



Project Impacts

NSRC-FUNDED RESEARCH FINAL REPORT

Consequences of Forest Management Practices on Climate Change



PROJECT AWARD YEAR AND TITLE:

2007

Climate Change Consequences of Forest Management Practices

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Forestry may play an important role in policy aimed at reducing climate-warming greenhouse gases. When forests grow they remove from the atmosphere the greenhouse gas, carbon dioxide, and store it as carbon in wood and other biomass. Payment for carbon storage is a potential incentive for forest owners to manage their lands to store carbon. There are unresolved scientific and policy issues with such schemes and how they affect forest management practices.

A recent scientific concern relates to consequences of afforestation and decrease in albedo (reflectivity of solar radiation) of a forested land surface compared to crops or grassland and impacts on climate. Snow covered fields reflect away more winter sunlight than evergreen forests, so planting forests could lead to absorption of more solar energy and further warming of the climate. However, computer models used to estimate impacts of forests on climate rely on often outdated estimates of albedo and do not consider effects of forest management on albedo.

NSRC researchers assembled estimates of albedo based on shortwave radiation data from AmeriFlux sites to evaluate estimates used in climate models. Albedos for grassland and deciduous conifers needed revision. They also measured albedo in managed conifer forests in Maine and compared shelterwood harvest with intact forest. The more open canopy of a shelterwood had a slightly higher albedo than closed coniferous forest, especially in winter. In addition to potentially high rates of carbon storage, shelterwood systems will lead to *reduced* climate warming compared to unmanaged forest, but climate models indicated limited change in surface temperatures to such slight changes in albedo.