US Forest Service R&D
PNW Research Station

Project Title: Global Climate Change and Policy Analyses: Decision Support Concerning Impacts, Mitigation Strategies, and Adaptation for the Forest and Agricultural Sectors

Project Personnel: PNW Research Station in cooperation with the Environmental Protection Agency, Oregon State University (Darius Adams), Texas A&M University (Bruce McCarl), Duke University (Brian Murray), and others.

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Project Description: Our project focuses on impacts, mitigation, and adaptation to climate change. In the National Climate Change Assessment, we examined socioeconomic impacts of climate change on U.S. forests, wood-product markets, and forest recreation. In the aggregate, where climate change was projected to induce yield increases, consumers were found to benefit but not producers. Projections of yield decreases had the opposite effect. To address mitigation, we have analyzed strategies for sequestering carbon in forests and agriculture and identified unintended consequences of policies. Compared to the baseline, more cropland and less forest land are projected under mitigation strategies involving use of corn for ethanol production. Unintended consequences can include responses in the other sector, such as agriculture converting other forest land to replace that land placed in forest carbon sequestration plantations. Our efforts in adaptation found that adaptation in the forest and agricultural sectors could limit effects. Options include land market adjustments, interregional migration of production (e.g., northerly migration of production capacity), substitution in consumption between wood and nonwood products (reflected in overall growth in wood products use) and between sawtimber and pulpwood, and alteration of forest stand management. Finally, to help decisionmakers understand the carbon implications of potential changes in public timberland management, we compared a baseline timber harvest scenario with two alternative harvest scenarios and estimated annual carbon stock changes associated with each. A "no timber harvest" scenario eliminating harvests on U.S. public timberlands could result in an annual increase of as much as 43 percent over current sequestration levels on public timberlands and would offset up to 1.5 percent of total U.S. greenhouse gas emissions. In contrast, moving to a more intense harvesting policy similar to that which prevailed in the 1980s may result in annual reductions of 50 to 80 percent in anticipated carbon sequestration.

Project Deliverables:

Alig, R.; Adams, D.; McCarl, B.. 2002. Projecting impacts of global climate change on the U.S. forest and agriculture sectors and carbon budgets. Forest Ecology and Management. 169: 3-14.

Irland, L.; Adams, D.; Alig, R.J. [and others]. 2001. Assessing socio-economic impacts of climate change on US forests, wood products markets, and forest recreation. BioScience. 51(9): 753-764.

Adams, D.; Alig, R.; McCarl, B.; Winnett, S.; Callaway, J. 1998. Minimum cost strategies for sequestering carbon in forests. Land Economics. 75(3): 360-374.

Alig, R.J.; Adams, D. McCarl, B.; Callaway, J.; Winnett, S.. 1997. Assessing effects of mitigation strategies for global climate change with an intertemporal model of the U.S. forest and agricultural sectors. Environmental and Resource Economics. 9: 259- 274.

Alig, R.; Adams, D.; Joyce, L.; Sohngen, B. 2004. Climate change impacts and adaptation in forestry: responses by trees and markets. Choices. Fall: 7-11.

Project Outcomes: Our project will provide a suite of decision tools for managers to address the impacts, mitigation options, and adaptation strategies to deal with climate change.