

Natural Climate Solutions for Forestry in Maine

Overview

Maine has set climate change goals of reducing greenhouse gas (GHG) emissions by 80% by 2050 and having net-zero emissions by 2045.

Natural climate solutions (NCS) such as planting trees, adjusting rotation lengths, and conserving forestland that sequester carbon or limit GHG emissions can provide cost-effective near-term GHG mitigation and enhance ecosystem services.

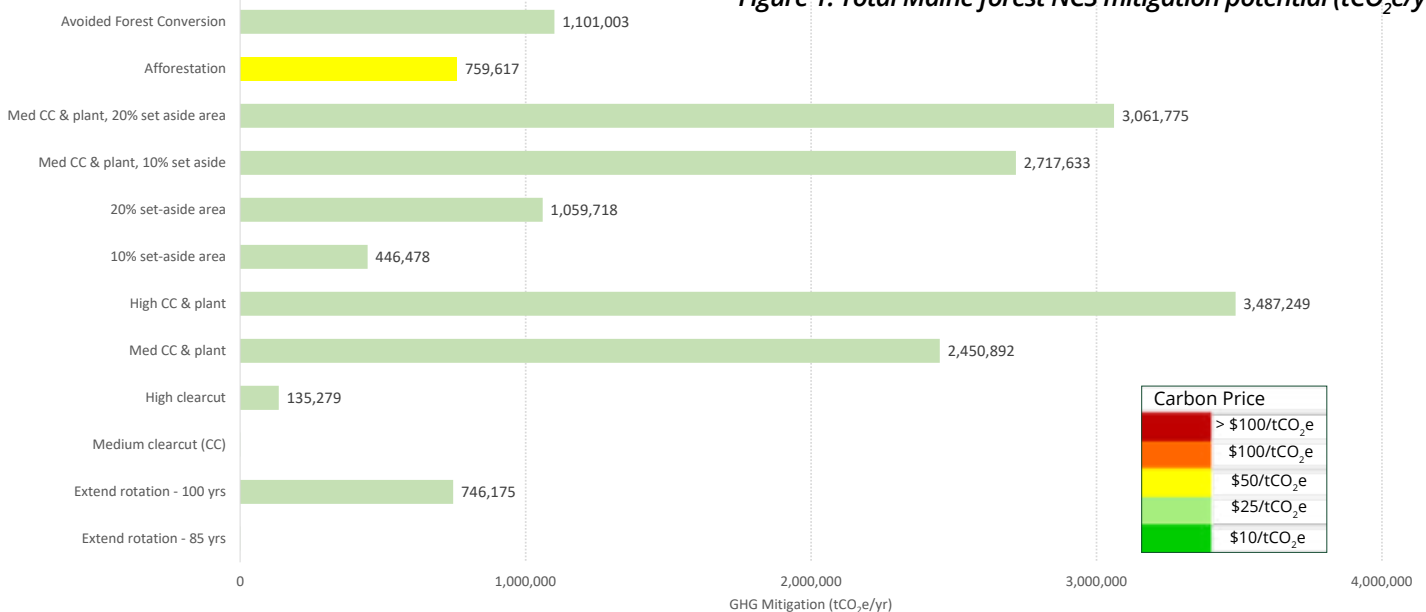
Our comprehensive assessment evaluated the benefits and costs of implementing twelve potential NCS practices to mitigate greenhouse gas emissions from Maine's forestry sector.

A key component of this project was identifying cost-effective forestry practices that can be implemented on a broad scale.

Key Findings

- High mitigation potential from implementing a mix of intensive forest plantations, naturally regenerating stands, and permanently setting aside 10-20% of forest area from harvesting (Figure 1).
- Most forest management NCS practices can be implemented at a cost of \$10-20 per ton carbon dioxide equivalent (tCO_2e), which is relatively inexpensive compared to most non-NCS opportunities.
- Increasing the intensity of active forest management in northern Maine along with avoided conversion and afforestation across the state could yield about 5.3 million tCO_2e/yr ($MtCO_2e/yr$) in additional carbon sequestration at a cost of \$79 million/yr or \$15/ tCO_2e .
- Implementing a mix of these NCS practices across the state could help make Maine carbon neutral or net zero by 2045 or earlier.

Figure 1. Total Maine forest NCS mitigation potential (tCO_2e/yr).



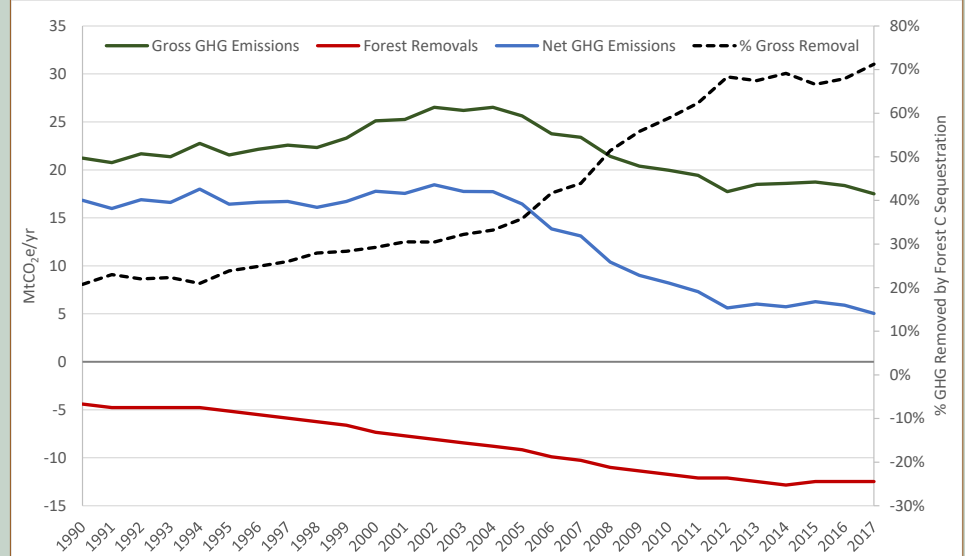
Natural Climate Solutions Initiative

Carbon Sequestration from Forestry

Figure 2. Maine GHG emissions and forest carbon removals, 1990-2017

(Source: Domke et al., 2020; Maine DEP, 2020).

- Forestry encompasses about 17.5 million acres, or nearly 89% of Maine's total land area, and generates an average \$8 billion/yr in economic impacts while also supporting other important sectors of Maine's economy such as recreation and ecotourism.
- Maine's forests sequestered 12.5 million tons of carbon dioxide equivalent (MtCO₂e) in 2017, removing about 70% of the state's 17.5 MtCO₂e gross GHG emissions (Figure 2).



Climate Change and Forestry

- The Northeast is warming faster with more total precipitation and a greater intensification of rain events compared to the rest of the U.S.
- Maine's temperature has increased by 3.2 °F and precipitation has increased by 15% since 1895 with greater variability in weather.
- Milder winters and earlier springs could have mixed effects on forestry in Maine.
- Changing climatic conditions are likely to place increasing stress on Maine's forests, particularly those species that are either at their northern or southern limit or vulnerable to emergent pests and pathogens.

Funding support for this project was provided by the Doris Duke Charitable Foundation, Maine Farmland Trust, and the Senator George J. Mitchell Center for Sustainability Solutions.

For more details, please see the **full report on the Maine NCS project website.**

CRSF.UMAINE.EDU/FOREST-CLIMATE-CHANGE-INITIATIVE/NCS

The Maine Natural Climate Solutions (NCS) Initiative project seeks to:

- Assess current practices to determine the degree to which foresters and farmers are using NCS;
- Determine the most cost-effective NCS for Maine;
- Understand key barriers to adopting NCS; and
- Generate information about which practices can be implemented on a broader scale.

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The mission of the **Center for Research on Sustainable Forests (CRSF)** is to conduct and promote leading interdisciplinary research on issues affecting the management and sustainability of northern forest ecosystems and Maine's forest-based economy. The **Forest Climate Change Initiative (FCCI)** seeks to better coordinate regional research and scientists working on the potential effects of climate change on forests, while also effectively collaborating to address key statewide research needs and opportunities.

