The Fourth National Climate Assessment, Chapter 25: Southwest

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Abstract

Chapter 25 of the Fourth National Climate Assessment (NCA4) is an assessment of climate change and variability, climate-related risks, impacts and adaptation in the U.S. Southwest. The chapter builds on assessments of climate change in the Southwest from the three previous U.S. National Climate Assessments. Each assessment has consistently identified drought, water resource reliability, and loss of ecosystem integrity as climate change challenges for the Southwest region. Chapter 25 further examines interconnections among water, ecosystems, coastal and marine systems, food, and human health and adds new key messages concerning energy and Indigenous peoples. The Southwest chapter is one of 29 chapters in Volume II of the Fourth National Climate Assessment - Impacts, Risks, and Adaptation in the United States. The National Climate Assessment fulfills the mandate of the Global Change Research Act (GCRA) of 1990 to provide the nation with a timely assessment and analysis of scientific findings of the effects of global change on multiple economic and natural resource sectors in the United States, and an analysis of observed and projected trends in global change. Chapter 25, Southwest, was written by a team of scientists and practitioners with expertise spanning areas specified in the GCRA, after extensive stakeholder engagement that involved the collection of input on key climate-related challenges, impacts, and opportunities in the Southwest region. The chapter went through multiple rounds of public and governmental review, during 2017 and 2018. This poster will focus on the findings from Chapter 25.
Key Messages

Water Resources. Water for people and nature in the Southwest has declined due to human-caused climate change. Intensifying droughts and occasional large floods, combined with critical water demands from a growing population, deteriorating infrastructure, and groundwater depletion, suggest the need for flexible water management techniques that address changing risks over time, balancing declining supplies with greater demands.

Ecosystems and Ecosystem Services. The integrity of Southwest forests and other ecosystems and their ability to provide natural habitat, clean water, and economic livelihoods have declined as a result of recent droughts and wildfire due to human-caused climate change. Management of these and other actions can help reduce future vulnerabilities of ecosystems and human well-being.

The Coast. Many coastal resources in the Southwest have been affected by sea level rise, ocean warming, and reduced ocean oxygen—all impacts of human-caused climate change—and ocean acidification resulting from human emissions of carbon dioxide. Homes and other coastal infrastructure, marine flora and fauna, and people who depend on coastal resources face increased risks under continued climate change.

Indigenous Peoples. Traditional foods, natural resource-based livelihoods, cultural resources, and spiritual well-being of Indigenous peoples in the Southwest are being affected by drought, wildfire, and changing ocean conditions. Because future changes would further disrupt the ecosystems on which Indigenous peoples depend, tribes are implementing adaptation measures and emissions reduction actions.

Energy. The ability of hydropower and fossil fuel electricity generation to meet growing energy use in the Southwest is decreasing as a result of drought and rising temperatures. Many renewable energy sources offer increased energy reliability, lower water intensity of energy generation, reduced greenhouse gas emissions, and new economic opportunities.

Food. Food production in the Southwest is vulnerable to water shortages. Increased drought, heat waves, and reduction of winter chill hours can harm crops and livestock; exacerbate competition for water among agriculture, energy generation, and municipal uses; and increase future food insecurity.

Human Health. Heat-associated deaths and illnesses, vulnerabilities to chronic disease, and other health risks to people in the Southwest result from increases in extreme heat, poor air quality, and conditions that foster pathogen growth and spread, improving public health systems, community infrastructure, and personal health can reduce serious health risks under future climate change.