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Forest Threat Facts

Climate and Severe Weather

Climate Variability, Climate Change, and Severe Weather

Forests play a key role in regulating temperature as well as water and energy cycles. The impacts of climate variability, climate change, and severe weather can affect forest ecosystem processes and create conditions that influence other threats to forest health including wildfire patterns,



invasive plant infestations, and insect and disease outbreaks. These interacting factors can limit biodiversity and forest productivity, often resulting in costly environmental, economic, and social impacts.

Climate vs. Weather

Weather describes daily conditions that can change rapidly. Severe weather refers to extreme short-term weather events, such as hurricanes, floods, tornadoes, droughts, and ice storms.

Climate represents typical or average weather patterns established over a long

period of time. Short-term changes in weather patterns, or the occurrence of multiple severe weather events, are known as **climate variability**. **Climate change** refers to long-term changes in weather patterns, which may take years or decades to identify.

Researchers with the USDA Forest Service **Eastern Forest Environmental Threat Assessment Center (EFETAC)** are investigating, developing and implementing strategies designed to sustain long-term forest productivity and health during changing climates and weather-related events. Key projects include:

Early Warning System

The early warning system is a disturbance monitoring project that detects forest threats across the continental United States using remote sensing and geographic information systems (GIS). EFETAC researchers use satellite imagery to measure vegetation "greenness" every eight days, resulting in maps depicting unexpected changes. The system is designed to identify and highlight potentially disturbed locations for additional aerial and field observation for verification and interpretation.



Template for Assessing Climate Change Impacts and Management Options (TACCIMO)

TACCIMO is a web-based tool that provides forest planners and other natural resource stewards a user-friendly and interactive portal into climate change science. Developed by EFETAC researchers in partnership with the Forest Service Southern Region, TACCIMO provides land managers with the best available science to effectively sustain forests under a changing climate.

Water Supply Stress Index-Carbon and Biodiversity (WaSSI-CB) Model

WaSSI-CB is an integrated, water-centered modeling system that can be used to examine how water, carbon, and biodiversity interact with climate, land use, and population changes within watersheds at the continental scale. The WaSSI-CB model



builds upon previous studies of water supply and demand from both ecosystem and human perspectives. Researchers are developing WaSSI-CB to be applied in the United States and internationally in Asia and Central and South America.

Climate Change Impacts on Forest Tree Species

Climate change could impact the genetic integrity of forest tree populations if some species are forced to adapt to new conditions or shift their ranges to more favorable environments. EFETAC researchers are mapping current and future suitable habitats for 100 North American forest tree species based on two climate change scenarios. The results will be valuable for



scientists and policymakers attempting to determine which species and populations to target for monitoring efforts, conservation actions, and genetic diversity studies.

Climate Change Resource Center (CCRC)

EFETAC is collaborating to expand the CCRC (www.fs.fed.us/ccrc/), a web-based tool that provides eastern and western land managers an online portal to credible, science-based, and relevant information and tools concerning climate change and ecosystem management options. The CCRC brings together the best scientific knowledge and expertise to present a coherent picture of how different climate change scenarios affect land management planning and practices.

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