

Climate Change Policies for Iowa

Climate change is more than glaciers melting and the permafrost in the Arctic thawing; climate change is affecting Iowans. The changes include:¹

- Precipitation has increased about 10 percent since the 1940s. More rain falls in the first half of the year, leading to wetter springs; the rain comes in downpours. Eastern Iowa has experienced a greater increase in precipitation than other parts of Iowa.
- Stronger storms are occurring.
- Floods are more frequent and more severe. Since the turn of the century, there have been significant floods in Iowa's major rivers, including the Mississippi River, Iowa River, Upper Iowa River, Turkey River, Maquoketa River, Wapsipinicon River, Shell Rock River, Winnebago River, Des Moines River, Raccoon River, Cedar River, Rock River, Big Sioux River, Skunk River and Missouri River.
- Stream flows have increased since the 1940s.
- Soils remain closer to saturation points in the spring.
- Dew-point temperatures are rising, meaning there is more moisture in the air, particularly during the summer.
- Nighttime temperatures are rising more than daytime temperatures and winter temperatures are increasing more than summer temperatures. There are five more frost-free days per year since 1950. The growing season has been extended.
- Over the last 30 years, wind speeds have declined.



Cedar River flooding, near Highway 30. Photo by Pam Mackey Taylor

Consequently, the United States Department of Agriculture updated its Plant Hardiness Zone Map to reflect warmer temperatures in 2023, having previously done so in 2012. The planting zone for most of Iowa is now in zone 5a and 5b, the northwest and northeast corners of the state are now in zone 4b, and southeast and southwest Iowa are now in zone 6b. This means that some perennial plants that once were not able to tolerate Iowa's colder temperatures can now safely grow in Iowa. The maps are based on the coldest temperature in the region in the past 30 years.²

¹ Material is compiled from "Iowa Climate Change Adaptation and Resilience Report," 2011, United States Environmental Protection Agency pilot project, pages 17, 41, 42 and 44 and from "Climate Change Impacts on Iowa, 2010," Iowa Climate Change Impacts Committee, article by Eugene "Gene" S. Takle titled "Climate Changes in Iowa," January 1, 2011, pages 8 to 13.

² In 2012, the Plant Hardiness Zone Map was changed to reflect warmer temperatures. For example, the planting zone for most of Iowa moved from zone 5a to 5b, while the northwest and northeast corners of the state were moved to zone 4b. See Daniel P. Finney and Yvonne Beasley, "As Iowa winters warm up, gardeners see more options," *The Des Moines Register*, January 26, 2012

In July of 2022, Iowa’s State Climatologist Justin Glisan convened a meeting of emergency managers, water treatment employees, and others, to discuss developing a drought plan. Erin Jordan reported in the Cedar Rapids Gazette the following:

“Glisan and other state officials hope that by creating a drought plan, Iowa can reduce its vulnerability. The long-term climate trends are concerning, Glisan said.

Iowa’s average daily temperature has increased about 1.3 degrees since 1895. That doesn’t sound like a lot, but the bulk of that change is happening at night, when cloud cover traps the heat from the day close to the Earth.

“Not cooling off at night exacerbates drought conditions,” Glisan said.

A warmer atmosphere holds more water vapor — about 4 percent more in Iowa — and doesn’t let it go as rain until it reaches critical mass.

This means some of Iowa is more likely to get 3 to 4 inches of rain in a few hours, leaving parts of the state very wet while others still are experiencing drought, Glisan said.”³

The sources of greenhouse gas emissions in Iowa by sector follows:

	In 2022 ⁴
Agriculture	31%
Residential, commercial, industrial fossil fuel use	27%
Power plants	17%
Transportation	16%
Industrial Process	6%
Waste	2%
Natural Gas Transmission and Distribution	1%

Climate protection adaptation strategies and policies

There was a time when one could predict certain things to happen during certain months of the year. Climate change has interrupted any predictability about the weather and climate. Although the exact timelines cannot be predicted and the road ahead is uncharted, we do know that there are noticeable effects today. We also know that reduction, mitigation and adaptation steps need to be taken in order to reduce the toll and human suffering that lie ahead if there is no reduction in greenhouse gases.

The Iowa Chapter supports solutions and policies that protect the climate, preserve our natural habitat and wildlife and allow the citizens to adapt to a changing climate. These solutions and policies include:

- Protecting from flooding
 - Prohibiting building in flood plains, retreating from the low-lying areas when buildings are damaged by floods, leaving the flood plains as green space

³ Erin Jordan, “Iowa makes plans for droughts as climate risks rise”, Cedar Rapids Gazette, July 22, 2022

⁴ Iowa Department of Natural Resources, “2022 Iowa Statewide Greenhouse Gas Emissions Inventory Report”, December 28, 2023. Also see Iowa Department of Natural Resources, www.iowadnr.gov/Environmental-Protection/Air-Quality/Greenhouse-Gas-Emissions

- Restoring wetlands so they will hold and slowly release water after a storm
- Ensuring adequate detention basins are built in urban areas to collect runoff and retain it rather than allowing storm water to rush into water bodies
- Installing permeable pavement to allow capture and the slow release of water after storms and snow melt
- Building grass waterways on fields and maintaining stream buffers
- Encouraging homeowners throughout urban areas to build rain gardens
- Updating flood plain maps following each flood event. This is especially necessary given the amount of fill that has been placed in the floodplain of some of the rivers in Iowa and the extensive destruction of wetlands that has occurred over the years
- Protecting Iowa's water resources
 - Monitoring aquifer health by the Iowa Department of Natural Resources on an on-going basis so that this water resource is not depleted, especially if Iowa farmers are forced to irrigate their crops due to dry summers triggered by climate change. The Ogallala Aquifer west of Iowa is depleting so prudence requires wise management of Iowa's water resources.
 - Ensuring adequate capacity of the sewage treatment plants in Iowa so that they do not overflow due to heavy rains, a situation known as a by-pass
- Transitioning to cleaner energy to reduce carbon dioxide emissions
 - Reducing dependence on coal
 - Transitioning to clean and renewable energy – solar, wind, and battery storage – combined with energy efficiency and conservation
 - Transitioning to electric cars and vehicles with high miles-per-gallon engines
 - Encouraging drivers to reduce miles driven by instead using the more energy-efficient mass transit, biking, and walking all of which will reduce greenhouse gas emissions
 - Implementing energy efficiency programs and conserving energy used in electricity, building heating and cooling and transportation
 - Avoiding nuclear energy due to the dangerous radioactive waste it creates.
- Protecting wildlife and wild lands
 - Developing corridors for animals and plants to move as the climate changes
 - Protecting public lands and expanding the number of acres of natural areas held by the public so that Iowans save remaining natural areas and species
 - Disrupting and removing invasive species – non-native plants and animals – in order to keep native habitat in good condition
- Reviewing and implementing the pro-environment public policy options suggested by the Iowa Climate Change Advisory Council to reduce carbon dioxide pollution



Stream buffer. Photo by Lynn Betts, USDA NRCS



Permeable pavement. Photo by Jason Johnson, USDA NRCS

reductions by 80 percent by 2050 using 1990 as a baseline.⁵ Also reviewing and implementing the pro-environment public policy options suggested by the Iowa Climate Change Impacts Committee in 2010.⁶

- Funding for scientists to continue to monitor climate research and to conduct research on climate change effects and responses in Iowa

How we respond to climate change makes a difference

The process of climate change begins when greenhouse gases, including carbon dioxide, are emitted into the air. The greenhouse gases trap heat in the earth's atmosphere, causing the planet to become warmer and causing more water to be absorbed into the air through evaporation.

The result is unusual weather, fluctuating weather and precipitation patterns and extreme weather. This extreme weather includes heat waves, drought, temperature records, more powerful storms, heavy lightning, more snow, more ice, heavier rain and stronger tornadoes and hurricanes.



Photo by Sean Waugh NOAA/NSSL

The only ways to respond to climate change are to:

- Adapt --- improve infrastructure, more sustainably manage water and other resources, modify agriculture processes, improve emergency responses
- Mitigate – reduce greenhouse gas emissions by moving to new technologies, such as using wind and solar energy to generate electricity and driving more fuel-efficient vehicles
- Cope and endure – failing to reduce carbon dioxide emissions will result in more severe weather and the suffering that occurs with extreme flooding, tornadoes and hurricanes and fires ignited by lightning. Unrestricted dumping of carbon dioxide into the atmosphere is not free; it costs taxpayers in recovering from storm damage.

Investing in solutions resulting from climate change problems brings benefits by:

- Reversing economic stagnation
- Creating jobs
- Advancing new technology in the marketplace such as energy efficiency measures and fuel efficiency
- Improving public health by introducing solutions that are less polluting such as wind and solar
- Ensuring our national security by not relying on foreign oil and gas.

Climate change glossary

Adaptation – the changes in policies, the changes in behavior and the responses and solutions used to deal with the changing climate. It includes more robustly building structures to better withstand storms, moving structures out of areas prone to increased flooding, changing when crops are planted to better take advantage of the weather and shifting to seed varieties that are more capable of maturing in the climate where they are being planted.

⁵ "Iowa Climate Change Advisory Council Final Report," December 23, 2008, Iowa Department of Natural Resources.

⁶ "Climate Change Impacts on Iowa: 2010," January 1, 2011, Iowa Department of Natural Resources

Climate – the average of weather in an area over a period of time; includes seasonal variations.

Climate change – major changes in the climate patterns. Since the advent of industrialization, the amount of greenhouse gases in the atmosphere has increased rapidly, causing the amount of heat trapped near the earth's surface to increase, leading to climate change and unstable weather patterns. You may also hear the term climate weirding to describe the changes in the climate that are expected, including increasing significant storms, major droughts and extreme heat. You may also hear the phrase global warming used instead of climate change.

Climate crisis, climate instability, climate chaos, climate disruption - describes the changes that are happening and are predicted to happen to the climate, the impending need for adaptation, including melting of glaciers, increasing numbers of significant major storms and major changes in the climate.

Climate protection – those actions and solutions that will reduce the greenhouse gases emitted in the air, thus reducing the risk of significant climate change

Greenhouse gases – a group of gases that hover in the atmosphere and that trap heat near the earth's surface, among them are carbon dioxide, methane, nitrous oxide, hydrofluorcarbons, perfluorcarbons, and sulfur hexafluoride.

Mitigation – mitigation involves strategies, processes, and technologies that reduce greenhouse gases.

Resilience – the ability of nature and mankind to adapt and survive and adapt in the face of change

Weather – the atmospheric conditions at a point in time, including temperature, wind, precipitation and cloud cover.



Tornado. Photo by NOAA Photo Library, NOAA Central Library; OAR/ERL/National Severe Storms Laboratory (NSSL)