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Native Plant to Know

Pussy Willow

Salix discolor

by Katie MacDonald

Visiting my grandmother as a little girl in the last weeks of winter always involved a walk down to the bog to see what was hatching, swimming or growing along the water's edge. As we walked, my grandmother would tell our family a story. One spring, several little kittens playing along a meadow's edge fell into a rushing stream and were almost carried away. The graceful willow tree dipped her branches into the frigid water and allowed the kittens to grab hold, saving them from drowning. My grandmother knew that when we arrived at the wetland, we would be delighted to see the soft, silky pussy willows (*Salix discolor*), the tree from her story – our first sign that spring was awakening.

Resembling cats' paws, pussy willows emerge covered in silvery-grey, fur-like hair that acts as insulation, protecting the buds from the cold temperatures of early spring. This type of flower, known as a catkin (from *katteken*, Middle Dutch for little cat or kitten), is a slender, elongated cluster of single-sexed flowers, lacking petals but with a spiky texture instead. Pussy willows are dioecious, meaning each individual plant is either male or female, but only the male trees produce the silky-soft pussy willows. These male catkins have many tiny flowers full of pollen that

bud and bloom earlier than the dull, greenish catkins produced by the female shrubs. Pollen from the male plants is distributed to the females, mostly by flies and bees. All catkins form on the bare branches of the plant long before the leaves appear, making them very easy to spot.

Early leaves can be hairy, but once they emerge, they become hairless and tend to be green, long, toothed and lance-shaped. The twig bark is greyish brown and can be tinged with red, but the more mature trunks have darker grey, scaly bark. In its natural form, pussy willow is multi-trunked and can grow to be four to six metres (15-20 feet) tall.

Pussy willows thrive in loamy, rich soil, especially along the banks of rivers and streams in full sun. They typically grow in communities where new vegetation emerges from canopy disturbance events in wetlands or open water; the plants are rarely found beyond the water's edge in the wild. *Salix discolor* is native to temperate climates with a cold winter, typical of much of southern Canada and the northern United States, but will grow, albeit more slowly, in warmer areas.

You can easily grow pussy willows in your garden if you have a sunny wet patch, by propagating new plants from stem cuttings. Select a new branch of

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Spring's
Harbinger
(Pussy Willow ~
Salix discolor)

ILLUSTRATION BY JACKIE GALLAGHER

The Blazing Star is . . .

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Serviceberry (*Amelanchier* sp.)

PHOTOGRAPH BY RICHARD KINGSLEY

Plant Sale Highlights

Stacey Shannon, one of the hardworking members of the NANPS Plant Sale Committee, conducted a mini-survey of her fellow committee members to find out where to shine a spotlight this year. They came up with two lists.

Hard-to-source native plants that NANPS was able to obtain for the spring plant sale:

Poke milkweed (*Asclepias exaltata*) – flowers dangle daintily from this larval plant of monarch butterflies

Green dragon (*Arisaema dracontium*) – an architecturally arresting plant that prefers rich woods and streambanks

Spicebush (*Lindera benzoin*) – an early-blooming woodland-garden shrub

Wild blue phlox (*Phlox divaricata*) – a pretty groundcover that loves woodlands and stream banks

Underappreciated native plants:

Swamp milkweed (*Asclepias incarnata*) – “a pollinator banquet,” according to committee member Kathy Edgar

Serviceberry (*Amelanchier* spp.) – three species of this delightful spring-blooming shrub will be available this year – *Amelanchier alnifolia*, *A. laevis* and *A. sanguinea*.

New Jersey tea (*Ceanothus americanus*) – a pollinator-friendly shrub for dry situations

Pearly everlasting (*Anaphalis margaritacea*) – the alluring name says it all for this perennial of dry meadows, open thickets and roadsides

Flat-topped white aster (*Doellingeria umbellata*) – a tall, early-fall nectar producer

Don't forget to include ferns (NANPS will have nine species for sale this year), sedges (eight species) and grasses (16 species) in your garden! Many thrive in hard-to-grow places like dry shade, feed pollinators and provide interesting structure and accents for your yard.

To our indefatigable Plant Sale Committee we offer our long-overdue thanks. If you wish to join them in any capacity, please contact volunteer@nanps.org.



NANPS Plant Sale in 2023

PHOTOGRAPH BY JANET CARNEGIE

The Baskin-Robbins Method

by Sayeh Beheshti

Gardeners are a crafty group. I am often amazed by their ability to turn almost anything into a gardening tool. Years ago, I heard about using horizontal blinds as labels for pots, but it was only through trial and error that I learned that soft lead pencils are the only writing utensil that won't fade over time. My favourite mini-greenhouses were the ones sold by Swiss Chalet but, sadly, they have been discontinued. My own humble contribution to this proud tradition of finding the hidden potential in everyday products is through what I refer to as the Baskin-Robbins method of potting up seedlings. I joke that this method turns the job of potting up thousands of seedlings into an enjoyable task since I associate it with the joy of eating ice cream! It all begins with the simple pink spoon that is perfectly shaped to create the

indentation you need to pot up seedlings.

First, I prepare a tub of dampened potting soil. I gently remove a seedling from its communal pot by loosening it from the rest, and place it on the table. I hold the pot at a 45° angle, which allows me to fill it halfway. I make an indentation with my Baskin-Robbins spoon to cradle the seedling. My goal is to place the seedling in the cradle and cover it with soil so there is minimal damage to the roots.

Once I have most of the soil covering the roots, I straighten the pot and put extra soil around the neck of the seedling, positioning it in the center of the pot.

An added benefit of using the Baskin-

Robbins potting method is that each time you visit the store, you are picking up gardening supplies with a bonus scoop of ice cream!

Sayeh Beheshti is a two-time winner of the NANPS Native Plant Garden Video Contest.



PHOTOGRAPH BY SAYEH BEHESHTI

Potting up butterflyweed (*Asclepias tuberosa*)



PHOTOGRAPH BY SEAN JAMES

This Milton, Ontario, lawn was converted into a meadow, encouraging floral and faunal biodiversity and sequestering carbon. Cup plants (*Silphium perfoliatum*), big bluestem

(*Andropogon gerardii*) and purple coneflower (*Echinacea purpurea*) support pollinators and larvae, kickstarting the whole food chain!

Life Returns after Dam Removal

by Evan Cantor

It's early summer on the Elwha River in the heart of Olympic Peninsula, Washington State. Clouds are rolling by, heavy with Pacific moisture. The sun has managed to peek through, lighting up dazzling displays of wildflowers. One meadow, covered with Oregon sunshine blossoms (*Eriophyllum lanatum*), glows a phosphorescent yellow. A few moths are flitting around this Lepidoptera magnet, a member of the Aster family. If deer happen to wander through the meadow, they will ignore the plants' unpalatable woolly leaves. Another patch of meadow is a mass of lavender, a field of fragrant riverbank lupines (*Lupinus rivularis*). The multicoloured blossoms have attracted pollinators, perhaps a rufous hummingbird, hungry for nectar after an arduous journey from Central America to its summer range.

Five varieties of salmon, mostly Chinook (a.k.a. king salmon), are making their way upstream to their spawning grounds. A mother black bear is fishing for dinner along the sandy bank, while her two cubs remain safely hidden in a thicket of young Douglas fir (*Pseudotsuga menziesii*). A bald eagle heads upriver to grab a longfin smelt that has swum upstream. A pair of blacktail deer have found the last green buds of spring in a grove of Sitka willow (*Salix sitchensis*). A small group of elk cows are browsing young cottonwoods (*Populus balsamifera*). The miracle of nature is on full display – made possible by the demolition of two massive dams, the Lower Elwha and the Glines Canyon.

Even more miraculous is that, only seven years before, the landscape had been flooded beneath an impounded reservoir. The Lower Elwha Dam, 4.9 miles (three kilometres) from the river's mouth, was constructed in 1913. With no provision for fish passage, the dam cut off the remaining 60-plus miles (97 kilometres) of

mainstream and tributary fish-spawning habitat. The annual salmon run was reduced from 400,000 fish per year to 3,000. The Glines Canyon Dam, further upstream, was completed in 1926. Both were hydropower dams designed to support the local timber economy, ignoring the fate of the salmon and the First Nations, whose lives were inextricably linked to the fish. However, by the 1980s, priorities had shifted. Salmon populations were endangered across the entire region and dam licensing within a national park (in this case, Olympic National Park) had become both questionable and contentious.

In 1992, the United

States Congress approved the Elwha River Ecosystem and Fisheries Restoration Act. The proposed restoration project was an experiment. Although many dams had been removed throughout the United States over the last century, nothing on this scale had ever been done. It would take two decades of planning to



PHOTOGRAPH BY JOHN GUSSMAN



Riverbank lupine

PHOTOGRAPH BY JESSE MAJOR, COURTESY PENINSULA DAILY NEWS

execute. Ultimately, the Lower Elwha Dam was removed in 2011 and Glines Canyon in 2014. The return of plant life was documented by Joshua Chenoweth, the botanical restorationist in charge of the revegetation effort on the Elwha River after the historic dam removal. In 2018, he reported to the *Peninsula Daily News* in Port Angeles, Washington, that revegetation had proceeded “way faster than anybody predicted.”

The first sign of success was the return of salmon to the middle Elwha less than a year after the lower dam was removed. Salmon are a keystone species upon which other species in an ecosystem depend for their survival. Because the fish come upstream to spawn and die, they bring ocean nutrients to the terrestrial environment, feeding all manner of wildlife from bears to bacteria. Ocean-

born nitrogen from salmonids was historically an important nutrient contributing to riparian vegetation. In 2011, prior to dam removal, the Washington Department of Fish & Wildlife (WDFW) released 700 hatchery coho salmon above the Lower Elwha Dam. WDFW indicated that these hatchlings were genetically identical to the wild fish using the river below the dam. Subsequent to their release, 100 redds (nests) were documented in the river’s tributaries. A WDFW study identified 131 species that directly or indirectly depend on salmon in their diet: 41 mammals, 89 birds, five reptiles and two amphibians. Stoneflies, caddisflies and blackflies all feed on the salmon carcasses.

In the wake of both dam removals, large, sediment-filled mudflats replaced the flooded valleys. To the delight and surprise of all concerned,

two-thirds of the sediment, amounting to over 847 million cubic feet (24 million cubic metres), made its way downstream within three years. Ninety percent of that load reached the coast under the power of the liberated river. The sediment stored in those two reservoirs for almost a century rebuilt the Elwha’s estuary, moving the mouth of the river nearly a half-mile (800 metres) further out. It also re-established the historic sandbar, which in turn protected nearby beaches from heavy wave action. With the waves no longer washing away fine sediments, sandy beaches and shallows reappeared where there had been only coarse gravel and rocks during the dam years. This fine-grained sand is preferred by the vast majority of aquatic species, including Dungeness crab, a tiny fish known as sand lance, surf smelt,

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PHOTOGRAPH BY JESSE MAJOR, COURTESY PENINSULA DAILY NEWS

Oregon sunshine in bloom on restored land in the Elwha River basin

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hardshell clams and many other smaller fish. They make up the preferred diet of salmon, birds and other marine life, animals that all quickly moved in to colonize the emerging wetland.

Although the river was scouring sediment from its own bed, the formerly flooded Lake Aldwell and Lake Mills were now 800 acres (320 hectares) of desolate silt and clay-covered uplands, deep silt and clay deposits, and coarse rock and gravel on the valley floors. Olympic National Park employees, members of the Lower Elwha Klallam Tribe, Washington Conservation Corps and other volunteers went to work. The park established the Matt Albright Native Plant Center in nearby Sequim, Washington, to handle the massive scale of replanting. It is estimated that 320,000 rooted plants were transplanted from the nursery to the lakebeds. Over 7,000 pounds (3,171 kilograms) of native seed were collected from the Elwha watershed and distributed on the exposed lakebeds. Douglas fir was the most common seedling planted. Other rooted plants included grand fir (*Abies grandis*), western red cedar (*Thuja plicata*), western white pine (*Pinus monticola*), thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), Nootka rose (*Rosa nutkana*), big leaf maple (*Acer macrophyllum*), fast-growing cottonwood and riverbank lupine. In 2017, just a few years after dam removal, red alder (*Alnus rubra*) had migrated into the area and was dominant, a pioneer species that readily colonizes openings in forests disturbed by landslides, fire and logging. The trees were up to 25 feet tall (7.6 metres) with 12,000 stems per acre (two-fifths of a hectare).

One of the lessons learned in this process was that seedlings in the areas planted with riverbank lupines were growing better than in the areas without lupines. Lupines are rapidly growing members of the pea family

(Fabaceae) with deep taproots that typically enjoy well-drained, sandy soils; this is exactly what was left on portions of the exposed lakebeds heavy with 100 years' worth of sediment. These plants provide shade, which preserves soil moisture and protects other seedlings from drying out in sun and wind. Riverbank lupine also provides cover and food for birds

and small mammals. It is known for its nitrogen-fixing properties, which give it an advantage where other species struggle, especially in nutrient-poor soils. *Lupinus rivularis* is especially attractive to bumblebees, which feed on the pollen and nectar, and is thought to be a host for western-tailed blue and orange sulphur butterflies. This attractive



A volunteer contributing to the Elwha restoration efforts

PHOTOGRAPH BY JOHN GUSSMAN

perennial was largely absent from the Elwha watershed in recent years, likely due to the adverse effects of the dams on the lupine's habitat. In short, it is a valuable keystone species in the northwestern environment and it is no surprise that it appeared as an early successional species in the revegetation mix.

The most numerous creatures exploring the revegetated areas have been rodents, like the tiny Keen's mouse. But researchers have also noted beaver recolonization as well as animal droppings documenting the presence of deer, elk, shrews, moles, woodrats and weasels. Bears have been photographed using the revegetated area.

Above the immediate river channel and floodplain are terraces consisting mostly of coarse rocks and gravel that are more resistant to revegetation than the areas covered by fine sediments, but seeding efforts have proved very successful. In the meantime, park staff are on the lookout for invasive non-natives attempting to establish themselves in the many remaining areas of bare soil. One of the most

concerning offenders is Scotch broom (*Cytisus scoparius*), an aggressive leguminous shrub native to Europe. Mostly undesirable as forage for wild animals, it forms mono-specific stands, crowding out native plants. Other notable invasives in the Elwha watershed are Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*), Japanese knotweed (*Reynoutria japonica*) and the confusingly named Canada thistle (*Cirsium arvense*), which is not native to Canada at all. The native vegetation faces competition from non-native invasives but, so far, those have appeared rarely in randomized plot studies, another indicator of the restoration project's success.

This success story has emboldened dam opponents and rewilding activists elsewhere. Thanks to community activism on the border between California and Oregon, all four dams on the Klamath River are slated to be demolished by the end of this year (the first one, the Copco #2 Dam, was removed in the fall of 2023). The first dam on the Klamath was constructed in 1908, with the others completed by

1962. This nearly rendered extinct the population of anadromous fish (those species that rely on freshwater and saltwater to complete their life cycle). A massive fish-kill event in 2002 made national news and energized activists, but it was another eight years before a legislative agreement was signed by all interested parties. It wasn't until the electric power utility PacifiCorp deemed its hydroelectric facilities obsolete that significant progress was made. Still, there remains opposition to the project. Property owners along the impounded Copco Lake will lose their prime waterfront locations. Is it any wonder that activists are still holding their breath?

Ultimately, it will take generations for the former lakes on the Elwha River to return to a state most fully resembling the pre-dam environment. Nonetheless, the remarkable success of the Elwha revegetation project demonstrates that nature, given the opportunity, will bounce back. It is well known that biodiversity is key to environmental resilience. In the face of a changing climate, our Mother Earth needs as much help restoring that elusive "balance of nature" as she can get. As generations succeed one another, the Elwha River Ecosystem and Fisheries Restoration Act will continue to stand as a watershed moment in environmental restoration, an inspiration for rewilding, as we face an uncertain future.

Evan Cantor is a musician, artist and gardener living in Boulder, Colorado. He loves seeing fish and tiger salamanders in Colorado's high-country waters and – horror of horrors – likes to hike off trail in the wilderness.

Special thanks to Joshua Chenoweth in the drafting of this story and to Jesse Major and John Gussman for the use of their photographs. To see John Gussman's spectacular documentary about the restoration of the Elwha, Return of the River, visit elwhafilm.com.



PHOTOGRAPH BY JOHN GUSSMAN

Sediment that settled at the mouth of the river after the dam was demolished

Power, Money and Sex: Female Botanists and Native Plants

by Janice Keil

If you think native plant gardening is a fun, congenial and ecologically important hobby, you are assuredly a product of the 21st century. Back in the 17th and 18th centuries, native plant hunting, collecting and growing, as well as the transatlantic seed trade, were all about patriarchal power, scholarly ego, money and sex.

Heads of major companies, developers, mega-landowners and governors, all über-wealthy men with lots of free time to dabble in their botanical hobby, engaged in cutthroat competition for colonial conquest. Who would be the first to complete his shopping list and find his “most wanted” of the New World’s horticultural novelties? Who would get credit for naming the “exotics” they scooped up to stock their gardens back in Britain or France (think John Tradescant’s Oxford Physic Garden, now the Oxford Botanic Garden)? They were members of The Royal Society, the elite British old boys’ club. Anyone not allowed in as a member was relegated to obscurity or deemed a mere “correspondent.”

Enter the women! At the beginning of the 18th century, unlike zoology and ornithology, fields of study to be “trod by men alone,” botany was finally deemed a suitable subject for women to pursue. However, as Peter Collinson, a British native plant dealer in the Americas, put it in 1755, plant collecting and preservation should be kept as a mere “delightful amusement and a pretty accomplishment for a young lady that fills up her idle hours.” He and others were slow to recognize that women wanted to go way beyond merely twiddling their green thumbs.

Catherine Jérémie (1664-1744), a renowned midwife and botanizer in Montreal, known as “la magicienne de ma vie au Québec,” gathered information from Indigenous peoples on the medicinal properties of local plants. She attached detailed notes on



Marianne North, "Wildflowers from the Neighbourhood of New York"

the plants’ properties and effects to all the specimens she shipped on the king of France’s vessels to the Jardin des Plantes in Paris. The honour of being the first female settler botanist in the Americas rightfully belongs to Jérémie, but instead was bestowed upon Jane Colden (1724-1766). Colden, working on her New York Hudson Valley family farm, became an

expert in the then-new, exclusively guarded Linnaean taxonomy, which she used in her *Botanic Manuscript* (now at the British Museum). Men in the academic botanical pantheon, such as Asa Gray or the Swedish scientist himself, Carl Linnaeus, attempted to stop women from accessing this system of binomial classification laden with the sexual overtones of

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pollination – the marital bed between husband-and-wife plants. This attempted censorship incited British philosopher Mary Wollstonecraft to defend botany against prudery in her 1792 feminist treatise *A Vindication on the Rights of Women*.

Colden exchanged native plant seeds with well-known botanist and horticulturist John Bartram in his Philadelphia nursery, a garden decried by George Washington in 1787 as that “distasteful wild hodgepodge of plants.” So did Martha Daniel Logan (1704-1779), who started a nursery in Charleston, South Carolina, after the birth of her eighth child. She and Bartram sent seeds back and forth in

a “little silk bag,” including characteristic Carolina species such as holly (might that have been *Ilex ambigua*?) that “did not prove what he wanted.” Most likely Bartram wanted the plant to be frost hardy and it wasn’t.

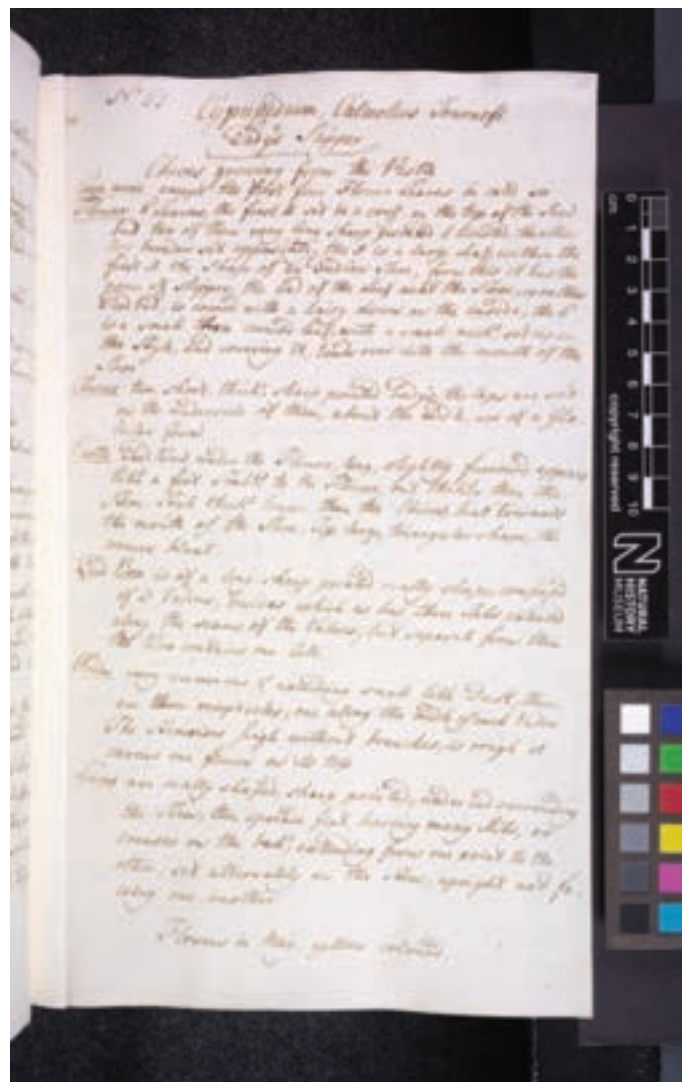
Bartram complimented both women for exhibiting the nurturing female trait of patience that predisposed them to meticulous collection and careful preservation of specimens. They were also seen as more curious, detail-oriented and accurate in their descriptions of the plants, with much better organizational skills than the men.

When the Marianne North Gallery

opened in Kew Gardens in 1882, the scientific accuracy of North’s 832 oil paintings of native plants from around the world – including from her initial visit to North America in 1871 – caused a sensation. Not only was North (1830-1890) one of the first solo, female, global plant hunters, she hung the pictures in the gallery which she designed herself. You can still visit her gallery in London, England, today.

William Jackson Hooker, the first director of Kew, commissioned four ladies of Canada’s colonial elite to contribute to his work, *Flora Boreali-Americana* (1829-1840). Out of his 120 correspondents, these four

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Two pages from Jane Colden's Botanic Manuscript, published in the 1700s, discussing and illustrating *Cypripedium* spp. (lady's slippers)



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Marianne North, "Flowers of North American Trees and Shrubs"

women, all in the land that became Canada in 1867, were the only females chosen. Mary Brenton in Newfoundland and Harriet Shepherd from Lower Canada (now Quebec) specialized in collecting bog and fen plants such as *Solidago uliginosa* (bog goldenrod). From Anne Mary Perceval, a neighbour of Shepherd's, we find an 1823 mention of *Dens canis* (the tiny dogtooth violet) and *Erythronium americanum* (yellow trout lily, a woodland spring ephemeral).

Perceval's colleague and neighbour, Lady Dalhousie, gave Hooker his long-held heart's desire, *Ranunculus rhomboideus* (Labrador buttercup, a denizen of dry, sandy prairies and open woods).

As women continued to take on the bastion of botanical power, thanks to their native plant expertise and skill in Linnaean nomenclature, they earned the admiration of the – somewhat

discomfited – male botanists. These intrepid female plant hunters led to a new generation of women botanical trailblazers in the 19th and early 20th centuries.

Janice Keil is a recently retired director of the NANPS board who, upon

discovering Emily Dickinson's herbarium of native plants a few years ago, entered an enticing world of discovery about female botanists and their admirable achievements. The result is this article, the second part of which will appear in the summer 2024 issue of The Blazing Star.

2024

Native Garden Contest

Two Categories:
Experienced and Novice

RULES:

- Deadline: September 1st, 2024
- Native Plants Only
- MP4 format ONLY!
- Submit to nanps@nanps.org
- Showcase ecology
- Specify category

Rewards for Experienced and Novice Categories

- **First Place: \$150**
- **Second: \$75**
- **Third: \$25**

NORTH AMERICAN
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Fens and Their Floristic Communities

Part Two: Fen or Bog?

by Don Scallen

What are the standard characteristics of fens? They're wet. They have peat – sometimes a lot of peat. So do bogs, of course. But unlike bogs – at least the ombrotrophic areas of bogs – fens have access to a little or a lot of groundwater. The peat mats they grow on haven't yet precluded the flow of groundwater and the nutrients it carries. This means that fens are richer in nutrients than the ombrotrophic areas of bogs and generally less acidic. What it doesn't mean, however, is that fens are alkaline and bogs are acidic – something I took as gospel prior to diving deeper into this subject. Turns out that fens range from acidic through to moderately alkaline. The pH depends on a variety of factors, including the depth of the peat mat, how much groundwater flow a fen receives, and what the pH of that groundwater is.

The productivity of fens varies with the pH. "Poor fens" are acidic. They

receive some nutrients from groundwater but not as much as "rich fens" do. Rich fens, by virtue of their higher pH and their greater access to nutrient-rich groundwater, support a more diverse flora.

Know, too, that the acidity of fens can vary with depth. The surface may be thick with sphagnum, somewhat removed from groundwater, and very acidic. Plants like round-leaved sundew (*Drosera rotundifolia*) can grow there, but other small fen plants can't, because of the acidity and low nutrient levels. However, Erik Danielson, stewardship coordinator of the Western NY Land Conservancy, interviewed on The Field Guides podcast, indicates that larger plants like skunk cabbage (*Symplocarpus foetidus*), blue-flag iris (*Iris versicolor*) and cinnamon fern (*Osmundastrum cinnamomeum*) may be present. These plants thrive in less acidic conditions, which they find by sinking their roots deeper into the sphagnum to access the mineral groundwater below.

Want more complexity? Under the general title of "fens" and the rather broad divisions of "rich fen," "poor fen," and "wooded fen" already mentioned, we have "coastal fen," "northern fen," "patterned fen," "open fen," and "prairie fen." There are likely other subcategories I'm missing, but you get the picture. Each of these subcategories could probably be divided further, but lines need to be drawn somewhere.

To sum up, fens always have some measure of groundwater that plants can tap into. This groundwater can raise the pH but not necessarily above neutral. It also, to a greater or lesser extent, raises the nutrient levels available to those plants. Beyond these rough, defining characteristics, complexity rules, dictating that different types of fens will support different types of flora.

All the complexity surrounding the various landscape features we call fens leads to remarkable floristic diversity. For someone like me who grew up in an area devoid of fens, my initial visits to these habitats evoked wonder. I was agog at the beautiful floral displays I encountered. And my experience with different types of fens was also revelatory. Visiting the coastal fens along the Lake Huron shore on Ontario's Bruce-Saugeen Peninsula for the first time was unalloyed joy.

In early June there were grass pink orchids (*Calopogon tuberosus*), wood lilies (*Lilium philadelphicum*), tuberous Indian plantain (*Arnoglossum plantagineum*), rose pogonia (*Pogonia ophioglossoides*) and other striking plants. Glorious, simply glorious! Northern watersnakes and massasauga rattlesnakes wended their way between the floral jewels. Northern harriers flew low over the peat mat, tilting in their inimitable way from side to side searching for voles. Pitcher plants (*Sarracenia purpurea*) erupted from the peat in all their macabre beauty.

The abundance of pitcher plants in

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PHOTOGRAPH BY DON SCALLEN

Green soldier fly nectaring on tuberous Indian plantain

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fen habitats served as a corrective to another belief I had long held – that pitcher plants indicated bog habitats. They do grow in bogs, but they also grow in fens – even alkaline fens. The bog connection seemed obvious: pitcher plants can survive in nutrient-poor bogs by ingesting minerals provided by captured insects. But, according to Danielson, acidity is not a prerequisite for pitcher plant growth; pitcher plants actually prefer the slightly alkaline conditions of rich fens. Their carnivory still helps them in these alkaline habitats because, again according to Danielson, phosphorus limitations can be stronger in alkaline fens than in acidic fens or bogs. Thus, in fens, the pitcher plants' famed carnivory seeks the

phosphorus that insects offer.

These coastal fens are sun-drenched, with substantial open areas devoid of trees and shrubs. The species mix is no doubt determined by the exposed nature of these fen habitats combined with the typical fen characteristics of saturated soils and groundwater minerals.

A fen further south in Ontario, which I suspect falls somewhat paradoxically into the northern fen category, has a very different assemblage of plants. Nashville warblers call and the wistful songs of white-throated sparrows filter downwards from their perches in spruce (*Picea* spp.) and tamarack (*Larix laricina*). Pitcher plants remain prominent, but most of the other

plants I found in the coastal fens don't. At this northern fen I face the dilemma of bog-fen delineation mentioned earlier. There appears to be a true bog with stunted black spruce (*Picea mariana*), Labrador tea (*Rhododendron groenlandicum*) and a profusion of sphagnum species. But along the edges of the bog, the flora becomes more diverse, with much of it characterized by Davis as indicative of wooded fen or "minerotrophic bog edge."

Regardless of whether I'm looking at wooded fen or minerotrophic bog edge, I'm amazed at how the plant communities change over the measure of a few steps. It is possible to quickly move from what I consider a bog with black spruce and Labrador tea into



Buckbean



Pitcher plant growing in a coastal fen

PHOTOGRAPH BY DON SCALLEN

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wooded fen habitat and then into open shrubby fen habitat. Davis, in *Fens and Bogs*, is bang on when he writes, “Fens and bogs are complex units of the landscape and often have considerable variation in soil chemistry and flora within the same fen or bog.”

So, steps away from the pitcher plants grow buckbean (*Menyanthes trifoliata*), showy lady’s slipper orchids

(*Cypripedium reginae*) and skunk cabbage. The buckbean is found in little pools of water, the skunk cabbage is on moist flats, and the lady’s slippers on slightly raised peat ridges. Buckbean, with its exquisite filigreed white blossoms, is an arresting plant when viewed closely. Since it grows in both the minerotrophic margins of bogs and in fens, I’m not sure how best to define its habitat at this

location. But I lean towards fen, because the nearby showy lady’s slippers reportedly have greater affinities to fens than to bogs, preferring mildly acidic to mildly alkaline soils. Also present in the area, mere steps away from the bog, are winterberry shrubs (*Ilex verticillata*) in profusion, another plant that flourishes in fens, though it, too, can grow in the minerotrophic periphery of bogs.

The nuances at this bog-fen habitat are profound. The lady’s slipper orchids, the buckbean and skunk cabbage grow in sunlight filtered by winterberry, red maple (*Acer rubrum*) and white cedar (*Thuja occidentalis*). The herbaceous plants appear to appreciate some shade, but they also need part sun to grow well. In fact, the lady’s slippers and the buckbean grow along a road right of way that offers them a little extra sun.

Leaving the wooded fen at this site, the habitat opens, becoming dominated by shrubs. Trees are sporadic – mainly tamarack, white cedar and red maple – but their shade has been largely banished. The shrubs include black chokeberry (*Aronia melanocarpa*) and, regrettably, invasive glossy buckthorn (*Frangula alnus*). Lots of shrubby cinquefoil (*Dasiphora fruticosa*) are present, a fen indicator. In the open space created by a lightly used trail, grass of Parnassus (*Parnassia palustris*) blooms, another fen indicator species. It’s clear that this is bona fide fen habitat.

Delicate Dorcus copper butterflies sip the nectar of the cinquefoil, which also serves as their larval food plant. Cedar waxwings and eastern kingbirds are abundant, and the spiraling calls of veeries contribute to the delightful ambience. Growing alongside the grass of Parnassus is blue-eyed grass (*Sisyrinchium montanum*) and yellow lady’s slipper orchids (*Cypripedium parviflorum*) in the peat mat exposed to sun, courtesy of human trailblazers. This disturbance has suppressed the



Yellow lady’s slippers

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woody growth of shrubs along the trail, allowing the low-growing wildflowers to flourish.

We think of trails and roadsides as injurious to plants, but in some cases such disturbance creates micro-habitats that benefit certain types of native flora. In natural systems this habitat modification can be caused by animal trails – beaver, perhaps, or deer. The takeaway, again, is that flora needs diverse habitats, micro and macro, to achieve its maximum expression of diversity.

This diversity, on the macro scale, is evident in my exploration of the two very different fen systems. Both fen types – coastal fen and northern fen (including wooded fen) – nurture profoundly different communities of plants but they are still fens. Both are peatlands and both have access to mineral-rich groundwater but, above the surface, they look very different. Causes of the floral differences are legion, but likely include the amount of sunlight reaching ground level, the quantity of groundwater movement and the mineral composition of the soils that groundwater moves through.

Nature is infinitely complex. Creating neat habitat categories is a human thing and is certainly desirable – it provides guidance for action towards protecting special ecosystems and lures botany lovers to those special places. But what I've learned from my fen investigation is that the connections between bogs and fens, and among the various fen habitats, cannot be delineated by distinct lines; these special habitats are nuanced, affected by micro and macro influences. The footfall of an animal can suppress or enhance the growth of fen plants, as can increased shade from wetland shrubs or trees. The gradual accumulation of peat can transform a rich fen into a poor fen and even into a bog over time. Aside from these natural processes, human impacts like draining, berm building and roadwork can profoundly influence fen habitats. Of course, people have the malign

power to eliminate fens altogether.

Let's hope we have the wisdom to protect the fens that remain. They are unique repositories of floristic diversity and rich faunal habitats. For plant lovers they offer discovery of the unfamiliar, the exciting, the magical.

Don Scallen believes there is much more to discover about fens. Anyone who would like to contribute to this store of knowledge is welcome to email editor@nanps.org.



Dorcus copper butterfly nectaring on shrubby cinquefoil

PHOTOGRAPH BY DON SCALLEN



Winterberry

PHOTOGRAPH BY DON SCALLEN

Continued from page 1 – **Pussy Willow**

pencil thickness that is still smooth-barked. Clip 30 centimetres (12 inches) from it. Plant the cut side finger-depth into the soil, leaving a few nodes above the ground, and keep it well watered. New plants should start showing leaves in a few weeks and can grow to fully developed shrubs in a few months.

It is important to remember that pussy willows grow fast and spread quickly. Like all willows, they have invasive roots that spread through rhizomes, so they should be planted well away from septic systems, sewers and water lines. However, pussy willows are ideal for large wetland-restoration projects since they anchor the soil, reduce erosion and attract wildlife.

Pussy willows start blooming very early in the spring (the first willows to do so), providing a valuable source of high-quality protein pollen and early-season nectar for pollinators as they

emerge from hibernation. The first visitors include early-emerging, ground-nesting solitary bees, such as mason bees, digger bees and mining bees, as well as bumblebees and syrphid (or hover) flies. As spring unfolds, the pussy willow becomes a larval host plant for 18 different species of moths and butterflies. The various caterpillars spotted on the plants include hairstreaks, sphinx, comma, cecropia and io moths, as well as viceroy, eastern tiger swallowtail and mourning cloak butterflies. Smaller feeders include leafrollers, sawflies, borers, midges and gall gnats. The insects attract birds, such as black-capped chickadees and American goldfinches, which flock to the shrubs for protein-rich meals.

Deer, squirrels, beavers, muskrats, turtles and hares all eat different parts of the pussy willow plant, including the branches, bark, leaves and catkins, fortifying themselves with essential

vitamin C and zinc as well as protein from the pollen.

Obviously, as I grew up, I came to understand that my grandmother's story about the kind willow tree saving the kittens was just a charming story, but given how generous the pussy willow is with her gifts, it's easy to see why this plant is remembered so fondly in legends.

Katie MacDonald loves being outside and spends her summers demonstrating the importance of native plant ecology in a primarily agricultural area.

For her painting, Spring's Harbinger (Pussy Willow – Salix discolor), Jackie Gallagher was awarded Third Place and People's Choice at the Botanical Artist of Canada 2017 exhibition – A Celebration of Canada's 150th Anniversary through its Native and Indigenous Plants, July 2017. Coloured pencil with graphite on drafting vellum was used to create this work of art.



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