

# What does a changing climate mean for Georgia's forests?

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## Key Messages

- Forestlands are a primary land cover, economic driver, and source of environmental benefits for the state of Georgia.
- In addition to sequestering enough carbon to offset 23% of our state's emissions annually, forests are keeping our communities resilient to the extreme heat and weather impacts of climate change.
- Climate-related stressors are pushing foresters to explore improved land management and novel revenue streams to ensure future timber product yields, clean water, and carbon storage for the state.

From working timberlands to urban forests, the forestlands of Georgia are vital to our state's economic and community health. 92% of our forests are owned and operated by private citizens and businesses who sell timber and other essential wood products to finance their operations. In addition to the urban trees and parks within our cities, the remaining 8% of Georgia's forests make up state parks, national forests, and other public lands that provide access to recreation for all Georgians. Harvesting trees, replanting

seedlings, and managing the landscape allow foresters and land managers to meet the economic and environmental goals of a given forest. Georgia ranks first in the nation for acres of commercial timberland and annual volume of timber harvested. Each year, the Georgia forestry industry provides \$4 billion dollars in salaries and pensions to over 140,000 workers, contributes \$36 billion to the statewide economy, and delivers essential building supplies and energy to the region and the world [1]. In addition to their economic benefit, our forests provide critical environmental and social services to all Georgians, improving air, water, and soil quality, enhancing public health and wellbeing, providing wildlife habitat, and reducing urban heat effects [2].

Our forest ecosystems face mounting risks from "weather whiplash" as climate change increases average temperatures and the frequency of extreme weather events. Although warming temperatures may increase the growth rates of some trees in parts of the southern United States, extended droughts and harsh cold snaps threaten

to increase mortality of seedlings and stress older trees, making them more susceptible to insect damage [3, 4]. Hurricane Michael demonstrated the formidable threat of increasingly frequent and intense hurricanes, flattening over \$750 million of forested land in southwest Georgia in 2018 [5, 6]. These climate impacts threaten the essential functions and health of our forests and the communities that rely on them.

Preserving Georgia's forests is a critical strategy for mitigating the causes of climate change. Carbon dioxide, a greenhouse gas created by the burning of fossil fuels, is an essential element of plant photosynthesis. Trees bind this molecule in their wood, leaves, and roots as they grow. As cities expand and the demand for new housing increases across the state, population growth and development are increasing pressures on the ownership and use of timberlands. The loss of our forests to urban sprawl and alternate land uses would reduce the state's capacity to sequester carbon dioxide from the atmosphere and provide other essential ecosystem services. Drawdown Georgia, our state's climate solution roadmap, has identified forest resources as one of several necessary solutions for mitigating climate change in Georgia. Today, Georgia's forests sequester enough carbon to offset 23% of the state's annual CO<sub>2</sub> emissions [7, 8].

Forests also play a key role in helping

communities adapt to a changing climate and reduce harmful impacts. As Georgia experiences more frequent extreme weather events, forests help to capture and abate floodwaters, reduce erosion, and provide protection from wind damage [9]. As heat waves become longer and more frequent, urban forests cool communities and homes by 10 degrees Fahrenheit compared to treeless neighborhoods [10,11]. Communities across the state are realizing the power of trees in addressing the complex causes and consequences of climate change, and they are integrating trees and forests as critical components of resilient urban and rural landscapes. For example, through collaboration with other non-profits and metropolitan municipalities, [Trees Atlanta](#) is well on its way to planting and conserving over 1,000,000 trees by 2030 in the greater Atlanta area [12].

Georgia's forestry industry is responding to climate change by adapting forestry management and practices. Nurseries are breeding faster growing trees to store carbon and mitigate climate impacts, and researchers are mapping the shifting growing conditions to help predict and protect the forests of the future [13, 14, 15]. In the field, foresters manage tree density to reduce competition for scarce resources and increase healthy tree growth [16]. The rebounding use of native longleaf pine,

together with prescribed fire, may also provide key solutions to water scarcity, wind damage, and insect damage. Ultimately, well-managed and healthy forests reduce the risk of catastrophic wildfire that are more likely in the future [5, 17]. Forest landowners, managers, non-profits, and environmental groups are rallying behind new ways to incentivize increased tree growth (and delayed harvest) for carbon storage [2]. By rewarding landowners for carbon storage in their forests or water filtration, private marketplaces and public initiatives are helping shape private forest management for the benefit of the public.

Just as the broader threats of climate change are expected to affect people of color, low-income communities, and indigenous communities in Georgia disproportionately, the benefits of forest land ownership and harms of the forestry industry are not equally distributed across the state's population. While female forest land ownership has increased in recent years, historical racial inequities in land ownership remain stark. While more than 30% of the state's population is Black, less than 5% of the state's forest landowners are Black [18]. Polluting industrial sites that process forest products are more likely to be located adjacent to low-income, minority communities [19].

Even prescribed fire, a central ecological land management tool, may disproportionately affect rural Black communities and other populations with lower socioeconomic status in the southeastern United States [20, 21]. Although prescribed fire protects important natural communities and helps prevent more harmful, catastrophic wildfires, fine particulate matter is released during burns that can contribute to asthma, chronic obstructive pulmonary disease, bronchitis, and pneumonia in people who are exposed at high levels [22]. Land managers who use this practice take special training, follow weather guidelines, and are working with researchers to develop best practices to mitigate these health concerns [23]. Substantial economic and environmental justice issues are ongoing topics of concern among landowners, resource managers, policymakers, and community members to ensure healthy forests are enjoyed by all.

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