NEWTON CONSERVATORS
WINTER ISSUE

NEWSLETTER

Preserving open space and connecting people to nature since 1961

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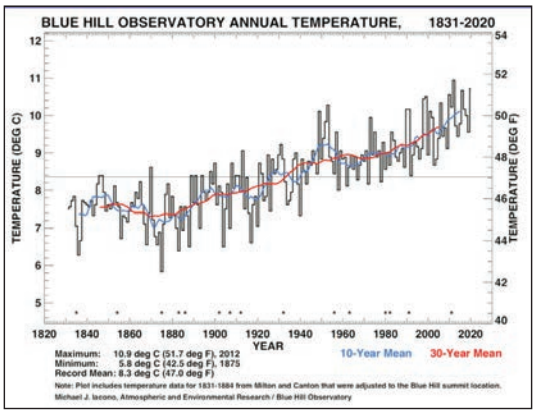
Our Changing Flora

By Richard Primack, Professor of Plant Ecology at Boston University and a lifelong Newton resident

Fifty-four years ago, as a college junior, I discovered that plants had names, and I wanted to learn the names of all the plants that grew in Newton's Webster Woods. I found a few rattlesnake plantain orchids growing along a forest road, and over the decades to come, I marveled at the exquisite beauty of their distinctive, white-veined leaves and rejoiced when they flowered. Then one year they were gone, never to return. I felt that I had lost a friend. In the early 1970s, I talked with an older person from Chestnut Hill. She told me that anemone and hepatica plants used to be common in the Webster Woods until they disappeared due to over-collecting for flower displays. I never saw a single one of those.

Rattlesnake plantain orchid



The New England flora has been strongly affected by human activity for centuries and now increasingly by climate change. Chart courtesy of Richard Primack[2]

Newton has changed dramatically since European settlers arrived in the area 400 years ago. Settlers cleared forests for farming and pastures and cut trees in wood lots for firewood. Rock walls in our woodlands still reflect the settlers' influence. Changes to the landscape continued as Newton shifted from a farming community to a residential suburb with roads and railroad lines. And our habitats continue to see growth in deer abundance, new diseases and pests, and a rapidly warming climate.

Even as organizations like Newton Conservators work to protect open spaces for wildlife and the community, can the plants and animals of Newton, such as the rattlesnake plantain, be protected in the face of all this change?

Documenting changes in the abundance of plants

New England has an exceptionally rich tradition of botanical research. Over the last 200 years, researchers and amateur naturalists have documented the floras of many towns and protected areas in the region, including Needham, Concord, Worcester County, and the Middlesex Fells in Massachusetts. No other region of the United States comes close to this level of botanical inventorying.

Today, botanists can match these historical floras with current surveys of plants growing in the same place to determine how our forests, fields, and wetlands have changed over time and if the protected areas have maintained their plant life. These comparisons show that:

- Many native wildflower species are

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declining in abundance and even going locally extinct (though often still found elsewhere in New England).

- The species most vulnerable to local extinction are those that were already rare.
- Non-native species from other continents represent an increasing proportion of plants in the region.

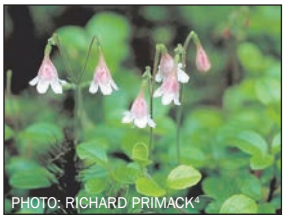
A rare purple fringed orchid from Concord

Concord, Massachusetts, provides a particularly stark example. Around 27% of the native plant species known to grow in Concord from about 1850 to 1950 are now locally extinct. This loss is concentrated in certain plant groups, including orchids and lilies. In contrast, the proportion of non-native plants has doubled, from 20% to 40% of the flora. This loss of species occurred even though around one-third of Concord's land is protected, and another one-quarter remains undeveloped.

We see these same changes happening in the Webster Woods. Over the past half-century, many rare wildflowers, such as Canadian lousewort and rattlesnake plantain, have disappeared from the woods. Non-native species have arrived, some of which, like purple loosestrife and garlic mustard, have become invasive, displacing native plants.

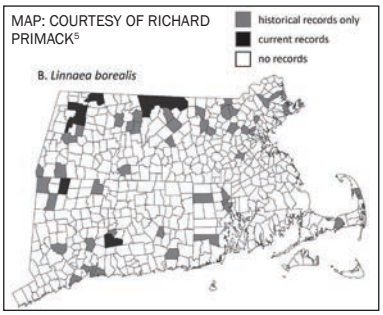
Invasive purple loosestrife

What is causing these changes?



Twin flower, a cold loving northern species that has declined

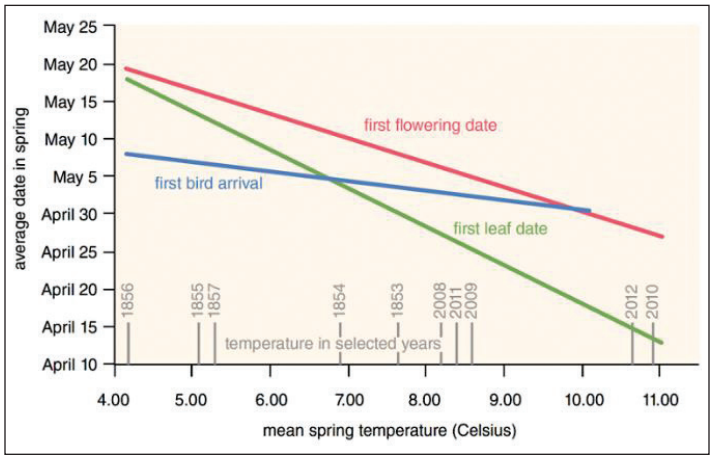
Many of the changes in the region's landscapes—the forest clearing and suburban development—destroyed or fragmented habitat for native plants. Development in New England and elsewhere in the country polluted our air and water, harming some native plants. Grazing by overabundant deer and infections by new pests and diseases have also contributed to changes in plants in our region. In addition, cold-loving northern species are declining more rapidly than more warm-loving southern species, a clear indication of the effects of climate change.



Map showing Twin flower declining at the southern edge of its range

Changes in timing

In addition to changes in abundance, plants are also altering the timing of their spring activity, a phenomenon botanists call "phenology." Like changes in abundance, researchers can investigate shifts in plant phenology by comparing historical records of flowering times and other spring activities with current observations. Yet again, Massachusetts has an abundance of historical documents. From 1851 to 1858, Henry David Thoreau observed the first flowering times of hundreds of plant species and the first leaf-out times of dozens of trees and shrubs in Concord, Massachusetts. Starting in 2003, my students and I repeated Thoreau's observations. We found that plants in Concord are now flowering and leafing about 10 days earlier than in Thoreau's time in response to warming temperatures.



Tree leafing times our are highly responsive to spring temperature (green), while bird arriving times in spring are much less responsive (blue). Wildflower flowering times are intermediate (red). Chart courtesy of Richard Primack[6]

Thoreau also recorded the arrival times of migratory birds, and later ornithologists and birders in Concord have repeated his observations. Like with plants, birds in Concord are responding to climate change, though not as strongly. Ecologists are investigating whether birds may now be mismatched with the plants and insects that provide food and habitat along their migrations and during their nesting seasons—birds may be arriving too late for the food and habitat conditions they historically relied on. Mismatches like these may contribute to declining populations of certain bird species.

High bush blueberry bushes are now flowering earlier

What you can do to help

There are things everyone can do to help with this situation:

- Keep a journal of natural history and phenology observations from around your house, neighborhood, or favorite conservation area.
- Share your observations of phenology and species occurrences with citizen science networks such as *eBird*, *iNaturalist*, and the USA National Phenology Network. Researchers investigating changes in plants and animals around the world rely on data from these organizations.
- Join an advocacy group and encourage government agencies and community organizations to take action to address climate change and the loss of biodiversity.

Newton Conservators organizes invasive pulls to remove Japanese knotweed and other invasives

- Change how you personally live and encourage the local government to reduce its use of fossil fuels, protect native habitats, and adopt other sustainable practices.

Conclusion

Over the past century, protecting natural habitats, as carried out by Newton Conservators, the Newton government, and other organizations, has proved to be the best overall conservation strategy. Now, abundant evidence shows that climate change and other landscape changes are already impacting natural systems, even in protected areas, and contributing to the decline and local extinction of well-known wildflowers, trees, and shrubs. The protection of conservation areas has slowed the loss of native species like the rattlesnake plantain I saw in my youth but has not stopped it. To stem further losses, we must not only preserve native habitats: we must also work to slow or stop further climate change. For graphic sources see last page. ◆

Could Bugging be the New Birding? (Part 2)

Editor's Note: This article is the second of two parts, with the first in the Fall 2025 newsletter.

Henshaw Haven front yard pollinator garden

In Part 1 of this article, we discussed the similarities between birding and bugging, how native plants are important for both, and some helpful hints and techniques for taking good photos of bugs, especially with your smartphone.

The great thing about bugging is that you don't need to be an entomologist to identify bugs. For birding, numerous phone applications, such as *Merlin*[1], have been developed to aid identification by characteristics, photos, or sounds, or to keep records of sightings using apps such as *eBird*[2]. Fortunately, similar free resources are also available for bugging!

Perhaps the most effective aid for bug ID is the amazing *iNaturalist* application[3]. *iNaturalist* works not only for bugs

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