

# Global Warming Impacts on Forests in Western United States

U.S.D.A. Assessment

The final draft of a U.S. Department of Agriculture report scheduled for release Tuesday, May 27, finds climate change has “very likely” increased the size and number of fires, insect outbreaks and overall tree die-offs in the forests of the West, Southwest and Alaska, and that this damage will accelerate in the coming decades. The full draft is available online at: <http://www.climatescience.gov/Library/sap/sap4-3/default.php>

The report estimates that in the next 30 years, CO<sub>2</sub> concentrations are expected to have increased about 60 ppm, from today’s 380 ppm to about 440 ppm, and temperatures over the contiguous United States are expected to have increased by an average of 2.2 degrees Fahrenheit.<sup>1</sup>

Impacts on Western forests include:

- **Dying Forests:** *“Insects and pathogens are significant disturbances to forest ecosystems in the United States, costing \$1.5 billion annually. Extensive reviews of the effects of climate change on insects and pathogens have reported many cases where climate change has affected and/or will affect forest insect species range and abundance.”*<sup>2</sup> Examples of ongoing pest damage include a bark beetle infestation that has killed more than 3 million acres of pinyon pine in the Southwest, mountain pine beetle attacks on nearly 660,000 acres in Colorado,<sup>3</sup> and spruce beetle attacks on 3.7 million acres in Alaska and western Canada.<sup>3</sup>
- **Pest Infestations:** Rising temperatures and drought are predicted to increase the range of a host of pests, strengthen their ability to attack forests, expand to new tree species and make trees more vulnerable to these attacks. *“Rising temperature is the aspect of climate change most influential on forest insect species through changes in insect survival rates, increases in life cycle development rates, facilitation of range expansion, and effects on host plant capacity to resist attack.”*<sup>4</sup> The mountain pine beetle, southern pine beetle, spruce beetle, ips beetle and spruce budworm are predicted to continue expanding their ranges.<sup>5</sup>

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<sup>1</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 31, [www.climatescience.gov/Library/sap/sap4-3/default.php](http://www.climatescience.gov/Library/sap/sap4-3/default.php)

<sup>2</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 100, [www.climatescience.gov/Library/sap/sap4-3/default.php](http://www.climatescience.gov/Library/sap/sap4-3/default.php)

<sup>3</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 101, [www.climatescience.gov/Library/sap/sap4-3/default.php](http://www.climatescience.gov/Library/sap/sap4-3/default.php)

<sup>4</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 109, [www.climatescience.gov/Library/sap/sap4-3/default.php](http://www.climatescience.gov/Library/sap/sap4-3/default.php)

<sup>5</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 109, [www.climatescience.gov/Library/sap/sap4-3/default.php](http://www.climatescience.gov/Library/sap/sap4-3/default.php)

- **More Forest Fires:** Trends in *“wildfire and climate in the western United States from 1974–2004 . . . show that both the frequency of large wildfires and fire season length increased substantially after 1985, and that these changes were closely linked with advances in the timing of spring snowmelt, and increases in spring and summer air temperatures.”*<sup>6</sup> The report also predicts that wildfires will increase in size and frequency in the coming decades.<sup>7</sup>
- **Loss of Carbon Storage:** The report estimates that forests and “long-lived wood products” absorb approximately 20 percent of all U.S. fossil fuel carbon output.<sup>8</sup> But dead forests release that stored carbon back into the atmosphere, which has the potential to increase climate change impacts. *“More frequent fire will increase emissions of greenhouse gases and aerosols and . . . though many forests will regrow and sequester the carbon released in the fire, forests burned in the next few decades can be sources of CO<sub>2</sub> for decades and not recover the carbon lost for centuries – an important consideration for slowing the increase in atmospheric CO<sub>2</sub>.”*<sup>9</sup> In addition, the report says that the trees killed by Hurricanes Katrina and Rita will, as they decompose, release nearly 115.7 million tons of carbon into the atmosphere—an amount equal to annual net carbon absorption in all U.S. forests.<sup>10</sup>

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<sup>6</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 99, [www.climate-science.gov/Library/sap/sap4-3/default.php](http://www.climate-science.gov/Library/sap/sap4-3/default.php)

<sup>7</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 108, [www.climate-science.gov/Library/sap/sap4-3/default.php](http://www.climate-science.gov/Library/sap/sap4-3/default.php)

<sup>8</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 106, [www.climate-science.gov/Library/sap/sap4-3/default.php](http://www.climate-science.gov/Library/sap/sap4-3/default.php)

<sup>9</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 109, [www.climate-science.gov/Library/sap/sap4-3/default.php](http://www.climate-science.gov/Library/sap/sap4-3/default.php)

<sup>10</sup> U.S. Dept. of Agriculture, “The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity,” final draft, Mar. 5, 2008; p. 113, [www.climate-science.gov/Library/sap/sap4-3/default.php](http://www.climate-science.gov/Library/sap/sap4-3/default.php)