



Fourth National Climate Assessment, Vol II — Impacts, Risks, and Adaptation in the United States

Chapter 16 | Climate Effects on U.S. International Interests

Prof. Jim Buizer

School of Natural Resources and the Environment &

Institute of the Environment

University of Arizona

**Center for Climate Adaptation Science and Solutions
Seminar**

December 5, 2018

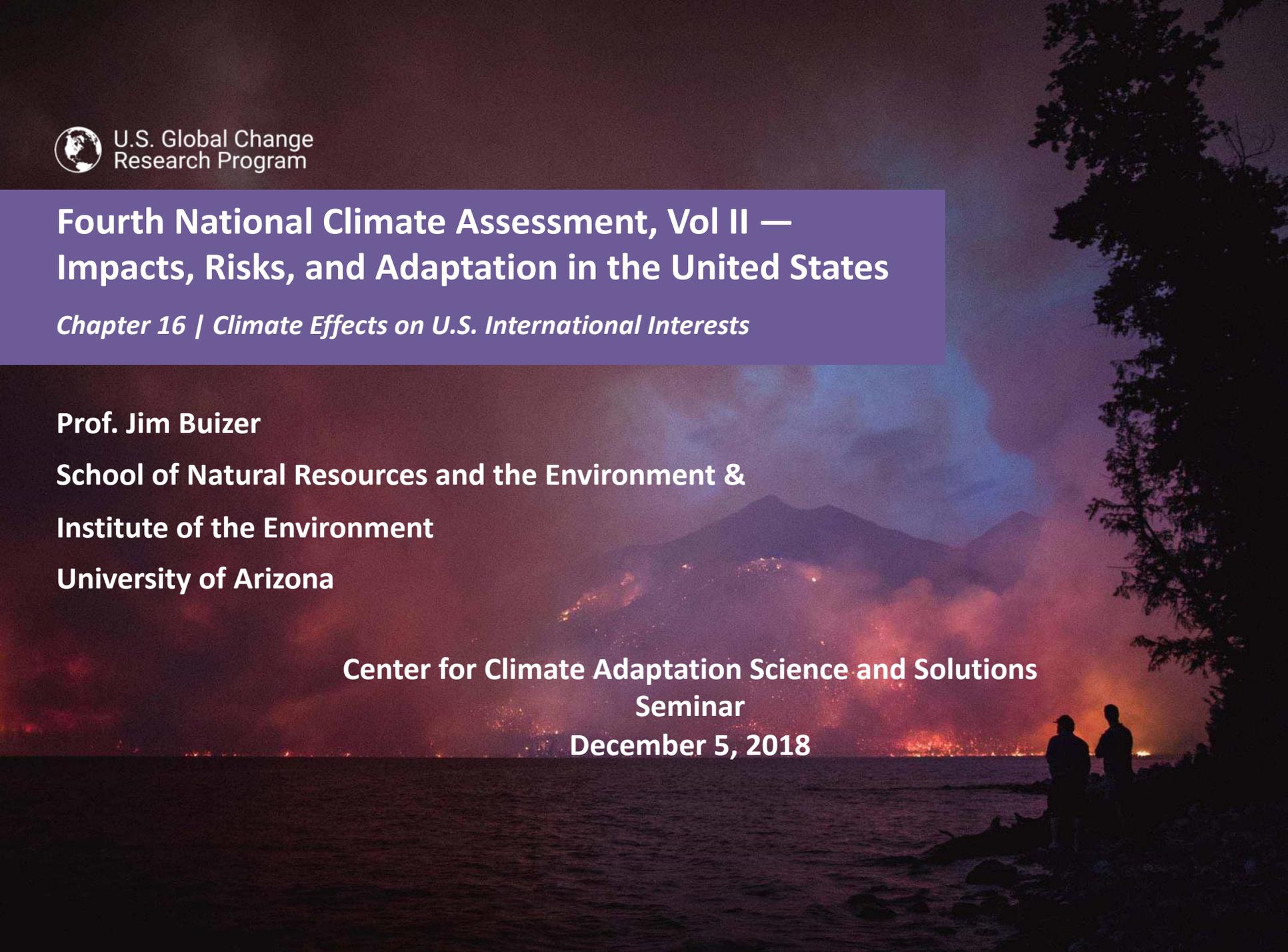


Table of Contents

I. Overview

II. Our Changing Climate

III. National Topics

- Water
- Energy Supply, Delivery and Demand
- Land Cover and Land-Use Change
- Forests
- Ecosystems, Ecosystem Services, and Biodiversity
- Coastal Effects
- Oceans and Marine Resources
- Agriculture and Rural Communities
- Built Environment, Urban Systems, and Cities
- Transportation
- [Air Quality](#)

- Human Health
- Tribes and Indigenous Peoples
- [Climate Effects on U.S. International Interests](#)
- [Sector Interactions, Multiple Stressors, and Complex Systems](#)

IV. Regional Chapters

- Northeast
- Southeast
- [U.S. Caribbean](#)
- Midwest
- [Northern Great Plains](#)
- [Southern Great Plains](#)
- Northwest
- Southwest
- Alaska
- Hawai`i and U.S.-Affiliated Pacific Islands

V. Response

- Reducing Risks Through Adaptation Actions
- Reducing Risks Through Emissions Mitigation

VI. Appendices

- Process
- Information Quality Act
- Data Tools and Scenarios
- [International](#)
- Frequently Asked Questions

NCA4 Volume II in 5 Bullets

- Earth's climate is now changing faster than at any point in modern civilization.
- These changes are primarily the result of human activities, the evidence of which is overwhelming and continues to strengthen
- The impacts of climate change are already being felt across the country, and climate-related threats to Americans' physical, social, and economic well-being are rising
- Americans are responding in ways that can bolster resilience and improve livelihoods
- However, neither global efforts to mitigate the causes of climate change nor regional efforts to adapt to the impacts currently approach the scales needed to avoid substantial damages to the U.S. economy, environment, and human health and well-being over the coming decades

16 Key Message #1

Economics and Trade

The impacts of climate change, variability, and extreme events outside the United States are affecting and are virtually certain to increasingly affect U.S. trade and economy, including import and export prices and businesses with overseas operations and supply chains.



Fig. 16.1: Impact of 2011 Thailand Flooding on U.S. Business Interests

Severe flooding in Thailand in 2011 created significant disruptions of local business operations and global supply chains, resulting in a range of impacts to U.S. business interests. *Source: ICF.*

The 2011 flooding in Thailand illustrates how an extreme event on another continent can affect U.S. business interests



Western Digital, a U.S.-based company that produces 60% of its hard drives in Thailand, sustained **\$199 million in losses** and a shipment reduction of **51% fewer hard drives** in the last quarter of 2011.

Shortages temporarily **doubled** global hard drive **prices** affecting United States-based Apple, HP, and Dell.



Production of Ford vehicles temporarily **halted** in Thailand due to the flooding.

Production of Honda vehicles in the United States and Canada temporarily **decreased ~50%**

16 Key Message #2

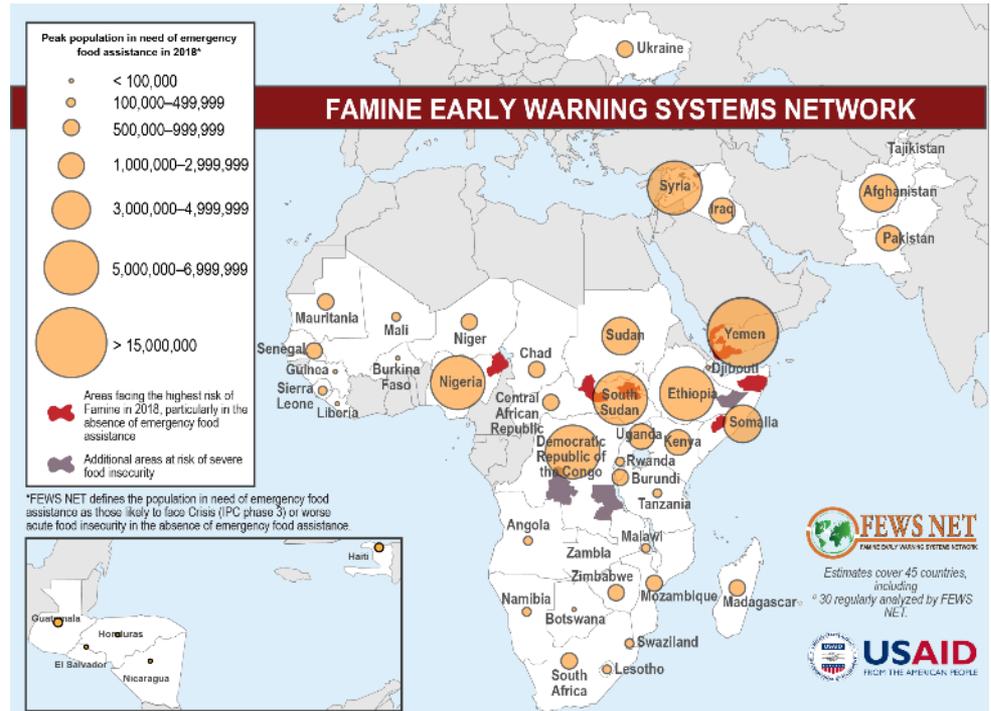
International Development and Humanitarian Assistance

The impacts of climate change, variability, and extreme events can slow or reverse social and economic progress in developing countries, thus undermining international aid and investments made by the United States and increasing the need for humanitarian assistance and disaster relief. The United States provides technical and financial support to help developing countries better anticipate and address the impacts of climate change, variability, and extreme events.



Fig. 16.2: Famine Early Warning Systems Network

The Famine Early Warning Systems Network involves a collaboration between U.S. government agencies, other national government ministries, and international partners to collect data and produce analyses of conditions in food-insecure regions and countries. The analyses integrate information on climate, agricultural production, prices, trade, nutrition, and other societal factors to develop scenarios of food security around the world 6 to 12 months in advance. This map shows projections of peak populations in need of emergency food assistance in 2018. *Source: adapted from USAID 2018.*⁵⁸



16 Key Message #3

Climate and National Security

Climate change, variability, and extreme events, in conjunction with other factors, can exacerbate conflict, which has implications for U.S. national security. Climate impacts already affect U.S. military infrastructure, and the U.S. military is incorporating climate risks in its planning.

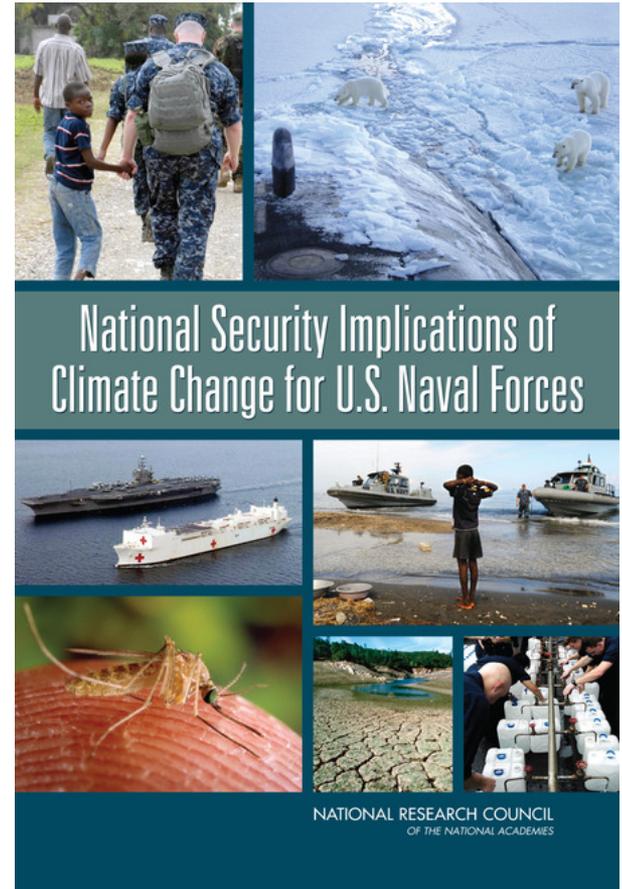


Fig. 16.3: U.S. Military Relief Efforts in Response to Typhoon Haiyan

The U.S. military conducted humanitarian and disaster relief efforts in the aftermath of Typhoon Haiyan in the Philippines in 2013. (upper left) An officer aboard an MH-60R Seahawk helicopter prepares to drop off humanitarian supplies. (upper right) A sailor assists a Philippine nurse in treating a patient's head wound at the Immaculate Conception School refugee camp. (lower left) Residents displaced by the storm fill the cargo hold of a C-17 Globemaster aircraft. (lower right) Sailors aboard the aircraft carrier USS *George Washington* move a pallet of drinking water across the flight deck. *Photo credit: U.S. Department of Defense.*



16 Key Message #4

Transboundary Resources

Shared resources along U.S. land and maritime borders provide direct benefits to Americans and are vulnerable to impacts from a changing climate, variability, and extremes. Multinational frameworks that manage shared resources are increasingly incorporating climate risk in their transboundary decision-making processes.



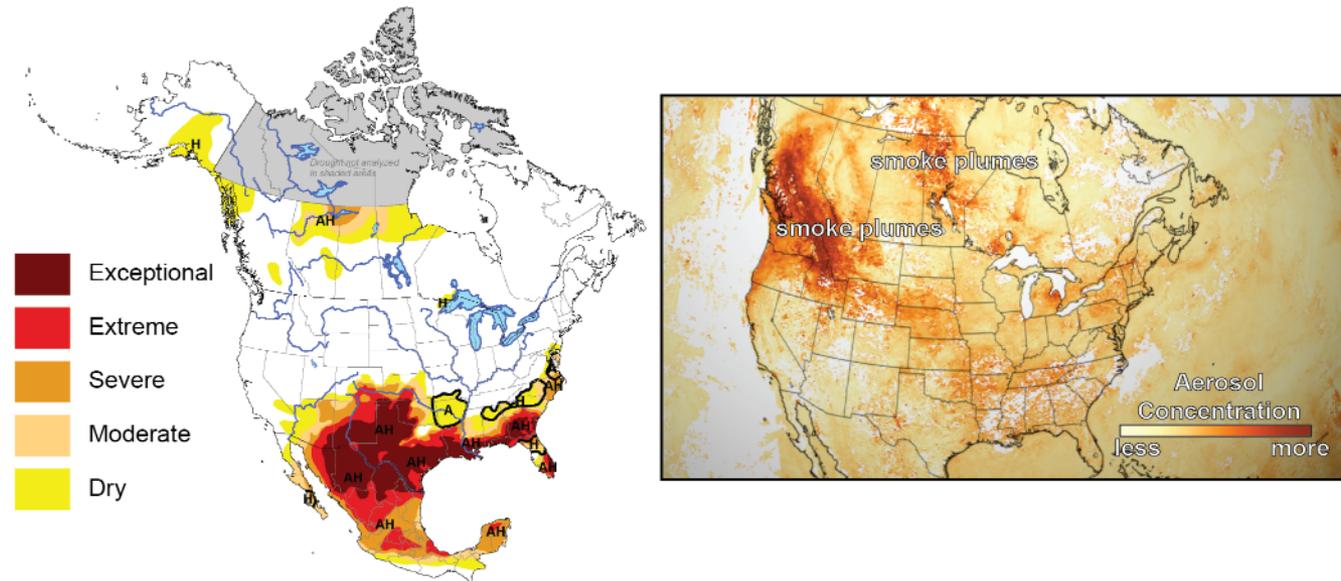


Fig. 16.4: Transboundary Climate-Related Impacts

Shown here are examples of climate-related impacts spanning U.S. national borders. (left) The North American Drought Monitor map for June 2011 shows drought conditions along the US–Mexico border. Darker colors indicate greater intensity of drought (the letters A and H indicate agricultural and hydrological drought, respectively). (right) Smoke from Canadian wildfires in 2017 was detected by satellite sensors built to detect aerosols in the atmosphere. The darker orange areas indicate higher concentrations of smoke and hazy conditions moving south from British Columbia to the United States. Sources: (left) adapted from NOAA 2018,¹¹⁴ (right) adapted from NOAA 2018.¹¹⁵

Box 16.1: Implications of Global Health Risks for the United States

While climate is only one factor influencing the spread of infectious diseases, warmer conditions and precipitation changes projected to occur outside and inside the United States could influence disease transmission outside, within and across U.S. borders, as well as habitat suitability for disease-carrying insects and pests.

Warmer temperatures provide the opportunity for mosquitoes and other disease-carrying pests to increase their geographic range. The past two decades have seen the introduction or reintroduction into the United States of several vector-borne diseases, including West Nile virus, dengue, chikungunya, and, most recently, Zika (see Ch. 14: Human Health).

Box 16.2: Benefits of International Scientific Cooperation on Climate Research

Cooperation with other international and national scientific organizations enables the United States to better observe, understand, assess, and manage the impacts of climate processes on U.S. interests within and outside of national borders. Examples of benefits to the United States of international scientific cooperation include:

- *access to observations, data, and knowledge;*
- *opportunities to leverage funding and equipment;*
- *knowledge of climate impacts in regions and sectors of interest to the United States;*
- *the ability to shape the priorities of an increasingly global and interdisciplinary research community; and*
- *mechanisms to share technical expertise and experiences with other countries, regions, and communities.*

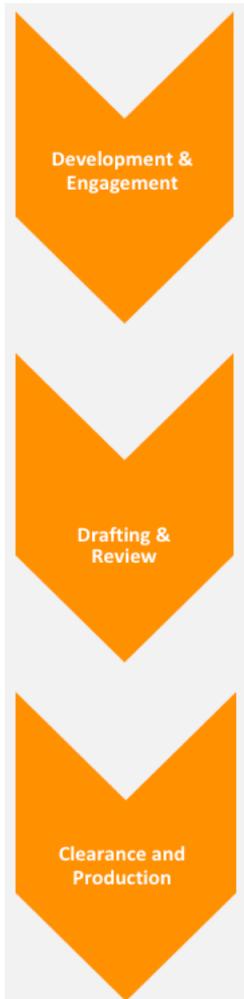
Box 16.3: How Well Are Climate Risks to U.S. International Interests Understood and Addressed?

There is high confidence that climate change, variability, and extreme events can result in profound consequences for U.S. international interests.

The mechanisms by which climate impacts beyond American borders can affect U.S. interests are not uniformly well understood, partly because these impacts are part of complex systems (see Ch. 17: Complex Systems).

The literature on climate impacts on U.S. international interests is at an early stage of development. Our understanding of the effectiveness of adaptation efforts to offset adverse impacts (or take advantage of positive impacts) is quite limited (see Ch. 28: Adaptation).

Chapter Development



- Federal Coordinating Lead Author and non-Federal Chapter Lead selected.
- Public outreach meeting solicits input on chapter outline, invites prospective authors/ contributors.
- Author team assembled, drawing evenly from Federal and non-Federal experts, all with international experience related to climate.
- Chapter topics selected to illustrate ways in which U.S. interests can be affected by climate impacts around the globe.
- Public review meeting provides updates on progress and seeks input from stakeholders.
- Drafting of chapter, with multiple rounds of review (Federal, public and National Academies). Responses to public and National Academies reviews are evaluated by a Review Editor.
- Final Federal review and clearance. NCA4 team works with Technical Support Unit on a technical review, proofing and final production.

16 Chapter Author Team

Federal Coordinating Lead Author

Meredith Muth, *National Oceanic and Atmospheric Administration*

Chapter Lead

Joel B. Smith, *Abt Associates*

Chapter Authors

Alice Alpert, *U.S. Department of State*

James L. Buizer, *University of Arizona*

Jonathan Cook, *U.S. Agency for International Development*

Apurva Dave, *U.S. Global Change Research Program/ICF*

John Furlow, *International Research*

Institute for Climate and Society, Columbia University

Kurt Preston, *U.S. Department of Defense*

Peter Schultz, *ICF*

Lisa Vaughan, *National Oceanic and Atmospheric Administration*

Review Editor

Diana Liverman, *University of Arizona*

Recommended chapter citation

Smith, J.B., M. Muth, A. Alpert, J.L. Buizer, J. Cook, A. Dave, J. Furlow, K. Preston, P. Schultz, and L. Vaughan, 2018: Climate Effects on U.S. International Interests. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA. doi: [10.7930/NCA4.2018.CH16](https://doi.org/10.7930/NCA4.2018.CH16)

Read the full chapter

<https://nca2018.globalchange.gov/chapter/international>

USGCRP Coordinator

Apurva Dave, International Coordinator and Senior Analyst

nca2018.globalchange.gov