



## Research Brief for Resource Managers

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### Recent Research: Fire management and carbon in pine barrens forests

Clark, Kenneth L., Nicholas Skowronski, Michael Gallagher.  
2015. Fire management and carbon sequestration in pine  
barrens forests. *Journal of Sustainable Forestry*, 34: 125-146.

Link to article: Contact [kennethclark@fs.fed.us](mailto:kennethclark@fs.fed.us) for a copy of  
the article at this time. Free USFS access to the article is  
forthcoming.

We shift our focus in this brief from fire history to modern management concerns. This month's highlighted journal article focuses on carbon sequestration and prescribed fire. Research regarding how much carbon is released during prescribed burning is becoming more important, because climate modelers and policy makers need to know if prescribed fire adds or subtracts from greenhouse gases in the atmosphere over the long-term. We know that fires release carbon dioxide into the atmosphere, but the question is: how long does it take for plants and trees to take that carbon back out of the atmosphere while growing back after the fire?

This 2015 paper by Clark, Skowronski and Gallagher answered that question for several sites in the New Jersey Pinelands. First, the authors state that fuels, moisture, and weather conditions are key factors for determining how much carbon will be released from a burn. In order to measure carbon emissions, the authors needed to measure several aspects of forest fuels during the pre-burn state, such as: how much biomass was present on the forest floor in the form of leaves and duff, how much understory vegetation was present, and how many larger trees were present. After the prescribed fires, the authors confirmed that the amount of fuel burned and carbon released to the

#### Management Implications

- Carbon dioxide release during prescribed burns may come under increased scrutiny with the regulation of CO<sub>2</sub> as a pollutant.
- The amount of carbon burned is directly related to the amount of carbon present before the burn in all layers of the forest.
- Managers can contribute to forest re-growth and re-capture of carbon by using fuel moisture, firing techniques, weather, and ignition patterns to maximize fuel reduction and minimize canopy damage.

atmosphere was highly dependent upon the amount of fuel present in each of these layers before the fire.

A key feature of this study was the use of carbon flux towers near the burns in some sites that measured the amount of carbon dioxide going into and out of the forest before, during, and after the burns. The authors found that the prescribed fires released a large amount of carbon during the burns; however, these forests were able to remove the same amount of carbon from the atmosphere within 2-3 years after the fire, just by re-sprouting and re-growing. This means that managers wishing to use prescribed fire in the pitch pine ecosystem for varied management purposes will not be significantly contributing to greenhouse gases in doing so.