

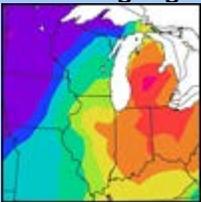


THE CLIMATE OBSERVER

A publication of the *Midwestern Regional Climate Center*

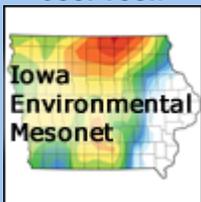
May 10, 2013

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Minnesota's Lost Spring — Snow and Cold in April 2013

Greg Spoden, Minnesota State Climatologist



Target Field, home of the Minnesota Twins, was covered in snow on April 11, 2013.

(Photo credit: Eric Miller/Reuters, New York Times)

Spring, where art thou? After four months of winter, Minnesotans eagerly awaited April rain showers, melting lake ice, and budding landscapes. Instead, Mother Nature delivered April snow and cold that snarled roads, delayed agricultural field work, canceled outdoor events, and postponed natural signs of spring by many weeks. The weather of April 2013 was noteworthy in many ways. However, coming just one year after an extraordinarily

early spring in 2012, the harshness of April's winter-like elements was even further exaggerated.

Minnesota's climate trophy case will be filled with records from April 2013. Ten winter storm warnings and numerous winter weather advisories were issued for Minnesota counties by the National Weather Service during the course of the month. Frequent, and often heavy, storms piled up snowfall totals to record or near-record levels at many locations. Historical average monthly snowfall totals range from two inches in southern Minnesota to six inches in northern counties. In many Minnesota communities, April 2013 monthly snowfall totals exceeded 12 inches. Numerous locales reported monthly snowfall totals in excess of 24 inches.

The focal point for the heaviest of the April snowstorms was northeast Minnesota, particularly Duluth, where April snowfall reached historic levels. The monthly snowfall total at Duluth's International Airport was an astounding 50.8 inches. Not only did this top the previous April record by nearly 20 inches, it was Duluth's snowiest month ever for any month of the year.

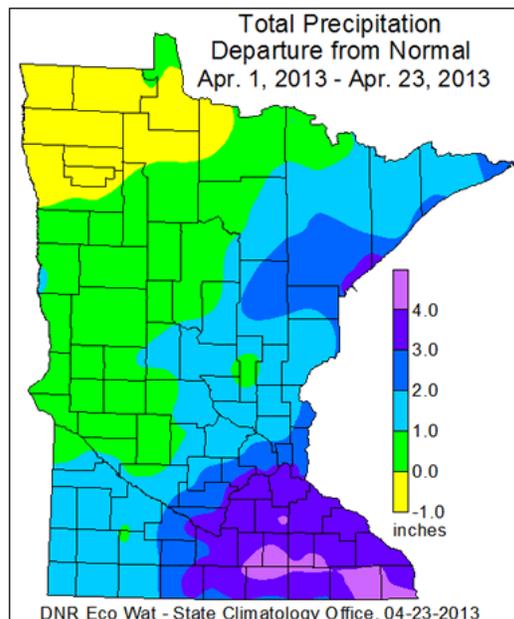
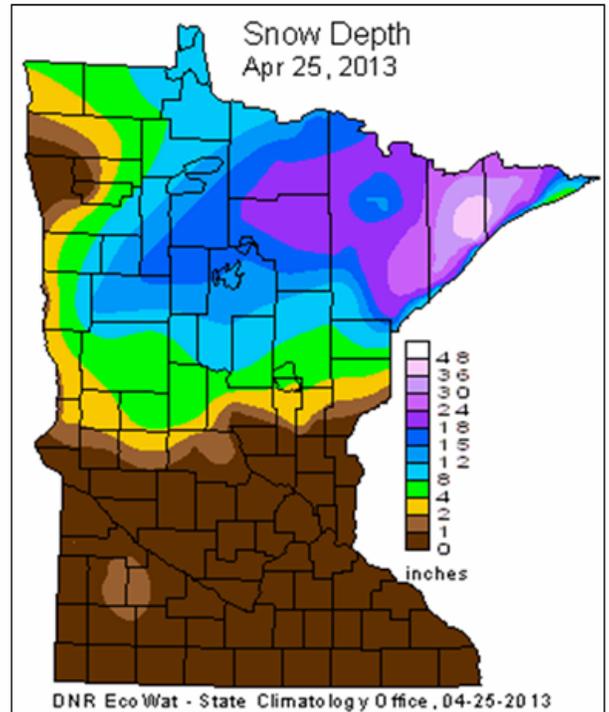
On the Road:

- IN** - Dynamics of Climate Conference
- IA** - U2U Team Meeting
- OH** - Coastal Climate Adaptation and Resilience Workshop
- IL** - Great Lakes Field Experiences for Watershed Educators Workshop
- Amman, Jordan** - Climate Data Rescue Program
- CO** - WERA1012 Technical Committee Meeting
- MO** - AASC Annual Meeting

In addition to a large number of snow events, ice also created havoc with transportation and infrastructure. An ice storm on April 9th led to widespread power outages in southwest Minnesota. Transmission lines feeding power to the city of Worthington were downed and the city declared a state of emergency.

Well into the final week of April, the northern one-third of Minnesota retained more than a foot of snow on the landscape. Snow cover in some sections of north central and northeast Minnesota was in excess of two feet.

While some snow cover is not unusual along the Lake Superior highlands of northeast Minnesota in late April, deep snow elsewhere in Minnesota is nearly without precedent in the historical record for this late into spring. The delayed melt in northwest Minnesota led to the latest snowmelt flood crest since 1887 along the Red River of the North.



In tandem with April's snowfall was the preponderance of seasonally cold temperatures. Monthly average temperatures at nearly all locations were six to ten degrees below historical averages. Numerous all-time minimum temperature records were set on April 20th, including a reading of minus 14 degrees at Embarrass in northeast Minnesota. This was the coldest temperature ever recorded in Minnesota on April 20th as well as the state's coldest temperature ever observed in the second half of April. The Twin Cities reached 60 degrees for the first time on April 26th, the second latest date ever for reaching that

spring milestone.

The heavy April snows and cold temperatures led to a prolonged snow cover season and delayed lake ice-out (thawing of ice). Minnesota's lakes are typically ice-free by early April in southern counties and by early May along the Canadian border. By late April,

only lakes in the southern one-third of Minnesota had completely lost their ice. Northern Minnesota lake ice was still solidly in place at month's-end and the prospect of ice-covered lakes for Minnesota's venerated fishing opener on May 11th is still an open question.

The unsettled April weather was not without its benefits. Entering April, two-thirds of Minnesota was in *Severe* or *Extreme* drought - the lingering impact of an exceptionally dry 2012 summer and autumn. However, due to recharge resulting from April's heavy precipitation totals, Minnesota ended April with less than 20 percent of its land area in the *Severe* or *Extreme* drought categories.

For more information on this article or the [Minnesota Climatology Working Group](#), please contact Greg Spoden via email at gspoden@umn.edu.

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April 17-18, 2013: Record Rainfall Across Central Midwest

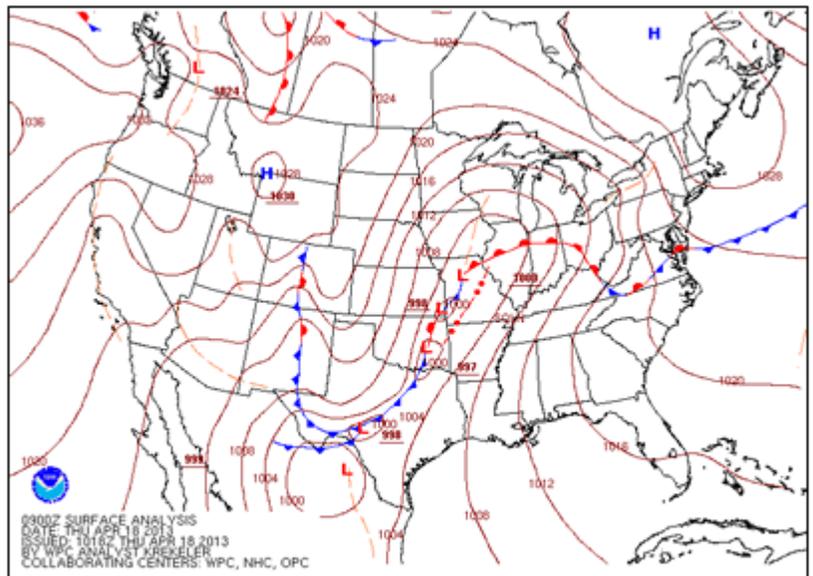
Molly Woloszyn, MRCC Extension Climatologist

A slow-moving storm system produced abundant rainfall across the central Midwest on April 17th and 18th, resulting in several stream gauges at flood stage and damaging flash flooding across the affected area. The atmosphere had all of the [right ingredients](#)

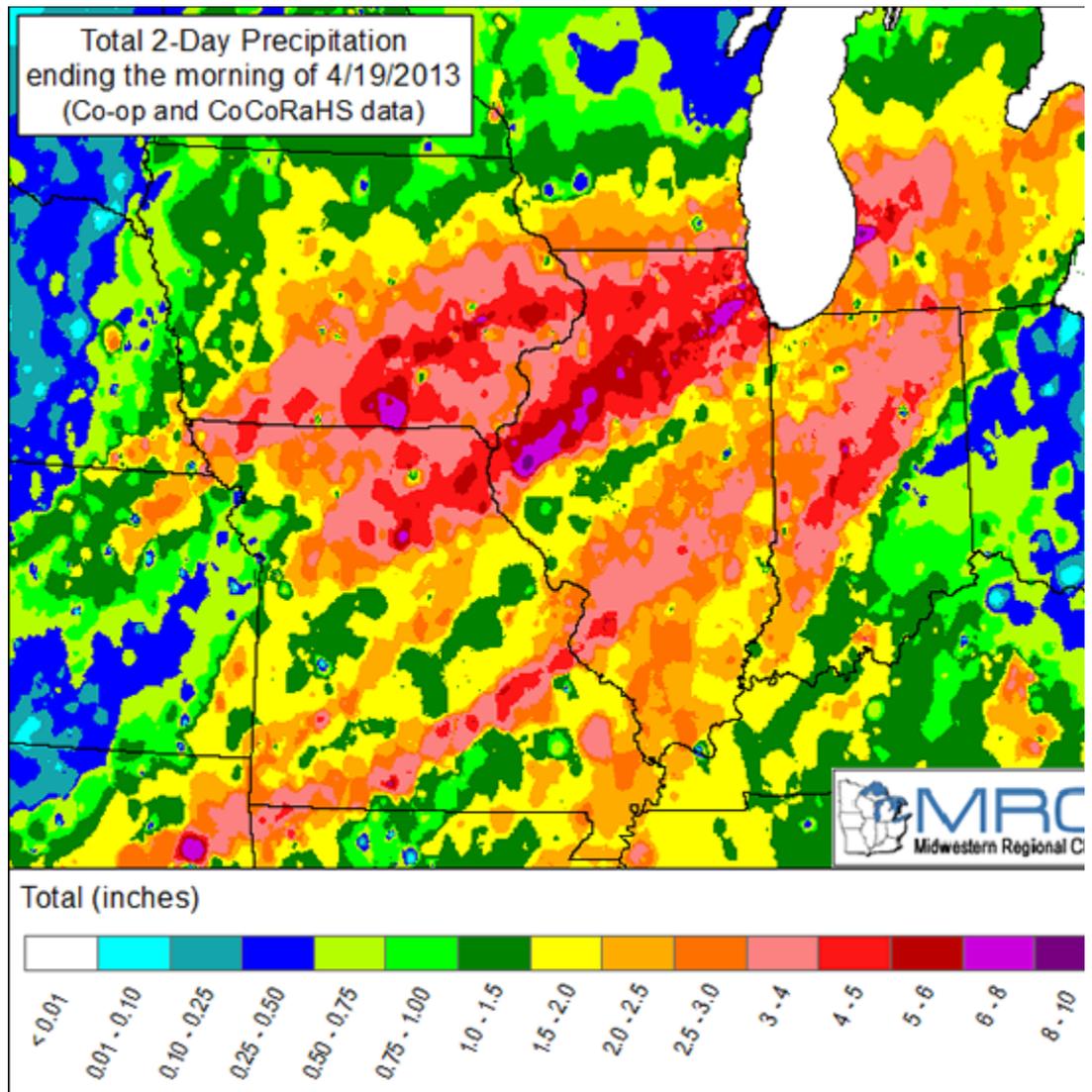
for heavy precipitation in the central Midwest

– moisture content, replenishment of moist air via the low-level jet from the Gulf of Mexico, a strong low-pressure system with a stationary front, and high rainfall rates.

The rainfall started in the western portions of the region on April 17th, bringing 4 to 8 inches of precipitation to portions of northern Missouri, southeastern Iowa, and northern Illinois. As the system progressed to the east on the 18th, several more inches of precipitation fell across southern Illinois, central Indiana, and central Michigan. Event rainfall totals topped out at 8 to 10 inches in areas of western Illinois and western Michigan.

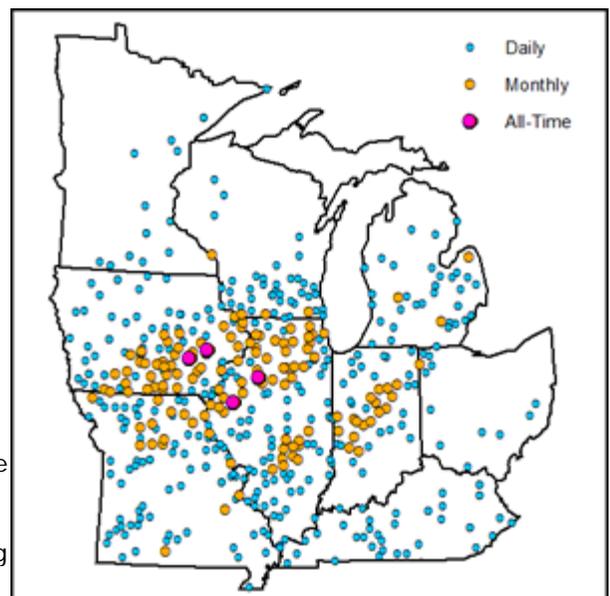


Surface map analysis of April 18, 2013. Source: NOAA.



A cooperative network station in Augusta, Illinois recorded 8.5 inches over the storm event, with a maximum 24-hour total of 7.96 inches reported on April 18th. These rainfall totals are near the 100-year storm for this location for the 24-hour and 48-hour storm, meaning that there is only a 1% chance of that amount occurring in 24- and 48- hours any given year, or an average of once in every 100 years.

Other stations across the Midwest approached significant storm events, anywhere from the 25-year storm to the 100-year storm. Chicago, Illinois had an official total of 5.48 inches, classifying this event as a 25-year, 24-hour storm. Over the last few years, Chicago

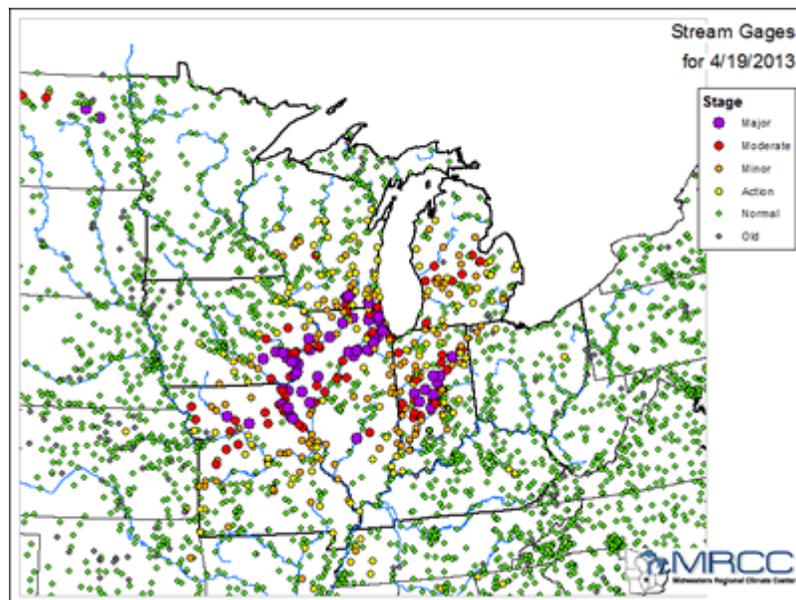


Stations that set daily (blue), monthly (orange), and all-time (pink) precipitation records during the April 17th-18th event.

has experienced recurring storms of significance. Less than two years ago, Chicago O'Hare received 8.11 inches on July 22-23, 2011. In addition, back on September 13, 2008, Chicago received 6.64 inches. The all-time 24-hour record of 9.35 inches was set on August 13-14, 1987.

Rainfall totals associated with the April 2013 event were record-breaking across the Midwest. There were over 500 [daily precipitation records](#) associated with this rainfall event. Of the daily records, just over 130 also broke the [monthly record](#) for highest precipitation recorded in April and four stations in Iowa and Illinois broke their [all-time](#)

[record](#) for precipitation.



The torrential rains during the event created both river flooding and flash flooding across communities in the Midwest. The flooding was worsened in part because of the saturated grounds from an already wet pattern earlier in

April. Several stream gages, mainly along the Illinois and Mississippi Rivers, in addition to portions of the Iowa, Missouri, White, and Rock rivers, were in major flood stage as of April 19th. At least ten United States Geological Survey stream gages in Illinois that have more than 20 years of record measured the highest flood levels ever recorded after this event. Several other stream gages across the region were at moderate flood stage following the heavy rains.

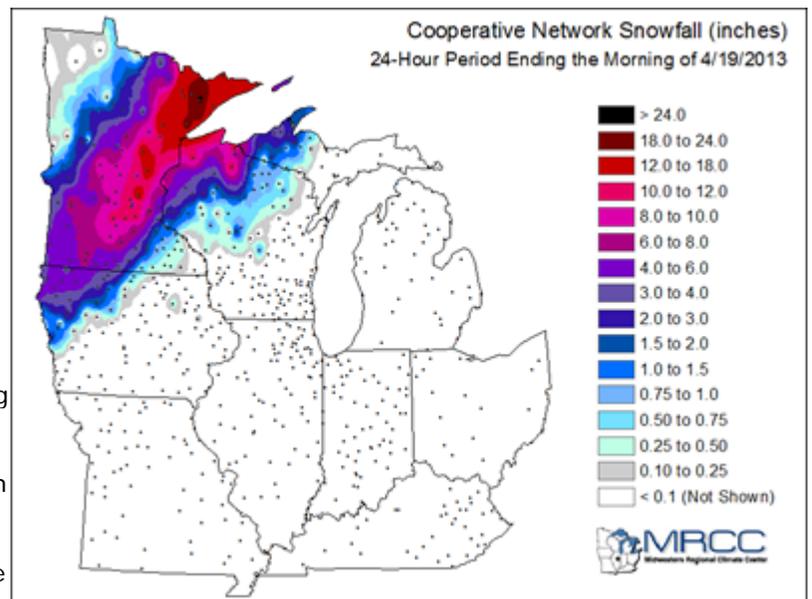
Flash flooding was a major issue across the region, with widespread areas of severe local flooding, including submerged streets and viaducts, house flooding, and other damaging flooding effects. The Chicago metropolitan region had extensive road closures, including major interstates, school closures, and numerous airport delays. On April 19th, the Illinois Governor declared 38 counties state disaster areas after surveying flooding damage across the state.



Grand Avenue in Chicago.
Credit: Chicago National Weather Service courtesy of John Trilik

Along with the heavy rainfall came severe weather for portions of the region. Several locations across Missouri, Iowa, Illinois, Indiana, Kentucky, and Michigan experienced large hail and damaging winds, and one small tornado was reported in southern Illinois on the 18th. At the same time as the torrential rains

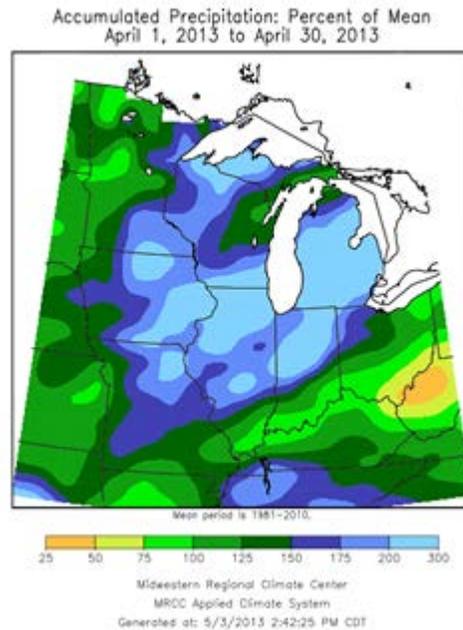
and severe weather were affecting the southern half of the Midwest, [record-breaking snowfall](#) was falling across Minnesota, northern Wisconsin, and Upper Michigan .



For more information on this article or the [Midwestern Regional Climate Center](#), please contact Molly Woloszyn via email at mollyw@illinois.edu.

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Midwest Climate at a Glance - April

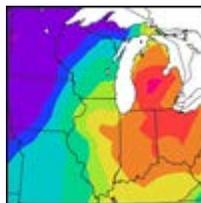


It was [a cold and wet April](#) across the Midwest. Temperatures ranged from near normal in the Ohio River Valley to well below normal in Minnesota where departures from normal exceeded 10°F in some areas. In addition to the cool temperatures, rainfall totals have been above normal for most of the region. A narrow swath of below normal precipitation extended along the Ohio River and in a few areas of Minnesota. A large area in the central Midwest, extending from northern Missouri, eastern Iowa, and southeast Minnesota northeastward to Michigan, had about twice their normal precipitation for the month.

Although the water was welcome to help replenish any remaining soil moisture deficits from last year's drought, the excess amounts have caused extensive flooding and prevented work in farm fields. Planting has been delayed across the region due to wet soils and very little of the corn crop was in the ground as April wrapped up. Major flooding of rivers and urban areas was a problem across a wide swath of the Midwest especially related to two systems that dropped heavy rains on the 10th-11th and again on the 17th-19th of the month. Snow totals in the upper Midwest were also unusual. Duluth, Minnesota set a record for its snowiest month with over 50", just topping the previous record from November, 1991. [Read more...](#)

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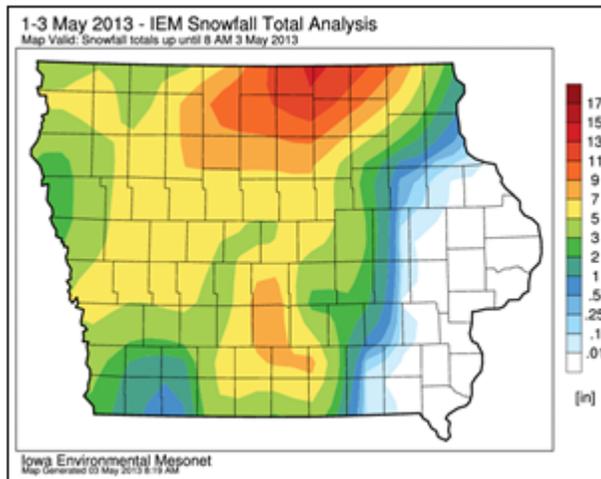
MRCC Product Highlight



[Maps of modified growing degree days](#) (MGDD) are updated daily on the MRCC website. The maps are provided showing the total MGDD accumulated since April 1st and since May 1st, and also showing the departure from normal for those two periods. MGDD are designed to measure corn maturity. The calculation limits temperatures to 50°F on the low end and 86°F on the high end. The rationale is that plant development is not helped by temperatures that exceed 86°F so the MGDD don't accumulate additional units as temperatures rise above that threshold. In years similar to 2013, the May 1st maps are more useful due to later planting. Last year, the April 1st maps were more useful as crops were planted earlier. Additional tools that calculate various degree days for a specific station are available in our subscription service, [MACS](#).

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Climate Cool Tool



[The Iowa Environmental Mesonet](#)

project collects data from various providers in Iowa including broadcast television and the Iowa Department of Transportation. The project's website contains a wealth of data outside of Iowa as well, including long term archives of airport METAR data and National Weather Service products. The site also attempts to provide its datasets in GIS accessible

formats, which include realtime summaries of NWS COOP data and composites of NEXRAD information.

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MRCC On The Road



Estes Park, CO (May 14-17) - WERA1012 Technical Committee Meeting

Steve Hilberg will be presenting at the Annual WERA1012 Technical Committee Meeting: Managing and Utilizing Precipitation Observations from Volunteer Networks.

West Lafayette, IN (May 16-17) - Dynamics of Climate Conference

Molly Woloszyn will be traveling to Purdue University to present and participate in the *Dynamics of Climate* conference, which will provide a professional development toolkit to informal and formal educators on climate science education.

Davenport, IA (May 20-22) - Useful to Usable (U2U) Team Meeting

Beth Hall will be attending the annual Useful to Usable team meeting, which brings project collaborators together to discuss outcomes from the previous year and strategize tasks for the upcoming year. The U2U team works on transforming climate variability and change information for cereal crop producers.

Toledo, OH (Jun 18-19) - Coastal Climate Adaptation and Resilience Workshop

Molly Woloszyn will present about climate trends in the western Lake Erie basin at the Coastal Climate Adaptation and Resilience Workshop. The workshop is for planners and professionals addressing land use, public health, stormwater, watersheds, economic

development, emergency preparedness, sustainability, agriculture, ports and natural resources.

Chicago, IL (Jun 26) - Great Lakes Field Experiences for Watershed Educators

Molly Woloszyn will present to teachers about weather and climate activities at the Great Lakes Field Experiences for Watershed Educators workshop. This event will provide 15 teachers in the Lake Michigan watershed with the expertise and inspiration to involve students in the stewardship, protection and restoration of coastal areas.

Amman, Jordan (June 6-21) - Climate Data Rescue Program

Nancy Westcott will be assisting the Jordan Meteorological Department on their Climate Data Rescue Program.

St. Louis, MO (Jul 8-11) - Association of American State Climatologists Annual Meeting

Beth Hall, Mike Timlin, Allan Curtis, Leslie Stoecker, and Steve Hilberg will be attending the Association of American State Climatologists Annual Meeting.

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MRCC is based at the Illinois State Water Survey, a division of the Prairie Research Institute

at University of Illinois Urbana-Champaign.
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