Assessing the Potential Effects of Climate Change on The Land Between the Lakes recreation area

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 strategies 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, resources, and the region's forestlands into the future.

Forest Health - Invasive plant and insect species may increasingly outcompete or negatively affect native species in the future. Winter freezes historically limit the range of forest pests but higher temperature will likely allow increases in their number and spread. Drought and other factors will increase the susceptibility of forests to destructive insects such as the southern pine beetle. Certain invasive plant species, including Japanese honeysuckle, are expected to increase dramatically as they can tolerate a wide range of harsh conditions, allowing them to rapidly move into new areas.

Response: Manage tree densities through practices such as thinning and prescribed fire to maximize carbon sequestration and reduce the vulnerability of forest stands to water stress, insect and disease outbreaks, and wildfire.

Response: Continually monitor for new invasive species moving into areas where they were not traditionally found, especially following events such as extreme weather and fire.

Japanese honeysuckle

Plant Communities - Heat stress may limit the growth of some southern pines and hardwood species. Stress from drought and wide-scale pest outbreaks have the potential to cause large areas of forest dieback. Intensified extreme weather events, such as ice storms and wildfire, are also expected to cause changes in plant community composition. Some species of rare or endemic plants may be particularly vulnerable. Hardwood-dominated forests may experience stress from higher temperatures, allowing pines and other fast-growing species to become more dominant at the expense of slower-growing species such as hickories and oaks.

Response: Focus restoration efforts in storm-resistant forests, such as shortleaf pine and promote the planting of shortleaf pines over loblolly pine where feasible.

Response: Manage for a range of ages and species in forests to lessen potential loss from drought, extreme storms, or infestation.

Shortleaf pine

Elk

Animal Communities - Wildlife species will be affected in different ways. Amphibians may be most at risk, as suitable habitat decreases due to warmer, dryer conditions. Greater ambient temperatures may be harmful to the endangered northern long-eared bat. Elk and bison depend on native grassland habitat that is threatened by shifting temperatures, precipitation, and invasive feral hogs.

Response: Maintain piles of natural woody debris in areas of high amphibian diversity to supplement habitats that retain cool, moist conditions.

Response: Restore native prairie grasslands to support the native plants and animals that depend on them.

Woodlands Nature Station

Extreme Weather - The potential for severe storm events is expected to increase in the future, as well as more intense rain events followed by longer dry periods. 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.

Response: Reduce increased wildfire potential by conducting prescribed burns.

Homeplace in LBL

Water Resources - Shifts in rainfall patterns will lead to periods of flooding and drought that can significantly impact water resources. Increases in heavy downpours and more intense storms are leading to greater erosion and more sedimentation in waterways. Geographically isolated wetlands are critical wildlife habitat and can be impacted by changes in surrounding landcover.

Response: Reduce the amount of water taken in by surrounding trees and plants, using management strategies such as thinning and prescribed burns, in order relieve stress on isolated wetlands and streams.

Response: Relieve groundwater and large reservoir use when there is ample surface water during wet periods or times of high water flow to recharge aquifers, provide temporary irrigation, decrease stored sediment loss.

Response: Restore and reinforce vegetation in headwater and marsh areas to help alleviate runoff of sediment during heavy rain, reduce climate-induced warming of water, and decrease water sensitivity to changes in air temperature.

Golden Pond

Recreation - Environmental changes may negatively impact recreational experiences due to changes in the plant and animal communities that make those experiences unique. More days above freezing could increase tick and mosquito populations throughout the year, leading to an increase in vector-borne illness. With more days of extreme heat, recreation areas could see decreased use in the summer if temperatures impact visitor comfort.

Response: Communicate early warnings for extreme weather to protect vulnerable groups from health impacts, such as heat illnesses, and monitor for early outbreaks of disease.

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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