Swimming is a refreshing way to beat the summer heat and an excellent form of exercise for the whole family. Gentle water aerobics help build muscle tone, relieve stress, strengthen the heart and lungs, and reduce the pain and inflammation of arthritis. But chlorine, the chemical used to treat and prevent bacteria formation in most pools, can have negative effects on the environment as well as our health.

When we swim in chlorinated water, the chemical reacts with trace amounts of sweat, urine, and skin cells, producing chloramines – toxic by-products that can be inhaled or absorbed through the skin as well as emitted into the environment. Chloramines have been linked to climate change and ozone depletion, not to mention serious human health risks. Damaged, discolored hair; dry, itchy skin; and eye irritation are the most obvious side effects of frequent exposure to chlorine. However, several recent studies have suggested a link between inhalation of the chemical by swimmers and increased asthma rates due to penetration of the lining of the lungs. General ear, nose, and throat irritation has also been attributed to chlorine, particularly in babies and young children. One study, which focused on forty adult swimmers after prolonged exposure to chlorine, found a rise in the DNA markers that can lead to cancer. The industrial process of producing chlorine itself creates highly toxic dioxins, which can accumulate in water, soil, and plants.
Despite the risks, you shouldn’t let chlorine stop you from enjoying the health benefits of swimming. Simply showering before and after you swim can significantly reduce the effects of chlorine.

Luckily, over the years, alternatives to chlorine pools have provided better options. Salt water pools slightly reduce the amount of chlorine necessary to fight bacteria. In addition, because salt causes the water to evaporate more slowly, the emission of chloramines is further diminished, making them a better option than “traditional” pools. However, there are several disadvantages to salt water pools. The biggest drawback from an environmental and financial standpoint is the amount of electricity needed to operate a salt water pool. Because an electric pump is required to turn the salt to chlorine, it needs to run on a constant basis, often with the help of a generator. Other disadvantages include high installation costs, scaling, corrosion, and subsequent maintenance costs.

An even better option is to install a filtration system using a combination of copper, silver, and zinc plates, which release ions into the water that kill bacteria and algae. This system is highly effective, significantly reduces or eliminates the use of chlorine, and runs on a low-volt electrical current.

The most environmentally sensitive and energy-efficient solution is the natural swimming pool, also referred to as a swimming pond, green pool, or organic pool. The principles of a natural pool are, in fact, the very same time-tested ones that Mother Nature uses to purify ponds, streams, and lakes. The water from the pool is circulated through an ecosystem of aquatic plants located in an adjacent basin referred to as the regeneration or plant zone. The plants are embedded in gravel and grow hydroponically, enriching the pool with oxygen. As water from the swimming area is pumped through the plant zone, the roots act as a biological filter, creating aerobic and anaerobic bacteria and other micro-organisms that help clean the water. Because aquatic plants grow fairly quickly, in just a short period of time, a lush, self-sustaining ecosystem will develop, often attracting frogs, dragonflies, and other beneficial life forms that eat mosquitoes and their larvae. Because there are no chemicals or other additives used in natural pools, the water is soft, pure, and gentle on eyes and skin. Aesthetically, natural pools blend in with the surrounding landscape and provide a beautiful, sustainable swimming experience with many health and environmental benefits.

Although natural pools have been enjoyed for decades in Europe, having pioneered in Austria and Germany, they are just making their way to other countries as a result of a growing number of builders and home owners who want to focus on creating a healthy, natural environment without the use of harmful chemicals or high-tech, energy-consuming equipment.

The chemical industry and their distributors contributed to and capitalized on our fear of germs and contaminates and our desire for clinical cleanliness (just think “anti-bacterial” soap), contributing significantly to the popularization of chlorine pools. However, as environmental and personal health awareness continues to grow and take root, builders specializing in natural pools, environmental advocates, and environmentally-conscious individuals are all helping spread the word about natural pools.

How a Natural Pool is Constructed

The good news is that most conventional pools can be transformed into a natural pool fairly easily, either by adding on a plant zone or relegating a percentage of the pool surface for that purpose. Whether you are building from scratch or converting an existing pool, two separate areas are needed: a swimming zone and a plant zone. The plant zone can either be adjacent to the swimming area or included within it.

There are two schools of thought regarding the size of the plant basin. The original recommendation by natural pool experts was to allot fifty percent to the plant zone, keeping it shallow in order to heat the water. However, many natural pool designers now recognize that as little as twenty percent is sufficient for filtering the water efficiently and allows for a larger swimming area. To accomplish this, the plant zone can be built...
to the same depth as the pool and then filled with gravel, allowing the roots system to take hold and assisting with natural filtration. Keeping the plant zone in partial shade helps plants grow quickly.

Aeration and oxygenation prevent the water from becoming stagnant, as is often found in natural bodies of water like ponds. This is accomplished by moving the water from the plant zone to the opposite end of the swim zone through closed-loop circulation tubes using an energy-efficient pump. A solar pump does the job nicely and is more eco-friendly and safer than an electric pump. A water fountain is usually added, helping to further oxygenate the water. Adding a bubbler is also an option, although not necessary. It is suggested that the pool be aerated four to eight hours a day, in the morning when oxygen is lowest and again in the early evening. Some natural pool builders recommend using skimmers (which may already exist in a conversion) to reduce floating debris from nearby trees, however, they require an auxiliary pump, involving additional electricity and expense. As this debris eventually ends up circulating into the plant zone, simply removing it on a regular basis is sufficient.

The design of a natural pool is limited only to your imagination, the function of the pool, and the size and site of the construction area, allowing for a great deal of flexibility and creativity. While some prefer a standard geometric shape for swimming laps or for aesthetic reasons, natural pools lend themselves well to organic free-form shapes that mimic ponds and blend in well with existing landscapes.

Natural pools can be constructed using concrete, a synthetic liner, or bentonite clay. Once the soil form is dug, which material you use depends on personal choice, budget, and often pool shape. Waterproof bentonite is the simplest, least expensive, and most environmentally sensitive option and works well with organic, meandering shapes. The clay functions like a natural glue, bonding the soil and providing a strong barrier to prevent pool water from seeping into the ground. But before using bentonite, have your soil analyzed. Bentonite works well with high clay content soil, but doesn’t bond well with high sand content.

Synthetic liners are often used in conversions, where budget is an issue, or when a specific liner color is desired. Concrete works well with more conventional pool shapes as does Rastra block. A composite of cement and recycled polystyrene (styrofoam), Rastra block weighs much less than concrete and is easy to cut to size and lay. It also provides superior insulation, which may help keep your pool cool in summer and warmer in winter.

Certified builders in Europe are now reaching out to share years of experience and expertise with interested parties interna-
tionally. As a result, more and more builders specializing in natural pools are available worldwide. Whether you choose to use a builder or build your pool yourself, it’s important to check on local building codes. While residential codes in Europe are lenient, natural pools are still in their infancy in North America and may require special permits. Michael Littlewood, a landscape architect and expert on natural pools in the UK has teamed up with Total Habitat, a builder in Kansas in the U.S., to form the Natural Swimming Pool/Pond Association. They’ve combined years of experience and knowledge to create a certification program, offering consumers greater confidence when choosing a builder. In addition, they have both written extensive do-it-yourself guides including step-by-step instructions and detailed photographs.

**Plant Function and Selection**

It is important to think of a natural swimming pool as a living micro-environment. The aquatic plants enrich the water with oxygen while their root structure filters and breaks down harmful bacteria, excess nutrients, and other contaminants in your pool water. In addition to cleaning the water, the shallow plant zone helps warm the water. Most importantly, these plants create a beautiful, vibrant environment that supports invertebrate and beneficial insect life. Typical aquatic plants include papyrus sedge, cannas, dwarf horsetail, rushes, pennywort, umbrella palms, cattails, water lilies, and duckweed.

Papyrus and rushes, which grow vertically, are the most commonly used, typically around the perimeter of the plant zone. Common waterweed and hornwort, both submergent plants, are a good choice for their high oxygen content. Floaters, like pondweed, water lilies, and duckweed provide quick surface cover to prevent excess algae accumulation. There tends to be a common misconception that algae is harmful. A single cell plant, algae is not only benign, but a small amount is actually necessary in the plant zone. Algae competes with water plants for light and nutrients, which is why a mix of appropriate aquatic plants should help keep excess algae in check.

There will always be a small amount of algae in the swimming area, particularly just after the pool is constructed and the

Photo © Guy Bohyn
water is stabilizing. Be patient! You’re not “shocking” the water with chemicals; stabilization is the natural process of uniting and filtering the plant zone with the swim zone. Depending on the climate and time of year the pool is built, sun and heat will play a factor in the time it takes for the water to become pure and clear. Once the water quality is established, any residual algae is controlled by using a standard pool vacuum and periodic cleaning of the plant zone.

When selecting plants, purchase through a native plant supplier or consult your local extension service, which can advise you on species suited to your climate. While collecting plants from wetlands is usually limited or prohibited by local law, if you know of a natural body of water threatened by construction in your area, consider rescuing plants from the site by contacting the company involved.

Although a few natural pool experts discourage the addition of fish for standard control reasons, many actually recommend them in limited numbers. Fish such as Japanese koi are not only beautiful, they feed off any bottom algae and other natural debris that may enter the pool, helping to keep it clean. As long as they are not fed fish food (which produces problematic fecal debris), their natural waste gets filtered into the plant zone and is biodegraded by the plants. A hollow tube can be submerged in the water, providing them with shelter when humans enter the water.

It’s important to state that aquatic plant filtration, while highly effective, does not remove all pathogens. As with any pool, limiting the number of swimmers and paying special attention to infants and animals will help ensure the health of your pool and your family. Having said that, it’s highly unlikely that your natural pool will harbor any seriously harmful bacteria, like e-coli. In Germany, there is a public natural pool that has been in operation for over twelve years and has yet to experience a health threat.

Cost and Maintenance
Construction of a natural swimming pool is about the same as a conventional pool, unless you build it yourself, which will save you considerably. The material you choose will also factor into the cost, as will any additional landscaping you many choose to add. However, because the pool is self-sustaining and uses no chemicals or extensive equipment, long-term savings are realized.
Natural pools tend to be warmer than traditional pools because the shallower plant zone acts as a passive solar collector. They can be heated in colder climates if special attention is given to maintaining the established environment. Too much heat can disturb the ecosystem and give reign to algae and bacteria growth.

A natural pool never needs to be drained, however, keeping the water level consistent is important. Natural evaporation will occur, which requires adding water periodically. Removing leaves and seeds from nearby trees and vacuuming the pool regularly is also a good idea.

The pleasure of watching the ecosystem you’ve created grow and flourish is matched only by the feeling of swimming in clean, clear water. Having built our own natural swimming pool over a year ago, I can say that not a day goes by when I don’t appreciate its simplicity. Aside from trimming and maintaining existing plants on a regular basis and cutting them back seasonally, Mother Nature maintains the pool for us. Speaking from personal experience, she does a great job.

Learn More


British Association of Natural Swimming Pools
www.bansp.org

International Organization for natural bathing waters
www.iob-ev.eu

Guy Bohyn, landscape designer - Water Garden

www.naturalswimmingpools.com

www.clear-water-revival.com

www.bionovanaturalpools.com

www.totalhabitat.com

www.gartenart-australia.com

Ellen Rowland is an American living in Senegal, W. Africa in an off-the-grid earth house she helped to build with her husband and two young children (see her article in Natural Life Magazine’s November/December, 2011 issue). She is a writer of sustainable issues, fiction, humor, and poetry, and is currently working on a book about her experiences in sustainable family living. You can follow her blog adventures at her website http://senegalease.blogspot.com.

This simple form natural pool with split inclusive plant zone is located in the hills of Tuscany.