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The Greener Side
Building a Sustainable Community
Volume 3, Issue 1, April 2004 - July 2004

Landscaping gets back to nature
By by Brad Horn

Energy efficiency, water conservation, and biodiversity are just a few of the benefits of landscaping with the environment in mind.

When the settlers began exploring North America hundreds of years ago, a popular saying held that a squirrel could travel from the Atlantic to the Pacific Ocean without ever touching the ground, simply jumping from branch to branch throughout the continent’s great forests.

Now, not much remains of those forests, most of them having long since been turned into floors and cabinets and their roots rolled over with asphalt. But what remains of the once-vast prairies which stretched on for thousands of miles, from the foot of the Appalachians to the base of the Rockies? Turned into cattle pastures? And what remains of the diverse wetlands, their plants and animals thriving off the Earth’s water purifying system? Filled with dirt to support shopping malls?

We have altered forests at the hands of “Progress,” true, but we have altered plenty of other unique habitats along the way. Deserts, wetlands, and grass and prairie lands have been greatly reduced. Yet we can still learn a great deal from these ecosystems. Their technology is timeless, created by laws that have slowly shaped the planet over the past five billion years. Their beauty is inspiring, displaying not simply vivid colors and fascinating plant formations, but also demonstrating effective methods for the distribution and conservation of natural resources.

Encouraged by the study of these natural ecosystems, a new breed of ecology-conscious landscaper is trying to combine the concept of The Yard with the concept of a natural, fully functioning habitat. If a prairie thrived in Iowa in 1685, chances are good a prairie landscape would thrive, in some fashion, in suburban Des Moines today.

The preferred mainstream landscape of exotic plant species, brought here from every corner of the globe and planted almost at random, requires tremendous amounts of watering, maintenance, and fertilizers, usually synthetic chemicals. It is expensive, outdated, and arguably too depleting for society’s future, possibly even current, needs and limitations.

In fact, many studies have estimated that American homeowners apply ten times the amount of chemicals per year to their lawns as farmers do to their fields – up to 200 million pounds nationwide. The results are devastating: polluted ground water, streams,
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and lakes, poisoned wildlife, and an environment that endangers those who live and work nearby.

Of the 40 pesticides which make up more than 95 percent of the chemicals used by commercial lawn care companies, 20 have been shown to damage the human nervous system, 21 have been proven to cause long-term health problems in laboratory tests on animals and people, and 12 are suspected carcinogens. Yet we pay people to put these poisons in areas where we live, play, and breathe every day, endangering ourselves and others.

Using plants native to the particular region in which they are planted, a landscape can be created which is more adapted to the climate and therefore in less need of human-supplied nutrients and care. Using elements like trees, bushes, and water, a resourceful design can cut a building’s energy costs by an average of 30% water by taking advantage of natural systems such as wind currents and precipitation. Meanwhile, an attractive, ever-colorful (ever-blooming in the right climate) landscape is possible with appropriate plant selection.

Alternatives to toxicity

There are a number of approaches that can be taken to create a more efficient landscape, but all start with a careful examination of the area in question. Preferable, a property should be studied before anything is constructed on it, thereby allowing building design to work in cooperation with the landscape and its natural environment. “The site analysis should be made before the architects and engineers start,” says Kibbe Turner of Wildlife Habitats, a landscape design company in New Market, MD. “A big problem is that we often have an expensive structure in place and if we recommend something it’s not worth the money to change it.”

Every piece of property is different and should be approached as a unique ecosystem. Begin by noticing things like where water collects, what direction warm and cool winds blow in from, and what types of plants and animals live on the property, all of which will determine what kind of landscape design will be most effective.

Each region of the country has its own climate, but every piece of land within that region can be described as having its own microclimate. You may live in an area that has moderate annual rainfall, but if your property is at the base of a slope you might consistently experience saturated ground conditions closer to that of a subtropical location. It is likely that a piece of land will contain several microclimates (a windy area, a shaded area, an area with nutrient-rich soil, etc.) and knowing each of them and what they will mean for you is important to consider.

Permaculture

The most successful landscapes take advantage of an area’s microclimate, trying to minimize, maximize, or simply thrive off the peculiarities of that specific location. Permaculture was first coined by Bill Mollison and David Holmgren in 1978 in their book Permaculture One as a combination of the words “permanent agriculture.” It has since become a general term for design that establishes productive environments that provide food, energy, shelter, and material and non-material needs, as well as promoting a culture that supports these goals.

In essence, it is a philosophy of overcoming the traditional Western cultural mindset that “nature is to be conquered.” It is the act of working with, rather than against or oblivious to, the earth and its climatic systems, and often becomes a process of turning a problem into a solution: if an area is shaded, one might plant understory woodland plants rather than becoming frustrated by brown, dying grass. Permaculture creates sustainable systems that can produce food and habitat for both people and wildlife or simply exist as miniature, self-
The WNCGBC meets the first Monday of every month at the Land of Sky at 5:30. All are welcome to attend.

**March 17 - 21, 2004**  
**HERS training**  
*Atlanta, GA*  
Course fees Subject to change  
Class size is limited to 15  
Attendees  
Entire course (5 days) $720  
(404) 872-3549 x 103 for more information or e-mail HERS@southface.org

**March 18-19, 2004**  
**Greenprints**  
Westin Peachtree Plaza, Atlanta Georgia  
http://www.southface.org

**March 19, 20-21 2004**  
**The Home Show**  
The Asheville Civic Center, downtown Asheville

**March 19-20: Solar Water Heating Workshop**  
Guilford County Cooperative Extension Center, Greensboro  
For more info call the NC Solar Center at 919/515-3480 or visit  
www.ncsc.ncsu.edu

**March 21, 2004 6pm - Midnight**  
**WNCGBC Benefit and Party**  
Grey Eagle Music Hall, Asheville - food, music, and fun

**March 26: Green Building - Opportunities and Techniques Seminar**  
Charlotte Convention Center, 301 South College Street, Charlotte  
Information:  
www.3buildingexpos.com

**April 2, 1:30pm-6:30pm, Alternative Fuel Vehicles Day Odyssey**  
Wake Technical Community College Campus, 9101 Fayetteville Rd., Raleigh.

**April 3-4: Home Energy Expo York Technical College, 452 South Anderson Road, Rock Hill, SC**  
www.homenenergyexpos.com

**April 13-14: Conservation Design: A Workshop on Growing Greener Communities,**  
Raleigh, NC  
For more information e-mail Susan Moore or call 919/515-3184.  
Cosponsored by the NC Smart Growth Alliance.

**April 17: Green Building Design & Construction for Homes**  
Central Carolina Community College, Hwy. 64W, Pittsboro, NC  
greenhomeconstruction.com/seminar/

**April 21-23, 2004 Environ Design 8:**  
Minneapolis Convention Center, MN  
www.environdesign.com

**April 23-24: Electricity From the Wind: Making Your Own Energy**  
McKinnon Center, corner Western Blvd. and Gorman Street, Raleigh (map)  
For more info call the NC Solar Center at 919/515-3480 or visit

Refer to these sources for more dates to come...

- **CAROLINA RECYCLING ASSOCIATION:** www.cra-recycle.org/index.htm  
- **NCSEA** www.ncsustainableenergy.org  
- **NC SOLAR CENTER:** www.ncsc.ncsu.edu  
- **SMART GROWTH PARTNERS OF NORTH CAROLINA:**  
  www.smartgrowth-nc.org  
- **SOUTHERN ALLIANCE FOR CLEAN ENERGY:** www.cleaneenergy.org  
- **SOUTH FACE ENERGY INSTITUTE:** www.southface.org  
- **WNC ALLIANCE:** www.main.nc.us/wnca  
  & of course the WNCGBC - www.wncgbc.org

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The pH of the soil is another important characteristic to be aware of. Most plants prefer a slightly acidic environment, somewhere just below the neutral pH value of 7. Determining your soil pH level can be done with store-bought tests and the value can be raised or lowered depending on what is added to the ground. To increase pH values (make the soil more basic), add lime or wood ash. To decrease values (make the soil more acidic) add pine needles.

Supplying compost to a piece of property increases the amount of organic matter in its soil and decreases the amount of organic matter going into landfills. Compost is made by layering topsoil, brown waste (leaves, straw, etc.), manure (best if slightly aged, no pet waste), and green waste (kitchen scraps, no meat or dairy), and can be aged in bins or in piles, kept moist and turned often. The process is complete when all that remains is a dark, crumbly material with a fresh, earthy smell.

“Compost itself is almost nutrient neutral,” explains Turner. “But what it has are almost all the necessary ingredients to break down nutrients for the plants. Compost, no matter where you are, is a great thing.”

Native Plants

One thousand years ago, before Europeans brought manicured lawns and pruned hedges to the U.S., green grass didn’t account for much of the 20 million acres of space it occupies in this country today. This isn’t the right climate for plants with such a high demand for water, a need for the elimination of all their competition, and a relentless hunger for nutrients.

Turf grass is not expensive to install from seed, but maintenance costs can be astounding. According to the EPA, the average commercial savings of seeding and maintaining native prairie grasses versus seeding and maintaining Kentucky Blue Grass is $4,690 per year per acre. Over ten years this is a savings of almost $50,000 per acre.

Natives, having evolved in a particular ecosystem, are much more adapted to the climate which they are chosen for and in need of far less care, watering, and fertilizing, if any at all. Xeriscaping is a term which refers to the creation of a low-water landscape through the selection of appropriate plants. “The benefits of this type of landscape are incredibly good if you want something that doesn’t take you a lot of time,” explains Barbara Bell, caretaker of the landscape of the Eiteljorg Museum in Indianapolis. The museum’s landscape, a natural planting by landscape artist Alan Sonfist, is designed to represent the early growth of a native Indiana forest. “And not only does it save money and time, but you develop [wildlife] habitat.”

Native plants are much more accepted by wildlife in the area, providing them with the food and shelter to which their species has become accustomed. “The wildlife value of exotic plants is usually very low,” Goedl says. “They lack the nutritional value that native plants have for birds. You can tell the difference between exotic and native plants because the berries last a lot longer on the exotic’s. If the berries stay on through the winter you know the birds don’t like them.”

Exotic (foreign) plants, if they do manage to grow, can potentially create two very destructive scenarios due to the fact that they are not indigenous to the area. A plant may proliferate uncontrollably due to the lack of barriers present in its place of origin. Or, the plant requires continual and excessive human-supplied nutrients and care. Either of these situations can be disastrous for the local environment, with consequences ranging from increased pollution due to runoff of pesticides, herbicides, and fungicides to habitat invasion of native plants and animals by exotic species.

Grass has its place, especially in areas of high activity and foot traffic, but the waste and...
LANDSCAPING - Cont. from page 7

The aquifer and surrounding water formations can also be replenished by paving with brick rather than impervious concrete or asphalt. Secured by grass plantings that are kept down by car traffic, the bricks are a functional alternative to surfaces that drain rainwater into the sewer.

It should be emphasized that water systems are complicated and are also subject to many local, state and federal laws. Extensive research or the help of a landscape or Permaculture designer is recommended.

Other Benefits

Increasing numbers of studies are indicating that plants are helpful for humankind in ways most people never thought possible. They increase biological diversity which strengthens the web of life on which we all live, they provide the compounds which make up a large portion of pharmaceutical medicines, and they furnish the most complete and easily digestible forms of nutrition available.

As part of this system, the more a landscape works with the Earth the more it can potentially benefit everyone. “It becomes not just an ornamental background but something to interact with,” explains Bane. “Inviting people to interact with the landscape . . . it’s better for the health of the culture. Changing views on nature and wildlife involves a cultural change.”

Using native and natural landscaping on company property, where it is often least expected in this world of low-cut grass and stylishly pruned bushes, shows that an organization is committed to making its overall effect a counterproductive one if winters are severe in your area.

In far northern regions, parking areas and other paved surfaces are best when dark in color (bad) in a situation where the sun's warmth would be a valuable resource.

They key to knowing what to do with solar radiation in temperate climates is to know what trees to plant and when to plant them.

When the sun's position in the sky fluctuates, landscapes must be designed with these variations in mind if they are to be truly effective. The result of not planning with the sun in mind is that they are less effective in extending the life of a building. If you are spending more on cooling than heating, in general the best action to take is blocking the sun's heat.

The sun has the single greatest influence over the Earth and its climatic systems, and using it to your advantage involves actively seeking to either retain or eliminate the sun's radiation, depending on location and time of year. In colder climates the sun should be welcomed into buildings, blocked by as little vegetation as possible. In hot areas the sun should be obstructed whenever possible, especially to the south and west.

Since the sun's position in the sky fluctuates, landscapes must be designed with these variations in mind if they are to be truly effective. The result of not planning with the sun in mind would be planting trees to block winter winds (good) that also block low-angle winter sun (bad) in a situation where the sun's warmth would be a valuable resource.

In hot areas (the Deep South and southwest) blocking the sun will create shade that can reduce cooling bills by up to 50%. Trees should be used to place shadows on both the south- and west-facing sides of structures, obstructing the scorching midday and afternoon sun. Remember to use tall trees due to the sun's high angle in this area of the country, and to shade air conditioners.

In the south the sun's rays must also be taken into consideration when adding, or dealing with pre-existing blacktops or patios – the surfaces will absorb heat during the day and radiate it at night. For these reasons they should be light in color, heavily shaded, placed downwind and located to the north or east of a building. Planting native ground cover on the south and west sides of a structure will reduce glare and reflected radiation as well.

In cool areas manipulating the sun's radiation can produce comparable advantages in the opposite direction.

In far northern regions, parking areas and other paved surfaces are best when dark in color and placed to the south to take advantage of their capacity to hold and emit heat. In moderate climates, the decision to either harness or obstruct the sun is not as predetermined as in the more extreme latitudes. A conventional energy saving practice is to use a deciduous (hardwood) tree to shade the south side of a building knowing that in summer its leaves will block the sun and in winter, leafless, it will let sunlight in. But even an oak with no foliage can stop 25% of the sun's incoming radiation, and that may be enough of a disadvantage to make its overall effect a counterproductive one if winters are severe in your area.

They key to knowing what to do with solar radiation in temperate climates is to know what you need most. If you spend more money on heating than cooling, your first priority would usually be to minimize the sun's influence on your building. If you are spending more on cooling than heating, in general the best action to take is blocking the sun's heat.

Council Selects New Board Members at Annual Meeting

The annual meeting was held in January on the campus of Warren Wilson College at the newly finished Eco-Dorm. Along with discussing the past years accomplishments, a new strategic plan was made. Bobbi Tousy served as facilitator.

The group also elected a new Board and new Executive Committee Members. The new group is as follows:


The new group is as follows:

New WNC Green Building Council Board: Chris Pelley, Marcus Renner, Shannon Tuch, Richard Sodenquist, Paul Bobbitt, Christopher Dorin, Maggie Leslie, Jake Gilmer, Terry Albrecht, Laurie Miller, Ashley Featherston, Boone Guyton, Duncan McPherson, Cindy Meehan-Patton, David Brannon, Traci Kearns, Issac Savage, Bobby McHugh, Aaron Johnston, Adam Lurie

Executive Committee: Boone Guyton, Chair
Duncan McPherson, Vice Chair
Secretaries, Cindy Meehan-Patton and David Brannon.
Treasurer, Maggie Leslie.
At Large, Jake Gilmer
Wind

Often overlooked, wind can have significant influences on a structure’s ability to retain and/or eliminate heat. Wind flow can either be funneled to increase air flow, or blocked to achieve the opposite effect. Similar to rules which apply to working with the sun, it is important to decide what would benefit you most: obstructing air flow or guiding it towards you. A helpful guideline to follow is figuring out what is more expensive for a particular building, heating it or cooling it.

If it makes the most sense to block wind currents there are two basic windbreak designs to choose from, based on the density and types of trees used.

Densely-planted windbreaks work best when made with evergreens such as pine and spruce, and are extremely efficient at blocking winds over short distances. They reduce windspeeds to 20% of their original rate over a distance equal to twice the height of the windbreak. In other words, if a dense barrier of Norway Spruce (Picea Abies) is 30 feet tall, it will block 80% of the wind 60 feet from the windbreak—from there its effectiveness drops off considerably.

Loosely-planted windbreaks are made mostly with thinner deciduous trees to block winds over a greater distance than the dense version described above. They are much more sparse, but due to the properties of wind this design prevents air currents from immediately “rolling over” the top of the barrier. They reduce windspeed by 40% over a distance of five times the height of the obstruction. With a windbreak 30 feet tall this means that only 60% of the wind’s original current would be felt up to 150 feet away. These thinly planted, but incredibly effective, barriers are best used when part of a design that seeks to let in valuable winter sun while blocking troublesome winter gusts. They should be made up of conifers and deciduous trees, planted so that the hardwoods eventually replace the softwoods and provide years of all-natural, inexpensive temperature control.

Winds can also be funneled to produce a more intense air flow in areas where cooling is the most needed temperature modification. Planting shrubs in a giant “U” or “V” shape (winds entering at the opening and the building located at the “point”) will guide the flow of air through open windows and into work, living, and recreation areas. This can be invaluable in hot, humid climates where relief from saturated air is desired. By placing a trellis or canopied tree at the end of the funnel, the air currents traveling underneath this “roof” will intensify the speed at which wind exits the design.

Water

Nature almost always provides ample amounts of this necessary landscape ingredient, despite what we may have assumed after being surrounded with sprinklers most our lives. If designed properly, a landscape may never need watering once plant roots are established and healthy enough to find nourishment on their own, even during dry spells and droughts.

Currently, depending on the city, 30-60% of America’s urban fresh water is used to water lawns. This is especially troubling when one considers what “watering the lawn” normally consists of, what its consequences are, and how simple the alternatives can be.

The traditional industry standard Kentucky Blue Grass needs almost 40 inches of rain per year, but is often the outdoor “carpeting” of choice in areas receiving half that amount. Other grass options exist and are used, few of which offer significant advantages or water savings. Lawns are frequently watered on a machine-controlled basis, and it’s common to see sprinklers running during a rainstorm or during the middle of the day when much of the water simply evaporates. Many water tables around the country, particularly in the west and southwest, are at an all-time low, dropping in depth by the yard every year. Implementing a landscape that would eat water needs by up to 80% is as easy as selecting a more appropriate type of ground cover to use. In areas where grass is not needed there are many options such as prairie grasses, understory woodland plantings, low-growing shrubs, or drought-resistant turf mixes, all of which work best when native to the area.

Simply mulching around plants saves water by preventing it from evaporating from the soil. Mulch will also reduce run off and can provide a dark contrast for brightly colored plants.

Over-mulching, although hard to do, can weaken plants by detaining too much moisture causing roots to come near the surface instead of firmly establishing themselves underground.

Retaining water on the property can have definite advantages, some as simple as the therapeutic sound of a babbling stream, others as complex as the heating and cooling patterns associated with convection energy transfers near a pond. Ponds can also support incredibly diverse and almost self-regulating habitats. Overflows are also important design features, both to prevent floods and to know where excess water will be directed so it can be utilized if desired.

Bodies of water are temperature moderators, slowly storing heat from the sun during the day and releasing it during the night. In the arid Southwest, a cooling effect will be experienced if water-retaining pools are kept shaded from the sun and positioned such that winds are channelled over them and towards a building. The best plants to shade the pond are tall palms with high crowns, lining the southern and western banks at a minimum. Species native to some parts of the region include queen palm (Arecastrum Romanzoffianum), Mexican Washington palm (Washingtonia robusta) and Washington palm (Washingtonia filifera). This can pay off immensely, especially in more mild climates where daytime is often warm and nighttime is cool.

In hot and humid climates, one must consider the increased humidity which comes with open reserves of water. For this reason many natural landscapers in these areas recommend avoiding ponds, or at least locating ponds away from structures and preventing winds from blowing humidity in the direction of buildings.

Pools of water have other benefits as well: they can provide a habitat for plants and animals that otherwise might never been seen in typical urban or suburban environments, create soothing sounds and help drown out the noise of city traffic, and can reflect light and radiation toward buildings, reducing heating and lighting needs in certain areas of the country. They can become a very large “channel” that water to a holding area so it comes back to the aquifer.

When ditches called swales are used to temporarily halt the flow of water downhill, they allow water the chance to soak into the ground, reducing runoff by 80% compared to bare land. Before the swales become saturated and the water moves on to another filtration area, vegetation is used to remove debris from the water. “Every pond should be built with an upstream silt trap with wetland plants, meaning cattails, bulrushes and others appropriate to the region,” says Bane. “They’re an enormously rich habitat.” The output of these systems is water which is free of particles and sediment, while the plants themselves can even be harvested and used as mulch.

Prince Street, a carpet manufacturing company located in Cartersville, GA, had its facility’s landscape designed to move water “through a series of grassed swales and vegetated detention areas and eventually to the Etowah River.” The design of Kerry Green of Atlanta utilizes several environmental landscaping techniques and uses a natural drainage system which was installed for less than the cost of conventional piping.