

# Lake water quality trends:

Recent results  
and identifying clues or  
opportunities to make significant  
improvements

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# Overview

State and Trend in lake water quality

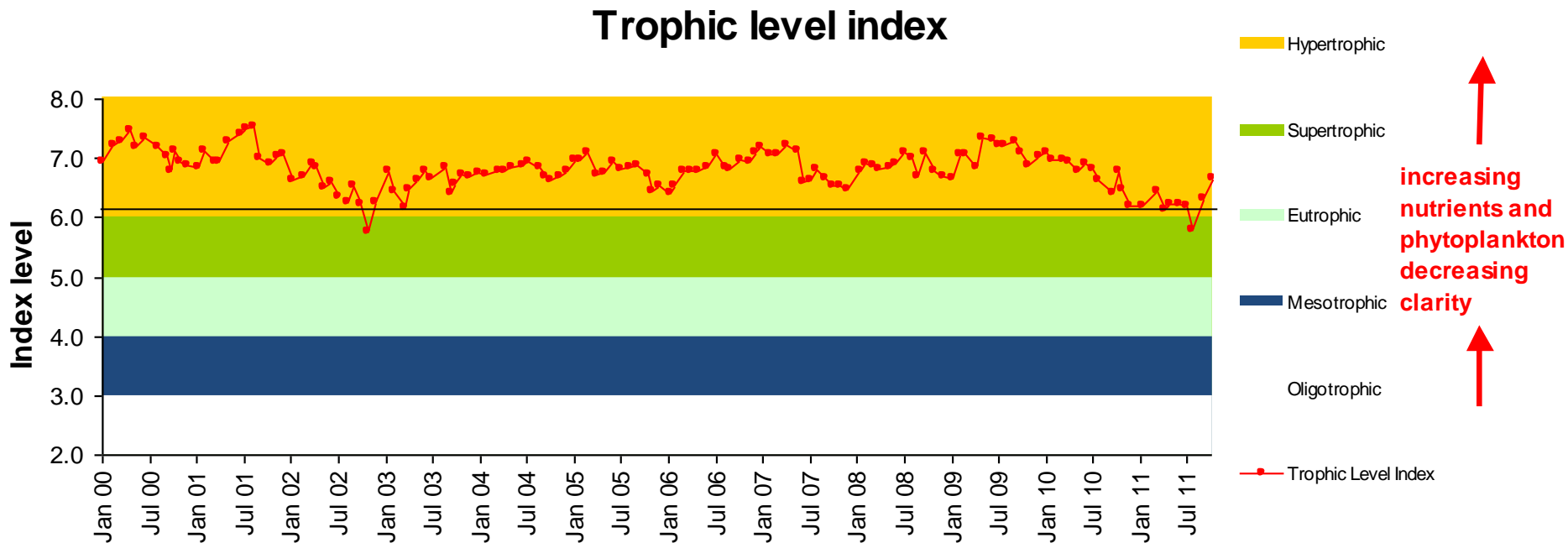
Significant annual patterns as clues to model or replicate improvements

How these fit in with recent investigations

Identify fruitful directions for lake management

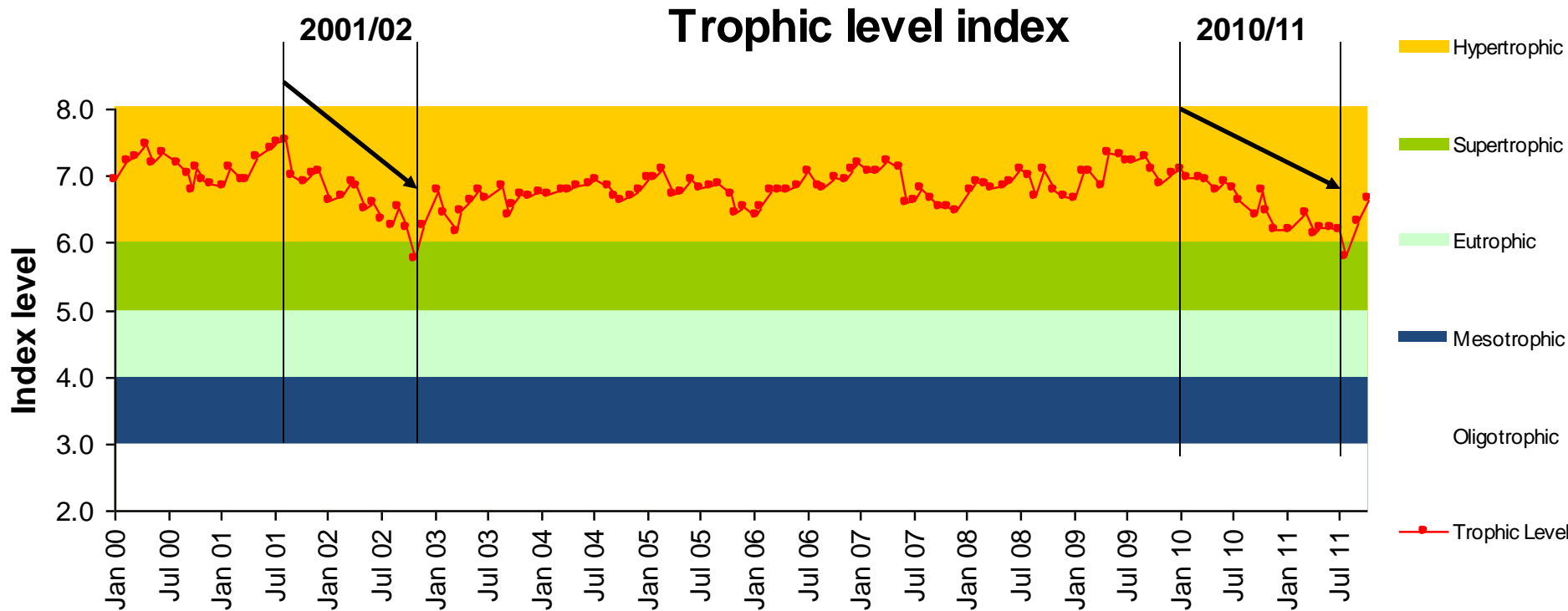
# Water quality trends - TLI

TLI – Trophic Level Index  
(N & P , Chlorophyll a, water clarity)



Generally steady in degraded HYPERTROPHIC state  
Variable but No long term TRENDS

# TLI – annual patterns of improvements to target levels

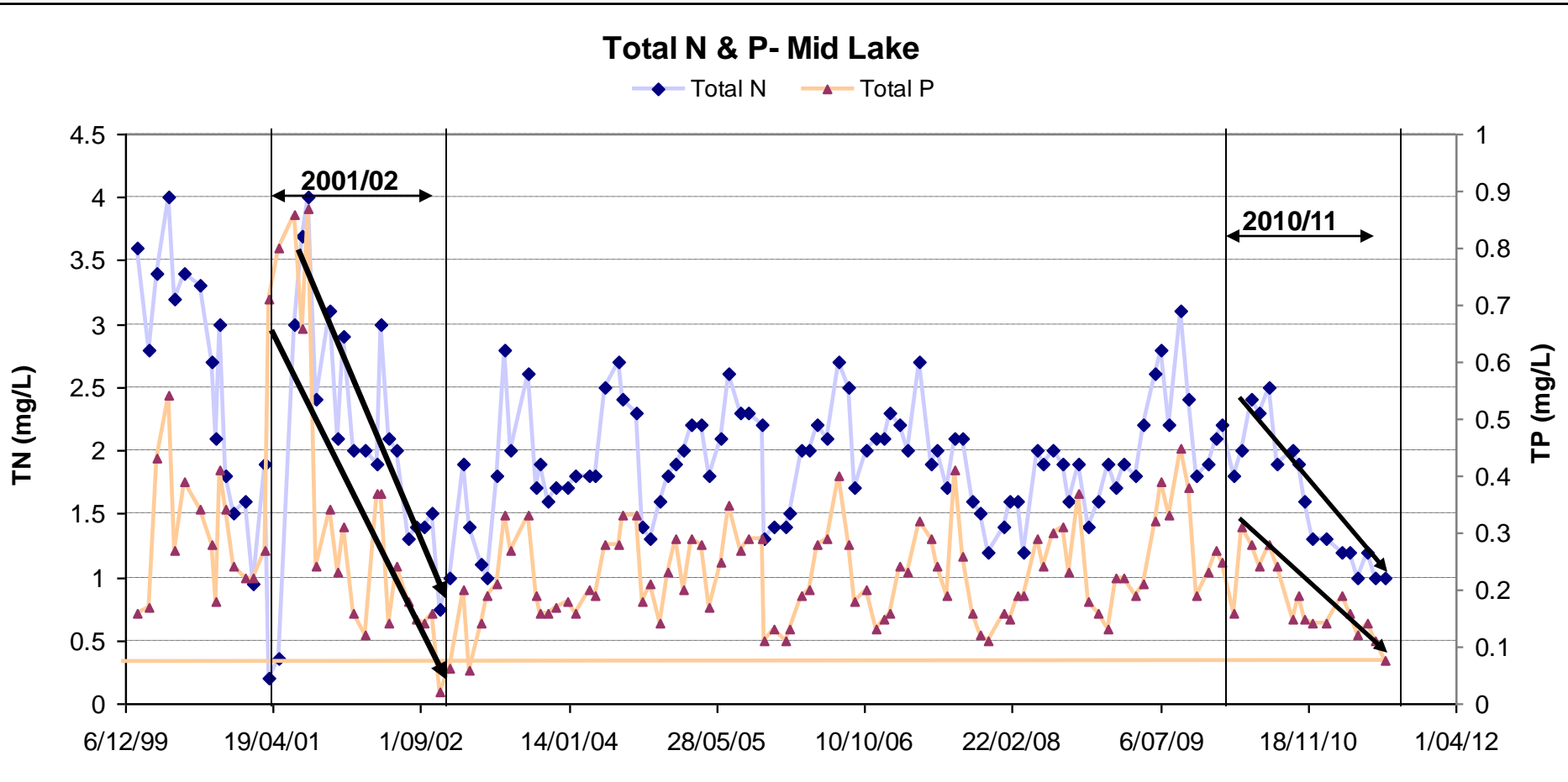


**What caused these periods of  
apparent improvement in lake water  
quality?**

**Why were they not sustained?**

**What can we learn from them?**

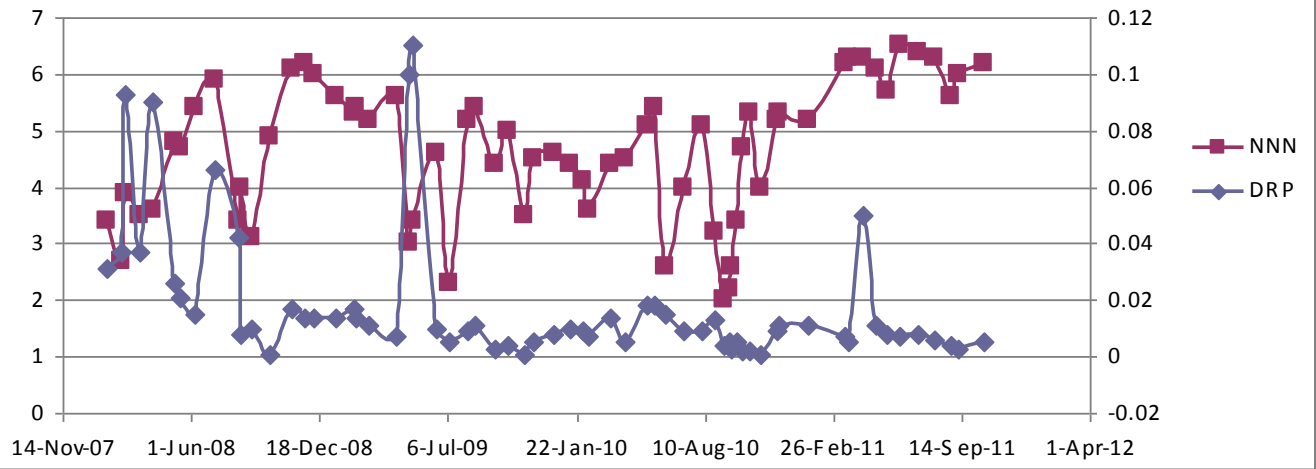
# TN and TP?



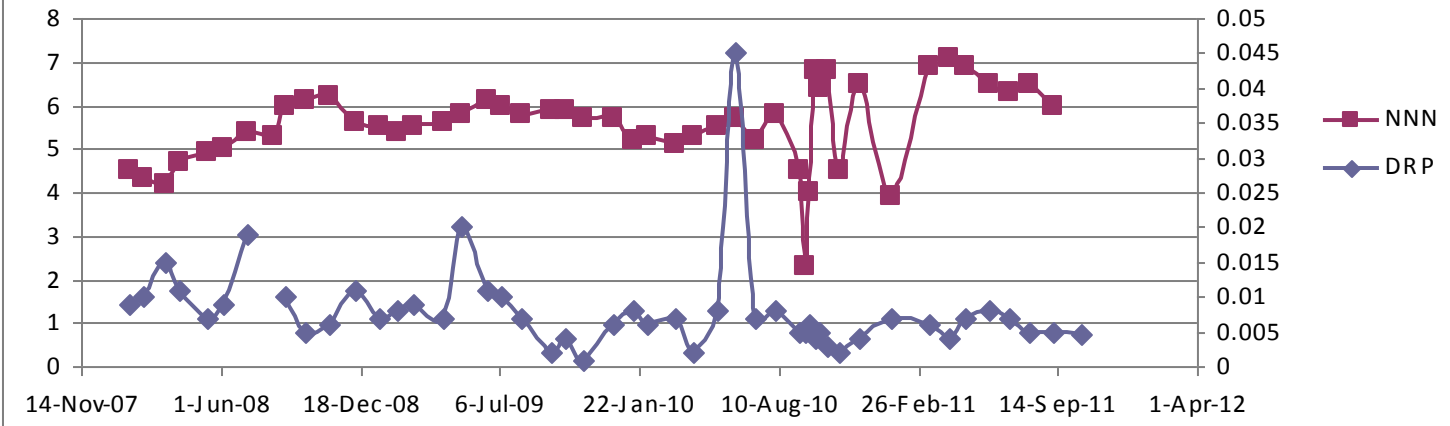
Both N and P decreased consistently over these periods

# No change in tributary nutrient inputs to lake in 2010/11

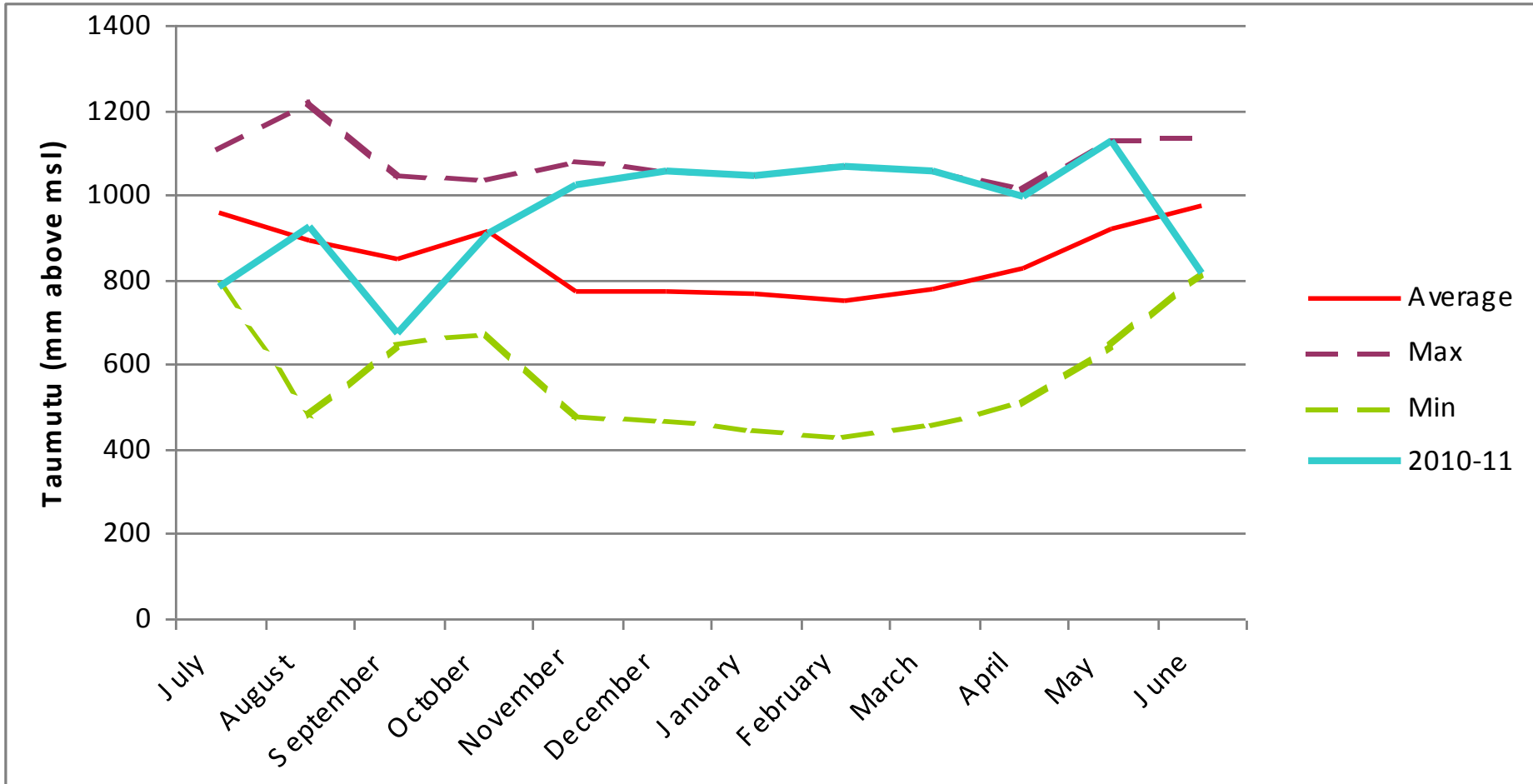
## Selwyn @ Coes Ford



## Harts Creek



# Lake level 2010/2011



In 2010/11 lake level rose in spring and stayed high all summer and autumn



1. Lake levels stayed high all summer/autumn
2. Mouth openings were largely unsuccessful due to weather patterns
3. Lake salinity stayed low all summer
4. No change in nutrient inputs?

Water quality improvement appeared to be controlled by physical lake processes.

**Pattern of improved water quality outcomes only broke down when mouth opening achieved and sustained low lake levels and higher sea water inputs (salinity) occurred.**

## Other improvements:

- Corresponding low incidence of toxic algal blooms (Nodularia)
- Period of re-establishment of lake edge macrophytes
- Studies show benefits to improved invertebrate populations in lake edge areas (Wilks thesis)

Reduced Toxic algal blooms





# Lake edge 'Ruppia-like' macrophyte bed establishment



## “Take home message”:

Lake is a dynamic system

There are existing physical conditions in the lake that can lead to rapid improvements in water quality

These ‘natural’ improved conditions should be used as examples in future to understand via:

- modelling
- further investigations
- incorporated into suites of potential solutions (not just nutrient reduction alone)

There remain challenges in using these ‘clues’ but they show fruitful directions for lake investigations and management

Thanks