HPRCC, is now providing weekly soil moisture updates for Nebraska on the HPRCC's website. Soil moisture sensors are installed at depths of 10 cm, 25 cm, 50 cm, and 100 cm under grass cover at over forty AWDN stations in Nebraska. Since soil moisture is a critical parameter for healthy vegetation, soil moisture data can be used to determine where soil moisture is deficient and where additional precipitation may cause flash flooding. Unfortunately, the most standard output variable – volumetric water content (θ) – requires some a priori knowledge of the physical structure of the soils at the locations in order to properly interpret whether the water content is representative of moist or dry conditions. This spatial interpretation issue was made easier with the development of a Soil Moisture Index (SMI).



The SMI is based on the estimated field capacity and wilting point values over the top 3 depths (10 cm, 25 cm, 50 cm) at a site. The SMI ranges from -5 at wilting point (or 0% of plant available water) to a +5 at field capacity (or 100% of plant available water), though lower values can be obtained during a severe drought and higher values are not uncommon after excessive rainfall. The good news is the SMI is available in map form (see map above) in a statewide soil moisture report that is posted on the HPRCC's website every Monday afternoon. The report includes an estimated map of surplus/deficit of available water at every site, total precipitation from the previous 7 days, and the Weather Prediction Center's (WPC) projected precipitation for the next 7 days. Every report also contains an average SMI by the USDA National Agricultural Statistics Service (NASS) Crop Reporting Districts such that there is a direct comparison with the moisture products that are available every week in the U.S. Weekly Weather and Crop Bulletin. The surplus or deficit is based on the 50% of available water over the top 50 cm at each site. As an example, if the total available water over the top 50 cm at a site is 3.0 inches and the available water at 50% is 2.0 inches, there would be a 1.0-inch surplus reported on the map. Conversely, if the total available water were only an inch, there would be a -1.0 inch deficit reported on the map. Questions about the SMI or the weekly reports can be directed to Eric Hunt at ehunt2@unl.edu.

Research Highlight: Heartland Sustainability Director's Network



Since early 2014, the HPRCC has been involved in a regional project concerning municipalities and climate adaptation planning. Martha Shulski and Natalie Umphlett have worked with a group of planners and managers from the Heartland Sustainability Director's Network, as well as climatologists around the region, to understand climate information needs for municipality departments. The Heartland Network represents a regional affiliation (one of eight in the U.S.) of the Urban Sustainability Director's Network, which is an organization fostering connections and engagement among small and large cities working toward sustainable communities (http://usdn.org/public/about-us.html). Martha and Natalie have engaged with the City of Lincoln and Mayor Chris Beutler's Senior Policy Aide for Sustainability, Milo Mumgaard, J.D. to pinpoint local historical climate variability and trends. Other climatologists on the project in respective states are working with municipality staff in Columbia, MO, Iowa City, IA, Lawrence, KS, and Oklahoma City, OK, and the project is being led by researchers at Iowa State University. Through discussions among the climatologists and city staff, it was found that these locations have specific concerns with extreme heat and cold trends regarding health impacts, heavy precipitation event frequency for runoff and water management impacts, cooling degree day requirements and energy impacts, and general seasonal temperature and precipitation changes. Concerns were also expressed from the municipalities for future changes in climate in terms of planning for the various municipality departments. Historical and future trends in specific climate metrics have been analyzed across the region and presented to the cities in a standardized template. This project has the great potential for growth with engagement across the High Plains Region.

Would you like the opportunity to provide feedback on HPRCC's various products and services? We are always looking for ways to increase customer satisfaction, so we have developed a survey for this purpose. It is open to anyone 19 years of age and older. Click here for the survey link and for more information: http://www.hprcc.unl.edu/articles/index.php?id=610.

Spring Outreach Events and Stakeholder Engagement Activities

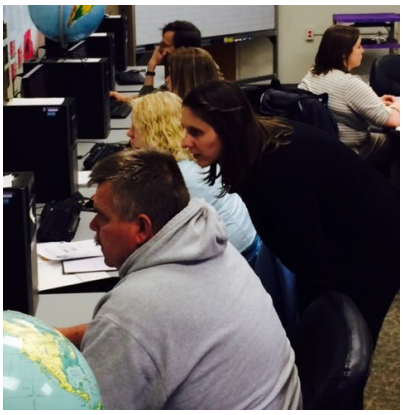
Earth Day Celebration, Winnebago, NE

Natalie and Crystal took the mobile weather station to Winnebago Public School, located on the Winnebago Reservation in northeast Nebraska, to participate in a celebration of Earth Day in April. Students learned about weather instrumentation and how to interpret radar and satellite images.

Students look inside a tipping bucket rain gauge to learn how the instrument records precipitation during the Earth Day Celebration at Winnebago Public School. (Photo courtesy Natalie Umphlett)

Tribal Meeting at Haskell Indian Nations University, Lawrence, KS

Tribes from the Northeast Kansas region met with HPRCC staff and Geography faculty at Haskell Indian Nations University, located in Lawrence, KS, to discuss how the university could help the tribes put together a climate summary for the Northeast Kansas tribal lands. Tribes represented at the meeting included the Kickapoo Tribe in Kansas, Sac and Fox Nation of Missouri in Kansas and Nebraska, and the Iowa Tribe of Kansas and Nebraska. Although not in attendance, Prairie Band Potawatomi Nation is also involved in this endeavor. HPRCC staff are working on a draft climate summary to share with the university and the tribes to determine the best content and design for the summary, which is similar to the one that the HPRCC has helped develop for the Wind River tribes. Bethany Perry from the NOAA Central Region also attended the meeting.



Natalie helps participants of the meeting at Haskell Indian Nations University as they learn how to obtain climate data for their region. (Photo courtesy Martha Shulski)

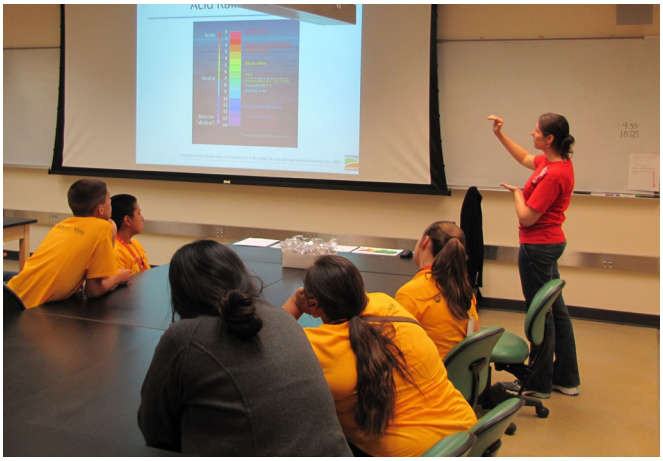
Sunday with a Scientist, Lincoln, NE

One Sunday a month, the University of Nebraska State Museum hosts an educational program for families that highlights the work of scientists, with topics relating to science and natural history. In May the topic was soil, and the HPRCC was invited to participate. Martha and Crystal brought the mobile weather station to the event and demonstrated the important link between soils and climate, which included showing the soil temperature probe on the weather station and talking about the importance of monitoring soil moisture.

SEPA Summer Camp, Lincoln, NE

Several HPRCC staff participated in the Science Education Partnership Award (SEPA) Summer Camp, which was organized by the University of Nebraska Medical Center. Approximately 50-60 Native American students attended this chemistry-themed camp. The HPRCC put together four activities for the students: a climate activity using M&Ms, a visit to an outdoor weather station, an acid rain activity, and a land use/land cover activity. Students had a great time learning about the link between chemistry and weather/climate – a student wrote this on the board: "Science is cool!"

Martha talks to a person attending Sunday with a Scientist about our display. (Photo courtesy Crystal Stiles)



Natalie explains the pH scale to SEPA Summer Camp participants. (Photo courtesy Judson Buescher)

Recent and Upcoming Travel and Activities

Useful to Usable (U2U) Annual Meeting, Davenport, IA (May 18-20)
Martha attended the fifth and final annual meeting of the Useful to Usable project, a five-year USDA funded project geared toward the transformation of climate data and information for cereal crop production (AgClimate4U.org). Several decision support informational tools have been developed through the course of the project and the HPRCC (along with the Midwestern Regional Climate Center) are eager to serve as the long-term host of these tools.

Discussion during the volunteer network conference that was held in Estes Park, Colorado in May. (Photo courtesy Jim Williams, Nebraska Department of Natural Resources)

Annual Conference on Managing and Utilizing Precipitation from Volunteer Networks, Estes Park, CO (May 18-20)
Bill Sorensen attended this conference where about 30 attendees from the climate community throughout the United States and Canada met to discuss climate data measurements, management of volunteer community observers, and education about climate using the data. Topics included rain and snow measurements, drought, water management and resources, and education and outreach using community weather network data. Continuous wet snow accompanied the conference, highlighting the subject being discussed.

American Association of State Climatologists (AASC) Annual Meeting, Cape May, NJ (June 23-26)
Martha, Natalie, and Crystal attended the AASC meeting this year, held in the beautiful resort/coastal town of Cape May, NJ. We had the opportunity to have lunch with state climatologists from the High Plains region to talk about regional issues. Crystal gave a presentation on the HPRCC's tribal engagement in the Missouri River Basin.

Upcoming: Wind River Region Climate Summary Development Workshop, Lincoln, NE (July)
The HPRCC and NDMC are hosting three people from the Tribal Water Engineer's office of the Wind River Indian Reservation in July to train them on how to put together a climate summary for their region. This is part of the ongoing Wind River project that is a collaboration between the HPRCC, the NDMC, the National Integrated Drought Information System (NIDIS), and the North Central Climate Science Center.

Upcoming: Husker Harvest Days, Grand Island, NE (September 15-17)
This September HPRCC staff, along with the Nebraska State Climatologist, will be hosting a booth at Husker Harvest Days, the "World's Largest Totally Irrigated Working Farm Show." Held in Grand Island, Nebraska, the show attracts upwards of 100,000 people each year. HPRCC staff will be showcasing the Center's most popular climate products as well as talking to attendees about the use of seasonal forecasts in agricultural decisions.

Crystal (left) and Natalie (right) pose in front of the picturesque Cape May boat on the beach during the AASC annual meeting. (Photo courtesy Ramesh Laungani)

Upcoming: National Weather Service Climate Focal Point Workshop, Lincoln, NE (September 22-24)
Also in September, HPRCC staff will be hosting a workshop for National Weather Service employees who are interested in learning more about Regional Climate Services. The two and a half day workshop will cover all the basics of the three tiers of climate services (state, regional, and national) and offer opportunities to learn more about HPRCC's data, products, and services.

Upcoming: NaturePalooza, Lincoln, NE (September 29)
Natalie and Crystal will be bringing the mobile weather station to NaturePalooza, an outreach event for families that is held every year in the fall on UNL's East Campus. This will be the 4th NaturePalooza event.