



Indiana Climate Change Impacts Assessment

Putting global change into local perspective

THE ISSUE

Climate change and associated extreme weather events are becoming increasingly evident, affecting Americans across the country, including in Indiana, and impacting key sectors such as human health, food production, water management, energy, and critical infrastructure. **These impacts are getting harder to manage and are expected to become increasingly disruptive over the next 50 years.** As a result, nearly every aspect of policymaking is potentially affected by climate change ranging from transportation to agriculture, to economic policy, disaster response and funding, and national security.

While climate change is a global phenomenon, its impacts are felt at the local level. The Purdue Climate Change Research Center leads the Indiana Climate Change Impacts Assessment, **IN CCIA**—an effort to document the latest scientific research mapping out what we can expect in Indiana if we choose to slow global climate change and what would happen if we choose to do nothing.

WHAT ARE THE RISKS?

Climate change is no longer a problem of the future. **It is happening now, it is happening here, and it will worsen if we do nothing about it.** Some of the ways climate change affects our natural and built systems include:

- Increased extreme rain events
- Reduced agricultural production
- More intense droughts and heatwaves
- Rise in frequency of insect outbreaks and spread of infectious diseases
- Loss of biodiversity
- Decreased air quality

Each of these impacts, in turn, will cause or amplify other impacts and risks to communities around the state. Take extreme rain events for instance. In addition to the immediate physical dangers and economic impacts to life and property caused by heavy downpours, the likelihood of flooding increases with these types of storms. Flooding can degrade water quality and soil health; damage water, sanitation, transportation, energy and other critical infrastructure; increase pressure on disaster relief systems; and can trigger the growth of health hazards such as mold and other infectious diseases. **Risks to a particular community will vary** depending on the frequency and intensity of these storms, the potential damages, and the adaptive capacity of a community.

INDIANA IMPACTS

Key findings from the assessment



More frequent heat stress and a doubling of water deficits will **reduce corn yields, for current varieties, by 16-20%.**



Livestock productivity and fertility will decline as heat stress events will more than double.



The growing season for **allergens** like ragweed will **increase by 4 weeks.**



Winters and springs will be wetter with more precipitation falling as rain in **heavy downpours.**



The number of days above 95°F will increase, degrading air quality and **triggering asthma attacks and heart attacks.**



Warmer and wetter springs will increase numbers of mosquitoes carrying **diseases like malaria and Zika.**



Warming winters will **reduce the time available to harvest wood** without damaging forest soils.

These impacts are expected by the 2050s.

WHAT'S CAUSING OUR CLIMATE TO CHANGE?

The Earth's climate has always fluctuated because of natural reasons, but **today, we are provoking a period of climate instability that would not be occurring naturally.** We are doing this by increasing the amount of greenhouse gases in our atmosphere, primarily by burning fossil fuels. Greenhouse gases like carbon dioxide, methane, and nitrous oxide are a small, but critically important, natural part of our atmosphere. Their heat-trapping property is what insulates Earth from the freezing cold of outer space, making our planet warm enough to live on. But now we have too much; and if we continue to add more greenhouse gases to the atmosphere, we will trap more heat and further disrupt our planet's climate system.

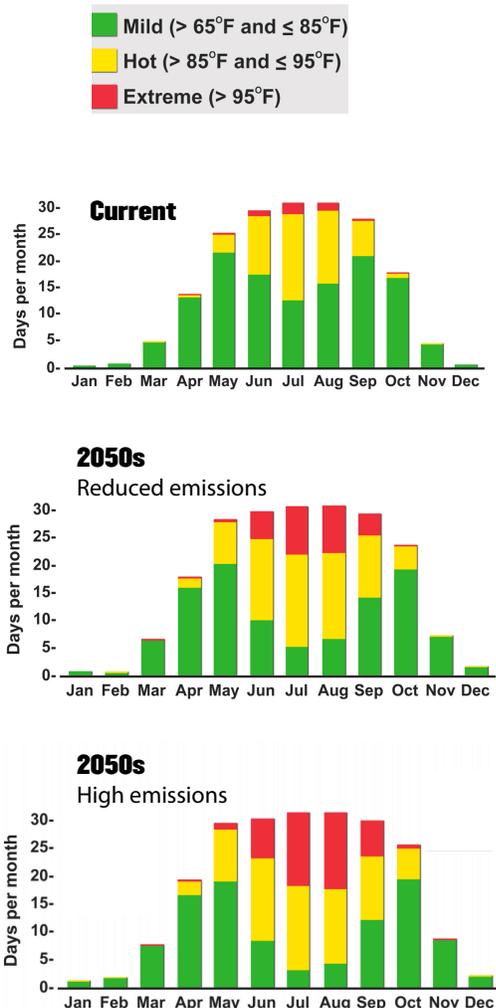
WILL OUR DECISIONS TODAY MAKE A DIFFERENCE?

Let's consider how climate change will impact heat extremes in Indiana. As global temperatures continue to rise, Indiana will also see a growing number of days with temperatures above 85°F, but with shifts in the distribution of mild, hot, and extremely hot days. In the bar graphs to the right, note in particular how the number of mild days (**GREEN**) and extremely hot days (**RED**) change in the future.

Historically, Hoosiers could expect, on average, 5 days per year where temperatures were extremely hot, over 95°F (top). **While some impacts are already unavoidable, the future will depend on the choices we make now.** If we reduce global greenhouse gas emissions (middle), by the 2050s, we can expect **27 extremely hot days** annually, and this increases to **38** days by the end of the century. If, however, we do nothing to reduce greenhouse gas emissions and stay on our high emissions pathway (bottom), by the 2050s we will see **42 extremely hot days** per year; and this number jumps to nearly **80** days above 95°F at the end of the century. Every fraction of warming that can be avoided matters. Our decisions today will make a difference.

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You can consult our [IN CCIA REPORTS](#) for plain-language analyses of how changing climate conditions impact various aspects of our lives. To date, 8 have been completed and 2 are forthcoming.

- **Agriculture**
- **Aquatic Ecosystems**
- **Energy**
- **Forest Ecosystems**
- **Health**
- **Past & Future Climate**
- **Tourism & Recreation**
- **Urban Green Spaces**

Forthcoming...

- **Water**
- **Infrastructure**

IN CCIA reports have been reviewed by individuals from: IN Department of Natural Resources, Corn Market Council, US Fish and Wildlife Service, The Nature Conservancy, Interra LTD, IN Tourism Association, Farm Bureau, City of Fort Wayne, Marion County Department of Public Health, IN Chamber of Commerce, Duke Energy, Soybean Alliance, IN State Poultry Association, Keep Indianapolis Beautiful, The Field Museum of Chicago, US Forest Service, Bloomington Parks and Recreation, Purdue Extension, LaPorte County Health Department, IN Dunes Tourism, USDA Natural Resources Conservation Service, and Central Indiana Land Trust.

The [Purdue Climate Change Research Center \(PCCRC\)](#) mission is to increase scientific and public understanding of the causes and consequences of climate change through interdisciplinary research and effective education and outreach. The PCCRC is committed to science-based, non-partisan, and collaborative analysis to support real-world decision making from the local to the global scales.

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