

Discovery Garden Naturescape Pond – A Journey Not Complete

Welcome to Naturescape, one of the garden rooms at the WSU Skagit County Master Gardener Discovery Garden in Mount Vernon, Washington. You visit Naturescape to relax and reflect in a natural setting. This informal garden room features a variety of meandering paths bordered by native and non-native plantings. Stroll the paths and contemplate the variety of ecosystems represented by the sunny meadow, the pond, and the shady corner which was recently inhabited by a swarm of honey bees looking for a new home. Be inspired to design your garden as a personal green space isolated from adjacent buildings and traffic by good hedges and the sound of water. Naturescape welcomes insects, pollinators, amphibians, reptiles, birds, small mammals, and even humans.

One of the many focal points of the Discovery Garden is the Naturescape Pond. This garden space was created by the Skagit County Master Gardeners when the Discovery Garden was first planned in 1996. The pond and surrounding garden have continued to evolve. One of the garden founders, [Julie Hubner](#), said that having people with ideas and letting them run was the most important part of designing. Having people, encouraging people to make decisions, allowing people to make decisions, and loving people who make those decisions were essential to a project. In the beginning there were 15 people working the vision of the WSU Skagit County Master Gardener Demonstration Garden - The Discovery Garden. From a blank field, 13 garden rooms were carved out. Now there are over 30 garden rooms!

In today's language the Naturescape Pond supports the statewide [MG Priority Goals](#) of Plant Biodiversity; Clean Water; and Nearby Nature. Skagit County is physically defined by water whether it is the sound, bays, lakes, estuaries, rivers and streams. Providing information about how to keep a pond healthy is a stepping stone to keeping all of our waters healthy.

The goal of the pond is to:

- Interest, inspire and educate the public
- Provide an example of a healthy pond ecosystem
- Be a focal point in the Discovery Garden
- Deliver a natural setting that can be used to support various educational opportunities
- Display an example of a tranquil backyard space that could be added to a backyard garden



The Pond on Ask a Master Gardener Day in the Garden (June 2022)

Pond History

The pond at the Discovery Garden was part of the original garden design in 1996. The pond is kidney shaped with maximum dimensions of 25'X15'. It is approximately 2 1/2' deep in the center with a very gradual slope to the edge (bowl shaped). It contains approximately 2000 gallons of water.



circa 2000

Just like there is no such thing as a maintenance free garden, there is no such thing as a maintenance free water garden. A large corkscrew willow tree towers over the pond providing a majestic backdrop as it continually sheds leaves into the water. Due to the shallow nature of the pond, the temperature rises in the summer and the pond is subject to algae bloom.

A natural pond has a continual water exchange and periodic purging through seasonal flooding. In the absence of this, a pond will gradually fill in and become a bog then a meadow. In order to artificially create a healthy pond, there has to be water filtration and aeration. The algae also must be controlled.

The pond's shallow water depth leads to a significant water temperature increase in the summer. That problem can be countered by increasing the depth and providing surface cover with plants. For the Discovery Garden pond, it was not feasible to increase the pond depth, so instead we focused on the filtration, aeration, and algae control with plant cover and a UV light.

Plants are part of a natural pond ecosystem: they provide oxygen, they remove nutrients from the water. Plants that float on the surface do extra duty. They provide shade to keep the pond cooler and reduced light limits algae growth. Plants also compete with the algae for nutrients. Our goal was to have at least 50% of the surface covered with plants. Fish also eat algae and provide ammonia for a healthy nitrogen cycle.

The pond was created in 1997, and its early history was undocumented. In 2006, the pond needed a new liner. The pond was emptied and a layer of carpet remnants was placed over the original liner. A new liner was installed over the carpet.



2006 Pond Renovation

After the 2006 renovation, the pond was healthy and hosted a population of feeder goldfish. Between 2011 and 2013, the fish disappeared along with replacement fish. Small barley balls were used for algae control but were ineffective. The pond was treated with several bacterial solutions which were also ineffective. In 2013, barley straw and concentrated green food coloring was tried to control the algae. Between 2014 and 2019, numerous other solutions were discussed including turning the pond into a bog. Thalia and hardy water lilies were thriving in the pond despite the poor water quality. In 2017, a contractor provided a quote to clean out the pond and the estimate was \$2,400 for a two day clean out. Due to budgetary constraints, the pond continued to exist as a stagnant pool.

By 2019, the pond was overgrown by plants and green from algae. Small trees had started growing in the water plant pots and were a threat to the liner. There was no filtration or aeration in the pond. Problems with water quality and algae were constant.

In 2019 another renovation was started. During the summer, a volunteer team drained the pond and removed most of the stones, and all of the plants and debris. The liner was inspected and found to be in good condition. The smaller stones on the bottom of the pond were not reinstalled as they interfered with pond cleaning and provided no advantage as they could not be seen from the surface. The plants were divided, repotted, and a portion returned to the pond.



2019 Renovation

After exploring various options and cost a new approach. The decision was made to add filtration, aeration and algae control. Since the pond had no bottom drain. The simplest and lowest cost filtration system that would be effective was to place a pump in the lowest area of the pond and pump the water to a waterfall filter. There was a concern about theft, so a submerged pump made sense. The pump selected had the capacity to cycle the entire water once every two hours, and could handle solids up to ¼" with overload protection which will cut the pump off if it jammed or overheated.

The waterfall filter provides mechanical and biological filtration as well as aeration. As a bonus, the waterfall enhances the pond experience for visitors. Inside the filter, mesh pads collect larger debris in the mechanical filtration stage of the waterfall filter and bacteria living in the mesh work to break down the decaying organic matter and fish waste. The bacteria convert harmful ammonia and nitrites from the water turning them into useful nitrate which plants and algae can use as fertilizer.

Filtration and aeration did not address the algae problem. Algae is not unhealthy for a pond, but it is unsightly. A 40-watt UV light was added to the system between the pump and the filter. The light would kill the algae as it floats toward the filter, and then the filter would collect the dead algae. The UV light in conjunction with surface plant coverage should provide adequate algae management.



Refilling the Pond



Summer 2019

Summer 2019

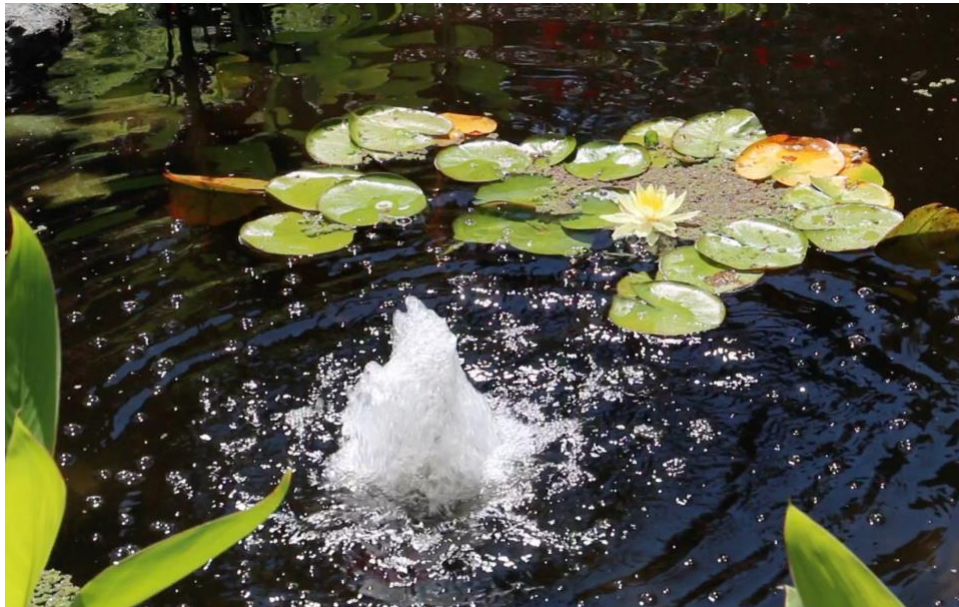
In the fall of 2019, the leaves fell from the willow tree and despite a lot of weekly scooping with nets, the bottom of the pond was soon layered with dead leaves and the water quality was suffering. This started an annual cycle of emptying the pond in the Fall after the leaves drop and then doing a partial water change mid-summer to simulate spring flooding and remove decaying organic buildup. The use of a pump that handled up to ¾" debris helped make the process easier, but the job still required going in to the pond and lots of net work.

By Spring of 2020, the pump, filtration, and UV light were in operation and the pond looked good. Three koi had been added for visitor enjoyment and to control mosquitos. The lilies were partially covering the pond surface and duck weed was introduced to help shade the pond water from sunlight which encourages the algae. The duck weed was prolific and soon covered the pond requiring routine netting for removal. It was so thick that slugs could literally walk on water.



Spring 2020 Slugs Walking on Water

As the world came to a grinding halt because of COVID, so did pond maintenance. The Discovery Garden was closed to the public and volunteers were prohibited from entering the garden to perform routine maintenance. There was no weekly netting of debris and once again the pond started to collect a heavy layer of muck on the bottom. The pump stopped working, and needed replacement. By late summer, limited personnel were allowed into the garden and the pump was replaced. It was necessary to add a prefilter to keep the small twigs from the corkscrew willow out of the pump. The new pump had two outputs so a bubbler was added to run in the winter to provide aeration when the waterfall filter is winterized. That fall, Diana Wisen donated some striking red water lilies from her family farm on Shaw Island which would emerge and bloom in 2021. Some good things did happen in 2020.



Summer 2020 Bubbler Fountain Addition



Summer 2021 Red Water Lilies

2021 passed relatively uneventfully as other projects were underway. In December of 2021, the now tiresome process of pond emptying and mucking was completed after the shedding of the willow. Sadly at the end of December, there was a winter storm that closed many roads and brought abnormally cold temperatures to Skagit valley. The garden was cut off from normal visitors and rested with a blanket of snow for protection against abnormally low temperatures and frigid winds. When it was possible to come back to the pond, there was no sign of the koi that were usually resting under the log awaiting warmer weather. A pond enthusiastic working in an adjacent building remarked that a heron had been seen around the pond.

In the Spring of 2022, it was time to do a partial water change and de-winterize the filter. While stirring up the debris with a net, two of the missing six koi were found hiding. The pond was refilled and additional koi added. In 2022, all the duckweed was removed as an experiment. Although the weed protected the pond from sunlight and helped absorb nutrients from the water, it created its own problem as the tiny leaves die off and settle in the bottom of the pond and clog the filter. By summer it looked like the experiment was a success, and the messy duck weed was not needed. However, in June, the algae returned in a big way. Was the removal of the duck weed a mis-step? After some investigation, it was found that the UV light was not working although the light was removed annually during pond winterization and the bulb replaced each year. It turns out the ballast on the light only lasts around 3 years and was due for replacement. With the UV light on again, the pond soon returned to normal.

The pond plants have been vigorous and, in the summer of 2022, the lilies were all removed, repotted, and fertilized. The hard-plastic nursery pots were replaced with mesh bags as the pots tended to slide to the center of the pond and occasionally tip over due to the bowl shape of the pond bottom.



Summer 2022

As Fall of 2022 approaches, plans are underway to install a net over the 25' long pond in the hope of keeping some of the leaves out of the pond and to protect the fish from unwelcome winter visitors. A pond vacuum has also been purchased. The volunteers at the Discovery Garden are hoping to celebrate not having a muck party this Fall.

Annual Maintenance Cycle

Spring

De-winterize waterfall filter

Replace UV light bulb and reinstall UV light

Drain pond and muck out

Start feeding fish at 50 deg (special diet from 50-60)

Start feeding fish regular food at 60 deg

Divide pond plants as needed

Summer Routine

Clear pump prefilter as needed

Clean filter media every 2 months

Test water monthly and when there are problems

Fertilize water lilies with fish safe fertilizer tablets inserted into the soil

Fall

Stop feeding fish when pond drops to 50 (special diet from 50-60)

Install net for leaves and fish protection

Vacuum