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Climate Change, Water, and Air

Why is this issue important? Under a changing climate, the availability and quality of water resources are critical issues. Research in the *Water and Air Strategic Program Area* plays an important role in helping understand both climate change (change in long-term states of the atmosphere) and climate variability (extreme episodic events over average climate norms). Climate variability has the potential for causing rapid change, i.e., tipping points, which could cause serious economic and social dislocations.

What is R&D doing regarding this issue? Forest Service scientists are investigating how climate variability influences wildland fire seasons generally and the development of large, extremely intense fires (e.g., so called mega fires) specifically. Scientists are also conducting research to determine how climate variability may create crisis-level water shortages in the western and southeast United States. We are investigating how hurricanes and other extreme events change forest structure and development. In addition, our research is focusing on understanding how variability of climate factors interacts with air pollution to affect forest and watershed health.

Why we care about this issue? The key to mitigation of climate change on the public lands is the active management of ecosystems for adaptation. This requires choosing management actions that (1) create and increase resistance to change, (2) promote resilience to ongoing changes and climate-related disturbances, and (3) enable natural resources to respond to changes. The goal is a landscape with a mosaic of animals, plants, and people adapted to a future climate. We care about this issue because it is our most certain path to the brightest possible national future.

Benefits of this research and connections to other areas: This research directly benefits human welfare. It is purposed to provide water security for the nation and as such, protects urban areas, wildlife, fish, recreation, and social values. It will also allow for improved wildland fire management and reduce fire suppression costs.

Highlights of the FY08 budget regarding this issue: During FY08 we will:

- 1) Conduct advanced high resolution (12 KM) climate forecast modeling for the entire USA through the Fire Consortium for Advanced Modeling of Meteorology Smoke (FCAMMS) to test fire and other management scenarios.
- 2) Develop and refine a water deficit modeling schema for the country, incorporating climate change, population growth, and demand scenarios.
- 3) Evaluate potential applications of climate change predictions in Forest Service land management planning on several western National Forests.
- 4) Conduct research on relationships among climate variability, air pollution, water stress, water supply and quality, and forest and watershed health.