

Citizen Science

Exploring the Interconnectedness of Nature



STARTS HERE





Sharing our vision

- Volunteer-run.
- Focus: conservation, preservation, community stewardship.
- Active in advocacy, education, on-ground work.





Together, we make a difference





Citizen Science

- Community involvement in scientific research.
- Anyone can participate — no science background needed.
- Collects valuable data to inform decisions



OBSERVE



RECORD



PROTECT



Why it's important

UNDERSTAND

What changes are resulting from climate change, reserve management, pest /weed /disease invasions and people pressures

DATA

To convince the Town of the need for change management or to increase monitoring

COMMUNITY

Involve in the management of the reserve bringing together multiple skills, time and interests





Water Levels

Presented by Rod Banyard

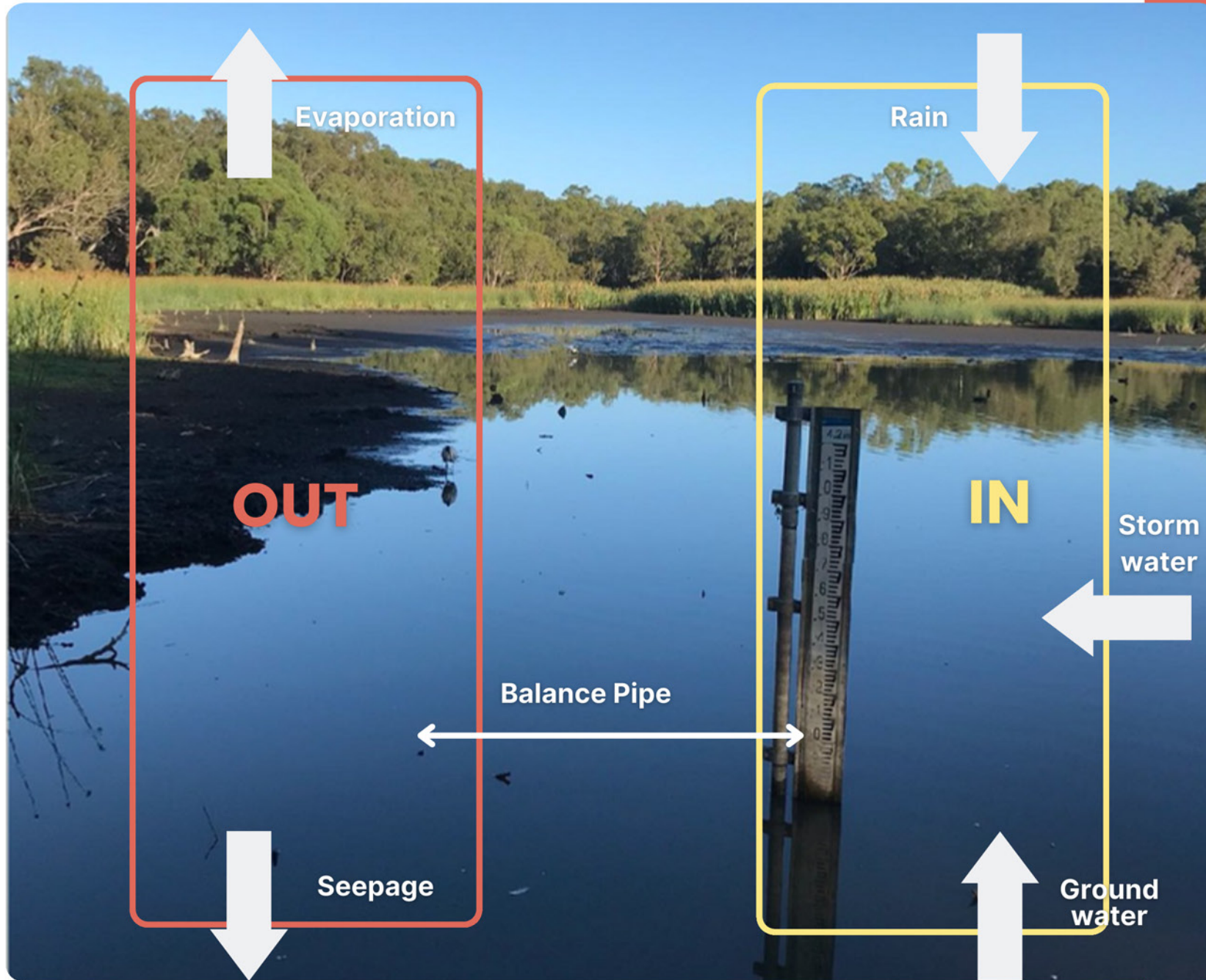


Perry Lakes



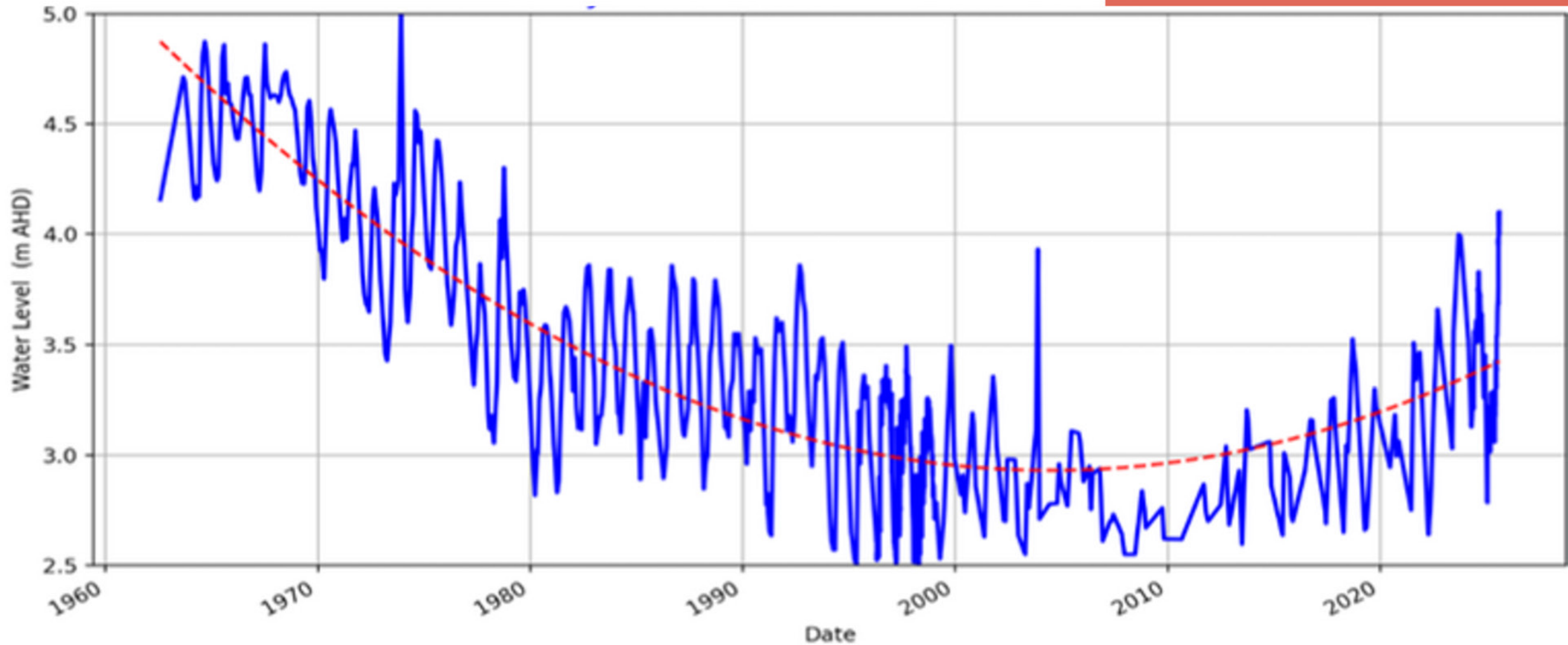


Water Balance



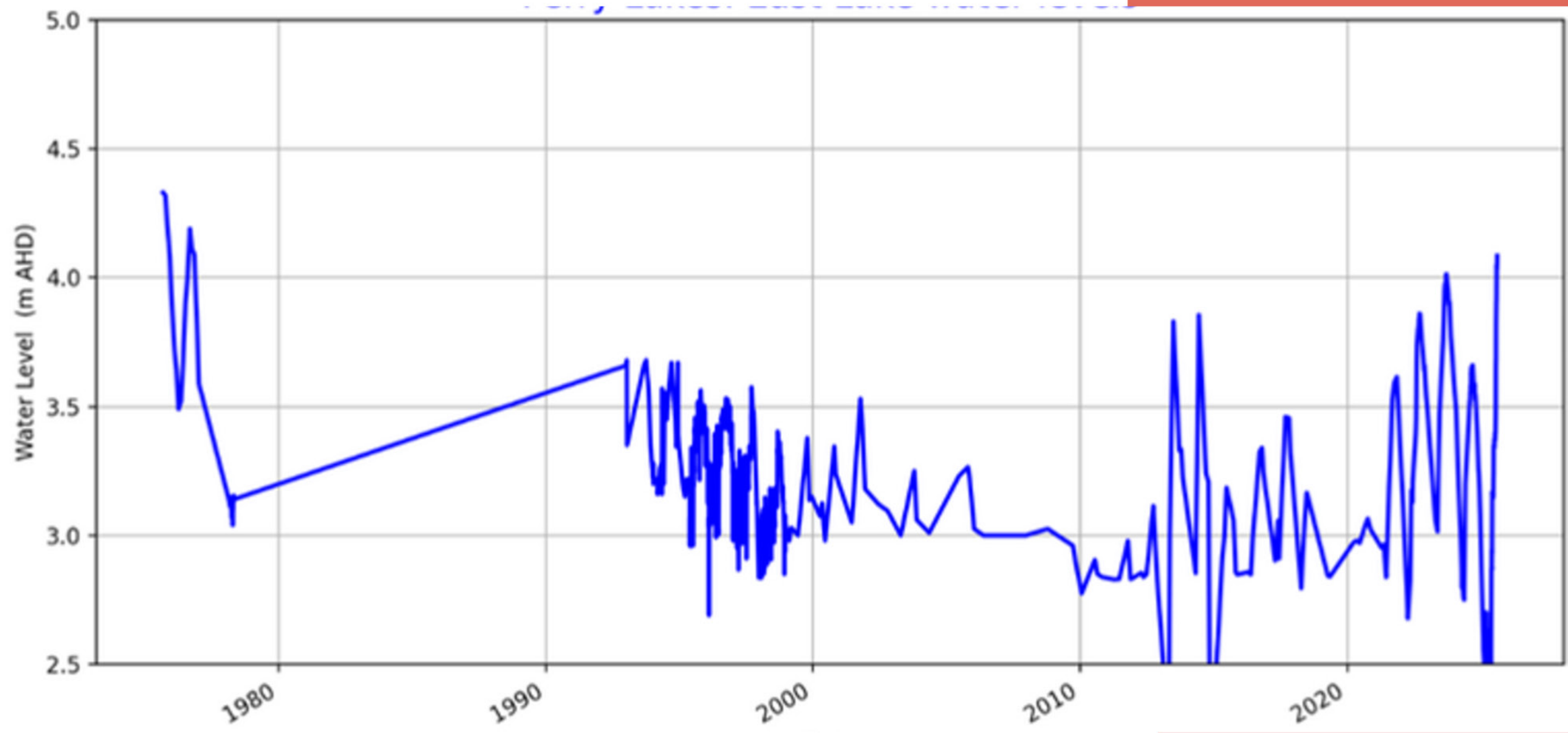


West lake water level history 1963 – present



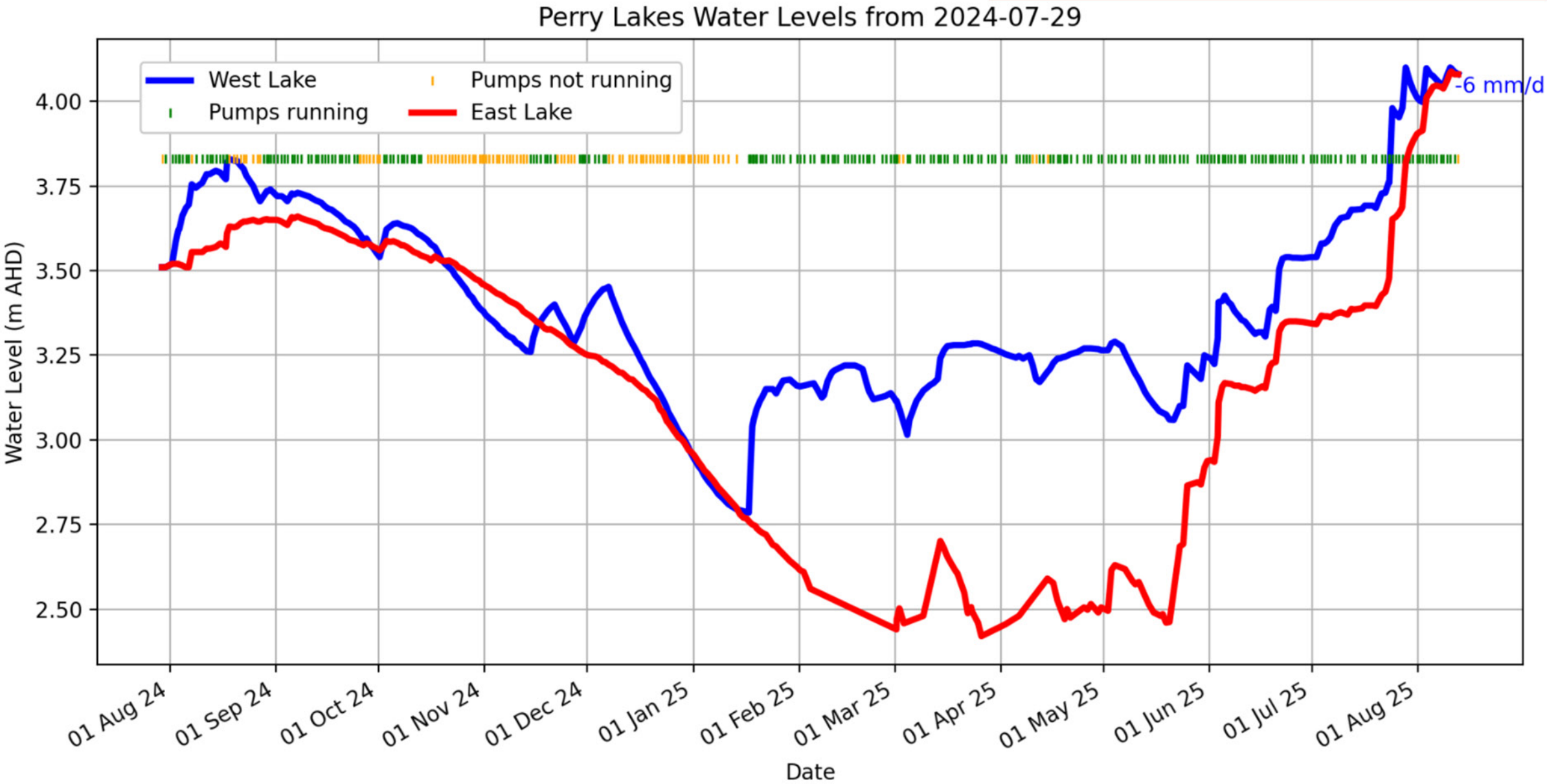


East lake water level history 1975 – present





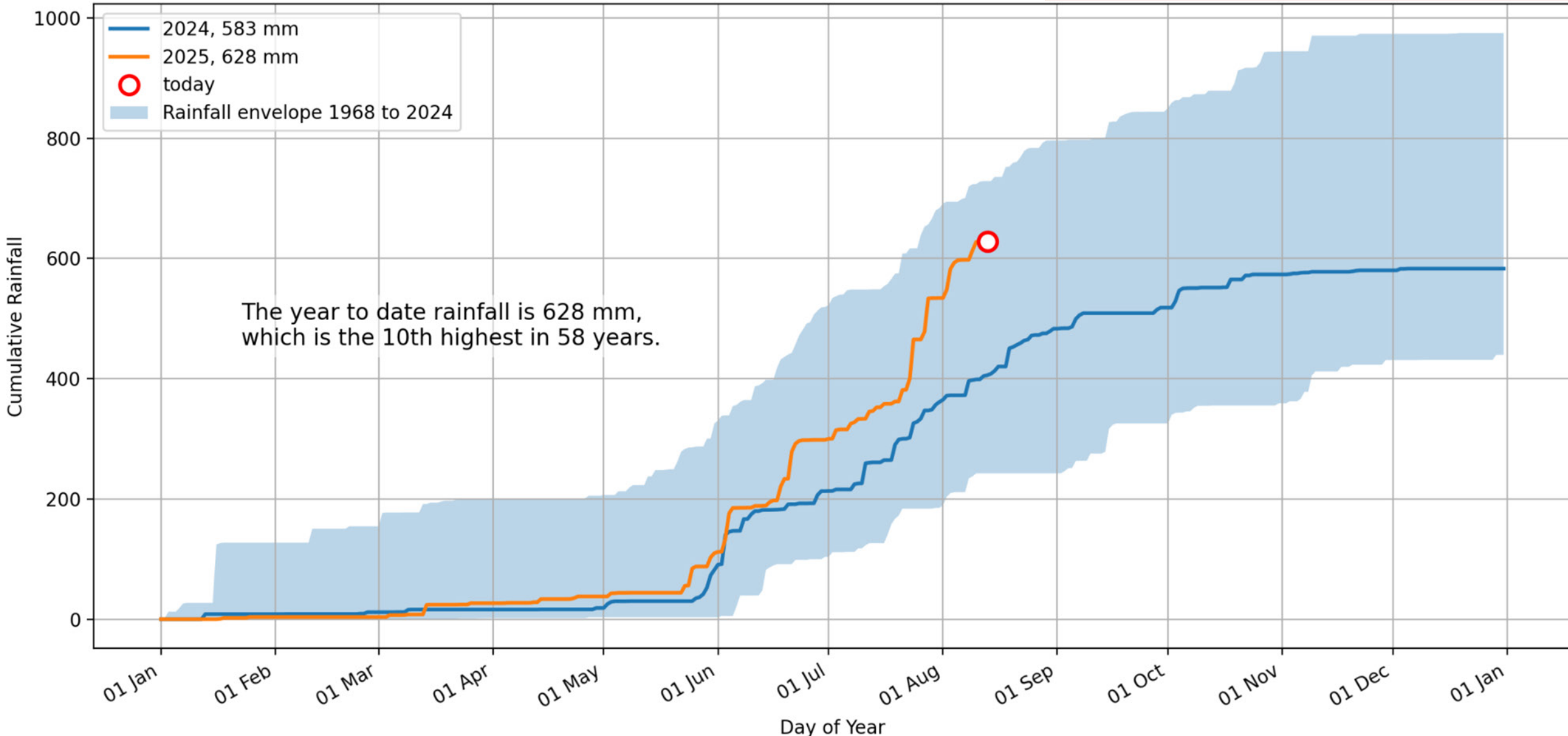
Last 12 months





Floreat rainfall

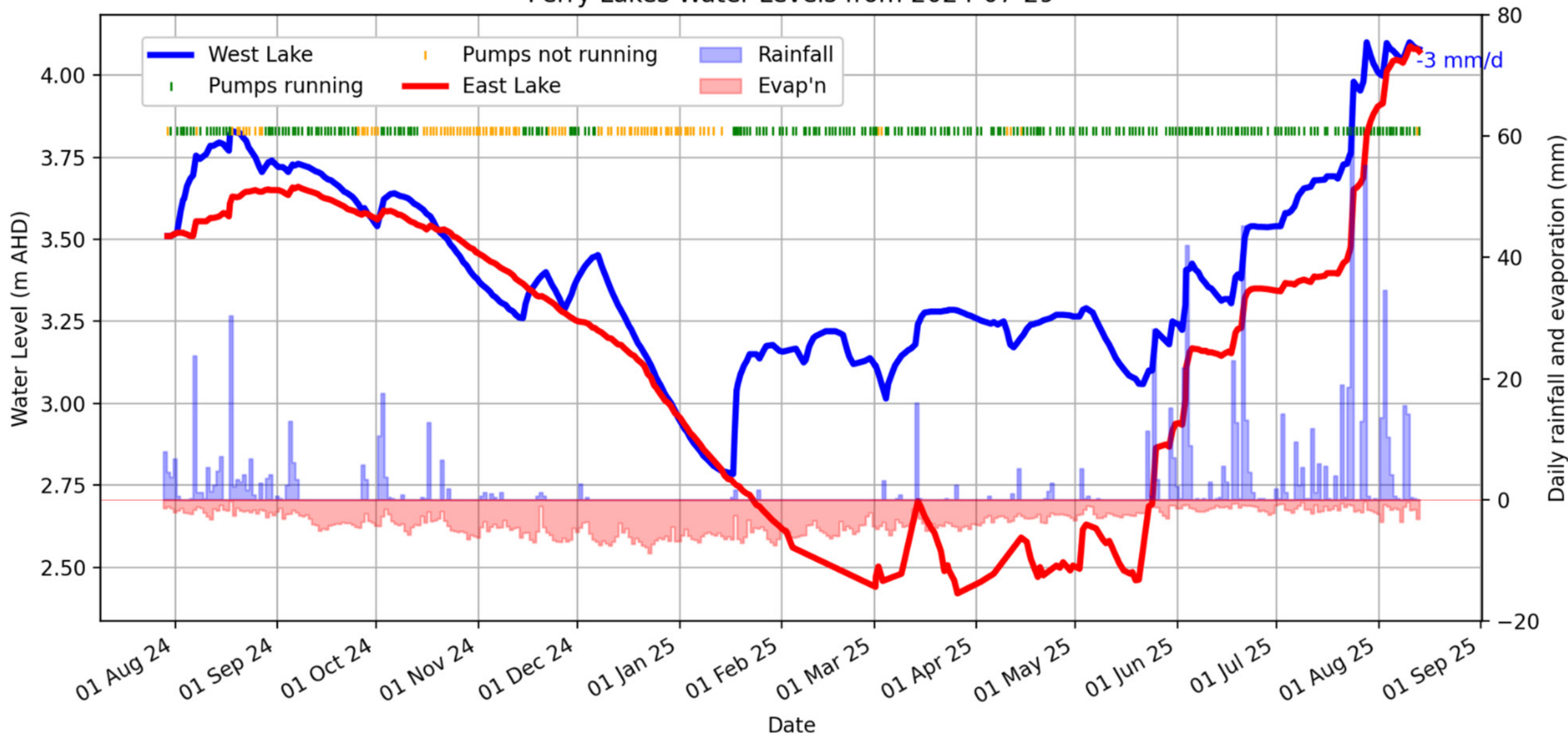
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With rainfall and evaporation

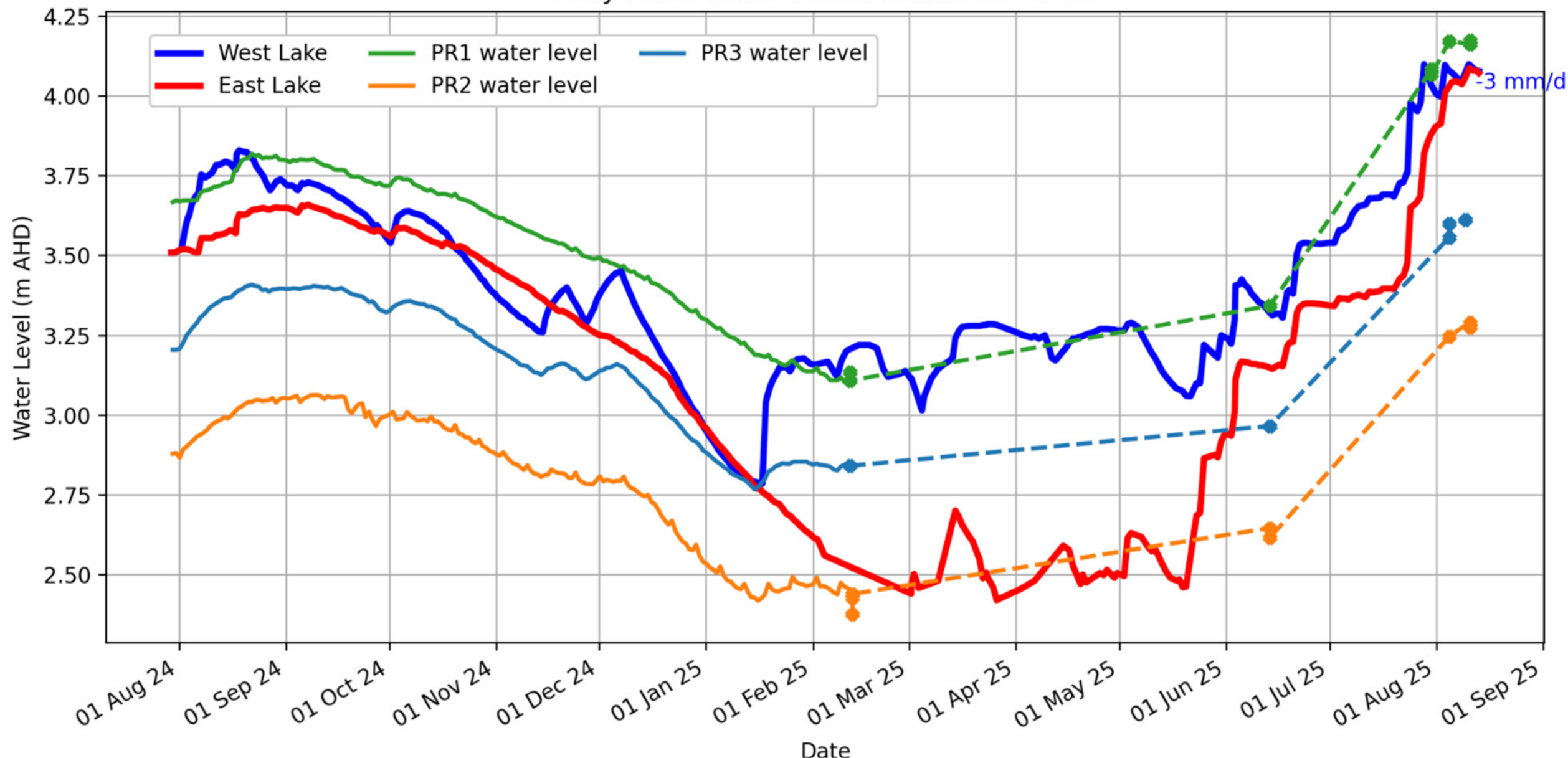
Perry Lakes Water Levels from 2024-07-29





Levels with groundwater

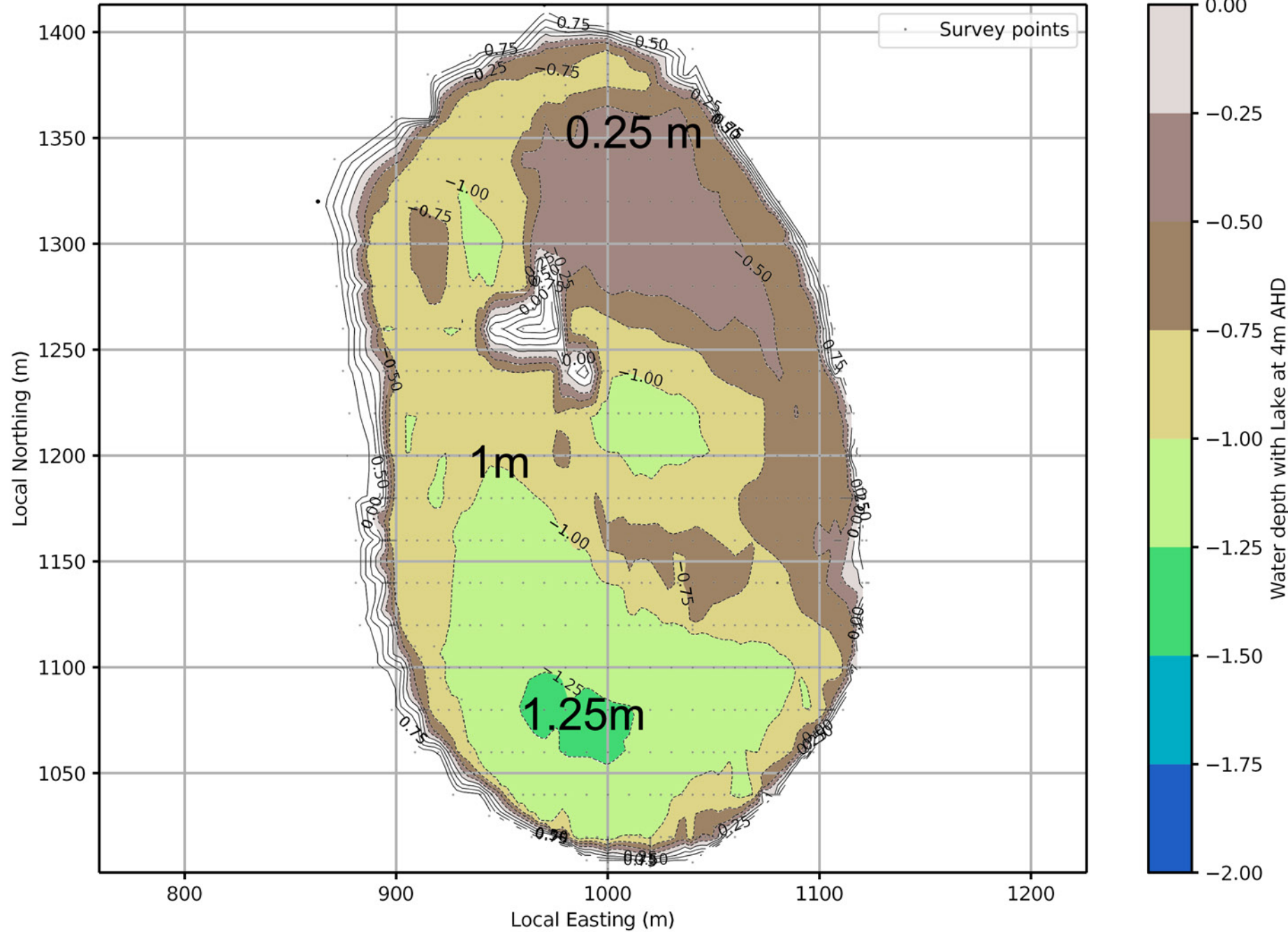
Perry Lakes Water Levels from 2024-07-29





Water depth

East Perry Lake Bed Levels





Herdsman water inflow





Balance Pipe West Lake





Water level gauge – Mark I





Mark II





Mark III



A woman with short brown hair, smiling, is standing in a shallow stream. She is wearing a dark green t-shirt, a grey life vest, and waders. She is holding a long, thin pole or tube that extends into the water. The stream is surrounded by trees, and the water reflects the surrounding greenery. The entire image has a green tint.

Water quality

Presented by Dr. Don McFarlane



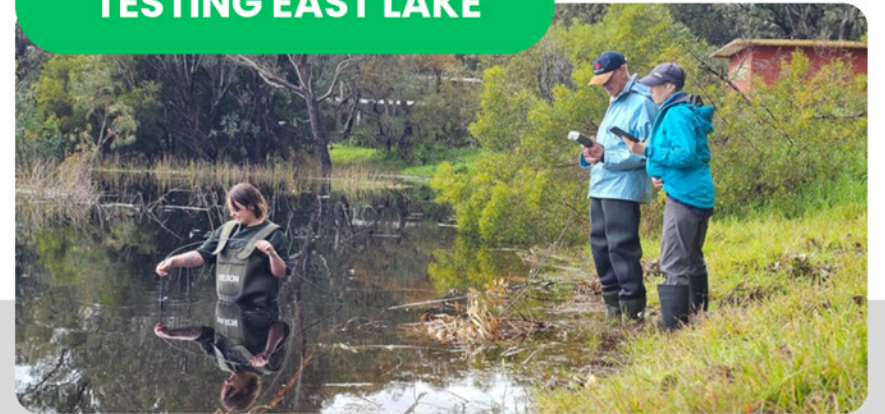
How we do it

- Help analyse twice-a-year water quality data collected by contractors employed by the Town
 - Four lake water samples plus the Herdsman Main Drain
 - Ten sediment sample sites
 - Ten macroinvertebrate sites (large aquatic insects)
- Citizen Scientists take monthly measurements of temperature, pH, turbidity, oxidation-reduction, dissolved oxygen, salinity (electrical conductivity) at 3-5 sites per lake to add to 1) above

HI9829 TRAINING



TESTING EAST LAKE





How we do it

- Ad hoc measurements to answer specific questions about algal blooms, reed growth, road runoff quality, water mixing etc
- Visual checks of algal blooms, odour, colour, light / shade, carp
- Look for correlations between algal blooms, reed growth and water quality. Plants and microorganisms need nutrients, light, warmth, and the correct acidity and oxidation status to grow

HMD INFLOW TEST



MARKING A SITE





Town's water quality results – what we're seeing

- The main threat is toxic blue-green algae (cyanobacteria) caused by too much Phosphorus (P)
- Eutrophication greatly reduces food for birds and depletes oxygen needed for aquatic life
- Low oxygen helps the growth of Clostridium botulinum, a bacterium that produces a toxin that causes botulism in birds.
- Since 2019, West Lake has exceeded a 0.06 mg P/L threshold about two-thirds of the time, although levels appear to be stable.
- East Lake has slightly lower and more stable P levels
- The Herdsman Main Drain water can bring in N, P, carp, cysts and have low dissolved oxygen
- Loads (kg) are more important than concentrations if P is not removed

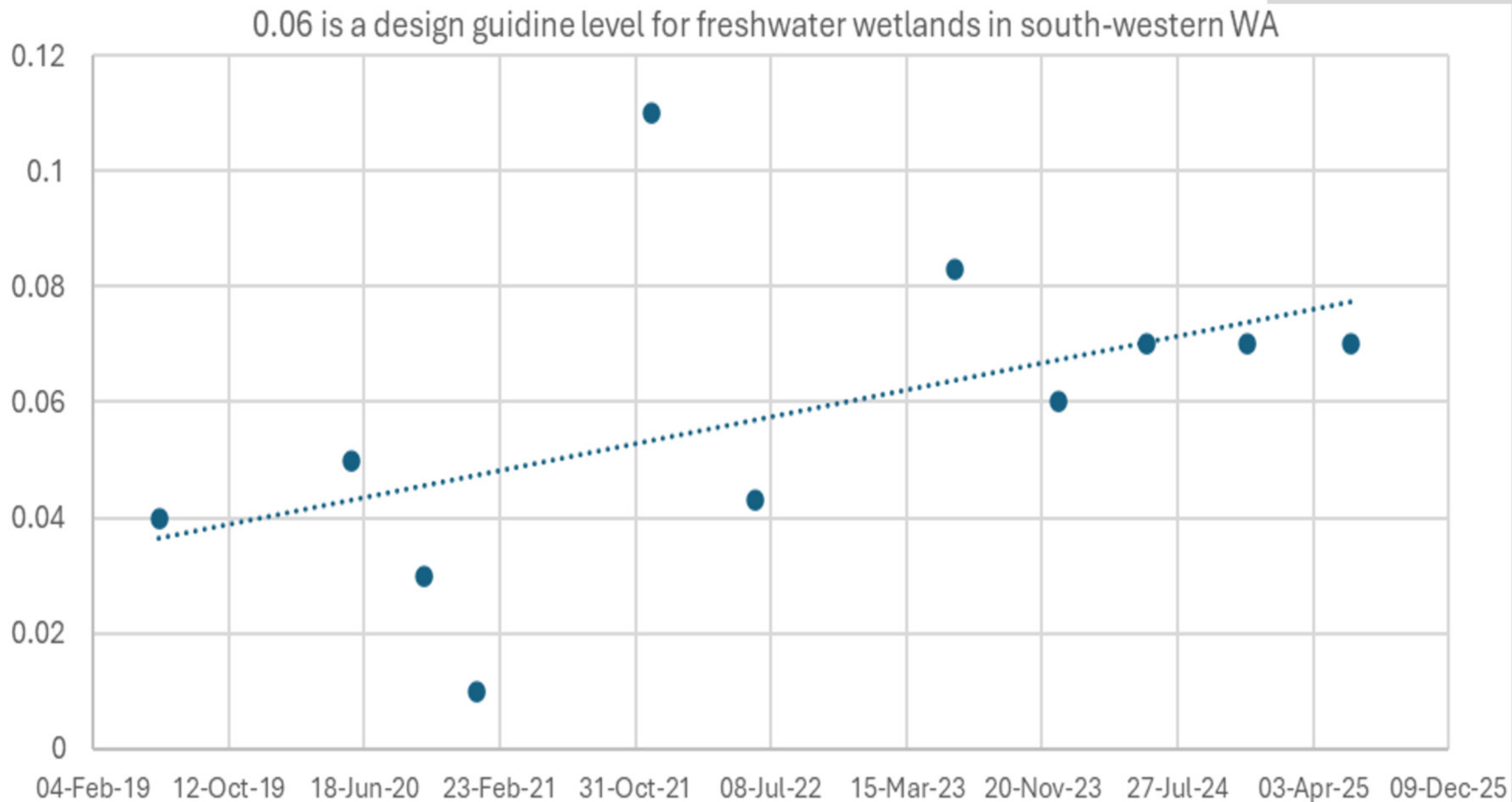


Town's water quality results – what we're seeing

- The HMD has had about 0.07 mgP/L since pumping started. It has increased over time.
- About 1 billion litres (1 GL) of water has been pumped since March 2023.
- If the average P in HMD water is 0.07 mg/L, this equals 70 kg P, or 30 kg per year.
- Typha and Azolla can contain about 0.5% P dry matter requiring 6 dry weight tonnes to be removed each year. The concentration of P in Azolla may be higher requiring less to be removed.
- These values need to be measured because their concentrations depends on water concentrations. Some P may be lost to seepage and the sediments may fix or release P (carp, hypoxia).
- This 30 kg/y load comes with the pumps only working at 10-15% capacity so the weight to be removed may increase in future.



Total Phosphorous in Herdsman Main Drain 2019 to 2025 (mg/L)





Citizen Science Measurements

Volunteers were trained on this instrument and receive ongoing training as to how data can be interpreted.

Hanna Instruments HI9829
supplied by Town of
Cambridge







FoPL water quality monitoring

What we're seeing

- In 2024 Azolla (water fern) covered parts of West Lake, and reeds (*Typha domingensis*, *T. orientalis*, and *Schoenoplectus tabernaemontani*) encroached on water areas needed by birds.
- Lake water is usually slightly alkaline. Water from the Underwood Avenue – Brockway Road drain water is more alkaline than runoff from the development
- East Lake was brackish over summer.
- Runoff is very fresh (< 10 mg/L).
- Winter lake water is fresh (150 – 400 mg/L).
- The Herdsman Main Drain is fresher and more oxygenated in winter. It is mainly groundwater in summer.



FoPL water quality monitoring

What we're seeing

- Lake water temperatures are 12–15°C but stormwater can be < 10°C.
- Stormwater is very oxygenated but lake waters close to the bottom and in 'stagnant' areas can be low in oxygen and reducing (low redox potential). This includes the S and SW parts of each lake which may be important for the release of nutrients and an outbreak of avian botulism.
- Water quality in a recent Azolla outbreak in West Lake was anoxic and slightly reducing. We will check this in future Azolla outbreaks,
- FoPL is buying a \$1,000 instrument to measure P in lakes and drains.
- FoPL can help decide how many reeds to remove to keep P low



Cyanobacteria outbreak in Galup





What it all means

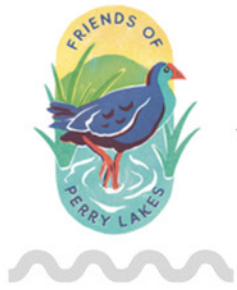


- What are the trends, tipping points, interactions and dependencies?
- What can we do to influence outcomes?
- Need to integrate measurements and understand processes.
- Early intervention is likely to be much more cost effective than recovery. Galup is too degraded.
- Need to keep P low, carp from disturbing sediments and reeds from covering the lake surface.
- Citizen scientists are our sentinels



Animal Surveys

Presented by Dr. Andrew Burbidge



Waterbird surveys

- Aim: to correlate waterbird presence/absence with water depth and water quality in the two lakes.
- Method: birdwatchers count birds using BirdLife Australia's birdata app.
- Four transects have been set up. Counts should be on one or more of the transects. Map and method to follow is on the FoPL website.
- We are currently negotiating with BirdLife data people in Melbourne so that we can download information from the Birdata app.



Photo courtesy of FoPL member Ian Stewart



Survey transects





Spot It, Share It

Report sightings of quenda and turtles via our **Spot It, Share It** QR form.

- Quenda (a bandicoot), only occurs in SW of WA
- Oblong turtle (SW snake-necked turtle) only occurs in SW of WA
 - Females emerge to lay eggs from November to January



QUENDA (A BANDICOOT)



OBLONG TURTLE



Report wildlife sightings to wildlife@friendsofperrylakes.org or upload via QR code.



Citizen Science Website

CITIZEN SCIENCE DATA

We aim to share our knowledge with the community by creating a hub for Citizen Scientists on our website.

<https://friendsofperrylakes.org/about-csi-perry-lakes>

EDUCATION MATERIALS

To assist Citizen Scientists, training and educational material in each discipline are provided on our website.



Q&A



**SCAN QR CODE
TO SUPPORT US**