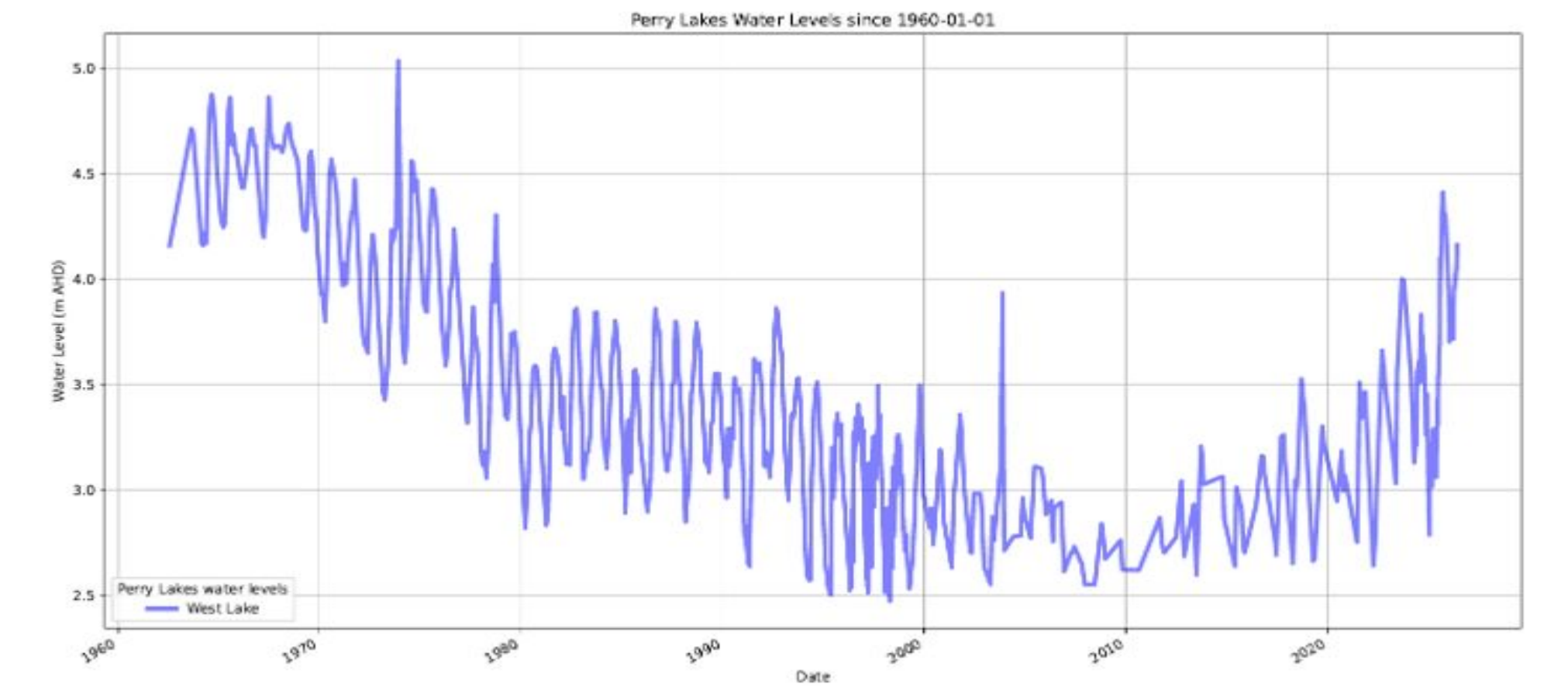
Healthy lakes, healthy lives 17th July 2026

Dr Don McFarlane, Science Officer, Friends of Perry Lakes

West Lake water levels since 1962



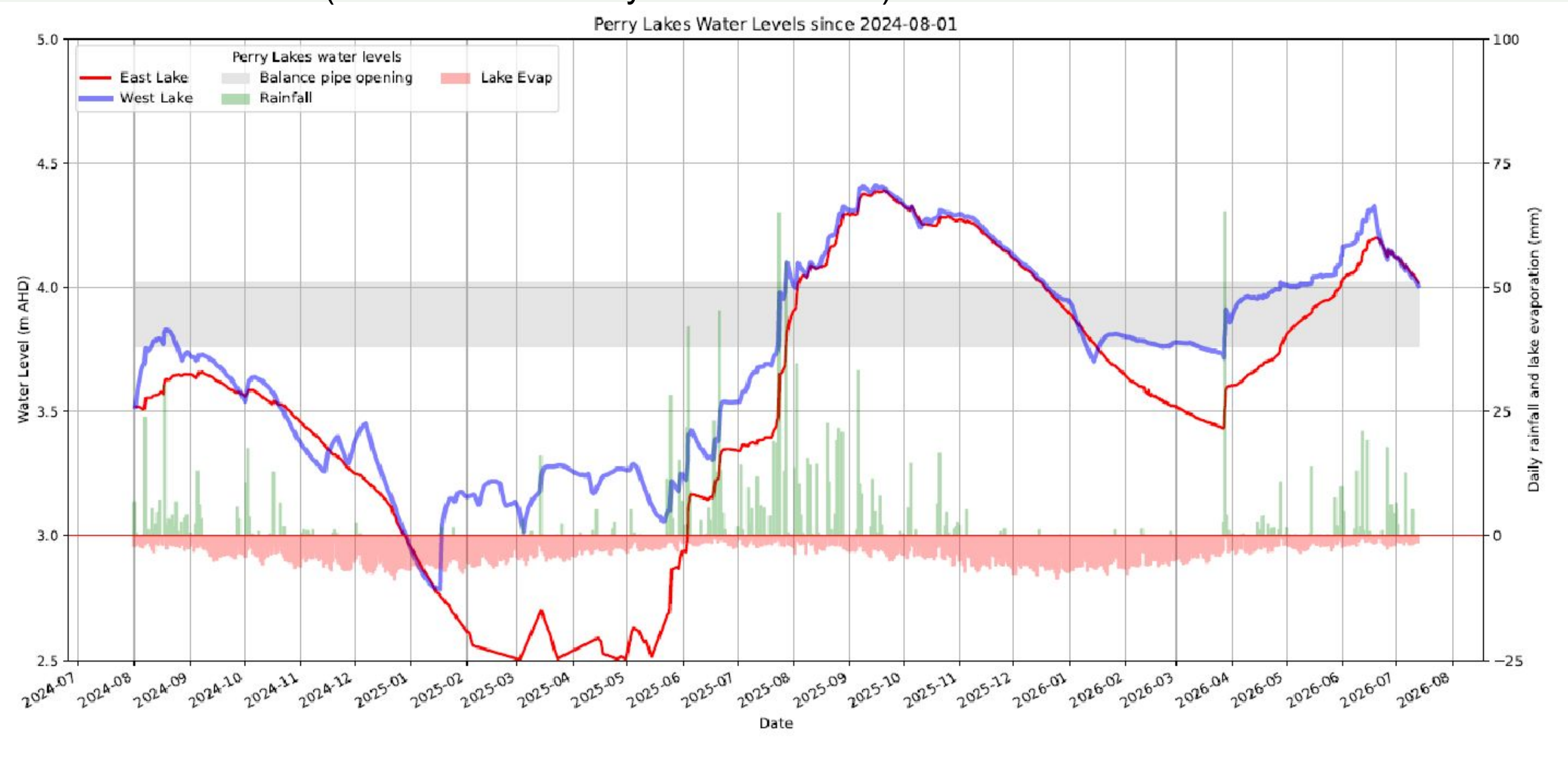
Fall between 1975 and 2010 due to climate change and increased pumping

Rise between 2010 and 2023 due to climate, reduced pumping and urban infill

Rise in levels since 2023 partly due to water pumped down from the Herdsman Main Drain

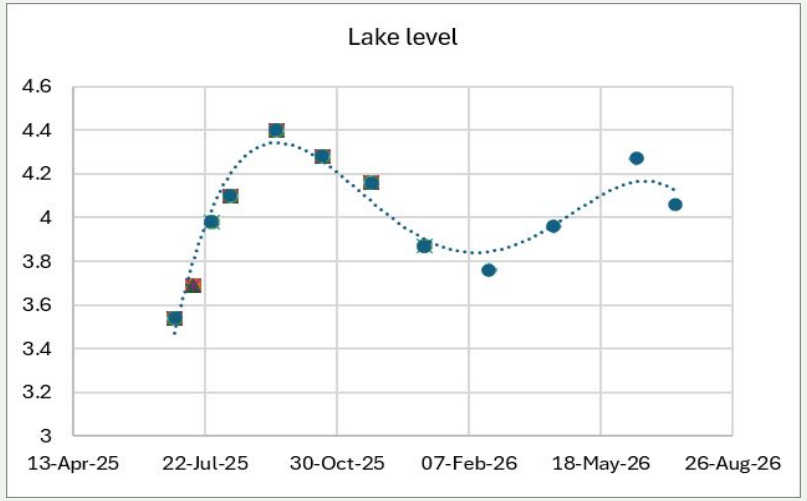
Daily levels since August 2024

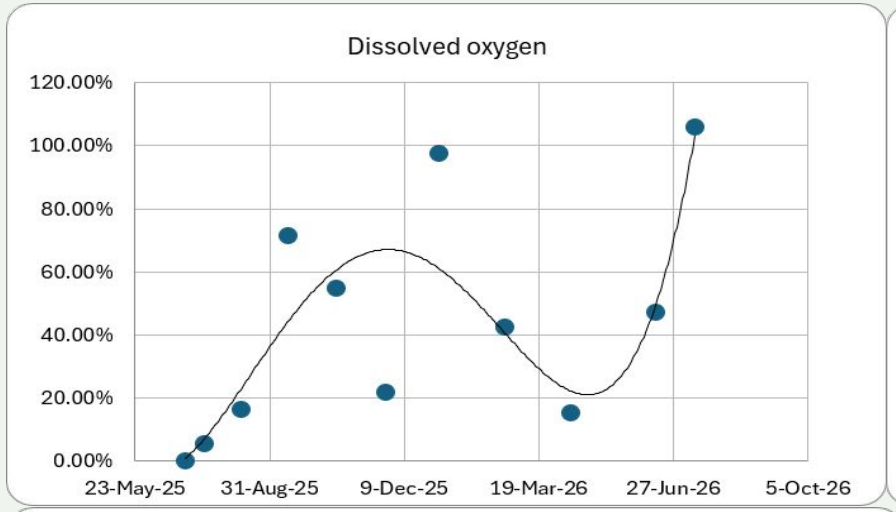
(thanks to Rod Banyard and DWER)

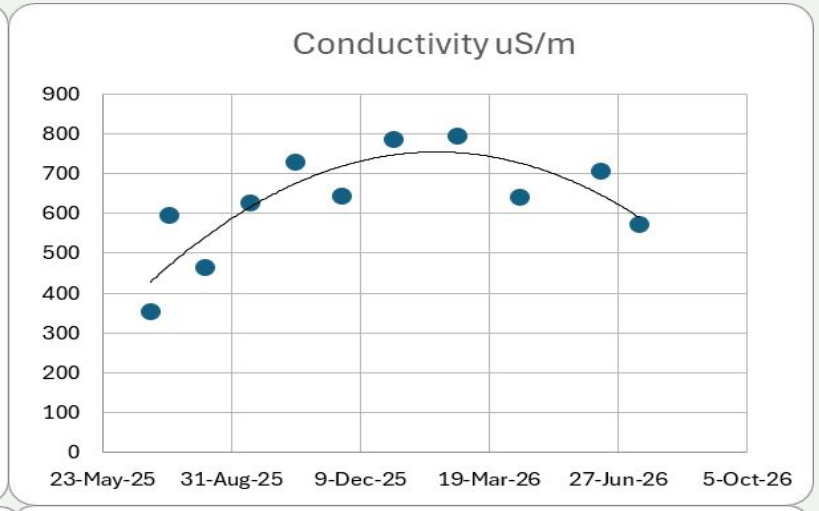


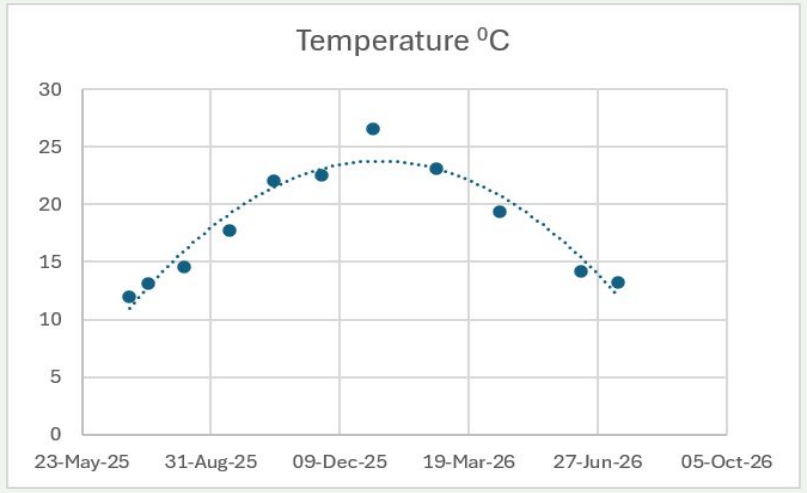
Transfer of pumped main drain water from new pipes to existing stormwater system in Ulster Road near McLean Oval

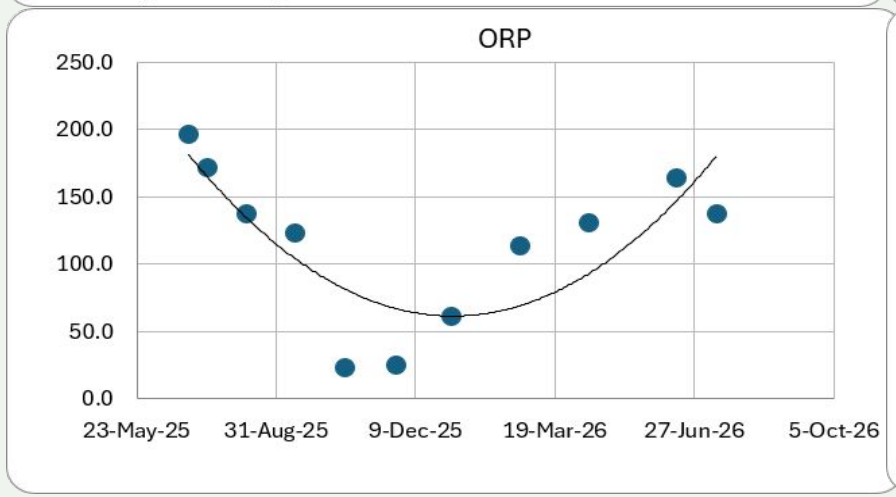
Seasonal variations in readings May 2025 to July 2026

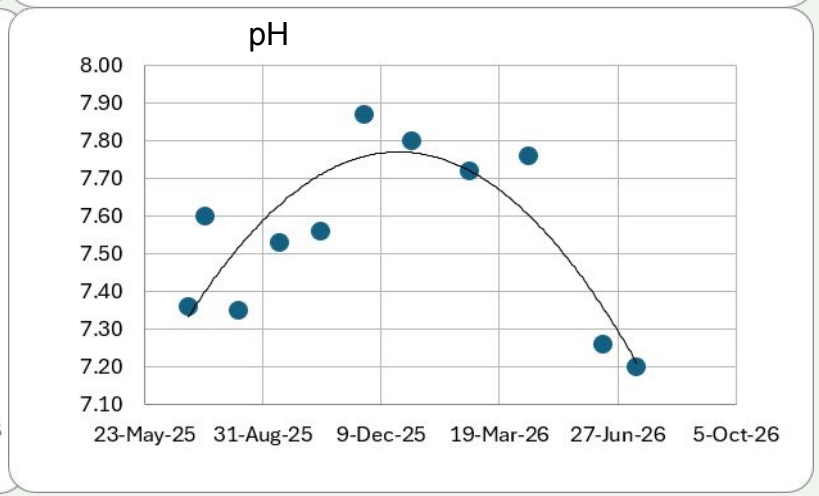










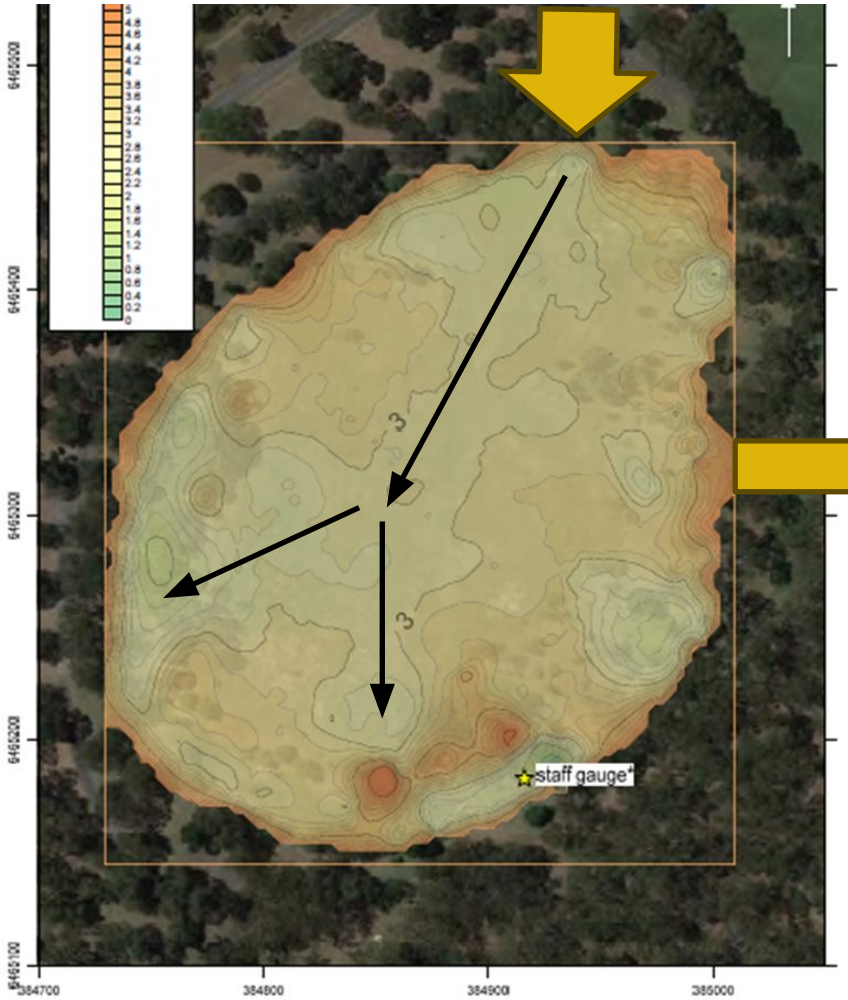


Cycles driven by seasonal conditions, runoff water salinity and temperature, photosynthesis and sediment interactions

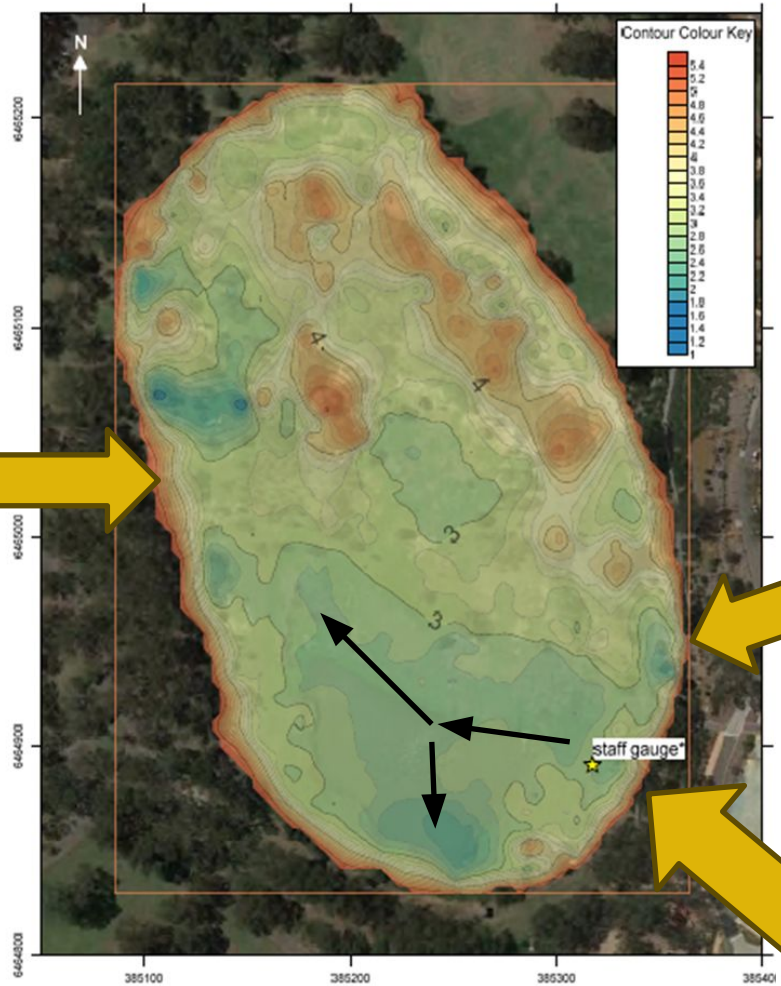
Water flows

West Lake
HMD and street drainage

East Lake



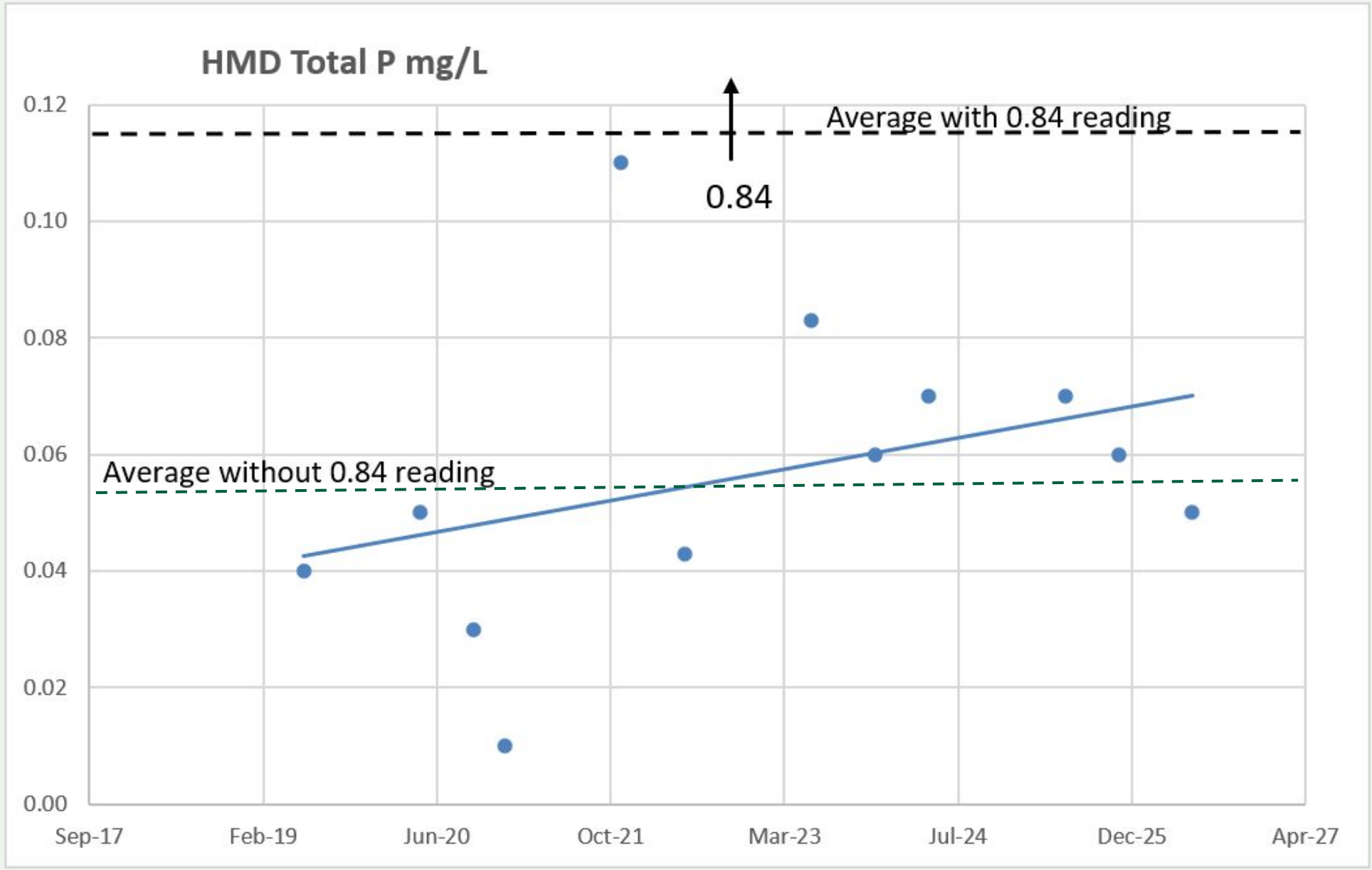
Balance
Pipe



G/W
inflow

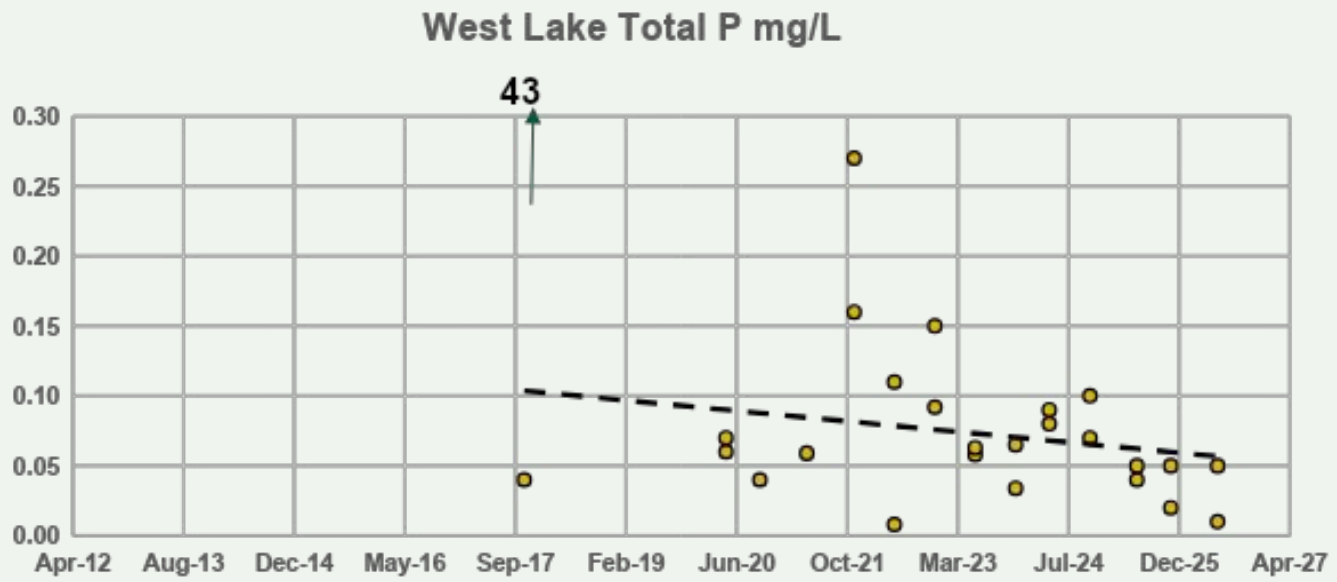
Street
drainage

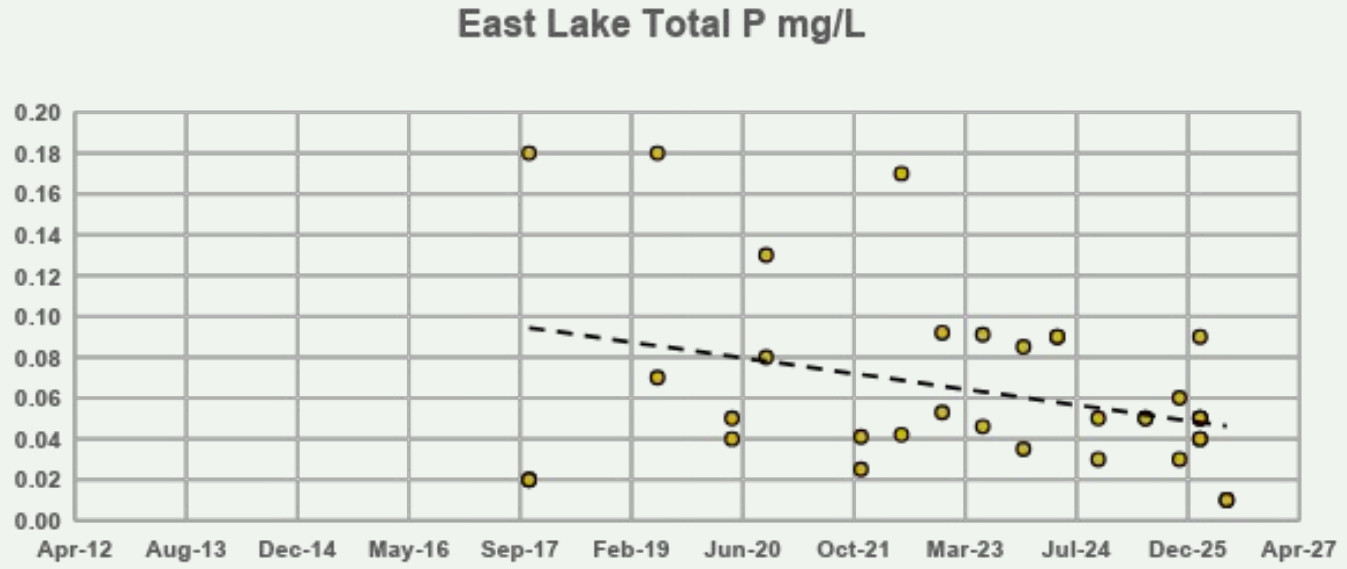
Total P concentration in the Herdsman Main Drain



1. Slight rise in Total P readings
2. Reactive P not measured with any sensitivity
3. Have started taking readings to see seasonal cycle

Biannual monitoring of Total P in lake water





Decreases in Total P concentration in recent years

East Lake average is 0.08 mg/L

West Lake average is 0.07 mg/L (without 43 reading)

Trigger levels 0.05, 0.06, 0.10, 0.12 or 0.15?

Road runoff levels:

East Lake average is 0.03 mg/L

West Lake average is 0.04 mg/L

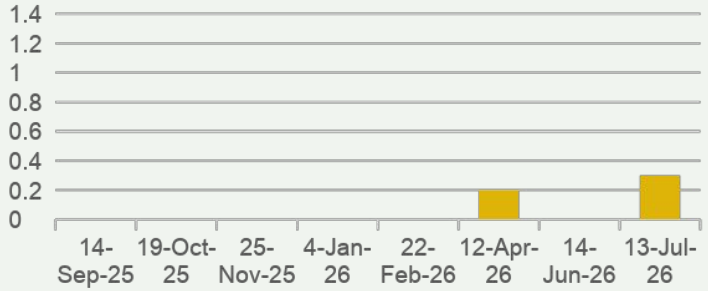
Can have falling P when:

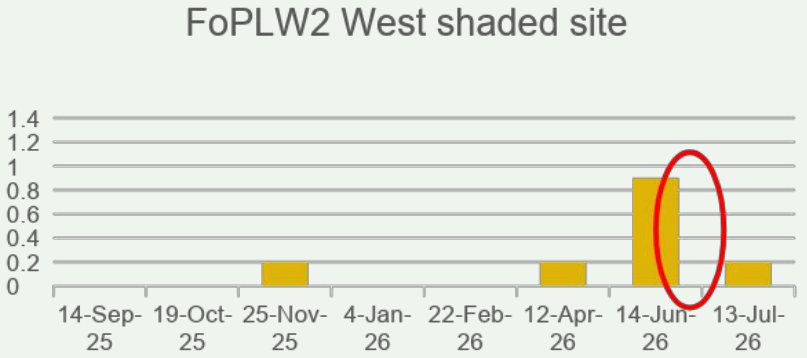
1) algae take it up when they grow. Recent increases in Total N and chlorophyll-a show increases
2) accumulates in sediments or reeds
3) is lost to the aquifer

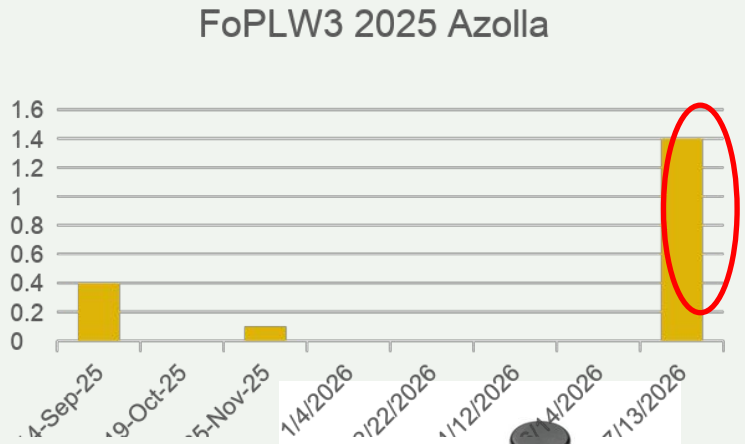
P may have been released in dry years when base was exposed

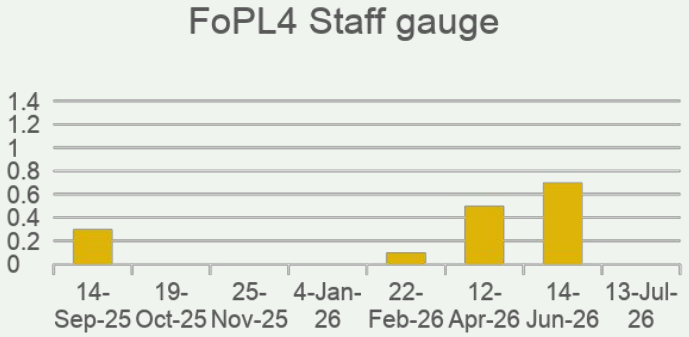
Ortho-P readings above 0.1 mg/L Sept 2025 to July 2026

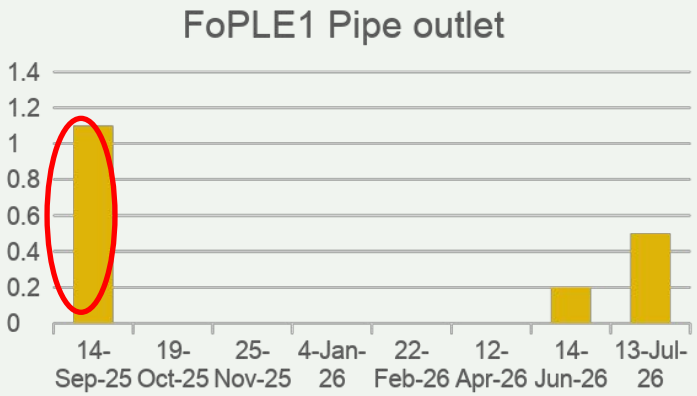
0.1mg/L is 10 times a trigger level for slightly disturbed wetlands

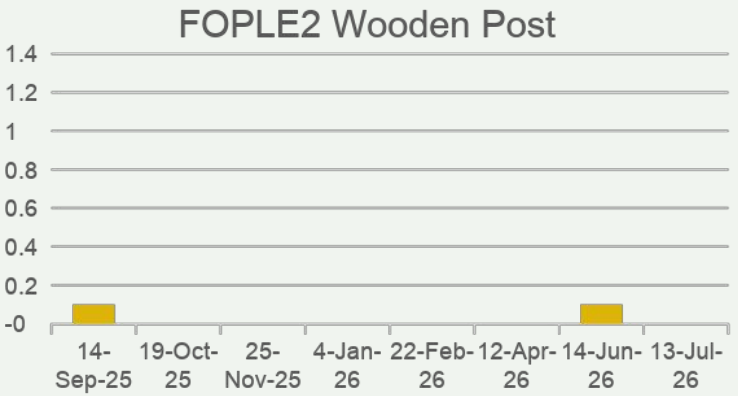


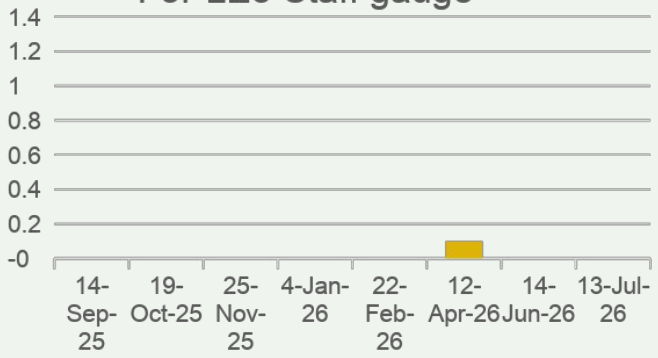


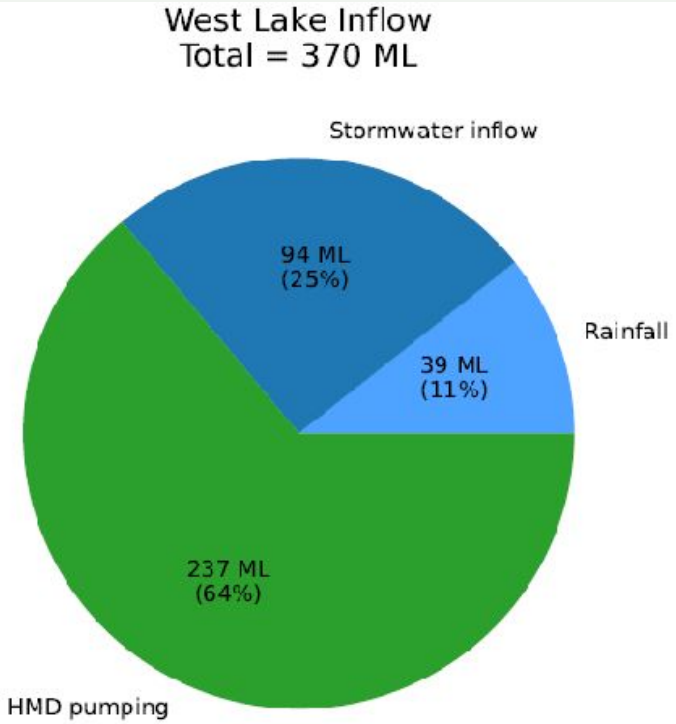


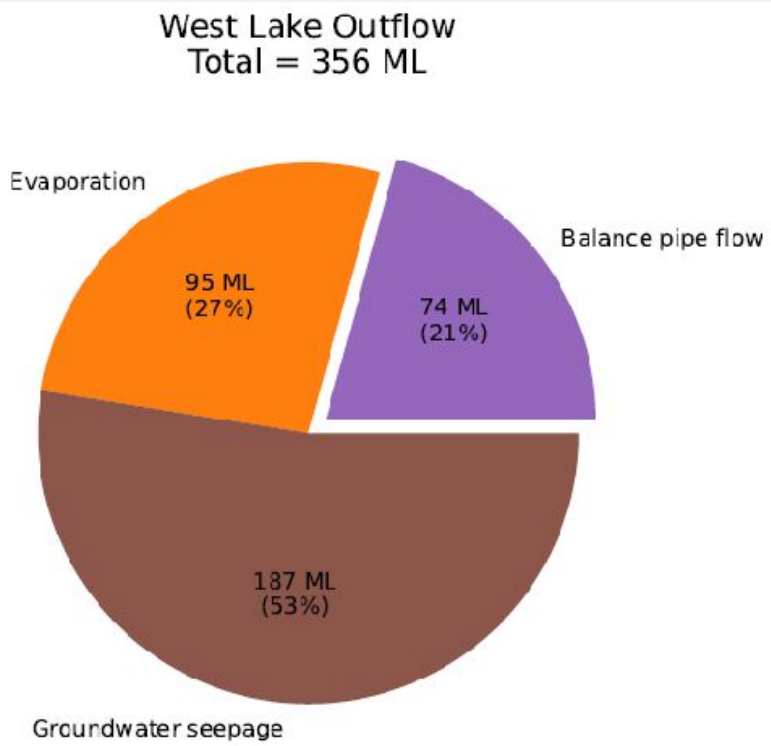




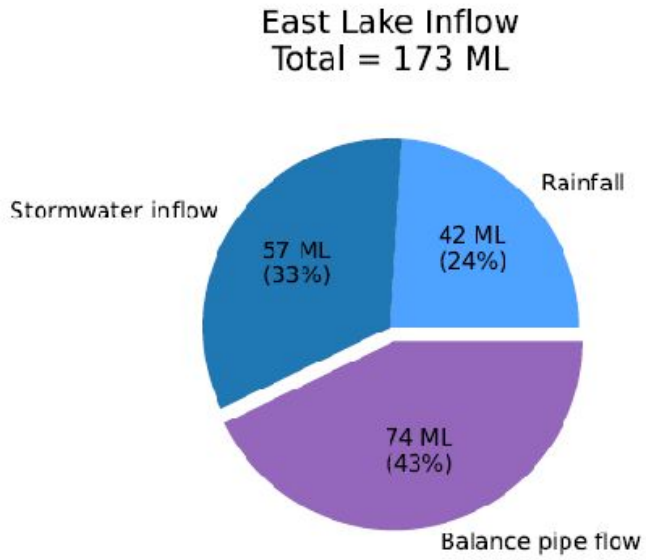


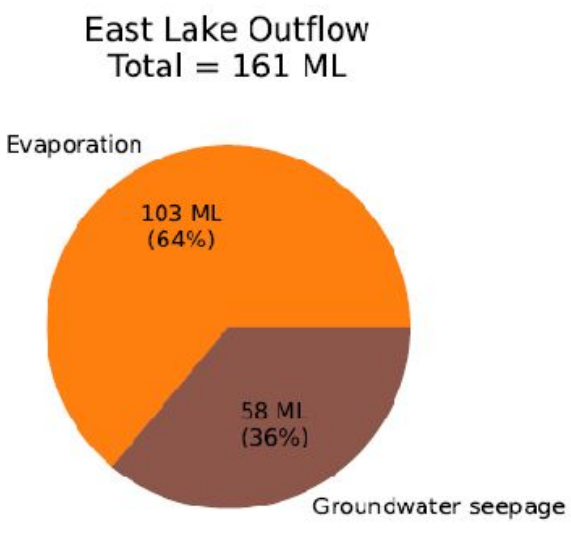


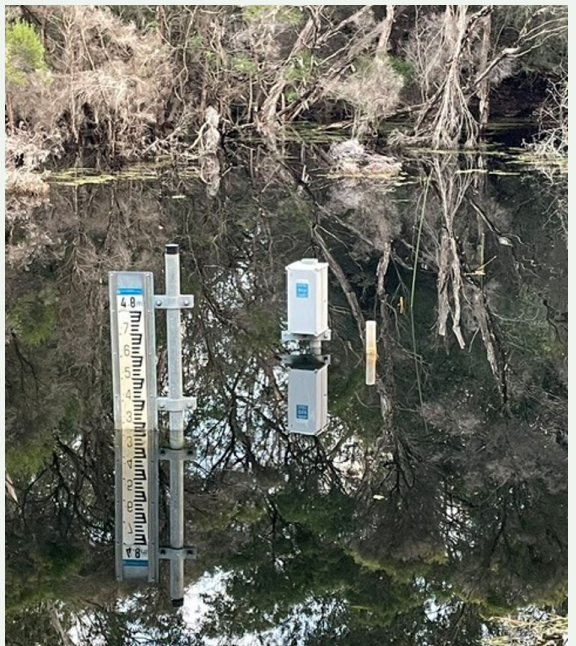




Perry Lakes water balance from 2025-07-01 to 2026-03-01

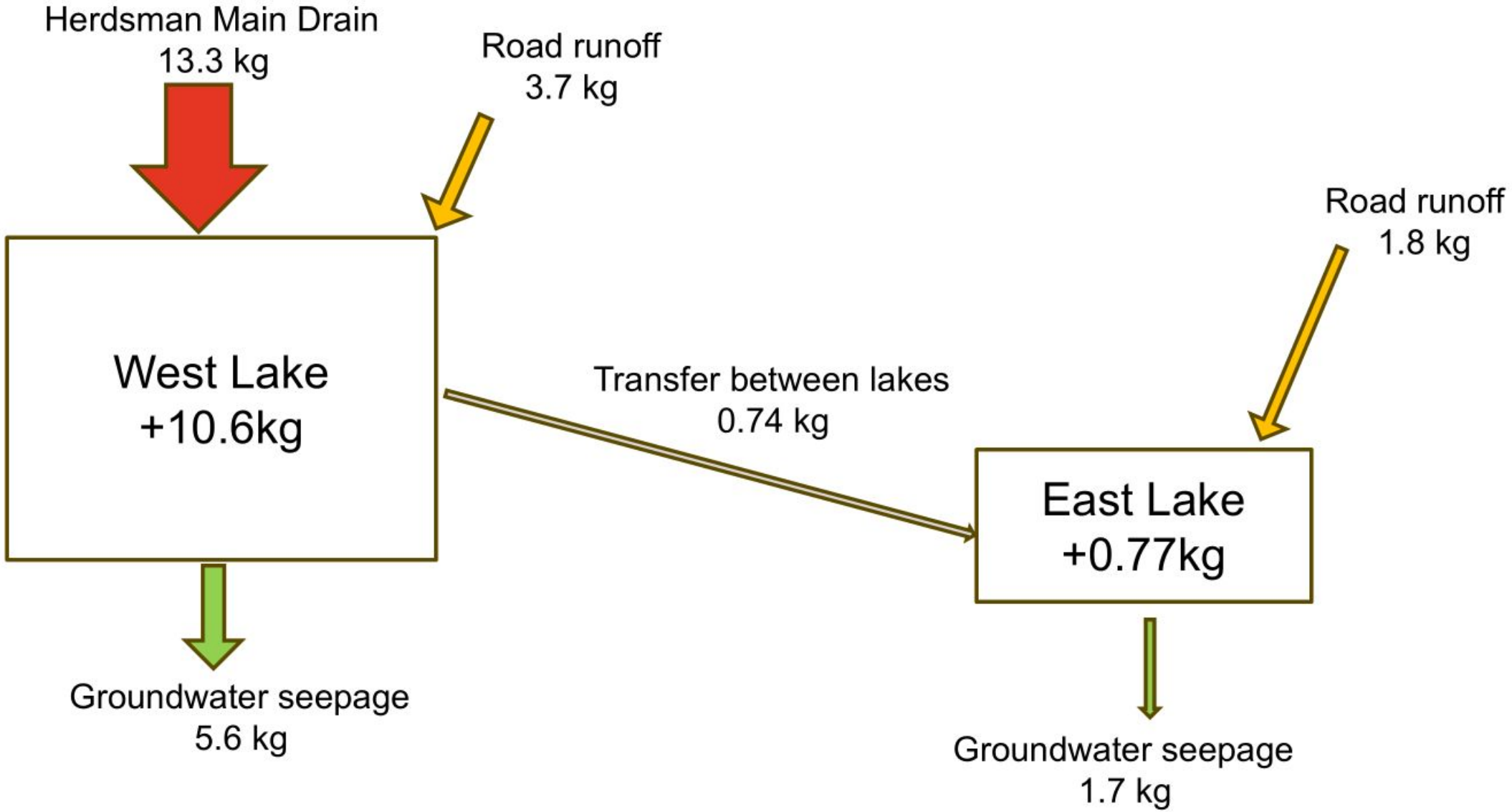






Total P flows and accumulations in the lakes

243 days between July 2025 and March 2026



Eutrophication (algal bloom) risk 1

Mainly caused by excess phosphorus (P)

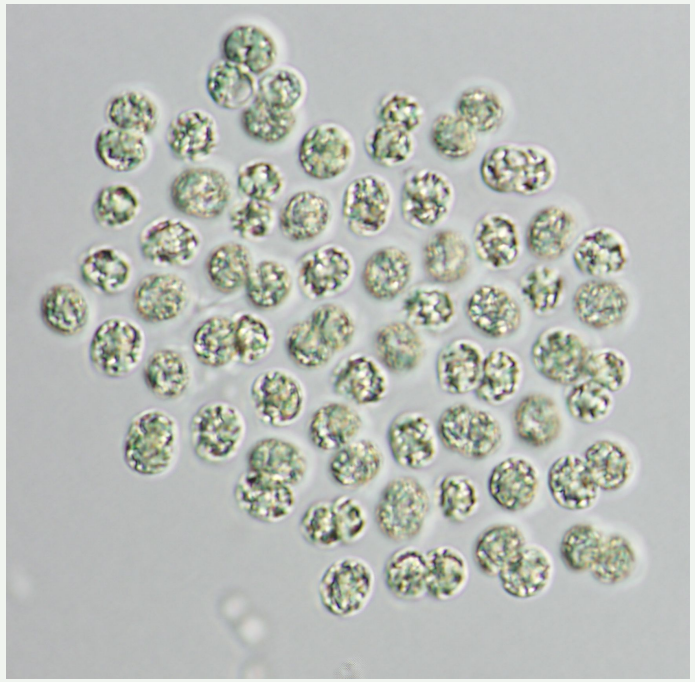
- Cyanobacteria (blue green algae) have toxins and deplete oxygen in the water when the bloom dies
- Birds lose food sources and fish die when oxygen is low. Frogs, invertebrates, algae growth and reproduction are disrupted
- Eutrophication increases midges, mosquitoes, odour, avian botulism. Possible impacts on human diseases (George Crisp to expand)

Microcystis bloom at Jualbup

Raphidiopsis (*Anabaena) and Microcystis bloom* at Galup

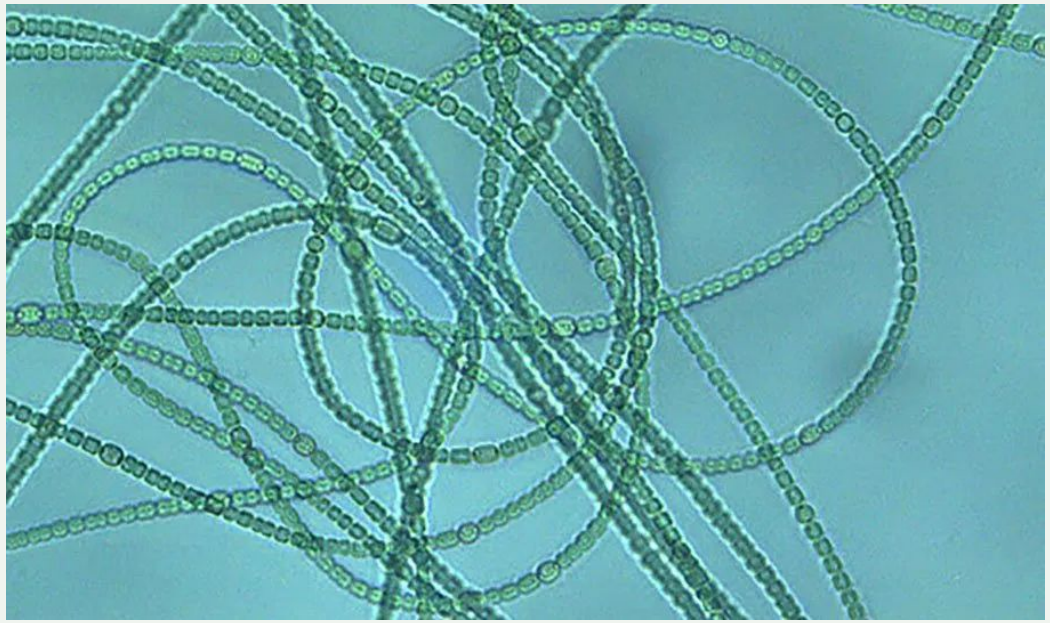
Eutrophication (algal bloom) risk 2

- Lake concentrations of Total P have decreased in recent years, but where additions from the HMD has gone is unknown (algae, reeds, sediments, aquifer)
- May not be many cyanobacteria ‘akinetes’ (spores) because of no serious blooms
- There are stores of P in the lake sediments which carp introduced from the HMD can mobilise



Microcystis

Raphidiopsis (*Anabaena*)



Other indicators of eutrophication

Macroinvertebrates - SLR report 2023

- **West Lake** – "*eutrophication may be present; more investigation is needed*"
- **East Lake** – "*eutrophication is unlikely*"

Levels of midge and mosquitos

Water colour, odour

Bird use

Avian botulism

Reduction of eutrophication risk and management if it occurs

1. Harvest and remove about 16 kg P/y *Azolla* and/or *Typha* – mainly West Lake

Up to 0.3% P in living Typha (dry matter).

Only up to 0.05% P in dead Typha

Reduction of eutrophication risk and management if it occurs

1. Harvest and remove about 11 kg/y *Azolla* and/or *Typha*
2. Treat inlet areas – vegetation filter, P-fixing material (lime, crushed gravel)
3. Ensure streets are swept and gully traps adducted
4. Keep peat inundated to reduce P release
5. Remove carp through electrofishing or predation to reduce nutrient mobilisation
6. Chemicals to fix P: PhosLock^{TM}, Hydrotalcite, Aquaritin, Soilzyme, Simplot
7. Aeration using fountains

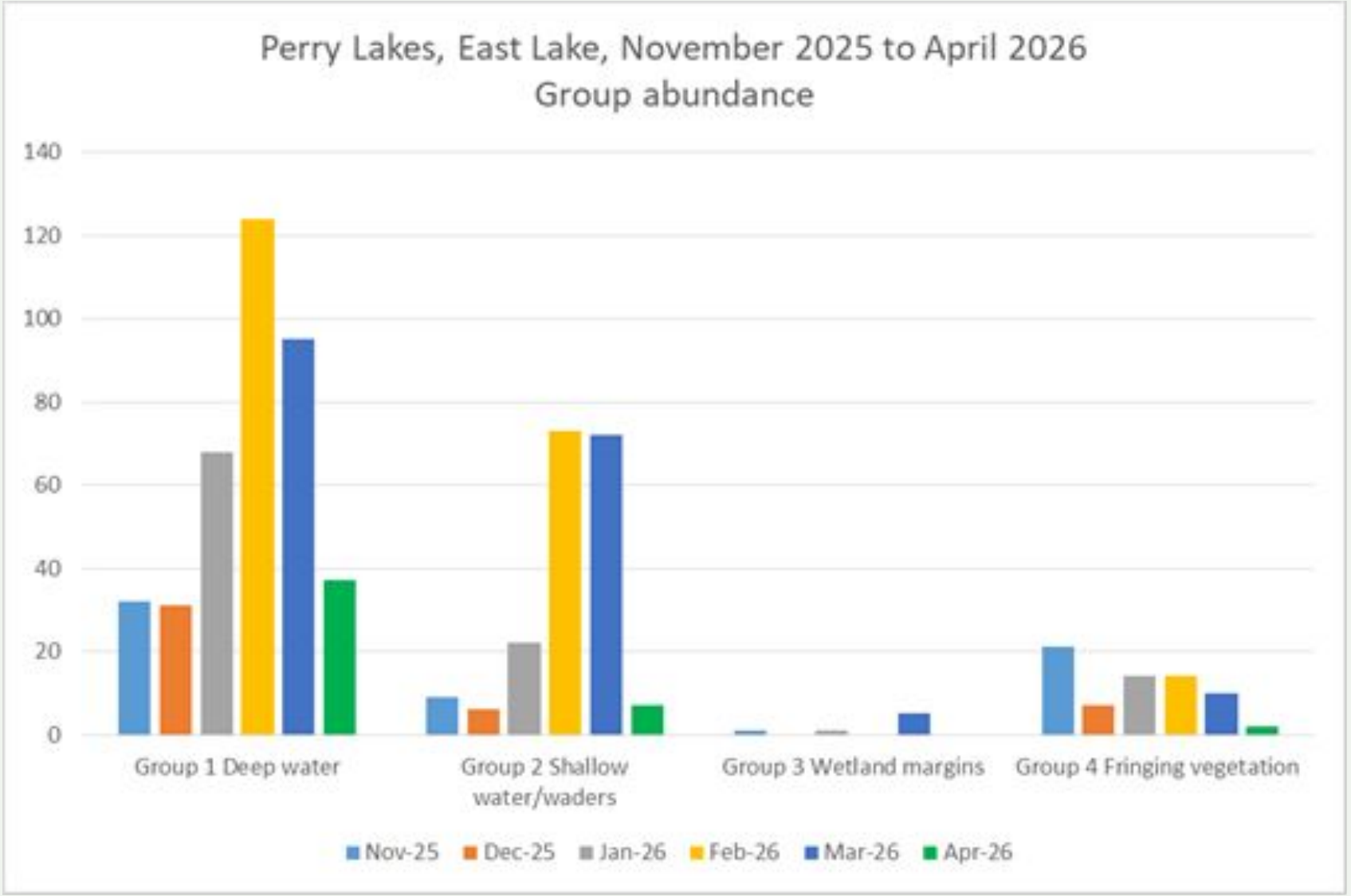
Waterbird monitoring by Citizen Scientists

Use the Birdlife WA eBird app along designated transects

Perry Lakes is an important summer refugia

As winter progresses, many waterbirds move inland to breed

With limited shallow water, few wading birds use the lakes



Main messages

1. The Herdsman Main Drain diversion is keeping lake levels much higher so that they act as a wildlife refugia in dry years (preferencing ‘deep diver’ birds). East Lake would dry in summer without additions

2. The diversion is introducing phosphorus (P) and carp into West Lake especially

3. The P could be is removed in vegetation and/or be stripped out before addition

4. People live very close to Perry Lakes so any human health impacts could be more likely than in Galup were the lakes to become eutrophic through a lack of intervention

5. Perry Lakes water levels and P loads needs to balance environmental, social, flooding and health impacts

Thank you