City of Bayswater

Maylands Lakes Community Forum

5 September 2024

Getting Started

Acknowledgement of Country

Setting the Scene

Aha! CONSULTING

Agreements

"Passion is the wind, reason the rudder – both are needed to sail a ship."

Session Purpose

- Update from the last session
- Department of Health
- Current approach to revegetation
- Master Planning

Aha! CONSULTING

1. Status Update

Update Since Last Session – Power BI

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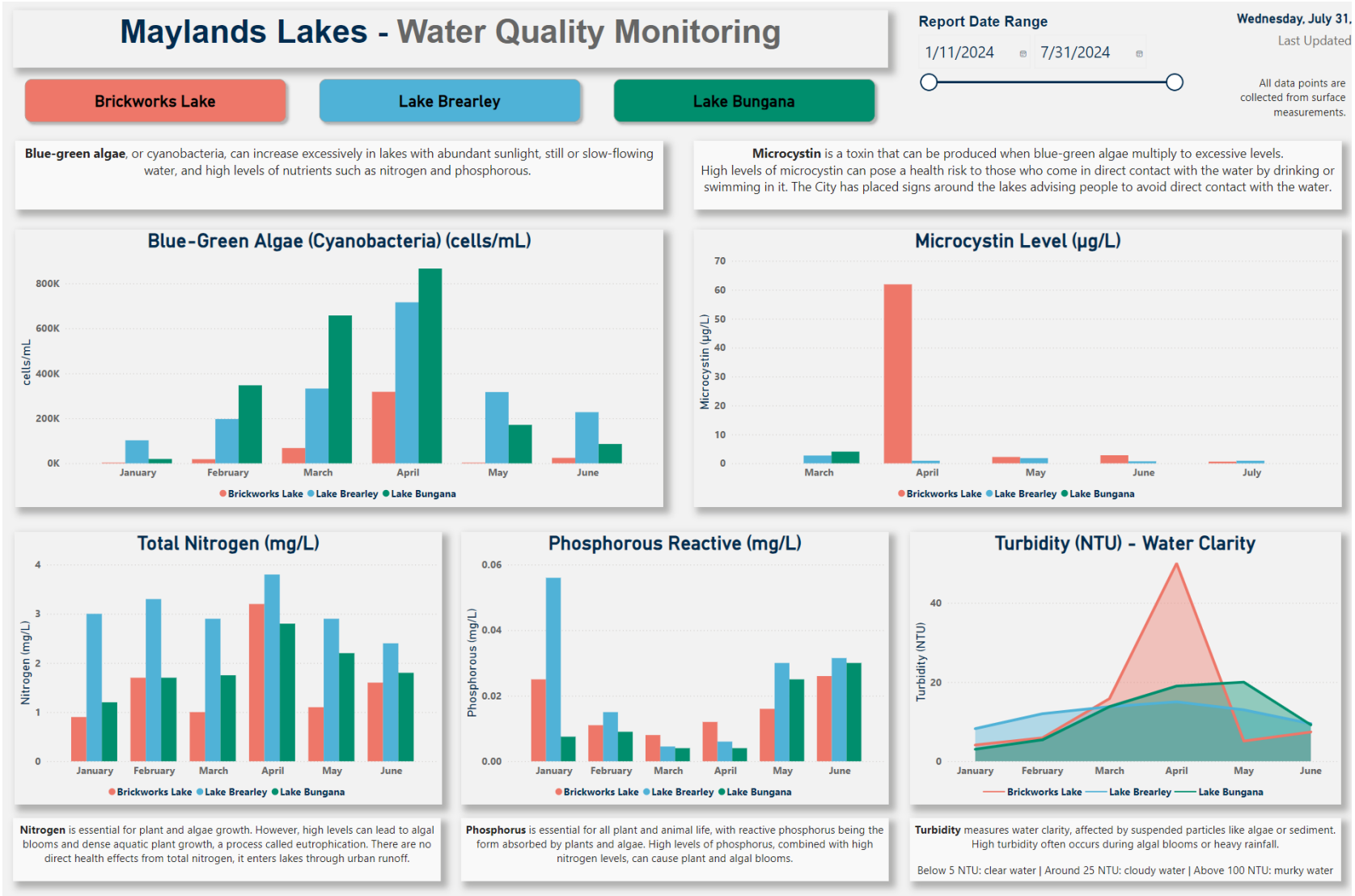

Update Since Last Session

- Additional engineering Scientific Advisory Panel members Dr John Ruprecht and Ian Edwards
- Department of Health
- EOI for pumps and filtration options
- Masterplan consultants appointed
- Project gantt chart updated on Engage Bayswater
- Irrigation system modifications at Brickworks Lake

Update Since Last Session – Midge

- Ongoing short-term treatments being undertaken
    - raking
    - treatments
- 8 new solar-powered midge traps have been installed
    - an additional 6 at Lake Brearley, 1 at Lake Bungana and 1 at Brickworks Lake
    - partnership with Bayswater Community Men's Shed to assist with manufacturing the midge traps
    - 4 additional traps are to be installed, bringing the total to 20 traps around the lakes
- Manual raking of midge breeding sites has been undertaken on the banks on the Hinkler Loop, Dakota Avenue and Tranby Road side of the lake
- The City is considering the installation of a light tower to draw midge away from residents

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Status Update Q & A

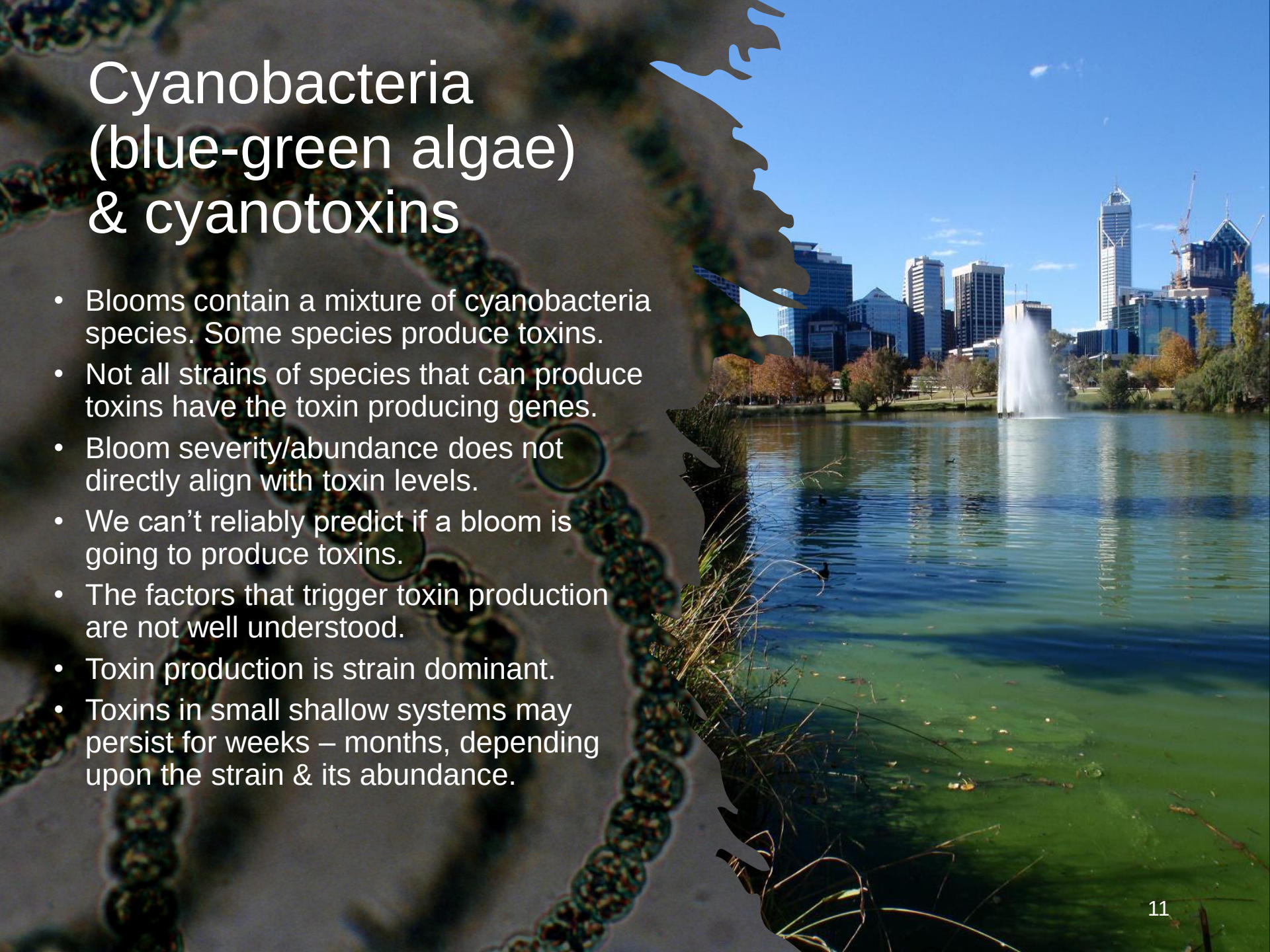
City of Bayswater

2. Department of Health

Jared Koutsoukos
Senior Scientific Officer
Water Unit, Environmental Health Directorate

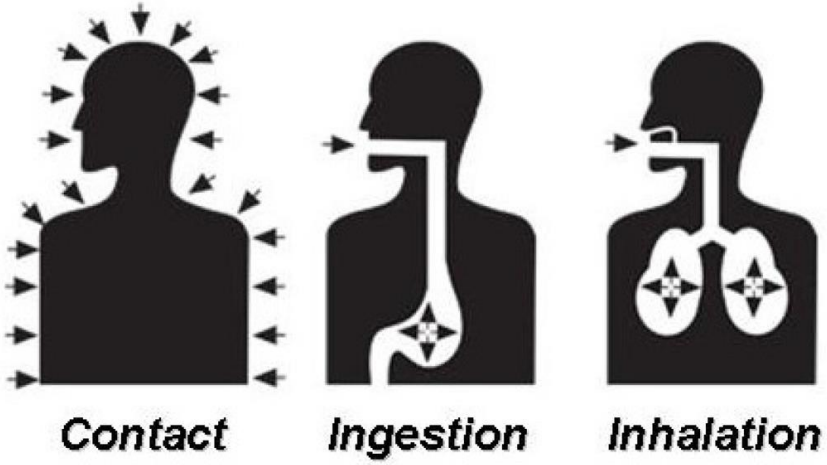
Cyanobacteria (blue-green algae) & cyanotoxins

- Blooms contain a mixture of cyanobacteria species. Some species produce toxins.
- Not all strains of species that can produce toxins have the toxin producing genes.
- Bloom severity/abundance does not directly align with toxin levels.
- We can’t reliably predict if a bloom is going to produce toxins.
- The factors that trigger toxin production are not well understood.
- Toxin production is strain dominant.
- Toxins in small shallow systems may persist for weeks – months, depending upon the strain & its abundance.



Modes of cyanotoxin transmission

- Dermal contact (skin)
- Ingestion (swallowing)
- Inhalation (nasal cavity & lungs) – droplets & aerosols



Key cyanobacteria, toxins & health

Microcystis spp.	**Microcystin (MC) -** liver damage, skin & eye irritation, gastrointestinal illness
Raphidiopsis raciborskii	**Cylindrospermopsin (CYN) -** liver, kidneys, lungs, spleen & intestine injuries, cyto- & genotoxic.

Primary mode of health impact is water ingestion.

Potential low level aerosol exposure via respiratory/ingestion pathway – if suitable conditions & regular exposure.

Cyanobacteria also produce lipopolysaccharides	Skin irritant/allergenic response - mild & self-limiting.

Applicable Guidelines

- **NHMRC 2008 Guidelines for Managing Risks in Recreational Water**
  - Focus is Primary Contact e.g. swimming – Table 6.2 (includes MC)
- WHO 2021 - Guidelines on recreational Water Quality Vol 1 Coastal & Fresh Waters – includes: CYL, MC etc.
- NHMRC 2011 Australian Drinking Water Guidelines
- ANZFWG 2024 – Draft - Water Quality for Irrigation and General Water Uses: Guidelines - Crops, pasture, occupational exposure
- Guidelines focus upon cyanotoxin impacts caused by ingestion & irrigation
- No current Australian, or international guidelines for aerosol exposure.
  - Relatively new/emerging area of health consideration and study.

Monitoring & Management

- Monitoring fortnightly/ monthly water sampling:
  - Blue-green algal species,
  - Cell counts & biovolumes
  - Toxin testing
- Provide results to Department of Health
- Health warning signs
- If elevated rec water levels:
  - cease irrigation,
  - turn-off water-fountains etc.
- Operate water-fountains only during low wind conditions.

Department of Health Q & A

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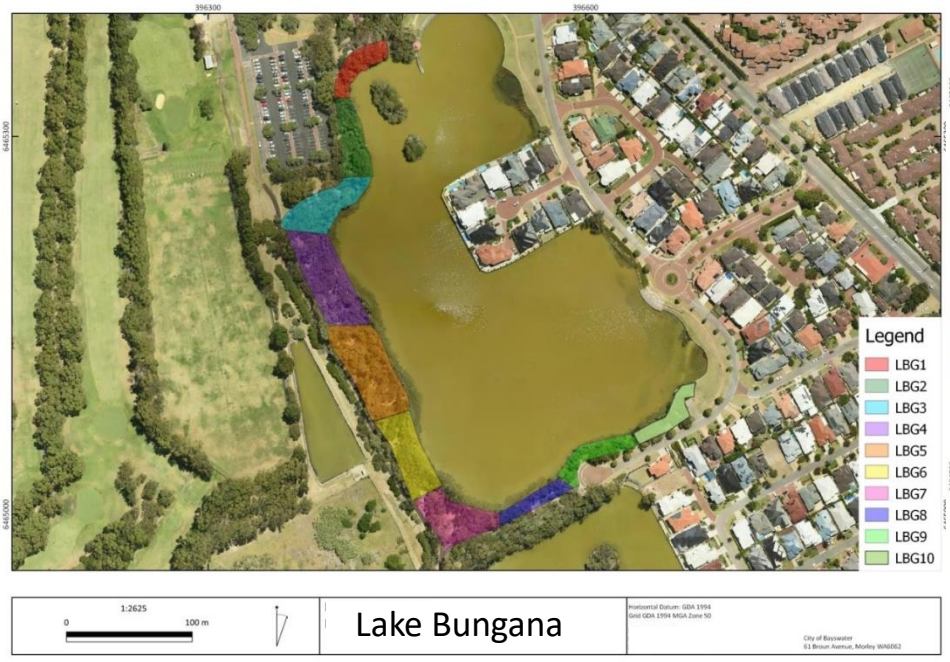
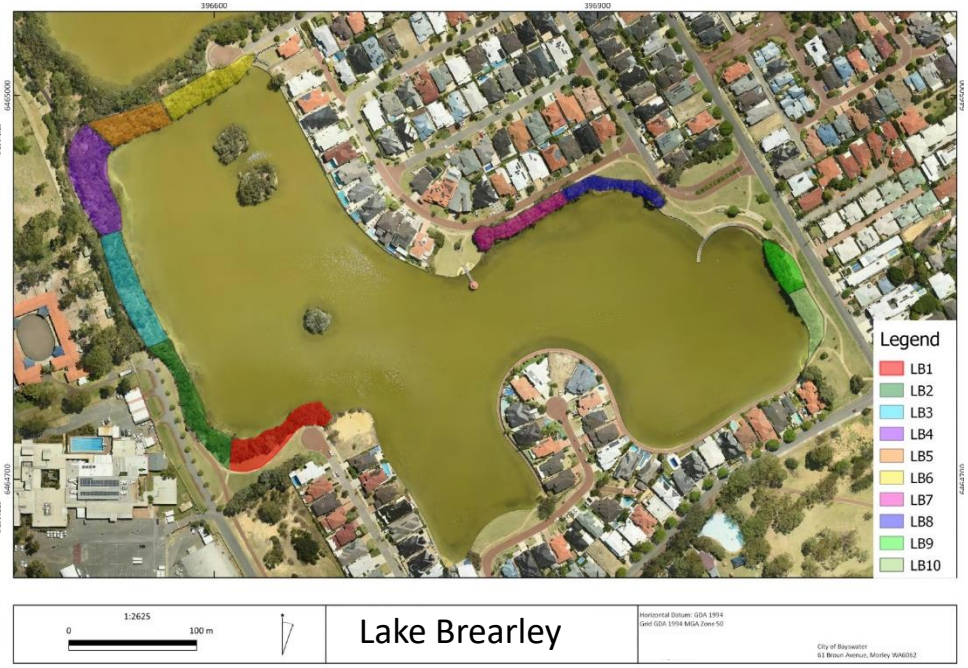
3. Revegetation

Revegetation Approach

- Staged removal of species listed as invasive by the Department of Biodiversity, Conservation and Attractions (DBCA)
- Revegetate with endemic species such as Swamp Banksia, Paperbarks and sedges
- Increased biodiversity in revegetation areas and establishment of sedges





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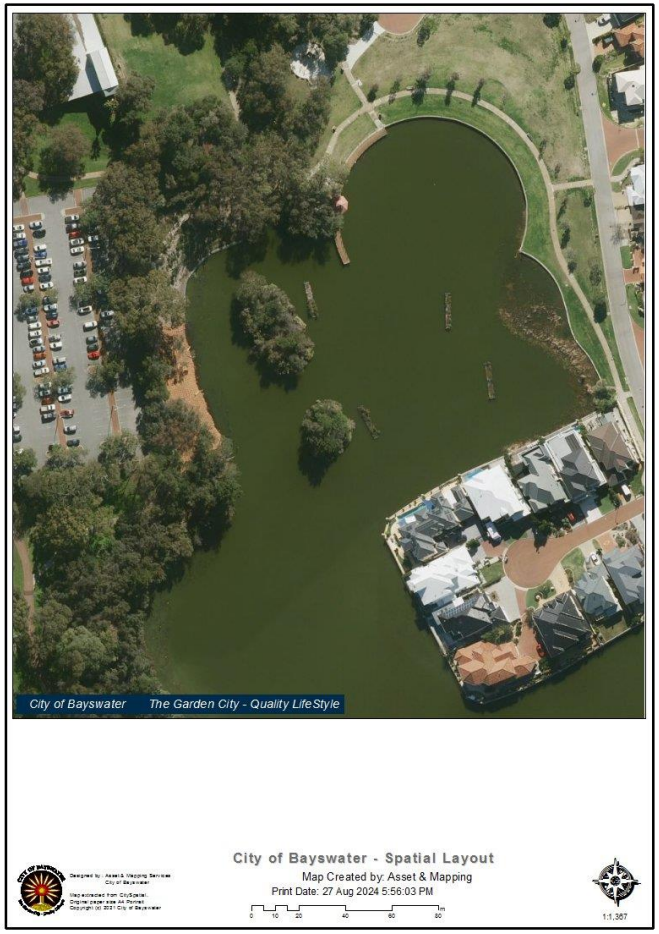
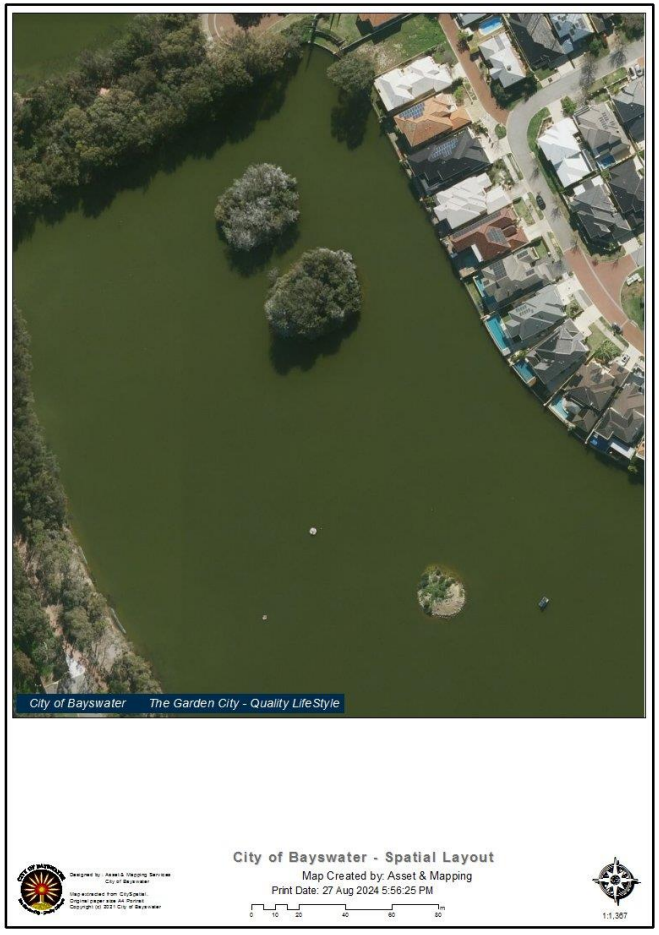
Revegetation – Before

Revegetation – After

Island Vegetation Management





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Revegetation Q & A

4. Masterplan

Who we are

Collaboration between:

- Alluvium Consulting Australia
- Josh Byrne and Associates
- Bamford Consulting Ecologists
- Seashore Engineering
- Griffith University - Professor David Hamilton (Peer Review)

Lakes/waterways we have worked on

Vasse River (Busselton)

Albert Park Lake (Melbourne)

Forest Lake (Brisbane)

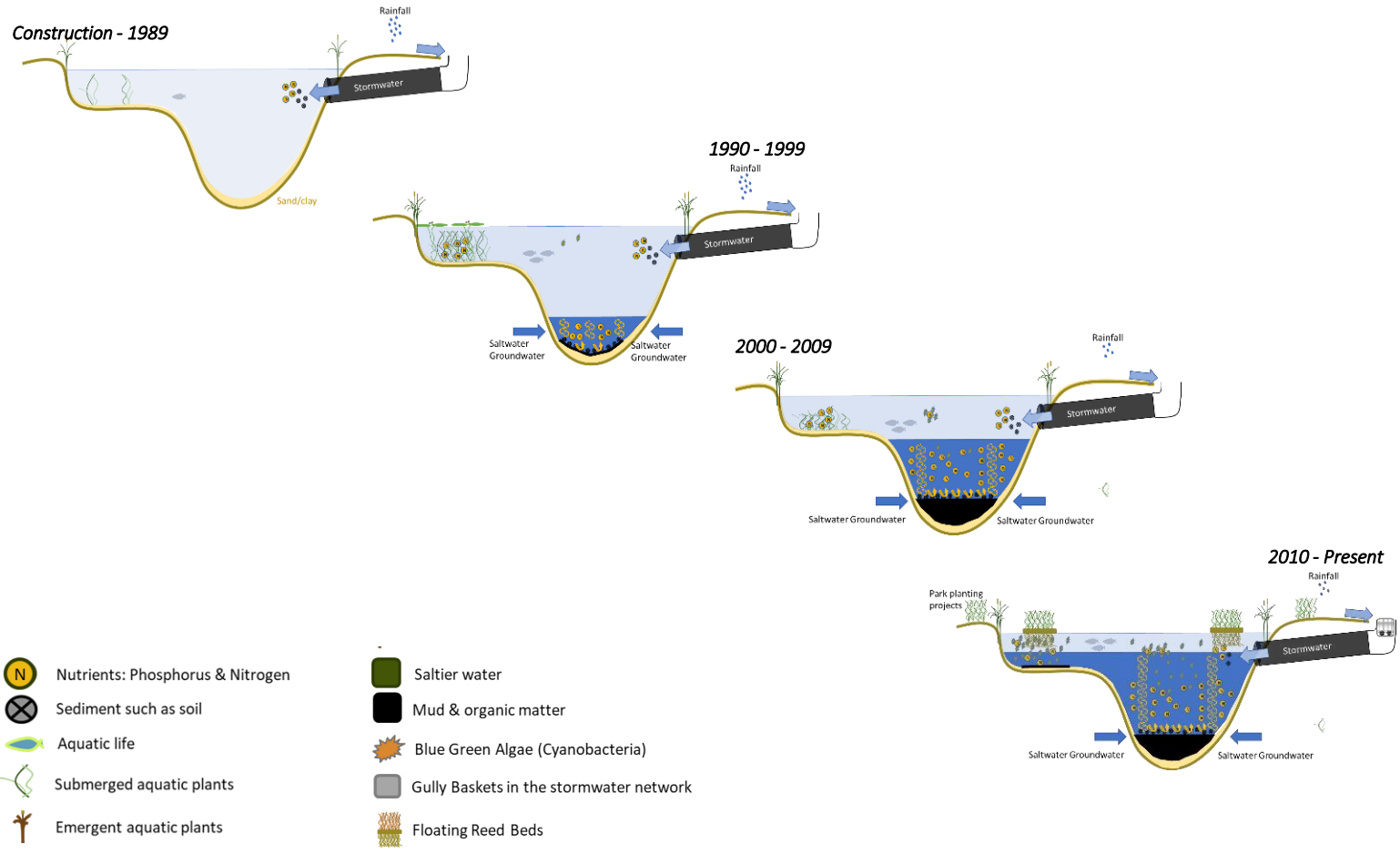
Varsity Lakes (Gold Coast)

Lake Hugh Muntz (Gold Coast)

Dongjiang Lake (China)

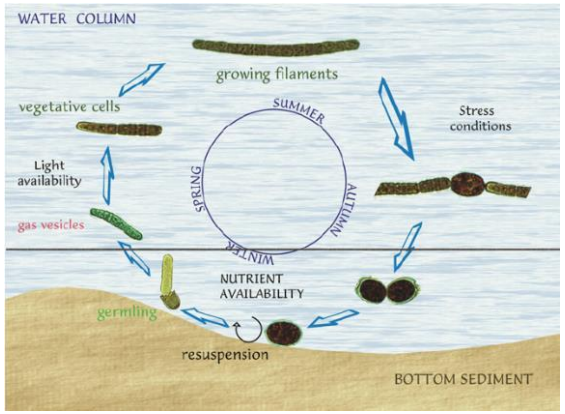
And many many more!

We need to understand the history (an example below)

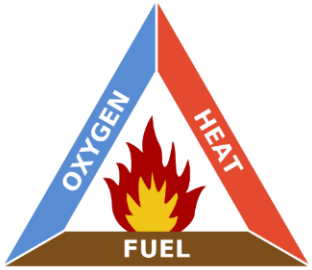


We need to understand the processes at play

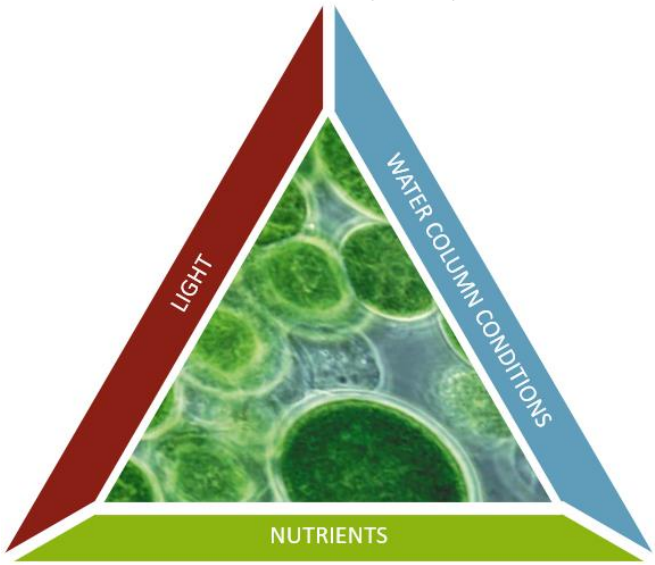
Lake algal cycles are complicated



Think of a fire triangle



Algal triangle

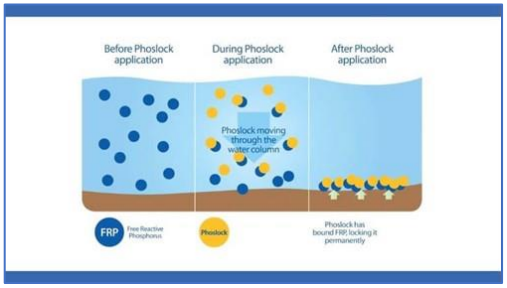


We need to consider what options might work (or not work)

Catchment options

Treatment systems

In lake



Chemical and biological controls

Combined options (treatment

Consider the range of management responses

Lots of potential solutions

Need to think about the triangle

- How do we control the "fuel"
- How do we control the water column conditions

Short, medium and long-term considerations

Need to think of the lake as an ecosystem

- Build resilience

Some of the many solutions

1. Sand capping
2. Phoslock
3. Mixing and/or aeration
4. Dredging
5. Submerged aquatic plants
6. Floating reed beds
7. Catchment management
8. Shallowing the lake
9. Emergent plants
10. Wetlands
11. Do nothing
12. Hydrogen peroxide
13. Reed beds
14. Ultrasonic
15. Nanobubbles
16. Cupricide
17. Straw bales
18. Bottom water pump out
19. Reverse osmosis
20. Diatomix
21. Lake bed blanket
22. Any combination of the above!

Think about how potential solutions:

Deal with the current issues

Deal with what is in the lakes

Deal with what is coming into the lakes

Understand

- Practicality
- Demonstrated effectiveness at scale
- Cost (Capex and Opex)
- Longevity
- Resilience

How we will do this

Phases and Stages

Phase 1

- Stage 1 Inception
- Stage 2 Data collation and review
- Stage 3 Problem formulation

Phase 2

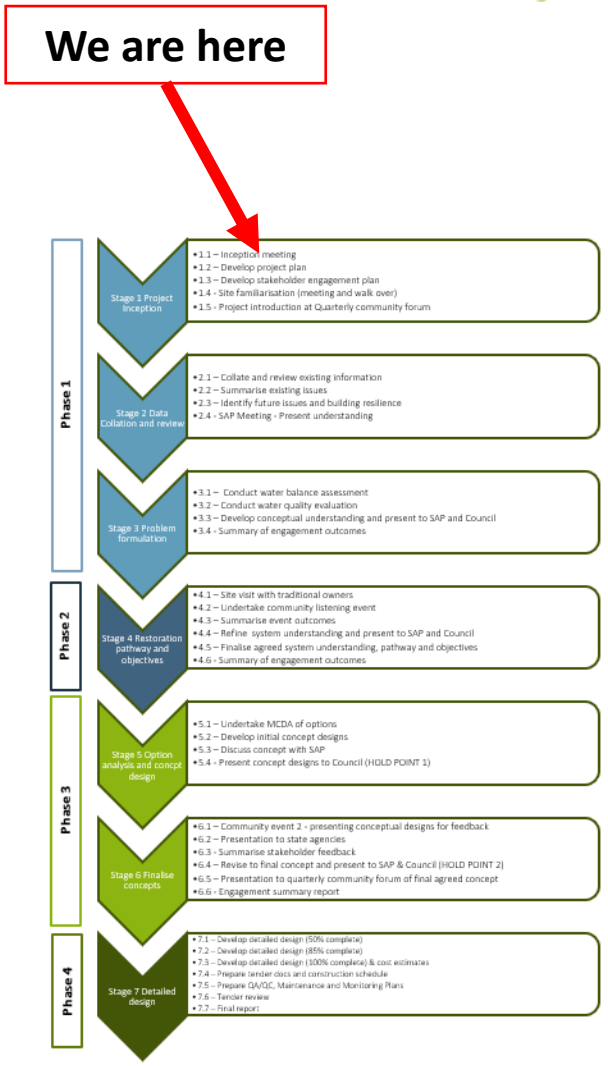
- Stage 4 Restoration pathway and objectives

Phase 3

- Stage 5 Option analysis and concept design
- Stage 6 Finalise concepts

Phase 4

- Stage 7 Detailed Design



Phase 1

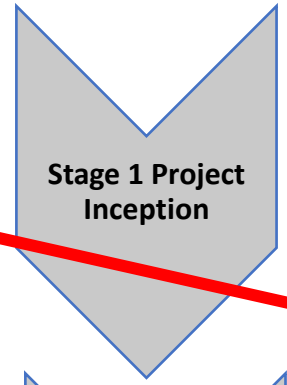
We are here

Stage 1 Inception
- Aug 24 – Sep 24

Stage 2 Data collation and review
- Sep 24 – Sep 24

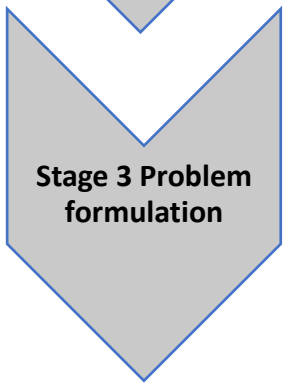
Stage 3 Problem formulation
- Sep 24 – Nov 24

Engagement
- Community
- SAP



- 1.1 – Inception meeting -
- 1.2 – Develop project plan
- 1.3 – Develop stakeholder engagement plan
- 1.4 - Site familiarisation (meeting and walk over)
- 1.5 - Project introduction at Quarterly community forum

- 2.1 – Collate and review existing information
- 2.2 – Summarise existing issues
- 2.3 – Identify future issues and building resilience
- 2.4 - SAP Meeting - Present understanding



- 3.1 – Conduct water balance assessment
- 3.2 – Conduct water quality evaluation
- 3.3 – Develop conceptual understanding and present to SAP and Council
- 3.4 - Summary of engagement outcomes

Phase 2

Stage 4 Restoration pathway and objectives

- Nov 24 – Dec 24

Engagement

- Community
- SAP

- 4.1 – Site visit with traditional owners
- 4.2 – Undertake community listening event
- 4.3 – Summarise event outcomes
- 4.4 – Refine system understanding and present to SAP and Council
- 4.5 – Finalise agreed system understanding, pathway and objectives
- 4.6 - Summary of engagement outcomes

Phase 3

Stage 5 Option analysis and concept design

- Dec 24 – Feb 25

Stage 6 Finalise concepts

- Feb 25 - May 25

Engagement

- Community
- SAP

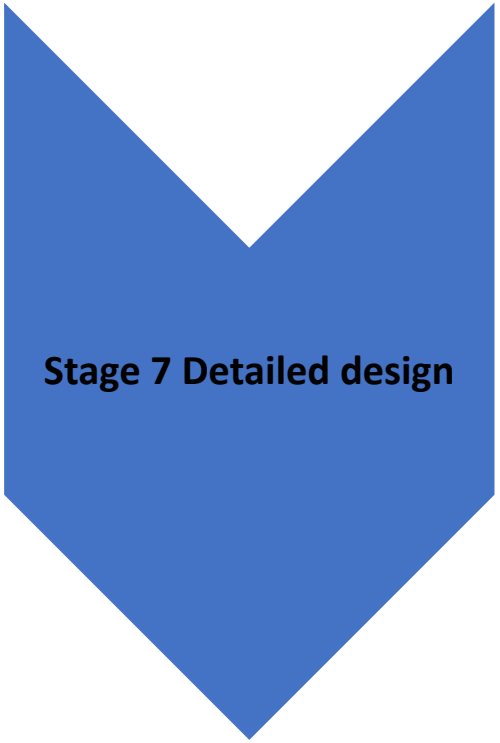
- 5.1 – Undertake MCDA of options
- 5.2 – Develop initial concept designs
- 5.3 – Discuss concept with SAP
- 5.4 - Present concept designs to Council (HOLD POINT 1)

- 6.1 – Community event 2 - presenting conceptual designs for feedback
- 6.2 – Presentation to state agencies
- 6.3 - Summarise stakeholder feedback
- 6.4 – Revise to final concept and present to SAP & Council (HOLD POINT 2)
- 6.5 - Repot to Council to Endorse preferred concept
- 6.6 – Presentation to quarterly community forum of final agreed concept
- 6.7 - Engagement summary report

Phase 4 – Schedule to be determined after Phase 3

Stage 7 Detailed Design

- May 25 – Aug 25



- 7.1 – Develop detailed design (50% complete)
- 7.2 – Develop detailed design (85% complete)
- 7.3 – Develop detailed design (100% complete) & cost estimates
- 7.4 – Prepare tender docs and construction schedule
- 7.5 – Prepare QA/QC, Maintenance and Monitoring Plans
- 7.6 – Tender review
- 7.7 – Final report
- 7.8 - Report to Council to endorse detailed design

Masterplan Next steps

City of Bayswater

Masterplan Q & A

Next Steps

- **What happens from here?**
  - Irrigation
  - RFT Pumps and Filtration
  - Fortnightly monitoring and raking
  - Masterplanning process
  - SAP meetings scheduled

- **Write-up of session**
- **Next community forum held in early December**
- **Thank you for your time**

City of Bayswater

Cyanobacteria and algae in fresh water

Guidelines

Fresh recreational water bodies should not contain:

- ≥10 µg/L total microcystins; or ≥50 000 cells/mL toxic *Microcystis aeruginosa*; or biovolume equivalent of ≥4 mm^3/L for the combined total of all cyanobacteria where a known toxin producer is dominant in the total biovolume; or
- ≥10 mm^3/L for total biovolume of all cyanobacterial material where known toxins are not present; or
- cyanobacterial scums consistently present.