The RCC Report

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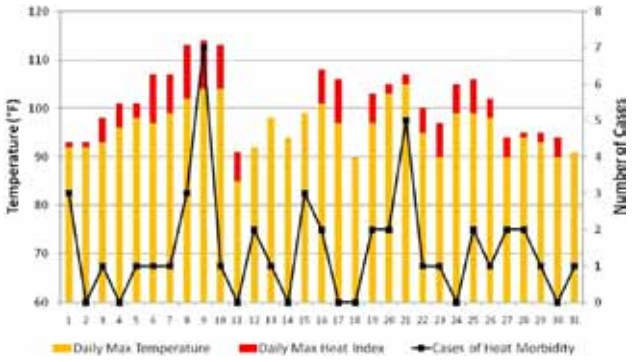
Weather-Related Morbidity in North Carolina: Who's at Risk?

The Southeast Regional Climate Center (SERCC) is collaborating with epidemiologists, bioclimatologists, air quality experts, and federal health officials to better understand how weather extremes affect human health. To accomplish this goal, the SERCC research team is using a comprehensive database of emergency department admissions from across North Carolina. The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT), maintained by the Department of Emergency Medicine at the University of North Carolina-Chapel Hill, has been providing statewide early-event detection and near real-time public health surveillance since 2006. This tool gives researchers a one-of-a-kind database from which to examine patterns and trends in public health and ascertain possible relationships with environmental conditions.

Currently, the SERCC is leading a pilot study on the health impacts of heat, humidity, and air pollution during the summer of 2007 across North Carolina. Compared to large urban areas, relatively little is known about how rural communities are affected by extreme heat and poor air quality. Recent work has shown that in North Carolina, a large number of heat-related deaths have occurred in rural areas, particularly among farm laborers. Additionally, preliminary research from August 2007 has revealed that young adults and those in the 25–44 age group accounted for the highest number of heat-related illnesses. This suggests that heat warnings should target specific demographic groups across urban and rural communities.

Ultimately, the SERCC hopes to develop extended-range weather and climate forecast products for heat and air pollution events, as well as other extreme weather events, tailored to specific user groups. These forecasts would provide valuable climatological context and more specificity with respect to the character and probability of extreme events.



Daily fluctuations in maximum temperature, heat index, and heat-related morbidity during the August 2007 heat wave in the Piedmont of North Carolina

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RESEARCH

ASCENTing Women in Steamboat Springs

July 13–16, 2010 was a great time to be an early-career female scientist, particularly in the areas of meteorology and atmospheric science. The second annual workshop for a program called ASCENT (Atmospheric Science Collaborations and Enriching NeTworks) was held in Steamboat Springs, Colorado at that time. ASCENT is funded by the National Science Foundation, and is designed to initiate positive professional relationships among female faculty of different ranks and postdoctoral researchers in atmospheric science/meteorology.

Laura Edwards of the Western Regional Climate Center is a co-investigator of this project, along with Dr. Gannet Hallar of the Desert Research Institute (DRI) Storm Peak Laboratory in Steamboat Springs and Dr. Linnea Avallone from the University of Colorado in Boulder. ASCENT hosts three annual workshops and at least three reunion events for participants. Each three-day workshop includes 20 junior female scientists and 10 senior female scientists from atmospheric sciences or related fields from all over the world. A mentor match is made, with one senior scientist for two junior scientists.

Senior scientists also contribute to the program by discussing their career and life paths and leading break-out sessions. This year's topics included communication, successful grant writing, paths to tenure, and time management. Poster sessions allowed junior scientists to present some of their interesting work. There were several opportunities for informal interactions

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Dr. Gannet Hallar, Lead Investigator for ASCENT and Director of DRI's Storm Peak Laboratory (in front of refrigerator), gives a tour of the lab facilities atop Mt. Werner in Steamboat Springs, CO. This room serves as the kitchen and conference room.

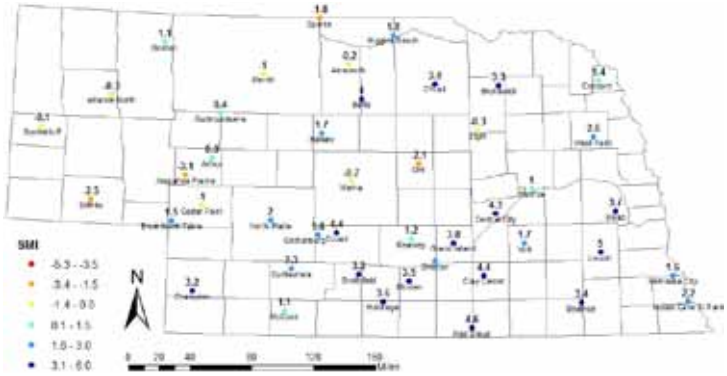
Weekly Soil Moisture Report Featured at HPRCC

A weekly Nebraska Soil Moisture Index (SMI) map is being produced by the High Plains Regional Climate Center (HPRCC) to assist agricultural producers and water managers during the growing season.

The online index also includes a few of the regularly updated HPRCC data products: the weekly percent of normal precipitation and departure from normal temperature. By definition, the SMI is an index "applied to the volumetric water content at the depths of 10, 25, and 50 cm. It is averaged over those three depths and scaled such that 5.0 represents field capacity and -5.0 represents the wilting point."

A short narrative accompanies the graphics to explain the current moisture situation in the context of recent weather events. In some cases, the statewide SMI can be quite different due to varying soil types found throughout Nebraska.

The SMI was developed by a former master's student of the HPRCC, Eric Hunt, currently a Ph.D. student with the School of Natural Resources. The index was developed using data from the network of soil moisture monitoring sites in place throughout Nebraska. These sites monitor soil temperature and moisture conditions under grass-covered and rain-fed surfaces, and coincide with the Automated Weather Data Network (AWDN) stations throughout the state. The SMI complements the suite of tools produced daily using the AWDN data (http://www.hprcc.unl.edu/awdn/).



Soil Moisture Index (SMI) as determined on July 5, 2010 for locations throughout Nebraska.

Integrated Pest Management Network Expands

Real-time climate observations are being linked with integrated pest management models for fruit and vegetable crops in New York and three other northeastern states. The Northeastern Regional Climate Center (NRCC) has partnered with the New York-based Network for Environment and Weather Applications (NEWA) to acquire data from National Oceanic and Atmospheric Administration's Automated Surface Observing Systems (ASOS) weather stations and a network of approximately 65 grower-owned weather stations in New York.

Data from both of these sources are processed in the NRCC Applied Climate Information System (ACIS) where they can be accessed for models and the NEWA website. NEWA sensors typically record temperature, precipitation, relative humidity, solar radiation, wind speed, and leaf wetness.

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An automated station for the New York Network for Environment and Weather Applications (NEWA).

Mosquito Abundance and Climate in the Northeastern U.S.

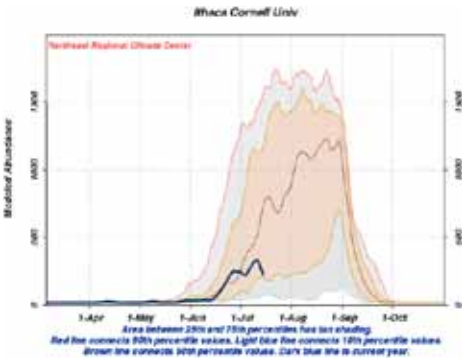
The Northeastern Regional Climate Center (NRCC) is producing, updating, and providing daily information on estimated mosquito abundance in the northeastern U.S. via the Web [http://www.nrcc.cornell.edu/mosquito/abundance/abund.html]. This information is the result of several years of field and laboratory research and extensive outreach with mosquito control.

The site is updated daily based on temperature and rainfall observations from Cooperative Network stations and evaporation values modeled using hourly First Order (airport) weather station data. These weather variables drive equations that represent the biological processes of mosquito egg laying and development, egg and adult survival, and diapausing (late-season decline in mosquito biological activity).

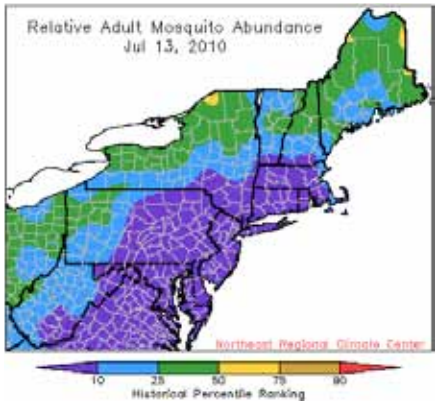
Modeled mosquito population values are substantially higher than the counts of mosquitoes captured in traps, a method which mosquito control and public health professionals often use to determine mosquito abundance. Therefore, the website expresses current mosquito abundance relative to the modeled historical climatology of daily mosquito populations. As part of this work, the NRCC has produced a 5 kilometer (km) x 5 km grid of daily historical mosquito abundance from 1980 to the present.

The website consists of four graphics. Two maps show a regional view of the abundance of immature (eggs and larva) and adult mosquitoes. Users also can select a graphic showing either immature or adult mosquito abundance at a particular monitoring station. Currently a list of 22 stations is available, representing major cities and locations in which the NRCC partnered with mosquito control agencies during the model development process.

The NRCC will solicit input from users of this site throughout the 2010 mosquito season. Feedback will be used to refine the products provided and allow the NRCC to further validate the model at a range of sites and under a variety of conditions that were not considered during the initial research phases of the work.



Graph of 2010 seasonal mosquito abundance at Ithaca, NY (dark blue line) in relation to historical seasonal mosquito abundance at Ithaca. Mosquito abundance began to increase in mid-June, reached a peak in early July, which was between the 25th and 50th percentile of the historical model-based population, and declined thereafter.



Map of relative adult mosquito abundance across the Northeast using the NRCC mosquito model. Dry conditions along the eastern seaboard have resulted in very low mosquito abundance. Here, mid-July mosquito abundance in 2010 is among the lowest 10 percent of values in the historical record. Along the Great Lakes, mosquito abundance is near the historical average for mid-July (i.e., the mapped percentile is near 50).

PARTNERSHIPS & COLLABORATIONS

Mapping Western Climate

A tool to help assess regional climate variability has been developed by a collaboration consisting of the Western Regional Climate center (WRCC), the University of Arizona and its Climate Assessment for the Southwest, and the PRISM Group at Oregon State University. Through climate services outreach activities, such as those of the Regional Climate Centers, and more recent investigations by the NOAA Regional Integrated Science and Assessment (RISA) programs, it has become quite apparent that stakeholders are increasingly requiring finer-scale climate information. They also require intuitive, efficient interactive applications tools that do not require extensive expertise or special software to use, and knowledge support resources to better understand and manage interactions between climate and their areas of responsibilities.

The WestMap toolbox is an interactive web-based interface developed in response to findings that stakeholders from a wide range of sectors require new forms of data, intuitive tools, and support resources to better understand climate variability. They also want to be able to incorporate this understanding into specific planning and management efforts. Specifically, stakeholders ask for lengthy time series of fine-scale (~1-4 km) gridded climate data

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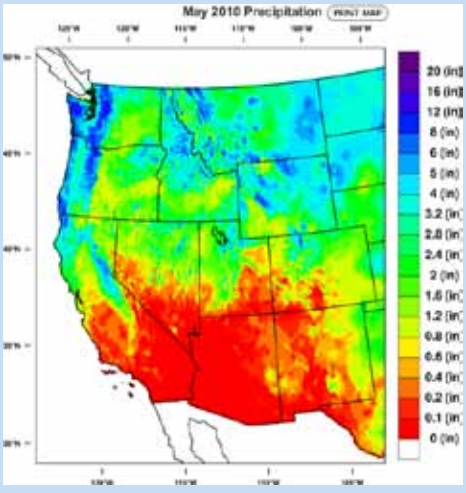
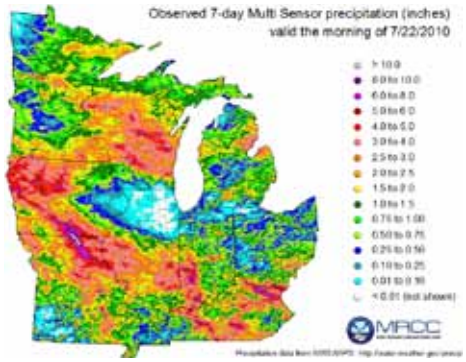


This map, generated with the WestMap tool, depicts total precipitation for May 2010 in the western United States.

Improved Climate Monitoring in the Midwest

Temperature, precipitation, and snowfall maps featured on the Midwest Climate Watch page of the Midwestern Regional Climate Center (MRCC) website were recently upgraded to provide higher resolution and better contouring of data and a cleaner look. The maximum temperature, minimum temperature, and 24-hour precipitation and snowfall maps are generated using data from the U.S. Cooperative Network. Maps of 24-hour, 7-day, and 30-day precipitation are generated using gridded data from the National Weather Service (NWS) Advanced Hydrologic Prediction Service, plotted on a county-level Midwest map. The multi-sensor precipitation maps are based on NWS NEXRAD radar data and hourly gage data processed by the NWS River Forecast Centers. Data are combined into a 4-kilometer resolution national grid and provide a higher resolution than the previous version of these maps.



This 7-day precipitation accumulation map depicts the areas of heavy rain and no rain across the Midwest.

ASCENTing women continued from page 2
as well, including trips to the Storm Peak Laboratory at a 10,500-feet elevation, a waterfall hike, and group dinners in relaxing settings. This year's workshop left the 30 attendees invigorated to be successful researchers and professors.

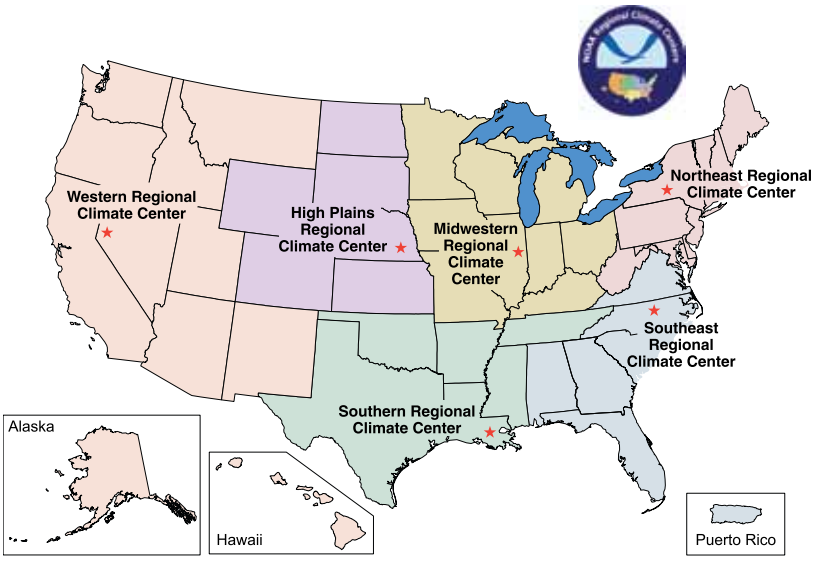
An independent workshop assessment is also being conducted to determine how effective the sessions are after the participants go home. So far, the first-year assessments have indicated the mentorships have been useful overall, and participants have collaborated with others they met at the 2009 workshop, and in general have kept in touch with each other's lives and careers. More about this project can be found at http://ascent.dri.edu.

Pest management continued from page 2
The success of the system over the latest several growing seasons has led to the expansion of the network in 2010. The NRCC now processes data from agricultural data loggers in Massachusetts, Vermont, and Maine. These data are also obtained by the ACIS and are used to drive pest management models in these states.

NEWA and the NRCC have worked with RainWise, the company that manufactures the majority of weather stations, to allow direct internet access to individual loggers. This will facilitate real-time incorporation of these data into the ACIS. A set of data loggers in Massachusetts is manufactured by Onset; NRCC accesses these observations via the Onset website.

Western climate continued from page 3
that have been aggregated to user-specified domains, accessible via user-friendly resources. Within the toolbox users can access user-specified data; map data; create time series plots; download and print maps, data, and plots; create "quick" maps and plots; assess data error; access metadata; learn from tutorials; and link to related climate and educational resources. WestMap is available via the web page www.wrcc.dri.edu/PROJECTS.html.

For more than twenty years NOAA's Regional Climate Center Program has been recognized by Congress as vital to the efficient, coordinated delivery of NOAA climate services from national to local levels. The mission of the six centers is to provide quality data stewardship, improve the use and dissemination of climate data and information for the economic and societal good of the U.S., and conduct applied climate research in support of improved use of climate information.



BY THE NUMBERS

April 1-June 30, 2010

Total Web hits:	15,239,737
Data Requests/contacts:	2,611
Media requests:	109

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Southeast RCC University of North Carolina, Chapel Hill, NC	**(919) 843-9721**
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Western RCC Desert Research Institute, Reno, NV	**(775) 674-7010**