

## Potential Solutions

Natural climate solutions (NCS) such as planting trees, adjusting rotation lengths, and conserving land that sequester carbon or reduce greenhouse gas (GHG) emissions can affect near-term climate change mitigation goals in cost-effective ways while also enhancing ecosystem services.

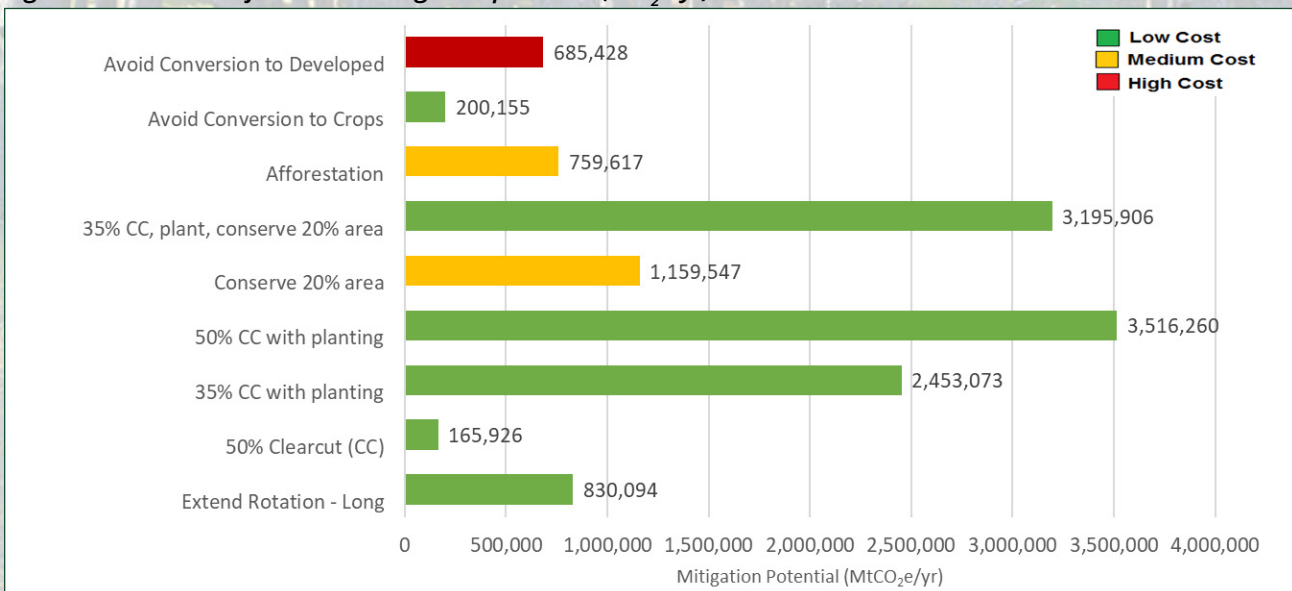
Our comprehensive assessment evaluated the benefits and costs of implementing 13 potential NCS practices to mitigate GHG emissions from Maine's forestry sector.

A key component of the Maine NCS Initiative is to determine cost-effective forestry practices that can be implemented on a broad scale.

### Key Findings

- High mitigation potential can be derived 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<sub>2</sub>e), 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 4.5 million tCO<sub>2</sub>e/yr in additional carbon sequestration at a cost of \$64 million/yr or \$14/tCO<sub>2</sub>e.
- Implementing a mix of these NCS practices across the state has the potential to make Maine carbon neutral or net zero by 2045.

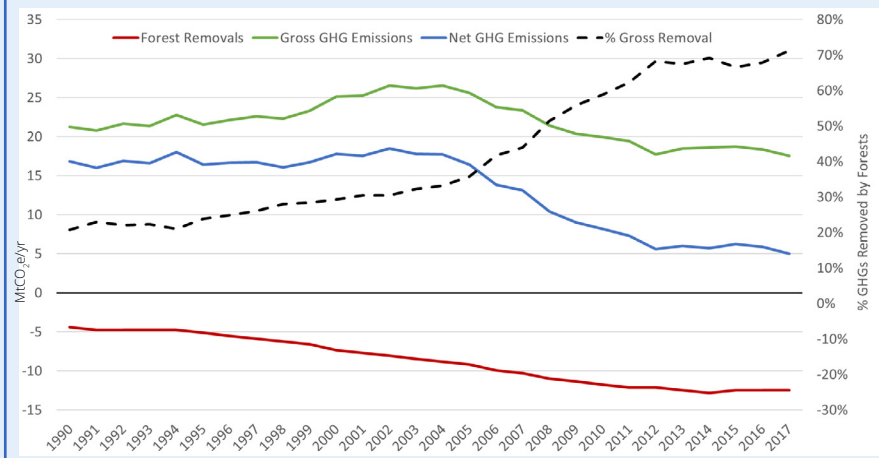
Figure 1. Total Maine forest NCS mitigation potential (tCO<sub>2</sub>e/yr).



# Natural Climate Solutions Initiative

## Carbon Sequestration from Forestry

- Forestry encompasses about 17.5 million acres, or nearly 89% of Maine's total land area, and generates about \$8 billion per year in economic impacts from more than 30,000 industry workers.
- The forestry sector in Maine sequestered 12.5 million tons of carbon dioxide equivalent (MtCO<sub>2</sub>e) in 2017, removing about 70% of the state's gross emissions (17.5 MtCO<sub>2</sub>e) across all reported sectors (Figure 2).



**Figure 2.** Maine GHG emissions and forest carbon removals, 1990-2017 (Source: Domke et al., 2020; Maine DEP, 2020).

## Climate Change and Forestry

- The Northeast is warming faster than the rest of the U.S., and Maine's temperature has increased by 3.2°F since 1895.
- 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.
- The State has set climate change goals of reducing greenhouse gas (GHG) emissions by 80% by 2050 and having net-zero emissions by 2045.

## 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 of 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.

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