

NH Envirothon 2025 Current Environmental Issue:

Forest Stewardship in a Changing Climate

Introduction

The United States has approximately 750 million acres of forest, with around 55% of forests in private ownership (USDA, 2024a). There are many threats to our forests including droughts, wildfires, invasive species, and several different diseases associated with insects. Climate Change has increased the severity of these threats in many parts of the country. Even though our forests are resilient, it is important to recognize *forest stressors* and to devise forest management strategies to ensure that the *ecosystem services* (values) provided by our forests remain viable.

Forests provide many important ecosystem services, including carbon storage and sequestration. Carbon storage and sequestration are what many refer to as “natural climate solutions”, which can help to mitigate the impacts of Climate Change. In New England, the climate has changed with warmer days, shorter winters, and more intense rain and storm events, and it is projected that these trends will continue (USDA, 2024b). Properly managed forests can provide climate benefits, but careful consideration should also be given to the other ecosystem services they provide such as wildlife habitat and the production of renewable forest products.

The Challenge

This year’s NH Envirothon challenge includes understanding global climate change, explaining some of the social and economic impacts of climate change, investigating regional changes, and researching climate projections and potential impacts of climate change on forest health.

Teams will perform a forest assessment on a forest stand in their community. Publicly accessible land owned by the town, county, state, or a land trust can be good options to consider. Prior to or during your visit, come up with a list of *ecosystem services* provided by the forest.

Teams should also choose 3-4 forest stressors from the following list to use in completing their forest assessment:

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|---------------------|----------------------------|
| 1) Pests | 5) Extreme weather events |
| 2) Drought | 6) Forest diseases |
| 3) Invasive species | 7) Shorter, warmer winters |
| 4) Over browsing | 8) Wildfires |

To help perform a forest assessment on your community forest, you should contact your UNH Cooperative Extension County Forester. Contact information for each county can be found here: [UNH Cooperative Extension County Foresters | Extension](#)

The forest assessment should include the following:

- a) A basic inventory of the forest, including dominant tree species, tree sizes, canopy structure, tree health, and evidence of past management
- b) Description of how the chosen forest stressors may or may not be having an impact on the forest's health and resilience
- c) A vulnerability assessment of the forest, considering the ecosystem services it provides and their likeliness to be impacted by a changing climate
- d) A list of several different options for managing this forest and the benefits and drawbacks of each option for a landowner
- e) An analysis of the risks and opportunities of each option considering the chosen stressors, and the ecosystem services that are provided by this forest

Teams will then use this assessment to compare their chosen community forest stand with the two examples shown below, which are real-life forest stands located in New Hampshire. How does your forest stand compare in terms of health, resilience, and vulnerability?

Stand 1 is a diverse, mixedwood stand that leans towards softwoods. Eleven tree species were observed during inventory, with hemlock, red spruce, white pine, and big-toothed aspen most prevalent. Red maple, balsam fir, white birch, red oak, and beech were also present in lesser amounts. Terrain was gradual in most

places, with one small section of steep, inoperable ground. Soils are stony well drained fine sandy loams. A recent harvest on the property left this stand uncut, and it is ready for management soon.

Most species were spread out in the 6-18" DBH size classes, with white pines and hemlocks on the larger size and balsam fir and red spruce on the smaller side. Big-toothed aspen was 10-14" DBH. Stem quality was good throughout, with 73% of the stand's basal area considered acceptable growing stock. The stand falls just below the A-line of a mixedwood stocking guide, indicating it is fully stocked.

Stand volumes averaged 12.0 MBF of sawtimber and 20 cords of pulpwood per acre. An assessment of the advanced regeneration indicated that almost half of the inventory plots were sufficiently stocked with tree species regeneration under 6" DBH. Hemlock, balsam fir, elm, and sugar maple were the species tallied in this regeneration layer, with most stems in the 2-6" or 0.5-2" DBH size classes.

***Stand 2** is an 80-year old pine plantation that was established in the early 1960s by the land's former owner. It is located on the sandy soils on the Merrimack River floodplain, with its southwestern corner less than 100 feet from the riverbank. The pines were originally planted 6 feet apart, and the forest has not been thinned since the time it was planted. About 90% of this stand's basal area is made up of white pine, with branchy, crooked stems densely packed. Trees throughout have small crowns, and diameters are mostly in the 10-16" DBH range. The western 10% of the stand is made up of rows of red pine, originally planted to shelter the white pine from winds. These pines are a bit smaller than the white pines, and mostly in the 8-12" DBH range. This past summer, red pine scale was noted in the stand, with trees beginning to turn brown and die. Scattered hardwood trees exist throughout the stand, including black birch and a few large balsam poplar trees that were planted along the stand's southern edge. Soils are excessively drained loamy fine sands on flat terrain that experience occasional flooding.*

The white pines that dominate this stand contain little or no sawtimber or monetary value due to their poor growth form. Essentially all the white pine are suitable only as pulpwood. The red pines are of better quality, but are dying off rapidly due to red pine scale.

The understory of this stand is dominated by a mixture of invasive species including glossy buckthorn and oriental bittersweet. No tree species were noted in this regeneration layer during the inventory.

Lastly, teams should devise a method of making the information gathered available to your community.

References

USDA, 2024a. *Managing Forests in an Era of Climate Change: Perspectives from the U.S. Forest Service*. <https://www.fs.usda.gov/speeches/managing-forests-era-climate-change-perspectives-us-forest-service>. Accessed November 2024.

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Resources

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