



Freshwater/Lakes Summary

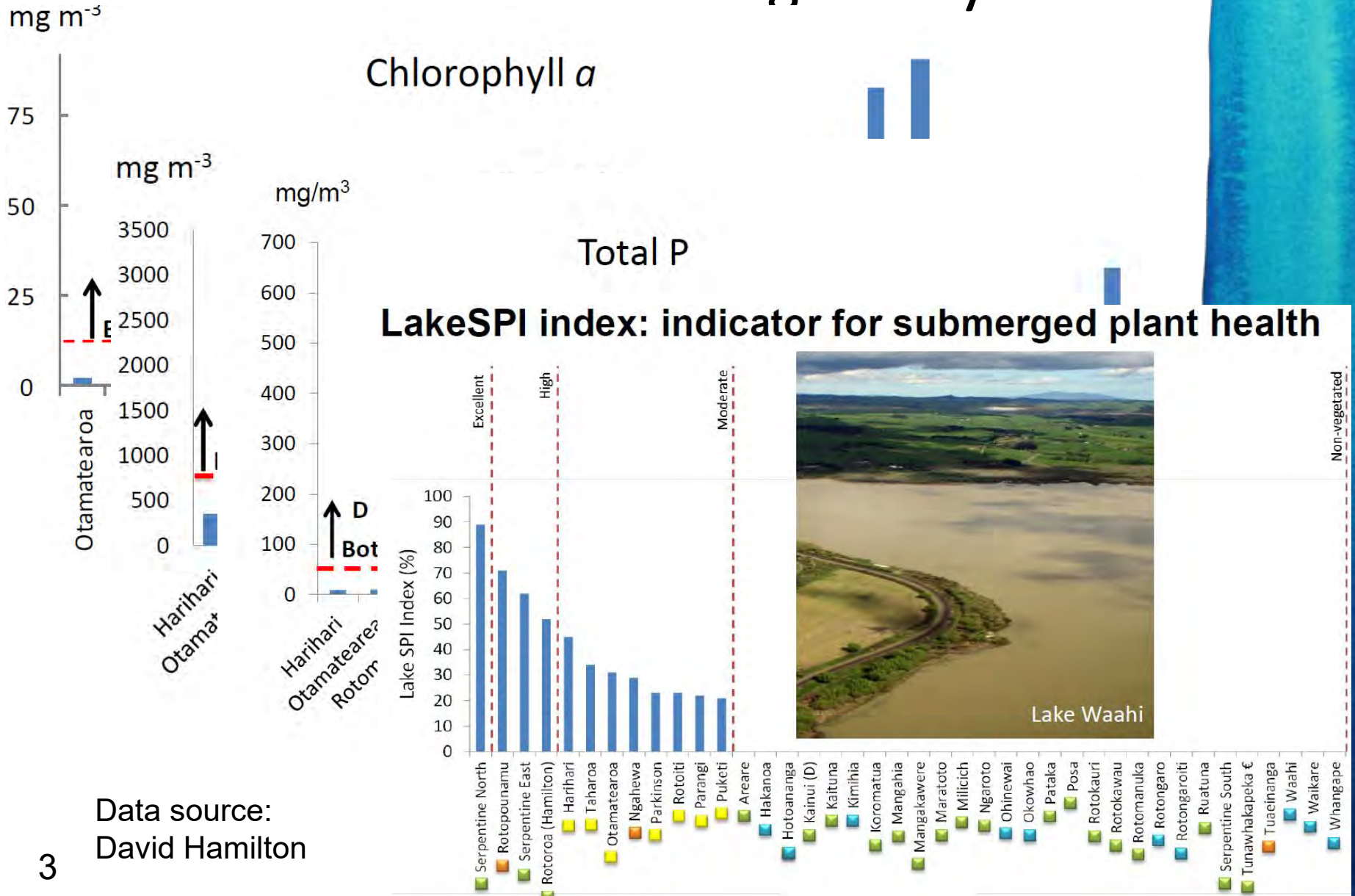


Dr Simon Stewart – 25 June 2019

Presentation overview

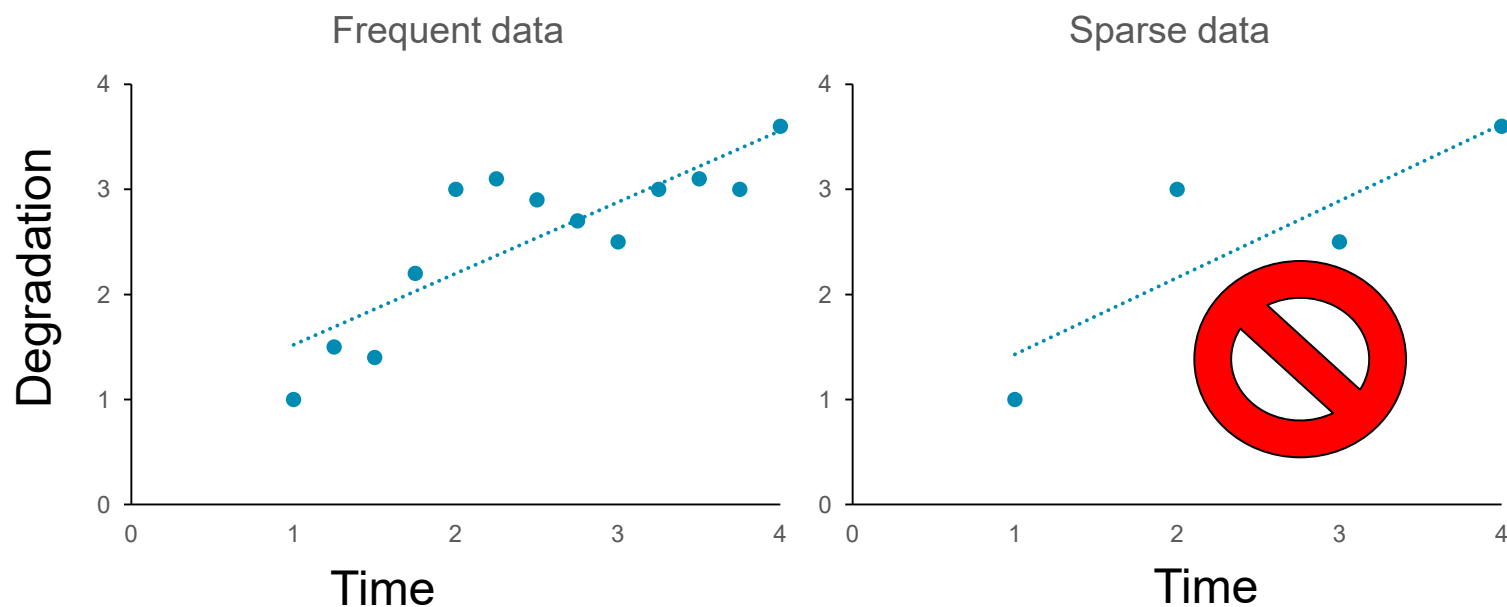
- Introduction into the need for nutrient improvements in lakes and the importance of aquatic vegetation
- Accounting for data deficient lakes.
- Peat lake FMU management
- Riparian setbacks and stock exclusion
- 75th percentile nitrogen reductions in lake FMUs
- Lake FMU farm environment plans
- ...

Waikato lakes are amongst the most nutrient-rich lakes globally



Data source:
David Hamilton

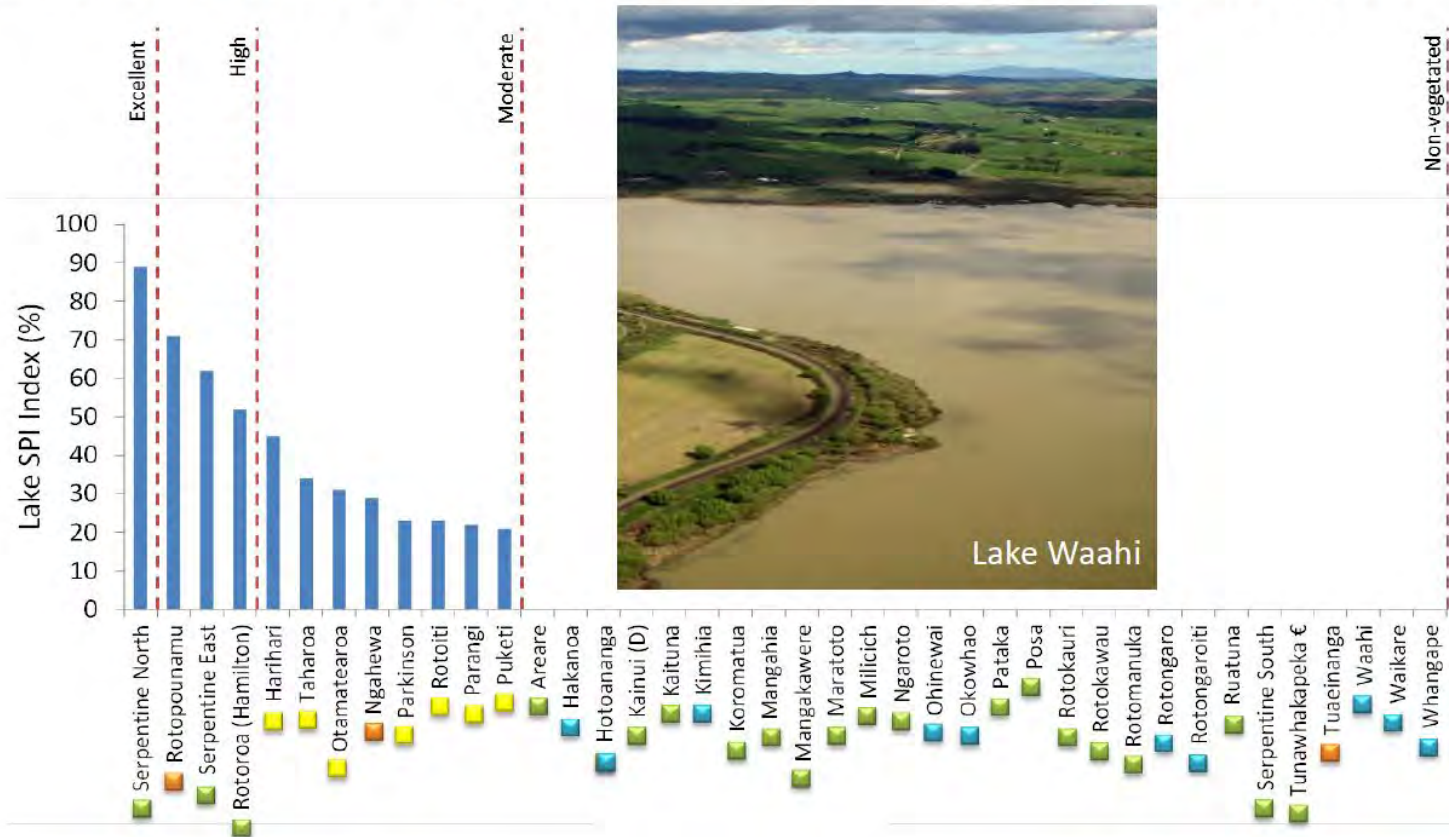
Data deficient lakes: issues with managing for “no decline”



- Managing from “improvement” is a correct application of the statistical test.

Data deficient lakes: issues with managing for “no decline”

LakeSPI index: indicator for submerged plant health



- Most vegetated Waikato lakes are near to a ‘nutrient tipping-point’ and require nutrient reductions despite meeting the national bottom line

Using the 60th percentile as N benchmark in lake FMUs



Waikato River
(Wikipedia.org)



Lake Waikare
(Hannah Mueller)



- Lakes need higher protection than streams and river reaches
- Nitrogen and Phosphorus have 2 and 3 times the impact in lakes than mainstem Waikato River

Using the 60th percentile as N benchmark in lake FMUs



Waikato River
(Wikipedia.org)



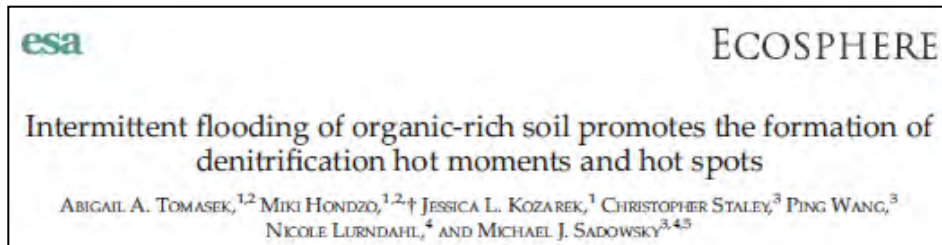
Lake Waikare
(Hannah Mueller)



- Lakes need higher protection than streams and river reaches
- Nitrogen and Phosphorus have 2 and 3 times the impact in lakes than mainstem Waikato River

Peat lake management

- Waikato peat lakes are likely N-limited as most of the water entered via seepage through saturated peat



- This function can only be restored through extensive riparian wetlands and reduced surface runoff.
- Current Peat-farming BMPs are available and should be mandatory within all peat lake FMUs



Lake Maratoto (LAWA) – ‘C band’

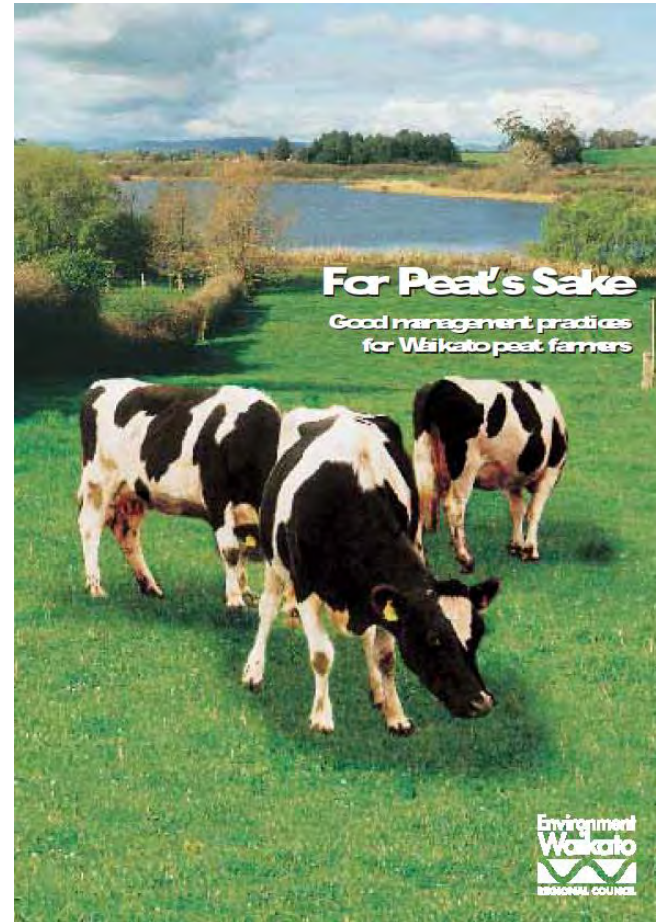


Lake Ngaroto (WRC) – 540% > bottom line

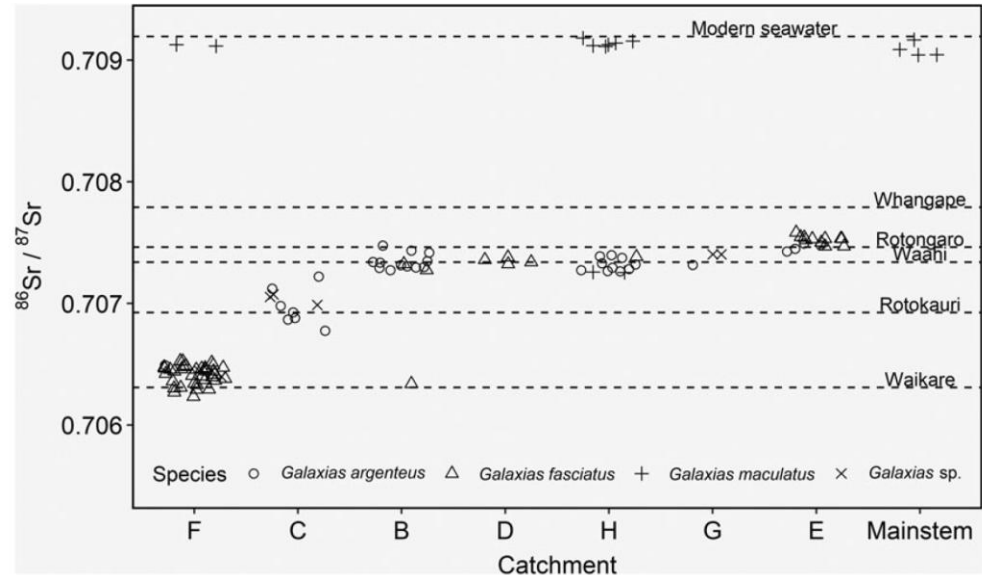
Implementing peat lake management plan

Good management framework exists and needs to be demonstrated in FEPs within peat lake FMUs:

- This function can only be restored through extensive riparian wetlands and reduced surface runoff.
- Current Peat-farming BMPs are available and should be mandatory within all peat lake FMUs:
 - No drainage cut through peat layer
 - Minimum pasture cover of 1200 kg Ha⁻¹ of dry matter
 - No rotary hoeing
 - Fence drains
 - Seasonally restricted fertilizer to minimize runoff



Riparian setbacks: accounting for in-lake galaxiid spawning



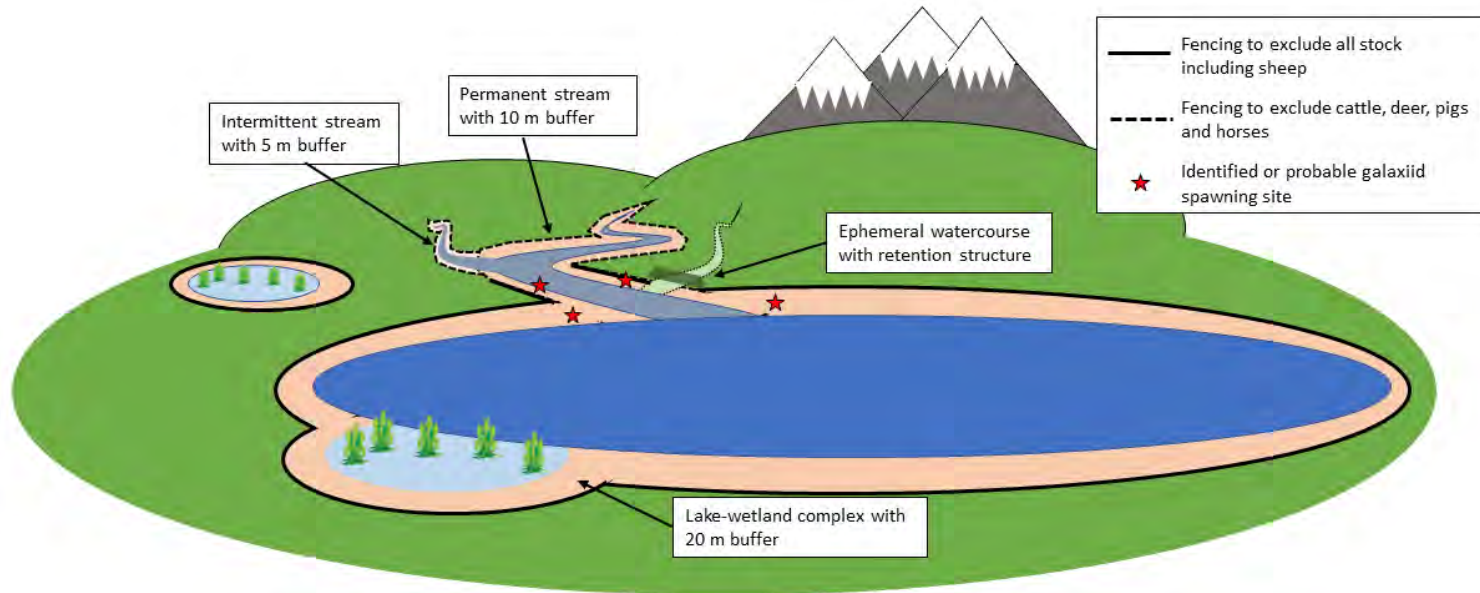
- Waikato riverine lakes are important galaxiid spawning sites (David et al. 2019)
- Lakes are also likely to be important spawning habitat within the upper catchment.

Riparian setbacks: accounting for water level fluctuation



- Riverine lakes naturally have high water level fluctuations
- High water level can effectively give stock direct access to the lake.

Farm environment plans in lake FMUs



Lake FMUs require more explicit direction for nutrient reduction:

- FEPs must demonstrate contaminant loss reductions
 - Identify all on-farm contaminant sources
 - Rank and evaluate all potential mitigation options
- Majority of contaminant load enters waterways from ephemeral streams
 - All ephemeral streams need to be identified and contaminant mitigation shown