



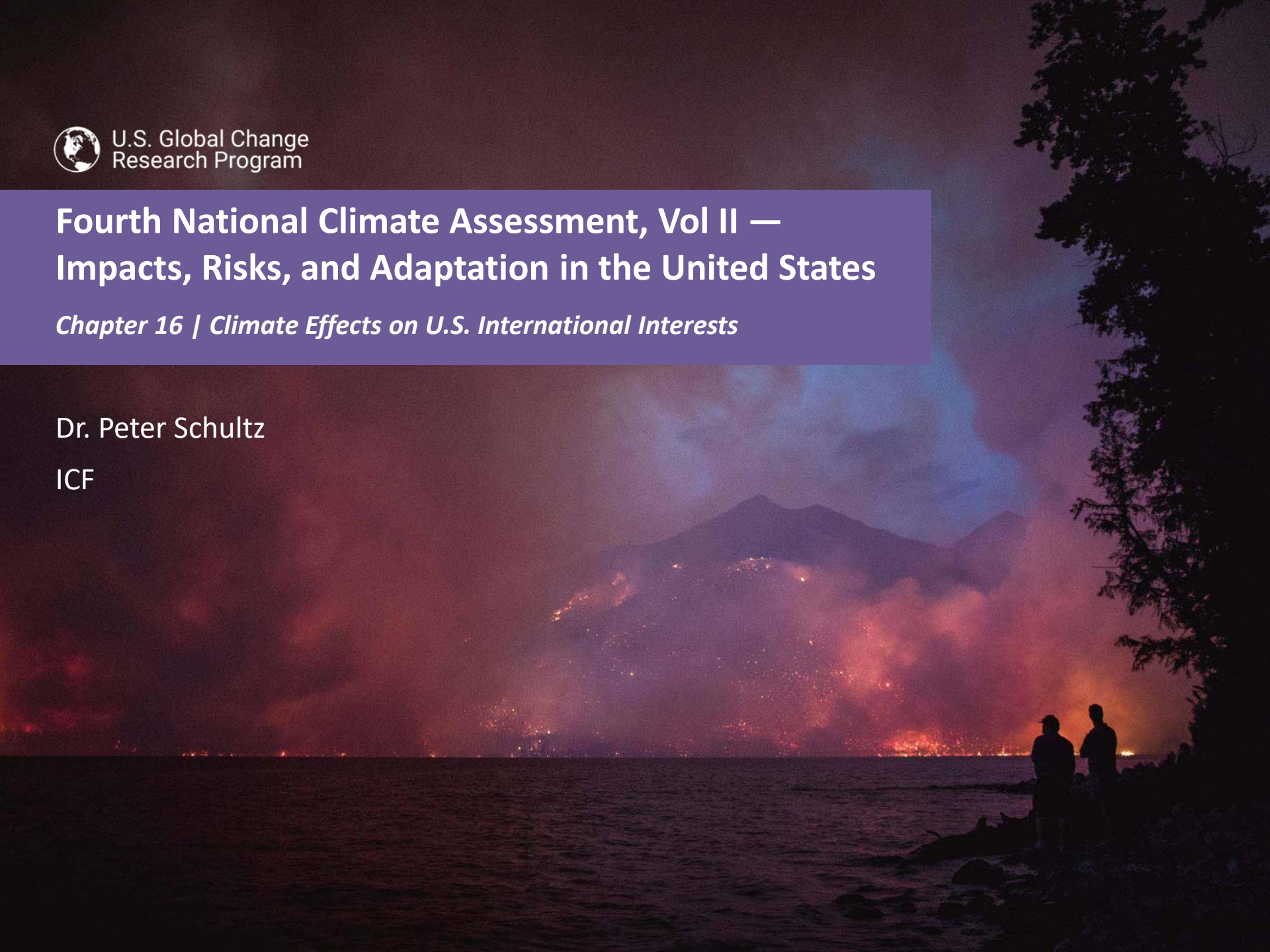
U.S. Global Change
Research Program

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

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

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ICF



16 International - 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.

16 International – Economics and Trade

Complex impacts, e.g.,

Impacts of 2010-2011 extreme weather/climate on wheat market

- Drought in Russia, Ukraine, United States, and damaging precipitation in Australia
- Corresponding reduction in wheat production together with high demand, low stocks, trade policies, and other factors drove up prices
- Benefits to U.S. wheat exports
- Higher costs to U.S. bread producers and consumers

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 International - 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.

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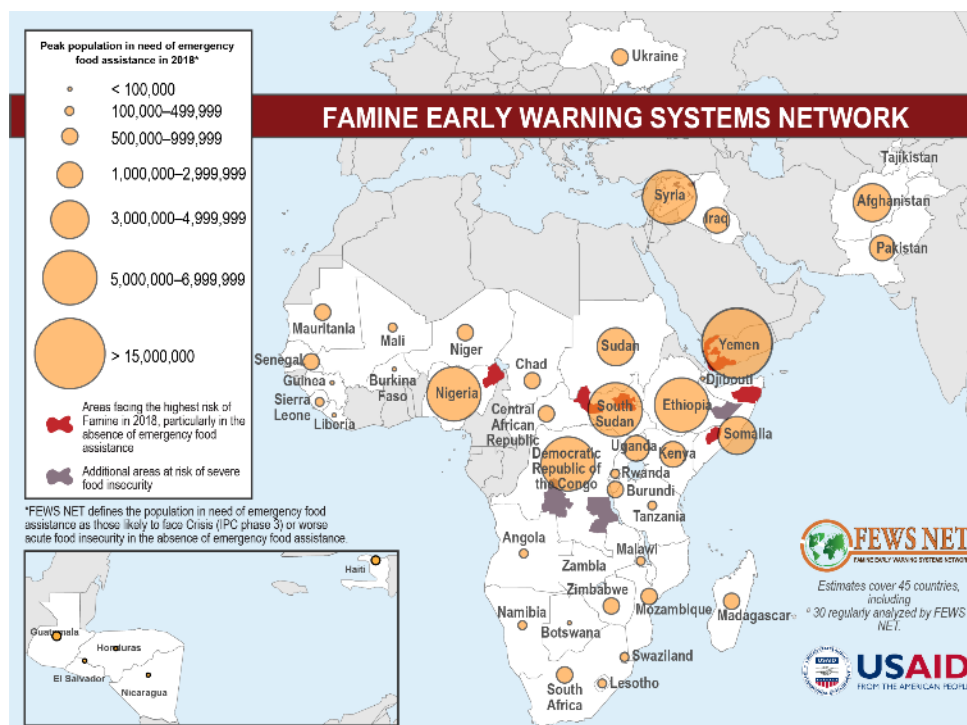
International – Development and Humanitarian Assistance

Developing countries are often highly vulnerable to climate extremes

- E.g., In 1998, Honduras and Nicaragua lost thousands of lives due to Hurricane Mitch
 - Responses from USAID and DoD
 - Need for this type of engagement will increase as the intensity of tropical cyclones and droughts increases

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



Weather index insurance approaches in Ethiopia, supported by FEWSNET, helped to mitigate the impacts of the 2015 drought.

16 International - 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.

16 International – National Security

- Direct linkages between climate-related stress and national security are unclear, but climate variability has been shown to affect conflict through intermediate processes including:
 - Resource competition
 - Commodity price shocks
 - Food insecurity
- Potential for conflict and displacement increases where there is a:
 - History of civil violence
 - Conflict elsewhere in the region
 - Low GDP or economic growth
 - Economic shocks
 - Weak governance
 - Lack of access to basic services
- E.g., Droughts around the world in 2010 contributed to doubling of wheat prices and tripling of bread prices in Egypt. This and other factors contributed to the civil unrest that ultimately resulted in the Egyptian revolution.

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



U.S. Military Relief Efforts in Response to Typhoon Haiyan

Figure 16.3: 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.

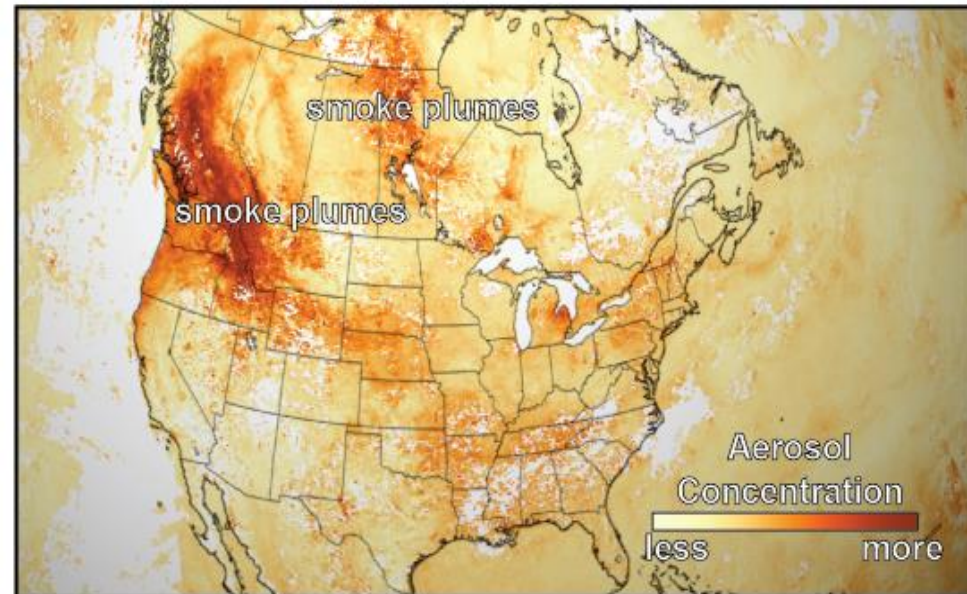
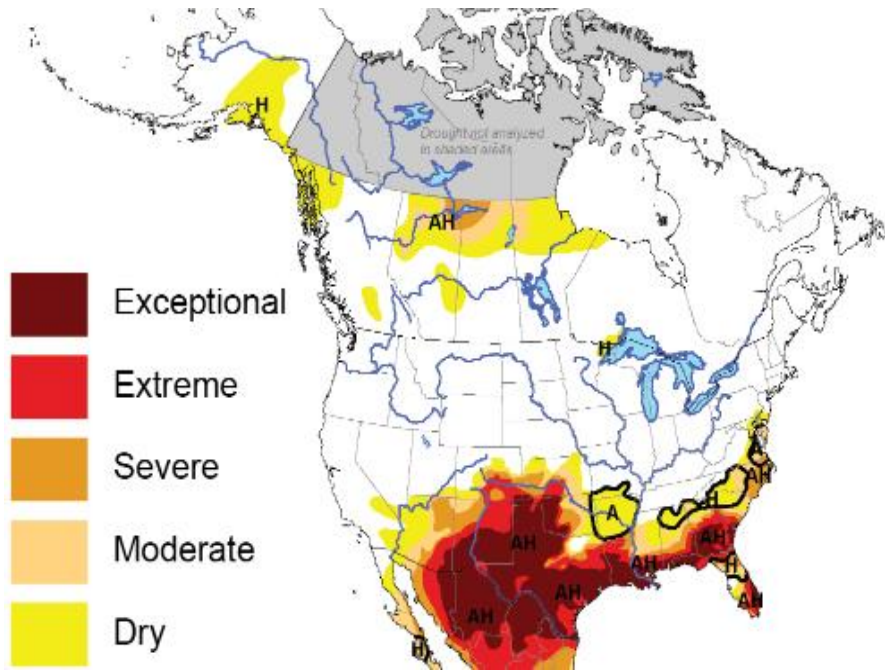


Fig. 16.4: Transboundary Climate-Related Impacts

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*

- Numerous other transboundary concerns including international shipping and cross-border disease propagation
- Examples of international transboundary approaches addressing these concerns include: International Boundary and Water Commission (US/Mexico); U.S. – Canada Great Lakes Water Quality Agreement

16 International – Transboundary Issues

Benefits of International Cooperation on Scientific Research

- U.S. and international climate affected by global processes, requiring international approaches
- Examples of benefits of U.S. cooperation in international research include:
 - *access to observations, data, and knowledge* that can shed light on how distant processes affect U.S. climate;^{130,131,132}
 - *opportunities to leverage funding and equipment* in the development and maintenance of climate observing systems, spreading the cost among countries that participate, including the United States;^{133,134,135,136}
 - *knowledge of climate impacts in regions and sectors of interest to the United States*, which can be used to inform decisions about humanitarian and development assistance, national security, and transboundary resource management;^{51,137}
 - *the ability to shape the priorities of an increasingly global and interdisciplinary research community*, which can help focus attention and resources on issues relevant to the United States through participation in joint research efforts^{138,139} and assessments;^{140,141,142} and
 - *mechanisms to share technical expertise and experiences with other countries, regions, and communities with respect to climate services, adaptation, resilience building, and sustainable development* in order to apply lessons learned in other regions to U.S. risk management challenges.^{143,144,145,146}

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