Ecosystem Modelling in Landscape Design

“Paying attention to local natural systems teaches us how to bring forth the hidden potential of nature in areas where others have lost hope.” –D. Floyd

Plants grow where they grow for a reason. In order to adequately accomplish so-called “Native” landscape design and installation, CUH pays close attention to what grows where, and why. Communities of plants, installed with ecological spacing, density, and variety, are the key. Existing site conditions in a garden determine plant selection, rather than plant selection requiring that the site be amended. A notable side effect is that the installations are beautiful and self-sustaining.

Our methodology for design is straightforward. It is based on the simple logic that plants grow where they grow for a reason. We match existing site conditions with conditions observed in the wild. We determine the native trajectory for the site (based on available data from nearby survey plots), and we determine a plan for how to instigate a process of renewal within the designed space. We strike a balance between mimicry and interpretation that ensures biodiversity is supported in a sustainable fashion while meeting client needs.

Native Trajectory. Every patch of land, despite its condition, has a natural potential for native system renewal. This renewal may be hampered initially by depleted soils or non-native species, but it has the trajectory no less. We call it Native Trajectory, and defining this for each project site is the first critical step in our design process.

In our many explorations, surveys, and assessments, we find that landscapes rebound from whatever stresses have impacted them. Each place has a natural trajectory that is unique to its location on earth, its ecoregion, and its unique local conditions. None is like another, and Nativism plays out along detailed and nuanced lines. Through this lens, “Native” takes on new meaning that is context based, and ecologically relevant (rather than being driven by cultural boundaries and human aesthetics).

The key to choosing the right plants for supporting local biodiversity resides in understanding the natural potential of your project site. Predicting Native Trajectory is a challenge and it takes time and practice to begin seeing all the clues that lead to an accurate diagnosis. The more hands-on experience you allow yourself, the simpler the logic becomes. The key is to begin visiting and studying a multitude of actual native systems in your region.

Important Characteristics to Consider before Design. Below we list eight of the most important characteristics you should be paying attention to if you want to ensure you are choosing the right native plants for your project.

- Geology. Overarching soil characteristics (even at depleted sites) and landforms are greatly influenced by the bedrock. There are always exceptions to the rule, but this is almost always the dominant factor in shaping native plant communities. What bedrock do you live on? Find a local native habitat on the same bedrock to make a study of.
- Elevation. Plants fill all niches of our landscape, and they frequently organize themselves by elevation. Low elevation habitats have different plants than high elevation sites. What is the
elevation of your project site? Find a local native habitat at the same elevation to study and learn from.

- **Aspect.** Aspect, or the direction that your sloping land faces, is very important for selecting types of plant communities. It is so strong an influence that it can result in entirely different fields or forests on the very same mountain. What is the aspect of your property? Does it face north, south, east, west… or somewhere in between? Is it flat? Find a local native habitat with the same aspect and see what you can learn from it.

- **Steepness.** Steepness plays a strong role in creating unique native plant communities. It effects both soil drainage, soil chemistry, and exposure to the elements. How steep is your project site? Can you find a local native habitat that has similar steepness? Do so, and you will find many solutions for plant selection that are appropriate for your site.

- **Moisture.** Water availability, and how consistent it is, is a factor that must not be overlooked. Certain plants occupy swamps and others grow on rocks. What are the moisture characteristics of your project site? Can you find a local native habitat that is the same? Make an inventory of the plants you find.

- **Soil Drainage.** Each site has more or less ability to retain moisture. Divisions between different plant communities often fall sharply along lines of differing soil drainage regime. Most plants that grow in a poorly drained area will not grow in the well-drained area only a few feet away. In this way, a plant is native to one spot, and not to another. What is the soil drainage of your project site? Find a local native plant community to study and you will have a long list of appropriate species for your project.

- **Quality and Duration of Light.** The sun reaches the landscape in a variety of ways. We see this play out with fine resolution on the landscape. What is the quality and duration of light at your project site? Find a similar setting in a local native habitat and presto, you will have teased out a few more clues for a sustainable and rich installation.

- **Location.** Latitude and longitude are important factors. Plant communities change dramatically if one heads north, or south, even if all other site characteristics remain constant. Set your limit at about 20 miles, north and south. If a plant grows naturally more than twenty miles from your project site, it is part of a plant community that is not in line with the native trajectory of your location.

**Getting the Plants.** Getting native plant variety and quantities that allow you to instigate native renewal is a challenge. One may find 100-200 species in a single natural habitat, and only 40-50 of them might actually be available. Be patient. Push your local nurseries. Ask for the native plants you need. Demand will drive availability. Buy local native plants and demand more. It will get easier!

**Preparation is everything.** Prepare your planting site thoroughly by removing all non-native weeds. If you have turf, remove it. We encourage using muscle and sweat, rather than herbicides. Never prepare a site unless you are ready to plant. Non-native exotics will quickly reclaim the garden and all your hard work will be for naught.

**Ecological spacing.** Plants should be spaced apart no more than what is observed in the wild (4-6 inches apart; for shrubs, 12 - 18 inches). The further apart they are spaced, the more maintenance and weeding you will have to do in the coming years. There’s a direct correlation. Invest upfront in plants, save long term in sweat and pain, mulch and maintenance.

**Maintenance.** Our rule of thumb is, three years of weeding, a lifetime of edge maintenance. Invest your time heavily in the first three years by ensuring non-native exotics are removed/managed so the natives can infill.

*C.U.H. 2017*