Effective management solutions for biogenic taste and odour in drinking water

Presenter: Dr Jin Zhu
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Sustainability Representative | AWA NSW YWP

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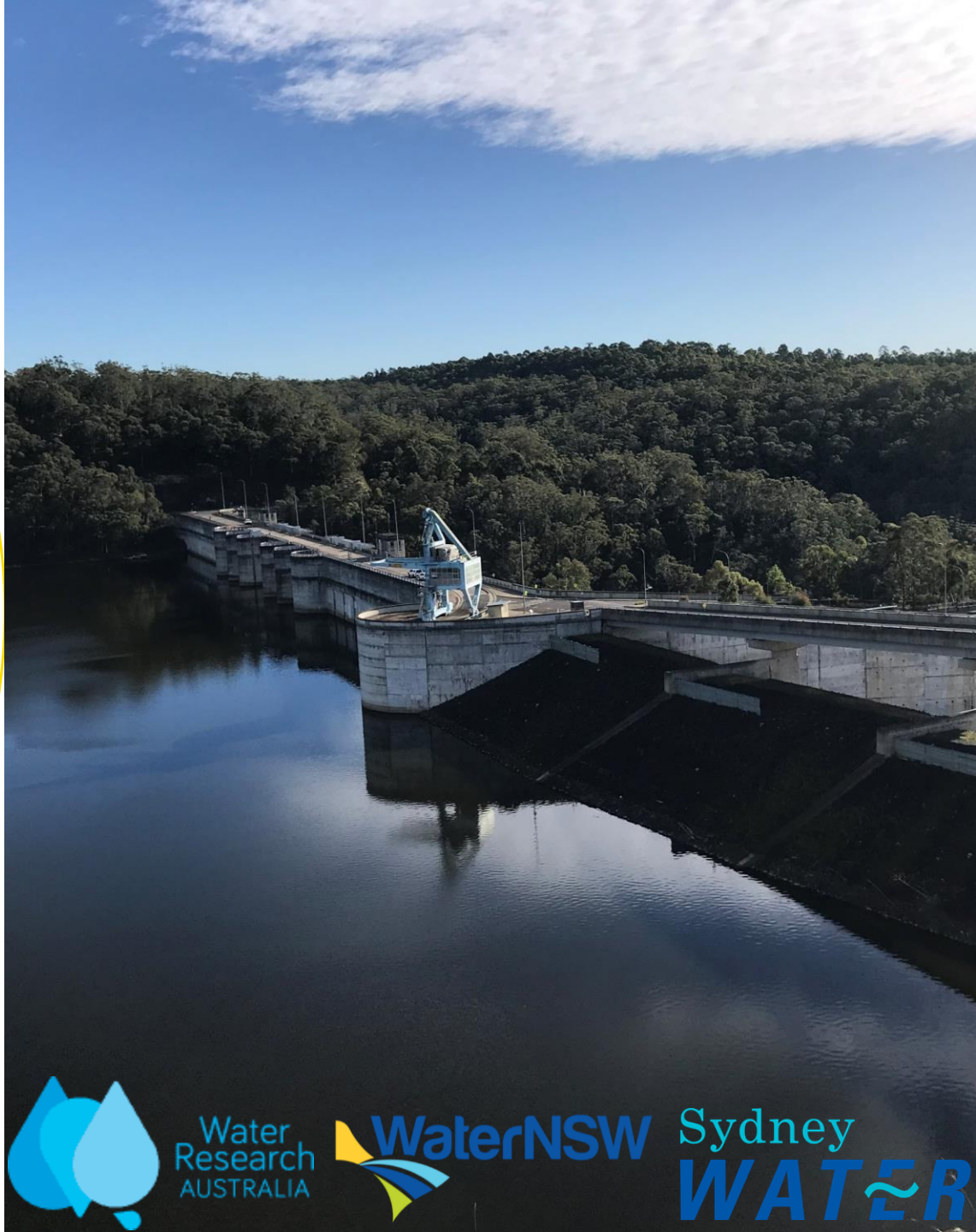
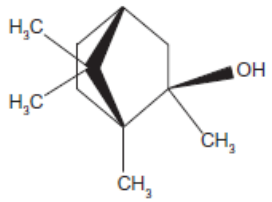


Biogenic taste and odour

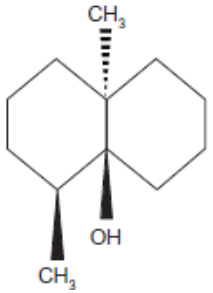
Algal blooms

Taste and odour complaints

2-methylisoborneol (MIB)



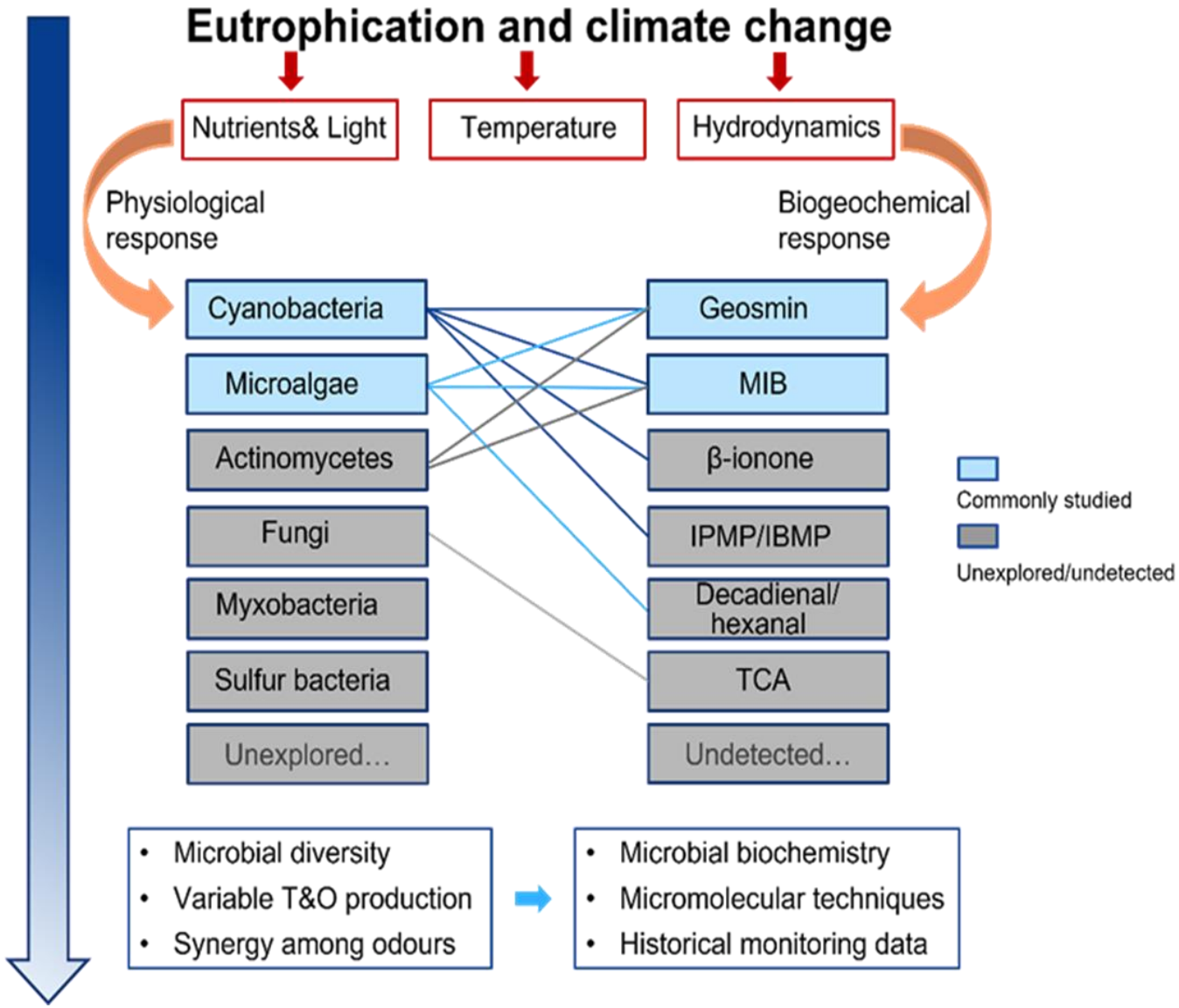
Geosmin



Risk factors

Biogenic T&O compounds & microbes

Challenges &strategies



Zhu et al. (2022). Journal of Environmental Management, 323, 116225

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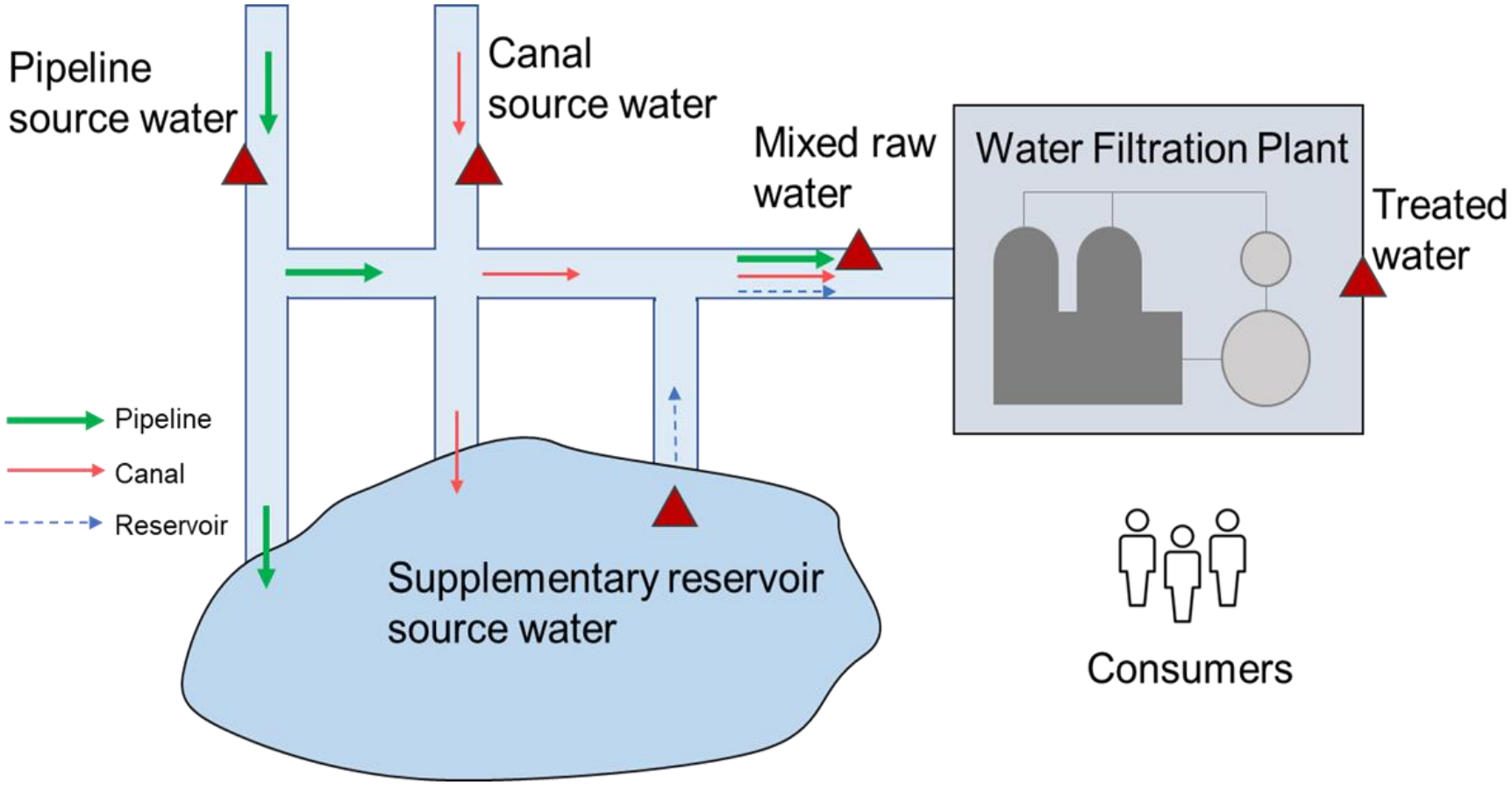
Historical data analysis



Drinking water supply system in a major Australian city

- **Source water supply**

Water storage levels

Water discharge levels

- **Source waters and mixed raw water**

Odorant (GSM/MIB) level

Odour descriptor

Algae community

- **Treated water**

Odour scale

Consumers complaints(tap)

Zhu et al.(2023). Journal of Water Process Engineering, 56,104329

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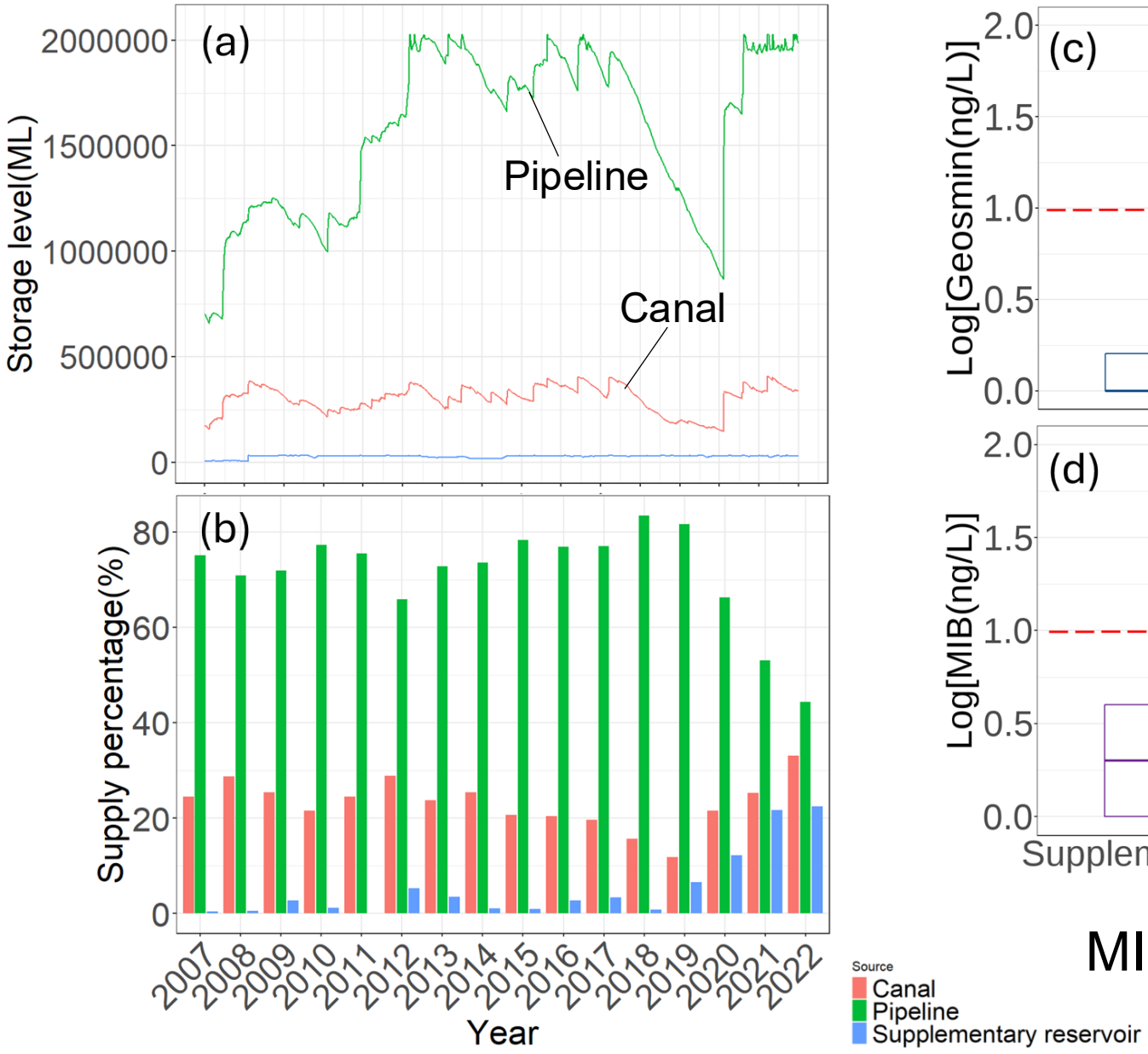
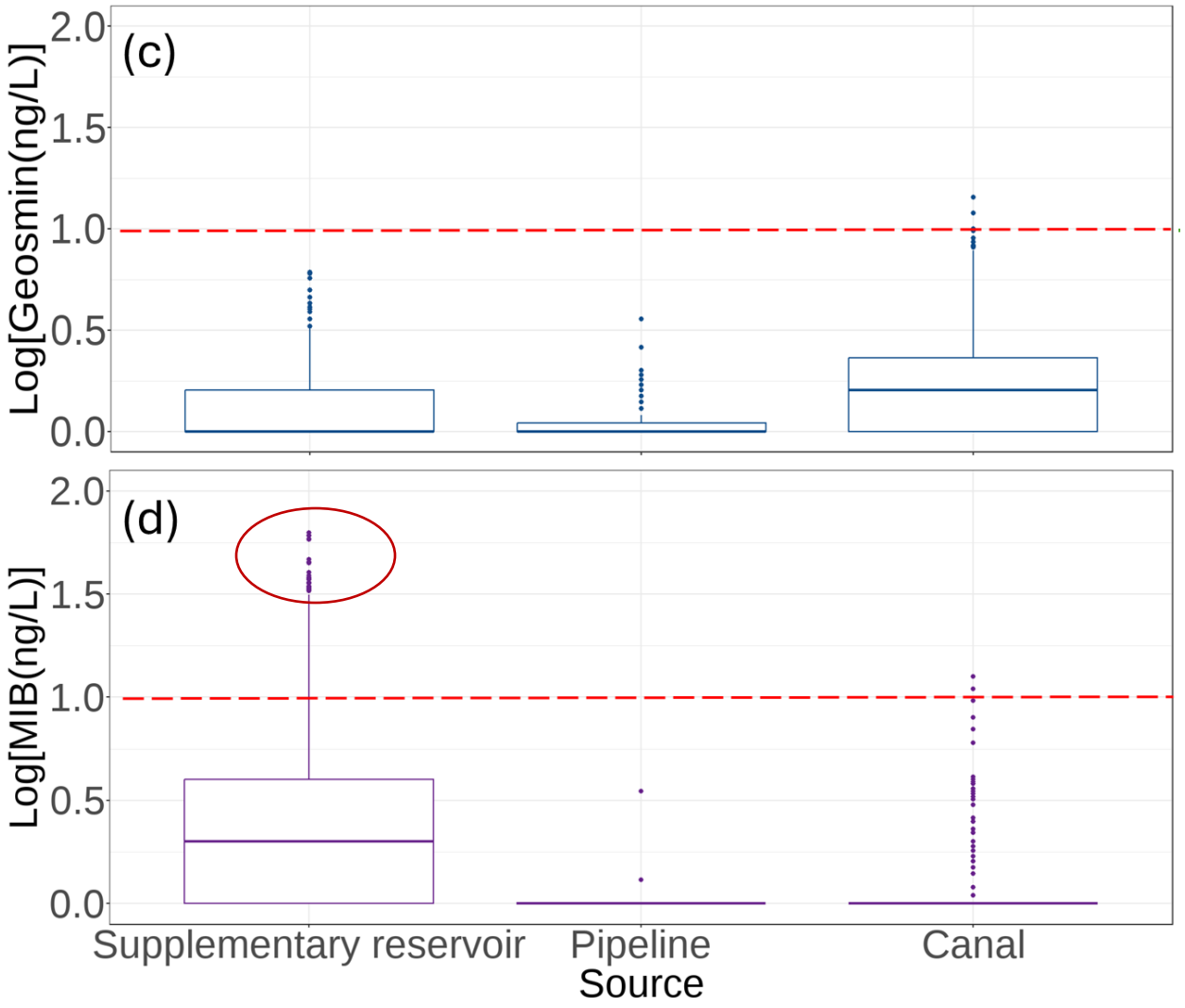
Source water supply and odorant levels





MIB in the supplementary reservoir were the main concern

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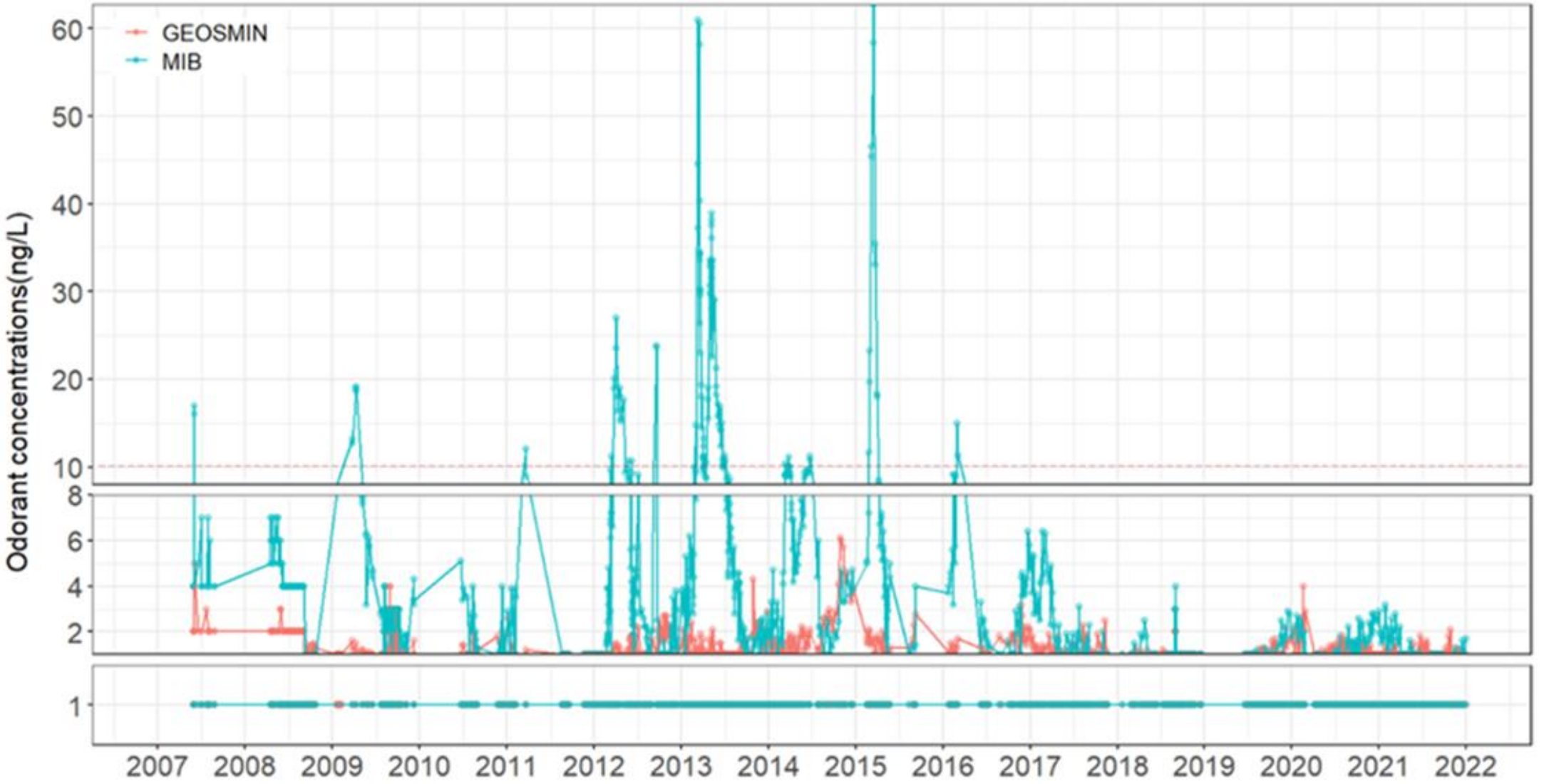
Odorants in supplementary reservoir



Numerous instances of MIB concentrations were over 60 ng/L

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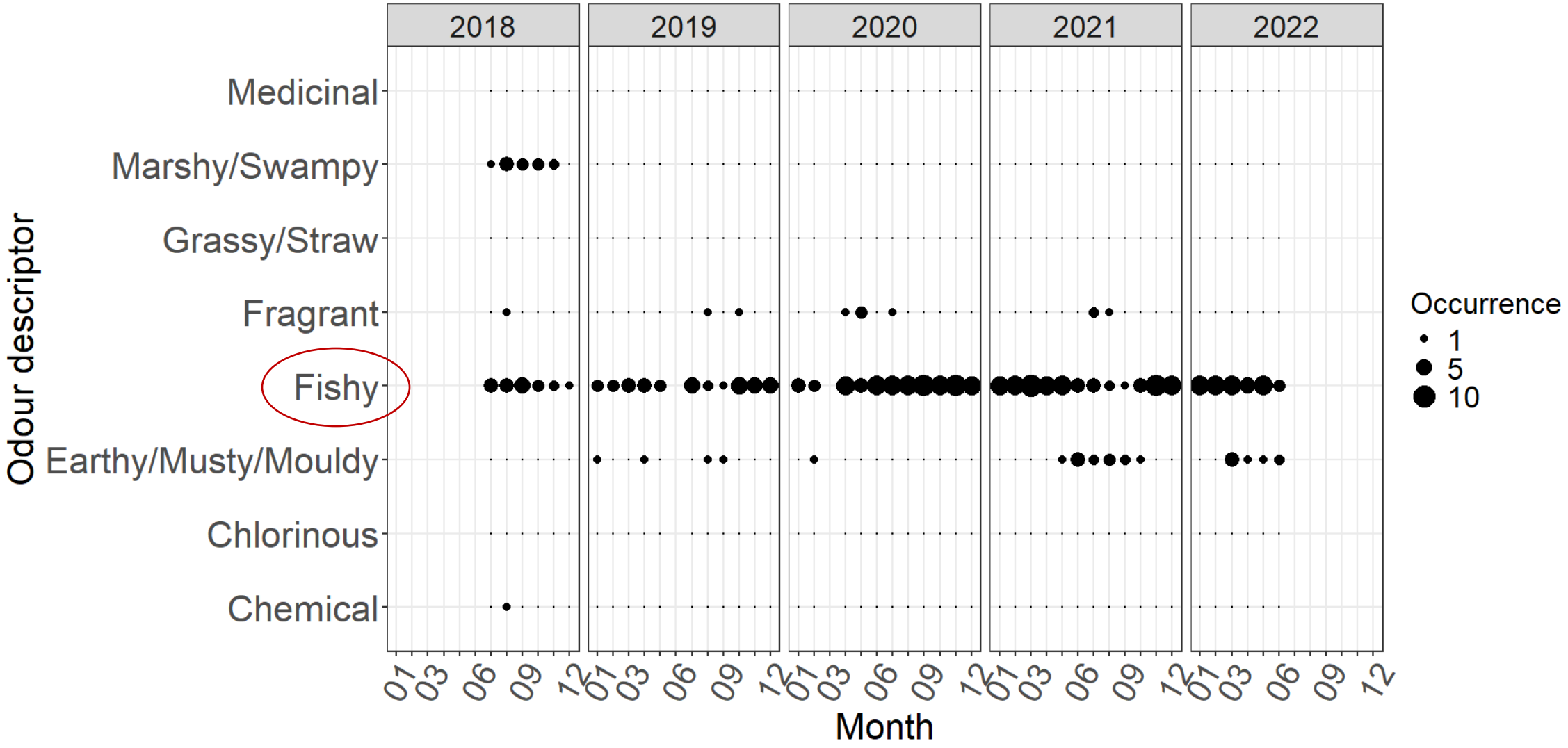
Odorants in supplementary reservoir



‘Earthy/musty/mouldy’ and ‘fishy’ frequently occurred

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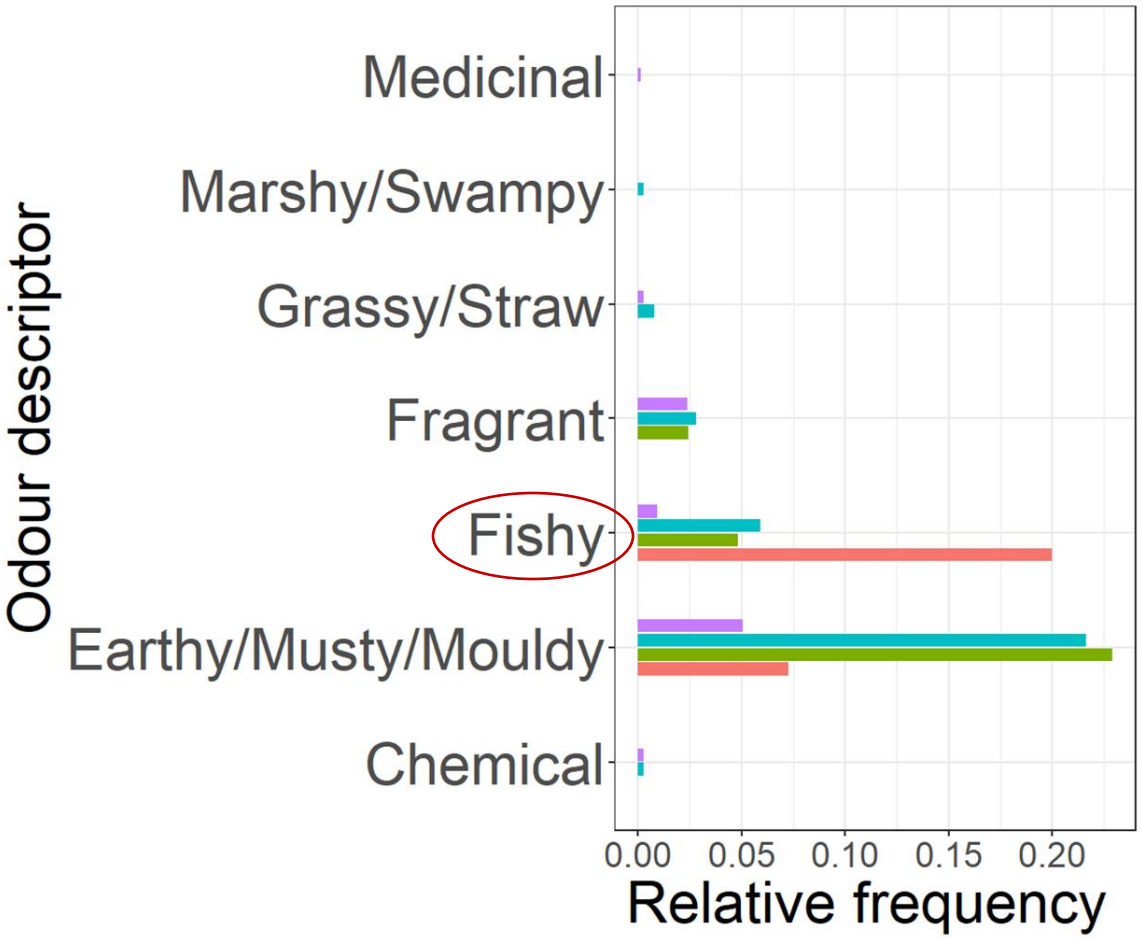
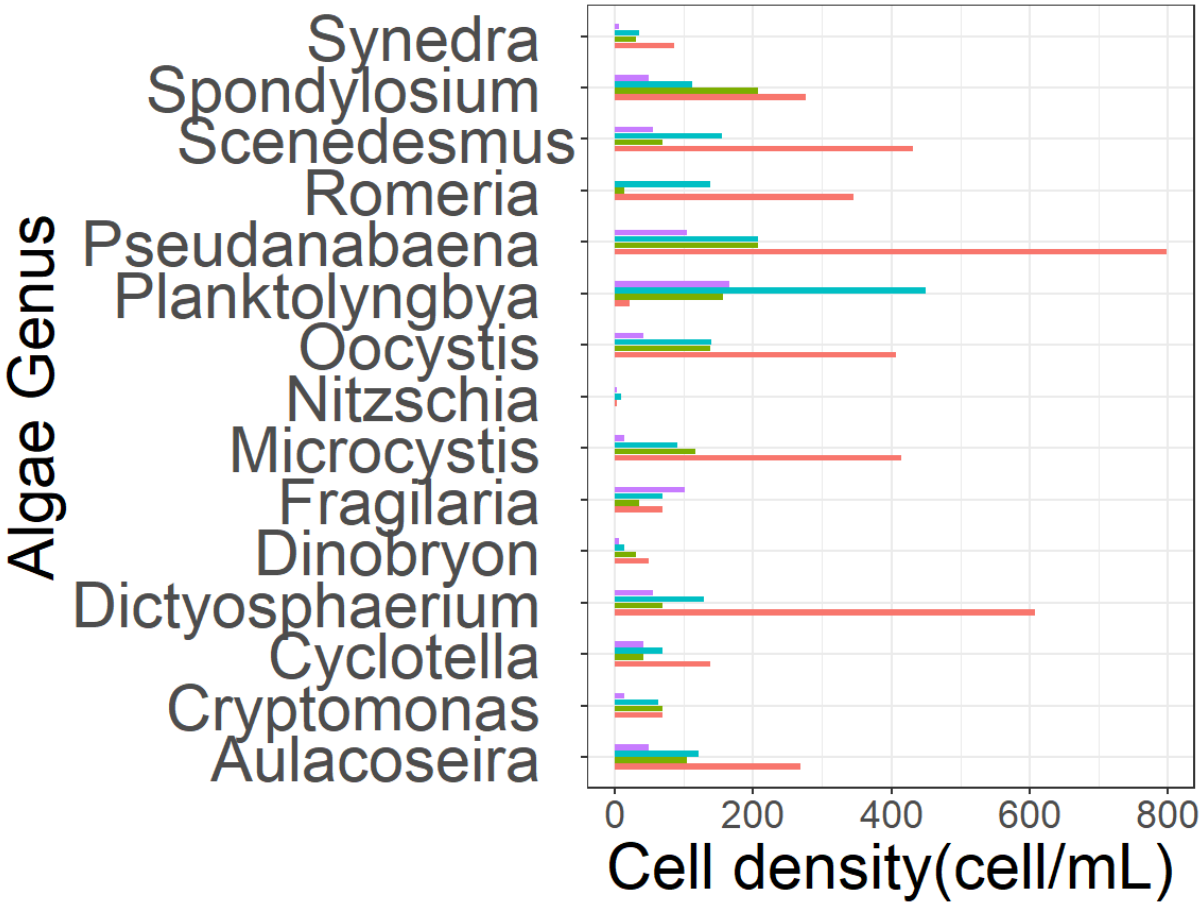
Odour in mixed raw water





Supplementary reservoir supply
- High (supply > 46.50%)
- Low (0 < supply ≤ 10.92%)
- Medium (10.92% < supply ≤ 46.50%)
- Offline (supply = 0)

Occurrence of ‘fishy’ odour and potential odour-producing algae are likely to increase with water supply from the supplementary reservoir

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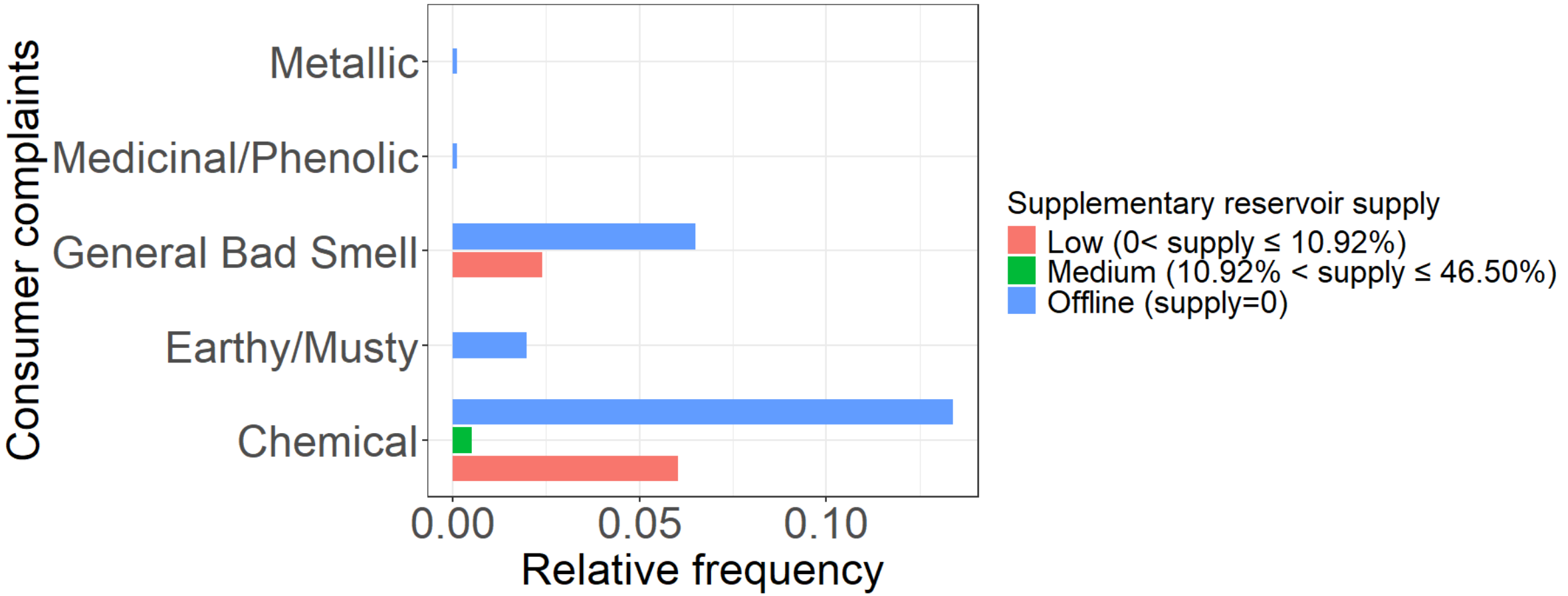
Consumers' complaints



Consumers' vocabulary does not align particularly well with the odour descriptors for source and raw water collected by water utilities

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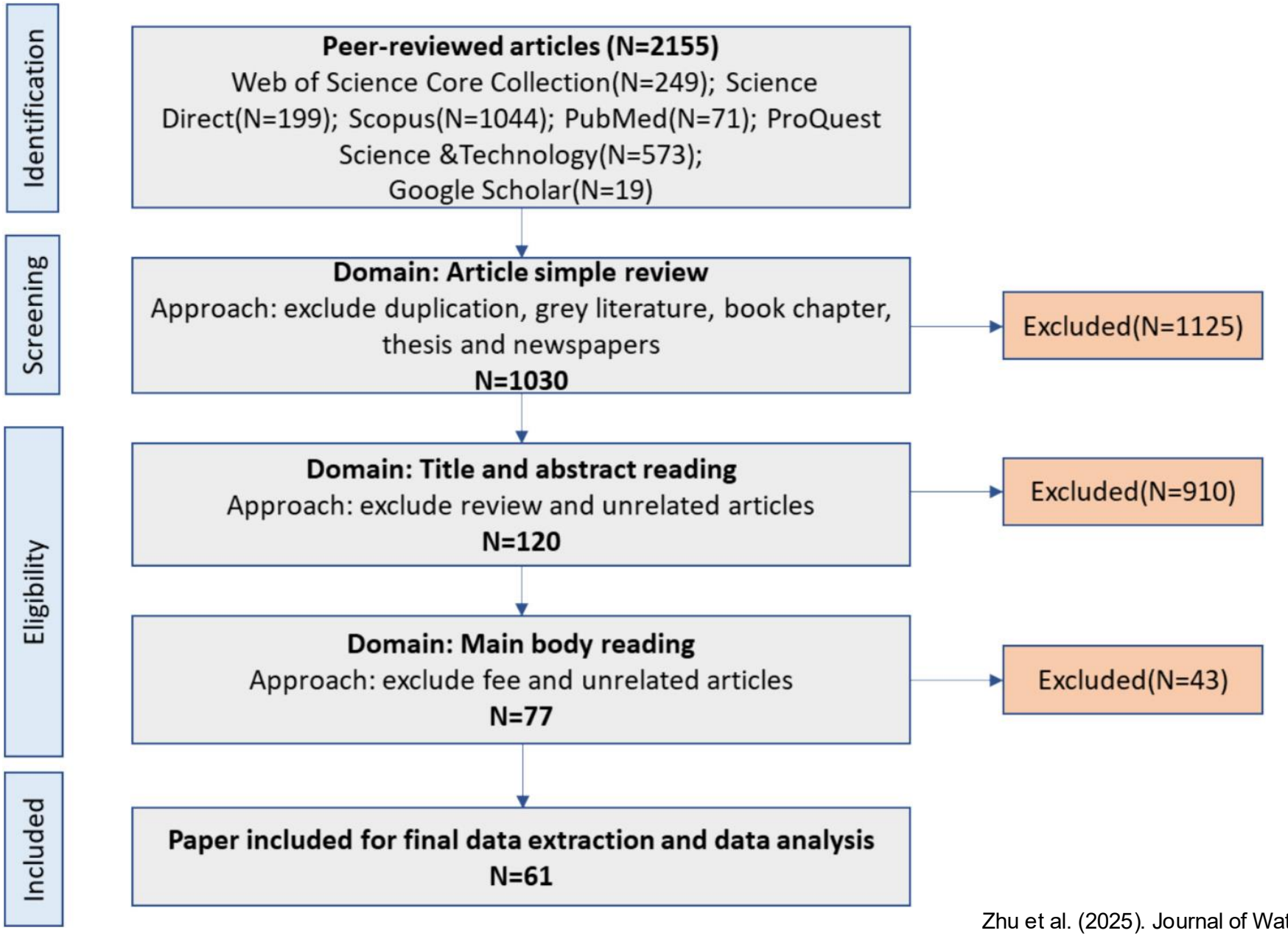
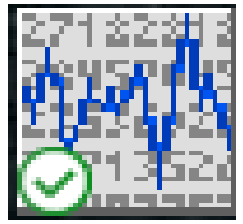
Operational-scale odour treatability





GetData Graph Digitizer for data extraction

R for data analysis and visualization

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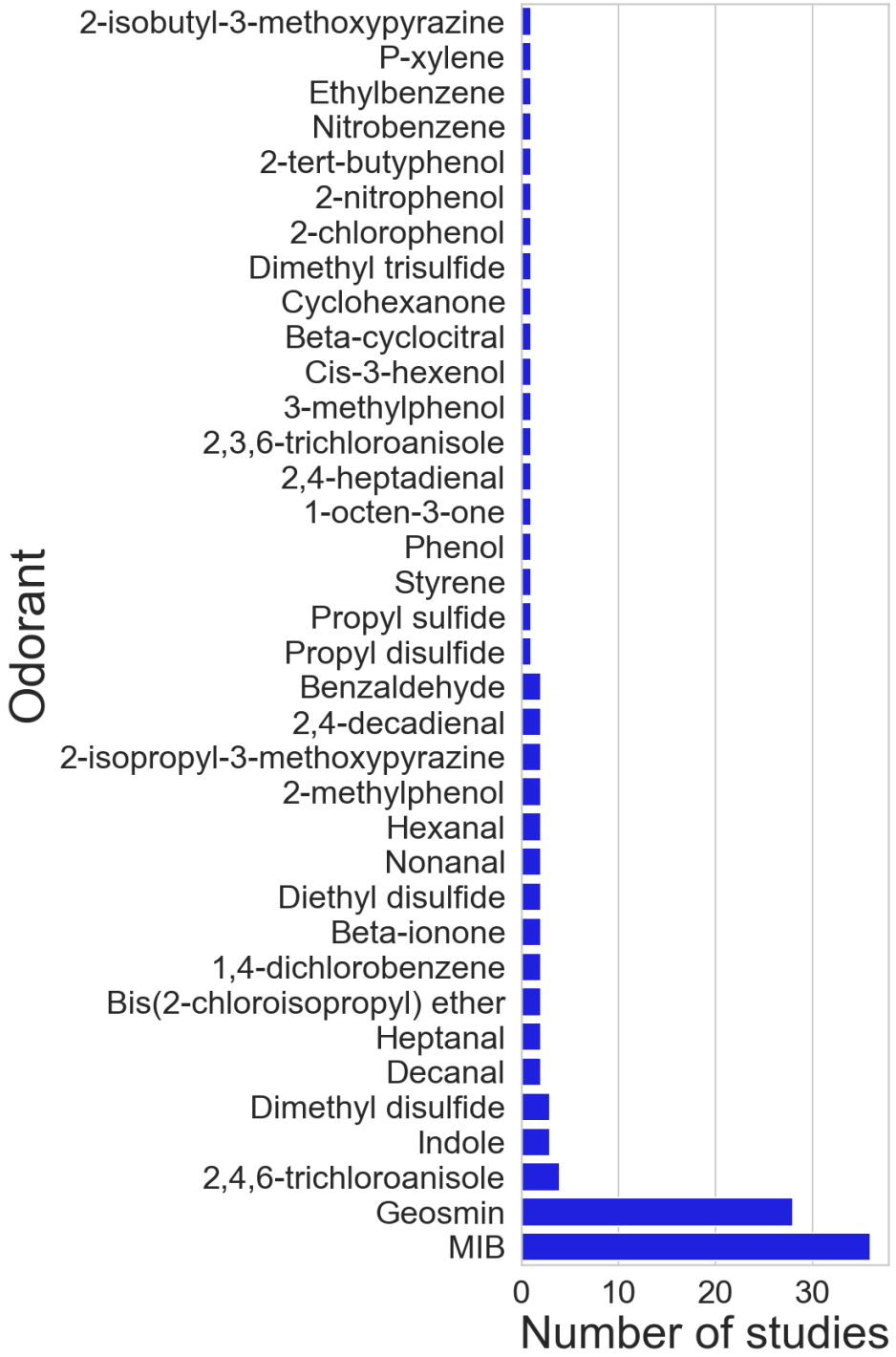
Zhu et al. (2025). Journal of Water Process Engineering, 70, 107099

Odorants within DWTPs



- 109 operational DWTPs across 16 countries
- 36 specific odorants detected within DWTPs

Zhu et al. (2025). Journal of Water Process Engineering, 70, 107099

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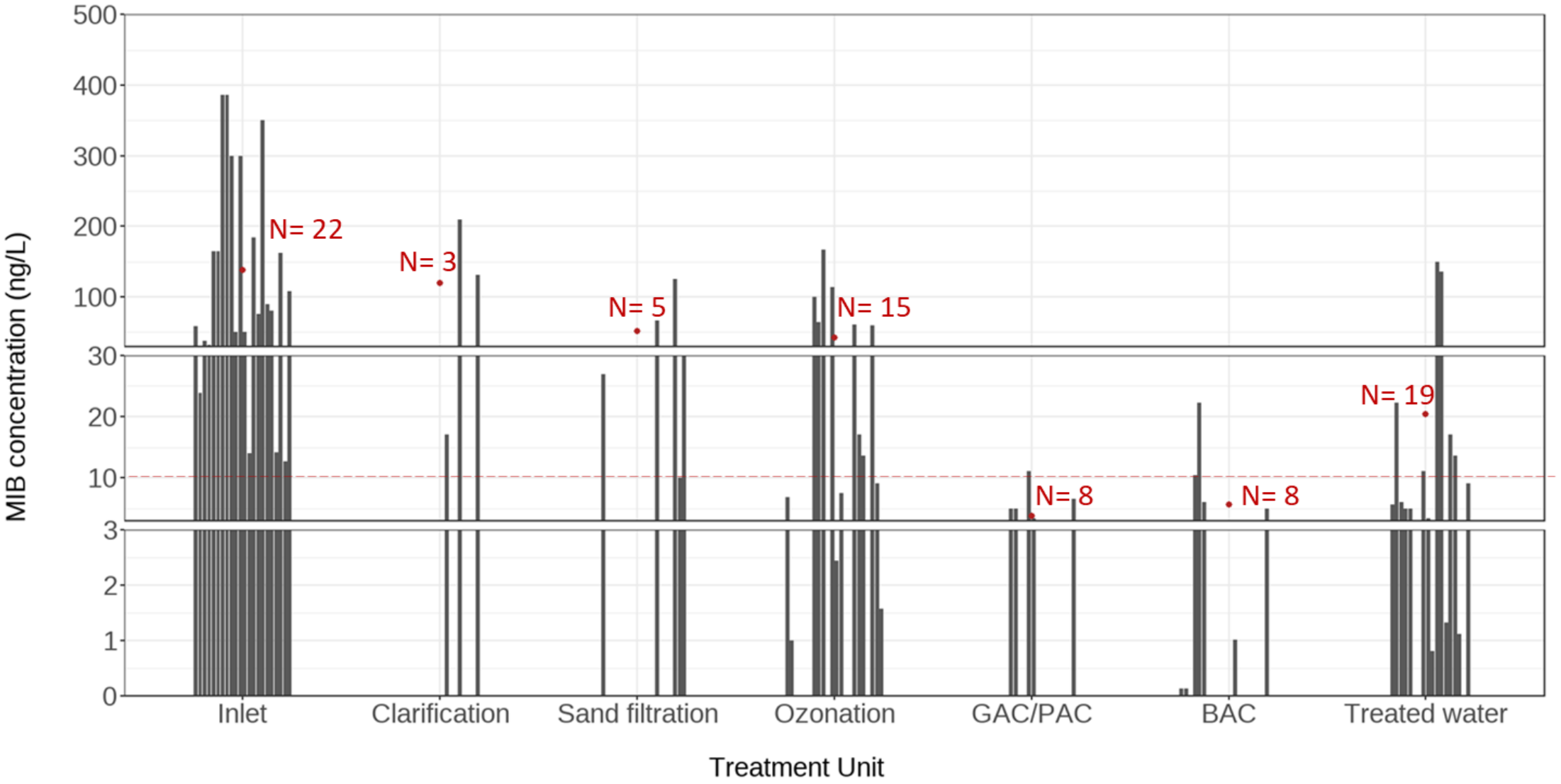
Advanced treatment performance



- Ozonation prior GAC/PAC for MIB removal could reduce breakthrough of odorants
- BAC could effectively remove MIB by 86.4%-100%, with inlet concentrations 58.1-164.4 ng/L

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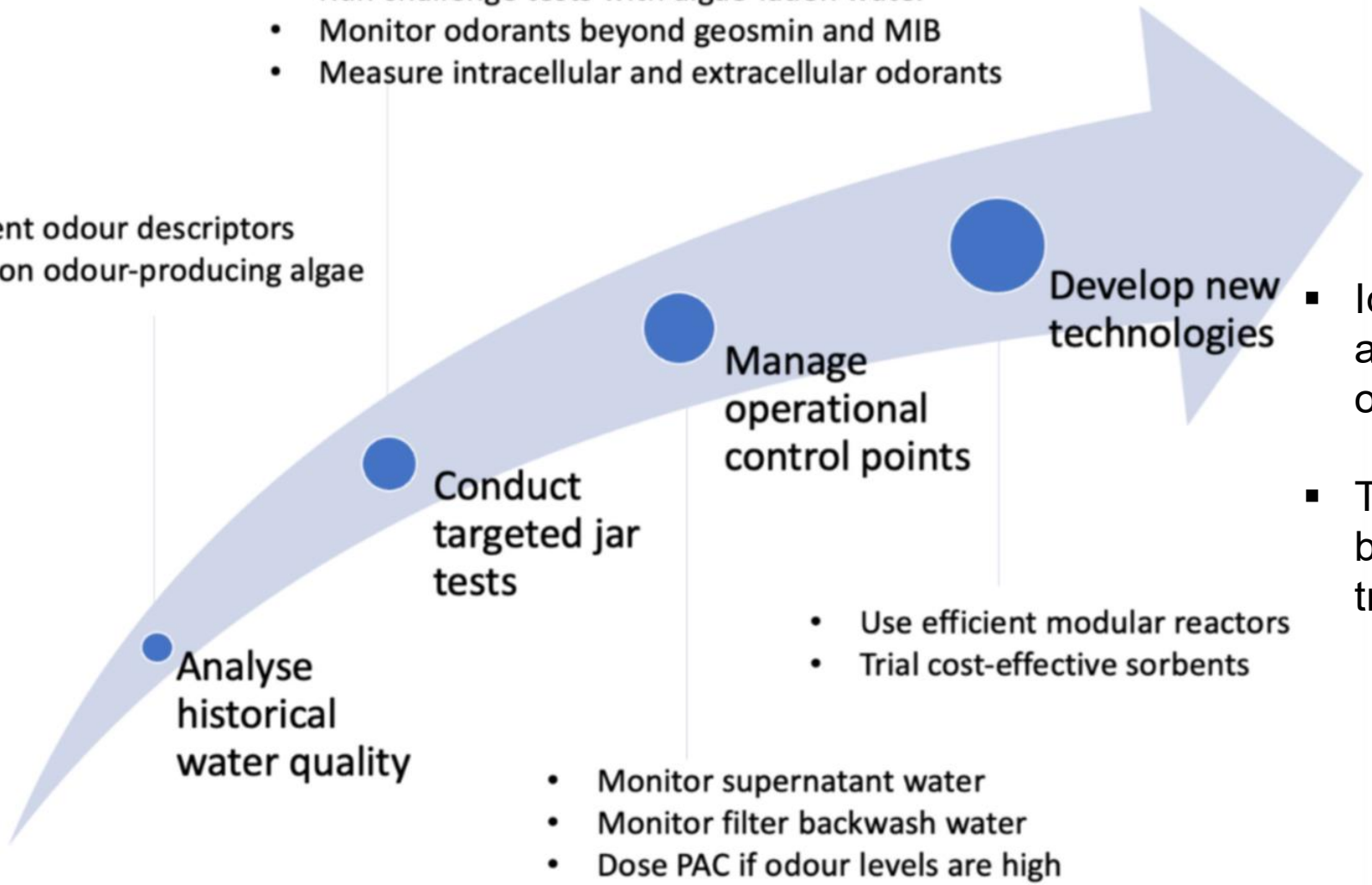
Recommendations for effective odour management



- Identify targeted odorants associated with recurring odour descriptors
- Targeted jar tests on algae bloom water to evaluate treatability

Zhu et al. (2025). Journal of Water Process Engineering, 70, 107099

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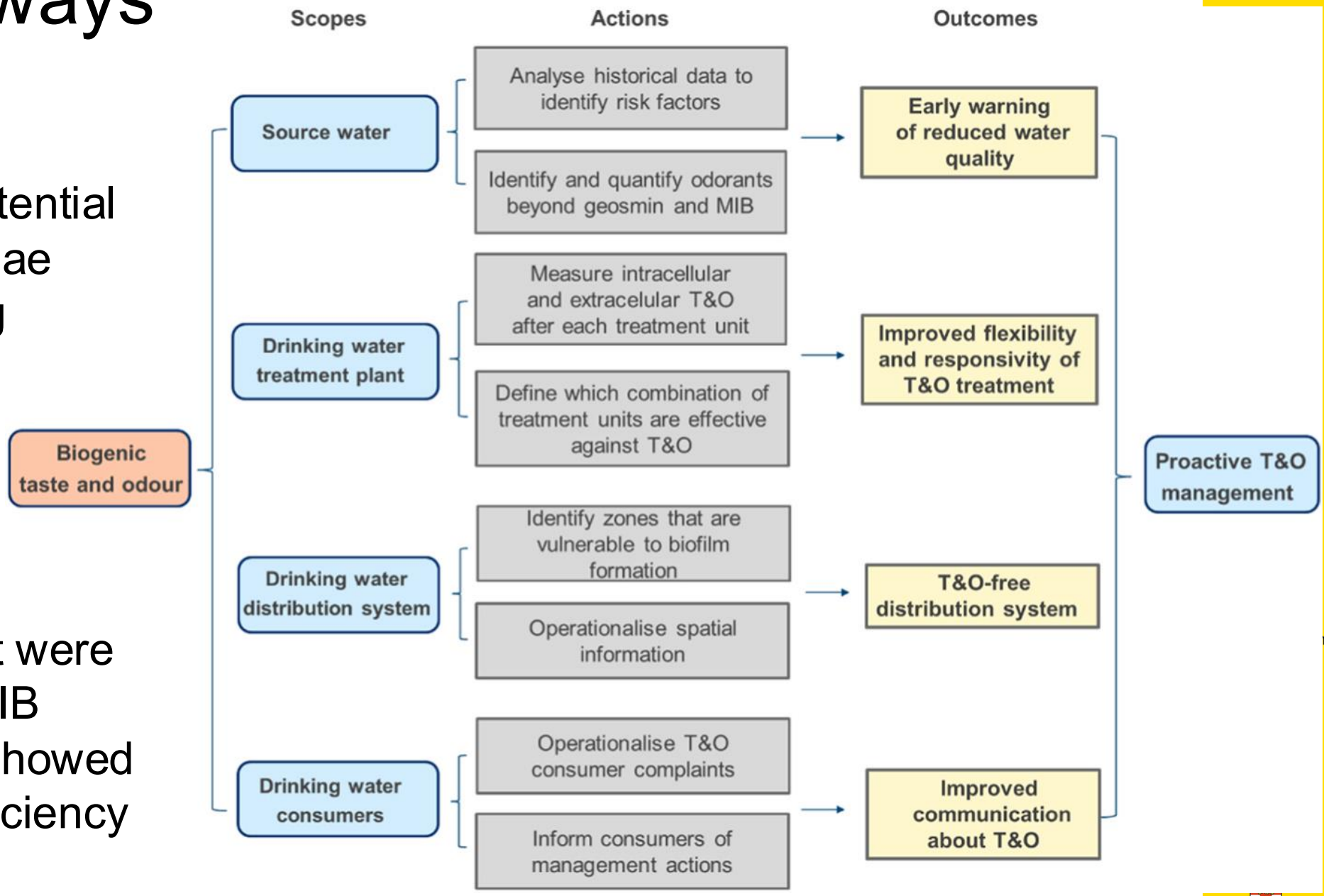
Key takeaways

- Latent risks from potential odour-producing algae could be an ongoing concern
- Advanced treatment were more effective for MIB removal, and BAC showed higher treatment efficiency and stability



Zhu et al.(2023). Journal of Water Process Engineering, 56,104329

Our team

Dr Lisa Hamilton | Water NSW
Strategic Research and Innovation Manager

Dr Kaye Power | Sydney Water
Principal Water and Public Health Advisor

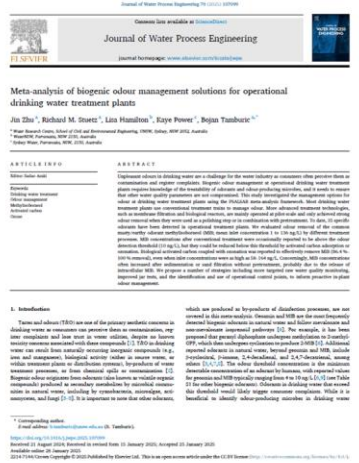
Prof Richard Stuetz | UNSW WRC
Deputy Head of School

Dr Bojan Tamburic | UNSW WRC
Senior Lecturer, Deputy Director

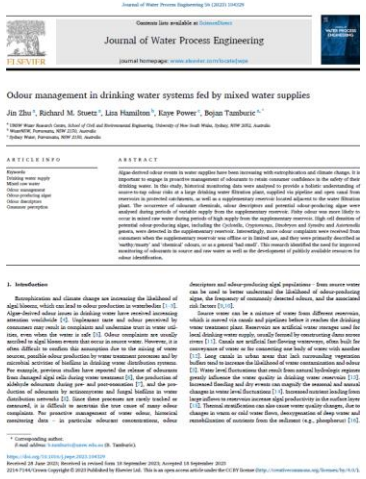
Our publications

- Source to tap review

- Full-scale treatability



- T&O in mixed supply



Thank you....

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Coastal, ocean and estuarine engineering and management

River flow, floodplain management and catchment hydrology

Eco engineering, wetland restoration, environmental studies, and climate change adaptation

Groundwater research and management

Hydraulic engineering and environmental fluid mechanics

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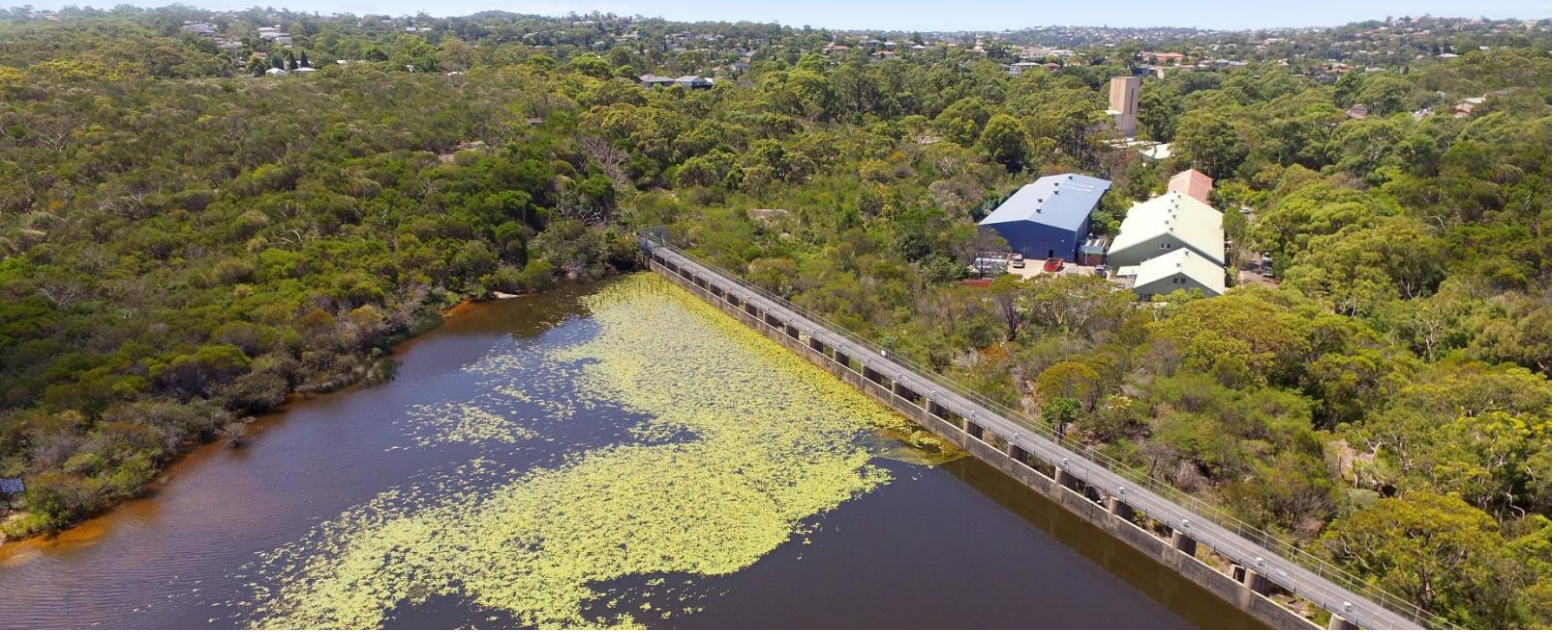
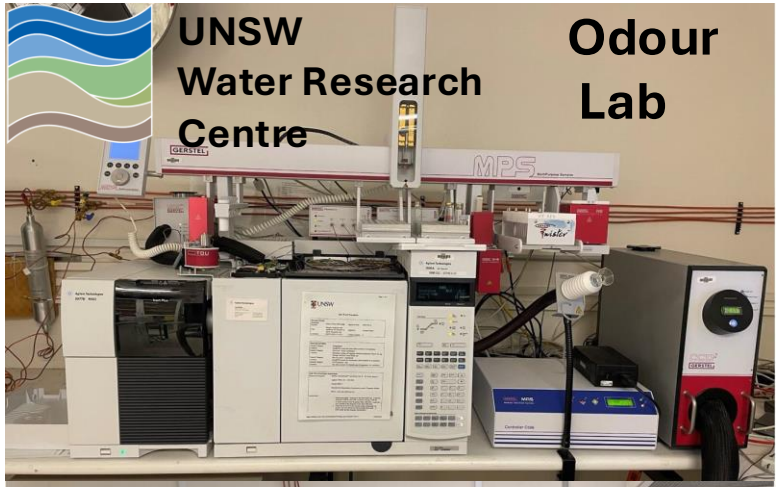
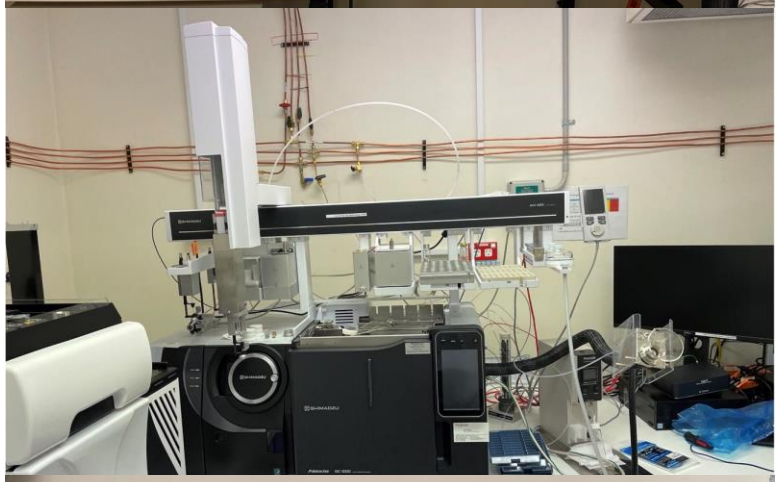
Thank you....







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