

Cultural impacts to tribes from climate change influences on forests

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Abstract Climate change related impacts, such as increased frequency and intensity of wildfires, higher temperatures, extreme changes to ecosystem processes, forest conversion and habitat degradation are threatening tribal access to valued resources. Climate change is and will affect the quantity and quality of resources tribes depend upon to perpetuate their cultures and livelihoods. Climate impacts on forests are expected to directly affect culturally important fungi, plant and animal species, in turn affecting tribal sovereignty, culture, and economy. This article examines the climate impacts on forests and the resulting effects on tribal cultures and resources. To understand potential adaptive strategies to climate change, the article also explores traditional ecological knowledge and historical tribal adaptive approaches in resource management, and contemporary examples of research and tribal practices related to forestry, invasive species, traditional use of fire and tribal-federal coordination on resource management projects. The article concludes by summarizing tribal adaptive strategies to climate change and considerations for strengthening the federal-tribal relationship to address climate change impacts to forests and tribal valued resources.

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1 Introduction

Climate change impacts, including increased frequency and intensity of wildfires, higher temperatures, extreme changes to ecosystem processes, forest conversion and habitat degradation are threatening tribal access to valued resources (Ryan et al. 2008). Climate change is affecting the quantity and quality of resources—such as water, minerals, and various plants, animals, and fungi—that tribes depend upon to perpetuate their cultures and livelihoods. In addition to providing sustenance, these resources and habitats have proven invaluable to cultural, economic, medicinal, and community health for countless generations.

Climate impacts on forests are expected to directly affect culturally important plant and animal species, in turn affecting tribal sovereignty, culture, and economy (Reo and Parker, submitted for this issue). Observed impacts include species losses and shifts in species ranges (Rose 2010; Swinomish 2010), including northward or elevational migration of some temperate forest species, contraction or expansion of other plant species, and changes in the distribution and population density of wildlife species (Trainor et al. 2009). Loss of biodiversity, impacts on culturally important native plants and animals, increases in invasive species or pathogens, bark beetle damage to forests and increased risk of detrimental wildfires have been observed in the Southwest (ITEP 2011), across much of the West, and in Alaska (Bentz et al. 2010; Hicke et al. 2012; Valachovic et al. 2011).

Increasing wildfires are projected to affect culturally valued resources. Rising temperatures, hotter and drier summers, and wildfires are projected to increase in frequency, intensity, and severity (Moritz et al. 2012; Flannigan et al. 2005). Droughts, as well as tree mortality and vegetation stress, will result in longer fire seasons by increasing fuel loading, insect outbreaks, and the spread of invasive species (NWF 2011). Rising temperatures are projected to affect tree ring growth and vegetation productivity in the Arctic (Andreu-Hayles et al. 2011). And just as climate change stands to affect forests and tribally valued forest resources, forests will play a role in affecting local climate responses (Mote et al. 2003).

This article examines the climate impacts on forests and the resulting effects on tribal cultures and resources. To understand potential climate change adaptation strategies, the article explores traditional ecological knowledge and historical tribal adaptive approaches to resource management, as well as contemporary examples of research and tribal practices related to forestry, invasive species, traditional use of fire and tribal-federal coordination on resource management. The article concludes by summarizing tribal climate change adaptation strategies and considerations for strengthening the federal-tribal relationship to address climate change impacts to forests.

1.1 Traditional ecological knowledge and climate impacts on forests

Climate impacts on tribal cultural resources will affect the formation and use of Traditional Ecological Knowledge (TEK). TEK, the indigenous way of understanding relationships among species, ecosystems, and ecological processes, can play a vital role in climate change assessment and adaptation efforts that bridge human and environmental systems (Whyte 2013; Hardison and Williams, submitted for this issue). Indigenous knowledge systems provide detailed information about ecosystems and spiritual and cultural identity (Grossman 2008; Parker et al. 2006; Turner and Clifton 2007). Native peoples use this knowledge to maintain and cultivate biodiversity, valued resources, and ecological health in their homelands (Jones et al. 2008; Salick and Byg 2007). Simultaneously, people adapt their knowledge base to changes in the environment (First Stewards 2012; Grossman 2008; Swinomish