



Kemp's Point

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News from the University of Wisconsin-Madison's Kemp Natural Resources Station

The Practical Science of Forestry

By Karla Ortman, Editor

Do you live in, or near a forest? What do you know about forestry? Currently, 46% of Wisconsin's landscape is forested. It can be easy to take this landscape for granted and think it will never change. But it does. In fact, every forest is undergoing a very slow, constant change, a concept known as **succession**. "Succession is the natural replacement of plant or animal species, or species associations, in an area over time. When we discuss forest succession, we are usually talking about replacement of tree species or tree associations." (UW-Extension, Forestry Facts)

Visit a forested space regularly and you will notice small changes, especially over a few years – "*Remember the wildflowers that used to grow here? The trees have grown up so much it is too shady for them now.*" When a major change happens to a forest in a short period of time, we may have a more dramatic or emotional reaction to the change. A good example of this was when, in August 2000, a storm caused a large blowdown of old growth hemlock at Kemp Station. It caused both shock and sadness to many who had enjoyed the spooky darkness of the forest as you drove onto the property. If a timber harvest occurs on a forested property in your neighborhood, your first reaction may be sadness or disappointment at the loss of the trees, the shade and coolness they brought. Or you may be angry that the lovely forest you passed every day now looks like a disaster zone.

To borrow a line from one of my favorite Elvis Presley songs, "*Understanding solves all the problems ...*" That is an oversimplification, but understanding more about forestry can certainly help us process



Session attendees visited a working forest where professional forester, Matt Carothers, provided a tour.

and even appreciate the major changes in forests around us.

This summer Kemp Station hosted an outreach series titled, "The Practical Science of Forestry." This three-part series was led by professional forester, Matt Carothers, of Superior Woodlands Company. For the last seven years, Matt has co-taught the UW-Madison "Forest Operations" course with Scott Bowe, Kemp Superintendent, Professor, and Wood Products Specialist. In Matt's words, the students enrolled in "Forest Operations" see forestry "*from stump to mill.*" His professional knowledge and experience, along with his passion in helping protect the woods and waters, made Matt a great choice to lead this outreach series.

It began with a classroom session introducing the language of forestry and logging. Next was a walk in the woods at Kemp Station where Matt illustrated some of the "logging lingo" and discussed characteristics of the forest at Kemp. To wrap things up, the final session was a visit to a managed forest where a logging job was underway. For those who

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missed the sessions, this is a recap primarily of the “logging lingo” session, which introduced important forestry terminology and concepts.

Forestry is an applied science. It is rooted in research and one of the first words to know is **silviculture**.

The U.S. Forest Service defines silviculture as “the science and art of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society such as wildlife habitat, timber, water resources, restoration, and recreation on a sustainable basis.” Silviculture is the technical umbrella under which all the different types of logging practices fall.

Landowners with 80 acres of forest may decide they want to add some hiking trails to their land. Perhaps family members would like to utilize the property to hunt for deer or grouse. These are reasons to contact a forester to discuss options for prescribed treatments to the forest in order to best reach these wildlife habitats and recreational goals. Landowners may choose to develop a comprehensive management plan that includes long-term guidance. Or they may only want a plan to harvest trees to meet their short-term goals.

Once goals and plans are determined, it is time for a **timber cruise**, which means the

forester will take measurements using a variety of tools to estimate the forest’s characteristics, such as volume, weight, carbon, quantity, size, species, and quality of trees. Keeping the goals and objectives of the landowner in mind, the forester will write a plan for harvesting timber. A harvest plan may include considerations for water and soil in addition to the logging prescription.

If the landowners accept the harvest plan prepared by the forester, then a timber sale will be arranged. But before any trees are cut, it is common to run a search of the Wisconsin DNR’s Natural Heritage Inventory (NHI) database for any species of concern. If there is a “hit” in the database, the forester may need to adjust the harvest plan. For example, wood turtles are a threatened species in Wisconsin. If the NHI database identifies suitable wood turtle habitat within the intended harvest area, logging for the timber sale may need to be scheduled to avoid the wood



Above: During the forest walk at Kemp Station, Matt Carothers shows an attendee how to use a 10 factor prism, one of several tools foresters use when cruising timber. At right: A tracked harvester is used to cut and fell trees during a harvest. It is helpful to have a young forestry assistant on site if possible. Being safe in the forest is always a top priority. (Photo by: Matt Carothers)



turtles breeding season. Often part of a harvest plan involves enhancing habitat for a variety of species. Finally, before timber is cut in Wisconsin, a Chapter 26.03 cutting notice must be filed at the County Clerk’s office.

Next, let us clarify the difference between timber and lumber before going any further. **Timber** is the raw material that comes from forests by logging, at any point before it goes through the first processing stage at a mill. Timber can be standing, uncut trees, or piled next to a road, or on truck making its way

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to a mill. Cut timber is often referred to as **logs**. Logs become **lumber**, the value-added product produced at the mill and sold at the store – a refined product made of wood, most often in the form of boards.

A **timber sale** is the transaction of standing timber between its seller and its buyer. The valuable good exchanged in a timber sale is known as **stumpage** – stumpage is the value of standing timber minus the costs to harvest and transport it to a usable market as paid by the buyer to the seller. Matt explained that very high-quality forestry takes place in northern Wisconsin because there is an adequate market for forest products. There is competition in the market and as a result, the quality of the product delivered from the forest and the forestry services behind it are high. Forest practices can suffer in areas of the state where adequate markets do not exist.

Once the timber harvest begins, there are more terms that come into play. A **feller-processor**, a.k.a. **harvester**, is a machine that fells and processes trees at the stump. To process is to delim, buck and top the tree. To **buck** a tree means to cut the tree into pieces of pre-specified lengths. The processor head on the harvester may be a fixed or a “dangle head.” Fixed and dangle heads differ in how much the head rotates, or how much range of motion it has. Harvesters may be tracked, like a bulldozer, or wheeled.

A **forwarder** can be thought of as a tractor built for the woods; with a knuckle claw grapple at the end of a loader boom, it picks up and hauls out pieces of cut timber. The forwarder follows the harvester and moves the cut timber from the stump to a roadside where it can be loaded on trucks. This action is known as **decking** – when timber is brought

from where it was cut to a staging area to await transport to a mill. In Wisconsin, the staging areas are known as **landings**. Sometimes logistics permit the decking step to be skipped, perhaps in a situation where the haul road is near to where the timber has been cut. A **truck and pup** is comprised of a straight semi-truck with log stakes and a self-loader pulling a short trailer with log stakes. The pup is the trailer pulled behind the truck. The operator of the truck and pup could pull timber directly from the forwarder and load it on the pup.

An important message Matt shared during the sessions was the connection between the forests and our daily life. He spoke of the Packaging Corporation of America, located in Tomahawk, where they make corrugating medium – that is the brown paper that becomes the squiggles in a cardboard box – another thing that we easily take for granted. But it is part of a very long supply chain. It began in a forest, where logging equipment valued at one million dollars was at work to ultimately deliver an Amazon order to your home.

It has been 25 years since the old hemlocks at Kemp

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Left: A forwarder and a truck and pup moving timber at a harvest site. Below: A wheeled harvester with a dangle head processor. A four-legged pup for scale. (Photos by Matt Carothers)



Scattering Seeds

By Ellie West,
Kemp Station Summer
Communication Intern

When I was a kid, my favorite book was entitled *Miss Rumphius*. The story follows a woman through her life as she tries to fulfill the promise made to her grandfather. A promise that she will make the world a more beautiful place. As an old woman, she scatters lupine seeds around her coastal town, knowing that she may never see them grow, but hoping that they will be there for someone else to appreciate.

Now, what seven-year-old me and twenty-year-old me took away from this book are two vastly different things. Little me decided that my life would be incomplete until I, too, had a garden of beautiful lupines. Unfortunately, the Missouri sun had other plans, and after years of fried seedlings, I eventually gave up. As I now realize, the book was about more than lupines, and nothing has been a better example of this than my summer documenting research at Kemp.

A perfect example of this is the DReAM Team. The focus of their project is assisting trees along their migratory patterns, in the hopes of preserving the populations as the climate changes. I spent a few hours with them, picking our way back and forth across transects. They measured and marked each tree carefully, making jokes at one another the entire time. As I watched them work, it struck me that they were pouring their time into trees that they'd never see grow. That nobody except the researchers studying them are likely to ever lay eyes on. Yet they came home every day with a layer of dust on their skin and smiles on their faces, exhausted but fulfilled.

They were not the only ones; the Loon Proj-



ect team worked at all hours throughout the summer. At the end of July, they were waking up at 3 a.m. daily to visit the lakes. The team was hitting twenty lakes daily between the four of them, tracking the loons, locating the nests, and watching their behavior patterns. A week later they were sleeping through the day and working nights to catch and band this seasons loon hatch. They had huge bruises on their limbs from the loons biting at them, trying to escape. Still the love they had for their work was obvious.

We were on our second lake of the night; the crew had gone banding and I was lucky enough to tag along. One of the chicks they were banding was nervously calling for its parents and nipping at the

researchers while they placed the bands on its legs. Korben, who was holding the chick, started stroking its feathery belly, whispering assurances that it would be back in the lake with its family soon. They were careful with every bird, but especially with the chicks, as they had watched them hatch and grow

*Left: A DReAM Team member takes measurements of newly planted trees.
Below: Loon researchers band a loon chick (Photos by Ellie West)*



throughout the season.

Every researcher I spoke with this summer echoed the work ethic of these two teams. They were proud of their work and the impact they were making. Some of these projects are already 50 years old. For others, it is the

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were blown down. While it felt like a loss at the time, today, a person driving by that area of the property would never recognize a loss occurred. Today it is grown up, a dense stand trees, including yellow birch, a species that is not easy to regenerate. Down the road from my house, 10 years ago, a neighbor had a timber sale that modified the look and feel of the area – one of those “disaster areas” for a while (Read story about this in the Spring 2015 issue of Kemp’s Point at <https://go.wisc.edu/77pn9u>). But today, it is a dense stand of aspen, surely attracting a variety of young forest wildlife species. Forests change whether they are changed very slowly by natural growth, or quickly either by natural causes or by forestry conducted by humans. Understanding the process and how it is tied to our daily life helps us to appreciate forests even more. 🌲

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first season of work on a project that will take another 50 years. My lovely friends at Kemp will not see the trees that they planted this summer grow to maturity or the loons that they banded grow to have their own chicks, but they worked tirelessly anyway. They were planting the seeds for the next research team to water and future generations to enjoy. 🌲

Nature Collage!

Participants of Kemp Station’s “Colorful Nature Collage” outreach session first spent some time outdoors gathering items in nature, like moss, leaves, and bark. Back indoors, they glued items to cardstock to make fun and colorful collages. Gathered items were supplemented with items from a Kemp staff member’s wildflower garden at home.



Growing the Future

Farmers are constantly seeking innovations to improve their operations, and UW–Madison’s Agricultural Research Stations help meet that demand. Across the state, College of Agricultural and Life Science researchers are focusing on the problems and opportunities farmers face today, generating new ideas for a fertile future. Efforts are underway to control nearly indestructible weeds, support the health of “beef-on-dairy” crossbred calves, and reduce the fertilizer needed for row crops to thrive.

To learn more about the research taking place at some of Kemp’s sister stations, visit <https://news.wisc.edu/growing-the-future/>.



Weed Science Field Day

Rodrigo Werle, UW–Madison associate professor of plant and agroecosystem sciences and extension scientist, talks about herbicide resistance in weeds such as waterhemp at the Agronomy and Soils Field Day at Arlington Agricultural Research Station in Arlington, Wis., Wednesday, Aug. 27, 2025. Photo by Michael P. King/UW–Madison CALS



The Fabulous Algae of Tomahawk Lake

By Dr. Linda Graham, UW-Madison

As the leaves turn and Tomahawk Lake cools, algae that live in the shallow near-shore waters prepare to survive another northern Wisconsin winter. These natural species, harmless to humans, hold the secret to the evolutionary origin of all land plants, including crops. So researchers come to Kemp Station to collect these algae for intensive study, such as comparing their genomes to those of plants. The simpler algal genomes indicate the genetic background onto which plants added complexity, so understanding them aids studies of plant systems biology, key to improving crops.



Coleochaete pulvinata

For example, researchers studying a key flowering plant gene used to make wood recently discovered that the gene actually originated in algae. Scientists found this gene in the genome of the green alga *Chara braunii* (photo upper right), which grows in sandy beds in Tomahawk Lake. A close relative, *Nitella tenuissima* (photo center above) likewise inhabits the lake's shallow waters. Both of these delicately-branched algal species are easy to see without using a microscope. They can be viewed in their natural habitat by using a simple plexiglas or PVC viewing tube to see below the lake surface. Both are harmless to other life forms and important to scientific advancement.

A smaller relative, *Coleochaete pulvinata* (photo above left), grows on the surfaces of pebbles and other surfaces in the same shallow Tomahawk Lake waters. This species can be seen most easily on the surface of white quartz rocks, appearing as

small green bumps. In late summer, all of these green algae produce zygotes (shown in microscopic view in Fig. 3). These zygotes, produced by sexual



Chara braunii



Nitella tenuissima

reproduction, have tough cell walls enabling survival through winter into spring, when they germinate and colonize the lake shore again. These plant relatives are sensitive to nutrient pollution, explaining why they cannot grow in over-fertilized lakes. Preserving Tomahawk Lake water quality not only fosters excellent recreational use and fishing, but also the survival of the algal relatives of plants that are so scientifically informative. 🐼

Images used with permission from *Algae*, Graham, et al. 2022, LJLM Press (an ebook available online, \$40)



Photo at left: Participants of “The Algae of Tomahawk Lake” outreach session learned about algae basics, collected samples from the lake and viewed samples under microscopes. The session was led by Marie Trest and Dr. Linda Graham.



Tiny Hitchhikers

By Karla Ortman, Editor

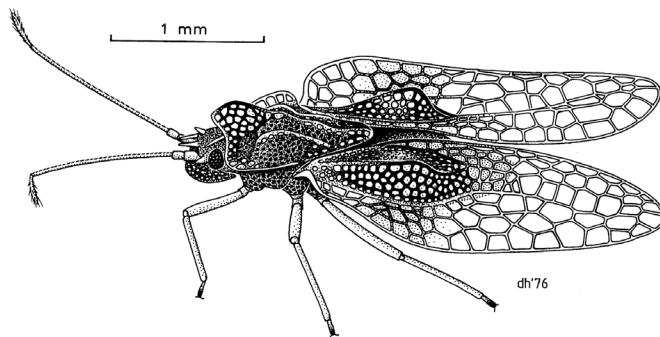
It was an otherwise typical Friday in July as Kemp Superintendent, Scott Bowe, walked the half mile from his home to the office at Kemp Station. But today was different. Today, when he arrived at his desk, he discovered something odd – his khaki shorts were crawling with some type of tiny insect! What the heck?! There was only one thing to do -- send photos to Dr. Dan Young at UW-Madison's Department of Entomology.

The mystery was quickly solved. Dan wrote, "These little cuties are the nymphal stages (immatures) of lace bugs (Tingidae)." Tingidae is the family name for "lace bugs." One author wrote that all species of lace bugs, "...have wings and thorax beautifully sculptured with an intricate pattern of veins that resembles lace." (Source: Missouri Botanical Garden) There are about 150 different species in North America and over 2,000 in the world!

Scott reported the immature lace bugs that hitched a ride on him during the walk to work were about 0.5-1 mm in length -- VERY tiny! The adults found in

North America measure just 3-5 mm. To understand lace bugs, think about the caterpillar of the monarch butterfly. This caterpillar has a single host plant, common milkweed. The monarch butterfly lays eggs on the milkweed plant and when the tiny caterpillar hatches it feeds solely on that plant. Similarly, many lace bugs are also host-plant specific. They take it one step farther as they tend to spend their entire life cycle, from egg to adult, on the same plant, often having multiple generations within a single season.

Given the tiny size of lace bugs, they are most often discovered due to leaf damage caused by their feeding process. According to a WDNR publication, "They are typically found feeding on the undersides of leaves, where they insert their mouthparts and suck the sap from the leaves. From the top of the leaves, these areas where the feeding damage occurs are stippled with small white or yellow specks, often in



This drawing of a species found in New Zealand illustrates the intricate design of lace bug wings. (By Desmond W. Helmore - Manaaki Whenua - Landcare Research, CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=72857216>)

a generally circular pattern." Most plants are strong enough to withstand reasonable feeding by lace bugs, but an excessive lace bug population may compromise even healthy plants. 🐛



One of the hitchhikers -- nymphal stage of the lace bug at Kemp Station.



Once a Badger, always a Badger! Members of the Wisconsin Alumni Association enjoyed an introduction to and property tour of Kemp Station by superintendent Scott Bowe.



In June Kemp Station hosted the 2025 cohort of Diversity in Conservation Interns. The 10-week program, offered through the Natural Resources Foundation, provides its interns with insights into environmental careers. The cohort spent their time at Kemp exploring the property and bonding through group games and shared meals.



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Lesser Purple Fringed Orchid (*Platanthera psycodes*)

We found the orchid on the last day of its bloom. Its petals were thin and the heat had already caused about half to shrivel. Still I could not believe my eyes. At Amnicon Falls, we had chosen the trail along the river for the waterfall views and the possibility of rare flowers. A few orchids had been spotted there a few days prior and we were hoping to get lucky. The three of us walked for about an hour, stopping to admire the waterfalls and poke along the shoreline for a telltale glimpse of purple. For an hour we saw nothing. Tired and hot, we arrived at the end of the trail where we decided to look one last time. There it was, *Platanthera psycodes*, tucked away in tall grass on the edge of the river. We gently picked our way through the brush and crouched beside it to take pictures, careful not to disturb any of the buds. The lesser purple fringed orchid is native to the eastern United States and Canada, preferring to grow in wet, shady forests. These purple orchids can grow up to three feet in height, often bearing over 100 individual flowers on its spike. According to the US Forest Service website, "The flowers have a long spur in the back that contains sweet nectar at their base. Flowers are pollinated when moths insert their proboscis down the long nectar tube and are covered by the sticky pollinia near the top of the flower. Then, they fly off to get more nectar from another flower and fertilize the ovary in the process." These orchids rely on a delicate balance of conditions to survive and should never be picked, as they will die if removed from their natural habitat. -Story and illustration by Ellie West

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