On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

Program Schedule – Winter 2020

Sunday, January 12, 2:00 - 3:00 pm – Tasmania, The Island Under Down Under – The West Woods Nature Center. Biologist and photographer Ami Horowitz shares pictures of the flora, fauna, and landscapes of Tasmania. Joint program with Geauga Park District. **Directions:** take St. Rt. 87 east from Rt. 306 in Russell Township approx. 2 miles to the park entrance on south side of the road. 9465 Kinsman Road, Novelty, Ohio 44072. **No registration required.**

Saturday, February 29, 10:00 - 11:30 am – The Rookery Through the Seasons. From winter weed and tree ID to spring wildflowers, from summer wetland flora to colorful fall foliage, discover the changing flora on this first of a series walks on the Interurban trail to the Chagrin River. Attend any or all as your time permits. Joint program with Geauga Park District. **Directions:** 10110 Cedar Road, Munson, OH 44026.

Saturday, March 7, 10:00 - noon – Invasive Insects Pests – The West Woods Nature Center. What have six legs, are not native, and cause harm to the environment and humans? Invasive insect pests! Amy Stone of OSU Extension, Lucas County, shares which invasive tree insects we should be on the look-out for that are making Ohio home. Discussion includes their identifying characteristics, their hosts, the damage they cause, and what you can do to help through monitoring, reporting, and management. **Directions:** take St. Rt. 87 east from Rt. 306 in Russell Township approx. 2 miles to the park entrance on south side of the road. 9465 Kinsman Road, Novelty, Ohio 44072. **No registration required.**

2019 Recipients of the Native Plant Society of the Northeastern Ohio's Annual Grant

We had 27 applications for our 2019 Grants, and all had interesting and compelling projects. It was difficult to choose, however we identified three recipients. We have encouraged those who were not selected this year to resubmit their projects for consideration next year. Our three 2019 grants go to the following organizations:

Girl Scout Troop 70444 of Mentor, Ohio is working with advisors from Cleveland Museum of Natural History Marsh Restoration staff to create a wildflower trail along a stream edge. The troop has already put in many hours learning about and clearing invasive species, identifying existing native species, constructing the trail, and working with a partner organization (The Hive at Lakeland CC) to create weather-resistant signage. They will use their grant to buy plants and (if possible) purchase a trailhead sign that reads "Trout Lily Trail."

Problem Plants of Ohio Book created collaboratively by Megan E. Griffiths, Melissa A. Davis, and David Ward of the Department of Biological Sciences, Kent State University. The book has been written and provides information on the identification and control of 148 non-native plant species that are listed as invasive or prohibited noxious weeds or are considered to be a nuisance in the garden, landscaping or natural settings. The book makes the case that one of the most important things that gardeners and land owners can do to help prevent further invasion is to remove known problem plants and replace them with native alternatives. The grant funds will be used to defray the cost of producing this book which will be published by Kent State University Press.

The Sustainable Wildlife Area Restoration Movement (SWARM) Native Plant Garden at Tuscarawas Central Catholic Elementary School will be a native plant garden on school property. What sets this project apart from many other such projects is the different kinds of curriculum at multi-levels that have been very thoughtfully planned to span multiple grades and different types of learning projects. From budgeting and planning the garden, then implementing that plan, to research and field studies as well as lessons incorporating science, math, art, and mutualism, this is an impressive project. The grant will be used to purchase native plant plugs.

The Native Plant Society is proud to have supported so many excellent projects over the years. We encourage all who would like to enable us to support more projects in the future to give specifically to our Endowment Fund, which supports our grants.

We thank all of the applicants for their submittals.

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On The Fringe

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The Mission of the Native Plant Society of Northeastern Ohio is to promote the study, appreciation and conservation of the native plants and plant communities of Ohio.

The Native Plant Society of Northeastern Ohio Awards: Jane McCullam the Gentian Award for 2019

Jane grew up in Mentor and Shaker Heights. She and Bill were married for 52 years, and together had two girls and four granddaughters. They bought her parents' property in Newbury, where Bill built their house. For fifty years Jane kept accurate records of rainfall and what grew there. She had a master's degree in psychology. She worked for General Bookbinding and the American Society of Microbiology. Because of her love of books, she started a children's bookstore called "Cattermole" 35 years ago, which is how she met Ann Malmquist, our founder. At Anne's memorial she remarked:

"I met Ann in 1996 through her interest in Beatrix Potter, but we found another bond in the Native Plant Society. She eventually persuaded me to become involved in the Journal "On The Fringe" and membership duties. We attended many field trips and programs, and I discovered a wealth of natural resources through her guidance."

In December 2000, Jane and Ann became editors of the Journal, making it into the scholarly document it is today.

Jane became a board member in the early 2000's, filling in for a departing board member. She was officially elected as an At large member in 2012 and remained as one until her death.

Jane took over as membership chair from Ann Malmquist in 2008, keeping an accurate spread sheet of members.

After my stroke in 2011, Jane encouraged me to resume activities, often driving me to board meetings and programs. Jane loved sharing her Newbury property along the Chagrin River with the Society, offering a spring wildflower walk to see the numerous green dragons on the flood plain in May of 2017.

Jane McCullam lost her battle with cancer on April 25, 2019. I dedicated Saturday's hike with Jim Bissell at Stanton Foreston on April 27 to her. Jane's family honored her with an open house memorial on Saturday, May 4th, 2019, which would have been her 79th birthday. Jane, you are dearly missed by your family as well as the Native Plant Society, so we are honoring you with the Gentian Award.

The plaque has a picture of a Fringed Gentian and says:
Gentian Award
For Dedication to the Native Plants of Ohio
Jane McCullam
2019

This tribute was given by Judy Barnhart, president of the society, and is a composite of information from Judy, and Jane's husband, Bill McCullam. Bill will accept the award at this year's Annual Meeting.

The Native Plant Society of Northeastern Ohio Also Awards: Jack and Florence Selby the Gentian Award for 2019

Jack and Florence Selby joined the Native Plant Society of Northeastern Ohio in 1983 as founding members. At the first meeting, Jack presented a slide show on their trip to the Bruce Peninsula. An accomplished photographer, he took over 8,000 slides over his many years of rambling through forests and wetlands. With him was his dear wife Florence, who scouted while he photographed. She also baked an "unbelievable cake" for the first meeting and, while Jack served on the executive committee as a member-at-large, she helped with brochures and many details.

Jack passed in 2013, and Florence preserved his slide collection and donated it to the Society a few years ago. We owe a great debt to Florence and Jack for their dedication to the preservation of the native plants of northeastern Ohio. Thank you - Florence and Jack!

Florence has expressed a preference for a letter of recognition rather than a plaque and, due to her age and health, we are mailing the letter to her.

This tribute was given by Charles Fletcher, secretary of the Society, and is based on information from the archives of our newsletter On the Fringe.

Turning Maple Syrup Forests Into Bird-Friendly Habitat

By Alison Haigh

High in the branches of a maple tree sit the tattered remains of a muddy, grassy bird nest. I train my binoculars on the small lump, but it was built the previous year and is very much empty. Closer to eye level, it's harder to miss the metal spigot and tangle of blue tubing attached to the tree's trunk like an IV drip. This tree is one of the 6,000 tapped for Cornell University's signature maple syrup, and last year it also raised a family of birds.

Birds and maple syrup share the same critical ingredient: healthy northeastern forests. Every year, millions of birds breed, feed, and fledge in the same forests that are tapped for syrup (called "sugar bushes"). As long as a sugar bush stays tapped, it will remain a forest and not be cleared for development.

Since 2014, Audubon Vermont has worked with nearly 40 maple syrup producers in the Green Mountain State on the Bird-Friendly Maple Project to help sugar bushes meet their full potential for bird habitat. Now the Cornell Lab of Ornithology is partnering with the Cornell Maple Program to sweeten the deal for both birds and the bottom line in the university's own sugar bush.

From Maple Monocultures To Bird-Friendly Forests

Maple-syrup producers exert considerable control over how the habitat looks in a sugar bush. At the same time, what is good for birds in a forest is also good for maple producers in the long run: the health and sustainability of the crop.

Aaron Wightman oversees operations at the Arnot Research Sugarbush in a Cornell University–owned forest south of Ithaca, New York. After learning about Audubon's maple programs in Vermont, he approached Cornell Lab of Ornithology conservation biologist Ron Rohrbaugh about managing a sugar bush for birds. (Rohrbaugh now works as a forest program manager for Audubon Pennsylvania.)



Blue-headed Vireo
Picture taken from www.studyblue.com.

Plastic tubing runs throughout the Arnot Research Sugarbush, connecting tapped trees to a sugar shack in a forest on Cornell University land. Cornell's bird-friendly maple syrup project strives to achieve sustainability for the forest's birds and its sugaring operation.



A tap in a maple tree.
Photo by Jason Koski.

Wightman was interested in helping the birds, but also in helping the forest he manages.

The understory of the oldest part of the Arnot sugar bush was thinned decades ago and deer have kept the shrub layer from regenerating, explains Wightman as we walk through the Cornell research forest on a delicately sunlit May morning. Here, slender maples tower over us like an arched cathedral ceiling; tiny beech and hornbeam seedlings pop out of the leaf litter—but there is nothing but empty space between the canopy and forest floor.

Ideally, forest managers aim for a diversity of tree species at a diversity of ages, with layers of branches and

leaves at the top, middle, and bottom. Without younger generations of trees growing up underneath the canopy layer, the entire forest community faces an abrupt decline when all those oldest-generation trees begin to die.

Birds suffer, too, from a lack of diversity in sugar-bush habitat. For example, without a conifer component among the maple trees, birds like the Blue-headed Vireo, Blackburnian Warbler, and Sharp-shinned Hawk are missing valuable nesting habitat. Fruiting trees and shrubs in a sugar bush, like black cherry, also provide critical energy supplies for birds fueling up for migration.

That's how we should grow all our food.
~Aaron Wightman

Next to the monoculture in Arnot Forest stands a plot that is a perfect model for bird-friendly management. The bright blue tubing disappears and reappears among the thick understory, winding around a few snags with holes drilled out by woodpeckers. There are more than just maples here; we stop to admire a Black-throated Green Warbler flitting around in a hemlock, and a Scarlet Tanager in an oak tree.

Conservation biologist Steve Hagenbuch, who heads up Audubon Vermont's Bird-Friendly Maple Project, says sugar bushes that contain at least 25 percent non-maple trees support a greater diversity and abundance of birds than stands growing only maples. And he says syrup producers in the Audubon Vermont program are finding that managing a sugar bush for tree diversity is good for sugaring sustainability, too. A University of Vermont study found that sugar bushes with a bird-friendly ratio of tree diversity experienced insect outbreaks that were significantly shorter and less intense than in maple monocultures.

"Is that a coincidence?" Hagenbuch asks rhetorically. "I don't think so. I think that speaks to a healthy, functioning forest, thanks to its structure and composition."



Black-throated Green Warbler
by David Leonard/Macaulay Library



Scarlet Tanager by David Leonard/Macaulay Library

Bringing Back the Forest for Birds

The quaint, colonial scenes on maple syrup bottles are misleading. Maple syrup is big business.

By the barrel, syrup costs more than oil. Products like maple-derived alcohol, candies, and even sports drinks have exploded in popularity. New York alone taps over 2 million trees, and its maple products were worth over 30 million dollars last year.

But the boom in sugar bushes, as another form of farming monoculture, is compounding a tree diversity problem in the Northeast's forests.

Throughout the 1800s, settlers cleared nearly 90 percent of all forests in the Northeast for farmland, only to suffer season after season of poor yields in their harvests. After the settlers abandoned their farmland, forests began to grow back. But wave after wave of invasive species, forest pests, and diseases stunted the growth of young trees, leaving many forests lacking in successive generations of native trees. The irony, noted in the *2016 State of the Birds Report*, is this: "In the East, there is more forest today than there was 100 years ago, yet forest stands lack the diversity of

young and old trees that makes for prime bird habitat."

With habitat loss and degradation looming as the greatest threats to birds today, sugar bushes have the potential to offer a big conservation footprint for birds.

"Conservation of anything…birds, habitat, anything…requires an all-hands-on-deck approach," Hagenbuch says. "We can't rely on protected areas, or even the goodwill of people interested in wildlife.

We need to integrate [bird conservation] into our businesses, create financial incentives, and encourage people to think about the role that their land management has in conservation."

Bird-friendly maple syrup is only one part of how the food production systems of modern society can help address the massive loss of bird habitat. After all, the very same Scarlet Tanagers that spend summer in sugar bushes in New York, Vermont, and Quebec fly to South America for the winter, where they may look for habitat among shade-grown coffee farms in Colombia. Ultimately, Wightman hopes the sugar bush in Arnot Forest will be a model for bird-friendly maple production in New York, and for the international importance of sustainable food production.

"Any healthy forest has a healthy bird population," he says. "That's how we should grow all our food."

Editors' note: This article has great significance to the editors since it was the last article Jane McCullam had sent for use in the Journal. Her dedication to the Native Plant Society was undeterred, even in her last difficult remaining days.

Alison Haigh is a senior Environmental Science major at Cornell University and freelance writer based in Ithaca, N.Y.

Article taken from https://www.allaboutbirds.org/turning-maple-syrup-forests-into-bird-friendly-habitat/, March 31, 2019.

Folklore:

The "Snap, Crackle and Pop" of the Woodlands Witch-hazel, *Hamamelis virginiana*

By Guy Denny

Witch-hazel is an attractive and fairly common shrub found throughout Ohio as well as throughout eastern North America. It is a species of stream bottom lands, open mesic woodlands, and dry sandy soils especially in the Oak Openings Region of Northwestern Ohio where it is a dominate understory species.

The generic name *Hamamelis* is derived from two Greek words: *hana*, meaning "at the same time," and *melis*, "a fruit." This is an apt description for members of the genus *Hamamelis* for, contrary to the springtime flowering of most plants, witch-hazel blooms in late autumn at the same time it is in fruit. As a matter of fact, it is the last of all North American shrubs to flower, which coincidentally is the same time seeds from the previous year are ripening. The strong-scented flowers of witch-hazel don't make an appearance until mid-October into early December



Witch-hazel flower
Picture taken from http://botanyphoto.botanicalgarden.ubc.

when most woody species, including witch-hazel, are dropping their leaves in preparation for winter. The four wavy or crumpled, strap-like liner yellow petals give the flower an almost spider-like appearance, adding color to the otherwise drab post autumn landscape.

Two hard, shiny black seeds are contained within each of the pale brown woody seed capsules situated along the branchlets. As these seed capsules reach maturity, which takes about a year, they shrink and split open at the top exposing the seeds. As they continue shrinking, considerable pressure is exerted upon the seeds until suddenly, with an audible snap or pop, they are forcefully shot out of the capsule up to a distance of 15-20 feet. This is why in some parts of its range witch-hazel is also known as "snapping hazel." The empty seed capsules can remain on the branchlets for another season or more. The small seeds are said to be edible, however, they are only about the size and shape of a large grain of rice and nearly impossible to find once ejected. In spite of its common name, this tall, bushy shrub is not, nor has it ever been, associated with witchcraft. Instead, the witch in witch-hazel comes from the Old English word "Wyche," a term used to describe pliable branches. Reportedly, witch-hazel was given its name by English settlers who thought its leaves looked similar to those of the hazel elm of England, which is the hazel of their homeland. The closest thing to supernatural powers witch-hazel possesses is derived from dowsers, who favor divining rods fashioned from the forked branches of witch-hazel, believing them to have special powers for locating water and precious ores.



Witch-hazel fruit
Picture taken from http://www.florafinder.com

At one time in the not too distant past, a bottle of witch-hazel distillate could be found in just about every medicine cabinet in America. Witch-hazel was listed in the U.S. Pharmacopeia from 1862 - 1916 and in the National Formulary from 1910 - 1955. A recent visit to my local grocery store confirmed that witch-hazel distillate is still available as a home remedy for treating skin irritations, bruises, sore muscles, and minor sprains. It is also used in some bath lotions, shaving creams, and other beauty aids. Witch-hazel liniment is distilled from the branches of this shrub. As is the case of most medicinal herbs, it was the North American Indians who taught settlers about the medicinal value of witch-hazel. Native Americans highly valued witch-hazel for the medicinal properties of its leaves, twigs, and bark, which were best harvested in the fall. The fresh leaves contain very high concentrations of astringent tannin, making them useful as compresses for treating inflamed eyes, skin irritations, small cuts, insect bites, minor burns, infections, and to stop minor bleeding. They were even thought to be useful in treating headaches.

The Iroquois made a pleasant tea by steeping witch-hazel leaves and then sweetening the brew with maple syrup. This tea also served as a gargle for irritated throats, sore gums, and as a general mouth freshener. The Potawatomi reportedly utilized witch-hazel sweat baths to treat fevers, colds, coughs, and to relieve sore muscles. The Menominee of Wisconsin reportedly boiled the leaves and rubbed the solution on their legs to limber up as well as to treat sore muscles. A decoction prepared by steeping the inner bark was considered by the Mohawks to be especially useful as an eyewash for bathing irritated eyes. Witch-hazel wood, which is very strong and flexible, was also said to have been used for making bows.

By today's medical standards, witch-hazel is now considered to be of little or no medical value. Nevertheless, this species has a long and fascinating history of such use. Regardless, witch-hazel remains one of our more interesting shrubs, worthy of becoming your new acquaintance.

Reprinted from *ONAPA News,* a publication of The Ohio Natural Areas & Preserves Association, Autumn 2018, Vol 5, No 4.

Witch's Broom

By George Ellison

Let's suppose you're walking a woodland trail and happen to look up and see a sizeable roundish cluster comprised of what might be leaves or sticks or both attached to a tree limb up high above your head. It's sort of curious looking so you pause to consider what it might be.

—Squirrel's nest? Nope. They're usually more compact and are definitely leafy in appearance.

—Broad-winged hawk's nest? Nope. They're usually somewhat flattened in appearance.

—Hornet's nest? Nope. They're usually more stylish in appearance and aren't comprised of leaves.

—Mistletoe. Nope. They display evergreen leaves in all seasons.

So, you get along home

—enter descriptions in google.com pertaining to what you saw

—and just as you are about to give up

—there it is in all its glory: Witch's Broom! Having never heard of it you decide to conduct a bit of low-tech research to find out more about your strangely named find. At the web site of the Missouri Botanical Garden you'll discover that, "Witches'-brooms occur on a number of conifers and deciduous tree species. They are caused by a number of factors that result in a great proliferation of shoots with short internodes that can look like a bundle of twigs or witch's broom. In other cases they appear as a ball-shaped dwarf plant growing in a tree. [They] are caused by a number of factors, including infection by fungi or phytoplasmas (a wall-less single celled organism with an unorganized nucleus), infestation of mites or dwarf mistletoe, genetic mutations, or adverse environmental conditions that kill the terminal bud of shoots. Those caused by genetic mutation may be stable allowing for them to be propagated as dwarf cultivars."



Elisabeth Ellison's watercolor of Witch's Broom

At the web site for Minnesota Public Radio2, an article titled "Plant fanatics climb up trees hunting for 'witch's brooms'" provides another sort of information:

> *On a frigid January morning, Rich Larson scales a big tamarack tree, breaking off branches as he climbs towards his target. About 30 feet high, as the wind swirls around him, Larson, 59, spots what he's looking for: a small, tightly woven mass of branches called a "witch's broom" — the genetic source of many landscape plants and shrubs sold at nurseries.*
>
> *"Hey I'm moving around pretty good up here!" he exclaims as the tree swayed back and forth in the wind.*
>
> *Larson, a nursery manager from Newark, Ohio, is one of nine men who came to northern Minnesota from across the Midwest and as far away as Europe to hunt witch's brooms in mid-January.*
>
> *After managing to reach the broom and cut it from its branch, he tossed it to the ground where Dennis Hermsen, a nursery owner from Farley, Iowa, grabbed it.*
>
> *"You don't have to be crazy to do this," Hermsen said, "but it does help!" After inspecting the broom's tiny needles, he explained that they're so crowded together that the twigs look like short braids of evergreen. The dense broom only grows about the length of his fingernail every year.*
>
> *Hermsen hopes that by grafting a piece of the broom to an already established stem and roots, he can produce a unique species of dwarf conifer. It will likely only grow to 1/10th or 1/20th the size of its parent tree. In two or three decades it might only be knee-high.*
>
> *Hermsen and Larson are part of a tiny group of plant fanatics — they estimate number about 200 nationwide — who traipse through forests collecting witch's brooms. The term, which dates to the Middle Ages, refers to tree mutations made up of dense masses of shoots growing from a single point. They look like balls of twigs woven together and can grow to several feet across. Each is the only one of its kind in the world. They are genetically unique.*

All this because you happened to look up rather than down.

Reprinted from *Chinquapin,* The Newsletter of the Southern Appalachian Botanical Society, Spring 2018, Vol 26, No 1. Artwork by Elizabeth Ellison, www.elizabethellisongallery.com.

Why Insects Need Plants and Plants Need Insects
Three Biologists Explain

By Jane Roy Bro

At some point in your education you probably learned a few facts about insects, such as that they account for more than half of all living species on Earth, making them the planet's most abundant and ubiquitous animals.

Maybe you also studied how bees pollinate flowers, after which your teacher moved on to nematodes. That cursory overview explains why most of us know pitifully little about insects. This knowledge gap comes at a high price, because some insects may be gone before we discover them. Yet insects form the important link in the food chain between plants and the rest of the animal kingdom.

"All animals get their energy directly from plants, or by eating something that has already eaten a plant. The group of animals most responsible for passing energy from plants to the animals that can't eat plants is insects," writes Doug Tallamy, the University of Delaware entomologist and champion of biodiversity. "So many animals depend on insects for food ... that removing insects from an ecosystem spells its doom." His words echo those of another famous biologist, E. O. Wilson: "If insects were to vanish, the environment would collapse into chaos.

But vanishing is what some unknown number of the world's approximately one million catalogued insect species are doing. The unknown part is



New Jersey tea, *Ceanothus americanus*
Picture taken from https://www.nrcs.usda.gov.

especially troubling: According to the International Union for the Conservation of Nature, as many as four million species may be undiscovered—and unprotected. In the United States, scientists have documented about 91,000 out of a potential 164,000 or more species, reports a Smithsonian Institution website. Yet, out of the 714 animals on the federal Endangered Species List, only 85 are insects. Entomologists view this number as a mere glimmer of a colossal iceberg.

"If we assume that insects and vertebrates face similar destructive forces at similar levels of intensity, then one should expect to find on the order of 29,000 at-risk insects in the U.S. alone," write Scott Hoffman Black and D. Mace Vaughan of the Xerces Society for Invertebrate Conservation. Only six of the current federally listed insects inhabit New England, but state endangered species lists for the region identify a total

"More than half the species of animals in New England are insects, more than half of these insects are plant feeders, about 80 percent of those are specialists."

of 229. Though some species overlap among states, Connecticut alone lists 174. To slow the decline of these native insects, Tallamy urges gardeners to expand insect habitat with native plants. This helps not only specialist insects, such as many butterflies that feed and lay their eggs only on particular plants, he says, but also generalist insects, spiders, and diverse vertebrates. What do other entomologists have to say about the crucial interactions between insects and native plants—and how we can slow the decline of both? Native Plant News asked three other experts with relevant research specialties.

"More than half the species of animals in New England are insects, more than half of these insects are plant feeders, about 80 percent of those are specialists, which ties them to the fate of their host plants. This is one reason why every time we lose a genus of plants there could be an extinction cascade."

"For example, the native sundial lupine, *Lupinus perennis ssp. perennis*, one of the most globally threatened plants in New England, supports three of the region's rare or endangered butterflies—the Karner



Tiger Swallowtail and Common boneset, *Eupatorium*
Picture taken from http://blog.delawarenaturesociety.org

blue, *Lycaeides melissa samuelis*, the Persius duskywing, and the frosted elfin. Karner blue larvae feed exclusively on the native lupine leaves, and adults lay eggs on or near the plants. Frosted elfins and Persius duskywings have a second host plant, yellow wild indigo, *Baptisia tinctoria*, which is rare in at least two New England states. So, we lose lupine and there go one to three butterfly species.

"All these plants and insects share early successional [open] sand-plain habitat, which is very scarce now in this region because it's so easy to develop. We still have not protected these habitats, yet they contain some of our region's most intriguing biodiversity, including about 300 species of sand-dwelling insects and several important plants, like New Jersey tea, *Ceanothus americanus* and sandplain gerardia, *Agalinis acuta*. The loss of New Jersey tea alone could doom more than a dozen species of bees, moths, and butterflies. It's so valuable for biodiversity that it is being considered for protection in New England."

"Entomologists widely share Doug Tallamy's views, because we understand how large the biomass of invertebrates is and that all of these insect species serve important ecosystem functions. Fireflies, *Photinus spp.*, for instance, are neither pollinators nor herbivores, but their larvae are generalist predators of other insects, including aphids and other garden pests. And their larvae live in the soil. Most people don't know this, so these insects suffer the cumulative effects of small insults: one more acre developed here, another five acres sprayed there. Before you know it, you've undermined a lot of the population. In the Northeast, you have eight to ten firefly species—Photinus pyralis is one that's common in New England. Although none are presently endangered, these persistent threats can change that.

"The decline of many insect species is the byproduct of land disturbance, which destroys the native plants that form their habitat and the larvae of species that live in the soil. Disturbance also invites colonization by invasive plants. Add to that elevated levels of pesticides, herbicides, and fertilizers, and you get a perfect storm that undermines local invertebrate and plant populations, all connected with the ways we use the land. It will reach a critical point past which these species won't be able to recover. So, yes, we need to plant natives. We also need to re-evaluate our land-use practices."

"As we lose insect habitat to development, one of the alternative places to foster insects is utility rights-of way, which cover between five and eight million acres in the continental U.S. Many biologists have documented their damaging impacts on plants and animals. But for insects, especially the four thousand species of native bees in the U.S., these areas can be transformed into biodiverse habitats with native plants.

"One of the alternative places to foster insects is utility rights-of-way."

"The reasons are the same ones that make rights of-way damaging to the original habitats—they are heavily managed to remain in an early stage of succession [open, meadow-like spaces], and they cut through less-managed habitats. But along the edges, a great diversity of plants and animals flourishes. In a study comparing bee communities in rights-of-way and about 25 in nearby mowed fields, the rights of way supported percent more bee species. Rare species of were more than twice as likely to be found in the rights-of-way. It turns out that the nearby fields provided very few flowering plants. But in the rights-of-way, there were all kinds of trees, shrubs, and vines providing a rich smorgasbord of nectars and pollens for the bees."

DAVID L. WAGNER is professor of ecology and evolutionary biology at University of Connecticut. His research focuses on the importance of early successional habitats to invertebrates, pollinator decline, invasive-species impacts, and climate change threats.
JAMES T. COSTA, a biology professor at Western Carolina University and director of the affiliated Highlands Biological Station, studies evolutionary relationships between native plants and invertebrate species, including interdependent, specialized functions among native species of flora and fauna. Costa also



Blue winged wasp on Solidago
Picture taken from https://the-natural-web.org

researches whether nonnative plants serve equally well as native plants for the habitat needs of less specialized invertebrates, and how invasive plant (or other) species disrupt beneficial invertebrate-plant relationships. He has published popular books about science, most recently Darwin's Backyard (W. W. Norton, 2017).

MICHAEL J. RAUPP, entomology professor and extension specialist, University of Maryland, studies the mechanisms by which plants escape attack from herbivorous insects, in order to create sustainable landscape systems with minimal dependence on synthetic pesticides and to develop integrated pest management (IPM) programs. Also known as "The Bug Guy" from his blog, BugoftheWeek.com, Raupp has appeared on programs including Good Morning America, National Geographic Explorer, the Dr. Oz Show, and the Tonight Show with Jay Leno, whom Raupp challenged to eat a cicada. (Leno did.)

Reprinted form *Native Plant News*, a publication of the New England, Wildflower Association, Fall/Winter 2017, Vol 4, No 2.

Invasive Worm:

Invasion of the Exotic Earthworms

Jumping worms – known also as Asian jumping worms, crazy worms, Alabama jumpers and snake worms – are invasive earthworms. These names describe their wild movement, they violently writhe and squirm when disturbed and move more like a snake than an earthworm. They present challenges to homeowners, gardeners and forest managers.

Composting advertisements boast that the worm can eat and process more than its body weight in organic matter (vegetable scraps, leaves, lawn trimmings, etc.) each day. That same tenacious appetite means that when people release their bait (or their bait escapes) and the worms make their way to the forest, they consume massive amounts of leaf litter. These invading earthworms eat the leaves that create the duff layer and are capable of eliminating it completely. Big trees survive, but many young seedlings perish, along with many ferns and wildflowers. Some species return after the initial invasion, but others disappear. In areas heavily infested by earthworms, soil erosion and leaching of nutrients may reduce the productivity of forests. They can out-compete and push out the other earthworms and degrade ecosystems, especially forests and woodlands, by stripping the soil surface of protective organic matter.

Besides consuming nutrients that plants, animals, fungi and bacteria need to survive, the resulting soil, which resembles large coffee grounds, provides poor structure and support for many understory plants. This altered soil structure is often unaccommodating to ornamental and garden plants, and inhospitable to many native plant species. In many cases, invasive plants are the only plants that can thrive where jumping worms live.

All earthworms, not just jumping worms, can harm forests by changing the soil structure and forest floor vegetation. Their feeding can result in a loss of soil moisture, compacted soil, exposed roots, erosion and an increase of pathogens and non-native plants. The result is less diversity of native plants and animals in delicate forest ecosystems.

If you were a leaf-litter-feeder such as a millipede, fly larvae, or springtail, this would be a big problem because your food source would be gone. In some areas on the

western side of the Smokies, the jumping worm population is so high there is almost no leaf litter left. Without this food, native animals are disappearing, and the nutrients from decaying plants aren't there to build new soil.

Jumping worms are native to Southeast Asia and are believed to have arrived in North America within potted plants, nursery stock or soil. Jumping worms have been in the southeastern U.S. for many years, including in the Great Smoky Mountains. In the past few years they have been found in Illinois and Wisconsin.

With the ease of movement as fishing bait and within plants and soil, it's probably only a matter of time before they are more commonplace in Ohio. Jumping worms are easy to spread because they spend the winter in the ground as small, pinhead-size, round, black or brown cocoons (earthworm cocoons contain eggs) that can move with soil, plants, mulch or dead plant material stuck to your shoes.



Asian jumping worms have a wide clitellum (band) around their bodies. Photo: UW Arboretum

Jumping worms are 3 to 5 inches long (some up to 7 inches in length) and dark brown to gray in color rather than reddish-brown. They are darker and smoother than our usual earthworms, such as nightcrawlers and garden worms. Jumping worms have a milky-white to gray clitellum (the band around the body of an earthworm) that is smooth, not raised above the body. The clitellum completely encircles the body unlike on European earthworms where the clitellum looks more like a saddle.

Jumping worm cocoons are resistant to cold and drought and are as tiny as mustard seeds. It appears that jumping worms do not survive as worms through the winter in the Midwest. When the worms reproduce in the fall, they produce cocoons that drop to the soil and survive the winter. The cocoons hatch to start the cycle over, and the population builds rapidly through two generations per season. Jumping worms are parthenogenic; each worm can reproduce on its own without mating. Jumping worms reach maturity within 60 days of hatching. Adult jumping worms do not become apparent until late June and early July, and populations are largest in early fall.

Information for this article taken from the National Park Service website, https://www.nps.gov/grsm/learn/nature/dff-earthworms10.htm; Iowa State University Extension and Outreach website, https://hortnews.extension.iastate.edu/2017/05/asian-jumping-worms; and Wisconsin DNR website, https://dnr.wi.gov/topic/invasives/fact/jumpingWorm/index.html.

To watch these worms squirm, type "Asian jumping worms' video" into your browser.

A Database of Plant Ecology – bplant.org

A database new to the internet this year, bplant**.**org is a website to help you learn about plants and their ecology and share plant distribution information, with an eye towards preserving, protecting, and restoring biodiversity.

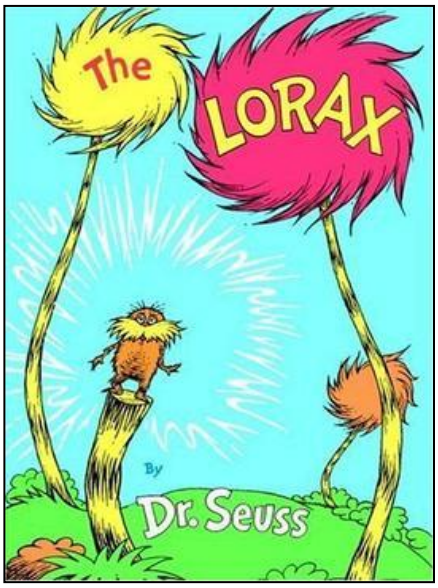
There are abundant websites with articles on individual plant species, including those that focus on horticulture and others focusing on wild plants. But bplant.org seeks to differentiate itself from other existing online references through a greater focus on ecology, including a plant's habitat, life cycle, and faunal associations. It also bridges the gap between the horticultural sphere and the wild, educating people on the ways gardening and landscaping plants interact with wild plant populations and tracking this through their reporting of observations.

To learn more, visit: https://bplant.org/.

Book Review:

The Lorax

By Dr. Seuss



Publisher: Random House, 1971
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Package Dimensions: 17.25" x 13" inches
Price: Hardcover: $13.59, Paperback: $5.14, Kindle; $9.99,

Review By JoAnna Klein

Who Was the Real Lorax? Seeking the Inspiration for Dr. Seuss

A new essay explores the possible real-life examples for the Lorax character and Truffula trees.

What inspired the creature who was "shortish and oldish and brownish and mossy"? The one who spoke in a voice that was "sharpish and bossy"? He spoke for the trees, yet he called them his own. All that he left "in this mess was a small pile of rocks, with the one word … 'UNLESS.'"

In 1970, millions of people observed Earth Day for the first time, and the Environmental Protection Agency was born. Joni Mitchell's "Big Yellow Taxi" topped the charts.

And in La Jolla, California, Theodor Geisel, also known as Dr. Seuss, was fighting to keep a suburban development project from clearing the eucalyptus trees around his home. But when he tried to write a book about conservation for children that wasn't preachy or boring, he got writer's block.

At his wife's suggestion to clear his mind, they traveled to the Mount Kenya Safari Club, an exclusive resort where guests watched animals along Kenya's Laikipia Plateau.

And if you haven't guessed by now, it was there that "The Lorax" took shape—on the blank side of a laundry list, nearly all of its environmental message created in a single afternoon.

Today it has been translated into more than a dozen languages, sold more than a million copies and adapted into a 2012 film. It was Dr. Seuss's favorite book and one that was much discussed for its environmental resonance.

In it, the Lorax, who "speaks for the trees," pops up from a chopped-down tree stump and angrily demands that a businessman called the Once-ler stop cutting down Truffula trees to knit "thneeds." But the Once-ler doesn't listen and eventually is left alone in a crumbling, empty factory on a barren landscape.

Despite an unsuccessful attempt by the logging industry to ban "The Lorax" in the 1980s, many have embraced the storybook as a critical tale about environmental policy, especially for children, ultimately heeding a hopeful message that future generations can save the environment by caring for it. But some have worried that Lorax, with his possessive use of "my" when referring to the trees and other creatures, isn't really a good teaching model because he comes off as a self-righteous eco-warrior with an unfounded anger.

In an essay published in *Nature Ecology & Evolution*, the authors argue that the Lorax may not have been as bossy and ineffectual as he seems. Rather, the authors posit that Lorax may have been involved in a type of symbiotic relationship with the Truffula trees and his surroundings, threatened and defensive.

"The prevailing sense among literary critics is that the Lorax is too angry and that environmentalists can't afford to adopt that kind of rhetoric because it will never work with policymakers," said Nathaniel Dominy, an anthropologist and evolutionary ecologist at Dartmouth College and lead author of the paper. "If you see the Lorax not as some indignant steward of the environment, but instead, as a participating member of the ecosystem, then I think his anger is so much more understandable, and I think, forgivable."

The case for the Lorax's Kenyan inspiration emerged after Dr. Dominy grasped for something to talk about at a dinner with Donald E. Pease, an English professor at Dartmouth College, praised for his lectures and biography on Dr. Seuss. And it evolved into a scientific process that included feeding the Lorax's cartoon face into sophisticated monkey face-recognition software.

Dr. Dominy, also a father, raised the topic of "The Lorax," suggesting that the fuzzy, mustachioed protagonist of the book resembled the patas monkey, a fluffy, orange, real-life creature with a raspy alarm call that he had observed while working in Kenya.

The monkey gets most of its nutrients from a gnarly tree called the whistling thorn acacia, in a type of interaction called commensalism, wherein one organism benefits from another without harming it. The tree also looks like barren trees in the story. "If Dr. Seuss would ever make a monkey," he told Dr. Pease, "that would be the one."

Dr. Pease questioned the notion that a creative master like Dr. Seuss would ever use a real life reference but became convinced after considering how the Lorax appeared from that chopped-down tree stump, suggesting, in a way, that the Lorax was part of it. This made the character's use of "my trees" more reasonable.

"The Lorax no longer sounded like an eco-policeman," said Dr. Pease, "but instead was a creature that could be understood as the spirit in place for the entire ecosystem."

To him, Dr. Dominy's otherwise silly conversation topic deserved attention because it enriched previous understanding of the work and addressed critical concerns. In what became their passion project, they searched for clues to support Dr. Dominy's hypothesis.

After scouring the literature and talking with Audrey Geisel, the author's wife, they determined that Dr. Seuss likely had devised his story after observing the relationship between the patas monkey and whistling thorn acacia during his Kenyan vacation.

They also teamed up with an anthropologist at New York University who had developed a machine learning algorithm for analyzing similarities among a large database of African monkey faces. Together, they fed the faces of five real Kenyan monkeys, the cartoon Lorax and a character from "The Foot Book" (its most common Seussian ancestor, they figured), into a program. Analysis revealed that the Lorax looked more like the patas monkey than the Foot Book creature.

"We're taking real tools from biology and applying them in super serious way," Dr. Dominy said. "I hope people find the humor in this."

In the book, once the forest and all its inhabitants vanish and the Once-ler is left with his empty factory, the Lorax blasts off into the sky, leaving behind the rocks and the word "unless."

Years pass, and a regretful Once-ler finally understands these words when a visitor asks what happened to the Lorax. He throws the last Truffula tree seed to the child and says "UNLESS someone like you cares a whole awful lot, nothing is going to get better. It's not."

Matthew Teorey, an English professor at Peninsula College in Washington state who was not involved in the study, has likened the Lorax to the writer Wallace Stegner, an environmentalist who wrote an article in 1969 using the term "unless" in a similar argument to that of "The Lorax." Still, he said he appreciated the new interpretation of the Lorax as an indigenous person or creature of the exploited land that can speak for the environment.

Real monkey-tree connection or not, by simply acknowledging this comparison, Dr. Pease said we learn about important ecological concepts and environmental interactions—like how removal of a keystone species, like the Truffula tree, can lead to ecosystem collapse.

We'll never know for certain the inspiration of this cautionary tale, but it doesn't really matter, Dr. Dominy said. "Ecosystems are communities, they're assemblages of species that are interacting, and if you affect one, you affect all of them. That's what's important, and he nailed that beautifully."

Reprinted from *The New York Times,* July 23, 2018; https://www.nytimes.com/2018.

We Need a Cure for Plant Blindness

By Robbie Blackhall-Miles

"Let's elevate plants from their throwaway status and recognize their vital role in keeping us all alive," argues Robbie Blackhall-Miles

Humanity is suffering from an illness the extent of which is not fully known. The impact of this is being felt across the globe. It renders humankind unable to see the plants in their environment and leaves us deeming the vegetation that surrounds us as nothing more than wallpaper, a nice background for the more important things that enhance our lives.

Take a photograph of a lion in the wild in Africa and ask anyone what they see. The answer you will invariably get is "a lion". If you are lucky, you may get the answer "a wild lion" or if you are extremely lucky, "a wild lion in Africa". Generally you won't get the answer "The African savannah in the dry season with some amazing acacia scrub and a lion lying on a bed of dry red grass, *Themeda triandra*, in the shade of a really old sausage tree, *Kigelia africana*".



Hiding in plain sight: lion cubs amid dry red grass, *Themeda triandra*, in the Kruger National Park in South Africa. Photograph: Alamy Stock Photo.

The picture of the lion in the wild in Africa is not just a picture of a lion. It's a picture of a whole environment and the biodiversity within it; biodiversity that is totally interconnected, and without which the lion cannot survive. I am sure that on some level the lion knows how important that biodiversity is to it.

Humans are in exactly the same position as the lion. However, we have forgotten our need for the biodiversity that surrounds us. Particularly we have forgotten the importance of the plants that provide that stunning William Morris wallpaper for our lives. This inability to see the vegetation that surrounds us has been given a name; plant blindness.

It has a bearing on the gardening world more than anywhere. In most gardens ornamental plants have just become the set dressings for sun loungers, barbeques, sculptures and water features; a required element but no longer the focus. The price most people are willing to pay for plants is reducing all the time. Plants—living things—often become throwaway items used purely for decoration, with little acknowledgment given to their much deeper importance to the human state. The impacts of this are huge.

The people that can "see" the plants and are able to grow them, horticulturists, may be the only people that can save this planet from impending disaster. Yet horticulture is suffering a skills crisis, there are far too few people looking at horticulture as a viable career option. The pay can be low (not always), the work hard (in some cases) and the long term career progression minimal (or so some say). Young people, swayed by the media and a need for greater things, are not interested in being gardeners or botanists (we don't have a single botany degree left in Britain's universities and 50% of under 25's see horticulture as a unskilled career); especially when the work is sold to them in the way that it currently is.

The industry has started to look to career changers for its influx of new blood; people that have maybe had a successful career and are now looking for more than just the attraction of money on which to base their working lives. Often these are people that have been cured of their plant blindness in an almost evangelical way: all of a sudden they see the background of that lion picture, their stressful lives calmed by the colour green.

But it's a vicious circle. A living still has to be made, so the newly-aware gardeners go to the higher-paid sectors of the industry to find their new careers, and all of a sudden (without even realising it) they are pedalling plants as wallpaper; a lovely palette to set off a hanging seat or garden "pod". The number of garden designers is growing, and yet specialist plant nurseries, with their intense knowledge of the individual plants in their care, are closing.

To change this horticultural employment crisis, we need to look to the root of the problem. We need a wholesale change in the way the majority of people view plants. Plants need to be seen, again, as the vitally important elements in our ecosystem that clothe us, feed us, give us the oxygen that we breathe and the medicines that cure us. They need to be understood to be the carbon sinks that will allow us to reduce global warming, controllers of the impacts of drought and maintainers of fresh water supplies. They need to be seen as the complex living organisms, in their myriad of forms, which they truly are. Plants need to become valued again, elevated from their throwaway, second class status and be put back into the limelight - stolen from them by the furniture (or lions). We need to find a cure for plant blindness, and quickly, because if we don't, it won't just be horticulture facing a crisis.

Robbie Blackhall-Miles is a modern-day plant hunter's propagator and gardener. He is interested in ancient families of plants and blogs about these on his website fossilplants.co.uk. He also tweets as @fossilplants.

Reprinted from *The Guardian* website, https://www.theguardian.com.

2020 Membership Renewal

You will receive your renewal form before the end of the year. If you wish a printed copy of the OTF journal mailed to you, simply check the box to receive the printed journal and add $10 to your total.

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Fowler Woods State Nature Preserve



Marsh marigold, *Calthia palustris*
Picture taken from www. naturepreserves.ohiodnr.gov

Fowler Woods is a 187-acre, state nature preserve located in Richland County in northeast Ohio. It is an excellent example of a beech-maple community, grading into swamp forest on the lower ground. Several low areas are water-covered most of the year and occupied by large buttonbush swamps. The numerous buttonbush swamps and woodland pools scattered throughout Fowler Woods support a wide diversity of breeding amphibians during the spring and early summer months.

This nature preserve is one of the best sites in Ohio for viewing spring wildflowers. Especially notable are the spectacular displays of marsh marigolds in April. Later in May the forest floor is blanketed with an outstanding diversity of spring wildflowers including trilliums, violets, Dutchman's breeches, jack-in-the-pulpit, spring beauty and phlox.

The woodlands support a variety of nesting birds including red-headed woodpecker, ovenbird, redstart and scarlet tanager. This is one of the few areas in north central Ohio where one can still hear the haunting song of the veery.

The preserve has a handicapped accessible boardwalk which provides access. The 1-1/4-mile loop boardwalk trail begins at the parking lot. The boardwalk passes through mature forest, buttonbush swamps, and an area that was once farmland, but is now reverting to forest. The preserve used to be one of the best sites in Ohio for viewing spring wildflowers, but since only a fraction of the boardwalk is now accessible to the public, many species of wildflower are no longer within sight. They are building a new boardwalk to replace the closed section, however, the timing for completion has not been communicated. Spring and fall are the best times to visit Fowler Woods to avoid biting insects.

The park is located at 7815 Olivesburg-Fitchville Rd. Shiloh, Ohio. It is in Richland County, 13 miles north of Mansfield, Ohio.

Following is a list of the spring flowers that exist at the preserve.

Hispid buttercup, *Ranunculus hispidus*
Marsh marigold, *Caltha palustris*
Wild ginger, *Asarum canadense*
Spring beauty, *Claytonia virginica*
Wild geranium, *Geranium maculatum*
Wild strawberry, *Fragaria virginiana*
Sharp-lobed Hepatica, *Hepatica acutiloba*
Purple cress, *Cardamine douglassii*
Large-flowered trillium, *Trillium grandiflorum*
Drooping trillium, *Trillium flexipes*
Drooping trillium, maroon form, *Trillium flexipes*
Blue phlox, *Phlox divaricata*
Bishop's cap, *Mitella diphylla*
Common blue violet, *Viola papilionacea*
Jack-in-the-pulpit, *Arisaema triphyllum*
Rue anemone, *Thalictrum thalictroides*

Information for this article taken from www.naturepreserves.ohiodnr.gov/fowlerwoods and https://trekohio.com/2015/03/31/fowler-woods-state-nature-preserve.

Interesting Factoid:

Ecological Grief?

By Diane Christensen

One poorly understood consequence of climate change is the concept of "ecological grief." Ecological grief is the mental anguish felt over our changing world and the sense that society is losing aspects of the environment we cannot get back.

Subtle or drastic changes in the environment and ecology around us can have dire effects on our emotional wellbeing. Grief due to changes in natural environments, such as parks and other green spaces, or in individual organisms is described as "ecological grief," whereas grief due to changes in human-constructed environments such as real estate development, is described as "environmental grief."

There are so many environmental changes occurring on our planet that lead to this grief. One recent study conducted by the world's leading climate scientists said that if greenhouse gas emissions continue at the current rate, by 2040 Earth will have warmed by 2.7 degrees Fahrenheit above preindustrial levels. Predictions say that such increase in temperature will cause extreme weather events, rising sea levels, species extinction, and reduced capacity to produce food. And to add to this list, there is clear-cut logging, invasive species, and the loss of native plants to worry about.

The grief you experience can be either dull or sharp. Unlike the death of a person, the degradation of a landscape is often cumulative: increased litter, more disjointed spaces, fewer birds each year, etc. "Dull" grief is the day-in, day-out experiences, aggravations, and worries that come from living in an ecologically unstable world. "Sharp" grief may occur after a specific event: a new real estate development, a flood, or finding an invasive plant infection that was not there last year. It's possible for "dull" grief to wear you down, and "sharp" grief to inspire you to action, or vice versa.

We want to do something to reduce global warming but are overwhelmed and depressed by the scope of the problem and difficulty in finding solutions. And we're anxious about how Earth will change over the rest of our or our children's lifetimes.

Although it is not an official clinical diagnosis, the psychiatric and psychological communities have names for the phenomenon: "climate distress," "climate grief," "environmental grief," "climate anxiety" or "eco-anxiety."



Interesting Factoids:

- An April survey by Yale and George Mason Universities found that 62% of Americans were at least "somewhat worried" about climate change. Of those, 23% were "very worried."
- Both younger and older generations express worry, although younger Americans generally seem more concerned: a 2019 Gallup poll reported that 54% of those ages 18 to 34, 38% of those 35 to 54, and 44% of those 55 or older worry a "great deal" about global warming.
- There is no epidemiological data yet to show how common distress or anxiety related to climate change is. But people say these feelings are real and affect their life decisions.

By beginning to pay attention to these intangible losses, we can expand the narrative of climate change and find ways to support one another, encourage action, and create healthy communities. It is crucial to remember that our response to climate change is often valid. The goal is not to get rid of the anxiety. The goal is to transform it into what is bearable and useful and motivating.

Information for this article taken from the Sun Sentinel newspaper, https://www.sun-sentinel.com, 8/15/2019; New York Public Radio, https://www.wnycstudios.org; Detroit's NPR Station, https://wdet.org; and Refugia Retreats, www.refugiaretreats.com. Picture taken from https://www.microcosmic.info/2016/10/environmental-grief-psychologically-how.html.

Picture taken from https://www.microcosmic.info/2016/10/environmental-grief-psychologically-how.html.

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