The Blazing Star

Summer 2015, Volume 16, Issue 3

A Publication of the North American Native Plant Society

Native Plant to Know

Black Cherry

Prunus serotina

by Gregor G. Beck

Black cherry (*Prunus serotina*) is a magnet for wildlife. Late each summer, the black cherry in our hedgerow attracts scores of early migrant songbirds as well as local breeding birds, such as cedar waxwings, gray catbirds, American robins, brown thrashers, eastern bluebirds, thrushes and vireos, to name just a few. Birds will stay for days, feasting on the cherries and the fruit of other plants in the area, building energy stores for migration.

A mid-sized to large deciduous tree, *Prunus serotina* is the largest native cherry in North America. It grows in a range of soil conditions from forests with deep, moist soils, to hedgerows and gardens, to harsher sites with dry, sandy or even gravelly conditions, but it does best in richer, well-drained soils. Shade intolerant, black cherry prefers sunny locations or forest gaps. It is relatively common in southcentral Ontario and southern Quebec east to New Brunswick and Nova Scotia, and south through the eastern and central United States to the Gulf of Mexico. It also occurs, albeit with a more sporadic distribution, in the southwestern United States and through Mexico as far south as Guatemala.

Black cherry typically grows to heights of 18-20 metres (60-70 feet), but on occasion can reach twice that height. In a forest, the tree is straight-trunked with few lower branches. Under such conditions, large specimens can be impressive, standing stately and tall amid other large forest trees, such as sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), oaks (*Quercus* spp.), hickories (*Carya* spp.) and many others. Exceptionally large specimens sometimes form part of the "super canopy" and tower above the crowns of neighbouring trees in search of bright light.

While the form can be somewhat variable, the crown is often conical in younger trees becoming roundish or ovoid in older specimens. Trunks are shorter and more tapered in open-grown trees with a more irregular crown. Larger branches are typically ascending, but the fine, small branches

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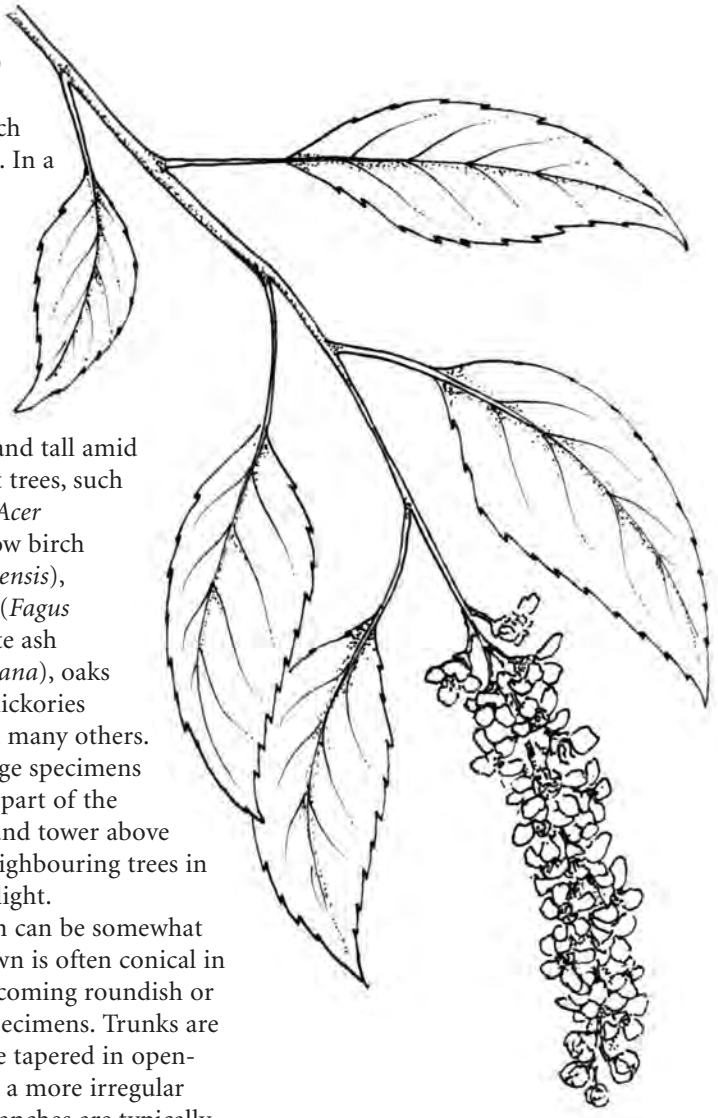

ILLUSTRATION BY BRIGITTE GRANTON

The *Blazing Star* is . . .

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Editorial

New England Botanical Conference

In June, NANPS directors Harold Smith, Miriam Henriques and I attended the 120th anniversary conference of the New England Botanical Society (NEBC) in Northampton, Massachusetts. We are grateful to Elizabeth Farnsworth of NEBC/Harvard for the personal invitation. The organizing committee gave us a very warm welcome. They were delighted to have Canadian representation.

Among the three of us, we attended every available workshop. We learned from Alex Bacjz of the University of Maine how flower removal can increase fruit size and productivity in wild blueberries and from Emily Marsh of Vermont how removing invasive non-native honeysuckle (*Lonicera* spp.) results in a decrease in the larvae of black-legged ticks, vectors for the bacteria that cause Lyme disease. Barbara Thiers, Director of Herbarium for New York Botanical Garden, outlined the methodology behind digitizing herbariums. Jehane Samaha from Harvard University discussed the need for bigger bud size in native woody species to beat out springtime canopy competition. Biologist Steven Daniel warned about incursions in the northeast of alien false brome (*Brachypodium sylvaticum*), established in the Pacific northwest since the 1960's where land managers are actively researching and controlling the species.

Not only did we acquire amazing knowledge, we had ample opportunity to network with interesting people and realize the strength of our solidarity as organizations working towards a common goal. This was reinforced by the keynote speaker, Pam Diggle, editor in chief of the *American Journal of Botany*, in her address on learned societies. She posed the question: why would we all come to this meeting when in this digital age everything could be done on line? What is the role of personal interaction in fostering solidarity between groups? The need to build awareness and outreach about native plants is still very real. We must create a northeastern alliance rather than separating our work into American and Canadian jurisdictions.

PHOTOGRAPH BY HAROLD SMITH

Sustainability was a topic that figured prominently in the weekend proceedings. We wandered the impressive 1880's Smith College campus designed by Frederick Olmsted with huge native trees and visited the renowned Environmental Center of Middlebury College, Vermont (home of Bill McKibben and 350.org, the world's largest environmental organization). Our Sunday excursion to the William Cullen Bryant Homestead in western Massachusetts with its 190+ acres (80 hectares), including old growth forest, elicited many a WOW! An example would be the black cherry (*Prunus serotina*), approximately 250 years old, that towered some 200 feet (60 metres) above our heads. We helped remove some garlic mustard (*Alliaria petiolata*), buckthorn (*Rhamnus cathartica*) and barberry (*Berberis* spp.) in this otherwise healthy forest with few invasives.

Over 150 people attended, but for those who were unable to make it and hear first-hand the 21 talks on original research, videos of all the talks will be posted at www.rhodora.org/conference2015. It was a phenomenal weekend of connection with people and plants, a connection that will be fruitful far into the future.

Janice Keil
Janice is NANPS retiring treasurer

NANPS ANNUAL GENERAL MEETING

Saturday, October 3rd, 2015
Noon - 4:30 p.m.
North York Central Library
North York, Ontario

KEYNOTE PRESENTATION: NATIVE PLANTS FROM THE BEES' POINT OF VIEW
The keynote speaker will be Susan Chan, a consultant with Farms at Work, who teaches sustainable agriculture at Fleming College and Trent University and is passionate about pollinators and the vital ecological role they play.

All NANPS members welcome. Visit www.nanps.org for details.

PLEASE NOTE CHANGES TO NANPS MEMBERSHIP FORM ON PAGE 16.

NANPS SEED EXCHANGE

It's that time of year again when plants produce seeds and we native plant growers collect them. Please consider collecting seeds for NANPS annual exchange even if you've never done it before. For collection tips, visit www.nanps.org/index.php/plant-sources/159-seedcollection-reaping-what-you-sow. The seeds need to be properly collected to stay viable. A common mistake among beginners: failing to allow the seed to sit a while and lose some of its moisture so it can be stored safely. Email seeds@nanps.org if you have questions.

Seed donors get first pick of the seeds and can order up to 30 packets. Although orders are on a first-come, first-served basis, seed donor orders always go to the front of the line!

Send your seeds, separated by species and identified with the source/parentage, to NANPS Seed Exchange, Box 84, Station D, Etobicoke, Ontario M9A 4X1. Thank you!

PLANT IDENTIFICATION GUIDELINES

At the North American Native Plant Society, our volunteers are happy to help you identify mystery plants, but you can help us. When you send in photos to ID, please make sure the photos are sharp and they show multiple characteristics of the plant: leaves, flowers, seeds, trunk. Better yet, buy a field guide and do some research on your own – it's a great learning opportunity. Happy botanizing and native plant gardening!

RESEARCH STUDY NEEDS YOUR HELP!

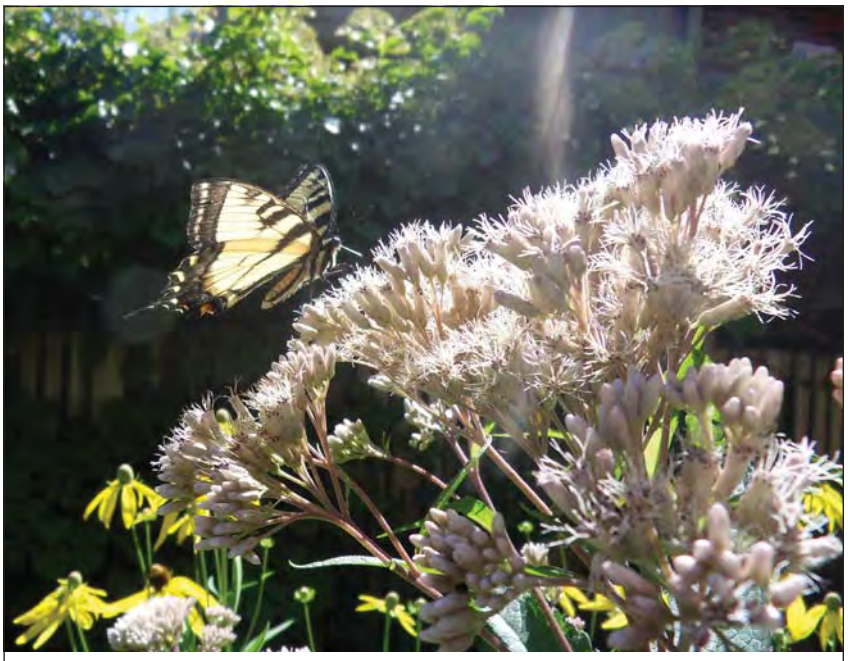
A University of Waterloo team of researchers is conducting a study about attitudes towards invasive species. Your participation as a member of the public concerned about invasive species will be invaluable for our research.

If you decide to volunteer, you will be asked to complete a 10-minute survey. Survey questions focus on your opinion of invasive species, your views of nature and place. If you complete the survey online, your answers will be anonymous. If you fill out a paper-based survey, your answers will be kept confidential. You can withdraw your participation at any time by not submitting your responses. There are no known or anticipated risks from participating in this study.

Please open https://www.surveymonkey.com/s/invasiveswaterloo to fill out the short survey. If you cannot access the Internet, contact the researchers and they will mail you a paper-based survey. Thank you for participating!

Contact: Prof. Brendon M. H. Larson and Dr. Archi Rastogi, Department of Environment and Resource Studies, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1, tel: 519-888-4567.

VISIT WWW.NANPS.ORG TO READ BACK ISSUES OF THE BLAZING STAR OR FIND OTHER RESOURCES ON NATIVE PLANTS.



PHOTOGRAPH BY HAROLD SMITH

*Eastern tiger swallowtail on eastern Joe-Pye weed (*Eutrochium dubium*) with grey-headed coneflower (*Ratibida pinnata*) in the background in Harold Smith's backyard.*

Teaching in the Sonoran Desert

by Emily Dimson

When your college is in the centre of 98 acres (40 hectares) of Sonoran Desert, it is impossible not to be inspired by your surroundings and bring that inspiration into the classroom. The Red Mountain campus of Mesa Community College is home to the iconic saguaro cacti (*Carnegiea gigantea*), 800-year-old ironwood trees (*Olneya tesota*), ocotillo (*Fouquieria splendens*), ephedra (*Ephedra trifurca*), jojoba (*Simmondsia chinensis*), creosote bush (*Larrea tridentata*) and many other remarkable trees, bushes, perennials and annuals. Roadrunners, quail, rattlesnakes, desert cottontails and coyotes also reside on campus. This has created an incredible outdoor laboratory and teaching space that allows us to integrate the ecology and beauty of the desert, plants and animals into a wide range of college disciplines.

Photograph by Darrell Woolf

Saguaro

English classes incorporate sustainability and environmental issues into their curriculum, assigning compositions on these subjects. Art students sketch the plants and scenery, gaining an appreciation for the beauty of the desert. Geography students use scientific instruments to search for different microclimates on campus. Every semester, future geographers are seen searching campus for the hottest and coldest locations, measuring wind speeds and humidity. Yoga students learn to stay present walking the two-mile (three-kilometre) trail around the perimeter of campus. The desert environment lends itself particularly well to biology courses. Labs have been taught on identifying Sonoran Desert plants, natural history, plant adaptations, soil ecology, leaf morphology, plant anatomy, vegetation analysis, floral morphology and pollination.

The saguaro cactus (pronounced sah-wah-ro), a native of Arizona and Mexico, is found exclusively in the Sonoran Desert. It developed many adaptations to survive in harsh, dry conditions. The saguaro's leaves have been reduced to spines to decrease surface area, minimizing water loss from transpiration. The spines point downwards, capturing rainwater and directing it to the base of the cactus. The spines provide shade for the trunk and protect it from intense sunlight, drying winds and thirsty animals. Saguaros have a thick epidermis covered in a waxy substance that reduces water loss. The trunk and branches have vertical pleats that allow the cactus to expand when water is gained and contract when water is lost. The saguaro's root system is extensive, spreading as wide as the cactus is tall. The roots are shallow so they capture the lightest of rains and are able to absorb hundreds of gallons of water in a week. A taproot extends five feet (1 ½ metres) underground to reach water deep in the earth. Internally, the saguaro's spongy parenchyma tissue (pith) allows the cactus to store large amounts of water. The saguaro can survive losing 80% of its stored water.

Saguaros have evolved a unique photosynthetic pathway to prevent water loss. The saguaro's trunk and branches are green, taking on the role of photosynthesis normally performed by leaves. Most plants open stomata (tiny pores) in their leaves during the day to take in carbon dioxide (CO_2) that is needed for photosynthesis. Saguaros open their pores at night when it is cooler and more humid to avoid water loss. Carbon dioxide is stored until light is available to complete the photosynthetic pathway.

Saguaros germinate from tiny, black seeds that are no bigger than a

Photograph by Darrell Woolf

Pipevine swallowtail butterfly larva feeding on desert pipevine

pinhead. They start life under a "nurse plant" that provides shelter and shade to the delicate seedlings and young saguaros. It can take 10 years to reach 1 ½ inches (four centimetres) and 25 years to reach one foot (30 centimetres) in height. Saguaros can live over 200 years and weigh 3,200-4,800 pounds (1,500-2,000 kilograms). It is a myth that you can determine a saguaro's age by the number of arms it has. Some saguaro never develop arms and it is still unknown what triggers arms to develop. Saguaros produce large white flowers that are pollinated by birds, bees and bats. Their succulent red fruits are eaten by birds, coyotes, tortoises, javelin and humans. Gila woodpeckers and gilded flickers peck large holes into saguaros, building their nests inside where it is cool during the day and warm at night. The saguaro builds a callus around the surface of the hollowed-out opening, forming what is known as a saguaro boot. When the woodpeckers abandon the nests, other birds such as screech owls, elf owls, purple martins, sparrows and finches find them and use them.

Photograph by Darrell Woolf

Jojoba nut

The desert pipevine (*Aristolochia watsonii*) is a perennial, herbaceous vine native to Arizona, New Mexico, Baja California and Mexico. The plant has a unique life cycle with interesting plant/insect relationships. Pipevines bloom in spring and summer producing purple-brown calyx flowers that resemble a mouse's ear, including the hairs, venation and musty rodent odour. This attracts small blood-sucking flies that climb into the flower looking for a meal. The flies are trapped inside the flower and become unsuspecting pollinators. Overnight, the flower releases its pollen; in the morning the pollen-covered flies are set free. These flies continue their search for a meal, visiting and pollinating other pipevine flowers in the process. Desert pipevine is also the host plant for pipevine swallowtail butterflies (*Battus philenor*) which lay their red eggs on the underside of young leaves. Larvae emerge and feed on the plant, bio-accumulating aristolochic acid, a toxic chemical found in pipevines. The caterpillars are black and red, warning predators that they are poisonous. When disturbed, the caterpillar will exude foul-smelling substances from glands that contain these toxic chemicals. The relationship between the swallowtail butterfly and pipevine is similar to that between monarchs and milkweed plants (*Asclepias* spp.). Historically, pipevine plants have been used medicinally to treat snake bites, infections, impotence and paralysis and to aid in childbirth. It should be noted that the powerful toxins make the side effects of consuming this plant very serious.

Jojoba (pronounced hoe-hoe-buh) is a four foot (one-two metre) tall evergreen shrub that grows in Arizona, California and Mexico in the Sonoran Desert. At first glance, this plant may seem boring but it has interesting adaptations, flower anatomy, ethnobotanical uses and agricultural significance. Jojoba has roots that reach down almost 12 feet (four metres) into the ground, allowing the plant to find water in the dry desert. The leaves are thick, leathery and covered with trichomes (hairs) to protect them from water loss through transpiration. The leaves are vertically oriented exposing only the margins to the intense, midday sun. The leaf surface is exposed to early morning and late afternoon sun for photosynthesis. The jojoba is dioecious, having male and female flowers on separate plants; it relies on wind for

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pollination. The aerodynamic shape of the leaves creates vortexes that help direct pollen to the female flowers. Jojobas produce acorn-shaped nuts that are 40% liquid wax and can be used for the production of jojoba oil. This oil is chemically similar to sperm whale oil and has been used as a substitute in cosmetic products since the Endangered Species Act banned importation of whale oil in the 1970s. The oil is very pure, resists oxidation that causes rancidity and is stable at high temperatures. It is used in moisturizers, cleansers, shampoos, conditioners and cosmetics. The oil can also be used as a lubricant, in polish for furniture and cars and as an alternative fuel source. Native Americans used jojoba to treat pain, stomach ailments, cancer, burns and other wounds. Native Americans and early settlers roasted the nuts and used them to make a coffee-type beverage. Deer, javelina, bighorn sheep and livestock graze on jojoba leaves. Rodents, squirrels, rabbits and birds eat the nuts. However, when eaten in large quantities, the nut's waxy oil is toxic to most animals. An exception is Bailey's pocket mouse, which is able to digest the wax.

PHOTOGRAPH BY DARRELL WOOLF

A cienega (a desert spring or marshy area found only in desert regions) located in the centre of the Red Mountain campus of Mesa Community College. This cienega provides habitat for Sonoran desert tortoises, longfin dace and several species of lizard. It also is a refugium for a breeding population of endangered desert pupfish.

The Sonoran Desert is habitat for a variety of plants and animals that have adapted to survive harsh, dry conditions with infrequent rain. What appears to be a desert wasteland is rich with life. It is our hope that bringing the desert into the classroom and the classroom into the desert will educate our students and inspire them to preserve this unique habitat.

Emily Dimson is a biologist and manager of the Red Mountain biology lab. Mesa Community College was the recipient of NANPS 2014 Conservation Award in recognition of their Cienega Project (see https://www.youtube.com/watch?v=3Pyh-X8h33A&feature=youtube).

Ecological Learning Takes to the Road

Botanical Springs Evolution Academy, a new charitable program launched by Botanical Springs L.L.C. in New England, is raising money to outfit and fuel a mobile ecological classroom. The retrofitted bus will travel throughout communities in the United States and Canada to raise awareness about bees, the problems they face and their importance within our environment, and teach about tapping maple and birch trees for sap. The activities are designed to be fun and interactive for everyone, from kids to seniors. As Francesco Capaldi, CEO of the company says, the bus "will travel from school to school, farm stand to farm stand, nursery to nursery, retirement party to birthday bash…" in spring and fall, teaching people to be ecologically aware and engaged with nature. The instruction will have math and science behind it (for example, tree tappers will get to try different diameter taps on trees of the same girth to discover how much sap flows through each tap.) Participants will learn why certain plants are native to certain areas or habitats (for example, yellow birch [*Betula alleghaniensis*] loves water), how to make money by gathering berries and how different species of maples (*Acer* spp.) have different sugar content, making each taste slightly different.

PHOTOGRAPH BY MIKAL MCCALMONT

The birch water lemonade infusion made by Botanical Springs that took first place at the first International Birch Sap and Syrup Conference held at Paul Smith's College in New York co-sponsored by Cornell University's Uihlein Forest.

If you would like more information, visit botanicalsprings.buzz or email Francesco@botanicalsprings.buzz.

Redirecting Stormwater through Low Impact Development

by Samantha Paquette and Julie McManus

How often do we give any thought to where rainwater goes when it hits the ground? And yet it has a tremendous impact on our lives, replenishing our groundwater, rivers and lakes, supplying the water that we drink and use daily.

As rain falls it gathers debris and spills (road salts, motor oil, grease, anti-freeze and heavy metals from roads, roofs and paved and concrete surfaces). It carries these into municipal storm sewers that often flow untreated into natural waterways. Typical neighbourhoods are designed to quickly convey runoff from roofs and driveways away from the property.

The best way to prevent stormwater from polluting our water supply is to treat rainfall where it lands, before it enters the sewers. By diverting stormwater into your yard in a controlled manner, you can prevent contamination of your drinking water and protect the local environment. This water can be used to irrigate your gardens or lawn, reducing your dependence on municipal water supplies – and reducing your monthly water bills.

Redirecting stormwater is an example of Low Impact Development (LID), a fresh approach to urban planning that creates sustainable communities. LID landscapes such as rain gardens or bioswales allow gardeners and landscapers to create environmentally safe gardens without sacrificing aesthetics. LID uses the same basic design principles as any other landscape, balancing good looks and function with the use of appropriate plants for the site. LID is different from other stormwater practices because it treats rainfall where it lands. Vegetated components in LID landscapes help to slow down, cool, filter and clean rainwater before it is absorbed into the ground.

PHOTOGRAPH BY CREDIT VALLEY CONSERVATION

*The Unitarian Congregation of Mississauga installed a bioretention cell (rain garden) in their parking lot in 2012. The garden collects and treats rainwater from the parking lot. It features all native plants, including New England aster (*Symphyotrichum novae-angliae*) and elderberry (*Sambucus canadensis*).*

Credit Valley Conservation (CVC), a non-profit environmental organization in the Greater Toronto Area, works with landowners and property managers to implement LID landscapes on a variety of sites. CVC, in partnership with the Town of Caledon, Ontario and Alton Public School, completed construction of a rain garden at Alton Park in the fall of 2014. The garden not only helps the local environment, but provides an educational resource for the students of neighbouring Alton Public School. The kids learn about local water issues, biodiversity and how to care for their environment. The garden is also a demonstration site for the community, showing local residents and visitors what they can do on their own properties to improve water quality and quantity.

Students from Alton Public School were involved in the construction of the garden from the start. In 2013, they helped CVC win a grant from Shell FuellingChange towards the construction of the garden by encouraging the local community to vote for the project. The students also contributed to design and plant selection at a design charrette hosted by CVC and Fern Ridge Landscaping. After construction of the garden was completed, students and teachers created an art piece from reclaimed wood materials that is now featured in the garden.

"Taking part in the rain garden project at Alton Public School has been an incredible experience for our students. Their participation in the design, construction and celebration of the final product was a completely unique hands-on learning experience. We are excited to continue to use the rain garden in future years to help create the next generation of environmental champions," says Laurie Johnson, principal of Alton Public School.

The Alton Park rain garden is one of three demonstration sites recently constructed in Alton Village as part of an LID marketing campaign (the other

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two were rain gardens on residential properties). In 2008, Freeman and Associates conducted a market research study in Mississauga, Ontario, that examined the attitudes and opinions of residents towards implementing lot-level stormwater management measures. The study found that people see their property as an extension of themselves and the general preference is for an orderly look. The common belief seems to be that a water-friendly, native plant garden is wild and weedy, but this does not have to be the case and effective marketing can bring people around. The sites in Alton were designed to show that you can build fantastic looking landscapes for anyone's taste that ensure clean and abundant water for the community.

LID landscapes can use different design styles. Corporate properties, commercial sites and many residential front yards call for a formal design. In public spaces such as parks, more naturalistic designs are often used for lower maintenance. This style recreates the appearance of a natural landscape by organizing plant material asymmetrically in groupings such as those found in meadows, forests or other natural ecosystems. At first glance, an LID landscape looks just like a regular garden and can fit into any land use type – a mall parking lot, a local park or the front yard of a home. It can integrate seamlessly with the urban form, creating greener communities.

A basic ecological principle is that organisms adapt to their environment over time through the processes of evolution and natural selection. Plants are dependent on six environmental factors: light availability, temperature, soil type, moisture, nutrients and pollutants/ disturbances.

Light and temperature are typically a product of climate and vary in response to altitude, aspect (i.e. positioning relative to sunlight), proximity to buildings and proximity to large bodies of water. The remaining four factors – soil, moisture, nutrients and pollutants/ disturbances – vary at the site level and under natural conditions, resulting in vegetation communities formed by

Photograph by Credit Valley Conservation

Elm Drive in Mississauga has been retrofitted according to LID practices. Rainwater is directed through permeable pavers into bioretention cells (rain gardens). In these cells, water is cooled and filtered before it infiltrates into the ground.

Photograph by Credit Valley Conservation

Joe-pye weed thrives in the range of moisture conditions found in rain gardens.

adapted plant species.

When selecting plants for your garden, it is important to know the characteristics of plants and decide which functions they need to fulfill for you. Is the plant a groundcover that spreads slowly in the open or in shade, or is it an aggressive colonizer that disperses clouds of seed or sends out surface runners or underground rhizomes to cover large areas rapidly? Does it stabilize the soil? Does it allow for easy infiltration of water into the soil? Does the plant slow down the flow of water? Does the tree or shrub mitigate ambient temperatures by providing shade? Does it provide screening or visual buffering? Does the plant offer wildlife habitat in the form of cover, food and nesting materials? Does it treat pollutants? How readily does it draw nutrients from the soil? Can it act as a barrier to trespassers or limit access to the property? Every plant has one or more functions that need to be taken into consideration.

The relationship between soils and plants is important, especially in LID design. It is essential to understand the basic characteristics of soil such as particle size, structure, drainage, soil depth, fertility and pH. Plants placed in LID landscapes are chosen in part based on their compatibility with the soil.

LID landscapes must also collect and infiltrate large quantities of rainwater. Soils with high infiltration rates and minimal compaction are ideal for LID practices. Sandy soils with infiltration rates of 15 millimetres/hour (or 1/2 inch per hour) or higher are best. In many cases, topsoil will require amendment with organic matter to achieve appropriate infiltration rates.

In southern Ontario, climate conditions range from very wet summers to periods of drought. Plants used in LID landscapes must be adapted to both. LID practices can be adapted to situations where very little water might collect or the bottom zone could have standing water for up to 48 hours after a storm. Plants intolerant to drought conditions will, obviously, have low survival rates in the wet. Those with low tolerance to flood conditions will grow slowly and reproduction rates will be reduced. In addition, the lack of oxygen may lead to root system death or decay. Plants adapted to flood conditions have enhanced oxygen transport systems and physiological adaptations that allow them to absorb nutrients appropriately within saturated environments.

PHOTOGRAPH BY CREDIT VALLEY CONSERVATION

Culver's root is one of the best plant selections for rain gardens as it is able to thrive in both droughts and flooded conditions.

It is important to distinguish between moisture-loving and moisture-tolerant plant species. Relatively few species are truly aquatic (adapted to withstand inundation) in southern Ontario. These "wetland obligate" species are *always* found in wetlands but will probably do okay in somewhat drier locations such as a nursery or garden. "Facultative wetland" species are *usually* found in wetlands but they are more versatile and can be grown in non-wetland conditions. Since LID practices rely on natural water cycles (no additional watering after the plants are established) using wetland obligate and facultative wetland species will ensure there is enough diversity of species present to thrive in the site-specific moisture conditions found in urban settings.

Note that plant species vary greatly in their ability to tolerate and assimilate pollutants and toxins. Choose plants that tolerate the conditions in your LID landscape.

The goal of planting design for LID practices is to achieve a sustainable vegetation community that is tailored to the ecological qualities of the site, while creating a beautiful landscape. Plant selection for LID practices is founded on the principle of "right plant for the right place." If you need more guidance on choosing plants, look for CVC's Landscape and Design Guide at www.bealeader.ca.

Iris versicolor, blue flag iris	Wetland obligate
Eutrochium maculatum, spotted Joe-pye weed	Wetland obligate
Veronicastrum virginicum, culver's root	Facultative wetland
Rudbeckia hirta, black-eyed Susan	Facultative wetland
Schizachyrium scoparium, little bluestem	Facultative wetland
Sambucus canadensis, common elderberry	Facultative wetland

Samantha Paquette is a water resources specialist and Julie McManus coordinates education and outreach to promote LID at Credit Valley Conservation.

That Friggin' Phrag'

by Bill Moses

Are you aware of the phragmites problem? We all know that at one time our native species thrived in a balanced ecosystem that is now being compromised by the rapid spread of some non-native plants. *Phragmites australis* (also known as common reed) is one of the worst offenders, forming colonies that cover wide areas and accumulate such a dense mat of litter that no other species can grow there. Even worse, it loves wetlands, where reside some of our most fragile and diverse ecosystems. That said, it should be noted that our native variety (*Phragmites australis* v. *americanus*) co-exists happily with other species in its preferred wetland environment (see sidebar on page 12).

It may be beyond the capacity of an individual to eradicate massive colonies (professionals with chemicals, burning capability and lots of money are better equipped to handle that), but remember that every huge colony started out as a small one. Although some people who have attempted to deal with small infestations have given up the task as hopeless, I propose that individuals can control smaller patches of phragmites, not necessarily by killing the plants, but by keeping them crippled. Admittedly, it's a long-term project, but satisfying.

Photograph by Bill Moses

The alien Phragmites australis.

Anthropomorphization of the plant can add zest to the game. David might not be able to slay Goliath but keeping him on his knees leaves him harmless. (Take that, sucker!)

In May of 2010, having just emerged victorious from a battle with periwinkle (*Vinca minor*) on a Nature Conservancy of Canada property in Chatsworth, Ontario, I turned my attention to a patch of *Phragmites australis* v. *australis*. It was (and still is) just down the road from my house.

How did phragmites come to be there? Our municipality had "cleaned out the ditches" so that water would not back up onto the roadway. Almost surely their equipment carried bits of root from somewhere else and deposited them on bare moist soil resulting in phragmites being inadvertently planted in ideal conditions. A new colony was born.

In dealing with invasives, one must consider how the plant propagates itself. Garlic mustard (*Alliaria petiolata*), for example, is a biennial that reproduces only from seed. Removing the flower heads before they go to seed provides some measure of control. Seeds can remain in the ground for several years (possibly up to 30) so it is necessary to remove the flowers each year; once you miss a year you have to start all over again. Phragmites, however, is a perennial, and the entire plant, including the root system, must be removed. This is an almost impossible task since any piece of root left in the soil or carried someplace else has the potential to start a new colony. (Gardeners face the same problem with goutweed

Photograph by Bill Moses

Phragmites sends out underground roots (rhizomes) which pop up as new plants. If the going is too tough underground, phragmites will resort to sending out aboveground roots or stolons that then form new plants.

[*Aegopodium podagraria*]). In all the places I've seen the alien phragmites, it's pretty obvious that it was introduced by humans (usually unintentionally). Phragmites can reproduce from seed but is a rare enough event that a few years ago this method of reproduction was dismissed as insignificant. In my view, removing the flowers merely saves energy that the plant can then put into expanding the colony through its root system.

I picture phragmites as a subterranean being with wants and needs. It wants to expand its colony, but it needs food and water. It gets its water underground by sending roots (rhizomes) out for several metres. However, even searching for water requires energy in the form of food. The plant's leaves (the food factory) produce food with the help of the sun (photosynthesis). The more leaves and the bigger the plant, the more food is produced and the greater is the potential for the colony to expand. Each time a leaf is removed, the plant has to expend energy to produce a new leaf. One can eliminate periwinkle in one or two years by depriving it of sunlight. However, it appears that phragmites has much bigger food reserves and greater tenacity.

So how am I dealing with it? I started by cutting down the old stalks with ordinary old-fashioned garden shears. Now I cut down new growth with a grass whipper. As other species of plants emerge, I try not to damage them by cutting only the part of the phragmites that sticks up above the other plants. I also snap off individual plants as low as possible by hand. I spend 15 or 20 minutes at a time keeping the space pruned and I feel that I am (very) slowly moving toward victory.

One common belief is that if you cut off a plant at the base, five more will take its place. Therefore, cutting off the plant only makes the problem worse. While it is true that there will be sprouting from the root system, I look at it this way: the root system is the real enemy. It gets its food from the aboveground portion of the plant. Every time you remove a plant (or leaves) you are depriving the root system of sustenance. All its stored energy then has to go towards producing new plants; with luck, there is no excess food that it can use to expand its area. As native plant competition flourishes, this also takes away sustenance from the plant. The real secret, as with any weed, is to realize that this will be a long-term

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PHOTOGRAPH BY BILL MOSES

This photograph shows that the non-native phragmites creates an impenetrable mat that only a shoot of the same species can poke through.

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(perhaps endless) battle. Truth be told, once every month or so during the growing season, I return to the former periwinkle patch to spend a few minutes looking for periwinkle sprouts and I find a few almost every time.

It is my sincere hope that I have given you the courage to join in the battle against the further spread of this alien species.

Bill Moses can claim no formal accreditation of a botanical nature. His passion is the study of the approximately 175 species of woody plants recorded as native to Grey and Bruce Counties in Ontario. He pursues this passion by volunteering at the Inglis Falls Arboretum. One of his pastimes is eradicating invasives.

Native phragmites

The native variety of phragmites (*Phragmites australis* var. *americanus*) is much less aggressive than the alien species.

There are enough physical differences between the two varieties that even an amateur like me can be fairly certain which are which. Of course, the physical examination of a properly collected sample by a recognized herbarium will give the definitive answer.

- The easiest thing to look for is redness in the stem where it is directly exposed to the air and not covered by the leaf sheath. This type of exposure first appears towards the bottom of the plant.

PHOTOGRAPH BY BILL MOSES

*Unlike the alien, native phragmites coexists with other species such as the red osier dogwood (*Cornus sericea*), marsh fern (*Thelypteris palustris*), pussy willow (*Salix discolor*), sage-leaved willow (*Salix candida*), balsam poplar (*Populus balsamea*) and spotted Joe Pye weed (*Eutrochium maculatum*) in this photo.*

PHOTOGRAPH BY BILL MOSES

The red stem of the native phragmites.

(I must admit that at one of my "native" locations, although the plants exhibit nearly all of the characteristics of the native variety, the stems are not red, proof that a botanist's job includes a lot of head scratching.)

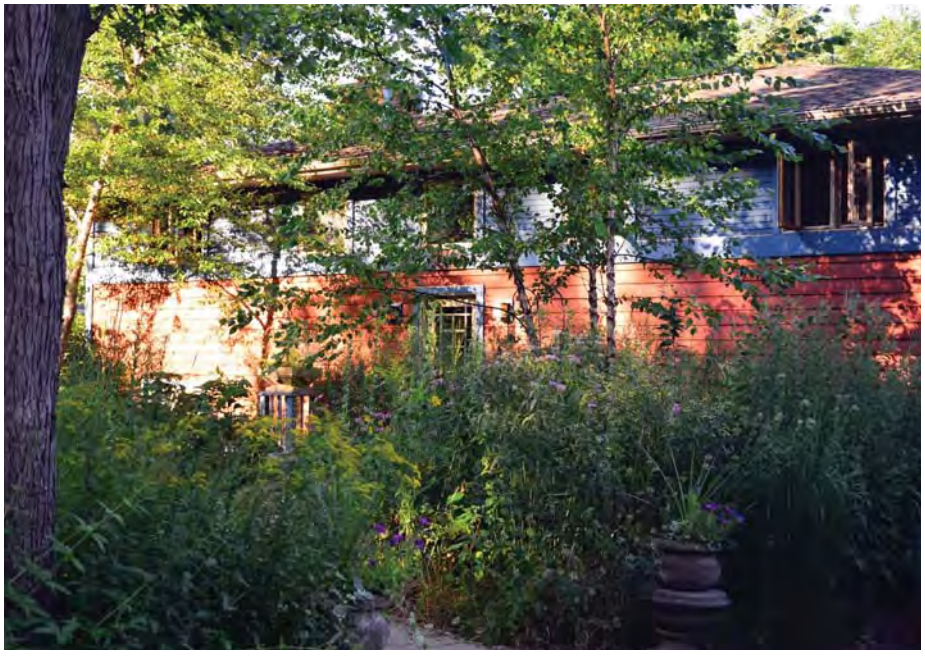
- The literature also states that the width of the ligule (the solid portion) is smaller in the non-native variety. I found the non-native variety to be less than half a millimetre in width, but greater than that in the native variety.
- The base of the leaf blades was less auricled and clasping in the native variety. Also, white hairs extending from the ligules were shorter, only one millimetre (.04 inch) as opposed to 10 millimetres (.4 inch) in the non-native species. These white hairs are deciduous (meaning they fall off) so it is best to look at the most recent leaves close to the top of an actively growing plant to observe this feature.
- The alien phragmites has a distinctive and demarcated yellow colouring where the leaf blade transitions into the leaf sheath.
- When I looked at the leaf under a microscope I felt that there was a slight difference in venation at the midrib of the leaf.

Bill Moses

Time to Rethink Natural Landscaping: Rewilding Your Yard

by Bret Rappaport

In *Walden*, Henry David Thoreau famously wrote, "In Wilderness is the preservation of the world," capitalizing the "w" to show its primacy. Some 75 years later, in *Wilderness Values*, Aldo Leopold wrote, "…one of the symptoms of immaturity in our concept of recreational values is the assumption . . . that a small park or forest has no place for wilderness." He then declared, "No tract of land is too small for the wilderness idea. It can, and perhaps should, flavor the recreational scheme of any woodlot or backyard." Combine these observations and you come to the realization that the resurrection of wilderness in our yards is crucial to the survival of our planet. So here and now I send the challenge to wildflower gardeners, natural landscapers and native plant enthusiasts everywhere to begin to rewild their yards!



Photograph by Bret Rappaport

Rewilding our yards is the next logical and necessary step in the evolution of the Natural Landscape Movement. The movement's modern roots trace back to Rachel Carson and 1960's progressivism. The modern Natural Landscape Movement boasts three branches. The first and oldest branch is organic gardening. Whether planting tomatoes or berries, organic gardeners eschew synthetic fertilizers and pesticides, and cultivate heirloom species. The second branch is the large-scale installation of native landscapes on corporate properties, military bases or other large sites. The third branch is residential natural landscaping: minimizing lawns and exotics and planting native plants in natural environments. It's time to rewild the third branch.

Rewilding, a term coined by conservationist David Forman, is a concept central to conservation biology. At its most basic level, rewilding means returning habitats to their natural state. In their landmark work, biologists Michael Soulé and Reed Noss applied this concept to large areas of land. In the article "Rewilding and Biodiversity: Complementary Goals for Continental Conservation" (*Wild Earth 8*, fall 1998), they declared that rewilding is "the scientific argument for restoring big wilderness based on the regulatory roles of large predators." Soulé and Noss recognize three independent features that characterize contemporary rewilding: 1) large, strictly protected core reserves (the wild), 2) connectivity and 3) keystone species. Rewilding is the mass restoration of entire ecosystems. As chronicled in his wonderful new book *Feral*, George Monbiot, an English environmental and political activist and writer, outlines how large-scale rewilding brought back wolves to Yellowstone, whales to the southern ocean and beavers to Wales. As a biological practice, rewilding means giving the management of nature back to nature, but it is more. Rewilding is a frame of mind, a radical rethinking of how we relate to nature.

The residential branch of the Natural Landscape Movement stands ready for both new management and a paradigm shift. It beckons its adherents to 1) return the management of nature to nature and 2) embrace the concept of a relationship with wild nature in their own yards. Management of our natural landscapes has heretofore included all sorts of planning, installation and maintenance. To be sure, the motivation for such tame landscaping is laudable and the results benign. We design our yards to "look natural" and select the plant species that attract the wildlife we desire, then we weed and prune and pluck that which we decide does not belong. But rewilding takes natural landscaping to the next step – by stepping back. It emphasizes processes rather than static preservation.

The rewilding of urban spaces is catching hold in Europe. Matthias Deimer explains in his article "Urban Wilderness in Central Europe" (*International Journal of Wilderness* 9.3, 2003) that when we rewild urban and suburban areas, "…the maintenance or reestablishment of natural processes, including vegetation succession, floods, wind throws and

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insect calamities, are expressly tolerated. Reestablishment of natural processes also implies rewilding since management is effectively terminated." To participate in this exciting movement, we natural landscapers need to do more of less – less planning, less installation and less maintenance.

In practice, this means letting go: allowing the tree to lie where it fell, the drought-stricken sedge to thirst and the yard to remain unfenced. I know this goes against the residential natural landscaper's orthodoxy which I advocated for years: start small, cultivate some traditional looking plants and maintain a fence as an aesthetic border, all to please neighbours and ease the process of acceptance and understanding of that which is different. That was my mantra.

No more!

The next stage beckons. We natural landscapers need to be proud, not apologetic. That does not mean eschewing common courtesy or ignoring that we live in a community of people. It means declaring with our yards, that nature, not man, is king. In so doing, we contribute to environmental awareness where people live and environmental problems pervade, in cities and towns.

To be sure, the hands-off approach brings challenges. First, there may be problems with neighbours, so-called stakeholder conflicts. People concerned about "weeds, vermin and hay fever" will complain more. Second, the outcomes of rewilding are uncertain. Third, rewilding may increase opportunities for invasives to become re-established. Finally, there are the practicalities of land use such as my need for some lawn in my yard so I can play catch with my son. I don't know the answers to these challenges but I know that they will be raised. We will assess them and overcome them. We must.

More than a solution to ecological woes, rewilding reorients our world view. To change our relationship to nature and each other – striving for peace and tolerance – we must live by Aldo Leopold's land ethic: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

In an interview published in *Orion* magazine, Monbiot describes the existential and personal fulfillment that rewilding stimulates: "If we have spaces on our doorsteps in which nature is allowed to do its own thing, in which it can be to some extent self-willed, driven by its own dynamic processes, that, I feel, is a much more exciting and thrilling ecosystem to explore and discover, and it enables us to enrich our lives, to fill them with wonder and enchantment."

Extreme weather, ocean acidification, drought, insect outbreaks, reduced agricultural yields, health impacts in cities due to heat and flooding are all here. California is in the fourth year of the worst drought in 1,200 years. We must do what we can to reverse the causes of climate change. We must do what we can to live the land ethic. Rewilding our yards is one way. Pull down the fences and welcome the wildlife; block the ditches so the water doesn't drain; don't use salt on roads in the winter. Any deviations from nature's course must be essential to maintain human life, health or safety. They must not be governed by whims or aesthetics.

Last winter, a large old vine-covered black cherry (*Prunus serotina*) crashed down in my side yard. I planned to take the chainsaw to it in the spring and rebuild my firewood pile. But having just finished this article, which had been germinating in my mind for a month, I decided that the tree should lie right where she fell. What she begets will be interesting to observe. Let rewilding begin.

PHOTOGRAPH BY BRET RAPPAPORT

Bret's son Jeremy working in the backyard pond a number of years ago. Jeremy is now a wildlife biologist with the U.S. government.

Bret Rappaport is a Chicago-based attorney who, for more than 25 years, has worked on behalf of natural landscapers whose efforts are challenged by weed laws, uninformed neighbours and village officials. He is also a national director of Wild Ones Natural Landscapers, Ltd.

Continued from page 1 – **Black Cherry**

PHOTOGRAPH BY GREGOR BECK

Mature "burnt corn flake" bark of black cherry.

droop. The "burnt corn flake" appearance of the bark is the most diagnostic field identification mark for older black cherries, especially for larger forest specimens where branches and leaves are far out of reach. The bark of younger trees is smooth and reddish-brown to black, with grey, horizontal marks (lenticels).

The simple and alternate leaves are narrow, oval and finely toothed. Leaves emerge relatively early in spring and are bright and shiny green above, paler below. The midrib on the lower side of the leaf is fringed with a mat of fine brown hairs on either side. In fall, leaves can turn to yellow, orange or deep red. Black cherry blooms in spring with small white flowers occurring in loose clusters on terminal spikes. The fruit is dark purple to reddish-black, bitter to the taste but edible for humans and animals.

The wood of black cherry is renowned for its strength, hardness and beauty; it is also easily worked and finished. The rich reddish wood is highly prized for furniture, cabinetmaking, veneers, paneling, trims and tool handles. It also makes about the finest canoe paddle available. While a plank of any sort might get you across the lake, a finely carved paddle made of cherry wood will get you there with style and precision of stroke and movement.

Black cherry fruit can be used to make wines and jellies. Appalachian pioneers would flavour rum or brandy with black cherry fruit to make a beverage called "cherry bounce," hence the tree's moniker of rum cherry.

Black cherry is one of the species planted for habitat restoration and remediation of former surface mining sites because it tolerates diverse soil and moisture conditions, including harsh dry environments. Although seldom relegated to the woodpile, a stick or two of cherry on an open campfire provides a sweet aroma and excellent coals.

The flowers attract pollinators and other insects; this, in turn, attracts more wildlife. Porcupines nibble the bark and white-tailed deer feed on the leaves and twigs. (Leaves, especially the wilted ones, twigs, seeds and bark are, however, toxic to livestock.) Foxes, squirrels, opossums, black bears and a lengthy list of birds (including woodpeckers, grouse and turkeys) are known to eat the fruit. Happily, they all disperse the pits (the tree's seeds) far afield and help new generations of trees grow.

On a personal note, I treasure a lovely cherry wood library chair a colleague gave me at the end of my stint with a conservation organization. The gift meant a lot because the quality and beauty of the black cherry wood reflected our wonderful working relationship in conservation over many years.

Gregor G. Beck is a consultant in conservation, communications and wildlife ecology. He currently serves as Acting Ontario Program Manager with Bird Studies Canada.

Calendar of Events

SEPTEMBER 18, 2015
New York Botanical Garden Native Plants Summit: Current Status, Conservation and Outlook for Plants of the Northeast
New York, New York
More information and registration at nybg.org/adulted.

SEPTEMBER 19, 2015
Invasive Plant Management Techniques
Saukville, Wisconsin
Held at the University of Wisconsin Milwaukee Field Station. Visit wildones.org/events/invasive-plant-management-techniques/ for details.

SEPTEMBER 25-26, 2015
Wetland Restoration
Saukville, Wisconsin
Visit wildones.org.

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