Scotland's climate changing faster than predicted

January 3 2024

Credit: Pixabay/CC0 Public Domain

Scotland's climate is changing faster than scientists predicted, with increasing likelihood of more frequent and more extreme weather events, according to new analysis by The James Hutton Institute in

Aberdeen.

Experts at the independent research organization say weather patterns in Scotland have changed substantially since 1960 and that changes that were expected to be seen over the next three decades are already happening.

In some parts of the country, temperatures in February, for example, have risen 2.5°C, since 1960. This observed change is comparable to the lower range of what climate scientists had projected for the future period 2020–2050, implying we are on course to reach the projections of higher temperatures.

The research, carried out for the Scottish Government, includes a warning that increased water scarcity could impact crop productivity, change ecosystem functions and undermine efforts to restore greenhouse gas-emitting peatlands in some areas, with central and eastern uplands particularly at risk. The trends of increased warming and reduced rainfall in the spring and summer will also increase wildfire risk.

The warning comes as the UK, including Scotland, experienced its hottest June on record while July was recorded as the world's hottest recorded month and 2023 will be the warmest on record. The daily global sea surface temperature also broke records at the beginning of August.

Antarctic sea ice coverage also reached a record low with associated threats of altered ocean currents, while Arctic sea ice also continues to decline, indicating a substantial detrimental change in the way Earth's temperature is regulated.

Dr. Mike Rivington, who led the Scottish climate change and extremes trends research at the Hutton says, "We are now in the midst of climate

breakdown: our ecosystems that regulate the climate and enable food production are degrading and are at risk of collapse, while we continue to increase greenhouse gas emissions driving further warming.

"There has never been a more important time to understand the scale of the threat and how fast we need to act. The acceleration of climate change and biodiversity loss on a global scale could push us beyond key tipping points, which if crossed will be irreversible.

"The fact that we have already experienced some of the projected changes in Scotland's climate suggests that climate change is happening faster. This will have global impacts, affecting trade and undermining the stability of economies at same time reducing our own capacity to adapt, for example, homegrown food and the water and energy and nature based services we get from today's ecosystems."

Cabinet Secretary for Transport, Net Zero and Just Transition Màiri McAllan said, "These findings underline that the climate emergency is not a distant threat—it is with us today. Storms have battered Scotland in recent months and 2023 is set to be the hottest year on record.

"The impacts of climate change are affecting families, communities and businesses across Scotland. That is why we are taking action to make Scotland more resilient in the face of a changing climate."

The research is set out in two reports delivered to the Scottish Government: "Climate Trends and Future Projections in Scotland" and "Climate Extremes in Scotland." They look at past trends, but also what we can expect, based on a range of 12 climate projections out to 2080.

They show that Scotland has also already experienced more rainfall during winter than had been projected. Between 1990 to 2019, February and to a lesser extent April have become wetter, particularly in the west,

by up to 60%, exceeding the projected change by 2050 of 45–55%.

In terms of temperature, for Scotland overall, the reports points to Scotland exceeding a 2°C increase in temperature by the 2050s, with the months from May to November experiencing up to 4°C of warming over the next three decades (2020–2049).

The number of days of consecutive dry weather—an indicator for drought and wildfire risk—are also expected to increase in drier months, such as September.

"Our climate is changing and this has many implications," explains Dr. Rivington. "It will increase stress on species and habitats and how well ecosystems function. Without fully functioning healthy ecosystems, agriculture and other ways nature supports society and the economy become impeded.

"Threats include water shortages reducing agricultural productivity, and risk water supplies running out at points in the year. Less and warmer water in streams impacts river health and water quality due to higher concentrations of pollution, but also increased potential for flooding in winter due to increased rainfall.

"Forewarned is forearmed and the analysis is hugely valuable if acted on. Adaptation plans need to consider the complexities of flood and drought in the same year or even same season, but we can adjust to manage these risks better.

"For example, we could capture and store more of that excess rainfall from the winter months for use in summer; this is not just in terms of engineering and reservoirs but also land management in our water catchments. Farms can increase the organic matter in soils, so they store more water for droughty periods. We can also use the knowledge to plan

better and have better surveillance e.g. raise greater awareness about wildfire risk and adjust seasonal management guidance on muirburn.

"The scale of the threats posed by the climate and ecological crises are daunting but the opportunities and many benefits of moving to a green economy as a solution are compelling and positive reasons to be optimistic about the future.

"Drastically reducing fossil fuel use, changing the food system to be better for our health and the environment, conserving and enhancing what biodiversity we have, restoring degraded ecosystems and reducing resource consumption to a sustainable level will give society a fighting chance and help us realize a better way of living."

Ms McAllan adds, "In January we will publish a draft of our ambitious National Adaptation Plan to address the climate risks facing Scotland. We are making Scotland more resilient to flooding, providing £150 million of extra funding, on top of our annual £42 m funding, for flood risk management over the course of this Parliament and consulting on a new Flood Resilience Strategy in the new year.

"We are creating Nature Networks across Scotland to help our wildlife adapt to the changing climate and make local environments more flood resilient and cooler in warmer weather. And we are getting our homes ready for extreme weather, with building regulations now including measures to address overheating and other extreme weather events."

More information: Summary report: www.hutton.ac.uk/research/proj … acts-natural-capital

For more on our Climate Change Impacts on Natural Capital work, visit here.

Provided by The James Hutton Institute