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SANCTUARY

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Accidental Wilderness

A natural history of the garden

Political Gardening

It has been a long time since I seriously tried to master a vegetable garden. The home I have lived in for many years doesn't have a suitable location, and I take advantage of abundant locally grown food all summer long, notably the wonderful produce from Drumlin Farm.

I continue to enjoy growing flowers in a garden that is quite forgiving of my benign neglect. While the garden will never be sought out for a garden tour, I derive much pleasure all season—from the early awakening of spring when green shoots emerge to the hot days of July when even the bees seem lazy. I love watching for butterflies and am thrilled by the occasional appearance of a hummingbird moth.

My own attachment to my garden, as small and insignificant as it may be, is echoed by all who treasure plants wherever they cultivate them. It should be no surprise then to discover that gardens, farms, estates, and botany played an important role in the early years of the United States.

In her recent book, *Founding Gardeners: The Revolutionary Generation, Nature, and the Shaping of the American Nation*, author Andrea Wulf explores the obsession that George Washington, Thomas Jefferson, James Madison, and Benjamin Franklin shared for horticulture and agriculture, and their constant quest to improve their estates and farms. These statesmen focused on utility and purpose, and experimentation and improvement—as well as form and beauty—reflecting their fundamental beliefs about the new nation. Wulf writes, "The founding fathers' passion for nature, plants, gardens, and agriculture is woven deeply into the fabric of America and aligned with their political thought, both reflecting and influencing it."

A conjecture of *Founding Gardeners* is that a visit to renowned botanist and explorer John Bartram's garden in Philadelphia in July 1787 by delegates to the Constitutional Convention broke a jog jam and helped lead to adoption of the US Constitution. At the time, Bartram's garden was "an unrivaled storehouse of American flora" and recognized for its collection of plant specimens from all thirteen original colonies. Within days a compromise proposal for a proportional House of Representatives and one state-one vote Senate was approved. Is it possible that the excursion to the garden, after weeks of frustrating and inconclusive debate, led several delegates to switch their votes? Perhaps seeing trees and plants from all the states prospering together helped illuminate the need to remain united as a viable country.

This parable attests to the power of cultivation to heal divisions and create a common purpose. As a country, we are finally beginning to focus on models for growing food that is healthy and affordable while sustaining the land. At Mass Audubon, we are engaged in these endeavors at sanctuaries across the Commonwealth, especially Drumlin Farm, the Boston Nature Center, and Moose Hill, where community gardens and community supported agriculture (CSAs) bring people together to support and nourish their families and neighbors.

Come join us!

Laura Johnson, President

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Hummingbird

STAFF

Cover: Purple coneflower
by John Hanson Mitchell

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Eighteenth-century horticulturalist and explorer John Bartram

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An Eden of Sorts

In gardens is the preservation of the world

Thirty years ago I inherited a two-acre plot of land consisting mostly of white pine. The forest was a dark foreboding place; the thick canopy shut out all hint of sunlight, and the forest floor was open and devoid of a shrub layer. In an unofficial inventory of the tract, I counted only six species of higher plants—poison ivy, starflower, sarsaparilla, partridgeberry, white pine, and three ancient apple trees, left over from the time when the land around here was all orchard. I identified three or four species of mushrooms, a few mosses, and three types of lichen. Birds flew through the forest from time to time, but, as far as I could tell, none actually nested there. Mammals such as foxes and coyotes also passed through, and there must have been a number of mice. But the only evidence of mammal habitation that I ever found was a gray squirrel nest.

What I really wanted on this land, or at least what I imagined I wanted, was a flowering mead, a sunny meadow where dragonflies criss-crossed and crickets sang all summer long; some place where you could walk out in spring over the fresh green shoots of emerging grasses or lie on your back in the autumn sun and watch the clouds sail over the hill on which the property was located.

With this in mind, and not without a certain amount of internal debate, I finally decided to undertake that anathema of environmentalists, a clear-cut. Over the course of the next two years, I created a semblance of a meadow, not quite what I had in mind—there were more weeds and wildflowers than planted grasses, but at least I had an open view of the sky.

© JOHN HANSON MITCHELL

Former pine forest

The cleared land, along with a grove of hickory and maple trees on the northwestern corner of the property, seemed to invite more shaping—some sort of definition to fix the open space in the midst of the generally wooded landscape that surrounded the tract. As it was, I found myself spending more and more time there, thinking out the roll of the land, the angles of the walls, and the blank slate of the meadow.

After a few years, I built a small Thoreauvian garden house in a hickory grove on the northwest side of the tract, and then laid out a long narrow bed along the west wall, planted with vegetables and annuals and a couple of pear trees. But the little clearing seemed to cry out for more—some larger statement that would fix the otherwise indistinct plot of earth as a place. Ultimately, I decided to build an actual dwelling there, a gothic revival house based on the plans of one of my heroes, the nineteenth-century garden and house designer Andrew Jackson Downing.

Once I moved into the house, I began designing, step-by-step and accident-by-accident, a series of garden rooms based on Downing's imaginative and romantic combination of English and Italian garden plans. Finally, after a period of five or six years, the grounds began to take shape.

I planted a mix of flowering trees and shrubs along a

north wall that bordered the driveway. On the south side of the drive, I put in an island of trees I named The Bishop's Close after a fine collection of trees of the same name that I had seen at a former rectory property turned garden in Lake Oswego, just south of Portland, Oregon. I put in a bank of flower beds in front of the entrance door, in the style of a French peasant cottage, and at the head of the drive I laid out a grassy allée bordered by a shrub mix, leading to a nineteenth-century garden shed I salvaged from a nearby property. In the back of the house, around the little Thoreauvian studio I had built, I put in more beds of flowers, and I expanded the vegetable and flower garden along the back wall into another band of flowering trees and shrubs.

© JOHN HANSON MITCHELL

A land of snakes, frogs, salamanders, birds, insects, worms, and too many small mammals

The main garden lay on the south side of the house. Here, after many designs and redesigns, I created what is known by French garden designers as a *patte d'oie*, or foot of the goose—a semicircle of lawn with five allées leading off to a series of garden rooms. At the end of the central path I built a little summer house, along with more vegetable and flower gardens, a mini-orchard to the southwest, and to the southeast a hedge maze, copied from a labyrinth design I had seen on the floor of a basilica in Ravenna, Italy.

Throughout this landscape, and all around the house, and beside the wall along the road, and also by the side of another privet allée leading up to the house from the road, I planted, among the existing hickories and maples, many varieties of ornamental trees and shrubs; and, when all that was done, I began to look around for more spaces to fill. In short, I seemed to suffer from what my wife termed a bad case of *horror vacui*, an art term referring to the apparent need to fill in absolutely every available space on a canvas.

It was all very ambitious and more theater set than serious garden. But in the end what emerged from all this digging and delving was a half-formal, half-uncared-for wild garden that resembles in some ways a formal Italian garden, in some ways a romantic design out of Andrew Jackson Downing's book *Victorian Cottage Residences*, plus a little of my own folly of design.

There was an ironic surprise in all this, however. In another casual survey I made of a small quarter-acre section of the grounds I had left to its own, I counted fifty-seven species of herbaceous plants. On summer afternoons, butterflies floated over the flower beds and hummingbirds speared around the flowers and shrubs, along with dragonflies and bees and wasps. Goldfinches, robins, wrens, cardinals, and song sparrows nested in and around the garden.

I commonly saw (or heard) toads, pickerel frogs, gray treefrogs, and spring peepers on the property. I found ringneck snakes, brown snakes, redbelly snakes, and, of course, common garter snakes. Moles and meadow voles and white-footed mice were everywhere; so were gray squirrels, red squirrels, and flying squirrels, and also chipmunks (too many) and cottontail rabbits (also too many). Thanks no doubt to the surrounding woods and fields, larger mammals commonly crossed the land, including skunks, possums, foxes, coyotes, fishers, and woodchucks.

One morning while I enjoyed an alfresco breakfast in the garden, I saw an otter hump by, on its way to a nearby brook, and, another day, a bobcat strode through on some unidentifiable mission. One evening, a horse appeared on the property, having wandered over from a nearby farm, and often (too often) small groups of whitetail deer grazed in the small field below the house.

The point is, in contrast with the pine woods, this two-acre patch of earth evolved into an Eden of sorts, a dense richly diverse habitat that supported local populations of a variety of birds, mammals, reptiles, amphibians, and insects, and no doubt an even greater number of other invertebrates, such as worms.

All this raises an interesting ecological dilemma. In spite of the obvious increase of biodiversity in this garden, we certainly would not want to go out and cut down all the wild forests (see page 6). But it does offer a little hope in the face of the traditional sterility of suburbia. Done right, and with a little help from local protected wildland, a small plot of cultivated land can in fact help preserve nature.

JHM

The Wildest Yard in the Neighborhood

Flora of the dooryard and understory

by Ann Prince

Butterflyweed, a favorite of monarchs

Although I once considered it my responsibility to manage the flora of my not-quite half-acre yard, over the past 25 years wild forces have always had the upper hand. If I'd taken out all the towering trees in the late eighties when we moved in and put in a lawn and gotten a power mower, things would have been different. Nature might have lost its foothold, but instead the intact habitat perpetuates itself.

The plants that are happy here on this sandy bay overlook thrive, those that aren't don't, and indigenous loyalists appear wherever they wish and have a way of winning our admiration.

One thing I've discovered is you can't have it both ways, at least not without constantly tending an understory or dooryard garden. Either you grow things adapted to the site, or you start over from scratch—which would require removing the giant conifers and deciduous trees and altering the soil. And, since gardening takes a back seat to family, work, and friends, I've had to accept that certain floral favorites are destined for failure.

I've embraced the inevitable after years of trial and error—and some years of downright neglect on the part of the garden.

While I used to want a showy woodland with masses of "naturalized" poet's narcissus and daffodils, and a palette of azalea colors by the dozens at the foot of the statuesque trees, somehow all the elements never came to fruition. Most of the bulb flowers I planted 20 years ago are gone, and while the species varieties of azaleas—flame, pinkshell, rosy pinxterbloom, plum leaf—offer brilliant but brief eruptions of orange, pink, or magenta at different times, many of the cultivars are stunted and unimpressive.

At one time I opted for bright and exciting shrubs and perennials on the inland side of the cottage, which has massive trees at the perimeter but a smallish sunny space near the dwelling for a lawn and flower and vegetable beds. As one might expect, high-maintenance tea roses such as Joseph's coat and gold medal didn't get the care they required, so antique climbers and Betty Priors are the sole survivors. Of the many flowers that have been introduced—gifts from friends, family, and neighbors, and certain nursery selections—quite a few have disappeared.

Gone are the hollyhocks, lavender, baptisia, dianthus, and pincushion flower. Absent are the delicate bleeding heart, pasqueflower, and hibiscus. But varieties most adapted to the acid, sandy, leaf- and pine needle-covered soil have become permanent elements, some with a little help from the compost pile and the noonday sun.

Given the reality that having time to tend the landscape has been sporadic at best, my new ideal is simple: let nature take its course and plant for the local fauna—especially bees and butterflies. Fortunately, many of my garden favorites that have been here from the start or have taken off since being planted are native and just as picturesque as any of the introduced flora. Milkweed, butterflyweed, Joe-Pye weed, New England aster, black-eyed Susan, and daisies, all nectar plants for butterflies, grow profusely, as do violets and daylilies.

And the bees' preferences abound: apple blossoms, chives, thyme and clover in the diverse lawn, and annuals growing from seed such as sunflowers and nasturtiums. I particularly love bumblebees, whose fuzzy black

and yellow pile covers their bodies. Fortunately they are fond of old-fashioned roses and foxgloves, which are gorgeous and not fussy about attention from the gardener.

A laissez-faire approach to garden design often means that the most pleasant garden scenery and vignettes are accidental. They grace the yard here and there—a quaint and carefree bayberry assemblage along the mailbox row, a crooked bonsai pitch pine by the front door, a triple red maple arching over the unpaved parking area. Certain mainstay shrubs also do well. I wouldn't be content without the forsythia, lilacs, scarlet quince, mountain laurel, and lace-cap hydrangeas, all originating from starts donated by other gardeners.

Trees give the garden poetic structure, and while some were intentionally positioned and planted, many just sprouted on their own. Since the seedlings come fast and furiously, the trick is to cull some so they don't crowd out the others. It's fun to pick out which stay and which go before they get too big to remove without a chainsaw. The beech grove is untouched and can continue to expand as far as it wants to. The pitch pines are all left alone as are the red cedars. But the oaks, white pines, and choke cherries are so prolific that they'd take over if they weren't thinned out.

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Bumblebee pollinating New England aster

I'd be remiss not to mention that I have a gardening partner. My husband is a landscaper. He deserves the credit for making the disorderly, fauna-friendly, overgrown garden presentable. Since he's always landscaped the "green" way, with hard work in lieu of chemicals, he's fine with having the wildest yard in the neighborhood.

Ann Prince is associate editor of Sanctuary.

"Green" Thumb Gardening Tips

by Margaret Hyde

The more sustainable life I have chosen includes an environmentally friendly garden. Fellow "green" thumb Sagar Faucheaux—who I refer to as the garden whisperer—helped me design a beautiful and abundant organic vegetable garden while at the same time being mindful of water consumption. The garden was inspired and created using simple-yet-effective ecological principles.

Reduce Reuse Recycle: Look around your property and consider what materials lying around could be used for aesthetics and function in the garden. You may have stone or old bricks you can use as walkable paths, to create solid edges in the garden, or to retain soil on a slope.

Conserve and Reuse Water: Choose plants based on the amount of water they consume in relationship to the climate and rainfall of your area. I chose low-water-use plants and a lot of indigenous species. Further, collect your rainwater and use it for your garden.

Install a "Smart Garden" Irrigation Controller: This type of watering system is controlled by a computer connected to a global satellite, monitoring daily moisture and evaporation levels of the local climate and soil. It self-adjusts to current weather conditions, providing sufficient water according to the real-time needs of your garden.

Mulch: Use an organic mulch layer composed of bark, aged wood chips, or a mixture of leaves and bark to preserve moisture and keep roots cool. This lowers your water consumption and encourages tiny beneficial bugs that improve the health of the plants. Mulch also suppresses weeds.

Compost: I use our food scraps—vegetables, coffee grounds, eggshells, etc—and put them in a bin containing worms that help produce rich organic fertilizer.

Employ Natural Pest Control: Certain herbs in your garden such as dill, cilantro, yarrow, and basil act as a natural form of pest control by attracting beneficial insects including ladybugs, bees, and lacewings that in turn eat destructive pests such as aphids.

The Garden as Ecotone

Why gardens appear to support more biodiversity than wild forests

by Chris Leahy

At the heart of John Mitchell's opening essay in this season's issue of *Sanctuary*, there is what appears to be a supreme irony. Having conducted an informal, but fairly thorough, ecological inventory of a small white pine stand he inherited, he finds it almost shockingly poor in species and depressing in character and yearns for a sunnier habitat more in the line of Yeats' bee-loud glade. With admitted trepidation and even a hint of fear that a lurking environmentalist might catch him in the act and report him to the Green Police, our thoughtful, yet determined, Thoreauvian editor takes up his axe and clear-cuts an acre or so of native pines. And there is worse to come.

Over the next three decades, he creates that hallmark of civilization, the epitome of man's arrogant impulse to improve on nature—a garden! Then thirty years along he repeats his inventory and finds that he has not merely improved the species richness of his land but created a veritable garden of earthly delights. How can this be? How can replacing the native and the natural with the extravagantly artificial possibly result in a triumph of biodiversity?

Part of the answer has to do with the type of forest that was cleared.

In the forest that the first European colonists saw as they stepped onto Massachusetts soil, white pines were mainly lone giants (many destined to be cut for masts to hold the sails of the King's Navy). But when our forests were cleared (as nearly all of them were during the colonial period and beyond), this sun-loving tree was able to sprout densely and effectively exclude other species with its sour needles that retard germination. As they gained height, the close-growing trees tended to develop a dense canopy for part of their life span, depriving any striving plant looking to prosper on the forest floor of yet another life-supporting element—sunlight—which as Mitchell notes also makes for a decidedly gloomy atmosphere.

Having grown to middle age, these pine stands are easily spotted as one hikes or drives across our reforested state and (like the stone walls that run picturesquely but uselessly through so many woods) mark land once cleared for a farmstead or other purpose—a likely scenario in Mitchell's neighborhood. It is thus possible to imagine a yeoman of the past clearing an acre of oak-conifer woodland with a view to creating something not unlike the present owner's sunny mead (though a cornfield or sheepfold is probably a more plausible guess at his intentions). But then, weary of banging his hoe against the unforgiving bedrock, he lights out for the territories or for the mills of Lowell, leaving

White pine forest, Winchendon

A garden in the woods

his yard as a nursery for pine trees.

In defense of the heretofore maligned pine stand, it should be noted that different types of habitats reveal their resident critters to different degrees. It is a fact of nature that tropical rain forests contain a greater variety of living organisms than any other biome on the planet. Yet one can walk for hours amidst towering trunks peering into the empty understory of these forests and get the distinct impression that the myriad life-forms described in the textbooks have all left for the afternoon.

There are many reasons for this apparent disparity between the actual and the perceived. Rain forest birds, for example, tend to travel in flocks and follow army ant swarms; they appear as either overwhelmingly present or utterly absent. Lots of rain forest critters live in the canopy some 200 feet above your head. It is no insult to John Mitchell's acuity as a naturalist to point out that there were doubtless more life-forms in his forest than met his eyes or ears. (Remember what the evolutionary biologist J.B.S. Haldane reputedly said to a theologian when asked what he had learned about the nature of God from his years studying the natural world: "[The Creator clearly] had an inordinate fondness for beetles.") The beetle tribe is numerous in both species and individuals and ubiquitous, yet its members often remain unseen. If Mitchell had sunk a tin can into the ground and dropped a slice of road kill or a piece of fruit in it, he would probably have added some species to his forest inventory.

The postglacial forest type that squire Mitchell felled is known (among other names) as oak-conifer forest and is the kind of wooded upland that covers most of the Commonwealth. Typically, an oak-conifer forest grows on well-drained, relatively thin soils over acidic bedrock such as granite or gneiss. The oak, pine, and hemlock leaves decompose slowly, creating deep leaf litter and contributing their own acidity to the soil chemistry. As with all natural communities, oak-conifer forest comes in many variations, and in sites where soils are relatively moist and deep and of less than toxic acidity, a selection of common understory shrubs (e.g., lowbush blueberry, sheep laurel) and wildflowers (even including the globally rare small whorled pogonia) can thrive, usually in low densities. In general, however, it is not a forest flora that makes a botanist's exploratory antenna vibrate in anticipation; and at its most severe, with a deep carpet of acidic needles underneath a conifer-dominated stand of such woods, is commonly just as barren as Mitchell describes.

In contrast to forests, gardenscapes tend to flaunt their biodiversity with sometimes intimidating abandon. This is partly just structure: it's easier to see things that are sitting or fluttering at eye level than those clinging to the treetops or buried in leaf litter and soil. And gardens, like old meadows, offer an intense concentration of the two things that keep the ecosphere throbbing: food (readily available leaves, fruits, seeds, nectar, insects, gardener's blood) and procreation (where better to meet a tiger swallowtail or American goldfinch of the opposite gender?).

Lowbush blueberry

In eco-jargon, a garden is an "ecotone"—a transitional zone where two natural communities meet. Picture a shrubby area connecting a forest and a grassland or a marsh bridging the gap between a wooded swamp and open water. For species richness, ecotones are often something like the opposite of the comparatively sterile pine grove. They tend to contain species typical of the habitats on both borders as well as those that are characteristic of the ecotone itself. It is axiomatic among birdwatchers and those who seek invertebrate treasure that "edges" are often especially productive hunting grounds; and ecotones might also be described as natural supermarkets, where active foragers with catholic eating habits (foxes, coyotes, blue jays, garter snakes, etc.) can find a great variety of food sources within a small area.

Mitchell's land and the patchwork of habitats surrounding make up something like the mother of all suburban ecotones. There are two working farms abutting his property to the west, and just to the east there is a mixed woodland, dotted with vernal pools, that runs down to a slow-running stream bordered by wide marshes—the source of the dragonflies and wayward otters that occasionally course through his property. (Never mind the new suburban desert of mausoleum-like trophy houses just to the north!)

Mass Audubon's own Broad Meadow Brook Wildlife Sanctuary in Worcester offers an even more extreme example of nature flourishing amidst apparently destructive forces. It is but a fringe of green on the outskirts of the city of Worcester, and yet it has recorded the greatest number of butterfly species of any of Mass Audubon's properties, most of which are breeding there. To explain this apparent conundrum, it is necessary to understand that, with a very few exceptions, butterflies are vegetarians in both their larval and adult stages. The caterpillars feed on a wide variety of leaves and buds, some species being highly selective about their food plants and others being less fussy about their diet; a few feed on tree leaves, but most prefer what many people would consider botanical commoners such as milkweeds, nettles, clovers, grasses, and weedy members of the aster family.

The dining preferences of adult butterflies are even more promiscuous than in their larval stage, and they will take nectar from almost any flower that offers a reliable supply, including those of non-native plants. Given these tastes, the landscape most likely to attract the greatest variety of butterfly species would (1) consist mainly of successional habitats, i.e., those that occur in sequence between bare ground and mature forest, because it is the plants of these transitory stages that most butterflies prefer; and (2) contain as many of these stages as possible since that ensures the maximum variety of plant species on offer in the butterfly cafeteria.

This describes Broad Meadow Brook to perfection. The fact that the sanctuary achieved this ideally patchy plant community not from a precisely planned and perfectly executed management plan, but through the random fires set intentionally or by accident by generations of urban youth reveling in their nearest wilderness, may not suggest a practical butterfly conservation strategy, but it is a fine illustration of the fact that disturbance—whether done by a lightning strike or members of the Lightning Gang or a gentle literary gardener—is a valuable, nay necessary, mechanism of biodiversity. Its workings are abundantly evident in Mitchell's suburban realm.

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The Uninvited Guest

When weeds and wildflowers encroach on your garden

by Teri Dunn Chace

Most gardeners would agree that the very nature of gardening is to keep out wild plants and grow only plants that you want. The essence of gardening, according to this view, is to banish the wilderness. In this regard, I am reminded of the words of a French-American Colonial-era settler, Hector St. John de Crèvecoeur, who remarked in his celebrated essay "What is an American?":

"Is it not better...to admire how the world is gradually settled, how the howling swamp is converted into a pleasing meadow, the rough ridge into a fine field; and to hear the cheerful whistling, the rural song, where there was no sound before, save…the screech of the owl, or the hissing of the snake?"

Perhaps I overstate the case by invoking de Crèvecoeur's abhorrence of the untamed wilderness and romanticizing of the civilized field. But, think about this for a moment next time you are confronted with weeds in your yard.

What is the point of carving out your own garden in the wilderness? If you allow the weeds to stay, your garden plans get overrun, disorder rules, and nature's wild ways return. And so you may logically conclude that in order for your garden to keep looking like a garden, the intruders must go.

That said, there are times when you may choose to relent, to allow a little relaxation or spontaneity into your best-laid garden plans. You may be curious to find

A half-tamed island garden with dandelions, roses, irises, and poppies

© GORDON MORRISON

Roses and New England aster

out which plant is invading your garden and spare its life until you know a little more about it. I let dame's rocket "volunteers" colonize the edge of my garden. The flowers, I think, are downright pretty, and, as the weeks go by, I can't help appreciating how they bloom over a much longer period than some of my pampered perennials. And while their flowers may be smaller, wild black-eyed Susan is as handsome a plant as the cultivated varieties that fetch a pretty price down at the garden center.

On Monhegan Island, off the coast of Maine, a place I like to visit in early summer, I have observed robust flower gardens grown in genial sunshine and mounds of compost. Almost without exception, these displays include the most glorious dandelions I have ever seen. They are too big and burly to have just arrived—they appear to be welcomed and encouraged. Seeing their bright yellow bursts mingle so successfully and cheerfully with domesticated classics like purple irises and orange poppies and red roses caused me to question my knee-jerk hostility. Why not allow them in my own garden?

Plants that weren't in the plan arrive in our gardens by all sorts of means. Some, such as dandelion and hawkweed, blow in. Water—rainfall and temporary floods—also carries in wildflower seeds or even plant bits that germinate or gain a foothold. We ourselves can even be the unwitting travel agent, by accidentally planting or allowing "hitchhikers" into our yards, seeds or root fragments or tiny plants that sneak in with the potting soil of purchased plants or with that nice load of loam or mulch.

Birds eat seeds out in the fields or woods, then deposit them randomly in and among our garden plants—complete with a handy "starter dose" of fertilizer. Actually, this little benefit has always gained my admiration, even when the donation turns out to be pesky privet.

Other animals can also bring in intruders. I'll never forget the year a mystery plant popped up among my perennials. I left it because it was attractive. It looked like a member of the pea family, although it was not a sweet pea; how bad could it be since that's not a plant family with a bad reputation! Although I showed it to every visitor, nobody knew what it was. I figured that when it bloomed, I'd be able to make a firm identification.

The matter never got that far. While pulling chickweed—a known and hated weed—out of the bed, I accidentally dislodged one of my mystery plants, which revealed its root system. It was studded with tiny little...peanuts. I leaned back on my haunches, plant gripped in my dirty fist, and gaped at them in wonder. And in a moment, I figured it out: neighborhood squirrels. Sure enough, a quick conversation with my next-door neighbor revealed what I suspected, that she was in the habit of leaving handfuls of peanuts out on her back porch so the "poor dears" wouldn't go hungry. Evidently, some of the poor dears squirreled away a few spares in my nice garden loam, for a rainy day maybe.

Not all interlopers get in by "jumping the garden fence." Ironically, some may already be present. It depends on where you live and garden, but chances are that your yard was once a wilder place or that previous occupants didn't garden in the same spots you do, or as zealously. Weeds shed their seeds in the soil and these get buried over time. Some can lie dormant deep in the ground for years. When you dig a hole or a new bed and bring the seeds up to the surface, they suddenly get some air, light, and moisture and spring to life.

In any event, if you have an intruder on the garden premises, it is a good idea to begin with identification. This is a process many gardeners frankly enjoy—we find all plants interesting. Plus, once you know what the mystery plant is, you can learn more about its habits,

such as how big it gets and when it blooms and whether it has aggressive growth. You can make an informed decision about whether to yank it out or allow it to stay.

As with my garden peanut, an intruder might look vaguely familiar (I did follow my hunch and confirm that peanuts are in the same family as sweet peas). This is because quite a few garden plants have wild relatives. For instance, daisy fleabane is related to the popular beautiful fall asters like Purple Dome and magenta Alma Poetschke. Bindweed is a few steps removed from morning glory. And so on. Such resemblances at least can give you a starting point.

If a mystery plant is totally unfamiliar, what do you do? You can try a variety of tacks, some or all of the following, and see if you can get a consensus. Ask anyone who visits your yard, especially other gardeners, if they recognize it. Pull out an entire plant or clip off a stem and show it to somebody who might know—again, a knowledgeable gardener, or perhaps a nursery employee, a landscaper, or any amateur botanist or biology student of your acquaintance.

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Dame's rocket

Keep an eye out for your plant in other yards, parks, lots, curb strips, or gardens in your area. Chances are it is not a lone ranger. When you spot it somewhere else, ask anyone who is around (a homeowner, city employee, docent, or yard guy) what it is. If you spot the plant at a nature reserve or public park, you may be lucky to find a helpful brochure or interpretive sign.

You can also turn to books and the Internet to search for or confirm an identification.

Generally speaking, garden invaders tend not to be rare or unusual plants. You can immediately narrow your quest by suspecting common wildflowers and weeds. Here in Massachusetts and indeed most of southern New England, common interlopers include dandelion, celandine, bittersweet, dock, butter-and-eggs, nightshade, aster, chickweed, wild geranium, dame's rocket, bindweed, elderberry, bladderwort, pokeweed, sweet everlasting, burdock, evening primrose, heal-all, chicory, hawkweed, and goldenrod—just to name a few.

You will have the best luck getting a solid identification if you have more than the leaves to go by. Flowers and fruits or seeds can lead the way. Observing or remembering the plant's growth habit (rambling groundcover, tall, or vinelike, for instance) is also helpful.

Once you know the plant's name, more useful information becomes available to you, including, of course, whether it is benign or has a reputation as an invasive weed. You can learn full details about its growth habit, life span and longevity, flowering time, method of reproduction, and growing requirements or habitat preferences—which your garden evidently already supplies.

Now that you're on a first-name basis with your uninvited guest, you can decide if it can stay.

Most of these unwanted plants are easily yanked out by the roots as soon as you notice them. Always pull up plants after a rain or after watering because the roots come out so much more easily. If there are many unwelcome invaders, wield a sharp hoe and cut them down at ground level, or mow, or smother them with pieces of cardboard, wooden boards, plastic, or some sort of mulch.

Better still is to try to prevent unwanted plants from growing in your garden in the first place. Covering over exposed ground, that is, laying mulch around your desired plants—to a depth of two or three inches—is quite effective. Landscape fabric, wood chips, compost, and straw (not hay, which often contains weed seeds) are all fine choices.

Since most plants, including wildflowers and weeds, need light and air to grow, a young, just-planted springtime flower bed or vegetable garden is more vulnerable. As the season progresses and your plants get bigger, they will shade over the open areas and it will be harder for invaders to establish themselves or prosper.

The point is, the line between wild and cultivated, "good" and "bad," blurs sometimes or becomes a matter of personal taste. In my own garden, wild asters snuck in and around my rosebushes and brought with them a touch of informality to that corner of my garden that I liked. When I gathered roses to bring into the house, I snipped a few stems of the "weeds" to add softness to my bouquets.

"Thanks for the suggestion," I murmured before I went back indoors. As Ralph Waldo Emerson famously quipped, "What is a weed? A plant whose virtues have never been discovered."

Teri Dunn Chace is the author of many gardening books, including 100 Favorite Wildflowers *and* Beautiful Roses Made Easy. *She is currently writing* The Homeowner's Guide to Invasive Plants *for Timber Press.*

All the World in a Garden

The ecological dynamics of the world at large can be found within the microcosm of a well-managed garden.

by Dori Smith

Black swallowtail and black-eyed Susan

Some years after starting the process of creating a large garden—at the point when I felt I could slow down, sit, and observe the fruits and flowers of my labors—I realized that I derived at least as much pleasure from the insects drawn to my plants as I did from the plants themselves.

Unable to control myself at the plant nursery whenever I spotted a new variety of lupine, or another color of Swiss chard, or a curly-needled variety of white pine, I had managed to create a quite beautifully diverse patch of habitat that drew an equally astounding variety of insects. They swarmed in, in multicolored throngs, refugees from barren chemlawns and fertilized farm fields in town. Such a banquet I provided for them! Nectar to drink, organic leaves to munch, rich composted leaf litter to welcome the next generation of eggs and larvae.

In the morning nowadays, as I stand in my sunny front yard, I become aware of a loud commotion emanating from the flowering raspberry patch. The pink-petaled flower cups are shaking, and inside each one is a fuzzy native bumblebee ravenously feeding and collecting pollen. Listening more carefully, I notice that the pitch of each bee's buzz changes from a deep note when in flight to a high intense tone once inside the cup of a blossom. Not only are the bees buzz pollinating by vibrating the flowers to shake out pollen, but the flower cups act as tiny megaphones amplifying the sound. From spring to late in the fall, the stalks lengthen and push out endless flowers, and the bees keep coming.

Near high noon, I weed the perennial garden. A moving blur startles me from the corner of my eye and I turn slowly. The blur hovers near my tall pink penstemon flower stalk, but it is too small and compact for a hummingbird. I focus carefully and identify a hummingbird moth feeding through its mouth tube. This aerodynamic novelty—its seemingly ponderous body held aloft by fast-fluttering wings—is so delightful that I call to a neighboring child to come see.

As I deadhead the pink malva, I come across a squadron of tiny insects that, if enlarged to the size of small dogs, would be terrifying. They are spiny looking, black and orange and yellow spotted, with claws.

The marvelous ladybug larvae look nothing like ladybugs, and they change rapidly in appearance as they grow. I leave them alone because soon they will be adults devouring the excess of aphids partaking of the tender tips of daisies.

Cleaning up around the base of my garden terraces and wading through blue veronica, I am suddenly attacked by a very angry wasp—the sentry for a hive of ground-nesting native yellow jackets—followed by reinforcements. I run away from the troubled mob, wait twenty minutes, and approach again. They remember me and are out to get me. After a few days they quiet down and I place a stake at the nest spot to remind myself to let them live in peace. Wasps play an important role in the garden ecology, predating on other insects that might instead be consuming my cucumber vines. They are also pollinators, so they are friends and good neighbors—along with a nest of carpenter bees, similarly vigilant, at home in a nearby spot.

Hummingbird moth

My gardening day includes moving some path stones around. As I pick one up, I take in the sheer diversity of insect and grub life that wriggles in the moist tunneled earth beneath. I am not quite as fascinated as I was as a child, when I tried to make pets of pill bugs that rolled up into balls when I touched them. Now I can only appreciate the gifts these creatures offer—churning and digesting and creating soil, providing nutritious protein for nesting birds, and so much more.

Late in the afternoon, I sink gratefully into my lounge chair on my organic clover-filled lawn (also loved by honeybees and rabbits). There I rest and soak in the warm western sun. I feel a light touch, and looking down I find that a scarlet-colored dragonfly has landed on my hand. There are more around me, sunning themselves too. I look farther off and see shimmering dragonflies everywhere, patrolling sections of my garden, each individual claiming one garden stake for a lookout perch, zooming out to grab tiny insects on the wing. Common whitetails, dramatic black-and-clear striped wings spread, are resting on the walkway stones.

The blur hovers near my tall pink penstemon flower stalk, but it is too small and compact for a hummingbird. I focus carefully and identify a hummingbird moth feeding through its mouth tube.

Toward sundown, I'm back in the garden looking for my own dinner ingredients. I've mixed vegetables and herbs in with pungent flowers such as bright marigolds, nasturtiums, and salvia that seem to keep the chewing insects at bay. Flowers of the potatoes, peppers, basil, cilantro, and comfrey draw hordes of flying nectar feeders. Reaching down for a bouquet of thyme for soup, I happen to notice a praying mantis as it stalks the many tiny insects drawn to the cool shade under the

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Ruby meadowhawk

leaves. In spite of this apparent abundance of life, and despite the extravagant buffet I put out for them, I see fewer and fewer butterflies every year. I suspect that their habitat has declined dramatically and they are succumbing to poisoning by garden and agricultural chemicals. Nevertheless, I continue to plant milkweed in hopes of attracting monarchs to lay eggs there so that their many-colored caterpillars can grow fat on the vegetation.

And it's not just butterflies that seem to be in decline. There is now a sad drop in honeybee populations as a result of colony collapse disorder. No one culprit has been found, but the root cause seems to be debilitation from environmental and nutritional stress. "Industrial" honeybees suffer job stress from being overworked in monoculture crops, and then fed corn syrup in the off-season.

Our valuable native bees have also suffered great decline due to habitat loss. There is a movement to encourage people to grow "whole food" in the form of mixed wildflower plots near farmland. Thus, the honeybees can have a well-rounded diet, as well as the native bees—which, if encouraged, can do a fine job of pollinating our crops, and will work longer hours than non-native honeybees. Concerned humans are also erecting "bee boxes" to house native bees such as mason bees.

I am personally proud of my contribution when I see thousands of bees of diverse species visiting my blooming summersweet, Virginia bells, coral bells, spiderwort, phlox, blue flax, coreopsis, barren strawberry, and more. (I always cut back some of the stalky plants early so they can branch out and produce more flowers later in the season.) I have learned to ensure that the garden has flowering plants from early spring to early December—to choose plants with long flowering seasons (mainly native plants) and leave some of the more beneficial weeds in place.

As I browse the nurseries, I have learned to pass up some of the most popular garden flowers, simply because they have been so highly hybridized for bounteous beauty that they are mostly petals, with very little food for my insect allies to eat. That lovely Japanese Kwanzan cherry tree throws all its energy into profuse double petals, no bothering with reproduction and thus no nectar or pollen. I have seen bees hover around tightly clustered rose petals in frustration, unable to get at the food inside. In fact, some impatient bees simply drill through petals to steal nectar, bypassing the pollen bodies entirely. I just buy the old-fashioned, single-petaled roses with gold stamen crowns exposed, making it easy for them.

As time has gone on, I have become more selective in my choice of wildlife-friendly garden structures, as well. My garden features three rain garden terraces, which gather rain from three downspouts and two rain barrels. Their soil is heavy with doses of microbe-rich compost and lots of sand, and is porous and full of life. A lush profusion of native plants grow there, with little need for my intervention. The plantings in this soil include bee balm, which is great for bees, butterflies, and hummingbirds, as well as winterberry, blueberry, elderberry, and inkberry. It also hosts red-twig dogwood, fothergilla, native honeysuckle, turtlehead, blue lobelia, rushes, and sedges.

For dragonflies and butterflies, I have constructed a wildlife pond at the low end of my garden. I scooped out the soil and mounded it up and edged it with native stones. The pond is about twelve feet in diameter and four feet in depth at the center, which is deep enough to create primordial ooze that hosts dragonfly larvae—some of which will overwinter here. The pond has native water plants such as arrowhead and blue flag. In the water grow tiny water beetles, water fleas, and fly larvae on which my carnivorous dragonfly larvae feast. A tiny solar spray oxygenates the water and attracts insects and hummingbirds to drink. And there is a muddy overflow edge to the pond, where butterflies can "puddle," eating the soil minerals they need, and where mud-dauber wasps can gather clay for their nests.

All is provided for the myriad of life in this mini-Eden, my microcosm of our nourishing planet Earth.

Dori Smith is a landscape designer, writer, and educator in Acton. Through her business Gardens for Life, she creates outdoor spaces for humans, birds, and insects.

A Remembrance of Gardens Past

A lesson in gardening according to nature

by Joe Choiniere

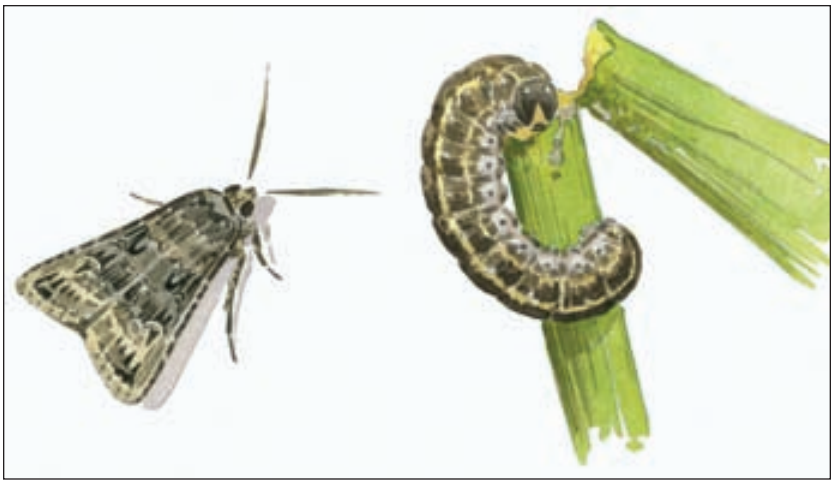
Toad and toad house

It was an invasion of toads that first made me aware of the benefits of allowing wild nature into a cultivated garden. They were the first to make it clear to me that vegetable gardens needn't be organized, nor separate from nature.

The toads were still far off in early May that year, paddling about in their vernal mating frenzy in the nearby cedar bog ponds. You could hear their distant trilling throughout the neighborhood. Meanwhile, I had painstakingly laid out a garden rectangle in my mother's side yard. I had measured the diagonals to achieve perfect right angles using the golden mean, the Parthenon's 1.618 governing ratio, to effect a fair and pleasing aspect to the ten- by sixteen-foot plot.

I chose three different vegetables to seed in the beds, radishes among them, always the best first crop for a kid. Shortly thereafter, the toads—via some apparent alchemy and perhaps sparked by a thunderous rainy evening—returned from their breeding journey in the twilight of the garden planting day and dug into my carefully measured earth. The prepared soil—all of it leveled, sifted, soft, sandy, and deep—must have been a surprise to the toads, perhaps as much a shock to them as the toads were to me the following morning. All my carefully counted and disbursed seeds, sowed in rows straightened with string, exactly the distance apart specified on the seed package, had been upturned and redistributed as the toads dug their burrows, according to their own zigzag, cold-blooded meridians.

I didn't want to harass the beasts, or injure them by accident while hoeing or weeding (if anything ever grew). My mother always encouraged and protected toads in her yard. She had built a dry wall of red sandstone with nooks and crannies that fortuitously provid-



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Cutworm adult and larvae

ed a hiding place, and she had purposefully installed toad "huts" of old roofing slates or boards set across two bricks whenever she found a loose toad about the yard. "I'll know where they are and won't step on them," she said.

These were, I later learned, American toads, and it was indeed a good thing to know where they were. I could visit them each day, peeking expectantly under the slates for the huge females, which are reddish brown, contrasting with the smaller green-brown males. I installed some huts in my little garden plot and the toads were happy.

A more significant seed planted that year was intellectual and fortuitous—the idea of belonging to a garden and allowing other living things, i.e., nature, to belong as well. It didn't go unnoticed that the random toad diggings had put some of my seeds in deeper or shallower settings, or in bits of shade behind humps of toad-dug soil. When the now-haphazard radishes germinated, some fared better in the chaos than in the undisturbed remnants of carefully controlled garden! Already I was noticing how nature works in a garden. There was a sense of success with the radishes, and these days the toads and I usually bury my seeds at a range of depths.

Also successful in that first garden season were the cutworms, caterpillars with a liking for tender young plants. These are not "worms" but caterpillars, the larvae of noctuid moths in a subfamily colloquially known as darts. A holographic frontwing patch of golden scales sports a jet black dart design, varying in shape with species. The Italian neighbor next door didn't know the cutworm's natural history, but he collared all his young seedlings of peppers, tomatoes, and eggplants with cardboard to prevent the cutworms from finding and snipping the stems. I was fascinated with the way the caterpillars cut off plants and then dragged them, leaves and all, underground.

The cutworms didn't purposely single out vegetables. We gardeners made them prey on our plants by clearing all the other weedy plants away before setting out seedlings. This was the genesis of my natural gardening ideas on cutworms, which are twofold. First, allow weeds to grow in the spaces where seedlings will be set out and the cutworms will feed on the weeds and show their location. Second, learn the cutworm's adult form since the moths come to porch lights in summer, and it's a no-brainer to simply grab them all and release them elsewhere in the nearby woods.

Nature taught me other things. I abandoned the tendency for careful and perfect plantings in my second garden, a voluptuous 200-foot-long strip of river bottomland with rich alluvial soil. My landlord planted these lengthy rows in carrots in half the time it was taking me to lay out twenty feet, and his stands were far better. As with my toad radishes, the germination was somewhat haphazard, but the average of the seeds produced ample rows of carrots. Toads were nonexistent; but cutworms were rampant. I put in collars until I could trim the population. And there were other moths—the tobacco/tomato hornworms, two species of sphinx moth with unbelievably tropical looking and sized larvae with "horns."

This garden was a grower's paradise compared with my earlier one. What made this soil so fertile? Nature, again. Seeing the garden half underwater from the adjacent river every spring and hearing about the alder thicket the landlord had carved this garden from caught my naturalist's eye: the purported nitrogen-fixing alder roots improved this deep depositional soil over time.

The cottage vegetable garden at the caretaker residence for Wachusett Meadow Wildlife Sanctuary, where I lived and worked for fifteen years, was absolutely brand new, atop the knoll looking east across the valley, with bedrock close to the surface. This thin "soil," the uphill portion of a small meadow, grew dry indicator plants, including our native little bluestem grass. And this garden didn't emerge for a few years, the deep loam downhill 500 feet at the old farmhouse being a better place until we got settled. But distance bred neglect, and ever since that time my gardens have moved closer and closer to my residence. When you can walk out your front door into your garden, nature is even closer and the minute-to-minute happenings are more noticeable.

Soil brought up the hill from the more ancient loam at the farmhouse, which had been removed to install drainage, improved this garden. But it spawned another natural garden connection: interesting weeds, most notably the striking abutilon, or flowering maple; flower-of-an-hour; and black mullein. Here weeds first became more than just something to pull. I piled them, mulched with them, and began to depend on them for many reasons. Some like dock had deep roots and seemed to increase the tilth of the soil; others like purslane provided a dense and water-conserving shade for the soil without interfering with taller vegetables. As the loam was only a small supply, raised beds were another first—the perfect way to collect soil here and

concentrate it in the places where it was needed.

The wet soils of my fourth garden were colluvial; they possessed large quantities of nutrients and elements that had flowed down along the perched water table from nearby forests. Here I grew my best root vegetables; they flourished as a result of unknown trace nutrients that were in perfect balance. This wet soil also needed lifting, so raised beds here were a necessity to dry soils out. The beds mimicked nature with their deep loose soils and little compaction and also provided a better range of moisture levels. I used two by twelve spruce framing lumber against all recommendations, and I discovered a species of red fungus in the process! I have never replaced a rotted raised bed—I simply install a new perimeter of the same material around the rotting sections since there is something living in the original frames that keeps the soil extremely healthy; the plants next to the edges flourish. Organisms living in the rotting wood such as beneficial predators, mulch processing invertebrates, and even fungi seem to help the garden.

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Vegetable garden with raised beds

Although the sound of the word fungi seems to spell doom—something negative, rotting, and sinister—these organisms are touted for their macro and micro nutrient production in ecosystems. They support other beneficial biota. Fungi are but the hidden part of the organic iceberg that shows aboveground as a fruiting body we know as mushrooms. In fact, fungi consist of a huge network of threads, cells called hyphae (and en masse mycelia), which ramify throughout the environment and are particularly evident in soils.

By the time I noticed the first fungal fruiting bodies in my garden, their mycelia had already spread throughout the raised bed frames. One, *Gleophyllum sepiarium*, resembled a beautiful bracket. It was a cinnamon red-brown with honey yellow edges and had gill-like structures below for spore dissemination. Other brackets invaded the wood; and also the fawn-brown *Peziza*, a fragile but large cup fungus that melted the flattened corrugated cardboard boxes I used to kill grass for expanding beds. Even the mulch and manure applied to the beds spawned a startling procession of fungi, including the mushroom *Stropharia rugoso-annulata*, tiffany lamplike, and the delicate *Coprinus micaceus*, more like an oriental paper lamp.

My current garden, which is on land that was a standard suburban no-care planting of trees and shrubs purchased from national chain home centers and maintained with herbicides and chemical fertilizers, needs all the fungi and help it can get. This challenging soil is certainly not my last garden, but it will involve nature—as we have learned from previous experiences. There will be mushrooms, cutworms, and weeds, although the supply may be a bit different—carpetweed, lady's thumb, and lamb's quarters to feed the cutworms and shade the seedbeds. I can't grow root vegetables here yet. Something is needed; in-depth soil testing might indicate elements, root-crop specific, that are missing and these might be increased with commercial preparations. But I have an idea to just glean some leaf litter from the sugar maple woods out back and see if that helps.

I miss the radishes from my first garden; likewise the deep Scantic River loams, the wide sweeping Wachusett views, the clamorous house wrens, the asparagus, and the currants—I have so many memories. It is more than satisfying to imagine that other gardeners now appreciate the gardens I've tilled in earlier times and are forming their own unique attributes and attachments to these places.

There has always been solace in the gardens I have had, the fragrant sweet peas that almost grew into our front door; old roses I dug from a foundation at Quabbin; sage in a brick walkway; a young forest of crowded saplings that provided wood for bean teepees.

Carolina wrens now sing from those bean poles in late February; and, best of all, the toads are back, entrenched in the front yard, having approved of the lawn turned into garden. We don't garden with nature—gardening *is* nature. While we control, concentrate, alter, and subdue by gardening, we also can adapt, mimic, and compromise.

Joe Choiniere is property manager at Wachusett Meadow and Broad Meadow Brook wildlife sanctuaries.

The Garden of Eaten

Garden pests—beware the ravenous reptiles and amphibians.

by Michael J. Caduto

In Victorian times, when natural history collecting was the rage among the wealthy, elegant parlors sported a luxurious glass cabinet displaying a taxidermic diorama of brightly colored birds and butterflies from around the world, perched on a branch that curled up the center. Envisioned as symbols of paradise, many of these displays had a stuffed serpent coiled around the central branch to portray the devil lurking in the Garden of Eden. As is written in Genesis: "Now the serpent was more crafty than any beast of the field which the Lord God had made."

As lush and sensually luxuriant as my garden becomes in the halcyon days of summer, I've never conceived of it as Eden. There is no apple tempting us with the fruit of original sin. Rather, the main moral dilemma concerning our vegetables focuses on the best way to control the pest of the day while hewing to the organic principles of biological control. And even though my wife and I are avid students of nature, we've never said, "Let's attract some snakes for pest patrol." Alas, we, too, harbor a vestigial bias regarding these alien-looking reptiles.

The fact is, however, snakes, as well as toads and other amphibians, fill important niches in the natural world, and play beneficial roles as denizens of our gardens. According to the UMass Extension Center for Agriculture, "Garter, redbelly, and brown snakes frequently consume garden pests such as slugs and certain soft-bodied insects."

Cultivated gardens are the real ecological interlopers in the natural world. The best way to successfully raise the vegetables, herbs, and fruits that please our palates is to grow sustainably—in harmony with the cycles of nature. Establishing a balanced relationship between predator and prey is essential. Snakes, toads, frogs, and even turtles can be critical herpetological links in a well-balanced garden food chain.

Overall, gardening that's less intrusive establishes a healthier environment that attracts predators and prey. Nooks and crannies of wildness afford habitat, shade, and shelter. No-till gardening protects burrows and other animal residences in the soil. Using hand tools—instead of weed whackers and power mowers—avoids inadvertently chopping up the beneficial wildlife in the garden that are well camouflaged and hidden. Most herps are sensitive to chemicals, and amphibians such as toads and frogs can absorb toxins directly through the skin, so it's important to refrain from using pesticides and herbicides.

Common garter snake

Few organic gardens lack a common garter. These attractive yellow-striped serpents are often seen sunning themselves between rows of vegetables—absorbing heat while digesting a meal of slugs, caterpillars, sow bugs, and other garden pests. Although they do consume beneficial garden residents like earthworms, small toads, and other snakes, garter snakes offer advantages that far outweigh their drawbacks. The larger individuals will even eat small rodents such as the meadow

Leopard frog

voles that wreak untold havoc on roots, tubers, and bark.

Garter snakes often hide beneath a board, in a stack of wood, or under some rocks. They thrive in organic gardens but decline dramatically wherever pesticides and other chemicals are applied.

My favorite snakes are among the most striking yet docile animals encountered in a garden—the ringneck snake and smooth green snake. With grass-colored scales and a pale white belly, the green snake blends in well with any verdant background. Almost three-quarters of the green snake's diet consists of insects, including grasshoppers and many crop-munching caterpillars such as hornworms. It also partakes of ants, crickets, flies, spiders, and snails. The ringneck snake, with a back the color of night and a golden yellow collar, hunts its prey by starlight. During the day, when I have discovered them sheltering beneath boards and in other cool refuges, they've been gentle in the hand.

Two other small snakes that frequent gardens are the closely related northern brown snake and redbelly snake. Brown snakes grow to about a foot long; they have a pinkish yellow belly and two rows of dark spots running along each side of a brownish back. A bright red belly distinguishes the ten-inch-long redbelly snake, along with three light brown spots that form a broken necklace. These snakes eat lots of slugs, insect larvae, worms, and sow bugs.

Although it's nonpoisonous and harmless to all but mice, voles, and other small nocturnal mammals, the milk snake has an attitude—and a row of alternating reddish brown splotches on a background of light gray or tan resembling the patterning of a copperhead or timber rattlesnake—that have earned it a bad reputation and the misnomer of adder. The milk snake came upon its other monikers of house snake and barn snake because it frequents buildings in search of rodents.

You can attract snakes to your garden by providing loose rock piles, old tree stumps, brush piles, prone boards, a stack of wood, and some unkempt corner swales. These will offer shelter during the active season and places to hibernate in winter. Mulch attracts small mammals, slugs, and many other snake foods. On the whole, snakes consume far more garden pests than beneficial species.

Unfortunately, one snake's snack is an animal that many gardeners consider the holy grail of herpetological pest control: the American toad. Female toads can grow up to four inches long, and that's a sizeable meal for a snake. It's easy to see why these homely endearing amphibians have appeared so frequently in the children's literature of nature such as Toad from *The Wind in the Willows* and Old Mr. Toad in the Thornton W. Burgess stories. There's a certain charm in a toad's wide mouth, bulging eyes, and mottled bumpy skin.

A toad may appear ungainly, but its long sticky tongue shoots out faster than the eye can see and snatches a slug, earwig, Japanese beetle, cutworm, or grasshopper. One toad eats 50 to 100 insects and other prey each night, or roughly 10,000 to 20,000 in a growing season, including sow bugs, snails, cucumber beetles, grubs, June bugs, tent caterpillars, centipedes, millipedes, and spiders. More than 80 percent of a toad's diet consists of harmful and unwanted garden pests. It can devour three times its own weight each day.

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American toad

Toads need a cool moist environment and will frequently burrow under mulch to take cover, or hide in the thick undergrowth of a feral garden corner. Since they are averse to the drying heat of the sun, they're mostly active by evening and at night. They dig holes in cool places with their rear feet and rest there during the day. If toads like a certain habitat, they'll hang around for a year or more and simply dig a deeper burrow to overwinter.

It's easy to construct toad residences and attract them to your garden. One of the simplest toad houses is a terra cotta pot placed on its side in a shady nook with a thin layer of leaves inside for bedding. Dig a tunnel that's about three inches wide and deep so the toads can enter by creeping under the rim of the pot. The clay pot absorbs rainwater, which evaporates and cools the interior. Toads will also seek shelter under boards, beneath flat stones, or at the base of a stone wall or garden statue.

Toads and other amphibians are drawn to gardens with water. You can help to attract them by sinking a birdbath into the earth so that the lip is level with the ground. Putting in a pond is even better. Dig a simple eight- to twelve-inch-deep depression measuring about three by four feet across, located so that it sits partially in shade and sunlight. Since toads can't climb out of a pond if the edge is steep (they'll drown), make sure one side slopes gently. Line the hole with plastic. Create a small patch of gravel on part of the bottom and spread a thin layer of mud over the rest where dragonflies and damselflies can lay their eggs. Their nymphs will hatch into adults that eat lots of garden pests. You don't need a filter or pump, and resist the temptation to add fish to the pond, which will outcompete and eat everything else. If raccoons and other potential invaders come calling, surround the pond with a chicken wire fence with holes big enough for toads to pass through.

If you do build a pond, frogs will often appear overnight, as if by magic. Place a small rock in the garden pond for frogs to crawl up onto. Pickerel, leopard, and green frogs may appear, especially when it rains and amphibians are on the move. Pickerel frogs, which have slim bodies and are excellent jumpers, have two rows of squarish spots running down the back and a tinge of yellow or orange on the inside of each rear leg. Leopard frogs can be distinguished by the rounded dark spots with light halos that form two to three irregular rows down the back.

Given the benefits of the presence of reptiles and amphibians in a garden, you could argue that all of these creatures, even the oft-maligned snakes and toads, will bring on better harvests.

Michael J. Caduto's latest books are Catch the Wind, Harness the Sun: 22 Super-Charged Projects for Kids *(Storey Publishing) and* Riparia's River (*Tilbury House). His website is www.p-e-a-c-e.net.*

Sticky Heels

Turtles have been around for twice as long as snakes—about 200 million years. The slow-moving eastern box turtle, which the Lenape call sticky heels, can survive for a hundred years. Individuals may become habituated to a small territory of 150 to 750 feet across and will stay around for a long time if their needs are met—shady hollows in the soil, leaf litter, brush piles, overgrown areas, water, and open spaces for laying eggs. Up to half of a box turtle's omnivorous diet consists of harmful slugs and snails. They also eat insect larvae, beetles, grasshoppers, fungi, and grass, as well as some beneficial critters including earthworms, toads, and small snakes. Turn your garden into a box turtle refuge by providing plants that bear fleshy fruits such as mayapple, blackberry, elderberry, and black cherry. But be sure to fence out the turtles from your lettuce, cantaloupes, and tomatoes, unless you're willing to share!

Poetry

Edited by Susan Richmond

Bloom

by Martha Carlson-Bradley

. . .to Giovanni Riccioli, SJ, who mapped the moon

I look up the Latin for moonflower—
Ipomoea alba—"white worm"—
not sure if they grew in Bologna,

or if you'd notice them climbing the market wall
with their blossoms tightly furled at noon:
small rods like mops twisted dry.

Did you know their name and habit?
They wait past sunset to flare
into fluted funnels,
wider, finally,

than your grown man's palm.

They're round and white as the Moon in full,
when their scent is a gift, all night,
to anyone, for any reason, still awake.

Martha Carlson-Bradley has published three collections of poetry, including Season We Can't Resist *(WordTech Editions, 2007).* If I Take You Here *is forthcoming from Adastra Press. She lives in New Hampshire.*

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Branch Shaked Out

by Joan Houlihan

From branch shaked out and speckled egg,
us made new eating, not to harm
the ones of hoof and horn

and ground was dug and seeded
taking those to plow who were ours tame.

Night and day, day and night,
sun and rain took up the work
and gave a take of all that fruited
ripe and sweet from green.

Us lived, and us of all, as to a light

and drinking from the sun.
Night kept us as would a pelt
of highest fur, the stars its eyes around.

Joan Houlihan's most recent book of poetry is The Us *(Tupelo Press, 2009). She is founding director of the Concord Poetry Center and Colrain Poetry Manuscript Conference. She teaches in Lesley University's MFA Program.*

The Political Landscape

State House Musical Chairs

by Jennifer Ryan

2010 Mass Audubon Picture This Photo Contest Winner for Best Wildlife Sanctuary Photograph (Under 18 Category)

In spring 2010, I penned a piece on the state environmental budget. Normally I wouldn't repeat a topic for this column so soon, but the precipitous and continued cuts to state environmental programs are so deep that they crowd out other features of the political landscape.

The recession may technically be coming to an end, but as one-time props are pulled out, the game of musical chairs is over and the environment doesn't have a seat. Funding for homeless shelters, veterans' homes, education, and public safety continue to be cut; the presence of public health and homeless advocates, and now teachers and other unionized workers, has become routine in front of the State House, where they speak out

for their interests. And as for state environmental programs, budget watchdogs and local think tanks report that state spending on parks and environmental monitoring and permitting are much lower here than in other states, and are taking disproportionate cuts.

This is a story of numbers and competing interests.

A little primer on state finances: The budget is roughly $30 billion per year. A little over 50 percent goes to health and human services; 21 percent to education; 11 percent to "independents" such as the state auditor, sheriffs, and board of library commissioners; 8 percent to administration and finance; and the remaining 9 percent makes up the rest. Last year we spent 0.7 percent for environmental programs; this year it is projected to be 0.58 percent.

About 40 percent of the state budget goes to entitlement programs, meaning the state is obligated to pay and if cuts are needed they must come from the remaining 60 percent "discretionary" funds. Since 2001, state spending for healthcare has increased 61 percent, for employee benefits 30 percent, and for interest on the state's debt 8 percent. Education and local aid has dropped 3 percent, human services are down 8 percent, higher education is down 37 percent, economic development is down 38 percent, and noneducation local aid is down 39 percent.

The Commonwealth's tax revenue has collapsed—in fiscal year 2008 the state brought in $20.9 billion and in 2010, $18.9 billion. The $2 billion drop is coupled with declines in other agency funding sources, like permit fees. Declines go along with rising fixed costs; healthcare costs, in particular Medicaid payments (about 30 percent of the state budget), and employee benefits continue to increase. Pension obligations are looming on the horizon, ramping up around 2012. One-time sources including federal stimulus funds and big Medicaid reimbursements are gone; and any drawdown on the state's rainy day funds will be minimal if at all. The state's deficit is structural.

What does this mean for our modest corner in the state budget? Over the past ten years, annual environmental spending dropped $66.5 million, from $245 million out of a $22 billion total annual budget in 2001 to $178.5 million proposed for 2012—or a drop from 1.1 percent of total spending to 0.58 percent. For managing and protecting the 695,000 acres owned by the Commonwealth, for supporting the 3,000 total full-time staff across the Departments of Environmental Protection, Conservation and Recreation, Fish and Game, and Agricultural Resources, we dedicate less than a penny on the dollar of our resources. We've lost 30 percent of the Environmental Protection budget, including funds for hazardous waste site oversight, and more than a quarter of Conservation and Recreation funds and staff.

We have the ninth largest state park system in the country, yet a Beacon Hill Institute report shows that we spend less than half the national average on parks and recreation—or $63 per person compared with the national average of $139. The Department of Environmental Protection (MassDEP) brings in about two-thirds of its budget in permit revenues, which are swept into the state's general fund and are not kept by MassDEP. The Department of Fish and Game is largely funded by hunting and fishing licenses and federal sources, yet its small programs that need state funds are either cut, like Riverways, or eliminated, like the Natural Heritage & Endangered Species Program.

In 2003, the last time the Environmental Council of the States crunched the numbers, Massachusetts ranked 49 out of 50 in percentage of state budget spent on environmental programs. Percentage points count here—they found that 1.4 percent across states was low, 1.9 percent in 1991 was the peak. We reached 0.86 percent in 2009, but are on a precipitous slide back down. Yes, we are a progressive state in terms of climate change legislation, rare species legislation, and other fronts—but on the back end we are undoing good legislation by starving programs. A 1988 Senate Ways and Means report on the environmental budget found that without increasing funding for environmental programs, we could not meet the constitutional requirement of Article 97 that "the people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment." That was 24 years ago.

The programs that conduct biological research and inventories; restore and manage critical habitats; manage forests and parks; implement environmental laws that protect public health and the environment; and improve decision making about statewide conservation issues are continually cut deeper and deeper. And they are a tiny portion of the state budget. Environmental programs are being left behind by Beacon Hill. At the same time, stresses to the environment continue to grow as the climate changes rapidly.

Environmental advocates are pulling together to call for 1 percent of the state budget to go to parks, clean water and air, endangered species protection, and agricultural programs. You can get involved—go talk to your state senator and representative and let them know. Time and time again, both citizens and elected officials are surprised when they find out just how little a progressive supposedly green state like Massachusetts invests in our environment. Some think all the great environmental nonprofits that they know and love take care of that, but nonprofits don't implement the Clean Air Act or Clean Water Act, or oversee the nation's ninth largest state park system.

Environmental agencies and their staff protect our clean air and water, our parks, and wildlife. We can't afford to lose any more employees, and further we need these important civil servants back. As we cut beyond bare bone, we must recognize that cuts will ultimately cost the state more in terms of increased pollution, degraded habitats, deferred maintenance, and, ultimately, damage that may never be undone.

Jennifer Ryan is Mass Audubon's legislative director. She is also a conservation biologist.

Central/West Regional Property Office

Waterfront Cottage for Rent
Late May through
Early September
at Pierpont Meadow
Wildlife Sanctuary in Dudley
Call 978-464-2712
for more information
and availability.

Calling All Shutterbugs

Mass Audubon's Photo Contest returns!

Once again, we're seeking striking photographs of people in nature as well as those that highlight the beauty and diversity of Massachusetts wildlife and landscapes.

Contest ends September 5.

www.massaudubon.org/picturethis

Mass Audubon Photo Contest
Picture This:
Your Great Outdoors

See one of last year's winners on page 22.

MASS AUDUBON'S BIRDSEED DAY FUNDRAISER

© LIZ PAGE

Help support your local sanctuary's education and conservation programs with your purchase of birdseed. Call for an order form and information about dates and times of sales.

BERKSHIRE SANCTUARIES
Lenox, 413-637-0320
Ordering deadline:
October 19
Pickup:
November 5—9 a.m-1 p.m.

BROADMOOR
South Natick, 508-655-2296
Ordering deadline:
October 20
Pickup:
November 5

Birding Programs

BERKSHIRE SANCTUARIES
Lenox, 413-637-0320
Bird Walks at Canoe Meadows Wildlife Sanctuary
September 2, 9, 16—8-10 a.m.

BLUE HILLS
Milton, 617-333-0690
Hawk Migration at Chickatawbut Hill
September 17, 18—10 a.m.
Rain date: *September 24, 25—10 a.m.*

BROAD MEADOW BROOK
Worcester, 508-753-6087
The Digital Birdwatcher
July 28, August 4—6:30-8 pm

BROADMOOR
South Natick, 508-655-2296
Hawk Watch at Pack Monadnock
September 10 and 17

CONNECTICUT RIVER VALLEY
Easthampton, 413-584-3009
Hawk Watch at Sugarloaf State Reservation
September 17—9 a.m.-noon

DRUMLIN FARM
Lincoln, 781-259-2206
Shorebirds and Swallows at Sunset
August 20—3-9 p.m.

IPSWICH RIVER
Topsfield, 978-887-9264
Warm Water Seabirds of Stellwagen Bank
August 5—8 a.m.-1:30 p.m.

JOPPA FLATS
Newburyport, 978-462-9998
Wednesday-Morning Birding
Every Wednesday except in July—9:30 a.m.-12:30 p.m.
Shorebirds of Joppa Flats Workshop
August 12 and 13

SOUTH SHORE
Marshfield, 781-837-9400
Introduction to Birding in Plymouth
September 10—8 a.m.

WACHUSETT MEADOW
Princeton, 978-464-2712
Nighthawk Migration
August 28 and September 4—6-7:30 p.m.

WELLFLEET BAY
South Wellfleet, 508-349-2615
Coastal Field Ornithology Field School
August 18–21
Birding North Monomoy and Nauset Marsh
Weekly tours in July, August, and September

Call the individual sanctuaries for more information, fees, and to register.

For a full listing of Mass Audubon programs and events, visit our online catalog at www.massaudubon.org/programs.

Family Programs

BERKSHIRE SANCTUARIES
Lenox, 413-637-0320
Twilight World of Bats
August 5—7-8:30 p.m.
Evening at the Beaver Ponds
August 10—6:30-8 p.m.
Insect Safari
August 18—10 a.m.-noon

BOSTON NATURE CENTER
Mattapan, 617-983-8500
Rockin' with Raptors
September 24—1-4 p.m.

BROAD MEADOW BROOK
Worcester, 508-753-6087
Night Noise
August 20—6:30-8:30 p.m.

BROADMOOR
South Natick, 508-655-2296
Wild about Turtles
September 11—1-2:30 p.m.

CONNECTICUT RIVER VALLEY
Easthampton, 413-584-3009
Perseid Meteor Shower
August 12—7:30-9:30 p.m.

DRUMLIN FARM
Lincoln, 781-259-2206
Friday Evening Hayride
August 12, September 9—4-5:30 p.m. or 6-7:30 p.m.

HABITAT
Belmont, 617-489-5050
The Scoop on Bats
August 10—7:30-9 p.m.

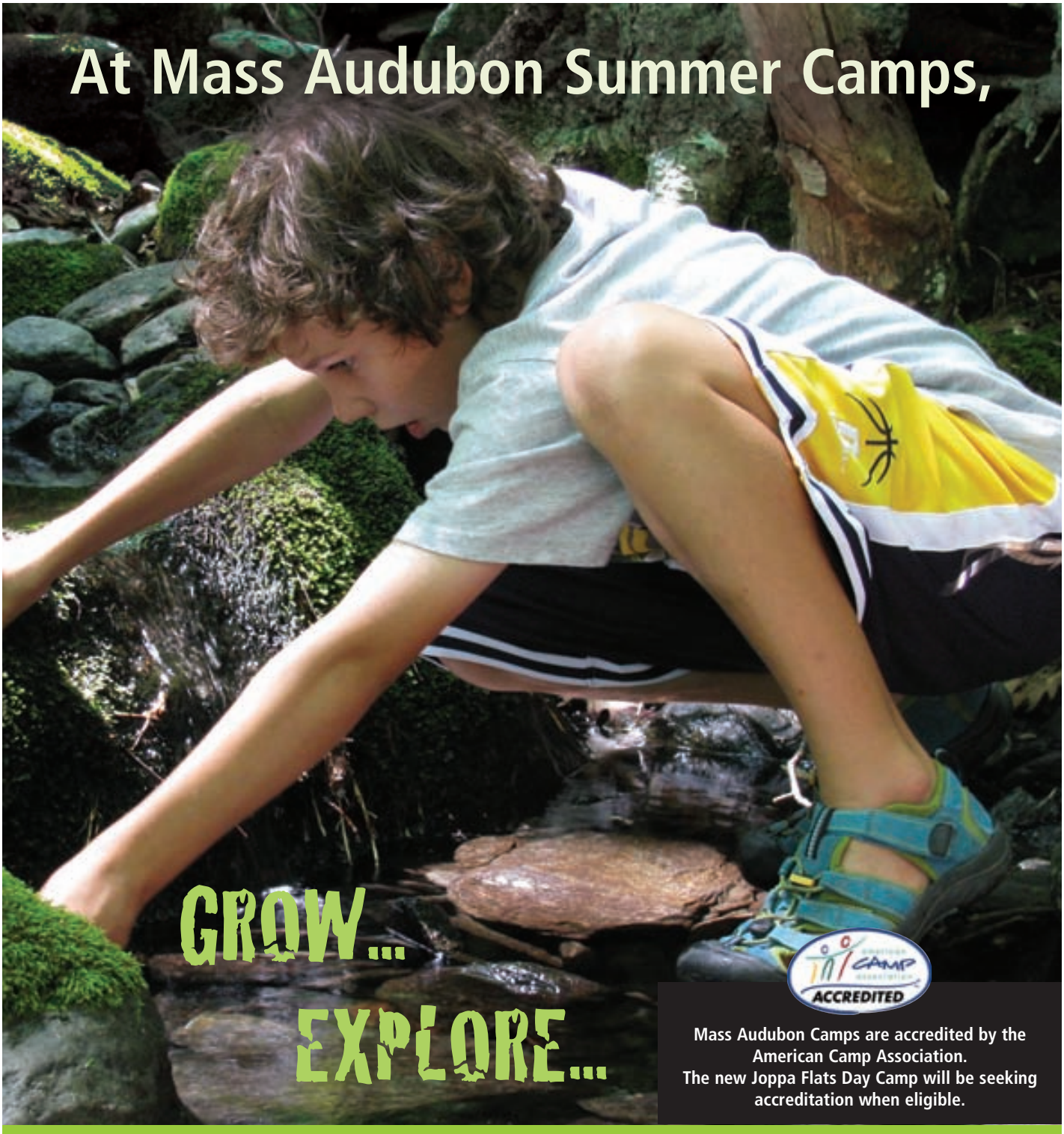
JOPPA FLATS
Newburyport, 978-462-9998
SCAMP Marshes and Mudflats
August 16-19—9:30 a.m. to 1:30 p.m. for children ages 6-8, 9:30 a.m. to 3:30 p.m. for children ages 9-11

SOUTH SHORE
Marshfield, 781-837-9400
Duxbury Beach Programs
Saturdays in July and August—9:30 am

WACHUSETT MEADOW
Princeton, 978-464-2712
Whale Watch and Pelagic Bird Trip
August 7—all day

Call the individual sanctuaries for more information, fees, and to register.

For a full listing of Mass Audubon programs and events, visit our online catalog at www.massaudubon.org/programs.



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FALL CELEBRATIONS

BROAD MEADOW BROOK
Worcester, 508-753-6087
Barbara J. Walker Butterfly Festival
August 13—10 a.m.-4 p.m.
Boo Meadow Brook Halloween Hike
October14, 15—6:30-8:30 p.m.

CONNECTICUT RIVER VALLEY
Easthampton, 413-584-3009
Arcadia Sensory Loop Trail Grand Opening
October 15—10 a.m.-2 p.m.

DRUMLIN FARM
Lincoln, 781-259-2206
Fall Harvest Days
September 24, 25
October 1, 2, 8, 9, 10, 15, 16
Tales of the Night
October 27 and 28

IPSWICH RIVER
Topsfield, 978-887-9264
Halloween Happenings
October 28 and 29

MOOSE HILL
Sharon, 781-784-5691
Halloween Prowl
October 28, 29, 30

SOUTH SHORE
Marshfield, 781-837-9400
Annual Farm Day
September 24—10 a.m.-4 p.m.

WACHUSETT MEADOW
Princeton, 978-464-2712
Hey Day
October 1—11 a.m.-4 p.m.
Rain date: *October 2—11 a.m.-4 p.m.*

Call the individual sanctuaries for more information, fees, and to register.

For a full listing of Mass Audubon programs and events, visit our online catalog at www.massaudubon.org/programs.

CANOE & KAYAKING PROGRAMS

BERKSHIRE SANCTUARIES
Lenox, 413-637-0320
Canoe Trip on Buckley Dunton Lake
August 13, September 17—9 a.m.-noon
Canoe Trip on the Housatonic River
August 14, September 4—8:30 a.m.-12:30 p.m.
Canoeing Upper and Lower Goose Ponds
September 10—8 a.m.-noon

BROAD MEADOW BROOK
Worcester, 508-753-6087
Canoe the Snow Marsh
September 10—1-4 p.m.

BROADMOOR
South Natick, 508-655-2296
Fall Foliage Canoes
Saturdays and Sundays—October 8-16

CONNECTICUT RIVER VALLEY
Easthampton, 413-584-3009
Evening Paddle Birdwatch
August 26—6:30-8:30 p.m.

IPSWICH RIVER
Topsfield, 978-887-9264
Family Dusk Paddles
Discovering Wetlands: August 12—6-8 p.m.

LONG PASTURE
Cummaquid, 508-362-1426
Kayak Cape Cod
August through September—times change with the tides

WELLFLEET BAY
South Wellfleet, 508-349-2615
Coastal Ecology by Kayak Field School
August 10–13
Twilight Canoe Trips
Weekly tours in August

Call the individual sanctuaries for more information, fees, and to register.

For a full listing of Mass Audubon programs and events, visit our online catalog at www.massaudubon.org/programs.

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INTERNATIONAL TOURS

Birding in Peru—Manu to Machu Picchu:
September 2011

The Polar Bears of Churchill, Manitoba:
October 17-22, 2011, with Gayle Tardif-Raser

Kenya Birding and Big Game Safari:
October 28-November 11, 2011, with Bill Gette

Tanzania Birding Safari:
February 2-20, 2012, with Wayne Petersen

Ecuador Birding
February 27-March 11, 2012, with David Larson
…with additional trips to Panama, Honduras, Jamaica, and many more…

US TOURS

Women's White Mountains Weekend:
July 28-30, 2011 with Carol Decker and Berkley Cline
For more information, contact Ipswich River Wildlife Sanctuary, 978-887-9264

Southern California Birding—From Santa Cruz Island to the Salton Sea:
September 21-27, 2011, with David Larson
For more information, contact Joppa Flats, 978-462-9998

Monhegan Island Weekend:
September 23-25, 2011, with
Carol Decker and Scott Santino
For more information, contact
Ipswich River Wildlife Sanctuary, 978-887-9264

Block Island Birding Weekend:
September 30-October 2, 2011
Cosponsored with Ipswich River Wildlife Sanctuary
For more information, contact
South Shore Sanctuaries, 781-837-9400

Southern California—Bishops to Pelagics by way of the Salton Sea:
October 3-10, 2011
For more information, contact
Drumlin Farm, 781-259-2206

Birding the Mid-Atlantic Coast
October 25-30, 2011, with René Laubach
For more information, contact
Berkshire Sanctuaries, 413-637-0320

Texas to New Mexico—Bosque del Apache and the Rio Grande Corridor
January 17-23, 2012, with Bill Gette
For more information, contact Joppa Flats, 978-462-9998

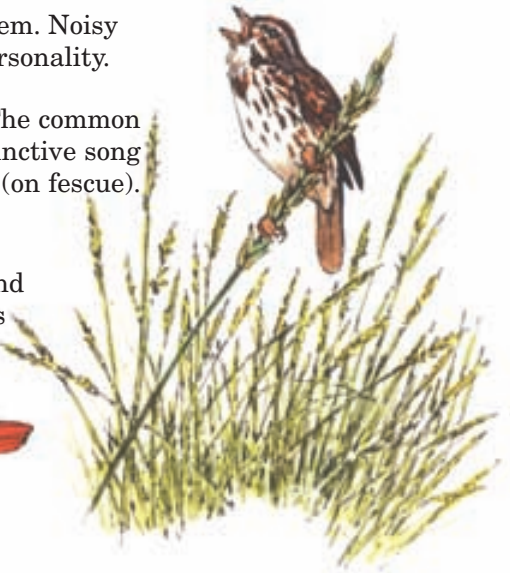
Curious Naturalist

Birds in the Garden

Illustrated by Gordon Morrison

Gardens, especially those designed specifically to attract birds, are well-known havens for local species. But even a standard garden will attract a wide variety of species. Below are just a few.

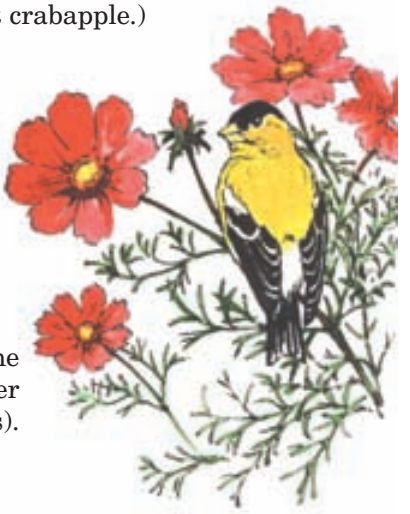
House Wren: Perched on a sugar maple stem. Noisy neighbor with a great deal of spunk and personality.



Song Sparrow: The common garden sparrow with a distinctive song (on fescue).

Northern Cardinal: A year-round resident best appreciated perhaps in winter but also a fine spring songster.

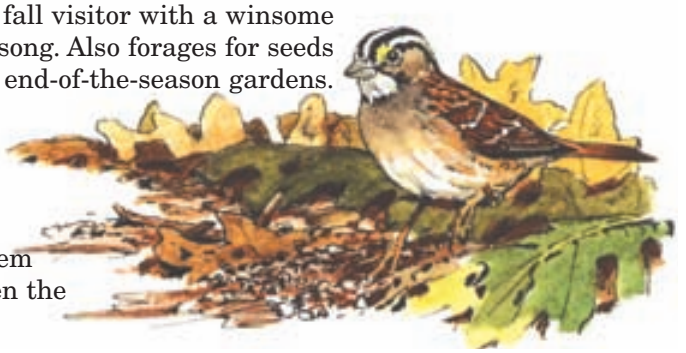
Robin: The quintessential garden bird. (Both birds are on Sargent crabapple.)



American Goldfinch: Usually the most colorful bird in the late-summer garden (on bright cosmos).

Northern Mockingbird: With black cherry. Another fine songster, with an added advantage—they'll chase away cats.

White-throated Sparrow: Spring and fall visitor with a winsome song. Also forages for seeds in end-of-the-season gardens.



Savannah Sparrow with Grasshopper: Watch for them at the end of the season when the garden has gone to seed.

Massachusetts Audubon Society
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Outdoor Almanac Summer 2011

July 2011

July 25 Shorebirds begin migrating. Watch for flocks along the coast.

July 27 Look for Indian pipes and beechdrops in forested areas.

August 2011

August 5 Yellow warblers and northern waterthrushes begin moving south.

August 9 Black fruits appear on the curving stems of Solomon's seal.

August 13 Full moon. Fishing tribes are given credit for naming this the Sturgeon Moon.

August 14 Goldfinches are nesting at this time. Watch for them in gardens and field edges.

August 16 Sweet pepperbush blooms near lakes and ponds about this time; sniff the air for its spicy odor.

August 18 The woodland asters begin blooming.

August 23 Cardinal flower blooms along clean freshwater streams.

August 26 Watch for migrating nighthawks overhead at dusk.

August 29 Fall webworms begin to appear; look for their nests at the tips of tree branches.

September 2011

September 6 This is the peak of the fall warbler migration; watch for them in backyard shrubbery and treetops.

September 10 Broad-winged and sharp-shinned hawks migrate about this time of year.

September 12 Full moon. The Corn Moon.

September 23 Autumnal equinox; days and nights are of equal length.

September 26 Look for ripening wild grapes along old stone walls. Wild cherries, elderberries, and dogwood berries are ripe. Watch the thickets for feeding migratory birds.

October 2011

October 2 Green darner dragonflies migrate about this time. See them over sunny meadows.

October 5 First juncos arrive from the north.

October 6 Phoebes are still around.

October 9 Watch for squirrel middens on stumps and rocks.

October 12 Full moon. The Grass Moon.

October 14 Look inside goldenrod flowers for yellow crab spiders.

October 17 Watch for daddy longlegs in meadows.

October 19 Watch for dropping hazelnuts.

October 21 Yellow-rumped warblers migrate. Watch for them in small trees and shrubs and listen for the *check* call.

October 23 Oaks are still holding their leaves.

October 26 Once the leaves are off the trees, look for oriole nests at the ends of willow and elm branches.

October 29 Watch for large congregations of migrating blackbirds around this time.

November 2011

November 4 Mushrooms are still coming up: look for the bright caps of yellow *Pholiota* growing on logs and vase-shaped clusters of oyster mushrooms on tree trunks.

November 10 Full moon. The Beaver Moon.

November 12 Peak migration date for snow buntings.