Portable BC Interior Water Park concept v1.0

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Abstract

Recognizing that the BC interior gets extremely hot in the summer, this concept is conceived in order to provide much needed relief for kids as well as elders in the area. There are strong desires for conventional water parks in interior BC, but conventional parks are expensive and even the smaller reservations need relief from the heat. There is an additional wish to incorporate nature and the streams in a more traditional fashion.
What makes a water park expensive is the level of ruggedness normally needed and the demand for recycling the water. This usually means incorporating channels, drains and reservoirs, as well as covering the entire area in concrete. If a water park was constructed near a clean stream or water source, water sprayed near the shore would simply return to the stream. Very water consuming activities could optionally (where possible) have a floor (concrete or even a tarp) and recycling of the water into a tank, whereas mist sprays etc. could be returning naturally to the stream.

We suggest and delineate here an affordable, portable and modular concept, optionally powered entirely by solar power and using locally available materials and traditional building methods, but adding state-of-the-art smartphone app controlled function/games and portability.

Natural concept

The water park should be placed on a conveniently “found” location, which allows for clearing of the area for safe play and visual monitoring of snakes, ticks etc. If needed, a circular area can be leveled for the “main attraction” and constructed with a central drain (utilizing concrete or even just a tarp), which has a (bilge) pump with a 1” pipe leading into a closed reservoir barrel of perhaps 100 or 200 liters, level with the park. The reservoir barrel should have a 2/3 full level switch, low level will start pumping water from the stream. If rain or the recycled water causes the barrel to run full, it will purge into the stream. That way, about 80L of water will always be available on demand. In the central area, a structure is needed to get the sprays over and level with the water park guests. The same structure can, at the top, carry a solar panel, oriented correctly towards South and at the optimal angle.

Park "bones"

Instead of making a bomb proof structure of stainless steel, a simple framework of willow branches, shaped like a sweat lodge, will do. It is suggested, if a foundation is available, to place 6 or 8 1.5-2" PVC tubes in the ground, into which the branches are put. This keeps the shape of the structure for its 1-2 year lifetime. Onto this structure, water hose or something equally cheap can be strapped with cable binders and/or strips of fabric and completely surround an area of arbitrary size. A combination of plumbing PVC pipes, water hose, copper pipes, junctions and T junctions are wired to 5-6 different pumps, for instance the Flo-jet or any other camper/boat pump capable of about 3PSI and 1 gallon/minute water flow (equivalent to a normal water hose).
The pumps are put in a (tamper proof if left on site) metal container with two 6V golf cart batteries and a solar panel controller. A small $50 computer (Raspberry Pi) controls the pumps via FET switches, which allow the pressure on each line to be regulated smoothly from 0-100%. The entire structure can be disassembled for the winter and stored, restored in the summer by a community effort.
Mist nozzles from vegetable displays and/or field sprayers can be used to make mist, also for the benefit of onlookers.

Portable and dynamic

The core of the water park is a re-usable harness, which enables changes being made by the community. All expensive components can be brought to site by volunteers and hooked up in a few minutes. When volunteer effort is available, the park can dynamically be altered to keep the interest. It is also modular, as the pump "suitcase" can be duplicated and more pumps added.
5-6 pumps would form a good base, as this psychologically translates to "a lot going on at the same time". A Flo-jet pump (or equivalent) takes about 2A at full blast, allowing 6 pumps to run at 50% for about 13 hours on a 80Ah battery. Two 6V golf cart batteries would run the park for 3 days. A 100W solar panel produces around 6-8A in ideal conditions and direct sunlight, which will be enough to recover one day of use completely in one day – or run the pumps. With 200W of solar panel, also grey days would be covered. Using a single pump and valves would end up being not only more complicated, but also more power consuming, expensive and harder to repair locally.

The pumps are protected by two 30cm household sediment filters (one for each 3 pumps). This will also prevent nozzles from clogging. Filters can normally be cleaned by reversing the flow with a water hose, otherwise they are cheap and last long, if the water intake is relatively sediment free.
If there are water concerns, other filters can be added (but should not be expected to last long).

PEX tube is stiff enough that holes can be drilled in it for creating thin spray; otherwise lengths of copper pipe can be used. Sprinklers, sprayers and garden spray pistols can be used – whatever is available, donated and bought by the community.

App-controlled games

Using a Raspberry Pi computer, it is possible to connect to the water park with WiFi (served by the Raspberry Pi, even with no Internet nearby) and control it from there, adding something to do for elders and parents. Games could be constructed, where the kids would try to dodge sudden random or evil parent controlled water sprays. The Raspberry Pi can serve web pages for control and selection of pre-programmed games, I suggest for instance a word game, where native words are drilled with sprays rewarding correct answers or soaking you if you forgot the word.

Estimated costs

6 Flo-jet pumps (surplus)	$450
Hose, fittings, pipes	$800
Enclosure / power supply	$300
100W solar panel + controller	$500
Computer and motor control	$150
Bilge pump (recycling)	$50 (optional)
2xInline water filter (sediment)	$150 (Rona / 30cm standard filter cartridges)
Bilge pump	$100 (pumping stream water)

Total about $2350
Plus foundation, willow brances, volunteer work, 6 x 1-1.5 foot 1.5” PVC pipe, cement

The concept is scalable. One pump is minimum, solar panel optional if power is available. Software should be open source and available to families who want their own – or who might bring theirs to the communal water park occasionally.