



VIRGINIA'S EMERGING FOREST THREATS

Management Options for
Healthy Forests

WHY DOES IT MATTER TO ME ?

It is important for private forest landowners to prepare for the likelihood of climate change when managing their land. Private forests make up the largest holdings of forestland in Virginia. These properties collectively will be crucial in protecting the overall health of our landscape. Management that takes the most current science into account will enable landowners to better protect their land and resources and to contribute positively to the conservation of Virginia forestlands.



Southeast Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

The mission of the Southeast Climate Hub is to develop and deliver science-based, region-specific information and technologies, with USDA agencies and partners, to agricultural and natural resource managers that enable climate-informed decision-making, and to provide access to assistance to implement those decisions. This is in alignment with the USDA mission to provide leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on sound public policy, the best available science, and efficient management

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The [USDA Southeast Climate Hub](https://www.usda.gov/southeast-climate-hub)

in association with the Virginia Department of Forestry

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EMERGING THREATS & HEALTHY FOREST MANAGEMENT

Threats to Forest Health — Invasive plants, insects, and disease cause devastating forest damage each year in Virginia and can impact forest water yield and water quality, and biodiversity. Increasingly longer growing seasons associated with climate change can extend the tree growing season, but also extend the outbreak season. Additionally, invasive plants such as tree-of-heaven and kudzu may outcompete native or planted species for resources during periods of drought. They also may lead to habitat destruction or fragmentation and loss of aesthetic value in recreational areas. Invasive species are particularly prevalent in the Southeast due to the region's mild winters, but warming temperatures have allowed them to survive, regenerate, and

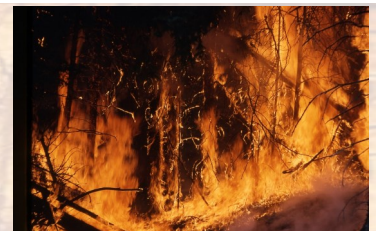


migrate farther north than their historical range. There are management practices to control these threats, including prescribed burning, herbicide or pesticide application, and decreasing the movement of woody debris and firewood. Early detection is critical to finding outbreak areas before the problem can multiply and spread.

Range Expansion — As the state experiences temperature changes, the natural ranges of tree species may shift. Warming temperatures may create unfavorable conditions for northern species, pushing their tolerable range outside of the state. As these species shift, other species from states like North and South Carolina may push into southern Virginia, leading to alterations in species diversity and forest structure. Temperature shifts may also lead to the expansion of invasive species and pest ranges into Virginia. Previously unsuitable locations may become hotspots for new invasive plant species, insects, and pathogens.

Threats from Wildfires — Increased fuel loads and more frequent droughts may increase wildfire frequency and intensity within the Southeast.

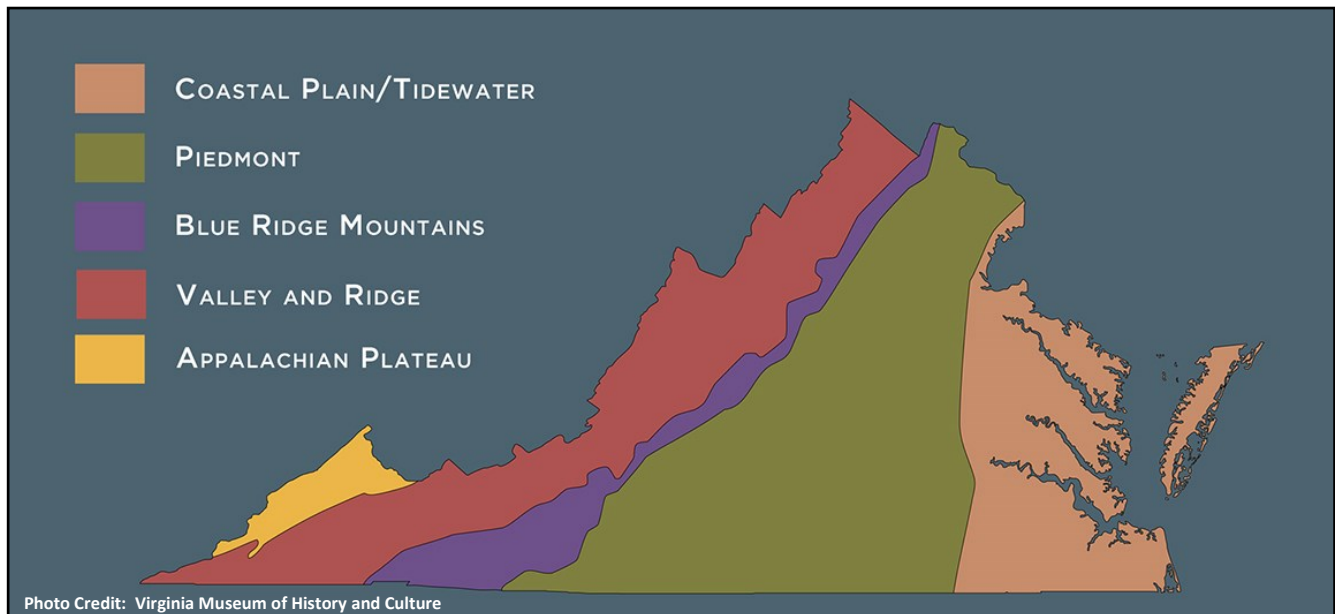
Fortunately, the Virginia Department of Forestry (DOF) has recently seen significant progress in fire suppression, saving the state about \$60 million in damage. However, Virginia experiences about 700 fires annually which impacts 9,500 acres of forests and 60 homes. Other impacts from wildfire include habitat destruction and fragmentation, and biodiversity declines. Virginia typically experiences the most wildfires during the spring and fall and the leading cause is typically the escape of embers.



Threats from Extreme Weather Events — A single hurricane, such as Hurricane Isabel, can cause over \$925 million in post-storm damage across the state. Increases in hurricane intensity and storm frequency are related to warming air and water temperatures. Therefore, annual forest damage is likely to increase in the coming years. Hurricanes and tornadoes cause habitat and recreational area destruction, reduce timber value and water quality, and can cause inland soil salinization from storm surges. Ice storms are another devastating threat to southeastern forests, and damages could become more frequent. The most likely areas to see ice storms are the western and upper Piedmont regions of Virginia. However, this area could shift northward with warming winters. Pines collect more ice compared to hardwoods because their year-round needles are able to hold ice. Additionally, pine branches break under less weight than hardwoods, making pines particularly vulnerable to ice storms

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REGIONAL THREATS



Eastern Region — The lowland coastal forests of Virginia are continuously threatened by rising sea levels and their associated secondary impacts. Some areas of the state have experienced significantly greater than average rates of sea-level rise. These trends increase coastal nuisance flooding, exacerbate hurricane impacts, and may even lead to inland soil salinity issues. All of these affect forest productivity and mortality on large scales, eventually leading to transitions from healthy forests to marshlands. Proactive strategies for maintaining these forestlands are crucial for overall ecosystem health and productivity.

Central Region — Water quality continues to be an issue across the Chesapeake Bay and its tributaries. Tributaries deliver billions of pounds of sediment containing nutrients like nitrogen and phosphorus every year and as the frequency of intense rainfall events increases, this sedimentation worsens. Biodiversity levels decrease as water quality declines and nutrient loading frequently leads to the promotion of algal blooms that can further harm the watershed's ecosystem.

Western Region — Changing temperature and rainfall patterns will mean that species from lower elevation areas can begin to migrate up-slope into mountain areas, changing the forest communities that we see today. Populations of species now existing on mountain peaks will be most at risk in the future, as there may be a complete loss of suitable habitat. In addition, this region is susceptible to flooding, which can lead to erosion. Together, these threats could mean the decline of high-elevation forest species in the region.

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FOREST MANAGEMENT AND ADAPTATION OPTIONS

The following management options provide landowners with an opportunity to increase the resilience of their forests to disturbance events attributed to variations in rainfall patterns and temperatures as well as multiple coastal issues. By using proper forest management practices that keep predicted future conditions in mind, land managers can safely promote the overall health of their forest stands in a cost-effective manner.

Prescribed Burning — Prescribed fire is a crucial tool that land managers use to promote the overall health of their forest stands. Prescribed fire reduces fuel loads of an area and wildfire risk by burning dead or overgrown vegetation. Fire can also control or contain invasive species, insects, and diseases from impacting larger sections of forest. Wildlife habitat can also be improved by utilizing prescribed burns and species such as longleaf pine, shortleaf pine, and white oak often benefit from routine prescribed burns. Burns are best implemented at specific intervals within a rotation or when conditions warrant action.

Proactive Tree Planting — When selecting a tree species to plant or retain, it is important to consider the inherent characteristics of the species and what threats it may experience within a given area. Some species are more resilient to environmental conditions and threats than others and selecting these species may improve the resilience of a forest stand. For example, live oak can tolerate high winds and salinity, improving coastal resilience and helping to mitigate hurricane damage. Willow oak grows well in areas of high heat and acidic soil, making the species highly suited to urban landscapes where tree canopy can be sparse. Planting this species can help to reduce the environmental effects of urban heat islands, making cities cooler and more habitable.

Promoting Forest Resiliency — The resiliency of a forest to withstand disturbance events is influenced by an array of factors, including maintaining diversity and employing appropriate management practices. Encouraging the protection and regeneration of diminished species will help to maintain the area's ecosystem and promote overall forest resiliency. Taking steps necessary to appropriately manage stand density, hydrologic characteristics, and natural habitats can also have a positive impact on the ecological functioning and overall health of the forest. Well-managed, and especially young, forests also capture and store carbon, providing an important ecological service. Area foresters and Extension agents can assist forest owners in assessing the best management practices for their forest stands.

FOR MORE INFORMATION ON
MANAGEMENT OPTIONS FOR YOUR
WOODLANDS:

Contact your local County Forester or the Virginia
Department of Forestry office at:
434-977-6555

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