Drought Monitoring Resources for Cranberry Crops in the Midwest—Through the Seasons

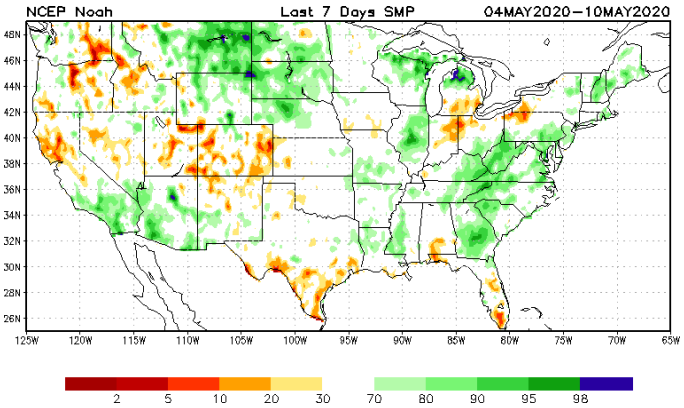
Winter

Many cranberry crop producers depend upon winter precipitation for soil moisture and reservoir recharge., and upon snowfall to protect over-wintering vines from desiccation and large temperature swings.

Soil Moisture Maps of the U.S.

(www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp_new.shtml)

These maps show how soil moisture in different layers of the soil column differs from normal. The soil moisture data account for regional differences in soil moisture field capacity. Yellow and orange colors indicate where there is less soil moisture than normal for that time of the year, while green colors show that the soil conditions are wetter than normal. The user can view current conditions as well as the past week or month.

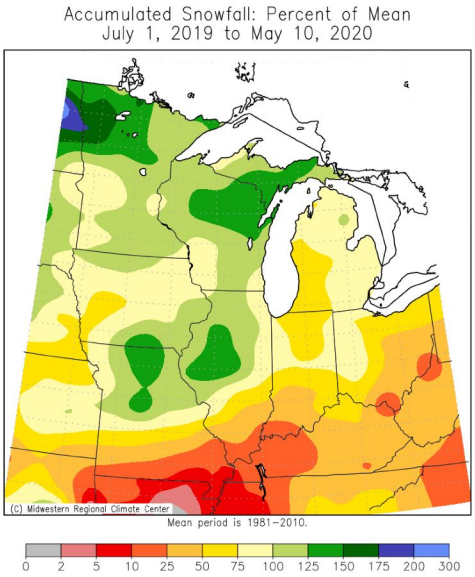


Midwestern Regional Climate Center's Climate Watch

(mrcc.illinois.edu/cliwatch)

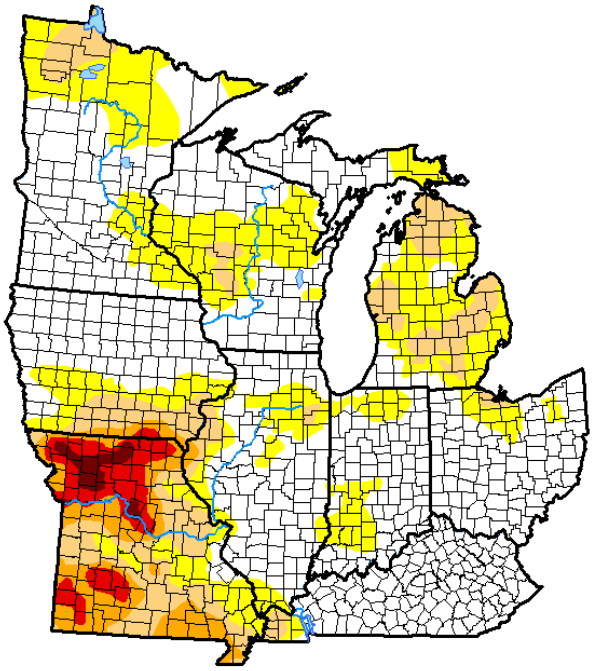
"Seasonal Maps - Winter" tab

"Percent of Normal" maps show how current snowfall compares to the 30-year normal. Areas in green/blue have received more snow than normal, while areas in orange/red have received less snow than normal. These maps can provide an early indicator of soil conditions come spring.



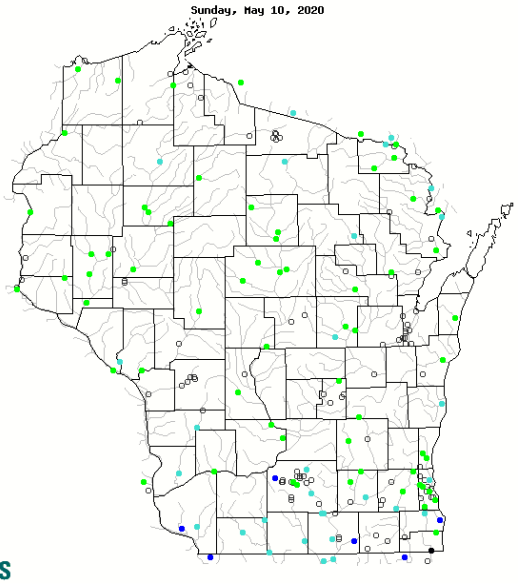
Summer/Autumn Hydrological Concerns

During the summer and autumn, growers may be keeping an eye on the availability of water reserves for harvest and the winter flood. While the U.S. Drought Monitor can provide a general snapshot of conditions, a few other monitoring tools focus more specifically on groundwater and surface water levels.



U.S. Drought Monitor
(droughtmonitor.unl.edu)

Areas in yellow are experiencing abnormally dry conditions that could develop into drought or are recovering from drought but are not yet back to normal. Areas in darker tan and red colors are currently experiencing moderate to extreme drought, indicating where it may be difficult to recharge soil moisture or reservoir levels before the growing season begins.



WaterWatch
(waterwatch.usgs.gov)

The U.S. Geological Survey produces these maps of real-time streamflow conditions, generally updated on an hourly basis. Colors represent streamflow conditions compared to historical streamflow, with red and orange colors representing below-normal streamflow, green representing normal streamflow, and blue and black colors representing above normal streamflow.

USGS

Climate Information Needs of Midwest Specialty Crop Growers is a project of the National Drought Mitigation Center and the University of Wisconsin, with the U.S. Department of Agriculture Midwest Climate Hub and the National Integrated Drought Information System. We are grateful for the participation of advisors representing Iowa State University, the Iowa Winegrowers Association, University of Missouri Extension, University of Wisconsin-Madison Extension, Wisconsin Potato and Vegetable Growers Association, and Wisconsin State Cranberry Growers Association. The project was funded by the National Oceanic and Atmospheric Association Sectoral Applications Research Program.

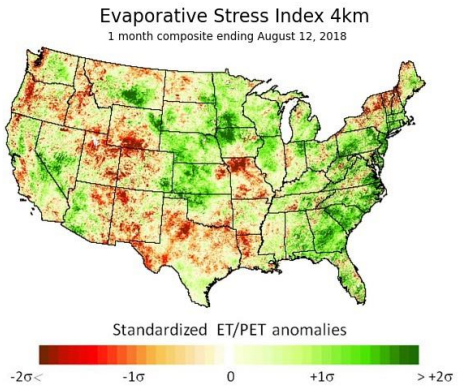
Spring/Summer Evapotranspiration Concerns

Drought can develop quickly in the spring and summer when the atmospheric evaporative demand is higher than normal. This can be caused by warmer temperatures, sunnier skies, low relative humidity, and strong winds and can desiccate plants in the spring and lead to fruit scald in the summer. It is important to keep an eye on tools that can alert growers to emerging drought conditions.

Satellite-based monitoring tools track vegetation health with high spatial resolution, showing the cumulative impact of elevated evaporative demand and dry soils. These tools monitor relatively fast changes in vegetation conditions, and can act as an "alarm" of rapidly developing drought.

Evaporative Stress Index (ESI)

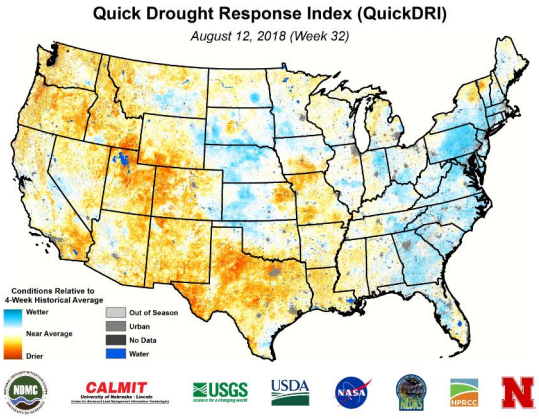
(hrsl.ba.ars.usda.gov/drought/index.php)



Orange-to-red colors indicate plant stress due to abnormally high evaporative demand. Green colors show areas where the vegetation is healthy.

Quick Drought Response Index (QuickDRI)

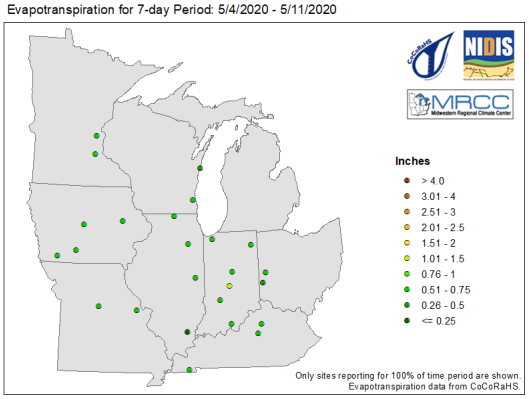
(quickdri.unl.edu)



Regions in yellow-orange-red are rapidly becoming drier while regions in blue shades are rapidly becoming wetter.

Evapotranspiration and Water Balance Maps

(mrcc.illinois.edu/cliwatch/drought/drought.jsp)



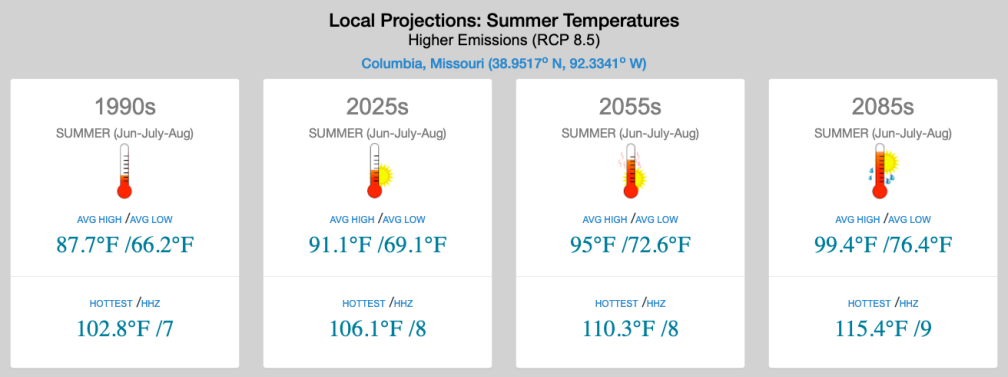
While many growers of irrigated high-value crops have in-field monitoring equipment, there are some tools that can help monitor daily evapotranspiration rates. Use of these tools can improve the efficiency of variable rate irrigation, and help the grower conserve water when possible while protecting plant health and yield. These of course tend to be very specific to conditions at the station location and will not provide anything close to the spatially continuous, high-resolution data provided by satellites and models.

Annual/Inter-annual/Longer Term

Cranberry growers make decisions that will affect their operations for many years to come, including locating crops for optimal health and productivity, and planting under circumstances that get vines off to a strong start. Future climate decision-support tools can inform these long-term strategic decisions by demonstrating how precipitation, temperature, evapotranspiration demand, and growing seasons might change over the next few years to over decades.

Future Climate Dashboard

(climatetoolbox.org/tool/future-climate-dashboard)

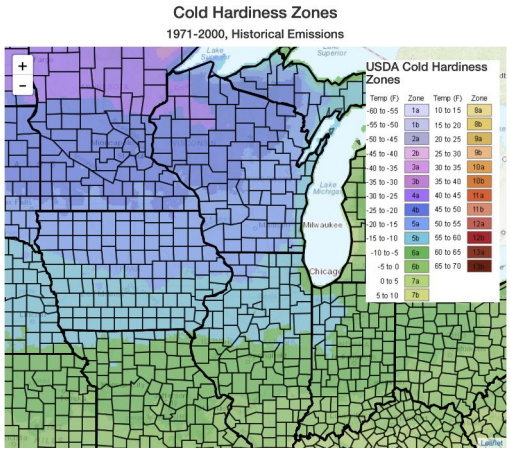


This tool displays a dashboard of projected future climate information for any location in the contiguous US. This tool is useful for evaluating how an individual climate variable is projected to change in future 30-year periods at a set location. The dashboard compares what was normal for 1971–2000 with projections derived from an ensemble of downscaled climate model projections using multiple future emissions scenarios.

Future Cold Hardiness Zones

(climatetoolbox.org/tool/Future-Cold-Hardiness-Zones)

This tool visualizes contemporary and future cold hardiness zones, also known as the USDA Plant Hardiness Zone. Cold hardiness zones can help growers determine which perennial crops and plants are most likely to tolerate their winter temperatures. The cold hardiness map is based on the average coldest single overnight temperature of the winter. Users can also map the potential geographic range under current and future climate from a number of perennial crops based on their hardiness zones.



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