ConWatch

The Garden Club of America • Spring 2019

"Between every two pines is a doorway to a new world."
—John Muir.

TREES

From the Editor

By Molly Jones

Hard to imagine a world without trees. In my one acre garden, more than 30 species of trees flourish. I have always anthropomorphized my trees. I even like saying many of their names. They have spirit and soul, they communicate, they have relationships, they are welcoming hosts. They are also vulnerable, they weep, and they become sick and die. So many of the world's problems rise from the loss of trees and it seems to me that so many potential solutions lie in restoring trees and their habitats.

At times, humans are a tree's worst enemy, causing deforestation, climate change, clear-cutting, planned monoculture forests, and other problems that arise from abuse and neglect. But, humans can also be a big part of the solution. Many of the articles in this issues highlight projects that are making a difference.

As usual, we've learned so much just putting this issue together. Researching economic and legislative solutions to carbon emissions, palm oil, and conservation laws showed that these headline issues are so much more interesting and complex than we knew and now that we've immersed ourselves in reading, we see these important issues appear in the news daily. Palm oil, carbon pricing, and Partners for Plants have all been mentioned in the *NY Times* just in the last week.

We've just released a beautifully illustrated new version of ***The History of Conservation and NAL Committees***, with many thanks to Dede Petri for the update. It is filled with wonderful old photographs and lots of interesting information about The GCA and its hundred-year+ advocacy for conservation issues, many of which have great relevance for members today. ■

Molly Jones, *The Portland Garden Club, Zone XII*
Editor of ConWatch

8 TREES IN MY YARD

Japanese Maple
Bigleaf Maple
Paperbark Maple
Coral Bark Maple
Trident Maple
Species Ginkgo
Dwarf Ginkgo
Mountain Ash
Douglas-fir
Katsura
Weeping Katsura
Sargeants Crabapple
Prunus mume
Alder
Chinese Elm (for bonsai)
Corkscrew Elm
Blue Spruce
White Fir
Cryptomeria
Cryptomeria elegans
Cercis canadensis (Red Bud)
Sciadopitys (Umbrella Pine)
Pinus contorta
Franklinia
Cornus nuttallii
Wolf-Eyes Dogwood
Cornus florida
Cornus kousa
Coast Redwood
Bay Laurel
Holly
Ornamental Cherry

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A HISTORY OF CONSERVATION AND NATIONAL AFFAIRS & LEGISLATION

The Garden Club of America

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News From the Conservation & NAL Committees

By Hollidae Morrison and SaSa Panarese

Legislative action was afoot during this year's National Affairs and Legislation Conference. Fortuitously, several of our delegates got passes from their Representatives to sit in the House gallery to watch members vote on the Senate Lands Package S.47. This legislation was a sweeping lands package that protected millions of acres of land and hundreds of miles of wild rivers and established four new national monuments. Notably, it included permanent reauthorization of the Land and Water Conservation Fund (LWCF), something the GCA has supported since its inception in 1965.

The House accepted the Senate bill as passed, suspended its normal process for voting on a bill, and passed it with a two-thirds majority. We issued a full Call to Action to all of our members in early February when the Senate was voting on S.47, so it was especially meaningful for our members to be in D.C. when it passed in the House. The President signed S.47 into law this month.

Another recent legislative action was the passing of H.R. 831, the revival of the National Scenic Byways Program. As with LWCF, the GCA sent out a full Call to Action before the conference asking members to call their Representatives in support of this bill. It passed the House by a vote of 404–19. The companion Senate Bill, S. 349, which has yet to be approved by the Senate, will also enjoy full GCA support when the time comes for a vote.

From last year's NAL Conference to this year, our committees have been busy opposing the EPA's proposed rollbacks on several regulations including methane emissions, the Clean Power Plan, CAFÉ standards for vehicles and drilling in the Arctic National Wildlife Refuge. We supported keeping the Endangered Species Act intact along with our national monuments, conservation titles in the 2018 Farm Bill and the retention of the Clean Water Rule.

On a very positive note, GCA members were instrumental in getting the so-called "Botany Bill" introduced in the House—H.R.1572—a bill "to promote botanical research and botanical sciences capacity," as Hannah Clark discusses in her NAL Issues to Watch article in this edition of ConWatch.

We are still avidly working on the introduction of a similar bill in the Senate so stay tuned for this and many more actions by your NAL and Conservation Committees.■

Hollidae Morrison, *Garden Club of Jackson, Zone IX*
Chairman of the NAL Committee
SaSa Panarese, *Garden Club of Milton, Zone I*
Chairman of the Conservation Committee

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Forest Fires: The New Abnormal

By Karen Gilhuly

Bigger, Hotter and Harder To Control

After a year of record forests fires in 2017, California was again trying to respond to another rash of deadly and destructive conflagrations late last year. Was this the "new normal?", Governor Jerry Brown was asked. *"This is not the new normal,"* he replied, *"this is the new abnormal. And this new abnormal will continue, certainly into the next 10 to 15 to 20 years."*

Forests cover a surprising 34% of the total land area of the United States. The incidence of forest fires has been on the rise, with the number of fires burning 1000+ acres doubling since 1970. A large number of fires can be found burning all across the U.S. during today's ever-lengthening fire season. Defined as the point in time at which the snowpack has melted, rain has ceased to fall and the earth has dried out, fire seasons continue to start earlier, largely due to a warming climate. At the other end of the calendar, the fire season can run well into the fall, finally ending with the first rains—if the rain comes at all. Fire seasons are an average of 20% longer today than they were 35 years ago. Record-breaking drought all across the United States in recent years has exacerbated conditions leading to forest fires.

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How do fires begin?

As the summer air heats up and the pressure builds in the afternoons, the incidence of lightning strikes increases. The tip of a tall tree is struck and ignites a fire that quickly spreads. Or perhaps someone is careless with a campfire, a lighted cigarette or a power tool casting sparks. For "controlled maintenance," some fires are set intentionally by USFS personnel, only to get out of hand. As people move into our forests in increasing numbers, more fires will begin through negligence. No matter what starts the fire, the flames will find an enormous amount of "fuel" throughout the forest floor and amongst the dry grasses of the plains.

Why Is So Much "Fuel" Covering the Earth's Surface?

It has been a long time coming. When Teddy Roosevelt set out to establish the US Forest Service in 1905, he sought to create a federal agency that would preserve one of our nation's natural treasures. Timber and mining industries felt differently. Having drawn on seemingly boundless natural resources in our forests to support a growing nation for decades, they were also making a healthy profit. Members of Congress were not inclined to set aside funds for the fledgling agency until the ***"Big Blowup" of 1910*** occurred. Over three million acres of virgin forest was burned across Idaho, Washington and Montana, an area as large as the state of Connecticut. Suddenly, the Forest Service's mission came into focus—it would never allow this sort of disaster to occur again. The USFS became the watchdog of our forests, spending the next

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70 years extinguishing all forest fires as quickly as possible. This was no small task but the USFS was very successful. Through their public service campaign, Smokey the Bear taught us that "only YOU can prevent forest fires". Following World War II, both planes and pilots became available to join the fight against forest fires. As technology improved, satellites and GPS systems identified fires quickly and firefighters could communicate and coordinate their efforts more efficiently. We were winning many battles—but setting ourselves up to lose the war.

Fire: a forest's friend–and foe

The ecosystem of a forest relies on fire to thrive in a multitude of ways. Low and slow-burning flames clean up the forest floor, breaking down debris and returning nutrients to the soil. Pest populations and invasive species are kept in check. Thick stands of trees are thinned out, allowing life-giving sunshine to penetrate the canopy, spurring the growth of young, healthy trees. The heat of the flames unlocks the seeds of certain species of trees and other plants that can only regenerate following a fire. All of this is well-known today but it was not understood or appreciated for many decades of the last century.

Without the natural occurence of fire, our forests have become clogged with debris, from low-growing shrubs to tall trees, many of which are dead or dying. Pests invade the weakened trees, killing them and contributing to the accumulation of "fuel" in the forest. These factors, combined with the rising temperature of the planet and extended periods of drought, make the condition of our forests ripe for conflagration. Average temperatures in forested parts of the western United States have gone up about 2.5° F since 1970, and are expected to keep rising. When fires begin, 90% of which are now caused by humans, the fuel is rapidly consumed and the fire moves very quickly, burning at such a high temperature that it creates its

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Fireweed is a native plant found throughout the temperate northern hemisphere. It earned its name because it is the first colonizer in the soil after forest fires.

own wind pattern. This creates an unpredictability that makes "megafires" difficult and dangerous to fight. Today's fires can burn at temperatures of 2000°+, so hot that they destroy the nutrients in the soil. This leads to erosion and mudslides. Fires also return massive amounts of carbon into the atmosphere.

The forest then becomes newly dependent on man's ability to protect and restore it, at a huge cost to the USFS and, by extension, to us.

Additionally, the cost of protecting the homes which are increasingly being built in the "wildland-urban interface," defined as settled areas abutting the forest, is spiraling. In recent decades, the number of people moving into previously uninhabited areas rose by 41%. When a forest fire starts, the first concern is the welfare of humans and the defense of their homes. At an ever-increasing rate, funds the USFS might have otherwise used to restore a damaged forest or to carry out controlled burns in an effort to reduce the risk of a massive forest fire, are diverted towards protecting people and their structures.

A Modern Tinderbox

"Stand-maintenance burns," used by the Native Americans and early settlers for generations are fires that burn small areas, with low-flame height, burning at about 1200° F and occurring about 8–10 years apart. It was understood that fire was nature's way of cleaning the forest floor, returning nutrients to the soil and beginning a cycle of renewal. As these controlled fires were discontinued, replaced by a concerted effort to suppress forest fires at all costs, the fuel build up on the forest floors and grasslands went unchecked.

Decades of fire suppression have inadvertently created a dire situation. Combined with climate change warming the earth, drying out timber and preventing the chill of winter from killing off infestations of Bark beetles, and drought weakening trees, making them more vulnerable to pests, many forests are now bone-dry tinderboxes waiting to ignite.

Today, there are over 300 million acres with unnaturally heavy fuel loads. This is an area equal to three times the state of California. So much fuel remains on the forest floor that when a fire does begin, it spreads very quickly, becoming huge

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Camp Fire, California, 2018

and uncontrollable "megafires," consuming 100,000+ acres or more. Since 2000, there have been 10 fire seasons with a dozen or more megafires.

Since the 1990s there has been increased awareness of the balance needed to manage the health of our forests. Agencies, ecologists and scientists have learned how critical the use of controlled burns is in reducing the fuel load of forests. Resources are scarce, however, and there is no way to keep up with the cost and the manpower required to complete the controlled burns needed across the West.

In Oregon, for example, the USFS manages to control-burn five to six thousand acres a year. In fact, there are over five hundred thousand acres which should be managed more closely. As megafires sap the firefighting agencies' budgets, little money is left for managed fire efforts. We will be living with increased forest fires for a long time to come.

A century of suppression, combined with other current factors, has created a situation that requires commitment by individuals as well as the government. Just as we shouldn't construct buildings in floodplains or avalanche zones, we shouldn't continue to build in areas that are in or at the edge of a forest vulnerable to fire. As with all things climate-change related, we know that an increasingly warm planet only exacerbates conditions leading to the degradation of our water, air, the earth and its forests. ■

Karen Gilhuly, *Woodside-Atherton Garden Club, Zone XII*
Vice Chairman, Forests/Redwoods, Conservation and NAL Committees

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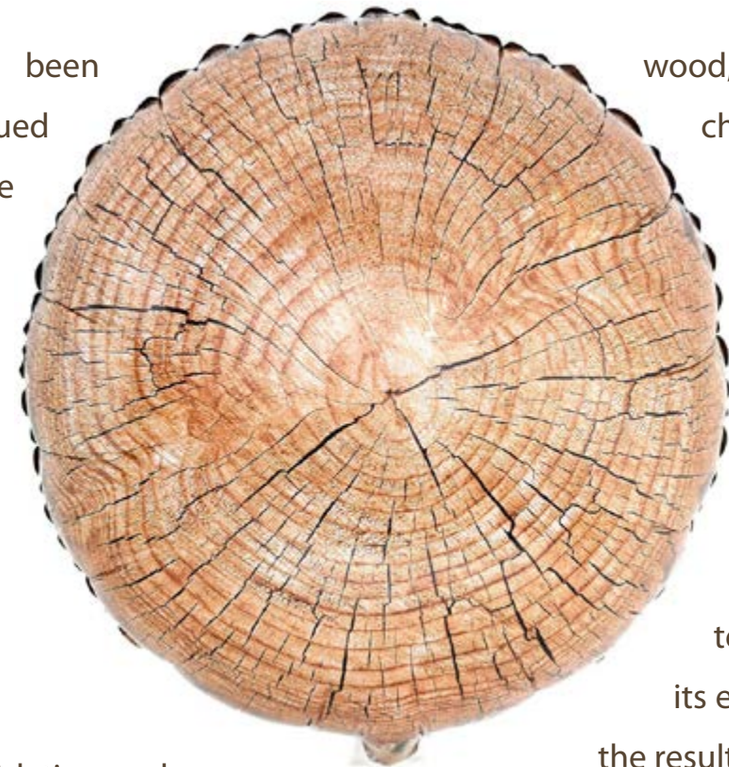
Forests for the Trees

By Karen Gilhuly

Green Trees, Green Money & Green Policy

Throughout the earth's history, our forests have been damaged, displaced and destroyed. Yet they've continued to re-emerge, survive and thrive. As we move into the era many call the Anthropocene—a new geological epoch characterized by humanity's influence on the planet–our forests will increasingly rely on man's intervention to protect them. Human beings have wreaked havoc on our environment for the last 400 years. Things are reaching a critical impasse, and now it is mankind who can rescue many species of plants and animals.



Legislative Push-Pull

Stewardship of our nation's forests has been an ongoing legislative push-pull between competing interests for many decades. Since the 1960s, laws have been passed that protected the diverse species living in our forests from encroaching development and logging, created a rigorous process of assessment of the economic value of our forests, based not just on board-feet of timber or potential homes to be built but also on tourist and recreational revenue and job creation. These laws have sought to balance the rights of the timber industry with the needs of the forest.

As foreign manufacturing reduced the demand for US forestry products, the timber industry felt the pinch. As our population increasingly moves into cities and more people become renters instead of owning homes, the home-building industry and its demand for more expensive, domestic timber has declined. Additionally, our society's move towards electronic forms of communication has reduced the demand for paper. Though there is still a market for domestic wood, the US logging industry has undergone profound changes in the last 50 years.

As the declining health of our forests and the growing threat of wildfire has become better understood, old adversaries have a unique opportunity to work together for the common good. Environmentalists, members of Congress, state and local officials and the timber industry all understand that to protect our forests for the long term we must accept the reality of climate change, its effect on our trees and grasslands and work to undo the results of decades of fire suppression. A huge task stands before us as we try to defend against large scale fires which are a major factor in the future health of forests.

Funding Solutions: Money Doesn't Grow on Trees

Solutions take money. Over the last four years, Congress has consistently reduced the budget of the US Forest Service, who is largely responsible for fire management on federal lands. In 2016, they had $7.1B with which to operate. In 2019, The USFS is budgeted only $4.8B, even though the incidence and severity of forest fires has dramatically increased. Having just experienced the two deadliest and most destructive years of forest fires in our history, politicians have begun to respond.

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States have had to step in to fill the void. Over the past two fiscal years, California made more than $100 million available to treat forest lands, though almost half of these lands are federally owned. In 2018 alone, Oregon spent $25M above what it had budgeted to fight fires, Idaho $17M and Utah, a whopping $47M. Much of this money should eventually be reimbursed by the Federal Government but it takes many years to settle accounts and disrupts each state's budget dramatically.

It looks as though things are finally changing. For many years, scientists, landowners, forest managers and others have advocated for the appropriate responses to the challenges our forests present and for the funds to make changes. Presented last spring and approved by Congress at the end of 2018, the Omnibus Spending Package included a new, more generous formula for "fire funding" in both the Department of Agriculture and Interior.

Previously, funding for fire fighting was based on a 10-year average and was not keeping pace with the demand. Internal "fire borrowing" was required, which still did not cover the agencies' needs. In addition, the package increases funding for wildfire-related programs by nearly $550 million. The agencies are now in a position to develop programs to:

- Create firebreaks
- Manage the build up of fuel
- Combat forest destruction by invasive pests and plants
- Educate citizens about the hazards of living in the wildland urban interface.

Last December, President Trump signed an executive order directing the Departments of Agriculture and Interior to actively reduce the fuel loads and invasive species on over five million acres of federal land and stresses the importance of working collaboratively with other groups on this effort. It greenlights the sale of over 4 billion board feet of timber from these lands and

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encourages the departments to look for new markets for this timber including, notably, the wood biomass market.

Collaborating For a Better Future

Those on the ground fighting fires and managing forests have not been waiting for the Federal government to lead the way. Seemingly disparate groups are coming together to try to address the problem in increasingly cooperative ways. The Good Neighbor Authority, a federal-state partnership established under the Farm Bill of 2014 was recently renewed and expanded with the passage of the Farm Bill of 2018. This agreement allows local agencies and workers, now including those in Puerto Rico and Native American tribal lands, to assist on restoration work and timber sales on U.S. Forest Service land.

Taking this a step further, Idaho recently signed its own agreement with the USDA called the "Shared Stewardship Agreement", the first of its kind between a federal and a state agency, scaling up the Good Neighbor Authority partnership to work on prescribed burns and restoration work. In Oregon and California, The Nature Conservancy has been a welcome partner to county water agencies and other state and federal officials as they work together to judiciously thin their forests for the benefit of all. Local stewards of the land know their forests and can steer management of projects most efficiently. Having all stakeholders working in partnership, with sound science and meaningful funding, is the best way forward as we confront the future health and survival of our nation's forests.

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Map depicting the concentration of biomass—a measure of the amount of organic carbon—stored in the trunks, limbs, and leaves of trees. The darkest greens reveal the areas with the densest, tallest, and most robust forest growth.

Other Ways To Help Support Forest Survival

Education

From the USDA to arboretums, citizen activists, universities and land trusts, there are multiple groups working on behalf of forests. One example is the Climate Change Response Framework, which runs six projects in 19 states focused on learning what best practices will ensure the health of forests.

Protection

One third of the earth's surface is covered by forests, sequestering more than 45% of the carbon stored on land. There has been a combined loss of forest area bigger than South America over the last 25 years. In an effort to combat this loss, many countries are increasing the land that is nationally protected. By 2012, more than 14 percent of the world's land area had been protected. America's federal public lands cover almost a million square miles, over 618 million acres, more than 25% of the U.S. land base. The 1992 United Nations adaptation of the "Forest Principles" for sustainable forest management, now guides many forestry decisions worldwide, including recommendations for:

- maintaining biodiversity
- productivity,
- regeneration capacity
- vitality
- not causing damage to other ecosystems

Additionally, there is increased cooperation between lumber companies and both government and non-profit groups to move forested land into protection. For example, in 2001, Sierra Pacific Industries, the

second largest lumber company in the country, sold 30,000 acres of riverfront land in the Sierra Nevada mountain range to the Trust for Public Land, protecting irreplaceable old-growth trees. In 2018, Save the Redwoods League, the non-profit and long-time partner of GCA, faciliated the protection of three critical parcels of old growth redwoods and giant sequoias in Northern California, including 730 acres of centuries-old Sequoia sempervirens that had been held in private hands for over 100 years.

Expansion

It is encouraging to note that in some parts of the world, including the United States, Europe and China, the size of forests has actually increased. There is more responsible commercial tree growing, increased use of selective harvesting and a trend toward planting more trees than are being removed. In addition, urban growth boundaries are used to prevent development of rural open spaces, including forests.

Relocation

Throughout millennium, trees have naturally sought out the environments where they could thrive. Retreating and advancing glaciers, rising and falling sea levels and warming and cooling climates have always pushed forests in many directions around the globe. Our forests migrate naturally to where they want to be but it takes a very long time. For example, the Coast Redwoods, Sequoia sempervirens, once banded the earth with towering trees across the entire Northern Hemisphere. After many geologic and climatic shifts, they are now limited to a small littoral strip in Northern California where conditions are perfect for their success. As the climate has warmed however, there is increasing concern that the natural migration of these trees towards areas where they thrive cannot happen quickly enough to ensure their long-term survival. To enhance this process, steps are being taken by Save the Redwoods League to understand the genetic makeup of the redwoods and to proactively work to populate areas where the conditions are anticipated to be as cool and foggy as their current environment.

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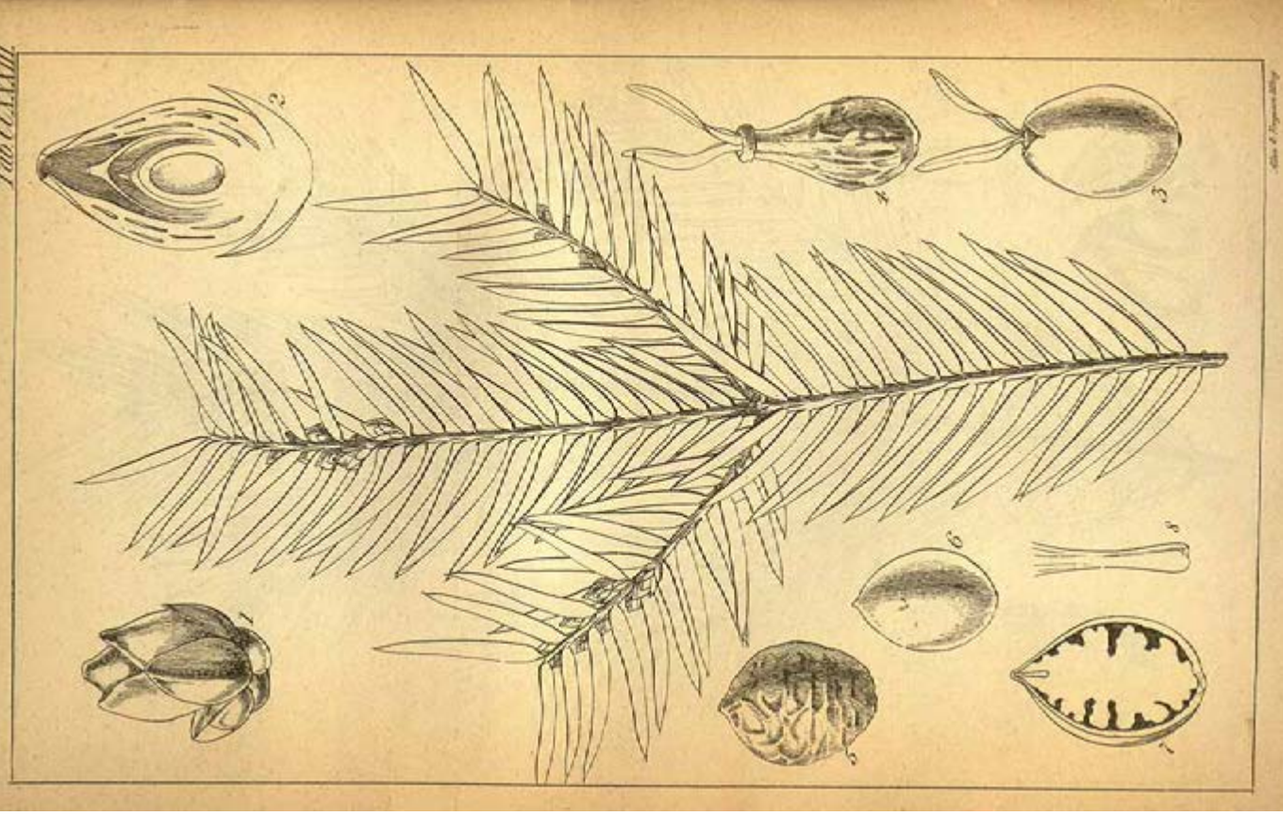

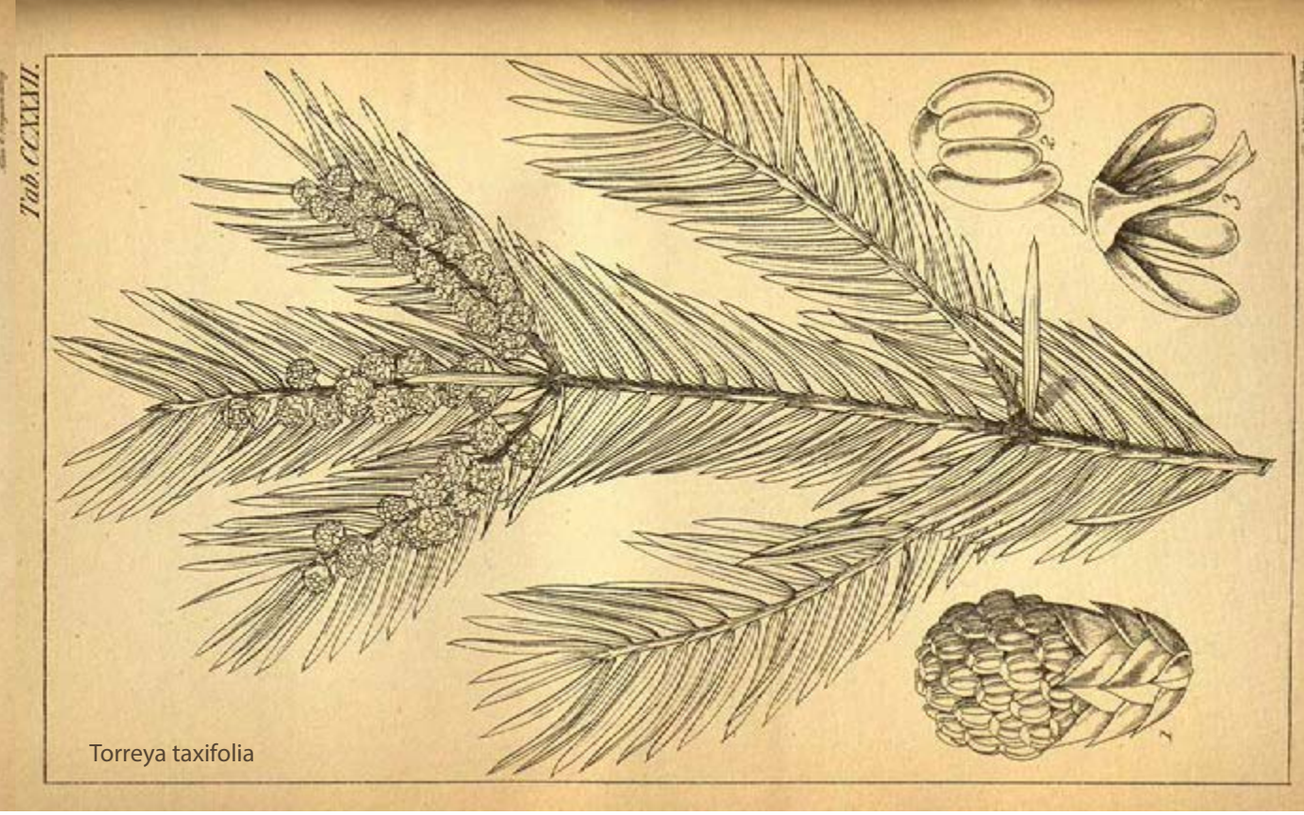

Torreya taxifolia

Another example of relocation is the Torreya taxifolia, a native of the Florida panhandle. After a pathogen decimated the population of these trees in the 1950s, they were listed as an endangered species in 1984. The Torreya taxifolia was headed for extinction. In 2004 however, a group of concerned citizens stepped in to form an alliance to assist with the survival of the "T tax, "as it's referred to by supporters. Using historical documents that proved the tree could survive as far north as New York, the "Torreya Guardians" set out to enlist the help of scientists and citizens throughout the eastern United States to relocate the species. Aligned with arboretums, universities and other partners, the project is on-going in 12 states, from North Carolina to Wisconsin and is experiencing success. This "assisted migration," or "re-wilding" as it's also called, hinges on the idea that, in a warming climate scenario, trees that work well in the south should be tried in the north. There are some species of trees that are expected to be better-adapted to future conditions including black locust, chestnut oak, persimmon, shortleaf pine, sweetgum, loblolly, Virginia pine and white oak.

How to take Action

Just as we work to protect our native plants, pollinators, watersheds, oceans and rivers, we can all take action to support the long-term health of our forests. There are a myriad of organizations through which you can participate as a forest guardian. ■

Here is a short list:

Tree People, Los Angeles

US Forest Service

Tree Trust, St. Louis

Friends of Trees, Oregon

National Forest Foundation

Karen Gilhuly, *Woodside-Atherton Garden Club, Zone XII*

Vice Chairman, Forests/Redwoods, Conservation and NAL Committees

Everyday Things

By Elizabeth Lamar

Palm Oil: It's Complicated

Most people reading this article have probably used palm oil several times before breakfast. It is present in cosmetics and hair products, toothpaste and soap, detergents and other cleaning products, chips and chocolate, pastries and pet food. In a typical grocery store, palm oil is found in about 50% of the items on the shelves.

Biofuels

Additionally, palm oil is increasingly used along with other vegetable oils as an ingredient in biofuels for automotive and aviation use, touted as a healthier choice for our environment than petroleum-based fuel.

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Why so Popular?

Palm oil is ubiquitous in processed food products, valued for its:

- Stability at high cooking temperatures
- Stability over time and long shelf life
- Neutral taste and smell
- Solid or semi-solid state at room temperature
- Smooth and creamy texture
- No trans fats and less saturated fat than butter

As a crop palm oil is more efficient to grow than many alternative oil sources such as soybeans, olives or sunflowers, requiring less acreage, pesticides and fertilizers. Palm oil has become one of the largest tropical commodities. Its production has contributed to the economic growth of nations such as Malaysia and Indonesia, bringing more secure economic livelihood to small farmers and others associated with the industry in those countries. Predictions of future growth promise increased economic stability to poor tropical regions of the world, but there is a price.

The Real Price

When it comes to palm oil production, environmental red flags abound. Instead of small production by local farmers, palm oil is increasingly grown in large plantations, carved out of some of the most ecologically sensitive regions of the world. The resulting monocultures provide no sustenance for native species. Burning of forests to create palm oil plantations has endangered native plants and animals, most famously the Orangutan. Between 1990 and 2008, palm oil production alone led to 8% of the world's deforestation and in turn deforestation led to 15% of global warming. Many palm oil plantations are being created by burning off carbon rich peatlands which can hold up to 18 to 28 times as much carbon as the forests above them. Smoke from these burns has led to unhealthy air pollution resulting in widespread health problems.

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Economics Versus Ecology

Despite the obvious environmental devastation, the production of palm oil has fierce local support because of its economic opportunities. Malaysia has launched a "Love My Palm Oil" public relations campaign to combat the anti palm oil rhetoric and sentiment around the world. Malaysia has announced that it will double the mix of palm oil in its biodiesel program by 2020 and many countries show increased palm oil imports as compared to last year.

While many get rich from palm oil production, others are exploited. Governmental agencies supportive of the economic impact of palm oil in their communities are accused of criminalizing local farmers and using law enforcement and courts to engineer charges that force farmers to hand over their land.

Greenpeace clarified last fall that it has a problem with deforestation, not with palm oil itself.

Many native people of Indonesia, Malaysia and Cameroon clearly see the threat to their traditional way of life posed by economic shifts toward palm oil production in their communities. An internet search will quickly reveal displaced families and illegal land grabs.

Relations are feverish in many regions where palm oil is leading to rapid development and strong feelings on both sides of the issue extend across the globe.

What's Being Done?

The demand for palm oil is not going away. To find creative solutions balancing economic and environmental concerns, the Roundtable on Sustainable Palm Oil (RSPO) was formed in 2004. with the objective of promoting the growth and use of sustainable oil palm products through establishing credible global standards and engagement of stakeholders. The RSPO has 4,000 members from over 90 countries. The ***RSPO*** has developed a set of environmental and social criteria which companies must comply with in order to produce Certified Sustainable Palm Oil (CSPO). When they are properly applied, these criteria can help minimize the negative impact of palm oil cultivation on the environment and communities. Consumers can look for RSPO certification marks on products they buy.

CSPO is one of the best examples of creative problem solving to emerge so far. Sustainable palm oil promises a solution, but an imperfect one. Currently, CSPO producers bear extra costs to create an environmentally friendly product, while others in the supply chain have lower production costs because they do not adhere to the same sustainability standards which makes it hard for CSPO oils to be competitive. Another organization,

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Green Palm, based in England, is working to provide economic incentives to encourage participation in CSPO certification.

Global Response

To reduce demand for the consumption of this environmentally destructive fuel, the European Parliament's Committee on Environment, Public Health and Food Safety passed a resolution in October of 2018 to ban palm oil biofuels by 2020 and ***Norway recently banned palm oil-based biofuels***. The French General Assembly voted this January to deny palm oil companies the tax incentives afforded to other biofuel companies in that country.

Getting Up to Speed on Palm Oil

While it is easy to find fault with ecologically unsustainable practices on the other side of the world, it's clear that a culture of insatiable consumption, a demand for cheap fuel and many other comfortable facets of life in wealthier countries continues to encourage such practices. The public is only just beginning to understand its impact. When it comes to palm oil, it's complicated. ■

Major articles, notably in the NY Times and National Geographic, present a fascinating overview of palm oil and its global impact.

Here Are Some Excellent Palm Oil Resources.

A good primer on palm oil
Extensive NY Times article with beautiful photographs
National Geographic article, also with great photos about palm oil in household items
Another National Geographic article, again amazing photos (requires email to view)
WWF palm oil scorecard
Which household products contain palm oil?
A powerful banned commercial

Elizabeth Lamar, *Garden Club of Nashville, Zone IX*
Vice Chairman, Native Plants/Pollinators/Endangered Species/Invasive Species, Conservation and NAL Committees

CONTAINS: Palm Oil

In a typical grocery store, palm oil is found in about 50% of the items on the shelves, including these commonly used items:

- Lipstick
- Shampoo & conditioner
- Soap
- Toothpaste
- Laundry detergent
- Ice cream
- Chocolate
- Cookies
- Candy
- Frozen pizza
- Sandwich breads
- Crackers
- Bodiesel fuel.

Palm Oil By Any Other Name

Palm oil and its derivatives can appear under more names than just "palm oil." While some of these ingredients, like vegetable oil, aren't always made from palm oil, they ***can*** be.

- Vegetable fat
- Vegetable oil
- Elaeis guineensis
- Glyceryl
- Sodium laureth sulfate
- Sodium lauryl lactylate/sulphate
- Sodium lauryl sulfate
- Stearate
- Stearic acid
- Palm Kernel
- Palm Kernel Oil
- Palm Fruit Oil, Palmate
- Palmitate
- Palmolein,
- Palmitic Acid
- Palm Stearine
- Palmitoyl Oxostearamide
- Palmitoyl Tetrapeptide-3,
- Sodium Kernelate
- Sodium Palm Kernelate
- Hyrated Palm Glycerides
- Etyl Palmitate
- Octyl Palmitate
- Palmityl Alcohol

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Photo: Scott Dressel-Martin, courtesy of the Denver Botanic Gardens

Denver Botanic Gardens

By Brian Vogt

After hundreds of years, many iterations and styles, botanic gardens are emerging in the modern era as not only cherished cultural institutions but also as centers of change for a world hungry for connection and purpose. Typically, botanical gardens are know for presenting tableaus from around the globe inspiring and enlightening their visitors. They introduce plants both familiar and curious; and with the artistic touch of master horticulturists, beauty shines forth every bit as compelling as a sublime painting or majestic sculpture.

But, when we survey our visitors and ask what they experience here, words like peace, comfort, oasis and love rise to the top. Many of our guests arrive at the visitor center with pain in their eyes. Some are clearly stressed. When they depart, something has changed and they seem centered and joyful.

What is this magic? How do gardens reach into your soul and make the world a little bit better? When you scan human history, it's clear that this urban way of life, not to mention the constancy of technology and communication, has been a part of our experience for just a blink of the eye. We are living longer, have more access to education, wealth and freedoms than any of our ancestors dared to envision, but it comes with a price. Our connection to the natural world is primal, genetic, essential, but is often severed today. We are born with traditions and rituals that demand a sense of humility in the presence of something more powerful and the natural world was always our wellspring of

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Photo: Scott Dressel-Martin, courtesy of the Denver Botanic Gardens

surprise and wonder. You can experience a piece of that at a botanic garden. When it's snowing in Denver, you can visit a tropical conservatory and pretend that you are in an equatorial jungle. When you are exhausted by traffic, you can contemplate serenity in a miniature representation of the mountains of Japan. And when you are suffering loss, you can find that special bench, that favorite spot, and feel connected to the one you love.

Botanic gardens have always changed the world one spirit at a time. And sometimes, we can reach into our foundations and go even further. Two tracks led to what our institutions are today. One was all about aesthetics, the show. The other goes back to physic gardens and the search for plant based medical treatments. With the Age of Exploration, attention focused on economics. New foods, spices and exotic blooms could reap fortunes. Whole nations could rise or fall because of their stewardship of plants.

Today, we are more engaged than ever before with worldwide research and conservation. The race is on to protect endangered species and rare ecosystems, knowing that the consequences of thoughtlessness are multiplying rapidly. Our Center for Global Initiatives is working on genetic diversity of essential crops like coffee and on exploration of steppe ecosystems on four continents, among the most diverse and under-researched parts of the world.

Furthermore, the health of plants takes us naturally to other essential ingredients for sustaining life on earth, namely fungi, water and soils. Botanic gardens teach the symbiotic relationships between fungi and plants. Especially in semi-arid zones like Colorado, we specialize in plants that have adapted to our climate and are in the process of leading a program to shift the public's appreciation of public horticulture to appropriate and sustainable design. Soils, it turns out, are the lynchpin of civilization. Many civilizations have fallen because they have depleted soils and lost the ability to produce food. What's more, soils play a critical role in the sequestration of carbon, a topic that is beginning to get traction within the agricultural community.

The world changes. Shifts occur with and without humanity's touch. The great breakthroughs in the years ahead will come from our desire for knowledge and our intention to serve the future. Botanic Gardens can and should embrace our responsibility to encourage that enlightenment in the unique way we can. We already know that we can play our part in restoring one spirit at a time. Now, let's join together and restore the entire planet. ■

***Brian Vogt**, CEO of the Denver Botanic Gardens*
Awarded the GCA Cynthia Pratt Laughlin Medal, 2019

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Arboretums: Living Tree Museums

By Dr. Phyllis Reynolds

Not Just a Park

I have lived within a thousand feet of the Hoyt Arboretum in Portland, Oregon, for 55 of my 89 years and have walked through it seven days a week for over forty years. Many people think of arboretums as places to use the trails for walking, dog walking and jogging, not distinguishing them from parks or botanic gardens, which may have trees, woody plants and flowers. What distinguishes an arboretum is that it is purposefully created to be an outdoor living museum of trees and woody plants, intended for education, conservation, research, and display. Many are associated with colleges and universities, used for research purposes. Some arboretums charge admission for entrance; others are free.

The idea of tree collections dates back to the time of the Pharoahs, but arboretums as we understand them, came into popularity late in the 18th century. An online survey of ***arboretums*** provides a vast list of them in almost every country in the world.

Above, the Hoyt Arboretum logo

There are approximately 275 arboretums In the U.S. Only four states have none: Delaware, New Hampshire, Vermont, and Wyoming. Pennsylvania has the most—27, followed by seven states with ten or more.

"… They took all the trees and put 'em in a tree museum and they charged the people a dollar and a half just to see 'em" — Joni Mitchell

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The best time to plant a tree was twenty years ago. The next best time is now.
—Chinese Proverb

Accreditation

For eight years the Morton Arboretum in Illinois has had an accreditation program for arboretums: 158 arboretums are accredited at one of four levels depending on the arboretum's stage of development, capacity and potential for scientific and conservation-related collaboration. All levels require a strategic plan, a focus on woody species, public access, and participation in the ***ArbNet community.***

The Arnold Arboretum

Perhaps the best known arboretum in the country and one of the oldest, established in 1872, is Harvard University's ***Arnold Arboretum*** in Boston, designed by Frederick Law Olmsted who grouped trees taxonomically by family. The plants have known provenance, which is essential for most research. This means that the exact site of seed collection or cutting is known. For all specimens full documentation of both provenance and history within the collection is a critical priority. The Arnold has a research building, nurseries, and greenhouses. It covers 281 acres and has 15,000 plants. Its mission is ",*…to increase knowledge of woody plants through research and disseminate that knowledge through education.*" Their quarterly publication, ***Arnoldia***, is a valuable resource for scientific research on woody plants. The publication is free for those at a certain level of Friends membership. Scientists from Arnold Arboretum gathered seed in the mid 1940s from the Dawn Redwood (Metasequoia glyptostroioides) thought to be found only in fossil form until 1944 when ***a few trees were found*** in China. Arnold Arboretum disseminated those seeds to various arboretums in this country. Portland's Hoyt Arboretum was the recipient of some of their Dawn Redwood seeds in the 1940s. The seeds germinated, the seedlings were

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planted in the arboretum four years later and one of these trees was the first in this country to produce cones in the Western hemisphere in six million years .

Other Notable Arboretums

Some arboretums are very large. ***Holden Arboretum*** in Cleveland has 3,600 acres. Established in 1931, it has 79 families of woody plants. The majority of its plants are maintained in a natural state. ***Morton Arboretum*** in Illinois is also large: 1,700 acres. It was established in 1922 by Joy Morton, founder of the Morton Salt Company.

Without the support of a college or university, many arboretums rely on volunteers and uncertain funding from local municipalities. The public often perceives them as ordinary parks, not valuing their role in studying and protecting fragile and endangered trees. In this time of changing climates, invasive plants and species eradication, arboretums are ever more important. Hoyt Arboretum in Portland, Oregon, was established in 1928 when the land was acquired by the city. Portland Parks Superintendent, E.T. Mische, who had been trained at the Olmsted landscape firm in Massachusetts, saw an opportunity to start an arboretum for conifers on the land. In 1928, the Hoyt Arboretum became a reality, named for County Commissionner Ralph Warren Hoyt.

The plan for the now 208-acre site was designed by John W. Duncan. He used family groupings and included locations for nearly forty families of trees planted in a naturalistic landscape. Its twelve miles of trails and hills range in elevation from 870–450 feet. It is a lovely, vibrant place having one of the best conifer collections in the world, with trees from both hemispheres. It is also well-known for its magnolias and maples. At present it has 6,566 trees representing 172 families. There are 2,300 species, 90 hybrids, and 60 cultivars.

Currently, Hoyt has no staff doing research on site and no educational affiliation. Yet it persists—it has a strong Friends group and in 2018 its 1,300 volunteers worked a total of 12,000 hours. Hoyt provides a good example of the precarious nature of arboretum funding and staffing. Hoyt has only 2.5 full-time employees. In contrast, Washington Park Arboretum in Seattle, with approximately the same number of acres and age, has five full-time and four part-time staff from the University of Washington and five full-time and two part-time staff from the city of Seattle.

There are several ways the public can help ensure arboretums are valued and maintained. Searching out and visiting local arboretums is a start. Volunteering, donating, and advocating to continue their funding are all ways to be involved in supporting these beautiful, magical and essential places. ■

Dr. Phyllis Reynolds

The Portland GC, Zone XII

Author of ***Hoyt Arboretum: Its Story***

and of ***Trees of Greater Portland: New Edition***


Photo: courtesy of Michael Van Valkenburgh Associates, Inc.

Martin's Park, Boston Massachusetts

By Carolyn Ross

What was once green lawn along the Fort Point Channel in Boston Harbor is becoming an urban sanctuary. With designs by Michael Van Valkenburgh Associates, Inc., Martin's Park, named after Martin Richard, the youngest victim of the Boston Marathon Bombing in 2013, is being built on an acre site next to the Boston Children's Museum in the city's Seaport District. In an area heavily developed with luxury condo and office towers, the park is being created with the intent of ensuring Martin's legacy of kindness and peace. A photograph of Martin as a gap-toothed eight year old, holding a sign he had made saying: " No more hurting people…Peace" became a symbol for Boston as it recovered from a horrific attack. That sign has been hanging on the construction site since construction began.

The Richard family worked with the team at MVVA, Inc. to design a playground that was accessible to all but also challenging for able-bodied children. The park has elements for everyone and includes play features that encourage imaginative, sensory and inclusive play, including:

- a play ship placed 12 feet up on climbing rocks
- cargo rope climbing structure as part of the ship
- amphitheater
- accessible trails including a wooden pedestrian bridge
- play areas filled with tube and embankment slides
- rock climbing
- basket swings
- rope and log climbs
- landscaped overlooks and seating areas
- tree-sheltered rest spots situated along the trails.

Drawing: courtesy of Michael Van Valkenburgh Associates, Inc.

The multi-level park, with garage parking underneath, is raised to accommodate rising sea levels expected along Boston Harbor. Native trees and shrubs found in New England coastal plant communities, with a tolerance for salt, will provide shade and shelter for the areas that are occasionally impacted by events of extreme tidal fluctuation. Gray birch, chamaecyparis, inkberry, sumac, rugosa rose and spice bush are some of the trees and shrubs that will be planted in the exposed areas.

Denise and Bill Richard said of their son: *"Martin spent long hours playing at the various fields and playgrounds around the city. Here, Martin learned the value of community, teamwork, fairness, and kindness. Martin's Park will be a symbol of Martin's welcoming, inclusive nature as well as a place where he and his friends would have loved exploring and being together. This unique, public, outdoor space will ensure Martin's legacy remains a vibrant and positive influence for future generations."*

Private funding has been raised to build and endow the maintenance of this city park, which is scheduled for completion in the summer of 2019. ■

Carolyn Ross, *Chestnut Hill Garden Club, Zone I; current Zone Rep for the Conservation and NAL Committees.*

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Hallett Nature Sanctuary, New York City

By Bennett Burns

Nature in the City

At the south end of New York's Central Park, just across 59th Street from the Plaza Hotel, lies a hidden natural gem that few visitors experience.

When Fredrick Law Olmsted and Calvert Vaux designed Central Park in 1858, they left relatively untouched this rocky promontory on the north edge of the area they transformed into "The Pond" near the current ice-skating rink. This four-acre woodland was designated as a bird sanctuary and closed to the public in 1934. It was renamed the Hallett Nature Sanctuary in 1986 after George Hervey Hallett, Jr, a prominent leader in New York's civic movement, and an ardent nature love and bird watcher.

Since 2003, as part of a program led by the Central Park Conservancy, students have participated in landscape restoration projects and the creation of trails allowing the public access to the site during scheduled hours. The Central Park Conservancy routinely offers half-hour tours, avoiding nesting season and the height of migratory season.

Limiting access to this unique landscape over the years has allowed a more diverse community of native plants and a broader diversity of wildlife habitat than elsewhere in the park. Although the Sanctuary is only steps away from the busy Manhattan hubbub, it offers one of the best bird-watching spots in the Park and provides a quiet retreat for those seeking a tranquil moment of Zen. ■

***Bennett Burns**, The Portland GC, Zone XII*

Assistant Editor, ConWatch, Conservation Committee

Phoenix Urban Heat Island

By Tana Kappel

But It's a Dry Heat…

Heat is no joking matter. Last year in the Phoenix area, heat killed 172 people, a record for a second consecutive year as rising temperatures took a worsening toll in the country's hottest major city. Over the last decade, heat claimed more than 900 people across Maricopa County. Around the United States, almost 2,000 people suffer from heat-related illnesses every year. Around the world, heat has killed more than 12,000 people every year—more than any other weather-related event.

With a warming climate, heat will become an even greater threat in the desert Southwest. Ground zero for heat is America's fifth-largest city, Phoenix, with a population of 4.7 million. Twenty days reached or exceeded 110 ° in 2016, according to the Maricopa County Department of Public Health which estimates that by 2060, there will be 47 days that hot or hotter, and by 2100, 76 days—more than two and a half months of scalding temperatures.

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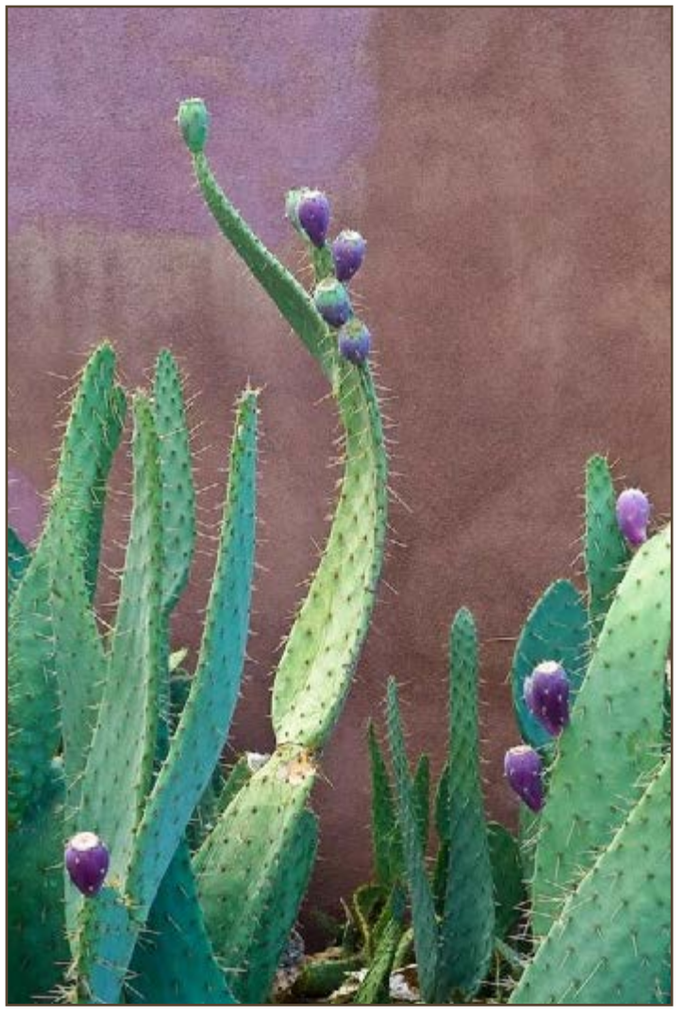
Cities are especially vulnerable. Buildings, parking lots, asphalt streets and cement tend to make urban areas much warmer than surrounding less-developed areas, a phenomenon known as the "heat island" effect.

Urban heat islands are a matter of increasing concern, since they can exacerbate air pollution and greenhouse gas emissions—due to greater use of air conditioning—and the occurrence of heat-related illness. Worldwide, more than 3 million deaths every year are attributed to heat and air pollution, according to ***Planting Healthy Air***, a global study released in 2016 by The Nature Conservancy.

A Solution: Nature

The Conservancy report cites scientific evidence of the benefits of city trees and their cost-effectiveness in reducing urban heat and pollution. Green spaces absorb carbon, filter irritants from the air and capture polluted stormwater runoff. Trees provide shade and can lower surface temperatures by up to 45 °.

In Phoenix, there is a scarcity of healthy, permeable soils that absorb and filter pollutants in stormwater, and consequently a lack of trees and vegetation that cool and clean the air. This lack of "greenness" can be especially acute in some of Phoenix's poorer neighborhoods, where people may not have cars, shade, or even air conditioning. During the summer, some Phoenix neighborhoods are up to 13° hotter than neighborhoods only two miles away, primarily due to their lack of trees.



"Around 50% of the rising heat that we are projected to experience in Phoenix has to do with how we build our cities," said Maggie Messerschmidt, the Conservancy's urban conservation program manager in Arizona. *"That means that as we work globally on mitigating the effects of climate change, there is also a huge opportunity at the local level to adapt and reduce temperatures."*

"Heat is not only affecting our health and comfort, but also our economy. Being able to quantify this will be absolutely critical as we try to raise awareness and engage decision makers, the business community and others in this work," said Diana Bermudez, director of special projects for the Conservancy in Arizona. *"Undoubtedly, the way we respond to this challenge will shape how Phoenix is perceived as a place to work, live and visit."*

In 2017, the Conservancy began a project with Arizona State University, Maricopa County Department of Public Health, Central Arizona Conservation Alliance and others focused on reducing the impact of urban heat in the Phoenix metro area.

This ongoing project engaged residents from three underserved neighborhoods facing some of the highest temperatures in Phoenix and Mesa, to understand their interests and concerns, and jointly develop heat action plans. The project will also seek to incorporate heat mitigation strategies into regional planning efforts.


Photos this page: Ivan Martinez/The Nature Conservancy.

Each community involved in the project came at the issue from a different perspective.

- South Phoenix Community leaders focused on planting more trees and traditional Southwestern Native American practices, such as using ollas, ceramic containers for planting and collecting water.
- In Mesa, the residents wanted to provide cool, safe routes for kids and shade on the way to school.
- Central Phoenix residents wanted shade at bus stops and housing funds targeting methods for indoor and outdoor cooling, water harvesting and heat mapping.

In order to create a baseline for those changes, more than 50 people—some armed with heat-measuring devices and GPS—walked 2.5 miles in Edison Park, a very hot part of the city, to determine how they reacted to the heat. They chose September 29, 2018, a day expected to reach 105°.

According to David Hondula, assistant professor in ASU's School of Geographical Sciences and Urban Planning, who partnered with the Conservancy on the HeatMappers Walk, *"We wanted to build awareness of heat issues and build a sense of urgency. Newcomers to Phoenix are shocked and surprised about the heat here. People who live here are sick of it but used to it,"* he said.

Pristine Nature vs. Urban Nature

Traditionally, conservation groups like the Conservancy have focused on saving pristine places, not urban areas. But with more than half the world's population living in cities, there's more pressure on our natural resources to meet the demands of life.

"We are reimagining cities as complex ecosystems where nature, people and the built environment work together to address unprecedented environmental challenges," said Maggie. *"By designing walkable communities, creating naturally diverse green, cool spaces, and harnessing the natural processes that occur within the city, we can build in a way that lessens the city's footprint on the surrounding environment while ensuring that more people understand and receive nature's direct benefits."*■

Tana Kappel, *Marketing Specialist for The Nature Conservancy in Arizona*

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Three Simple Words that Mean so Much

By Allene Nungesser

Partners for Plants (P4P)

Most of us in GCA have read or heard about Partners for Plants, but how many of us really know its purpose, its history and its current role in GCA's ever-growing interest and involvement in conservation efforts across the country?

GCA has always had a long history of concern and action for the conservation of native plants and their habitats. In the early 1990s members of GCA testified before congressional subcommittees about the neglect of endangered native plants and the chilling reduction in the number of botanist, horticulturalists and environmentalists who studied and protected endangered plants on federal lands. At the 1991 NAL meeting, the protection of endangered native plants was a key area of discussion. The emerging consensus was to have GCA encourage grassroots efforts by local GCA clubs. The result of these dynamics was that in 1992 a new GCA project was conceived and launched… Partners for Plants.

In that first year, P4P was generally defined as a conservation and horticulture project to pair local GCA clubs with managers of national parks and other federal lands to monitor endangered and rare plants. It was expected that each project would encompass approximately 150 acres. Six projects in four states were approved that first year with the Acadia National Park project being the first. The Acadia project is alive and thriving twenty-seven years later!

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Today Partners for Plants is defined as *"…a joint initiative of the GCA Conservation and Horticulture Committees along with local GCA clubs to focus on restoring native habitat on federal, state and local public lands through out the United States. This will be accomplished by working closely with botanists and land managers who share their knowledge and expertise and supervise the removal of invasive species, the inventory and monitoring of rare plants and the propagation and replanting of native plant material."*

Over successive years, the P4P program has grown and evolved.

- Federal lands are not the only governmental lands that can be considered. Today many of our projects are involved with federal, state or local public lands.
- In 2016 the 150-acre project requirement was eliminated. Any size project will be considered.
- The application process for project approval has been streamlined.
- The expectation for the involvement and support of scientific experts in the fields of botany, horticulture, conservation and land management are underscored.

The elimination of the acreage requirement in 2016 caused a project application boom and in that year alone twelve new projects were approved. Today there are 58 active P4P projects spanning all 12 GCA zones.

Three projects approved in 2018 and shown on the following pages, have been chosen as perfect examples of how three simple words stand for anything but simplicity. They stand for propagation, restoration, education, exploration, vision, commitment and activism. They stand for what GCA meant them to stand for 27 years ago. ■

Allene Nungesser

Pasadena Garden Club, Zone XII

Vice Chairman, Partners for Plants, Conservation and NAL Committees

Sonoran Desert Habitat Restoration

ABOUT: This project is a wonderful example of the patience of propagation and the power of combined partnerships in an urban environment.

MISSION: To restore habitat within the Sonoran Desert by using genetically appropriate native pant material that has been propagated from locally collected seeds.

WHERE: Along the Phoenix Mountain Preserve Piestewa Trail located in the heart of metropolitan Phoenix.

WHY: The heavy use of the trail has degraded the native plants and allowed for the encroachment of invasive plants.

HOW: Spend the first 12–24 months propagating native materials from semi-abandoned seedbeds owned by the local park department. Upon successful growth of the native plant material, restore and replant trail in year three.

WHO: The Arizona Columbine Garden Club, *Zone XII,* is partnering with The Central Arizona Conservation Alliance whose membership includes the Desert Botanical Gardens, botanists, educators and land managers.

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Lake Roland Bare Hills Serpentine Restoration

ABOUT: This Project embodies the need for careful research and education as the foundation for a potentially successful P4P restoration effort.

MISSION: To work together with biological experts to study the fragile ecosystem and create a plan that will assist in reversing the rapid decline of the native serpentine savannah grasses and implement processes to ensure long-term sustainability of the ecosystem.

WHERE: Lake Roland Bare Hills is one of the last underdeveloped urban area Serpentine Barrens in the United States and is located in Lake Roland Park.

WHY: At Bare Hills only 3–4 acres of the ancient serpentine savannah grasses remain out of the 125 acres that existed in the 1940s—a 97% loss in less than 80 years. The declines are blamed on poor land management, invasive plants and urban development.

WHO: Guilford Garden Club, *Zone VI,* will partner with the Lake Roland Nature Council and the Baltimore County Department of Recreation and Parks.

HOW: The project will be divided in 3 phases, which will be led by an ecological restoration expert.

1. **Assemble** a scientific assessment of the desired conditions for a successful outcome – 9 months
2. **Prepare** a draft stewardship plan with an appropriate land management framework–6 months
3. **Complete** and present the final ecological restoration and land management plan to Lake Roland Nature Council–3 months

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Prunus serotine (Black cherry) Native to the Sandy Hook Coastal Maritime Forest

Sandy Hook Native Plant Preserve: Coastal Maritime Native Vegetation Enhancement

ABOUT This project, while modest in its land use, demonstrates the ability of P4P projects to be visionary and exploratory as we work to combat the potential impact of climate change.

MISSION: To preserve and enhance a one-acre native plant preserve at Sandy Hook Unit of Gateway National Recreation Area and to explore the effect of climate change on the ability of Sandy Hook to maximize it protection of Lower New York Bay.

WHERE: Sandy Hook is a barrier spit in Monmouth County, NJ. It is approximately 6 miles in length and about 1 mile wide. It is owned and managed by the National Park Service.

WHY: Sandy Hook boasts some of the best and most visited beaches in New Jersey and as a result, has become heavily trodden and loaded with invasive plants. These conditions have had negative impacts on the birds, monarch butterflies, native bees and other pollinators. In addition, Sandy Hook encloses the southern entrance of Lower New York Bay thus offering natural protection against hurricanes and storms. Certain plant material can aid in deflecting water flow and potential water damage along tidal areas and have become a major point of interest after the destruction left by Superstorm Sandy.

HOW: The project will initially be limited to a manageable 1 acre and will be focused on the removal of non-native plant species with replacements of native plant species that will be propagated and relocated from neighboring Jamaica Bay.

The project will also use about 350 sq. feet of its 1acre for a climate change experiment. After diligent research, this area will be planted with species from the warmer southern coastal regions of Delaware, MD. These species may provide stronger, firmer plants with the potential for better water deflection. The plant selection will be determined by expert botanists who will also monitor their survival rate and growth characteristics on Sandy Hook.

WHO: Rumson Garden Club, *Zone IV,* will partner with Gateway Nation Recreation Area and specifically with their Chief of Natural Resource Stewardship Division.

Conserving an Iconic Pine

By Stephanie Steele

Protecting Endangered Plants

Spanning a diversity of landscapes and climates, the United States is home to a stunning assemblage of plant species. However, over 4,000 of these species are at risk of extinction, necessitating the work of plant conservationists. Conserving and restoring the imperiled flora of the United States is precisely the goal of the more than 50 institutions that make up the Center for Plant Conservation (CPC). CPC partners work towards this mission through horticultural research, seed banking, *in situ* recovery efforts, and by maintaining an *ex situ* collection of native, imperiled plants which now includes over 1,500 species, making it the largest living collection of rare plants in the world.

San Diego Zoo Global (SDZG), which houses the national headquarters of CPC, has a unique opportunity to protect rare plant species by virtue of being located in a biodiversity hotspot. San Diego County contains 1698 native vascular plant species, nearly 200 of which are considered ***rare or endangered***. To date, the SDZG Plant Conservation team has banked seeds from about 31% of the rare plant species in the county, and further implements restoration projects and genetic research to help guard species against extinction.

Torrey Pine: An Endangered and Beloved California Native Conifer

The need for conservation efforts is exemplified by the Torrey pine (*Pinus torreyana*), a rare species endemic to southern California that is also the rarest pine species in North America. Torrey pines occur naturally in only two locations—in coastal San Diego County where they are protected in the Torrey Pines State Natural Reserve (TPSNR) and the Crest Canyon Open Space Park, and on Santa Rosa Island where they are protected in the Channel Islands National Park. They are both ecologically important and charismatic—a visitor to the reserve can hardly forget their often unique, wind-carved shapes set against a backdrop of sandstone bluffs and ocean stretches.

Like many trees across California, Torrey pines are threatened by prolonged drought and bark beetles. Drought weakens the trees and makes them more susceptible to attack by the California fivespined ips (*Ips paraconfusus*). While only millimeters long, large numbers of these tiny beetles can overwhelm a tree's defenses as they build galleries, lay eggs, and feed on tissue layers important to the tree's day-to-day functioning and survival.

Approximately 12% of the Torrey pines population was lost in TPSNR from 1988 to 1991 after windstorm-felled trees prompted beetle attack. *Ips* have

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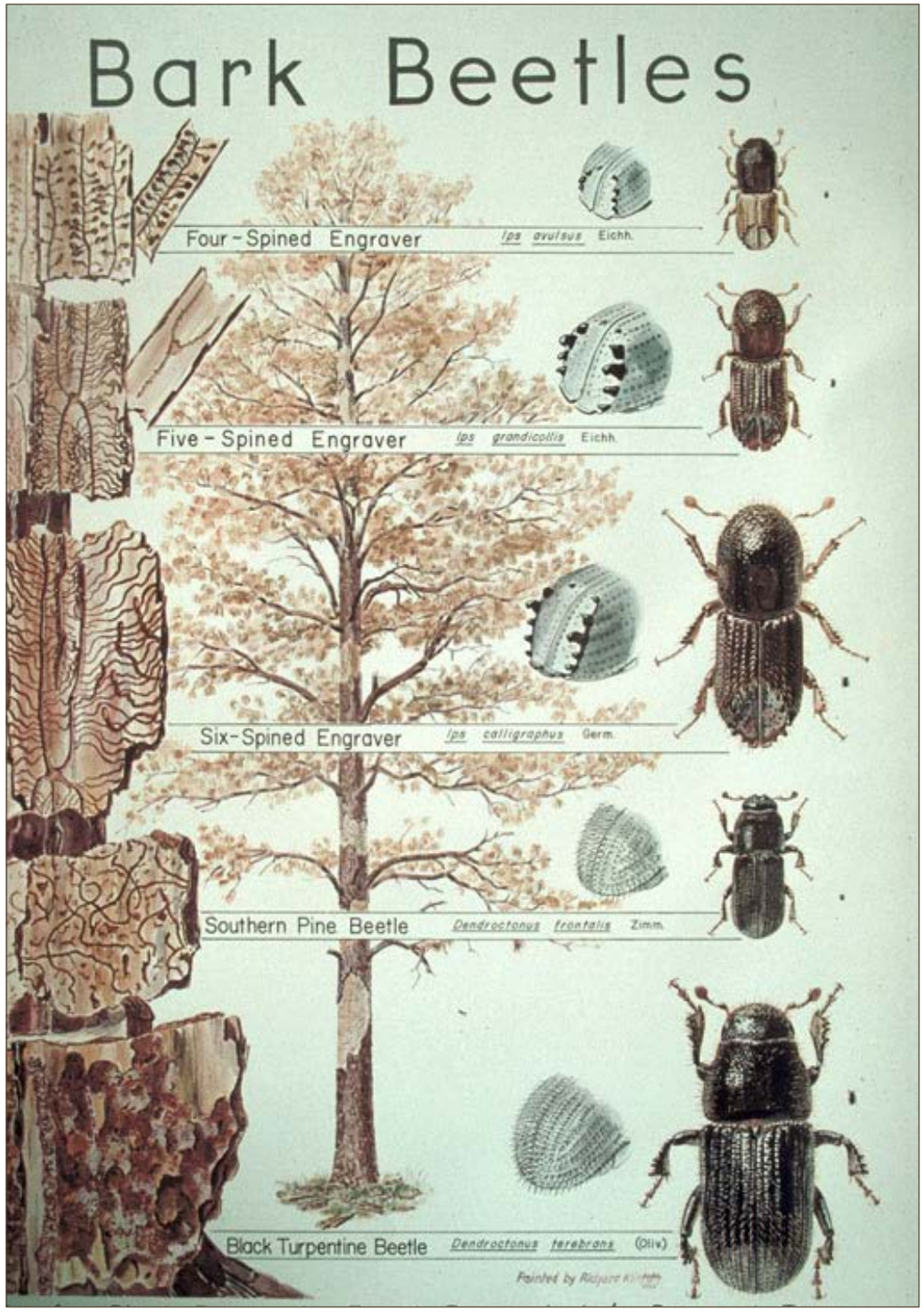
again resurged with current drought conditions, causing a large die-off in the reserve in recent years. California State Parks has been able to curb the beetle population with pheromone-baited traps, and additional conservation tactics are being pursued.

Using Genomics Tools to Aid Conservation of Torrey Pines

The potential exists that some Torrey pine trees may be better able to defend themselves against bark beetles than others in the population. While the environment may play a large role in a tree's ability to withstand beetle attack, there may also be a genetic basis to pest resistance. Although past genetic studies have revealed a remarkably low level of genetic diversity in the Torrey pine populations, SDZG researchers are scanning variation across the genome of Torrey pines with a focus on gene-coding regions that may be involved in adaptation. The goal is to test genetic differences between trees that are attacked versus trees unaffected by bark beetles. Particular focus will be paid to defense-related genes such as those involved in the production of resin, which may act as a physical deterrent and chemical toxin.

If genetic differences exist between *Ips*-colonized and unaffected trees, it could indicate that Torrey pines have the potential to respond to continued bark beetle outbreaks. It would further pave the way for controlled experiments to untangle putative variants underlying resistance and susceptibility. This knowledge could help guide which genotypes should be seed banked and used for restoration of wild populations, while also aiming to maximize genetic diversity. By understanding the adaptive genetic potential of the species, we hope to preserve this iconic pine for generations to come.■



Common bark beetles found in the US, similar, but not the exact ones mentioned in the article.

***Stephanie Steele**, Ph.D.*

Postdoctoral Associate, San Diego Zoo Institute for Conservation Research

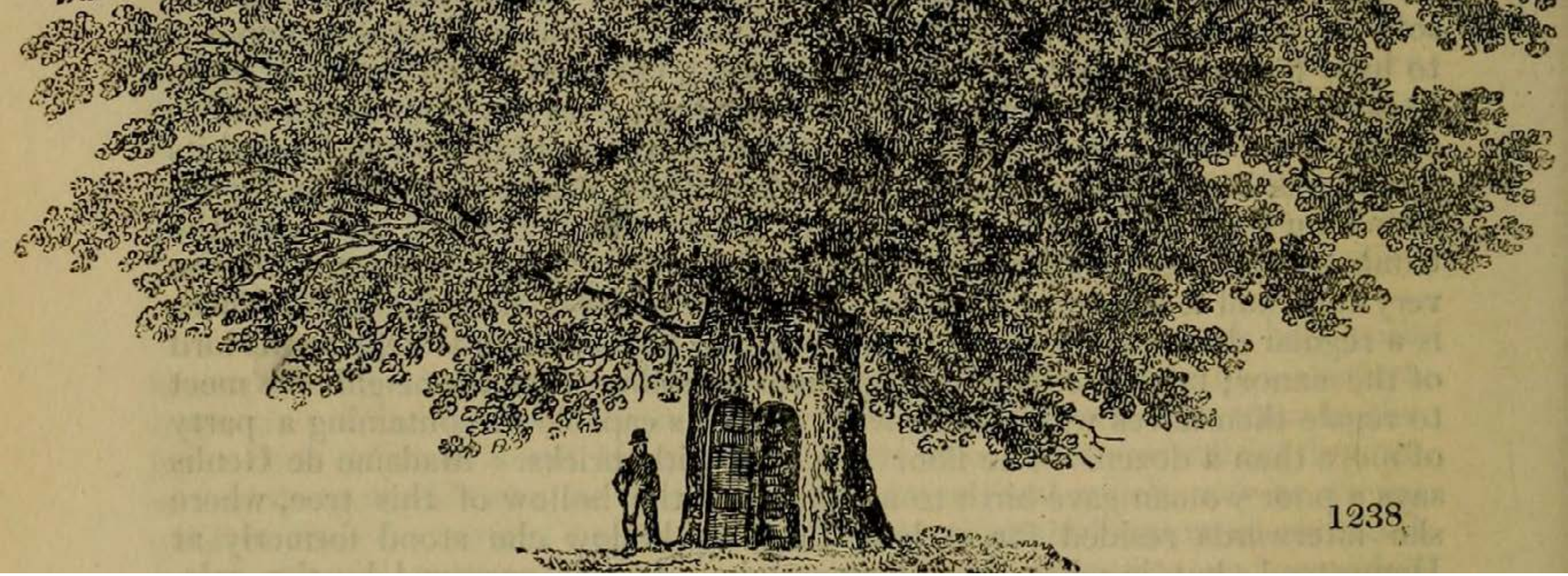
Trees Embrace Diversity

By Dr. Cynthia Morton

An urban environment rich with trees is highly valued for its aesthetic qualities as well as its environmental benefits, such as reducing summer cooling costs, carbon sequestration, intercepting airborne pollutants, reducing storm water runoff and promoting habitats for native wildlife. In the United States, urban forests are estimated to contain about 3.8 billion trees, with an estimated structural asset value of $2.4 trillion. Billions of federal, local and private dollars are being spent annually on management, labor, and the trees themselves as part of tree revitalization projects, and millions more are being spent by individual homeowners to improve their environment and property values.

An important criterion for selecting trees to be planted is diversity: biodiversity and genetic diversity. Genetic diversity refers to the genetic variability within a species. Each individual species possesses genes which are the source of its own unique features. Similarly, human beings are all the same species, but we all look different from each other. A lack of genetic diversity in individual species of trees reduces the genes available, causing individuals to look alike; and as a result, unique features of the species are no longer present, including its resistance to diseases.

Genetic diversity is especially important for trees because of their long life spans and the unpredictability of future pests, pathogens, climate shifts, and other environmental factors. By selecting tree composition for the maximum biodiversity and genetic diversity, the trees will have a greater chance of surviving for longer periods. Unfortunately, the last few decades have seen a movement in the opposite direction: cultivation in order to achieve uniformity.



Recently, some biodiversity measures have been implemented; however, despite this multi-billion-dollar urban tree economy, little work has been done to understand urban tree genetic diversity as an issue of vulnerability, or to examine the long-term impacts of urban tree genetic diversity on the sustainability of the urban environment. ***Work*** conducted by Cynthia Morton, PhD and Phil Gruszka in 2008, compared the level of genetic variation in London Plane trees already existing in the Pittsburgh area with trees of the same species currently available from three commercial nurseries. The genetic diversity was far greater in the older urban tree samples compared to that of the nursery samples, indicating that the nursery industry has been selectively cloning to produce new trees. While cloning trees is in itself a benign practice, doing so on a mass scale without a proper understanding of the implications of drastically reducing the genetic diversity of urban forests is ill-advised and potentially creates an area for natural disaster.

Morton and Gruszka's initial research led to inquiries for information about other commonly-grown nursery tree species and cultivars. The paper entitled "***Popularity of tree species and cultivars in the United States,***" lists the top ten species sold by nurseries in the United States and in which major geographic region they are sold. Almost all —eight of the top 10— of these nursery stock trees are grown throughout the United States and not just in one or two regions.

In early 2010, Dr. Morton conducted a telephone survey throughout the U.S. and discovered that most regional nurseries buy from wholesale growers located in Washington and Oregon. After this telephone survey was completed, Dr. Morton contacted the wholesale nurseries in Washington and Oregon and asked how 5 of the top 10 species of trees were grown. Their response indicated that almost all were cloned.

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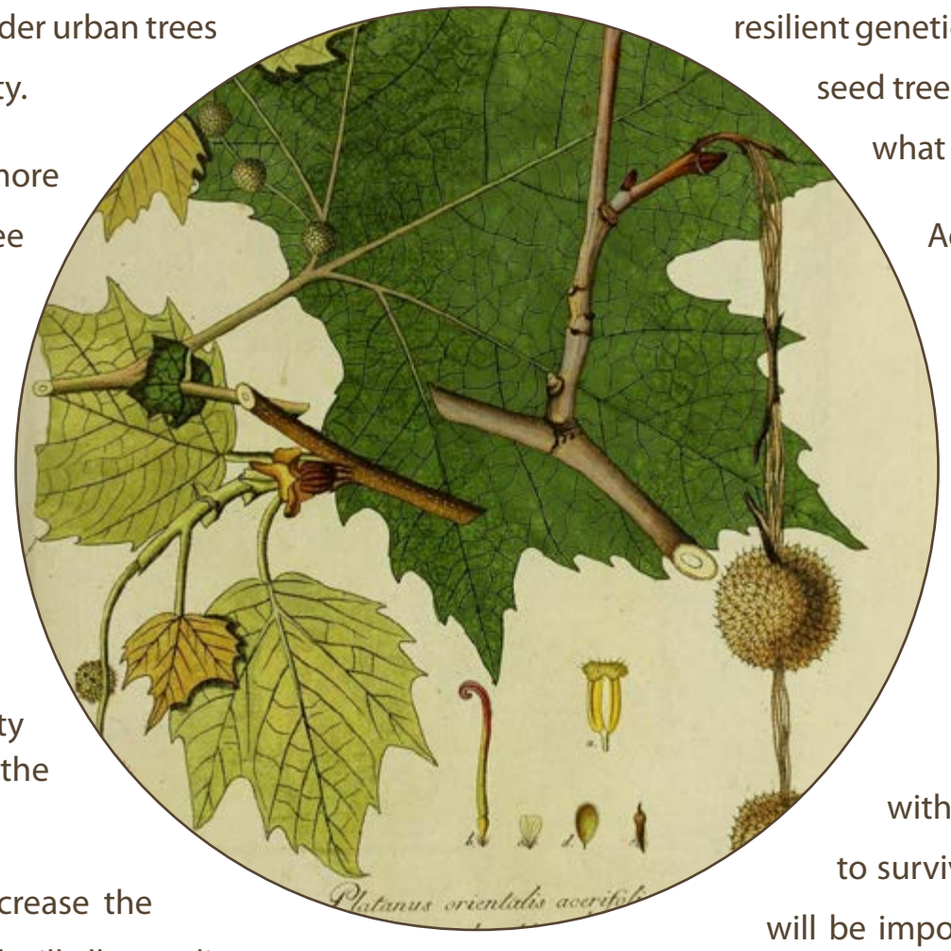
The Morton and Gruszka study found that the genetic diversity was greater in the older urban tree samples compared to that of the nursery samples. The existing older urban trees are approximately 100 years old and were originally planted from seeds or seedlings, representing decades of natural testing for resistance. Clearly, existing older urban trees are a great resource for increasing nursery diversity.

We have four suggestions for creating a more biodiverse and genetically diverse urban tree environment:

1. Work with the nursery industry and conduct more research to increase genetic diversity.
2. Work with the private centers growing trees from seeds.
3. Work with the local foresters to supplement native, young seedlings into urban areas.
4. Provide information about low genetic diversity to the general public and to people working in the nursery industry.



Using all four methods above would greatly increase the understanding of urban tree genetic diversity and will allow policy makers, city planning and environmental agencies, urban foresters, and the nursery industry to make informed decisions and recommendations to improve practices for maintaining a robust tree landscape for the future.

Pittsburgh Leads the Way in Finding Solutions

Although the scale of this problem can be daunting, action is being taken on the local level and with Garden Club support, as described in this ***article***.

The Garden Club of Allegheny County was an early financial supporter of the genetic research done by Dr. Morton and Mr. Gruszka on London plane trees and red maples in their area. "The problem that study showed was that as we lose our old trees, we will have no chance of getting nursery trees with the resilient genetic makeup," Mr. Gruszka said. "But there are old, wild seed trees with strong genetics all over the place and that's what we want to plant. We don't need the uniformity."

Addressing the problem takes cooperation, and the ***Pittsburgh Parks Conservancy*** has teamed up with ***Tree Pittsburgh***, a community forestry nonprofit, to develop a new $2.5 million tree nursery to breed genetically diverse trees from multiple sourced "heritage seeds."

Their goal is to provide locally adapted and genetically diverse, native trees for forest and ecosystem restoration. Trees with diverse genetic makeup will be better equipped to survive future impacts of pests and climate change. It will be important to integrate genetic testing as part of this program to insure a strong urban tree framework is created. If done with scientific rigor, this innovative program of seed collection could offer a new model of urban forest management, which could eventually be replicated in other urban areas.. ■

Dr. Cynthia Morton

Dr. Cynthia Morton holds an M.S. in biology from the University of North Carolina and a Ph.D. in biology from CUNY/New York Botanical Garden. As a botanist, Dr. Morton has worked locally and internationally to collect specimens for phylogenetic analysis of molecular and morphological data.

Backyard Trees

By Lisa Ott

Trees have been sacred to our species since the beginning of time. Standing tall connecting the earth to the sky—in some ways they form the architecture of our everyday lives. Members of the Garden Club of America understand the many values of trees, from cleaning our air to cooling our homes, and from habitat for birds to filters for groundwater. But do we stop and take time to appreciate how much they contribute to our place in time?

As is true for most of us, I spend a reasonable amount of my everyday life in a car. Each year I know fall is coming when one specific tree at a much-traveled intersection begins to change color. For more than 30 years this has been the tree to watch! When I near my brother's house off a long country road in Kentucky, I know to turn right just past the towering oak which was most likely there when the state was settled.

As a young girl I was happiest when spring would arrive, and we could reattach the swing to the soaring magnolia in my grandparents' yard. They would push that swing for hours on end regaling me with stories from their youth. Now that I am an old girl, the blossoms that cover the weeping cherry in the front yard under which my children used to play fill me with grownup delight. And how could I forget the dead tree on an island in Smithers Pond which continues to hold up the huge osprey nest year after year even though its ability to produce leaves ceased more than a decade ago.

Trees are beautiful and important and integral to the future health of our world. They take care of us by manufacturing oxygen, storing carbon, stabilizing soil and all the while increasing our property values and quality of life.

What are your special trees? If you don't know, take more time to look up and see the trees, one of which may keep you company for the rest of your life.■

Trees

I think that I shall never see

A poem lovely as a tree.

A tree whose hungry mouth is prest

Against the earth's sweet flowing breast;

A tree that looks at God all day,

And lifts her leafy arms to pray;

A tree that may in Summer wear

A nest of robins in her hair;

Upon whose bosom snow has lain;

Who intimately lives with rain.

Poems are made by fools like me,

But only God can make a tree.

—Joyce Kilmer

Lisa Ott, North Country Garden Club of Long Island, Zone III

Vice Chairman, National Parks & Public Lands, Conservation and NAL Committees

The Climate of Taxes

By Fran von Schlegell and Sandra Thomas

Taxing Change: Cap & Trade and Carbon Tax

As long as there have been taxes, they have been used for social engineering. In United States tax code, this has been evident from the beginning. The first domestic tax on whiskey is credited to Alexander Hamilton who cited the health and moral implications of drink as reasons to support imposing a tax. Current U.S. tax code provides $500 billion in incentives for home ownership, adoption, child care, charitable deductions, saving for retirement, etc.

Often tax laws have unintended consequences their drafters may not have foreseen. For example, Section 179 of the IRS tax code, sometimes referred to as the 'Hummer deduction,' allows some tax write-offs for vehicles above 6000 pounds if certain business usage requirements are met. There is little doubt that this deduction for larger vehicles has been a factor in the increased purchase of large, less energy efficient vehicles.

In current U.S. tax code, both fossil fuels and renewable energy sources benefit from a complex collection of tax deductions and credits. Fossil fuels tax deductions date back as far as 1913. In recent times, as the issue of climate change has come to the forefront, tax incentives have been designed to encourage investment in renewable energy sources, and enable them to compete price-wise with fossil fuels. New methods of financially addressing climate change through carbon pricing have also emerged.

"Fed up with taxes"

Given scientific data on climate gathered over recent decades, it is widely accepted that there is too much carbon dioxide and other greenhouse gases in our planet's atmosphere. If human beings do not do something to reduce and or eliminate it, there will be consequences for the health and vitality of life on earth.

So, the question of how to reduce our carbon emissions is being wrestled with by people all over the globe. The idea of putting a price on carbon as a means to combat climate change has been in the global conversation for a long time. Since the 1920s economists have realized that there were unseen costs associated with products beyond the obvious formula of materials plus labor. The cost to society in destruction of the environment is one such cost.

In the 1960s, economists proposed a pricing mechanism to limit emissions from industry. This mechanism became known as cap and trade and was successfully used by the U.S. government to battle pollution caused by acid rain and leaded gasoline. Since then, in addition to cap and trade, many countries and states have created further financial incentives in the form of a carbon tax.

Cap & Trade

In a cap-and-trade system, the government sets an emissions limit, called a cap, and issues a quantity of permits to make sure targeted emissions limits are not exceeded. Emitters must hold permits for every ton of greenhouse gas they emit. Companies may buy and sell permits. If a company's emissions exceed the cap, it must either curb them or buy more permits on the market. A company whose emissions are below the cap may sell its extra permits.

Carbon Tax

A carbon tax is a price applied to one metric ton of carbon dioxide (CO_2) emitted into the atmosphere. Entities emitting the CO_2 would, in theory, find other sources of energy or renewable options or pay a tax.

Cap and Trade, Carbon Tax, What's the Difference?

Cap and trade and a carbon tax are two distinct policies aimed at reducing greenhouse gas (GHG) emissions.

Cap and Trade: The advantage of cap and trade is that by setting a specific cap and limiting the number of allowances, it achieves a set environmental goal. The cost of reaching the goal is determined by market forces.

Carbon Tax: The advantage of a carbon tax is that it provides certainty about the costs of compliance but the resulting reductions in emissions are not capped.

In the Works

- Ten states in the U.S. and 100 countries worldwide have already adopted carbon taxes.
- California has established a cap and trade policy focused for the most part on electrical power plants.
- Oregon and other states have bills in their legislatures to establish a cap and trade policy in their current sessions.
- At the national level, the ***Energy Innovation and Carbon Dividend Act*** (H.R. 763) was introduced by a bi-partisan group in the House of Representatives in January of 2019. It would put a price on each metric ton of carbon dioxide emissions with yearly price increases. It includes reduced taxes for exported goods whose producers have cut emissions and increases taxes on goods imported from countries that have not made reductions in emissions in an effort to make its proposals more global in nature. Revenues collected would be rebated back to taxpayers.

The Bigger Picture

Critics say the ideas in the Energy Innovation and Carbon Dividend Act are too US-centric and the incentives in the bill won't address the fact that even if the US stopped emitting today, carbon levels would continue to increase because the market needs pollution controls for countries like China and India. Many emerging economies have limited options for clean energy production at this time so readily available coal remains their energy source of choice. Without global solutions, climate change will not be reversed.

Some critics of the carbon tax discussion suggest that press reports on climate change don't take into account the nuanced and complex issues that surround world economies and the realities of the international marketplace. Others argue that changes in carbon and gas emissions must consider how to stimulate economies so that an economically practical and viable choice in energy consumption evolves as the new way to power the world.

Despite the fact that carbon pricing has been implemented in Canada, China, South Korea, the EU and about a dozen U.S. states, there are more carbon emissions than ever. Last year's energy-related greenhouse gas output, which has been flat for three years, rose 3%. Some experts feel that carbon is not priced high enough to force changes in behavior. Politicians, governments and businesses haven't yet shown the will to force the real cost of carbon on the emitters. But raising taxes is politically problematic—as recent violent protests by the Yellow Vests against a gas tax hike in France have shown.

It's going to take a great deal of courage and leadership to make the public feel the urgency of carbon emissions reduction. It's also going to take much creativity and innovation to make it financially plausible to implement. ■

This article was originally two separate articles by two different authors and has been combined for clarity. The authors of the original articles are:

Fran von Schlegell, *The Portland Garden Club, Zone XII*
Conservation Co-Chairman of the PGC

Sandra Thomas, *Kanawha Garden Club, Zone VII*
Zone Director, Liaison to NAL

GCA's Position Paper on Climate Change Action

"The Garden Club of America recognizes that global climate change is affecting the natural world, our economies, national security, and human health. Rapid loss of biodiversity, species extinction, ocean acidification, sea level rise, droughts, floods, storms, along with threats to clean air, to clean water, and to the health of our national parks are all risks we face if we do not address the human activities that create global warming."For the complete Position Paper on Climate Change Action log into the GCA website and follow this ***link****.*

NAL Conference: A First-timer's Experience

By Carole Connell

For more than 30 years, the National Affairs and Legislation Committee of the GCA has sponsored a four-day conference with an agenda packed with interest, education and fun. Hats off to our NAL Chairman Hollidae Morrison, Conservation Chairman SaSa Panarese, and to Lynne Nelson, organizer of the outstanding 2019 event. The purpose of the conference is to familiarize members with the ten GCA ***position papers*** so they can encourage others to join in the protection of our environment. Conference leadership made it clear that GCA is bipartisan and that conservation *is* conservative!

The conference featured professional experts from non-profit organizations, universities and governmental agencies. Speakers included Katharine Hayhoe, professor of climate science and lead author for the U.S. National Climate

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Assessment; Dr. James Porter, scientist and author of the film "Chasing Coral"; and Mark Bittman, food journalist and author of 20 books who said what we eat can worsen climate change.

Topics included important climate change impacts such as:

- The loss of native habitat for pollinators essential for food production.
- How loss of coral reflects the declining health of our oceans and sea life.
- The negative and costly effects of drought, desertification, flooding and warming oceans.

The first two days of the conference were designed to build knowledge, confidence and enthusiasm for a day on Capitol Hill and set legislative priorities for our meetings with senators and representatives. This year's priorities focused on seeking legislative support for:

- **The Botany Bill:** Which encourages the use of native plants on public restoration projects and promotes the hiring of botanists to help combat invasive species and select appropriate native plants in order to reduce drought, improve water quality and promote resilience.
- **The Public Lands Bill:** This is the most significant (and bipartisan) conservation bill in US history which not only preserves but also adds additional public lands; it includes permanent authorization for the Land and Water Conservation Fund (LWCF), whose funding is from oil & gas lease fees paid by companies drilling on federal lands and waters.
- **Americas Scenic Byways:** Revives a dormant program in order to limit billboards, create corridors for nature and encourage use of native plants.
- **Restoring National Parks:** Restores funding for the National Park Service to improve neglected roads, trails, visitor centers and infrastructure.

On day 3 we headed to Capitol Hill where our 350 GCA members heard from 14 senators and representatives from around the country and on both sides of the aisle. That same afternoon coincided with an important vote on the Public Lands Bill, which passed with a vote of 363–62. This bill grants permanent authorization to the Land and Water Conservation Fund (LWCF), a cause long championed by the GCA. Several NAL delegates got to watch this historic vote from the House Gallery. It was extremely exciting to watch government at work.

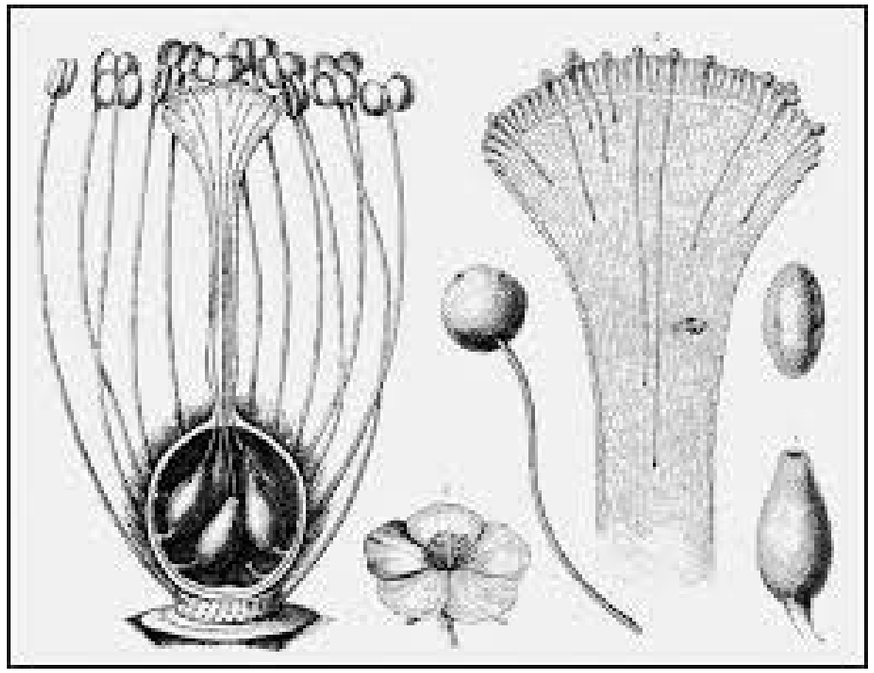
On the last day of the conference, GCA members went back to The Hill to visit Congressmen from their home states and districts to encourage support for environmental issues and federal policy initiatives related to the GCA mission.

The NAL Conference provided attendees a solid background of how the legislative system works and how we can make a difference. I encourage everyone to attend an NAL conference. It can be life changing!

For a full review, please log on to the GCA website, go to the ***NAL landing page*** and find links to videos, speech summaries and a PowerPoint presentation. ■

Carole Connell*, The Portland Garden Club, Zone XII*

Conservation Chair, The Portland Garden Club



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How the Green Thumb of GCA's NAL is Tipping the Scale!

By Carol Carter

Kermit the Frog said *"It's not easy being green"* and he may be right, but it is getting easier and the Conservation/NAL team worked hard to advance the green mission at the February conference in Washington this year. The "not easy" part includes working with conference facilities that frequently use disposables for speed and ease. There is also the matter of balancing the need for hands-on information with digital no-waste versions.

Trowel GC member Lynne Nelson and her planning team worked with multiple venues to push for plastic-free wherever possible and it showed! While our beautifully designed program brochures were chock full of important conference information, they were printed on 100% post-consumer waste recycled paper. The program had such great reference materials that delegates will be wise to keep them for future review. Nametags, lanyards and signage were reusable and ultimately recyclable when they wear out. We ate a little lower on the carbon food chain too, eliminating mammal products. We also donated to ***Carbonfund*** to offset the carbon footprint of the conference. Key information on one of our most important topics—the Botany Bill—was summarized on simple but attention-getting postcards to deliver to our members of Congress and delegates were encouraged to share our GCA position papers with staff on the Hill digitally. These are important lessons for all clubs to consider when they plan meetings and events. What we did not recycle were attendees! While we had a healthy and necessary number of veteran mentors in attendance, we had the highest number of new NAL delegates ever!

GCA women are well known for their cutting-edge floral designs and horticultural best practices. We are pushing the envelop in conference planning too, and while it takes effort, it is getting easier, Kermit! ■

Carol Carter, *Albemarle Garden Club, Zone VII*
First Vice Chairman, Conservation and NAL Committees

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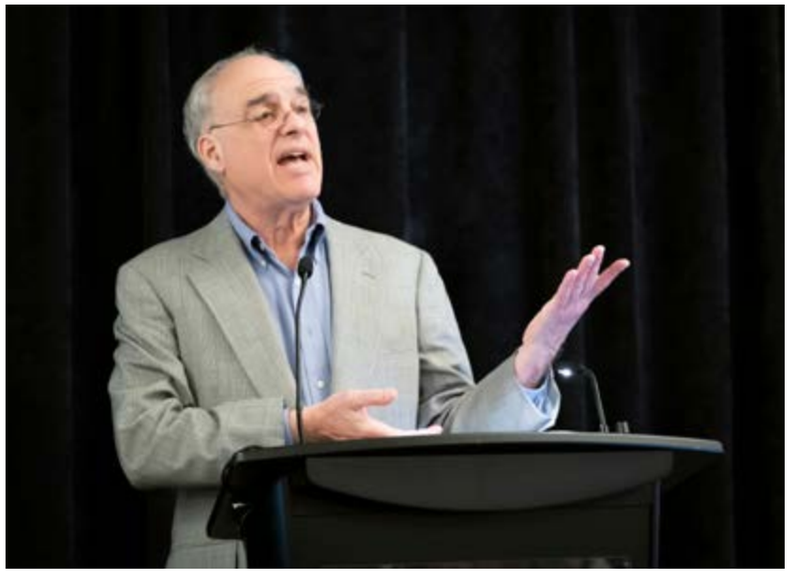







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Rep. Garrett Graves
(R, LA)


Rep. Lee Zeldin
(R, NY)


Sen. John Boozman
(R, AR)


Sen. Chris Van Hollen
(D, MD)

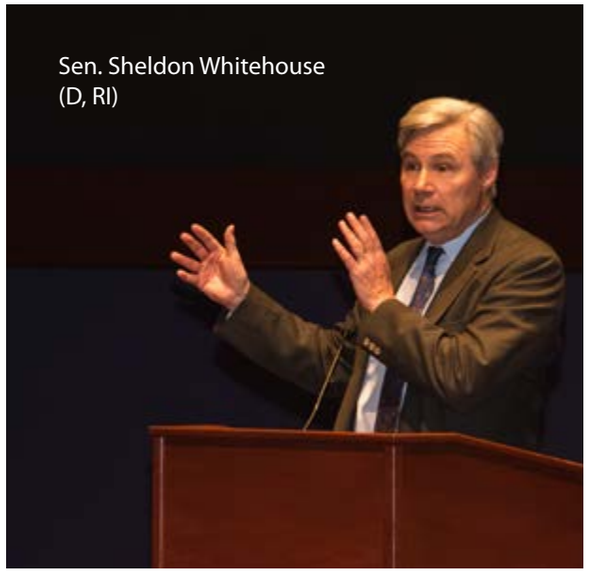

Rep. Donald McEachin
(D, VA)


Rep. Jared Huffman
(D, CA)


Sen. Shelley Capito
(R, WV)


Rep. Tom Suozzi
(D, NY)


Rep. French Hill
(R, AR)


Sen. Sheldon Whitehouse
(D, RI)


Rep. Derek Kilmer
(D, WA)


Rep. Earl Blumenhauer
(D, OR)

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NAL Issues to Watch: The Botany Bill

by Hannah Sistare Clark

How do laws come into being? They start with an idea and purpose. For several years the GCA has been advocating for one such purpose: to promote the use of native plants and the training of sufficient numbers of skilled botanists. This was at the center of education and advocacy during the 2019 NAL Conference in Washington, D.C. through the promotion of the Botanical Sciences and Native Plant Materials Research, Restoration, and Promotion Act, H.R. 1572, nicknamed the "***Botany Bill***."

Why This Legislation is So Important

Massive forest fires, erosion, and invasives on public lands are making plant science more and more critical to informed decision-making. And yet generalists, with no background in botany or related fields, are being asked to deal with these challenges. Park leaders and land managers increasingly complain that they cannot find botanists and others who are adequately prepared to address the challenges caused by a changing environment. They are unable to find experts able to control invasive plants and preserve or restore healthy native ecosystems. Native vegetation sustains plant biodiversity, controls erosion, moderates floods, and provides food and habitat for pollinators and wildlife. An understanding of ecology and the critical importance of native plants is essential to the future health of the American landscape and cost-effective management.

What The Botany Bill Will Do

- Serve as an organizing vehicle to promote botanical science research and the use of native plants
- Promote the education and placement of botanists
- Provide students trained in botany and employed in the field with real benefits including forgiveness of student loans
- Promote demand for native plant materials by creating a preference for the use of locally adapted native plant materials in land management activities under the jurisdiction of the Departments of Interior and Agriculture. This will help keep native species from becoming extinct and will over time result in cost-savings made possible by established native plant populations.
- Help save native pollinators that rely on native plants. Pollinators are critical to success in agriculture and related fields.

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- Promote native plants as essential to the federally managed lands strategy. Nonnative species, though often cheaper, undermine management strategies to promote the health of honeybees and other pollinators.

GCA Promotes Need for Botanists

The GCA has a long history of promoting the education of botanists for federal programs and the importance of native plant protection and cultivation. In 1998, NAL Chairman, Jane Henley, appeared before the House Interior Appropriations Subcommittee, noting that the GCA's efforts to monitor, propagate, and protect plants at risk were being severely hindered by the lack of botanists in the federal workforce.

GCA Partners to Write & Advocate for Legislation

The GCA has formed alliances with several groups who share our goals. Experts from the Chicago Botanic Garden helped craft the Botanical Sciences and Native Plant Materials Research, Restoration, and Promotion Act, H.R. 1572. In the 116th Congress, Rep. Mike Quigley (D, Il.) and Rep. Francis Rooney (R, FL) and more than 20 co-sponsors formally introduced H.R. 1572 in the House. Quigley was instrumental in inserting language calling for making native plants a priority in Agriculture Department projects. The NAL and Conservation Committees are now urging the Department of Agriculture to make good use of this native plant directive.

Since 2017 NAL delegates have encouraged their representatives and senators to co-sponsor the Botanical Sciences and Native Plant Materials Research, Restoration, and Promotion Act. Sen. Mazie Hirono (D, HI) and Sen. Chris Van Hollen (D, MD) are working on a Senate version of the bill.

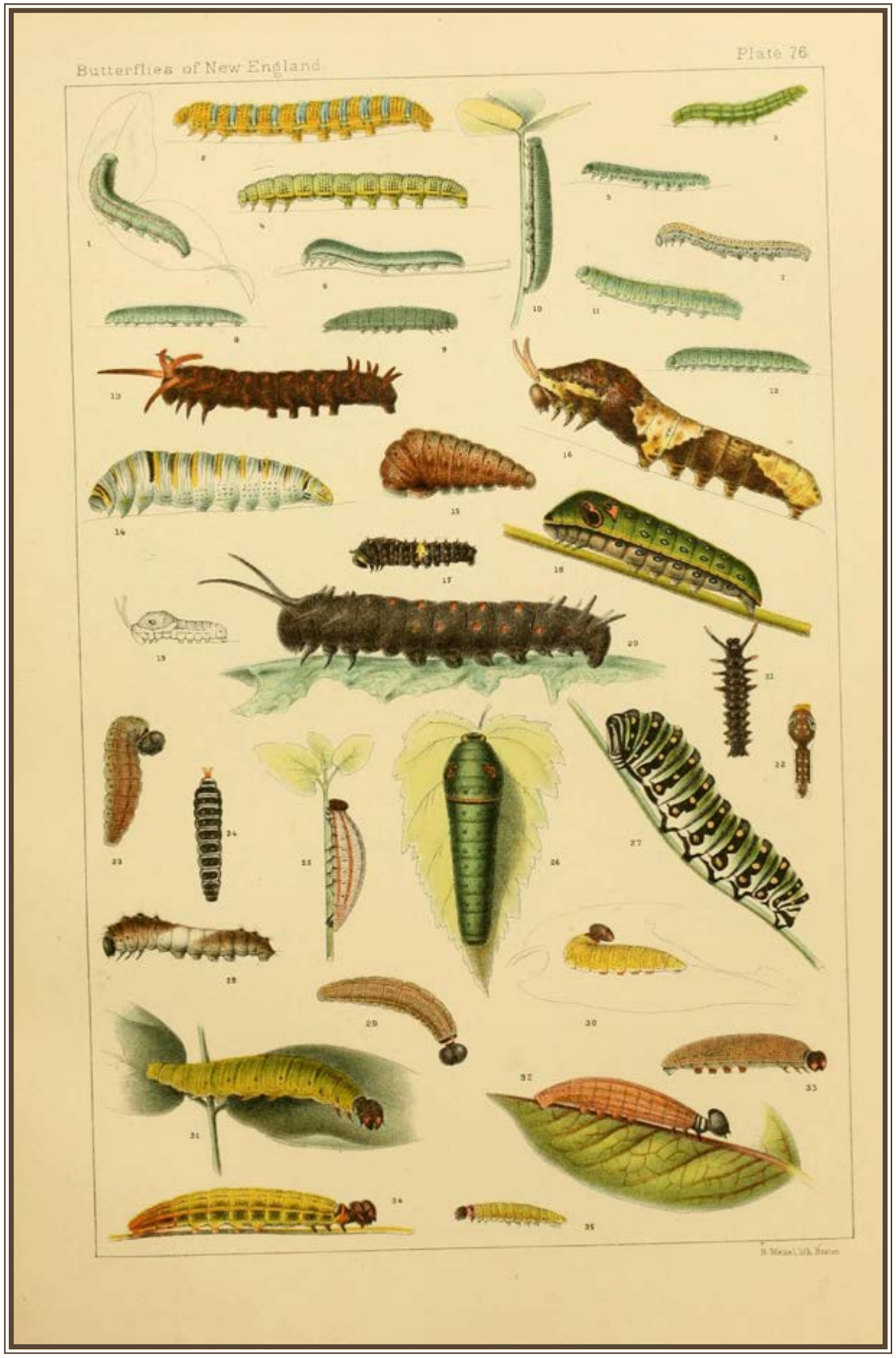
GCA Puts Issues into Action

The legislative focus on native plants and education has also spawned action closer to home. The GCA's Partners for Plants program (P4P) was established to provide volunteer help to protect native plants on federal lands and to educate the general public about their importance. More than 50 P4P projects now exist in GCA clubs across the country and in all zones. ■

Hannah Sistare Clark

Garden Club of Mount Desert, Zone I

Assistant Chairman, Legislation and Policy, NAL

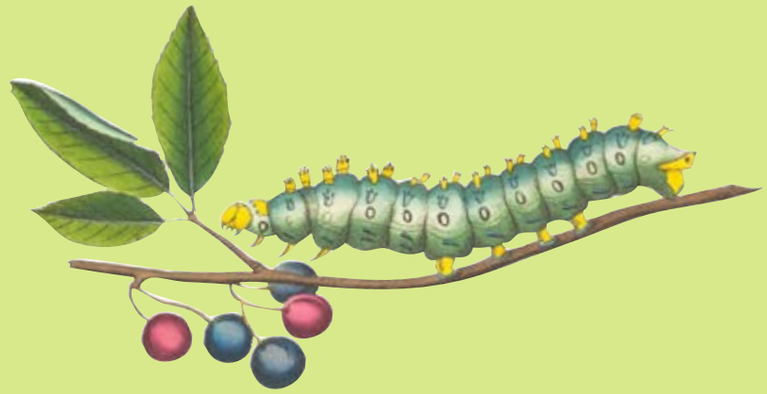


MORE BUGS FOR BIRDS

The Audubon Society

During the summer of 2018, the GCA formed a partnership with the National Audubon Society to advocate for native plants. Audubon subsequently put strong persuasive language on their ***website*** about the value of native plants which are home to large numbers of caterpillar varieties. Birds' diets consist significantly of caterpillars, yet non-native trees and plants host very few of them*. Professor Douglas Tallamy from the University of Delaware has published research on this phenomenon that makes a strong scientific case for native plants. ***Bringing Nature Home*** is an excellent resource. ■

*Blueberry plants support 288 species of Lepidoptera. Oaks host 532 species of caterpillars. Cornus florida supports 117 species of Lepidoptera (moths and butterflies.) Several non-native plants provide no resources for breeding birds including zelkova, ginkgo, and lilac, and the non-native Cornus kousa (Kousa dogwood).



NAL reports serve in an advisory capacity, based on committee research. Individual clubs and members may act on any issue as they choose. Editors: Mary Kelberg, Vice Chairman of Legislation and Policy, National Affairs and Legislation Committee, contact: marykelberg11@gmail.com and Hannah Sistare Clark, , contact: hannah.sistare@gmail.com

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The Great Healthy Yard Project

TAKE THE PLEDGE

I pledge to take care of my yard without synthetic pesticides, weedkillers and fertilizers except on rare occasions to resolve an infestation or to improve habitat for native plants and wildlife.

I also pledge not to throw pharmaceuticals or chemicals down my drains or toilets. ■

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