



Turning a New Leaf Conference
Shepherdstown, West Virginia
November 16, 2013

Challenges in Conservation Landscaping
Presented at 10th Anniversary Dinner Celebration

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I come to landscaping from a science background. I left a postdoctoral research position to start working at Adkins Arboretum, where my first big event was the native plant sale. Suddenly visitors expected me to advise them on what shrub to plant that would look good year round and only grow 3' tall. I got through that first plant sale on what I knew about how plants grew in the wild, asking other staff and volunteers, and reading the descriptive sale signs. Although since then I have learned a lot about landscape design and horticulture, I am still an ecologist and so tonight I want to address four biology-related challenges I see for conservation landscaping professionals: plant identification, ecology, conservation biology and the kitchen sink topic - novel ecosystems.

1. Basic plant ID - Let's start with basic plant identification (showed leaves of Ailanthus and Walnut)

You might be able to tell these plants apart, but can the people who work for you? Can the guys with the weed whackers? Is there anyone out there who can be hired to weed a perennial garden or manage a meadow who can tell a weed seedling from a desirable seedling? I am pretty good at plant ID, but if asked to identify a non-flowering grass in a meadow I can be easily stumped.

Conservation landscapes require some new management skills and we need to figure out how we are going to reach out to and train landscapers.

Another whole topic here would be the naming of plants so that we know what we are buying - in particular trademarked cultivars, but I'll leave that for another day!

2. How's your knowledge of Ecology? In the Ecology class for the George Washington University Sustainable Landscapes program, I start out class with an Eco-Jeopardy game. Let's just say, relatively few people in the landscape design field have much of a science background even if they have a passion for sustainable practices. I want to give two examples here of how conservation landscaping could benefit from more ecological knowledge.



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Plant ecology - we need to understand more about the life history and ecology of the plants we work with if we want to use them in a sustainable fashion. This thought was prompted by Thomas Rainer's posting titled "Intermingling and the Aesthetics of Ecology," on his blog *Grounded Design*, which in turn was prompted by his reading *Planting, a New Perspective* by Noel Kingsbury and Piet Oudolf. In Thomas' posting he writes about whether massed or intermingled plantings have any particular ecological value relative to each other.

To answer that question we need to understand how those plants grow in a natural environment. In natural environments do they grow in large colonies or are they intermixed with a wide variety of other species? What insects, animals, and soil biota do they need to grow their best? Once you know a plant's ecology, you can really figure out its best use in a designed landscape. If you're going to plant golden ragwort, you'd better want it to form a groundcover or you will spend a lot of energy pulling it out. If you want colonies of bloodroot, you need tall, deciduous canopy trees that allow plenty of light in early spring, organically rich soils, and ants to move the seeds around. At least there's a lot of research out there on plant ecology relative to the next challenge - soil ecology!

Soil ecology - As the number of people signed up for the Soils track shows, most of us really want some more education on soils. Not many of us could explain the nitrogen cycle, much less the importance of bacteria versus fungi in soils. In fact, it is a field in which a lot is being learned quickly. As a graduate student at Rutgers University I helped Dr. Jean Marie Hartman with a project looking at the effects of soil amendments on succession in old fields. Plots that had sulfur added had much more growth of warm season grasses over weeds, because the sulfur lowered pH, and in this case nutrient levels, increasing the competitive ability of the warm season grasses. This could be very important if you were trying to establish a new meadow.

I keep seeing new articles about how soils and plants interact. Example: Grasslands in TX invaded by cheatgrass develop higher total N levels in the soil, lower soil food web diversity, and an increase in bacterial dominance of the soil microbial community. This in turn favors the growth of cheatgrass over native grasses.

The implications of this and other studies are that we need to figure out what sort of soil communities we have, what types would benefit the types of plants we're trying to grow, and how we can restore soils. Many of us work in areas with highly disturbed soils and yet there is



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relatively little practical information available on improving soil health beyond the mantra of "add compost."

3. A third area of biology that we could turn to more is Conservation Biology - we know we are conserving water and energy in conservation landscaping, but how are we doing at conserving plants and animals?

Cultivars - Cultivars are selected for looks and hardiness, but seldom are they evaluated for pollinator attractiveness, seed production or as host plants, which we SAY we also value them for in a sustainable landscape. Planting a 'Lime Sherbet' *Echinacea* is not equivalent to planting an *Echinacea purpurea* grown from seed.

Having said that, yes, I have cultivars that I love in my garden like the double flowered 'Sunshine Daydream' Garden Candy™ *Helianthus* hybrid that was handed out at a conference a few years ago (with a tag IDing it as a US native even though it is a horticultural hybrid). But I also love my (unfortunately named) flowering spurge (*Euphorbia corrolata*) whose parents were grown from wild locally collected seeds. It has a long bloom time, neat habit and attracts scads of pollinators. So it is the overuse and sometimes inappropriate use of cultivars that I fear.

Loss of genetic diversity in our garden plants - biodiversity doesn't just mean diversity of species, it also means genetic diversity within and among populations, community diversity and ecosystem diversity. Genetic diversity is important because it allows species more of a chance for adapting to introduced pests and diseases and climate change. There will seldom, if ever, be enough cultivars in a landscape to equal the genetic diversity among populations of plants. Planting a giant swath of *Panicum virgatum* 'Shenandoah' is not as stable as planting *Panicum virgatum* grown from seeds collected from a wild or cultivated seed-propagated population. We need to encourage the nursery industry somehow to provide not just cultivars but also seed-propagated plants. Maybe if you patent a plant to sell you should also be required to sell its seed grown ancestors <smile>.

Rare species - Lastly in the realm of conservation genetics, we also should take more care to learn what species are rare in our local area and avoid planting cultivars of those species nearby. I don't think this is a widespread problem but there are several popular plants out



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there for sale that are state-listed rare plants including *Coreopsis rosea* (pink coreopsis) in Maryland, and *Chrysogonum virginianum* (green and gold) and *Iris cristata* (dwarf crested iris) in Pennsylvania. It may seem counterintuitive not to plant more of an endangered species, but the concern is that those local populations may have special adaptations that could be diluted by gene flow from cultivated plants or that plants brought in from elsewhere could introduce a new pest or disease.

Conservation - At the landscape level - the matrix of urban areas, forests, and fields; the increased biodiversity we achieve by creating lots of conservation landscapes does not equal the loss of biodiversity as natural habitats are degraded and destroyed. Small backyard habitats function for some species, especially those that can fly among isolated patches or those urban adapted species like raccoons or coyotes. But even more mobile wildlife are deterred by highways and fences. At my house in a relatively rural part of Maryland, I've never seen a deer in the yard because one side of the property is bordered by water, 2 sides by a string of houses with fenced yards, and on the other side by fenced cow pastures.

Eventually we may be able to create whole corridors of wildlife friendly neighborhoods, but there are still a lot of barriers out there in the form of roads, parking lots, and fences. If we want to preserve biodiversity, we have to make sure that we are also protecting natural areas that surround us. They are the ultimately the source for new plants we might want to include in our constructed landscapes and serve as a reservoir of biodiversity.

So we need to add more diversity to our gardens and conserve the biological diversity in surrounding natural areas, and that means genetic diversity, community diversity and ecosystem diversity, not just species diversity. This will help our gardens and surrounding ecosystems to be more resilient to changes in the long-term.

4. Novel Ecosystems - Finally I want to address novel ecosystems. The issues of climate change, invasive plants, and native plants have become entangled in the debate over what are being termed "novel ecosystems." These are areas that are so heavily disturbed that never-before-seen combinations of plants and animals occur together. These are usually combinations of native and non-native plants including some invasive non-natives, and some people argue that this is the future of our ecosystems. Think of the vacant urban lot ecosystem with its community of tree-of-heaven, chicory, pale smartweed, and mugwort.



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The first question that tends to arise in this debate is whether native and introduced species are inherently different; particularly in this era of changing climates and human influences on the landscape. Ellie Altman sent me an article recently from Horticulture Magazine entitled "Aliens Welcome Here," that seems to take exception to the promotion of native plants and the labeling of some plants as invasive. This article at least included a link for more information on invasive plants, but other articles have not taken such a balanced approach.

Most of the articles criticize native plants arguing that they can be as aggressive as an invasive plant and that the definition of what's native is fuzzy anyway in this era of widespread movement of species and climate change. I grant you that not all native plants are garden-worthy. I wouldn't plant trumpet creeper in my garden in Maryland because I'd have to be cutting it back all the time. I have one growing in my garden in New Mexico though, where it is well-behaved (of course it isn't native there and does require occasional supplemental watering! It is still attractive to New Mexico's many native hummingbird species). I have a rampant maypop or Passion flower vine (*Passiflora incarnata*) growing on a hillside at my house where I know I'll never be able to get rid of it. But at least the bumblebees love it; it's hosting lots of fritillary butterfly caterpillars; and something is eating the fruits, maybe the raccoon my dog treed recently. It's certainly preferable to the non-native autumn clematis (*Clematis ternifolia*) growing on another section of hillside that nothing eats.

The second argument is that non-native plants are performing the same functions of cleaning air, filtering runoff, and reducing erosion in urban areas as native plants would, so why fight to stop the inevitable spread of these species? As an ecologist I can think of several reasons to stop the inevitable - homogenization of the world's flora, wildlife habitat degradation, and the importance of urban areas as an educational tool among them. Ultimately restoration choices and of course planting choices are governed by human aesthetics and preferences. If roadsides lined with Callery pear are considered more beautiful than the edge of an oak-hickory forest with its ghost-like glimpses of *Amelanchier* in the spring, then I know Callery pear will continue to spread. If kids see *Ailanthus* growing in urban lots and that's all they know, they won't be concerned if they see it growing at the edge of a natural area. I was very encouraged by a recent visit to Barcroft Park in Arlington, Virginia. Volunteers there have been removing invasive plants in and around the remnant woodland. This woodland contains some of the last magnolia bogs on the planet, as well as a lovely oak hickory woodland. It could have been left to turn into an oak - shrub honeysuckle and English ivy woodland, but instead people care



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about its condition and are working to maintain it so that future generations can enjoy what is certainly not a pristine woods, but is one that still holds an amazing diversity of native plants and animals.

I urge caution then in moving towards novel ecosystems. We have an amazing diversity of species in our region, many of which will be able to adapt to future conditions. But we need to give them a chance, particularly against invasive species that are clearly causing harm to native plant populations and less-disturbed ecosystems. Gardens have always been places where you can experiment with never-before-seen plant combinations and they will continue to be a creative outlet, but I think native species need to get top priority in areas we define as "natural" or "wild."

5. Conclusion

As I think every good dinner should end with chocolate, so I think every good dinner speech should be brief and end with some inspiring notes:

First, there need to be more and better training opportunities so that those of us in the landscaping fields can learn our plant ID and practical information on plant ecology and soil amendments. CCLC is working on standards for training and certification with other regional groups. Municipalities and some businesses have embraced green roofs, rain gardens and other LID elements because it saves them money on stormwater control and energy but there is a lack of qualified professionals to install and maintain these features. A certification program would help to identify individuals who have good training.

CCLC is also partnering with other similar groups around the country to offer a webinar series for professionals. For example, Mike Curry from Chicago gave one a few days ago that had some valuable information on the soil food web and soil amendments. Added training opportunities will mean that the next generation of landscapers will learn some basic plant and soil ecology and that those of us already in the field can stay current with new developments.

Second, clearly there is a need to integrate more ecological knowledge with conservation landscaping. One of CCLC's first committees was the Standards and Measurement committee. This committee collected data to develop the eight elements of a conservation landscape.



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Some elements still lack data and new information comes out all the time, so it is an ongoing effort to add to our database of knowledge. We bring you the latest update of the 8 Elements at this conference and hope to continue adding information in the years to come.

Finally, there's the question of how we can connect with the general public to make conservation landscaping standards the norm. I'm encouraged by some of the municipal programs now in place. Arlington, Virginia has its StormWise Landscapes Program, Montgomery County, Maryland has Rainscapes, and Washington, DC has RiverSmart Homes as examples of incentive programs for reducing stormwater pollution. There are tree planting and care programs like Marylanders Plant Trees, Pennsylvania's TreeVitalize program, and Casey Trees in DC. These programs not only increase the market for conservation landscaping techniques but they are great educational tools because people see more rain gardens, green roofs and trees, and hopefully begin to appreciate them.

I think another approach may be to push the health benefits of sustainable landscapes. There is a lot of renewed emphasis on growing your own food in the U.S. mainly because of the focus on health benefits. More than half of the nation's 78 million gardeners reported growing vegetables in the Garden Writers Association Foundation October 2013 *Gardening Trends Research Report*, and more schools are adding vegetable gardens according to a recent USDA survey. I think that this interest provides opportunities for us to link personal health with landscape health, not just in an individual's backyard but in their neighborhood overall. Of course spending on lawns still remains higher than any other gardening expenditures, so we need to see if we can shift some of that spending to less lawn and more trees!

So, let's keep working together and creating new links with scientists, landscapers, designers, horticulturists, and landscape architects to make the field of conservation landscaping robust and make it the accepted landscaping standard in the country!