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Climate Panel Confident Warming Is Underway

Report to Detail the Role of Humans

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The newest international assessment of the consequences of Earth's warming climate has concluded with "high confidence" that human-generated greenhouse gases are already triggering changes in ecosystems on land and sea across the globe.

The second working group of the Intergovernmental Panel on Climate Change, which was charged with tracking the impact of global warming on specific regions and species, plans to release its final report tomorrow in Brussels. The Washington Post obtained a near-final draft of the report yesterday.

That document -- which follows an IPCC study in February that concluded with at least 90 percent certainty that humans are responsible for Earth's recent warming -- provides a more detailed look at how emissions from automobiles, industry and other sources are affecting life around the world.

The draft says "much more evidence has accumulated over the past five years" to indicate that changes such as longer growing seasons and earlier leaf-unfolding and earlier egg-laying by birds are traceable to human activities.

Thomas E. Lovejoy, an environmentalist who is president of the H. Heinz III Center for Science, Economics and the Environment in Washington, said in an e-mail that the report amounts to "a sad confirmation of what I have been following for 20 years, namely that nature is very sensitive to climate change, more so than anything else, and that we are seeing responses -- including threshold changes in ecosystems -- in the living world all over the globe."

The draft report makes distinctions between changes it considered significant with "high confidence" -- at least 80 percent certainty -- and those to which it assigned "very high confidence," which means 90 percent certainty. While it says with "very high confidence" that earlier bird migrations and a shift of species toward the poles are results of warmer temperatures, it said satellite data gave it only "high confidence" that "there has been a trend in many regions towards earlier greening of vegetation in the spring and increased net primary production linked to longer growing seasons and increasing atmospheric CO2 concentrations."

Scientists from around the world contributed to the report, whose details were being finalized in Brussels this week. The authors relied on peer-reviewed scientific reports to make their findings, and the report was subjected to rounds of outside review.

In some cases the authors compared real-life observations with computer models of a warming world and found that they matched well. That led them to find "with high confidence" that the human-caused "component of warming over the last three decades has had a discernible influence on many physical and biological systems."

The report also seeks to predict how warming could affect particular regions in the future, suggesting that drought-prone areas are likely to become drier and "extreme precipitation events, which are likely to increase in frequency and intensity, will augment flood risk."

At the same time, the authors write, "water volumes stored in glaciers and snow cover are very likely to decline," which will cut water supplies in parts of the globe "where more than one sixth of the population currently live."

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Several scientists interviewed yesterday said they had already detected specific ways that climate change is altering ecosystems in the United States and abroad.

Camille Parmesan, a professor of integrative biology at the University of Texas at Austin, said several bird species, such as the Rufus hummingbird, have started residing year-round in Gulf Coast states rather than just migrating there part of the year from Mexico. Some species of Mexican butterflies have begun breeding in the United States.

"It's clear that climate is going through a major shift," Parmesan said in a conference call with reporters yesterday.

Margaret Palmer, a professor of entomology and biology at the University of Maryland, said scientists at the Chesapeake Biological Laboratory, where she works, have been measuring the water temperature at the end of the lab's pier since 1938 and found that it has warmed between 3.6 and 5.4 degrees Fahrenheit during that time. As a result, she said, they have noticed some fish species have changed when they migrate in and out of the region.

Since the IPCC has already predicted the global temperature could increase between 1.8 and 10.8 degrees Fahrenheit over the next century, Palmer added, "this will translate in terms of river and stream temperatures of [7.2 to 12.6 degrees Fahrenheit], which is a very significant degree when you think about temperature impacts."

The new report estimates that 20 to 30 of the world's species "are likely to be at high risk of irreversible extinction if global average temperature" rises between 2.4 and 4.5 degrees Fahrenheit.

The scientists warn that humans could suffer as well, since hunger and the spread of infectious diseases could increase in a warmer world. Global agriculture production would probably increase in the near term as colder climates warm, the report says, but it would probably start to decline after an increase of 5.4 degrees Fahrenheit.

Robert Correll, who directs the Heinz Center's program on the issue, said yesterday during the conference call with reporters that scientists are struggling with how to predict the impact of a period that will be warmer than any time since the Ice Age.

"It really is much different compared to what humankind has had itself exposed to over the past 10,000 years," he said. "It's really entering a new world about which we know very little."

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