IMPACT

Climate Change and US-Mexico Border Communities

"Transboundary cooperation to address the impacts of climate variability and climate change is essential to promoting the best outcomes and to building regional adaptive capacity on both sides of the border."

On the left is San Diego, located in the United States. On the right is the densely populated border town of Tijuana, located in Mexico. Photo: Sgt. 1st Class Gordon Hyde.

Key Messages

1

Climate change exposes the populations in the border region to uneven impacts, due to their cultural and institutional diversity and uneven economic development.

2

Climate change exposes sensitive wetland ecosystems, which are hotspots of border-region biodiversity, to impacts such as reduced precipitation and extended drought.

3

Projected climate changes will put additional pressure on severely stressed water systems and may exacerbate existing vulnerabilities relating to water supply and water quality. Cascading effects of additional stress on water systems include: challenges to energy infrastructure, agriculture, food security, and traditional farming and ranching cultures prevalent in the border region.

The sixteenth chapter of the *Assessment of Climate Change in the Southwest United States* examines climate-related vulnerability in the western portion of the US-Mexico border region from Baja California to El Paso, focusing primarily on border counties in the United States and municipalities in Mexico. "Climate Change and US-Mexico Border Communities" analyzes demographic, socioeconomic, institutional, and other drivers of climate-related vulnerability, and the potential impacts of climate change across multiple sectors (e.g., water, agriculture and ranching, and biodiverse ecosystems).

Most of the border's population is concentrated along the international boundary in fourteen city pairs that constitute binational urban systems. The border region has higher poverty, water insecurity, substandard housing, and lack of urban planning relative to the rest of the United States, and multiple socioeconomic asymmetries exist between the US and Mexico sides of the border. These asymmetries create challenges for governance, planning, effective communication of climate-related risks, and design of adaptation strategies.

For more information about *Assessment of Climate Change in the Southwest United States*, see: www.swcarr.arizona.edu, www.cakex.org, www.islandpress.org/NCAreports.
This fact sheet developed by Institute of the Environment, University of Arizona.

The Rio Grande River at the US-Mexico border.

Temperature, Precipitation, and Drought

Climate models project that average annual temperatures will increase between 2°F and 6°F during the mid-century time frame (around 2041–2070, according to the high-emissions scenario). Spring precipitation is projected to decrease, exacerbating dryness in the region's driest season and probably intensifying dryness in the summer season as well. These climate variations increase the likelihood of drought, with ramifications for northern Mexico water supplies and probably groundwater recharge.

Economy

The border is a region of dynamic growth in both industry and employment. The region is of critical value to the global economy and both countries' national economies. Its economic significance therefore enhances its exposure to climatic stress. The economy of the border is highly integrated through manufactured and agricultural trade, exported-oriented production and labor, and markets that include cross-border manufacturing clusters in aerospace, electronics, medical devices, automotive products, and other sectors. Its integration into the global economy means that climate stresses have potential impacts beyond local borders because of the potential for disrupted trade.

Biodiversity

The border region is particularly rich in species and ecosystem diversity. Socioeconomic factors are related to biodiversity loss—population growth may drive higher resource use, leading to higher vulnerability to climate change. Biodiversity loss has many potential negative impacts, such as the encroachment of invasive species, decreasing water-retention capacities, and fewer locations that can be used as recreational areas and that can sequester carbon dioxide.

Water

Expected effects of climate changes include: constraints on available water supply to major cities reliant on Colorado River water; increased urban-agriculture competition over water; constraints on meeting increasing regional water and energy demand; and threats to ecosystems of high-resource value, including endangered species habitat, such as Rio Grande estuaries that are home to migrating cranes, geese, and fish. Climate change in the Southwest will place additional burdens on an already-stressed water system. Both the United States and Mexico have aging water infrastructures that are very expensive to fix.

The Colorado River Delta is a significant border ecosystem that is at risk from increasing regional water stress. Image courtesy of NASA/GSFC/MITI/ERSDAC/JAROS and United States/Japan ASTER Science Team.

Trans-border Collaboration

Distinctions in governance approaches—centralized (Mexico) versus decentralized (United States)—and institutional fragmentation and complexity make the task of collaboration daunting and reduce the potential adaptive capacity in the region. Collaboration may help reduce regional climate-related vulnerability and promote adaptive strategies for the region. A collaborative model for other trans-border areas and issues, the Colorado River Joint Cooperative Process, which includes government agencies, NGOs, and water stakeholders from both countries, has been working to develop "binational processes for meeting municipal, agricultural, and environmental needs" in the Colorado River delta.

A lack of infrastructure in border communities increases erosion risks. Photo: Margaret O. Wilder.

Information from: Wilder, M., G. Garfin, P. Ganster, H. Eakin, P. Romero-Lankao, F. Lara-Valencia, A. A. Cortez-Lara, S. Mumme, C. Neri, and F. Muñoz-Arriola. 2013. "Climate Change and U.S.-Mexico Border Communities." In *Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment*, edited by G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, 340–384. A report by the Southwest Climate Alliance. Washington, DC: Island Press.

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