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John Magyar builds ponds for a living, but when it came to the backyard of his new home, he decided he needed a special crew to enact his vision — namely, his son Elijah. The father-son team transformed their yard into an expansive outdoor living space.

15 The Pull of Perks

Regardless of what products or services you offer, if you don't have the right people in the right roles, it's difficult to succeed in any capacity. **Mark E. Battersby** discusses how offering fringe benefits and other perks can help recruit and retain the most talented workers.

18 17th Century 'Gosanke' LANGUAGE OF KOI

Gosanke means "three families" in Japanese, and today, it refers to the "big three" in any group. In the world of koi, Gosanke refers to Kohaku, Sanke and Showa. **Taro Kodama** profiles these "big-shot" swimmers and shows you what to look for in each variety.

22 Keep It Flowing

If you're a pond builder, you've probably heard a story like this before. A customer adds too many koi to the pond, and their existing koi keep getting bigger, leading to a problematic, ailing body of water. Let **Eric Triplett** explain how upgrading the filtration can save the pond and all its inhabitants.

28 Victory Through Vivipary

Vivipary is the process of plantlets forming while still attached to its parent plant. **Suzanne Boom** takes you on a journey through vivipary as it relates to pond plants and shows you how to utilize it to your advantage.

36 Find the Leakers COVER STORY

Whether you're talking politics or ponds, a leaker can really throw a wrench into your plans. **Josiah Crousore** tells the story of a pond that had numerous leaky offenders and recounts how his team tracked each of them down.

47 Be Still, My Pond

Everyone loves the ripples caused by a waterfall, but in formal ponds, it's more about seeing what's underneath the surface. **Kent Wallace** collaborated with a team to use vertical pond return bottom drains to calm the water.

55 Pond Now, Pay Later

You've heard of a house payment and a car payment. But what about a pond payment? Just ask **Stanley Sensenig**, who has seen his business boom after offering third-party financing of his ponds for qualified customers.

58 Pond Construction with Concrete

Flashback! In a new segment of POND Trade, we'll take a look back at articles from yesteryear. In this issue, we'll revisit **Demi Fortuna's** cover story (January/February 2013) about construction tactics associated with concrete.

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Upcoming Events

2018

September 5 - 6

Atlantic Professional Conference
Bertram Inn & Conference Center
Cleveland, Ohio
atlanticwatergardens.com/apc-adc-program

September 13 - 16

IWGS Symposium
San Angelo Visitors Center Complex
San Angelo, Texas
www.iwgs.org

September 14 - 16

St. Louis Koi Show, hosted by slwgs.org
Timberwinds Nursery
Ellisville, Missouri
www.nmzna.net sponsored by Anjon Mfg.

October 17 - 19

Hardscapes / GIE+EXPO 2018
Exposition Center
Louisville, Kentucky
www.gie-expo.com
www.hardscapena.com

October 31 - November 2

International Pool | Spa | Patio Expo
Mandalay Bay Convention Center
Las Vegas, Nevada
www.poolspapatio.com

December 3 - 7

Irrigation Show 2018
Long Beach Convention Center
Long Beach, California
www.irrigation.org

2018

February 19 - 22

Water Garden Expo
Heart of Oklahoma Expo Center
Shawnee, Oklahoma
www.wgexpo.com

March 22 - 24

Central Florida Koi & Goldfish Show
Avanti Palms Resort Hotel
Orlando, Florida
www.cfks.org

May 7 - 9

National Hardware Show
Las Vegas Convention Center
Las Vegas, Nevada
/www.nationalhardwareshow.com

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POND Trade Magazine is published bi-monthly, starting in January, for \$41.70 per year by LG Publishing, Inc., POND Trade Magazine, PO BOX 2721, Orland Park, IL 60462. Qualified applicants may subscribe at no cost at www.pondtrademag.com. Postage is paid at Orland Park, IL and additional offices. For new subscriptions, additional copies and address changes, please call 708/873-1921 or email llgelles@pondtrademag.com.

POSTMASTER: Send address changes to POND Trade Magazine, PO BOX 2721, Orland Park, IL 60462 © Lora Lee Gelles, 2018

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Publisher's Perspective

Round Three!

Fall is in the air, so it's time to start netting those ponds to keep out all the falling leaves. At least we'll start getting some more moderate temperatures to make the pondside experience all the more comfortable. It just so happens that fall also marks the start of the entry period for our Water Artisans of the Year contest.



Unless you're new to POND Trade (in which case, welcome!), you know that the first two years of the contest have seen some pretty impressive competition between and among some of the leading water-feature contractors around the country. Well, Round Three is just around the corner, so start compiling the details and photos of the most jaw-dropping projects of this year's pond season. Check out pg. 27 for more information about how to enter.

Fall has also inspired us to "fall back," so to speak, and take a fresh look at some of the most-viewed articles from our web archive. We continuously strive to provide new, relevant content; however, we've found that many of our articles are timeless in terms of relevancy and are worth another peek. In this issue, we fall back to January/February 2013 and Demi Fortuna's "Pond Construction with Concrete." In case you missed it the first time, you can check it out on pg. 58.

This issue is also loaded with new content to help you run your business as effectively and smoothly as possible. A successful business starts with its people — specifically, hiring the right employees and keeping them happy. This is Mark Battersby's focus in "The Pull of Perks" on pg. 15. Offering the right fringe benefits and other perks can lure in talented workers and offset any extra costs at the end of the day. Our Pond Construction segment this issue features the story of a personal project by John Magyar and his son Elijah. A new home meant building a new pond, which in the end made one proud papa. The article begins on the next page.

Finally, you'll want to check out this month's "Keep It Flowing" article by The Pond Digger, also known as Eric Triplett, over on pg. 22. Eric explains why upgrading or expanding a filter system can be an efficient fix for an overpopulated pond. He delves into the fundamentals of filtration that are important for your customers to understand before they threaten to abandon their overgrown pond.

Happy PONDering!

The architects of the massive, 95-foot pondless waterfall project in Lawrenceville, Georgia, show off their work one year after its completion.



A Family Affair

Father & son create backyard oasis

by John Magyar,
Universal Aquatics

In April 2016, I moved into a new house in Lawrenceville, Georgia. The first thing I did was survey the property for a suitable spot to install a water feature. My family and I tossed around a few ideas to see what we could come up with, like installing a swim pond, a koi pond, a pondless waterfall system or a maybe combination of all three.

I was slated to attend Pondemonium in Chicago a few months later, so I wanted to wait to construct whatever I thought I was going to install. I knew I would pick up some inspiration on my journey that might get the creative juices flowing. On a pond tour that August, I saw a breathtaking koi pond that had a series of waterfalls on one side

that eventually flowed into a 40-foot pondless waterfall system. I also picked up a few more ideas on another pondless feature that I wanted to create. I knew that my design fell somewhere between those two systems.

Although the inspiration was strong, I stalled for another year, and I'm so glad I did. When we first moved in the house, I thought I knew where we would end up spending most of our outdoor time, but I was wrong. After a year and a half or so, we finally moved forward with the design and installation of a 25-foot pondless waterfall system with a fire pit near the basin area.

Catching Fire

It all started with the fire pit. That's where we wanted to gather as a family. There was only one spot in the backyard



The Georgia heat was brutal at times during the construction, but 13-year old Elijah Magyar didn't let the heat slow him down during the pondless build.



It all started with the fire pit (left). The entire waterfall (right) was constructed around this gathering area. Everything else fell into place as the project evolved.

that had an opening between the Georgia pines to install a fire pit. Everything else was designed to interact with the feature based on that one particular viewing and gathering location.

A 25-foot pondless waterfall system was dropped in just before the sunken fire pit was on the menu, but the menu quickly changed. My wife Monica decided she wanted to enjoy the feature closer to the deck, so the feature quickly grew from 25 to 50 feet.

I got to thinking. “Well, if you want to see it from the deck, then I want to see it from the kitchen.” So just like that, the 25-foot pondless feature had become a massive, 95-foot pondless endeavor.

It was settled. We had our marching orders. Our 95-foot feature would be accompanied by a 7-foot-long, solid-stone bridge with twists and turns that would be accessible from a moss pathway leading from the deck.

A Family Affair

After my Atlanta-based design, installation and maintenance company, Universal Aquatics, went through some

staffing changes, I decided that the installation team for this project would consist of my 13-year-old son Elijah and yours truly. Even at 13, Elijah has some

Fifty-three tons of Tennessee boulders

and gravel were used for the project,

with the largest at 2,900 pounds.

I was like a kid in a candy store.

experience with large excavators, having helped our team set large boulders from time to time. I wouldn't recommend boulder setting as a hobby for every 13-year-old, but Elijah was ready to take on the 95-foot monster during his summer break.

The Goods

For the heart of the system, we decided to go with one 4,000 to 8,000 AquaSurge Pump, two 5,000 AquaSurge Pumps and 40 Aquablox for our reservoir system. We used these particular pumps because we wanted to have energy-efficient, yet powerful results. This way, we could have the flexibility to adjust the

overall flow, look and feel of the feature as needed based on the season. In the winter months, the 4-to-8 pump was operating the entire system. Multiple pumps were also chosen to assist in blocking out some nearby road noise.

Fifty-three tons of Tennessee boulders and gravel were used for the project, with the largest at 2,900 pounds. I was like a kid in a candy store. Having never created a significant water feature for myself before, I just went nuts. It always amazes me how there always seems to be just the perfect amount of rock on-site for whatever we are trying to construct. We often find ourselves making design changes during the construction process to accommodate for the excess stone we have available.

Working off the fire pit area, we began our mission by carefully excavating the basin area. When it came time to set the first spillway boulders, we positioned the stones to maximize our viewing area, which would include Adirondack chairs, sitting boulders and our future outdoor pavilion.

Creating Nature

After the stone was roughed in, it was finally time for nature, in the form of driftwood accents, moss and ferns, to find its way into the design. Elijah and I went down to a local river in search of anything we could use to add instant age and natural beauty to the newly constructed feature. We managed to wade through the river and dig up quite a few tree stumps, some of which had actually been taken down by beavers. The biggest challenge with this part of the process was simply accessibility. We wanted to bring home much larger pieces than we were able to transport, so a lot of the treasure we found had to be left behind until our next adventure.

With a pathway needed to connect the newly constructed outdoor space with the house, we explored several options, including large steppingstones and gravel. Considering the slope of the area and the slippery nature of the flagstone pathways when they get wet, we took a completely different approach. What if we could create a moss pathway?

Monica wasn't sold on the idea at first, but the idea eventually grew

With construction well underway (top), we took some time to harvest materials such as driftwood, moss and ferns from a local river to provide instant age to the newly finished project. The view from the fire pit (bottom) can't be beat. This area is perfect for hanging out with the family and relaxing after a hard day's work of building water features.

on her. The area already had patches of growing moss, so I thought we had a shot at getting the moss to stabilize. The hunt was on. We decided to find, harvest and relocate all the moss we could find locally. We found some in the backyards of customers' houses, in the woods behind our house, down by the river and, of course, my all-time favorite — on the side of the road. It took quite a bit of time, but we managed to create a moss pathway that stretched 5 feet wide and 30 feet long, all collected one handful at a time!

Following the moss pathway, you gain access to the 7-foot-long stone bridge. The bridge measures 12 feet across and overlooks the widest section of the feature. In this area, all three pond pumps converge, creating the loudest section of the feature. From the bridge, the journey continues on a natural forest-floor pathway to a series of large stone steps that lead down to

the main viewing and relaxation area.

The Payoff

It took us approximately three weeks working part-time to rough in the new pondless waterfall system, plus another week or two to add the hand-harvested moss pathway and plantings. Submersible pond, pathway and large spotlights for the surrounding trees were also added to give us the evening serenity that we were searching for.

The space doubles as an office area. While kicking back with my sweet tea in an Adirondack chair and meditating to the sounds of Chopin, I somehow manage to get work done.

Overall, it was a great experience and allowed my son and me to bond and create experiences that will last a lifetime. If you can believe it, he now actually shows off the feature to his friends every chance he gets.

That makes one proud papa! 🐸

About the Author

John Magyar,

owner of Universal Aquatics LLC in Atlanta, is a biologist with more than 15 years of experience in pond design and installation and maintenance of koi ponds, pondless waterfalls, water gardens and water fountains. His expertise stems from years of work in the zoo and public aquarium industry throughout the United States.

John has worked as a biologist at the Georgia Aquarium, the San Antonio Zoo and the Flint RiverQuarium in Albany, Georgia. Working at public aquariums gave him a chance to care for exotic animals, while developing a truly hands-on approach to designing, creating and maintaining many different types of water features. universalaquatics.com



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The **Pull** of **Perks**

How to attract workers affordably

by **Mark E. Battersby**

Whether the result of a booming economy, tighter immigration laws or an educational system gone astray, finding qualified job applicants has become increasingly more difficult for those in the pond industry. Even more troubling for smaller businesses is the question of how they can compete for badly needed, qualified workers.

Fortunately, thanks to our unique tax laws, every retailer, distributor, manufacturer and contractor can afford to offer fringe benefits to their workers — and may even be able to benefit themselves. That's right; our tax laws only prevent employers from discriminating in favor of owners, key employees and other highly compensated individuals when setting up benefits plans that are both tax-deductible for the business and tax-free for the recipient.

Fringe Benefits

Fringe benefits are defined as property and services whose benefit to employees frequently outweighs the cost to the employer. With a number of notable exceptions, fringe benefits are generally included in an employee's gross taxable income, where they are subject to income tax withholding and employment taxes.

However, while some fringe benefits are included in an employee's taxable wages, other fringe benefits aren't considered taxable and remain deductible by the employer. Among these exceptions

are nontaxable fringe benefits, so-called "qualified" fringe benefits such as health insurance, medical expense reimbursements, dental insurance, education and daycare assistance. Tax-qualified benefits are also deductible by employers and totally free of federal and state income taxes and the employee's Social Security and Medicare taxes.

These tax savings obviously make fringe benefits an attraction. However, thanks to the Tax Cuts and Jobs Act of 2017 (TCJA), the array of tax-free fringe benefits that employers can provide is not quite as generous as it used to be.

Retain & Train Your Workers

Surprisingly, survey after survey shows that it is not money alone that attracts new workers and keeps existing employees on the job — it's the benefits. In fact, the flexibility and the opportunity to balance work with other life responsibilities, interests and issues are treasured by job seekers and employees alike. No garden pond professional can be an employer of choice without a good benefits package. Job training, educational assistance and employer-provided vehicles used for business are among the common working-condition fringe benefits provided by many small businesses.

On-the-job training provided by an employer is a tax-free hiring incentive and an invaluable perk for current employees. Educational assistance and tuition reimbursement are also welcome fringe benefits.



A formal, written educational assistance plan doesn't necessarily mean immediate employer funding. Some effective plans provide reimbursement for an employee's educational expenses — up to \$5,250 per employee per year, exempt from tax. Educational assistance includes not only tuition, but also payments for books, equipment and other expenses related to continuing education.

Ways to Beat the Competition

While pay often isn't the primary goal of many job seekers, every pond business owner and manager should keep in mind that in today's job market, compensation remains an important factor. By surveying the local job market and the compensation offered by others in the pond industry, a retailer, distributor, manufacturer or builder can offer higher pay than average to attract the best candidates.

Benefits offered by a pond business should also be above industry standards, with new fringe benefits added when they are affordable. Existing employees should be educated about the cost of their benefits so they appreciate that their needs are being addressed.

Job seekers and employees are increasingly looking for cafeteria-style benefit plans in which they can balance their choices with those of a working spouse or partner. Bonuses that pay employees for measurable achievements and profit-sharing plans can be invaluable.

Again, bonuses and awards must be included in an employee's taxable income. Should the bonus or award be in the form of goods or services, employees must include the fair market value of those goods or services in their income. The same applies to holiday gifts. However, employees receiving turkeys, hams or similar items of nominal value from their employers at Christmas or other holidays may exclude the value of the gift from their income.

A profit-sharing plan, often called a "deferred profit-sharing plan" (DPSP), gives employees a share of the operation's profits. Under this type of plan, an employee receives a percentage of the operation's profits based on its quarterly or annual earnings, regardless of the size of the operation. This is a great incentive to attract new workers and a way to enable your employees to feel sense of ownership in the business. Not too surprisingly, however, there are restrictions on when and how a person can withdraw these funds without a penalty. The contribution limit

for a pond business that shares its profits with an employee is the lesser of 25 percent of the employee's compensation or \$55,000. In order to implement a DPSP, the business must file I.R.S. Form 5500 and disclose all participants of the plan. Just as with other retirement plans, early withdrawals are subject to penalties.

An Employee Stock Ownership Plan (ESOP) is an employee-owner program that provides workers with a tax-free ownership interest in the pond business. An ESOP is a qualified, defined-contribution employee benefit plan designed to invest primarily in the stock of the employer. In general, employees are provided with ownership at

What Do They Want?

HEALTH BENEFITS are by far the single most important fringe benefit. Health benefits include providing employees with health, dental and vision insurance as well as paying health-related expenses.

LONG-TERM CARE INSURANCE covers expenses such as the cost of nursing-home care. While premiums are not taxable, benefits received under the insurance may be partly taxable if they exceed certain limits.

GROUP TERM LIFE INSURANCE of up to \$50,000 can be provided to each employee tax-free.

DEPENDENT CARE assistance of up to \$5,000 can be provided to each employee tax-free. Of course, many working parents may also qualify for a tax credit for child and dependent care.

WORKING CONDITION FRINGE BENEFITS are anything provided or paid for by an employer to help someone do their job. Local and long-distance travel for business, business-related meals and entertainment, professional publications and company cars used for business-related driving are all good examples of tax-free, working condition fringe benefits.

no upfront cost. The shares provided can be held in a trust for safety and growth until the employee retires or resigns. At that time, the shares either go back to the business for further redistribution or are completely voided.

At the Very Least

So-called "de minimis" benefits may be worth little or nothing in the eyes of lawmakers, but they go a long way toward making employees — and prospective employees — happy without an accompanying tax bill. De minimis fringe benefits refer to any property or service that is so small in value that accounting

for it is unreasonable or administratively impractical.

A happy workplace is always an attraction for job seekers. Whether it's a nightclub affair or a buffet in the business's break room, parties are a tried-and-true benefit. And, in addition to making employees feel valued and keeping them motivated, parties have tangible tax benefits. The tax rules allow a business to throw a holiday party — even a relatively fancy one — with no tax consequences to the employees.

Of course, in order to be deductible, the I.R.S. requires any cost to be "reasonable." A garden pond professional cannot deduct expenses for entertainment that are considered lavish or extravagant.

It should also be of note that the TCJA included important changes to the tax treatment of employer-sponsored benefit programs. The new law restricts an employer's ability to deduct many common business expenses, such as meals, entertainment and employee moving-

expense reimbursements. On the upside, though, the law also included a new tax credit for employers who provide paid family and medical leave for employees.

While pay often isn't the primary goal of many job seekers, every pond business owner and manager should keep in mind that in today's job market, compensation remains an important factor.

The bottom line is, in order to attract and retain talented individuals at your pond business, you must offer fringe benefits and other perks.

Once you have determined what benefits will best attract the specific workers you need in today's job environment,

which benefits new and prospective employees would prefer, and which benefits the pond business can really afford, only then can you make an informed choice among them.

And, hey — wouldn't it be ironic if the benefits you choose to offer and their associated additional expenses actually ended up saving your operation more money? ☞

With 25 years of professional experience in taxes and finance, Mark Battersby writes on unique and topical subjects in the industry.

Although no reputable professional should ever render specific advice at arm's length, he does craft unbiased, interesting, informative and accurate articles.

Mr. Battersby currently writes for publications in a variety of fields. His topical columns are syndicated in many publications each week. He also writes columns for trade magazines and has authored four books.

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17th Century 'Gosanke'

The big three in the koi world

by **Taro Kodama**,
Kodama Koi Farm

The term “Gosanke” in the koi world refers to the three main varieties: Kohaku, Taisho Sanshoku (Sanke) and Showa Sanshoku (Showa). Although there are more than 100 varieties of koi, these three varieties stand apart from the others for their excellence, perfection and popularity. It is no exaggeration that these varieties are well representative of most Japanese koi.

The word *gosanke* literally means “the three families” in Japanese. In fact, Gosanke is not a unique term to koi. It is often used to refer to the “big three,” or the three main things that represent a group. One might say that Harvard, Yale and Princeton are the Gosanke of Ivy League schools, but of course, that’s debatable.

History of Gosanke

Historically, Gosanke referred to historic families in Japan going back to the Edo period (1603 – 1867). This is the time when Tokugawa shogunate, started by Tokugawa Ieyasu, was governing Japan. During this era, the eldest son of the shogun family was supposed to take over the shogun position in principle. But in this case, however, the Tokugawa shogun family had no son to take over.

The feudal lords of Owari, Kii and Mito were the three major Tokugawa branch families descended from the three sons of Tokugawa Ieyasu. They were ranked above all the other feudal lords. The three families were called Gosanke. Ever since then, any three in a group that are more important than the others are called the *gosanke* in Japan. Kohaku, Sanke and Showa are surely the Gosanke in the koi world.

Kohaku

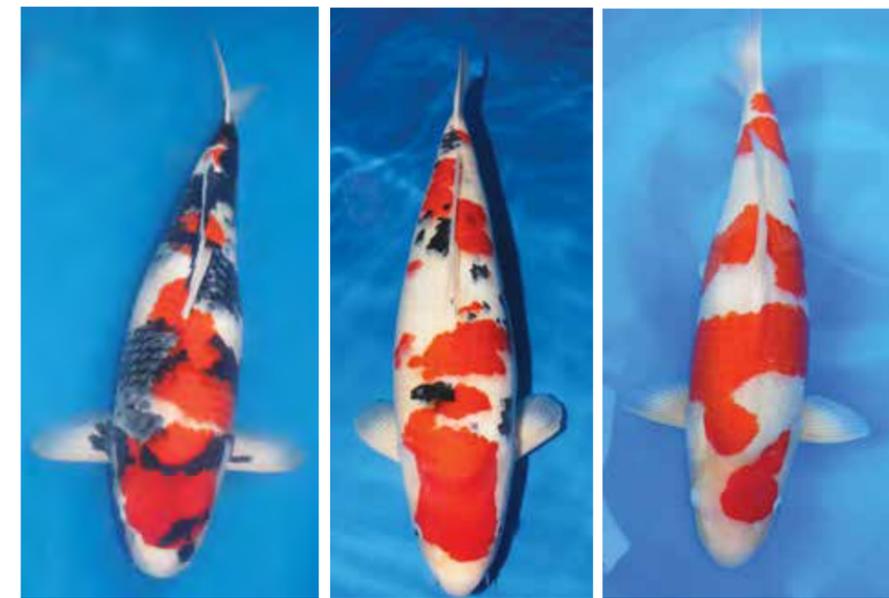
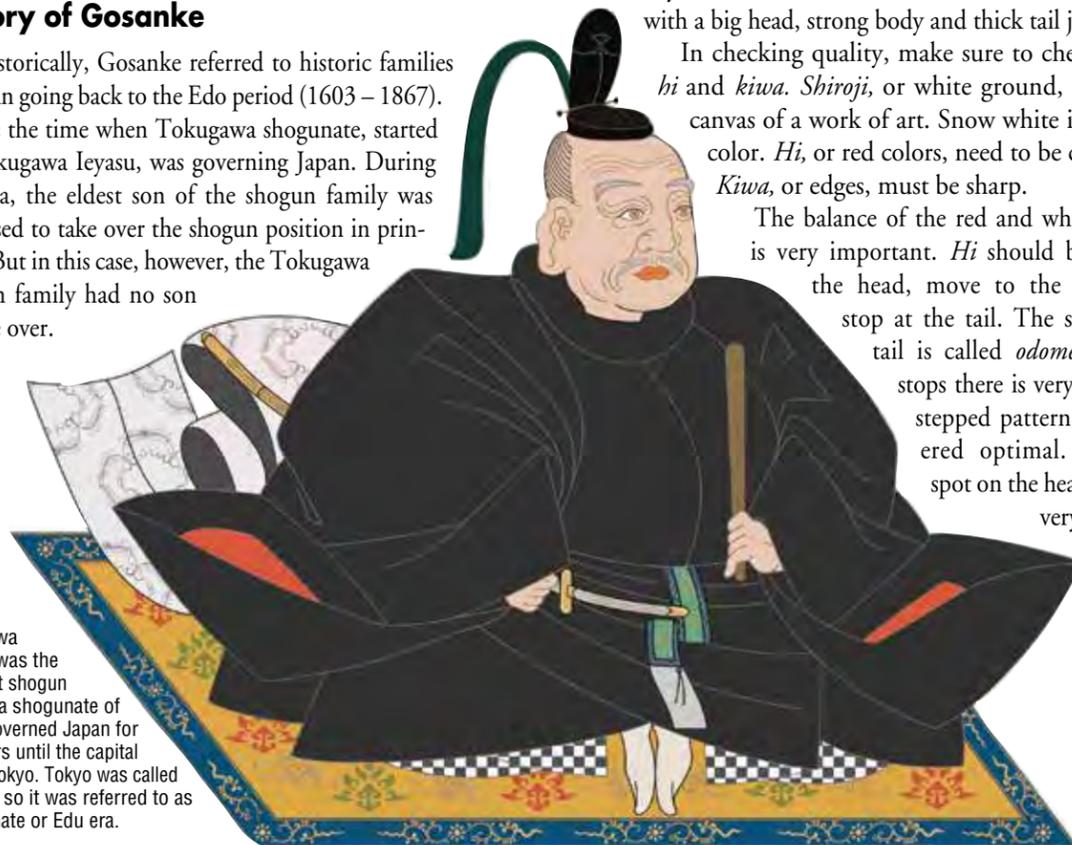
As it is often said, “It begins with Kohaku and ends with Kohaku.” Kohaku is the foundation of every koi variety. There are four things to check on Kohaku: body, quality, pattern and the breeder.

Body is the most important factor in koi. Although it does not matter if they are small, once they have grown up, how the body is constructed makes big difference in beauty. The ideal body conformation is often described as a tree trunk, with a big head, strong body and thick tail joint.

In checking quality, make sure to check *shiroji*, *hi* and *kiwa*. *Shiroji*, or white ground, is like the canvas of a work of art. Snow white is the ideal color. *Hi*, or red colors, need to be consistent. *Kiwa*, or edges, must be sharp.

The balance of the red and white pattern is very important. *Hi* should begin with the head, move to the body and stop at the tail. The stop at the tail is called *odome*. How *hi* stops there is very critical. A stepped pattern is considered optimal. A round spot on the head is always very popular.

Ieyasu Tokugawa (1543 – 1616) was the founder and first shogun of the Tokugawa shogunate of Japan, which governed Japan for almost 300 years until the capital was moved to Tokyo. Tokyo was called Edo at the time, so it was referred to as the Edo shogunate or Edo era.



Showa (left), Sanke (middle) and Kohaku (right) exceed other varieties in beauty, perfection and popularity.

Finally, checking breeders is critical, especially in the Kohaku variety. Because a koi is a growing beauty, it is important to envision the future. What looks beautiful now does not guarantee beauty in future. Knowing the breeders is probably the biggest key. Simply coming from Japan is no longer enough. You must know and investigate which breeder you are dealing with.

Taisho Sanke & Showa

Taisho Sanke refers to three-colored koi, or Kohaku with *sumi* (black) spots or a *bekko* pattern. Taisho Showa, by comparison, is three-colored koi with a dynamic *sumi* or Shiro Utsuri pattern. When you look at either koi, you must check the Kohaku, the *sumi* and the breeders.

Because Sanke is Kohaku with *sumi*

spots, we first examine the excellence of Kohaku. Check its body, quality and pattern. Although pattern is also important in Showa, it is not as important to have a perfect Kohaku pattern as it is in Sanke.

The quality and location of *sumi* determines the excellence of Sanke. The term “*sumi*” originally came from calligraphy, referring to black ink. So the quality of the

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sumi color needs to be as thick and deep as black ink. The location of *sumi* is delicate. It needs to stay in balance with *hi* pattern. In Showa, *sumi* develops massively and dynamically. Even though it may be lacking in some parts of the Kohaku pattern, *sumi* could appear to maintain a good balance. It is more important to predict what kind of *sumi* quality will appear and where.

As far as breeders go, the bloodline is very critical whether you are shopping for Sanke or Showa. If there is no good bloodline, there is no future for the koi.

Value of Rarity

When you are showing koi to your customers, it is unlikely that you show only one variety. It's so easy to find beauties in each variety and so difficult to decide which one to pick. As long as we can carefully examine its body conformation, quality, pattern and breeders, we will know which koi is the best in each variety. But when you pick the best of each, how might you decide which one is the best of the three?

It is not an easy task, almost like comparing apples and oranges. In fact, apples and oranges may be easier, because you can pick your preference. But in koi, there is a rule of the value of rarity. What is rare is more valuable. So if Kohaku, Sanke and Showa are all equally beautiful, we must pick Sanke for the best value. Breeding beautiful Sanke is more difficult than Kohaku and Showa. And because it is difficult, there are not many Sanke breeders. Their production is much smaller than that of Kohaku and Showa.

Judging koi at a show is a bit of a different story. We generally do not know bloodlines, and we judge based on how the koi look on that day, at that time. Future potential is not as important. But when it comes to extremely close competition, the value of rarity will almost always come into play.

Indeed, Showa currently seems to be the most popular among the three. I see many Showa win grand champions at koi shows. Even in my retail and wholesale divisions, Showa has a higher demand. Many breeders in Japan breed Showa now, too. Interestingly enough, Showa used to be the rarest variety

about 20 years ago when I first joined my father's company. Needless to say, the power balance of the three families (Kohaku, Sanke and Showa) has changed over the years, and it will be interesting to watch the trends of the future. ☺

About the Author

Taro Kodama

is the president of Kodama Koi Farm, the largest importer and distributor of quality Japanese koi in the United States. With locations in Japan, Hawaii, New York and New Jersey, Kodama Koi Farm carries more than 35,000 Japanese koi from the top breeders in Japan. Taro, along with his father, Mamoru, not only provide show-winning koi, but they also conduct many koi seminars.



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This pond is 36 inches deep to the finished floor. It uses a classic filtration approach with Helix products, including a pond skimmer, moving bed waterfall filter, suction grid and, of course, aquatic plants. The water looks like it's 10 feet deep!

Keep It Flowing

When a pond outgrows its filtration

Pond Filtration

by Eric Triplett,
The Pond Digger

Over the last decade, more than 35 percent of our pond construction contracts have involved remodeling existing ponds. While this

approach to filtration. We design systems that start with quality prefiltration and then work in both mechanical and biological filtrations including, but not limited to, moving bed filter technology, active bog filters and airlift technology.

While most pond manufacturers includ-

tion until your eyes turn green, and it will put some green in your wallet, too.

I have cured many ponds plagued with cloudy water by simply adding a moving bed waterfall filter. We have resolved ponds with heavy particulate issues with the addition of biomechanical pressure filters and gravity-



Kelly Billing (left) demonstrates how some pond plantings can aid in the filtration process. You can also achieve the desired effect with two different waterfall filters on one waterfall (right). These tactics make up what we call a multipronged approach to filtration.



is an important statistic that cannot be ignored, the really surprising fact is, we are removing beautiful ponds that have been pressed beyond their limits by their homeowners. One word comes to mind — overstocked!

The sad reality is that most people cannot afford a complete pond remodel. The wonderful spin to this reality is, if you and your team become skilled at adding filtration and upgrading filters on an existing pond, you can create a steadily flowing stream of revenue.

A Multipronged Approach

One of the most frequently asked questions I get about pond design is, “What size of pond will that filter keep clean?”

My answer is usually something like this: I don't believe any filter as a standalone is a good idea for a pond, regardless of size or total gallons. We always take a multipronged

ing myself want to sell fancy black boxes and filter pads, the consumer really doesn't care so much about the label as much as they want something carefree, easy to maintain and beautiful to look at, keeping their koi happy and healthy.

Lean on Mother Nature

Using Mother Nature by adding aquatic plants in and around the pond is a great way to give your client what they need and still turn a profit. As a rule, aquatic plants consume nutrients from the water column and improve water quality, adding to filtration. But if you actually implement a system where you circulate water to the roots of the plants, the results are staggering.

Aquatic plants that are installed in an active bog filter grow at an amazing rate when compared to aquatic plants grown in static planters and shelves in and around the pond. Study active bog and wetland filtra-

flow sponge filters of all styles, sizes, shapes and brands. We try to manufacture what we need, but we don't hesitate to buy from another brand that offers the right solution to our client's problem.

When They're Ready for Dirt

While we rarely get calls from customers who want to give up on their pond, even once a year is too much for us! When we get that call from a client who feels that they have tried everything on their pond and just can't get it cleared up, they are usually so frustrated that they're ready to just fill it in with dirt. It is so disheartening!

When we get that phone call, we see it as a wonderful opportunity to solve problems and rescue some pond fish. When we know someone is almost ready to throw the towel into the ring and the dirt into the pond, we try to get them to turn over a new lily pad and start enjoying their pond again.

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Fish Grow. Filters Don't.

Fish population is really the easiest thing to overlook. When a pond is new and the fish are small, your typical filtration has no problem keeping up with the waste production. As the years roll by, the fish grow, but the filter doesn't.

When koi double in size, they produce up to 10 times more waste. It might seem unbelievable, but it's true — 10 times more poop! So those six cute little 4-inch koi your customer started with are now 20-inch behemoths, cruising around the pond like Russian Typhoon-class submarines, producing Chihuahua-sized poops and making the filter cry uncle.

The filter that was fine before for the young fish is now simply too small. Imagine if when you got married, you and your spouse have a sporty little two-door coupe. As the years go by, you start having children, and suddenly, there are simply not enough seats in the car. So you go bigger, right?

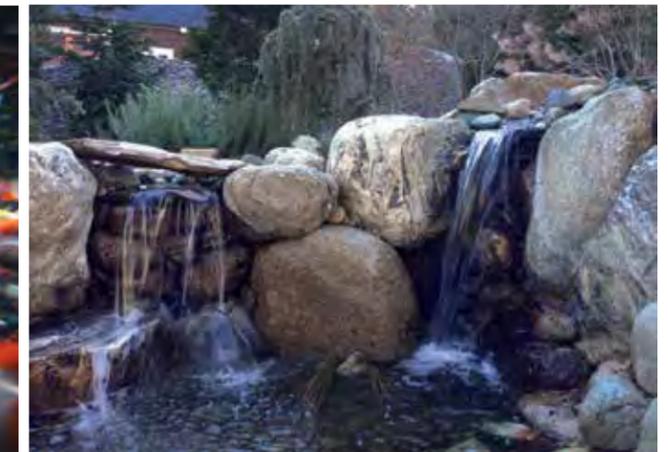
So, upgrade the filter. Or better yet, go the multipronged approach and put in a secondary filter. That way you can retain the established beneficial bacteria colony that the original filter had. It is so simple, yet it is often overlooked.

Be wary of a filter that's too small. It will be unforgiving if the customer adds new fish on a regular basis. Even just one fish a year becomes 10 whales just 10 short years later.

Never Skip the Upkeep

Maintenance is the key to keeping a pond clean and clear. Cleaning the filters frequently and performing regular water changes can overcome a plethora of pond challenges. It is not unusual to find an unhappy pond owner who has not performed the annual spring drain and clean for several years, only backwashes their pressure filter once a month in the summer, or only cleans their filters when the waterfall slows down.

Pardon me, but a pond owner has to keep a regular pond-cleaning schedule. Your fish keep pooping, even if it is the dead of winter. Here's the real kicker: 75 percent of fish waste is ammonia expelled by their gills from breathing. So, don't



When your initial handful of koi turns into a swarming school of swimmers (left), you have to adjust the filtration for the new environment. Use multiple waterfall filters (right) during a build to give you different configuration options. One of these falls has a moving bed filter, and the other uses a biomechanical filter.

try to tell me, "It's winter; the fish aren't eating, so there's no need to clean the filter." That's simply not cutting it. If those fish are still breathing, they are still producing waste.

Fish waste, whether in the form of poop or ammonia, causes water quality to deteriorate. Poor water quality causes undesirable algae, and it's the No. 1 reason people want to fill in their pond with dirt. It also causes

poor water clarity and reduces the fish's immunity, causing them to get sick easily. Eventually, the solids can build up on the bottom of the pond, making a mucky, gross buildup that smells like rotten eggs.

So, clean that pond. Clean the filters. Clean the skimmers. Add beneficial bacteria. Do water changes. And please, if the pond type requires an annual spring drain and clean, do it every spring, even if the pond looks great. If you skip it, pretty

soon, it won't look great, and then your customer will be on the hunt for a shovel and a semi-truck load of backfill soil.

Our Mantra

Proper filtration obviously goes hand in hand with fish load, but sometimes customers don't even start out with the right filter for their original 4-inch koi. We see this most frequently with those little pond kits that come from DIY stores, big

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box stores, hardware stores and the highly competitive “pond-in-a-box” offerings from online low-margin “e-tailers.”

These ponds are typically too small to house koi in the first place, as most of those preformed ponds are less than



150 gallons. An adult koi needs at least 250 gallons of water, but it does much better in 500 gallons of water. In addition, the “filters” they typically come with are really prefilters that sit in line before the pump. They are designed to keep the pumps from clogging with debris, not to keep the water clean.

Make sure the filter your customer has is designed to keep the water clean,

not just keep the pump from clogging. It should sit outside the pond somewhere, potentially in the waterfall, or beside the pond, where it easily can be cleaned of captured fish waste, plant debris and excess food on a regular basis. Most need cleaning as frequently as once a week.

Understanding the fundamentals of all the different types and brands of filtration will set you and your customer up for success. Take a deep dive into filtration, from gravity flow to pressure filters, and from static waterfall filters to moving bed waterfall filter technology.

Whether or not your certifications or affiliations in the business allow you to use these filters, make sure you understand when and why we use separation tanks and UV clarifiers, and learn the breaking point when a biological filter turns mechanical and ultimately fails. Understanding failure is always a pathway to opportunity. **CS**

About the Author

Eric Triplett is the owner and operator of The Pond Digger Waterscape Design & Construction Company and the creator of Helix Life Support Pond Filtration Systems.



Triplett has dedicated his life to ponds and shares his experience, both successes and failures, to help professionals and do-it-yourselfers create beautiful, low-maintenance water features. Eric has touched millions of people with his YouTube Channel “Ask The Pond Digger Show” and extensive playlists of how-to video tutorials on designing, building and maintaining ponds. He is regularly asked to speak at seminars, clubs, schools and garden centers. Eric also writes for trade magazines and has been featured on several TV shows including HGTV’s “Yard Crashers.” His Ponds for Schools program has allowed thousands of children in Southern California to experience and learn from water features.

With his focus on information, education and inspiration, you can see why his company has won so many awards at local, state and national levels, including his 2015 induction into the Green Industry Hall of Fame. www.theponddigger.com

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Victory through Vivipary

When runners and tubers aren't enough

by Suzanne Boom,
Lilypons Water Gardens

Life will find a way, as Jeff Goldblum's character in Jurassic Park famously said. The need to reproduce is a basic motivation that drives all life on Earth, and modern aquatic plants have demonstrated this better than most of Earth's other creatures. In fact, they have found several ways, which I'll shine a light on here with a couple of examples of plants for which even two reproductive strategies are not enough.

The two forms of reproduction used by most aquatic plants are classic sexual reproduction, or pollination, and one or many forms of vegetative propagation. Vegetative propagation is a broad category describing various forms of asexual reproduction, resulting in the creation of clones of the parent plants.

Propagation Nation

The most common forms of natural vegetative propagation that we see in the pond trade involve the formation of tubers, (e.g., *Nelumbo*, tropical *Nymphaea*) stolons and runners (e.g., *Nymphoides*) and rhizomes (e.g., hardy *Nymphaea*, iris and *Typha*).

Sexual reproduction is a superior method of propagation, because the population benefits from the exchange of genetic material. Greater genetic diversity

leads to greater resistance to disease and adaptability to changes in the environment. Conversely, most forms of vegetative propagation simply produce clones of the parent plant. This offers the plant a faster strategy to colonize an area with good growing conditions and allows it to produce fewer but larger offspring with a higher likelihood of reaching maturity than seedlings. But, this comes at the cost of possibly reducing the genetic diversity of the overall population.

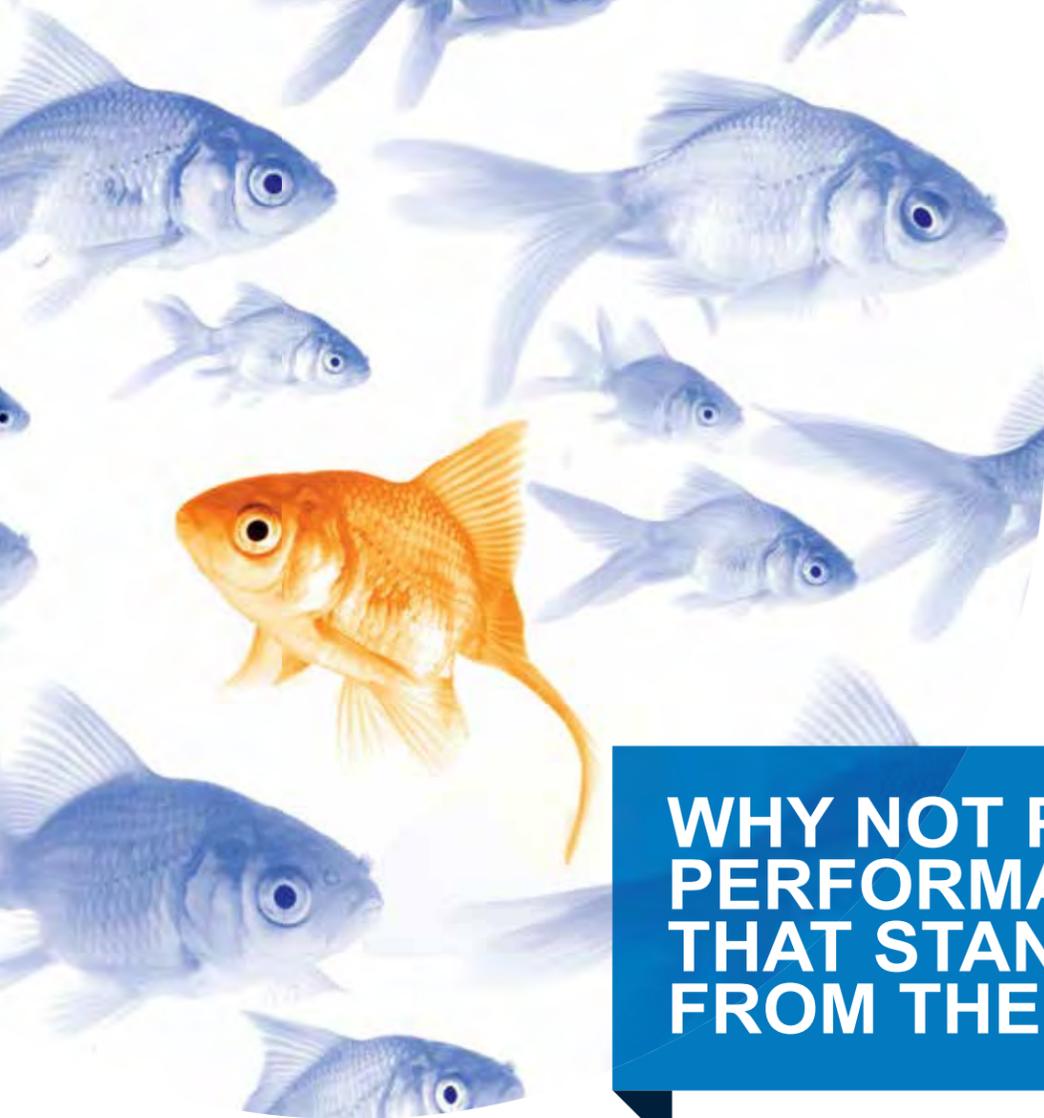
By taking advantage of both sexual and vegetative methods, plants can establish themselves quickly in a particular area, maintain genetic diversity and extend their range to new areas.

For those who produce cultivars of waterlilies or lotuses with very specific characteristics, vegetative propagation is a major key to maintaining the purity of a cultivar.

Another vegetative strategy we growers may exploit is a fascinating process known as vivipary. There is more than one definition of vivipary in the world of botany. The narrower definition describes true vivipary as a form of sexual reproduction whereby germination takes place while the seeds are still attached to the parent plant; pseudo-vivipary, on the other hand, is the formation of plantlets in place of sexual reproductive structures. The wider definition, which I will focus on in this article, includes any scenario in which plantlets are formed while still attached to the parent plant.



Cyperus isocladius inflorescences (above) with plantlets
Newly formed plantlets (top left) on Nymphaea 'Josephine' leaves
Nymphoides (left) with a plantlet growing from a leaf and a runner
Dwarf bamboo (bottom) with plantlets still attached to the parent plant and plantlets that were manually removed from the parent plant
Nymphaea 'Colorado' in bloom (opposite page) at Lilypons Water Gardens



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These photos of a Nymphaea 'Colorado' flower bud with plantlet were taken three days apart.

Waterlilies

In addition to the production of tubers or rhizomes, some species of waterlily also create fully formed plantlets from either the leaves or the flower.

Nymphaea micrantha is an African waterlily species that produces plantlets from the center of the leaves. These plantlets start from a small, gelatinous nub at the center of the leaf. N. micrantha utilizes this strategy to such a degree that the plantlets even produce plantlets of their own while still attached to the parent plant.

More than 30 tropical waterlily hybrids employ this method of propagation to a lesser or greater degree, and all those are descendants of N. micrantha. Some popular examples are N. 'Lindsey Woods', N. Panama Pacific, N. 'Daubenyana' and N. 'Margaret Mary.'

In hybrids, production of these plantlets seems to be triggered by the decaying of the parent leaf. Plantlet formation can even be induced by removing the leaf from the parent plant. With the right growing conditions, this can be used as a viable

way of propagating certain hybrids. Sean Stevens describes a method where the leaves are removed from the parent plant and placed on the bottom of a 35-gallon propagation tank under artificial lights. He reports that the plantlets started developing within days, and in just a few weeks' time, they were large enough to be transferred to individual pots.

Some hardy waterlily cultivars display a form of vegetative propagation that more closely resembles pseudo-vivipary. These plants produce plantlets directly from the flower. Two slightly different forms of this have been observed.

In the first form, the plantlet grows from the side of the flower bud. In this case, the plantlet starts to form before the parent flower even opens. What I have found in observing this behavior in N. 'Colorado' is that these plantlets often form blooms of their own before they form roots or leaves. The parent flower's ability to produce pollen and seed does not appear to be inhibited.

In the second form, the plantlet grows from the center of the bloom. In this case, the reproductive parts of the flower

are modified, and the development of the plantlet replaces the flower's ability to produce pollen or seed.

Many of the hardy hybrids that use this strategy can be directly or indirectly linked to Nymphaea mexicana. N. mexicana has been observed to produce plantlets off the flower, but it is very rare. The hybrids that don't have a clear link to N. mexicana are descendants of N. 'Colonel A.J. Welch' or N. 'Perry's Fire Opal.' Unfortunately, according to the Water Gardeners International (WGI) list of names, both of these varieties have gaps in their genealogy.

Some examples of hybrids that have exhibited this behavior are N. 'Barbara Dobbins', N. 'Cherokee', N. 'Georgia Peach', N. 'Innerlight' and N. 'Colorado.'

The Big Question

So, what triggers this behavior? Can it be induced, as it is in tropical hybrids? It is not commonly observed in any naturally occurring species of the subgenus Nymphaea. The one species that this has been recorded in appears to exhibit this behavior far less



Pickerel rush (*Pontederia cordata*) and cattail (*Typha latifolia*) compete at the edge of this earth-bottom pond.

frequently than the descendant hybrids. This is the opposite with *N. micrantha*, which propagate from the leaves more readily than its descendants. This could mean that the formation of plantlets from the flowers in hardy waterlilies is more of an artifact of hybridization than a naturally developed strategy.

This is not to say that this strategy doesn't occur in the wild. Pseudo-vivipary off the flowers in waterlilies has been observed in *N. lasiophylla* and *N. prolifera*; however, these tropical species are in the subgenus *Hydrocallis* and are not known to have been used in propagation. In both *N. lasiophylla* and *N. prolifera*, this vegetative propagation replaces sexual reproduction to the point where these plants in the wild rarely produce seed. Instead, they produce several generations of clones without leaving the parent plant.

Without knowing what triggers vivipary in hardy lilies, it is less likely to be a reliable propagation method for growers. I

am currently experimenting with some *N. 'Colorado'* plantlets that were removed from the parent plant at different levels of development. These plantlets don't seem to develop any substantial roots while still attached to the parent plant, so because of this, they don't

These various propagation strategies allow aquatic plants to multiply quickly and take advantage of good growing conditions. It is not surprising that these plants have gotten so creative.

get established as easily. One curious thing that I've noted is that the first flower of the plantlet often doesn't look like *N. 'Colorado'*.

Sedges

Several species of the sedge family (*Cyperaceae*) also exhibit alternate propagation strategies where new plantlets are grown from the base of the inflorescence or from the stems.

Umbrella palms *Cyperus alternifolius*

and *C. involucratus*, Dwarf Papyrus (*Cyperus isocladius*) and Giant Papyrus (*Cyperus papyrus*) will produce new growth from the base of the inflorescence. This occurs mainly when the inflorescence is brought in contact with water. It's not

necessary to remove the stem from the parent plant to trigger this behavior. In *C. isocladius*, I have even seen it occur when the stem was merely bent down without actually touching the water.

A different member of the *Cyperaceae* family uses a slightly different strategy. Dwarf Bamboo (*Dulichium arundinaceum*) creates plantlets along the stem when floated in water. The plantlet will sprout from between the segments of the stem.

To encourage this behavior, simply bend the stems downward so that at least part of the stem is floating horizontally. Once the new plantlets have formed, the parent stem can be cut off and pushed gently or slightly submerged into wet soil.

Nymphoides

Several species of the genus *Nymphoides* are also known to propagate viviparously by production of plantlets from leaves separated from the parent plant. This is part of why *N. peltata* (floating heart) can be so invasive and difficult to remove in earth-bottom ponds. The native water snowflake (*N. cordata*) also exhibits this behavior.

These propagation strategies allow aquatic plants to multiply quickly and take advantage of good growing conditions. It is not surprising that these plants have gotten so creative. In a natural environment, good growing conditions can be limited by many factors, such as water depth, clarity, temperature, sunlight, nutrients and predation. Plants are constantly jockeying for position, especially at the water's edge, and they use these vegetative propagation strategies to try to outcompete their neighbors. As growers we can use these behaviors to our advantage, and we may even enhance or inhibit them through hybridization. ☞

About the Author



Suzanne Boom is the operations manager at Lilypons Water Gardens. She oversees the grounds and plant production for this 100-year-old business. She has a master's degree in marine biology and 10 years of water-gardening experience. www.lilypons.com

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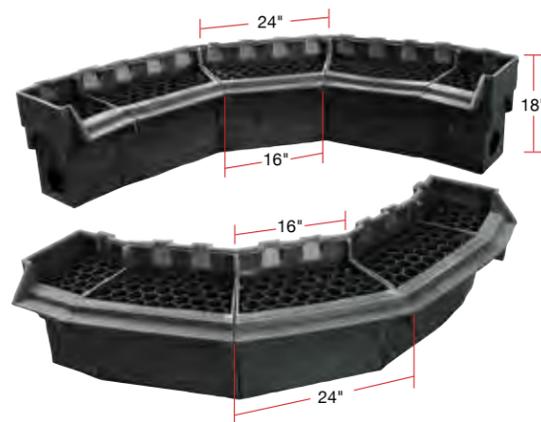
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Find the LEAKERS

Locate and terminate the traitors in the pond

by **Josiah Croure,**
Specialty Water Gardens

The leakers represent a serious issue that must be dealt with. They are eroding the chances of us ever being successful.

Thankfully, I'm not talking about politics. No, the "leakers" in our industry like to turn dirt into mud. Sometimes they cause certain plants to grow like crazy while the rest of the landscape wilts. They almost always result in puddles of standing water on the wrong side of a pond liner.

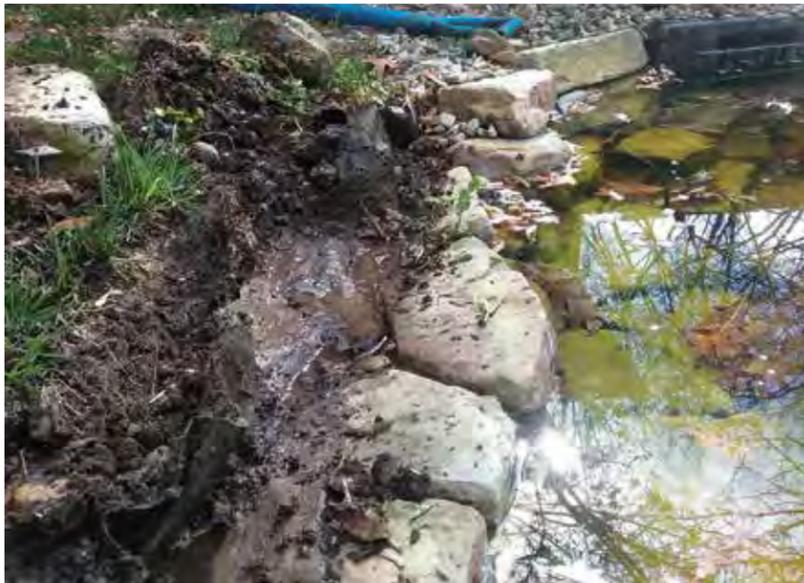
Leaks can be frustrating, elusive or incredibly annoying for a homeowner; in extreme cases, they can lead to serious problems that could result in harm to fish and damage to costly pumps and other equipment.

The Nature of a Leaker

Leaks happen for a number of different reasons. A comprehensive article on all possible leaks and their solutions would fill an entire book. The best builders are not immune to accidents, equipment failure or wildlife damage. Even a neglected or dirty filter pad can cause water to be forced around it and over the edge of a filter box.

Water is, by nature, a dynamic and unpredictable force. Attempts to contain and shape it by less experienced contractors — including enthusiastic homeowners — often lead to it escaping the confines of its intended area. We at Specialty Water Gardens have learned a lot by observing and correcting the mistakes of others, but I personally have learned even more from the mistakes I've

Excessive water on the outside of this liner indicates a leak nearby. Failure of the seal between the skimmer weir and the liner is the most likely culprit.



made myself. The water features we build now are a lot more reliable than some of our earlier attempts. Through experience and education, we've also learned techniques that will prevent most common leaks from happening. Some ponds have a propensity to leak anyway, and frequently, we are called upon to find and fix an elusive leak in a pond that isn't one of ours.

Part of being a water garden professional is identifying and repairing leaks in a timely, competent manner. The confidence that the successful repair of a leak can instill in a new client often leads to additional sales like other repair services, new products or ideally a full rebuild of an old or inefficient water garden.

Landscapers and homeowners of all skill levels may attempt to build a water feature at some point. Often times, the job is respectable; but sometimes, the results are less than ideal. But when a pond owner develops a leak and needs assistance, they usually seek out the help of a pond professional. Here's the story of a recent repair project that exhibited many different, but common leaks, and how we found and fixed them.

A Pond Gone Wrong

This particular pond was already familiar to us. It was originally homeowner-built, and several years before, we had actually installed a new skimmer and biofilter. It functioned well enough, and although it required an annual cleanout, problems were minimal. We were able to provide the owner with some products and services to keep it reasonably healthy.

This time, it had several apparent problems, and after an initial assessment, a few leaks were showing up in areas where we had seen leakage before. None of the leaks appeared to be fatal, but it would be a long process to track down all the issues and repair them.

Unfortunately, the liner was starting to degrade, and the homeowner's dog had caused some punctures. The owners, Ray and Sue, were interested in replacing the liner and changing up the look of it, so early last year, I met with him to discuss a rebuild. We talked about making it quite a bit bigger and changing the stone from small, flat-stacked stones to larger, weathered boulders. We also wanted to improve the filtration and pumps, and we considered building an Asian-style bridge that would span the pond and lead to the front door. My estimate was not unreasonable for the size

Stones were laid on top of the liner (top) on this low edge of a pond, pushing it down and causing a leak. We pulled the liner straight up above the water level (middle) and reinforced the area behind it with base gravel. We lifted the liner up (bottom) and packed base gravel behind it to reinforce it and prevent future settling.

of the project, but ultimately, he decided to go smaller and hired someone else to rebuild the pond.

The story is probably familiar to many of you — the yard guy knew a guy who knew another guy, and collectively they all knew how to do “that kind of stuff.” The contractor who won the job said that he could put in a new liner and make it a little bigger, but to my surprise, he wouldn't need to bring in any additional stone. He also vowed to

The story is probably familiar to many of you — the yard guy knew a guy who knew another guy, and collectively they knew how to do “that kind of stuff.”

keep the same pump and filters, but just move them around. So, his price was less than a quarter of my price for the more extensive rebuild.

It's not Ray's fault, of course. It seemed like a good deal at the time, but unfortunately he was left with a leaker. After some discussion, Ray decided he still didn't want to expand and change the pond too much, especially after having just spent a chunk of money to have it “fixed.” We agreed to track down the issues one at a time and repair them to the best of our ability.

Some of the leaks in the pond were readily apparent, but in order to know exactly what we were dealing with, we began a process of elimination to figure out where in the system the leaks were occurring. This pond had the original skimmer, pump and biofilter I had installed a few years earlier. These drove the main waterfall, and a new, box-store-brand pump in the bottom of the pond circulated to a second, smaller waterfall. Ray told us that even when the pumps were off, the water would drop quickly at first and then slow down to a steady leak. When he turned the pump on, the pond would go from full to the bottom of the

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Roots from nearby plants can grow over the liner edge in search of water. They often develop a "witch's broom" appearance as they grow and expand to absorb lots of that good old pond water.



skimmer opening within one day. I knew at this point that we would need to look for leaks in both the dynamic and static parts of the system.

Static Leaks

A hole in the liner was a possibility; we would just need to find it. We brought in an aerator for the fish, filled the pond to its full mark and left the pump off. We hoped this would allow the pond to leak down to the spot where

the liner was damaged and stop there.

This method for finding the static pond leaks is not always reliable, because our Midwest clay soil tends to drain poorly and holds too much water. However, Ray had originally installed a drainpipe under the pond for groundwater evacuation, and it still worked. We saw the water coming out the other end. The pond dropped rapidly, and we identified several spots along the



Muddy or wet areas (middle) often show up at the lowest edge of the pond near the skimmer. This does not necessarily mean that the leak is nearby. Water will sometimes leak along a stream edge and travel down the slope between the liner and the ground, finally reappearing at the farthest point downhill. Even a tiny hole like this (bottom left) can cause big problems, as roots from nearby plants seek out the water and grow through, turning small leakers into bigger ones. Water is only meant to be on one side of this liner, so puddles on both sides (bottom right) indicate trouble.

pond's top edge where the water was going over.

After the water level continued to steadily drop for a few days, it stabilized at a spot right along the bottom of the skimmer faceplate. This is a commonly leaky area among older skimmers when the silicone breaks down or the hardware corrodes, but this skimmer used an all-compression seal. Moving some stones and feeling around the faceplate revealed a spot where a small fold in the liner prevented the faceplate from correctly sealing against the liner. The skimmer had also been set too low and was crooked.

We dug up the skimmer and realigned it. We also installed an overflow pipe directly through the liner using a bulkhead fitting. This would give us a point of reference to ensure that the liner was brought up higher than the edge of the pond. Thankfully, even though the pond edges were low and leaking, they hadn't been trimmed too close, and we were able to find enough liner to pull them up above the overflow level and reinforce them with base gravel.

After the pond was cleaned and refilled, the water level thankfully remained stable, so we were quite confident that the pond itself would now hold water exactly as it was intended to do.



The previous builder had run the pipe over the liner, creating this muddy leaker.

Dynamic Leaks

As we moved on to the dynamic part of the system, we had previously observed through our inspections that the water-

maple planted just a few feet away was noticeably thinner. It'd been a dry spring, so this very well fed tree was highly suspicious.

We pulled the stones away from the

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biofilter to get a better idea of the situation and discovered that not only had the lip been installed incorrectly, but the liner underneath also had several small holes in it. The thriving Japanese maple was taking full advantage of these "watering holes." We showed this to Ray, and I suggested that it would be best to replace the whole section of liner under the falls and bring in some new boulders to build the waterfall again. When Ray agreed to this plan, I was quite pleased, as it meant that I could make things look a little more natural and appealing.

After cutting out and disposing of the damaged liner, we seamed on a new piece and attached it to the biofilter in a proper manner. Some small boulders were brought in, and the waterfall was rebuilt.

Felonious Foam

That left only one section of the feature that hadn't been addressed, the second, smaller waterfall that was fed by a submersible pump in the bottom of the pond. This side of the stream also showed a spot where the soil was damp, and another leak was suspected. Digging up the wet area revealed that the builder had crossed over the top of the liner from the outside to go up to the falls with the return pipe, and he had pushed down the liner around it. This folded-down area was below the water level of the stream when it was running. He had then attempted to seal up the area between the pipe and liner with black waterfall foam.

Black foam is handy stuff, but it's porous and will wick water through it. Black foam should never be used to prevent water from leaking or going over an edge. Only pond liner that is brought completely above the water level and well reinforced to prevent settling will reliably hold the water.

This being (hopefully) the last issue to address, the homeowners gave me permission to go ahead and fix it the way I wanted to. So, we set out to rebuild the second waterfall to match the main one. We cut the pipe off where it crossed over the liner and ran a new piece up the outside. This allowed us to raise the liner edge and contain all the water within the stream. The installation of a bulkhead fitting then allowed us to safely penetrate the liner at the top of the waterfall area and install a compact waterfall box. The finished stonework looks natural and so much better.





Before (top) and after (bottom): An ugly, leaky waterfall transforms into a peaceful-looking, better-sounding water feature.

Peace of Mind

The repair is complete, and the pond is no longer a leaker. Ray and Sue can leave for more than a day without worrying about burning up a pump or leaving the fish high and dry. I would've liked to have done the original rebuild, but I know that when they are ready, we will have fully earned their trust. We will be ready to deliver a new pond that they can

count on to function properly and last for many years.

We can't prevent every possible leak from happening, but we can build in a manner that ensures longevity and reliability. A quality builder knows how to go into a bad situation and do what it takes to fix a troublesome leaker. This is what sets a dedicated water garden professional apart from that yard guy who knows another guy, who ... you know the drill. ☞

About the Author

After both working in the green industry for most of their careers, husband and wife **Josiah** and **Anne Crousore** figured out that they were good workers, but weren't that good at working for other people. So in 2008, they started Specialty Water Gardens and Landscapes, a design and build aquatic landscape business that also ends up providing repair, maintenance, service, landscaping, plant and fish products, netting and so on. They love meeting the needs of their pond-owning customers.



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Be Still, My Pond

It's all about seeing the fish



Damon Lang of Green Planet Landscaping created this 3-D design of a formal pond. Let's build it!

by Kent Wallace,
Living Water Solutions

Over time, I have been drawn to the “still-pond” look. Being able to view fish through an undisturbed surface is the main attraction. I’m partial to formal ponds, but this doesn’t mean a garden pond can’t have the same still-pond effect, with a few adjustments.

SERIES:
Best Pond Practices
This is an installment of an ongoing, multi-part series. Be sure to watch for further installments in future issues!

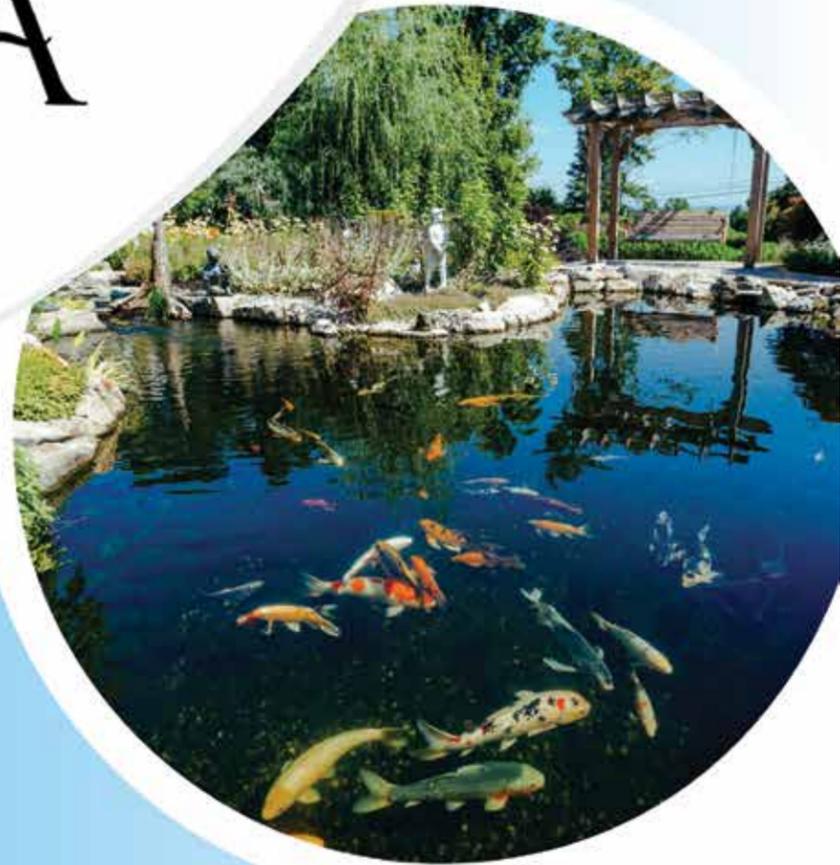
The Ripple Effect

Waterfalls are beautiful and add much-needed oxygen to a pond, but they turbinate the surface. This is helpful when it

comes to creating a healthy system, but the surface remains disturbed. When you’re trying to craft that glassy surface on a koi pond, the main issue is the demand for a high turnover rate. Using oxygenated filtration such as a moving bed, shower filter or dilution reactor, and returning the water through a small spill and current jets is a good option, but sometimes, depending on the shape, it can cause a lot of current in some areas. Because of these situations, I like to use airlift-powered circulation coupled with my vertical pond return bottom drains, or VPRs.

Water in a pond stratifies with the worst water quality at the bottom and the best at the top. Massively circulating the water from bottom to top with air is one of the key elements in lake or large, natural-pond management. Keeping aerators on continuously in a

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Chad surveys the hole. The swimming pool plumbing had to be moved during the excavation.

koi pond maintains a healthy environment, but it makes it hard to see the fish. VPRs bring water back into the pond through the center of the drain dome. This creates a toroidal-current effect and an air dome usually on the top of the drain cover, but it can be anywhere on the pond floor. As the water is directed upward toward the surface, it draws additional water from the surrounding floor. When this is part of a drain assembly, water is drawn toward the bottom drain with more effect. The VPR allows for a high volume of bottom-to-top circulation without disturbing the surface of the pond, provided the depth is adequate for the volume being returned.

Bigger Pond, Bigger House

I wrote an article in the May/June 2017 issue about a pond I helped repair and then expand on four separate occasions. This

was unusual, because in the pond industry, return customers are usually limited to maintenance and repairs.

As it happens, a couple of months after the article came out, Chad, the owner of

replied. "So I bought a new house." The new house was just a couple of miles away in the same community.

Over the next few months, we designed and constructed a new pond. He also did

I told him there was no practical way of making his pond larger. "I know," he replied. "So I bought a new house." The new house was just a couple of miles away in the same community.

that particular pond called me. "Kent, my pond isn't big enough!" The original series of rebuilds had brought him into the neighborhood of 6,000 gallons, and he had been doing a great job of maintenance and koi husbandry.

I told him there was no practical way of making his pond larger. "I know," he

a complete makeover of the existing backyard and pool, bringing in Damon Lang of Green Planet Landscaping for the design and Duane Forte of Laguna Pools for the construction. Chad worked with Damon to come up with a beautiful plan that matched the pool with the pond finishes, making it look like they belonged together.



Chad wanted to add a barbecue area between the pool and pond and a deck overlooking the pond. He also wanted a raised pool that would be the home for a pair of custom carved marble Foo dogs with a small trough pouring back into the pond, which would be the only "feature" in the design.

The Ultimate Drain Assembly

The goal was something a bit more than 15,000 gallons, and my job was to make it function. This would be a giant "still" pond, so my mind immediately went toward airlift-operated VPRs. In the past, I have modified existing drains, but it was very time consuming. With four drains on this pond, I decided to

The goal was something just over 15,000 gallons, and my job was to make it function. This would be a giant "still" pond, so my mind immediately went toward airlift-operated VPRs.

create a mold for my ultimate drain assembly, incorporating everything I had learned modifying other drains.

The body of the new drain has a 4-inch outlet coming out from the bottom edge at a 22.5-degree angle from the lowest point on the side to prevent debris entrapment on the bottom. This makes connecting the outlet pipe a smoother run, eliminating the need for a pair of 22.5, 45 or 90-degree fittings to get below a concrete shell. For liner application, you can insert a 22.5-degree street fitting and go horizontally out under the liner. For concrete, you can attach a length of 4-inch pipe as necessary and then use one standard 22.5-degree fitting to go horizontally under the shell. The return inlet is 3 inches for this pond, and both outlet and inlet fittings are threaded on the inside for pressure testing and keeping the pipes clean throughout construction. The upper edge of the body has a recessed, clamping-flange edge, making the clamp ring sit flush with the surface to prevent

The initial plumbing (top) with bottom drains, skimmers, returns and rebar are installed. The upper pool (middle) has three adjustable floor drains that act as returns. The VPR drain (bottom) is shown with the outlet and inlet plugged. Notice the 22.5-degree outlet.

buildup of debris around the edge under the dome.

Because this was to be a raised-edge formal pond,

design and look and function like holes in the surface of the water. The upper edge of the skimmer body has a flanged

In any pond design, it's important to calculate the total water flow through filtration based on pond volume.

it made the use of side-mounted skimmers difficult, because they would bulge out beyond the beam of the pond. Sometimes you can find a corner near a back edge where the bulge can be incorporated into the landscape or another structural element, but that wasn't the case in this design. For this layout, I used two of my Aqua-niche skimmers mounted on two corner steps inside the front wall of the pond. These disappear in the

clamping edge for the sealing surface to attach to. In this case, the sealing surface was polyurea, but they can be used in liner applications, also. The clamping flange is recessed to keep the clamp ring flush with the surface.

Total Targeted Flow Rate

In any pond design, it's important to calculate the total water flow through filtra-

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tion based on pond volume. The target was something over 15,000 gallons, so a targeted total water volume through filtration at a 1 1/2 times-per-hour turnover rate should be in the range of 22,000 gallons per hour. The turnover rate isn't an absolute, but a general target is based on the overall filtration type, circulation patterns, dissolved oxygen content, climate, fish load, etc. The better you understand and meet each of the criteria, the less critical the absolute number becomes.

Once you have an idea of the total targeted flow rate, you must first determine how to get that volume out of the pond. The total exit volume will come from the four 4-inch bottom drains, two direct-suction skimmers and one 2-inch midwater drain. The bottom drains flow into one of my 500-gallon radial separator prefilters and then into two air-driven dilution reactors with a 6-inch airlift in the center of each one. At a gravity flow rate of 3,600 to 4,000 gallons per hour through a

4-inch line, the four bottom drains should yield 16,000 gallons per hour, which is the approximate total volume of the pond. The skimmer-midwater circuit will make up the rest. Each of the 6-inch airlifts can flow at



Shown here is the VPR drain cover with center-return piping and air diffuser ring.

each airlift is fed by two 4-inch lines. This circuit should yield between 16,000 and 20,000 gallons per hour when running.

at a rate of approximately 10,000 gallons per hour if plumbed correctly as gravity flow systems. The four outlets from the radial separator consist of 4-inch lines supporting four of my 8-inch circular weirs. Two circular weirs feed each of the biofilters, so

Prime Real Estate

The design has a raised pool supporting the Foo dogs. This upper pool cannot be run on airlifts, so a standard pond pump was used. This affords the opportunity to use an upflow sand and gravel filter as the fines filter and stabilizing platform for the pond's bacterial colonies. This is my favorite fines filter, because it creates the best water clarity of any filter I have ever used. The natural rock — the sand and gravel — is the type of real estate that bacteria find the most attractive.

The two skimmers and midwater drains are each connected at the intake of a WLim Wave I 1/4-Horsepower pump with a valve on each for balance and flow control. The pump delivers the water into a WLim EZR upflow sand and gravel filter, which is about 400 gallons. The top of the tank is approximately

6 inches above the water line in the upper pool and is gravity-fed through a 4-inch line from the tank to the floor inlets at the back of the pool. Water fills the pool and exits through two 12-inch spills into the side of the trough and three adjustable floor returns that act as current jets at the bottom of the pond below the pool. This would provide another 6,000 gallons per hour of total flow, which should help us reach the target.

The airlifts return water through the four bottom drains as 3-inch lines and 1.5-inch return jets. The water exits the airlifts and enters a 6-inch air purge chamber. The purge chamber allows the bubbles to be removed as the water travels downward, preventing bubble buildup, restriction and burping in the return piping.

At the base of each purge tank, the water is divided into two 3-inch lines for two of the bottom drain returns and three 1.5-inch side wall returns. This is a little less than the total diameter of a 6-inch pipe, but the restriction will be made up for with

a slightly higher water level, or head, in the airlift, which will create a faster flow rate through the pipes back to the pond.

The air-driven dilution reactors are like a moving bed without the moving media. A moving bed creates multiple opportunities for the bacteria on the media to come in contact with the ammonia in the water through tumbling the media with air. For each one-time pass-through of pumped water volume, the water acts like it's going through multiple filters.

In an air-driven dilution reactor, the media is stationary, and the water is cycled through the inner and outer chambers multiple times for each one-time pass-through of pumped water volume with no moving media. I prefer Bacti-twist, but many different media can be used.

The plumbers for Laguna Pools did a great job, even though they had never before seen a design using all gravity-flow in this manner. In the next issue, we'll put the pond together. *cs*

About the Author

Kent Wallace

was born and raised in Las Vegas. Kent spent most of his adult life in the automobile industry at independent shops and dealerships, including his own shop as a racecar fabricator at age 24. Then, in 2001, a neighbor asked Kent if he could build her a koi pond like the one Kent's father had.



From that point on, pond building became his new passion. That first pond he built was submitted to Better Homes & Gardens magazine and won Best Courtyard Nationwide in their special-interest publication.

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Pond Now, Pay Later

The perks of providing financing to your customers

by **Stanley Sensenig,**

Signature Pond & Water Features

Over the past 20 years, a lot has changed in our pond-building business. Some of those changes have made a fairly large impact on our business. One of these is how consumers pay for their pond installations.

When we started our pond business in the mid '90s, I would meet the customer at their site, design the pond of their dreams and then provide them with a quote. If the customer wanted to move forward with the project, I would collect a 50-percent deposit and schedule the job. However, if my quote was more than they could afford to pay, I would offer to make adjustments like taking out the lights or making the pond a little smaller to try to get it within their budget.

Sometimes we could reach an agreement, but at times, we could not. Of course, when we could not, I would be disappointed and frustrated — and so was my customer!

There Has to Be a Better Way!

Two things came together to pretty much eliminate this problem. One was menu pricing, so to speak. We took several of our most popular pond and pondless waterfall sizes and created a price menu for our customers to browse ahead of time. We have a display garden where customers can walk among each of the different items on the menu and see for themselves exactly what is included with each of our features.

The other thing we started was financing. As people began coming to our display garden, we started hearing the question, "Do you offer financing?"

At first I thought, "Who would ever finance a pond?" I knew people financed cars and houses, but ponds? So whenever I heard a potential customer ask that question, I pretty much wrote them off as "tire-kickers" who really couldn't afford us.

But when the finance questions kept coming, I realized we had to look into it. Where to start, though? We talked to our local bank, but their setup seemed pretty clumsy. About that time, our supplier announced they would be



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Our "pond menu" conveniently displays the details of the feature along with estimated financing costs.

working with a financial institution to offer financing for ponds. We attended a webinar, and we were amazed at how simple the plan was. We filled out the vendor application, and the rest is history.

How Does it Work?

All the items on our pond menu are now clearly labeled with an installation price and the monthly payment amount if a customer chooses to finance the project. (For example, our Serenity Pond installs for \$9,625, or \$193 per month at a 7.99-percent APR for 61 months.) If they want to finance it, we send them a link to the online application, which takes less than a minute to fill out. Usually within a couple of minutes, they get an email showing they have been approved and how much they have been approved for. We then schedule a site visit.

Site visits are much easier to navigate when both the customer and I know exactly how much they can spend. More often than not, the customer has been approved for more than the cost of the original water feature they

chose. This makes it very easy to add things like a longer stream, more lights or even a larger pond. Sometimes the customer comes in thinking they only have the cash for a small pond, and when they see our financing offers, they are quick to choose a larger-sized pond with more options.

By the Numbers

When we finance through our institution, we do not collect a deposit before the project begins. We do, however, link the amount for which they are approved to our account, so they can only spend it with our company. As soon as the project is finished, we fax the sales slip to the bank. Payment in full for the entire project is deposited into our account within one or two business days.

The banking institution does, however, charge us, the vendor, 6 percent of each project installed. Right now, we are financing about half of our projects, so we have built 3 percent into all our menu prices to cover this cost and the fee if customers choose to pay with a credit card. The bank also typically charges their vendors a

small annual fee, which may be negotiable depending on your institution.

One thing I have learned is to avoid trying to figure out if a customer wants to finance. At first, I thought that if a customer drove an expensive car or lived in an affluent neighborhood, they would most likely not need financing. I now know that the nicer the car or neighborhood, the more likely they are to finance. Even if they can afford to pay for it in full, some banks offer deals like no interest for 18 months, which is a

no-brainer for most people. We now include "easy financing available" with all of our advertising, whether on billboards or in social media and mailers.

Sometimes changes make a big impact for the better. Financing has definitely made a huge impact for us. If you are on the fence about financing, I would encourage you to set it up and then advertise it. I can guarantee that you will be pleasantly surprised with how easy the process is as well as how many customers will take advantage of it. 

About the Author

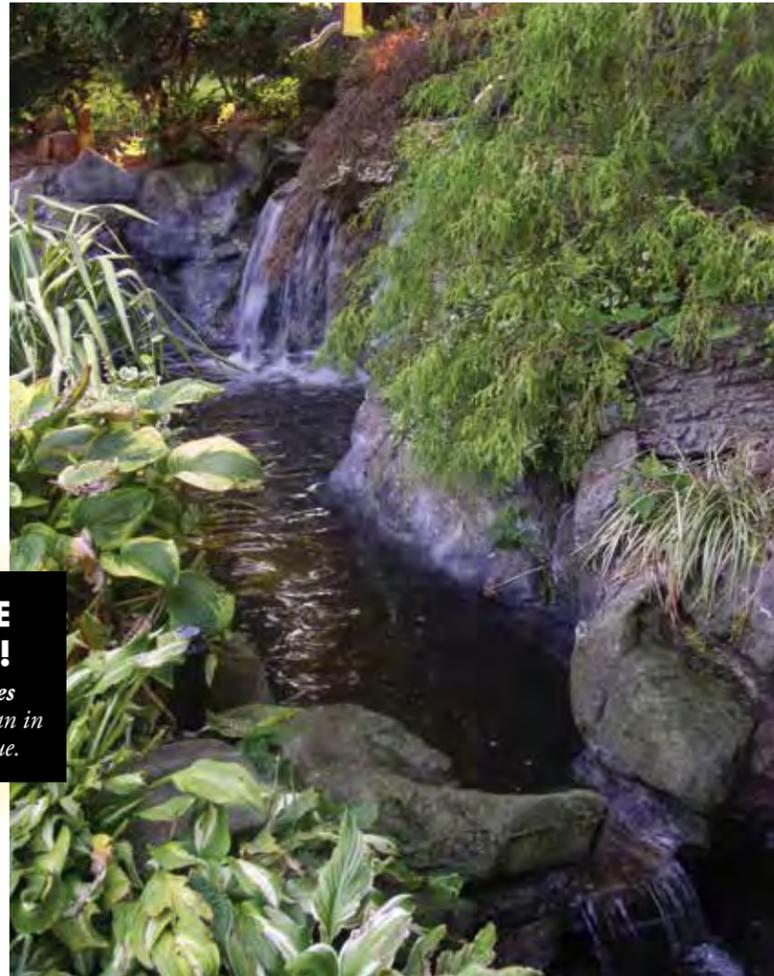
Stanley Sensenig is a Master Certified Aquascape Contractor and the owner of Signature Pond & Patio in Wernersville, Pennsylvania. In business since 1995, his company installs ecosystem ponds, waterfalls and fountains. They also sell retail and wholesale boulders, water garden supplies and decorative driftwood.

Stanley and his wife Lydia have five daughters. Having their own business has allowed them many opportunities to work together. Stanley is chiefly responsible for marketing and selling the water features they install.

Their company has seen steady growth since the beginning. Stanley attributes their success to great employees, hard work and the blessing of God.

www.signaturepondandpatio.com.





Concrete goldfish pond with two-part epoxy coating

POND TRADE FLASHBACK!

*From the Archives
This article originally ran in
the Jan/Feb 2013 issue.*

Pond Construction with Concrete

POND Trade revisits the age-old building method

by **Demi Fortuna,**
Atlantic Water Gardens

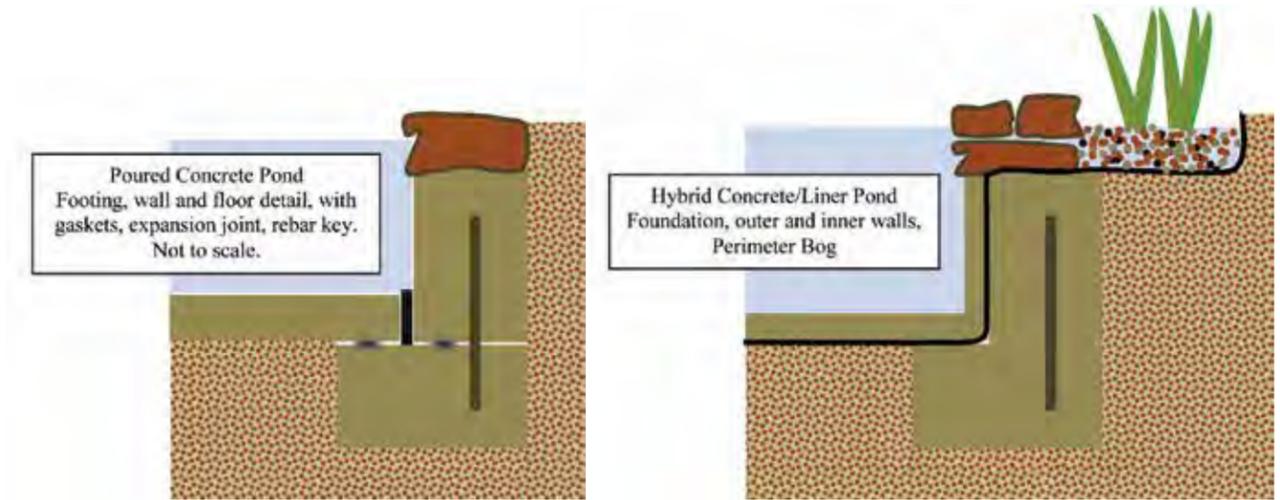
Concrete and mortar have been favored by pond and fountain builders since the Roman Empire, and the formula has changed little in the past 2,000 years. Limestone and clay are mixed, heated and ground to the silky powder we call cement. Concrete is made by adding water,

sand and gravel to the cement, while mortar refers to a finer sand and cement mixture used for bonding brick and stone.

Our modern formula was first cooked up on a stove in 1824 by British inventor Joseph Aspdin, a real 'kitchen chemist.' He named it Portland cement for its similarity to stone from the nearby Isle of Portland, but it's basically the same stuff that built Ancient Rome.

Properly mixed and applied, concrete

can last a very long time under the right conditions. The intact, magnificent roof of the Pantheon is still the world's largest unreinforced concrete dome almost 2,000 years after it was built. Roman aqueducts and fountains built two millennia ago are still in daily use today. That said, concrete is not a "set it and forget it" material. There are a number of requirements to be met if it is to last.



Cement and Water

Portland is hydraulic cement, meaning it hardens and cures upon contact with water, but the exact process is so complicated that we don't fully understand it even today. The proper amount of water is critical in mixing concrete — too little won't fully hydrate the mix, leading to an uneven cure and too much will weaken it. The curing process doesn't stop with mixing, either. Concrete needs to be kept evenly moist for as long as feasible after pouring to develop its full strength, at least three days, but it will continue to strengthen for a year or more if kept moist.

Untreated concrete is usually quite porous, absorbing and allowing water to slowly seep through microscopic spaces, but it can be made highly resistant to the passage of water by using fine aggregates and waterproofing additives to close the pores. This makes it an ideal material for ponds and waterfalls in warm-weather climates, where prolonged freezes aren't an issue. In colder areas water trapped inside the concrete can freeze, expanding from within and causing cracking and spalling. Ice sheets on the surface of the water can force walls apart, causing structural damage and leaks. Damage from frost is usually progressive if left unattended, so temperatures below 32 degrees are a cause for concern and require different strategies than warm weather water features.

Foundations for Concrete Structures

Concrete has tremendous compressive strength, capable of supporting thousands of pounds per square inch, but doesn't bend or stretch very well, so the most critical require-

ment of any concrete structure is a proper foundation, set on undisturbed soil that will not move or settle. In colder climates footings must be set below the frost line to avoid movement during freeze-thaw cycles, usually 3 to 4 feet below grade.

That may sound very deep, but if we're considering the expense of concrete to start with, then we're generally talking about a more elaborate pond, perhaps a koi pond where the deeper the water is, the better. Most koi ponds are deeper than the frost line, into undisturbed soil, so the depth of the footing is often of no great concern. We'll usually dig out the pond as carefully as possible first, leaving the walls vertical, then we'll excavate the trench for the footing at least 8 inches deeper than the rest of the pond, always below the frost line and at least 12 inches wide, to provide a solid, stable base that's a little wider than the walls.

We pour the footing level and set some kind of 'key' to lock the walls to the footings. This can be as simple as regularly spaced rebar rods set into the wet concrete, or a groove in the top of the footing that the wall can lock into. An 8-by-12-inch footing may sound like overkill, but it ensures the walls will stay straight and solid and support any load likely to be set on them, and with 8-inch walls, the 12-inch-wide footing provides a 4-inch shelf that the floor will key into later.

Waterproofing

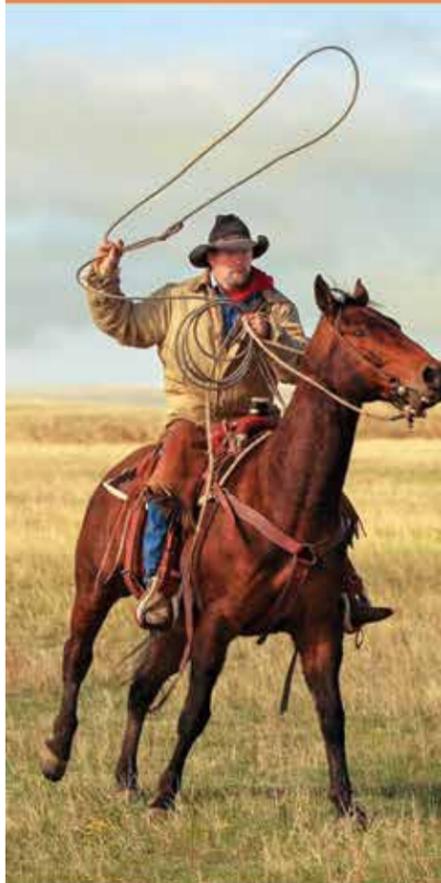
There are three different ways I know of to waterproof the concrete pond, all starting with the solid foundation just described.

The first method is the conventional way to pour a fully waterproof concrete shell.

The pond is excavated, a footing poured, the appropriate reinforcement rods and wire set in place and forms built. Latex or acrylic waterproofing solutions are added to the mixing water, to close the pores in the concrete and eliminate seepage through the walls. The concrete must be carefully mixed and vibrated into place to eliminate air bubbles, and the additives can be costly, but in warm climates where frost isn't an issue this method works very well. Although the entire shell of a good-sized pond can be poured all at once by an experienced crew, we prefer doing the footing first, then pouring the walls, then the floor, sealing the seams between the three elements with waterstop gasketing. The flexible gasket is set on the footing before the wall is poured on top of it, sealing the joint from the inside as the gasket swells on contact with water. We'll place an expansion joint vertically on the inside of the wall and a second gasket on that 4-inch shelf at the base of the wall before the floor is poured, to form an elastic seal that allows for expansion and contraction of the floor. The coping is set on top of the walls with a simple, strong, waterproof mortar made by mixing one 45-pound bag of thinset to two 70-pound bags of Type S mortar, a great mix I first heard about online from Doug Hoover of Aquamedia (many thanks for giving this great formula away for free!) This method of pond construction is effective, permanent and fully waterproof as long as there are no cracks, so it's ideal for the Southern states and the West Coast. It isn't optimal where freeze-thaw cycles are a concern.

The second method dispenses with the cost and additional labor of integral concrete waterproofing by applying a waterproofing

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In my first pond, I used 11 pounds of 4,800-psi poured concrete. It was overkill!

coating on the inner surfaces of the pond after the shell is constructed, and it works with either poured shells or with cinder block construction. There are many types of coatings, ranging from liquid EPDM rubber compounds to two-part epoxies to cement-based slurries to simple paints, so there's a waterproofing compound for every job. The more elastic preparations bridge small cracks and even tolerate a small amount of movement, so they can be very forgiving and are often used to waterproof leaking existing concrete ponds. The key to these applications is proper surface preparation, so the manufacturer's instructions must be strictly followed. The more stable the base, the better the coating will perform, so this method of pond construction also works best where winters are mild.

Both of these methods are well-known, and the steps involved in their construction well documented, so I won't go into further detail, but unless you're planning on draining the water feature for the winter, we've found neither is ideal in harsh winter country. Where we build, in the mildest area of New York, 100 freeze-thaw cycles represent a gentle winter, temperatures regularly visit the 20s, and we can stay below freezing for weeks. We needed a way to permanently waterproof concrete regardless of weather, so we developed a simple way to construct a concrete pond so it will always stay completely sealed under all conditions. We combine flexible and concrete liners. Burying a flexible liner inside a concrete



wall offers advantages over either method alone. In contrast to straight concrete, seams and small cracks cannot leak, so integrated gaskets, waterproofing additives and coatings are unnecessary, and freeze-thaw cycles are no longer a concern. In contrast to liner ponds, the waterproof EPDM or PVC membrane is fully encapsulated between geotextile layers surrounded by concrete, permanently protected from sunlight, weather, wear and vandalism, so it's ideal for harsh conditions or public water feature construction sites.

Although liner and geotextile is an additional expense over plain concrete or cinderblock, it is usually comparable to the cost of acrylic additives or two-part coatings, and typically less expensive than sprayed polyurea foam, and it involves little additional technical expertise. This isn't brain surgery.

On the contrary, this simple, obvious method is easier and more tolerant of adverse conditions or less-than-ideal preparation, so we've found it adapts well to any jobsite.

Hybrid Liner/Concrete Pond Construction

We tried, with some success, to simply skim-coat EPDM liner with a couple of inches of cement, but found the simple way wasn't so simple — the liner was vulnerable to penetration from sharps in the ground, tree roots and even shifting soils that settled and exposed the membrane, not to mention those hideous, destructive juggernaut rodents (hint: Chip and Dale do bite).

Nowadays, we'll build outer walls on a solid footing just like the first two methods, either pouring or mortaring cinder block in place; the type and thickness depend on the application. If we're going to pour the walls, the soil can serve as the outer form for the pour if we're careful and cut the walls vertical.

If we're going to use block, we make the excavation a little wider all the way around so there's a little room to work. We'll backfill after the walls are set. We always use galvanized wall reinforcement like Durawall between our courses of cinderblock, and we fill each course with concrete — the small additional expense adds tremendous strength and resistance to displacement. The walls don't come all the way to the level of the water surface; we stop 8 to 10 inches below the intended water level to create a rock shelf for the natural rock coping to come. Once the walls are in, we backfill and level the soil behind them to create a broad shelf for the coping (and any perimeter bogs we install behind the coping).

We'll pour the floor last, but we need to grade the floor out now so we can cover the entire excavation — floor, walls and Rock Shelf — with a nonwoven 6-ounce geotextile, leaving plenty of extra to pull up behind coping and bogs to above water level. Our waterproof liner, usually 45-mil EPDM, goes over the geotextile, again leaving enough above the walls to cover the shelf then come



While we set stones, we smeared the rubber liner with a thin Portland slurry. When dry, it will give the next layer of sand and cement something to adhere to.

up another foot to well above the water line. We could cover the liner directly with concrete at this point, but we've found it's both safer and much easier to cover the liner with another layer of geotextile, not just for protection, but because cement sticks to it like crazy, even vertically.

The final step is to cover the liner-geotextile "sandwich" completely. Depending on the job, we may build both inner and outer walls of 4-inch block, or spray cement stucco over the geotextile, 3/8 inches at a time, with our little Tirolessa sprayer that we absolutely love for smaller jobs. Finally, we dump out a rich, fiber-reinforced mix on the floor a wheelbarrow at a time and trowel the sides and bottom smooth, working our way out as we go. We leave at least 3 inches on the floor and 2 inches on the walls, and the 'gorilla hair' type poly fibers help keep the cement in place even if it cracks or crazes on the surface.

Consider creating a design or covering the floor with pebbles if the job warrants a special touch — it's always appreciated, even if it's rarely seen after the pond grows in. The coping goes in last, with the largest stones mortared in with that 140-pound mortar/40-pound thinset mix.

For koi ponds, we lay in smaller stones dry in front of Perimeter Bogs, simple gravel beds 6 to 8 inches deep on 2- to 3-foot-wide areas of the rock shelf with the liner pulled up at the outer edge, so water can filter in and get filtered by the roots. Look up "active bog filtration" for some really cool ideas on keeping koi ponds algae-free.

Winding up

In warmer areas, concrete ponds can be built and waterproofed in many different ways, so they're easily adaptable to most sites. They provide strong, long-lasting, virtually limitless structures regardless of soil conditions. Concrete ponds can also be shaped and smoothed to make cleaning easier and safer than liner ponds. When properly constructed and waterproofed, they are very low maintenance; and offer resistance to damage and vandalism that bare liner, or even gravel-bottom ponds cannot match.

In colder climates, using a membrane buried in the concrete shell to waterproof the pond offers all of the previous advantages, and is impervious to leaking from cracking and crazing that's almost inevitable where winter holds an icy grip. Maintenance is even lower than in the warm weather ponds, since there's no coating to scratch or wear off and settling cracks do no harm, and the liners can last virtually forever, protected by their stony armor.

There's no reason to shy away; concrete is far easier to use than ever before, thanks to advances in additive technology and delivery systems, and adding an impermeable liner makes ponds that are literally bulletproof. We've used this technique for ponds from 250 to 10,000 gallons, and I'm pretty sure it's adaptable to much more than I've run into. Give concrete construction a try next time you need a long-lasting, low-maintenance, virtually indestructible pond. ☞

About the Author

Whether building waterfalls in the Yucatan, working with his sons on Long Island, or serving as the director of product information for industry leader Atlantic Water Gardens, **Demi Fortuna** still loves water gardening even after 30 years in the field.



Anjon Manufacturing Joins Forces with Savio Engineering

Savio Engineering, an industry leader known for its engineered, patented pond equipment, and Anjon Manufacturing have united to become a new premier manufacturer of professional pond



and water feature equipment. The consolidated company serves pond and water feature distributors, irrigation and landscape suppliers, garden centers and nurseries, with more product lines than

any other manufacturer.

Anjon Manufacturing has a long history with Savio Engineering. "We signed on as a Savio customer when Chic Kelty and his team launched the Savio line of Innovative Skimmerfilters, Livingponds Waterfall Filters and FilterWeirs in the early 2000s," recalled Jon Lottes, CEO of Anjon Manufacturing. "Strategically, Savio fits very nicely with the rest of our Anjon product line."

The immediate goal for the new company is to restock distributor warehouses and garden center shelves with Savio-engineered pond equipment and restore trust and confidence in Savio as a reliable supplier.

"We're proud to announce Savio's skimmers, waterfalls, filters and weirs are, once again, all made in the U.S.A.," said David Christensen, COO of Savio Engineering. "We've also taken the unprecedented step of lowering prices."

For sales and inquiries, call 800/553-5605, email sales@anjonponds.com or visit www.anjonmfg.com and www.savioeng.com.



Atlantic Water Gardens Introduces Larger Pond Nets

Atlantic is pleased to announce that our Pond Netting will be available in 100-foot lengths for 2018. In response to requests from the field, we will be offering our popular 1/2-inch by 1/2-inch mesh netting in three larger rolls — 10 by 100 feet, 20 by 100 feet and 30 by 100 feet. Durable poly netting is UV-resistant for an extended life span, and small mesh openings keep predators, leaves and wind-blown debris out of ponds and gardens. Along with larger nets, a new, longer stake design offers better retention in loose soils, while the larger diameter heads provide improved net retention. Stakes are now available in 50-piece quantities for use with rolled netting.

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New Bronze Resin Heron Kits from EasyPro

EasyPro Pond Products of Grant, Michigan, is now offering its popular Bronze Heron in a kit with all you need to install in one box. This resin heron spitter is a great focal point with the added benefit of aeration without the weight of stone spitters. It easily can be added to any existing pond or water feature. EasyPro is also featuring a widely expanded line of tranquil decor statuary in 2018, along with lighting, pumps and aeration.

For more information, or to request a full-color catalog, call 800/448-3873 or visit www.easypro.com.



Pondliner Wholesale Announces the 2019 Water Garden Expo

Pondliner Wholesale's 2019 Water Garden Expo will be held Feb. 19 – 22 at the Heart of Oklahoma Exposition Center in Shawnee, Oklahoma.

Kevin Dougherty, a 31-year veteran of the construction industry, headlines the show this year. He has served as sales manager, project manager, operations manager and corporate trainer for a multimillion-dollar specialty-services contractor. Dougherty has also been a frequent speaker for many trade associations across multiple industries. His professional and educational experience enables him to relate to today's problems and provide tangible solutions in an easy-to-listen style. Dougherty's client base ranges from family-owned businesses to corporate conglomerates.

Tuesday and Wednesday (Feb. 19 and 20) will feature hands-on construction at the Pond Pro Shop with a large-scale pond and stream build led by Jason Lenox of Ponds Inc. of Illinois and the Living the Pond Life team. This project will showcase innovative design and construction methods that will be beneficial for professionals at any experience level.

The presentation of POND Trade magazine's 2018 Water Artisans of the Year will kick off Thursday morning, with 24 seminars following over the next two days. Three educational tracks will provide learning opportunities for all knowledge levels. Attendees can also visit with more than 25 manufacturers at the trade show and network with peers from across the country.

The Water Garden Expo is open to trade professionals only. Visit WGExpo.com or call 866/219-3561 to register or learn more.



New Matala Gravel Vacuum Head

This vacuum cone head attaches to the end of the suction pipe and can be used to clean a gravel-bottom pond without draining the whole pond or removing any fish! Clean gravel of up to 2 inches deep. Matala's Gravel Vacuum Head is also ideal for working around large rocks and plants to remove loose debris without clogging.

The head is 8 1/2 inches in diameter and is suitable for gravel between 3/8 – 1 inch in size. It comes with a universal adapter that fits most pond vacuums on the market.

For more information on the gravel head, visit www.matalausa.com.



Donate Your Company's T-shirt to 'Living the Pond Life'

Karrie Lightsey needs your company's T-shirt for a one-of-a-kind project that will benefit a great cause.

Lightsey, co-owner of The Pond Monster and Living The Pond Life in Winter Haven, Florida, is a cancer survivor and well-known personality in the water gardening industry. She announced a new project in August that will merge the industry and the fight against cancer.

"Imagine a quilt with 'Living the Pond Life' in the middle and your logos all around it," she said. "Well, it's happening, and we will auction it at the Water Garden Expo!"

All industry-related contractors and suppliers are encouraged to send company T-shirts to the address below, and Lightsey will integrate them into a custom "Living the Pond Life" quilt, which will then be auctioned at the Water Garden Expo in February 2019. All proceeds will be donated to the American Cancer Society.

"But hurry," Lightsey added. "It takes months to make dreams happen."

She requests that each T-shirt include a \$20 donation, which will go toward the cost of making the quilt. Checks payable to Karrie Lightsey and the T-shirt should be mailed to the following address before mid-September 2018.

livingthepondlife
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MARKETPLACE



Kasco Celebrates 50 Years of Moving Water Forward

Kasco is celebrating its 50th year as a leading manufacturer of decorative fountains, surface and diffused aerators, de-icers and more. Common applications for such products include residential ponds and lakes, water treatment plants, retention ponds, marinas and docks.

This family-owned company is based in Prescott, Wisconsin, with more than 60,000 sq. ft. of office, engineering, manufacturing and warehouse space. It is comprised of an extremely knowledgeable staff who have set the industry benchmark for quality products, personalized service, reliability and design.

Kasco was formed in 1968 when an inventive marina operator developed one of the first de-icers. The company brought the product to market, and by the 1980s, Kasco was dominating the de-icing market.

In the 1980s, the surface aerator was added, followed by a pumping chamber that created the aerating fountain. This line of aerating fountains has since expanded to include a wide range of decorative fountains.

“Over the last 50 years, Kasco has been dedicated to producing innovative, high-quality products backed with outstanding service,” said Ray Lee, president of Kasco. “We strive to provide our employees with a positive environment to perform their work, and the satisfaction shows. Every person here truly cares about the customer. We look forward to future growth and celebrating the next 50 years.”



Registration Now Open for
International Pool | Spa | Patio Expo in Las Vegas

Registration has officially opened for the 2018 International Pool | Spa | Patio (PSP) Expo, which returns to Las Vegas for the first time since 2015. The exposition, sponsored by the Association of Pool & Spa Professionals (APSP), will be held Oct. 31 – Nov. 2, 2018 at the Mandalay Bay Convention Center. To register, please visit www.poolspapatio.com/register.

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