

WATER SHAPES

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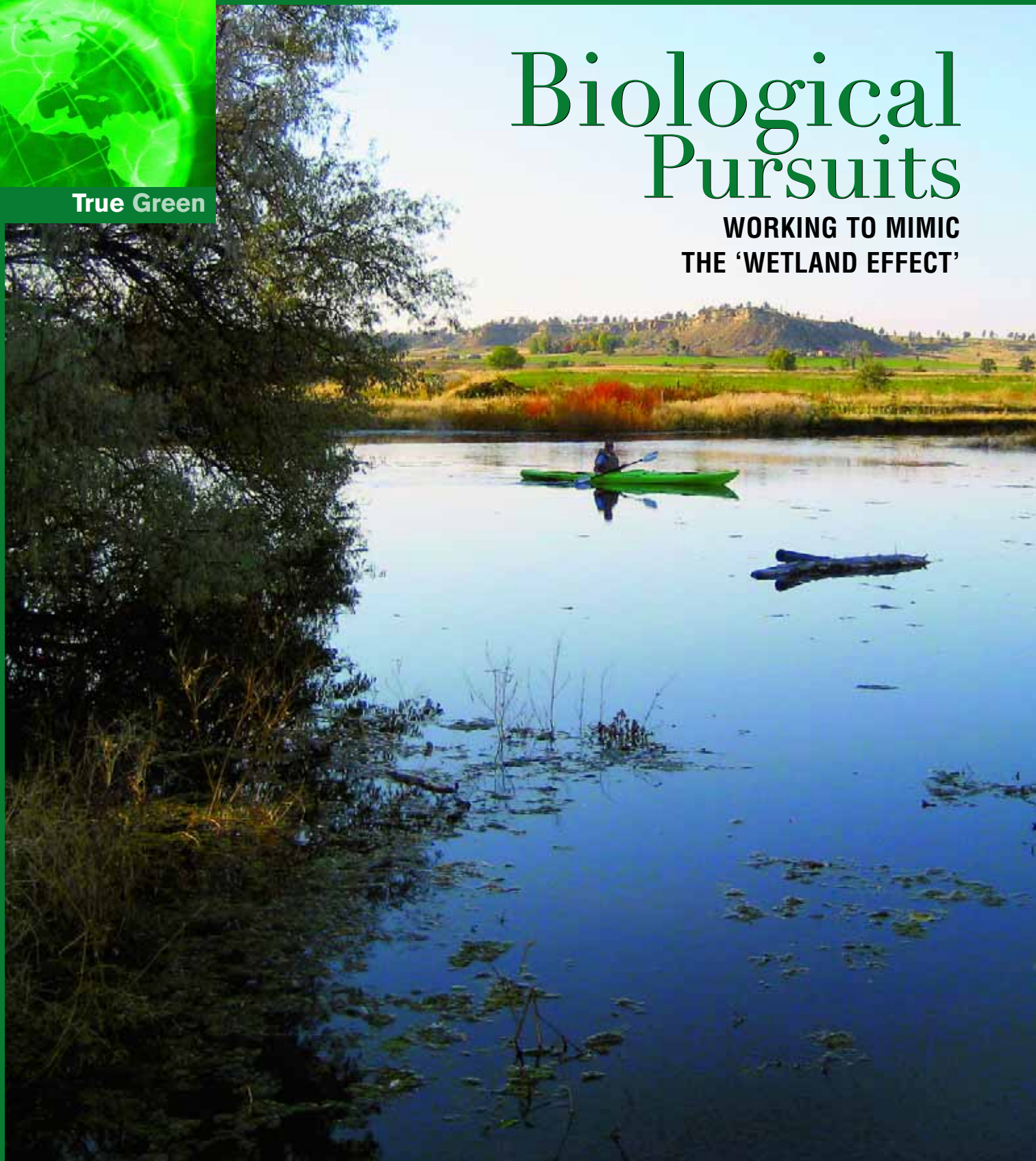
INSIDE: Developing a True Green Agenda

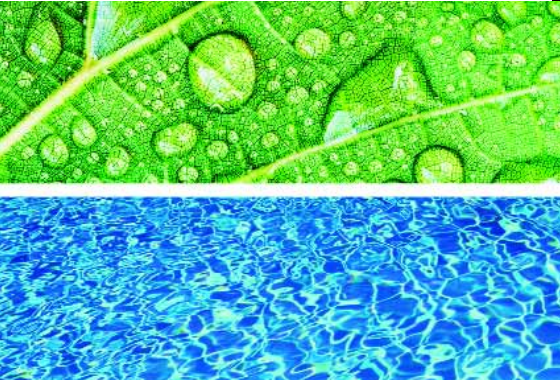


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Behind True Green

By Eric Herman

I wasn't surprised when Jim McCloskey suggested that it was high time for us to produce a Green Issue of *WaterShapes*: I've known him for more than 20 years and have long admired his dedication to environmentalism, recycling and keeping the planet healthy for his children and everyone else's children as well – beliefs I wholeheartedly share.

I was, however, caught a bit off guard by his marching orders: "Look at this," he said, "as though we were launching a new magazine."

"That's more than a special issue," I replied, to which he said, "Absolutely. This needs to be a real, earnest, honest approach rather than the sort of lip service we've seen when other magazines have done these issues. Our readers expect more from us, and if we can't deliver, I'd rather not do it."

I've also always appreciated Jim's desire to push our boundaries editorially, so I dutifully set out in search of coverage that drove familiar-seeming topics in fresh directions. Accordingly, what you hold in your hands is our best effort at producing "True Green."

The columns and features in this issue, starting from Brian Van Bower's "Aqua Culture" and marching through to Mike Farley's "Book Notes," deal with a vast range of green-related subjects and processes. At every turn, the approaches are practical rather than theoretical, grounded rather than speculative and realistic rather than overblown.

As Brian puts it so elegantly in his column (see page 10), consumers have declared their support for the Green Revolution, and it's up to watershapers to become versed in the issues and informed about solutions – or risk being swept aside by the tidal forces that seem to be reshaping the marketplace. Those consumers may be green by convenience (after all, efficient systems save them money in the long run), but there's no doubt that this is more than a fad or a short-lived trend.

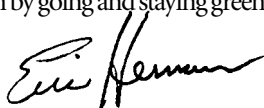
Our first True Green Issue (and there may indeed be many more as events unfold) aims to open the conversation in ways we haven't seen before. We've sought out voices and selected topics in an effort to be as useful, supportive and sensible as possible – with everything directed at giving you ideas and a vocabulary for addressing your clients' interest in environmental responsibility, protection of water resources, energy conservation and much more.

Some of what you'll find in these pages may even surprise you. For starters, there's Mark Holden's bluntly critical (yet still optimistic) look at swimming pools and the environment; then there's Jamison Ori's evaluation of the current state of the art and his insights on using what's currently available to green up his watershapes in ways that make his clients feel good about owning them.

There's also an article from Timothy Rumph about working in the vicinity of protected wetland, dune and waterfront areas and the kind of regulatory awareness and environmental sensitivity the work requires. In addition, Aviram Müller addresses the basic concepts of water collection, conservation and usage in contexts in which he also manages to preserve the decorative qualities inherent in various flows of water.

The thought behind all of this is to be honest and realistic about the challenges watershapers face in this emerging business climate – and highlight opportunities facing those who design and build watershapes to carve out fresh niches in the marketplace of green ideas, ideals and the industry's future.

As we at *WaterShapes* see it, we have everything to gain by going and staying green.




True Green

WATER SHAPES

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In This Issue

October's Writers

Timothy Rumph is president of Araiys Design Landscape Architecture, a firm based in Southampton, N.Y. A native of Long Island, where he has worked as a landscape architect for more than 30 years, he offers design services for a range of public, non-profit and private clients in the municipal, recreational, corporate, healthcare, housing, industrial, educational, retail and residential markets. He founded his firm in 1994 and currently has a staff of five, including three trained in landscape architecture. Rumph has a wide-ranging familiarity with and understanding of environmental, zoning and regulatory issues. With his experience as a consultant to municipalities, he also lends his expertise to the effective management of projects that face various state, county and local approval processes.

Jamison C. Ori is president of Rosebrook Pools, a water-shape and landscape design/construction firm based in Libertyville, Ill. Raised in a family of pool builders, he has worked for the firm on a full-time basis for the past 12 years and became a partner on its ownership team six years ago. He began his career at the age of 11, accompanying his father Joe to job sites, meeting customers and learning the construction process. By the time he was 14, he was working maintenance routes. After finishing school, he stayed connected to the pool industry while playing professional hockey in California. His drive to raise the bar with respect to design and construction led him to participate with the Genesis 3 Design Group, while his personal interest in design and engineering – and specifi-

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cally the work of Frank Lloyd Wright – led to his fascination with extreme cantilevers and their construction.

Bruce Kania is an inventor with a successful track record in the licensing of product concepts in the prosthetic, orthotic, textile and sporting-goods industries. He originated the idea of replicating natural, self-sustaining floating islands while working at his research farm in eastern Montana and runs what amounts to a think tank of independent contractors through his company, Fountainhead LLC of Bozeman, Mont. In his work, he deliberately draws on an enormous talent pool centered in and around the state, finding creative people with the right skills to achieve innovative and marketable results.

Aviram Müller is the founder of Karajaal, a water-experience company based in St.-Sauveur, Quebec, Canada, that focuses on the design and engineering of distinctly interactive aquatic venues in which water, lighting effects, fountains and pools are typically part of the package. A multi-faceted artist with an extensive technical background, Müller has worked on three continents through the past 25 years. He has a passion for creating distinct, affordable and ecologically responsible experiences, with a focus on commercial centers and resorts. He is currently working on a textbook on the subject of sculpting with water that will be aimed at university students and graduates in architecture, engineering and the fine arts.



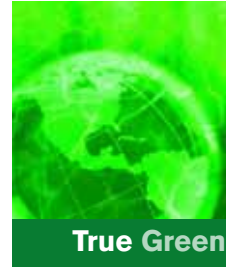
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True Green

My clients continue to seek the finer things in life, but they're anxious to do so in ways that demonstrate their sense of genuine environmental responsibility.



Easier Being Green

By Brian Van Bower

Until quite recently, it was difficult to find too many people in the water-shaping industry who were willing to say much about “going green.”

For a while now, I’ve thought that was a mistake: It’s been manifestly clear for several years that practices and programs related to energy conservation, water conservation and an overall sense of environmental responsibility are here to stay, and I always think it’s better to stay ahead of the curve when these movements arise than it is to try to react after the fact.

In this particular case, I think staying out front is far and away the better idea, and I’m happy that our society has embraced environmental activism in the form of recycling and purchasing energy-efficient appliances and automobiles: It all makes a good deal of practical, common sense at a time when resources are being stretched thin and costs for energy, water and basic materials are rising.

At the same time, I refuse to take great issue

with those who have yet to climb on board with the green movement. Old, established thought patterns don’t alter overnight, and it’s difficult being put in a position where, one day, you’re doing your best to do a good job and, the next, people are branding you as an environmental outlaw because you drive a big pick-up truck.

Even so, it’s time to acknowledge that times have changed and that we watershapers need to start thinking in creative ways about joining the Green Revolution, get ourselves out ahead of the curve and find an assortment of ways to make certain our clients and the public at large are satisfied with what we’re doing or attempting to do when it comes to being green.

all of a sudden

What’s happening right now – truly *as I write this* – is that more and more people out there are going green with as much force and momentum as possible. On the one hand, we should take this trend very seriously and do all we can to participate aggressively; on the other, we need to develop our “hype detectors” and make certain what we’re doing makes sense.

When I watch television or read consumer magazines, I just laugh when I run into many of the advertising messages they carry about “green” products, basically because what I see are slogans rather than true greenness. This obvious marketing hyperbole doesn’t cut it, and I get the sense that, in some respects, it’s making consumers a bit cynical about manufacturer claims of environmental virtue. At the same time, I also see ideas and products that can and really do make a positive difference.

Ultimately, it’s up to us to sift through the information we’re receiving and make decisions about products and approaches that make the most sense – just as has always been true. In this case, however, I think we get too skeptical and cynical at our peril, because I think the green movement is the real deal.

I didn’t start out thinking that way: Part of the challenge I’ve always faced in accepting environmentalism is that the movement comes with plenty of baggage. Indeed, the environment has been a political football for years, and I’ve always been offended by the extremists who seem to want to take much of the satisfaction and all of the fun out of modern life.

But what I’ve seen in recent times has opened my eyes, particularly as a watershaper who interacts with architects and landscape



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architects who spend so much of their working lives focusing on sustainability and LEED points.

That comes very close to home for me: By analogy, it's no longer about driving an underpowered Volkswagen microbus with a peace sign on the front panel, but instead about sophisticated technologies,

hybrids, alternate fuels and all-electric options in well-appointed automobiles that have get-up-and-go, spacious interiors, beautiful designs and all the amenities that we associate with luxury.

To me, that's highly significant: I'm never happy when, in a modern world filled with abundance and wherewithal, I'm

asked to serve a cause by telling people who've achieved success that they can't get what they want and must sacrifice their quality of life to save the world for everyone else. I can't buy into that, and I don't see my clients doing it either.

What they *are* buying into is the idea that they can do things as modern citizens to make a positive difference. On that level, they continue to seek the finer things in life, but they're anxious to do so in ways that demonstrate their sense of genuine environmental responsibility. In other words, luxury, pleasure, and true greenness are no longer incompatible in concept or reality.

balancing act

My clients, however, have questions and seek my help in cutting through the hype to find the truth. They're keenly interested, for example, in knowing whether or not their investments in environmentally beneficial products will be worthwhile, not just with respect to financial paybacks but also to helping the environment in real and tangible ways.

In some cases, I tell them, the advantages are small on both fronts; in other cases, however, the investments make perfect sense. This is why I've spent so much time in the recent past getting educated and up to speed on these issues. I need to be able, almost on a daily basis now, to speak in clear, credible terms about benefits in ways that go well beyond the empty chatter that seems to accompany all things green these days.

In other words, as someone who is genuinely concerned about the environment and equally interested in delivering value to clients, I'm now in the habit of taking long, hard looks at what I can do as a watershaper to make my projects as realistically green as can be.

For me, it always starts with good hydraulic design. This is *not* a new topic to readers of this magazine, and we should all know by now that downsizing pumps and upsizing pipes yields tremendous energy savings.

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Every natural rock used in a landscape or water feature leaves a hole in a forest or meadow. Much attention is paid to preserving other natural resources but there is little respect for surface rock. Does beautifying one landscape justify destroying another?

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"Rocks belong to the land."

Hawaiian pool builder in response to why he uses RicoRock instead of natural rock.



matically – and there's also the added safety benefit that the low flow rates can help reduce concerns about suction entrapment. The beautiful thing in all of this is that these designs don't increase project costs significantly for my clients and also save them money down the line.

Yes, I recognize the fact that there are still some watershapers who haven't heeded this hydraulic-efficiency message, but if you're at all interested in talking with clients about how green you are, this is a great place to start! Heck, it works even if your clients' sole motivation is saving money. (I don't kid myself here: Lots of clients who talk a green story are really in it for the ongoing savings.)

And lest we forget: We do live in times when our government offers tax relief based on the energy efficiency. I know of no specific programs or breaks related to watershapes, but that doesn't mean they won't come along someday. And if you think of how far the LEED program has come in a relatively short time, my guess is that watershapes will be considered as part of the picture sooner rather than later.

All I know is that, right now, design teams and clients I work with are all ears when I bring up any ideas in which energy savings and other environmental benefits are a possibility.

exciting times

The bottom line is that there are people on both the professional and client side of the equation who are extremely interested in weighing options that point in a green direction.

As an example, I'm currently working on a project on a small island that lacks basic infrastructure. The project includes multiple watershapes, landscape lighting and a spectacular array of refined outdoor spaces. The clients could very easily afford to run the entire estate using fossil-fuel generators, but instead they're insisting on our using solar heating for the watershapes and solar panels to generate electricity for a large percentage of their energy needs. So even though cheap, renewable energy isn't a necessity, the clients are moving strongly in that direction just the same.

And they're not alone: In recent months, we've been involved in several other pro-

jects in which clients have set similar requirements. They're not willing to give up luxury, but that doesn't make them any less interested in reducing energy consumption, saving on operating costs and feeling green about the whole project as a result.

So now we're looking into geothermal heating systems and LED lighting systems – new technologies to us, but something we're learning about as quickly as we can. We've also become involved in designs where heat pumps are a big part of the picture. This is definitely familiar turf for us, but we're using these systems in more integrated ways that make them even better investments for our clients.

Again, our clientele isn't interested in making sacrifices with respect to functionality or aesthetics, but these folks *do* want to know about technologies that will reduce the environmental footprints of their systems. From my perspective, it doesn't matter if they're motivated by environmental altruism or pocketbook issues: I need to be conversant in the language of the green movement and be ready to work with design criteria that implement green-oriented technologies and approaches whenever necessary.

For one thing, this greener focus has carried me more deeply than ever before into water-treatment issues and options. As I've mentioned in this space many times before, saltwater chlorine generation seems to be today's most popular choice, basically because it eliminates the need to transport and handle chlorine and simplifies the task of maintaining proper water chemistry. But my clients are also into ozone these days – whatever works! – and most of our recent projects include some combination of the two approaches.

Somewhere in all of this, my clients are also expressing their concerns about water usage and the state of the water supply where they live. To overcome any hesitation they might have, we're also developing our expertise with systems that capture and inject rainwater into our systems. In many cases, it's a simple matter of pitching decks toward collection troughs, pre-filtering the runoff and upsizing surge tanks to handle the increased volume.

Here again, what I love about such systems is that they add precious little to a pro-

ject's cost but yield major benefits when it comes to water usage and making our clients feel better about their watershapes.

a call for innovation

I'd like to conclude this discussion with a message to the manufacturing sector: For a good while now, I've believed that they could help everyone out by designing and selling matched equipment sets for installation as off-the-shelf skid packs.

The truth is, despite our industry's best efforts to educate its builders and designers, too few watershapers are masters of efficient hydraulic design. In that light, doesn't it make sense for manufacturers to offer prepared, fully engineered equipment sets with all hydraulic connections preassembled and all guesswork removed from the picture? And wouldn't it be a great idea to make the ports on pumps, filters and heaters larger to accommodate the bigger pipes we're using?

As I see it, these would represent huge, green steps in the right direction. Yes, some suppliers are already moving this way, but I see the potential for huge benefits here and think they all should take meaningful, powerful and, yes, *promotable* steps in that direction.

For those of us who work with clients, one thing we should all know and accept is that, whatever the specific manifestation, general pressure to minimize the environmental impact of our watershapes will only grow for the foreseeable future. Those who deny this trend will fall dangerously far behind the curve – especially when the economy rebounds and demand bounces back.

You can dig in your heels and resist, but to my way of thinking, there's really no choice but to set aside apprehension, political sentiment and doubt, then jump on the bandwagon and start thinking, talking and *truly* being green. **WS**

Brian Van Bower runs Aquatic Consultants, a design firm based in Miami, Fla., and is a co-founder of the Genesis 3 Design Group; dedicated to top-of-the-line performance in aquatic design and construction, this organization conducts schools for like-minded pool designers and builders. He can be reached at bvanbower@aol.com.

.....
"Some pool designers don't think a lot about color because they don't understand it and are afraid of it. But good pool design depends on composition — and color is a major element of that."
.....

— Judith Corona



The WaterShapes Interview

Judith Corona: Understanding Watershaping's Color Palette

Judith Corona leads a colorful life: Among other things, she teaches color theory and application for UCLA Extension, as well as a 20-hour course on the subject for the Genesis 3 Design Group. In this far-ranging interview, Corona discusses the importance of color in pool design, plus various factors to consider when creating a color palette for a backyard watershape.

To read the interview with Judith Corona, go to www.watershapes.com and click on Interviews.

WATERSHAPES
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Down to the Ground

By Bruce Zaretsky

Whether you're a watershaper or a landscape architect, designer or artist, I've always felt that those of us who work on exterior environments should stand on the front lines of the "green movement." After all, we move the soil, alter the terrain, plant trees and shrubs and define the use of water, among many other things.

In the course of doing what we do, in other words, we alter (sometimes profoundly) the environments in which our clients live and work. And nowadays, it seems that some media organizations are taking notice.

Every year, for example, our local *Rochester Business Journal* conducts a competition called the Environmental Leadership Awards, a program that recognizes companies in the area that develop and implement ideas that help sustain the environment in our slice of New York. For the most part, awards go to big companies that have established extensive recycling programs, and I've always seen the awards not only as a good marketing opportunity, but also

One local company has put giant wind turbines atop its building to generate electricity, but if you add up all of our smaller-scale environmental contributions, it would be pretty to close to even.

as a measure of the degree to which companies shape the environment with their business practices.

We've entered before without winning, so we took a slightly different tack this year, starting with an extensive list of the things we do that have an obviously positive effect on the environments we encounter. We were several pages into this exercise, touching on recycling, water conservation and a range of other points we knew were part of just about every application form.

At that point, we stopped and asked ourselves, "What do we *really* do that makes us green? What do we do that not only does no harm, but actually improves the planet? What do we as a company do that truly sets us apart from the competition?" In answering these questions, we discovered that the most positive things we do were not necessarily the sexiest but were truly the most significant.

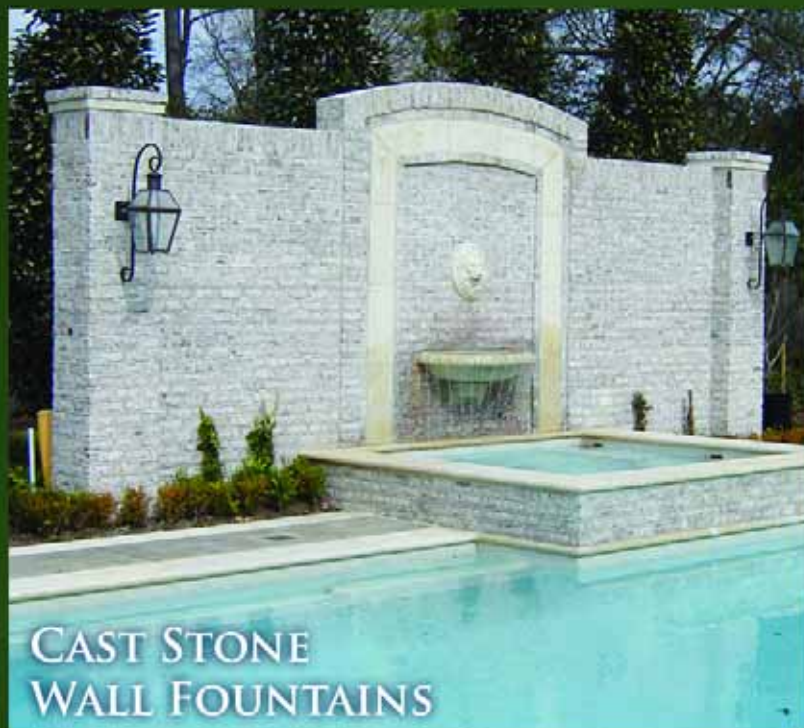
in the dirt

In past columns, for example, I've mentioned what we do to minimize energy consumption – putting high-efficiency watershape pumps on timers to avoid wasting energy when clients are at work or asleep, for example, or combining timers with photocells in our lighting control systems to reduce energy usage while also automatically adjusting daily on/off cycles.

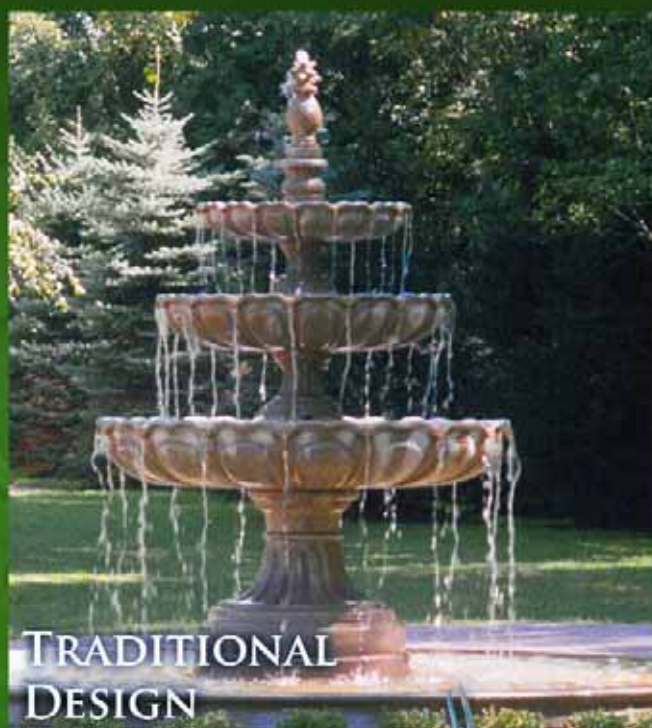
Those are pretty obvious and are certainly not as sensational as what some local businesses have managed to do, such as putting giant wind turbines atop their buildings to generate electricity or establishing rooftop rain-harvesting gardens. As we see it, however, if you add up all of our smaller-scale contributions, it would be pretty close to even – and has certainly had positive effects on the bank accounts of our clients.

But then we came to what seemed to all of us to be the least sexy of all our possible contributions to the environment: that is, soil preparation for planting. We've always approached this function as being just as important as preparation of a proper foundation for a home, patio or retaining wall – another one in a long list of key project details that are never seen again by our clients once we're done.

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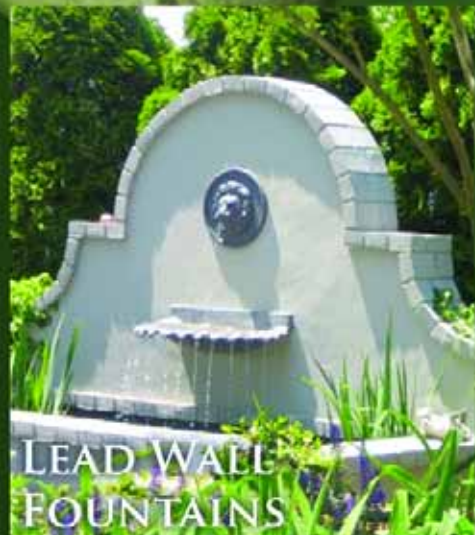


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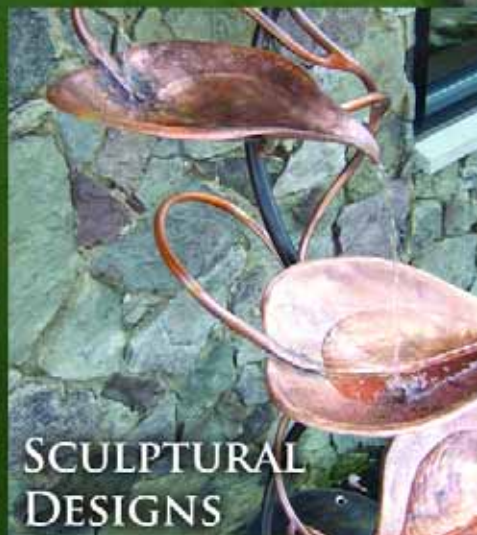
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On the Level

Through the years, I've seen the short-cuts and missteps others have taken — plants stuck in solid clay, pushed through sheets of plywood left along foundations, plopped into gravel on the margins of paving installations and even punched through sections of concrete left over from masonry projects. When you con-

sider the added work needed to keep these plants alive (all that extra watering, fertilizing and pruning) or the work involved in replacing them when they die — how “green” is that?

We plant trees and plants to help with carbon/oxygen exchange and cool the planet by minimizing the urban “heat island”

effect, but how much good are we *really* doing when we end up having to drive big diesel trucks back a site to deal with failing plants and using potable water in ill-fated efforts to keep them alive? Basically, I think we all need to do a better job from the start by giving these plants and trees a fighting chance at survival.

What we do as a company is take an extreme approach to soil preparation on every site we plant. In some cases, we'll begin by testing the soil, although in most instances, the existing vegetation tells us what we need to know.

If there's lawn to be removed, we do it through the careful use of Roundup. While using an herbicide does not seem on the surface to be the environmentally sound thing to do, removing the grass with a sod cutter is even more problematic in my opinion. (Moreover, we're quite careful in applying Roundup, using a three-foot-wide roller rather than a spray system so the material goes where we want it to go with some precision.)

As a fallback in cases where clients object to using the herbicide, we have them spread sheets of black plastic to kill the grass: All it takes is a couple sunny days for a lawn to become a memory — although for large areas, this approach is definitely a chore.

Continued on page 20



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digging in

Once the grass is dead, we rototill the area to a depth of about twelve inches, then add a three-inch-thick layer of compost before rototilling again.

There are many advantages to this approach, the most obvious being that we markedly improve the quality of the soil for the plants we'll be inserting. There's also the fact that the labor involved in installing those plants is significantly less because we've turned the entire area into one big, fluffy planter. This saves fuel use with (and pollution from) our vehicles, especially when we pare a day or two off of our time on site.

We place our plants using a mycorrhizal bacteria called M-Roots to give root systems a head start in assimilating to their new environment. Altogether and with proper watering, we've found that, by using this approach, we lose precious few plants overall.

I contrast this experience with the one I had in working for a large landscape

The Recycling Urge

When we work on a site – *any* site – our goal is to recycle everything we have to remove. If we take out a concrete walkway, for example, we'll do what we can to break it up and use it as fill or as backfill for retaining walls.

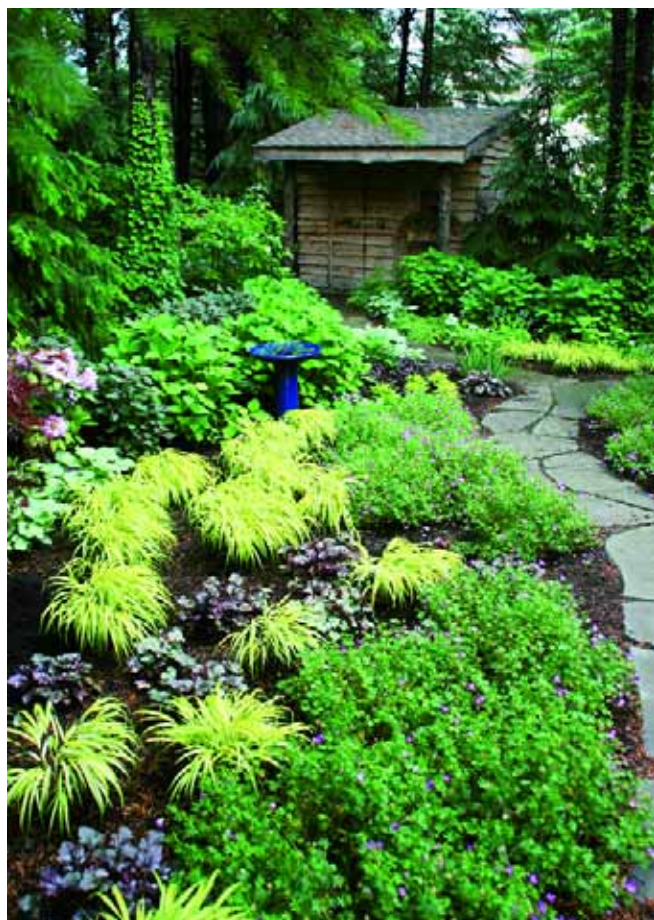
Lately, however, we've been having trouble meeting our recycling goal because we're running into more and more sites where we're taking out either pressure-treated wood and/or composite decking.

Pressure-treated wood had its heyday in the 1980s and is now pushing past its useful lifespan. Trouble is, wood-recycling centers don't want it, and it generally can't be reused for anything on our job sites. The same is true with the first generation of composite decking: Even though it was touted as a lifetime product, the reality is that we're now seeing sites where it needs to be replaced, either because of structural issues or changes in client attitudes about using "artificial" products.

We recently removed just such a deck: The plastic recyclers didn't want it because of its wood content, while the wood recyclers rejected it because of its plastic content. We thought we were stuck, but then we came up with a simple solution: We cut it up into manageable lengths and set it at the end of our facility's driveway, where we sometimes leave leftover or recyclable bricks and pavers.

Within a day or two, every scrap was gone – and now we place *all* materials we can't use ourselves on the street for discerning recyclers!

– B.Z.



All of the perennials seen here were planted as one-gallon containers. Extensive site preparation is responsible for their remarkable growth: The photograph on the left was taken three years after planting, while the one to the right was taken just a year after planting.

company on Long Island many years ago: I ran a crew of four doing *nothing* but replacing dead plants on projects – six days a week, straight through the summer. I shudder to think of how much money the company could have saved – even beyond the fuel use and pollution costs – if the planting crews had used proper techniques in the first place!

And because of the way we do things now, we can be very stingy in water use. In fact, when watering systems are needed, I do my best to convince my clients to have us install simple drip lines rather than sprinklers. I tell them that, with proper soil preparation, plants only need regular watering for the first season or two and then should be on their own in using rainfall to supply their needs. After the first or second season, the watering

system should be turned off!

(I believe this is true no matter where you live and work – if, of course, you're attuned enough to what's going on that you're using plants fully adapted to your local environment, whether you're in the deserts of the great southwest or experience the chills of a northern-tier state.)

Where we can, we also encourage the use of rain barrels and rainwater-retention systems for use in plant maintenance. While this is a novel concept and therefore something of an uphill battle with clients, we try on every project to convince them to go this way, letting them know that, at my own home, just two rain barrels provide all the water I need to take care of all my container plants and newly installed shrubs and perennials.

This approach might not work on a large property, but even then we discuss the fact that water is *not* a renewable resource – and with increasing frequency we're able to design water-reclamation systems that take care of entire landscapes. (If you need to know more, take a look at *Sustainable Land Development*, a trade publication that offers in-depth information and access to suppliers.)

Both of these non-sexy measures – proper soil preparation and judicious water use – can result in huge benefits for our clients and our planet. The days of digging holes, throwing in some peat moss, cramming in a plant and watering it to the point of drowning it should be over: If we want to be responsible caretakers of the environment, we need to use proper installation and watering techniques every time.


making our case

Although soil preparation and water conservation are not the most compelling of all subjects covered by *WaterShapes* (particularly relative to the amazing pools, fountains, ponds, streams and waterfeatures that are steadily featured), we as watershapers, landscape experts and engineers should focus on setting examples for others to follow: Our work directly affects the planet, and doing so responsibly is something we should all take seriously.

In that spirit, we completed our appli-

cation for Rochester's Environmental Leadership Awards and submitted it along with about 20 pages of information on our humble ten-person landscape operation. Not only did we explain our recycling program, but also our use of water-saving design and installation methods, our design of landscapes that avoided use of extensive lawn areas and much more, including testimonials from clients and colleagues.

In years past, we had entered this competition only to see the largest companies take all the prizes, but this year was different: Indeed, two companies with ten or fewer employees were honored along with local corporations – and ours was one of them.

We were thrilled at the thought of being recognized for something we care deeply about, but we were even more excited about the actual award, which was a painting done by one of our local dignitaries: an elephant at the Seneca Park Zoo! 

Bruce Zaretsky is president of Zaretsky and Associates, a landscape design/construction/consultation company in Rochester, N.Y. Nationally recognized for creative and inspiring residential landscapes, he also works with healthcare facilities, nursing homes and local municipalities in conceiving and installing healing and meditation gardens. You can reach him at bruce@zaretskyassociates.com.

All Wet

How many of us company owners have made a practice of going to a local big box store every week to stock up on cases of bottled water for our work crews?

I know I did, and for a long time. But then I saw photographs of the infamous Pacific Ocean "toilet bowl," an area larger than the state of Texas in which billions of plastic bottle and six-pack rings (and more floating plastic debris) swirl in a circle, caught amid the ocean's currents. I've also seen photos of marine life growing up with rings wrapped around their bodies and caught in their beaks.

The last straw: Photos of the Citarum River in Indonesia, where for as far as the eye can see there is nothing more than a carpet of plastic bottles and bags.

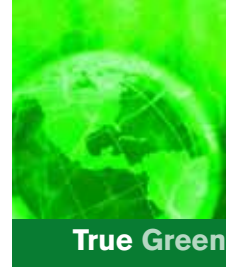
On the spot, we stopped buying bottled water, opting instead to give each crew a large cooler we fill with filtered water as well as reusable bottles they have on site. And for those on our crews who still purchase bottled water and other drinks on their own, we've set up bins in our shop, strongly suggest their use and send a monthly load to our local recycling center.

– B.Z.

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True Green

My students see the need to preserve the environment as nothing less than a fundamental mandate and a solid commitment.



Tomorrow's Advocates

By Mark Holden

Standing in front of classes filled with landscape architecture students is always an unpredictable proposition: You just never know what their young minds will bring to the education process, the only constant being that they're always full of surprises.

Each and every time I've had the privilege of starting a new semester with a fresh group of students, however, it's never long before one of them will ask me about how ecologically sound watershapes really are or can be.

Truth be told (and as you'll see in what follows), this has become something of a sore subject for me. So when the question inevitably comes, I pause, ponder a bit and finally tell these eager young people that most watershapes have a relatively large carbon footprint – but, I hasten to add, “at least they use less water than irrigating a lawn of similar size.”

Their reaction to my response is always less than enthusiastic: I'm never surprised by their

disappointment, but I must say that I'm a bit put off when they get openly hostile.

ingrained skepticism

One thing I've learned time and time again is that environmental concerns stand tall in the minds of these students – and it's been that way for several years now.

In that time, I've also learned that they are angered when companies (some in the watershaping industry among them) bombard them with messages about how “green” their products are: They see right through the convenient labeling and know that many of these companies are doing nothing beyond cynically tying their marketing campaigns to an environmental star.

Unfortunately, in fact, these students are already seeing the term “green” as a near-meaningless cliché and greet this advertising with lots of skepticism. And I have to admit that I've come to agree with them in most ways.

My students see the need to preserve the environment as nothing less than a fundamental mandate and solemn commitment that defines both their personal lives and the way they want to approach their future careers. I find myself being inspired by their sincerity, passion and uncluttered idealism as I move forward in my own work in designing watershapes.

At the same time, I find myself wondering if the watershaping industry has even the slightest idea of what this clear-eyed (and ultra-hard-edged) attitude implies for the future of its products: It's a universe in which lip service to the environment and fresh “green” labeling on the same old products just won't cut it.

And all of this is happening against the backdrop of a marketplace that is pressing all of us in the design and building professions toward greater environmental soundness.

Over on the architecture side of things, for instance, today's practitioners currently face *tremendous* pressure from end users to make their projects truly “green.” This is especially the case with commercial projects, where property owners and managers are after tax incentives in the form of the LEED points granted by the United States Green Building Council (USGBC).

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that is already a hugely powerful tool in determining a site's environmental and economic status. Talk about ingenuity: No matter whether or not commercial real estate developers care even slightly about the environment, they are all rabidly inspired by the idea of saving money on property taxes. Those properties earning LEED points, they know, receive *substantial* tax breaks.

The USGBC has declared its intention to have *all* new construction certified in this way, the goal being to reduce humankind's imposition on the planet. And it seems this organization has the clout to do precisely that.

One of the most compelling beachheads for the program is the fact that every architecture and landscape architecture student in this country is being indoctrinated in the value and significance of the LEED system – the upshot being that all of their study projects reflect green building practices and that lots of their questions for their instructors pointedly pursue straight information about environmental performance.

pathways of consumption

In developing a curriculum for my students, I am constantly forced to consider and address the relationship of watershaping to the environment. In all candor, I believe that the overall picture is currently rather bleak: Not quite hopeless, but not quite hopeful, either.

Professionals from a broad range of industries are now calculating how ecologically sound something is by tallying up British thermal units (Btus) to determine the total expenditure of the earth's resources required for the implementation of a task or process. (We should all be familiar with Btus, which watershapers use to describe the output of a heater. That has changed, however, and now the term applies in a *much* broader context.)

With watershapes, these Btu evaluations consider the rate of consumption involved in the manufacturing and transporting of products; in the on-site activities related to product or system installation; and in the long-term operation and maintenance of the product or system. Obviously, this is a complex calcu-

lation, so for our purposes here, let's do as I do in my classroom and break things down in simple, comprehensible ways:

► Manufacturing and Transporting:

Pumps, pipes and concrete are all made from raw materials extracted from the earth. Strip mines, for example, yield metals and minerals we use to make copper-based components such as heat exchangers or electronic controls.

Once these products are created and assembled, they are set atop rail cars or trucks and transported to distribution houses where they sit in air-conditioned facilities in anticipation of being loaded onto smaller vehicles for delivery to job sites.

All of this accumulation of consumption happens before we ever see these products, so the deck is pretty well stacked before we can do anything about it. Be that as it may, these objects are finally there for us to uncrate, after which the cardboard and polystyrene packaging is whisked away by yet another vehicle to a garbage dump.

► **Construction:** Work trucks are organized each day in a parking lot, after which contractors and crews spill out onto roads and highways to tackle a day's work.

Once on site, these people variously cut up and form lumber, pour concrete and release the volatile organic compounds (VOCs) of their PVC glues into the atmosphere. They also produce plenty of trash that fills dumpsters to the brim, then even more trucks will come and haul these bins to landfills, where eventually all of that material will be painstakingly buried by gas-guzzling machinery.

► **Operation:** The expenditure of Btus continues – perhaps forever? – once the watershape is completed. The owner buys chlorine, operates the pumps, backwashes hazardous materials into the sewer system and adds potable water to the vessel to overcome evaporation and splash out.

I don't need to attach a single number to this summary for just about anyone to recognize that watershapes, by the very nature of the processes with which they are produced and maintained, are not what could be called "a regenerative component in the consumption cycle."

For all their inherent beauty and benefits, in other words, our products are net users of rather than net contributors to the environment. As a consequence, I believe – as do my students, who will be making decisions about what to include in their projects for generations to come – that our goal, now and immediately, should be to find and implement ways to minimize our Btu consumption and become LEED-points-worthy participants in the ecosphere.

not easy being green

Taking all of the above into consideration, I think it's time for watershapers to start thinking about how we can all be far more responsible to the planet we occupy. This is not about tree hugging: This is about economic survival in a marketplace in which our output is on the wrong side of a massive, irresistible historical trend.

We must, in other words, do all we can to relieve the bleakness of our current environmental profile.

We need to start thinking deliberately about products and materials we use in our projects, reduce waste generation on our job sites and design systems that are more easily sustainable for the long haul. In short, we need to revamp the common watershaping ethos, stop making jokes about environmentalism at trade shows and, instead of talking a green game when it's convenient, must start living the life and walking the walk.

In a recent column (April 2009), I wrote about how we need either to overhaul the watershaping industry or watch it die all around us and mentioned a couple of new concepts and green-leaning technologies we need to integrate into our collective design palette. If the pool industry in particular does not take this seriously and start addressing the trend toward energy efficiency and the growing demand among clients for us to reduce our carbon footprint, we will sit powerlessly as other industries pass us by.

Right now, many of the landscape architects among us are leading the charge for sound environmental practices and have been asking for quite some time why they're being asked by the watershaping

industry to use methods and materials that were introduced in the 1950s. As they see it, simply putting a green-leaf symbol next to a new pump in a catalog does not make it green, and they are seriously questioning whether watershapes in general and pools and spas specifically will ever be environmentally sound enough that they can be recommended as parts of projects.

It makes me think of all those U.S. automakers that ignored the green movement and left it to foreign companies to develop and market more fuel-efficient cars and trucks. The Toyotas of the world are enjoying quite a ride now at the expense of pillars of the American economy such as General Motors, which kept making bigger and more powerful vehicles at a time when gas was getting more expensive and global warming was in the headlines on a daily basis.

It's a case study that should teach us something.

We need to open our eyes, pick up the pace and step into line with modern times. The era of consumption at will is gone: Ecological responsibility is now the dominant (and probably permanent) design criterion and will only become even more significant as time passes.

the green machine

So how do we shape water in planet-friendly ways? As I see it, watching our consumption of Btus is the starting place in identifying what we need to do to become more responsible.

To start with, careful designs will save energy:

► Hydraulic systems that move water at four feet per second, for example, use less electricity than those that do so at ten feet per second—an indisputable fact. This means using big pipes, but it also means using smaller pumps because it takes less force to push the same volume of water through a larger diameter. So in a more important sense, hydraulic efficiency translates to lower energy consumption.

► Careful design also means a clear-eyed evaluation of filtration technology: Cartridge systems waste less water than sand systems—and both of those options are easier on the environment than di-

atomaceous-earth systems, the cleaning of which involves the disposal of a distinctly hazardous material.

► Among other things, I'm also now an advocate of using simple water effects rather than big waterfalls and other large water displays. Not only do these smaller-scale systems reduce evaporative loss-

es, but they can be more aesthetically pleasing as well.

► Then there's chlorine in its various forms. Calcium hypochlorite, for example, is flat-out dangerous (it can explode when improperly mixed with water) but is still commonly used along with a range of other shotgun-method sanitizers. As

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an alternative, there are a number of effective saltwater chlorine generators as well as a long list of other, more efficient methods of delivering oxidizing agents to water.

In addition to the obvious points listed above, we should also focus on the materials and products we use around watershapes to make things greener. Besides an obvious decision to use non-endangered, renewable wood species, for example, it's also a good idea to investigate use of recycled wood and plastic products. The use of recycled concrete is another possibility.

I've already written at length about using variable-speed pumps, LED lighting and the abovementioned salt-chlorine generators, and it's my belief that using these products every time we shape water will make a difference not only in the project at hand but also by inspiring other watershapers and suppliers to follow suit. The key is to work with less environmentally abusive materials and products and to select only those that reduce our work's detrimental environmental effects.

In building, there are additional choices to be made that influence site conditions and pollution-causing activities – and some of them simply make sense, such as setting up carpools to get crews to job sites, minimizing trips off site through careful planning and combining visits to various suppliers into multi-stop runs. These are all about lowering emissions and reducing the carbon footprint, and everything counts!

As much as we can, my crews and I are also preassembling products and features in our shop: No vehicles are used, needed materials and tools are close at hand and it's also easier to consolidate recyclables (including packing materials) for efficient processing. These measures may seem insignificant, but every one of them helps the planet.

finding a direction

Also of significance in the environmental impact our products have is how they perform once installation is done and we leave the job site.

If a watershape is poorly designed and

installed, there's little anyone can do to redeem it short of pulling it out and replacing it. But even some worthy projects are undone after the fact by careless owners or poorly informed service technicians. I can't begin to count the number of times I've visited past projects and discovered that ozone systems or UV sterilizers or chlorine generators have been disabled by a pool operator or technician who preferred working with liquid chlorine.

I blame education (or a lack of it) for such actions, but I also lay the charge at the feet of facility managers and homeowners who don't take ongoing, active interest in seeing to the use of products and systems intended to make their watershapes greener.

If I sound discouraged, it's only because of what I have observed in the recent history of an industry with which I've been involved for a very long time. Every landscape architect and most landscape designers know all about the LEED program, but I'm convinced that relatively few pool designers and builders do. Architects live by this point system, while so far as I can tell, precious few watershapers even know it exists!

If I have a hope in all of this, it's that a few watershapers I've encountered are paying attention and spending the time required to understand what this is all about. More of us need to bend in this green direction, and those who do – watershapers and suppliers alike – need our support and encouragement.

We *all* need to pay attention to this trend and watch how it unfolds in industries remote from but related to ours: They are blazing trails that will make it easier for us to follow, and we also need to recognize that there's a whole new generation of potential watershapers who are being taught to embrace these principles and won't be shy about pushing those who don't get in line completely off the path.

This is no time to bury our heads in the sand. If freshman landscape architecture students are already aware of the magnitude of this trend, I for one am inclined to listen to what they have to say. They may be just 18 or 19 years old, but

they see what's coming: From their perspective, we who've been in the business a while are part of watershaping's past: They are pursuing its future.

Talking green is easy, as we should all know by now. Living and working that way will eventually be painless, but getting there will require us to relearn processes, rethink purchasing habits and retrain our crews and subcontractors. And if you're harboring thoughts that you can coast into the future doing things the same old way, think again: Our clients and a whole array of government agencies are coming close to insisting that we rise to a new level without delay.

If we are already prepared for the change when that moment comes, it will be far easier to profit from this new working environment in the future. **WS**

Mark Holden is a landscape architect and a landscape and pool contractor specializing in watershapes and their environments. He has been designing and building watershapes for nearly two decades, and his firm, Holdenwater of Fullerton, Calif., assists other professionals with their projects. He is also an instructor for the Genesis 3 schools and at California State Polytechnic University in Pomona. He can be contacted at mark@waterarchitecture.com.

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WATERSHAPES

ONLINE



True Green

Green Verges

Famous for its beautiful bays and fabulous oceanfront vistas, New York's Long Island is also prized for its pristine inland waterways and wetlands of both the fresh- and saltwater varieties. Working around these bodies of water, says landscape architect and longtime Long Island resident Timothy Rumph, requires familiarity with a number of different agencies as well as a clear understanding of myriad rules governing what is (and isn't) possible.

By Timothy Rumph

Of all the roles we water-shapers and landscape professionals play in enhancing the basic value and character of the areas in which we work, I would argue these days that preserving the health and beauty of natural forms of water and their associated landscapes might well be the most significantly "green."

I live and work on New York's Long Island, which is one of those fortunate places defined by natural beauty and abundant waterforms. With our pristine wetlands, bays, freshwater ponds and sand-dune-draped ocean vistas, it's a place that's long been treasured by residents and visitors alike. It's also a place where I, as a local landscape architect, see my mission as one of creating spaces that please my clients by enhancing their properties while also fulfilling a responsibility to be a good steward of the environment on their behalf.

Projects here typically involve work-

ing around environmental setbacks designed to protect natural bodies of water. While such rules are common to many areas across the country, here the enforcement is so stringent that it almost invariably shapes our designs and often calls for unusual serenity in dealing with regulatory agencies and inspectors – and for clear, effective communication with clients.

In effect, we must reconcile the needs and demands of our clients with the needs of nature and the demands of the regulators. It's a challenge that can be quite tricky at times (not to mention frustrating), but we accept it as the very heart of the work we do.

By the Books

More than anything, working on the edges of environmentally sensitive areas requires us to understand the rules and, as important, fully respect an area's natural watershapes. The key, as we see it, is

taking what we know about these issues and then conveying our ideas to clients in ways that help them accept approaches infused with our knowledge and practical experience.

In lots of areas where wetlands and other waterways are present, that knowledge and experience tell us that the steepest challenges we face have to do with learning the ropes.

On Long Island, for example, every time we start a project, we at Araiys Design (Southampton, N.Y.) encounter whole phalanxes of regulations that differ from location to location. To keep ourselves sane, we have broken things down into four categories of easements that relate, in turn, to a project's proximity to a freshwater pond, a saltwater estuary, a bay front or the open ocean – and *then* consider subcategories covering variations in the rules imposed by certain municipalities.

Oceanfront areas, for one, are largely



Working at this Long Pond residence required us to pay close attention to multiple setbacks from a large freshwater pond, including a 75-foot easement from the water's edge in which nothing could be touched; a 100-foot setback for the swimming pool and its terraces; and a 200-foot setback for the residence itself – all enforced under the watchful eyes of the state's Department of Environmental Conservation as well as the town's own Conservation Board.



governed by the U.S. Federal Emergency Management Agency (FEMA), while nearby bays and inland ponds of the fresh- and saltwater variety are overseen by New York State's Department of Environmental Conservation as well as local municipal regulations. This means there are, on occasion, multiple layers of federal *and* state regulation you have to analyze in detail to understand what can and cannot happen on site.

In practical terms, these rules are mostly about *setbacks* – that is, zones within which human activity and permanent structures are permitted. The basic idea is to prevent damage to wildlife habitats and to protect and preserve the health of the water. (In the case of FEMA regulations, there's also a sensible focus on protecting people and structures in

the event storm surges and natural disasters come into play.)

Fortunately, although these rules are strictly enforced in most areas, they've also been written with the idea that property owners should be able to enjoy their homes and land and have opportunities to interact with nature. Of course, one can always find fault in the way any rule is conceived and written (and there are occasions when conflicts arise in time-consuming and frustrating ways), but for the most part, the rules make sense and do not present insurmountable barriers.

Homeowners often become aggravated by the restrictions, however, and are even more aggrieved by the amount of time that can be consumed by permit processes and plan approvals. That's entirely understandable, which is why I take

it on myself as a designer to do as good a job as possible of preparing my clients for what's to come and setting their expectations (especially about timelines) at appropriate levels.

Most of the time but not always, I find that well-informed clients will actually come to appreciate the fact that their proximity to nature is intrinsic to their property values as well as their future enjoyment of the places in which they live. As a result, they come to accept and even support the rules that define what they can and cannot do with their outdoor spaces.

Sometimes getting them into this frame of mind takes some finesse on my part, but it's always worth making the effort if only to help the project proceed without persistent regulation-related stress.

Place Specific

In our part of the country in general and on Long Island specifically, regulations are generally set in accordance with geology and hydrology – that is, in response to the specific and entirely natural evolution of places next to which people have purchased land with the intention to build.

Let's take a look at freshwater ponds: Anyone with even a casual familiarity with the geology of this part of North America knows that the landscape of Long Island was forged in the last Ice Age. Our numerous freshwater ponds were carved out by glaciers, and water has for centuries collected in low spots created by erosion when the slow-moving ice rivers flowed and retreated. In effect, all of these ponds are somehow related – and many are connected and can literally be considered as single bodies of water flowing from north to south toward the open ocean.

We've recently finished a project located close by one of these ponds – a perfect case study in what it takes to work with stringent environmental regulations. The property is located on what is known as Long Pond – just a few miles inland from the Atlantic Ocean in a part of Long Island called the South Fork.

Working on the lot was all about the setbacks, the first of which was a 75-foot easement at the water's edge – a zone in which everything had to be left completely alone and natural or, where the zone had been disturbed or encroached upon in the past, had to be replanted and restored as a precondition of any new construction.

The latter was the case here, as the original pool and pool house had been placed in close proximity to the water's edge. In

revamping the property, the owners had to remove those structures and called us in to replant approximately 10,000 square feet of wetland buffer area. Using indigenous grasses and flowering plants, we developed a plan that, although it was completely natural with respect to plant selection (as defined by code), we nonetheless used the available palette to create an aesthetically pleasing area for the clients' enjoyment.

Although this first setback was to be uninterrupted by structures and had to be filled with a defined range of plants, it was still "designable space" – and we had lots of latitude in working with the client's desires when it came to colors and textures. The client in this case is an avid golfer, so we used plants including fescue grass and perennials to give the

space the feeling of a fairway rough.

In addition, regulators understand that homeowners want to be able to approach the water's edge, so they allow for pathways within this 75-foot setback zone in the form of mulch paths or, in this specific case, bands of fescue that can be mowed to create strips of lawn: It all works so long as nothing within the zone requires irrigation or fertilization.

Further Along

Beyond that zone is a second setback that starts 100 feet from the water's edge and defines an area in which we were allowed to place structures in the form of decks, pools or outbuildings.

For the project described just above, this involved working with a significant slope – a rise of approximately 40 feet



In this case, not only did we work under close scrutiny in the existing wetland area around a freshwater pond, but we actually *expanded* the wetlands to combat an unsightly, invasive reed species that had grown up to block some views of the water. In doing so, we removed the unwanted phragmites and more than replaced them with lower-growing buffer plants in a color palette that pleased the homeowner.

across the breadth of the property. In that space, the design included a large swimming pool overlooking the pond along with a big deck and a pool house, all of them requiring the support of a substructure of pilings and grade beams.

Finally, there's a third setback, which is at 200 feet and indicates where the house can be situated. Some of these cases are fairly straightforward (as was true of the project I've been discussing here), but other considerations arise depending upon the specific features of a piece of property.

In this project, for instance, we were only working on about three acres of an 11-acre parcel – basically a horse farm – so here there was no need (as there is in many cases) to leave a certain percentage of the site uncovered by impermeable surfaces. In fact, we weren't affected at all by that set of rules.

If we had been working closer to the allowable limits, we would have been constrained in our construction activity to maintain a mandated balance between permeable and impermeable surfaces – a factor that can be a major issue on smaller properties with clients who want large homes and outdoor entertainment spaces.

Even restoring land damaged by storms is a major issue in some areas. The dune seen here, for example, was literally torn away by winter storm surges, yet it took some convincing to get officials at the Federal Emergency Management Agency to agree that we should be allowed to rebuild it. Only after presenting extensive details, cross-sections and evaluations of the structure of the sand as well as information on native grasses and stabilizing fences were we allowed to proceed.



All of these regulations about setbacks and permeability must, of course, be followed to the letter, but there's nothing to prevent us from expanding on these areas and creating, for example, buffers that are *wider* than required. In one recent project located on a freshwater pond, we actually expanded the wetlands to enable us to combat an unsightly, invasive reed species (phragmites) that's been known locally to take over and choke off wetland plants.

Remediating areas affected by such reeds is so expensive a process that municipalities typically don't require it. Nonetheless, there are now clients who sufficiently value the beauty and integrity of the wetlands that they are willing to spend what it takes to restore and preserve the environment.

As for saltwater estuaries and wetlands, the same basic principles we work with around freshwater ponds also conveniently apply: Once again, the rules impose a list of graduated setbacks that govern activity around the water's edge and dictate where people can put their structures.

The rules, however, are typically a bit more stringent in saltwater areas than in freshwater settings. For starters, the first setback, which typically aims at preserving a natural buffer, reaches back 125 feet from the water's edge, basically to protect various saltwater fish and crustaceans found only in these delicate ecosystems. There are also more stringent rules governing the re-

Supply and Response

One of the positive consequences of imposition of regulations of the sort described in the accompanying text is that, where I work at least, the local nursery industry has responded in a big way by providing wonderful quantities of code-compliant plants.

Nowadays, in fact, it's tough to find outlets that don't put far greater emphasis on indigenous species that thrive without fertilization and are also drought-resistant enough to survive without irrigation.

This ready supply of plants eases the way for our work with clients in making plant selections. As important, it also helps us meet the challenge of creating "sustainable" environments that will flourish with virtually no maintenance.

—T.R.

planting of these areas, along with complete moratoriums on any kind of structures at the water's edge, including docks.

The wider buffers make sense because estuarial water levels rise and fall with the tides: In many cases, land of this sort is swamped all the way to the 125-foot limit (or beyond). Given this fact, it's generally impossible to create pathways to the water's edge; in addition, the planting palette includes a wholly different set of salt-tolerant plants.

We've found that, given these wider easements, clients tend to place more emphasis on bringing built areas right up against the edges of the boundaries as a means of maximizing views and their enjoyment of a property. With narrower setbacks,



The design features, colors and textures of this oceanfront watershape were all chosen to echo the horizon line of the Atlantic Ocean at Southampton, but what seems a simple exercise in aesthetics and good taste is yet another study in how complex it is to work in ecologically sensitive areas. Effectively, we couldn't *touch* the dunes while meeting various setback requirements and had to make certain we left them in utterly pristine condition.



Clean Effluent

As might be expected in even a casual reading of the accompanying text, there are lots of regulations and special circumstances having to do with the construction of swimming pools around Long Island's natural bodies of water. Here are two:

First, in lots of cases we end up building in places with high water tables and must set up dewatering systems during construction. As mentioned in the main text, removing ground water can be a significant issue hereabouts. When it is, we dewater on the side of the pool away from the water's edge and then return it directly to the wetland rather than pumping it to waste.

Second, there are issues related to the chemical treatment of pool water. Some municipalities have banned traditional chlorine sanitization because, during filter backwashing, it gets pumped to waste and will eventually be re-injected into the ground. In these areas, methods such as saltwater chlorine generation or another form of alternative treatment are required.

—T.R.

by contrast, we often have a bit more room to maneuver when it comes to designing spaces for either aesthetic purposes or environmental advantage.

On the Beach

On those wonderful occasions when we're asked to work on lots close to Long Island's plentiful scenic bays or on the ocean, the most substantial added challenge comes from the presence of far more active surf conditions. The waves here are not as vigorous as those that hit beaches in Hawaii, but they do influence the lines where the setbacks begin – that is, at the high watermarks.

Among the big issues we encounter in these spaces are those related to existing seawalls and docks. In most areas where such features exist, we are able

to replace them with structures “in kind and in place,” meaning we could restore them to like-new condition but were *not* allowed to add any new structures that weren't there before establishment of the setbacks.

In situations in which seawalls or bulkheads were set in place before the state started regulating such things in August 1977 and we can prove that the feature has been there at least that long, we are allowed to build within 30 feet of that structure. If, by contrast, there is no such structure and the client wants one to hold back storm surge, we have to install it beyond the setback point – and often must also restore the wetland with approved plantings between our new structure and the water's edge.

Another issue we occasionally encounter in these areas is seawater intrusion. Many properties have historically drawn from freshwater wells that are relatively close to the ocean or bays. As the water table inevitably sinks, saltwater invades many of these wells and renders them brackish and unusable.

To combat this problem, many municipalities routinely inject fresh water into the ground to present a barrier to seawater intrusion. This is such an issue for public utilities that, even when there's a working well on site, we're required to fill our watersheds with water trucked in from remote sites.

(These rules can approach the outlandish: On Shelter Island – located between Long Island's north and south forks – water-use rules require installation of cisterns for irrigation that can only be filled by water trucked onto the island.)

Finally, there are special considerations on properties facing the open ocean, including a number of FEMA rules dictating mandatory heights and overall sizes of seawalls and bulkheads. There are also plentiful rules having to do with protection of the spectacular sand dunes that define much of our oceanfront landscape: Generally, municipalities maintain setbacks based on primary and secondary dune-crest areas – zones in which any form of construction is completely prohibited. From that point, there are typically 150-foot setbacks that effectively push the boundaries for con-

struction back several hundred feet from the surf.

If that seems onerous, it's also generally advantageous for clients because the dunes serve as a natural barrier to high surf and destructive storm surges.

Water Culture

Because the setbacks are more extensive – and also because lot sizes tend to be smaller right on the ocean, we find ourselves in some projects pushing construction right up to the easement boundaries to maximize views and a sense of proximity to the ocean. (These projects often see us pushing right up to the limits when it comes to ratios of permeable and impermeable surfaces as well.)

In one recent project, we placed a pool in a spot overlooking a beautiful set of dunes, creating visual transitions using natural stone along with grasses that thrive in sand. This approach enabled us to blend the design of the pool area in with the untouched areas while fully observing the required setbacks.

In all such matters, we have learned through the years that the key to making these projects work is knowing the rules before we begin design work or we even speak with prospective clients: We know we must be intimately familiar with the specific requirements so we can, from the start, be absolutely clear about what is and isn't possible and make suggestions to clients that fall within reach.

What we've also found is, although they can seem onerous and are certainly voluminous and can vary from place to place, the regulations having to do with building around natural bodies of water are actually quite straightforward and make sense – all in the name of preserving the environment on the one hand and, on the other, of enhancing property values.

Once informed, we've found that most clients go with the flow, basically because the natural beauty of the area is why they're here in the first place. There are some instances where stubborn clients will press for designs that push the limits, but we know what can be done and must push back.

In that sense, landscape architects and

other designers working in environmentally sensitive settings become *de facto* enforcers of the rules and regulations and stand on the front lines when it comes to clarifying things for clients. As I also see it, this falls right in line with our inherent professional responsibility to preserve the environment.

In other words, it makes perfect sense to embrace the situation and consider the creative design solutions available to us less as limitations than as opportunities to serve both our clients and Mother Nature. As a lifelong resident of Long Island, I personally appreciate the mostly thoughtful efforts that have gone into writing these regulations and the way they help us all sustain the magnificent flora, fauna and aquatic beauty we see at almost every turn. In a very real sense, I wouldn't want it any other way: It's the green thing to do.



Occasionally, we're lucky enough to approach a site with an existing structure we can redo in place. In this case, it meant we could design this new pool within the dune – a rare opportunity along a stretch of barrier beach where setbacks for new work can be amazingly restrictive.





True Green



Improving your Moves



Building pools and other watershapes to reduce their energy or chemical usage while also taking advantage of rainwater or recycled construction materials isn't rocket science, notes watershaper Jamison Ori. But it does require thinking differently about the fundamental nature of watershapes as they relate to environment – and even more so, about how you approach clients when it comes to addressing their increasingly 'green' inclinations.



By Jamison C. Ori

It comes up almost every time: Our clients tell us they want to increase the energy efficiency and overall environmental friendliness of almost everything they plan to do with their homes, landscapes and watershapes. It truly is a “green revolution,” and, as is true of most clients, they’re looking to us for guidance in what can be accomplished.

From our perspective at Rosebrook Pools in Libertyville Ill., this trend kicked into high gear about three years ago – not surprising at a point when gas and other fuel prices started to soar. We’re proud of the fact that we saw this coming and had, for about five years already, been considering and implementing eco-considerate features into our watershaping and landscape work.

In doing so, we took many of our cues from the U.S. Green Building Council, the organization that oversees the Leadership in Energy and Environmental Design (LEED) certification process. The council has nothing in its program that applies directly to swimming pools or other watershapes, but it wasn’t particularly difficult to translate a range of their recommendations for home construction into our approach with pools and spas.

Developing Market

Why go to all that effort? For years now, swimming pools and other watershapes have been tarred by environmentalists as being bad for the planet. And that’s putting it mildly: Sometimes the negative rhetoric is extremely harsh and likely has damaged the image of swimming pools in particular among some consumers.

We took those criticisms to heart, because we know that installing and operating watershapes involves consumption of electricity, water, chemicals, fossil fuels and other natural resources. And while we know we can’t say that our pools are 100 percent eco-friendly, we know we’ve done our best to meet our

clients' ambitions to make them as efficient as can be.

The best approach, as we saw it, was to accept reality while also defining ways in which pools could be produced that would reduce their environmental footprints. In so doing, we developed a menu of options clients can use according to the nature of the design, the scope of the work and the extent of the budget.

With energy consumption, for example, we've long known that there are a

will save them money once the system is operational.

Better yet, we've self-consciously been installing these systems for nearly five years now, so we know how they perform over time – a depth of direct experience that impresses our more sophisticated clients, many of whom come to the process with ideas of their own and a curiosity about what we've learned in developing efficient systems.

As we see it, actively embracing this

of reliable options and prioritize them when speaking with clients.

Green Ways

Let's get down to some specifics, starting with hydraulics and circulation – the heart of any watershape system.

The plain fact is, every watershape circulates water – and thereby consumes energy. For 20 years now, voices in the pool industry and elsewhere have strongly advocated the use of hydraulic designs that make efficient use of this energy. Many of their recommendations are (or at least should be) familiar to everyone by now, but they bear mentioning again in this context.

Indeed, if you do absolutely nothing else "green" on a pool design, you should at least be using properly sized pumps and plumbing. Time and again in these pages and elsewhere, we've been told that upsized plumbing and downsized pumps will save energy and our clients' money – and the great thing is that it's fairly easy to do.

Yes, things can get complicated with multifaceted systems where a pool is joined by a spa, a vanishing edge, fountain jets and other details – not to mention applications in which solar or geothermal heating systems are used or you're installing the various filtration loops required for implementation of a rainwater-har-

We offer our clients a wide range of options in full confidence that what we're saying is reliable – and not just green-tinged rhetoric we've cobbled together to help make a sale.

number of specific measures we can apply to reduce the amount of energy a watershape consumes. Does this or any other step make a design "green"? We don't make that claim, but in a universe in which the word "green" is overused and abused, we feel pretty good about our program.

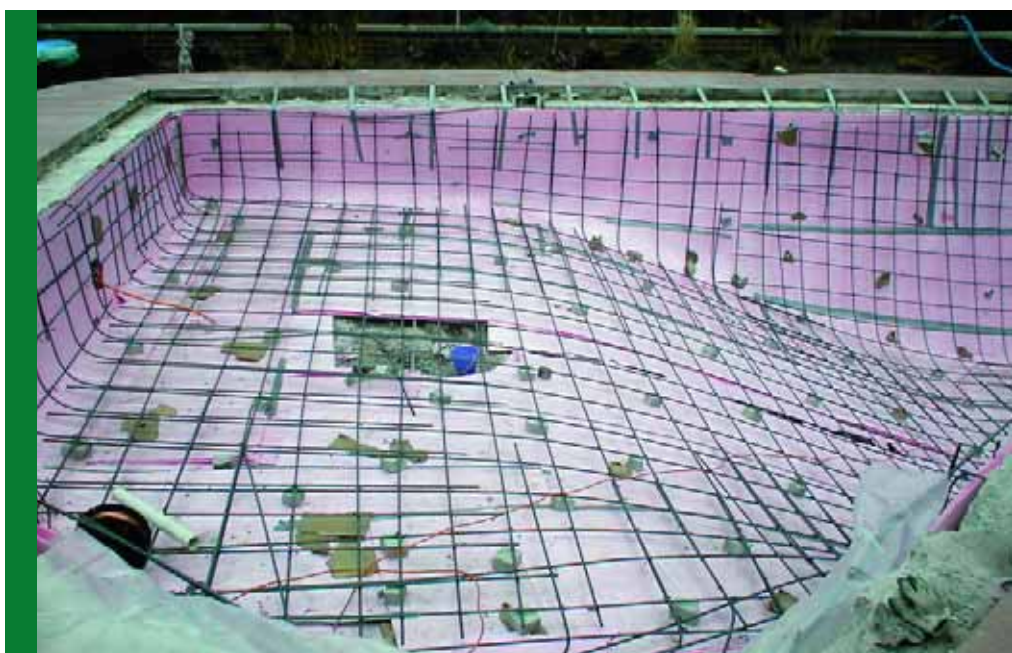
And so we avoid the "green" label, opting instead to appeal directly on the one hand to clients' concerns about preserving natural resources and, more important in most cases, saving them some money in the long run on the other. The fact that these two goals go hand-in-hand benefits everyone.

Having done our homework and determined what we consider to be the best products, design approaches and construction techniques, we enter into conversations with our clients in which we offer them a wide range of options in full confidence that what we're saying is reliable – and not just green-tinged rhetoric we've cobbled together to help make a sale.

This progressive, proactive approach to environmental concerns has given us a tremendous advantage, even in what we all know is a tough market. It also helps that we work mostly with affluent clients who have the resources to invest in systems that conserve resources and, although they might cost more up front,

trend rather than following behind it (or, worse, resisting it) is all a part of making watershape and landscape design as sophisticated as our client base. Just as it's critical to understand art history, color theory, options in materials selection and the fine points of custom detailing, we see coming up to speed with environmental concerns as another requirement of being completely professional.

The key is to consider the widest range



vesting system – but it's always possible to find ways to optimize performance and achieve higher levels of efficiency.

We've also found support in the form of the new variable-frequency-drive pumps – devices that make it possible to use a single, highly efficient pump to address a number of different functional scenarios. Even here, however, there's not much a sophisticated pump can do to compensate for bad hydraulic design. And we can't be blinded by technology, either, because there are instances in which a system's needs are met perfectly well by less-expensive two- or single-speed pumps.

That brings me to a point our experience has driven home time and again: All of the elements in a system are tied together in ways that depend completely on the overall system and how it is meant to function. As a result, it's difficult to isolate one element from another, develop and approach and feel confident that it's the smart way to go. Especially with hydraulics, the best solution most often requires a systematic, comprehensive approach.

Heating the water presents the same sorts of challenges, depending not just on where you work but also on system complexity. In Palm Springs, for example, heating might not be much of an issue at all, but in our highly seasonal market, heating extends the period in which a

pool can be used and is so integral a part of the package that energy-efficient system design is a must.

We generally start with a high-efficiency fossil-fuel heater and really see no excuse not to use one. But then, depending on the client and the circumstances, we can go well beyond the conventional, sometimes using geothermal systems in which the steady temperature of the ground below the frost line helps maintain a baseline temperature that lightens the load on fossil-fuel systems. We'll also deploy solar heating and have even gotten into some projects in which a combination of all three approaches – fossil fuel, geothermal and solar – are used to great effect.

Even more complex are systems in which our watershape-heating systems are tied into a home's heating, ventilation and air-conditioning system and a heat pump is used to transfer energy from cooling the home into heating pool water. Depending on the circumstances, we seek out the best possible solutions, come what may.

Finding Opportunities

The approaches we've discussed so far are relatively conventional, but we've found others that are a bit off the beaten path – some of them methods we've spotted in home construction and have

transferred to our watershaping.

For one thing, we insulate the pipes in all of our projects. Where they're exposed, we wrap them in two-inch-thick insulating foam; where they're underground, we spray insulating foam to encapsulate them in their runs and troughs – or use whatever combination of techniques makes the most sense.

We also offer our clients the option of having us insulate the pool shell. In doing so, we place two-inch-thick insulation board underneath and around the pool shell before shotcrete application and have learned from experience that this is a real energy saver when it comes to maintaining the desired water temperature.

We also steadfastly encourage the use of automatic covers, which offer a whole range of benefits when it comes to environmental sensitivity. Heat retention is probably the largest benefit for most of our clients, but reductions in evaporation and chemical use are right up there as well, along with keeping leaves and dirt out of the water and adding a layer of safety to a project.

(Aesthetics are always an issue with covers, which is one of the reasons we've worked with our suppliers to develop what we call our "extreme cantilever" approach, which allows us to install covers on pools of almost any shape. This will be the subject of an article on its own in a future issue.)

Water treatment enters the eco-friendly picture as well. Let's start with chlorine, which has, for whatever reason, become almost a dirty word among many consumers. At our firm, we are far from opposed to using chlorine and appreciate the many benefits it delivers, but we're also sensitive to client complaints about



In our climate zone, keeping the water warm and extending the swim season are major goals, which is why we insulate the pipes on every project we complete and also offer our clients the possibility of having their pool shells insulated – as seen here, with two inches of insulation board applied before shotcrete application.

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Covers are essential components in our energy-management approach. To keep their use from placing excessive restrictions on shapes and design possibilities (A), we've developed what we call 'extreme cantilevers' – overhanging decks that enable us to install covers on pools with a variety of contours and edge configurations (B).

chloramines odors, green hair and faded bathing suits as well as their questions about chlorine's nastier byproducts.

When the need arises, we easily shift our attention to any of a number of alternative treatment methods that either streamline chlorine use or eliminate it altogether. Saltwater chlorine-generation systems are certainly popular these days: Ironically, they offer just another chlorine-based approach, but they appeal to clients because they eliminate the need to transport prepared chlorine products to the property and, when adjusted properly, keep the amount of chlorine in the water to a minimum.

In other instances, we've used ozone generators or copper/silver ionization systems to provide "chlorine-free" water, and experience has shown these systems to be far more effective than is gen-

erally recognized. In fact, we've turned to these technologies in a variety of our most unusual applications (including pools for dogs and thoroughbred racehorses) with great success.

Of course, the nutrient load in these applications must be carefully considered, but that's also true with pools for humans. It all comes down to proper sizing and establishment of adequate turnover rates: When we hit those

"It's about time!"

As a landscape architect I truly feel that if you don't know how to build something – you have no business designing it! This course should be mandatory for all watershape designers.

*Shawn Birch,
STB Landscape Architects / Redlands, CA*

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marks, we've been able to achieve remarkable results in water quality with chlorine-free approaches.

Cycling and Recycling

Filtering the water is another area in which we offer our clients various eco-friendly options – with decisions depending, as always, on the application and the project's specific requirements.

For basic pool and spa systems, for example, we use either cartridge or diatomaceous-earth filters. With the latter, however, we set aside the diatomaceous earth and use a substitute coating product based on cellulose fibers: They are as effective as diatomaceous earth with respect to filtration, but they share none of its toxicity issues.

In recent times, our approach to filtration has become somewhat more complicated as a result of including water-harvesting systems in our projects: In all of our pool and spa designs, we strive to achieve the highest water quality standards, so as a result we take fairly aggressive approaches when it comes

to filtering runoff. This has led us at times to use reverse-osmosis and carbon-activated filtration methods to treat water we capture from rooftops or deck areas, all in the name of removing the harmful contaminants this water can carry.

Our clients are increasingly interested in these systems, which are developed simply by creating ways to channel rainwater into cisterns or surge tanks instead of sending it to waste. As we see it, our task is to process and filter that water before it moves into the general circulation system, and both reverse-osmosis and carbon-activated filtration have proved remarkably effective on that front.

In some cases, however, the harvested water is also used for irrigation – a request we're getting more and more frequently. In these cases, we back off from our drinking-water target and simply run the water through a standard filter. As always, the approach depends on the specific situation.

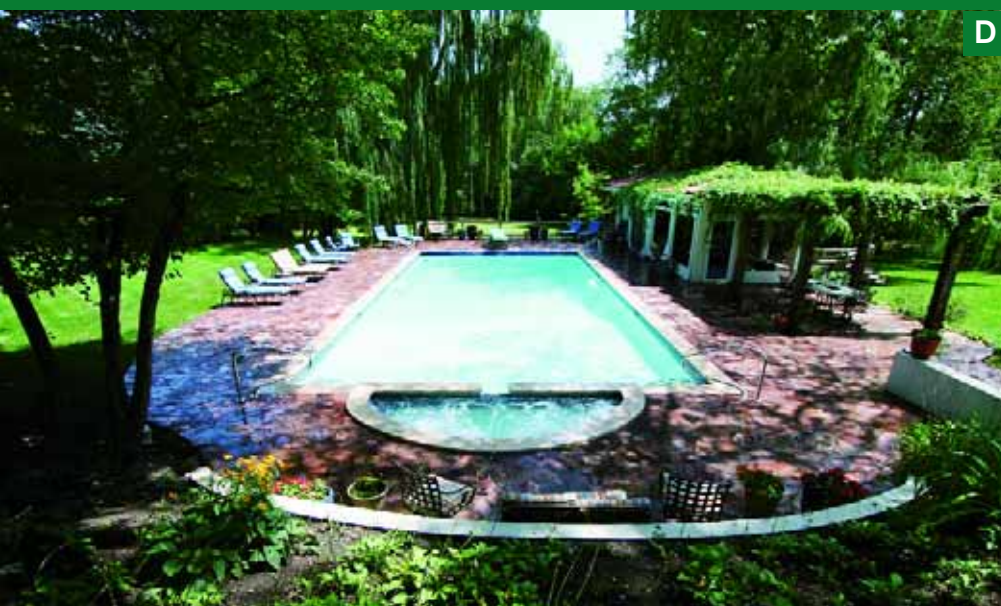
That same sort of situational think-

ing applies to recommendations on use of recycled materials in the construction process – and there are huge opportunities here. In fact, we've found recycled options for just about everything other than the shotcrete we apply, including glass tile manufactured using recycled glass as well as repurposed pavers, bricks, stone, architectural finishes and woodwork. We've even found a source for reclaimed rebar and rebar made from recycled steel, and there's a company that makes coping and various hardscape materials using a combination of recycled newspaper and cement.

We've found places for these materials in retaining walls, outdoor cooking areas, gates, planters and decks. Not only does this make sense from an environmental standpoint, but many of these products also have aesthetic virtues that simply cannot be reproduced using new materials. As an example, we recently built a beautiful pergola made using reclaimed architectural woodwork: It was expensive, but it's truly an object of great



We're strong believers in finding recycled options for use in nearly all phases of construction. In many cases, for example, we'll use glass tile made from recycled material (A and B) and frequently reuse old pavers, bricks and stone in assembling our decks (C and D). When possible – as seen in one of our pergolas (D) – we also reuse old wood.



beauty because of the wood's weathered look and rich patina.

Even when it comes to the most basic material of all – that is, *soil* – we find ways to decrease our environmental impact whenever we can by using excavated spoils to create berms or earthen contours. Instead of hauling this material away, we use it to lend changes in elevation to a basic, local geography that is generally devoid of such features.

Beyond the Basics

As I mentioned at the outset, none of these available measures should come as revelations to watershapers (although I do think relatively few of us go so far as to insulate our plumbing). Basically, it's a matter of evaluating and packaging established

systems and techniques and then making them available to clients based on the nature and scope of the project at hand.

To be *truly* effective with such a program, however, we've come to believe that you have to incorporate a green attitude into your overall thinking as a company and use it in ways that reach well beyond the products and systems sold and installed.

We know, for example, that it makes sense from both environmental and operational standpoints to have our crews be on the job site for fewer stays over longer stretches, which is why we've cross-trained all of our installers in multiple disciplines. Our rough-plumbing crew, for instance, also handles rough-electrical installations, which

means that the same person can stay on the job site longer and perform more than one set of tasks in that visit. This cuts down on the number of people traveling to and from each job site and reduces the overall number of trips that one person might have to make in the course of a project.

Coincidentally, this program has had the major added benefit of creating understanding across multiple lines of how details in one type of installation influence procedures in another. In addition, it prompted us to outfit our project managers with sophisticated cell phones that allow for communication via voice and e-mail: This lets them stay in touch about job status and scheduling issues in ways that eliminate wasted time and unnecessary trips.

If I had to boil all of this down to a pair of words, "common sense" comes to mind. None of us in the watershaping realm needs to reinvent the wheel to move in the right direction when it comes to environmental responsibility. Even though I'd never be so bold as to call our products "green," I can say without hesitation that we do all we can to use today's technology in a good-faith effort to meet our clients' desires to be as ecologically conscientious as they can possibly be.


With continued technological progress, advances in equipment and broader material options, we think that, as a company, we're more than ready to take our approaches to all-new levels as new possibilities emerge.



True Green

Buoyant Explorations

By Bruce Kania



If the sheer volume of scientific research into the use of water and plants to remediate pollution, conserve water and preserve wildlife habitats is any indication, it's clear that floating islands may have a substantial role to play in the greening of the planet. Here, inventor Bruce Kania surveys some of these studies and discusses all-new ways of looking at plants, wetlands, floating islands and the ability to restore even the most distressed bodies of water.

There may still be some who resist the idea, but by now it is a verifiable fact that plant material can be used to treat and purify water in artificial watershapes as well as in natural bodies of water. For decades, in fact, scientists have borne witness to these processes in natural wetlands – so much so that today, these concepts are being studied around the world using artificial wetlands and floating islands that mimic natural structures and processes.

Our firm, Floating Island International of Shepherd, Mont., is predictably focused on the floating island concept. In our efforts to understand all of the nuances and specifics of how plants on floating islands can be used to best advantage, we have made contact and worked worldwide with scores of independent researchers and institutions across a range of settings, applications and agendas.

Yes, we've been gratified by the resulting findings and the benefits that reportedly flow from use of our systems. In a more important and greater context, however, we see this collection of empirical data and anecdotal evidence as conclusive proof that biological water treatment is not only viable, but is also surprisingly dynamic over a broad spectrum of situations in which contaminants are found in open bodies of water.

Ideas Afloat

Floating islands (or, as they are referred to in the scientific literature, "floating emergent wetlands") are a new technology focused on *biomimicry*, which in our case involves the replication of certain "natural" aquatic structures using recycled materials.

Basically, what we're doing with our technology is fostering the "wetland effect" by developing combinations of surface area and circulation within waterways that set the stage for thriving plants, burgeoning microbe colonies and naturally healthy water. (A leading researcher in this effort is Dr. Chris Tanner, a world-renowned wetland biologist with the National Institute of Water and Atmospheric Research in New Zealand: He's the one who coined the term "floating emergent wetlands.")

Nature is the model at the core of our research, and along the way we've studied natural floating wetlands and islands as well as coral reefs, overhanging banks and even beaver dams. Our

success in reproducing these structures *artificially* and making them fit in *naturally* bodes well, we think, for the ability of human beings to live more gracefully within and around aquatic environments.

In a broader sense, in fact, we've reached the point where we believe that humans can co-exist with sensitive marker species in complex urban settings, around intense agriculture and even in areas affected by stormwater runoff or where waste streams infused with toxic heavy metals flow away from mining operations.

Those are big claims, but we've learned that by using nature's own wetland model and developing new substrates and island designs that concentrate or expand the wetted surface area, it may be possible (with time and careful management) to remediate even huge, hyper-eutrophic freshwater systems and bring them and their dependent species back to health.

As you will see from some of the studies reviewed below, we're at a moment of historic transition: As watershapers, you are invited to add your aesthetic talents and creativity to this transition. An important step towards this shift will be the development of urban environments that are beautiful while simultaneously conserving and stewarding precious potable water resources.

Are these ideas ambitious? Absolutely – but in discussing them I draw support from numerous research studies, pilot programs and varied forms of experimentation, including the dozen described briefly on the following pages:

1

At the National Institute of Water & Atmospheric Research (New Zealand), Dr. Chris Tanner and others have been working with our firm's floating wetlands concept for five years. One groundbreaking study measured significant zinc and heavy metal uptake by wetland microbes and plants living on these structures.

The objective of these investigations is defining how best to work with stormwater management ponds – a key consideration in modern urban planning and a pursuit that so far has resulted in numerous presentations and publications. Spinning off data collected to date, Dr. Tanner is currently running a study comparing the efficacy of surface flow, subsurface flow and floating emergent wetlands in reducing nutrient loads of wastewater.



2



For the island nation of Singapore, water is an abundant but precious resource for a population that continues to grow at an accelerating pace. In the interest of conserving water to permit future growth, the government is attempting to develop a “freshwater loop” – a series of interrelated systems that focus on recycling and conservation.

As part of this program, the government protects numerous reservoirs from salt-water incursion. We provided the research team with several small floating islands that have since been placed on the Sungei Punggol Reservoir, a classic example of concentrated wildlife (including six-foot-long monitor lizards) and fish surrounded by an urban setting.

3

Citizens for Conservation is a non-profit organization based in Barrington, Ill., and to describe those folks as "early adapters" would be an understatement: This eclectic mix of nature lovers, stockbrokers, retired persons and other citizens has taken on the challenge of restoring native tall-grass prairie, waterways and wildlife habi-

tats within minutes of downtown Chicago.

In one award-winning project, the group launched 42 floating islands of various sizes into a stormwater management pond near a big subdivision. Before long, sandhill cranes had set up nests on one island, and a wide range of rare plants has taken hold on others.



4

Floating Island West of Sacramento, Calif., is currently collaborating with several environmental groups (including The Nature Conservancy) in deploying floating islands as secure habitats for coho and king salmon fingerlings within the Sacramento River delta.

The environmental groups have also been purchasing upstream spawning sites and protecting them with conservation easements. Among their missions is restoration of critical riparian edge habitats not just for salmon, but also for key insect and plant populations. Stream banks damaged by cattle, for example, are being fitted with overhanging bank structures that replicate original habitat conditions.

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5

Approximately 2,100 square feet of floating island was launched in 2009 at Chicago's Lincoln Park Zoo in an effort to reduce both the volume and the nutrient load of water flowing out of the zoo's waterfowl exhibits.

Designed by Shaw Environmental & Infrastructure (Baton Rouge, La.) and based in part on experience gathered at Zoo Montana in Billings, Mont., the project includes solar-powered aeration and strategically positioned islands as well as perimeter netting – a classic use of floating emergent wetlands and a wonderful visual addition to the zoo's exhibits.

Floating Island Environmental Solutions (also from Baton Rouge) developed the netting solution to protect the islands and also helped with plant selection and the planting scheme to ensure that all design criteria were met.



6

The GEF Program is a large-budget initiative aimed at installation of sewage-treatment systems in parts of the Caribbean basin where human and agricultural wastes have historically been flushed into the nearest waterways and, ultimately, the open ocean – a practice that has resulted in dying coral reefs and development of organic sludge deposits on beaches.

Given the obvious implications the program has for human health, tourism and the health of fisheries, the goal is to install wastewater systems as quickly and cost effectively as possible. An international team including the engineering firm of Sanderson Stewart (Billings), Ray Davis of Floating Island Southeast, environmental consultant Jeff Griffin and consulting en-

gineer Frank Stewart are developing a system that goes well beyond simple sludge containment.

Eventually, this system will sequester nutrients using floating islands and floating emergent wetlands as cleansing "lids" over wastewater ponds – and will do so at about the same cost that would be involved in building conventional sludge ponds.

7

Off the coast of Southeastern Australia in Tasmania, Kauri Park Nursery (a floating island manufacturer based in New Zealand) has proposed development of a 317,000-square-foot archipelago to provide for cost-effective uptake of heavy metals found in the tailings stream of a local

goldmine. The goal here is to treat the water before it infiltrates one of Tasmania's premier trout streams.

If implemented, the proposal will save the mining company more than 80 million Australian dollars compared to the cost of installing a conventional metal-re-

moving system using reverse osmosis technology. (Work on zinc and copper uptake conducted by Dr. Tanner at New Zealand's National Institute of Water & Atmospheric Research is the basis for this ambitious concept.)

8

As project manager for American Electric Power (Columbus, Ohio), Christina Svoboda is running several studies to test the efficacy of Elevated BioSwales, a biomimetic structure developed by Floating Island International that conforms to the shape of any swale or ditch while providing a strategic wetland effect with either a seasonal or continuous flow.

In effect, the material provides a "leaky dam" effect, slowing down storm surges and providing another tool that facilitates the biosequestration of nutrients, heavy metals and other toxins. In Svoboda's case, she's dealing with water flowing through mine tailings – work that will be mirrored in Billings in 2010, when the Montana Public Works Department will be using Elevated BioSwales as a stormwater-management strategy in connection with development of new roads.



9

In the summer of 2008, a 2,000-square-foot floating island was launched just downstream from a fish hatchery in Calgary, Alberta, Canada. The island, designed and planted to mimic a floating fen, is being used to sequester hatchery-generated nutrients before they reach Bow River, a natural (and noteworthy) trout fishery.

Animal impoundments of any kind represent obvious nutrient-surge challenges. In this case, the provincial government of Alberta has stepped forward with a pilot program that could become a model for thousands of similar projects in zoos and various locations associated with the raising of fish, cattle, swine and poultry.



10

The U.S. Army Corps of Engineers plans to launch an island for Caspian terns in conjunction with a team headed by Dr. Dan Roby, a wildlife biologist at the University of Oregon. He wants to develop habitats for these birds using floating islands as a cost-effective alternative to the construction of earthen islands.

Caspian terns are migratory shorebirds and, unfortunately, their historic rookeries are in places where they prey heavily on salmon fingerlings. With the assistance of Dr. Roby and others, the Corps is working to relocate these rookeries to waterways in which other, less-threatened prey-fish species are abundant. When installed, the planned 40,000-square-foot tern island will be the largest floating island in the world, outstripping the 22,000-square-foot tern rookery island launched early in 2009 in Oregon's Duchy Lake.



11

Owen Mills of the Oklahoma Water Resources Board has developed a proposal to use floating islands to begin the process of slowing down eutrophication of a large Oklahoma reservoir long plagued by nutrient surges associated with chicken farming – but which also supports an exceptional largemouth bass fishery and is lined

with more than 5,000 homes and cabins. The plan is to launch floating islands and exploit the wetland effect at nutrient inflow sites and in selected other sites where placement will take advantage of natural circulation patterns.

A single 250-square-foot, eight-inch-thick island provides the equivalent of an

acre of wetland surface area, and Mills intends to use the wetland effect to move nutrients up the food chain. Moreover, the oxygen-generating root systems of the floating islands' wetland plants means that today's deadly, deoxygenating nutrient surges might soon be replaced by record-setting largemouth bass.

The Shepherd Research Center is located a short drive north-east of Billings on the Yellowstone River and also serves as headquarters for Floating Island International. The center is situated at the end of one of Montana's oldest irrigation ditches and has long been exposed to nutrient surges associated with intense agriculture.

An example of the effects of these conditions is a hyper-eutrophied 30-foot-deep, six-and-a-half-acre pond: Until recently, only the top six feet contained enough oxygen to sustain fish. By circulating large volumes of the stratified, nutrient-rich bottom water through floating islands, oxygen depleting nutrients are being moved into the food chain. In just three months, fish-friendly oxygen levels now occur down to 14 feet.

For more information:

My ambition in the accompanying text has been to demonstrate the breadth of the available research on floating islands and give you some idea of the diversity of current applications as well as the ways in which mimicking the wetland effect with artificial structures is being considered across the globe.

Specific information on the 12 projects covered in the accompanying text can be found on Floating Island International's Web site (www.floatingislandinternational.com) or by visiting sites sponsored by the indicated researchers, organizations and institutions.

— B.K.





True Green



Healthful Waters



By Aviram Müller

In recent centuries, watershapers have done a tremendous job of figuring out how water behaves in visual and aural terms and have learned how to use those characteristics to make strong aesthetic impressions.

Now that we're entering an era in which environmental concerns are of increasing importance, however, we're being challenged to think differently about water, how it affects us physically and the essential role it plays in maintaining a healthy world.

That challenge is not insubstantial: As a species, we've done a great deal to squander water as an asset, whether by contaminating and otherwise polluting natural bodies of water or by treating pools and other watershapes with harsh chemicals. Isn't it ironic that spas, which exist primarily so we can take advantage of their healthful benefits, are commonly sanitized with chlorine or other powerful oxidizers that may be hazardous to our health?

The plain fact is that, in trying to use water to achieve healthful or recreational ends, we have turned away from nature to make our systems work. And it's not just spas or swimming pools: Even with decorative, purely visual waterfeatures such as fountains, we have for years turned our backs on natural processes while pursuing our aesthetic goals.

Point of Crisis

As I see it, we've reached a point where we should ask ourselves what we're really doing as watershapers: Are we active in the profession simply to promote and sell products and systems, or are we working to elevate the art and craft of watershaping to benefit the world and those around us?" Of course, those two objectives go hand in hand, but for us to be truly effective in achieving the latter, I believe it's time for us to rethink

When fountain designer/engineer Aviram Müller considers a future he believes will be dominated by environmental consciousness, he's elated to contemplate the role watershapers will play in efficiently using water and energy in architectural and landscape settings. It's a delight he shares here by outlining a new reality in which watershapes are seamlessly integrated into built environments where conservation is a driving, necessary priority.

Photo courtesy BioNova Natural Pool, Hackensack, N.J.



the basic concept of the “watershape” and look at what we do in a variety of nontraditional ways.

In opening this discussion, I’m aware that everything these days is being seen through the lens of tough economic times in which too many watershapers have watched their incomes shrink or

of 50 years of practice and technological progress that has inspired some watershapers to keep pushing the envelope and do great things. I also see the formation of habitual approaches and behaviors that have led others into ruts of their own devising. Either way, it’s time to consider a new path forward –

that fountains moved decisively away from their original purpose and became more or less purely decorative.

I would argue that, in a very real sense, it’s time for the presence of water in the built environment to come full circle. No, I’m not asking anyone to think of fountains as primary suppliers of potable

I prefer to see the current tough economic time as an amazing opportunity to step back and take a good, hard look at past approaches as a foundation for setting a fresh and potentially wonderful new direction.

have had their businesses threatened. I refuse to indict our profession for what we might have done that led us to this pass, nor do I see this as some sort of cosmic retribution for past transgressions: Instead, I prefer to see the current situation as an amazing opportunity to step back and take a good, hard look at past approaches as a foundation for setting a fresh and potentially wonderful new direction.

That foundation, as I see it, consists

a real break from the past in which we rethink watershaping and prepare ourselves for the future.

As is so often the case, however, perspectives on the future start with lessons from the past. When systems for controlling water emerged in Classical, Islamic and later European societies, for example, they began by serving in practical roles as sources of potable water for urban residents. It was only after centuries of performance as public utilities

water; rather, what I’m after is consideration of the drinkability of that water and making certain that anyone who ingests it won’t get sick as a direct result.

That’s quite a conceptual leap, but bear with me: As I see it, our first job as today’s watershapers should be to reorient our thinking about what our systems do. Not only must watershapes be beautiful, exciting and soothing, but henceforth they must also be viewed as functional, purposeful components in grander-scale



The first 'watershapes' were entirely functional – generally no more than wellheads or plumbing fixtures. In recent centuries, however, they've taken on far grander and more decorative forms and purposes. I'm not proposing a return to the ancient past, but what I'd like to suggest is that we should reincorporate practicality into our designs and integrate our watershapes into overall water-management programs.

systems that reclaim water, decontaminate it and minimize the draw on potable water supplies.

And if those systems also happen to remediate existing environmental damage or contribute to the cooling of interior spaces, all the better!

Increased Scope

One of the reasons this line of thought is so compelling to me is that it defines opportunities for watershapers to sell products *and* help the planet in ways that increase the scope of our work.

In the traditional watershaping model, a fountain (or a pool or a spa or a pond or a stream) is essentially a stand-alone unit in which water is circulated, filtered and treated in a closed loop. As such, these features have very little (if anything at all) to do with the overall performance of adjacent buildings or spaces.

Now let's consider the watershape as being part of a much larger system in which the water passing into the loop has been reclaimed from roofs and other impermeable surfaces, moved into storage in various cisterns or reservoirs and then treated biologically in planted pond or

wetland areas. This is water that can be pulled from the circulation loop for use in irrigation or firefighting or conditioning the air of indoor spaces or cooling of manufacturing, industrial and power-generating systems.

It's a wildly brave, new world in which a watershape, no matter its type, becomes much, much more than an ornament or decoration.

If a building has a green roof that helps insulate a building while collecting and purifying water that is stored in a hidden vessel, such a system might be entirely invisible. But if a watershaper rescues that system and, with due consideration of its utilitarian existence, uses its water to beautify the setting by making certain functional details of the system visible, then aren't the basic aesthetic impulses of the architects and designers of these systems better served? Isn't this possibility a fantastic plum for the building's owner? Does this make the composition not only brilliantly functional, but also soothingly, inspirationally beautiful as well? By the very act of making key, beneficial functions visible, can't we also make the overall systems more appealing?

As a watershaper, I'm excited by this

notion of finding ways to bring functionality and beauty together. As I see it, this will maximize the benefits of these systems while making them far more integral to the overall design scheme.

The best thing about this is that some of the pioneering work has already been done. What may seem revolutionary to some in North America is, in fact, already widely practiced in Europe and has been part of the watershaping approach there for more than 20 years. It is not that Europeans are more advanced or sophisticated than Americans; it's just that natural resources and environments are so restricted by population density that designers there have already moved in this direction out of necessity.

For years, they've dealt with acid rain, groundwater contamination and rivers so polluted that swimming in them has been hazardous or impossible for many years. Under those constraints, system designers think differently about how they manage water, reclaim it and use it over and over again.

In Europe, in other words, necessity has forced an earlier awakening of a different kind of value system. Only recently have we in Canada and the United



The processes by which rainwater, runoff and gray water can be captured, restored and put to use are well established and are becoming increasingly familiar in conversations about watershapes. Water collected on green roofs (A), for example, is filtered and aerated (B) and moved from collection points via runnels or cascades (C) that deliver it to ponds where plants take up contaminants (D) and ultimately make the water suitable for use in fountains, pools, spas and interactive displays (E and F). That might seem an oversimplification, but basic loops of this sort have been used in Europe for many years now.

supposition, but is rather a matter of empirical fact.)

Finally, and as mentioned above with some vigor, biological systems can be utterly beautiful, whether they take the form of ponds with wetland areas and planted floating islands or of green roofs that bring park-like features to urban settings.

Again, watershapes can provide all of these wonderful benefits while also being beautiful. After all, plants do the basic work of correcting the water and these systems can easily include cascades, floating aeration systems and various water-shaping structures that beautify settings while helping clean the water. And it's even reached a point where, in North America, we're seeing plants along the edges of retention basins: What were once humdrum settings are now becoming beautiful focal points in park-like spaces accented by pathways, docks, floating fountains, floating islands and diverse varieties of wildlife.

Specific Measures

The big question in this discussion, of course, is "How do we do this?" How do we insert ourselves into the basic design process so thoroughly that our involvement is elemental to the success of any architectural- or landscape-design project?

One of the best ways to answer that nest of questions, I think, is to evaluate watershapes as they relate to certifica-

States needed to think along those same lines and develop approaches that deal seriously with a mandate to preserve our resources.

Using Biology

Among the lessons we can collect from the European experience is that biological treatment can indeed be used as a primary method of water purification. In North America, we have been taught that water can only be effectively treated through use of chemicals and filtration in tanks with various forms of media. As the Europeans have shown us, however, biological water treatment also works quite well, and in a natural way.

By using the biological approach, our European watershaping counterparts say we can eliminate the use of manufactured chemicals and the generation of their potentially harmful byproducts. Moreover, there's no need to draw on the energy required to make chlorine compounds or fuel the transportation system needed to bring them on site or cope with the downstream effects of harsh chemicals on groundwater or above-

ground water systems.

At this point, Europe is teeming with extreme applications of biological filtration. They process the effluent from car-washes; water discharged from nuclear power plants; cooling water from large office buildings; and even the utterly foul water that emerges from zoological exhibits – with that last providing the most extreme possible example of the challenges these systems can handle.

To be sure, not all of these systems produce potable water, but even if the output is "gray water," that's still something that serves noble purposes in irrigation, firefighting and a host of other applications – and mean that we don't need to tap supplies of potable water for those important purposes.

In addition, the European experience has shown that biological filtration using specific types of plants can help remediate contaminated water by removing heavy metals and organic compounds introduced into water supplies via the fertilizers used by agricultural or industrial operations. (This ability of plants to take up these materials is no longer



tion under the Leadership in Energy and Environmental Design (LEED) program – the widely recognized points system administered by United States Green Building Council.

Currently, there are no classifications or criteria in the LEED program referring specifically to watershape designs. There are, however, several areas in which applications may be found, mostly in the program's extensive Water Efficiency category. Here, we learn, the idea is to reduce the use of potable water supplies – not through use of well water, but instead by capturing and treating rainwater or gray water.

According to current LEED provisions, you can use a green roof to capture rainwater (which has the added virtue the instant it falls from the sky of reducing air-conditioning costs as a result of the insulating capacity of these roof structures). Once captured, the water begins a journey of purification by flowing either to a gravel-based wetlands zone/retention basin or into a body of water that contains floating islands and myriad plants that take up contaminants.

When water exits these basins, no matter its condition, it can be used immediately for irrigation, firefighting or janitorial water – even to flush toilets if those fixtures are outfitted to handle gray water. Alternatively, this water can be channeled into an “infiltration” basin where water is injected into the ground to help





maintain water tables. This can be *extremely* helpful in areas where there are issues with seawater intrusion or underground plumes of pollution.

Once the water is contained in such a system, it can also be polished and “cleaned up” for use in fountains or swimming pools: All you need to do is run it through a sand or cartridge filter. And you can avoid that step altogether simply by deploying plants that remove bacteria, algae and contaminating organic compounds in a filtration area large enough to render the water potable.

At the risk of repeating myself, all of this is incredibly exciting. I’ve even seen reports of LEED-points-seeking designs that involve remediation of environmentally damaged areas. Indeed, it seems that soil laden with contaminants – the junk that has heretofore been excavated, carried away and incinerated at great cost and at no net benefit to the environment because of the air pollution and energy consumption that result – can be helped by properly designed watershapes.

Biological treatment has, in fact, proved itself a wonderful option here. When you channel water through bad soil and thereby flush contaminants into open bodies of water, it is then possible to select plants that will clear specific substances from the water either with plantings along the banks or on floating islands. Some plants, for instance, are particularly inclined to extract heavy metals, while others are adept at collecting fatty contaminants.

Active Participation

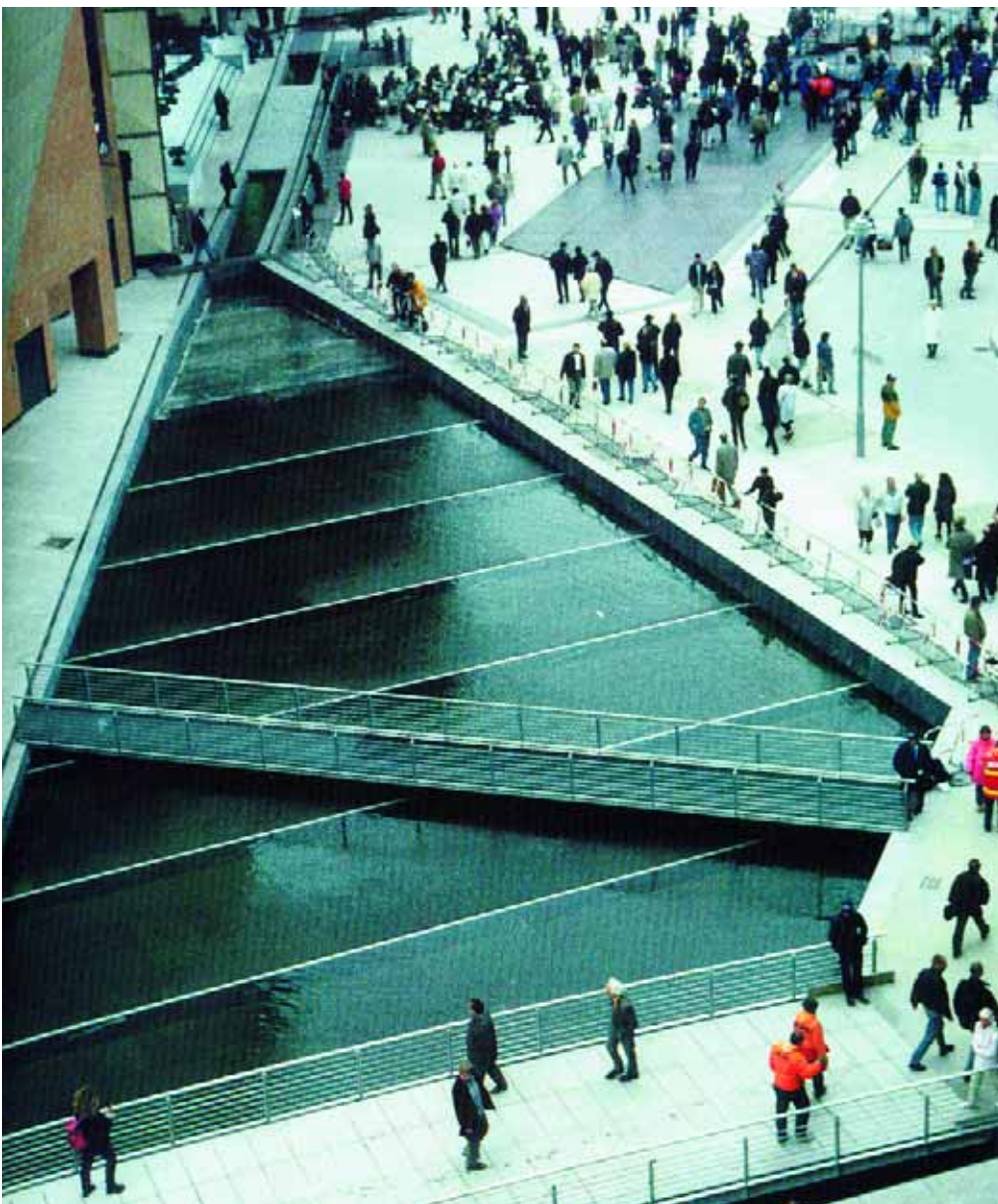
In sizing up the LEED-point potential of watershapes, it’s important to recognize that the measures we implement earn credit relative to specific situations.

In using rainwater for irrigation, for example, there are precise ratios to be achieved with respect to the volume of potable water relative to the surface area from which that water is to be collected. Helpfully, there is no apparent favoritism: The same holds just as true for water used for industrial cooling as it does for water collected from carwashes or zoological applications.

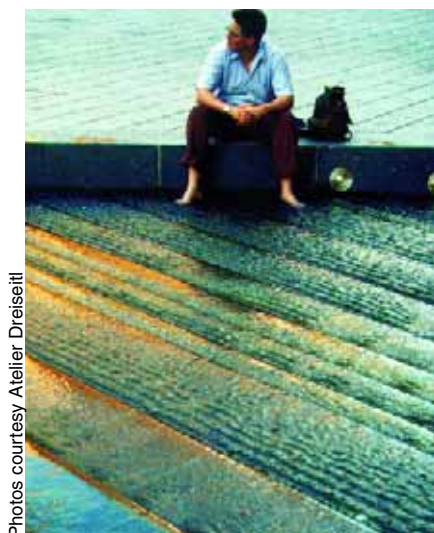
In all cases, a design’s value with respect to points is always subject to a pha-

Designed by Atelier Dreiseitl (Überlingen, Germany) and built between 1989 and 1993 in the town square of Hattersheim, Germany, this system uses aerating cascades and a biofiltration system to produce safe water with no chemical support.

Photo courtesy Atelier Dreiseitl, Überlingen, Germany



In this project built in 1989 and 1990 for Potsdamer Square in Berlin, the designers at Atelier Dreiseitl used another approach, storing and then feeding filtered rainwater to a massive watershape composition that safely invites public participation – and does so without drawing on potable water supplies.



Photos courtesy Atelier Dreiseitl

Designed by A. John Wilkes and built in 1988, this 'flowform' cascade is part of the sewage-treatment process at a plant in Hogganvik, Norway. Along with biofiltration, floating islands and additional conventional waterfalls, this wonderfully aesthetic cascade helps prepare highly contaminated water for safe discharge into the sea.



Photo courtesy A. John Wilkes, Virbela Institute for Rhythm Research, East Sussex, England



This 2003 project by BioNova (Munich, Germany) uses biofiltration to treat the water in a large, heavily used indoor swimming pool at the Arterhof Wellness Center.

Photos courtesy BioNova Natural Pool



lanx of variables associated with the application and the design. The key, I think, is that this system of points and relative values and the urgent need on the part of projects to gain LEED certification opens an all-new discussion of the role watershapers might play in the design of commercial complexes as well as residential developments.

Look at it this way: Traditionally, watershapers in their more aesthetic or recreational roles are often among the last of all items considered in a project. Until recently, in fact, fountains, swimming pools, spas, ponds, cascades or interactive waterfeatures have been seen as separate and divorced from everything else on site – a half step shy of, say, a sculpture or some identifying signage.

With the philosophy I've been discussing here, by contrast, we as watershapers become intimately engaged in the process of designing water reclaiming and recycling programs; play a role

in establishing irrigation systems; and, in fact, make ourselves an integral participant in the overall design scheme in ways far more imperative than has ever been true in the past.

In other words, we as watershapers will be included as part of initial design teams, and our work will become inseparable from a huge range of other architectural and landscape elements.

Again and in yet *other* words (basically because I think this message bears repeating over and over again), the role we have as watershapers is about to become greatly expanded and its importance dramatically increased. We all have a tremendous opportunity to participate in the future of our industry *and* our planet at an all-new level, and our business opportunities will expand vastly in the process.

It's all good, and all we need to do to seize this bright future is to become a bit more involved in going green.

For this private residence, the designers at Wassergarten (Wels, Austria) in no way compromised on the beauty of the project in using the biofiltration provided by a large pond to purify the water of the adjacent swimming pool.

Photo courtesy Wassergarten, Wels, Austria



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MULTIQUIP (Carson, CA) offers the EZ Grout Hog Crusher, a job-site material recycler that works with brick, block, stone, rock, asphalt, non-reinforced concrete and more. The unit scoops up and pulverizes material in minutes, turning it into fill and eliminating the need to have the debris removed from the job site. The machine has a half-yard hopper capacity and can process up to ten tons of material per hour.

Robotic Pool Cleaner



WATER TECH (East Brunswick, NJ) has added the Hercules 9000 to its line of commercial robotic pool cleaners. Using the Aqua Smart system, the unit changes its cleaning direction for systematic coverage of every surface in a pool, eliminating the additional hours required by cleaners that use conventional, random patterns. It also has an infrared obstacle-detection system and a remote control for spot cleaning.

Artificial-Rock Waterfalls



RICOROCK (Orlando, FL) manufactures artificial-rock waterfalls. Made with lightweight, fiber-reinforced concrete, the products come in three forms: modular, which can be assembled with simple masonry skills; structural, which require training and advanced masonry skills; and custom, in a wide range of styles. All compositions are molded from real rock formations for convincing detail and character.

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Automatic Pool Covers



AQUAMATIC (Gilroy, CA) offers the Hydramatic line of automatic pool covers. Designed to work on pools of virtually any configuration, the quick, easy-opening units feature mechanisms that are maintenance-free and can be installed

beneath walk-on lids that hide everything from view within the decking. Moreover, there's no electricity near the pool: The powerpack can be placed up to 150 feet away.

Outdoor Showers



JACLO (Cranford, NJ) has introduced a line of outdoor shower systems. Using minimalist designs and exploiting advanced technology, the stainless steel Arc Column Allegro and Aqua Adagio models can be outfitted with mixing valves for hot water use as well as foot-washing outlets and come with polished or matte finishes. They also have freeze-protection systems for cold-climate applications.

Variable-Speed Controller

BELL & GOSSETT (Morton Grove, IL) has introduced the Technologic 502 variable-speed-pump controller. Designed for a quick payback on investment and to contribute to LEED certification, the device features an advanced hardware platform as well as pumping software focused on energy efficiency. It can control up to four parallel pumps and has a simple diagnostic display with soft-touch keypad switches.



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Sculpted-Stone Features

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Lighting Guide

HADCO (Littlestown, PA) has published an installation guide for its low-voltage landscape lighting systems. The 60-page booklet covers the benefits of lighting, then gets into design issues and project planning before discussing installation of a full range of systems, from mounting the transformer and hiding cables to placing fixtures for underwater, tree-mounted, inground and other applications.



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When It Rains

By Mike Farley

The numbers are eye-popping: Just about one percent of all the water on Planet Earth exists as fresh water suitable for human consumption. And depending on where you live in the United States, anywhere from a quarter to almost half of that precious resource is used for irrigation.

This is why it's so important for those of us who design watershapes and exterior environments to consider options that minimize our use of potable water to maintain the landscape – and why I'm glad I picked up a copy of *Rain Gardens* by Nigel Dunnett and Andy Clayden (Timber Press, 2007): This 190-page text defines specific steps we can all take to replace municipal or well water with rainwater, capturing a gift from the skies and using it to sustain our landscapes.

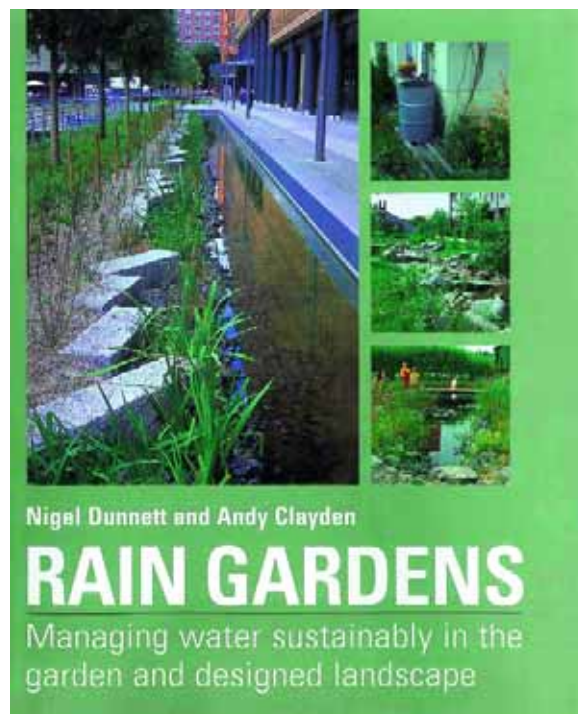
As the authors point out, we live in a time when drought is becoming more and more prevalent: When the rains *do* come amid dry spells, it's often in record-setting torrents that cause floods and property damage.

If homeowners established environments that captured a good portion of this sudden water rather than let it run rapidly to waste, two key issues would be affected in positive ways: The stored rainwater may be used in place of piped-in irrigation water, and the simple act of diverting the flow to storage relieves a measure of pressure on public drainage systems and helps keep them from being overwhelmed. At present, however, few of us create structures or hardscape elements that do anything more than send water to waste – and *that*, say the authors, is something we should change.

At the heart of their discussion of “rain gardens” is the concept of *bioretention*, the simple notion of using plant material to slow down and capture water. They offer various examples showing how water that would otherwise flow into drains can be channeled instead to fill retention ponds or flow into irrigation systems before percolating into the ground.

That sounds simple, but as Dunnett and Clayden point out, we need to think differently about how we organize surface flows and landscapes with these ideas in mind. The beauty of it all, they note, is that it costs very little to take this conceptual step – and the plain fact is that rain gardens can be wonderful.

The authors also observe that, where rain gardens aren't possible or practical, you also have options in using rain barrels or cisterns to collect and store water for irrigation. They also discuss ways that gray water (that is, runoff from washing ma-



chines and showers and sinks) can be used for irrigation purposes, the caveat being that this is illegal in some parts of the country – a prohibition they hope will change before too much longer.

Two other big ideas they cover include the use of green rooftops to capture water (which has the added benefit of passing water through the biofiltration system represented by plant material) and the use of wetland areas to pre-treat water used in swimming pools.

Certainly, none of these ideas is new. Indeed, and as they point out, there are situations around the world where these strategies have been in place for decades. But now, as environmental concerns are becoming a greater part of mainstream thinking in the United States, it's clear that these design options will be more in demand and become more commonplace.

As watershapers and landscape designers and architects, we all have everything to gain by ramping up our efforts to make better use of all available resources – and especially water. And there's nothing wrong with making those spaces beautiful as well! **MS**

Mike Farley is a landscape architect with more than 20 years of experience and is currently a designer/project manager for Claffey Pools in Southlake, Texas. A graduate of Genesis 3's Level I Design School, he holds a degree in landscape architecture from Texas Tech University and has worked as a watershaper in both California and Texas.



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