Water Garden Authority

Design A Pond- eReport

Douglas C. Hoover- AquaMedia



FREE CONSULTING AND ENGINEERING

...PLUS WHOLESALE PRICES ON EQUIPMENT Page 14

INTRODUCTION

After 30 years designing and building well over 2000 waterfalls and ponds, I have discovered over time who has the best equipment and the best warranties and which equipment combination will afford the lowest maintenance costs over time. I do not sell just any pond equipment that fetches the highest profits but rather

put together a package of the proper equipment for a specific water feature.

Many factors need to be considered, the proper sized pump and filter system for each individual pond. Matching the right size pump to the right size and type filter, the proper placement of the skimmer or skimmers, location of the antivortex drains, whether or not the pond needs a venturi valve or aerator. I will help you design the proper placement of the pump or pumps, correct pipe sizes and the location of the check valves and Jandy valves.



Not only will I engineer your system for you, but make available all of the proper equipment and accessories you need at deep discounts. Questions? log on to: <u>askdoughoover.com</u> or call Doug at 619-22FALLS (223-2557)

CONTENTS

	Page
Is an Ultraviolet Light Necessary?	3
Does my Water Garden Need a UV? A Simple Test	5
Pond Construction- Liner vs. Concrete	6
Why Build a Pond With Concrete	7
Which Pump To Use	8
Biological Filters	10
Pondless Waterfalls- No Filter Needed	11
Professional Pond Equipment	14
AquaFill Automatic Water Level Controller	15
AquaFill Fountain & Installation	16

Swimming Pool AquaFill	17
Professional Waterfall & Pond Construction Manual	. 18
Do It Yourself (DIY) Bio-Filter- Download	. 19
Ultimate Training Course	. 20

Is An Ultraviolet Light Really Necessary

What is the best way to control algae and impurities in backyard water gardens? It is not as simple as you think! Ultraviolet light was discovered to have adverse effects on certain organisms commonly found in ponds, such as specific types of bacteria and algae. For this reason, UV light treatment of ponds has become very popular and effective in controlling certain forms of bacteria such as pathogens and planktonic algae. Planktonic algae are cousins to filamentous algae, also sometimes referred to as string or blanket algae. Unlike filamentous algae, planktonic algae are common to ponds and are critical to a pond's food chain. They provide food for many microscopic animals that, in turn, are eaten by animals higher up the food chain such as water bugs and fish fry. Unfortunately, these algae can bloom to nuisance levels, requiring immediate control methods.

Planktonic algae or "pea soup" algae are microscopic, free-floating plants. They are generally found near the surface of a lake or pond, within the top two or three feet where sunlight can help provide food through photosynthesis. Planktonic algae consist of green algae, blue-green algae, diatoms, and euglenas. Some species of planktonic algae, primarily blue-greens, can be toxic to animals and emit an odor or foul taste to water. Algae are most prevalent in the summer months and are extremely sensitive to water temperatures, thriving in warmer water.

Cold water inhibits their reproduction and growth, resulting in a clear pond in the winter months. Algae blooms usually occur in the spring, around April or May, as the water temperature begins to rise. Depending on the algae species, the water turns various shades of green or brown. In a natural pond or lake, microscopic animals such as the rotifers and daphnia create large populations which begin devouring the algae bloom; then the water becomes clearer.

Once temperatures reach about 72 degrees Fahrenheit, the microscopic animal population declines rapidly, with decreased reproduction; this is when they become prey to fish fry, resulting in the proliferation of algae. This can be controlled by an increased number of hyacinths or bog plants to help regulate the nutrients that algae thrive on.

In addition to water plants, the single most effective control for planktonic algae is ultraviolet filter treatment. As the pond water passes through the UV light, the algae spores are killed. The deeper the pond, the cooler the water remains, and the better the chances for controlling algae growth. Planktonic algae could create a serious threat to the fish population if it were to die off quickly. The dying algae deplete the oxygen in the water, threatening the fish. The same goes for filamentous or string algae. In small amounts, this type is beneficial as food for fish; however, it can get out of control rapidly and choke the pond. Even though string algae provide oxygen during the sunlight hours, it also consumes oxygen from dusk to dawn, canceling out the oxygen-generating benefit. In addition, if you attempt to kill off the algae all at once using herbicide or salt, the resulting effect of the dying algae depleting the oxygen could be fatal to the fish.

Great caution should be taken when handling liquid or granular fertilizer so that it never is introduced into a pond. Also, be aware of any possible contamination from groundwater run-off accessing the pond. Fertilizer, even in minute quantities, can trigger algae blooms and, in larger quantities, can poison your pond. Most generally, an abundance of algae is a direct result of excess nutrients in the pond.

If you already have a biological filter and a UV light, the source of the excess nutrients could be from (1) the watershed, (2) too many fish in proportion to the size of the pond, (3) an inadequate filter system, or (4) not cleaning or back-washing the filter often enough. These are the types of conditions that warrant an ultraviolet light in conjunction with a good biological filter for the removal of the extra nutrients, suspended particles and algae spores, as well as the microorganisms that cause the water to stink and turn the water cloudy. The UV light will need to be cleaned regularly; and if it has been over one year, it may need the bulb replaced. Or you may need to add more plants to your waterfall and pond.

Filamentous or string algae are also referred to as "moss" or "pond scum." It forms dense mats of hair-like fibers growing on the sides of the pond and submerged objects. The algae produce oxygen which becomes trapped in the strands and mat formations, causing it to float on the pond's surface. Portions of the exposed raft of floating algae become overexposed to the sun and die. The brownish-green bubbly condition gives the appearance of a disgusting scum, hence its name. However, if you were to gather up this slimy mess and wring out the water, you would quickly discover it is not slimy or scummy at all, but rather has a soft, fibrous cotton textures and smells of freshly mowed grass. As it hangs from the rocks in a waterfall, it looks like anything but that.

The best way to control string algae is by hand. Actually gather up the floating mats in the pond and hanging clumps in the falls. If you are planning to use a herbicide for control, always remove the bulk of algae by hand first. You will reduce the chance of oxygen

deprivation from the dying algae. An ultraviolet light with wiper cleaning device can reduce the amount of algae significantly.

Have an expert calculate the size of your pond and how many watts you need for the proper rate of flow per hour. The proper equipment can mean the difference between owning a water garden that can provide more joy and pleasure than anything you ever spent money on, or it can be your biggest nightmare.

Does my Water Garden Need a UV? A Simple Test

- 1. Is your water cloudy or green?
- 2. Does your pond or waterfall stink?
- 3. Have you forgotten how many fish you have or what color they are?

If you answered yes to these three questions, you may need an ultraviolet light,

There are several types of algae found in a pond. One type may turn your water green, another brown, and yet another could mimic the smell of a sewer or dead fish.

Algae need nutrients to thrive. When a pond has excessive nutrients, it could be the result of too many fish. Also, it could be an inadequate bio-filter, over-feeding the fish, feeding them the wrong type of food, or run-off from the surrounding area depositing dirt, debris or fertilizer into the pond.

These pond conditions can be remedied by reducing the number of fish, if in fact it is over-crowded. Another remedy is to cover 50% of the pond's surface with water lettuce or hyacinths. A third remedy is to install a bio-filter; if you already have one, you can install a better, more efficient one.

In nature, if a pond is overcrowded, the strong fish survive and the weak perish. When our ponds are overcrowded, we compensate for the increased waste and by-products with mechanical devices such as bio-filters and ultraviolet lights. If a natural pond is overcrowded and the nitrate and ammonia levels create vast algae blooms, the algae die, depriving the fish of oxygen and many fish die. Now there is less waste creating less algae, and the eco-system is once again balanced.

If you respond properly to the signs and signals provided by your pond, you can intervene in what would normally be a calamity. We can filter the water, irradiate it, buffer it, treat it, aerate it, skim it, cool it, cover it, monitor it, or change it. UV light is just another weapon in our pond maintenance arsenal.

Pond Construction - Liners Vs. Concrete

Many people are still searching the internet for information on how to build a waterfall or koi pond. Unfortunately, there is very little information regarding professional construction. There are thousands of websites involved in marketing pond products to uninformed and unsuspecting customers.

The majority of these sites promotes and advocates the use of rubber pond liners. Why? Because they sell them. Rubber liners are profitable, primarily because of the add-on products related to the pond liner industry. For example, when you construct your pond using a pond liner, you have no choice but to buy all of the related accessories such as a biofilter, special skimmers and drains, and the large variety of energy-sucking, inefficient, short-lived sump pumps.

Rarely do pond liner dealers or installers tell you the whole truth about the unpredictability of liners and sump pumps. Rarely do they acknowledge the truth about the vulnerability of liners after they are installed - whether it be attacks by rats, mice, ground squirrels, gophers, chipmunks or the sharp claws of animals that can puncture the liner in their attempt to get out of the pond after accidentally or purposely entering it. Animals burrow under the liner through the easy access of the loose rocks piled around the pond and waterfall. Against the coolness of the liner, they build their nests and raise their families that can then chew holes in the liner.

Over the past fifteen years I have replaced countless leaky waterfalls and ponds constructed using rubber liners with concrete and rebar construction. In twenty-six years of building over 1900 waterfalls and ponds, I have never had one crack or leak.

Liner advocates tell you their liner has a thirty to forty year warranty, but fail to mention it is against factory defects only. They don't mention the other issues like rodents, heavy rocks stretching and ripping the liner, and damage from children with sharp sticks or garden utensils. I've seen it all!

Many water garden contractors will misrepresent the liner as the best construction material by saying concrete is expensive and it cracks. Yes, that is true, if you don't build it properly using 3500 psi concrete and rebar 8 to 10 inches on center. Plus, they say the alkali poisons the water. That is true only if you don't seal the concrete with a sealer after it is poured. Concrete construction costs 20-25% more than a liner, but it lasts for decades. You only have to replace one liner for the concrete pond to cost considerably less in the long run. In the past five years there have been scores of lawsuits against pond liner contractors and their clients win every time.

Doesn't it make sense to build it right in the first place?

Why Build A Koi Pond With Concrete

Many pond builders have started out in the water garden industry by building ponds the easy way, by using a rubber liner, biofalls, and a sump pump. Many of these landscapers were not informed of what to expect in terms of durability and the longevity of these building materials. Unfortunately, the manufacturers of the pond liners only warranty this material against factory defects. A few years down the road and a few water features under their belts, and the bad news starts trickling in from perplexed or downright irate customers, complaining of losing water from their ponds. There are a myriad of reasons:

- Improper sealing of liner seams;
- Holes in the liner caused by the weight of the boulders sitting on the surface stretching the liner;
- Holes created by burrowing animals (gophers, ground squirrels, rats, mice, chipmunks, groundhogs)
- Holes created by children with sharp toys or objects like sticks, lawn darts etc.;
- Holes created by the sharp claws of dogs, raccoons, hooves of deer, moose etc.;
- Holes made by roots of trees and plants like rhododendrons;
- Leaking around drains, piping and skimmers.

There are many of these pond builders who have tried to solve the leak problems to satisfy their clients, but have done so at a very high financial cost. After 15 years of pond liner construction in Southern California, these liner short falls are showing up on a regular basis. The problem is so prevalent that many realtors are asking their clients to remove the liner pond from their yard and fill the hole before they will list the house since the liner ponds are such a great liability and litigation risk for the realtor, bank and seller of the home. I would highly recommend to any contractor who is constructing ponds with liners, that they should make it very clear to the client prior to signing a contract that there are certain liabilities associated with this type of construction. You should let your clients know in advance that a liner has limitations, and then explain in detail what those limitations are. You should also let the customer know that for approximately 20% more, you can construct their pond and waterfall out of concrete and rebar which would increase their pond's lifespan by decades. Because many pond builders only know how to construct a pond using a rubber liner, they do not make concrete and rebar an option for the client. This fact alone can create a serious customer relations problem in the future, when the customer finds this fact out on their own, especially after a couple of minor leaks.

If the customer is told about all of the potential issues with maintenance and upkeep associated with liners and compares this to the peace of mind, lack of maintenance and upkeep, and the overall longevity and the equity added to their real estate, they will most likely opt for reinforced concrete construction for the extra 20% in cost. The author has constructed well over 2,000 reinforced concrete ponds and waterfalls over the past 30 years and has never encountered a crack or leak of any kind.

There are a number of other issues associated with liner ponds, such as the use of submersible pumps and the lack of bottom suction drains, that also create a serious issue with water circulation within the pond and higher maintenance costs associated with the inefficiency of a sump pump's energy consumption. Many liner pond installers avoid cutting the liner to install bottom suction drains since they can become a source for a leak. Unless water is drawn from the bottom of the pond, there can be areas that do not receive adequate circulation. Consequently, it will lead to stagnant water and algae problems.

When used in the proper applications, pond liners can become an asset rather than a liability for the simple fact that they do cost less than concrete construction and are quick and easy to install. So for situations where the pond is needed for a short period of time, a liner pond is the perfect solution.

Which Pump to Use

When I started in the waterfall and pond design & construction business in January of 1982, I was asking the same question. I had a slight advantage over most when it came to answering the question, "Which pump do I use?"

I came out of the energy conservation field, so I was already savvy about energy consumption topics.

It was a challenge in the seventies, when I was trying to convince people that they should buy the Mitsubishi compact fluorescent bulb to save energy. This was the first of its kind and it retailed for \$12 to \$14. Its lumen or light output was equal to a 60-watt incandescent bulb, which sold for \$.60 in most stores. I needed to convince the engineer at Betty Ford Hospital that a \$12, 12-watt bulb would save the facility \$35,000 a year in electrical costs. I did so, and it did!

Pumps are no different when it comes to performance vs. energy consumption. The rule of thumb is: If an electrical appliance was engineered to be used only occasionally, as opposed to continually, rest assured, it is not engineered or built with the highest industry standards in mind.

Sump pumps were designed to be submerged underwater and pump that water to a different location. Their most common uses are in basements, bunkers, bilges, and that sort of thing. These pumps would only come on by demand, when a float control indicated a high water level.

Sump pumps were cheap to buy because they were built cheaply. It did not matter that they consumed more energy than the more expensive centrifugal pump, since they only came on occasionally.

These pumps turned out to be perfect for the get-rich-quick liner pond industry for three major reasons:

They were cheap to buy, as were the liners;

They were simple to install; and They were easy to hide.

One major drawback of sump pumps that the liner pond industry does not share with their clients is that they are literally energy sponges. But then, that is not the only thing they forget to mention to their usually innocent and unsuspecting clients.

These easy-to-install, easy-to-make-a-killing liners that come with a 20-50 year warranty (against factory defects only) are actually a meal down the road to a burrowing gopher, rat, mouse, ground squirrel, chipmunk or muskrat.

How do I know? I replace liners with concrete and rebar for a living and I ask if the customer if the liner salesman told them the pros and cons about the liner. (Most cons don't!)

Besides a sump pump costing twice as much to operate than a high efficiency, centrifugal pump, they plug up easily. (By the way, the liner guys changed the name to a

"submersible pump" and they are now using the term "waterfall pump.") Concrete and rebar constructed ponds with bottom anti-vortex drains seldom, if ever, plug up.

In the industry magazine, Water Garden News, the vice president of product management for the Aquascape Company stated,

A lot of the time, the more energy efficient the [sump] pump, the less solids and debris it can handle. So often the consumer is excited the pump will only cost them \$10 a month to run, but what they did not know is that they are going to have to be out there 3 times a week, cleaning the intake of the [sump] pump to keep it going.

Water Garden News is a trade magazine that is for manufacturers, wholesalers and retailers in the water garden industry. This information was not meant for the consumers' eyes. Until now!

Read my article entitled Pondless Waterfall: Concrete vs. Pond Liner ; EzineArticles.com. I cover the subject in depth, and expose the truth about pond liner promoters. All of the costs involved in building a pondless waterfall are analyzed by comparing the two techniques: using concrete & rebar or a rubber liner.

The difference in the cost of energy consumption between a 5700 gallon per hour sump pump and a 5800 gallon per hour high-efficiency centrifugal pump is staggering. The sump pump uses twice as much energy, costs \$171 more to purchase, and its warranty is 6 months less! Look before you leap and research before you weep.

Happy koi, peace and joy.

Biological Filters

Contrary to common belief, biological filters do not process or filter the solid waste of fish in your koi pond. They continue to build up and putrefy, creating a breeding ground for harmful species of heterotrophic bacteria which are pathogenic to koi fish. As stated, the biological filtration process utilizes Nitrosomonas bacteria to break down ammonia into nitrite and nitrobacter, further converting nitrites into nitrates, which is less harmful to koi fish.

Plants now utilize the nitrate and phosphate for fertilizer; if you have not provided an adequate ratio of water plants to koi fish, "hard" algae (growing on rocks and koi pond walls) and "free-floating" algae use nitrate and phosphate to reproduce. The key to preventing this condition, called "algae bloom," is to provide enough nonsoil bearing

plants such as water lettuce and hyacinths to compete for the nitrate and phosphate. Since these two plants are tropical and can only survive in warm climates, hardier varieties such as Elodea and Anacharis will perform well in cold climates. These plants are commonly used in bio-filter ponds.

A bio-filter pond is used in conjunction with shallow koi ponds with small populations of koi fish. It will also eliminate the need for a mechanical bio-filter and a second pump to operate it. The bio-filter pond is located higher than the main pond for two reasons. It prevents the koi fish from eating the plants and it allows the water from the waterfall to be filtered as it passes through the plants prior to spilling into the lower koi pond.

An adequate ratio of plant cover for the koi pond's surface is approximately 20 to 30 percent. This is a basic rule of thumb and many factors can change this equation. For example: koi fish population, water temperature, and debris accumulating from leaves or over-feeding the koi fish. I have said many times that the Koi Pond is the koi's living room, dining room and toilet.

Please invest in the health of your fish. Purchase a koi pond test kit from any pet or pond store. Invest the time to read the directions and start regularly testing your koi pond. Remember, clear water does not mean clean! As in the water we drink, just because the water looks clear, smells good, and tastes good does not mean it is clean.

Most of the most toxic, cancer-causing priority pollutants listed by the E.P.A are colorless, odorless, and tasteless. Do not ever forget the simple facts: You have a toilet in a separate room of your house. Your scaly friend's living room is their toilet, and they have to swim in it. Keep it flushed and clean.

A pound of prevention is worth a pond cure. dh

If you do not have a bio-filter, that could explain why your koi pond is a tad green, stinky, or cloudy, and why your finned family is gulping air on the surface. Trust me. That will not be for long. Fish gulping air to survive would be like you -- in an attempt to avoid breathing poisoned air -- gulping water to survive.

Pondess Waterfalls- No Filter Needed

No filter is needed in a pondless waterfall? That is correct - a properly designed pondless waterfall needs no filter. It also does not need a centipede module, snorkel vault, or pump housing. The liner industry added all of these unnecessary contraptions to their kits to drive up their profit margins.

I have built hundreds of pondless waterfalls over the years, starting with my first one in 1984 in Fallbrook, California. So, regarding this subject, "A man with experience is not at the mercy of a man with an argument."

1. Value: Pondless waterfalls constructed with a liner cannot be warranted against holes caused by mice, rats, ground squirrels, gophers, chipmunks, tree roots, sharp objects, etc. However, pondless waterfalls that are constructed with concrete and rebar can be warranted for life. Because of this fact, a professionally constructed waterfalls with no pond will actually add equity to a home. We have compared the cost of materials and labor (hiring a concrete contractor and rebar fabricator) of both methods of construction and discovered that concrete and rebar pondless waterfalls cost the same or less than liner kits cost, uninstalled still in the box)!

2. Filter: Advocates of pondless waterfalls require you to install a "bio-falls" at the top of the falls for a filter. This is a waste of the customer's money because it is not needed. Note: this plastic molded box is cheap to produce and returns exorbitant profits, plus it tacks on additional maintenance costs to the client, requiring periodic cleaning.

3. Pump: For several years the promoters of these liners recommended placing a sump pump in the bottom of the collection basin, and then fill it with gravel. I talked to a woman recently who said, when she turned on the sump pump, before the pumped water would return to the basin, the pump was sucking air (the basin was empty). She did not know where the pump was and the installer would not return her calls. A friend of hers found the pump at the bottom of the basin buried in gravel. And, the pump was all plugged up with debris. There is no telling how many thousands of pondless waterfall customers have this very same problem.

4. Needless extras: The liner guys came up with the brilliant idea of producing a pump chamber with holes in the bottom, or a centipede or snorkel vault. These are all fancy terms for worthless devices for which they can charge more money. All these contraptions do is keep the gravel away from the pump.

5. Correcting two major design flaws: Our pondless waterfalls are designed with a catch basin. It not only does not contain any gravel at all, but it does not utilize an inefficient, high-maintenance, energy-sucking sump pump that only has a one or two-year warranty. Our pondless waterfall basins (constructed of concrete) contain two 8" anti-vortex suction drains, which feed an above-ground, high-efficiency centrifugal pump which is warranted for three years. The pump uses up to 60 percent less energy, is easy to hide, silent and maintenance free. It utilizes a leaf basket with a "twist and lift" cover for removing debris.

The basin is covered with five or six galvanized grates that are covered with rocks to hide it. The grating holes only allow debris small enough to be drawn through openings in the suction drains where it can be collected in the pump basket for easy removal, thus keeping the basin free from collecting debris. There is no need to ever get into the basin. There is a fail-safe Aquafill water leveler to keep the basin full so you never need to worry about it running dry and burning up the pump. Not to mention that the total volume of the basin is available for water, unlike the liner pondless waterfall that wastes 80 percent of its capacity with gravel. Over several months the gravel plugs up with rotting debris, creating a putrid, slimy, filthy job for the pondless waterfall owner.

6. Last, but by no means least: The reason concrete pondless waterfalls do not need filters is because, unlike the water that slowly moves through the gravel in the basin of a liner pondless waterfall (where the water becomes stagnant from its inability to move freely), concrete pondless waterfalls have an open chamber in the basin, allowing the rapid and free flow of water. This rapid circulation assures that mosquito larvae cannot survive. Nor can algae survive since the basin is covered. This keeps out the sunlight, cools off the water and keeps it clear.

Since a pondless waterfall does not have a pond, you are not dealing with fish food, fish waste, and large quantities of decaying debris. Consequently, there is no need for a filter in a properly designed concrete pondless waterfall. Hundreds of pondless waterfalls since 1984 will attest to that fact.

An ounce of prevention is worth a pond cure. DH

PROFESSIONAL POND EQUIPMENT

http://aquafill.com/professional-pond-equipment/



Free Engineering and consulting:

You give me a layout or sketch of your proposed waterfall and pond and I will calculate the correct size pump, filter, and UV along with location for the anti vortex drains, skimmer, and location of check valves and Jandy valve, plus proper size of piping for drains and waterfall.

In addition I will sell the equipment at wholesale, discounting the entire package. Whats more I include a free AquaFill automatic water level control system valued at \$136.00

THE AQUAFILL AUTOMATIC WATER LEVEL CONTROLLER



THE FOUNTAIN AQUAFILL



Notice: The AquaFill Float is used with a 24 Volt Transformer and a Solenoid Valve.(Not Included)



Fountain AquaFill Chamber- Model AFF-001

http://aquafill.com/water-leveler-controller-float/fountain-aquafill-water-levelers/





http://aquafill.com/water-leveler-controller-float/aquafill-pool-water-levelers-controller-floa/



http://aquafill.com/book/



http://aquafill.com/book/

Build Your Own Biological Pond Filter

...using parts that can be purchased from any home improvement or local hardware store costing between \$50- \$75. Complete plans, parts list and detailed instructions and diagrams can be downloaded following purchase.

Important: After you purchase the plans, you will be sent a unique email link and password which is required to download the complete plan files; so be sure to include your email address at checkout.

NOTICE- The \$4.99 biofilter plans are included for FREE when you purchase the *Professional Waterfall & Pond Construction Manual* (ebook download) for the discounted price of only \$14.95 (Bookstore price: \$49.95)



http://aquafill.com/diy-biological-filter-plan/



For More Information: <u>http://aquafill.com/diy-biological-filter-plan/</u>



ULTIMATE TRAINING COURSE



More Information: http://aquafill.com/ultimate-training-course