

Can Machines Replace Fire in the Pine Barrens?

For thousands of years, hot wildfires shaped the ecology of New Jersey's Pine Barrens. Today, a mechanized society prevents wildfires to protect human life and property.

The dry, sandy, acidic, and nutrient-poor upland forests leaf-out late in spring, compared to forests on rich soils in the adjacent Delaware Valley. This delay lets the sun dry fallen leaves and needles on the forest floor, before new leaves cast shade. Historically, spring wildfires ignited by lightning and Native Americans burned huge swaths of Pine Barrens forest.

Wildfires burned a mosaic pattern, with alternating hot and cooler bands and variable patches of scorching. The result was habitat variability: open forest patches with huge, scarred trees where rare woodpeckers could nest, and expanses devoid of large trees, where wildflowers and low shrubs and vines could grow.

Some Pine Barrens uplands encountered by European settlers were termed prairies and heaths. New Jersey's most unique bird species, the still abundant Prairie Warbler and the extinct Heath Hen, are named after these historical landscapes. More than 100 species of rare Pine Barrens plants and animals would be more common today – everything from the White Tiger Beetle to

American Chaffseed to Pickering's Morning Glory – if the frequency and intensity of wildfires could be re-created. Rare wetland peat bogs, with species like False Asphodel (now found only in New Jersey), were created as wildfires spread into swamp forests.

But wildfires are dangerous and are not tolerated. The New Jersey Forest Fire Service puts out hundreds of fires yearly, before they can threaten homes or highways. The public only hears about the rare fire that escapes and roars out of control.

Wildfires sometimes burn very hot, especially in habitats that have lacked fire for too long. Although hot wildfires occasionally harm rare species in the short-term, to perpetuate Pine Barren habitats, hot wildfires would be better than no fires.

Prescribed winter controlled burns are used to reduce wildfire hazards and create firebreaks, but not to create or maintain rare Pine Barrens habitats. The Pine Barrens is adapted to growing season wildfires, not cool winter burns that result in a steep loss of biological diversity.

Can we maintain a wildfire-dependent ecosystem while improving fire safety for people? Enter the ecological forester, with ideas for logging to thin the canopy and loosen sandy soil, drum chopping to perforate root mats, and igniting hotter prescribed fires. Can these techniques mimic wildfire ecology and perpetuate rare Pine Barrens plants and animals?

Ecologists have installed long-term plots within our Franklin Parker Preserve, studying how artificial means compare to wildfire in terms of nutrients, biomass, soil fungi, microorganisms, and plant colonization.

It is unlikely that the unique Pine Barrens ecology can be maintained by forestry alone. It is impossible to eliminate the dangers and risks posed by wildfires when conditions are severe.

But, hopefully, mechanization can help protect civilization from wildfire, and help create zones deep within wilderness areas where wildfires can safely burn.

