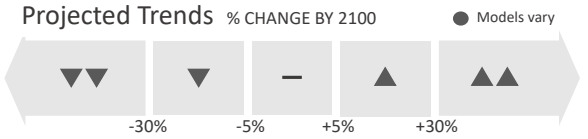
OBSERVED/PROJECTED CLIMATE CHANGES AND ASSOCIATED IMPACTS FOR JOHNSON COUNTY, IOWA



CLIMATE CHANGES	METRIC	TREND	OBSERVED/PROJECTED CHANGES
Air temperature	Minimum temperature	▲	44.8°F (+5.5°F) by 2050 and 49.0°F (+9.7°F) by 2100[1] COMPARED TO OBSERVED AVERAGE DAILY MIN TEMP OF 39.3°F FROM 1961–1990
	Maximum temperature	▲	65.9°F (+5.7°F) by 2050 and 70.3°F (+9.8°F) by 2100[1] COMPARED TO OBSERVED AVERAGE DAILY MAX TEMP OF 60.2°F FROM 1961–1990
Extreme heat	Days over 100°F # OF DAYS WITH MAX TEMPS >100°F	▲▲	9.6 days (+9 days) by 2050 and 30.8 days (+30.2 days) by 2100[1] COMPARED TO OBSERVED AVERAGE OF 0.6 DAYS PER YEAR FROM 1961–1990
Precipitation	Annual precipitation	–	36.1 in per year (+0.7%) by 2050 and 37.2 in per year (+4%) by 2100[1] COMPARED TO OBSERVED AVERAGE OF 35.9 INCHES FROM 1961–1990
	Seasonality	▲▼	Likely increase in spring precipitation and decrease in summer precipitation, as well as greater interannual variability[2,3]
Snow	Mean annual snowfall and event frequency/intensity	▼▼	Significant declines in annual snowfall as well as frequency and intensity of snowfall events[4]
Humidity	Spring surface humidity APRIL–JUNE HUMIDITY AT SURFACE LEVEL	▲	+4.4% per decade in spring humidity in Iowa from 1979–2014[5]
Soil moisture	Moisture level	▲	Likely increase, with spring soils saturated more frequently[2,3]
Extreme precipitation & flooding	Extreme precipitation 99th PERCENTILE DAILY PRECIP TOTAL	▲▲	+42% in extreme precipitation total from the heaviest rain events in the Midwest from 1958–2016[6]
	Spring MCS precipitation APRIL–JUNE PRECIP DURING MESOSCALE CONVECTIVE SYSTEM (MCS) EVENTS	▲	+25% per decade in spring rainfall associated with MCS events in the central U.S. from 1979–2014[5]
Severe storms & wind	Frequency & intensity	▲	Increased likelihood of spring MCS events; changes in temperature and humidity will generally support more extreme weather events[2,5]
Drought	Frequency & intensity	▲	Likely increase in droughts between wet years, particularly by late century[3]

[1] U.S. Climate Resilience Toolkit Climate Explorer (https://crt-climate-explorer.nemac.org), generated using high-emissions scenario for 2050/mid-century (average of 2035–2064) and 2100/late-century (average of 2070–2099) time periods compared to average conditions between 1961–1990.

[2] Iowa Climate Change Adaptation and Resilience Report (U.S. Environmental Protection Agency, Washington, DC, 2011; https://www.hsdl.org/?view&did=828099)

[3] E. S. Takle, W. J. Gutowski, Physics Today. 73, 26–33 (2020)

[4] M. Notaro, D. Lorenz, C. Hoving, M. Schummer, Journal of Climate. 27, 6526–6550 (2014).

[5] Z. Feng et al., Nature Communications. 7, 13429 (2016)

[6] D. R. Easterling et al., in Climate Science Special Report: Fourth National Climate Assessment, Volume I, D. J. Wuebbles et al., Eds. (U.S. Global Change Research Program, Washington, DC, 2017), pp. 207–230.

ELEMENTS*	LIKELY IMPACTS ASSOCIATED WITH PROJECTED CLIMATE CHANGES
Transit	• Damage to transportation infrastructure (e.g., roads, bridges, culverts) following storm and flood events • Road blockages and loss of access following extreme events, impacting evacuation routes, emergency access, and other critical travel • Loss of electricity due to flooding or heat waves, limiting use of electric vehicles and impacting public transit • Slower travel or road closures due to melting asphalt, overheating engines, and other impacts associated with extreme heat
Health & Safety	• Increased occurrence of respiratory illnesses and other public health concerns due to heat stress, reduced air quality, and increases in allergens • Increased risk of injuries and/or death during floods and extreme heat, particularly among vulnerable populations • Increases in the intensity/frequency of extreme events (e.g., flooding) may overwhelm emergency systems, block emergency access or evacuation routes, or damage/disrupt emergency shelters • Disruption to emergency communication systems due to power loss or infrastructure damage from extreme events
Facilities & Public Services	• Increased risk of damage to critical infrastructure (e.g., wastewater treatment plants) during flood events • Increased energy demand during heat waves, potentially straining electrical grids • Increased soil erosion and nutrient runoff into rivers and streams during heavy rainfall, reducing water quality • Increased concentration of contaminants and increased risk of algal blooms in water sources during periods of drought, impacting recreation and effectiveness of water treatment • Decreased water supplies during drought due to declining surface water sources combined with increased demand for agricultural and municipal use
Land Use	• Increased heat stress in developed areas, exacerbated by large areas of impervious surfaces and lack of vegetation • Increased flooding in low-lying areas and where drainage is poor • Extreme heat and flooding exacerbate existing patterns of inequity for low-income neighborhoods and other vulnerable communities more likely to experience heat island effect and poor drainage • Increased vegetation stress and mortality due to drought, disease, insect pests • Increased heat stress for people using parks and recreation areas as well as changes in patterns of recreational use (e.g., heavier use of sites with water features)

* All icons from the Noun Project: (1) Road icon created by Jorge Namos; (2) Public health icon created by Pete Fecteau; (3) Buildings icon created by Alice Design; (4) Land use icon created by Nithinan Tatah

Resources:

- U.S. Climate Resilience Toolkit Climate Explorer (https://crt-climate-explorer.nemac.org)
- Midwest Chapter of the Fourth National Climate Change Assessment (https://nca2018.globalchange.gov/chapter/21/)
- Iowa City Climate Action and Adaptation Plan, 2018 (https://www.icgov.org/project/climate-action)
- An Uncertain Future: The Outlook for Iowa Communities and Flooding as our Climate Changes, 2019. Iowa Policy Project (https://www.iowapolicyproject.org/2019docs/190905-Flood-Climate.pdf)
- Iowa Climate Adaptation and Resilience Report, 2011. U.S. EPA (https://www.hsdl.org/?view&did=828099)

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