
THE *ecological landscaper*

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Water

by Robert Hsin

We hope you find the content of this special water issue valuable as reference and incentive

Water has historically been viewed as the source of life in almost all human cultures, and with good reason. The origins of civilization have always been closely tied to large bodies of water. The Yellow River in China, the Euphrates in Persia, and the Nile in Egypt enabled those early empires to flourish. However, our urban centers today are far more populated and require much more water than these early civilizations. The abundance of water on the globe has given mankind the false conception of fresh water as an infinite resource. In fact, freshwater comprises only 3 percent of the earth's total

water supply, much of which is locked in the polar ice caps¹. This false conception has led to extremely unsustainable modern methods of water management to provide for our urban centers.

"The highest good is like water. Water gives life to the ten thousand things and does not strive. It flows in places men reject and so is like the Tao."

—Excerpt from the Tao Te Ching, chapter 8

Understanding the earth's natural water cycle and the land's watershed are the keys to sustainable water management. The process is relatively simple to explain, in contrast, the effects of our alterations—even minor ones, are extremely complex. In short, the sun evaporates water into the atmosphere, forming it into clouds. The water is then released back to the earth in the form of precipitation where it flows through the land, supplying all the life forms before returning to the rivers, lakes, and oceans, where the cycle is repeated again. The path of the water along the land is defined as the watershed. Man's interventions to this watershed has led to many environmental problems including, flooding,

droughts, extinction of native plants and animals, water contamination, and depletion of freshwater reserves.

In addition to these direct environmental problems, the processes of extracting, storing, distributing and heating water is also energy intensive. Hence sustainable water management must consider both watershed protection and water conservation.

Protecting the watershed

The site's natural watershed is responsible for providing water to the environment. Managing this watershed sustainably can enhance the natural habitat, conserve water, and provide long term water storage and flood protection.

Water sources

Water sources are primarily drawn from groundwater (underground wells and springs), and surface water (lakes, rivers, and streams). Conversion of saltwater into freshwater is also possible, but the difficulty and energy intensity of this process makes it a viable solution only in very limited areas. The main objectives are to protect these water sources from contamination and ensure the natural replenishing of them. Protecting the watershed therefore, becomes the highest priority in sustainable water management.

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"Gramma said when you come on something good, first thing to do is share it with whoever you can find; that way the good spread out where no telling it will go. Which is right."
—*Little Tree* in *The Education of Little Tree*, by Forrest Carter



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EDITOR'S TWO CENTS

The water crisis is here

Water. H₂O. Three atoms, uniquely joined, form a large part of the basis for life on Earth. On the planet we call home, 71 percent of whose surface is covered with the stuff, water plays an essential role in nearly every aspect of life and is capable of astounding feats.

That it is a substance less dense as a solid than a liquid allows ice to float (no fun skating on the bottom of a pond). With enough volume and time, it can carve a Grand Canyon. It comprises the bulk of most living things. Biochemical processes occur mostly in an aqueous environment, whether within the walls of a cell, in the soil under our feet, or in the vast oceans.

Seemingly abundant, essential for life, and long taken for granted, our water supplies—fresh, readily available, clean water—are now declining or threatened on an ever-widening scale. The total amount of water in the global system (roughly 326 million cubic miles¹) doesn't significantly change (your afternoon tea could be made with Cleopatra's bath water), but its distribution, quality, and availability do.

Changing weather patterns (likely, at least in part, due to human activity), overuse, inefficiency and mismanagement, political upheaval, and, recently, even commercial commodification of water supplies have produced situations where water crises are now occurring, spreading, or looming in many parts of the world.²

A sampling of the current state of affairs is sobering:

- *About 20 percent of the world's population (more than a billion people) do not have access to safe drinking water.*
- *Roughly 5.3 million deaths per year are attributable to unsafe water.*
- *80 percent of diseases in the developing world are caused by contaminated water.*
- *Global water consumption is doubling every 20 years, more than twice the rate of the population.*
- *More than half the world's wetlands were destroyed in the last century.*

And lest one think that water problems are confined only to countries in the developing world, or to traditionally arid regions, note recent news headlines such as "U.S. faces day of reckoning; even traditionally wet areas run out of water as sprawl, global warming take toll."³ In Florida, overdrawn ground and surface waters are becoming briny as seawater infiltrates. In 2001, more than half of Kentucky's counties ran short of water or were on the verge of shortages before a rainy period brought relief. In northeast Kansas, water is becoming so scarce that consideration is being given to a \$200-million pipeline to bring water from the Mississippi River.

A number of towns face water running out of water in a decade or two not only in the arid southwest (El Paso, San Antonio, and Albuquerque), but also in other parts of the country. Here in New England, in the late 1990s, many rivers had average monthly flows lower than they had in decades, and water levels in in-ground wells were also at record lows. In Massachusetts, the combination of water withdrawals for public water supplies and extended drought reduced sections of the Ipswich River to a series of isolated, stagnant pools during the summer months in a number of recent

years. This past summer, many towns and cities instituted water restrictions or bans to conserve supplies.

As a culture, we still often display a stunning lack of understanding of and appreciation for water (to the point where the U.S ranks worst in the world in water use efficiency; see article, page 10). Even in the midst of serious droughts, TV weather forecasters refer to imminent rain as “trouble,” or a “problem.” Lawn sprinklers on auto-pilot apply water when it’s raining. Leaky pipes in municipal water systems result in flow losses of as much as 30 percent in some places. The list goes on....

Our collective awareness of and respect for water need to take giant leaps forward if we are to protect this indispensable resource for future generations.

Water can’t be taken for granted in our landscape work any more so than that for other uses. Water falling onto a site, collecting on it, or flowing through it needs to be treated as the valuable resource and essential element of the ecosystem that it is. We need to seek and take advantage of opportunities to use water to build ecological assets such as water gardens of various types. Irrigation water needs to be properly applied to avoid waste. Landscape design should take water into account, as should plant choices.

In this issue of the *Ecological Landscaper*, we take a broad look at some of the ways water issues impact our landscape work, give some advice on how to use water wisely, and offer specific techniques to limit water use. Protecting all our resources, including water, will take everyone’s participation. ■

—Nick Novick

NOTES:

¹ One cubic mile equals in excess of one trillion gallons.

² In an attempt to head off the growing trend toward the commodification of water (private companies taking ownership of water supplies and treating water as just another commodity to be sold for the highest possible price), the UN has taken the unprecedented step of declaring water as a public good, a human right and “a limited natural resource and a public commodity fundamental to life and health.” For more see article at <www.commondreams.org/headlines02/11298-01.htm>.

³ Published Aug. 12, 2001, in the *Toronto Star*; full article at <www.commondreams.org/headlines01/0812-04.htm>

SOURCES:

BBC, United Nations, World Water Council, *New York Times*, U.S. Geological Survey

BOXED FACTOIDS throughout this issue were collected from the following sources: U.S. Geological Survey, NASA, UNESCO, U.S. EPA, National Geographic, Mass. Dept. of Food and Agriculture, Rocky Mountain Institute, Maryland Dept. of the Environment, *Los Angeles Times*, *Introduction to Plant Biology* (Stern), National Parks Service, “Environmental Effects of Manufacturing Computer Components” by Elaine Tso.

Water continued from page 1

In general, groundwater sources are the cleanest and most energy-efficient source since it is often local, requires very little treatment, and is easily extracted. However, groundwater reserves can easily be overused and contaminated. To protect groundwater reserves from contamination, they should be kept at least 50 feet deep and 200 feet horizontally from surface water².

Nature and water flow

Modern methods of water flow management are dependent on technology. Mechanical pumps and steel and concrete materials are the common tools. This technology is extremely energy intensive and is often detrimental to the environment. Controlling the flow of water can easily be accomplished by letting nature do the work with no energy expenditures.

Often referred to as *landform engineering*, its primary goal is to manipulate and enhance the natural flow of water to improve the site’s ability to catch, hold, and absorb water. The site’s topography can be used to guide water through constructed swales and depressions. Roots of trees retain soil more efficiently than concrete. Certain plants and micro-organisms can be used to filter out bacteria, toxins, and heavy metals from sewage run-off, in effect, acting as a wastewater treatment system.

Swales and contour trenches

Subtle alterations to the site such as construction of swales and contour trenches is an effective method of collecting and guiding water to storage areas or distributing the water back to the site. Water can be guided into vegetated areas such as wetlands and forests or storage basins such as retention ponds. These depressions should be lined with sand or gravel and filled with water-harvesting plants which slow down water movement, cleanse the water, and assist the land in absorbing the water.

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Retention systems

Stormwater retention systems provide a more environmental and aesthetic alternative to conventional drainage systems which often wash away stormwater, preventing it from replenishing the site. Retention systems store runoff water to be released slowly and/or absorbed into the ground. The soil used in these systems must be permeable with infiltration rates of at least 27 inches per hour³. These systems retain the water on the site and provide flood protection. With some attention to design, these systems can also be made into attractive parks, using the retention “pond” as a focal point.

Water conservation

There are many examples of wastewater practices in American cities which could easily be improved. In the city of Los Angeles, for example, it is estimated that 50 percent of home water usage is spent on maintaining lawns and gardens⁴, most of which are not indigenous to the semi-arid climate of Southern California. In fact, Los Angeles’ watershed map extends into 11 states to provide the water needs for just one city. Much water demand could be reduced simply by using common sense in landscaping, while potable water usage could be greatly reduced by reusing treated wastewater and graywater (used

water from dishwashers, laundry machines, and showers).

Water-efficient landscaping

It is plainly evident from all the previous principles and guidelines that site design and landscaping are inherently linked with water. Water-efficient landscaping therefore, has an enormous impact on the ability of a development to save water. Selection of plant materials which require less water, as opposed to exotic species which tax water supplies, is a priority. In this case, selection of indigenous plants is often the solution. The use of exotic species in arid regions, such as Kentucky Bluegrass which requires enormous amounts of water, is just not sustainable. Indigenous species exist because they are able to live in the area’s climate and therefore require only the amount of water that the environment can supply.

Watering plants during evening hours is a much more sensible alternative to watering during daylight hours when the sun evaporates much of the water. Water irrigation timers are available on the market which assist in more efficient watering of plants. Reducing the size of lawns is also an effective method of conserving water.

Rainwater collection

Once widely used before the 1950s in the U.S., this strategy is still applied in many areas around the globe. Collected rainwater from cisterns and catchbasins can be used to provide for landscaping needs and can even be treated to be used as potable water. The rainwater is usually collected from rooftops and then stored in cisterns and catchbasins for later use.

Depending on the location, it is possible to provide enough water, including potable water, for all the needs of the community. In Hawaii, for example, rainwater provides all the water needs for 25,000 people⁵.

Wastewater reuse

Wastewater comes in two forms, graywater, which comes from showers, laundry machines, and dishwashers; and blackwater, which is the sewage from toilets. In most cases, potable water is used for all these purposes, when it is only necessary for drinking and cleaning purposes. Reusing graywater for flush toilets and landscaping can provide enormous savings of potable water. Buildings can be designed or retrofitted to allow for separate drain lines to accommodate this strategy.

Conventionally, wastewater is treated in expensive, energy-intensive treatment plants, and eventually dumped into our rivers, lakes, and oceans. Despite this, over 2,000 beaches in the U.S. were closed in 1991 due to sewage pollution problems⁶. Wastewater can be treated and reused for irrigation and even potable purposes through biological wastewater treatment such as wetlands. This serves two purposes, it saves water, and it recycles the pollutants in the waste as food for the biological treatment system. In most cases it is also a more economical alternative to conventional treatment facilities. ■

(This is a chapter excerpted from *Principles and Guidelines for Sustainable Community Design; A study of sustainable design and planning strategies in North America from an urban design perspective.*)

WATER FACTS

- Amount of water in the atmosphere at any given moment: 3,100 cubic miles
- Percent of all fresh water that figure represents: .001
- Depth of coverage if all atmospheric water fell to earth at once: 1 inch
- Average daily precipitation on the continental U.S.: 30 inches (4 cubic miles)

NOTE: one cubic mile equals one trillion gallons (more or less)

ENDNOTES:

- ¹ National Park Service. *Guiding Principle of Sustainable Design* (Department of Interior: Denver, Colo., 1993)
- ² Ibid.
- ³ John Tillman Lyle. *Regenerative Design for Sustainable Development* (John Wiley and Sons: New York, N.Y., 1994).
- ⁴ Julia Russell, “Xeriscape” ed. Bob Walter, and Lois Arkin. *Sustainable Cities* (EcoHome Media. Los Angeles, Calif., 1992) pp 140.
- ⁵ Dianna Barnett and William Browning. *A Primer on Sustainable Building* (Rocky Mountain Institute: Snowmass, Colo., 1995).
- ⁶ Larry Stammer, “Sewage Forced Closure of 2,000 Beaches in 1991” (*Los Angeles Times*, July 24, 1992).

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"Irrigation of the land with seawater desalinated by fusion power is ancient. It's called rain."—Michael McClary

U.S. suffers under drought

by Randolph E. Schmid, Associated Press

WASHINGTON (Sept. 13)—Confronted by parched lawns and withered fields, few Americans will be surprised to learn that the summer of 2002 was hotter and drier than normal.

For the record, the National Climatic Data Center reported Friday that June through August was the warmest summer since the 1930s and drought affected about half the country.

The average temperature for the 48 contiguous states this summer was 73.9°F.

That's 1.8° warmer than normal and the third hottest on record. Warmest was 1936 and second was 1934.

The report comes just a day after the National Weather Service forecasted continuing dry conditions for much of the country through winter. Only the Southern tier of states are expected to be wetter than normal.

The data center, part of the National Oceanic and Atmospheric Administration, said no state was significantly colder than normal in summer and many were much warmer than average.

There was much below-average rainfall in 29 states, while the only wetter-than-average states were Wisconsin, Minnesota, Iowa, and North Dakota, plus parts of Texas and Florida.

Heavy rainfall eased drought but led to severe flooding in southern and central Texas in early July with damage estimates reported as high as \$1 billion. Strong thunderstorms also brought widespread flooding to western Minnesota and North Dakota and resulted in hundreds of millions of dollars in damage in crop losses in June.

In many areas, the drought extends back years. Indeed, the 12 months that ended with August were the driest on record for six states: North Carolina,

Virginia, Colorado, Utah, Arizona, and Nevada. It was the second driest 12 months in South Carolina, Georgia, Maryland, Delaware, and Wyoming.

The Climate Center said there was some drought relief in the Northeast during the spring and early summer, but a return to below-average rainfall during July and August led to worsening drought there.

Moderate to extreme drought covered more than 45 percent of the contiguous United States during each of the past three months, the agency said.

By comparison, the most widespread drought on record occurred in July 1934 when 80 percent of the contiguous United States was in moderate to extreme drought. And the center pointed out that studies of tree rings indicate there have been worse droughts in the past.

"The severity of the 1930s drought was likely surpassed by the drought in the 1570s and 1580s over much of the western U.S. and northern Mexico, which lasted several decades in parts of the southwestern U.S.," NOAA reported.

While the costs of this year's drought are not yet known, it has diminished water supplies that led to the need for water restrictions in many cities, contributed to an active wildfire season and produced extremely difficult farming conditions.

The National Center for Atmospheric Research in Boulder, Colo., reported Thursday that by the end of August, 6 million acres of mostly forest—an area roughly the size of New Hampshire—had been consumed by flames across the United States. That's double the annual average in wildfire damage with costs estimated at \$1.5 billion so far, and large fires still burn in the West.

In its summer report, the National Climatic Data Center, located in

Asheville, N.C., said the average global temperature for combined land and ocean surfaces during June-August was 0.8° above the 1880-2001 long-term mean, the third-warmest such period since recordkeeping began in 1880.

Summer was marked by numerous extreme weather events throughout the world, including more than 100 deaths across Europe as heavy rainfall caused devastating floods in the Czech Republic, Germany, Austria, Slovakia, Russia, and Romania.

Monsoon rains led to hundreds of deaths in northeastern India and Bangladesh, and heavy rainfall brought severe flooding to central China. ■

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WATER FACTS

- Total amount of earth's atmospheric, surface, and ground water: 326 million cubic miles
- Percentage of total mass of the earth accounted for by oceans: .02
- Percent of earth's water which is fresh water: 2.5-3
- Proportional amount of available fresh water if all the world's water were reduced to a gallon: 1 teaspoon
- Percent of freshwater which is tied up in glaciers and polar ice: about 75
- Percent in groundwaters: 30
- Percent in surface waters: .3

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"We forget that the water cycle and the life cycle are one."—Jacques Cousteau

A quick review of some water-conserving practices for landscaping

Design

Do a thorough site analysis to determine water-related characteristics of the site.

Preserve as much of the existing, desirable, native plants as possible. Incorporate natives and appropriate nonnatives which are not invasive or have heavy water demands.

Consider on-site water as a valuable resource. Try to reframe drainage "problems" as unexpected supplies of free water. Plan systems to utilize excess water.

Plan shade into the design. Shade trees block sun from reaching soil, lowering soil temperatures, and reducing evaporative water loss. Cooling effects from leaf transpiration are also significant. Consider other shade-providers such as espaliers, arbors, fences.

Note prevailing winds and plan windbreaks to reduce evaporative losses from wind.

Plan zones of water use. Some areas such as vegetable gardens and beds near hardscape areas may need more water than other areas. Group plants according to water needs to simplify watering, should it be needed.

Consider reducing or eliminating lawn areas, especially in locations where the existing site characteristics are not favorable for turfgrass. For cool-season grasses in the north, full sun on a south-facing slope and poor soil will provide an annual challenge that a lawn is not likely to overcome. Limit lawn to where it will be used, such as for play areas.

Consider native grasses and wild-flower meadows for a low-maintenance alternative in areas where a lawn would serve no practical use. Once established, properly chosen meadow plants will survive the harshest of droughts.

Plant selection and planting

To minimize the need for ongoing watering, choose plants based on how well their need for water matches the prevalent site conditions.

Plants native to a region generally are well adapted to those conditions and will need little supplemental watering once established.

Consider the eventual height of the plant at maturity. Will it provide essential shading?

Avoid planting too closely. Allowing adequate space between plants will minimize competition for water.

When appropriate for the chosen plants and economically feasible, incorporate adequate organic matter into the soil to increase the capacity of the soil to hold water. In cases where amending soil on a large scale is impractical, consider plants which grow well naturally on "poorer" soils.

Maintenance

Maintaining an adequate mulch layer on planting beds helps to moderate soil temperatures and reduce evaporation.

Water needs for newly planted trees, shrubs, and perennials are higher than for plants which are well established. Watering every few days may be needed during excessively hot periods. Each application of water should reach to the bottom of the root zone.

Avoid fertilizing during periods of stress, including drought.

Experiments have shown that applications of seaweed (kelp) extract can help plants tolerate and recover from drought and other stresses.

Irrigation

Check systems at least once a year for proper operation.

Most plantings need about one inch of water per week. On clayey soils with slower infiltration rates, divided applications will help prevent water loss due to runoff.

Water needs vary during the growing season. Ideally, irrigations systems will be adjusted throughout the season.

Lawns

Leave clippings to add organic matter to soil.

For most of the growing season mow turf high, at least 2.5 inches, and as high as 3.5 inches; even higher is possible in areas where a "trimmed" look is not important.

Unless prepared to increase watering during hot summer months, allow lawns to go dormant then. There may be some benefit to a very light, daily watering (.1 inch) to cool the lawn and prevent heat stress. Once temperatures moderate in the fall, lawns growing in healthy soils with adequate organic matter will recover relatively quickly from all but the most severe droughts.

Select turf seed species and varieties based on site conditions. Some fescues are more drought tolerant than other types, such as bluegrass.

Seed new lawns in late summer or early fall to ensure best chance of success and minimize need for supplemental watering. Newly seeded lawns need be watered only enough to keep seed damp by frequent applications of small amounts of water. ■

—Nick Novick

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"Water sustains all."—Thales of Miletus, 600 B.C.

Rain garden plants

In some cases, it may be difficult or impractical to solve drainage "problems" by diverting or reducing the water flowing into areas of a property. On some properties, water may collect at certain times of the year, or after heavy rains. This can result from soils with a large clay content, surface runoff patterns, roof water accumulation, etc. It may not be easy or practical to solve these drainage "problems" with solutions such as underground drainage, dispersion, or other methods.

In some of these instances, a "rain garden" may be one solution. Plants adapted to occasional inundation can be installed to create a garden or bed in what otherwise might be considered problem areas. By making slight changes in grading, water can be collected into selected spots.

In nature, plants which grow on river and stream banks and wet meadows are appropriate choices for rain gardens, but some upland species can also tolerate occasional periods of wetness.

The mostly native trees, shrubs, and perennials listed at right (slightly modified as taken from the November 2002 issue of *The Avant Gardener*) will do well in wet to occasionally saturated soil conditions. (This is not a comprehensive listing.)

Numerous grasses, sedges, and rushes will also do well in rain garden conditions, as will many ferns including *Athyrium felix-femina* (Lady Fern), *Osmunda cinnamomea* (Cinnamon Fern), and *Thelypteris noveboracensis* (New York Fern). Suitable bulbs that will tolerate temporary flooding include the genera *Canna*, *Camassia*, *Crinum*, *Eucomis*, *Hymenocallis*, *Zantedeschia*, and *Zephyranthes*. ■

trees

Acer rubrum (Red Maple), *Alnus* (Alder), *Amelanchier* (Serviceberry), *Betula nigra* (River Birch), *Celtis laevigata* (Southern Hackberry), *Chionanthus virginicus* (Virginia Fringetree), *Fraxinus pennsylvanica* (Green Ash), *Larix laricina* (Tamarack), *Liquidambar styraciflua* (Sweet Gum), *Nyssa sylvatica* (Sour gum), *Platanus acerifolia* (London Plane), *Populus tremuloides* (Quaking Aspen), *Quercus bicolor* (Swamp Oak) and *Q. palustris* (Pin Oak), *Taxodium distichum* (Bald Cypress), *Thuja* (Arborvitae)

shrubs

Aronia arbutifolia (Red Chokeberry), *Cephalanthus occidentalis* (Buttonbush), *Clethra alnifolia* (Summersweet), *Cornus alba sibirica* (Tartarian Dogwood), *C. amomum* (Silky Dogwood), *C. sanguinea* (Bloodtwig Dogwood), *C. sericea* (Redosier Dogwood), *Dirca palustris* (Leatherwood), *Ilex cassine* (Dahoon Holly), *I. glabra* (Inkberry), *I. verticillata* (Winterberry), *I. vomitoria* (Yaupon Holly), *Kalmia latifolia* (Mountain Laurel), *Leucothoe fontanesiana* (Drooping Leucothoe), *Lindera benzoin* (Spicebush), *Myrica cerifera* (Southern Waxmyrtle), *M. pennsylvanica* (Bayberry), *Nemopanthus mucronatus* (Mountain Holly), *Rhododendron arborescens* (Sweet Azalea), *R. canadense* (Rhodora), *R. periclymenoides* (Pinxterbloom Azalea), *R. vaseyi* (Pinkshell Azalea), *Rosa palustris* (Swamp Rose), *Sambucus canadensis* (American Elder), *Vaccinium* (Blueberry), *Viburnum cassinoides* (Witherod Viburnum), *V. dentatum* (Arrowwood Viburnum), *V. trilobum* (Cranberry Viburnum)

perennials

Asclepias incarnata (Swamp Milkweed), *Aster novae-belgii* (New York Aster), *Aster novae-anglie* (New England Aster), *Astilbe*, *Astrantia major* (Masterwort), *Echinacea purpurea* (Purple Coneflower), *Eupatorium maculatum* (Spotted Joe-Pye Weed), *Filipendula rubra* (Queen of the Prairie), *Dicentra*, *Gentiana*, *Hemerocallis* (Daylily), *Hostas*, *Iris versicolor* (Northern Blue Flag), *I. fulva* (Copper Iris), *Liatris pycnostachya* (Prairie Blazing Star), *Lilium superbum* (Turk's Cap Lily), *Lobelia cardinalis* (Cardinal Flower), *Rudbeckia subtomentosa* (Sweet Coneflower), *Silphium*, *Stokesia laevis* (Stoke's Aster), *Trollius* (Globeflower), *Veronicastrum virginicum* (Culver's Root)

Wise watering

Making the best use of applied water

by Cheryl Lowe and Nick Novick

We all breathed a sigh of relief when the first autumn rains began to fall after a summer of so much heat and drought. Perhaps you thought you were off the hook. But implementing water-wise landscaping practices over the long term, not just when we are forced to do it, pays off both ecologically and economically.

These practices can range from design considerations to maintenance techniques to appropriate plant selection. Effective design might mean decreasing lawn area or clustering plants so they not only shade and protect each other from desiccating winds, but also accommodate distinctive irrigation cycles. Maintenance techniques include mulches; deep, but less frequent watering; adding organic matter to soils; or avoiding pruning, fertilizing, or planting in water-stressed areas. When selecting plants, remember that less stress means more resistance to disease and pests, so select species adapted to the environmental conditions of your site.

With all other measures taken, there still may come a need to water. At that point, the goal is to get water to the plants in your landscape in the

most effective and efficient way. Understanding your soil type and its infiltration rate is essential to efficient watering. If your sprinklers are applying .5 inch of water per hour, only sandy soils and sandy loams (infiltration rates of one inch and .5 inch/hour respectively) can absorb everything that you apply. When you apply that same rate to loam, half the water will run off, since infiltration rates for loam are approximately .25 inch/hour). The infiltration rate is even less if the site is sloped. Clay loam absorbs only .15 inches/hour.* Useful tools to help in your quest for water-wise gardening include a number of small containers (tuna or pet food cans work fine) to measure water as it is being applied, a soil probe, and a shovel.

Although mulches are efficient at preventing water from evaporating from the soil surface, they can also be a barrier to water absorption if they dry out, or, if they are applied too heavily. Last August, I (Cheryl) took the time to compare water application rates to depth of moistened soil in several different situations (sun, shade, loam, sand, etc.). The sites had not been watered all summer, so the soil was bone dry. In a loamy soil, I applied two inches of water over 5.5 hours using an oscillating sprinkler. The soil was moist down to an 8-inch depth, but only where the soil was not protected by a dry, 3-inch layer of woodchip mulch. With the mulch, the water reached only 1 inch into the soil, as it took most of the water to moisten the mulch first. In a similar experiment in an uncultivated woodland site, a 2-inch layer of fine forest duff absorbed over 4 inches of water, and no moisture reached the soil. In a nearby test spot (sandy soil and .5 inch of forest duff) the soil was moistened 8 inches into the soil.

Because excessive mulch can prevent water from reaching plant roots—or even the soil—it is important not to apply too much fresh mulch over incompletely decomposed, existing mulch. Annual applications of many inches of mulch—especially bark mulch, which, because of its high

wax content, breaks down fairly slowly compared to leaf mold, compost, and some other mulches—can prevent water from reaching the soil.

So, how to apply the water? There are many different systems to do the job. Choosing a system will depend on the area you need to water, what is being watered, your budget, etc. If you need irrigation, here are some options.

Permanent, in-ground systems are common for lawns. They are complicated enough that professional installation is required, and the cost is relatively high. These systems are most often set to go on for a certain period of time at set intervals, and there are overrides available which turn the system off when it is raining. The sensors need to be checked regularly to work properly.

A common mistake is to set the system to run frequently for short periods of time. This results in shallow water penetration into the soil, and shallow-rooted turf. Applying one inch of water per week is a good, rule-of-thumb guide; this can be applied in split applications of a half inch every few days. The exact amount needed will depend on soil and grass type, temperature, etc. In general, unless they are adjusted regularly, such automatic sprinklers tend to waste large amounts of water because they fail to compensate for changing conditions.

Smaller lawns can be watered with with oscillating or impulse sprinklers attached to the end of a garden hose. The inconvenience of setting these up and putting them away every time they are needed is compensated by the low initial cost and the ability to more easily apply water only as it is needed. On the more expensive models, there is usually some capacity to adjust the spray pattern.

For trees, shrubs, and flowers, a better option is a system which applies water directly to the ground, as opposed to the aerial application provided by sprinklers. Water sprayed on foliage can contribute to conditions which lead to the development and spread of diseases, so,

WATER FACTS

- Percent of all fresh water available for plants: .001
- Average percentage of fresh plant weight contributed by water: 75
- Gallons of water utilized by a typical hardwood tree to produce a pound of green wood: 120
- Gallons of water transpired by an average-sized, 200,000-leaf birch tree during a growing-season day: 200-1,000

other things being equal, it is better to avoid unnecessary wetting of foliage. (And, if you do have an in-ground system watering a mixed planting in addition to the lawn, those areas should be on a separate zone because much less water is needed there than for the lawn.)

Two popular, on-ground systems are soaker hoses and drip systems. The most common soaker hose is one made of recycled rubber. The hose weeps slowly from its entire length, and so, releases water very slowly to the soil. They work well for fairly short runs (200 feet or less) and for level sites. Any slope of more than a few degrees will result in little or no water reaching sections of the hose at the highest elevations in the run. Depending on the length of the run and the pressure at the faucet, pressure reducers may need to be installed at the beginning of the run to help produce even weeping over the length of the hose.

Drip systems (Rain Bird is one producer) are a bit more expensive, but more versatile. A solid, plastic pipe (usually .5 inches in diameter) carries the water. Wherever an emitter is needed, a hole is poked, and any of a variety of available emitter types is installed. This allows application of water right where it is needed. Choices for emitters include drip and spray types in a range of flow rates, so a high degree of precision is possible. Plus, the system can be adjusted or modified as conditions change.

For both types of drip systems, any sediment in the supply water can clog or slow the flow, especially for the soaker hoses which will eventually get clogged by even the smallest sized particles. An inexpensive filter can be installed to catch any sediment present in the water. ■

*from *The Chemical-Free Lawn* by Warren Schultz, Chapter 6, Water Wisdom

Cheryl Lowe is the Horticulture Director for the New England Wild Flower Society and a former board member of ELA.

"For many of us, water simply flows from a faucet, and we think little about it beyond this point of contact. We have lost a sense of respect for the wild river, for the complex workings of a wetland, for the intricate web of life that water supports."

—Sandra Postel, *Last Oasis: Facing Water Scarcity*

Do the right thing?!

(To water or not to water, that is the question)

Because of recent periods of drought, beginning as early as last spring, a number of towns in eastern Massachusetts have instituted some sort of outdoor water-use restrictions.

One of my landscape design clients lives in a town that had been on a total outside water ban for the last 18 months. He has spent many hours and dollars beautifying his property with trees, shrubs, and perennials. He has a very small lawn that was mostly clover and crabgrass this summer. He was resigned to relying on whatever rain might come and the dishpan water to "save" some of his prized plant possessions yet again this summer.

He had been a ban-abiding citizen for 18 months, but, in mid-August—after six straight days of temperatures over or close to 100°, and with many plants flagging to the point of nearly lying on the ground, or, worse, sporting crispy, brown leaves—he couldn't take it any longer.

Under cover of darkness, he broke the rules and turned the soaker hoses on in the hillside gardens which baked under full sun. The next day there were a few spots here and there where the earth looked darker from the moisture but there was no knock on the door; he had done it and he was glad he did. He was so emboldened by his previous evening's guerilla action that he moved the soakers farther down to water yet another very crispy area, but, alas, the next morning the water police were at his door to serve him with a \$200 fine.

The homeowner did seem a bit remorseful as he was relating the story. He didn't like to break the

rules, but still justified his action with, and I quote, "It was worth it this one time, I would have spent more than \$200 to replace the plants that I would have surely lost. I'm glad I did it!"

This homeowner is a very conscientious gardener—he chose plants carefully for the site conditions, incorporated organic matter when he planted, used soaker hoses to target water use carefully; even recycled his dishwashing water to water plants. Was he right to water or not?

I guess the answer lies somewhere between a rock and a hard place. ■

—Kathy Sargent-O'Neill

WATER FACTS

- Percent of adult human body weight contributed by water: 50-65 (70-75 in children)
- Average daily household use of water per person in the U.S.: 75-80 gallons
- Percent increase in that amount over the past 30 years: 75
- Total daily U.S. water use (agricultural, industrial, household): 35 billion gallons
- In U.S., percent of all public and private utility-supplied water accounted for by households: 47
- Percent of that which goes to outdoor uses: 30-50
- Percent of outdoor water use accounted for by lawn irrigation: 30-40

"Children of a culture born in a water-rich environment, we have never really learned how important water is to us. We understand it, but we do not respect it."

—William Ashworth, *Nor Any Drop to Drink*, 1982

"In every glass of water we drink, some of the water has already passed through fishes, trees, bacteria, worms in the soil, and many other organisms, including people....Living systems cleanse water and make it fit, among other things, for human consumption."

—Elliot A. Norse, *Animal Extinctions*

WATER FACTS

- Gallons water required to produce a single serving of lettuce: 6
- Gallons of water required to produce a single serving of steak: 2,600
- Gallons of water required in the manufacture of semi-conductors and printed circuit boards in one personal computer: about 12,000

CLIMATE STATS

- Warmest year in recorded history: 1998
- Second warmest year in recorded history: 2002
- Third warmest year in recorded history: 2001
- Fourth warmest year in recorded history: 1997
- Number of years of the past 10 not in the top 10 warmest on record: 1

...AND OTHER DEEP THOUGHTS

- Amount sea level has risen in the last 100 years: 6 to 8 inches
- Amount of water held in and below earth's mantle (top layer), not including groundwater, suggested by recent studies: 5 to 10 times the amount on the surface

"For all the darkness that presently confronts us and our descendants, there is no reason to give up. There is every reason to take up the fight, because we have within our grasp the power of the people to force the right decisions."

—Jacques Cousteau

U.S. rated highest on wasteful water use

by Sue Leeman, Associated Press

LONDON—Some of the world's richest countries—including the United States and Japan—lag behind some developing nations in making the best use of water, according to a new grading system published yesterday [Dec. 11, 2002].

The United States was rated the world's most wasteful user of water by the first Water Poverty Index.

Finland was ranked highest on the index, which graded 147 countries according to resources, access, capacity, use, and environmental impact. The rest of the top 10 were Canada, Iceland, Norway, Guyana, Suriname, Austria, Ireland, Sweden, and Switzerland.

The 10 countries at the bottom of the index were: Haiti, Niger, Ethiopia, Eritrea, Malawi, Djibouti, Chad, Benin, Rwanda, and Burundi.

Issues raised by the index are to be discussed in March at the World Water Forum in Japan.

"The links between poverty, social deprivation, environmental integrity, water availability, and health become clearer in the (index), enabling policy-makers and stakeholders to identify where problems exist and the appropriate measures to deal with their causes," said Caroline Sullivan, who led the team developing the Water Poverty Index at the Center for Ecology & Hydrology in Wallingford, England. The center is part of the British government-funded Natural Environment Research Council.

One-fifth of the world's population in 30 countries faced water shortages in 2000, a figure that will rise to 30 percent of the population, in 50 countries, by 2025, according to the World Water Council based in Marseilles, France.

"Water demand is increasing three times as fast as the population growth rate even though no new water can be created anywhere on this planet," said World Water Council president Mahmoud Abu Zeid.

The Water Poverty Index assigns up to 20 points in each of its five categories, meaning a country that meets the criteria in all five categories would have a score of 100. The highest-ranking country, Finland, has a Water Poverty Index of 78 points, while Haiti rates 35.

Iceland, Ireland, Spain, Japan, and Austria were rated tops in the capacity category, which defines a country's ability to purchase, manage, and lobby for improved water, education, and health.

The bottom five were Sierra Leone, Niger, Guinea-Bissau, Mali, and the Central African Republic—some of the world's poorest nations.

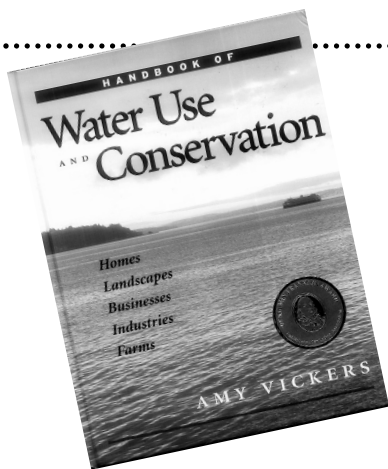
The United States was ranked 32nd overall in the index, but last in efficiency.

"The U.S. is at a relatively low position because of wasteful or inefficient water use practices in domestic, industry, and agriculture," said William Cosgrove of the World Water Council. "This is illustrated by the fact that per-capita water consumption is the highest in the world."

Japan ranked 34th, with a low score on environmental factors.

The World Water Council is a non-profit, nongovernmental organization made up of 313 members, including UN agencies, other NGOs, and public and private groups. ■

This story ran on page A37 of the Boston Globe on 12/12/2002. Reprinted here by permission of Associated Press.



Sipping from Amy Vickers' *Handbook of Water Use and Conservation*

At \$99.95, Vickers' book would be ideal to stock in a reference library or employed as a course guide. Its range is broad, looking at water conservation within the household, in business, industry, and agricultural applications. Reprinted on this page are excerpts from the section on landscaping. Vickers, a member of ELA, promotes the use of native plants and other sustainable practices.

Conservation or efficiency measures...can be grouped into two general categories:

- (1) hardware devices or equipment
- (2) behavior or management practices

"Odd/even" irrigation schedules can increase water use

Communities sometimes establish every-other-day watering schedules—for example, during a drought—but watering schedules of this frequency are generally discouraged now because experience has shown that they often lead to overwatering. Schedules based on odd/even house numbers may appeal to consumers because they are easy to remember—e.g., residents at even-numbered addresses may use water outdoors on Tuesday, Thursday, and Saturday, and residents at odd-numbered addresses may use water outdoors on Wednesday, Friday, and Sunday. However, homeowners under odd/even schedules sometimes assume that they should water every other day, even though they didn't before.

LANDSCAPE IRRIGATION SCHEDULING

Efficient irrigation scheduling involves understanding lawn and plant water needs and setting the *frequency* and *duration* of irrigations accordingly. Knowing *when* and *how much water is needed* and adjusting irrigation schedules in response to changing plant and weather characteristics is critical to efficient water use and optimal plant health. Determining how much and how often water is needed is site-specific....

Lawns and landscapes are typically watered too often and too long. Many irrigated lawns and landscaped areas can thrive on a watering schedule of once or twice a week for periods of no more than 15 to 30 minutes. Less time is usually better than more. People sometimes overwater when they see brown spots that they assume were caused by insufficient water. This is not always the case. Brown spots can be caused by multiple sources, including high salinity levels in the soil, over-application of lawn chemicals, nematodes, and animals. In addition, overwatering can increase lawn and plant viruses, fungi, and insects—conditions that also create brown areas. During hot summer months or periods of drought, many homeowners and landscape managers believe that the only way to keep lawns and plants alive is to deluge them with water. Such practices not only raise water bills but also increase runoff, plant diseases, root rot, brown spots, and mowing and maintenance costs.

Overwatering seems to be more common with single-family properties and other lawns and landscapes that rely on automatic irrigation systems. Automatic irrigation systems are run by controllers programmed to set the days, time of day, and length of time that each irrigation valve or station will operate. When programmed properly, the controller can boost water efficiency by giving turf and plants just the right amount of water, in just the right places, for the minimum amount of time needed. In reality, however, the average water-use efficiency of automatic irrigation systems is about 50 percent. In other words, for every two gallons of water applied, one is wasted.

Handbook of Water Use and Conservation: Homes, Landscapes, Businesses, Industries, Farms by Amy Vickers (WaterPlow Press, 2001) ISBN 1-931579-07-5. Toll-free orders call 866-367-3300. More details about the book are available at www.waterplowpress.com.

Outdoor water use

The amount of outdoor water use in a given region or within a particular customer group is usually correlated with four key factors: climate, amount of rainfall, water rates and the total cost of water, and household income.... On a per-capita basis, outdoor water use by apartment dwellers in multifamily units tends to be low or even negligible and is typically much lower than that of residents of single-family homes in a given area when measured by household unit. Exceptions can include customers living in affluent multifamily complexes featuring large irrigated landscaped areas, swimming pools, fountains, and maintenance practices involving water, such as sidewalk cleaning.

Moisture sensors

Handheld tensiometers and moisture sensors are relatively inexpensive, are available at lawn and garden stores, and give a moisture reading when the probe is pushed into the soil. Handheld sensors are useful for people who irrigate manually, either with a hose or a sprinkler they turn on and off. In-place moisture monitors are used with automatic irrigation systems. They also have a probe that is inserted into the ground, plus a wire connecting them to an irrigation system controller.... Used properly, moisture sensors can boost irrigation water efficiency and save water. ■

PRESIDENT'S MESSAGE

Keeping things in order

Making a list, lately checking it about four or five times a day! I don't know about you all, but life has been in overdrive these days. For every "to do" that gets checked off, it seems like two take its place.

I'm not complaining, just realizing that if I don't write things down and check them frequently, all sorts of things slip by, important things and stuff I really want to do. I've been told that memory is an age thing, but I think—at the tender age of 53—that it's a busy thing! Anyway, I hope you all have had a very full and prosperous year and that this list will help you remember some of the things that are important to you, too, so they don't slip by:

The "Remember To Do" List ANYTIME

✓ Remember to renew our commitment to be more ecologically minded in our landscaping endeavors. We're the ones who can make a difference in what we do and how we approach the many challenges that we'll be facing in the coming year.

✓ Check out the ELA Web page <www.ELA-ecolandscapingassn.org> for information about upcoming educational events and conferences, links to other interesting Web sites (share your favorites with us), and ELA news updates.

JANUARY

✓ Remember to renew your mem-

bership in ELA. The renewal letter will be mailed out soon, with the new membership categories and their benefits. Please review the information sheet enclosed with the letter, update your member information if necessary, and return it along with your check. Your support is essential to the organization. Thank you.

✓ Check your mailbox in early January for the brochure for the expanded, two-day, 9th Winter Conference. If you need extra copies, or need more information, visit our Web site to download what you need, or call the phone line (617) 436-5838, with your request.

✓ Attend the ELA round table, "Designing the Landscape with Water in Mind," Jan. 8. (Call for a brochure; registration is required for all round tables.)

FEBRUARY

✓ Remember to stop by the ELA table at New England Grows (Feb. 6-8). We'd love to see you and hear what you've been up to.

✓ Attend the ELA round table, "Turf and Landscape: Keeping Water in Mind," Feb. 12.

✓ Attend the ELA Winter Conference and Eco-Marketplace scheduled for Feb. 28 and March 1, 2003. This two-day event will be held at the Boxborough Holiday Inn, Boxborough, Mass. This year's event features educational presentations

both in the classroom and on the show floor and will showcase ecological products and services. This is a great opportunity to learn something new, renew old acquaintances, and make some new ones.

MARCH

✓ Attend the ELA round table "The Great American Lawn; Alternatives and Cost Benefits," on March 29.

SPRING

✓ Read the first installment of ELA's "Guide to Healthy Landscapes," a manual designed to provide easily accessible information on ecological landscaping methods.

JULY

✓ If you can plan ahead that far, think about attending the ELA Annual Meeting and Summer Forum which, typically, is held the third Wednesday of July. More information will be available closer to the date.

And, for the Down Time (is there really such a thing?), I'm sure you all have lots of your own stuff to add to the list.

Oh, just thought of one more very important item to add, and it's to wish you all a happy, healthy, prosperous, and environmentally sound New Year. See, it's good to check the list at least twice... Happy New Year!

—Kathy Sargent-O'Neill

NEW MEMBERSHIP CATEGORIES: To better serve our members and support our growth, we have restructured the membership categories and rates, which had been unchanged for a number of years. This change will take effect with the next renewal cycle in January 2003.

For nonprofessionals, homeowners, and others, the "associate" level offers an easy way to support our mission and programs. The "professional" level provides benefits to help build your business and to keep you connected to a vital,

growing network of ecologically minded colleagues. And, the higher levels offer additional perks and provide ELA with much needed support.

We encourage you to renew or join at the highest level that is comfortable for you. We will continue to work hard to make ELA valuable to you, and we are grateful for your continued support. Watch for renewal forms in the mail soon.

As always, we welcome your comments and input.

.....
"We call upon the waters that rim the earth, horizon to horizon, that flow in our rivers and streams,
that fall upon our gardens and fields, and we ask that they teach us and show us the way."—Chinook Blessing

2002-2003 round table series: considering water during dry times

This season's round tables will focus on issues of water use, quality, and conservation in the landscape, especially in times of drought.

ELA's round tables are designed to provide for plenty of interaction among and between both the audience and presenters. To this end, registration is limited to 40, so be sure to call our phone line at (617) 436-5838 to request a registration form. Fee is \$25 for ELA members and \$35 for non members.

Because of a number of scheduling issues, there is no round table scheduled for December. The first one will be in January. The schedule is as follows:

January 8, 2003, 1:30-4 p.m.

**Designing the landscape with water in mind
at the Broadmoor Audubon Wildlife Sanctuary, Natick, Mass.**

Speakers Peter Phippin, with the Merrimack Valley Planning Council, and Jean Akers, of the Conway School of Landscape Design, will discuss the impact of recent droughts and the consequences for water supplies. Other watershed issues and how to accommodate hydrologic functions in the design and planning process will also be considered. Case studies and sample projects will be used to demonstrate practical, innovative development alternatives that preserve hydrologic functions and ecological integrity.

February 12, 2003, 1:30-4 p.m.

**Turf and landscape; keeping water in mind
at Tower Hill Botanic Garden, Boylston, Mass.**

Learn how to be part of the solution by incorporating environmentally sensitive techniques in you business. Most of the techniques are easy to adopt; have immediate, positive environmental benefits, and are based on common sense. (Speakers not yet finalized as we go to print.)

March 29, 2003, 9 a.m.-12 p.m.

**The great American lawn
at Arnold Arboretum Hunnewell Building, 125 Arborway,
Jamaica Plain, Mass. (cosponsored by Arnold Arboretum)**

Lisa Vernegaard, with the Trustees of Reservations and contributing author of *Redesigning the American Lawn*, and Tom Akin, assistant grounds superintendent at the Arnold Arboretum and ELA board member, will provoke us to think about why we—homeowners and landscape professionals—make the landscape choices we do. Lisa will examine the history of lawns and the implications this "crop" has on our water supply. Tom will demonstrate how lawns can be beautiful and healthy without using chemical fertilizers, pesticides, and excessive irrigation.

2002 annual appeal

Thanks to everyone who has generously responded to ELA's annual appeal this fall. Contributions are still coming in, and we are grateful for your help. In these challenging financial times, outside funding sources have an increasingly difficult time meeting all the requests they receive. While we will continue to pursue grants and other inputs, we depend in large measure on member support to support our programs and keep us moving forward.

If you haven't yet responded, it's never too late. Contributions of any amount are always welcome and appreciated. Your tax-deductible contributions can be sent to ELA, 60 Thoreau Street #252, Concord, MA 01742. Thank you!

ELA receives grant

ELA is proud to announce that we are the recipient of a generous grant of \$2,000 from the Crossroads Community Foundation. This is an extremely competitive year for funding and ELA was one of eight organizations selected from 49 proposals. We are grateful for the Foundation's support of our mission and programs in the Metrowest (Massachusetts) service area. We plan to allocate this money to "capacity building," that is, staff support and membership development.

ELA retreats ... but only for a day. In October, the ELA board held its annual retreat, this year at Massachusetts Audubon's Broad Meadow Brook Conservation Center and Wildlife Sanctuary in Worcester. The full-day session with facilitator Rhua Stakely provided an opportunity to consider in depth specific issues that there isn't sufficient time to take up during the regular board meetings.

This year, the focus was on sharpening ELA's definition

of itself: What really constitutes "ecological landscaping"? Where do we fit among other organizations? How are we unique? How can we more clearly describe the organization to prospective members and supporters?

Intensive discussion, brainstorming, and summation sessions produced a lot of good thinking and output which we will continue to digest, refine, and integrate into our program and materials in the coming months.

Meet your board of directors (continued)

In the last issue, we began to introduce the diverse and eclectic members of our board of directors. Following are the descriptions for the balance of the board.

M.L. Altobelli

education committee chair,
manual and marketplace coordinator,
steering committee,
continuing director

I've been part of the ELA board since its inception. I've been most involved with the educational component of ELA. I'm currently working on *The Guide to Healthy Landscapes* and the new eco-marketplace.

I run a small horticultural service business in north-central Massachusetts. It includes design, installation, and maintenance of annuals, perennials, trees, and shrubs. I love color and variety and I'm not fond of lawns! I use organic soil development as the foundation of all of the gardens, but I do not consider myself an organic landscaper and probably never will. My clients do not care what I do as long as the gardens look great, and I prefer the flexibility of looking at all of the factors involved in a given garden and making the best decision available for both the client and the environment.

My favorite part of ecological landscaping is creating healthy soils and therefore creating an environment for healthy plants and people. I'm currently working with brewed compost teas (Dr. Elaine Ingham's work) and soil remineralization for weak trees.

Jim Marzilli new director

I am in my sixth term in the Massachusetts House of Representatives, representing Arlington and West Medford. I maintain a 6,000-square-foot, ecologically sustainable, suburban garden with an emphasis on plants native to the East Coast.

I am active in a wide range of environmental policy issues. I serve on two public-private partnerships organized by the U.S. Fisheries and Wildlife Service, working to restore native plant species and removing nonnative, invasive species. I initiated the Green Streets, Green Cities program to restore urban green areas using volunteers and native plants. I am active at the national level in urban forestry issues.

I am a member of the Board of Trustees of New England Wild Flower Society and, now, the Ecological Landscaping Association. I was named Environmental Legislator of the Year by the Environmental League of Massachusetts in 2001.

Nick Novick

newsletter editor,
steering committee,
continuing director

I've been actively involved with ELA for about six years now. My time in landscaping extends only a little longer than that, having shifted from a 10-year stint where photography was mostly responsible for paying the bills. Despite an academic background in natural sciences (B.S. Environmental Conservation, UNH), until recently i had been mostly working in publications production and photography. And here i am with ELA, still blending most of those interests.

Additional training in landscaping and horticulture included UMass Extension's Green School; the certificate program at New England Wild Flower

Society; numerous symposia and conferences (including the excellent Native Plants in the Landscape conference in Millersville, Pa., the New Directions in the American Landscape symposium in Pennsylvania and Connecticut, and, of course, ELA's own Winter Conference).

Despite a missing gene for business management, i'm currently running my own small landscaping design and installation business in eastern Massachusetts. That i have yet to do any advertising for the business—but am as busy as i want to be—attests to the growing demand for a different kind of landscaping service. I concentrate on "natural" plantings (meadows, woodland/shade gardens, native plants), but also do a fair amount of lawn fertility and pest management, hardscape work, etc.

My motivation to enter the landscaping field was based, in large part, on a concern for the environment, and i suppose one could say i even take an activist's approach in my work whenever i can. When possible, i try to view clients' properties as opportunities to restore part of the environment to a healthier state.

The personal and professional connections i've made through ELA have been invaluable in the growth of my professional knowledge, and have led to some great friendships and acquaintances. I'm grateful to be involved with such a fine group of dedicated, fun people.

As health and environment concerns continue to grow, the kind of information ELA provides will be increasingly important. A still relatively young and small organization, ELA will face new challenges as it grows to the next level of organizational maturity. I look forward to helping ELA develop in its capacity to provide practical information on sustainable tools and facilitate connections between people in the spirit of our mission.

Chris O'Brien

vice-president, steering committee,
continuing director

I joined the ELA about two years ago because it is one of the few organizations concerned primarily with the environmental effects of the work performed by landscape professionals. I agreed to serve on the Board of the ELA because I think that my previous experience working on the boards of similar organizations can contribute to achieving the goals of ELA.

Previous experience includes work for trade, professional, and other not-for-profit organizations, as well as in the energy area. I currently help operate Howard Garden Designs Inc., which is a landscape design and build firm based in Newton, Mass.

Like most gardeners, I spend a lot of time fiddling around with our own gardens, but I also am interested in blacksmithing and the creation of iron works for the garden and house.

Tom Smarr

membership chair,
continuing director

My appreciation for nature developed during my youthful days in the mountains of north central Pennsylvania. As a result, in part, of my several years of frolicking through the forests and farm fields, I studied Environmental Studies at a little-known school called Slippery Rock University of Pennsylvania (located north of Pittsburgh).

After completing my BS degree, a more demanding call to horticulture immersed me into the beautiful world of public gardens. During my several years of work experience and studies, I found myself in Seattle, Wash. There, I worked as a gardener and nursery salesman, and was the interim Education/Outreach Coordinator for the Center for Urban Horticulture. I also completed a master's degree in Urban Horticulture, specializing in public

garden management and outreach, from the University of Washington. After completing my degree, it was only natural for me to find my way back to native plant horticulture. Currently, I am a horticulturist at Garden in the Woods, the botanical garden of the New England Wild Flower Society.

I have a wide range of horticultural interests, plus many other related interests. I am very dedicated to the education of professionals and the public about environmentally friendly landscaping concepts that will enhance and build healthier surroundings for our communities. I look forward to serving ELA as a board member and providing my expertise and enthusiasm to the growth of our organization.

Sue Storer

treasurer, steering committee,
continuing director

I have been on ELA's board of directors from its inception in the early '90s. This organization has given me the information and support I have needed to put (at least some of) my ideals into practice in my landscaping work. Over the past 10 years, I have helped coordinate the organic lawn-care standards group; have organized round tables, annual meetings, and board retreats; and have served as president, secretary, and now treasurer. It has been a thrill to see what this group has been able to accomplish together so far, and I am very excited about our goals for the next several years.

My work in horticulture began in the fields at Weston Nurseries (including a stint as a mule driver). I have worked as the horticulturist at Garden in the Woods, ran my own garden design and maintenance business, and managed an old estate undergoing massive renovations (it had all the elements of a good British sitcom). I am currently working part time as a subcontractor doing garden installation and maintenance.

Diane Syverson

public relations coordinator,
steering committee,
new director

I am honored to be joining the board of ELA, a group with a mission and an organization to lead the way for other regions of the country.

For many years I worked within the arboretum and botanic garden community, with elementary school children and teachers. Then my job was to find ways to encourage learners to think more deeply and often about plants. To build their understanding about how incredibly interesting plants are and how we depend upon them for life. A stimulating professional network was automatically part of working at the Arnold Arboretum in Jamaica Plain, Mass.

Now I am starting a small garden design business. I am especially curious to find ways to help clients develop their own awareness of their home's landscape ecology. This is a complicated job. To succeed, I need a professional network which shares a commitment to changing the way we value the ecology of place—in our gardens and communities. A network to help me stay interested and informed. One with which to share and develop ideas, stretch thinking, trade frustrations. Many thanks to those who founded the Ecological Landscaping Association. I am pleased to be a member! ■

* * *

Note: Terry Bastian has resigned from the board for personal reasons.

gleanings

More on treated wood

As reported in the last issue of *The Ecological Landscaper* ("CCA wood to be phased out by 2004"), one organization (Environmental Working Group) cast doubt on EPA assurances that it "did not believe there is any reason to remove or replace arsenic-treated structures."

Another group reaffirms these concerns. The New York Coalition for Alternatives to Pesticides [353 Hamilton St., Albany, NY 12210; phone (518) 426-8246] has been testing playground structures in New York State. According to the summer 2002 issue of the NYCAP newsletter, "preliminary results indicate [arsenic] levels that are over 40 times higher than the ... clean-up recommendations from the New York State Department of Environmental Conservation." Contact NYCAP for more information on the test results or for details on how to conduct your own tests.

—from *HortIdeas*, September 2002 (750 Black Lick Road, Gravel Switch, KY 40328)

Weed-and-feed lawn chemicals reduce litter size in lab test

Miniscule amounts of lawn weed killers reduce the birth rate of lab mice, according to toxicologist Warren Porter of the University of Wisconsin-Madison and his colleagues. Rather than testing high doses of single herbicide ingredients, as has previously been done, these researchers used a brand of weed-and-feed mix that contained three herbicides: 2, 4-D; mecoprop; and dicamba.

They fed solutions containing various concentrations of the weed killer to pregnant mice. Compared with control mice, those consuming the herbicide had up to 80 percent fewer pups. Mice receiving the lowest doses of herbicides generally produced the smallest litters, contrary to toxicological dogma that "the dose makes the poison." Fred vom Saal of the University of Missouri in Columbia says that in light of this

study, researchers should test very low as well as high doses of such hormone-like pollutants.

—from: "Lawn Agent Cues Embryo Shortfall," by J. Pickerell, *Science News*, Oct. 12, 2002 (as reported in *Maine Organic Farmer & Gardener*, December 2002-February 2003)

Tougher fertilizer standards

Beginning Jan. 1, 2002, California began enforcing the toughest fertilizer standards in the country, according to the state's Department of Food and Agriculture. The standards follow a process that included public hearings and input from fertilizer manufacturers and environmental groups. CDFA Secretary Bill Lyons Jr. said the new standards ensure the levels of certain heavy metals do not pose a risk to Californians and the environment. For more: <www.cdffa.ca.gov>

—from: *NMPro magazine*, Feb. 2002

State of Maryland helps growers

This past summer, the Maryland Legislature granted Gov. Parris N. Glendening's request for money to subsidize the cost of writing nutrient management plans. The legislature appropriated \$987,409 to help plant growers write the plans. Without increased funding, many growers would not have been able to afford the plans, which are required by the Water Quality Improvement Act of 1998 to help restore the Chesapeake Bay and its tributaries, according to the Maryland Department of Agriculture. For more: <www.mda.state.md/us>

—from: *NMPro magazine*, July 2002

Yet another new invasive

Inula britannica, an aggressive European weed, has entered the United States through Ditch hosta and daylily liners.

I. britannica, also called British elecampane, is a member of the *Asteraceae*

family. It grows 6 to 30 inches high and the top of the leaves have soft, downy hairs. Margins of the leaves are even or finely toothed. Look for yellow flower heads that occur alone or in clusters of two or three. The weed flowers in July and August.

Any plant infested with *Inula* should be destroyed.

USDA's Animal and Plant Health Inspection Service is trying to determine how far this weed has spread. If you have an infestation, contact Al Tasker, APHIS noxious weed coordinator. For more info: Al Tasker, Invasive Species and Pest Management, Plant Protection and Quarantine, USDA APHIS, 4700 River Road, ste. 134, Riverdale, MD 20737; (301) 734-5708; <atasker@email.aphis.usda.gov>; <www.aphis.usda.gov/npb/inuladetail.html>.

—from: *NMPro magazine*, August 2002

Trees cause pollution?

Could trees actually be the cause of air pollution? U.S. EPA speculates that oak trees are to blame for high amounts of formaldehyde in the air around St. Louis. St. Louis has some of the highest formaldehyde air pollution levels in the country, and officials are doing research to see if the surrounding Ozark forests contribute. Oak trees give off isoprene, a gas that reacts with sunlight and water to create formaldehyde.

—from: *St. Louis Post-Dispatch*

White House tree falls to squirrels

A tree that has graced the White House's expansive North Lawn since the 19th century came down [last September], the victim of over-aggressive squirrels.

Workers with chain saws, a wood chipper, a forklift and other equipment labored through the morning to fell the yellow buckeye that had towered over many of the grounds' other trees. After chopping off the branches and most of

the top, the final large piece of the trunk hit the ground with a boom around lunchtime.

All that was left by the end of the day was a hole in the ground newly filled with dirt.

The tree was planted at an undetermined time before 1900, said White House Spokeswoman Anne Womack. Unlike some of the trees on the grounds, it had not been planted for any special commemorative purpose, she said.

The tree's undoing was its appeal to squirrels, which burrowed so deeply they penetrated the layer that transports water throughout the tree.

Groundskeepers had to spend a large amount of time tending the tree and shearing top branches as they died of thirst. Eventually, workers concluded the tree could become a hazard over the winter and decided it had to come down, Womack said.

"Over the last couple of years, for some reason the squirrels have just attacked this particular tree," Womack said.

—*from: Miami Herald, Sept. 12, 2002, reprinted by permission of Associated Press*

Naked gardener wins another court case

Chalk up another victory for the naked gardener.

The Pennsylvania Superior Court has overturned the harassment conviction of Charlie Stitzer, who has a habit of tending his backyard garden in the nude.

Stitzer, 64, of Pleasant Gap, was convicted in December 2000 of indecent exposure after a neighbor, Pam Watkins, complained that she and her 15-year-old daughter had seen Stitzer gardening in nothing but shoes and a

wristwatch. Stitzer was sentenced to two years probation.

The Superior Court threw out that conviction in March, saying Stitzer's backyard was private and that the neighbors were too far away—65 yards—to have seen anything offensive.

The separate harassment charge stems from three letters Stitzer wrote to Watkins. The Superior Court, in its ruling Monday, said Stitzer used the letters "to establish a dialogue with his longtime neighbor in an attempt to mediate their ongoing conflict.... He used these letters as a forum to make peace."

Stitzer said he first started gardening in the nude to persuade Watkins to dim the outdoor floodlights that shone toward his property, a few miles north-east of State College, Pa. ■

—*from: news story, Aug. 9, 2002, reprinted by permission of Associated Press*

2003 Ecological Landscaping Winter Conference and Eco-Marketplace

Building Viable Habitats: Resources for the Ecological Landscape
February 28, March 1, 2003
at the Holiday Inn, Boxborough, Mass.

Keynote presenters will be **Leslie Sauer** of Andropogon Associates, who will discuss ecological landscape management and preservation, and **Dr. Elaine Ingham**, national expert on the soil foodweb, who will explore the complexities of the soil ecosystem and ways to manage its health. Both will also present workshop sessions.

Other scheduled speakers include **Bill Cullina** on native trees for tough sites; **Cheryl Smith** on biorational approaches to managing plant diseases; **Frances Clark** on managing conservation land for habitat; plus, sessions on lawn care, pest management, and more.

There will be expanded opportunities for informal networking sessions to meet and talk to other landscape and horticultural professionals.

The addition of the Eco-Marketplace will feature vendors of products and services related to ecological landscaping and conservation.

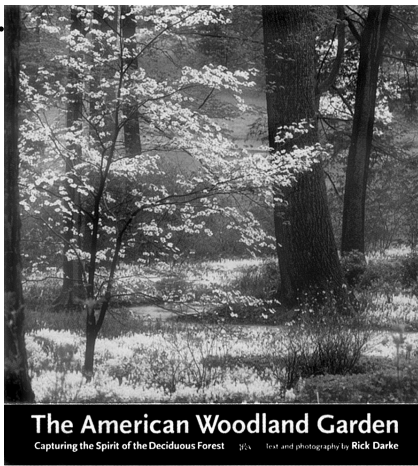
Cost is \$125 for Friday only, \$95 for Saturday only, or \$185 for both days. Cost includes program, lunch, continental breakfast, and conference booklet.

IS, MC, MCS, AND MCLP, and pesticide contact hours have been requested.

For more information, contact Nancy Askin, ELA's conference coordinator at (978) 425-0101 or Kathleen Carroll at (413) 545-0895, <kcarroll@umext.umass.edu>. Or, check these Web sites: <www.ELA-ecolandscapingassn.org>, <www.umassgreeninfo.org>, or <www.newfs.org>.

Co-sponsored by the Ecological Landscaping Association; UMass Extension's Landscape, Nursery, and Urban Forestry Program; and the New England Wild Flower Society, the 9th Annual Winter Conference has been expanded to a two-day-long program. Presented by leading experts, the educational sessions will provide information on a broad range of vital topics.





The American Woodland Garden
 Capturing the Spirit of the Deciduous Forest text and photography by Rick Darke

Review of Rick Darke's *The American Woodland Garden; Capturing the Spirit of the Deciduous Forest*

The American Woodland Garden: Capturing the Spirit of the Deciduous Forest by Rick Darke (Timber Press, 2002) ISBN 0-88192-545-4. More details about the book are available at www.timberpress.com.

Rick Darke's latest publication is, in effect, two books. In the first half Darke wends through a forest aesthetic, examining light and shadow, color and structure, and the manifestations of the seasons. He goes on to model an exercise all of us would do well to imitate: He examines a site over a period of years, taking notes and photos in order to comprehend all that he observes. Offering readers 66 images of one woodland stream (with most photos taken from the same vantage point), he introduces us to this ecosystem's constituent parts and opens our eyes to their transitory qualities. These illustrations are followed by a smorgasbord of landscape photos, each scene cap-

Darke's literary style weighs more toward the pragmatic than the poetic, and his phrasing often hits the nail on the head. At right are a few of the best Darkeisms:

Native plants may be better adapted, but what is most important is that they have proved their ability to co-exist within the balance of a forest community, something that cannot be said for many exotics.

The regimented aesthetic of traditional formal gardens is usually in conflict with the necessary plasticity of natural forests.

I'm sometimes inclined to believe horticulturists are involved in an unwitting conspiracy against big trees.

I'd come to appreciate the structure and the pace of the landscape and its living community, and knew where to look for the details that set today apart from yesterday or tomorrow.

Many daily rhythms became apparent and predictable ... such as the cloaking effects of morning shadows or the luminous depths produced by the sun's late-afternoon backlighting, and I've since learned how to emulate these effects in garden designs.

Unless we've been trained in art, our color vocabulary is usually so limited it is completely inadequate for describing the subtle hues readily apparent to the eye in the winter landscape.

tioned with insightful text pointing out the tints, textures, forms, or layers that give rise to visual reward.

The second part of this book provides textual and photographic profiles of Darke's favorite native trees, shrubs, herbs, ferns, grasses, sedges, and wood-rushes. Each plant gets, on average, two paragraphs of description. Comparatively, this section pales to better, specialized books. Guy Sternberg and Jim Wilson's *Landscaping with Native Trees*, for example, outshines Darke's quickie tree profiles. As for Darke's treatment of herbaceous plants, Lorraine Johnson's *100 Easy-to-Grow Native Plants* does a better job of describing landscape uses and suggesting companion plantings.

Given this, you might wonder what would motivate you to add *The American Woodland Garden* to your library for \$49.95. I recommend the book for 738 colorful reasons: Its photos remind us how the sensorial pleasures of a forest are the result of nature going about its relatively predictable biological business. If we can learn about those natural processes and keep them in mind, then, as landscapers, we can see

through time to contrive a sustainable and visually successful design.

Printed with Hong Kong's customary eye-popping reproduction, all aspects of the book's layout and typography are exemplary and worthy of any coffee table.

Darke has authored or otherwise contributed to these other notable books: *Manual of Grasses*, *In Harmony with Nature: Lessons from the Arts & Crafts Garden*, the *Color Encyclopedia of Ornamental Grasses*. ■

—Joy Buslaff

Joy Buslaff recently joined the production staff of this newsletter to assist Nick Novick, whose work as editor she admired from afar (Waukesha, Wis.). Joy's business has been providing publishing services for mainstream and special-interest magazines for over 20 years. You may know her from her five-year tenure as editor of Wild Ones Journal. After converting virtually all of her home's property to native plants and edibles, she and her husband are now taking on the renovation of her inherited childhood home (a historic schoolhouse) and will then embark on another grand native landscaping adventure.

Use of proprietary product or manufacturer names is for informational purposes and is not intended to constitute or imply any endorsement or warranty by ELA. We strive to present accurate and reliable information, however, ELA assumes no responsibility for any claims made or for results obtained from any procedures described in the articles we print. Unless described as such, opinions expressed in the newsletter do not necessarily represent those of ELA's directors, staff, or members.

events

January 8, 2003

ELA round table: Designing the Landscape with Water in Mind, Broadmoor Audubon Wildlife Sanctuary, Natick, Mass., 1:30-4:30 pm. Peter Phippen from the Merrimack Valley Planning Council and Jean Akers, of the Conway School of Landscape Design will review impacts of recent droughts and consider how to address water issues in landscape design and planning. \$25 for ELA members, \$35 for nonmembers; registration limited to 40. Call (617) 436-5838 to request registration form.

January 9-10, 2003 (Connecticut)

January 15-16, 2003 (Pennsylvania)

New Directions in the American Landscape; Vegetation and Innovation: Meadows, Woods, and Water, held in two locations: New London, Conn., and Villanova, Pa. Speakers include Dennis Burton on planting and protecting natives in disturbed landscapes, Richard Pais on forest conservation in new development, Bill Cullina on seeding the woodland landscape, Carol Franklin on establishing meadows under different site conditions, Larry Weaner on meadow techniques, and more. \$275 includes program, continental breakfast, lunch, and breaks. Info: (860) 439-5020 (Conn.); (215) 247-5777 ext. 156 (Pa.).

January 10-12, 2003

Ecological Cut Flower Growing Workshop, Ballston Spa, N.Y. Contact the Regional Farm and Food Project, tel.: (518) 427-6537; Web: <farmfood@capital.net>.

January 16-February 28, 2003

Winter Horticultural Lecture sponsored by the New England Wild Flower Society, held at the Wellesley Community Center, Wellesley, Mass. Jan. 16: Ann Lovejoy on natural garden and landscape care; Jan. 30: Patrick Chasse on Art, Nature, and Landscape Character; Feb. 13: Warren Leach, "Gardens That Fit; Designing for New England"; and Feb. 27: Leslie Sauer on restoring and managing small woodlands. Many other educational programs are offered through NEWFS. Contact NEWFS Education Dept. at (508) 877-7630 ext. 3303 or e-mail <registrar@newfs.org>.

January 22, 2003

Eco-Landscaping Conference and Tour, Asilomar Conference Center, Pacific Grove, Calif. 9 a.m. - 5 p.m. Topics include alternative weed management, beyond xeriscaping, the new urban watershed. Presenters include ELA member Owen Dell on the design and management of watershed-friendly homes, landscapes, and public infrastructures. \$75 includes organic lunch. To register/for info., contact Ecological Farming Association at (831) 763-2111 (phone); e-mail: <info@eco-farm.org>; Web: <www.eco-farm.org>.

February 6-8, 2003

New England Grows! trade show, Hynes Convention Center, Boston, Mass. Educational program includes Gardens on the Edge: Coastal Landscape Design by Patrick Chasse; Soil Microbes, Roots, and Plant Growth by Don Marx; The Livable Landscape: Garden Design with Habitat in Mind by Rick Darke; and Organic Land Care: The Wave of the Future? by ELA member Mike Nadeau. Info: (508) 653-3009, <www.NEGrows.org>.

February 8, 2003

Landscaping for Wildlife with Native Plants; workshop by Cynthia Boettner of the Conte Wildlife Refuge in Mass., sponsored by the Montshire Museum in Norwich, Vt., 9:00 am-4:00 pm. Free with museum admission. Info: (802) 649-2200; <www.montshire.org>.

February 12, 2003

ELA round table: Turf and Landscape; Keeping Water in Mind, Tower Hill Botanic Garden, Boylston, Mass. 1:30-4 p.m., speakers to be announced. Discussion will deal with incorporating environmentally sensitive techniques into your lawn care program. \$25 for ELA members, \$35 for nonmembers; registration limited to 40. Call (617) 436-5838 to request registration form.

February 28-March 1, 2003

Ecological Landscaping Association Winter Conference and Eco-Marketplace, co-sponsored with UMass Extension and New England Wild Flower Society, Boxborough, Mass. Holiday Inn. Keynote speakers are Leslie Sauer of

Andropogon Associates and Elaine Ingham of Soil Foodweb, Inc. Other expert speakers will address lawn care, pest control, and other landscape issues from an ecological viewpoint. Contact ELA at (617) 436-5838; <www.ELA-ecolandscapingassn.org>.

March 1, 2003

Introduction to Winter Trees, Green Mountain Club, Waterbury Center, Vt. Learn winter identification of native trees by bud, bark, and other characteristics. \$8 members, \$12 nonmembers. Contact Julia Grand-Coucet at the GMC (802) 244-7037 ext 23.

March 13, 2003

UMass Community Tree Conference; the Preservation of Vintage Trees, co-sponsored by UMass Extension and the U.S. Forest Service's Northeast Center for Urban and Community Forestry, Amherst, Mass. Contact Dennis Ryan (413) 545-6626 or Kathleen Carroll (413) 545-0895.

March 18, 2003

Perennial Plant Conference, Univ. of Conn., Storrs, Conn. For info., contact Dr. Richard McAvoy, tel.: (869) 486-0626; e-mail: <richard.mcavoy@uconn.edu>.

March 22, 2003

Backyard Habitat Enhancement, slide presentation and talk sponsored by the New Hampshire Fish and Game Dept., Hopkinton, N.H. Handouts provided. Info: (603) 746-6121.

March 29, 2003

ELA round table: The Great American Lawn, with Lisa Vernegaard, with (Mass.) Trustees of Reservations and contributing author of *Redesigning the American Lawn*, and Tom Akin, Assistant Ground Supt. at Arnold Arboretum and ELA board member, 1:30-4 p.m. Will consider lawn history, the ramifications of our landscape choices, and how to manage lawns with the environment in mind. \$25 for ELA members, \$35 for nonmembers; registration limited to 40. Call (617) 436-5838 to request registration form.

resources

Water

- "The Ecology and Culture of Water," an article by James Patchett and Gerould Wilhelm, discusses water in the broadest contexts of ecology and cultural relationships, and how to incorporate a priority for water in the design process. It can be found in the Conservation Design Forum Web site at <www.cdfinc.com/Ecology%20and%20Culture%20of%20Water.htm>.
- The UMass Extension Web site at <www.UMassDroughtInfo.org> provides practical information for water conservation in the landscape, tracks local water restrictions, gives links to relevant organizations, and more.
- A number of drought-related resources can be found on the University of Maryland Web site at <www.agnr.umd.edu/hottopics/drought/> including video clips, downloadable fact sheets, and other information. Topics covered include agricultural, garden, and home-based concerns.

□ A "Water Efficient Landscape Planner," a downloadable zipfile is available from the U.S. EPA at <www.epa.gov/grtlakes/seahome/landscp.html>. It offers information on the advantages and principles of water-efficient landscaping for homeowners, small businesses, communities, and teachers.

□ Few sensible systems have been available to collect rainwater from building roofs to make it available for future use. Between huge, underground tanks, and inadequate small barrels, there's been, well, not much.

To help address this need, the Charles River Watershed Association, in Newton, Mass., is developing a scalable system designed to collect roof water in 400-gallon cisterns so it can be used for car washing, watering plants, etc. For information on the "Smart Storm" system, check their Web site at <www.crwa.org/index.html?wavestop.html>.

Turf school

2003 UMass Winter School for Turf Managers, Jan. 6-Feb. 21, 2002.

Contact: Trudie Goodchild (413) 545-2484; e-mail: <goodchild@admin.umass.edu>.

Another deer repellent

Manufacturer claims that a new product, "Liquid Fence" deer repellent, is highly effective in deterring feeding by deer, rabbits, and other foraging animals on plants. Derived from "derivitized fatty acids, derivitized tree sap, whole eggs, and garlic," it is claimed to protect plants for up to one month. It is said to be odor-free after drying, biodegradable, and harmless to insects and birds. Info.: Liquid Fence, Box 300, Brodheadsville, PA, 18322; tel.: (888) 923-3623; Web: <www.liquidfence.com>.

Ongoing classes

The Institute of Ecosystem Studies in Millbrook, N.Y., offers a continuing education program encompassing gardening, landscape design, natural science illustration, and more. Contact IES, Continuing Education Program, Box R, Millbrook, N.Y. 12545-0178; tel.: (845) 677-9643; Web: <www.eco-studies.org/cep>.



The Ecological Landscaper
6 Meadowbrook Lane
Ashland, MA 01721

"Throughout the history of literature, the guy who poisons the well has been the worst of villains..."

—author unknown