The Blazing Star

Spring 2016, Volume 17, Issue 2

A Publication of the North American Native Plant Society

Native Plant to Know

Prairie Nymph

Herbertia lahue subsp. *caerulea*

by Stephen Johnson and Mary Stark

Prairie nymph (*Herbertia lahue* subsp. *caerulea*) is a delicate, early flowering member of the Iris family. In Greek mythology, Iris is the personification of the rainbow and the messenger of the gods. We like to think that the ephemeral structure and transient nature of prairie nymph's pretty flower embodies the essence of the mythological nymph transported to the grasslands of the New World.

This diminutive plant typically bears flowers from March to May in the tallgrass prairies and nearby pine woods of south Louisiana and adjacent southeastern Texas. Its pale violet-lilac flowers can be seen hovering above a green background of grasses. The emergence of prairie nymph means that spring is here and summer can't be far behind.

The tight accordion-pleated leaves are indistinguishable from the surrounding grasses when viewed from a distance. The 30 centimetre (one foot) tall floral scapes terminate in a narrow spathe, typical of the Iris family, containing between two and three flowers, opening successively over a span of nearly a week. Each flower lasts but half a day, unfurling near sunrise and collapsing soon after noon. Only when the flowers are open can you spot the plant in the tallgrass prairie.

Herbertia, named for the early 19th century British bulbous plant expert William Herbert, has had a transitory taxonomic past. For a long time, it was in the genus *Alophia*, but later genetic studies clearly showed that prairie nymph was not related to plants in that genus. Then, to avoid confusion with the moss genus *Herberta*, prairie nymph was transferred to genus *Trifurcia*. Fairly recently the plant settled into the genus *Herbertia*. Even there it has been shifted from lower varietal to higher subspecies status.

Prairie nymph is generally considered to be native to the Gulf coastal prairie, but retired Louisiana botanist Charles Allen suggests that it may be a garden escapee.

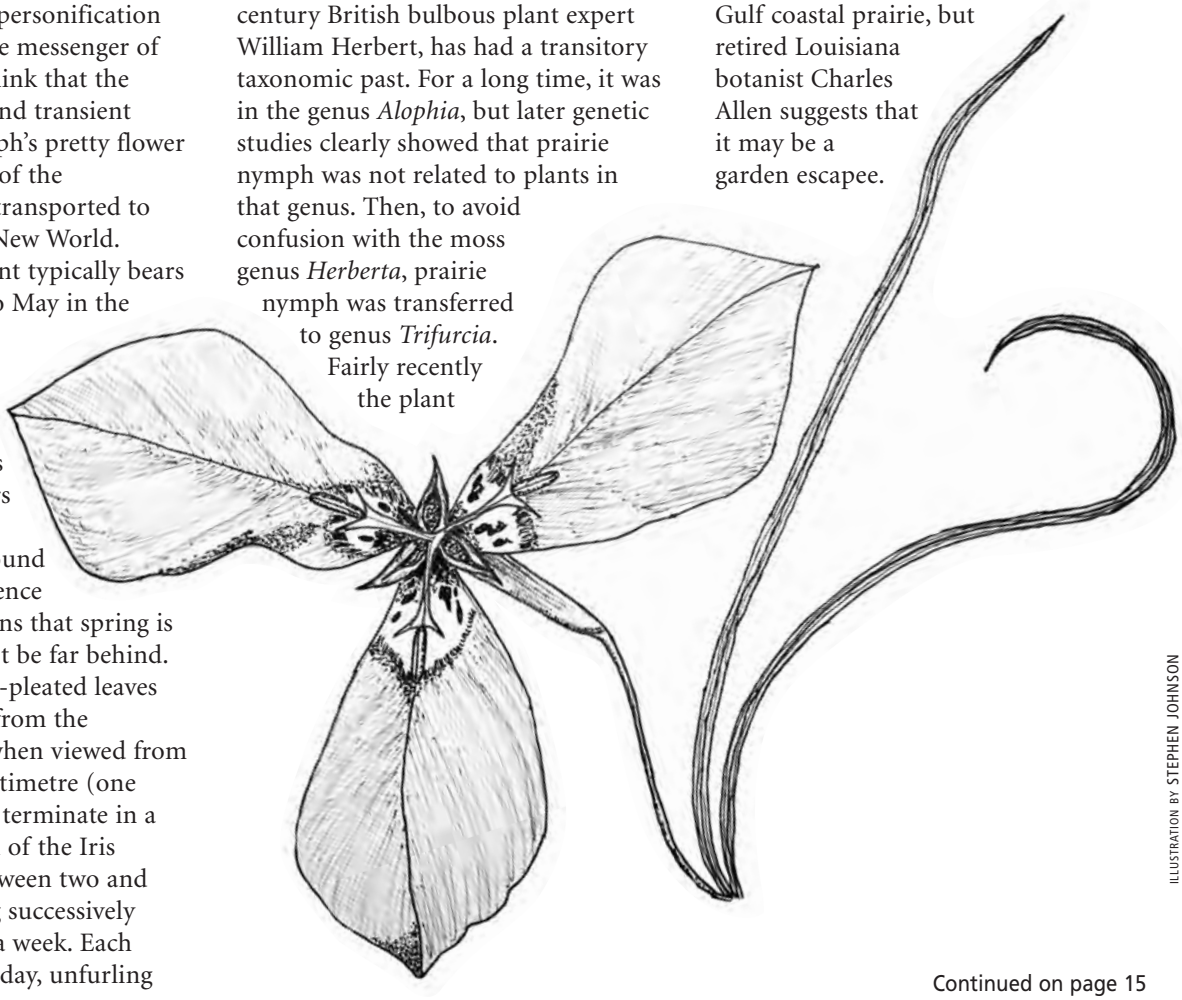

ILLUSTRATION BY STEPHEN JOHNSON

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The *Blazing Star* is . . .

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Editorial

We are often told that the best things in life are free. The old adage (or was it a song?) is very true, and our pollinators come to mind as one of the best examples of this idea. I would argue that these busy invertebrates freely provide the world's most important ecological service, ensuring the continued reproduction and survival not only of the vast majority of plants, but also organisms that depend on those plants for survival. That includes you and me.

Our native pollinators, however, are in grave trouble. The well-publicized dive in the population of bees, as well as butterflies like the monarch, is an alarming trend in North America (and beyond), and poses a threat to economies and the environment.

In Ontario, where I live, something that would have seemed unimaginable a few decades ago – the extinction of many native bee populations – is now a distinct possibility, unless significant and immediate action is taken. Last year, to its credit, the Province of Ontario announced changes to the *Pesticides Act* that include reducing the proportion of neonicotinoid-treated crops. Given the direct link between neonics (the shortened form of the pesticide name) and bee death, this is a commendable first step in support of pollinators. This past winter, Ontario released the Pollinator Health Action Plan (http://www.omafra.gov.on.ca/english/pollinator/actionplan-draft.htm) for public comment. This document lays out the issues relating to pollinator decline and outlines potential future actions.

Its strengths notwithstanding, the action plan is overly timid on at least two fronts that are critical to the survival of our pollinators. The first of these is pesticides. The link between pesticide use and bee mortality is well established. As an example, around half of the 100+ registered pesticides approved for fruit crops in Ontario are toxic to bees. This, along with the research linking neonics to bee mortality, is one smoking gun that we can target and dispense with. The systemic use of pesticides creates undue harm to our environment and influences the entire food chain, including humans. Now is the time for our lawmakers to invest in strong regulations that phase out – not simply reduce – these known chemical offenders.

The second critical piece is habitat. The loss of pollinator habitat has been identified as a prime cause of native pollinator decline. The perpetual dwindling of natural areas and ecosystems due to road construction, residential and industrial development and farm practices, such as the removal of hedgerows, has forced bees and other pollinators to the brink.

Creative incentives are needed to re-create and preserve pollinator habitat on both public and private lands. This should include expansion of Ontario's Greenbelt, research and funding for pollinator-friendly farming practices, greater education of landowners and new enforced regulations to protect pollinator habitat and native plant communities.

Unless we collectively change the ways in which we manage our gardens, fields and wild spaces, our native pollinators may soon face extinction. The changes seem like a small price to pay to keep them healthy and able to continue with their free, life-sustaining services.

Myles Mackenzie
NANPS board member

PHOTOGRAPH BY CHARLES ISCOVE

*Bumble bee on fragrant hyssop (*Agastache foeniculum*)*

NANPS EVENTS

NANPS ANNUAL PLANT SALE:
Discover the Wonder and Beauty of Native Plants

Saturday, May 7, 2016, 10 a.m. – 3 p.m.
Markham Civic Centre, 101 Town Centre Blvd., Markham, Ontario
Native trees, shrubs, forbs, ferns, sedges, grasses, all supplied by NANPS-approved ethical growers. Knowledgeable volunteers will be on hand to provide help with your gardening decisions.

TORONTO PLANT SALES
East End

Saturday, May 14, 2016, 11 a.m. – 4 p.m.
Artisans at Work, 2071 Danforth Ave. at the Woodbine subway

West End

Sunday, May 29, 2016, noon – 4 p.m.
Christie Pits Park at the Christie subway station

EXCURSION TO WARSAW CAVES CONSERVATION AREA

Saturday, June 11, 2016, 10 a.m. – 3 p.m.
Cost: $30 (includes carpooling mileage and gas charges, admission, honorarium for hike leader)
PLEASE NOTE: Limited to 15 NANPS members.

This outing – a collaboration between NANPS and the Peterborough Field Naturalists (PFN) – will take us to Warsaw Caves Conservation Area, a beautiful and glacially significant site east of Peterborough. It is located in the Indian River Valley, a former glacial spillway with karst features, cliffs, caves, alvars and a variety of woodlands. The river disappears underground for several hundred metres. We'll examine a variety of habitats for plants and talk about the effect of the topographical features and geological history on the vegetation.

Our guide will be Mike McMurtry, who has recently retired from the Natural Heritage Information Centre, Ministry of Natural Resources Peterborough. The NHIC is Ontario's conservation data centre tracking biodiversity and Species at Risk. Mike is active in the Field Botanists of Ontario and the Kawartha Land Trust. He is presently compiling a list of flora for Hastings County.

This will be a valuable opportunity not only to learn about vegetation in karst landscapes but also to meet other NANPS members and those involved in PFN, which celebrated its 75th anniversary last year! Please bring hiking gear (including rainwear), binoculars, lunch and good cheer.

Due to the fragile nature of the protected site, participation will be limited to 20 people in total (15 NANPS members, 5 PFN members). First come, first served, so sign up today. Please register through Eventbrite (North American Native Plant Excursion to Warsaw Caves). If you are paying by cheque, register with jkeil@nanps.org and send your cheque to NANPS, Warsaw Caves Excursion, Box 84, Stn. D, Toronto, Ontario, M9A 4X1. No cash please.

Please indicate your location so we can arrange carpooling. We look forward to seeing you on June 11.

NOMINATIONS STILL OPEN FOR NANPS AWARDS

The **NANPS Conservation Award** recognizes the extraordinary contribution of an individual or group to the conservation, protection or restoration of the natural heritage/flora of North America at the community, regional, provincial, state, national or continental level. Deadline for submissions is May 31, 2016.

NANPS Garden Awards recognize and celebrate the amazing gardens that support diverse habitat and shared accommodations for our native flora and fauna. Deadline for submissions is July 31, 2016.

Visit nanps.org for more information and to make your nomination.

NANPS NEEDS A TREASURER

Can You Stick To Your Budget? Except When Buying Native Plants? Then We Need You!

PHOTOGRAPH BY HAROLD SMITH

Responsibilities for this volunteer position include reporting to the board, making deposits, tracking receipts and invoices, providing financial documents to the bookkeeper and meeting with our accountant. NANPS has audited financial statements. Attendance at some but not all monthly board meetings is required. Liaise via Skype when necessary. Duties to commence November 2016.

If you are interested or know a strong candidate, please contact Janice Keil treasurer@nanps.org or Harold Smith hsmith@nanps.org.

NORTH AMERICAN NATIVE PLANT SOCIETY
www.nanps.org

Through the Seasons with American Ginseng and its Companions

by Madison Woods

In early spring when the ground still snuggles under blankets of snow and leaves, the American ginseng (*Panax quinquefolius*) habitat companions are already beginning to stir. One of the first plants to bloom in shady Ozark hollers* in Arkansas is harbinger of spring (*Erigenia bulbosa*). After that, and in overlapping simultaneous successions, come more delightful spring bloomers. Bloodroot (*Sanguinaria canadensis*) covers the rocky hillsides with fragile white blossoms. Dutchman's breeches (*Dicentra cucullaria*), with its little pantaloon blooms, often flowers before the bloodroot. Yellow trout lilies (*Erythronium rostratum*) carpet the ground alongside the creek. Rue anemone (*Thalictrum thalictroides*), false rue anemones (*Enemion biternatum*), liverworts (*Anemone americana*) and bellwort (*Uvularia sessifolia*) soon join the party.

Blue cohosh (*Caulophyllum thalictroides*) unrolls its unearthly coloured fronds before the ruckus of spring. It takes full advantage of broken sunlight reaching through the mostly bare branches before the trees become fully clothed in leaves. Later in the season I won't even be able to find it behind and beneath the usurper black cohosh (*Actaea racemosa*).

When these flowers arrive, I begin the vigil for American ginseng even though I know it's too early. I watch for it to photograph the process of unfurling and to check on the populations in our colonies. But mostly I watch for it because these plants feel like old friends returning from a vacation and I enjoy being there to welcome them home. I have hundreds of photos of the same plants from year to year and yet each year the camera goes with me to the woods to document their arrival. This particular habitat draws me with a passion bordering on addiction.

Ginseng usually unfurls in late April. Sometimes, if winter has been mild and spring comes early, it can unfurl as soon as mid-March. This has never happened at our Wild Ozark Nursery, but others have reported to me that they've seen it that early. As a frequent habitat companion of ginseng, goldenseal (*Hydrastis canadensis*) unfurls along the same schedule.

By mid-April, the goldenseal, doll's eyes, a.k.a. white baneberry (*Actaea pachypoda*) and blue cohosh are blooming. Giant Solomon's seal (*Polygonatum commutatum*) has unfurled and flower buds dangle beneath the leaf fronts now too. Pawpaw trees (*Asimina triloba*) are sporting immature flowers. By now,

Photograph by Madison Woods

American ginseng three-prong, unfurling on Day 1 in late April

Photograph by Madison Woods

Same three-prong unfurling on Day 2

American ginseng has tightly closed buds.

By the end of April the ginseng is fully unfurled and has well-formed flower bud clusters. Here in the Ozarks, our ginseng flower clusters remain low on the plant and don't rise much over the leaf plane. Flowers begin to open in mid-May, inviting pollination visits from tiny insects. By the end of May there will be a few green berries forming. Flowers are still opening, a few at a time. The pawpaw flowers have now matured to a gorgeous burgundy.

Mildew often forms on both wild and wild-simulated ginsengs when we've had a very wet spring. It usually doesn't hurt the plant but sometimes the berry stalk withers and drops prematurely. To minimize spreading the fungus, don't touch the plants or brush against them while walking past. In spite of this fungus, the plants reproduce well enough on their own and I try not to interfere. The fungus rarely affects ginseng's low-growing habitat companions although sometimes a light white fuzz forms on lower stalks if the spring has been unseasonably wet.

PHOTOGRAPH BY MADISON WOODS

Day 3

Most of the Ozarks have been heavily logged and the resulting heavy undergrowth blocks air flow. Our property was last logged about 20 years ago and we still have too much undergrowth in some places. Clearing some of the excess from an area I intend to wild-simulate might reduce the fungal growth. But generally I do nothing, except protect the existing forest, and let nature recover on her own. The ginseng still thrives in the shady enough spots.

Sometime around mid-July the ginseng berries will begin to turn red. The berries continue to ripen throughout the summer. By September, most have fallen to the ground but a few still cling.

At this time of year the plants begin showing their age. They develop spots and holes. Sometimes a prong will break off. If it's been a dry summer, they may be yellowed. September 1st

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American Ginseng Conservation Status

In Arkansas, American ginseng populations appear to be stable and the Arkansas State Plant Board licenses "any person, business, or corporation who digs, harvests, sells, or exports wild or artificially propagated American ginseng (*Panax quinquefolius*)". However, there are 10 states that have declared the plant as part of the Endangered species scale from Special Concern in Connecticut, Massachusetts, North Carolina and Tennessee to Endangered in Maine and Rhode Island. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has designated American ginseng as Endangered in Canada.

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marks the beginning of harvest season here in Arkansas. My sons usually go out to do the harvesting, but they'll only dig a few roots for our household use.

My interest lies less in the harvest, and more in the stewardship, documenting and sharing of information about American ginseng. And I do enjoy using it in the kitchen. I love to grind a little of the dried root and add it to my home-roasted coffee. I'll add 1/2 teaspoon (2.5 millilitres) to the grounds before brewing a half a pot. Sometimes I'll just keep a small piece of the root in my mouth to chew on throughout the day. It increases my focus and energy levels, without making me jittery. I've also used it experimentally in some of the ointments and balms I make with other herbs. Studies on the benefits of ginseng are promising (http://umm.edu/health/medical/altmed/herb/american-ginseng).

By the time October rolls around, most of the ginseng will be yellow. I found a still-green plant here and there last year at this time but some had already died back. I could not find a standing seedling anywhere, but I did find some that were shriveled and dried near the mother plants.

In November the only plants I could find were thoroughly dried. Anyone hunting for roots in the late fall would need to know exactly where to dig or have a very good eye – finding the dried stems among the fallen tree leaves can be a challenge.

The berries that escape being eaten by mice, wood thrushes or wild turkeys will settle down beneath the leaf litter to wait. In the first year, the fleshy berry decomposes and exposes the bare seed. In the second year after falling, if conditions are right, it will sprout and the cycle begins again. Plants at least three years old produce berries every year, but seeds take two seasons to sprout. So there's always one generation lying in wait as the previous year's sleeper seeds become seedlings, unfurling for the first time.

Madison Woods lives way off the beaten path in northwest Arkansas with her husband, horses, chickens, cats and dogs. She and her husband own Wild Ozark, an American ginseng nursery and nature-based business which produces books, workshops and crafts. Visit WildOzark.com.

** In the southeast mountains of the United States, "holler" is an Appalachian English term used instead of "hollow" to denote a small rising valley between two mountains or hills, often containing a creek.*

PHOTOGRAPH BY MADISON WOODS

Same three-prong with ripe berries in July.

PHOTOGRAPH BY MADISON WOODS

Different three-prong, yellowed and wilting in October

Spring in my Colorado Garden

by Evan Cantor

In this madcap world of instant everything, there are things still worth the wait: opening presents on Christmas morning, opening night of a new *Star Wars* movie or even the latest installment of *Game of Thrones*. The embrace of delayed gratification is a sign of maturity and patience. Every gardener who ever lived possesses this quality, for planting requires patience. And for every gardener, the arrival of spring is a payoff very much like a child's Christmas morning reward.

In Colorado's "valley" – the plains along the eastern edge of the Front Range mountains – spring starts its seasonal tease only a few weeks after autumn's arrival. When the last leaves drop in October, knocked off by early snow and chinook winds, balmy breezes return. Beneath grey, heavy solstice clouds, you can't help but take a deep breath, look up and wonder, is that it? Is winter over already?

Well of course it isn't, and we know it. Still, we wonder. As mild days come and go, bona-fide winter roars south from Alberta with the geese and we finally don our sweaters and snow-boots. Thaws bring out muddy hiking boots and turn the high-country snow into wet cement. But come the end of February, the first crocuses pop up in the valley. Hybridized domestics, these little fellows still possess the wisdom to open their blossoms only when the sun shines. Their native Colorado cousin, pasque flower (*Pulsatilla patens*), waits patiently for May.

February is only the beginning of what passes for spring here. March is our snowiest month and April the second snowiest. The first signs of spring in my native garden must survive these blizzards. Catkins come out on the quaking aspens (*Populus tremuloides*) around April Fool's Day and the native flowers arrive a little bit later.

First in line is a sand lily (*Leucocrinum montanum*), transplanted from private property almost 30 years ago. It disappeared altogether in the first hot, dry years of the new millennium and I almost forget it was there, but heavy spring snowfalls re-invigorated it. It now emerges between flagstones on a re-directed garden path between cactus and shrubs representing the plains and foothills interface. Sand lilies are among the first blossoms on the mesa meadows just west of town. Sadly, it's impossible to capture the sparkling iridescence of the white petals in a photograph. You have to take off your spectacles and stick your nose right into these flowers to deeply appreciate their beauty.

PHOTOGRAPH BY EVAN CANTOR

Golden banner

As the sand lily fades, the creeping hollygrape (*Mahonia repens*) comes into its own. Hollygrape is one of several ubiquitous creepers native to Colorado's montane zone and in my garden it thrives beneath a cover of quaking aspens and gambel oaks (*Quercus gambelii*). The common name is a misnomer on two counts. Although the leaves resemble holly, it is in no way related. Likewise, the little dark-blue berries resemble huckleberries far more than they do grapes. They are edible, but very tart, and are sometimes collected for jams or jellies. Prodigious bouquets of

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yellow blossoms are accompanied by green berries which turn blue by late summer. Hollygrape is unperturbed by cold and blooms right through late spring snowfalls.

Alongside the hollygrape, a carpet of pink and white flowers appears in my montane grove. This is creeping phlox (*Phlox hoodii*). Numerous species of creeping phlox share the plains and dry foothills of Colorado's Front Range mountains. Since my specimens originated in a nursery sometime during the 1990s, I cannot identify them with certainty. That, however, does not detract from the lovely display.

Another early riser is golden banner (*Thermopsis rhombifolia*). This small shrub is sometimes called spreading golden bean, golden pea or false lupine. The Latin binomial derives from the Greek words *thermos*, for lupine, and *opsis*, for resemblance. Fields of these butter yellow blossoms thrive in open meadows on prairie mesas and under sunny forest canopies in the montane zone. A member of the pea family (not a lupine), golden banner is mildly poisonous, producing inedible pea-like pods. I am attempting to establish it at the fringes of my own little montane zone.

Another cheerful foothill and plains flower I've planted is western wallflower (*Erysimum asperum*). This member of the mustard family indeed has some mustard-coloured blossoms. The jolly clusters range from butter yellow to ruddy orange. It is listed in catalogues as either a biennial or a perennial. I'm hoping the wallflower will flourish in my dry prairie meadow, but I won't know until spring. As always, it takes patience.

As the days get longer and the sun grows hotter, the two species of cactus in my prairie zone are stimulated. Plains prickly pear (*Opuntia polyacantha*) is a member of one of the most widely spread cacti families in North America. Hybridizing quite easily with others of its genus, it is likely the most cold-tolerant of all cacti on the continent. Opuntia's range extends from Mexico and Florida to British Columbia and Ontario. My specimens were transplanted from private property and represent the plains variety dominant in the semi-arid foothills of the southern Rockies. The blossoms are a bright yellow, which reddens slightly as they fade. Prickly pear is such an enthusiastic garden participant that I am left with no other choice but to prune it with a shovel. Eminently edible once the spines are removed, prickly pear is eaten in many forms and contexts.

Penstemon of uncertain species

The other cactus in my prairie zone is a hedgehog (*Pediocactus simpsonii*). This particular specimen was rescued from a construction site at the edge of town by Boulder's Open Space & Parks Division. The hedgehog cactus is a little, barrel-shaped column of spines often found hiding among prairie grasses, causing the unwary to jump up with barbs in their backsides (is it that tall or did you actually sit on it?). I have only made this error once. Once was enough! Over the years, my specimen has happily produced barrel after barrel and is covered with greenish-yellow blossoms in spring.

PHOTOGRAPH BY EVAN CANTOR

Wallflower

PHOTOGRAPH BY EVAN CANTOR

Like the prickly pear, the blossoms stay closed until warm sunshine encourages them to open.

In the far corner of my prairie zone, up comes what I think is fuzzy-tongued penstemon (*Penstemon eriantherus*). I rescued these specimens from a neighbour when she was getting ready to tear up her whole yard and re-plant. The previous owner had an enthusiasm for native plants, but when she left the yard reverted to mostly noxious, overbearing weeds. Of the over 400 varieties of penstemon in North America, all are distinguished by the funnel-shaped flowers, two lobes above and three below. They are also known as "beard-tongues" because the lobes sprout fuzzy hairs. My transplants feature lovely pink blossoms and thick, nearly succulent, leaves.

"Volunteers" appear constantly in my garden. In my effort to maintain a "native plants scheme", I pull hearty colonizers like alfalfa (*Medicago sativa*), salsify (*Tragopogon* sp.) and dandelion (*Taraxacum officinale*). They may be naturalized, but they're not native and, in my garden, they will attempt domination if not kept on a leash. One spring-blooming volunteer, however, has earned my approval. It's a mint from the Lamiaceae family, indicated by the square stems, but I've been unable to identify it. The blossoms are atypical. Instead of clumps of small blossoms at the upper leaf axils or the funnel-shaped tubes of most in this family, the blossoms are star-shaped with four petals and a prominent pistil. It's a happy volunteer I'm reluctant to evict.

Towards the end of spring, the yucca (*Yucca glauca*) sends up its stalks. If I'm lucky, mule deer wandering in the neighbourhood will leave the buds alone long enough for them to open in early summer. The buds and flowers are a very pale yellow and almost glow in the dark, especially in the twilight hours, like natural neon to roaming deer. The deer will even defoliate entire stalks of blossoms. Often

PHOTOGRAPH BY EVAN CANTOR

Hedgehog cactus

mistaken for cactus, yucca indeed has sharp points at the end of each leaf blade, but is a humble member of the agave family. Yucca was tremendously useful to native American populations, providing both fibre and food. Roasted yucca root resembles sweet potato and has found a place in fashionable Latin American cuisine.

As for Colorado blue columbines (*Aquilegia coerulea*), I've tried to maintain them beneath my aspens and oaks, but they don't seem to care for it here. The problem may be in the soil composition (leftover construction fill) or perhaps the summer heat on our southwest exposure at this elevation (5,500 feet or 1,700 metres) is too much for them. It is strictly against the law to transplant wild ones. Nineteenth-century enthusiasm for Colorado blue columbines nearly wiped out the species in short order, so they were protected and proclaimed the state flower. I have not seen any specimens in nurseries in recent years, but I'll certainly search again when I find the opportunity.

Once summer is upon us in earnest, the heat wilts these flowers and the spring burst of growth slows down. Perfect miniature red leaves on the gambel oaks turn a dark olive and ruddy jewel-like aspen leaves tremble bright green, back-lit by the western sun. Once again, we wait. Late summer and autumn bring a last burst of colourful tansy-aster efflorescence. The first signs of winter appear above the tree line in mid-August, sometimes burying alpine flower gardens at 12,000 feet and beyond (3,700 metres) beneath several feet of snow. Winter crawls downhill in Colorado, from the alpine tundra to southern prairie step-by-step, and so we repeat the process, complete with the occasional warm, breezy glimpse of the rebirth to come.

Evan Cantor is a musician, artist and gardener living in Boulder, Colorado. Spring is always an exciting time as his native garden wakes up from winter slumber. When will the first aspen catkins appear each year?

Tiny Insect vs. Mighty Tree: Confronting the Threat to Eastern Hemlock

by Michael Henry

I believe our memories are framed by trees. Maybe it's the shady avenues where we walked as children or a spreading oak tree that gave us shade for a picnic. For me, as for many northerners, my memories of wilderness parks and cottages dwell in the deep shade of eastern hemlocks that commonly grow along the shores of lakes and streams. The hemlocks offer a cool shady spot on even the hottest day. Or they give temporary respite from a rain shower as the drops work their way through the canopy, offering a few dry minutes to watch rain curtains sweep across a lake. Later, heavy drops continue to fall from a hemlock for an hour after the rain passes and the sun breaks through. These are memories and associations that I hope my children will carry into adulthood. I'm concerned that they may be the last generation to know hemlock in the landscape. It sounds melodramatic and I hope it is, but the threat to hemlocks should not be downplayed.

PHOTOGRAPH BY MICHAEL HENRY

Hemlock forest in Algonquin Park

The threat comes in the form of a millimetre-long (.04 inch) sucking insect from Japan called Hemlock Woolly Adelgid (HWA). HWA commonly kills eastern hemlock (*Tsuga canadensis*) trees within a decade of its arrival in a forest. For context, think Dutch Elm Disease or Chestnut Blight. Where the adelgid has become established in many parts of the southern Appalachians it has resulted in the functional extinction of hemlocks, meaning they no longer play an important role in the ecology of the forest. This is a huge shift because hemlocks create very different habitats from hardwood trees, providing cool shady areas in summer and relatively snow-free areas in winter. When hemlocks were removed from riparian areas by HWA, studies found that stream temperatures increased as much as three to 10 degrees Celsius (five to 18 degrees Fahrenheit), which can be disastrous for cold-water species such as Brook Trout and Brown Trout.

I had to see the effects for myself in the Great Smoky Mountains to fully appreciate the implications. HWA was found in Great Smoky Mountains National Park in 2002 and within a decade an estimated 80% of the hemlocks in the park were dead, including important old-growth forests, like the Cataloochee Valley, where some hemlocks were 500 years old. When I visited in 2014, where groves of ancient hemlocks had once stood, there was nothing but dead snags shedding bark and sending large branches crashing to the ground 10 stories below. In a few decades, the only record of these once magnificent forests will be logs sprouting hemlock varnish fungus and our living or written memories. When I first heard about hemlock woolly adelgid as a botany student in the 1990's, it seemed far away, someone else's problem. Now it's on my doorstep, having already spread through half of hemlock's natural range.

HWA has been adapting to cold climates as it spreads; every killing freeze in winter simply makes the surviving adelgids more resistant to cold. There have been detections as far north as Ontario and Michigan, though in both cases the infestations are thought to have been eradicated. Whether that's true or not, it's only a matter of time – HWA moves at an average rate of 15 kilometres (nine miles) a year, carried by wind, birds and humans. Wind moves the insect from tree to tree within a stand, birds carry it from stand to stand, and humans afford it occasional huge leaps of hundreds of kilometres when it hitches a ride on

nursery stock.

As HWA moves north into the last strongholds of hemlock, it seems to move and kill trees a little slower in the colder climates. However, we should not be complacent. Mark Whitmore, an extension associate with Cornell University, has been watching the spread in upper New York State, and is concerned. "HWA was first detected in the Finger Lakes area in 2008," he says, "and here we are just six years later and there's already mortality showing up in one of the first locations we found. And it has spread in a spotty manner over a very wide area, all the way to Buffalo and throughout the Finger Lakes."

What worries Whitmore most is the thought of HWA arriving in the Adirondack Mountains. "Right now it's in the Finger Lakes, where the forests are not contiguous," he says. "We have old-growth resources we're looking at trying to protect in the Finger Lakes, but I look at places like the Adirondack Mountains which have a huge amount of hemlock, and by the time it gets into there I won't be able to do anything." Whitmore's allies in the fight against HWA are insecticides used as a temporary measure and a tiny beetle named *Laricobius nigrinus*, affectionately called Lari, a specialized HWA predator introduced from the west coast.

Systemic insecticides can protect individual trees for years after treatment. This buys some time for forest managers trying to establish *Laricobius nigrinus* and other biological control agents that protect trees when the chemical protection wears off. The idea is to leave a subset of the trees untreated to grow the population of predators. Most likely these trees will end up dying, but hopefully a population of beetles will be established that can control HWA in the remaining forest. There is anecdotal evidence that this is working in some places, but while biocontrol is one of our best hopes to keep hemlock on the landscape, it is far from certain. One of the problems is just getting enough beetles. Last year Whitmore was only able to buy 330 Lari beetles, but he has been rearing them on HWA-infested hemlock hedges.

What we need is more time. Jurisdictions such as Michigan, Ontario and Quebec are best placed to preserve hemlock in their forests because they can learn from everything that came before. One thing we should have learned by now is to avoid salvage logging of hemlock, a practice that has killed more hemlocks than HWA. Salvage logging lowers the likelihood of preserving genetic resistance to adelgids, which appears to exist in some trees, although it is very rare. Another hard-learned lesson is to prepare for HWA before it arrives.

The word "cathedral" is often used to describe old-growth hemlock forests such as those found in Cook Forest, Heart's Content and Tionesta in northwestern Pennsylvania – some of the most spectacular old-growth eastern hemlock forests that still exist; hemlocks in Cook Forest tower as high as 44 metres (144 feet) above the forest floor. In 2013, the adelgid was first found in Cook Forest and the Allegheny Plateau, but it was not found by chance. Park staff and volunteers had been waiting for it, actively monitoring the trees, and they detected the infestation early on. What's more, a working group of governmental and non-governmental organizations had been planning a response. The state budget to preserve hemlock jumped from $17,000 to almost $500,000 in one year, funding detection, insecticide treatments and biological control. Donald Eggen, from Pennsylvania's Department of Conservation and Natural Resources, sees hope in the new strategy. "We will be able to preserve the eastern hemlock," he says. "Will they be as

Photograph by Michael Henry

Hemlocks killed by Hemlock Woody Adelgid in Great Smoky Mountains National Park, North Carolina

abundant everywhere 10 or 15 or 20 years from now? No, they will be highly impacted. But they will survive as much as cold winters will allow."

After HWA was detected in Ontario in 2012-2014, various levels of government, non-governmental organizations (NGO's) and landowners responded. One initiative was the formation of an HWA land manager working group inspired by the partnership in the Allegheny Mountains. Kathleen Ryan, who is organizing the effort, explains, "David Puttock from Silv-Econ read about the High Allegheny Collaborative Hemlock Conservation Partnership in Pennsylvania, and wondered whether we could do something similar here. We contacted them and they were very helpful, sharing their approach and lessons learned." The working group now includes conservation authorities, regional, county and private land managers, and NGO's, which are working collaboratively on early detection and response plans. Ontario land managers and organizations interested in the working group can contact Kathleen at kathleen.ryan@silvecon.com.

Early detection and containment of HWA in the fragmented forest landscape of southern Ontario may buy us the time we need for control measures to come to fruition before adelgid makes the leap to Muskoka and Algonquin Park, where it may be unstoppable. Ancient Forest Exploration & Research is working on mapping hemlock in southern Ontario and locating high-value forests that should be a conservation priority. You can learn more about this effort and early detection in Ontario at http://www.ancientforest.org/hwa/. You can also get information and report sightings of HWA at http://www.eddmaps.org/ontario/ and at the Canadian Food Inspection Agency. One other way you can help is to plant hemlock from native plant nurseries that grow it on site. Planting locally grown hemlock preserves the genetics and prevents movement of HWA on nursery stock. Mark Whitmore recommends planting hemlock hedges to use as predator rearing sites before adelgids arrive (for some reason hedges work better than individual trees). The North American Native Plant Society maintains a list of nurseries at http://www.nanps.org/index.php/plant-sources/other-sources.

Michael Henry is the author of Ontario's Old-growth Forests *and an ecologist with Ancient Forest Exploration & Research. He lives in Peterborough, Ontario, where he's keeping an eye on his local hemlock forests.*

PHOTOGRAPH BY MARK WHITMORE

Hemlock Woody Adelgid can be recognized by its woolly egg sacs.

Cootes to Escarpment EcoPark System

by Peter Kelly

Consensus is difficult to achieve. Individuals often disagree and groups of people disagree even more. That said, what are the chances that nine organizations, each with a different agenda, could reach consensus on anything?

PHOTOGRAPH BY DAVE DEJONG

Smokey Hollow's Great Falls is located in the vast Cootes to Escarpment Eco-Park System.

Welcome to the Cootes to Escarpment EcoPark System, a network of natural lands nestled within Ontario's Greenbelt at the western end of Lake Ontario and created by a partnership of nine land-owning agencies and organizations. The EcoPark System is framed by the Niagara Escarpment to the north and a wetland complex known as Cootes Paradise to the west and south. The partnership that created it includes three municipalities (City of Hamilton, City of Burlington and Halton Region), two conservation authorities (Conservation Halton and Hamilton Conservation Authority), one university (McMaster University) and three non-profit organizations (Royal Botanical Gardens, Hamilton Naturalists' Club and the Bruce Trail Conservancy).

The EcoPark System is located in one of Canada's biological hotspots, home to almost 1,600 species of flora and fauna, including over 50 Species at Risk such as red mulberry (*Morus rubra*), eastern flowering dogwood (*Cornus florida*), butternut (*Juglans cinerea*) and American columbo (*Frasera caroliniensis*). Yet it is surrounded by urban development including four cities and towns with a combined population of over 700,000 (not including rural areas). The threat of urban encroachment on these significant natural lands was the impetus behind devising a plan of action that could provide permanent protection for them, create natural corridors and offer opportunities for recreation and education.

Conversations between the stakeholders began in 2006, but the vision of these early meetings did not become a reality until 2013 when the nine partners signed the memorandum of understanding to formally establish the Cootes to Escarpment EcoPark System. Its mission is to "collaboratively continue preserving and enhancing the natural lands using a sustainable approach that balances natural ecosystem health with responsible human appreciation and activities."

How do these partners with differing goals and agendas work together to fulfill the mission?

First, they created a working governance model. Each partner contributed funds to the operation of the EcoPark System secretariat, which includes a coordinator who ensures that everything runs smoothly. A management committee (consisting of one representative from each partner organization or agency) meets monthly to make ground-level decisions while a governing council (consisting of one senior administrator from each partner) meets twice annually for higher level decision-making. Funding dollars that support project staff and project implementation come from granting agencies like the Friends of the Greenbelt Foundation, Ontario Trillium Foundation and the Province of Ontario.

Involvement in the Cootes to Escarpment EcoPark System is voluntary. Inclusion of natural lands in the system is also voluntary. Partners may leave at any time (although this has yet to happen) and partners may add or remove lands at any time. It is important to recognize that individual partners still manage their properties outright and that the

Continued on page 14

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existence of the partnership doesn't impose any restrictions on the management of the lands by the individual partners.

The next important step in the process was to produce high-level management plans. Regardless of partner ownership, all natural lands have been partitioned into six groups of "heritage lands" and holistic overarching plans are being prepared for each. Partner staff, regional stakeholders and the public (through meetings and open houses) provide input and feedback.

How do the partners "preserve" natural lands? How are the natural lands "enhanced"?

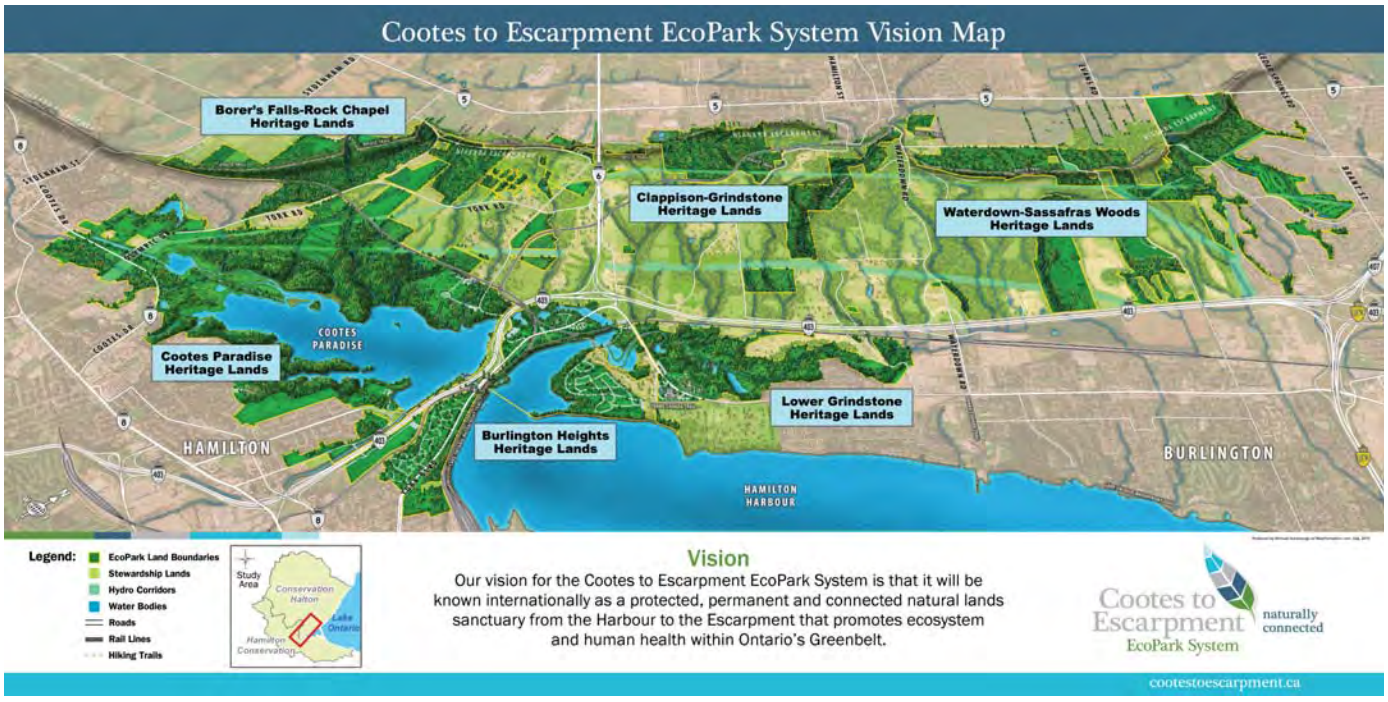
Permanent protection of natural lands comes through land purchase, land donation or conservation easements held by one of the partner agencies. Land acquisition is facilitated by a part-time land securement coordinator. Since 2013, 89 hectares (219 acres) have been acquired by the partners, including the purchase of a 17-hectare (43-acre) property in December, 2015 that established a continuous corridor of natural lands between Cootes Paradise and the Niagara Escarpment. At the same time another 22 hectares (54 acres) were acquired, including a spectacular freshwater ravine and the adjacent pioneer cemetery. In 2013, a 15-hectare (37-acre) property, that became the Eileen and John Holland Nature Sanctuary, was donated outright for inclusion in the EcoPark System by a local business owner in memory of his wife.

It's obvious to the stakeholders that much of the land within the EcoPark System will never be protected through acquisition. Some of the lands have already been developed and development has been approved on others. A significant proportion of the lands will remain private; there will always be a strong human presence.

But lands in private hands can also contribute to the vision. In the fall of 2014, the Cootes to Escarpment Eco-Park System was launched with landowner outreach as a significant component. The Eco-Park stewardship technician is working to foster ecological stewardship and conservation within the community of private EcoPark System landowners, providing them with advice about initiatives that can maintain the natural features of their properties. Some of this work can be initiated or completed by staff and volunteers.

Landowners can learn about invasive species and their control, protection and enhancement of stream banks to improve water quality and reduce erosion, protection and enhancement of forest environments and habitat creation projects like pollinator gardens or stormwater management. Sometimes, landowners learn about the native plants and animals with whom they share the land and gain an understanding of how their property fits into the local landscape. The idea behind the stewardship program is that small actions or projects on multiple properties can make a difference over the landscape as a whole.

The next step is a community stewardship program that promotes a sense of community responsibility. In this model, landowners and business owners will work together as local stewards on properties within the EcoPark System, not necessarily because they own the lands in question but simply because these projects will enhance their local



environment and provide a collective benefit.

Spring and fall workshops and events run by the stewardship program, such as selecting and planting native seeds, invasive species identification, pollinator garden design and insect hotel building have been well-attended. Restoration projects such as tree and shrub planting, pollinator habitat creation, invasive species removal and live staking of stream banks have been held on partner lands using volunteers and other environmental and stewardship groups. One overarching theme for 2015 restoration projects was the creation of Mottled Dusky Wing butterfly habitat. This butterfly is Endangered in Ontario. It deposits its eggs almost exclusively on New Jersey tea (*Ceanothus americanus*) and restoration efforts have included planting many of these shrubs.

The partnership isn't just focused on the preservation and enhancement of natural lands. Recreation is important too. So much so, that the Hamilton Burlington Trails Council, an early working group of the EcoPark System, evolved into an independent organization to consolidate and build a well-connected trail network within the protected lands for recreational trail users while conserving natural ecosystems. The trail network will be community supported, community accessible and a model of progressive recreation and sustainable tourism.

Photograph by Peter Kelly

Volunteers planting a meadow at Clappison Woods.

The Cootes to Escarpment EcoPark System is unique in eastern North America. Enthusiastic support has come from multiple partners, communities inside and outside the network and politicians at every level of government. A lot has happened, but it's only the beginning. The conservation and recreational benefits of this unprecedented partnership will be felt for generations to come.

Peter Kelly is the coordinator of the Cootes to Escarpment EcoPark System. He was formerly the executive director of the North American Native Plant Society.

Continued from page 1 – **Prairie Nymph**

Recent genetic studies relayed by iris expert Peter Goldblatt in his book *The Iris Family* suggest that the gulf coastal *Herbertia lahue* subsp. *caerulea* represents a rather odd case in the annals of plant geography. Prairie nymph is virtually indistinguishable from its very close relative *H. lahue* subsp. *lahue* endemic to central Chile. Goldblatt hypothesizes that the gulf coastal plants may have been introduced after Christopher Columbus landed on Hispaniola in 1492.

Whatever its provenance, prairie nymph is quite rare. It only occurs in seven parishes in southwestern Louisiana. We found the largest grouping of about 30 plants at Brazoria National Wildlife Refuge in southeast Texas in 1996. A friend from Lafayette, Louisiana sent us several bulbs six years ago. He told us the plant was becoming increasingly difficult to find.

In our experience, prairie nymph adapts fairly well to container culture. In Iowa, the plants usually initiate the flowering process in mid- to late February. We place them outdoors when night-time temperatures stay above 40°F (four degrees Celsius). Outdoors the plants occasionally produce new floral scapes and flower again in May. Pot culture outdoors has its drawbacks: The plant bulbs are too often unearthed by squirrels searching for nuts. Green aphids that attack grasses also favour *Herbertia* where they are adept at hiding in the unassailable pleats of the leaves.

The species is commonly known as early flowering and short-statured, but can still offer some surprises. Ordinarily in late summer in south Louisiana, prairie nymph exists in basal leaf form or, more likely, is dormant. One time, with a friend, we found a small population of a dozen plants, 85 to 92 centimetres (33 to 36 inches) tall, alongside big bluestem (*Andropogon gerardii*) plants. One prairie nymph had finished flowering a day or two before we found it. This indicates that *H. lahue* subsp. *caerulea* is capable of flowering in August and early September and can be much taller than the typical form. This suggests it is still adapting to the coastal prairie where it may carry the message of autumn's arrival as well as spring's.

Stephen Johnson enjoys the thrill of discovering plants. Mary Stark shares that thrill and enjoys finding connections between plants, mythology and literature.

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