The UNDERSTORY

THE MAGAZINE OF THE SOUTHEAST LAND TRUST OF NEW HAMPSHIRE

2025

conservation is our *COMMON THREAD*

SELT

SELT

The Southeast Land Trust of New Hampshire (SELT) saves, shares, and stewards land for the benefit of people and nature in southeast New Hampshire. SELT serves 52 towns and cities of greater Rockingham and Strafford counties and has conserved more than 30,000 acres since 1980, including nature preserves, hiking trails, farmland, and scenic vistas.

SELT relies on its annual contributing members, committed Board of Directors, talented staff, and dedicated volunteers to keep advancing critical conservation initiatives in our region.

Our Mission

To protect and sustain the significant lands in our communities for clean water, outdoor recreation, fresh food, wildlife, and healthy forests.

Our Vision

Conserved lands in every community, sustaining people and nature.

Contents

The Understory is the annual magazine of SELT, the Southeast Land Trust of NH. Written by David Johnson. Photographed by Jerry Monkman, David Johnson, and SELT staff. Designed by David Johnson and Cathy Arakelian. Edited by Brian Hart and Lizzy Franceschini.

Autumn at Mount Jesse in New Durham. JERRY MONKMAN—ECOPHOTOGRAPHY

COVER: A spider welcomes the sunrise. JERRY MONKMAN—ECOPHOTOGRAPHY

Nature Binds Us Together

There is something so simple, so elegant about a spider's web. The radial silk, a home and a means to capture prey, is nature's engineering at its finest. In the broader picture of a complex ecosystem, a modest web hidden in a fallen log may be small in comparison to towering trees and vibrant vernal pools, but they are significant elements in a bustling biome.

As natural predators, spiders help control insect populations and prevent diseases by snagging and snacking on mosquitoes and other pests. And their waste is a major contributor to soil health, cycling nutrients and enhancing vegetative growth.

When I look at a spider web and consider their importance to the interdependencies of a healthy ecosystem, I am reminded of our community of conservationists here in southeast New Hampshire. We are all bound together by a common set of values, united in our belief that the green places that make our corner of the country so remarkable are worth saving, sharing, stewarding, and sustaining.

Like those webs, we all play important roles in a greater endeavor to ensure that the natural resources, scenic beauty, and diverse habitat that surrounds us remain protected for future generations.

Each year, *The Understory* presents the stories of the people (and arachnids) behind conservation. There is no shortage of needle-movers, no dearth of nature defenders; their willingness to save their lands, or to make exciting new advances in ecological research, or to offer their time and talent in service of the great outdoors, is game-changing.

Like the silk strings of spider webbing that bind our backyards together, the promise of conservation connects all of us to a shared ethos: that the natural world is worthy of every effort to protect it.

And now, to spin some tales!

Warm regards,

Brian Hart
Executive Director, SELT


next
farmer
up

Ready for milking at the Perry Dairy Farm JERRY MONKMAN–ECOPHOTOGRAPHY

1973. Watergate dominated the headlines. *The Exorcist* was sending unsuspecting theatergoers into the lobby with heart palpitations. The New York Knicks won their second NBA championship. And in Rochester, NH, a 15 year-old named Mark Perry made his first commercial milk run.

While his classmates were focused on sports, proms, and "The Dark Side of the Moon," Mark had heifers on his mind. Hours before the first bell sounded at school, Mark was up, milking his herd and shipping milk. As the years passed, you could tell who the burgeoning dairyman was by surveying the school parking lot; among the 'Cudas and Mustangs, a rugged 1974 Chevrolet one-ton farm truck sat like a pack mule.

But that was fine. Mark enjoyed school enough—he was just a student of a different discipline: slinging milk and building a future in a booming dairy economy. And he was certainly no social misfit, earning significant popularity in his circle of friends thanks to his farmer-honed mechanical and welding skills, which came in handy when a pal needed a car repaired.

Fringe benefits, all happy ones. But at the end of the day (literally, since Mark would be out there with cows until night fell), it was all about the "ag." He sourced his love for farming from his days as a 4-H brat, when he worked on a dairy project and fell in love with the milking game.

"It just blossomed from there," he recounts. "I had a neighboring farmer who sold me a few cows to start with, and I bought my first milk tank, milking machine, and some assorted equipment for $260."

Dairy farming was the most viable career path Mark could foresee. His father always joked that raising beef cattle was "the most expensive hobby in the world," and the meager proceeds he got from harvesting his Holsteins were far outweighed by the overhead. No, milking was the way to go if he wanted to make a living at this.

"It was the only path forward I could see as a viable job," Mark says. "And it was actually quite true back in those days. There were five farms on my road alone shipping milk at that time. When I got my milk license, I was number 650 in the state. There were 649 other dairy farms in the state of New Hampshire. I have a great recollection of my first milk inspector telling me that."

Of those 650, Mark was by far the youngest. And contrary to the imagined

Mark Perry JERRY MONKMAN–ECOPHOTOGRAPHY

visage of a grizzled milk veteran pooh-poohing the thought of an upstart elbowing his way into the business, the Strafford County dairy community embraced him.

"The novelty of it actually opened a lot of doors," he says. "I got to know a lot of dairy farmers in the county because I was just a young kid. I never saw my age as being a detriment, and as I look back, it was a tremendous advantage—because everybody wanted to help the kid out."

Who is the next agricultural wunderkind?

That's the question Mark wants to answer. And to help accomplish that—no small feat considering the health of New Hampshire's small, independent farming scene these days—he is conserving his family's dairy farm through SELT to give it the very best chance to remain a working farm into the future.

"It's so hard to do today what I did, getting started in the dairy business," he says. "We had good years in the early '70s. In the 1980s, the dairy industry went to hell. Very few survived it. However you want to put it, there was a mass exodus out of agriculture. In 1986, I became the only dairy farmer left in Rochester."

When he thinks back to those fateful years—when the U.S. government was offering buyouts to local dairy farmers to give them sustenance in the face of cratering milk prices, and in the process permanently rewriting the agricultural DNA of the Granite State—Mark reflects:

"I didn't want to quit," he says. "That's probably because I was bullheaded. But even now, I don't have any regrets. And the reality is, when I am done, this will probably never be a dairy farm again. It's too small. But this land has a lot of other great production uses. And if we've learned anything—especially during the pandemic—we've learned that eating and producing foods locally is important." That ethos led Mark toward including the OPAV as a method to ensure his land had a farming future. The Option to Purchase at Agricultural Value is a unique

An aerial look at Mark Perry's family land. JERRY MONKMAN–ECOPHOTOGRAPHY

tool that increases the likelihood that a working, conserved farm will continue to be in farmer ownership and in active production growing food.

When it comes time for Mark to sell his family's farm, the OPAV requires that he sell the farm to either a family member or an active farmer. If a non-farmer is poised to acquire the farm, SELT has the option to step in and acquire the property at its agricultural value with the intention of then seeking a farmer to farm it. In practice, SELT would try to find a farmer quickly enough that the farm could be conveyed directly to a farmer without SELT ever needing to own the property. While the conservation easement ensures the property will remain protected and undeveloped, it is the OPAV that adds an extra layer of certainty that conserved farmlands remain active, Mark's primary wish for his property.

"Even with development restrictions, conserved farmlands are still vulnerable to being sold to non-farmers due to their privacy, large acreage, open fields, and scenic beauty," says Ben Engel, Conservation Project Manager for SELT. "Local farmers are unable to compete with these market values and often struggle to purchase farmland. At SELT, we believe that continued access by working farmers to farmland is critical—both to our mission and the overall health of the local community. Mark's land offers a wonderful opportunity down the line for him to pass the baton to a new farmer."

For Mark, it's not all about the money. In fact, a key component of the project's success is Mark's willingness to accept less than the appraised value for the easement (known as a "bargain sale").

The NH Department of Agriculture, Markets, and Food's Agricultural Lands Preservation Program awarded SELT with a grant of $200,000, which represents approximately half of the funds necessary to complete the project.

With the Legislature restoring funding for the program, Commissioner Shawn

These rich agricultural fields are ready for the next farmer. JERRY MONKMAN–ECOPHOTOGRAPHY

Jasper, who leads the Department of Agriculture, Markets, and Food, is excited to see a focus on farmland protection.

"It is gratifying to once again be able to work with NH farmers and our land trusts to preserve farmland," said Commissioner Jasper. "The Perry property is a prime example of the type of farm we want to see saved for future generations. It is a small working dairy farm in a city, a true rarity. As our state continues to grow, farms in population centers will become non-existent unless the land is put under conservation easements. We are grateful to the Perry Family for participating in the program and their commitment to agriculture now and into the future."

Additionally, The City of Rochester has supported the project from the start, and the Conservation Commission voted unanimously at their July 2025 meeting to provide the final funding necessary to complete the project.

With that, the Perry family farm was on the path to permanent protection.

Mark has been a staple in the local fair scene for decades. If you gave him truth serum—well, if you just straight asked him because he would always tell you what he thinks—Mark would lament that the agricultural presence in New Hampshire fairs has dimmed.

The milieu that shaped his 4-H experiences and set him on a path to be a career farmer is not quite the breeding ground for young homesteaders these days. But, not unlike the optimism and stubbornness that kept him milking when the economics of the dairy industry were most dire, he is unwilling to lose hope that somewhere out there is the next Mark Perry.

"And if it's my kids or grandkids, that will be a plus," he says. "But if it isn't, and it's somebody who enjoys the land as much as I do—great. There's nothing better than when you go to a fair and you see little kids in the back playing around, or their parents are helping them take care of animals. Because you'd like to think that out of a hundred of those kids, maybe five or six of them are going to grow up to be farmers. And we will regret not having places for them to make that happen." ■

Meanwhile, at the ATLAS Ag garden...

If you have visited Burley Farms this summer, you may have noticed a blooming garden behind the barn. This is more than aesthetic landscaping; the ATLAS Ag garden offers a new dimension to SELT's nature-based education program.

Our ATLAS program growth is guided by our research around creating the next generation of conservationists, and research indicates that including farm-based programming is essential. That is why one of our strategic plan goals is to fully integrate farm education into our ATLAS programming, and why we've been piloting this programming with our partners at Epping Elementary School since fall 2024.

Autumn 2025 has since descended into the garden. Inside the garden gates, you'll notice busy bees sharing sunflowers, monarchs stopping by at the zinnias, pumpkins turning from green to orange, the last of the summer vegetables ripening, and the occasional hummingbird zipping in from the neighboring fields.

The new school year brought the familiar rumbling of school buses up the Burley Farms driveway. Kindergarteners from Lamprey River Elementary School were our first large group to use the garden this fall. They practiced their communication skills in our newly built hammock area, moved dirt through our discovery table, and chased butterflies.

Our upper elementary students focused on roots and their important functions, dissecting veggies and creating carrot recipes. (There is always time for farm wild play, where students jump on hay bales, swing in the garden, and dig in the dirt.)

In between the 340 children we've already formally hosted at the garden this year, we also kept up with weekly harvests and donations to the Newmarket Community Food Pantry. As of early September, we've donated 141 pounds to our neighbors in need.

Lizzy Franceschini
SELT Education Program Manager

Flower Crowns from the Garden!

Enjoy this easy activity for the whole family, courtesy of our ATLAS crew. These fun, wearable crafts blend outdoor exploration and high fashion!

- Cut card stock into three-inch strips, then staple 2–3 strips together to make the crown base
- Cover the crown with double sided tape (two-inch is recommended)
- Let children cut a selection of flowers from a cut flower garden
- Children can press the flowers onto the double sided tape to create their crown
- Once decorated, staple the crown together to form a complete circle
- Let's the children's imaginations soar while they wear their beautiful flower crowns in the garden!

My Friends, I

My Neighbors

When you walk onto Cheryl Keim's Hampstead property, you're setting foot into a hand-drawn animated Disney movie. The relative silence of the easygoing, small-town neighborhood gives way to a symphony of cooing, skittering, chittering, and chattering. It genuinely feels like at any moment a two-dimensional pastel songbird will land on your shoulder and warble a tune about house chores.

That is pretty much the feeling Cheryl is going for. Through patient property acquisition, careful land management practices, curated gardening endeavors, and an abiding love for all manner of creeping, crawling, clambering, or cruising critters, her love for the natural world and its inhabitants shines through.

That's how it's been since she moved into her home in 1987 with Tom, her then-husband (and current friend and partner in property stewardship). And that's what it's been like since—the welcome mat is always rolled out for all creatures great and small.

Conservation was always going to be the ultimate destination for this land. Cheryl felt so compelled to ensure her friendly neighborhood biosphere remained undeveloped that she decided to work with SELT and, generously, donate a conservation easement.

It is easy to understand such passion when you realize a love for conservation is in her DNA...

Cheryl Keim, at home in nature. SELT STAFF

“I was a nerdy little kid that read encyclopedias,” Cheryl says. “Anything that I could learn about nature, I soaked in. That was my thing.”

When she was eight years old, Cheryl would routinely accompany her grandfather, a game warden, on his patrols. Nothing was better than getting outside and seeing her reading material spring to life.

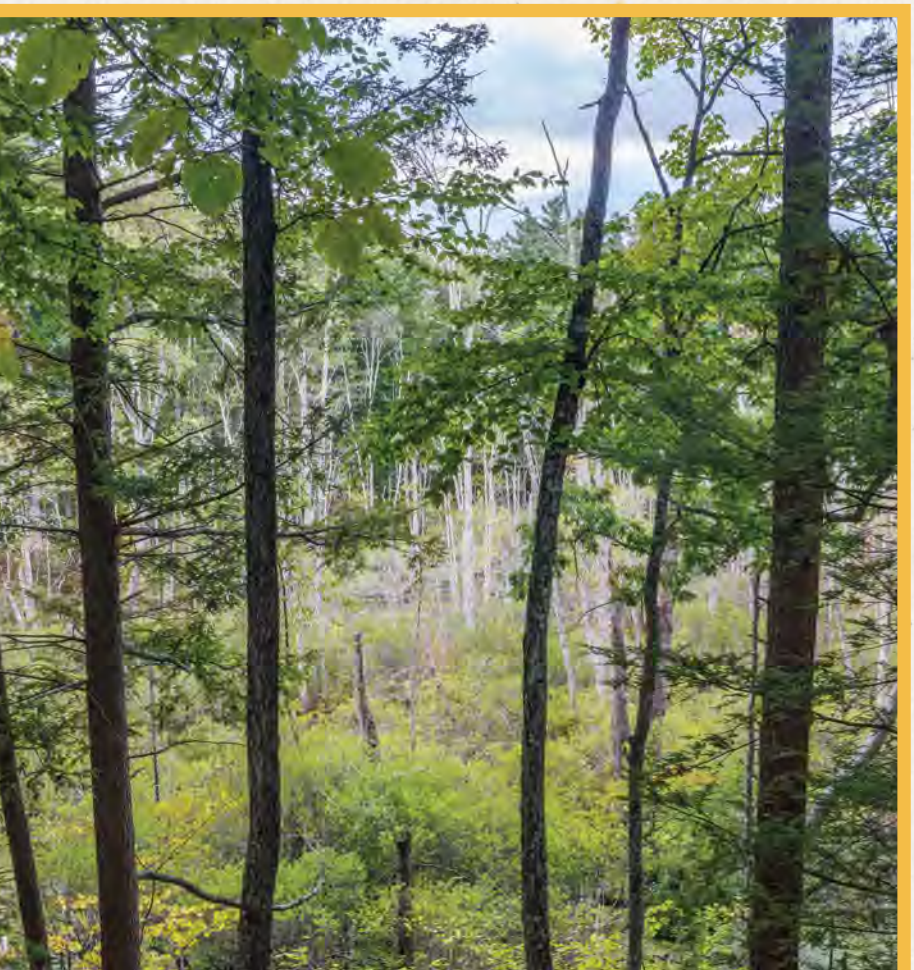
One of her main tasks was to retrieve felled groundhogs that her grandfather picked off for farmers, who were concerned that their livestock would break their legs putting hooves down into burrows. Less than glamorous work, sure, but it was honest, and it was a passport to the outdoors, the object of her rapidly developing love.

The family ties don’t stop there; Cheryl’s mother was one of the founding members of the Wildlands Conservancy in Pennsylvania and became a force for conservation in her own right.

Fast-forward to Cheryl’s life as a landowner, and that love of the outdoors manifested itself in a new way: the patient and opportunistic accumulation of beautiful land with high-end natural resource value. Throughout the years, Cheryl and Tom methodically pieced together a series of parcels abutting their property, steadily growing a forested tapestry.

“This way, the land stays as a forest,” she says. “Instead of buying a place on a lake somewhere, we have this.”

That’s how a 2.6-acre house lot transformed into a full-scale 35+ acre wildlife preserve; and why conserving it with SELT became the manifestation of her life’s legacy.



The nearby wetland is a wildlife hub. SELT STAFF

“We intentionally kept it natural and undeveloped,” she says. “Tom and I both grew up watching forests and fields being paved over. There was one place in Pennsylvania that I loved to explore as a child, and one day, when I was 14, all I could see were big machines. The trees were gone. I just burst into tears.”

To articulate the full wildlife inventory on this land would take a whole afternoon. Off the top of her head, Cheryl reels off the species that traipse between her boundaries: deer, turtles, spotted salamanders, yellow

The Keim land is an expansive green canvas. JERRY MONKMAN–ECOPHOTOGRAPHY

garter snakes, wood ducks and mallards (who use a "duckway" to travel to the beaver pond and back), muskrats, otters, opossums, bobcat, gray foxes, red foxes, fishers, and birds too numerous to list.

Safeguarding her critter-cosmos became a paramount priority, especially when a medical scare prompted her to put some serious thought into pursuing conservation.

"'What do we do?'" Cheryl recalled the question she and Tom asked themselves. "'How do we keep it from being built on and the trees getting cut, and all the animals going away?' You get to a point with age where you start thinking about these things."

When these discussions began to percolate, she was relatively unfamiliar with SELT. But word of mouth (and her notice of more and more SELT signs popping up on nearby conserved lands) led her to make a fateful inquiry: would SELT be interested in conserving her beloved property?

And to further showcase her commitment to seeing this through—she opted to generously donate the conservation easement, a gift worth over $121,000 in market value.

"We are deeply grateful for Cheryl's remarkable generosity in pledging to donate this conservation easement," says Kaitlin Deyo, Conservation Project Manager for SELT. "This exceptional property serves as a vital wildlife corridor that ensures passage for a variety of species, protects clean drinking water, and connects seamlessly with a broader network of conserved lands. We're honored to bring Cheryl's long-held vision to conserve this land to fruition."

The protection of these 35 acres represents a fulcrum point in the community's conservation canvas; the "Keim Forest Conservation Easement"

(as it will be called once the ink dries) abuts the 137-acre Kingston Town Forest (another easement held by SELT), and that in turn connects to the 118-acre Mount Misery property, owned by the Town of Plaistow.

And that's not all!

Across Mount Misery sits the 405-acre Plaistow Town Forest (yet another easement held by SELT). All of this contiguous, conserved land is cradled within a 1,710-acre block of unfragmented forests.

Though the Keim Easement may be small in comparison, its role as a connector is mighty.

"This large, contiguous swath of conserved and public lands is uncommon for this highly developed part of the region," says Kaitlin. "When you step back and look at the breadth of nearby conservation, protecting the Keim Forest becomes a critical priority. It represents a keystone piece in an area that is white-hot for development."

For Cheryl, the proposition is simpler: her land will provide a linkage to a cohesive, diverse, enduring habitat for all creatures great and small.

"They're my neighbors," she says. "They're my family." ■

Indoors for Cheryl isn't much different from outdoors. SELT STAFF

On Durham Point

The shore at Durham Point. JERRY MONKMAN–ECOPHOTOGRAPHYPHY

Hewn into the original timbers of the Langley farmhouse and sown in the sands and soils of the land where it sits, is the story of multiple generations branching from a family tree whose roots spread deep through Durham, NH.

Pamela Langley is the caretaker of that heritage and, through conservation, she looks to protect it for all time.

There were no idle hands at the Langley family's historic homestead in Durham. For a young Pamela, there was always something going on at the farm, always something to do. From haying to growing Hubbard squashes to tending to beef cattle to their eventual focus on dairy farming, the Langleys' property was perpetually buzzing.

"I had my little cow chores where I had to feed the calves," Pamela says. "And then when the cows separated, it would be my job to go bring those cows back. I would walk about halfway down, and I'd holler, 'Come on, cows!' and they would actually come. It was a pretty nice skill to show off."

That was the life Pamela was born into, and she wouldn't trade it for the world. And as she approaches the finale of a conservation conversation that began with SELT over five years ago, the prospect of seeing her beloved family land protected forever represents the perfect coda on a historical record that spans centuries.

"After I retired, I had more time to think about conservation," Pam says. "As I would talk to my mother, she would say, 'Don't forget to put the land in conservation.'"

During the early colonial period, Durham Point (which is encompassed by the Langley property) was an important locus, offering a variety of landing points for seafarers.

The adjoining Bickford Point served as one of the first ferry landing posts, operating from the mid-1600s until the late 1700s, with the route ending at the end of Langley Road. Before there was the Scammell Bridge crossing Little Bay, this was the primary way to move goods and people across Little Bay.

Teams of oxen were stationed along a small hill off of Durham Point Road and would be used to unload the laden ferry, but the only remnants are the name "Team Hill" and a network of stone walls.

"My ancestors have been on this property since the 1600s," Pam says.

Her great-grandfather, Jeremiah, was a prominent Durham citizen, active in state and local politics who made his name operating coal barges from

The Langleys' land provides critial watershed. JERRY MONKMAN–ECOPHOTOGRAPHY

Portsmouth to Dover, Exeter, Durham, and Newmarket. Successive generations took more to farming, and the milieu's agricultural activity kept everyone busy—until their circa 1700s-built historic barn burned down in 1981.

"It was such a loss," Pamela recounts. "We had one phone in the house at the time and if it rang in the night, I was the one expected to answer it. Usually, it was a drunken college student."

Not that time. A "sober-sounding lady" asked to speak to her father Stanley, who picked up, listened quietly for a bit, hung up, turned towards the family and with the most deadpan Yankee delivery imaginable calmly said: "Barn's on fire."

Thankfully, no livestock were in the barn at the time, but the edifice's charred cinders represented a significant chapter break for the Langley story. Commercial farming had come to a close. From then on, it was a vegetable garden here and there and third-party haying to keep the fields open.

Because of its heritage, Pamela envisions her family's farm to continue to add value to the local agricultural landscape, which is made possible thanks to the looming conservation of her family's 44+ acre property.

Fried eels. Who knew?

When she wasn't wrangling lollygagging cows or blistering her hands hauling hay bales, Pamela could, alternatively,

be found on the shores of Oyster River, scavenging the brackish waters in her backyard for horseshoe crabs to use as bait for eels.

"We'd chop them into sections and roll them in a little cornmeal and flour and fry them up," she says.

The magic of the Langley spread is its geographical diversity, and Pamela pursued every aspect that the varied biomes had to offer. It was a surf and turf upbringing.

And while the property's soil-centric farming may have receded, today there is an important, modern form of agriculture –aquaculture–that remains: oyster farming. The reefs located at the mouth of the Oyster River are rich in shelled bounty.

"Of the 15 active oyster farms in New Hampshire, 14 operate in Little Bay with four operating off of Durham Point and in close proximity to the Langley Project," says Steven Jencso, Coordinator of the NH Shellfish Farmers Initiative. "With the limited coastline of New Hampshire, and the extreme development pressure in the fastest growing region of the state, conservation of the Langley property serves to protect water quality that these farms and the estuary depend on."

But the value of this land is even more than the treasured memories of a Yankee daughter. Within the greater vision of coastal conservation, it is one of one. The property sits at the mouth of the Oyster River, where it flows into Little Bay. These are critical components of the Great Bay estuary, the protection of which supports the efforts of Great Bay 2030, a wide partnership of conservation organizations (including SELT) focused on the long-term health and resilience of the Great Bay estuary and its watershed.

Created in 2015 and supported with a significant investment from the New Hampshire Charitable Foundation's Great Bay Watershed Fund, Great Bay 2030 coordinates local, state, and federal resources to restore critical habitats, enhance water quality and quantity, encourage adaptation and resilience in the face of a changing climate, foster a culture of stewardship, and, of course, conserve priority lands.

"The protection of the Langley property is a tremendous addition to the landscape of conservation lands on Durham Point and along Great Bay," said Dea Brickner-Wood, Great Bay Coordinator for the Great Bay Resource Protection Partnership. "Identified in the NH Coastal Watershed Conservation Plan as a priority conservation area, this historically significant property boasts many conservation attributes including high value agricultural resources, wildlife habitat, and undeveloped shoreline along Great Bay and the Oyster River."

It doesn't get much more "priority" than the Langley property. And that's reflected in the federal granting programs that have stood behind its conservation. The importance of the Langley property shows through the multitude of partnerships supporting its conservation. One is the NH Source Water Protection Partnership which is funded through the US Natural Resource Conservation Service's Regional Conservation Partnership Program (RCPP). This Partnership is seeking protection and

restoration of lands and water in critical watersheds across New Hampshire, and the Langley project was awarded a $1,076,000 grant.

And in September, SELT's partner, the Strafford County Conservation District, was awarded $1,131,500 by the National Oceanic and Atmospheric Administration (NOAA). The Conservation District successfully applied for and secured the NOAA funding and will co-hold the conservation easement with SELT. These two grants, plus $100,000 from SELT's Conservation Acceleration Fund, will ensure the future of this critical land.

"Our partnership identified Pam's property as a critical area for enhancing and safeguarding wildlife habitats and intertidal areas," says Duane Hyde, SELT's Land Conservation Director. "In addition, the conservation easement enshrines permanent conservation to a scenic stretch of river visible from several public locations like Durham's Wagon Hill Farm, Newington's Fox Point and the Scammell Bridge. When you take the heritage value of this land into consideration as well, you're looking at a generational opportunity to preserve the shoreline for the benefit of both the human and natural communities of Great Bay."

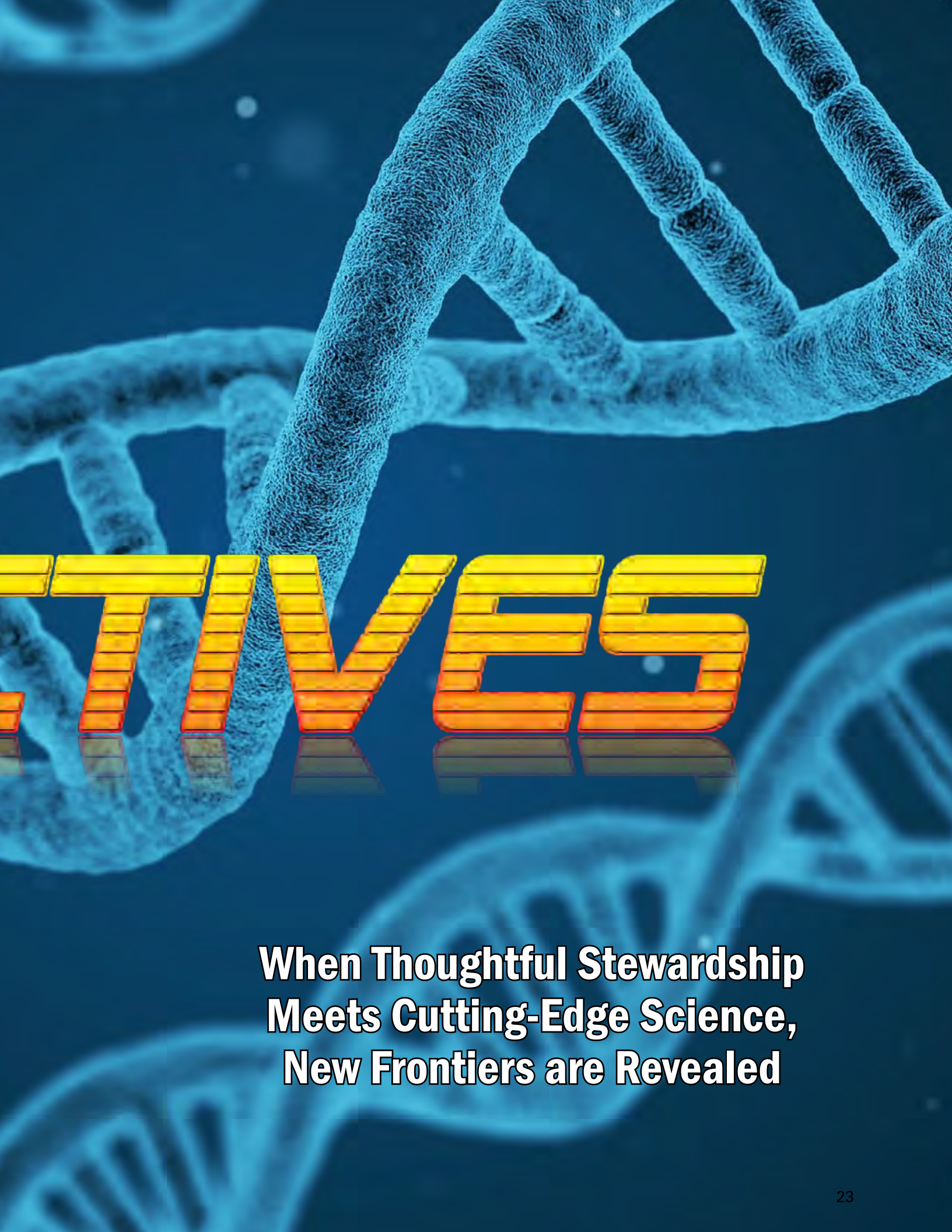
Pam sits at her kitchen table and recounts her childhood adventures. She remembers the halcyon days of hay hustling, the bovine detective work, the lobstering with her dad, or the lazy afternoons walking through the woods.

Oysters are the current crop being harvested.
JERRY MONKMAN–ECOPHOTOGRAPHY

The accumulation of these memories, added to the already sprawling family history, fashions a tome of local legend.

And if some day in the not-so-distant future, you find yourself on the shores of the Oyster River at Durham Point or looking across the river from Wagon Hill, breathe deep the salt air and gaze at the ghosts of the Bickford Point ferry landing and soak up the story yourself. Preferably with fried eel. ■


DNA
DETE



When Thoughtful Stewardship Meets Cutting-Edge Science, New Frontiers are Revealed

The forest is quiet. A faint breeze meanders through the overstory, shifting branches ever so slightly, jarring loose a handful of the first leaves that are ready to jump ship in the face of the approaching New England autumn. A man is walking the trail that weaves through the woods—and pauses. Something captures his eye.

He peers into the knot of timber and brambles just off the beaten path. There it is. He would have missed it if not for the briefest glint of sunlight ricocheting off its silk strands.

A spider web.

The man veers off-path and tentatively approaches the web. It's at ground level, which is ideal for his purposes. He draws closer and sees more detail. This has promise. The web looks recently spun, fairly free of the woodsy refuse that can get entangled in the silk after a long period of disuse.

He retrieves a pair of blue nitrile gloves from his back pocket and slides one on each hand. Then he takes out a baggie containing a clear plastic tube and a cotton swab. Deftly, he spins the swab on the web, twisting it in the gooey gossamer as if he were spiraling spaghetti on a fork.

Confident in his sample, he puts the swab in the tube, the tube in the baggie, takes off his gloves, and departs the scene. He got what he came for. A clue. A puzzle piece. A snippet of a clause, of a sentence, of a paragraph, of a million-page novel written in DNA that has a very important question to ask the forest:

WHO GOES THERE?

The University of New Hampshire

Durham, NH
9:48 a.m.

As I approached Gregg Hall, I didn't quite know what to expect. My tenure as a post-grad writing student came to a close three years before this building came online. Not that it would have mattered; Gregg Hall is a science and research building, stacked with advanced lab equipment that would look at home on the bridge of the Enterprise. The last thing anyone wants is a flaky English major wandering through a lab, lost in thought about dangling participles while knocking over flasks of acid.

So, it was with a hefty amount of anticipation that I, said former English major and perpetual acid flask risk, took the staircase to the second floor to meet with Dr. Jeffrey Miller, Research Assistant Professor in the Department of Molecular, Cellular, and Biomedical Sciences.

The subject of the conversation: a new frontier in DNA research that inventories the wildlife community passing though forest habitat. Capturing segments of Environmental DNA (eDNA) and sequencing species-specific DNA barcodes, researchers are able to identify the diversity of wildlife in the area, a gold mine of intel for conservation and land management organizations like SELT.

"Generally speaking, eDNA is any DNA that ends up in the environment that you can sample and sequence to identify who it's coming from," Jeff says. "You can find it in anything from a water sample to track microbes to the surface of leaves in a forest to see what's been walking through."

For true crime aficionados, this may conjure images of serious-looking forensics investigators in Brooks Brothers suits methodically combing for trace DNA to catch the villain of the week. And guess what: you're not far off!

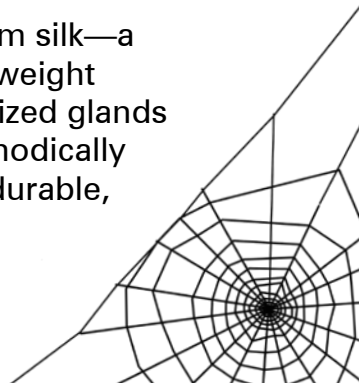
"The eDNA process takes a lot of cues from working a crime scene," Jeff says. "We're essentially talking about finding any small traces of DNA from all the things that might've passed through a particular area."

Jeff got rolling as an undergrad in Minnesota, pursuing fish research and evolutionary biology. This cultivated an interest in a deeper dive into the molecular goings-on of aquatic species, which led to even deeper dives into the world of DNA. Soon enough, he had developed a real knack for coding and analyzing cosmically complex DNA sets.

He began at UNH working with Alison Watts, Research Assistant Professor for Civil and Environmental Engineering (and SELT Board member), using the eDNA tactic in support of a large estuaries project that monitored fish populations. This was all new stuff—something UNH was pioneering—and its proof-of-concept eventually made the jump from the aquatic realm into the terrestrial world. Jeff was now trading his waders for hiking boots and bug spray.

That's where the spiders come in.

Spiders create their webs from silk—a remarkably engineered, lightweight material produced by specialized glands on their abdomen. They methodically weave the structure using a durable,



non-sticky form of silk. Once that phase is complete, they deploy a spiral of glue-like silk from the outside, trapping unsuspecting insects.

Now, with the dawn of eDNA, web functionality has taken on a new dimension, becoming more than all-you-can-eat bug buffets and turning into repositories for trace DNA.

"Webs are useful because air is passing through them at all times," Jeff says. "It's almost like setting up a passive filter in the woods to continuously sample the air. And then we take all the stuff that might have accumulated, bring it back, and see what animals it might have come from." This approach kicked off in 2023 in Australia, when scientists sampled webs outside an open-air zoo to see if they could match eDNA to nearby animals. Stateside, this is all new, and Jeff and UNH are at the forefront of testing its viability in forests and ponds.

A spider awaiting its prey. JERRY MONKMAN–ECOPHOTOGRAPHY

Which is where organizations like SELT come in. As one of the largest private landowners in the region (nearly 12,000 acres and counting), SELT provides a unique portal to eco-researchers like Jeff, offering diverse venues to investigate with eDNA capture. The opportunity to partner with UNH came via Board member Alison Watts.

"As a researcher, it is very rewarding to work with a land trust like SELT, where our science can be applied to real-world landscapes to better protect and preserve habitat," she says. "SELT's Strategic Plan calls on the organization to 'sustain ecological functioning for natural systems, wildlife, and the health and well-being of all people,' and eDNA is one of the most exciting new methods to help us actually measure if we are succeeding in our mission to sustain natural systems."

"Leveraging our lands to further advances in research is an important component of our stewardship goals," says Deborah Goard, SELT's Stewardship and Land Engagement Director. "It's exciting for us to be at the forefront of a project that can inform our land management practices in new ways."

The University of New Hampshire

Durham, NH
11:12 a.m.

We take a tour through the labs on the fourth floor, where the real eDNA magic happens. Actually, it's the opposite of magic. It's trillions of bits of data being fed through machinery with cool names like the Oxford Nanopore GridION, turbocharged by the on-campus supercomputer.

Jeff holds up a plastic pipette (fun fact: eDNA swabs are repurposed COVID test kits). The translucent tube contains clear liquid. Within that solution reside microscopic eDNA shards—the trace evidence washed and scrubbed from a gooey knot of spider web, dirt, and bark bits.

The sample is then placed in a machine with another cool name: the thermocycler, which essentially acts as a space-age Xerox machine, creating many copies of the short sequence for the various DNA that are found in the sample.

"Since eDNA is in such low concentrations, we have to amplify it," Jeff says. "We're making more and more copies of the DNA fragments because the instrumentation upstairs needs a little bit more starting material than just a single piece of DNA."

Fascinated, I probe for more. "Wasn't this the plot to *Jurassic Park*?" I think, unwilling to say it out loud so I don't come across as a total nimrod.

Jeff indulges my curiosity: "We put the sample in with an energy compound, almost like sugar, and then add in raw

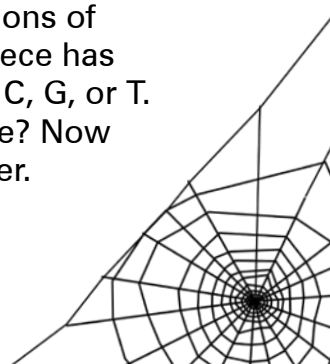
A web on the forest floor of the UNH trail. SELT STAFF

DNA that hasn't been put into a chain yet. We introduce a couple of other enzymes, and the machine heats up and cools, heats up and cools. That's what thermocycling means. And that leads this chemical reaction to happen over and over again, where it's running over the chunks of DNA that you have in the solution and making duplicates."

An early-onset popsicle headache begins to manifest, so I call it.

But I actually kind of understand: what Jeff and his crew are doing is essentially trying to assemble a puzzle from the tiniest of pieces, amplifying them so they're large enough to look at, and numerous enough to piece together the larger picture.

Of course, with that analogy, you're talking about a puzzle with millions of pieces. Oh, and every puzzle piece has just one of four letters on it: A, C, G, or T. Assembling that monster puzzle? Now you're getting to the heavy-hitter.



Jeff examines his findings. SELT STAFF

The DNA sequencer, one floor up, leverages the horsepower of the campus supercomputer, taking these amplified fragments and applying immense graphics processing power to piece together the eDNA clues and assemble cohesive strands of adenine (A), cytosine (C), thymine (T), and guanine (G), the four nucleotides that govern genetic coding and the structure of DNA.

The end result of this space-aged number-crunching is a .TXT document. But the As, Cs, Ts, and Gs are now ordered and—voilà!—Jeff has completed the puzzle.

The newly assembled data strings are called "barcodes" and are not dissimilar to the ones on your Pringles can. They're identification marks that match up to inventory, but instead of a pallet of salt and vinegar potato chips, these barcodes point to "bear," "chipmunk," "moose," "black racer snake," or "Blanding's turtle."

Or, if you want to shift your gaze to non-animals, you can get barcodes for fungus or plants. As long as the barcodes match the (ever-growing) DNA database, the flora and fauna inventory takes shape. (These databases are publicly available due to efforts from places like the Smithsonian and NIH / NCBI, which you can find at www.ncbi.nlm.nih.gov/refseq.)

Music to the ears of a stewardship director at your friendly neighborhood land trust.

"The information that can be retrieved by eDNA has tremendous potential for informing our land management

approach," says Deborah Goard, SELT's Stewardship and Land Engagement Director." A more accurate idea of the diverse wildlife on our properties, especially those that are rarely seen, will lead to even more precision in our stewardship."

The reference databases are still being built. The samples are still being collected. The barcodes are still being crafted. The science is still being refined. Jeff notes that he tries to "triangulate" his eDNA work by collaborating with other researchers at UNH like Remington Moll, the director of the Wildlife Modeling and Management Lab that specializes in camera work and Dr. Laura Kloepper, lead of the Ecological Acoustics and Behavior Lab for acoustic monitoring.

"We're trying to use all three methods at once to see if these newer technologies can give us better information," he says. "That's why we're partnering with SELT. If we sample beforehand—before a management plan is put in place—does the extra bit of data on what species live there affect that management plan?"

The University of New Hampshire

Durham, NH
11:48 a.m.

We've just emerged from a quick trip down the nearby UNH trail. Jeff showcased a how-to on the notably analog eDNA capture process.

Grab the Q-tip and twirl—and you're in business. The pipette now holds a mass of grubby silk and leafy bits. It doesn't look like much.

But soon enough, this nondescript wad of organic detritus will be scrubbed, washed, filtered, juiced-up, superheated, supercooled, superheated, supercooled, superheated, supercooled, multiplied, enlarged, then analyzed with enough computing power to send Michael J. Fox back in time.

And after all that, what comes out?

A series of letters that will change our understanding of the natural world. ■

The web sample, a trove of potential eDNA. SELT STAFF

THE DREAM TEAM

Over the summer, Burley Farms in Epping buzzed. And not just because the pollinator gardens were in bloom, attracting enough bumblebees to fill a yacht. In addition to the usual hullabaloo that goes down at SELT's HQ—the hikers and bikers, the kiddos playing at Burley's Backyard, the birds of prey circling the airspace—the summer was also characterized by another stalwart sight: three guys diligently working in the burgeoning educational garden.

Meet James, Joseph, and Nathan, local volunteer superstars who have fashioned a giving-back résumé the length of a flagpole. The Salvation Army Thrift Store, Habitat for Humanity ReStore, Pope Memorial Humane Society—the list goes on.

The trio are clients of Work Opportunities Unlimited, a regional organization with a local office in Dover that finds employment and volunteer activities for people with disabilities. Following a conversation with Zoe Graves, SELT's Outreach and Education Director, SELT became the latest addition to James, Joseph, and Nathan's laundry list of experiences—and the partnership could not have been more of a home run.

"We were contacted by Work Opportunities about potential volunteer opportunities," Zoe says. "This was exciting for us, as a guiding principle for our outreach efforts is to bring as many people as possible into our mission. We believe nature is for everyone, and partnering with Work Opportunities puts that into action. Not to mention they are incredible volunteers, so it's been a complete win-win."

Joseph, James, and Nathan were on board, and SELT had the perfect destination for their time and talents: the farm on the Burley campus, the brand-new venue for hands-on agricultural experiences for children participating in ATLAS, SELT's nature-based education program. Three guys itching for some good old-fashioned outdoor work?

ABOVE: Joseph, James, and Nathan. SELT STAFF
RIGHT: The trio hard at work aroud the ATLAS Ag garden. SELT STAFF

Getting to use some cool, new-fangled power tools? Jackpot.

“Community-based volunteerism fosters a sense of belonging and social connection,” says Mary Leddy, Chairman of the Board for Work Opportunities Unlimited. “It’s essential to recognize that everyone has unique skills and abilities that can be valuable.”

And it doesn’t get more valuable than James, Joseph, and Nathan’s work output. Over the summer, working closely with other SELT volunteers, they reeled off these big-time projects:

- Painted the “Ed Shed,” SELT’s recently constructed storage shed for all things ATLAS
- Built the three-bin compost system
- Constructed sensory beds (gardens that engage all the senses)
- Installed classroom shade and hammock posts
- Harvested, watered, weed-whacked, and mowed
- Spread wood chips
- Helped build the handicapped-accessible beds
- Filled raised beds with dirt and compost

Let’s take a moment to hear from the guys themselves about why they enjoy working with SELT:

“I like the view," says James. "I like the trails, and I like meeting some new people.”

“I like doing weeding because I can work with my hands," says Joseph. "I’ve always wanted to help with nature stuff.”

“I like to help the community because they need extra hands and support, and I love to help people," says Nathan. "I like to explore the outdoors and want others to be able to do the same.”

All told, they logged 156 hours and played a significant role in transforming the educational garden from an in-process concept to a fully farmed and operational agricultural station.

A win for SELT, a win for ATLAS students, a win for the environment—and a win for James, Joseph, and Nathan, the dream team. ■

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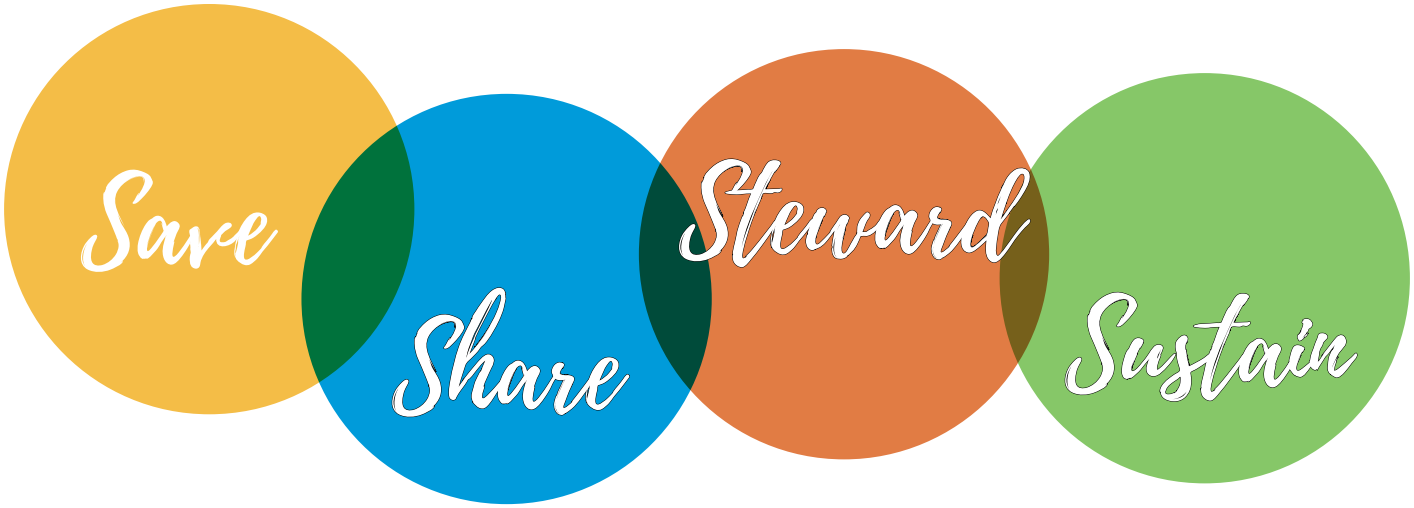

SAVE
SELT conserves the special places in our communities for clean water, wildlife habitat, healthy forests, local farming, and outdoor recreation.

SHARE
Whether it is the miles of trails, or the local farms producing food, or the water flowing from your taps, SELT's properties are protected for the benefit of everyone in our communities.

STEWARD
SELT's team of stewardship staff and volunteers thoughtfully manage and monitor our properties—all to ensure these lands are safeguarded so that they can be treasured for generations.

SUSTAIN
SELT is a healthy, thriving organization whose staff, leadership, volunteers, members, and community partners work seamlessly to support our mission.

CONNECT WITH SELT'S MISSION!

Join or Renew Today! Scan the code or visit seltnh.org