

ASSESSING THE POTENTIAL EFFECTS OF CLIMATE CHANGE ON THE SOUTHEAST UNITED STATES



The Southeast United States faces continued increasing temperatures and variation in precipitation due to climate change. Extreme weather events like drought, hurricanes, and wildfires are projected to increase or worsen due to climate related effects. Saltwater intrusion is affecting wetlands and coastal forests along the coast, changing vegetation and affecting wildlife. The threat from invasive insects and diseases is projected to increase with warmer temperatures. 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 - Southeast forests will be affected by many factors including extreme weather, shifts in plant hardiness zones, sea level rise and saltwater intrusion, and increased pressure from invasive plants and pests, drought, and wildfire frequency. Increasing temperatures will worsen disturbance due to invasive plants and insects. Warmer temperatures due to climate change are converting saltwater marsh to mangroves and shifting where the marsh to mangrove ecotone exists. Sea level rise will increase soil salinity levels in coastal communities. Coastal forest retreat due to saltwater intrusion and the formation of "ghost forests" has been documented along the Southeast U.S. coastline. In addition, coastal wetlands have seen plant community shifts due to higher levels of salinity.

Response: Develop a coordinated system of monitored and controlled entrance points that control the majority of water flow inland from the shoreline and high-value water and land restoration areas in order to reduce salt-intrusion as well as to preserve marshes and swamps.

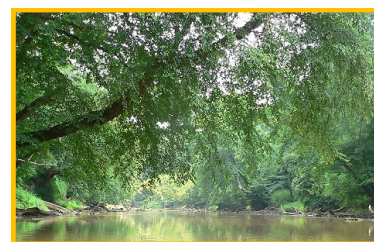
Response: Efforts to restore ecological integrity to impacted ecosystems (ex. by managing for longleaf and shortleaf pine) can have positive effects on disease and pest resistance, as well as wildfire and drought resilience.

Plant Communities - Suitability conditions are projected to change for different tree species, with certain species having more adaptive capacity (southern pines, oaks, and hickories) than others (balsam fir, red spruce, eastern hemlock, and sugar maple) due to pests and climate competition. Changes in growing season and flowering dates are also possible with increasing minimum temperatures. Projected increase in temperatures can allow invasive pests and plants to increase their spread.

Response: Manage for tree species with high adaptive capacity.

Response: Early detection and rapid response (EDDR) is the most effective way to respond to invasive species and should be implemented where possible.

Animal Communities - Some bird species along the coast have been negatively affected by the development of ghost forests and consequent habitat loss. Certain amphibian and insect species such as the red legged salamander or the Diana Fritillary that are highly dependent on elevation are becoming more and more isolated due to habitat fragmentation and loss.



Neuse River, NC



Southern Pine Beetle impacts



Diana Fritillary

Response: Conserve buffer areas along riparian habitats to provide habitat for amphibian species.

Response: High elevation areas are crucial refugia for many species. Preventing the addition of new roads and heavy equipment in these areas can maintain habitat connectivity.

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

Extreme Weather - Extreme precipitation events are becoming more likely; however, there are longer dry periods between storms. Increasing drought frequency and a projected increase in dry season, as much as 156 days in some areas, will increase the risk of wildfires. Not only are extreme precipitation events becoming more likely, hurricanes are becoming more severe and are able to sustain damaging conditions for longer periods of time. These events have large impacts on nearby estuaries and coastal waters, including negatively impacting carbon sources and sinks.

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.

Response: Communicate early warnings to visitors of extreme weather events.

Water Resources - With climate change projected to cause warmer temperatures and variable precipitation in the future, water resources will likely be even more affected by drought and extreme weather events. Severe drought impacts could lower streamflow in forested watersheds. Increased water temperature due to warming climate can potentially lead to an increase in toxic algal blooms in lakes.

Response: Reduce impact on aquatic ecosystems affected by drought by favoring tree species that are fire tolerant and have relatively low water use (e.g. longleaf pine).

Response: Remove invasive species that use more water to reduce stress on the aquatic ecosystems.

Recreation - Changes in precipitation due to drought could negatively impact water based outdoor recreation like canoeing, kayaking, and motorized activities. Increase in temperature can impact visitors comfort. Climate change can also have impacts on culturally significant natural resources.

Response: Enact monitoring to determine when it is safe for recreational activities to take place in water recreation areas and communicate effectively to visitors the potential risks of higher temperature or high water levels.

Response: Work with local indigenous populations and cultural groups to provide resources for them to adapt to the climate driven changes on their cultural sites.



Wildfire in the Southeast US



Prescribed Fire



Longleaf pine Forest

CLIMATE CHANGE AND YOUR NATIONAL FOREST: CITATIONS

Information in this factsheet is summarized from 52 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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