The Watershed Forestry Partnership Newsletter

SUMMER 2026

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From the Coordinator…

As many of you may know, adequate funding for the Watershed Forestry Partnership (specifically the full-time Coordinator position) was due to dry up at the end of June 2026. The position was initially funded by Lake Champlain Sea Grant, UVM-Extension, American Forests, USDA-NRCS, and a private donor. In all cases, funding was either not renewed or was reduced to the extent that a coordinator position was no longer viable.

I am very grateful and relieved to announce that the Lake Champlain Basin Program has committed to providing two years of funding to keep the Partnership going. Gratitude is also due to Watersheds United Vermont, which provided a stop-gap Workforce Capacity grant that allowed the position to continue while other funding streams were explored. Thanks, too, to those of you who expressed support for the Watershed Forestry Partnership during rough times earlier this year!

During the next two years I plan to continue to do much of the work I've been doing over the past two and a half. There is already a lot to do this fall: I'll be organizing an October wetland restoration workshop (more on that coming soon!), a November Native Tree Nursery Roundtable meeting, and next year's annual meeting. What I hope are the final edits on a riparian restoration manual are in the works, as are much-needed updates to the WFP website. A UVM intern and I have monitoring data from this summer we need to crunch, and a National Fish & Wildlife Foundation grant I'm managing is winding down with grant reporting to do.

For longer-term efforts, however, I would really like to hear from you all about how I can best support your tree growing and riparian forest restoration programs. Are there barriers you're facing that could be addressed by the WFP? Public outreach that we could all partner on that would entice landowners to come running for trees? Training you wish you had? Let me know!

Best wishes for a nice, slow end to the summer and a successful fall season,

-Shawn

US Fish & Wildlife Partners planted 27,000 trees and shrubs this spring

by Chris Smith, US Fish & Wildlife

This spring, the U.S. Fish and Wildlife Service worked with our valued partners to plant 27,000 native trees and shrubs in riparian buffer projects to benefit fish and wildlife habitat, water quality, and other ecosystem services. Projects covered 84 acres of high priority streamside habitat across the state. Most sites occur on agricultural land in partnership with Farm Service Agency and Vermont Agency of Agriculture, Food and Market's Conservation Reserve Enhancement Program (CREP). VAWQP staff who want to learn more about the CREP program should visit the webpage below and/or reach out to Ben Gabos and Phil Wilson at same location: https://agriculture.vermont.gov/crep
Additional project partners include Friends of the Winooski River, the White River Partnership, Connecticut River Conservancy, and several conservation districts. Projects will support migratory birds, priority fish species such as brook trout and American eel, and At-Risk species such as wood turtle.

Planting crew from Redstart with a turtle found in a newly restored CREP project (photo credit: USFWS)

2025 Tree Planting Survey Results

by Shawn White, Watershed Forestry Partnership

Earlier this year, I posted a survey on the Watershed Forestry Partnership Listserv to see if I could get a total number of trees and acres that were planted by partners in 2025. My intent was to present cumulative numbers at the annual meeting in February, and to get an idea of the sources of the plant material being used (in or out of state). Several organizations graciously responded to my last-minute effort, and while I reported provisional numbers during the Nursery break-out session, I neglected to do the same for the larger group!

So here's a summary of the survey results, which should be considered very approximate estimates, especially since CREP projects may have multiple partners who may have all reported (and which I tried to correct for):

- 17 groups responded to the survey
- 165 acres were planted across the Lake Champlain, Lake Memphremagog, Connecticut River, and Hudson River watersheds.
- 50,890 stems planted (43,449 bareroot, 1,331 container, and 6,110 live stakes)
- Mostly sourced from local VY and NY nurseries, with some from Cold Stream Farm in Michigan
- Almost all of the trees and acres planted were initial plantings rather than replanting of previous projects.

If your organization did not respond but would like to be includ

If your organization didn't respond but would like to add your projects to the results, please contact me for a copy of the survey: shawn.white@uvm.edu

Restoring Riparian Buffers at Green Mountain Audubon Center

by Sarah Hooghuis, Green Mountain Audubon

It would have been a strange scene to onlookers — all thirty of us out in the field dancing to music from the 70s wearing colorful rain gear while April snow blew sideways. Despite the weather and unbeknownst to these onlookers, we were planting hundreds of native plant species along the Huntington River.

The day started at eight in the morning with a small group of Audubon Vermont staff organizing native shrubs and trees into clusters for each planting plot. At this point, it was raining, the paper list of plants was getting soggy, and our fingers were losing dexterity in the cold. Still, we worked quickly and efficiently — if someone had overheard us, they might have compared us to an assembly line in a kitchen. One person would call out the plants needed in a cluster, another would grab the plants and repeat the plant names back to confirm, while the third labeled each plant and bound them all together with a piece of flagging tape containing the cluster's number. Each cluster contained 10 plants such as birch, dogwood, cherry, oak, arrowwood, and serviceberry. Once a cluster was complete, it was loaded into the tractor bucket to be dropped off at our planting location.

Our goal with these plants is to restore riparian habitat at the Green Mountain Audubon Center along a stretch of the Huntington River. Riparian areas provide critical wildlife habitat to wildlife species that depend on proximity to both water and vegetation and can act as stopover locations for migrating birds. Strong riparian buffers can host a mosaic of habitats, ranging from dense forests to open shrublands. Shrublands are a unique yet variable habitat type, not quite forests and not quite grasslands — they fall somewhere in between, dominated by short, woody plants interspersed with grasses. Both shrubland and riparian habitats provide crucial resources for a wide range of wildlife species — each rich with opportunities for shelter, food, and breeding habitat.

After several 100-year flooding events from July 2023-July 2024, these habitats took a huge hit. Invasive species were carried in and dispersed by the floods, riverbanks eroded and fell into the water, and sediment was deposited in unusual ways. At the same time, an opportunity presented itself when our farming neighbors let us know they were retiring the field for hay production. This allowed us to consider how we would manage the area for birds and other wildlife by extending the riparian buffer and jumpstarting the natural regenerative process by planting shrubland clusters. Thanks to funding from National Fish and Wildlife Foundation and Lake Champlain Basin Program, we were able to purchase 339 native plants and shrubs to plant across seven acres of retired agricultural fields running along the Huntington River.

Our Youth Conservation Leadership Program powered this planting. Audubon Vermont alumni, local high school students, UVM students, and AmeriCorps Members made up the majority of our team of 30 volunteers. Many hands made light work! Every plant we purchased found a new home in the ground after two days of planting. We will monitor the success of these plants as well as the response of avian communities, although it may take several years for the habitat to fully regenerate and provide the resources necessary for wildlife. Once the regenerative process is underway, however, we expect to see benefits for birds including Field Sparrow, Prairie Warbler, Common Yellowthroat, Belted Kingfisher, and Tree Swallow as well as native pollinators. You can see some of these plantings the next time you take a walk along our River Trail!

from www.audubon.org/vermont/news/restoring-riparian-buffers-green-mountain-audubon-center

Photo credits: Meghan Lee-Hall/Audubon Vermont

Restoring a Degraded Riparian Forested Buffer for Phosphorus Mitigation, Pollinator Habitat, Land Access, & Ecoliteracy

by Cam Arcona, UVM
(edited by Jess Rubin, Josef Gorres, Joshua Faulkner, Sarah Geiling)

This season marks the last of seven years of data gathering for an ecological restoration project at Shelburne Farms centered around mitigating phosphorus (P), promoting pollinator habitat, facilitating rematriation, and improving ecoliteracy. The research occurs in a forested riparian area that receives runoff from a compost pile and a field laden with legacy P, before draining into Lake Champlain's Orchard Cove.

The degraded riparian forested buffers in this area were restored through manually removing opportunistic common buckthorn (*Rhamnus cathartica)* and planting a diverse, multi-layer, multifunctional native plant palette. The palette was co-designed with an Abenaki elder and plant teacher to maximize medicinal, utilitarian, and edible value for the land's Original Peoples. All of the planted species also provide food and habitat for Vermont's native pollinators, including threatened species.

Native herbaceous plants bloom in a restored buffer in spring 2025. Buckthorn plants were cut back three times in two seasons; halting growth without causing further nutrient release from soil into water and while providing habitat for invertebrates and fungi.

Data gathered during the initial four-year pilot phase of the study highlights a statistically significant decrease in soil P concentration in all restored plots compared to the degraded control. One of the research questions examines the effects of inoculating half of the restored plots with native mycorrhizae on plant P uptake and soil P concentrations.

An initial key finding is the role of cyclical plant harvest for P uptake and removal. P concentrations peak in plant biomass in early August, the ideal time to harvest before P is rereleased into the ecosystem when plants senesce. This phytoremediation strategy, called phytoextraction, is proposed as a Best Management Practice for riparian forested buffer maintenance, as it can reduce P runoff and corresponding eutrophication in Lake Champlain. For example, data from past years indicate that elderberry has a mean P concentration of 3274 mg/kg. Harvesting elderberries from a plot upcycles this P while providing a key ingredient in Abenaki medicine. According to the honorable harvest tradition, only a quarter to a third of a given species is harvested to promote regeneration and maintain ecosystemic trophic balance (Rubin et. al., 2024).

In addition to the 42 species planted in each of the restored plots, 54 volunteer plant species were observed over the first two years of the expanded study. This year, our mycophytoremediation and pollinator research intern Sarah Geiling, funded by UVM FOUR and LCBP, is gathering pollinator visitation data for each of the restored plots. So far, she has observed 43 species of pollinators including the Yellow-banded Bumblebee (*Bombus terricola*), a globally vulnerable native bee endemic to eastern North America. The 171 species of plants, pollinators, and fungi observed in the restored plots so far can be viewed in our iNaturalist project. Stay tuned for our final results publication, fact sheets, educators' manual, and film—all coming this year!

Rubin, J., McGranaghan, C., Kolba, L., & Görres, J. (2024). Restoring a Degraded Riparian Forested Buffer While Balancing Phosphorus Remediation, Biodiversity, and Indigenous Land Access. Sustainability, 16(8), 3366. https://doi.org/10.3390/su16083366

Jess and intern Sarah Geiling perform a plant diversity survey in one of the restored plots.

Butternut Trees Restoration Initiative holds its biennial workshop in Vermont in 2026

by Carrie Pike, US Forest Service

Butternut, *Juglans cinerea*, is an uncommon, native hardwood tree that grows across the eastern US and Canada. In some locales, butternut hybridizes naturally with Japanese walnut (*Juglans ailantifolia*) which was planted by homesteaders in the early 20th century and was favored for its high nut-producing ability. Hybrid trees are generally more common in urban areas or places where former homesteads were located.

Butternut has experienced sharp declines in regeneration across most of its range that is largely attributed to an introduced fungus, known as *Oc-j* (*Ophiognomonia clavigignenti-juglandacearum*), believed to have arrived in the 1960s from Asia. This fungus is now present across the entire range of butternut. It is likely spread through a combination of insect vectors and rain-splash. Japanese walnut, and hybrids between butternut and Japanese walnut, are sometimes more resistant to *Oc-j* than non-hybrid trees. Japanese walnut and hybrids with butternut are also more susceptible to bunch disease, or walnut witches' broom, which is a mycoplasma-like organism that is often fatal on trees that exhibit symptoms. Little is known about how bunch disease is transmitted among host trees but it is likely vectored by a leafhopper or other insect.

A relatively healthy, pure butternut tree (left) and a diseased tree (right) growing in close proximity on Isle La Motte. (photo credit: Shawn White)

Research has been undertaken by the US Forest Service and partners for the last few decades to study the pathogen's life cycle, its interaction with butternut and hybrids with Japanese walnut, and to identify geno types with enhanced resistance. Resistance in butternut trees appears to be either non-existent or extremely rare in the population. Few landowners plant butternut seedlings because of the likelihood of widespread failures so most regeneration on the landscape today is natural and attributed to squirrel-planted seeds. Even with a healthy squirrel population many seedlings fail to reach canopy-stage due to the presence of the fungus, low sunlight, and other local conditions that are unfavorable for the tree's health.

A collaboration of researchers and managers began in the early 2020s led by the USFS State, Private, Tribal forestry with a goal to advance conservation knowledge and research science of butternut. This collaboration, across the US and Canada, is made possible through regular monthly online meetings and periodic workshops led by the USDA Forest Service's RNGR (Reforestation, Nurseries, and Genetic) Program which is housed in the Eastern Region's State, Private, and Tribal Forestry deputy area.

The most recent workshop was held in Vermont June 2-4, 2026. Approximately 135 people (73 virtual and 63 in person) participated in this workshop that included field tours to two locations including a private property at Isle la Motte and Charlotte City Park along with 1-1/2 days of indoor presentations at Shelburne Farms. All indoor presentations were recorded and placed at the RNGR.net site. Presentations included updates on genomic resources, field screening, seed orchard development, and genotyping results (to assess relative degrees of hybridity) from across the US and Canada.

Workshop participants on a tour of a population of pure healthy butternuts on the Isle La Motte. (Photo credit: Shawn White)

Deep Roots Allow Friends of the Mad River to Grow

by Michelle Krieg, Friends of the Mad River

As a community-supported nonprofit founded almost forty years ago in 1990, Friends of the Mad River (FMR) has a long-standing history of stewarding the Mad River and surrounding watershed. Their work focuses on improving water quality, restoring habitat for fish and other wildlife, and helping to make our communities more flood resilient—with projects including culvert widening and replacement, floodplain bench lowering, water quality monitoring, introduced species removal, and native planting along streams and rivers. They also support private landowners in restoring riparian buffers up and down the Mad and its tributaries–from Warren to Moretown–providing no-cost technical stormwater management consultations, native planting recommendations, and resources to restore habitat and increase biodiversity.

Nursery open house celebration on July 18th

As a watershed group, the strength and success of this work is rooted in long-standing relationships with diverse neighbors, businesses, towns, and other partner organizations, which has continued to inspire a stream of collaborative projects.

With a desire to more directly serve their community and the growing opportunities for restoration both in the Mad River Valley and the larger Lake Champlain Basin, this Spring FMR launched a native plant nursery with funding support from the Lake Champlain Basin Program. Transformed from humble beginnings as a pig pen at Lareau Farm in Waitsfield, FMR's **Mad River Restoration Nursery** will grow locally-sourced, genetically-diverse native ecotype plants and seed for use in watershed restoration projects. As explained by Restoration Nursery Coordinator Michelle Krieg: "Since traditional nurseries often lack ecological diversity among species, genotypes, and stock types, this nursery aims to fill a critical gap in local restoration capacity and ecological impact. Over the next few months we will be looking closely at restoration opportunities in the Valley, as well as gathering information from other more regional conservation partners to identify how we can help meet the need for plants."

As part of the broader mission of FMR, the Mad River Restoration Nursery also aims to provide hands-on educational opportunities for students and volunteers through environmental education field trips and public volunteer opportunities in native seed collection and plant propagation. Michelle reflects: "This nursery will not only be a place to grow plants, but will also serve as a space for the community to connect, learn, and grow a sense of belonging through practical, hands-on engagement."

Restoration Nursery Coordinator Michelle Krieg and Executive Director Ira Shadis at the Mad River Restoration Nursery flower "ribbon cutting"

To learn more about how FMR is growing, or if you are interested in participating in upcoming volunteer seed collection hikes and nursery propagation workdays, check out www.friendsofthemadriver.org or contact Michelle Krieg at michelle@friendsofthemadriver.org

Riparian Lands Native Seed Partnership's Seed Collection Target Species List

Reprinted from the RLNSP Spring Newsletter

Late last winter, the RLNSP went through a process to reprioritize our target species list for seed collection. This process included cross-referencing several state and regional restoration plant lists, as well as reaching out to local conservation nurseries to review their priorities and capacity gaps in seed collection.

We reviewed the following plant lists:

- Vermont Planting Guidelines for ANR State Lands
- NRCS Tree and Shrub List
- UVM Reforestation Guide
- Xerces Society: Native Plants for Pollinators and Beneficial Insects (Northeast)
- Northern Appalachian - Atlantic Maritime Hub List
- USFS Climate Change Atlas Tree Species

Each time a species was mentioned in a list or by a nursery, it was given a point. Points were tallied and each species recieved a score. Higher scoring species were then set as priorities for seed collection. At the end of the review, we identified a total of 80 species that we plan to scout sites for and collect in 2026 and 2027 depending on masting cycles and availability.

This process is a part of our commitment to understanding the dynamic needs for native plant materials in restoration projects within Vermont. We plan to continue updating our priority list every few years to adapt to evolving demands.

For questions, reach out to brooke@intervale.org

<u>Woody Species</u>
Balsam Fir - Abies balsamea
Boxelder - Acer negundo
Red Maple - Acer rubrum
Silver Maple - Acer saccharinum
Sugar Maple - Acer saccharum
Mountain Maple - Acer spicatum
Speckled Alder - Alnus incana ssp. rugosa
Serviceberry - Amelanchier spp. (A. arborea, A. laevis)
Black Chokeberry - Aronia melanocarpa
Yellow Birch - Betula alleghaniensis
Black / Sweet Birch - Betula lenta
Paper Birch - Betula papyrifera
Gray Birch - Betula populifolia
Bitternut Hickory - Carya cordiformis
Shagbark Hickory - Carya ovata
Common Hackberry - Celtis occidentalis
Common Buttonbush - Cephalanthus occidentalis
Pagoda Dogwood - Swida alternifolia
Silky Dogwood - Swida amomum
Gray Dogwood - Swida racemosa
Red Osier Dogwood - Swida sericea
Beaked Hazelnut - Corylus cornuta
White Ash - Fraxinus americana
Black Ash - Fraxinus nigra
Green Ash - Fraxinus pennsylvanica
American Witchhazel - Hamamelis virginiana
Winterberry - Ilex verticillata
Black Walnut - Juglans nigra
Tamarack - Larix laricina
Hophornbeam / Ironwood - Ostrya virginiana
White Spruce - Picea glauca
Black Spruce - Picea mariana
Red Spruce - Picea rubens
Red Pine - Pinus resinosa
Eastern White Pine - Pinus strobus
American Sycamore - Platanus occidentalis
Balsam Poplar - Populus balsamifera
Eastern Cottonwood - Populus deltoides
Bigtooth Aspen - Populus grandidentata
Quaking Aspen - Populus tremuloides
Pin Cherry - Prunus pensylvanica
Black Cherry - Prunus serotina
Chokecherry - Prunus virginiana
White Oak - Quercus alba
Swamp White Oak - Quercus bicolor
Bur Oak - Quercus macrocarpa
Northern Red Oak - Quercus rubra
Staghorn Sumac - Rhus typhina
Elderberry - Sambucus canadensis
Sandbar Willow - Salix interior
Shrub Willow - Salix spp. (S. bebbiana, S. discolor, S. eriocephala, S. sericea, S. lucida)
Black Willow - Salix nigra
White Meadowsweet - Spiraea alba
Steeplebush - Spiraea tomentosa
Northern White Cedar - Thuja occidentalis
Basswood - Tilia americana
Eastern Hemlock - Tsuga canadensis
American Elm - Ulmus americana
Slippery Elm - Ulmus rubra
Lowbush Blueberry - Vaccinium angustifolium
Arrowwood - Viburnum dentatum
Hobblebush - Viburnum lantanoides
Nannyberry - Viburnum lentago
Wild Raisin - Viburnum nudum
Highbush Cranberry - Viburnum opulus var. americanum

<u>Herbaceous Species</u>
Swamp Milkweed - Asclepias incarnata
Common Milkweed - Asclepias syriaca
Poverty Oat Grass - Danthonia spicata
Showy Tick Trefoil - Desmodium canadense
Flat-Topped White Aster - Doellingeria umbellata
Virginia Wildrye - Elymus virginicus
Common Boneset - Eupatorium perfoliatum
Grass-Leaved Goldenrod - Euthamia graminifolia
Spotted Joe Pye Weed - Eutrochium maculatum
Little Bluestem - Schizachyrium scoparium
Gray Goldenrod - Solidago nemoralis
Calico Aster - Symphyotrichum lateriflorum
New England Aster - Symphyotrichum novae-angliae
Blue Vervain - Verbena hastata
Golden Alexander - Zizia aurea

Upcoming Events

Valley Brook Restoration Project, Morgan, VT. Memphremagog Watershed Association
9/17/2026 1pm-4pm. Rain date 9/22/2026
Valley Brook Streambank Management Area, 1435 Valley Road Morgan, VT

Join Patrick Hurley and colleagues from the Memphremagog Watershed Association (MWA) to walk the Valley Brook restoration site. Patrick and his team designed restoration practices aimed at enhancing roughness and stream-wetland-floodplain function by incorporating wood and rock structures meant to slow flows, encourage sediment deposition, and enhance fish and wildlife habitat complexity. The tour will highlight several aspects of a multi-phase, catchment-scale project which includes removing & upgrading crossing structures, obliterating roads, disconnecting drainage ditches, reconstructing alluvial fans, and acres of riparian plantings. Learn how PBR techniques can be incorporated alongside other restoration practices and discuss the planning, design, permitting, and implementation process. More info on the project can be found here: Valley Brook Restoration Project – nContact elijah@vlt.org if you're interested.

Upper Waits River Strategic Wood Addition (SWA), Orange, VT. Vermont Fish and Wildlife.
10/13/2026 12:30pm – 4pm. Rain date 10/16/2026

Jud Kratzer, Fisheries Biologist with VT DF&W, has been implementing and studying strategic woody addition projects in Vermont for over a decade and has documented significant increases in brook trout populations at strategic wood addition sites. Visit a section of the upper Waits River with Jud to observe a completed SWA project and discuss wood placement and techniques, permitting, site selection, and more! This project was completed in 2024 and added large wood to 2.7 river miles, improving fish and wildlife habitat structure, bank stability, channel roughness, and floodplain access. More details to follow!
Contact elijah@vlt.org if you're interested.

Wetland Restoration Workshop Hold-the Dates!
9/25/2026, 1-4 pm, Rain date 10/2/2026
Location TBD (eastern VT)

Join Cassidy Gale from USDA-NRCS on an informal field trip to explore challenges and successes at a wetlands restoration project. See examples of various restoration practices within a dynamic floodplain in a retired agricultural fields. More info coming soon!

Research highlights

Shawn's summaries of some recently published articles of interest

Single- and multithread rivers originate from (im) balance between lateral erosion and accretion. AJ Chadwick, et al., Science 389, p.146-150 (2025). https://www.science.org/doi/10.1126/science.ads6567

This article describes an investigation into why some rivers are single-threaded and others are multithreaded. Thirty-six years of satellite imagery were used to study the origins of channel patterns of 84 of the world's rivers. Researchers found that in single-threaded channels, erosion of one bank is balanced by deposition on the opposite bank (accretion) causing the river to meander as it maintains a constant width (the dynamic equilibrium we've all heard of). However, multithreaded channels originate from an imbalance in which erosion outpaces accretion, causing channels to widen and then split. Deposition of sediment occurs on the channel bottom, eventually forming islands that split the channel. Instead of meandering far across a floodplain, multi-thread channels simply reshuffle active threads (and so still maintain an equilibrium). Interestingly, the article mentions that many of the world's rivers have likely transitioned from multi-threaded channels to single-thread channels due to human interference. Based on their findings, the authors developed a formula for determining the width needed for a natural channel patten to restore itself, based on average thread width, lateral erosion and accretion rates, and other variables. Of note, the restoration of multi-thread channels- which are often effected by allowing, rather than preventing, erosion- is faster, less expensive, and can be more land-efficient than single channel restoration and therefore could be prioritized.

A related video is available here: How rivers flow, split, and change

A summary layman's article about this research is available here: Rivers choose their path based on erosion — a discovery that could transform flood planning and restoration

Tanana River, Alaska. photo: Kira Harris
creativecommons.org/licenses/by/2.0/

Genomic approaches to accelerate American chestnut restoration. J Westbrook, et al., Science 391, p.730-735 (2025). https://www.science.org/doi/10.1126/science.adw3225

American chestnut is functionally extinct after two introduced fungal pathogens, chestnut blight and root rot, killed billions of trees in the late 19th and early 20th centuries. Despite over a century of effort to develop American chestnut populations with improved resistance, the complex genetics of blight resistance has made the process slow and only partially successful to date. Approaches employed so far include hybridizing American chestnut with Chinese chestnut and backcrossing the hybrids with diverse American chestnut trees, intercrossing large surviving pure American chestnut trees, and genetic engineering to introduce a resistance gene from wheat. Candidate restoration populations must not only show to chestnut blight and root rot, but also grow tall enough to compete well in the canopy and have enough genetic variation to adapt to

New Research, cont'd.

different geographical and climatic situations.

The Westbrook et al. article describes progress on these approaches, Among their findings:

- The minimum amount of Chinese chestnut ancestry needed to improve blight resistance in hybrids is 15 -30%
- Progeny of the Large Surviving American Chestnuts had, on average, only very modest resistance compared to non-LSAC trees. Four first-generation progeny, however, had substantial resistance.
- The genetically engineered trees had widely variable resistance and slower growth compared to wild -type trees. A few trees with only one copy of the transgene, however, had both high resistance and height growth similar to wild-type trees.
- Comparison of the genomes of Chinese and American trees indicates resistance is due to a higher copy number of some genes within the Chinese chestnut genome. Some of these genes are related to lipid signaling, cell wall strengthening, and secondary metabolism (e.g. production of aromatic compounds). Higher copy numbers seem to allow higher gene expression during infection.
- Chinese chestnut was found to have 41 compounds with higher concentrations than in chestnut. Among those that were particularly elevated was the compound lupenol, which completely suppresses growth of the blight fungus in a lab setting. Another, erythrodiol, partially suppressed growth.
- Resistance appears to be due to many chromosomal segments that have small effects on resistance rather than a few with large effects. This means breeding of resistant American chestnut will require multigenerational intercrossing and selection rather than simple backcrossing of hybrids to pure American chestnut.
- Genetic markers can be used to predict the chromosomal segments associated with resistance, height growth, and American chestnut ancestry in hybrid trees and could be used for initial selection of seedlings with a high likelihood of having improved traits.
- Future breeding will include 20-50 wild American chestnuts from serval geographically distinct population to improve genetic diversity and climate adaptability. Open-pollinated seeds are expected to be available for restoration trials within the next decade or two.

This newsletter was complied and edited by Shawn White, Coordinator of the Watershed Forestry Partnership.

If you would like to submit a story for a future issue, or subscribe / unsubscribe from the Watershed Forestry Partnership mailing list, contact Shawn White at shawn.white@uvm.edu.

For more information about the Watershed Forestry Partnership, please visit the website or contact Shawn

Thanks to Watershed Forestry Partnership financial supporters: Lake Champlain Sea Grant, UVM-Extension, Lake Champlain Basin Program, and Watersheds United Vermont! The artilces in this newsletter have not been reviewed by these organizations and may not represent their opinions or endorsements.