

LARGE-SCALE REFORESTATION AT HAMILTON COLLEGE

Lessons Learned from an Adaptive Approach to Institutional-Scale Reforestation



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A reforestation story

As New York State and the Department of Environmental Conservation continue to deepen efforts to plant 25 million trees by 2033 and to develop and maintain 1.7 million acres of new forested lands by 2040, we need more examples of how private institutional landowners can participate by planting, growing and maintaining new forests on their lands. While many people have, at some point in their lives, planted a tree, few people have actually grown new forest. It seems simple – after all if you abandon land in New York it will likely eventually be covered in forest. But these forests are filled with invasive species like European buckthorn and Asiatic bittersweet and are of low ecological and biodiversity value. Importantly, they also store less carbon than an intentionally grown and well-managed, native hardwood forest.* “Growing” a good forest is worth the effort.

Navigating the onslaught of small decisions that need to be made and the myriad setbacks that arise in growing new forest is not simple. And, as more institutional landowners start reforesting, learning

from each other will become increasingly critical for the success of the tree planting and new forest acreage goals. If we can share our stories of what we tried, what has worked, and what has failed and why, we can all advance our communities towards our collective goals of a thriving forested future.

This case study presents the story of reforestation efforts at Hamilton College – a small, private, liberal arts college located in Clinton, New York, situated in the western Mohawk Valley. At Hamilton, our efforts have been deeply interwoven with our core educational mission and our own institutional climate and sustainability goals. Here, we tell our stories in the hopes that they will inspire other non-profit private institutional landowners in their own reforestation journeys.

* (Mascaro and Schnitzer 2011) Mascaro, Joseph, and Stefan A. Schnitzer. “Dominance by the introduced tree *Rhamnus cathartica* (common buckthorn) may limit aboveground carbon storage in Southern Wisconsin forests.” *Forest Ecology and Management* 261.3 (2011): 545-550.



The Setting: Hamilton College’s Lands

Hamilton’s campus and lands comprise over 1,390 acres located in the foothills overlooking the Oriskany Creek valley in southwestern Oneida County. The main, built-up educational campus occupies 400 acres of land, as well as 800 acres of forested land, some of it in native secondary growth hardwood, some in a historical legacy pine

plantation, and some in unmanaged abandoned buckthorn-dominated forest. However, it is on the 190 acres of currently open lands – a mix of current agricultural lands, former agricultural lands, and a former golf course – that the College has focused its reforestation efforts.

OPEN, AGRICULTURAL & REFORESTED LAND SUMMARY (DEC. 2025)



CAMPUS ROAD TRACT ACREAGE (13)

Tract 1 — 12.27	Tract 7 — 11.37
Tract 2 — 8.05	Tract 8a/b/c — 12
Tract 3 — 18.05	Tract 9 — 1.8
Tract 4 — 18.05	Tract 10 — 1.6
Tract 5 — 20.54	Tract 11 — 16.91
Tract 6 — 2.21	Tract 12/13 — 30.1

NOTE

- Tracts outlined in blue are currently in agricultural leases
- Tracts outlined in green are currently open and available for reforestation.

A REFORESTATION STORY

RESERVOIR ROAD TRACT ACREAGE (1)



RESERVOIR ROAD TRACT ACREAGE (1)

Tract 14a/b — 35.0 acres

• 14a — 22 acres

• 14b — 23 acres

NOTE

■ • Tracts outlined in blue are currently in agricultural leases.

■ • Tracts outlined in green are currently open and available for reforestation.

SUMMARY OF BOTH CAMPUS ROAD AND RESERVOIR ROAD TRACTS

• Totals: ~188 acres, 14 tracts

■ • Total acreage in blue under agricultural lease contracts: ~82

■ • Total acreage in green outside agricultural contracts: ~106

– Subtotal acreage of actual/ongoing reforestation efforts (tracts 6, 8a, 8b, 9, 11): ~28

– Subtotal acreage of current managed grasslands that might be reforested in the future (5, 8c, 10, 12, 13, 14a): ~78

Phase 1: Early Reforestation Efforts (2018–2019)

Background & Goals

Hamilton launched its first large-scale reforestation projects in 2018 and 2019 as part of its sustainability commitments and Earth Day celebrations. The goal was to repurpose portions of the former golf course and engage the community in a visible step toward carbon neutrality.

Approach & Methods

During two annual spring events that coincided with the College's Earth Day efforts, volunteers planted a total of 900 bare-root seedlings across approximately 3.5 acres. Two layers of solar-charged electric deer fencing were installed in the days immediately following to reduce browsing.

Beyond the fencing, no other steps were taken to protect the trees. There wasn't a defined/ prescribed post-event maintenance plan for the trees, including watering, or the maintenance of the electric fencing.

Tree species included:

- Red maple
- White oak
- Black walnut
- Sycamore
- Shagbark hickory
- Black cherry
- Red pine

Costs

The costs for this project (excluding labor since it was mostly volunteer) was \$1,179 for the trees, \$270 for dibble bars and \$3,685 for the electric fencing (inclusive of posts, wire and two solar energizers), for a total project cost of \$5,134.

Community & Educational Value

The events drew more than 50 students, faculty, staff, and family volunteers, introducing many to reforestation for the first time.

For Hamilton, this was not only an environmental action but also an experiment in connecting hands-on sustainability with community traditions.

Observations & Outcomes

While enthusiasm was strong, tree survival rates were low; about 3% of seedlings survived by 2025. The primary factors identified were the drought conditions during the spring and summer of 2018, as well as the electric deer fencing shorting out by way of grass growing too high and contacting the wires.

The College committed to controlling the grass growth underneath the electric deer fencing on a more regular basis following the planting event in 2019, but that did little to improve the success rate.

Lessons for Future Efforts

- Broad participation builds awareness, but trained teams and structured maintenance are essential for success.
- Site history matters. Golf course soils, designed to shed water, can magnify drought stress and may not support reforestation without adaptation.
- Even with low survival, these plantings seeded institutional knowledge that directly shaped Hamilton's next phase of reforestation, where survival rates climbed to more than 80%.



THE HAMILTON TEAM INVOLVED



DIBBLE BARS AND BARE ROOT TREES



ELECTRIC DEER FENCING



THE RANDOM PLANTING EFFORT

Phase 2: Reforestation Efforts (2021–2023) Tubes, Fences and Climate Goals

Background & Goals

Following Phase 1, Hamilton sought strategies that would improve survivability and scale reforestation in ways that aligned more closely with teaching and research. Two developments shaped this shift:

- **Tree Tube System:** Associate Professor of Biology Andrea Townsend had pioneered the use of tree tubes with her students in 2019. This method quickly proved more effective than bare-root planting.
- **Sustainability Commitments:** In 2023, Hamilton adopted three campus-wide action plans that elevated carbon neutrality as a central goal. These commitments ensured that reforestation efforts would be better resourced and guided by faculty expertise. A 2020 land-use map further organized open, agricultural, and reforested lands to support decision-making.

The Tree Tube System

The Miracle Grow Tree Tube system used in Phase 2 marked a significant step forward, pairing ecological science with hands-on student learning. The system included:

- A 4–6' plastic tree tube to prevent deer browsing and create a warmer microclimate for growth
- A 4–6' wooden stake to secure the tube
- An 18"x18" plastic weed mat with staples to reduce competition from surrounding vegetation
- A small net at the top to prevent birds from perching or falling in.



Phase 2a: 2021 Plantings

Background & Goals

Hamilton's first Phase 2 projects tested the tree tube system at scale while also engaging the campus community in seed and seedling planting and site restoration.

Approach & Methods

Tract 11 (16.91 acres)

- Planted 200 potted trees (white pine, black cherry, hickory, red maple, red oak, American bittersweet, silver birch).
- Half were placed within a 7' deer exclusion fence, and many hardwoods were protected with tree tubes.



SEVEN YEARS AND COUNTING

Tracts 8a & 9 (Golf Course Site)

- A community event, Oak Stomp, planted thousands of native seeds in rows marked with the tree species; seeds were planted roughly 9-10 feet from each other.
- 52 potted hardwoods with tubes were added along the perimeter.
- 12 potted willow trees were planted in Tract 9 using the tree tube system.

Costs

The costs for this project at both tracts 8a and 11 (excluding labor) was \$252 for the trees, \$2,500 for the tree tubes (inclusive of wooden stakes, tubes, bird nets and weed mats), and \$6,988 for the 7' deer exclusion fencing and posts, for a total project cost of \$9,740.

Community & Educational Value

The Oak Stomp event connected students, employees, and community members in a highly visible planting event.

Faculty-student collaboration (Townsend's classes) provided a model of research-based practice influencing institutional strategy.

Observations & Outcomes

- Tree tubes reduced deer browsing, substantially but required ongoing maintenance (stakes loosened, mats shifted).
- Vegetative competition was significant in non-perimeter areas, potentially reducing the growth of planted trees.
- While some planted seeds have started to grow into seedlings, our data tracking has focused on planted seedlings, not seeds.

By 2025, when we revisited these areas to assess mortality:

- Tract 11: 99 trees found, 66 alive (~66% survival among located trees, ~33% overall survival)
- Tract 8a: 52 hardwoods planted, 24 alive (46% survival)
- Tract 9: 12 hardwoods planted, 7 alive (58% survival).



FALL 2021 OAK STOMP WITH PERIMETER TREE TUBE PLANTINGS



FALL 2021 TRACT 9 WILLOW PLANTINGS

Lessons for Future Efforts

- Pairing deer fencing with tubes boosts survival but requires seasonal upkeep and maintenance efforts.
- Perimeter plantings perform better than interior plantings due to reduced competition.
- Additional maintenance is needed on interior tree plantings to reduce competition from vegetation
- Faculty-led pilot projects can accelerate institutional learning and success.

Phase 2b: 2022 Plantings

Background & Goals

Building on the promising results from Phase 2a, Hamilton aimed to scale reforestation in 2022 while continuing to strengthen community engagement.

The goal was to involve the entire graduating class, creating both a lasting sustainability legacy and stronger connections between students and Hamilton's land stewardship.

Approach & Method

- **Scale:** Ordered 1,000 trees for Tract 11 with roughly 900 tree tubes
- **Senior Week Event:** Each senior (~500 students) was invited to plant two trees, guided by a training video on the tube method
- **Follow-Up:** Sustainability staff and student interns planted approximately 300 additional trees later in the season.

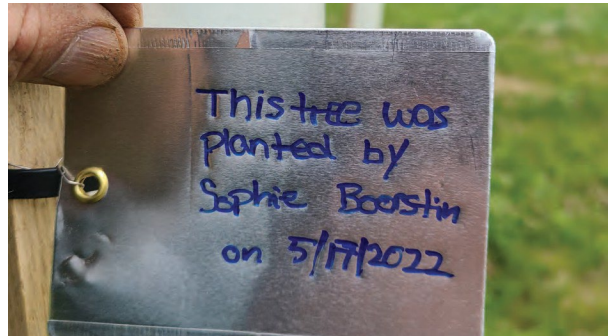
Costs

The costs for this project (excluding labor) was \$3,139 for the trees and \$5,791 for the tree tubes (inclusive of wooden stakes, tubes, bird nets and weed mats), for a total project cost of \$8,930.

Community & Educational Value

The Senior Week planting was a milestone cultural event that celebrated environmental responsibility.

Students were excited to tag "their" trees in hopes of revisiting it during a future trip to campus. This created a personal connection between them and Hamilton's long-term sustainability efforts.



2022 TRACT 11 SENIOR WEEK TREE PLANTING EFFORT

Observations & Outcomes

- Turnout was enthusiastic but lower than anticipated (~400 students)
- Planting errors occurred (e.g., some trees left in pots or planted upside down)
- Roughly 300 trees could not be planted in time and were lost.

Lessons for Future Efforts

- Large events inspire pride but require expert oversight at every step to ensure planting quality.
- Logistics, including storage of seedlings, timing, and immediate planting, are as critical as the planting method itself.
- Scaling reforestation is achievable but demands structured maintenance and monitoring to preserve survival gains.
- By 2025: of the roughly 700 trees successfully planted, 378 were located and 242 were alive — a 64% survival rate among found trees, or 35% overall.

Phase 2c: 2023 Plantings

Background & Goals

Having learned from the challenges of scaling up in 2022, Hamilton shifted to a smaller, more controlled effort in 2023 that was designed to prioritize planting quality and process refinement over sheer numbers. Our goal here was to focus on getting it right, rather than volume.

Approach & Method

- Planted 100 native hardwoods in Tract 11 using the full tree tube system.
- Students and staff pre-dug augured holes rather than hand tools, ensuring consistency in depth and spacing.

Costs

The costs for this project (excluding labor) was \$510 for the trees and \$819 for the tree tubes (inclusive of wooden stakes, tubes, bird nets and weed mats), for a total project cost of \$1,329.

Community & Educational Value

Although the group of students and staff was smaller, the experience provided intensive, hands-on training in advanced reforestation methods.

The project demonstrated how deliberate, high-quality planting can produce measurable ecological benefits.

Observations & Outcomes

- Standardized planting with mechanical assistance improved efficiency and survival
- By 2025: all 100 trees were located, and 88 were alive — an 88% survival rate, the highest of any Hamilton reforestation phase. These trees were easier to find due to tagging and recording tree numbers.



2023 TRACT 11 TREE PLANTING

Lessons for Future Efforts

- Smaller-scale plantings with trained participants can achieve much higher success rates.
- Mechanical support (augured holes) enhances uniformity and survival outcomes.
- Strategic refinement — not just scaling — is essential for long-term reforestation success.

Phase 3: Reforestation Efforts: Growing Trees (Not Just Planting Them) and Planning the Future (2024 and Beyond)

2024 PLANTINGS AT TRACTS 6, 8A AND 11

Background & Goals

Having learned cumulative lessons from all reforestation efforts through 2023, Hamilton shifted in a bold new direction. That direction would even further scale up our reforestation efforts with both external and internal mechanical assistance, as well as field preparation.

Approach & Method

Tract 6 (2.21 acres)

Four aspects of our Tract 6 plantings were unique:

- First, we prepped the former agricultural (corn) field by planting red clover in the spring of 2024 in preparation for reforestation efforts. Clover was planted to increase nitrogen in the soil. While we had targeted a late 2023 fall planting timeframe, due primarily to weather all plantings did not take place until the winter in early 2024.
- Second, we collaborated with a local Christmas tree farmer to effectively outsource the most physically challenging aspects of tree planting, including the actual planting via heavy equipment, deer fence erection, and tree tube installation. That work left only the weed mat installation to Hamilton faculty, staff and students.



WINTER 2024 TRACT 6
MECHANICAL PLANTING



SPRING 2024 TRACT 6
NEARING COMPLETION

- Third, we scaled up the plantings to “tract scale” (all 2.21 acres of the tract).
- And lastly, we selected plantings that were not just local, but mimicked nearby habitat to include shrubs. The breakdown of the 1850 species planted were as follows:
 - > 850 hardwoods, as follows:
 - + 200 willow
 - + 200 sugar maple
 - + 200 red maple
 - + 200 red oak
 - + 50 additional black gum, yellow birch, American plum, red maple, sugar maple and American hornbeam
 - + 500 softwoods, all white pine
 - + 500 shrubs, including flowering dogwood, crab apple, serviceberry, chokeberry.

Tract 8a and 11

In the fall of 2024, we revisited portions of both Tracts 8a and 11 where either previous reforestation efforts had not been very successful, or that we simply had not reforested yet. We mostly chose easy to access perimeter locations and planted 300 trees total, as follows:

- 150 trees at Tract 8a; 150 trees at Tract 11
- 75 trees each of 4 species—red maple, sugar maple, red oak, red bud.

All planting locations were first brush hogged, and the trees locations were pre-dug by an auger operated by Hamilton Facilities Management department. Hamilton faculty, staff and students then planted the trees, and installed tree tubes, weed mats and bird nets.

Costs

The costs for this project for tract 6 (which included all trees, tubes and installation labor by the Christmas tree farmer) was \$20,750. The costs for the project for tracts 8a and 11 (excluding labor) was \$1,530 for the trees and \$2,683 for the tree tubes (inclusive of wooden stakes, tubes, bird nets and weed mats), for a total project cost of \$4,213.

Community & Educational Value

Courses in Environmental Studies and Biology continue to study the reforestation plots and summer research students have started studying how the reforestation ecosystems are changing in other ways. In 2024-2025, an environmental studies student led a project studying soil carbon storage across our reforestation landscape. We have also begun disseminating our efforts more broadly across the campus community, through large public presentations. As reforestation continues, increasing number of students, faculty, staff and alumni are becoming engaged in our efforts.

Observations & Outcomes

Overall our early efforts ran into numerous challenges, resulting in planted tree mortality rates above 96%. It is exciting that our most recent plantings have had much better success with mortality only 32%. We've learned how to manage deer, and while we are still figuring out the best approaches to deal with weed and wind, our trees are growing fast.

Lessons for Future Efforts

Assessing the success of reforestation efforts means figuring out how many trees survive and what management approaches work better. That is impossible if you don't know exactly what trees you have planted and where you have planted them. As we continue our reforestation efforts, we will be sure to tag and mark the location and species of each individual tree, so we can better understand what is working (and what is not working) and why. Ultimately, the biggest lesson learned in Hamilton's adaptive approach has been that reforestation is not about planting trees, it's about growing them.



2024 TRACT 8A TREE PLANTING



2024 TRACT 11 TREE PLANTING

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