

Two Case Studies

Both involve lakes similar to Lake Jualbup. Both have actually done what so far is only an option for Lake Jualbup. So they tell us more about the issues than any armchair opinion. Updated May 2014.

Case study 1: Mabel Talbot Reserve

How environmental experts got it seriously wrong, and the pros and cons of drying out



Above: Winter at Mabel Talbot Reserve in Jolimont. The lake is one-third the size of Lake Jualbup. Like Lake Jualbup it receives road runoff, has an island, and is surrounded by lawns and trees. Unlike Lake Jualbup it was kept full in summer by adding bore water, and its links with Nyungah people are better documented. Thus O'Connor et al (1985) could say of Lake Jualbup that "*neither stories relating to the lake, nor names of people who camped there were available; nor was there any knowledge of the original dimensions of the camp*" (p.28). But at Mabel Talbot a Nyungah known as "Daglish granny" had a permanent camp southwest of the present lake, and everyday life in the area is vividly described by Robert Bropho in his 1980 autobiography *Fringedweller*.



In 2003 a **management plan** for Mabel Talbot Lake was prepared by Ecoscape. Public consultation included a survey of 104 park visitors who typically lived within 1 km and visited the park 3 times a week to walk, have picnics, and meet friends. They valued its tranquillity and wildlife. At that time there was a perimeter wall and footpath. *Photos are from the Ecoscape report.*

Ecoscape stressed that the objectives included "*a water filled lake throughout the year*" to maintain the "*aesthetics of the lake environs*" (p.23), that the European style of the park was "*strongly valued*" by the community (p.26), and that "*large scale changes are unlikely to be tolerated*" (p.27), Nevertheless Ecoscape recommended that the wall be pulled down "*in places*" (p.31) and replaced with sloping banks planted with vegetation. This would convert the lake to a wetland that would be wet in winter and dry in summer. Visitor's views of sloping banks vs walls were as follows:

Lake with sloping banks

Vegetation a visual barrier but more natural
Can peer only from observation platforms
Vegetation less interesting for kids in pushers
Vegetation needs frequent maintenance
Sloping sand banks increase leakage

Lake with perimeter wall

Beautiful walking by deep water
Can peer into water everywhere
Especially OK for kids in pushers
Path and walls need maintenance
Walls limit leakage

The above views are similar to those expressed about the wall at Lake Jualbup in the 1999 Lake Jualbup visitor survey (nearly 300 responses), and in letters to the POST.

Ecoscape list the **pros and cons of drying out** as given in the UWA's *Wetlands Research and Management* report on Mabel Talbot. They also apply to Lake Jualbup (for which no comparable list is publicly available), so we give them on the next page with an explanation of technical terms.

Pros and cons of drying out

Dries out in summer

Loss of fish
No exotic fish species
No waterbirds in summer
Lake/park quieter in summer
Aquatic invertebrates more diverse
Declining tortoise numbers (?)
Aquatic plants more diverse
Occasional waterbirds in winter,
no resident individuals
Less winter nesting (?)
Loss of plants needing permanent water
Dry lake not visually attractive in summer
Lower risk of algal blooms
Lower risk of botulism
Lower risk of midge problems
Use of aerators minimised
* No need to supplement levels
Vandalism and fire a problem esp on island
Easier to remove silt and litter when dry
Poor water quality as lake dries

Does not dry out (ie permanent water)

Maintain fish populations
Proliferation of exotic fish species
Refuge for waterbirds over summer
Sounds of waterbirds in summer
Aquatic invertebrates less diverse
Stable tortoise numbers (?)
Aquatic plants less diverse
Resident waterbirds all year,
greater numbers in summer
More residents (more winter nesting?)
Lots of plants needing permanent water
Permanent water is visually attractive
Higher risk of algal blooms
Higher risk of botulism
Higher risk of midge problems
Need for aerators during summer
* Need to supplement with groundwater
Island an excellent refuge for wildlife
Silt and litter will accumulate
Water quality more stable across seasons

* Not applicable to Lake Jualbup because our proposal is to maintain water levels by reducing leakage

Aquatic invertebrates are essentially everything not plants, birds, reptiles or fish, eg beetles. **Exotic** species are any non-native species. A high concentration of nutrients, eg from decomposition of organic matter or from fertiliser runoff, plus warmth and sunlight, can boost photosynthesis in phytoplankton, tiny floating plants up to 2 mm in diameter. The result is a green or reddish explosion of growth called an **algal bloom**. Eventually the bloom dies and decomposes, creating an unsightly scum, consuming oxygen from the water and often promoting the growth of botulin, one of most potent toxins known. So there may be outbreaks of **botulism** (paralysis and death) among waterbirds. A high concentration of nutrients is called **eutrophication**, from the Greek *eu* well (ie excessive) and *trophe* nourishment.

The UWA report stressed that, in an urban setting, the sights and sounds provided by water may be more appealing than a dry lake. The surroundings may be cooler due to evaporative cooling. The same urban setting may increase the risk of foul-smelling algal blooms, and the death of waterbirds from botulism, but these may be avoided by appropriate strategies such as aeration, keeping lawn clippings away from the waterbody, minimising nutrient enrichment due to fertilising adjacent lawns, catching debris such as leaves and cans in traps on the inflow drains, and keeping the traps clean. The UWA report missed two adverse effects of drying out (acid sulphate soils and infestation by weeds). The argument in favour of a dry lake is not exactly overwhelming.

Mabel Talbot lake becomes a "natural wetland"

In 2004, despite the community's misgivings, Subiaco council replaced the walls with sloping sand banks planted with vegetation that was supposed to turn the lake into a beautiful natural wetland. To an environmentalist it may have seemed like a good idea at the time, but it went terribly wrong. In February 2010 the beautiful natural dried-up wetland was choked with shoulder-high weeds impossible to walk through. It happened again in January 2011, when the wetland looked like this:



Note the problems: Wildlife (except perhaps snakes) cannot penetrate such thick weeds. When the rains come, the weeds rot, the lake stinks (greatly upsetting those nearby residents who happen to live downwind), and the seeds survive for a better crop next year. The same thing happened at Lake Jualbup in 2010, with the same weeds (South American barnyard grass, a species of millet). When the rains came, the weeds rotted and the lake stank, see page 2 of **Our Proposals** for pictures of the shoulder-high weeds and the nauseating results of their rotting.

The **stink** is largely due to the hydrogen sulphide gas (H₂S) given off when the weeds rot. But there is more to H₂S than the smell (which is like rotten eggs) – it is also very toxic. One part per million is detectable by most people (some can detect 0.1 ppm), 10 ppm can cause headaches, 100 ppm is dangerous, and 1000 ppm is rapidly fatal (DKB Thistlethwayte, *The Control of Sulphides in Sewerage Systems*. Butterworths, Sydney 1972, pp 55-57). On the Lake Jualbup shoreline the strong stink level suggested it may have exceeded 10 ppm at the peak of weed rotting in 2010.

Case study 2: Hyde Park Lakes

A virtual duplicate of Lake Jualbup but this time their council opted for permanent water. 2014 update

Hyde Park lakes are ornamental man-made lakes that are similar to Lake Jualbup in history, size, design (walls and big trees), iconic status, Aboriginal significance (greater than at Jualbup), use as a holding pond for road runoff, and use of surrounding reserve as a community recreation area and wildlife habitat. Conversion to a park occurred fifty years before the conversion at Shenton Park, but in both parks the water began drying up in summer at about the same time. Initially the Town of Vincent felt that the best option was to let the lakes dry out and return them to a seasonal wetland.



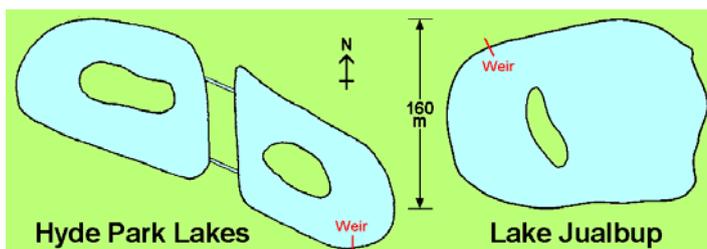
Looking south over Hyde Park Lakes, August 2010

But the community responded with written protests and a petition with 276 signatures saying yes, these lakes may not be best suited to our climate, but they are part of our heritage and are a great source of delight, therefore permanent water should be restored. The Town of Vincent listened and, with Nyungah approval, it adopted a *Masterplan for the Restoration of Hyde Park Lakes*. It included putting in new walls and lining the lake beds to reduce leakage. Later it was discovered that the lake beds had acid sulphate soils and very high levels of heavy metals that might contaminate the groundwater if a liner was used (acid sulphate soils and heavy metals are not a problem at Lake Jualbup). So it was decided instead to dredge the lakes to remove the heavy metals and to allow groundwater inflow to maintain water levels during most of the summer months. At least that was the plan in 2010. But it was later decided that dredging was not feasible, see next page.



Left: Hyde Park's wall and big plane trees

Right: Hyde Park Lakes and Lake Jualbup to same scale



The lakes are similar in their vital statistics

	Hyde Park Lakes			Lake Jualbup
Catchment area, sq km	1.56			1.51+1.39 QEII
Trees planted around lake	1901			1957
Perimeter wall completed	1937			1973
Average road runoff/lake vol	8			8
When overflowing:	E Lake	W Lake	Total	
Water area sq m	11250	12950	24200	25900
Water volume cu m	7000	11000	18000	42000
Average depth m	0.62	0.85		1.62

About the only significant difference between Lake Jualbup and Hyde Park Lakes is depth of water – on average Lake Jualbup is twice as deep as Hyde Park Lakes – which makes Lake Jualbup more resistant to drying up in summer. So if Hyde Park Lakes can be returned to permanent water with Nyungah approval, the same should be possible at Lake Jualbup.

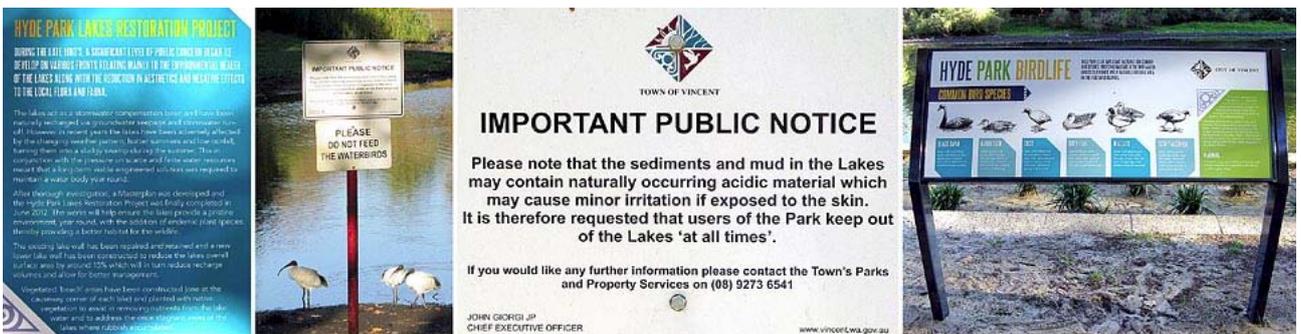
By 2014 Hyde Park Lakes had been returned to permanent water. Visitors were ecstatic. See next.



New walls had been put inside the old walls, allowing appropriate planting in between.



Permanent water had been restored by pumping from groundwater, a solution deemed acceptable because all leakage returned naturally to the groundwater. As a result, no dredging was necessary (which would have removed the natural seal), and the distance to water level was not increased.



Advisory and educational signs set a standard that Jualbup has yet to match



Looking south over Hyde Park Lakes April 2014. Otherwise the park was unchanged (see first picture on p.3)

For more on Nyungar involvement, click **Aboriginal Heritage** on the home page.