



# natural swimming pools



*Natural pool with decking, swimming area and regeneration zones for plants on either side.*

## what are they?

They're constructed pools / ponds for swimming, but with room for nature. They typically have a swimming area and a 'regeneration zone', where the water is cleansed biologically (by plants and micro-organisms) and with physical filters, but without chlorine, UV or ultrasonic devices, which reduce the biological activity that a natural pool is intended to encourage. Microbes on plant roots and stones remove nutrients and contaminants, and swimming micro-organisms eat algae.

**History:** the modern 'movement' started with Gottfried Kern in Austria in 1954. The 60s saw a wave of chemically-treated pools spread across Europe from the US, but in tandem with the wildlife gardening movement in the 70s, many people in Europe installed natural pools for bathing. Installation companies were formed in the late 80s, and a new sector developed in the 90s. The first public natural swimming pool was created in Austria, in 1991, and in 2015, the UK's first public natural swimming pool was opened at King's Cross in London.

**Types:** pools can have different levels of wildlife-friendliness. Some pools, although unchlorinated, have vertical walls, with no escape route for amphibians, and intensively-filtered water that reduces plant growth. Here are the 4 main types, by increasing complexity (and therefore cost):

1. Swimming pond: water body with shallow edges (regeneration zone) for plants (inc. wetland & submerged plants and plants with floating leaves) that do the filtering, but without a pump. This is the most cost-effective model, but needs quite a large area (at least 120m<sup>2</sup>) to work well.
2. Swimming pond with surface flow: a skimmer or overflow gutter allows water to flow to a pump, which oxygenates and delivers water back through the regeneration area to the swimming area, providing a nutrient flow for the plants. At least 50% of the surface area should be planted, and the overall area should be at least 100m<sup>2</sup>.

3. Pool with 'technical wetlands' that operate like a reed bed: a pump circulates water to a vertical- or horizontal-flow gravel bed that traps nutrients and makes them available to plant root systems (usually reeds). Water passes through the beds back to the swimming area. You could even pump water to the top of a series of gravel-filled terraces, creating a rock garden to filter the water.

4. Pool with biofilm-accumulating substrate filter (BSF): gravel bed whose coarser stones are kept aerated, so that they become covered in a 'biofilm' of micro-organisms that remove nutrients and pathogens from the water filtering through it. No reeds or other plants (they would find it difficult, because nutrients are taken by the biofilm). Water filtered through the biofilm filter bed is pumped back to the swimming area.

Types 3 and 4 can be much smaller than types 1 and 2. You can also have pools that combine features from two or more of these models.

## what are the benefits?

**For people:** to guarantee pathogen-free water, traditional swimming pools are usually treated with chlorine, which increases the risk of asthma and allergies, especially for kids. It's also a potential carcinogen. Regular exposure to chlorine may cause reproductive disorders and birth defects as well as skin ageing. Natural swimming pools don't require chloring - purification is achieved via physical and biological processes. Few natural pools will be large enough for lane swimming, but they're fine for swimming and splashing about in the fresh air, and they're great as plunge-pools after a sauna.

**For nature:** a natural pool will provide habitat for wildlife. Not everyone will be happy to share their swimming space with frogs or water beetles, but they'll try to get out of your way, and if you're a nature lover, you'll take to it easily. The environment will benefit from the fact that chlorine isn't used, and it will save water too, as, unlike conventional swimming pools, total water changes are not required.



*Unrolling the pool's EPDM liner.*



## what can I do?

Type 1 and 2 pools (and possibly 3) can be built DIY, but you'll probably need a professional for type 4. Consult a good book for detailed info on construction, planting and maintenance.

**Construction:** here are the (basic) stages:

**Planning:** choose the type, location, size, depth and partitioning of the pool. Think about filtering equipment and decks, paths, planting areas etc.

**Excavation:** hire a mechanical digger, or dig by hand - definitely a case of green gym. The swimming area needs to be at least 2m deep.

**Underlay and sealing:** EPDM (synthetic rubber) is more environmentally-friendly than PVC liner or concrete – plus it's UV resistant. It will need an underlay - old carpets can come in handy.

**Build superstructures:** stone steps, foundations for decking or bridges, boulders or flag stones on the bottom and around the edges; you can also start filling the swimming area to tension the liner.

**Build regeneration zones:** 50-150cm deep, and separated from the main swimming area with an underwater barrier wall that allows water to flow over the top; introduce plants (beginning in the deepest zone), then fill up with water in stages.

**Construct the capillary barrier:** the edge of the liner must be above the level of surrounding soil, or the soil will suck water from the pool; also to prevent influx of surface water after heavy rain, which might wash in nutrients and pollutants.

You won't need planning permission unless you're in an AONB / conservation area, although even then maybe not. Contact your local authority if you are. Conventional pools can be converted - plants replace chlorine to keep water pathogen-free.

**Welcoming wildlife:** stocking with animals is not recommended. Fish raise phosphorus levels and increase the likelihood of algae. Wildlife will come on its own. You might get an algal bloom at first, but soon after, the first microscopic animals such as water fleas and daphnia will appear to eat the algae and the pool will clear. Their predators – water-insects and arthropods - will follow: pond skaters walk on the water surface thanks to their hydrophobic feet; great diving beetles fly in, as do whirligig beetles with their dances on the surface of the water. Later, dragonflies will lay eggs, and their larvae will go hunting with their extending mandibles. Later still, frogs, toads and newts will find their way overland to lay their eggs. All very exciting if you enjoy observing nature.



*Yellow flag irises love wet conditions and will add beauty to your pool, as well as helping to keep the water clean.*

In type 1 & 2 pools there's an area with wetland, submerged and floating-leaf plants. Plants for type 3 pools are mostly helophytes, e.g. common reed, cattails, irises or sedges. In this case the roots and rhizomes keep the filter aggregate permeable for water percolation and promote the development of beneficial micro-organisms. In type 4 pools, plants are only for decoration. Consult specialist books for the range of native plants that are available.

**Maintenance:** remove accumulated mud once per year. Suction pond cleaners are cheap, and can transfer the mud to fertilise the garden.

Prune back plants in autumn to remove nutrients. Clean out skimmers and/or pumps – you'll work out how regularly. Occasionally, the biofilm in type 4 pools will die off and flush into the pool, making the water murky. To prevent this, backwashing is required (twice a year). Switch the pump off for a week to kill all biofilm microbes. Then reverse the direction of water flow - instead of pumping water into the filter, draw it off into the garden. When it becomes clear, switch the pump to its original setting, and a new biofilm will establish itself.

## resources

- [lowimpact.org/natural-swimming-pools](http://lowimpact.org/natural-swimming-pools) - information, contractors, books, including:
- Wolfram Kircher, *How to Build a Natural Swimming Pool*
- Michael Littlewood, *a Guide to Building Natural Swimming Pools*
- David Butler, *Organic Pools DIY Manual*
- [bansp.org](http://bansp.org): British Association for Natural Swimming Pools
- [iob-ev.eu](http://iob-ev.eu) – International Organisation for Natural Bathing Waters

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