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NATIVE PLANTS, NATURAL LANDSCAPES

# LANDSCAPING WITH NATIVE PLANTS

US EPA ARCHIVE DOCUMENT



*Fourth Edition of the original Wild Ones Handbook*



## A BRIEF HISTORY OF WILD ONES®

**W**ild Ones is a direct outgrowth of a natural landscaping workshop offered by the Schlitz Audubon Center of Milwaukee, Wis., in 1977. A nucleus of nine people became intensely interested in this new concept of native plants as an alternative to lawns. A camaraderie developed during the lectures, tours, and digs, but it was two years later that an organization sprouted. Gini Lindow had a 'wild' idea that blossomed into Wild Ones—Natural Landscapers, Ltd. Our resident expert, Lorrie Otto, taught us much about the natural landscaping philosophy—organizing yard tours to help us with planning our yards.

We are no common 'garden variety' garden club, but a fast-growing, not-for-profit organization encouraging natural yards with a sensitivity to land use in harmony with Nature.

Chapter winter programs include how-to-do-it sessions, seed exchanges, and presentations by experts in prairie, woodland, and wetland restoration, and members profiling their own

projects. In the spring, summer and fall we are out on yard tours, woods excursions, and digs (rescuing plants in the path of development). Annually, each chapter offers a "help me" day of consultation at various members' properties. In the late summer and autumn, we go on seed-collecting outings, sustainably harvesting seeds to do our own plant propagation.

Beyond exchanging seeds and rescuing plants, we patronize the reputable native plant and seed companies that have taken root. We do all these joyous things in an effort to grow a diverse and eye-pleasing collection of native species on our own land.

In July 1979 there were just nine members. As of 2004, there are 3,000 members in more than 40 chapters. We believe time will prove our landscaping methods popular for their economic and environmental benefits, but we are already proving, by example, that our landscapes are beautiful—naturally. 🌿

**National Presidents**  
*Gini Lindow*  
*James Brien*  
*Margot Fuchs*  
*Lu Ann Thompson*  
*Rae Sweet*  
*Deb Harwell*  
*Irena Macek*  
*Mandy Ploch*  
*Bret Rappaport*  
*Joe Powelka*

## WELCOME TO WILD ONES® AND A HERITAGE OF STEWARDSHIP

**M**embers and friends of Wild Ones have watched and participated in a journey of delight as they followed the natural landscaping movement. At first it was just the artists who were courageous enough to break the cruel fashion of lawns. Not only were the landscapes flat, bleak and shaved, but shrubs were not free to display their own shapes or bear flowers and fruit at the ends of their branches. Young trees were pruned to look like bushes on top of long broomsticks. Mature trees were sprayed with biocides which killed songbirds, butterflies and multitudes of other breathing, moving life forms. However, it was the aesthetic impoverishment which empowered these artists in the early '70s to defy the weed laws (*conformity laws*) and decorate their yards with diverse, tousled, communities of life.

In Milwaukee, it was Ruth Grotenrath, Mary Berry, Emeline Krause, Tula Erskine, Rochelle Whiteman and I who flaunted our front yards of flowers and their pollinators. Soon Nature lovers and birders joined with their own models. Finally, concerned scientists added to the chorus, calling for islands and corridors of

native landscapes to protect genotypes and endangered species.

All the while there were a few graduate students who literally made it their business to provide us with native seeds and plants grown in their own nurseries. Today we name with pride and gratitude: Ahrenhoerster, Boehlke, Smith to Diboll, Kopitzke to Glass, Powers and Wade. During these times not only was it difficult to get support from neighbors and officials, but information on *how to do it, where to do it and why we should do it* was hard to find. Oh! My Goodness! My Goodness! What a gift this *Landscaping with Native Plants* would have been then.

May this new generation learn from this book and treasure it, while making a lifetime commitment to being good stewards as we heal our Earth!

Lorrie Otto

# NATURAL LANDSCAPING IS

... MORE BENEFICIAL—  
choosing organic methods over poisonous ones

... MORE ENLIGHTENED—  
reviving ecosystems rather than  
planting indiscriminately

... MORE JOYOUS—  
growing ever-changing plantscapes  
instead of mow-me-every-week turf grass

... MORE ALIVE—  
attracting a diversity of wildlife that have  
few natural places left to call home.

**Landscaping with Native Plants** (formerly titled *Wild Ones Handbook*) presents the current wisdom regarding natural landscaping techniques. However, native plant culture and propagation theories continue to develop. You are encouraged to attend Wild Ones chapter meetings where knowledgeable individuals will keep you abreast of practices that work best in your locale. If your area does not have a chapter, you may form one. Request chapter information by writing to: Wild Ones, P.O. Box 1274, Appleton, WI 54912-1274.

This special issue represents the work of many pioneers of the natural landscaping movement. The views expressed are the opinions of the writers. The people whose names follow have earned our appreciation for putting on paper the why-for's and how-to's of natural landscaping.

On behalf of our readers, thank you to:

Annette Alexander	Pat Armstrong
Pat Brust	Carol Chew
Elizabeth Czarzata	Neil Diboll
Barb Glassel	Darrel Morrison
Lorrie Otto	Tom Patrick
Mandy Ploch	Joyce Powers
Bret Rappaport	Gloria Stupak
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Alan Wade	Wendy Walcott
E.O. Wilson	

*Fox Valley Area Chapter for originating  
the idea for this book*

*and Wild Ones' very special illustrator—  
Lucy Schumann*

—Joy Buslaff, editor  
—Lorraine Johnson, editor of  
revised fourth edition

## TO BECOME A WILD ONES MEMBER

or to obtain Wild Ones products, visit our website, contact your local chapter or request current pricing information from the Appleton address at right.

**Landscaping with Native Plants (4th Edition)** and the original **Wild Ones Handbook** can also be found online at <http://www.for-wild.org> and at <http://www.epa.gov/greenacres/>

## CONTENTS

### ALL THE LIFE THERE IS

*Biodiversity* . . . . . 4  
*A Sustainable Future* . . . . . 5

### THE LANDSCAPE THAT WAS

*Forest* . . . . . 6  
*Prairie* . . . . . 7  
*Wetlands* . . . . . 8  
*Today's Lawns* . . . . . 9

### WHAT EVERY WILD ONE SHOULD KNOW

*Being Neighborly* . . . . . 10  
*Important Causes of Hayfever* . 11  
*Observational Design* . . . . . 12  
*Policies & Opportunities* . . . . 15  
*It Starts with The Soil* . . . . . 16  
*Removing Vegetation* . . . . . 17  
*Handling Seed* . . . . . 18  
*Planting A Woodland* . . . . . 19  
*Planting A Prairie* . . . . . 20  
*Prairie Maintenance* . . . . . 21  
*Wet Gardens* . . . . . 22  
*Invasive Species* . . . . . 23  
*Landscaping for Wildlife* . . . . . 24  
*Genetic Guidelines* . . . . . 26

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#### WILD ONES

P.O. BOX 1274, APPLETON, WI 54912-1274

Wild Ones: Native Plants, Natural Landscapes promotes environmentally sound landscaping practices to preserve biodiversity through the preservation, restoration and establishment of native plant communities. Wild Ones is a not-for-profit environmental education and advocacy organization.

Wild Ones Natural Landscapers Ltd. (now known as Wild Ones: Native Plants, Natural Landscapes) was incorporated in 1990 in the State of Wisconsin, under the Wisconsin Non-Stock Corporation Act for educational and scientific purposes. Wild Ones is a not-for-profit, tax-exempt corporation under Section 501(c) (3) of the Internal Revenue Code and is publicly supported as defined in Sections 170(b) (1) (iv) and 509(a). Donations are tax deductible as allowed by law.



# All The Life There Is

## The Diversity of Life

BY E.O. WILSON

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*"Nature, in her blind search for life, has filled every possible cranny of the Earth with some sort of fantastic creature."  
—Joseph Krutch*

The creation of biodiversity came slow and hard: 3 billion years of evolution to start the profusion of animals that occupy the seas, another 350 million years to assemble the rain forests in which half or more of the species on Earth now live. Life had stalled on plateaus along the way, and on five occasions it suffered extinction spasms that took 10 million years to repair. But the thrust was upward. Today the diversity of life is greater than it was a 100 million years ago—and far greater than 500 million years before that.

The modern fauna and flora are composed of survivors that somehow managed to dodge and weave through all the radiations and extinctions of geological history. **All living species are direct descendants of the organisms that lived 3.8 billion years ago. They are living genetic libraries which record evolutionary events all across that immense span of time.**

Scoop out a plant, shake the soil from the roots into the cupped hand, magnify it for close examination. The black Earth is alive with a riot of algae, fungi, nematodes, mites, springtails, enchytraeid worms, thousands of species of bacteria. The handful may be only a tiny fragment of one ecosystem, but because of the genetic codes of its residents it holds more order than can be found on the surfaces of all the other planets of our solar system combined. It is a sample of the living force that runs the Earth—and will continue to do so with or without us.

Now is the time to get on the great Linnæan enterprise and finish mapping the biosphere. Species are disappearing at an accelerating rate through human action, primarily habitat destruction, but also pollution and the introduction of exotic species to residual natural environments.

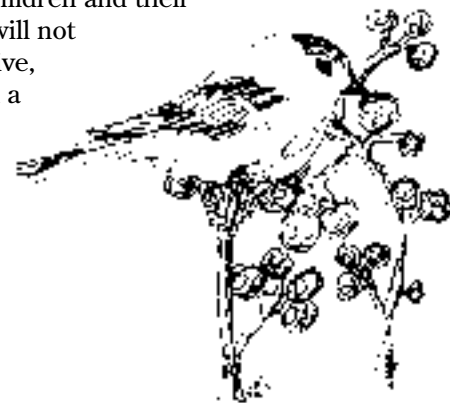
Why should we care? Vast potential biological wealth will be destroyed. In amnesiac reverie it is easy to overlook the services that ecosystems provide humanity. They enrich the soil and create the very air we breathe. The life-sustaining matrix is built of green plants with legions of microorganisms and mostly small, obscure animals—in other words, weeds and bugs. They run the world precisely as we would wish it to be run.

Biological diversity refers to the number of different life forms co-existing in an ecosystem. Ecologists know that the more different kinds of organisms that can co-exist in a system, the more stable or resilient that system is. The concept of a web is often used to explain why this is so.

Picture a spider's web with its complex interconnections. Suppose that each connection point is a separate life form or species and the strands connecting them are their interactions with one another. Clearly, the more points of connection or intersections within the web, the stronger it is. Further, when some event occurs that destroys a point of connection or even a small section of the web, the whole web does not collapse. However, imagine that one-half of the connection points are destroyed, without tearing the fabric of the web, just decreasing the interconnections. The web becomes noticeably more fragile. The next accidental event may destroy it completely.

The metaphor of the spider's web is, of course, just that—a metaphor. It does not take into account the energy-exchange systems and constant flux that all ecosystems embody. Even if our only interest is in self-preservation, all species have value because they strengthen the web of which we are a part.

**The more different kinds of plants we can restore, the more different types of birds, butterflies and small mammals can live on the land.** And the more different life forms we can keep with us on this planet, the better the chances that we, our children and their children will not only survive, but live in a balanced and beautiful world. 🌱



# A Sustainable Future

**A**s we begin a new century, it is essential our landscapes take on a new meaning. Designed and managed landscapes need to demonstrate an environmental consciousness and a shift in values. A part of the beauty of a landscape in the 21st century will be derived from its resource consciousness, its productivity, its sustainability.

These thoughts are stimulated, in part, by a February 1990 prediction by the Worldwatch Institute. This Washington think-tank predicted (optimistically, maybe) that the world will become 'self-sustainable' by the year 2030; i.e., that society will see that basic human needs are met without depleting or further polluting the Earth's resources. The Institute acknowledges that in order for its prediction to become reality, a new set of values will need to be adopted, with one difficult component being a shift away from materialism and conspicuous consumption.

In the Institute's hopeful scenario, today's throw-away society will be replaced by one with a comprehensive recycling ethic. In the sustainable world, people will rely much less on automobiles and will live closer to their work in mixed-use neighborhoods, or work at home with the assistance of technology. This will be a world where neighborliness and sociability can be revived, with people walking or biking to schools, shops, and offices, perhaps along streets where houses have front porches. Small towns will experience their own revival. Historic buildings will be preserved, restored and reused.

And what will a sustainable landscape be like in the year 2030? The Worldwatch Institute doesn't propose a scenario for this, so I will:

— Expansive, resource-consuming lawns will be unfashionable, obsolete symbols of over-consumption and pretense.

— Where there is a need or an urge for large, open lawn-like areas these will be pastures in which cattle and sheep graze on native, drought-tolerant grasses, returning nutrients to the soil.

— Other fields will be set aside with rows of solar collection panels harvesting sunlight for power. In the space between the solar collectors will be soil-rebuilding grasses intermingled with colorful drifts of native flowers.

— On the shoulders of roads, hiking and biking trails, and in small openings on residential and industrial sites will be infrequently mown short meadows.

## *On The Edge of A Sustainable Landscape*

BY DARREL MORRISON, FASLA, Landscape Architect

— Food-producing landscapes will have a resurgence, providing more food close to home and reducing the need for long-haul transportation of fruits and vegetables, which will be picked when ripe and eaten in season.

— In the same vein, beautiful vegetable and herb gardens, as well as grape arbors and mini-orchards of dwarf fruit trees will be integrated into home grounds.

— Ornamental plantings will also include a large component of time-proven native shrubs and trees, flowers, ferns and grasses, providing seasonal changes and links with our natural history without the need for irrigation or fertilizer.

— A network of forests and other natural areas will be preserved and protected, in various stages of succession. With management to maintain their natural diversity and beauty, various-sized patches and corridors will be protected and managed, and they will in turn protect the quality of water in streams and rivers and will help counteract global warming trends.

— At the edges of the forests, and along fence rows between solar collection fields, pastures and orchards, there will be a network of consciously managed edge plantings producing food and habitat for many species of birds and mammals.

Whether we reach the goal of sustainability is dependent on our activities. We won't get there by maintaining a business-as-usual attitude. We won't get there if we permit the perpetuation of an image that sustainable, productive landscapes are anti-design, or that they can never really be as beautiful as today's irrigated, herbicided, chemically fertilized, and mowed landscapes.

**We may help achieve the goal of sustainable landscapes—and public demand for them—by demonstrating that they can possess a new level of beauty derived from the richness of their lines, forms, colors, and textures, from their regional associations, and from their very productivity and sustainability.** ☛

*"My husband and I feel so privileged to own and observe this special little corner of the world, even though we realize it is actually ours for just a fleeting moment in time."  
—Janice Stiefel*

# The Landscape That Was

## Forest Cathedrals

BY PAT ARMSTRONG

**Forests are old and wise; they evoke feelings of reverence. Their air hangs heavy with the misty incense of ancient conifers. Their spires filter light through lacy leaves, radiating celestial beams as through cathedral stained glass windows.**

At the end of the Cretaceous period, some 75 million years ago, the cycads, conifers, ferns and other Jurassic plants and giant reptiles began to decline as mammals and Angiosperms (true flowering plants) began to rise. South America and Africa had begun separating from the supercontinent Pangea in the Cretaceous, but the *tertiary forest* still continued across North America and Euro-Asia as the Atlantic Ocean widened between them.

About 15,000 years ago all the trees in eastern North America were hunched-together refugees, pushed to the mountaintops of the southern Appalachians by glaciers. As the ice retreated, the huddled species began to spread. As they migrated back into the landscape, they sorted according to the soils and climates encountered.

Only a handful of Spruces, Firs, Larches, Aspens and Birches reached the arctic tundra in the *boreal forest* of Canada. Similarly, a few species of Junipers, Pines and Oaks moved southwest and west to the savannas, barrens and forest glades at the edge of the prairie. Even the richest deciduous forests of the Midwest contain only a few species of Beech, Maple, Tulip, Ash, Elm and Basswood instead of the over 600 species that made up the ancestral tertiary forest.

Trees and rainfall go together. We have tropical rain forests and temperate rain forests, cloud forests and fog forests, flood plain, flatwoods and swamp forests, mesic and mesophytic forests. These are our richest forests, and when the rainfall drops below 30 inches a year, the forests began to peter out into savannas and prairies.

Trees need water, save water, hold water. They protect and supply the watershed. They evaporate water to cool and humidify the air around them. Their leaves and branches intercept rain,

making it last longer and fall more lightly upon the soil. Their size

and clustering restrict the wind and its ability to desiccate. It is cool, dark, shady, humid, quiet, calm and fertile in a forest. Humus, leaf litter and duff pile up and are sifted, sorted, decomposed and recycled by fungi and invertebrates in their mysterious unseen ways.

Plants are arranged in horizontal layers. The tallest trees making the canopy top, younger trees and shorter species compose the understory below the canopy. Still younger trees, saplings and tall shrubs make up the next layer. Then there are small shrubs, seedling trees and the herbaceous plants on the forest floor, and finally the humus and duff layer on top of the soil with all its roots, microrhizae and organisms.

Light is the controlling factor. Plants must adapt to its transient supply. Blooming and leafing out in spring progresses from the ground up. Flowers bloom first, using stored energy in their bulbs, before the shrubs, understory and canopy leaf out and eclipse the sun. Shrubs and trees often bloom before their leaves emerge and owe their survival to wind-pollinated flowers that produce seeds with wings that act like propellers for dispersing through the relatively open branches.

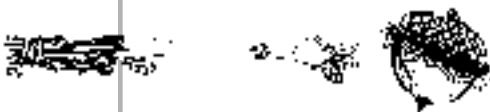
In the summer, deep shade envelops the forest floor and only the largest of leaves, held horizontally to catch as much light as possible, can survive. Spring ephemerals disappear until next year. The many sizes, shapes, textures and shades of green of the leaves become a pleasing tapestry in groundcover layers.

By the end of August leaves of deciduous trees are tattered and shriveled. Their colors flame in October as they die and fall to the forest floor to be recycled. More light encourages late-blooming flowers to burst into bloom. Fleshy fruits and berries, acorns, nuts, and seeds with forks, prongs, stickers and burs entice birds, mammals, and insects to eat them, store them or carry them away to propagate somewhere else.

In winter, the forest rests, lifting bare limbs to the sky or sloughing off snow mounds from bouncy evergreen branches. Nests, galls, footprints disclose the identities of its inhabitants.

There is some evidence that the fall of great civilizations like Greece and Rome is linked to the destruction of their forests. When the trees are cut and the water is gone, we, too, perish. ♣

*"When we garden with native and naturalized wildflowers, we garden not only with Nature but also with history."—  
Brooklyn Botanic Garden*



# The Landscape That Was

To appreciate prairie, one must experience and understand the environment that created it. Drive across Interstate 80 in August. Stop somewhere just west of Lincoln, Neb., and get out of your car. Climb to the top of the roadway embankment and walk a short distance into the fields. Sun will beat down on you in fiery fury as 140°F heat waves writhe and wriggle dizzily across the land. Desiccating blasts of oven wind will parch your lips and ping your skin with sharp dust arrows. Grass rising, falling, tossing in ocean-like waves will churn your stomach and sway your balance with seasickness. Yet in this unbearably hot and dry environment several hundred beautiful plants thrive and multiply.

Repeat your visit at the end of January. Now howling gales and biting winds sting and numb you with windchill factors of -70°F. There's no place to hide and nothing to block wind or even hold snow as an insulating blanket over soil.

Where are the plants? Roots, rhizomes, bulbs, and growing tips (which is over 60 percent of the plant) are all safely protected in soil away from temperature extremes. Stems and leaves which are above ground make up the smaller, more expendable part of the plant. This is the most important adaptation of plants to a harsh, prairie environment.

Four factors shaped the great American prairie that stretched in a rough triangle from Northern Mexico to southern Canada along the eastern side of the Rocky Mountains, narrowing eastward into the prairie peninsula of Illinois, Indiana, and Ohio.

The first was a **drier climate** that occurred over millions of years as continental plates collided causing the formation of mountain ranges and the breaking away of land masses. Ocean currents and rain patterns changed, the Earth cooled, and inland oceans retreated. By 25 million years ago, the climate in central North America had become dry enough for the first grasses to appear. Twenty million years ago, prairies were well-established.

Prairie plants developed an alternative form of photosynthesis, C<sub>4</sub>, which allows them to be active at higher temperatures and require much less water. Plants using this system use carbon dioxide more efficiently and have smaller stomatal (pore) openings which cut down water loss.

Other ways prairie plants adapt to climate is

## *Prairie Plants Evolved to a Harsh Climate*

BY PAT ARMSTRONG, PRAIRIE SUN CONSULTANTS

with small or finely cut leaves that reduce evaporation. Hairy surfaces help, too, by reducing the air flow, shading the leaf, catching and holding dew or condensing water evaporated through the stomates. Having leaves close to the ground where air flow is reduced and they are shaded by other plants is another way. Having no leaves at all, growing altogether in a clump, having wide-spreading fibrous roots or deep taproots are additional ways.

The second factor was the thick covering of **rock and soil debris left by glaciers**. Clay particles in this young soil affect its fertility, texture, and ability to hold and release water. Many, like loess (extremely fine wind-blown particles of silt from glacial deposits) are very droughty. Prairies are located almost exactly where there were once glaciers or where glacial debris washed or blew eastward from mountains down into the great plains.

Thirdly, **fire** is an important factor in prairie development. Being deep-rooted perennials, prairie plants aren't hurt by having their upper parts burned. In fact, if fire is suppressed, they lose vigor and fail to flower. Fire returns nutrients to the soil in the form of ash and reduces the dense overburden of plant debris so shoots can reach sunlight.

Prairie soil is enriched and fertilized not by the decay and decomposition of leaf litter as on the forest floor, but by the death and decomposition of underground parts where the greater percentage of plant material resides. Other beneficial effects of burning are to control invading woody plants and aliens, and to allow sunlight to reach the soil and warm it in the spring so that plants can resume growing sooner.

The fourth factor influencing the development of prairie was the billions of **large grazing herbivores**. Plants survived by differing strategies. Those with growing points extremely close to the ground could be clipped off on top and keep growing. Other species developed coarse, rough, bristly or thorny surfaces. It is these diverse plant shapes and textures that give them their charm in the garden landscape. 🌻

*"You can't turn back the clock, but you can wind it up again."*—  
Benjamin Franklin





# The Landscape That Was

## The Influence of Effluence: Wetter Is Better

BY PAT ARMSTRONG

*"We need the tonic of wilderness, to wade sometimes in marshes where the bittern and the meadow hen lurk, and hear the booming of the snipe."  
—Henry David Thoreau*

**Loren Eiseley once said, "If there is magic in this world, it is to be found in water." Water sparkles and ripples, gurgles and splashes, trickles and thunders. It can excite like drums in a marching band or soothe like a mother's heartbeat. It can churn with fury or be as still as a mirror.**

As long ago as 600 million years past, the Cambrian sea contained every animal phyla except the vertebrates. Amphibian mating choruses were the primeval voices heard on our young Earth when animals crawled out of Devonian swamps 325 million years ago. Water makes our planet unique in the solar system and makes life, as we know it, possible.

When the glaciers covering most of North America melted away some 10,000 to 20,000 years ago, they left a barren landscape. They dropped their ice chunk pothole ponds and superimposed their meltwater rivers on top of this newborn land to let the waters find their own way and create their own drainage patterns. Thus, we were blessed with millions of wetlands: ponds, lakes, rivers, creeks, intermittent streams, sloughs, marshes, sedge meadows, shrub carrs, swamps, floodplains, bogs, fens, springs.

All of these places teem with life. Walk around any natural body of water. Blackbirds "conk-a-ree" in the cattails, shorebirds footprint the mudflats with sanskrit, frogs squawk and leap in ahead of you, whirligig beetles spin in dizzy circles, their double eyes seeing both above and below the water's surface, a beaver disappears with a slap of the tail, dragonflies patrol on gossamer wings, waterfowl carve Vs in the water.

Hidden under the surface, uncountable algae and diatoms, plankton and copepods feed the burgeoning billions of invertebrates. Insect larva and naiads scuba dive, carrying water bubbles or breathing through snorkels. Two-inch salamander tadpoles with their scarf-like gills are caught and sucked dry by the ice-tong jaws of one-inch water tigers or dragonfly naiads. Two-inch water bugs can suck a four-inch adult frog dry.

Boatmen and back swimmer beetles row their long legs looking down or up to find their

prey. Water spiders build bubble nests to house their young. Caddis fly larva construct their cases from plant debris or grains of sand, and some catch prey by casting sticky nets.

To be small and live in a pond is the most dangerous thing in the world. One must be very quick and clever to live long enough to reproduce. And reproduction is a megabusiness in the pond. A female American toad can lay 4,000 to 8,000 eggs in double strings; the bullfrog 10,000 to 20,000 in a mass that covers five square feet. Bluegill females can lay up to 67,000 eggs.

Although water is a fairly stable growth medium (it is much slower to change temperature than air or soil), its size, depth and rate of flow affect waves, currents, temperature gradients and light penetration. Different plants and animals are adapted to life in fast or slow currents, deep or shallow water, rocky, sandy or muddy bottoms, and various amounts of light, oxygen or anaerobic conditions.

Some aquatic plants cast their pollen on the surface to float to waiting flowers. Many have swollen stems that trap air to help the underwater parts 'breathe.' And most have large buoyant tubers or seeds that float away to lodge elsewhere and propagate the species.

Even the very muck on the bottom is marvelous, for in it dwell reducing bacteria so necessary in the cycle of life. All living things (except for a few kinds of bacteria and fungi) breathe oxygen and use it to burn (oxidize) their food, producing energy to live and grow, thus more and more substances are changed to their oxidized form. The reducing bacteria in mud live by changing all those oxidized substances back into their reduced state.

As May T. Watts canoed from open water to a pond shore she described the sounds of her paddle as *drip, splatter, slide, rustle* as it encountered dark water filled with microscopic plankton graduating to a 10- to 5-foot-deep submergent zone of flaccid water weeds, then to a 5- to 2-foot-deep area of waxy-leaved, floating lily pads followed by a 2-foot- to 6-inch-deep area of stiff, emergent cattails and bull rushes.

Wetlands are truly awesome. So instead of fretting over that big puddle or wet ditch, look to Nature. Find the plants adapted to wetlands and create a 'sump pump garden,' a mudflat, a marsh or trickling stream and watch the wildlife teem to your yard. 🐾



# Today's Lawns

## U.S. Lawn Care Facts as Annual Totals & Percentages

From *Redesigning the American Lawn* by F. Herbert Bormann, Diana Balmori, Gordon T. Geballe, Yale University Press, 1993.

- A lawnmower pollutes as much in one hour as does driving an automobile for 350 miles.
- 30 to 60 percent of urban fresh water is used for watering lawns (depending on city).
- \$5,250,000,000 is spent on fossil fuel-derived fertilizers for U.S. lawns.
- 67,000,000 pounds of synthetic pesticides are used on U.S. lawns.
- 60,000 to 70,000 severe accidents result from lawnmowers.
- 580,000,000 gallons of gasoline are used for lawnmowers.
- \$25,000,000,000 is spent for the lawn care industry.
- \$700,000,000 is spent for pesticides for U.S. lawns.
- 20,000,000 acres are planted in residential lawns.

Powered mowers contribute to noise pollution and hearing loss.

### *The English Burgher Lawn Aesthetic*

BY VIRGINIA SCOTT JENKINS  
CONDENSED FROM THE LAWN,  
A HISTORY OF AN AMERICAN OBSESSION

The mowed lawn aesthetic originated in the late 18th century from aristocratic France and England. Landscape architect André LeNôtre designed small lawn areas for the Palace of Versailles. This aesthetic was rapidly adopted by the rich of England, because turf grass grew easily in the English climate of moderate temperatures and frequent rains.

The U.S. colonists also adopted the lawn aesthetic in an attempt to transform the wildness of the new country into the sophistication of the old world. Landscape architects again were at the forefront, and Lancelot Brown created thousands of acres of magnificent parks using lawn turf and trees.

Prior to the middle of the 19th century, U.S. homes were either built fronting up to the street or road, or else with a small fenced front yard consisting of bare ground or garden plots. The middle class did not copy the wealthy lawn aesthetic until after the Civil War, with the stimulus of the new landscape architects leading the way.

In the late 19th and early 20th century, the USDA, the U.S. Golf Association, and the Garden Clubs of America jointly spread the front lawn ethic throughout the U.S. [They] held competitions for landscaping and shamed neighbors into compliance by setting strong example. ♪

### *Can Lawns Kill?*

BY COLLEEN AAGESEN & MARY FISCUS  
CONDENSED FROM THE  
HEARTLAND JOURNAL

According to the National Coalition Against the Misuse of Pesticides (NCAMP), if you have your lawn chemically treated, take these precautions: Do not walk barefoot on it; do not breathe near it; confine children, pets and toys inside; close windows.

Wildlife specialists, such as Diana Conger of Washington, D.C., call bird poisonings in residential areas *lawn-care syndrome*. Symptoms enumerated by toxicologists include excessive salivation, grand mal seizures, wild flapping and screaming, most often followed by death.

Ward Stone, New York State's wildlife pathologist, sees more than that in the poisonings. "The songbirds act as miners' canaries for us in detecting the buildup of chemicals that may ultimately threaten humans," reports Stone.

According to the National Academy of Sciences, lawn use is a significant component of the total pesticide problem. NAS said that although the farmer uses pesticides more widely, the homeowner uses 10 times more per acre than do farmers. ♪



*"An old error is always more popular than a new truth."*  
—A German Proverb

# Being Neighborly

## How to Naturally Landscape without Aggravating Neighbors And Village Officials

BY BRET RAPPAPORT, Attorney & Wild Ones Past Pres.

*"I want us as a culture to depart from the old tradition of evaluating land according to what can be extracted as a commodity or abstracted from it as a social asset and turn instead to a new tradition of valuing land for the life it harbors."— Sara Stein*

In 1981, Darrel Morrison, a professor at the University of Georgia and member of the American Society of Landscape Architects (ASLA), defined three characteristics necessary in natural landscape design:

- 1) regional identity (sense of place)
- 2) intricacy and details (biodiversity)
- 3) elements of change

Not surprisingly, the first professional and amateur landscapers who attempted to realize Morrison's vision ran into public opposition. For several decades, natural landscapers from Florida to Canada faced prosecution for violating local weed laws. These laws, designed to protect the public from neglectful landowners, promoted monoculture and the accompanying notion that man and Nature are independent of each other. Neighborhoods that opposed the non-conformity of the natural landscape attempted to find valid objections for their claims. They argued that natural landscapes resulted in:

- rats and mice
- mosquitoes and pests
- fire hazards
- airborne pollens
- lower property values

Each argument is flawed.

Rats and vermin are products of civilization. They do not live in natural landscapes, eating plants and berries; they live in man-made structures, dining on garbage.

Mosquitoes breed in standing water. Naturalistic landscapes tend to absorb more water than traditional lawns, thus reducing, rather than increasing, runoff and standing water. By providing a habitat for birds, natural landscapes may also increase the population of mosquito predators.

Properly managed naturalistic landscapes do not present any greater fire hazard than any other landscape type. Not only does prairie grass burn quickly and at a low temperature, but natural landscapes comprise mostly green, leafy material that does not burn readily.

Allergens are primarily produced by exotic

grasses, oak trees, and ragweed. Most native plants are insect-pollinated and do not produce airborne allergens. Finally, property values are a function of public perception. As naturalistic landscaping becomes more familiar and gains acceptance, it will be viewed as an asset rather than a liability. Furthermore, as suburban sprawl continues to consume open space and natural settings are lost, those rare elements of nature that remain in a landscape will increase its value. It has been and continues to be a long, tough row to hoe for those who would rather "grow than mow." Confronted with out-dated and ambiguous weed laws, a growing number of environmentally concerned homeowners are standing up to their neighbors and municipal officials and reclaiming their right to landscape naturally. And, they are winning.

For those who undertake natural landscaping in their own front and backyards, five simple steps may minimize potential conflicts and avoid "weed wars." They can be remembered by the acronym BRASH.

**BORDERS** can provide a sense of order and purpose preferred by most homeowners. A "wild" yard tends to conflict with that preference and can disrupt equilibrium. A simple border—a mowed edge or low stone wall—can keep neighbors mollified, if not happy.

**RECOGNIZE** the rights of others. You have a right to your coneflowers and bluestems, but your neighbor has a right to his clipped lawn, plastic sunflowers, and concrete lawn deer. Avoid arrogance by remembering that you are trying to win converts, not be a martyr willing to go down in a flood of litigation and neighborhood hostility.

**ADVERTISE.** Let your neighbors know what you are doing—and why. Tell them about your project before you start and continue to provide updates as you progress. You may want to consider putting up a small but readable sign that announces that your property is a special place that saves water, eschews toxic chemicals, and provides sanctuary for wildlife. Wild Ones



provides such a sign, as does the National Wildlife Backyard Federation. You may also simply make a sign of your own.

**START SMALL.** Daniel Burnham, an influential architect at the turn of the century, once said, "Make no little plans; they have no magic to stir men's blood."

The sixth-century philosopher Lao Tzu taught: "A journey of a thousand miles begins with a single step."

Both ideas apply to successful natural landscapes. Having an overall plan, but proceeding in small stages, will reduce expenses, increase learning and enjoyment, and engender less hostility from skeptical neighbors.

**HUMANIZE.** Once we recognize that we are a part of nature, adding spontaneous personal touches to our gardens provides a human element to the natural setting. Strategically placed

bird feeders, birdbaths, stone benches, pathways, sundials, and gazer balls create interesting accents. These touches also tell onlookers that the landscape is intended.

Many people create natural landscapes and never face hostile neighbors or uptight town officials. A good example is Wild Ones member Rochelle Whiteman in Milwaukee, Wis. When she converted her yard into a naturalistic prairie landscape, her neighbors asked her to help them do likewise. Today, her neighborhood boasts seven natural landscapes all on the same street.

Although a lush green mask of Kentucky bluegrass covers some 32,000 square miles of suburban and urban America, change is in the air. The natural landscaping "movement" has taken root, and its adherents are a varied lot. They all share a common goal—to harmonize gardening and landscaping practices with nature. ♣

*"Coexistence is part of the very foundation of Nature."  
—Robert Masello*

## Important Causes of Hayfever

People often wonder if native landscaping contributes to allergies. You'll see from the list below that the real culprits are rather a select group of trees, non-native grasses, and 'weeds' (plants no one would choose to add to their landscape).

This information was collected from *That the Patient May Know* by Harry F. Dowling, M.D. and Tom Jones, M.D. and *The International Textbook of Allergy* edited by J.M. Jamar, M.D. Annotations by Lorrie Otto.

### TREES

- Birches (*Betula*)
- Hickories (*Carya*)
- Ashes (*Fraxinus*)
- Walnuts (*Juglans*)
- Oaks (*Quercus*)

[Although many trees are important sources of allergenic pollens, no one would suggest that woods be destroyed for that reason.]

### GRASSES

- Redtop Grass (*Agrostis albia*)
- Bermuda Grass (*Cynodon dactylon*)
- Orchard Grass (*Dactylis glomerata*)
- Timothy (*Phleum pratense*)
- Kentucky Blue Grass (*Poa pratense*)

[None of the grasses above is native to the U.S.]

Many grasses bloom in May and June when

ground-nesting birds need cover. To mow at that time destroys both cover and nests. Ironically, though it is against the law to shoot songbirds, it is not illegal to destroy their nests.

Mowing grasses from mid-July to frost is counter-productive for the following reasons:

1. Many grasses are in seed at this time. Thus mowing does nothing to remove pollen.
2. Mowing eliminates a good filter that removes dust and other particulates which are health hazards that pose problems for the entire population.
3. Cutting removes good food and cover for wildlife. (This does not include rats, which do not gather grass seeds, but depend on grain cribs, garbage, and pet food. Rats are not native to the U.S. They arrived in America with settlers and are dependent on people.)
4. Mowing maintains the landscape at weed level. Annual weeds germinate and thrive in disturbed soil.
5. Frequent mowing retards the growth of perennial native flowers and prevents their seeding.

### HERBACEOUS PLANTS

- Pigweeds (*Amaranthus*)
- Ragweeds (*Ambrosia*)
- Goosefoot (*Chenopodium*)











# Policies & Opportunities

## WILD ONES RECOMMENDS THAT YOU...

- **Shop 'close to home.'** Local suppliers will be more familiar with local conditions and will likely carry species descended from local genetic material.
- **Patronize nurseries** with knowledgeable staffs.
- **Inquire** of nurseries how any endangered or threatened species were acquired. All plants offered for sale should be 'nursery propagated.'
- **Learn botanical names** to avoid confusion.
- **Collect native seed and plant catalogs** which make good reference books.

## PLANT CHOICE

Alien grasses, flowers, vines, shrubs and trees have come to dominate dwindling societies of native species. And you will notice as you go on yard tours that many Wild Ones members have chosen to eliminate all alien species from their properties. This does not mean that you must give up Aunt Eva's heirloom hollyhocks, your vintage asparagus patch, or your teenager's athletic turf. Indeed, good landscaping takes into account such thoughtful considerations. Wild Ones decries only mindless and environmentally irresponsible land practices. To that end, we not only recommend you get to know the beautiful native plants of America, but that you make yourself familiar with some of the marauding bullies of the vegetative world.

See page 23 for more information on invasive alien species.

## SOWING FARTHER AFIELD

Many Wild Ones members branch out with their natural landscaping, taking it to their house of worship or place of business. Oftentimes teachers and parents initiate native plantings at schools. Contact Wild Ones for referrals to current recommended planting and study guides.

## SEEDS FOR EDUCATION

The Lorrie Otto Seeds for Education Fund of the Milwaukee Foundation through Wild Ones awards grants to places of learning for projects whose efforts best reflect our message of creating natural landscapes using native plants and environmentally sound practices, and appreciating humankind's proper place in the web of Nature. Contact Wild Ones for further information and an application.

## FROM THE WILD

With property owner permission, you may collect seeds and plants from the wild—with the understanding that Nature needs you to leave the greater portion behind to rejuvenate herself.

You may also rescue great numbers of plants that would otherwise be lost to development and use them to stock your yard, donate to community projects, and share with others at seed and plant exchanges. **[Stay alert for indications of impending bulldozer activity, such as real estate signs or surveyor markers.]**

### Plant Rescue Procedures:

- 1) Seek out the private owner, developer or government agency (in the case of roadway development) for permission to trespass.
- 2) Survey the site for indigenous species or contact your local Wild Ones chapter plant rescue team.
- 3) If there is no local Wild Ones chapter near you, follow these steps for conducting a plant rescue. Explain to the landowner that ...

- ... you have identified native American plants on their site that you would like to rescue from destruction.
- ... you will take responsibility for your own safety and that of any assisting rescuers and that all are willing to sign release waivers protecting the property owner from any liability
- ... you are willing to dig during whatever hours are convenient to the landowner
- ... in the case of a developer, they can generate good publicity out of their generosity in helping to preserve some native plants

- 4) Inform only those potential assisting rescuers whom you trust to respect the landowner's rights and privacy about the exact location of the site, its boundaries, growing conditions and types of plant communities present, and any restrictions imposed by the owner.
- 5) Dig and transplant, cutting back the top third of each forb to reduce transplant shock.
- 6) Express your gratitude. (By maintaining an upbeat, professional manner and honoring the owner's restrictions, you may be treated to additional dig sites in the future!)

For more information about plant rescue procedures please go to the Wild Ones website at [www.for-wild.org](http://www.for-wild.org).

*"We need natural areas to bring people and Nature together. We need a place for youth to be wowed by 10-foot-tall prairie grasses."*  
—  
Marlin Johnson



# It Starts with The Soil

ALL NEIL DIBOLL ARTICLES ARE  
CONDENSED FROM PRAIRIE NURSERY CATALOG

Soils can be divided into three basic classifications: sands, loams, and clays. There is great variation within these basic groups, but these categories will suffice for the purpose of describing where a given plant will grow.

**Sandy soils**, referred to as *light* soils, contain large-sized soil particles that are loose and easy to work. They allow water to drain readily, and tend to be low in nutrients. Sandy soils tend to be more acidic than the more fertile loams and clays. If your soil's pH is below 5, consider adding lime or wood ashes to raise the pH to 6 or 7.

**Clay soils** are known as *heavy soils*. Consisting of small, tightly packed soil particles, clays tend to be dense and hard to work. They're generally rich in nutrients, have a high water-holding capacity, and can be very productive.

**Loamy soils** are *intermediate*—between sands and clays. Composed of different-sized particles, they combine fertility and moisture-

holding capacity with good drainage. Easier to work than clays, better consolidated than sands, loamy soils are an excellent growing medium.

Dig into your soil when it's dry. A sandy soil will seldom exhibit clods. Any clods that do form will crumble easily. A loamy soil will have clods that can be sliced cleanly with a shovel. Clay soils tend to form hard, persistent clods. Rather than slicing through them, a shovel will get stuck or will shatter the clod into many hard, little blocks of soil. If you're in doubt, take a soil sample to your local county extension agent or soils lab.

If you have a sand or clay soil and wish to improve it, add large quantities of organic matter. Compost and dead leaves are excellent. Do not use sawdust or wood chips. These require a long time to break down and rob the soil of nitrogen. Avoid uncomposted manure. It contains large numbers of weed seeds.

Another method of improving poor soils is to plant a *green manure crop*, such as buckwheat or winter wheat. These crops improve the soil by bringing up nutrients from the lower soil and converting them into organic plant matter. The crop is plowed under while actively growing to incorporate the roots and leaves into the soil.

Clay soils with low levels of organic matter can be difficult to work. The fine soil particles pack together tightly, impeding drainage and air exchange. In the heat of summer, clay soils harden and prevent downward root growth. Clay soils warm up slower in spring and compact if worked when wet. Each of these problems will retard root development and plant growth.

There are many plants that can grow in clay soils. With good initial care, these flowers and grasses will flourish even on difficult sites. Their roots will gradually work their way down into the clay, opening and improving it, just as these plants have done for thousands of years.

Soil moisture is equally important in deciding what species to plant. **Moist soils** have a generous amount of water in the subsoil throughout the growing season. They may have periods of standing water in the spring or fall.

**Dry soils** include sandy and gravelly soils that drain readily and never have standing water, even after a heavy rain.

**Mesic** (medium) **soils** include well-drained loams and clays. These soils may have standing water for short periods after a hard rain. ☘

"We are of  
the soil  
and the  
soil is  
of us."  
—Luther  
Standing  
Bear

## COMPOSTING

Composting vegetative waste speeds the natural process whereby organic material is returned to the soil to add fertility. Aged compost can be worked into the soil at planting time or added as a surface mulch any time. Alternately layer combinations of as many of these items as you have available...

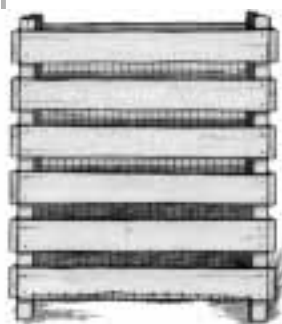
**Green waste:** Kitchen wastes (avoid dairy, meat or synthetic products), grass clippings.

**Brown waste:** Shredded leaves, sawdust (not from treated wood), straw, uncolored paper products.

**Topsoil:** It stocks your compost with the organisms needed for decomposition.

**Manure:** Fresh or aged, but no pet wastes.

*Keep the pile moist by watering or covering it to retain moisture. Good air circulation is necessary, so sides of the*



*bin need to 'breathe.' Once the pile reaches about 4 feet cubed, start a new pile. Turning the pile with a pitchfork from time to time will speed the process, which will take anywhere from three to 18 months. You have humus when the material is dark and crumbly, bearing no resemblance to the original components, and has a fresh, earthy smell.*

Illustration courtesy of Naturescape British Columbia



# Removing Vegetation

BY NEIL DIBOLL

**O**n small areas of a few thousand square feet or less, smothering is simple. Smothering involves covering the surface with black plastic, old plywood, a thick layer of leaves, or any creative resource available (old pool liners, carpeting, etc.). This should be left for a full growing season to kill the plants beneath.

If you use herbicides, chose a low-toxicity, non-persistent herbicide, *read the label*, and follow the manufacturer's instructions. The best is a glyphosate (i.e., Roundup, Ranger or Kleenup).

If you prefer not to use herbicides, a variety of equipment can prepare your soil by cultivation.

**Lawns.** The quickest way is to remove the top three inches of grass and soil using a rented sod-cutter. This usually creates a nearly weed-free site ready for seeds or transplants. Be aware that the area will be lower than the surrounding lawn after sod removal. If using herbicides, apply in fall or spring, when lawn grasses are actively growing. Cultivate after everything has turned brown to prepare the seedbed for planting (usually about two weeks). To remove a lawn by cultivation, cultivate two to three times, about a week apart. If rhizomatous perennial grasses such as Quackgrass or Johnsongrass are present, a year-long tilling program may be required.

**Old Fields.** An old field usually requires at least one full growing season to prepare the site. This may seem long, but a little patience at this stage is essential for a successful planting.

To herbicide, mow in early spring. This will encourage new growth. Apply a glyphosate herbicide three times—once in mid-spring, again in mid-summer, and finally in early fall—unless no plant growth is visible one month after the second spraying. This allows you to attack weeds which have peak activities at different times.

Using cultivation only, cultivate every two to three weeks from spring through fall at a depth of five inches. Be religious about this. If you are fighting rhizomatous, perennial weeds, waiting longer than two or three weeks will allow these weeds to recover. For some species, such as Quackgrass, cultivating in intervals greater than two weeks may actually increase its density.

**Agricultural Fields.** To prepare with herbicides, spray once mid-spring for spring planting, or after crop removal for fall planting.

The seedbed may be prepared without herbicides using cultivation as you would for any other crop. If rhizomatous perennials are

present, work up the soil all year, same as for old fields. Once all vegetation is removed, the final seedbed should be prepared by tilling or disking, followed by dragging or raking.

Do *not* plant flowers in fields treated with Atrazine within the last two years. A smother crop of corn or sorghum will hold your soil and control weeds while the Atrazine breaks down.

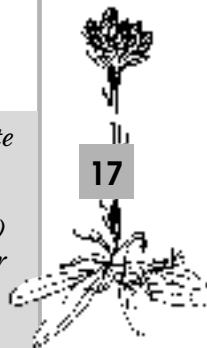
**Erosion-Prone Sites.** To avoid runoff and soil loss, the site should not be left unvegetated for any length of time. Cultivation should be minimal. Preparing your site solely by cultivation may create erosion problems. The site should be planted immediately following soil preparation. Use a nurse crop of oats and a cover of mulch, stabilized with netting. If you are unable to plant immediately, the site may be stabilized by planting oats at a rate of four bushels (128 lbs.) per acre. Till the oats under when ready for planting.

**A Final Tip.** After the existing perennial vegetation is eliminated, weed seeds still lurk in the soil below. These seeds will germinate and compete aggressively with your flowers and grasses. Weed density can be greatly reduced by a final treatment of the surface soil just prior to planting in late spring or early summer (this will not work in late summer or fall). Start with a prepared seedbed. Allow weeds to germinate and grow. Apply herbicide when the weeds are two to three inches tall. Wait 10 days, and then till the soil one inch deep. Tilling deeper will bring up more weed seeds. Plant immediately.

If you prefer to avoid using herbicides, similar results can be obtained using well-timed, careful cultivation. Start with a prepared seedbed. Till the soil one inch deep five to seven days after the first good rain. This will kill weeds after they germinate but before they come up, without bringing up more weed seeds. On sandy soils, a drag can be used. A very light disking is usually more effective on heavy soils. Plant immediately. 🌱

*If you'll be plugging in transplants, a weed-free site can be created by putting down a 12" layer of leaves or 10 sheets of newspaper (you can check with the publisher to make sure they use vegetable-based inks) topped by a couple inches of quarried sand (beach or dune sand might contain weed seeds). This mulch will deny light to existing vegetation and weed seeds.*

*"The efforts expended to maintain a lawn can be used instead to plant and restore the native vegetation of your part of the country. Gardens, unlike lawns, create experiences that uplift our spirits, expand our visions, and invigorate our lives."*  
—Stevie Daniels





# Handling Seed

BY PAT BRUST, LUCY SCHUMANN AND CAROL CHEW,  
Native Plant Enthusiasts

*"A seed is latent, intelligent energy waiting for the right time and place to express itself. A seed knows exactly what it has to do and exactly how to do it."  
—Jamie Jobb*

**G**ermination rates of plant species can vary greatly. For instance, some seeds, including Buttercup, Pasque Flower, Columbine, and Blue-eyed Grass, do best if planted fresh as soon as they're collected. But most seeds require some form of pre-treatment, imitating Nature in order to change from a dry, dormant embryo to a visible sprout. If, with landowner permission, you collect seed, follow these techniques to maximize your yields.

## DRY STRATIFICATION

Start with proper winter storage in a cool, dry place in a clean, dry airtight container. A garage or unheated attic serves well. Remember to label!

## MOIST STRATIFICATION

Four to eight weeks before germination is desired (either inside or outside), moist stratification is worth the effort since it will increase germination success. Place seeds with equal amounts of clean, moist (sandcastle consistency) sand into clean plastic bags. Close and label with species' name and date. Then place in the refrigerator (not freezer) to mimic Nature's cycle of freeze-thaw of the soil surface which breaks down chemical inhibitors of germination. Most forb seeds benefit from this process.

## SCARIFICATION

Legumes require additional techniques to break their hard coats. One is scarification, which involves making a small cut in the hard seed coat enabling the seed to absorb water. As it does, the embryo expands which ruptures the protective coat causing the seed to sprout. Scarify by rubbing seeds against a wire screen or sandpaper. Moist stratification should follow scarification, but for a shorter time, usually 10 to 14 days.

## INOCULATION

Inoculation is necessary for certain legumes, such as Lupine. After scarification and stratification, seeds of this group will germinate but need nitrogen-producing soil bacteria for successful growth. Your soil may contain these bacteria, but to be sure, purchase inoculum (from seed suppliers) specific to the particular legume species.

## COLD-WEATHER SOWING

Native seed can be sown outdoors during winter months and even into very early spring. The combination of cold weather with ice and snow provides natural stratification conditions needed for germination which occurs during warmer spring weather. Protective seed mechanisms, such as thick coverings or germination-inhibiting chemicals, ensure that young plants won't sprout during fall rains and freeze in winter. Cold weather and repeated exposure to moisture softens seed coats and dissolves inhibiting chemicals when conditions are optimum.

To do winter planting, find an area in your yard that has bare, humus-rich soil and is free of snow. (If you have special types of seeds you'd have trouble replacing, reserve a portion to 'winter over' in the refrigerator and plant later in flats or use for reseeding, if needed.) Then seed according to the general seeding instructions on page 20. Since the ground will probably be frozen or wet, it might not be possible to set seeds by raking. Birds may relocate seeds to new unplanned areas (which may add to your pleasure) so some experts cover the planted site with hardware cloth to keep out wildlife. Seeding just before a snowfall will press seeds into the soil and provide a protective blanket.

Native seeds vary in appearance, hardiness, growth patterns, and germination rates. Keep in mind biodiversity and try seeds in different spots until you find the best places. 🌱

*"The plant reveals what is in the seed."  
—Ancient Egyptian Proverbs*



*"All the flowers of all the tomorrows are in the seeds of today."—Unknown*



# Planting A Woodland

BY DON VORPAHL, Landscape Designer

Test your soil for pH (i.e., acid, neutral, alkaline), PKN (phosphorus, potassium, nitrogen) and organic content. Depending on the results, you may amend your soil with sand, leaf litter, humus, compost, cottonseed or soybean meal, malt sprouts, lime, peat, pine needles, and/or 'starter soil' containing microorganisms and microrrhizae (beneficial fungi) from the top two inches of forest soil (where most soil organisms live). To eliminate existing vegetation, smother it with newspapers, finely shredded hardwood bark or flakes of weed-free hay.

Create shade, depending on your location, with early-succession tree species such as Birch, Aspen, Plum, Black Cherry, Pin Cherry, Serviceberry, Hawthorn, Red or White Cedar.

**Shrubs:** Hazelnut, Diervilla, Ninebark, Potentilla, Hypericum, Red or Silky Dogwood, Oldfield Juniper. **Groundcovers:** Virginia Creeper, Wild Strawberry, Common Blue (Butterfly) Violet, False or Starry Solomon's Plume, Solomon's Seal, Mayapple, Wild Columbine, Pearly Everlasting, Pussytoes, Wineleaf or Oldfield Cinquefoil, Zigzag Goldenrod, Bigleaf Aster.

Add mature canopy, later-succession and climax species. **Trees:** Oak, Maple, Basswood, Beech, Hemlock, Hophornbeam, Musclewood.

**Shrubs:** Witchhazel, Pagoda Dogwood, Bladdernut, Leatherwood, American Cranberry, Arrowwood, Mapleleaf, and Nannyberry Viburnum, Russet Buffaloberry, Eastern Wahoo. **Groundlayer:** Limit species to fewer than six in a given area, often planting in masses of only one or two species. Plan for blooming and fruiting throughout spring, summer, and fall.

Many native grasses, ferns, sedges, and rushes (*Juncus spp.*) are useful as groundcovers. All, except ferns, can be field-seeded. Several species shown below (see asterisks\*) may also be field-seeded. The remainder are generally planted as dormant rootstocks or potted plants.

Canada Anemone*	<i>Anemone canadensis</i>
Wild Columbine*	<i>Aquilegia canadensis</i>
Silver Sage*	<i>Artemisia ludoviciana</i>
Wild Ginger	<i>Asarum canadense</i>
Large-leaf Aster*	<i>Aster macrophyllum</i>
Coreopsis*	<i>Coreopsis spp.</i>
Wild Strawberry	<i>Fragaria virginiana</i>
Wild Geranium	<i>Geranium maculatum</i>
Prairie Smoke*	<i>Geum triflorum</i>
Waterleaf	<i>Hydrophyllum virginianum</i>

Blue Wood Phlox	<i>Phlox divaricata</i>
False Dragonhead*	<i>Physostegia virginiana</i>
Mayapple	<i>Podophyllum peltatum</i>
Jacob's Ladder	<i>Polemonium reptans</i>
Silverweed	<i>Potentilla anserina</i>
Oldfield Cinquefoil	<i>Potentilla simplex</i>
Solomon's Plume	<i>Smilacina racemosa</i>
Starry Solomon's Plume	<i>Smilacina stellata</i>
Zigzag Goldenrod*	<i>Solidago flexicaulis</i>
Early Meadowrue	<i>Thalictrum dioicum</i>
Wild Violet	<i>Viola spp.</i>

For best results, water deeply after planting and during dry spells. Fertilize with organics such as fish-emulsion, cottonseed and soybean meal, malt-sprouts, compost, leafmold, and bone-meal. Deep-mulch to feed, insulate, control weeds, and hold moisture. Hand-weed diligently, especially in first and second years.

## BOOKS TO HELP YOU WITH YOUR WOODLAND LANDSCAPE

*The American Woodland Garden: Capturing the Spirit of the Deciduous Forest*, by Rick Darke

*Growing and Propagating Showy Native Woody Plants*, by Richard E. Bir

*Growing Woodland Plants*, by Clarence and Eleanor Birdseye

*Landscaping With Native Trees: The Northeast, Midwest, Midsouth and Southeastern Edition*, by Guy Sternberg

*Native Trees for North American Landscapes*, by Guy Sternberg and Jim Wilson

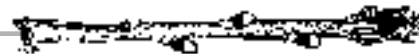
*Native Trees, Shrubs, and Vines: A Guide to Using, Growing, and Propagating North American Woody Plants*, by William Cullina

*Native Trees, Shrubs, and Vines for Urban and Rural America*, by Gary L. Hightshoe

*The New England Wild Flower Society Guide to Growing and Propagating Wildflowers of the United States and Canada*, by William Cullina

*100 Easy-to-Grow Native Plants for American Gardens in Temperate Zones*, by Lorraine Johnson

"Fertile womb, my world. Such burgeoning. Pulsing. Opening. Pouring forth miracles, a million right around my feet."  
—Mel Ellis



# Planting A Prairie

BY NEIL DIBOLL

**P**rairies require sunny, open sites with good air circulation. A minimum of one-half day of full sun is necessary for most prairie plants to thrive and bloom.

Be careful of aggressive, weedy plants located adjacent to your future prairie site. Some plants can creep into your meadow by means of underground rhizomes, while others have seeds that can blow in on the wind. Problem neighbors include Quackgrass, Smooth Bromegrass, Johnson Grass, Canada Goldenrod, Tall Goldenrod, Canada Thistle, Gray Dogwood, Sumac, Buckthorn, Tartarian and Japanese Honeysuckle, and Multiflora Rose, to name a few. If there is an old field next to your prairie, expect some incursion by unwanted visitors. To prevent this problem, maintain a mowed strip five to ten feet wide between the prairie and the old field, and mow the adjacent fields every summer in late July, before the plants go to seed.

Short prairies are a good choice for around homes and buildings. Tall prairies are best when planted on larger acreages, or in background situations. You may want to plant some areas of both tall and short prairie to create two different landscape effects and habitat types. Beware that if you plant tall prairie to the west or north of your short prairie, the ripening seeds of the taller plants may be blown into the short prairie. Eventually your short prairie may become a tall grass prairie.

For a prominent display of flowers, plant them with the shorter bunchgrasses, such as Little Bluestem, Prairie Dropseed, and Side Oats Grama. These low-growing, clump-forming grasses allow the flowers to show off better than when planted with the taller prairie grasses. Large, robust flowers should be planted with the tall prairie grasses.

I recommend including native grasses for a number of reasons. Their dense root systems help squeeze out weeds, making the prairie truly low-maintenance. Grasses also help hold the flowers upright, and provide cover and seeds for birds. The grasses' warm autumn colors of gold, orange and bronze extend the meadow's interest well into winter.

## TRANSPLANTS

For small prairie gardens, transplants are often preferable to seeds. Perennial flowers and grasses are slow to grow from seed, and typically do not bloom until the third year. With care, transplants often bloom the first year, giving you an instant prairie garden.

Transplants do best when installed in spring or early fall. Early spring flowers often do better when transplanted in autumn.

Transplants should be spaced approximately one foot apart. Mark each transplant at planting time so it's easily identified. Mulching with three to four inches of clean straw helps keep weeds down. One weeding may be required the first growing season. Once established, little if any further weeding should be necessary.

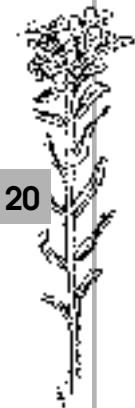
## SEEDING

Seeding prairies in late spring or early summer typically produces good results. Most prairie flowers and grasses are *warm season* plants which germinate best after soil temperatures have warmed up. **Grasses do best with spring and summer seedings.** Planting in spring or early summer allows for better pre-planting weed control than fall seeding. Prairie plantings can be successfully seeded through mid-July.

Fall seeding can be very successful, too, especially on dry soils. Fall plantings are *dormant seedings* (the seeds will not germinate until next spring). Fall plantings on dry soils allow seeds to germinate in early spring and become established before the heat of summer. Clay soils can also benefit from fall plantings. Young seedlings can become established before the clay dries out in summer and restricts root growth. Careful soil preparation and weed control is essential with fall plantings. **Native flowers exhibit higher germination when planted in fall.**

Fall seedings on erosion-prone sites require planting with a nurse crop for soil stabilization. Nurse crops of Annual Rye (15 lbs. per acre) or Oats (128 lbs. per acre = 4 bushels per acre) must be planted by mid- to late September to grow sufficiently to form a protective covering over the soil. The nurse crop will be winter-killed, but the dead roots will continue to hold the soil over winter, until spring when the prairie seeds germinate. 🌱

"Native flowers, grasses and ferns can match the finest cultivated perennials in beauty and surpass them in ruggedness and resistance to insects and diseases."  
—Jim Wilson



# Prairie Maintenance

## MOWING

Mowing is the primary management tool used to prevent weeds from shading prairie seedlings. During the first growing season the planting may need mowing a number of times. The cutting height should be 4 to 5 inches (a home lawnmower set at the highest cutting position should work well for small areas). Mow each time the weed growth is 6 to 10 inches high and do not allow weeds to set seed. Do not worry about cutting the tops off or crushing the seedlings. A flail-type mower is preferable for large areas because it chops cuttings into small pieces which will filter down and serve as mulch. If a sickle-bar or rotary-type mower is used, mow more frequently so cuttings will not have become large enough to smother native seedlings. Try to time the last mowing so weeds can grow to about 8 inches before winter. This will help protect young seedlings from heaving frosts.

During the second growing season one mowing may be helpful in late spring or early summer if weeds are thick. This should be the last mowing needed for weed control unless a serious problem occurs. Raise cutting height to 6 to 12 inches if mowing during second year.

## HAND WEEDING

Hand weeding small plantings during the second and third growing seasons will make a big difference in your planted prairie. Care must be used when weeding to avoid disruption of the soil which can dislodge prairie seedlings. Weeds will generally pull easier a day or two after rain or watering (when soil is soft but not muddy). Another control option is to clip weeds near the ground with pruning shears. Whatever method you use, be sure to remove weeds from the site before they mature and spread seed.

Discriminating between prairie seedlings and weeds is of utmost importance. If you are unsure as to what your young prairie plants will look like, plant a small amount of the seed mix 1/4 inch deep in a regular garden flat filled with sterile potting soil and keep moist. By studying the seedlings which emerge you will learn to recognize prairie seedlings. These may then be transplanted to pots and eventually set out in the planting.

An easier method to avoid pulling prairie seedlings is to remove only plants which you are

BY ALAN WADE, PRAIRIE MOON NURSERY

sure are weeds. To help identify weeds, cover part of the planting area with a piece of bed sheet before sowing. Mark the outside corners of the sheet (stakes, driven in flush with the soil surface, will not interfere with later mowing). Remove sheet after seed is planted. Plants that germinate in this marked area can be considered weeds since prairie seed has been excluded.



## BURNING

After two growing seasons, planted prairies need to be burned annually for the next several years to become well established (mature prairies with no serious weed problems may need burning only once every two to four years). Always use caution when burning. Check local fire regulations and obtain permits. Try to burn or mow only one-third of the prairie area each year to preserve over-wintering insects, their eggs and pupae.

Always plan fire safety into plantings, even if you are not going to use burn management. Prairie fires intentionally or accidentally set during fall or spring dormancy can burn very rapidly. Use any existing features such as roads, driveways, streams, lakes, or mowed lawns as fire breaks. In addition to paths through a prairie, also include a wide path around the perimeter. A mowed lawn buffer 20 feet in width between buildings and prairie is advised.

An alternative to burning is to mow in late fall after seeds set or preferably in early spring (late March to mid-April). Sites that are too wet in spring need fall mowing when soil is dry. If burning does not occur periodically, cuttings need to be removed to avoid a thatch layer buildup. Do not cut and then burn large quantities of plant material (creating thick piles) or you will sterilize the soil beneath. ♣

Illustration by Airnee Kuehl

*"Once we become interested in the progress of plants in our care, their development becomes a part of the rhythm of our own lives and we are refreshed by it."—Thallasa Cruso*



For more information, we recommend purchasing the booklet *How to Manage Small Prairie Fires* by Wayne R. Pauly.

# Wet Gardens

BY ANNETTE ALEXANDER, *Native Plant Enthusiast*

## RAIN GARDENS

*are those planted in depressions where water gathers from rain or snow-melt. Rain gardens filter pollutants, slow run-off, prevent soil erosion, mitigate flooding, recharge groundwater, and provide habitat.*

*Choose a low spot at least 10 feet from the house and dig down 6 to 12 inches, gently sloping the sides. Direct your downspout or sump pump outlet to the area, via either a shallow swale or through a buried plastic drain.*

*Amend the soil at the bottom of the depression with compost, sand, and gravel. Plant moisture-loving species in and around the depression and mulch to discourage weeds.*

In planning a **water garden**, first consider the **safety** of small children, check local regulations, and call the digger's hotline to locate buried utility lines. Do not disrupt existing valuable habitat—especially intact wetlands.

Follow the design rules on pages 12-14, paying particular attention to grade. For instance, if you have heavy clay soil and expect to create a pond without a liner, use a low area where water collects naturally but doesn't receive surface run-off from roads, parking lots and fertilized areas. Observe **drainage** during and after rainfall. Determine which direction to aim the pond's overflow.

If you'll need to supply your pond with **water**, locate it within reach of a hose. If your water contains chlorine, aerate it while filling and allow it to stand for a week before adding plants or fish. If your water contains chloramine, use filtered water or collected rainwater instead.

The sound of a stream spilling into a pond will attract species of birds that would ignore still water. Moving water is easily created by circulating water with a submersible pump. A fine spray or mist is also an attraction, particularly to hummingbirds. When using a pump, allow for a weatherproof electrical outlet adjacent to the pond and conduit running to your power source.

A pond needs at least five hours of **light** a day for plants to thrive and lilies to bloom. Locate your pond away from large trees to avoid excessive shade. In addition, digging into tree roots may damage the tree as well as your back. Decaying vegetation in the water depletes oxygen, so skim out any leaves that do blow in.

Now that you've found just the right spot, experiment with the pond's **size** and **shape** by laying out a hose to represent the pond's edge.

Your pond need not be deeper than 1 to 2 feet, unless you're planning to stock fish. A 4-foot-deep center protects fish from predators and gives them a better chance to over-winter. In areas with very cold winters, you'll need to use a heating coil (such as those made for horse troughs) or your fish will need to be relocated to indoor tanks. Minnows are excellent mosquito larva eaters. Goldfish are bottom feeders.

Materials for **pond liners** include flexible synthetic rubber (EPDM), PVC or polypropylene (purported to be kinder to aquatic life).

While many kits offer a liner of 10- to 12-mil thickness, experts recommend 30 mil if you plan for your pond to have any permanence. To prevent puncture, put a protective **underlayment** between the ground and your liner. You can either buy underlayment for this purpose, use old carpeting, put down a bed of sand or use a 1/2-inch-thick layer of newspaper. As the newspaper slowly decays, it actually forms a watertight substance called *gley*.

Concrete contains chemicals toxic to aquatic life. Scrub concrete ponds with muriatic acid and rinse thoroughly. New concrete continues to leach lime for up to a year, so monitor pH levels (testing kits available from pond suppliers).

A lined pond should have a free-form shape. Gradually sloping, rocky sides provide niches for plants. If predators (i.e., raccoons) are a problem, steep sides will help protect fish, but then you'll need to provide emergent stones or deadwood elsewhere in the pond to provide wildlife access. A log connected to the shore will serve as an escape route for small mammals that fall in and would otherwise drown.

Hide the pond **edge** as Nature would. Lay a branch at a curve and train a vine along it, then change the pace with sedges and rushes blending into stones that provide shelter for emerging amphibians. Hiding places for fish include: sunken drain tiles, rock piles, or flowerpots or brown plastic milk crates turned on their sides (top the crate with stones for camouflage).

Follow the advice of native species pond books and wetland nursery experts when making decisions about **plants** and their density. Each type requires a specific location in relation to the surface of the water—some need their crowns just above the surface, others well below. Including oxygenating plants will improve water quality. Be sure to include vertical plants (as opposed to all water lilies) for emerging dragonflies to climb.

You may pack your plant roots in soil and then tie up the rootball in burlap. If using pots, line them with a permeable fabric to prevent the soil's leaching out, then cover the soil with a layer of pea gravel to keep it in place. Or you may put soil into the pond bottom and plant directly into it. In any case, be patient about learning how your pond will stabilize itself. Then sit back and enjoy watching all the activity that's bound to follow. 🐸



BY ELIZABETH J. CZARPATA

A tragedy is silently but relentlessly unfolding before our eyes. All around the world, as the human population becomes increasingly mobile, the spread of ecologically invasive plants is taking its toll. As defined by an Executive Order from then President Clinton in 1999 that called for increased national attention to, and coordination of, control of invasive non-native species, an “invasive plant” is “an alien species whose introduction does or is likely to cause economic or environmental harm to human health.” (Alien plants are also sometimes referred to as exotic, non-native, or non-indigenous species.)

It is important to note that the vast majority of non-native plants, about 85 percent, cause little if any environmental damage. They politely occupy their place in the landscape and pose little threat to natural areas. Even our food supply is primarily made up of exotic species. But some exotic plants are not so innocent. Once removed from their native habitats, they begin to reproduce abundantly in their new settings, causing significant environmental disruption. Invasive plants have competitive advantages over native plant species that often include:

- an absence of the insect predators and plant diseases that helped to keep their numbers in check in their homelands;
- a longer growing season that allows them to shade out native plants before the natives have a chance to grow, or to take more than “their share” of moisture and nutrients from the soil;
- an astonishing ability to reproduce and form colonies in disturbed soil due to rapid growth rates and massive seed or shoot production;
- the capacity to adapt to a wide range of growing conditions;
- effective means of spreading.

## **INVASIVES SHADE OR CROWD NATIVE PLANTS OUT OF EXISTENCE**

The impact that invasive weeds have on our quality of life can be staggering. Allowing them to proliferate has many consequences. High-quality woodlands, normally bursting with springtime beauty and diversity, are being quietly and sadly transformed into jungles of buckthorn, honeysuckle, and garlic mustard. The amazing springtime arrangement of diverse wildflowers that delight so many is being lost in the process.

Invasive weeds destroy wildlife habitat and food sources. Having evolved with native plant species, our wildlife often relies on native plants for survival. If invasive weeds cause the diversity and quantity of native plants to diminish, the diversity and quantity of native wildlife will diminish as well.

The economic impact of invasive weeds is staggering, costing the U.S. economy more than \$35 billion a year. Besides decreasing property values, invasive weeds are a major threat to tourism (hunting, fishing, swimming, hiking, photography, birding, and other activities), forestry, and agricultural production.

## **OTHER IMPACTS CAUSED BY INVASIVE WEEDS**

- Soil instability and runoff may increase.
- Herbicide use increases the longer invasive weeds are ignored.
- Hybridization (crossing) with native species can occur, potentially leading to loss of original strains.
- Insect life cycles, microbial activity, soil characteristics, and other natural processes can be altered.
- Water quality and quantity may decrease.
- Threatened and endangered species, particularly vulnerable to environmental disruptions, undergo rapid decline once areas are infested with invasive weeds.

This is one environmental problem we can do something about. Early detection and monitoring of natural areas can make a huge difference in the effort required for invasive weed control, the cost of control, and the number of species saved. The ability to properly identify invasive weeds and utilize safe and effective control techniques is vital. Insist that your legislators support greater funding for educational programs about invasive weeds and get involved in control efforts. Contact the Nature Conservancy, your local extension office, nature center, parks department, conservation organization, or state office of natural resources for more information. Invasive weeds cannot be ignored.

Some recommended Web sites:  
[nps.gov/plants/alien](http://nps.gov/plants/alien), [inhs.uiuc.edu/edu/VMG.html](http://inhs.uiuc.edu/edu/VMG.html),  
[tncweeds.ucdavis.edu](http://tncweeds.ucdavis.edu), [plants.usda.gov](http://plants.usda.gov).



# Landscaping for Wildlife

**TOM PATRICK, President, Windstar Wildlife Institute**

**D**o you enjoy observing nature? Hearing the song of a chickadee, watching hummingbirds fill up on nectar from trumpet vines, listening to the chattering of squirrels, seeing the beauty and grace of a monarch butterfly perched on milkweed, experiencing the antics of a mockingbird, the cooing of mourning doves, the swiftness of a cottontail, and the brilliance of a cardinal or Baltimore oriole...

If you enjoy any of the activities mentioned above, you'll probably want to attract more wildlife to your property.

The term "wildlife" means different things to different people. To a livestock producer, it may mean coyotes. To someone who feeds birds, it may mean cardinals, nuthatches, and hummingbirds. To a birder, it may mean rare species. To a gardener, it may mean butterflies.

To a wildlife biologist, the term wildlife means all living organisms out of the direct control of humans. Dr. Thomas Barnes, extension wildlife specialist, University of Kentucky, suggests that the definition should also include the habitat of the species. He says that it is impossible to understand the ecology of a species without having a thorough knowledge of an animal's diet and how this differs during the year, plus how the species relates to its habitat (predators, vegetation, soil, competitors, etc.).

Wildlife doesn't just randomly appear in a given area. It is there because of favorable habitat. To attract more wildlife, you need to apply specific wildlife management practices. To reach your wildlife management goals, you must manipulate the habitat, the animal population, or manage the people (landowners).

## **ESSENTIAL ELEMENTS OF A WILDLIFE HABITAT**

There are four essential elements needed for survival in a wildlife habitat—food, water, cover, and space for wildlife to raise their offspring.

If you keep these needs in mind while creating your wildlife habitat plan, your chances for success are excellent.

**Food** requirements vary for every species. It changes as they age, and from one season to

another. For some species, the berries in your garden are ideal. For others, it's the nuts and acorns, grasses, grain or seeds, or nectars in flowers.

**Water** is as important as food and is critical to survival. Adding a pond or bird bath will produce results in a hurry. Perhaps letting your pond overflow will produce wetlands.

**Cover** is important for weather protection as well as protection from predators. It's also important for nesting and resting. Cover can be provided by shrubs, grasses, trees (including dead trees), rock and brush piles, nesting boxes, and abandoned buildings.

**Space** is needed for wildlife to raise their young. Most species establish territory and defend it. For example, bluebird nesting houses must be 300 feet apart or the bluebirds will fight each other. Wood ducks and purple martins do not defend territories. Loons prefer 100 acres of lake or wetlands, and ruffed grouse need 10 acres.

## **BASIC CONCEPTS OF A HABITAT**

Before fully evaluating a wildlife habitat, some basic concepts about habitat and relationship of habitat to different wildlife species needs to be understood.

A term that you will often hear in reference to wildlife habitat is *niche*. This refers to the concept that each individual species in a community has its own role within that community. For instance, it is the *occupation* of woodpeckers to eat insects under tree bark and to excavate holes in tree trunks, while beavers can be expected to cut down trees and create dams. These are examples of species that are fairly specialized.

Other creatures could be called *generalists*, and they tend to be in competition with one another. For example, raccoons, foxes, and other medium-size omnivores all seek the same fruits and small mammals for food, but the variety of their food sources lets them compete successfully.

Each species performs a specific role in the ecosystem that directly benefits other living things, including people. A good example is that squirrels help forests continue to grow. Squirrels bury acorns for food, but fail to dig up all of them, so acorns sprout and produce new oak trees.

Other birds and animals scatter seeds

*"If nothing moves in your landscape but a lawnmower, it's time to think of designing a natural yard."—Rochelle Whiteman*



throughout the landscape. Blue jays, for example, are especially important in the long-distance dispersal of acorns and beechnuts. They carry them to distant locations and bury the nuts in soft earth or under leaves. A Virginia study showed that 50 blue jays transported 150,000 acorns in one month. Some of the acorns were retrieved by the jays and eaten later in the year, but many were left to regenerate the forest.

Within a forest ecosystem, plants grow in different vertical layers. This is important because some wildlife species may use the ground layer (herbaceous plants) for food, but they also need the tallest layer (tree canopy) for shelter. The middle layer is composed of shrubs. If you follow nature's lead by planting in layers, this will allow for the different feeding and nesting habits of many species.

While it is not necessary to give up entirely on having a lawn, limiting its size will not only benefit wildlife, it will also save you time and money. Mowing, chemical treatments, weeding, and watering are all costly—both in terms of what you pay for them and the number of hours that you spend doing them.

The place where two or more different plant communities or successional stages meet (such as where a forest meets an open area) is called *edge*. Sometimes there is an abrupt change, or distinct edge, between plant communities. Other times there is no sharp or distinct difference, but only a gradual change from one plant community to another. The latter attracts the most wildlife.

Jonathan Kays, Maryland regional extension specialist for natural resources, says that if there is one single rule to follow in attracting wildlife, it is to make your landscape as diverse as possible with many different plant species. Then, your habitat is less vulnerable to insect damage or diseases that can wipe out single species. In ecosystems, diversity means stability and ability to withstand change.

You will find that wildlife thrives when you landscape using a wide variety of plants. Some plants will be evergreen or form thickets for cover, while others will be valuable because of the flowers and fruits that they bear.

Become aware of the needs of the wildlife species in your area. Fancy double-petaled, ruffled blossoms are lovely in the garden, but butterflies can't access the nectar in them, so

you should also provide the flatter, more open blooms that butterflies prefer.

Always be careful not to plant invasive exotic species, such as multiflora rose and Japanese honeysuckle, which can overwhelm native plants and be nearly impossible to eradicate.

Wildlife needs extend through all four seasons of the year, so be sure to plant a variety of trees, shrubs, and flowers that bloom or bear fruit at different times of the year. For example, crabapple trees provide fruit in fall and winter. Cherry trees produce fruit in summer. Hickory trees produce nuts in the fall.

Food, water, and cover need to be arranged close together to produce optimum results. This cuts down on mortality from predators when wildlife species move from one habitat element to another. Connecting elements with a corridor of good cover is important.

Thoughtful landscaping can help to maintain biodiversity. By offering many kinds of native plants, you are ensuring that a wide range of wildlife can thrive.

*WindStar Wildlife Institute is a 501(c)(3) national, non-profit, conservation organization. Its mission focuses on effectively teaching and communicating wildlife habitat improvement methods, including promoting the use of native plants. The institute holds seminars throughout the country and certifies wildlife habitats and also individuals as "wildlife habitat naturalists." The institute is located at 10072 Vista Ct., Myersville, MD 21773. Phone: (301) 293-3351. Web: windstar.org. E-mail: wildlife@windstar.org.*

#### **TO MAKE A TOAD HOME:**

Cut a small arch in the rim of a clay pot for an entrance. Invert the pot amongst vegetation in a secluded, shady spot near water and a rock pile.

—*Naturescape British Columbia*

8-INCH-DIAMETER CLAY POT

Illustration courtesy of  
Naturescape British Columbia



*"Good neighbors come in all species."*  
—Sally Wasowski

# Genetic Guidelines

BY WILD ONES LOCAL ECOTYPE COMMITTEE

## THE IMPORTANCE OF LOCAL ECOTYPE: GUIDELINES ON THE SELECTION OF NATIVE PLANTS

The following guidelines are intended to assist Wild Ones members and others in their natural landscaping efforts. They were developed by a committee of national board members and others who read widely in the scientific literature and consulted with experts. While there is ongoing debate within the restoration community concerning the issues below, we offer the following guidelines with the hope that they will help make our natural landscapes places of health, diversity, and ecological integrity.

**Wild Ones Natural Landscapers advocates the selection of plants and seeds derived, insofar as is possible, from local or regional sources at sites having the same or similar environmental conditions as the site of planting. Such plant materials is often termed the local ecotype.**

**Environmental Conditions:** These include everything from soil, climate, elevation, drainage, aspect (such as north/south slope), sun/shade, precipitation, etc.

**Local or Regional Sources:** Plant material that originates in and is native to your geographic region is generally the best to use. These regions have ecological, not political boundaries; i.e., it is better to use a source from your geographic region but outside your state than to use a source from a different geographic region inside your state. Such regions are often referred to as ecoregions by scientists. The ecoregions within the U.S. are best delineated by The Nature Conservancy in the U.S. and the Conservation Data Centres in Canada. (Maps of the ecoregions can be obtained from these groups; a copy of each set of maps is in the Wild Ones library.)

### WHY CHOOSE LOCAL ECOTYPES

1. *To ensure the greatest success in your landscaping efforts.*

In general, the more closely you match the environmental conditions of the source of your

plant material to that of the planting site, the better the plants will grow. Studies show that this is because species have become genetically adapted to the local conditions to varying degrees—some species more than others. Since there is little species-specific information, it is best to take a conservative approach so plantings will do better both in the short term and in the long term.

*Example:* A red maple from the deep South will not do well in the North. Also, a red maple from a lowland will not do well if transplanted to an adjacent upland site.

*Exception:* Threatened and endangered species which have reduced genetic variability, may need an infusion of genetic variability from plants from other, maybe distant locales, in order to ensure their survival over the long term. Work with such species should be conducted under the supervision of the state and federal agencies which have jurisdiction over them.

2. *To help preserve local pollinators, insects, birds, mammals, and other wildlife which have coevolved with plants of local ecotype and depend upon them for food, shelter, etc.*

3. *To preserve the genetic diversity and integrity of native plants.*

An all-important concern today is the preservation not only of a diversity of species, but also of the genetic diversity within each species. A native species varies genetically in its adaptation to the particular localities and environmental conditions under which it grows. This results in a number of ecotypes of the same species or gradations (clines) between populations.

You can help preserve the local ecotypes in your area by using them in your landscaping. There can also be significant genetic variation within an ecotype in terms of form, size, growth rate, flowering, pest resistance, etc. You can help preserve this gene pool by asking for seedling stock, not clonal stock or cultivars.

### HOW TO FIND YOUR LOCAL ECOTYPES

To prevent the local extinction of native plants, plants should be bought from reputable nurseries, not dug from natural areas.

*Exception:* Plants rescued from a site slated for immediate development. (However, every effort should be made to save such sites whenever possible.)



**WHERE TO BUY**

A list of nurseries carrying native plants of local ecotypes can often be obtained from local nature centers, from state natural resource departments, from local Wild Ones chapters or from native plant organizations. Nature centers or nurseries dealing exclusively with native plants are more apt to have stock of local ecotypes.

- Ask the nursery about the source of their plant material. Does it originate within your eco-region?
- Beware of plant material dug from the wild or plants which are “nursery grown” in pots after being dug from the wild. Plants should instead be “nursery propagated” from seed or cuttings, not collected from the wild. It is environmentally unethical and contrary to the mission of Wild Ones to buy plants dug from our last remaining natural areas in order to naturalize your yard.
- Ask for seedling stock, not clonal stock, cultivars or horticulturally enhanced plants. Clonal stock, cultivars, and horticulturally enhanced varieties lack genetic variation. They are usually selected for bigger, showier flowers or sturdier stems, and this goal of aesthetic uniformity is at the expense of genetic diversity. Cultivars and horticulturally enhanced varieties are often propagated asexually and thus are clones rather than unique, genetic individuals. (A variety of an individual species

can be a naturally occurring variety or a horticulturally produced variety.) Check with local lists of native plants to see if the varieties are native locally or horticulturally produced.

**SEED COLLECTION**

When collecting seeds, collect from many individual plants from within the same ecotype of each species (rather than taking seeds from only the biggest plant, for example), and do not take all the seeds from any plant. This will help preserve and increase the genetic variation of the population. Also, be sure to get permission for seed collecting; it is not allowed in some natural areas.

**DOCUMENT YOUR PROJECT**

Keep records of the origins of the plant material you use. This is particularly important for large-scale restorations, especially if they are at nature centers or other places of education. Detailed records on sources of plants used can help us understand their success or failure and adapt our plant selection strategies as needed. This may become increasingly important given the changes in climate expected with global warming.

*This guideline has been drafted by the Local Ecotype Committee: Pat Armstrong, Lorraine Johnson, Chistine Taliga, and Portia Brown, with final revisions made by committee chair, Mariette Nowak, August 7, 2001, and revised March 19, 2002.*

**NATIONAL ORGANIZATIONS**

Bat Conservation International  
P.O. Box 162603, Austin, TX 78716  
batcon.org

Brooklyn Botanic Garden  
1000 Washington Avenue  
Brooklyn, NY 11225  
bbg.org

Center for Plant Conservation  
Missouri Botanical Garden  
P.O. Box 299, St. Louis, MO 63166  
centerforplantconservation.org

Invasive and Exotic Species  
of North America Project  
invasive.org

Lady Bird Johnson Wildflower Center  
4801 La Crosse Avenue, Austin, TX 78739  
wildflower.org

National Wildlife Federation  
11100 Wildlife Center Drive  
Reston, VA 20190-5362  
nfw.org

The Nature Conservancy  
4245 North Fairfax Drive, Suite 100  
Arlington, VA 22203-1606  
nature.org

New England Wild Flower Society  
180 Hemenway Road  
Framingham, MA 01701  
newfs.org

North American Native Plant Society  
P.O. Box 84, Station D  
Etobicoke, Ontario M9A 4X1  
nanps.org

Society for Ecological Restoration  
285 W. 18th Street, Suite 1  
Tucson, AR 85701  
ser.org

Wild Farm Alliance  
Box 2570, Watsonville, CA 95077  
wildfarmalliance.org

Wild Ones: Native Plants,  
Natural Landscapes  
P.O. Box 1274  
Appleton, WI 54912  
for-wild.org

Xerces Society  
4821 SE Hawthorne Blvd.  
Portland, OR 97215  
xerces.org





## SOME BOOKS TO HELP YOU WITH YOUR LANDSCAPE

(See additional book list on page 19)

### GUIDES

*The Book of Field and Roadside*, by John Eastman  
*The Book of Forest and Thicket*, by John Eastman  
*The Book of Swamp and Bog*, by John Eastman  
*A Classification of North American Biotic Communities*, by D. Brown, F. Reichenbacher, S. Franson  
*Freshwater Wetlands: Guide to Common Indicator Plants of Northeast*, by Dennis Magee  
*A Great Lakes Wetland Flora*, by Steve Chadde  
*Hortus Third V1&2 Dictionary of plants cultivated in the U.S. and Canada*, by L.L.H. Bailey Hortatorium, Cornell University  
*The Illustrated Companion to Gleason and Cronquist*, by Noel Holmgren  
*Invasive Plants of the Upper Midwest: An Illustrated Guide to Their Identification and Control*, by Elizabeth J. Czarapata  
*Newcomb's Wildflower Guide*, by L Newcomb  
*Plant Identification and Terminology: Illustrated glossary*, by J.G. Harris, M.W. Harris  
*Weeds of the Northern U.S. and Canada*, by France Royer, Richard Dickinson

### PLANT SELECTION & LANDSCAPE DESIGN

*American Plants for American Gardens*, by E.A. Roberts, E. Rehmann  
*100 Easy-to-Grow Native Plants for American Gardens in Temperate Zones*, by Lorraine Johnson  
*Grow Wild! Low Maintenance, Sure-Success, Distinctive Gardening with Native Plants*, by Lorraine Johnson  
*The Native Plant Primer*, by Carole Ottesen  
*Native Gardens For Dry Climates*, by Andy and Sally Wasowski  
*The Natural Habitat Garden*, by Ken Druse  
*Reflecting Nature: Garden Designs from Wild Landscapes*, by J. Malitz, S. Malitz

### PROPAGATION

*The New England Wild Flower Society Guide to Growing and Propagating Wildflowers of the United States and Canada*, by William Cullina

### WILDLIFE & HABITAT

*American Wildlife and Plants: Guide to Wildlife Food Habits*, by A.C. Martin, H. Zim, A. Nelson  
*Attracting Birds, Butterflies and Other Backyard Wildlife*, by staff of National Wildlife Federation  
*Landscaping for Wildlife and Water Quality*, by Minnesota Department of Natural Resources  
*Wild Neighbors: The Humane Approach to Living with Wildlife*, by the Humane Society of the United States

### GENERAL PHILOSOPHY

*Building Inside Nature's Envelope: How New Construction and Land Preservation Can Work Together*, by Andy and Sally Wasowski  
*Ecoregion-Based Design for Sustainability*, by Robert Bailey  
*Farming with the Wild: Enhancing the Biodiversity on Farms and Ranches*, by Dan Imhoff  
*How to Get Your Lawn and Garden off Drugs: Pesticide-Free Gardening for a Healthier Environment*, by Carol Rubin  
*How to Get Your Lawn off Grass: A North American Guide to Turning off the Water Tap & Going Native*, by Carol Rubin  
*The Landscaping Revolution: Garden With Mother Nature, Not Against Her*, by Andy and Sally Wasowski  
*My Weeds: A Gardener's Botany*, by Sara Stein  
*Nature's Services: Societal Dependence on Natural Ecosystems*, by Gretchen Daily  
*Noah's Children: Restoring the Ecology of Childhood*, by Sara Stein  
*Noah's Garden: Restoring the Ecology of our own Backyards*, by Sara Stein  
*Reading the Landscape of America*, by May T Watts  
*Requiem for a Lawnmower*, by Andy and Sally Wasowski  
*Restoring the Tallgrass Prairie for Iowa and Upper Midwest*, by Shirley Shirley

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