

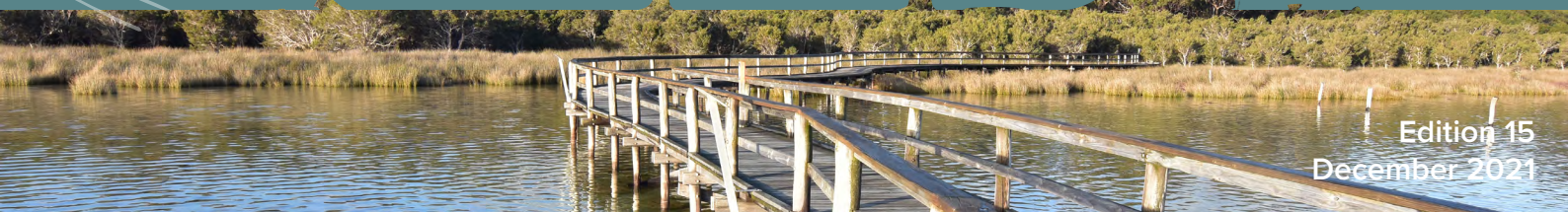
# Landcare matters

Lake Clifton Sub-catchment



PHCC Working Together  
Peel-Harvey Catchment Council

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Welcome to Landcare Matters: Newsletter of the Lake Clifton Stewardship Program – a program supporting landowners for healthy habitats and waterways in the Lake Clifton catchment.



## Land restoration to combat increasing salinity at Lake Clifton

Lake Clifton is part of the Peel-Yalgorup System and recognised as a wetland of international importance. The Lake is fed by groundwater and direct rainfall and, as there are no natural outflows, the water quality of Lake Clifton is determined by the quality of groundwater entering the system. Lake Clifton has significant conservation and scientific value due to the high number of resident waterbirds and the presence of thrombolites.

### Thrombolites at risk

Thrombolites are sedimentary formations of cyanobacteria that contain the oldest evidence of life on earth. They are rare across the globe and occur in shallow lakes with high nutrients and organic ions. Fresh groundwater flows are critical to the formation of thrombolites, however, salinity levels at Lake Clifton have continued to increase sharply since the early 1900's due to agricultural land use practices and rural-residential development (Luu et al., 2004).

### Monitoring water quality at Lake Clifton

As part of PHCC's 'Wetlands and People (a community restoring the ecological character of the Peel-Yalgorup Ramsar 482 Wetlands) Project' a comprehensive water quality monitoring program has been developed for the Yalgorup Lakes. Key features of our 'Wetlands and People Project' include:

- 19 assessment locations covering the 17 discrete waterbodies that make up the overall system
- Water quality assessments carried out monthly for two years (Fig. 1)
- Lake levels recorded at each site



Fig 1: PHCC's Steve Fisher and Rick James, undertaking water quality sampling at Lake Clifton

Our results show great variability in water quality between the various wetlands, many of which are hypersaline or saltier than seawater (world average seawater is approx. 38g/L Total Dissolved Solids). In the late 1980's Lake Clifton was less salty than seawater all year round (Luu et al., 2004), however, our results show that it is now up to 4 times more salty than seawater all year round (Fig. 2). Salinity at Lake Clifton is higher during the summer months when there is less water available. PHCC's water quality monitoring work has identified that adjacent lakes (Lake Pollard) have also dramatically increased in salinity and we are currently exploring the hydrology of the Yalgorup Lakes to better understand the causes to the decline in water quality.

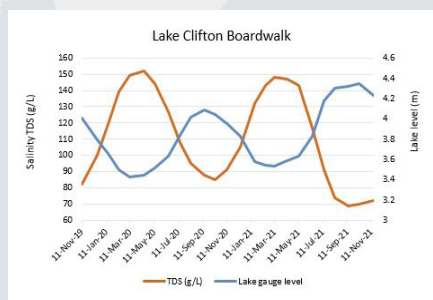


Fig 2: Salinity at Lake Clifton is greatest during summer months and is now ~4 times saltier than seawater.

Increased salinity has caused permanent changes to the lake and concerns exist about the effect on Lake Clifton's thrombolites. If Lake Clifton becomes permanently hypersaline, it is likely that the patterns of thrombolite growth, faunal diversity and waterbird usage will also be affected (Beeton, R. 2010), which may affect the internationally scientific significance of the lake (Knott et al., 2003).

### What can be done to reduce salinity at Lake Clifton?

Groundwater allocation for the Lake Clifton area are fully allocated and, as no further allocation is available, smart water use and restoration of the Lakes riparian zone will become increasing important under climate change and land use intensification. Increased fertiliser and

groundwater use on adjacent land results in increased run-off of nutrient loaded water that can pollute the Lake.

One method to combat increasing salinity at Lake Clifton involves restoring tree species on properties adjacent to the Lake. The upper section of Lake Clifton is dominated by stands of Tuart Woodlands, and include important native tree species; *Eucalyptus gomphocephala*, *Agonis flexuosa*, *Banksia attenuata* and *Acacia saligna*, to name only a few. Planting native species, and controlling invasive species, on properties adjacent to lakes can alleviate poor water quality and restore ecological function by acting as a natural filter. If you would like more information about techniques and approaches to restore native vegetation on your land to minimise the impacts of rural/residential run-off, please contact PHCC on 6369 8800 or your 'Friends of Lake Clifton' support groups. PHCC provides funding to support restoration activities around Lake Clifton through our Lake Clifton Stewardship Grants (see notice below for more details).

### References

Beeton, R. (2010) *Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton) Listing Advice*. Threatened Species Scientific Committee. <http://www.environment.gov.au/biodiversity/threatened/communities/pubs/96-listing-advice.pdf>

Knott B, Bruce L, Lane J, Konishi Y and Burke C (2003). Is the salinity of Lake Clifton (Yalgorup National Park) increasing? *Journal of the Royal Society of Western Australia* 86: 119-122.

Luu R, Mitchell D and Blyth J (2004). *Thrombolite (stromatolite-like microbialite) Community of A Coastal Brackish Lake (Lake Clifton) Interim Recovery Plan No. 153 2004-2009*. Western Australian Department of Conservation and Land Management. Perth.



### Dieback sampling

PHCC are working with Murdoch University to undertake sampling for dieback at properties around Lake Clifton. Some landholders have reported occurrences of tree dieback, particularly for Peppermint trees (*Agonis flexuosa*) and some Tuarts.

Dieback can be caused by a wide range of factors, such as increased groundwater salinity, reduced water availability through climate change and increased groundwater abstraction, extensive grazing pressures and *Phytophthora*. At some locations where dieback is most severe, there are strong smells of rotting vegetation and occurrences of *Armillaria* fungi, which is linked to root rot in many native tree species.

The sampling process includes DNA sequencing for isolation of true fungi and below-ground sampling for *Phytophthora* and related oomycetes (*Phytophthium*, *Pythium*, etc.).

If you suspect the presence of dieback on your property, please contact PHCC on 6369 8800 to discuss funding opportunities for sampling to help determine potential causes of dieback.

*PHOTO: Peppermint tree dieback at a Lake Clifton property, with extensive signs of wood rot (©Nancy Fardin)*



### Wishing our landholders a Merry Christmas and prosperous New Year

PHCC would like to thank landholders within the Lake Clifton catchment who have demonstrated their passion for conservation by joining the Land for Wildlife campaign or undertaking restoration activities on their property.

Your tireless efforts to restore natural biodiversity ensures threatened Woodlands, and the native fauna that depend on them, can persist for many generations into the future. We wish you a 'green' Christmas and happy New Year.



### Lake Clifton Stewardship Grants

Grants are still available for Land for Wildlife (LFW) members in the Lake Clifton Catchment. Landholders are able to apply for small grants of \$250.00 to \$1000.00 to assist in implementing eligible activities outlined in their LFW Site Assessment report. This may include revegetation, dieback sampling, weed control, pest control and habitat augmentation, with a strong focus on managing natural habitats and protecting water resources.

If you are interested in applying for a Grant contact Corrine Duncan on 6369 8800 or email [corrine.duncan@peel-harvey.org.au](mailto:corrine.duncan@peel-harvey.org.au), or visit our website for details: [www.peel-harvey.org.au/grants/lake-clifton-stewardship-grants/](http://www.peel-harvey.org.au/grants/lake-clifton-stewardship-grants/)

### Coming up...

Early - Mid June 2022: Lake Clifton Seedling Giveaway. Dates will be released in the New Year. If you are a landholder in the Lake Clifton area and interested in receiving a free tray of native seedlings, register your interest via email to:

[corrine.duncan@peel-harvey.org.au](mailto:corrine.duncan@peel-harvey.org.au)

Keep an eye on our social media pages and website...[www.peel-harvey.org.au](http://www.peel-harvey.org.au)