Native Plants: Design Rules and Maintenance Techniques

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INTRODUCTION

This document is meant to be an introduction or primer to the use of native plants. The information contained is general in nature and in particular is most applicable to the Mid-west, particularly southern Wisconsin, and northern Illinois. There is a great body of information regarding the use of native plants in formal or informal applications and there are a number of professionals that can provide a more detailed and specific application of native plants for a property. The references used in generating this document can be found at the end of this document.

Because of the general nature of this document it will not explore precise costs, or rules for using native plants.

For complicated, larger, or commercial applications it is recommended that one seek professional assistance from an Ecologist, Ecological Designer, or Stormwater Engineer.

While the use of native plants is not terribly complicated; understanding how, when, and which to use can be come increasingly complicated depending on the future use of the site.

It is not recommended that one use this document as the primary tool for developing a native plant design. However, it is our intent that this will encourage the reader to learn more.

Please share this document with colleagues, neighbors, and family.

What are native plants?

Native plants are those species of plants recognized by state or federal agencies as plants indigenous to a region. The Environmental Protection Agency differenciates between regions in four levels[1]

Much of the vegetation we see today are species that have been brought to the United States for

horticulural or agricultural purposes but may not have originated in the United States. Many, but not all, foriegn plants are not the most efficient plants for the growing conditions they are required to grow in, the result is an increase expenditure of resources in order to achieve crop yields or aesthetic integrity.

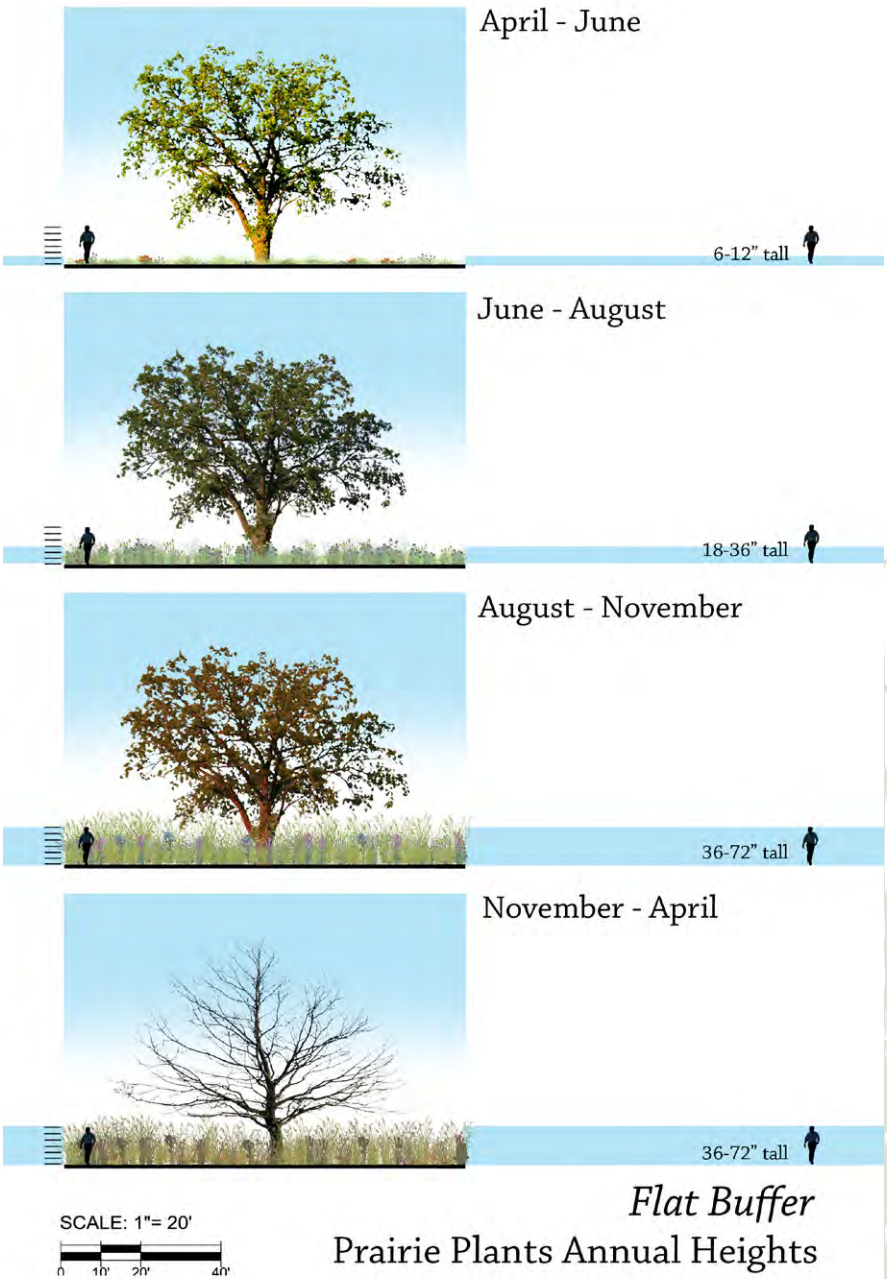
For example most turf grass is not native to the United States, let alone Wisconsin. Turf grass is an excellent example of a plant that requires a lot of extra rescources and regular maintenance. By contrast a meadow or prairie requires no extra water, or fertilizer and usually very minimal maintenance. The extra input of rescources and maintenance resulsts in higher lifetime cost for most conventional landscapes, such as turf, when compared with native plantings. Studies vary in the degree of savings but over the lifetime of the planting native plantings range between 1/2 to 1/5 the cost of conventional landscapes.[2] The larger the area of landscaping the greater the cost savings potential, particularly when employed with alternative stormwater management systems.[3]

By contrast most regionally native species require very little extra resource or maintenance input when place in a balanced planting and located in appropriate conditions. Like all plants, native plants will require some extra water until they reach establishment, however, after the first growing season most native plants rarely require supplemental water, and never require fertilizing. Native plants, when used correctly can be just as aesthetically pleasing as conventional landscape material and can be used in informal or formal arrangements. The regular maintenance requirements for native plants is often lower as well, in many areas native plants are maintained annually with seasonal burning or mowning and periodic weeding of invasive species. Though maintenace requriments will depend on the planting arranagement type, it won't be any more than conventional landscape material.

There is another tremendous benefit from using native plants that can't be found with many conventional landscape plants, habitat. Whether in formal or informal arrangements native plants tend to have higher habitat value than non-native conventional plants. The nutrient content of the material, the structure of the material, and the diversity of species are all precisely the type of rescources needed for the native fauna of a region.

For example honey suckle, a common landscape shrub, though aesthetically pleasing to some and used by birds for mast has very low nutritional content[4] and has been likened by some like asking birds to live off of candy.

It would seem that using native plants is the easy and right solution, so why isn't it done more often? Probably because most people aren't aware of what is native, and the benefits of native plants.The wide spread use of native plants is expected to increase as more people become aware of the benefits of native plants and begin to recognize what is native and what is not.



When using native plants it is important to understand that there is a seasonality to the plantings. Unlike lawn, which can remain relatively static in appearance over the course of a year, native plants are dynamic. Most native plantings are designed for year round flowering, however, the species in-flower may change. In addition, most native plantings will change in structure over the course of a year. We expect a tree to grow and drop leaves on an annual basis, in the same way the structure of native plantings, including non-woody herbaceous species may change in structure, grow, and recede.

There are some important general rules to remember when working with native plants regarding color and aesthetics.

1. Most woodland types of plantings have a larger percentage of color on the ground plane in the spring, with fall color moving into the canopy at the end of the year.

2. Most wetland, prairies, or meadows keep their color near the ground to middle plane all year long. Severl non-woody herbaceous plants have a fall color in the same way that many trees' leaves change color.

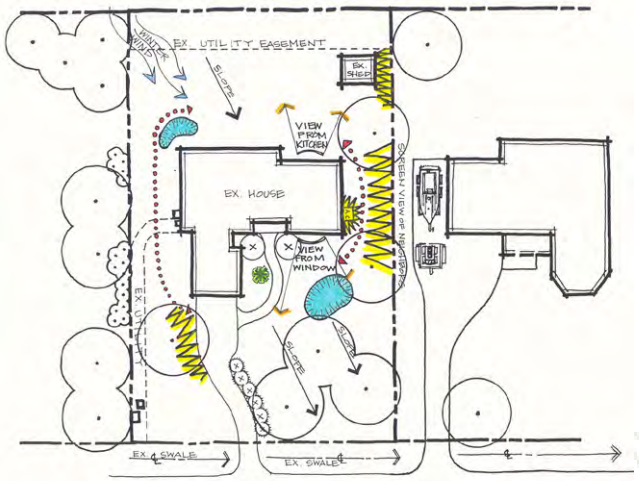
It is precisely this seasonality that give native plantings a greater habitat value.

We must first begin by asking our selves some key questions. These questions form the design program for the property and help determine which type of planting technique and which species of plants are appropriate for the property. Depending on the scope of the project and size of the property the ability to answer the following questions becomes more or less difficult. The key questions are:

1. What is needed? Begin by developing a list of the types of uses the property will have to accomodate. A sample list might include:

- play area for the kids;
- yard space for dog;
- small garden space;
- potting shed;
- compost area;
- alternative stormwater management features.

2. What is there now? Next, review the existing conditions of the property. Include such features as areas of steep slope, sunny or shady spots, areas one loves to look at and areas one would like to see less



of, as well as utilities, if known. It is usually best to diagram the existing conditions. When preparing an ecological design there are some specific existing conditions that should be measured. *Preliminary data*, the data that is often most easily overlooked are property lines, legal easements, local planting restrictions, utility features and locations, and local ordinances or covenant restrictions, building shape and size, and hardscape features, such as driveways or sidewalks. *Environmental data*, are primarily collected through observation or simple tests and include climate, topography, any existing vegetation location and type, soil type, observed 'wet spots', sunny and shady places, and others. *Cultural and Miscellaneous data* include any historical or areas of special value, specialized views that may want to be preserved or obstructed, etc.

3. What will work and survive? Answering this question becomes more difficult, it is not as much of a inventory of existing needs or conditions but an analysis of the conditions against future *potential* conditions. Defining the future potential conditions presupposes you know enough about the material that will be used in the design. This is most often where people become confused or frustrated and often where professional assistance is more valuable.

4. What would have been there? This questions is linked closely with Question 3, understanding what will survive on the property will be closely related to understanding what would have existed on the site if no development had occurred, 10, 50, or 100 years ago. Like Question 3, this could require professional help.

STEP 2 -
Understanding Native Communities

WETLANDS

Characteristics:
- Open or shaded landscape
- Low spots and saturated soils
- Various moisture levels
- Various plant heights
- Various plant types: woody, herbaceous
- Colorful in late spring and early fall

Representative Species:
- Asclepias incarnata
- Panicum virgatum
- Phlox glaberina
- Carex vulpinoidea
- Iris virginica shrevei
- Juncus torreyi
- Lobelia cardinalis
- Physostegia virginiana
- Sagittaria latifolia
- Scirpus atrovirens

Appropriate Uses:
Rain Gardens
Stormwater Management Features
BMP's

PRAIRIE/MEADOW

Characteristics:
- Open Landscape Full Sun, no shade
- Dominated by grass, but high forb diversity
- 50% of blooms from June to August, 25% in spring, 25% in fall
- Historically burned every year

Representative Species:
- Andropogon gerardii
- Monarda fistulosa
- Sorghastrum nutans
- Rudbeckia hirta
- Echinacea pallida
- Liatris pychnostachya
- Asclepias tuberosa

Appropriate Uses:
Open un-mowed Areas
Periodically Flooded Areas

WOODLANDS/SAVANNA

Characteristics:
- Shaded landscape
- Various moisture levels
- Blooms primarily in spring
- Layered vegetation
- Canopy closure 80% +

Representative Species:
- Podophyllum peltatum
- Dentaria lacianata
- Polygnatum biflorum
- Asarum canadense
- Trillium grandifolium
- Arisaema triflorum
- Asclepias tuberosa

Appropriate Uses:
Deeply Shaded Areas
Planting in Shade Wells or Under Trees

The following rules are genearl in nature, but are intended to help the user select and then design native plants appropraitely. Because of the general nature it should be noted that the three ecosystems shown in STEP 2 are a very gross generalization of ecoystem types. Regional variability means there are actually many more types of systems; one should consult with local experts to determine the specific types of systems that may have occurred on a property and which of these systems would survive there now.

GENERAL DESIGN RULES

1. Each site has a level of fitness that must be achieved: identify and map all opportunities and constraints; ecological and cultural; design and restoration programs must be appropriate to the site

2. Design is subtractive; not additive: imagine the site as a restored, functional unit and carve out the space needed.

3. Develop a concept that is the measure of all design decisions; if it isn't consistent with the concept it isn't consistent with the design

4. Create compositions based upon natural communities; in general use sympathetic community species; position plantings in appropriate settings

5. Use regional and local material to create a sense of 'Place'; select regionally appropriate native species; specify local building materials and architectural styles

PLANT SELECTION

1. Compare the information gathered in STEP 1 with the three basic types of ecosystems shown in STEP 2.

2. Determine the type of native ecosystem that would grow on a property, understanding some properties may have more than one or all of the general ecosystems shown in STEP 2.

3. Compare the native ecosystem with the desired use for the property; match appropriate ecosystems with their proper use or function (Ex. wetland species with alternative stormwater systems).

4. Select species based on functional and aesthetic needs.

PLANT ARRANGEMENT

1. Plant in drifts; mass and accent plantings of single species provide immediate bold color

2. Pattern drifts to emulate undulations or irregular edges in your landscape, or from the hardscape and architectural lines of the site

3. Grasses or groundcovers give a continuous, refined look

4. Planting with quarts or gallons give a more immediate mature look

STEP 3 -
Design Rules

5. Plant fine textured plants in the foreground & coarse textured species in the background to create a sense of depth

6. Defined edges give a naturalized planting a deliberate look and provide evidence of habitation

7. Plant groups of differently colored and textured species adjacent to each other

8. Use formal plantings in the foreground and restoration as the backdrop

9. Formalized planting areas are not restorations. Too much diversity can lead to a messy or arboretum aesthetic.

10. The smaller the size of the planting area the more specific the placement and understanding of species arrangement required.

11. Layout or set-out plants prior to planting; arrange plants while they are still in their pots and prior to planting.

12. Herbicide, if necessary, weedy species and remove prior to planting.

13. Rototill planting beds to a depth of 6” prior to planting; be sure to remove all weed material prior to tilling to prevent weed spread.

14. Place plants in at least 3” of topsoil.

15. Split the root systems of all potted plants at the root base with 1” cuts in a crisscross pattern using a sharp blade.

16. Use seed in areas half an acre minimum size to ensure restoration success

17. Seed at a rate of 10-15lbs/acre

18. Seed is typically most cost effective method of installation, but requires more time to mature and may require more front-end maintenance

19. Generally seeded areas should be composed 2/3 grasses/sedges & 1/3 forbs

CONTROLLED BURNS

Many ecosystems, particularly those in the Mid-west, were historically exposed to periodic burning. Burning is an extremely efficient, low cost technique for maintaining a native planting. The larger the planting becomes the more efficient burning can become as a maintenance tool. Burning has multiple benefits, many plants respond positively to burning, increasing growth above and below ground, increasing fertility, and releasing nutrients. Burning also tends to be an effective means of controlling many undesired species.

Burning can be easily and safely executed when performed by a well-trained individual. There are insured burning crews that can assist with burning maintenance and there are a numer of different resources to learn how to conduct controlled burns safely.[5]

In addtion to being an efficient and effective maintenance tool controlled maintenance burning has become a community event in some portions of the U.S. where neighbors gather on lawn chairs with popcorn and snacks to watch trained burning crews conduct controlled burns across large native plant areas.

Controlled burning typically begins after the 2nd or 3rd full growing season when there is sufficient fuel for carrying a fire. Burning is typically prescribed on annual to 2 to 5 year intervals.

MOWING

Burning isn't always a viable option, it may not be allowed in some communities or proximity to structures, utilities, or certain types of vegetation prohibits burning. In cases where burning isn't viable burning is an appropriate maintenance tool.

Like a controlled burn, mowing can be an annual event but only after the native plants have become established.

Mowing is more labor intensive because all of the 'duff' material will need to be removed to prevent it from smothering resprouting perennials or new seed sprouts.

Mowing is commonly employed in any seeded areas for the first two full growing seasons with prescribed mowing occurring 2 to 3 times in the first growing season and 1 to 2 times in the second growing season.

WEEDING

In very small beds or in concentrated populations of un-wanted weeds, hand-pulling can be the most effective and fastest way of eliminating unwanted plants. In formal planting areas which may have a mineral or bark mulch top dressing weeding may be the only real regualr maintenance required. Just like weeding a garden, the intent is to remove the entire unwanted plant, roots and all.

STEP 4 -
Maintaining Native Plants

HERBICIDE

Herbicide is often used to prepare a site for native plantings. Most sites have some level of invasive non-native plants that have to be removed before planting can occurr. Many of these non-native species have to be herbicided in order to effectively remove them.[6]

After planting occurrs herbicide may be employed to control large populations of undesired speces. Large applications of herbicide require and herbicide applicator's license, however, smaller applications of retail herbicides can be applied by non-professionals.

Herbicides vary in their toxicity, target species, and appropriate applications; be sure to follow the manufacturer's recommendations to minimize accidental mortality.

Herbicide is applied in many different forms, from larger sprayers, to hand wick applications. Applications vary by population size of target species, species type, sensitvity of surround vegetation and future intentions.

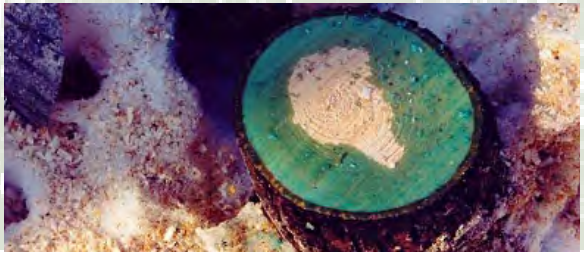
BRUSHING

Mechanical removal of woody material is used to thin wooded areas of over-concentrated native plant populations as well undesired non-native, invasive species.

Brushing typically occurs in the winter season when plants have become dormant and the ground is frozen allowing vehicles to drive into wooded areas to haul cleared brush out without compacting sensitive soil structure or damaging roots.

After undesired trees or shrubs are removed they may be treated with a topical herbicide, depending on the species and the time of year in which it is removed.

Mechanical brushing opens up a wooded environment so that larger populations of non-woody, herbaceous material can recieve more light at the forest floor or to encourage the young growth



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