

Implications of 21st century climate change for the Pacific Northwest: The Washington State Climate Change Impacts Assessment and Columbia Basin hydrologic database

Marketa McGuire Elsner, P.E.
University of Washington Climate Impacts Group

In February 2009, the University of Washington's Climate Impacts Group (CIG) completed an unprecedented assessment of climate change impacts on Washington State. Funded by the Washington State legislature, the Washington Climate Change Impacts Assessment (WACCIA) presents the projected effects of climate change on eight potentially vulnerable sectors: agriculture, coasts, energy, forests, human health, urban stormwater infrastructure, salmon, and water resources. In this study, we utilized climate projections from A1B and B1 greenhouse gas emissions scenarios, as simulated by the full suite of 20 global climate models (GCMs), archived in the 2007 Fourth Assessment Report of the IPCC. We statistically downscaled the GCMs to generate regional scenarios and used these future climate variables to drive hydrologic model simulations. Each sector incorporated the projections of climatic and hydrologic variables in their respective evaluations of climate change impacts. Here we present the results of this study over the State of Washington for three future intervals: the 2020s, 2040s and 2080s. We also discuss the challenges we encountered with statistical downscaling of climate change scenarios to small spatial scales (~3,000 square miles or less) and to daily timesteps. In a related study by the CIG, we are building on the groundwork of the WACCIA to develop a publicly accessible database of hydrologic climate change scenarios for the greater Columbia River basin (including coastal drainages of Washington and Oregon). Finally, we discuss the continuing progress of this study, including modifications to our approach based on what we've learned from the WACCIA.