

## ISSUES SURROUNDING REFORESTATION PLANTING ON LAND IN NEW YORK STATE

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Hugh Canham, February 7, 2024

New York State has a long history of reforestation through the planting of coniferous trees. Fernow, in the late 1800's, started what was then considered very radical forest management by clearcutting the mixed hardwood-softwood native forests in and around Saranac Lake and planting Norway Spruce, Scotch Pine and other coniferous species. For his efforts and other different ideas, he lost his position as head of the new forestry school at Cornell University.

With the advent of the Forest Preserve in the Adirondacks, an effort was made to plant some of the old farmland. However, tree planting and the development of State-run tree nurseries really got underway in the 1930's with the passage of a state law (the Hewitt amendment to the New York State Constitution) that enabled the Conservation Department to purchase farmland across the State, from owners who were experiencing difficult times with the Great Depression, pay them, plant trees on the abandoned farm land, and make payments to the local governments in-lieu-of-taxes. (See Dwyer 1974, and Robbins 1969, for a detailed description of the development of State Reforestation areas in New York.) Note that one of the major objectives of this effort was to put tax-delinquent and other marginal farmland back on the tax rolls and ease the burden of local government and schools during the depression. One of the other guiding thoughts at that time was that it was undesirable to leave "Idle Land" and it should be planted. Now 100 or more years later, the science of forestry has advanced and the public realize that naturally reforesting land is not idle but provides many benefits (Dwyer, 1974, chapter IX).

Tree planting efforts continued through the 1930's and while mainly on publicly acquired State Reforestation areas, there were some notable private plantings. Several private plantations were established at that time, the Eberley Brothers plantations, and others around Boonville, the Kernan plantations at Forestport in Oneida County, the Dumond plantations in Delaware County and the Luther plantings in Saratoga County. (There are more but these serve to illustrate the point and are the ones I am familiar with.)

After World War II there was some planting on State lands and the Soil Bank program spurred some tree planting on private farmland under the Conservation Reserve Program. It must be noted however, that many of the Soil Bank plantings of the 1950's and 1960's was on productive agricultural land. Newly planted spruce and pine seedlings were not successful competing with the abundant grass (alfalfa, clover, fescue) cover still growing there and instead of replanting it was often decided that just leaving the natural vegetative cover was achieving the same degree of conservation.

The Climate Leadership and Community Protection Act (CLCPA) enacted by the New York State legislature and the subsequent scoping document has brought new interest in using traditional tree planting reforestation efforts to sequester carbon dioxide and aid in maintaining a healthy environment. However, in New York State, our knowledge of forest management and alternative ways of achieving a healthy world have greatly changed over the last 100 years. There are 5 major concerns, or issues, which must be addressed before undertaking massive tree planting efforts. These are:

1. Physical availability of land for planting trees
2. Landowners' willingness and ability to plant trees
3. Survival of planted tree species on different soil and land cover types
4. Natural forestation of nonactive agricultural land in New York state
5. Biodiversity and forest values

Each of these is addressed below.

## **Physical availability of land for planting trees**

Cornell University, with the Nature Conservancy, studied the possible acreage of marginal farmland in New York that could be reforested. (Richardson et al, 2023) They conclude that approximately 1.7 million acres of land that falls under various definitions of agriculture could be planted to trees. However, there is much more that must be factored in before even this preliminary estimate is used for planning. The authors do state the limitations of the study and recognize that all lands identified may not be suitable for reforestation. However, the methodology used, while a good one for a first estimate does not account sufficiently for why these lands are outside productive farmlands yet are not already covered with native trees. Some of these lands, while not classified as wetlands, may be very poorly drained and as history has shown, even planting conifers on such sites produces very poor results. Survival is low and growth very slow. Other lands may have very shallow soil, which might support some agriculture but for trees with deeper and more extensive root systems there is a danger of windthrow and poor growth rates. Existing vegetation is a third physically limiting factor. The presence of a dense grass cover, as mentioned above on Soil Bank plantings is one obstacle to seedling survival. At the other end is the possible rapid invasion of native tree species already present at field edges. These can often outcompete planted trees for nutrients, sunlight, and soil moisture.

There is a prevailing assumption that forests are more important than grasslands, shrublands, and prairies, simply because they have more trees and look more “lush.” .....any area with more than 10% trees is considered a forest, which pushes all other land types into the “empty land” area — but they aren’t empty land. We need to redefine “ecosystems” to include not just forests, but also grasslands and savannas, which are essential.

## **Landowners’ willingness and ability to plant trees**

Unlike the massive tree plantings of the 1930’s, which were mainly on public land using hired labor and the Civilian Conservation Corps (CCC) the current proposed effort at reforestation would take place mainly on private land. As the Cornell publication points out (Richardson et al, 2023), the social acceptability and landowners’ motivations are key to owners’ decisions to participate in reforestation projects. Dwyer (1974) pointed out how these may have changed substantially from what were common motivations in the 1930’s.

If the land is adjacent to, and part of a working farm, there probably will not be much interest in establishing a long-term tree cover that would make it difficult to pursue farming activities in the future. For other possibly suitable lands held by nonfarmers, time and opportunities to devote energy to other land use practices often prevails when evaluating forest management practices. For all landowners, the time, energy, and cost of planting is a major obstacle. Through various federal and state cost-sharing or reimbursement programs the financial burden is somewhat eased but still involves time and effort by the landowner to secure contractors or other labor to help plant the trees. The timeframe for tree planting in New York is limited to a few months in the spring of the year whereas other forest management practices such as improvement thinning, insect or disease control may extend over much of the year, making it a more attractive alternative.

Conversion of nonworking agricultural land to other nonforest uses can also be a strong detractor from and long-term commitment of the land to forest cover. Landowners also might have the opportunity to sell parcels for home sites, summer or hunting camps, or for agricultural use on a lease/rental agreement. The availability of these alternatives is not uniform across the State and appears to be less in the more rural counties where the Cornell study finds much of the physically available land for reforestation. However, there is still pressure for alternative land uses.

### **Survival of planted tree species on different soil and land cover types**

Almost any tree species will grow best on deep well-drained fertile soil free from competing vegetation and without insects, disease, or elimination by animals (predominantly deer). More important is finding the best species to grow best on the various biological and physical conditions on a given site. Almost no species will develop well on shallow, very wet or poorly drained soil with much competition from native vegetation. Other species such as eastern white pine, which is native to New York, will grow and survive on a variety of conditions, is subject to the white pine weevil which can severely limit its use as a lumber species. Weevil damage is most widespread on the heavier clay and clay-loam soils and less on sandy soils. Conversely, red pine, also native to some parts of the State, is not affected by the weevil but will not grow well in poorly drained areas. Norway spruce, a third widely planted species across New York in the 1930's will survive and grow under the most severe conditions but is usually slower to develop and often outcompeted by other existing vegetation. Other species such as balsam fir, larch, and Scotch pine were planted in the 1930's era. These do require clear sites and well-drained soil. Scotch pine and Norway spruce are not native species.

Hardwoods are the native climax species across most of New York. Sugar and red maple, red oak, yellow birch, hickory, tulip popular and many others are found in our woods. Any of these can be planted but the site requirements for successful hardwood plantings are more demanding than for many conifers. Mass production of hardwood seedlings will require changes in some nursery practices. Sufficient seed must be acquired, fertilizer applied, and watering possibly increased to mention a few.

The big deterrent to all reforestation efforts in New York is probably the impact of deer. This occurs not only for planted species but also for natural regeneration of native species following any disturbance either from timber harvesting or a natural event (wind or ice damage, drought). Deer are particularly attracted to the mix of species that usually exist in newly planted old farmland where grass, young tree seedlings and other browsing plants exist. Without a much more aggressive deer management program across the State reforestation with planted species will have little success. On recently harvested natural forest areas deer are often effectively eliminating much regeneration of the forest unless the owner pursues an active hunting regime or constructs some form of deer enclosure. In areas of the northeast invasive shrubs have completely inundated the understory of existing woodlands, leaving no chance for successfully regenerating the area. NY Restoration Project among other groups routinely have crews dedicated just to removal of invasives. We need to take care of what we have before we plant more acres to trees.

### **Natural forestation of nonactive agricultural land in New York state**

The dominant form of land covering over 90% of New York, if left alone, will be trees and forests. Given our moist climate, generally good growing conditions, and relatively fertile soils, trees will grow almost anywhere. When European settlers first arrived in New York in the 1600's about 95% of what is now New York State was covered with forests. Over the next 300 years land was aggressively cleared for homesteads and subsistence agriculture, then later for market-driven farming. By the beginning of the 20th century (circa 1900) only about 20% of New York was in forest cover ( Just the Facts, 2020). Today 63% of New York is covered by forests and woods. This remarkable regrowth of the forest happened mainly through natural regeneration of the forest on lands abandoned for agriculture. Much of the Adirondacks was not intensively cleared for farming but widespread clearcutting for various timber products was widespread. Here again, the natural forest regrew as timber harvesting decreased and many areas were kept from logging by the constitutionally protected Forest Preserve. Artificial reforestation in the 1930's and more recently added only a small amount of forests to the land cover. (See Dwyer, 1974, chapter IX)

The reverting of land, not actively in use for specific human purposes, to forest cover continues into the 21<sup>st</sup> century although in the last 20 years the amount of forest land in New York has not grown. This is largely due to some land being taken for residential use in suburban areas, clearing of land for agriculture on highly productive sites, and general human settlement sprawl.

### **Biodiversity and forest values**

Almost any ecosystem, from the most elementary to the most complex mix of biological, physical, economic, and sociological factors benefits from containing different species, age classes, and varying cultural beliefs. Forest ecosystems produce many different values to society. For New York's forests they are: source of wood supply, wildlife habitat, watershed protection, recreational opportunities, and climate mitigation. Native shrublands also supply vital ecosystems services (Cornell Coop. Ext. Habitat Stewardship Series).

Large areas of planted native hardwoods will contribute to the existing strong markets for hardwood lumber and fit in well with the domestic and export markets for these products within the limitations described above regarding deer and competition from native vegetation. Planted conifers will not contribute much to the wood products industry. The northeast has lost much of its low-grade markets, including biomass and pulp mills (especially for softwood pulp). Softwood lumber in today's economy comes mainly from the Pacific Northwestern United States and Canada. In certain locations in our State white pine and red pine are used in building construction. Recent developments in mass timber construction could offer improved markets. However, the principal driving force in the existing wood products firms in New York are hardwoods. Natural forests in our State usually contain a variety of species. As such they can better withstand insect and disease outbreaks and provide different wood products for a dynamic market.

Wildlife (birds, small and large mammals) require areas for feeding, nesting or bedding, and corridors for safe movement across the land. This calls for a variety of tree species and age classes. In New York the abandonment of agricultural land in the 20<sup>th</sup> century produced many young-growth forests and transitional areas from fields to woodlands. Presently there is a scarcity of these types of forests in some parts of the State. On some State Forests there are active programs to mow or to use controlled burns to maintain open "old fields" for needed diversity in an increasing landscape of forests. Biodiversity is a necessary part of wildlife habitat and large areas of single-species conifer plantings do not offer much value for wildlife. Small patches interspersed with hardwoods and open areas are often the greatest benefit. Indeed, probably the greatest benefit of the small one-to-two-acre conifer plantings often found on private lands, as the result of perhaps a 4H or other project, is in providing winter cover for wildlife.

Forest-related recreation is an important use of New York's forests. Hunting, camping, hiking, skiing, and snowmobiling all take place mainly in various forest environments. Recreation is probably the biggest use of the 4 million acres of state-held Forest preserve in the Adirondacks and Catskills. Much recreation also occurs on the 1 million acres of State Forests and State Wildlife Management Areas. Recreationists often want to experience a variety of forest types when hiking or viewing fall foliage. Winter sports in forested areas require trails and often are enhanced by the presence of alternating areas of conifer and hardwood stands of trees. Open vistas enhance the recreational experience and maintenance of open spaces is often desirable.

Forested watersheds across New York provide clean water for over 80% of our population. Some watersheds contain planted conifers, largely established in the 1930's, but many contain a variety of hardwood species and native conifers. The key to successful watershed protection is developing and maintaining diverse and healthy forests. This can involve periodic thinning out of trees to maximize the

overall growth rate per acre, establishing low ground cover to eliminate most surface runoff, culling of dead and diseased trees, and combatting any severe insect or disease outbreak; all of which suggests biodiversity in the forest stand.

Planting individual trees in urban areas can have a significant impact on summer temperatures. Studies have demonstrated such effects. The care and protection of these individual trees is costly and require attention of trained arborists. However, the reduction in electric powered air conditioning units could be significant. Perhaps more attention should be devoted to this effort.

Across New York State the greatest single way to mitigate climate warming is by capturing greenhouse gases, primarily carbon dioxide, by forests. As with all other forest values the key to successful carbon capture is developing a diverse and healthy ecosystem with different species mixes and stand ages across the landscape.

## Summary

Reforestation is one tool to mitigate climate warming across New York State. However, there are serious drawbacks as described under each issue above. These include the accuracy of estimated available acres, landowners' willingness and ability to plant trees versus other forest management activities, survival of planted trees when competing for the natural regeneration that occurs naturally in the moist and relatively fertile land in New York, and what is the best way to achieve biodiversity and help slow warming of the global climate.

Natural regeneration of unused agricultural and other land in New York should be given more attention. It is going to happen anyway since forest cover is the natural climax cover across most of the State. Of overall importance is keeping land in forests and managing those lands to grow healthy trees, harvesting when economically mature, and securing the next generation forest. Public policies are needed regarding control of deer browsing, high property taxes, assisting private forest owners in forest management, and the maintenance of a diverse wood products industry that supports the private landowner in practicing sustainable forest management.

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