

Frequently Asked Questions

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<http://www.bringingnaturehome.net/>

Q: Won't climate change make restoring natives to our landscapes nearly impossible?

A: Climate change is certainly exacerbating the many pressures we humans have already put on plant and animal communities and it won't make restoration efforts any easier, but we must not use climate change as an excuse to do nothing. Most species of plants and animals are far more resilient to climate variability than we give them credit for. Besides, increasing the number and biomass of the plantings in our yards and public spaces is one of our most accessible and convenient tools to fight climate change. Every plant you add to your yard is built from carbon it has pulled out of the atmosphere. It also pumps carbon into your soils via its roots throughout its life time, improving our carbon imbalance daily!

Q: I have heard that invasive plants "disrupt" ecosystems. Are ecosystems really so fragile that a single invasive plant can harm it?

A: Can a single tumor disrupt your internal ecosystem? Indeed, it can; by its very nature, it doesn't stay a single tumor; it spreads. I like this analogy because, by definition, invasive species spread, displacing native plant and animal communities wherever they go. And they keep spreading until checked by us or climate. Moreover, our ecosystems don't have to contend with a single invasive plant species; there are now well over 3300 species of invasive plants in North America!

Q: Why should I care if birds are disappearing? I don't even like birds.

A: You should care because birds are excellent ecological indicators - - canaries in the coal mine, if you will. They would not be disappearing if the ecosystems that support them were functioning properly. And you should care whether the ecosystems that support birds are healthy because it is those same ecosystems that support you. The species in an ecosystem are the engines that run that ecosystem. Every time we lose a species, either literally or functionally, whether it is a bird, a bee, a lizard, or a plant, or a nematode too small to see, that ecosystem functions below its capacity and our life support systems are weakened.

Q: A man recently asked me where the grasshoppers of his youth had gone. “As a youngster, walking through fields or even vacant lots in Illinois, or western NY state, New Jersey and elsewhere in the summer, it seemed there was an incredible number of grasshoppers jumping around and hitting my legs as I walked. Sadly, there seem to be few, if any today. In the evenings, the sounds of crickets were everywhere. No longer. No one has explained to me why grasshoppers and crickets have disappeared.”

A: Whether or not grasshoppers, crickets and other Orthopterans are disappearing depends on where you are. Fortunately, there are still many places where grasshoppers and crickets are doing well. But, as you note, there are many places where they are nearly gone. Anyone who uses Chem Lawn will not have crickets or grasshoppers. Anyone who uses Scott's turf builder and mows religiously will have very few grasshoppers and crickets. Any farmer growing roundup-ready corn or soybeans will not have the plants needed to support grasshoppers and crickets. We are just now learning about the negative effects artificial lighting at night has on local insects. Millions of acres that are now lawn in the U.S. once supported the native herbaceous plants that fed lots of grasshoppers and crickets. Grasshoppers, despite their name, depend primarily on broad-leafed forbs, while crickets mostly develop on dead plant material. In pursuit of our obsession for neat landscapes, we have eliminated both in too many places. Finally, areas overrun with invasive groundcovers like Japanese stiltgrass, vinca, or English Ivy wouldn't support grasshoppers because the plants grasshoppers depend on have been replaced by species they cannot eat. We can bring grasshoppers and other insects back if we plant more of our private and public spaces with the native plant species they depend on.

Q: I live in an area with lots of Lyme disease. Several websites suggest keeping large lawns because they are not attractive to ticks. The sites also say I should get rid of brush piles because ticks love them. How can I contribute to Home Grown National Park without getting Lyme disease?

A: Whenever I get this question, two platitudes immediately pop into my head. ‘Life is not risk free’ and ‘Life is a trade-off.’ It's true that lawn will not support a large tick population (nor anything else) and pavement supports even fewer ticks. To create a world with no ticks we could

turn everything into lawn or pavement. The risk from Lyme disease would drop to zero, but so would the probability that we will persist on this planet much longer. Let's think about what deer ticks need to complete their life cycle, and then think about the easiest way to disrupt that life cycle. Deer ticks do not eat native plants, or leaf litter, or brush piles. Ticks stay in brushy areas because they need high humidity. Deer ticks do eat mammals (or at least their blood), and two of their favorites are white-footed mice and white-tailed deer. Although Lyme disease has always been around in very low frequencies, it reared its ugly head in the 1970s because white-tailed deer changed in abundance from rare sightings in the 50s and 60s to several times over their carrying capacity. Since there are several reasons too many deer are bad news for the environment, reducing deer numbers seems like the best place to interrupt the Lyme disease cycle. We need to collectively agree as a society that having too many deer is not alright and it's not something we have to tolerate. I realize a single homeowner can't bring deer populations down to ecologically safe levels alone, although each one of us can stop opposing deer culls at our local township meetings. But what can you do in the meantime to minimize your exposure to deer ticks?

Ticks do not run after us when we go into our yards. They climb up on vegetation and 'quest.' That is, they wait for us to walk by and then grab on when we do. So, one easy solution is to reduce your lawn to wide mowed paths, and then stay on those paths during periods of high tick infectivity (May and June in Southeast PA.) For me, staying out of the woods is not an option I choose to follow, so I remain vigilant. I (with a little help from my wife) check myself after I've been playing outside. Deer ticks like bare patches of skin near waste and sock bands or tight undies and with close inspection they can be easy to find. They also like to get between my toes. Fortunately, they avoid our hairy heads. When I find an embedded tick, I pull it off (sometimes I need tweezers for those tiny nymphs) and put Neosporin on the bite site. A Lyme researcher told me years ago that the Neosporin kills the *Borrelia spirochete* before it gets into the blood stream. I don't know if that is true but I do know that I have never gotten Lyme disease when I follow that rule (and I have had it 5 times when I didn't follow the rule). This all might seem like more aggravation than it's worth, but the joys I get from interacting with nature far outweigh the nuisance of tick checks.

Another thing we can all do is landscape in a way that encourages higher mammal diversity in our neighborhoods. Research has shown that areas with foxes, chipmunks, squirrels, raccoons, groundhogs, and possums have much lower rates of Lyme disease, not because they have fewer ticks, but because those mammals are dead end hosts for Lyme disease. Simplified landscapes that only have white-footed mice and deer have much higher rates of infectivity.

Q: What is the difference between a naturalized landscape and native landscapes?

A: Naturalized can be synonymous with invasive, or it can simply mean plants that require little to no care after they are established, like a massed planting of daffodils. In either case, the word naturalized refers to plants that are not native members of the plant community into which they are put or into which they have moved on their own.

Q: How can we hope to build Home Grown National Park in a nation so culturally and politically polarized, we can't agree on whether the sky is blue?

A: The fact that we have allowed certain special interest groups to successfully politicize the health of our environment has always baffled me. There is no one on the planet who does not require a healthy environment, including the complex ecosystems that create our life support systems. Yet we tolerate or even vote for people who foul our nest (our only nest) for short term profit. Fortunately, we don't need an act of congress to restore ecological function to our landscapes. In fact, if we are just a wee bit clever, we don't need anyone's permission. Using what we might call 'gorilla landscaping,' we can add productive plants to our landscapes without others even realizing it or objecting to it.

Q: Plants and animals have always moved around the planet, so the arrival of new species at our shores is a natural process. So, what's the big deal? If the new species are more fit than the species already here, than they deserve to replace them.

A: I hear the 'They deserve to succeed' argument quite a bit. It is true that species have always moved around the planet, but their rate of movement was extraordinarily slow compared to the rate at which we are moving plants and animals around the globe today. This matters; if new species arrive at our shores only occasionally, say once every 1000 years, they would never be numerous enough to swamp the complex resident communities, and their addition to existing

communities would be so slow, local native species could adapt to their presence. Four conditions make the ecological contest between resident species and novel species inherently unfair, if we can anthropomorphize just a bit. First, new species typically arrive in novel habitats today through the actions of humans. And they usually are not imported once, but repeatedly. Think of ornamental plants from Asia. They are brought to this country and sold by the millions over wide geographic areas for decades. The scale of such an influx of new species into our ecosystems in no way resembles any type of dispersal that happened through natural mechanisms in the past. Second, we are importing thousands of new species all at the same moment in ecological time; in any given place today, our native flora must simultaneously compete against dozens of introduced species. Third, in nearly every case, we humans have disturbed native plant communities with our backhoes and bulldozers before introduced species were able to successfully establish. Most introduced species would never have been able to out-compete native plant communities if those communities had not first been gutted by human “development.” Finally, new species are typically introduced without the predators, parasites and diseases that keep them in check in their homeland, and so they are healthier when they enter into competition against native plants that must survive attack from multiple species of herbivores and diseases. To call introduced plants more fit and thus more “deserving” of a place on this continent than our native plants seems a stretch when we have stacked the playing field against our natives so unevenly.

Q: Are connected habitat fragments more vulnerable to invasion by non-native plants and if so, should I promote isolated habitats?

A: Connected habitats are always more sustainable than isolated ones (see Chapter 3) but skinny connections are subject to plant invasions because they are effectively all edge habitat. With this in mind, building the widest connections possible is always the best strategy. Keep in mind, well-planted neighborhoods with few invasives can serve as good biological corridors connecting natural areas for many species. Encourage dense plantings and high plant diversity within corridors, both of which will help them repel biotic invasions. But there is no getting away from heavy management. Since the corridors we are talking about will be in your own yard, you can minimize the invasion of debilitating aliens with regular vigilance.

Q: A man recently wrote to the Virginia Native Plant Society about a conundrum concerning the healthful food qualities of the nonnative autumn olive, *Elaeagnus umbellata*. He wrote, "This is one of those confusing issues. The Autumn-olive is touted by natural food experts as being a nutritious source of the cancer fighter lycopene (eighteen times as much lycopene as tomatoes). But environmentalists and most conservationist organizations (including most state and federal agricultural agencies) have declared it an invasive species and want to destroy it. Shouldn't we value this plant for what its berries could give us?"

A: Every plant can be evaluated through a cost benefit analysis. The ecological costs of Autumn olive are enormous. They are one of the most invasive plants we have and decimate local plant and animal diversity and thus threaten ecosystem stability and function wherever they spread (see our data in Chapter 7). Autumn olive berries might provide cancer-fighting benefits, but so do berries of many native plants (elderberry, for example). It's not like we have no other sources of lycopene to take advantage of. In my view this is a clear case where the costs of planting a nonnative species far outweigh the replaceable benefits.

Q: To build Homegrown National Park most of us will have to add more plants to our landscapes. But won't that increase the risk of fire in our western states?

A: What a conundrum! Climate change is causing longer and more intense droughts all over the west and when there is plenty of dry fuel on the ground the risk of fire increases. It is possible, however, to design landscapes that minimize this risk. Before we started to mismanage our coniferous forests in the west by suppressing fire and allowing fuel to accumulate, low, relatively cool ground fires were frequent. They would consume accumulated grasses and shrubs every few years without jumping to the crown of the large trees. We can recreate this savannah-like landscape by thinning the large trees near our homes and removing dead brush every few years just as a ground fire would do. Fire experts suggest we do this in a 100' circumference around our house. Another preventive tip is to be sure to remove invasive cheatgrass. Cheatgrass (*Bromus tectorum*) is a winter annual from Europe that has spread throughout the west. Though green in winter and spring, it dies back to highly flammable tinder in early summer. Most of our terrible forest fires actually start when cheatgrass is ignited by lightning or careless people. Eradication of cheatgrass is unlikely, but you can suppress its dominance by encouraging native perennials that hold more moisture through the dry summer months and thus are less flammable.

Q: As we take more and more resources from other creatures, why don't we see the predicted negative impact on ecosystems?

A: We do, in fact, see it, particularly in African and middle eastern ecosystems where the impact of collapsing ecosystems can be measured in human suffering that we habitually mislabel 'political unrest, famine, or failed states' without acknowledging the root causes. Unfortunately, we don't need to go to Africa to find symptoms of eroding ecosystems; they are everywhere. Nearly 1/3 of the atmospheric carbon now disrupting our climate has come from removing plants around the world and releasing the carbon they once stored in the planet's soils. Flooding and wildfires are escalating (yesterday we got 7" of rain in our yard from a storm that wasn't even predicted!); pollinators are declining; the Aral Sea, once the Earth's 4th's largest lake, has dried up; the list of extinctions is growing and the list of species now at risk of extinction is exploding. Finite fresh water stores are declining globally; there is a seasonal dead zone at the mouth of every large river in the world; ocean acidification and bleaching have destroyed thousands of miles of coral reefs; fish stocks have collapsed; micro- and macroplastic pollution is omnipresent in all oceans; lost predators have unbalanced food webs nearly everywhere - - - need I go on?

Q: In Bringing Nature Home you wrote that 54% of the U.S. is what you call the urban/suburban matrix. But land use websites say only 3.5% of the U.S. is urban. How much land is really impacted by humans? I see lots of good habitat while driving around. Aren't you overstating the problem we have?

A: Many people have questioned these statistics because, as a nation, we want to believe that there is still a lot of nature out there. The "suburban/urban matrix" I refer to is the patchwork of cities and towns that now blankets most areas east of the Mississippi and more and more of the west. There are small isolated patches of habitat within this matrix, but it is rarely 'good' habitat. We worry about the destruction of the Amazon rainforest, 20% of which has already been logged (www.rain-tree.com/facts.htm): but, by comparison, more than 70% of our Eastern forests are gone and no one seems to notice (Brown 2006).

How did I get the 54% figure? I started with Michael Rozensweig's work at the University of Arizona (Rosenzweig 2003). Rosenzweig has spent a long and highly respected career studying the evolution and maintenance of biological diversity and is the leading authority on the matter. Michael tells us that only 5% of the U.S. (lower 48) is relatively pristine. The USDA web site tells us 41% of the U.S. is in some form of agriculture

(https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Farms_and_Farmland/Highlights_Farms_and_Farmland.pdf). This includes monoculture tree farms that many folks mistake for wilderness. That leaves 54%, that area that has been chopped up into cities, suburbs, malls, roads, airports, golf courses, etc. and little habitat fragments. The reason formal definitions of how much space is urban differ from my estimates of the urban/suburban matrix is because they are based on the density of people living in an area. Areas like airports, malls, paved infrastructure, corporate landscapes, industrial complexes, etc. have very few residents and thus are not defined as urban areas. In fact, such areas are often ignored altogether in land-use statistics.

Another critical part of this argument is the state of our 'natural areas.' That patch of woods at the end of the street and the seemingly endless trees that line many of our highways look like pristine habitats to most people. But those tiny patches are unable to sustain many species precisely because they are tiny and isolated from each other (Chapter 3). Moreover, they have been logged at least once and often multiple times over the past several centuries; the old growth trees vital to species like the ivory-billed woodpecker are long gone. They also have been invaded by non-native plant species that do not support our local food webs. Cheatgrass, just to name one example, has destroyed the sage brush ecosystems in over 200,000 square miles of the west (Richard Mack, Pers. comm.). The top predators (wolves, bears, cougars) that once controlled our deer, raccoons and possums are gone as effective controls east of the Rockies, so now populations of such species are far above the carrying capacity of the land to the detriment of local plant and bird communities. In my county, the carrying capacity for white-tailed deer is approximately 14 per square mile. We have 100 deer per square mile in most years and the understory in those forests that most people think are wild places has been destroyed.

My point is simple: the most destructive part of suburbia is not the space occupied by houses and roads, although that is substantial (the paved surface area of the 4 million miles of roads that crisscross the U.S. now covers an area over five times the size of New Jersey: Hayden 2004, Elvidge et al. 2004;). Instead, it is the way suburbia fragments large chunks of habitat into areas too small to sustain nature that so threatens our biodiversity. These are all reasons that the effects of humans on ecosystem function in the urban/suburban matrix is far greater than most people realize.

Q: What about the risks of bringing nature into our everyday spaces? Isn't interacting with nature dangerous?

A: Maybe it's because of our detachment from nature, the sensationalization of rare events, or our innate suspicion of the natural world that once threatened us, but our ability to accurately assess risk in the U.S. has gone haywire. There are 75,000 deaths from alcohol every year in the U.S. (<http://www.nbcnews.com/id/6089353/ns/health-addictions/t/alcohol-linked-us-deaths-year/>), yet one physician called West Nile virus, that killed 105 people nationwide in 2013 “a matter of life and death” and recommended that no one go outside. In 2013 there were 9,480 deaths and 76,690 new cases of melanoma in the U.S.

(<http://www.cancer.gov/cancertopics/types/melanoma>), yet we rush to the beach every summer and to tanning salons every winter to bask in cancer-causing rays. In 2017 cities in the north sponsored large-scale, expensive mosquito fogging campaigns to combat Zika virus (campaigns that kill all of the insects they reach, not just mosquitoes), even though there was no Zika virus north of the gulf coast. And these mosquito campaigns continue, even though Zika has been totally eliminated from our country. We have a real fear of sharks and why not? On average one person is killed by sharks every other year in U.S. waters. Things that we should worry about but don't include the 550 children that have been cooked in their parent's car since 1998, which is 550 more kids than were killed by poisonous snakes; in 2010, falling killed 26,009 people in the U.S. alone, while accidental poisoning ended the lives of 33,041 more people. On average obesity kills 30,000 people each year, texting kills 3000 people, autoerotic asphyxiation kills 600, hotdogs kill 70 kids, lightning another 51 people, high school football kills 20 kids per year, pet dogs kill 30 more, vending machines kill 13, roller coasters kill 6, and a whopping 300 people are killed by toasters in the U.S each year. Can you guess how many people are killed by

gardening with native plants?

Q: “I accept that humans have changed nature in many ways but I’m not so sure that is bad. Won’t natural selection “adjust” the natural world to accommodate human changes? Why won’t insects quickly adapt to novel plants and the food web will continue as it always has?”

A: I wish they would, but that is not how evolution works. Each year, Asian Callery pears, oriental bittersweet, multiflora rose, Japanese honeysuckle, crown vetch, and autumn olive seed into our property from our neighbors’ properties. Cindy and I continually work to remove them, but if we didn’t, their numbers would increase until our property was little else, exactly the way it was when we bought it. This transformation would be fast, only 3-5 years. What would happen to the insects that depend on the oaks, red maples, tulip trees, cherries, black walnuts and native viburnums that are crowded out in such landscapes? Would they adapt to the invasive plants in that short period of time? No, they would disappear, and so would the 840 species of caterpillars (yes, I am counting them!) that depend on our native plants and that, in turn, fuel bird reproduction in our yard. Will our monarchs switch to Japanese stilt grass when it overruns our milkweed patch? Of course not. Monarchs have been physiologically locked into eating only members of the milkweed lineage for millions of years. Evolution does not happen at the rate we are changing the food base for native animals. Unfortunately, extinction of existing fauna is the typical response to invasion by new species (Webb 2006).

Q: Most of our public land (local parks and preserves) has been degraded by introduced plants that the land managers do not have the budget nor the labor force to combat effectively. How can we possibly manage these public lands during the age of invasive species?

A: This is a huge but not impossible challenge. One solution would be to crowd-source the management. For example, every public park or natural area is bordered by private landowners. If everyone bordering a park assumed responsibility for controlling invasive plants along their border of the park, the invaded area would shrink considerably. And the area in which these species are controlled increases dramatically as property owners move deeper and deeper into the park. This approach would be particularly effective in linear parks (nearly all of our riparian parklands). Let’s say a park is 500 yards wide and 2000 yards long and all of it is invaded by

introduced plants. That is a total area of 1 million square yards of invaded parkland. If every property owner bordering that park controlled invasives just 50 yards into the park along their bordering property line, 200,000 square yards of parkland could be perpetually maintained invasive free. If each property owner controlled invasives 100 yards into the park, then nearly half of the park would be freed of invasive plants. Such progress might even encourage property owners to clear invasives deeper into the park. Because plant invasions are typically most severe on park edges, this approach will address the areas most seriously impacted. The removal of invasives would reduce the rain of seeds from introduced plants into the park and long-term control would become easier and easier. How could we convince bordering property owners to take such action? Social pressure. It is clearly a privilege to live next to a natural area. Privileges are not free. They come with strings attached in the form of responsibility for the park's well-being.

Q: Are cultivars of native plants the ecological equivalents of their straight species?

A: I get asked this question more than any other. In fact, I addressed it in *Bringing Nature Home*, but that was before research had been done to compare ecological function in cultivars and their parent genotypes, so my answer was not much more than an educated guess. The interest in how well cultivars function stems from how hard it can be to buy straight species; when natives are offered in typical garden centers, the vast majority are cultivars of native species that have been selected for a particular trait. Recently, there have been some studies designed to tackle this question and the results suggest that the answer depends upon which trait has been selected. A study my graduate student, Emily Baisden, recently finished compared insect use of straight species with their cultivars that had been selected for six traits: changed growth habit, enhanced fruit size, enhanced fall color, disease resistance, leaf variegation, and cultivars in which leaf color was changed from green to red, purple, or blue (Baisden et al. 2018). Emily found that the only trait that consistently deterred insect herbivores was changing green leaves to red, purple or blue. For her PhD, Annie White at the University of Vermont compared cultivars in which flower traits were changed and found that, more often than not, changing flower size, color or shape also changed the availability and/or quality of pollen and nectar offered by the flower and thus negatively impacted pollinators.

Although there are cultivar traits such as altered growth habit and disease resistance that can make some natives good choices for residential landscapes, I have two problems with cultivars in general. First, most cultivars are propagated by cloning; this means we are planting individuals with no genetic variation at all. In the age of climate change and highly variable weather, loading our landscapes with plants that do not have the evolutionary mechanism to adapt (genetic variability) makes little sense. Second, offering only cultivars for sale perpetuates the notion that plants are simply decorations and how they interact with other species is irrelevant. I would love to see straight species sold right alongside of their cultivars so that people who value function over aesthetics have the option buy these plants.

Q: “Doesn’t this new approach to landscaping take more knowledge than most homeowners have? I don’t think it will catch on because it is more complicated than sitting on a mower.”

A: I have heard this concern repeatedly: homeowners don’t know enough about plants or ecology to transform their traditional landscapes into living landscapes. My, my! What little faith we have. I agree that it is really easy to mow, and that increasing the number of natives in your landscape requires some knowledge about natives. But we learned how to landscape with plants that don’t belong in our yards, so surely we have the intelligence to learn how to favor plants that want to be in our yards. Think about all of the new things we learn all the time. In the ‘80s we learned how to program our VCRs. Nothing could be harder than that! In the ‘90s we became proficient at email, and today we master our I-Phones and Blackberries in just a few days. This is complicated stuff - - in my opinion, far more complicated than learning that an oak tree is a better choice than a Norway maple - - yet we have measured up to the task each time new knowledge has challenged us. And if something does prove to be beyond us, we hire someone who is an expert to do the job. There is a multi-billion dollar landscaping industry ready to do whatever we ask to our properties if we are not interested in puttering ourselves. Believe me, we can do this. All we need is the motivation.

Q: Privet flowers are good sources of honey and pollen for honey bees. If we remove privet from our natural areas as part of our fight against invasive species, won’t our honey bees suffer?

A: Nine species of ornamental privet have invaded over 1 million acres of ‘natural areas’ in the eastern U.S. (Hanula et al. 2009), making such areas far less natural than they used to be. One

consequence of privet invasions is that what was once a diverse shrub layer comprised of Viburnums, blueberries, buttonbush, sheep laurel, winterberry, sweet pepperbush, mountain laurel, Virginia sweetspire, native azaleas, and myriad species of perennials and annuals is now a monoculture of privet. It is true that privet provides good forage for honey bees while it is in bloom, but that is one short week each year. The rest of the year it just sits there, excluding native plants that would otherwise be making pollen and nectar for our bees. Bees need a diversity of flowering plants to provide a diversity of food sources, and they need such food throughout the season. Monocultures of introduced plants like privet, and burning bush, and Japanese knotweed, and multiflora rose, and Autumn olive, and bush honeysuckle provide just the opposite: a single species with a very short bloom period. This impacts our honey bees, to be sure, but think what it is doing to the thousands of species of native bees that our native plant communities have relied on for pollination services for millennia. Removing invasive species from our natural areas and replacing them with the diversity of productive plants will not harm the honey bee; it will help it.

Q: Somebody told me that they want to create a bird-insect friendly garden but they asked me to give them a list of non-toxic plants for kids.

A: The ironic thing is that kids don't eat plants...even the vegetables we want them to eat. They are not like horses. The first taste of a leaf that's bitter and they won't take another bite. Peaches are toxic if you eat the pit; full of cyanide. Same with apples, but we never eat the pit or seeds so no one cares. Kids are already surrounded by "toxic" plants...every plant on the street, is, in fact, toxic if you eat enough of it. There are many introduced plants that we live with every day that could be a problem if you ate a ton of them (azaleas, buttercups, lily of the valley, Nandina, Oleander, Amaryllis, Chrysanthemum, English ivy, foxglove, holly, Hydrangea, periwinkle). The real danger to kids is getting in a car. Motor vehicle accidents is the leading cause of death in children under 13 years of age but we manage that risk and don't worry about it. Bottom line is, I don't have a list of nontoxic plants, but I also don't think you need one.

Q: Charles Mann of '1493' fame says that it is hard to restore ecosystems to their 'natural' prehuman state because humans have been manipulating ecosystems for many thousands of years. Does that mean Home Grown National park is ill-conceived and doomed before we begin?

A: Charles Mann is absolutely correct. It is very difficult to decide what a natural state is. But it is not difficult at all to know what a productive state is. A productive ecosystem is one that maintains its inherent diversity and produces lots of ecosystem services. The more species in an ecosystem, the more productive it is (see Chapter 7). Native Americans did change the prehuman state of North American ecosystems by hunting the large Pleistocene mammals that dominated this continent for millennia to extinction. Yet, through controlled burns, they maintained the savannah-like structure of woodlands in much the same way those large mammals had. But here's the key; although Native Americans did manipulate the members of local ecosystems, they did not change what those members were or how those members interacted with each other. Unlike us today, Native Americans did not replace native plant communities with species from other continents, and so they did not destroy the specialized coevolved relationships that glued local ecosystems together. That is, Native Americans fiddled with but did not, on average, reduce ecosystem productivity. Besides, our goal is not to turn the clock back to a particular period and recreate ecosystems that once flourished in North America; we have already changed too many ecosystem components - - - from soils, to plant communities, to natural fire regimes, to top predators - - - for this to be possible. Instead, our goal is to restore as much ecosystem productivity as possible by reassembling the specialized relationships that encourage productivity, even if they are not exactly the same relationships that existed at a particular place 1000 or 2000 years ago.

Q: Does my yard have to be 100% native effectively join Homegrown National Park?

A: Absolutely Not! There is there room for compromise. Over the years, my students and I have framed our research results in terms of the ecological harm that occurs when introduced plants replace natives. With few exceptions, however, it is not the addition of introduced plants to our landscapes that destroys biodiversity; it is the removal of the native plants upon which that biodiversity depends. Landscapes with a healthy dose of keystone plant genera almost always have room for some striking non-invasive introduced ornamentals without losing their ecological clout.