Ten Elements of Natural Design

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The elements that make a landscape design “natural” are difficult to define. A landscape with curved bed lines, informal plant arrangements and no pyramidal yews does not always qualify as a natural landscape. And advocates of natural design are not necessarily eager to banish a host of beautiful exotics from the plant palettes of American landscape designers, replacing the plants with a motley crew of straggly natives.

The basic concept behind natural design, however, is fairly simple—to incorporate native plant communities into the designed landscape. But their successful incorporation requires a basic understanding of how native plants operate in nature.

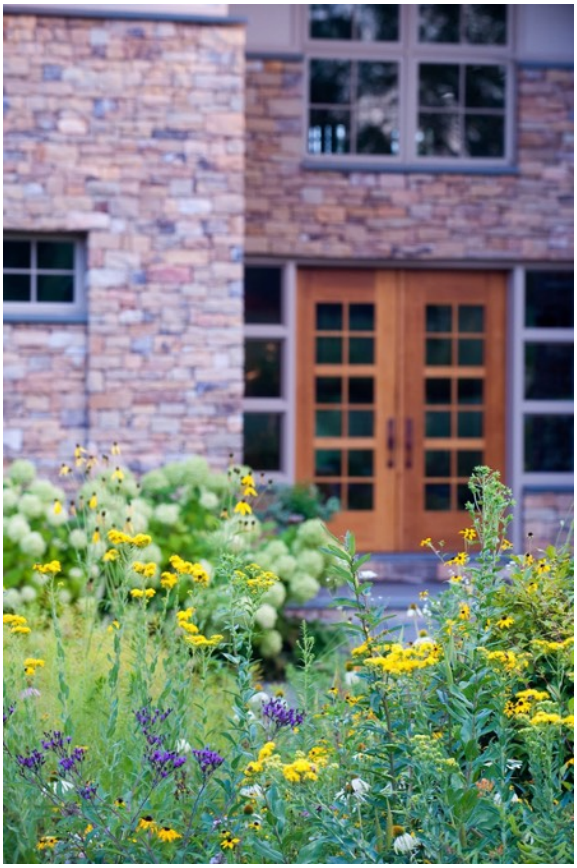
Too often, random informality passes for “natural,” when in reality nature is highly ordered and anything but random. Understanding this order and using it in our designs is the key to making natural design workable and successful. This does not mean, however, that we must design exclusively with native plants, attempt to copy nature exactly, or exclude the influences of other design styles. The goal is to create a framework for the overall designed landscape that has an aesthetic and ecological relationship to our indigenous landscape through the use of native plants in their natural associations.

The basic considerations of natural design can be broken down into three categories: aesthetic, managerial and environmental.

The aesthetic aspect of our designs is highly subjective, and individual style varies greatly. Some designers may object to uniformly patterning their work on the native landscape, feeling they are homogenizing their designs or stifling their artistic expression. But, as landscape designers, our medium is the land.

Unlike a painter whose art occupies an isolated canvas, our work visually interacts with the surrounding landscape, both natural and constructed. We therefore have a responsibility to contribute continuity and a sense of place to the larger landscape. To successfully accomplish a marriage of art and nature, we should sometimes put our egos aside and let nature be our guide.

The managerial aspect of natural design is tied to the fact that reducing landscape maintenance is a strong priority for virtually all our clients. Natural design techniques can make a great contribution in this regard. This does not mean that natural landscapes are maintenance-free and can be completely left to natural processes with no human guidance, however.



What natural design does mean is that landscapes that incorporate native plants and natural processes will require less time, money and energy for upkeep than designs in which plants are selected and combined for ornamental effect alone. A purely ornamental garden is like a beautiful, sleek automobile with no engine. It may be nice to look at, but the only direction it will go without help is downhill. We will be perpetually required to tow these gardens up the hill with fertilizers, watering hoses and weeding forks.

The environmental considerations of natural design are equally important. Many detrimental landscape practices can be minimized or eliminated. Such landscape practices include the excessive use of pesticides, herbicides, inorganic fertilizers, fossil fuels burned while mowing large areas of turf grass, and exotic species that have aggressively naturalized in the wild.

Natural design aims not only to reduce these negative effects, but to make a positive contribution to the surrounding environment as well. Naturally designed landscapes can also become functioning ecosystems capable of providing food and shelter for animals and insects, while helping to perpetuate many native plants whose habitats are being reduced through development.

Now that I've covered these main categories, I'd like to discuss 10 elements of natural design and examples of how to apply them to our work.

1. Cultivate an appreciation of the beauty in nature.

Everyone admires the beauty in a majestic mountain range or a towering waterfall, but most of what we can create in our landscapes is more subtle. The contrasting patterns of straight and leaning tree trunks in a woodland grove, a single turk's cap lily (*Lilium superbum*) nodding above a bed of meadow grass, or the layered branches of a pagoda dogwood (*Cornus alternifolia*) in a woodland edge may be an acquired taste.

A native old field in winter is a prime example of how learning to see the landscape anew can open a whole new vista of aesthetic possibilities. The glistening orange of little bluestem (*Schizachyrium scoparium*) in the sun, punctuated with columnar green patches of eastern red cedar (Juniperus virginiana) is a spectacular American scene, and a much more warming sight on a frigid February morning than a curled up 'PJM' rhododendron (Rhododendron 'PJM') in a crispy bed of pachysandra (*Pachysandra terminalis*). Designers who cultivate in their clients an appreciation of the natural world around them will find their work to be more easily accepted.

2. Minimize disturbance of existing native growth.

Protecting existing native growth, particularly woodlands, is easier and less expensive than trying to restore it after it's destroyed. Even our best restoration efforts may never achieve the beauty and mystery of an undisturbed woodland. Developers, architects and clients need to be aware of the benefits of considering ecological systems before designing the structures for the site. Early decisions relating to the siting of buildings, topographic changes and excavation disturbance can help minimize destruction of natural growth during construction. Unfortunately, landscape designers and architects often are brought in after construction is complete and have no opportunity to influence the treatment of the existing landscape.

3. Decide how closely your design will emulate the native landscape.

The design will be determined by numerous factors including the character of the surrounding landscape, client dictates, architectural style, site characteristics and the scale of the site. A large site may allow for the design of a functioning ecosystem using strictly native species. A smaller residential site can be designed with a perimeter of site-appropriate natives, becoming more cultivated as the landscape nears the house. Native plant cultivars such as 'Golden fleece' goldenrod (*Solidago sphacelata* 'Golden fleece'), 'Purple Dome' aster (*Aster novae-anglia* 'Purple Dome') and native azalea cultivars can be very useful in making a transition from wild areas to more formal ones.

4. Allocate the location of woodlands, open spaces and transitional areas.

Natural landscape patterns found in many areas throughout the country are formed by the interplay of woodlands, open landscapes and the transitional areas where they meet (edges or ecotones). A graceful and functional mix of these features will define the design before any plants are selected. Even small properties can be approached in this manner, often resulting in the illusion of more space.

5. Base your design on native plant communities found in similar conditions in the surrounding areas.

Determine which plant communities would have existed on the site had it not been disturbed, and use these as a design model.

Determining native plants is easiest on a site that still contains remnants of indigenous growth. If this is not the case, you can obtain information by observing nearby natural areas with similar ecological conditions, analyzing the soil and hydrology of the site, obtaining geological maps and studying the natural history of the area. If the post-disturbance soil and water conditions are no longer capable of supporting these plant communities, consider basing your design on a community with similar conditions.

6. Use and plan for natural processes of change to modify the landscape.

The indigenous landscape is a constantly changing system composed of plants, animals, insects, microorganisms and soils. Plants are not isolated entities, but participants in a system constantly in flux. Different types of systems change at different rates. The annual meadow immediately resulting from a

disturbance may last for only one year, while the perennial meadow may last for 10 before yielding to pioneer forest species. By contrast, an old oak and hickory forest may last for hundreds of years if left undisturbed.

Once these changing systems are understood, the designer can decide which aspects to encourage, discourage or manipulate to fit the requirements of the client and site. Designed landscapes need not be static photographs frozen in time forever, doing battle with the forces of nature.

7. Occupy all the spaces.

A basic law of almost any native ecosystem is that if nothing is currently growing in a given space, something soon will. The more available space is filled, the less opportunity there is for a weed to enter. Plants grow against each other, above each other and below each other. Even a 3-foot-tall meadow has a multi-layered structure designed to seal off the area.

This is also evident below ground, where fibrous rooted plants occupy the soil surface and coexist with deep taprooted plants “holding down the fort” down below. There are obvious lessons here for the designer interested in creating landscapes that have the ability to fight off weed invasion without the aid of mulches, fabrics and grub hoes. Mulched beds around isolated groupings of shrubs are an open invitation to neighborhood bullies such as Canadian thistle (*Cirsium arvense*), knotweed (*Polygonum*) and nut grass (*Cyperus esculentus*).

A mixed, densely planted herbaceous ground cover layer, composed of plants with complementary aboveground and below-ground growth habits, will be far more successful at inhibiting weed invasion than any mulch. If this ground layer is also designed for succession of bloom and contrasting foliage texture, we can create a reduced-maintenance landscape that suggests the diverse tapestry of our native ground covers while achieving an artistic and colorful composition.

8. Increase ground water recharge by preserving rainwater on-site.

Current landscape practice often considers surface water as something to be eliminated. Meanwhile, water shortages are a frequent problem in our communities.

Whenever we grade a property to direct surface runoff into the storm water system, we are sending a valuable commodity out to sea. Aquifer recharge, the replenishment of our underground water tables, depends upon the absorption of rainwater into the ground. We can assist this process by using ponds, irrigation catchments, porous paving surfaces and bog gardens.

Low wet areas can be converted into colorful assets by designing them as wet basins containing a range of colorful water tolerant plants like turtlehead (*Chelone lyonii*), Joe-Pye weed (*Eupatorium purpureum*), New England aster (*Aster novaeanglia*) and blue flag iris (Iris versilcolor).

9. Employ alternatives to high-maintenance lawns.

The American lawn has become the focus of a great deal of controversy. Great quantities of water, fertilizers and fossil fuels are expended for lawn upkeep and the amount of pollution from herbicides, pesticides and small engine exhaust is well documented.

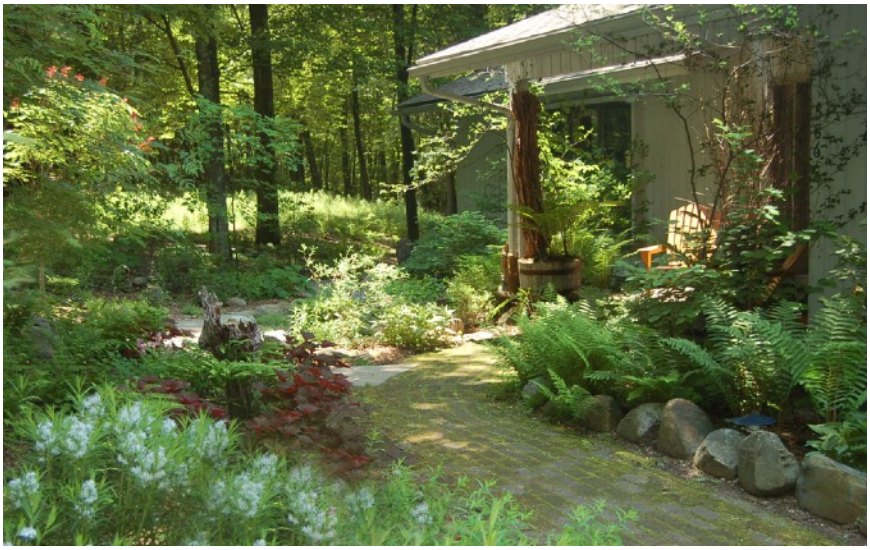
Although there is nothing inherently evil in a blade of Kentucky blue grass or the person who likes it, replacing substantial portions of mowed lawn with other, more ecologically friendly plantings would have a positive effect on our environment. A mowed lawn does serve a unique function in that you can walk, lay and play catch on it—activities that are difficult in a tall grass meadow or a cottage garden. It is possible, however, to offer alternatives that are affordable, easily sustainable, ecologically sound and aesthetically pleasing.

The first alternative to lawn is lawn. Not the resource-intensive grass monoculture that we normally plant, but a diverse ground cover of creeping broadleaf plants combined with slow-growing drought and disease-resistant grass cultivars or native grass species. These plants could include buffalo grass (*Buchloe dactyloides*), Pennsylvania sedge (*Carex pensylvanica*), wild strawberry (*Fragaria* spp.) and violets (*Viola* spp.). A lawn of this type would require little or no fertilizer or chemical application, and would need to be mowed less frequently than a traditional lawn.

Wildlfower meadows are currently the most popular lawn alternative as they can provide visually stimulating, low-maintenance landscapes. However, in order for

these plantings to succeed in the long run, the majority of wildflower seed producers must completely revamp their mixes. Annuals and short-lived perennials selected for immediate floral effect must give way to long-term native perennials and grasses selected for function and site-adaptability, as well as aesthetics. By patterning these landscapes after our native prairies and grasslands, their exciting potential can be fully realized.

The most neglected lawn alternative is woodland. While open space is highly valued, it can be even more appreciated when contrasted with a shady tree grove. While this type of landscape would obviously take far longer to mature, a transitional period can be filled with a meadow or grassland landscape supplemented with trees. Woodland understory and ground layer plants can be added after a sufficient canopy is developed.



10. Exclude invasive, exotic plants in the native landscape.

A number of exotic species have naturalized so aggressively into our woods, meadows and wetlands that the natural plant diversity of these areas is destroyed. These include many commonly used ornamental plants such as Norway maple (*Acer platanoides*), burning bush euonymus (*Euonymus atlatus*), privet (*Ligustrum*), Japanese barberry (*Berberis thunbergii*). Russian olive (*Elaeagnus angustifolia*) and tatarian honeysuckle (*Lonicera tatarica*). Purple loosestrife (*Lythrum salicaria*), a European perennial that has attained enormous popularity, has completely destroyed the biodiversity of thousands of acres of wetlands. (Claims that its cultivars are sterile and therefore harmless have been proved false, as these cultivars eventually hybridize into fertile forms.) We should completely abandon using any plants that have proved to be invasive in the native landscape.

In addition, we should be looking into ways to identify and discontinue using any new plants that show likely potential for invading our natural areas.

Although natural design is not new, current public interest in natural aesthetics, reduced landscape management and environmental issues is making its widespread acceptance a real possibility. In order to capitalize on this opportunity, we need to develop concrete

and reliable strategies for the design, implementation and management of these landscapes based on real ecological principles.

Landscape designers and architects influence the treatment of vast areas of land. We have a responsibility to treat the land as more than our personal paint canvas. The landscape designer should be part artist and part repairman, restoring some of the aesthetic qualities and environmental functions of the native landscape that have been destroyed. By making an effort to truly understand the workings of our indigenous landscape, and combining that understanding with the horticultural and design knowledge long associated with our profession, we can legitimately lay claim to the word “natural” when describing our work.

Woodlands, Meadows and Transition Zones

Natural design can incorporate native woodlands and meadows, as well as transition zones between the two. In a limited space, you can adapt these elements to a smaller scale. Woodlands are the dominant plant community type in many areas throughout the United States. If left undisturbed, these open sites would revert to some type of forest community after passing through various stages of herbaceous and woody shrub composition. Therefore, where woodlands predominate, landscapes patterned after our indigenous forest should be a strong—if not dominant—component of our work. The re-establishment of woodland landscapes on open sites, both large and small, should also be considered as a primary option.

A natural woodland is composed of a multilayered tapestry of canopy and understory trees with a ground layer of shrubs and herbaceous plants. Trees of the same species are found at many different ages and irregular clusters, and do not necessarily have straight trunks and uniform heads. In fact, leaning and jagged trunks can often be the most interesting feature in the landscape.

Unfortunately, there is not enough space to create true self-sustaining woodlands on most residential properties. However, if the planting of site-appropriate native woodland species on the perimeters of suburban properties became commonplace, a series of continuous woodland corridors would be created, connecting existing isolated fragments of native forest badly in need of ecological interaction. The positive ecological impact of this would be quite significant, while the aesthetic advantages of suburban landscape in visual harmony with our native American forest would be easily apparent. Additional privacy would be a bonus.

Native meadows and grasslands are often the product of the disturbance of existing woodlands. This disturbance can result from either people (fire, bulldozers, chain saws)

or nature (fire, storm, pathogens). If left alone, a succession of plant communities occupies the site. The process begins with herbaceous annuals and biennials, then leads to herbaceous perennials and grasses.

A mixed old field composed of herbaceous perennials, shrubs and fast growing pioneer trees follows. Finally, the site reverts to woodlands until another disturbance comes along, starting the process all over again. To preserve the open landscape then—be it lawn, meadow or perennial border—we must continuously arrest the successional process by artificially disturbing the landscape in various ways, such as by mowing lawns and weeding perennial gardens.

Although there are many different types of native meadows, they generally have one thing in common. The plant group most vital for their stability are the warm-season grasses such as Little Bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*) and Panic grass (*Panicum virgatum*). Although wildflowers receive the bulk of attention and are certainly an important aesthetically pleasing portion of the mix, it is the grasses that provide the stability for successful long-term results. Only through a combination of warm-season grasses and tough native perennials selected for site adaptability can we create dynamic and colorful landscapes that can live up to the low-maintenance expectations surrounding the wildflower meadow.

Woodland edges (or ecotones, in the language of the ecologist) are the transitional areas between the woods and the open landscape. They are, by nature, rapidly changing plant communities composed largely of herbaceous perennials, woody shrubs and vines. These communities can include species from both the woodlands and open landscapes that the ecotones separate. Additional species not found in either of the bordering landscapes may also be present. Some of the plants found growing in edges are the same pioneer species found in landscapes in transition from open to woodland communities.

We can design and manage a small woodland as an edge ecosystem, or selectively remove some of the edge species and manage the landscape to contain some of the aesthetic and functional characteristics of an interior forest. Ecotones are dynamic and diverse communities that hold a very prominent visual position in the landscape, and the design opportunities are exciting. Woodland edges also present both challenges and opportunities for the designer. Many of the most pernicious weedy vines such as Oriental bittersweet (*Celastrus orbiculatus*) and Japanese honeysuckle (*Lonicera japonica*) can be found in this type of environment where a combination of trees for support and adequate light for growth are present. A dense planting of desirable edge species, such as Arrowwood (*Viburnum dentatum*), Pagoda dogwood (*Cornus alternifolioa*) and Sweet fern (*Comptonia peregrina*) can help to eliminate these vines, but selective removal may be needed as a supplemental management tool in many cases.

Natural recruitment of Maiainthemum canadense, Dennstaedtia punctilobula, and Carex pensylvanica in a woodland setting. Invasive species have been selectively controlled (through cutting or herbicide treatment) to give the desired species a competitive edge and eventual domination of available resources. The shrub and vine layers can be added with protection from deer browse as necessary.