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Cold Spring Park Red Maple Swamp — Can It Endure?

By Eric Olson, Senior Lecturer in Ecology at Brandeis University

Eighty years ago this spring, a lucky red maple seed-on-a-wing took its spiraling flight downward from its mother tree and settled into the damp peaty soil of Newton's Cold Spring Park. A mature red maple is a prolific seed producer, and that single seed would have had hundreds, if not thousands, of siblings also winging downward that year. A seed, as a biology professor of mine liked to say, is a baby tree with a packed lunch, and wild nature can be hard on babies of any creature, but especially those of plants. Of the many thousands of seeds produced by a tree during its lifetime, few ever become seedlings, much less mature forest trees.

A few do make it of course, and that is how this past summer fellow naturalist Bruce Wenning and I found ourselves standing before a particular red maple, one of the many in Newton's largest red maple swamp. We were able to trace this tree back to a lucky seed 80 years ago because we counted its rings. No, we didn't cut it down — using a forester's corer we extracted a slim cylinder of wood, thinner than a pencil, which we later sanded, moistened, and examined under a dissecting microscope. Our drill hit close to the center of the tree, allowing us to confidently count back in time to the year

1937, when this tree was starting its long, slow ascent into the canopy.

We were taking part in Newton's Red Maple Swamp Study Project, organized this year by the Newton Conservators in collaboration with City of Newton Parks and Recreation Dept. officials. Of the hundreds of large and healthy red maples that dominate the swamp forest of Cold Spring Park, Bruce and I had stopped at one, chosen pretty much by chance: "How about this one, Bruce?" "Looks good to me, Eric, lets see what she's got!"

In 1937 Franklin Delano Roosevelt was beginning his second term, Amelia Earhart disappeared over a distant sea, and war was brewing in Europe. Counting a tree's growth lines can connect us to the past, but though our chosen study tree proved to be old in human years, the thick peat soils

at this site suggest that a swamp forest has dominated here for centuries, well before Newton became a named town. An 1895 map of Newton shows a wetland here at least four times its current size before most was ditched and filled, along with hundreds of other wetland acres in town, to make the land suitable for suburbia. Reflecting on this history should increase our appreciation



Red Maple Foliage: note three main lobes. Also shown is a close up of a male flower (note pollen-producing stamens), a close up of a female flower (note the pair of long stigmas), and seeds on wings. This fruit type is known as a samara. Red maple is wind-pollinated and wind-dispersed.



Blue plant symbols indicate red maple swamp covering much of Cold Spring Park's 65 acres.

for what remains and our gratitude to the citizens and city officials who back in the 1970s decided to conserve forever about 35 acres of Red Maple Swamp right in the center of town.



Eric Olson takes a core sample of a red maple in Cold Spring Park

more moisture than most trees — in fact red maples do just fine planted in a typical suburban yard. Rather, this tree becomes so common in wet sites because oaks, sugar maples, white pines, and most other native trees cannot thrive in waterlogged soils. On better-drained sites, especially those unaffected by logging or heavy deer browse, red maple cannot compete against most other tree species. It dominates wet sites due to tolerance, not competitive ability.

To honor this past, it behooves us to ask today if all is well, and can we count on generations of sturdy red maples to dominate here for centuries to come, sending their seeds spiraling down into the wet peat soil? This question is what motivates the Conservators' Study Project, and here is what we have learned.

It turns out that red maple trees dominate New England's wet soils not because they need



Portion of core taken from a Cold Spring Park maple showing 25 years of growth. Sharpie pen dots indicate annual rings.

And we also have learned that there is a threat to this centuries-long story, and that is the arrival of glossy buckthorn (*Frangula alnus*), a Eurasian shrub that thrives in saturated soils and tolerates understory shade. Newton's red maple swamp is dense with buckthorn shrubs, as many as 24 stems per square meter (average 10 stems per m², N = 7 plots, range 0 to 24), ranging in height from 10 cm up to three meters. Extrapolating from this admittedly small sample suggests that there could be over 1.4 million buckthorn stems in Newton's 35 acres of maple swamp.

Such a dense understory of buckthorn is able to suppress the growth of native tree seedlings. My buddy Bruce and I looked for understory red maple but found very few, even in sites where canopy trees had fallen and opened up the stand to more sunlight. The buckthorn is everywhere, and it is inevitable such an aggressive plant will hamper regeneration of red maple.



Glossy buckthorn shrub in the red maple swamp at Cold Spring Park

When did this invader become so prevalent? Bruce grew up on the edge of Cold Spring Park; he's 63 now and remembers as a youth walking and running

through the park to meet up with with friends and sometimes exploring and playing in the forest. He says red maple has always dominated the low-lying areas of the Park, but he remembers that back then it was possible to see much farther into the forest. In just the past few decades, then, this old unique forest has been changed in a way that may mean the gradual loss of overstory maples.

Here's one reason you should care, even if you don't mind the look of all that buckthorn: Professor Doug Tallamy has shown that native maples are fed on by the caterpillars of



PHOTO: KEN MALLORY

Removal of glossy buckthorn in the red maple swamp in Cold Spring Park

over 250 species of native butterfly and moth. In contrast, a survey of insect life on buckthorn found just nine caterpillar species, all generalists usually found on other plant species (Yoder et al., 2008). That team also reported what we have seen in Cold Spring Park, that buckthorn leaves rarely show evidence of feeding by any insect. Freedom from herbivory was likely seen as a desirable trait by the nurserymen that brought buckthorn from Europe as an ornamental in the 1800s, but to an ecologist such a plant may as well be made of plastic. Think about it! As we all learn in grade school, the sun powers plants, plants feed caterpillars which in turn feed

baby birds. Or: plant to caterpillar, metamorphosis to moth, then moth to bat. Or: plant to grasshopper, grasshopper to spider or frog or toad or salamander. Plants are the proverbial base of the food chain, and so wherever inedible plants come to dominate, insect-eating creatures like birds will struggle to find sufficient food.

What to do? We have begun to explore this question, pulling out hundreds of buckthorn stems by the roots, in two 10 by 10 meter test plots in Cold Spring's swamp forest. Over the next year we will monitor these plots watching for regrowth of buckthorn but also for new red maple seedlings. It isn't easy, this approach: treating just those two plots took a couple hours of work by several determined volunteers. If we do observe a new generation of red maple trees starting life in our test plots, you may be asked to pitch in, and help steward Newton's unusual Red Maple Swamp into the future. ■

https://en.wikipedia.org/wiki/Acer_rubrum
<http://www.newtonma.gov/gov/parks/city/coldO.asp>
<http://www.nytimes.com/1999/04/27/science/eastern-forests-change-color-as-red-maples-proliferate.html>
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