

APPALACHIAN OAK–PINE FOREST

CLIMATE ASSESSMENT

Appalachian oak–pine is the southernmost forest type in New Hampshire, occurring primarily in southeast New Hampshire and further north along major river valleys. It is dominated by southern oaks like white, black, and scarlet oaks, and includes other southern species like hickories, sassafras, and flowering dogwood. This forest type reaches the northernmost limit of its range in southern New Hampshire.



POTENTIAL CHANGES TO HABITAT

- Although the species that dominate Appalachian oak–pine are tolerant of warmer and potentially drier conditions, and thus believed resistant to climate change, expansion of this habitat is likely to be limited by site conditions. Timing of range shifts will also vary considerably among species, and any migration is also likely to take place over timeframes longer than the present assessment considers.
- Drought–induced water shortages may make this habitat more susceptible to fire, but this is unlikely to significantly alter its extent or composition. Note that fire is still relatively rare even in similar habitats well to the south of NH, so the likelihood of increased fire events is probably low.
- As with other forest types, some forest pests may increase with warmer and/or drier conditions (e.g., gypsy moth), although the potential impacts of these on the overall habitat is unknown.

WHAT DOES THIS MEAN?

Predicting the responses of forests to climate change is a complicated endeavor. The response of a particular habitat to climate change is actually comprised of the individual responses of the habitat's component species. As a result, it is unlikely that forest types will simply shift their positions on the landscape. Instead, some species will increase and others decrease depending on specific climate needs and site conditions, resulting in subtly different forest types than those currently described (e.g., Zhu et al.2011). These changes will likely take place over a much longer time frame than the roughly 100 years under consideration for this current assessment, although the rate of change will be heavily influenced by local conditions.

As a more southern habitat type, Appalachian oak–pine is not expected to suffer significant negative impacts from climate change. To the extent possible, it is generally predicted to increase where site conditions allow, especially where disturbance opens up areas previously dominated by northern hardwood–conifer or hemlock–hardwood–pine habitats. The potential for increased fire is unlikely to convert this forest type into another, since its dominant species are already adapted to occasional major disturbances of this sort. Of potentially greater importance is the introduction or proliferation of pests or pathogens that do well under a warmer climate. Although specific cases of the latter have

not been identified (with the possible exception of gypsy moth), available evidence from other pests and pathogens indicates that changes in tree species composition can result.

Perhaps the greatest risk to Appalachian oak–pine forests comes from the human response to climate change. Because this habitat occurs primarily in southern New Hampshire, it has already suffered heavy losses to development, including fragmentation. Not only does existing human infrastructure impede species' ability to colonize new areas, it also serves as the starting point for future development. Any shifts in human population – or in how humans use forests (e.g., firewood) – will initially affect those habitats in closer proximity to existing population centers. If people move north in response to higher temperatures, sea level rise, or drought, they will initially settle in areas currently dominated by (or in proximity to) Appalachian oak–pine forest.

HOW DOES THIS AFFECT WILDLIFE?

Most wildlife characteristic of oak–pine forest are unlikely to be significantly influenced by climate change. These species are already adapted to warmer climates, and are likely to be supplemented by new species moving in from farther south. Changes in hydroperiod could have strong negative impacts on species that use vernal pools embedded in this forest type.

General Strategies to Address these Vulnerabilities:

See the full [Climate Change Adaptation Plan](#) for strategy descriptions

S1: Conserve Areas for Habitat Expansion and/or Connectivity

S2: Habitat Restoration and Management

S5: Invasive Species Plan

S6: Comprehensive Planning

S9: State Energy Policy

Specific Strategies:

1. Manage Appalachian oak pine habitat with prescribed burning to maintain habitat and reduce the risk of wildland fires.
2. Provide education and outreach to the public on the importance of fire in Appalachian oak pine habitats.