

RIPARIAN LANDS NATIVE SEED PARTNERSHIP NEWSLETTER

Highbush cranberry (*Viburnum trilobum*)
© NorthWoods Stewardship Center

Introducing Brooke

Statewide Seed Coordinator, Intervale Center
Brooke Fleischman

Hello! My name is Brooke Fleischman, I was born and raised in the suburbs of Omaha, Nebraska where my grandparents originally ignited a love for the outdoors in me when we would spend summers camping in Colorado and Wyoming. In 2019, I received a Bachelor's degree in Wildlife Ecology & Conservation from Northwest Missouri State University. For the first few years out of college, I spent time on Palmyra Atoll and Midway Atoll, both remote Pacific islands where I worked on invasive species removal, sea bird monitoring, native plant propagation and outplant monitoring. From there, I worked as a technician in the Hawaii Volcanoes National Park native plant nursery. My primary focuses were on seed collection, propagation, and outplanting of both culturally and ecologically significant native plants.

I started my position as the Vermont Statewide Seed Coordinator at the Intervale Center in January 2023. With the support of our partners, we've been able to grow the seed program so much in the last year and I can't wait to see what this collaborative turns into!



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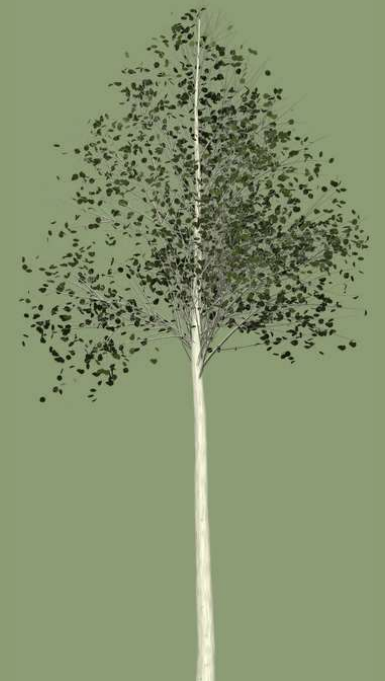
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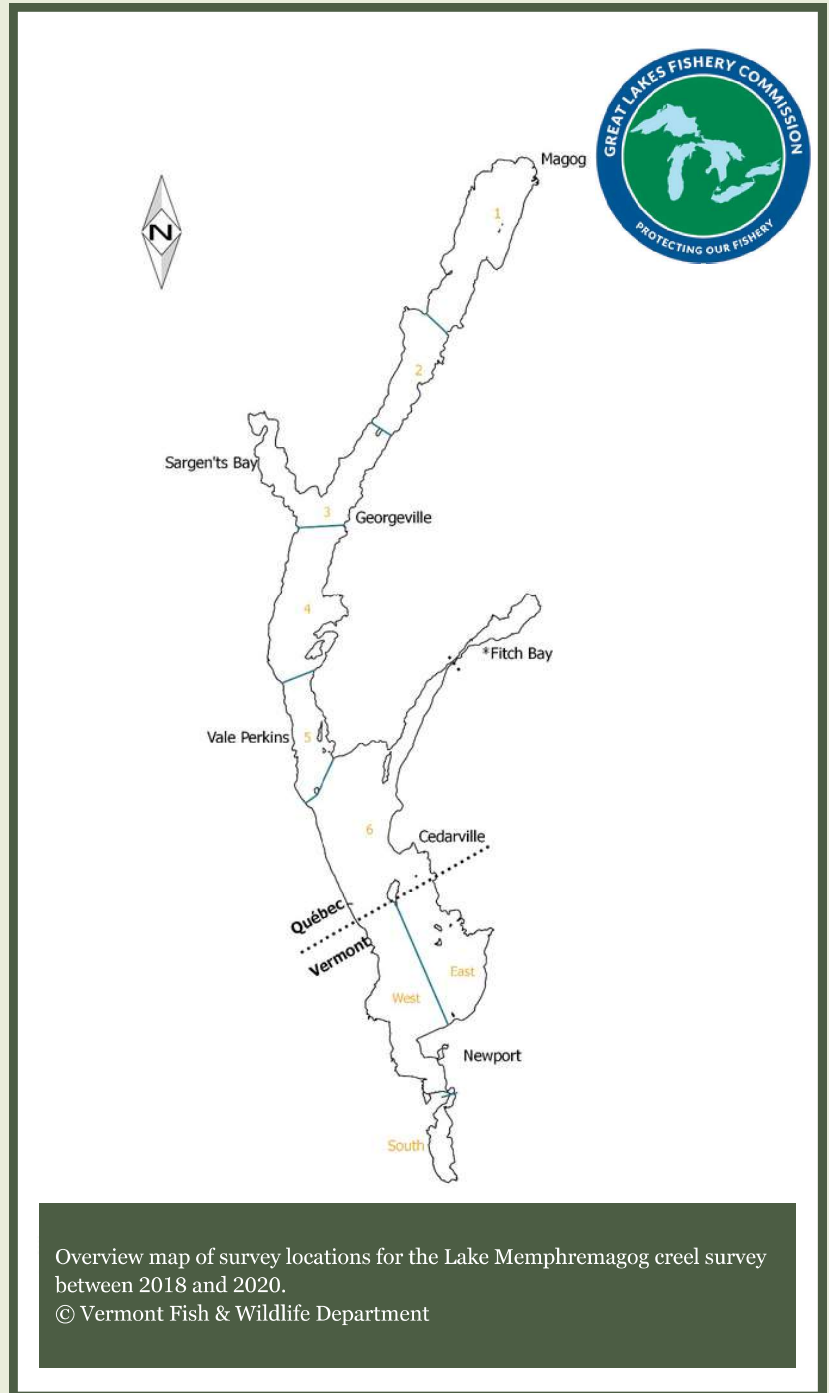
Great Lakes Fisheries Commission

Fisheries Biologist, Vermont Fish & Wildlife Department

Peter Emerson

Thanks to advocacy efforts by Senator Patrick Leahy, Lake Champlain and Lake Memphremagog are able to receive Great Lakes Fisheries Commission (GLFC) funding. GLFC was created in 1954 as a binational response to sea lamprey devastation, habitat destruction, water quality concerns, and overfishing in the Great Lakes between the US and Canada. The purpose of the commission is to develop, conduct, and coordinate research programs that inform recommendations to the government to protect fisheries. GLFC also implements sea lamprey control programs and publishes articles on the research.

A roving creel survey was conducted on Lake Memphremagog beginning in December 2018 and continued through September of 2020, during the open water fishing season. This two-year angler (“creel”) survey was conducted on both the Vermont and Quebec portions of the lake. GLFC provided \$250,000 in funding to Memphremagog Conservation Inc. for the Quebec portion of the survey to finance all Quebec operations, including both equipment acquisition and maintenance and staff salaries. GLFC also funded Vermont operations (\$250,000 over the two years), including equipment acquisition and maintenance and salaries for creel clerk staff and VFWD Biologist and Specialist when they were conducting surveys or when maintaining the equipment. Federal Dingle-Johnson dollars were used to pay partial salary for one employee (Peter Emerson, Fish Biologist with VFWD) to conduct project oversight, project coordination, data analysis, public presentations, and report writing.



Today, the VFWD GLFC budget is \$500,000 annually. This money is currently being used to purchase land for Streambank Management Areas in the Memphremagog Basin and to build out capacity at several partner organizations. [NorthWoods Stewardship Center](#) uses funds to host seasonal crews for seed collection efforts, invasive species removal, and public river access projects. [Memphremagog Watershed Association](#) currently conducts public outreach and focuses on developing projects. [Orleans County Natural Resources Conservation District](#) (OCNRCD) identifies culverts in need of replacement to improve fish passage throughout the watershed. [Essex County Natural Resources Conservation District](#) (ECNRCD) will use funds to reinvigorate their native tree nursery. Starting in 2023, some of this budget also went towards partially funding a statewide seed coordinator position based out of the [Intervale Center](#) in cooperation with the [U.S. Fish and Wildlife Service](#).



Silver maple (*Acer sacharinum*)
© Intervale Center

Introducing Jess

Riparian Lands Project Coordinator, NorthWoods Stewardship Center

Jessica Colby

My name is Jessica Colby and I have been the Riparian Lands Project Coordinator at NorthWoods Stewardship Center since June 2020. I lead a seasonal two-person crew in seed collection efforts, invasive species removal, and tree planting projects on State lands. I grew up exploring the Northeast Kingdom of Vermont and North Country of New Hampshire, where I developed a love for the outdoors. I graduated from the University of Vermont in 2017 with a bachelor's degree in Wildlife and Fisheries Biology and a minor in Forestry. The majority of my experience has been focused around stream restoration and eastern brook trout projects in northern Vermont and New Hampshire.



I have been incredibly lucky to have worked for many of our partners, both during my time at UVM and post-graduation. While in school, I began working for Trout Unlimited implementing strategic wood additions (alongside VFWD fisheries biologists), collecting stream temperature data, and assessing culverts for aquatic organism passage. I also spent a summer interning with Vermont Forests, Parks, and Recreation assessing trail usage within the Willoughby State Forest. After graduating from UVM, I began monitoring various elm planting sites for signs of Dutch Elm Disease for The Nature Conservancy of Vermont through the summer and then transitioned back to Trout Unlimited part-time for the fall. I also spent some time collecting red spruce cones for a tree genetics study conducted by Dr. Stephen Keller at UVM. I began working part-time for the Essex County Natural Resources Conservation District in 2018, helping to organize public outreach on invasive plant species in the Upper Connecticut River watershed and to manage their native tree nursery. During the summers of 2018 and 2019, I conducted stream assessments and electrofishing for the NH Fish and Game Department. I have also spent over 200 hours volunteering for both VT Fish and Wildlife and NH Fish and Game on various wildlife projects - including annual goose banding and deer check stations.



Seasonals from Vermont Fish & Wildlife help the Riparian Lands Crew collect silver maple samaras at TNC's Maidstone Bends in 2022. © NorthWoods Stewardship Center

Forming the Riparian Lands Native Seed Partnership

Riparian Lands Project Coordinator, NorthWoods Stewardship Center
Jessica Colby



Cornfield replication plots being prepped at Willoughby Falls WMA
© Vermont Fish & Wildlife Department

Vermont's Riparian Lands Native Seed Partnership unofficially began in the mid-2010s when the Vermont Fish & Wildlife Department, Connecticut River Conservancy, and U.S. Fish and Wildlife Service began conducting cornfield replication experiments at Willoughby Falls Wildlife Management Area. The goals of this project were to determine the best methods for re-establishing floodplain forests and restore ecosystem health in areas that had been invaded by reed canary grass, an invasive plant in the northeast. It was determined that plowing the site and then following up with herbicide provided the most effective method to removing the dense thatch formed by reed canary grass. However, regeneration on the sites were lackluster. This project led partners to decide that direct seeding into future sites following treatment may be a more reliable means to restoring sites infested by invasive plants.



Spring 2022 site visit to Johnson Farms WMA to assess effectiveness of fall herbicide treatment of reed canary grass.
© NorthWoods Stewardship Center

Direct seeding trials began in 2019 and 2020, but efforts were slowed due to the COVID-19 pandemic. NorthWoods Stewardship Center began collecting seeds in 2021 with the addition of a short season Riparian Lands crew that were also tasked with tree planting and removing invasive honeysuckle from state-owned properties. Seed collection was not originally on this crew's task list and therefore none of us were fully prepared for the complexities that came with identifying the different species and good locations for collection. To prepare for another season of seed collection, Meg Carter (Conservation Science Director, NWSC) and I joined other partners to tour the Saratoga Tree Nursery in New York to see their facilities and to ask questions on specific species we were focusing on.



Rhona Thomson and Rob Fitch show off their quaking aspen (*Populus tremuloides*) collection at Eagle Point WMA in 2022. © NorthWoods Stewardship Center

I then spent the winter between 2021 and 2022 reading up on our target species and planning for the upcoming year. In 2022, the Riparian Lands crew was expanded to include the entire seed collection season (March through November). Our crew members, Rob Fitch and Rhona Thomson, greatly expanded our capacity to scout for species and locations. They helped come up with methods for cleaning seeds and we ended up collecting an estimated 20 million seeds based on weight (*roughly adjusted based on knowledge learned in 2023*).



NorthWoods' 2022 Riparian Lands team (Rob Fitch, Jess Colby, and Rhona Thomson) use a Dybvig Seed Cleaner to process chokecherry (*Prunus virginiana*) at their Conservation Barn. © NorthWoods Stewardship Center

In January 2023, Brooke Fleischman was hired as Vermont's Statewide Seed Coordinator based out of the Intervale Center. Her position formed from a need to coordinate more collaborative efforts among partners and potential partners across the state for seed collection, processing, storage, and use.



Rhona Thomson looks out over a beaver pond while collecting fall species including gray birch (*Betula populifolia*) and tamarack (*Larix laricina*) © NorthWoods Stewardship Center

Target Species

- Red Maple - *Acer rubrum*
- Silver Maple - *Acer saccharinum*
- Speckled Alder - *Alnus incana*
- Yellow Birch - *Betula allegheniensis*
- Gray Birch - *Betula populifolia*
- Silky Dogwood - *Cornus amomum*
- Tamarack - *Larix laricina*
- Red Spruce - *Picea rubens*
- Balsam Poplar - *Populus balsamifera*
- Eastern Cottonwood - *Populus deltoides*
- Quaking Aspen - *Populus tremuloides*
- Black Cherry - *Prunus serotina*
- Chokecherry - *Prunus virginiana*
- Northern Red Oak - *Quercus rubra*
- Shrub Willow - *Salix spp.*
- Black Willow - *Salix nigra*
- Northern White Cedar - *Thuja occidentalis*
- American Elm - *Ulmus americana*
- Nannyberry - *Viburnum lentago*
- Highbush Cranberry - *Viburnum trilobum*

Other Species of Interest

- Paper Birch - *Betula papyrifera*
- Red Osier Dogwood - *Cornus sericea*
- Black Ash - *Fraxinus nigra*
- Green Ash - *Fraxinus pennsylvanica*
- Butternut - *Juglans cinerea*
- White Oak - *Quercus alba*
- Swamp White Oak - *Quercus bicolor*
- Bur Oak - *Quercus macrocarpa*
- Wild Raisin - *Viburnum nudum*



2023's Riparian Lands crew members, Jake Gallinger and Alex Sehl, collect quaking aspen (*Populus tremuloides*) at Little Otter Creek WMA.
© NorthWoods Stewardship Center

2023 Field Season

Executive Summary

Brooke Fleischman & Jessica Colby

The 2023 season brought about much change to Vermont's native tree and shrub seed collection project. After an extensive nationwide search, the Riparian Lands Partnership hired Brooke Fleischman for the Statewide Seed Coordinator position through the [Intervale Center](#). Brooke's role is to create a more coordinated effort among partners to provide locally adapted native tree and shrub seeds for riparian restoration. To prepare for the 2023 field season, Brooke began working with [NorthWoods Stewardship Center](#) (NWSC) and [The Nature Conservancy](#) (TNC) to pull together previous data into a single state seed map that could be used to help track accession numbers, collection sites, and phenology.

Brooke and Jess have been busy this year expanding their professional networks and spending time learning more about the target species and how to collect and process them. In February, they traveled down to [Saratoga's State Tree Nursery](#) in New York to meet with the facility manager and crew. While there they discussed how to store seeds, how to clean some of the more difficult species (i.e., highbush cranberry), and had an in-depth look at the various equipment utilized at the nursery.

2023 UPDATES

In March, Brooke and Jess both traveled down to Washington D.C. to attend the [National Native Seed Conference](#) put on by the [Society for Ecological Restoration](#) (SER) and the [Institute for Applied Ecology](#). While the conference was geared more towards herbaceous plants, it was a great networking event that allowed both Brooke and Jess to connect with others doing similar work. Both have become active participants in webinars put on by the [Native Plant Trust](#) surrounding the [Northeast Seed Network](#) and webinars hosted by the [University of Maine's Ash Protection Collaboration Across Wabanakik](#) (APCAW).

As of right now, [NorthWoods](#) is the only partner to host a dedicated seed collection crew for any length of time. The 2022 Riparian Lands crew, Rob Fitch and Rhona Thomson greatly expanded capacity for seed work across the state. During their tenure, this crew worked towards defining general seeding timelines for our target species and identifying new locations for collection. The 2023 Riparian Lands crew, Alex Sehl and Jake Gallinger, continued building upon this work by zeroing in on how to identify when species are mature enough for seed collection and improving upon seed processing and storage methods. In addition to seed efforts, this crew conducted invasive removal on state lands, planted trees for riparian buffers, built beaver dam analogs with the [Memphremagog Watershed Association](#) (MWA), and assisted with the improvement of local state-owned access areas.

Much of Vermont was devastated by floods in mid-July. The [Intervale Center's Conservation Nursery](#) lost many of their trees in the field and had to reallocate time towards flood recovery efforts. This time normally would have been spent on weeding and transplanting new trees into the field. In December, a second major flood event occurred causing most of the transplants from 2023 to be lost. Though, the full extent of the damage will be unknown until spring 2024. Because of this, nursery production will be affected for the next few years. Meanwhile the Riparian Lands crew was unable to conduct invasive species removal due to unsafe conditions. The floods also seemed to have pushed some species, like dogwood to flower and fruit later in the year when compared to 2022.



Jess Colby and Brooke Fleischman attend the National Native Seed Conference in Washington D.C.
© NorthWoods Stewardship Center



Flooding at the Intervale Center following the storms that impacted much of Vermont in 2023.
© Intervale Center

2023 UPDATES



Brooke Fleischman collects northern white cedar (*Thuja occidentalis*) at Willoughby State Forest.
© NorthWoods Stewardship Center

NorthWoods pivoted to working with the MWA to construct low-tech process-based restoration projects in Morgan, VT in the form of beaver dam analogs. These structures are small, leaky dams built in areas (in this case ditches and incised stream channels) to retain water on the landscape and reconnect floodplains. Even though this project was much safer than conducting invasive removal in flood conditions, this project area was not unaffected by flooding itself. The night before the team was set to begin on site, the area experienced 200-year flooding that washed out culverts and damaged the road. It was an incredible show of water's power on the landscape.



Alex Sehl joins Gabryel Gianoni (MWA) in building beaver dam analogs.
© NorthWoods Stewardship Center

Brooke and the NorthWoods crew (with help from other NorthWoods crews, Vermont Fish & Wildlife seasonals, and USFWS seasonals throughout the year) collected roughly 56 million seeds in 2023 (see breakdown on the following page). With all of the vast improvements in cleaning, this number is much more grounded in truth when compared to last year's (incredibly rough) estimate of 40 million. Early in the spring, the team met virtually with Jeff Carstens, a horticulturist for USDA's Agricultural Research Service in Ames, Iowa. During this meeting, Jeff shared a lot of knowledge and showed the team how to clean seeds in the Salicaceae family (i.e., quaking aspen, willow, and balsam poplar) by creating a "tornado" with an air compressor and cylindrical plastic container to separate seeds from their fluff. Prior to this meeting, the seeds of these species were stored with their fluff. By separating the seeds from the fluff, these seeds are easier to store for future use. Other cleaning protocols were developed after purchasing a "Clipper" machine, which uses two layers of screens and a fan to separate seeds from the other seed-bearing materials. In practice, this machine has worked well for birch, cedar, fir, and tamarack.



Meg Carter trials the "tornado" technique in cleaning aspen seeds.
© NorthWoods Stewardship Center



The Clipper Seed Cleaner
© Intervale Center



ESTIMATED SEEDS COLLECTED IN 2023

Balsam Fir - 361,500	Paper Birch - 195,245	Chokecherry - 198,785
Boxelder - 23,210	Gray Birch - 35,820,550	Shrub Willow - 1,093,700
Red Maple - 49,840	Silky Dogwood - 3,125	Black Willow - 6,133,335
Silver Maple - 182,465	Tamarack - 97,330	Northern White Cedar - 603,575
Speckled Alder - 5,390,125	Balsam Poplar - 412,330	American Elm - 85,305
Serviceberry - 25,530	Eastern Cottonwood - 3,557,900	Wild Raisin - 6,495
Yellow Birch - 52,165	Quaking Aspen - 1,200,025	Highbush Cranberry - 48,295

Total: 55,540,840

Seeds were dispersed across three different sites this fall. After inventorying all the seed collected since 2021, the team realized that much of the older seeds (seeds collected prior to our various processing protocols) were not storing well and were beginning to mold. The newly formed Valley Brook Streambank Management Area in Morgan, VT was a site of extreme restoration this year and MWA utilized a lot of this low quality native tree and shrub seed to cast out on the site to create a dense seedbed that will hopefully regenerate after all of the human-made disturbance. The team also hand-cast seeds collected in 2023 on delineated trial sites at Johnson Farms Wildlife Management Area in Canaan, VT and the Upper Lamoille River Access Area in Wolcott, VT.



Filling up the hydroseeder at Valley Brook Streambank Management Area.
© NorthWoods Stewardship Center



Alex Sehl, Gabryel Gianoni, Brooke Fleischman, Jess Colby, and Jake Gallinger pose in front of the hydroseeder.
© NorthWoods Stewardship Center



Jess Colby uses the hydroseeder to spray seeds across the site.
© NorthWoods Stewardship Center



One of the plot centers at Johnson Farms WMA for direct seeding.
© NorthWoods Stewardship Center

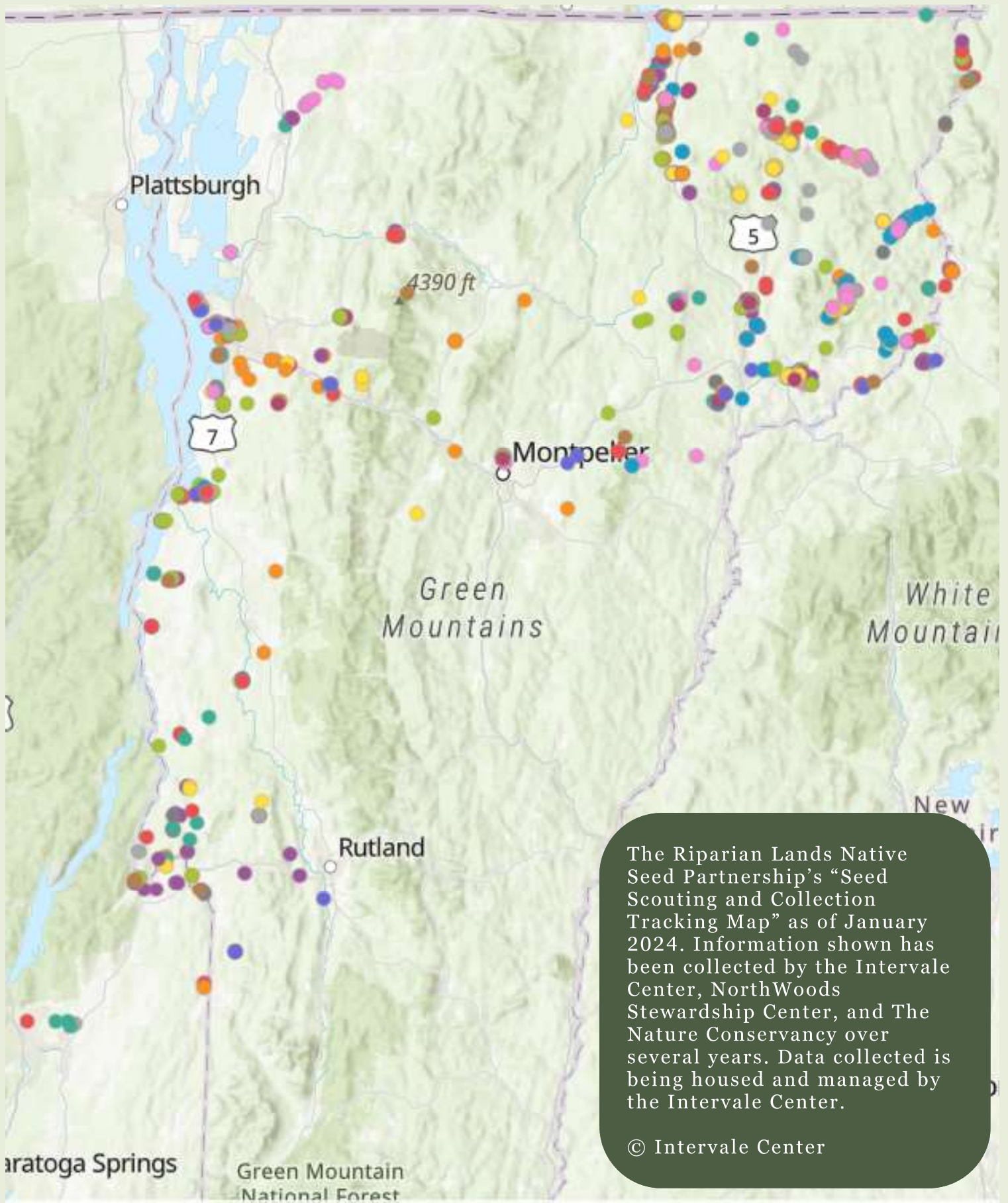


Seed mix for the Upper Lamoille Access Area direct seeding application.
© NorthWoods Stewardship Center



Seeding out plots in Wolcott.
© NorthWoods Stewardship Center

2023 SEED MAP



2023 PROJECT TIMELINE



JANUARY

Brooke Fleischman begins as Vermont's Statewide Seed Coordinator at the Intervale Center



FEBRUARY

Brooke and Jess Colby (Riparian Lands Project Coordinator at NorthWoods Stewardship Center) visit the Saratoga Tree Nursery (NY)



MARCH

NorthWood's 2023 Riparian Lands Crew members, Jake Gallinger and Alex Sehl, begin their season. Brooke and Jess travel to Washington D.C. for the National Native Seed Conference.



APRIL

Brooke and the NorthWoods' crew begin spring seed scouting across Vermont. The Riparian Lands crew implements tree planting projects on State lands.



AUGUST

The Riparian Lands Crew is implementing beaver dam analogs with the Memphremagog Watershed Association. Chokecherry collection begins.



JULY

The Riparian Lands Crew is out conducting invasive species removal on VFWD lands. Dogwood collection. Brooke is supporting the Intervale Center's Conservation Nursery.



JUNE

Seed collection slows down for our target species and the Intervale Center's Conservation Nursery propagates a lot of seed.



MAY

Spring seed collections start and don't stop! Brooke and NorthWoods clean spring collections.



SEPTEMBER

Fall collections ramp up. Brooke is able to test out the Clipper for cleaning seeds.



OCTOBER

Fall species continue to be collected. The Intervale, NorthWoods, VT Fish & Wildlife, and partners direct seeded at sites in Morgan, Wolcott, and Johnson, VT



NOVEMBER

Brooke and NorthWoods organize seeds in storage, input data, and pull together reports about the 2023 season. Riparian Lands Crew season ends



DECEMBER

Brooke and Jess work to expand the network and build on planning for 2024. Brooke visits the USDA germplasm facility in Ames, Iowa.



Statewide Seed Coordinator, Intervale Center
Brooke Fleischman

In 2024, the Intervale Center will host its first crew for spring seed collection, expanding our capacity for scouting and collection efforts during the busy spring season. For the third year, NorthWoods will be hosting an eight-month Riparian Lands Crew - who will be returning members Alex Sehl and Jake Gallinger. Direct seeding trials will continue at the same three sites in Canaan, Morgan, and Wolcott with a spring seed casting of approximately 16 million seeds in June and a fall seed casting at potentially two new sites.

In the last few months of 2023, the Vermont Seed Need Survey was sent out to local restoration practitioners and nurseries to assess the demand for plant materials in conservation projects around the state. Responses from this survey will inform how we can support each other to further the development of a statewide seed collection effort and restoration project planning as a whole.



STRATEGIC PLANNING

Shortly after the new year, partners gathered together to discuss the challenges and opportunities within this project and restoration practice as a whole. With this meeting, we have some actionable next steps to further develop the native seed partnership in Vermont.



Alex Sehl and Jake Gallinger collect silver maple samaras at TNC's Maidstone Bends in 2023.

© NorthWoods Stewardship Center



Eastern cottonwood (*Populus deltoides*)

© Intervale Center



CONNECT WITH US

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WAYS TO SUPPORT

CONTACT BROOKE FOR PROSPECTIVE PARTNERSHIPS

Come collect seeds with us!

Keep an eye out! Help us track phenology.

Have any species of interest on your property? Grant access for us to collect!

We'd love to hear about work you're doing as well! Send us pitches/photos for our next issue!

Share this newsletter and help us spread the word about our project!

The Riparian Lands Native Seed Partnership would not be possible without the support and guidance of all of our partners organizations!



NORTHWOODS
STEWARDSHIP CENTER



Clean water. Healthy habitat. Thriving communities.
**Connecticut River
Conservancy**

**The Nature
Conservancy** 