Assessing the Potential Effects of Climate Change on Daniel Boone National Forest

Forestlands across the region are experiencing increased threats from fire, insect and plant invasions, disease, extreme weather, and drought. Scientists project increases in temperature and changes in rainfall patterns that can make these threats occur more often, with more intensity, and/or for longer durations. Although many of the effects of future changes are negative, natural resource management can help mitigate these impacts. Responses informed by the best current science enable natural resource professionals within the Forest Service to better protect the land and resources and conserve the region's forestlands into the future.

Forest Health - Invasive and aggressive plant and insect species may increasingly outcompete or negatively affect native species in the future. Winter freezes currently limit many forest pests, but higher temperatures will likely allow these species to increase. Extremes in temperature or rainfall also stress forest vegetation making it more likely to die when attacked by insects and disease, such as the hemlock woolly adelgid and the two-lined chestnut borer.

Plant Communities - Heat stress may limit the growth of some trees. Stresses from drought and wide-scale pest outbreaks have the potential to cause large areas of forest to die. Intense weather events, ice storms and fire, are also expected to lead to changes in plant community composition by knocking down the forest canopy and allowing aggressive species to invade an area.

Animal Communities - Wildlife species will be affected in different ways. Amphibians may be most at risk, due to dependencies on moisture and cool temperatures that could be altered. Greater ambient temperatures may be harmful to the endangered Indiana bat and the Virginia big-eared bat as well. Alternatively, mammals such as deer and black bears may increase due to higher survival rates resulting from warmer winters.

Extreme Weather - The potential for severe storms is expected to increase in the future. Extended periods of extreme high temperature and drought may lead to drier forest fuels which will burn more easily and contribute to larger and more frequent wildfires. More cloud-to-ground lightning due to warming may also increase wildfire ignitions.

Water Resources - Shifts in rainfall patterns will lead to periods of flooding and drought that can significantly affect depth and volume of water in lakes, streams, wetlands and underground water systems. Heavy downpours may lead to erosion and sedimentation in waterways as well as flooding and damage to forest roads and recreation sites. Periods of drought between rain events may affect species of fish, mussels and amphibians that are sensitive to fluctuations in water temperature and depth.

Recreation - Changes in plant and animal communities as mentioned above may make some areas less attractive to recreation users. Tick and mosquito populations may increase due to warmer winters and extreme heat may result in less visitors during high heat conditions.

Fall Forest Colors Daniel Boone

Bark Camp Creek

Yellow Lady's Slipper

Indiana Bat

Climate Change and Your National Forest: Citations

Information in this factsheet is summarized from 54 peer-reviewed science papers found in the USDA Forest Service's TACCIMO tool. TACCIMO (the Template for Assessing Climate Change Impacts and Management Options) is a web-based application integrating climate change science with management and planning options through search and reporting tools that connect land managers with peer-reviewed information they can trust. For more information and the latest science about managing healthy forests for the future visit the TACCIMO tool online: **www.forestthreats.org/taccimotool**

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