The Blazing Star

Fall 2017, Volume 18, Issue 4

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Native Plant to Know

Cylindrical Blazing Star

Liatris cylindracea

by Angelique-Marie Mori

The dainty, herbaceous perennial known as *Liatris cylindracea* (cylindrical blazing star) adds a lovely lavender-pink accent to any sunlit garden.

A member of the Asteraceae family, it enjoys several sobriquets: barrelhead blazing star, grass-leaved blazing star, slender blazing star, dwarf blazing star and Ontario blazing star. The last one is misleading as the plant is native to eastern North America from Minnesota to Ontario, in zones 4a to 8b.

Liatris cylindracea was first documented in the botanical records of André Michaux (1746-1802), a French botanist and explorer who toured the American West and who was perhaps best known for his posthumous publication *The Flora of North America*.

Cylindrical blazing star blooms from July to September. It is an erect, clumping forb that matures to two-thirds of a metre (two feet) tall. The cheerful flowers are like quirky, feathery mop-tops, inspiring another moniker, gayfeather. The widely spaced heads of the compound flowers are up to 2.5 centimetres (one inch) across and occur at the top of the stem on small spike-like racemes. Flowers are composed of 10-35 pinkish-purple florets with funnel form throats. These tiny, five-lobed florets often display distinctive long protruding styles to fanciful effect. Fertile flowers produce dry seeds crowned with tiny rings of bristly hairs that aid in wind dispersal of the seeds. Overlapping bracts that support the flowers form a smooth tubular shape and allow for easy identification of cylindrical blazing stars. The overlapping bracts, with their pointed tips, form the characteristic, narrow cylinder that inspires the plant's Latin species name. (The origin of the species name *Liatris* remains unknown.) Thin and lance-shaped, the alternate grass-like leaves are up to 25 centimetres (10 inches) long at the base and decrease in size as they ascend to the top of the stem. The root system consists of a rounded corm-like structure with fibrous roots which occasionally produces offsets.

Liatris cylindracea thrives in sunny fields and open areas, preferring poor, dry soils, but it will tolerate well-drained loamy soil. It can easily rot with too much moisture. Ideal habitats are prairies, limestone and sandstone outcroppings, bluffs, barrens, woodland openings and oak savannas. This blazing star is more delicate-looking and smaller in stature than related species and often blooms

Illustration by Angelique-Marie Mori

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The *Blazing Star* is . . .

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Editorial

I began work with the North American Native Plant Society (NANPS) in the spring of this year, helping with communications and information management. I met an incredibly passionate and knowledgeable group of people, all volunteers, who were getting an immense amount of work accomplished.

The NANPS that many of us are familiar with (especially those who live in southern Ontario) tends to revolve around the annual native plant sale, the members' seed exchange, presentations and workshops. An aspect of the organization's work that is less visible is the stewardship of two properties in Ontario that support populations of at-risk native plants and animals.

NANPS owns Shining Tree Woods in the Carolinian zone of southern Ontario and Zinkan Cove on the west shore of the Bruce Peninsula. Shining Tree Woods (STW) is a 20-hectare (50-acre) parcel connected to a larger piece of Carolinian Forest (unusual in the highly fragmented southern Ontario landscape.) NANPS acquired this property to protect an area of high-quality second-growth forest which is home to one of the largest Ontario populations of the endangered cucumber tree (*Magnolia acuminata*). Ontario is home to just 18 populations of cucumber tree, with less than 200 mature trees in the province. The woods are also home to other at-risk plants such as broad beech fern (*Phegopteris hexagonoptera*), eastern flowering dogwood (*Cornus florida*), American chestnut (*Castanea dentata*) and butternut (*Juglans cinerea*), and birds such as the Acadian flycatcher.

We recently applied to the Ontario Ministry of Natural Resources and Forests for a grant to help develop a multi-species Species at Risk Stewardship Action Plan for STW. NANPS would collect information on the trees, such as size, seed production and habitat conditions, and assess threats to the trees and other native species. The data would contribute to broader work being done in the province on breeding bird surveys, the Ecological Land Classification, and documenting threats and potential recovery strategies for species at risk. The grant would allow NANPS to hire biologists and species experts to conduct plant and bird surveys of the property.

If NANPS receives the grant, we will reach out to our volunteers to help with administration, project overview and field work. It's a tall order, but as I've learned, NANPS is made up of dedicated people who get things done.

You will certainly be hearing more about Zinkan Cove, Shining Tree Woods and this proposed project in upcoming issues of *The Blazing Star*. Each year NANPS hosts excursions to these properties, which are led by seasoned naturalists and biologists, and open to all members. I invite you to contact me with questions, comments and offers to volunteer at dtassie@nanps.org.

Danielle Tassie
NANPS Communications Coordinator

LETTER TO THE EDITOR

Note that red pine (*Pinus resinosa*) is a two-needle pine and not a three-needle pine (as indicated in the article entitled NANPS Leads Rouge River Walk for CWF and HSBC in the summer 2017 issue of *The Blazing Star*). Pitch pine (*Pinus rigida*), which one may find growing in the Frontenac Axis area of eastern Ontario, is a three-needle pine. Jack pine (*Pinus banksiana*), Ontario's other native pine, is also a two-needle pine but with short needles rather than long ones. Eastern white pine (*Pinus strobus*) is the only five-needle pine and it is Ontario's provincial tree. All the needles of pines, everywhere, grow in bundles called fascicles.

John F. Foster, Oshawa, Ontario

RoncyWorks

by Irene Fedun

Heidi Eisenhauer is an enthusiastic ambassador for native plants. She approaches her native plant gardening hobby in unconventional ways, such as seed-bombing waste places and creating pollinator seed bomb packages as gifts.

Heidi moved into west Toronto's Roncesvalles Avenue neighbourhood in 2012. The previous year, the main artery had undergone a major overhaul. The street had been gutted and rebuilt, giving priority to public transit, cycling, walking and spontaneous community gatherings. Public consultations revealed that the residents wanted trees and gardens to bring a sense of cozy neighbourliness to the area.

The City of Toronto planted native trees along the sidewalks from King Street to Dundas Avenue, then turned over the beautification project to the community. The local Business Improvement Association (BIA) offered to provide funding if a community group would take on the design, development, planting and maintenance of the local gardens. Over 20 people (mostly seniors) came to the first meeting to form the Roncesvalles Green Team and young Heidi took up the reins as coordinator. With her background in urban agriculture in San Francisco and her previous volunteer work as a NANPS director, she was a natural for the role. The project was named RoncyWorks (using the affectionate nickname residents have adopted for the area).

Before the fun part – the planting – could begin, structural work was needed to create the gardens, especially considering the ever-present concern about precipitation runoff. The team worked with architects to design and build drainage systems which suited many native species very well.

The trees were planted in 2011. A Green Team committee reviewed and critiqued the Toronto Forestry Department's tree list, which included native and non-native species and cultivars. Not all their recommendations were accepted and the end result was that half of the 81 trees planted were natives or cultivars of natives. They were planted in hidden soil trenches, which are suspended sections of the sidewalk filled with uncompacted soil. The other advantage the trees have (apart from the love and care they get from the Green Team) is the naturally sandy soil which allows for good drainage. The Roncesvalles Avenue trees are expected to live decades longer than typical Toronto street trees. Native species that are thriving are bur oak (*Quercus macrocarpa*) and red oak (*Quercus rubra*).

Bill Montague and other members of the Green Team designed simple, elegant metal signs that were bolted to the tree guards with each tree's common and Latin names. (The tree signs were made by a traffic sign maker for only $4 each.) Bill thinks that identifying the trees this way gives them added protection. For example, if a truck runs into a tree, a citizen calling 311 (the municipal number for residents to call if they have a complaint or concern involving city parks or property) can name the species of tree damaged, prompting the Forestry Department to sit up and take notice. The care taken in planting and protecting the trees has impressed graffiti artists who have avoided spraying graffiti or putting stickers on the signs. The labels also serve as educational tools. Children might ask their

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PHOTOGRAPH BY WILLIAM MONTAGUE

Red oak

PHOTOGRAPH BY WILLIAM MONTAGUE

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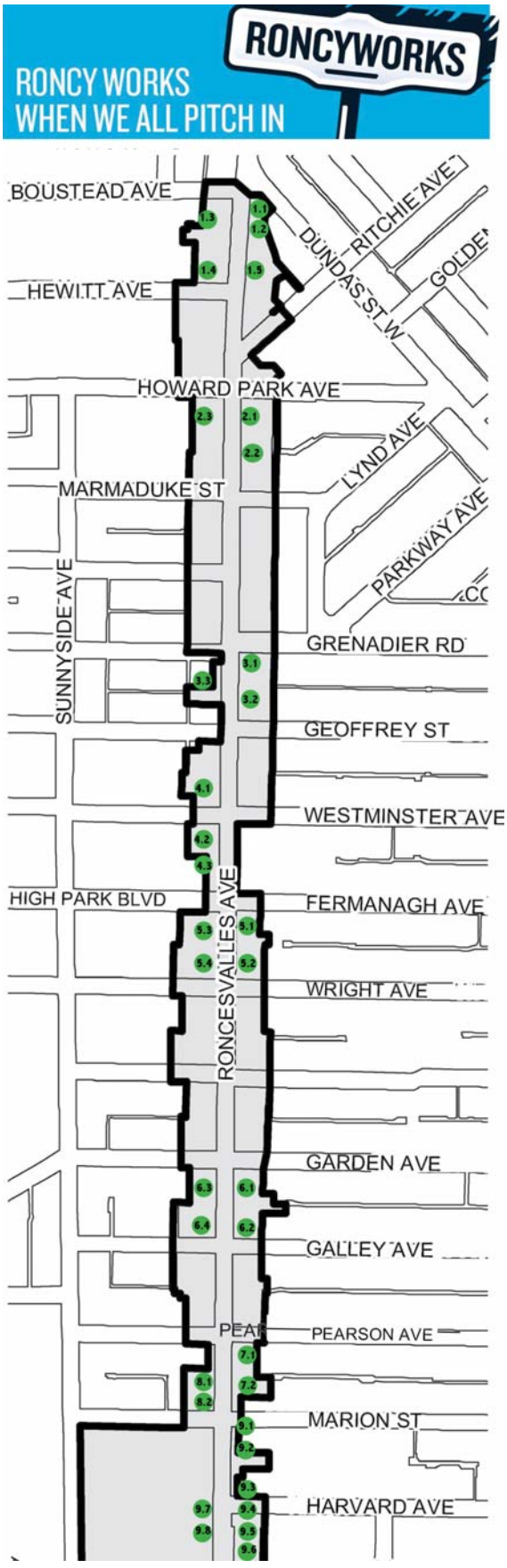
parents what kind of tree it is and the parents might not know; both kids and adults learn to identify trees. Bill adds simply, "I love trees and sharing information about them."

Before RoncyWorks garden planting could begin in the designated beds, Heidi did a presentation on easy-to-grow native plants, hoping for support for increased indigenous plantings. Some local gardeners who championed cultivated, well-behaved flowers were initially reluctant. Heidi soon realized that they viewed all native plants as gangly and messy, rather like patches of goldenrod (*Solidago* spp.) scattered over abandoned fields. Patiently she educated them. Her own neat 100% indigenous plant garden provided a fine example of what could be done with creativity and a small budget and she eventually won the hard-liners over to her cause – more or less.

Members of the Green Team each had their own Roncesvalles gardens and they were responsible for choosing the plants for their patch of land and maintaining them. They were encouraged to pick native plants, but were not limited to them and no attempt was made to unify the plantings up and down the street. Barbara Japp, a Green Team volunteer and member of the Parkdale and Toronto Horticultural Society, sent around catalogues from local nurseries (Humber Nurseries and Connon NVK) who allowed the team to take advantage of discounts usually only offered to horticultural societies and wholesalers. When Heidi found that certain highly desirable plants were not available from these sources, such as white turtlehead (*Chelone glabra*), Robin's plantain (*Erigeron pulchellus*) and pale purple coneflower (*Echinacea pallida*), she made trips to Nith River Native Plants in Wilmot, Ontario and St. Williams Nursery and Ecology Centre in Norfolk County. They provided not only hardy plants, but sound advice.

In some areas, where the city neglected to put in drainage, there was serious overflow on rainy days. Heidi solved this problem by putting in a bog garden. She and her helpers layered sand, loam and peat and put in a colourful array of moisture-loving plants. The brilliant red, August-blooming cardinal flowers (*Lobelia cardinalis*) were the stars of the show and have persisted despite their reputation as challenging flowers to grow in garden settings. Swamp milkweed (*Asclepias incarnata*) brought in the monarchs and provided food for their caterpillars. Allegheny monkey flowers (*Mimulus ringens*) provided a touch of the exotic with their mauve snapdragon-like blooms. In all, 10 moisture-loving plants worked to soak up the rain the city's infrastructure couldn't handle.

Not all the plants chosen were resilient enough to withstand the rigours of city living. Salt, oil and other fluids from vehicles, occasional foot traffic and sometimes harsh winters took their toll. Shrubby cinquefoil (*Dasiphora fruticosa*), a low-growing, yellow-flowered shrub, planted in the early days was one of the first casualties. Tulip trees (*Liriodendron tulipifera*), beloved for their oven-mitt leaves and blousy, tulip-like flowers, succumbed to the fierce cold one winter. Butterfly weed (*Asclepias tuberosa*) and prairie smoke (*Geum triflorum*), a spring bloomer best remembered for its seed heads whose long fuzzy hairs resemble puffs of



mauve smoke, failed to thrive.

Dogs urinated on the plantings until someone had the brilliant idea of putting in "pee rocks", open areas of pea gravel (pun unintended, no doubt) surrounded by large boulders where a dog could confidently lift a leg knowing that no plant would suffer as a result.

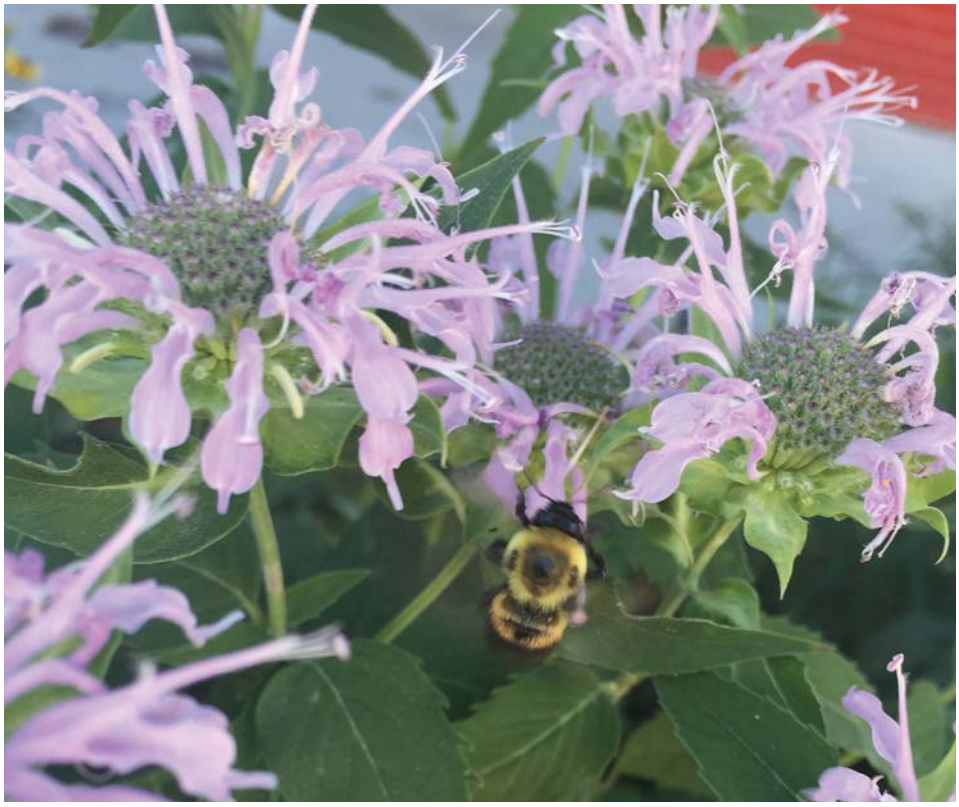
Among the hardiest streetscaping survivors were the poisonous but pretty white snakeroot (*Ageratina altissima*), mauve wild bergamot (*Monarda fistulosa*), Solomon's seal (*Polygonatum biflorum*) with its arching branches sporting small, bell-like flowers, spiky blue vervain (*Verbena hastata*) and Gray's sedge (*Carex grayi*). Low-growing plants were a huge asset, with native groundcovers such as wild strawberries (*Fragaria virginiana*), violets (*Viola* spp.) and Canada anemones (*Anemone canadensis*) quickly filling in dry pockets with their fragrance, fruit, flowers and pretty leaves. They were especially popular on public transit bump-outs (raised constructions that prevented cars from parking in front of streetcar stops).

Locals and visitors to the neighbourhood would be captivated by the plantings and some people would even dig out plants from the gardens to take home (leaving numerous holes to fill throughout the seasons.) Heidi wanted to encourage widespread use of indigenous plants and would offer divisions to passers-by as she went about her work planting, weeding, pruning and watering. The team would also sell milkweed plugs and other plants during their monthly yard sales which would have the double benefit of spreading the butterfly-magnet milkweeds throughout the city and providing additional funds for RoncyWorks projects.

Store owners on Roncesvalles were thrilled with how the plantings enhanced the look of their

PHOTOGRAPH BY HEIDI EISENHAUER

*Common, swamp and whorled milkweeds (*Asclepias syriaca, incarnata and verticillata*)*



PHOTOGRAPH BY HEIDI EISENHAUER

*Wild bergamot (*Monarda fistulosa*) and brown-belted bumblebee*

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PHOTOGRAPH BY HEIDI EISENHAUER

Heidi's diverse native planting in front of The Westerly restaurant.

establishments and brought more shoppers to the neighbourhood. They showed their appreciation to Heidi and other volunteers in special ways. On weekends when Heidi was working in front of the Westerly Restaurant, the owner would send out a pot of coffee for her. The butcher shop next door would bring her cabbage rolls! The BIA, which continues to support the project, throws a party every year for the Green Team.

When asked why she chose to get involved in the project, volunteer Barbara Japp responds quite simply, "This is my neighbourhood. This is my garden." Of course the implication is that she wants it to look beautiful and be welcoming. She goes on to say, "I enjoy my association with the group. Our work has made such a difference to the street. I also love to order plants, look at plants, plant plants…"

Heidi's motives are similar. She loves to see people getting out and becoming engaged in the community. "And besides, gardening is important for my mental health."

Sadly for everyone involved in the project, Heidi no longer lives in the neighbourhood, having moved to Sudbury for work. You can be sure she's hatching plans to beautify that city with native plants too…and you can look forward to reading all about it in a future issue of *The Blazing Star*!

Irene Fedun is the editor of The Blazing Star.

Clark Fork River Delta Restoration Project

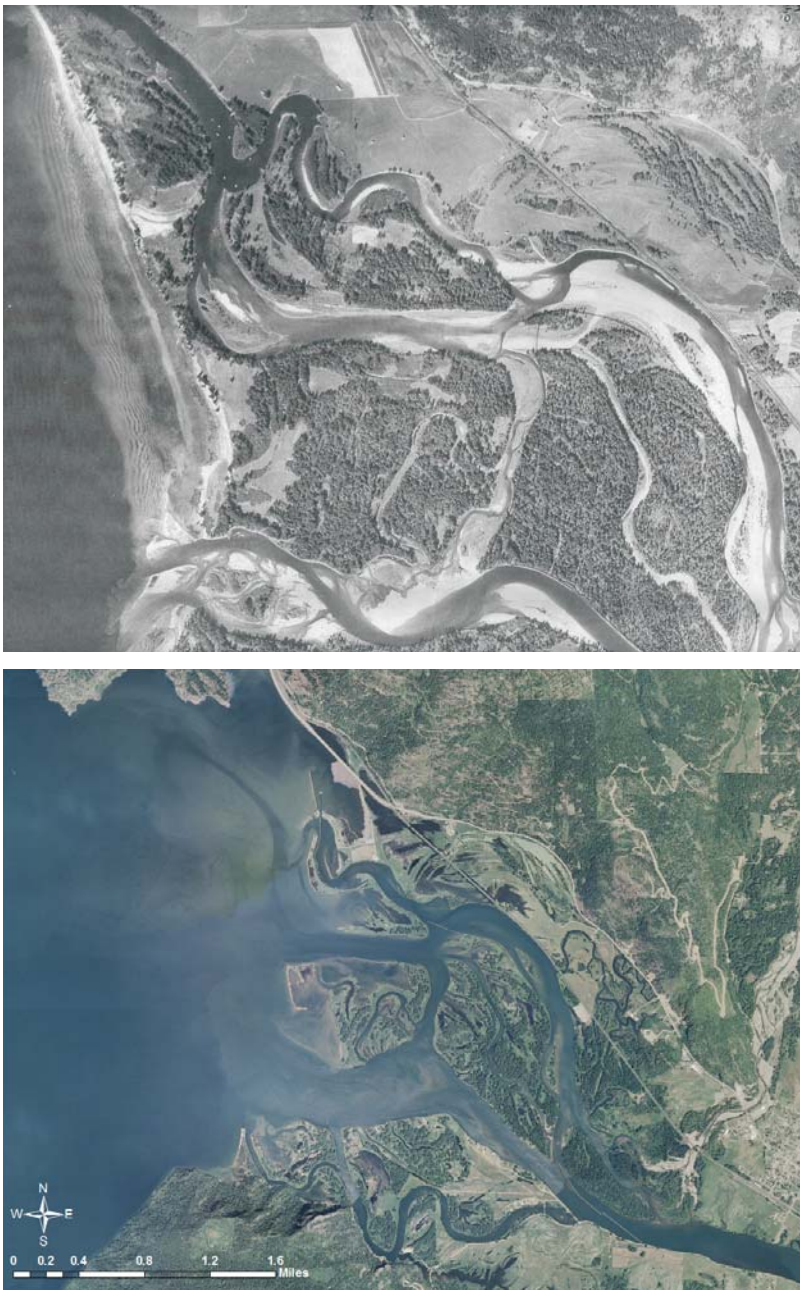
by Katherine Cousins

Islands and shoreline in the Clark Fork Delta – located at the confluence of the Clark Fork River and Lake Pend Oreille in North Idaho – have experienced extensive bank erosion due to the operation of several dams in the areas, resulting in the loss of soil and native riparian and wetland vegetation, and severely affecting the quantity and quality of fish and wildlife habitat. It is estimated that 12-15 acres (five-six hectares) are lost annually, the result of wave action and water level fluctuations of Lake Pend Oreille due to the operation of the Albeni Falls Dam, located on the Pend Oreille River near the Washington/Idaho border. In addition, 15-25% of all habitat loss in the delta is attributed to the operation of the Cabinet Gorge/Noxon Rapid hydroelectric projects located upstream on the Clark Fork River.

The altered hydrology in the Clark Fork River and delta has also resulted in changes in the wetland and aquatic vegetation cover. Reed canarygrass (*Phalaris arundinacea*), an invasive non-native plant that thrives in disturbed ecosystems, now dominates in all delta habitat areas, impairing many of the wetland functions.

In June 2012, the State of Idaho and Bonneville Power Administration agreed to allow wildlife mitigation funds to be used for habitat restoration purposes. I lead the restoration effort by organizing teams of agency, tribe and community volunteers to determine the vision, design and goal for the restoration project. The teams decided that the project should protect areas vulnerable to erosion while improving and diversifying key riparian and wetland habitats to restore ecological function in the delta. The restoration should mitigate for wildlife habitat loss due to the construction/inundation and operation of the dams.

The first phase of the project began in November 2014. Efforts to protect island shoreline involved covering over 20,000 linear feet (over 6,100 metres) with 50,000 tons (50,800 tonnes) of riprap rock. In addition, 51,000 willows (*Salix* spp.) and 330 trees with root wads were embedded in the rock. Bendway weirs were constructed and the land was raised with infill from burrow pits located on site.



The Clark Fork River Delta as it appeared in 1946 (top photo) and 2006 (bottom photo).

Large woody debris such as trees with root wads attached were either partially buried in or placed on the raised soils to add habitat structure and complexity. In mid-March 2015, after the completion of the construction, 1,200 pounds (544 kilograms) of native seeds were hydroseeded across all raised areas. The seed mix consisted of 20 species selected by a group of native plant specialists from government, tribes and non-governmental organizations. Plants chosen included western pearly everlasting (*Anaphalis margaritacea*), blue joint (*Calamagrostis canadensis*), blue wild rye (*Elymus glaucus*), largeleaf avens (*Geum macrophyllum*), Rocky Mountain iris (*Iris missouriensis*), Canada goldenrod (*Solidago canadensis*), seep monkey flower

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(*Mimulus guttatus*) and many other hardy common and uncommon native plants. Volunteers collected seed from 15 species in late August 2014, including two small collections of Species of Special Concern: purple meadow rue (*Thalictrum occidentalis*) and large St. Johnswort (*Hypericum majus*). These collections were hand-broadcast in November 2015, where appropriate microhabitats had been identified for each species.

Between April and June of the same year, over 100,000 plants were planted by volunteers, school groups and Idaho Department of Fish and Game staff. Over 20,000 trees and shrubs went in. Approximately half of them were in ¾ gallon (2.8 litre) pots, including mountain alder (*Alnus incana*), water birch (*Betula occidentalis*), red osier dogwood (Cornus sericea), chokecherry (*Prunus virginiana*), three species of willow, quaking aspen (*Populus tremuloides*) and Douglas spirea (*Spiraea douglasii*). Half a dozen species were planted bare root, such as serviceberry (*Amelanchier alnifolia*) and Nootka rose (*Rosa nutkana*). Over 9,000 20-cubic inch (327 cubic centimetre) plugs were also planted, representing five coniferous species including western red cedar (*Thuja plicata*) and shrubs such as mock-orange (*Philadelphus lewisii*) and woods rose (*Rosa woodsia*).

Year 2015: Showing vegetation establishment at the same site after a single growing season. The site was first cleared of reed canarygrass in the winter of 2015, and then emergent plugs and willow poles were planted in the spring.

Photograph by Kathy Cousins

Year 2016: Large woody debris was placed in early spring.

Photograph by Kathy Cousins

Before the Lake Pend Oreille level was raised 11 feet (3.3 metres) to the summer elevation of 2,062.5 feet (628.65 metres) in late June, almost 80,000 emergent plugs were planted. Ducks Unlimited engineer Brian Heck installed hubs at known elevation sites so that my team could identify the correct water depth for planting the emergent plugs. Using the hubs and a laser level, he delineated the high watermark, 2,062.5 feet (628.25 metres) in elevation, and six inches (15 centimetres) below the high water mark with spray paint as a guide for the volunteers and the Northwest Youth Corps who were planting shallow and deep emergent plugs. Plants included six species of sedge, creeping spikerush (*Eleocharis palustris*), American and western managrass (*Glyceria grandis* and *G. occidentalis*), common rush (*Juncus effusus*), woolgrass (*Scirpus cyperinus*), four species of bulrushes and common cattails (*Typha latifolia*).

Some sites still had significant amounts of residual reed canarygrass clumps where the contractors had failed to bury them as instructed. Other weed species present included Canada thistle (*Cirsium arvense*), spotted knapweed (*Centaurea stoebe*) and common tansy (*Tanacetum vulgare*). Reed canarygrass was treated with a prescribed burn in

April 2015, before the plants started actively growing. During active growth, the grass clumps were sprayed with systemic herbicides from the last week in June through mid-July. Weeds were spot-treated again during the same period. Additional treatments for reed canarygrass control were conducted in 2016 and 2017.

Researchers have found the reed canarygrass monocultures result in loss of biodiversity, wildlife displacement and alterations in invertebrate assemblages. The grass is highly competitive. It has wide genetic variability, phenotypic plasticity, tolerance for a variety of conditions, sexual and asexual reproduction, effective seed dispersal mechanisms and small seed mass. It is able to occupy the same ecological niche as many native plants. In addition, it can change hydrology, increasing the risk of flooding in nearby agricultural fields, and increase the elevation of a site, eliminating ponds and watercourses used by waterfowl, amphibians and invertebrates. Evidence also suggests that reed canarygrass can have impacts on the soil microbial community.

I found that reed canarygrass had an average cover of 81.5% in the baseline sample areas surveyed prior to the construction and planting efforts. The dominance of reed canarygrass in these samples had resulted in low species richness with an average of 17.4 species per sample area. The 2015 and 2016 monitoring surveys within the newly created island areas showed tremendous improvement in all of the diversity measures with the overall reed canarygrass cover reduced to an average of 2.6% for the samples completed. The result was a great increase in species richness in the newly created island habitats (an average of 49.5 species were observed per sample.)

Still, there is more work to do: construct a breakwater, raise and plant the ground, install bank and slope protection in other areas. The estimated cost is $7,000,000 and we will need a supplemental environmental assessment to address changes in design and the potential presence of contaminants. And that's just the first phase of the project. We must also remain vigilant, knowing the battle to reduce the presence of reed canarygrass is just starting. All that said, I am optimistic that future generations will enjoy the wetland habitats of the Clark Fork River delta now that some of the shorelines and low-lying areas are protected from eroding wave action.

PHOTOGRAPH BY KATHY COUSINS

This site was dominated by reed canarygrass until restoration took place. Note the that the reed canarygrass grew very well even though it was in two feet (two-thirds of a metre) of water and this water level held throughout the growing season. In the literature, some authors suggest that reed canarygrass can be controlled by inundating areas with water. Unfortunately, the grass can survive very well being inundated, even throughout the growing season. Scraping the grass off and burying it under two feet of soil seemed to be the only way to control it at Clark Fork Delta.

PHOTOGRAPH BY KATHY COUSINS

Rushes and sedges planted in the spring of 2015 at the same site.

Katherine Cousins is the Mitigation Staff Biologist for the Idaho Department of Fish and Game. She may be contacted at kathy.cousins@idfg.idaho.gov.

Adaptations to Fire in North American Plants

by Stephen Johnson

Fire varies from a modest to a colossal shaper of ecosystems over most of the North American continent. Conservationists and fire ecologists will even suggest that fire itself is alive. After all, it grows, it consumes and it reproduces. Fire managers and fighters often refer to fire "behaviour." Native Americans of the grasslands echoed this view by referring to fire as "the red bison (or buffalo)."

Fire has typically been absent from the desert southwest, where plant cover is too sparse to support wildfires, and the humid deciduous forests of the southeastern United States, often considered too wet to allow fires to take hold. As with most generalities, there are exceptions; the southeast does have some interesting plant adaptations to fire.

Wildfires occurred most often in the once vast tallgrass prairies. According to experts, the highest species richness happens when fires blaze every four years. Most of the prairie plants are preadapted to wildfires; the grasses and forbs have meristems located just below the soil surface where the destructive heat of the fire misses them. Woody plants, by contrast, typically have meristems in aerial branches which receive the direct lethal heat of the fire. The effects of fire in tallgrass prairie are similar in many fire-adapted ecosystems around the world. Fire is an easy and large-scale way to remove the previous year's dead plant thatch. If left in place, the dead biomass often smothers new growth. It keeps the soil cold by reflecting sunlight and thus slowing plant regrowth. It also intercepts rainfall, depriving the soil and plant roots of life-giving moisture. Another equally important function of fire is the removal of shade-producing woody vegetation that will steadily colonize an area in fire's absence.

The North American tallgrass prairie is the youngest grassland in the world so most experts suggest that direct adaptions to fire have not yet had the time to develop. One mild adaption may be in bunchgrasses such as big bluestem (*Andropogon gerardii*) where persistent, thick and flame-resistant dead basal leaf sheaths from previous years' growth protects new and sensitive meristems from intense heat. In older grasslands such as in Africa, some plants are stimulated to flower by the effect of a heat pulse from fire passing over their shallowly buried flower buds.

In the savannah bordering the tallgrass prairie, there are plants with modest adaptations. Bur oak (*Quercus macrocarpa*) and honey locust (*Gleditsia tricanthos*) have a thick slow-to-ignite bark that resists flames as the main body of a wildfire quickly passes by.

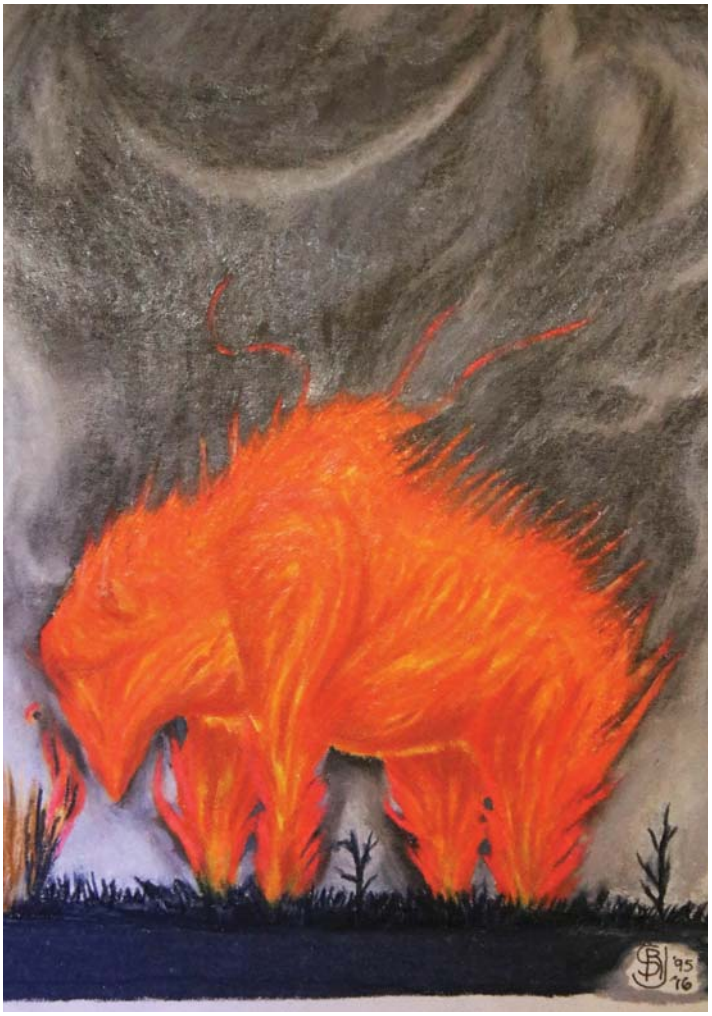

Illustration by Stephen Johnson

Native Americans saw fire rip through the prairie like a herd of buffalo. Perhaps that's why they called fire "the red bison."

In certain areas of the northern, western and even the southeastern United States, there are conifers that are adapted to 40 to 50-year flamboyant conflagrations. Perhaps the best known is jack pine or cyprès (*Pinus banksiana*), which grows in the northern United States and into adjacent Canada. Jack pine is a small to medium-sized pine tree with serotinous pine cones. These cones do not open at maturity and, as Jack pines age, they accumulate a load of small, pointed, gray cones. After about 50 years, lightning may strike a grove of dead or nearly dead jack pines and set them ablaze in a conflagration known as a crown fire. The fire burning through the crown of the tree opens the cones and reduces the parent trees to ash, allowing the seeds to fall and germinate into an open, sunny environment. A crown fire may be frightening to watch, but it produces a bright green forest of young jack pines. Trees with serotinous cone pines appear across the United States, from

the prickly – hence, painful to hold – cones of table mountain pine (*Pinus pungens*) in high-elevation western Virginia to the large, smooth-coned Monterrey pine (*Pinus radiata*) in central California. I take a few jack pine cones to my environmental and general science classes and burn them to show students how flames are the only thing that will open the cones to release seeds.

Illustration by Stephen Johnson

*Stylistic view of the fire poppy (*Papaver californicum*), a native of the American west, and its requirement for fire (the stamens are matches).*

Serotiny (an ecological adaptation exhibited by some seed plants, in which seed release occurs in response to an environmental trigger rather than spontaneously at seed maturation) is so linked to fires and conditions that cause them that this dependency can also cause a variation in a single species. For example, lodgepole pine (*Pinus contorta*) growing in the rainy and moist habitats west of the Rocky Mountains has cones that open at maturity, while lodgepole growing in the rain shadow of the Rockies to the east has serotinous cones.

Perhaps the regions best adapted to periodic fires are those with a Mediterranean climate. The chaparral ecosystem of California is such a one. Here, most plants have some adaptation or preadaptation to 50 to 75-year cyclopean fires. Many of the standing shrub and tree layers have volatile oil in their leaves which helps them withstand dry periods. These oils are also spectacularly flammable, turning burning shrubs into Brobdingnagian torches! The fire adaptations these shrubs and trees exhibit put them in a group called obligate resprouters: new growth arises soon after fire. Then there are the fire followers: out in the open, in mineralized and sunny landscapes certain herbaceous plants emerge from their seeds. An example is the fire poppy (*Papaver californicum*) whose seeds germinate upon the increase in sunlight following fiery destruction of shading shrubs and trees. The seeds of other species, such as members of the bean family, germinate in direct response to heat shock. Typically, the ultra-hard seed coats of legumes crack from heat shock and subsequently imbibe water, allowing germination. Other species may respond to chemicals released from charred wood.

A few years ago, when I was studying fire effects in the southeastern Louisiana tallgrass prairie, I happened upon several white wild indigo (*Baptisia alba*) plants each with several partially burned to completely burned fruits. I recalled that some legumes in California chaparral need fire to germinate. Inside the *Baptisia* fruits, I found different colours of seeds: some were the normal tan-colored seeds, others had the color of caramelized sugar and yet others were blackened. I wondered what effect, if any, fire had had on the viability of the seeds. One possibility, of course, was that it killed them. Instead, I discovered that in these south Louisiana Baptisia alba plants normal, caramelized and even lightly blackened seeds collected from burned fruits had a 50 to 70% higher germination rate than seeds from unburned fruits.

Plants such as the beautiful large-flowered bristly matilija poppy (*Romneya trichocalyx*) and the annual caterpillar phacelia (*Phacelia cicutaria*) possess seeds that will only germinate if they encounter chemicals leached from nearby charred wood. Some conservationists have suggested that in order to simulate the effect of charred wood leachate to germinate seeds one needs to soak them in gasoline. Not the most environmentally friendly way of reproducing the plants.

In the southeastern United States, there are inner coastal to inland regions dominated by longleaf pine

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(*Pinus palustris*) savannah. The pine has no adaptation to crown fire and produces enormous cones which open at maturity to release seed. The dominant fire in this or any savannah is a low-intensity, fast-moving ground fire. The trees have developed a remarkable adaptation to the wildfires. The longleaf seedling grows quickly into a single stem or candle embedded in a dense array of very long needles. This is known as the grass stage of longleaf pine. The moist needles surrounding the shoot retard fire so that a wildfire will rush by the sapling but not scorch it.

Western Virginia is home to Peter's mountain mallow (*Iliamna corei*), once a rare and threatened species. Conservationists in the 1980s had few ideas about how to save this mallow; seed germination under greenhouse conditions was not producing the desired effect. In the mid-1990s, a controlled burn was conducted of the area where the few remaining mallow plants were found. The following spring hundreds of Peter's mountain mallow seedlings sprung up, seed germination apparently stimulated by the controlled ground fire and removal of shading shrubs.

Photograph by Stephen Johnson

Burned white wild indigo fruits with singed and possibly improved germination seeds.

Burning jack pine cone beginning to open.

Seasonally wet and dry habitats anywhere can experience fire. Most bogs are typically too wet to support fire, but in the absence of fire those bogs can change into dense thickets of acid-loving ericaceous and other shrubs. Fires are a way of maintaining a bog dominated by pitcher plants (*Sarracenia purpurea*) and sundews (*Drosera* spp.). Even near the coast in wet habitats like ponds and poquosons (a native American word meaning "great marsh," that loaned its name to an old city in Virginia) in southeast Virginia and eastern North and South Carolina, wet-season growth leads to dry-season standing dead biomass – perfect tinder for a fire. Pond pine (*Pinus serotina*) grows in such habitats with the serotinous pine cone of a typical fire-adapted species.

Fire can undoubtedly be destructive, but it is also beneficial and, in fact, necessary to the health and integrity of many ecosystems.

Photograph by Stephen Johnson

Stephen Johnson became convinced of the importance of fire while studying its effects on prairie grasses in northeast Kansas. Now he burns off a cropped big bluestem on his own prairie plot every spring.

Native Conifers Dominate Our Winter Forests

by Rob Zimmer

Nature provides stunning seasonal beauty with the many species of conifers that call North America home. They thrive in just about every habitat and make exceptional landscape choices for those who wish to bring nature home, especially for winter wildlife food and shelter.

Native conifers can be separated into three families: Pine (Pinaceae), Yew (Taxaceae) and Cypress (Cupressaceae). All are wind pollinated. Pines, spruce, hemlock, tamarack and fir trees are in the pine family. Canada yew is in the yew family, while white and red cedars are in the cypress family. Learning to identify the different conifers by their appearance, foliage and cones is a fun and interesting way to explore the natural world.

Following are some tips to help get you started.

PINES

In general, pines can be distinguished from spruces by their thin needles that grow in clusters. The long, fine needles of white pine (*Pinus strobus*) are arranged in bunches of five at branch tips. These wispy needles give the tree a soft appearance when viewed from a distance. The slender cones of white pine are about five inches (13 centimetres) long. Look for this widespread species in sandy soils.

PHOTOGRAPH BY LINDA READ

Jack pine

A tall northern tree, the red pine (*Pinus resinosa*) has long, stiff and brittle needles in clusters of two. When bent, the needles break. Its short, woody cones grow on the tips of its twigs. Jack pine (*Pinus banksiana*) is a small scrubby tree that needs an open, sunny habitat. Look for bundles of two short needles and tight cones that need fire to open for seed dispersal.

SPRUCES

In general, spruces feature short, sharp needles that individually grow out of short, woody pegs that surround the stems. The needles are square in cross section, unlike firs that have flat, soft needles.

Black spruce (*Picea mariana*) and white spruce (*Picea glauca*) are the most common native spruces. The cones of spruces tend to be more papery and smaller than those of the pines. Black spruce are common in the soggy soils of northern swamps and bogs. While white spruce can grow as an associate, it can also grow in a larger range within mixed forests and near streams.

Red spruce (*P. rubra*) is also found in the north, but persists at windswept higher elevations in the Alleghenies and Adirondacks. Adapted to harsh weather, spruce grows tight grained and elastic wood – perfect for musical soundboards of stringed instruments. A western cousin, Colorado blue spruce (*Picea pungens*) has been used for traditional landscaping throughout the east, far from its native central and southern Rocky Mountains.

CREEPING JUNIPER

Growing in northern areas from the Great Lakes to as far as coastal Alaska, creeping juniper (*Juniperus horizontalis*) is well adapted and reduces erosion on gravely and sandy hillsides, dunes and grasslands. With foliage similar to eastern red cedar, this juniper is identified by its low-growing, sprawling habit, rather than as a classic, upright tree. In some locations, this shrub may reach no more than a foot (1/3 of a metre) in height. It is state-listed as endangered or threatened in at least six states.

WHITE CEDAR

Eastern white cedar (*Thuja occidentalis*), commonly known as arborvitae, grows in many areas of the upper Great Lakes and northern United States. Preferring moist, swampy soils, this tree forms dense cedar thickets where it grows in combination with balsam fir (*Abies balsamea*), hemlock and yellow birch (*Betula alleghaniensis*). This conifer can be identified by its flat, thick, fan-like foliage and little brown clustered cones.

PHOTOGRAPH BY LINDA READ

Eastern white cedar

RED CEDAR

Eastern red cedar (*Juniperus virginiana*), also called juniper, is quite different from white cedar. Red cedars sport beautiful female cones that look like waxy, blue berries in fall and

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winter. The foliage is sharper than white cedar and the reddish heartwood is quite fragrant. Slow growing, red cedar prefers upland, slightly dryer areas than white cedar and is often a pioneer tree in fields and prairies.

HEMLOCK

The great hemlocks (*Tsuga canadensis*) that tower over the steep ravines and bluffs along the Niagara Escarpment and Lake Michigan shoreline are my favourite old growth conifers. With short, flat needles aligned elegantly along each branch, these massive trees dominate areas such as Wisconsin's Point Beach State Forest and Whitefish Dunes State

PHOTOGRAPH BY LINDA READ

Hemlock forest

Park. Slow growing, they flourish in cool, shady, moist habitats in eastern North America. Winter finches and cross-bills forage on their tiny brown cones for seeds.

TAMARACKS

Tamarack (*Larix laricina*), also known as larch, is not an evergreen conifer. Just like deciduous trees, tamaracks drop their needles each fall. These trees feature short, star-shaped clusters of 10-20 soft needles along the branches, with tiny purple upright cones. In autumn, tamaracks transform into beautiful shimmering gold, sometimes remaining well into January.

PHOTOGRAPH BY LINDA READ

Soft tamarack needles

Rob Zimmer is a nature and garden writer in Appleton, Wisconsin. He is the author of Voices of the Wind: Four Seasons in Wild Wisconsin, Reflecting: Nature in Black and White *and* Wild Seasons: The Beauty of Native Wildflowers. *Visit www.robzimmeroutdoors.com. Reprinted with permission by the* Wild Ones Journal *and Rob Zimmer.*

BOREAL CANADA SONG

by Lesley Strutt

community of expression conifer being

wrapping the northern reaches of the planet
dancing where no one sees but you little bird

with your heart fork-tuned humming inside the moist
caverns dark fingers toes of spruce fir larch pine

breathing desire taming the sun

Lesley Strutt is the Associate Members' Representative of the League of Canadian Poets (LCP). She and other LCP poets from across Canada are preparing an anthology of poems celebrating trees. Poets pay particular attention to what matters, and with this anthology they are acknowledging the immeasurable value of trees to our planet.

NATIVE PLANT SEEDS WANTED

One of the many benefits of a NANPS membership is the ability to donate and/or receive native plant seeds. NANPS is currently accepting seeds for the 2017/18 exchange. Send in your seeds separated by species and identified with the source parentage to NANPS Seed Exchange, Box 69070, St. Clair P.O., Toronto, Ontario M4T 3A1. A list of available seeds is included in this mailing of *The Blazing Star* newsletter. Please consider getting involved in this fascinating practice that helps preserve our native species. For information on how to collect seeds visit nanps.org/index.php/activities/seed-exchange. Thank you.

Continued from page 1 – **Cylindrical Blazing Star**

earlier. It has difficulty competing with taller, more aggressive plants, but is generally a low maintenance plant if content in its planting site, suffering from no serious insect or disease problems. It is a worthy choice for massing in native plant gardens and provides a striking accent in rock, cottage and prairie gardens. The flower's delicate loveliness and desirability to native pollinators compensates for its lack of fragrance.

Small birds relish the seeds so if you intend to collect them you need to remain vigilant to beat the flocks to their buffet. It's possible to grow the plants from seed, but they are very slow to establish so patience is needed. To collect the seeds, cut the stems as soon as the wiry hairs begin to darken and spread the stalks out to dry, away from direct sunlight. When completely dry, remove the small hairs and store in a cool dry place. Seeds may be sown in late fall, gently pressed into the soil surface. For spring planting, cold stratification is required: collected seeds must be stored in moist sand in the refrigerator for 60 days before planting. Keep soil lightly moist until germination, which normally occurs within three to four weeks. *Liatris cylindracea* can be started indoors six to eight weeks before spring planting.

The flowers are enthusiastically swarmed by long-tongued bees, bee flies and many species of butterflies including tiger swallowtails, clouded sulphurs, grey hairstreaks, Aphrodite fritillaries, skippers, painted ladies, red admirals and wood nymphs. Short-tongued bees may visit the flowers to collect pollen, but they are not effective pollinators. *Liatris cylindracea* is the host plant of the liatris flower moth (*Schinia sanguinea*) and the rare glorious flower moth (*Schinia gloriosa*) whose larvae consume the blossoms and seeds of this and other *Liatris* species. An assortment of mammalian herbivores, including rabbits, groundhogs, deer and livestock, will eagerly devour all parts of the plant. Do not attempt to establish *Liatris cylindracea* in areas with large populations of voles. It is a hopeless endeavour!

Historically, First Nations peoples would eat the corms although this was considered starvation food.

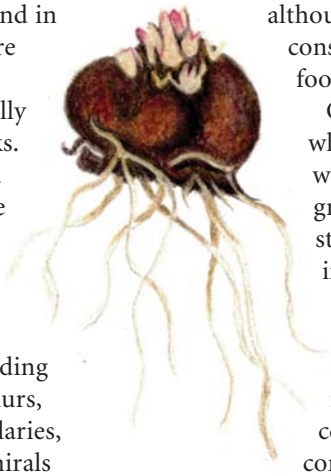

ILLUSTRATION BY ANGELIQUE-MARIE MORI

Captivated by its whimsical beauty, I was keen to give grass-leaved blazing star a try. I planted it in the dappled light of my woodland garden, fully aware of the less-than-ideal growing conditions. As a consequence, there were some unfortunate casualties in this venture. One plant became a reluctant resident in one of the few sunny spots in my garden. Unquestionably, it would be happier in a sunnier, drier locale where it would bloom earlier and be more floriferous. Still, I'm grateful that it survived so that I might enjoy its charms and observe its magnetic appeal to pollinators.

Angelique-Marie Mori is the recipient of the 2014 NANPS Native Plant Garden Award. She lives in Hamilton, Ontario where she is dismayed by urban sprawl's relentless destruction of green space, but cheered by the wild creatures in her habitat garden which offers them sanctuary.

PHOTOGRAPH COURTESY OF THE NATURE CONSERVANCY OF CANADA

Liatris cylindracea *hosting a monarch butterfly at the Red Cloud School Road property (part of the Nature Conservancy of Canada's Salt Creek Nature Reserve) in Cramahe Township.*

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