



Climate Change Growth Platform

Forest Service

Research and Development Mission Area

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VISION

Climate Change presents an enormous challenge for forest management. Research on the affects of climate change on forests has been carried out at the Forest Service for more than 20 years. Scientists have found that higher temperatures have shortened western mountain snow accumulations, thereby reducing peak snow pack and hastening spring melt. Less stable water supplies coupled with increased demand in urban areas means regional water shortages. Nationwide, scientists have observed recent severe forest diebacks as a result of drought and increased susceptibility to insect and disease. They have also recorded an increase in large, destructive wildfires that threaten biodiversity, watershed stability, water supply, and human lives and property. Forest Service Research and Development (R&D) scientists are evaluating the long-term effects of climate change on forests and determining how land managers and communities might adapt to changes.

Forest Service R&D will emphasize:

- **Climate change and ecosystem adaptation** research to improve the resiliency of forests, rangelands and aquatic areas to the stresses created by climate change.
- **Climate change and carbon sequestration mitigation** research to assist managers in increasing forest growth rates and more rapidly reforest areas after catastrophic events such as fires and hurricanes.
- **Research to provide forest manager decision support tools**, such as an adaptation and mitigation tool kit for managing forested landscapes under a changing climate.
- **Collaborative research**, such as the Forest Service Change Research Program that builds on existing expertise in landscape ecology, watershed hydrology, vegetation modeling, nutrient recycling, and forest management. Research will also build on long-term data sets from the Forest Inventory and Analysis program and the Forest Service network of Experimental Forests, Research Natural Areas, and the National Science Foundation's National Ecological Observatory Network (NEON).

CAPABILITIES

Forest Service Research and Development provides long-term research, scientific information, and tools that can be used by managers and policymakers to address climate change impacts to forests and rangelands. Forest Service scientists have several long term data sets, including the Nation's Forest Census (Forest Inventory and Analysis) and the Experimental Forests, that provide decades-worth of information on forest and rangeland trends.

- **Climate Change and Air Quality.** Forest Service is developing new methods of estimating emissions of carbon and key greenhouse gases from wildfires across North America by combining emissions models with satellite data on areas burned in particular vegetation types.
- **Climate Change and Water Supply.** Forest Service scientists produced digital maps created from extensive databases to produce estimates and origins of the United States water supply, important information for local, state, and federal managers. The findings show that across the contiguous 48 states, 54 percent of the water supply originates on forested land, 25 percent on agricultural land, and 8 percent on rangeland.
- **Climate Change and Fire.** Forest Service researchers have developed models for estimating the net effects of biomass use on carbon stocks, including wood product substitutions for fossil fuel-intensive materials.
- **Climate Change and Insect Infestations.** Forest Service managers are using models to project outbreak dynamics under various climate warming scenarios to 2100. Scientists have found the connections between elevated ozone and nitrogen deposition on forest health, water quality, invasive bark beetles, and fire.

DELIVERABLES

The following are examples of the kinds of products, tools and strategies that will be realized with an expanded emphasis in Climate Change Research:

- Science-based approaches for addressing climate change and greenhouse gas reductions in forest and project-level planning. This will allow managers to effectively include climate change and greenhouse gas emissions in forest and project planning and NEPA compliance, and ensure healthy and productive forests and grasslands for future generations.
- Land management decision-support tools for assessing and conserving carbon in forests and wood products, such as iTree, Carbon On-line Estimator (COLE), and Forest Vegetation Stimulator (FVS).
- A climate change adaptation and mitigation tool kit for managing forest and grassland landscapes under a changing climate. This will provide the tools for land managers to be responsive to regional and local projections of climate change.

BENEFITS

In addition to the deliverables identified above, the climate change growth platform will provide the numerous benefits to its constituents.

- By ensuring healthy and productive forests and grasslands for future generations; this is a critical component of energy and economic security.
- Increasing carbon sequestration that will provide financial benefits to landowners as markets for carbon credits evolve. This additional financing to the forest sector helps improve other forest benefits such as wildlife habitat and water quality.
- Developing best management practices that consider projections of climate change to improve forest resiliency. By maintaining healthy and productive forests and grasslands, the cost of preventing and mitigating damage from wildfire, invasive pests, and other threats can be substantially reduced.