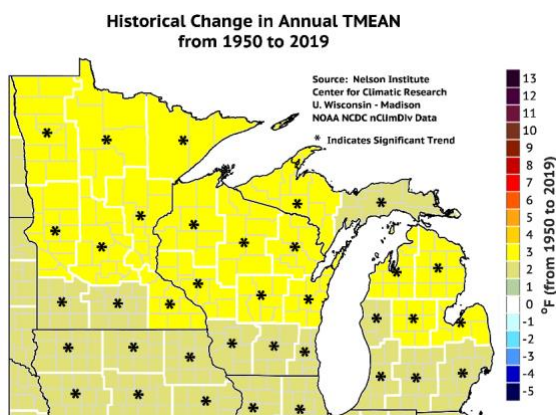


Driftless Area Adaptive Silviculture for Climate Change (ASCC) Project: Climate Change Considerations

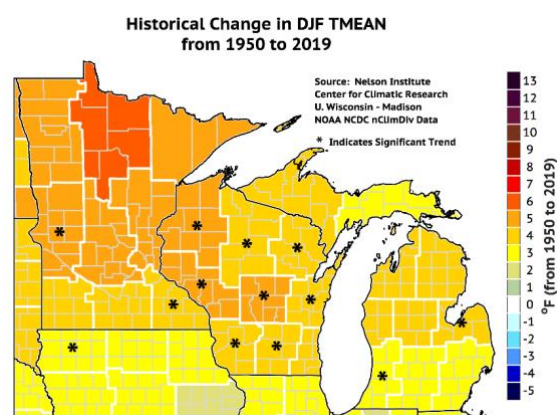
Regional Climate Impacts

- Average annual temperature has increased 2-3 degrees F across the region since 1950, and average winter temperatures have increased about double that amount (3-5 degrees F).¹
- Average summer maximum temperature has remained constant or increased 1 degree F since 1950, while average winter minimum temperature has increased 4-7 degrees F.¹
- The Driftless Area has received more than 20% more annual precipitation since 1950. Summer precipitation has increased 15-20% over the same timeframe, while all other seasons have experienced increases of more than 20%.¹
- Heavy precipitation events have occurred more frequently in recent decades and these events are expected to continue to occur more frequently in the future.¹
- The frost-free growing season has already increased by almost two weeks across much of the Driftless Area, and the growing season is expected to increase by about 20 additional days by the middle of the century.
- A handful of trends may increase the risk of drought stress in the future:
 - Warmer temperatures will increase evaporative demand on trees and soil (vapor pressure deficit).
 - More water will be lost with longer growing seasons.
 - More water will be lost to runoff during intense rain events rather than recharging soil moisture, and there may be longer dry periods between rains.
 - Warmer winters reduce snowpack and accelerate snowmelt, so water “release” in the spring will be less gradual.
- Invasive species are already a major threat to forests in the Driftless Area, and they are expected to benefit from climate change because they rapidly colonize disturbed areas and may be more able to capitalize on changing conditions.
- Based on our current knowledge, we assume forest pests and diseases may be more damaging in Driftless Area forests under climate change, due to longer growing seasons and interactions with other climate stressors such as drought.
- There’s a lot of uncertainty about the effects of climate change on the ability to apply prescribed fire in southern Wisconsin. Warmer, drier conditions may support prescribed fire and lengthen the window of opportunity for burning. Conversely, widespread tree mortality, wetter conditions, and on-going mesophication could limit local prescribed fire implementation. Because prescribed fire depends on advanced planning and staff availability, erratic conditions will be a serious challenge.

Observed Annual Mean Temp, 1950-2019³

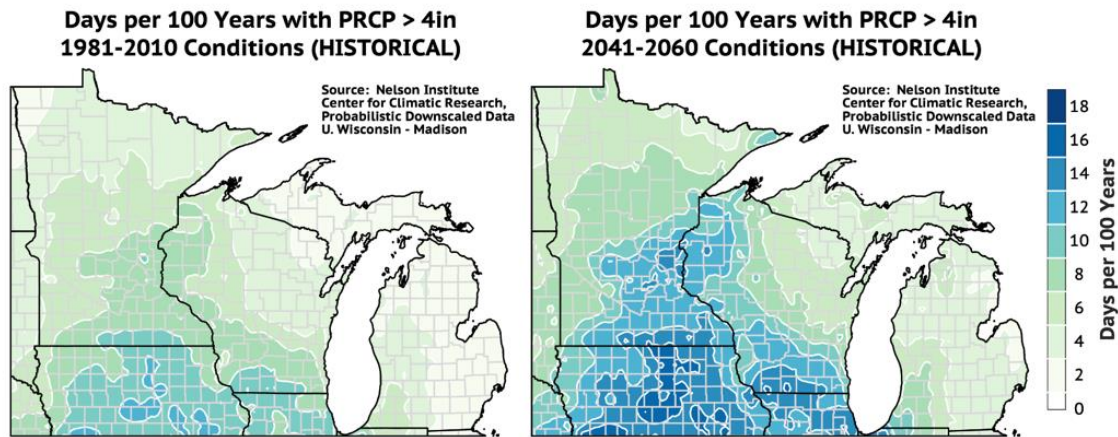


Observed Winter Mean Temp, 1950-2019³



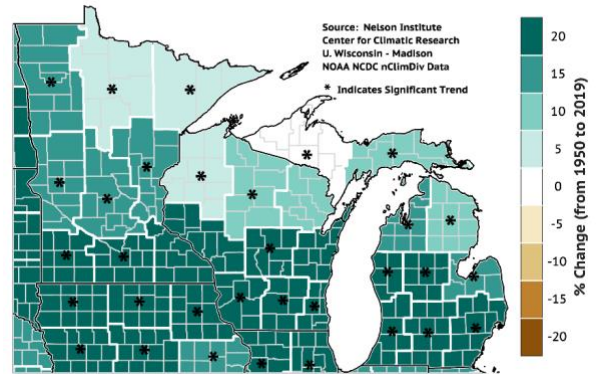
¹ University of Wisconsin-Madison, Nelson Institute Center for Climatic Research

Projected heavy rainfall, 2041-2060 RCP 4.5³



Observed Annual Precip, 1950-2019³

Historical Change in Annual PRECIP (%)
from 1950 to 2019



Climate Change Considerations for Southern Dry-Mesic Forests

- Learn more about [Southern Dry-Mesic Forests](#) (Wisconsin DNR)
- Climate Change Vulnerability: Moderate-High ²
- Climate Change Impacts: Disruptive
 - Northern red oak, white oak, and shagbark and bitternut hickory are expected to maintain or gain suitable habitat over the next century.
 - Red maple is currently common but expected to decline in suitable habitat over the next century, while sugar maple is often common and expected to increase slightly.
 - Disturbances in these forests without fire will likely hasten the conversion to mesic species.
 - Invasive species such as buckthorn and honeysuckle readily invade dry-mesic stands and may benefit from longer growing seasons.
- Adaptive Capacity: Moderate-Low
 - Many dry-mesic forests will be degraded because they haven't had regular fire. Sites that have been managed with fire may be more adaptable because they will have more favorable conditions to perpetuate oak.
 - Past high-grading may have damaged some stands and made them less resilient to future change.
 - Oak regeneration is currently limited by competition with mesic species, deer herbivory, and other factors. Oaks may not be able to capitalize on projected suitable habitat gains.
 - Sites that have been grazed often have degraded understory plant communities.
 - Stands with several tree species may be more able to adapt to changing conditions.
 - Deer may benefit from climate change and cause more damage to oak regeneration.
 - Sites with high earthworm activity will have less leaf litter and it will be harder to conduct prescribed burns.

² Handler, S., A. Calhoun, G. Edge, B. Hutnik, N. Morehouse, R. O'Connor, A. Staffen, M. Zine, K. Marcinkowski, M. Peters, T. Ontl, and C. Swanston. 2021. Climate change field guide for southern Wisconsin forests: Site-level considerations and adaptation. USDA Northern Forests Climate Hub Technical Report #6. Houghton, MI. 102p. Available at: www.forestadaptation.org/southern_WI_fieldguide

³ Dan Vimont, University of Wisconsin-Madison, Nelson Institute Center for Climatic Research