USDA United States Department of Agriculture

Assessing the Potential Effects of Climate Change on Chattahoochee and Oconee National Forests

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. Potential management 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[1, 2]. Certain invasive plant species found in these forests, including Japanese honeysuckle are expected to increase dramatically as they are able to tolerate a wide range of harsh conditions, allowing them to rapidly move into new areas[3, 4, 5].

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 fire[6, 7, 8, 9].

Response: Continually monitor for new invasive species moving into areas where they were not traditionally found, especially following events such as hurricanes and fire[10].

Large-flowered skullcap

Plant Communities - Heat stress may limit the growth of some southern pines and hardwood species. Stresses from drought and wide-scale pest outbreaks have the potential to cause large areas of forest dieback[11]. Intensified extreme weather events, such as hurricanes, ice storms, and fire, are also expected to lead to changes in plant community composition. Species more resistant to these disturbances, such as shortleaf pine, will be more resilient to a changing climate[12]. Populations of other plants, including the threatened large-flowered skullcap, may be particularly vulnerable because invasive species like the Japanese honeysuckle out-compete the native plant[13].

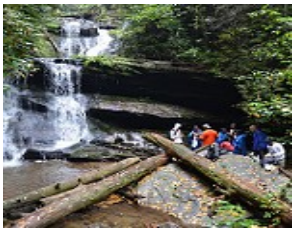
Response: Include a range of ages and species in forests to lessen potential loss from drought or infestation[14].

Mountain bog

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[15,16]. A changing climate may be harmful to the endangered gray bat by impacting their food supply and the internal temperature of their roosting caves[17]. Bird species, such as red cockaded woodpeckers, may see a decrease in population as vegetation types change and heat stress increases[18,19].

Response: Maintain piles of natural woody debris in areas of high amphibian diversity to supplement habitats that retain cool, moist conditions[20].

Response: Create habitat corridors, assist in species movement, increase National Forest management unit sizes, and identify high-value conservation lands adjacent to National Forests[21].



Picnic by the waterfall

Extreme Weather - The potential for severe storms is expected to increase in the future, including more intense hurricanes making landfall in the southern US[22]. 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[23]. More cloud-to-ground lightning due to warming may also increase wildfire ignitions[24,25].

Response: Identify areas that provide particularly valuable ecosystem services, like timber harvest or carbon sequestration, and are also vulnerable to extreme weather, like hurricanes or fires. Then plan conservation strategies accordingly to mitigate for extreme weather impacts and payment for ecosystem service programs[26].

Response: Prescribed burning can also be a management option for reducing the impacts of any future increases in wildfire potential emanating from climate change[27].

Canoeing

Water Resources - Shifts in rainfall patterns will lead to periods of flooding and drought that can significantly impact water resources[28]. Increases in heavy downpours and more intense hurricanes can lead to greater erosion and more sedimentation in waterways[29]. Increased periods of drought may lead to poor water quality.

Response: Focus attention on and near smaller, isolated water systems that are more vulnerable and may not be able to absorb and benefit from wildfires and heavy rains that cause large floods or debris flow[30].

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, and construct small reservoirs[31].

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[32].

Fall forest colors

Recreation - Environmental changes may negatively impact recreational experiences due to changes in the plant and animal communities that make those experiences unique[33]. More hotter days 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[34].

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[35].

Fishing

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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