



Collaborative on Health and the Environment – Washington

*A Partnership Network for Environmental Health
Established and Coordinated by the
Institute for Children's Environmental Health*



Summary of Climate Change and Public Health in Washington

Introduction

Scientists have reached a consensus conclusion that climate change likely will have large-scale impacts on human society at multiple scales, from global to local, for the remainder of this century and beyond.¹ The projected effects on human health are broad and serious, and put at risk many of the gains that have been made in the past century in disease prevention and treatment, and in building robust public health systems.

Climate Change and Health—Identifying Connections

Research carried out by the Intergovernmental Panel on Climate Change (IPCC) and other scientific bodies has linked increases in global average temperatures largely to emissions of carbon dioxide (CO₂) and other heat-trapping “greenhouse gases” caused by fossil fuel combustion. Research carried out by the IPCC and others has identified spin-off impacts of increased heat energy in the atmosphere.²

From the perspective of Washington State and public health, those follow-on impacts include: thermal stress, air pollution, water and food impacts, and disease.³

Thermal Stress

Heat waves are a serious public health threat, especially for vulnerable populations such as the elderly. Pacific Northwest temperatures increased throughout the 20th century, and are projected to increase more rapidly across all four seasons in the 21st century. Model runs carried out by the University of Washington Climate Impacts Group project the largest temperature increases during summer months, with increases averaging 2.38 degrees F in the 2020s and 3.78 degrees F in the 2040s.

Air Pollution

Ground-level ozone, also known as photochemical smog, typically forms in the summer during periods of high temperatures and extended sunlight. Ozone forms from precursors, emitted by fossil fuel combustion and volatilization of petrochemical-based cleaning and coating products. Research indicates a strong association between temperatures above 90 degrees F and ground-level ozone formation.⁴

Washington State University and other institutions have prepared a study on how global warming may affect air quality in the Pacific Northwest. Preliminary results indicate a worsening of air quality caused by higher ozone precursor emissions and increased long-distance transport of ozone.

Water & Food Impacts

Global warming will result in numerous impacts on Washington's water resources in ways that will have significant implications for human health.

A leading concern is availability of fresh water for domestic and agricultural needs. Even if climate change were not an issue, ensuring adequate water supplies to accommodate expected population growth will be difficult. Climate change will exacerbate the difficulty. Models show that higher temperatures will cause more winter precipitation to fall as rain

rather than snow, resulting in a thinner mountain snowpack and reduced summer flows into drinking water reservoirs.⁵ A 2004 study estimated that Seattle Public Utilities' "firm" water yield will fall from 171 million gallons per day (mgd) to 147 mgd by 2040, as a result of dwindling snowpack.⁶

Water availability will have significant implications for food production, especially in the drier region east of the Cascades. Global warming impacts on agriculture will vary depending on crops and water availability. Higher temperatures and increased levels of atmospheric carbon dioxide will likely mean higher crop yields, if water is available. CO₂ fertilization, however, could also mean greater weed growth, leading to increased use of herbicides. In addition, higher temperatures could accelerate insect life cycles and expand pest ranges. Statistical analysis indicates that global warming may increase the need for farm pesticides.⁷

Disease

Higher temperatures will expand the ranges of mosquito species and, under some conditions, boost their effectiveness as disease vectors. One vector-borne disease of concern is West Nile Virus. The first U.S. outbreak of the disease took place in New York City in 1999, and since then, West Nile Virus has spread to people and animals across the coterminous 48 states, including Washington.

Another concern with higher temperatures and higher levels of atmospheric carbon dioxide is higher growth rates of allergenic plants, resulting in longer and more intense allergy seasons.⁸

Further Steps

A state-mandated study is underway to better understand the possible health impacts of global warming in Washington. A report is due December 1, 2007. The study's goal is to develop epidemiological models quantifying climate change impacts on public health. Such information will be useful for developing policies, surveillance, and response systems to mitigate climate change impacts. More specific information also can help justify greenhouse gas emissions reduction targets and timetables.

*Compiled by the Collaborative on Health and the Environment's
Climate Change and Health Working Group
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For more information, please see: <http://washington.chenw.org>

¹ IPCC. Climate Change 2007: The Physical Science Basis. Summary for Policymakers.

² Ibid.

³ Ann Marie Kimball, MD, MPH. The Pacific Northwest and Climate Change: Health Effects of an Inconvenient Truth. Presentation to CHE-Washington, 2007

⁴ Knowlton, K., et. al. Assessing Ozone-Related Health Impacts Under a Changing Climate. Environmental Health Perspectives. November 2004. Volume 112, Number 15.

⁵ University of Washington Climate Impacts Group. Climate Impacts on Pacific Northwest Water Resources. Retrieved from <http://www.cses.washington.edu/cig/pnwc/pnwwater.shtml>

⁶ Washington Department of Ecology, Washington Department of Community, Trade and Economic Development. Impacts of Climate Change on Washington's Economy: A Preliminary Assessment of Risks and Opportunities. November 2006.

⁷ See Note 6.

⁸ Oregon State University, Institute for Natural Resources. Scientific Consensus Statement on the Likely Impacts of Climate Change in the Pacific Northwest. June 2004