

Dealing with changes in analytical methods

Keith Hamill
Paul Scholes

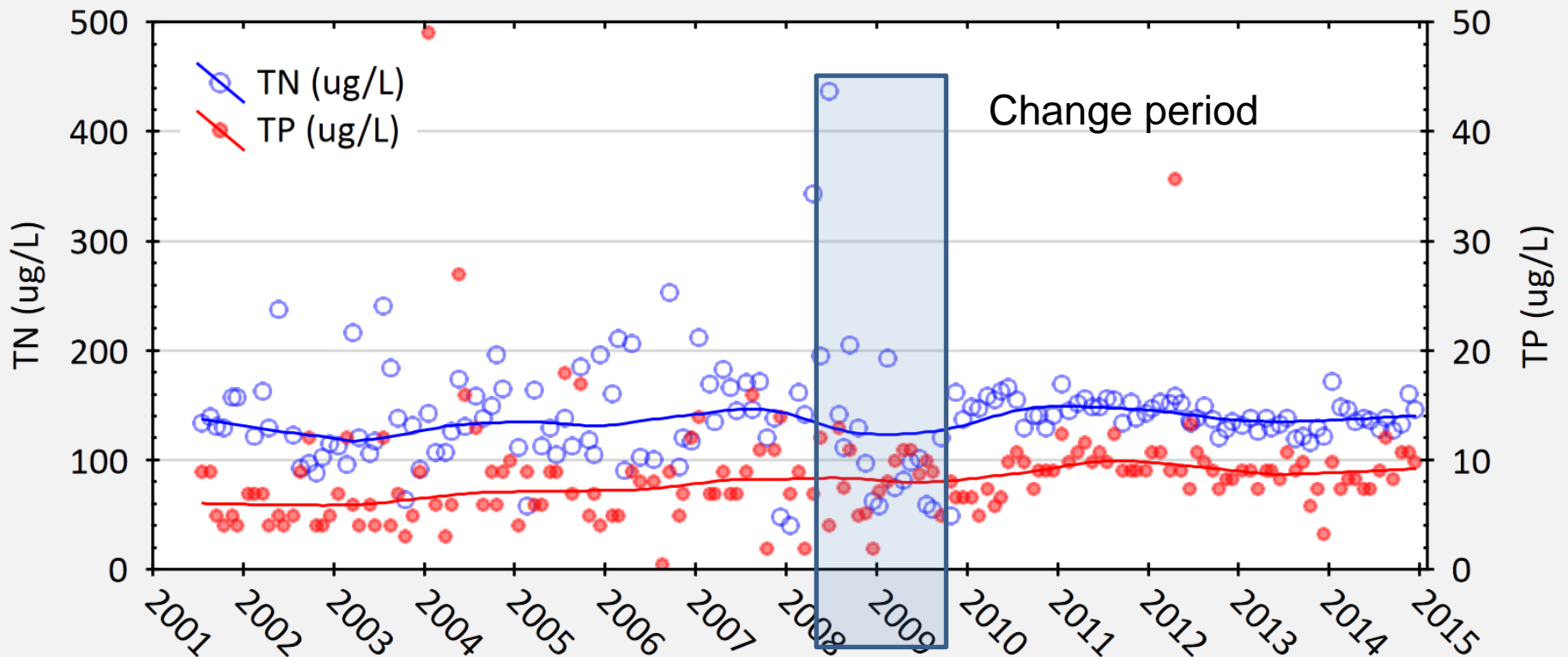


The issue

- Lab methods for analysing TN, TP and DRP changed in 2008 – 2009
- With new methods since 2009 there has been:
 - Less variability in results
 - Step change decrease in TN
 - Step change increase in TP
- This complicates trend analysis over this period.

Changes to laboratory methods through 2008-2010

Okataina

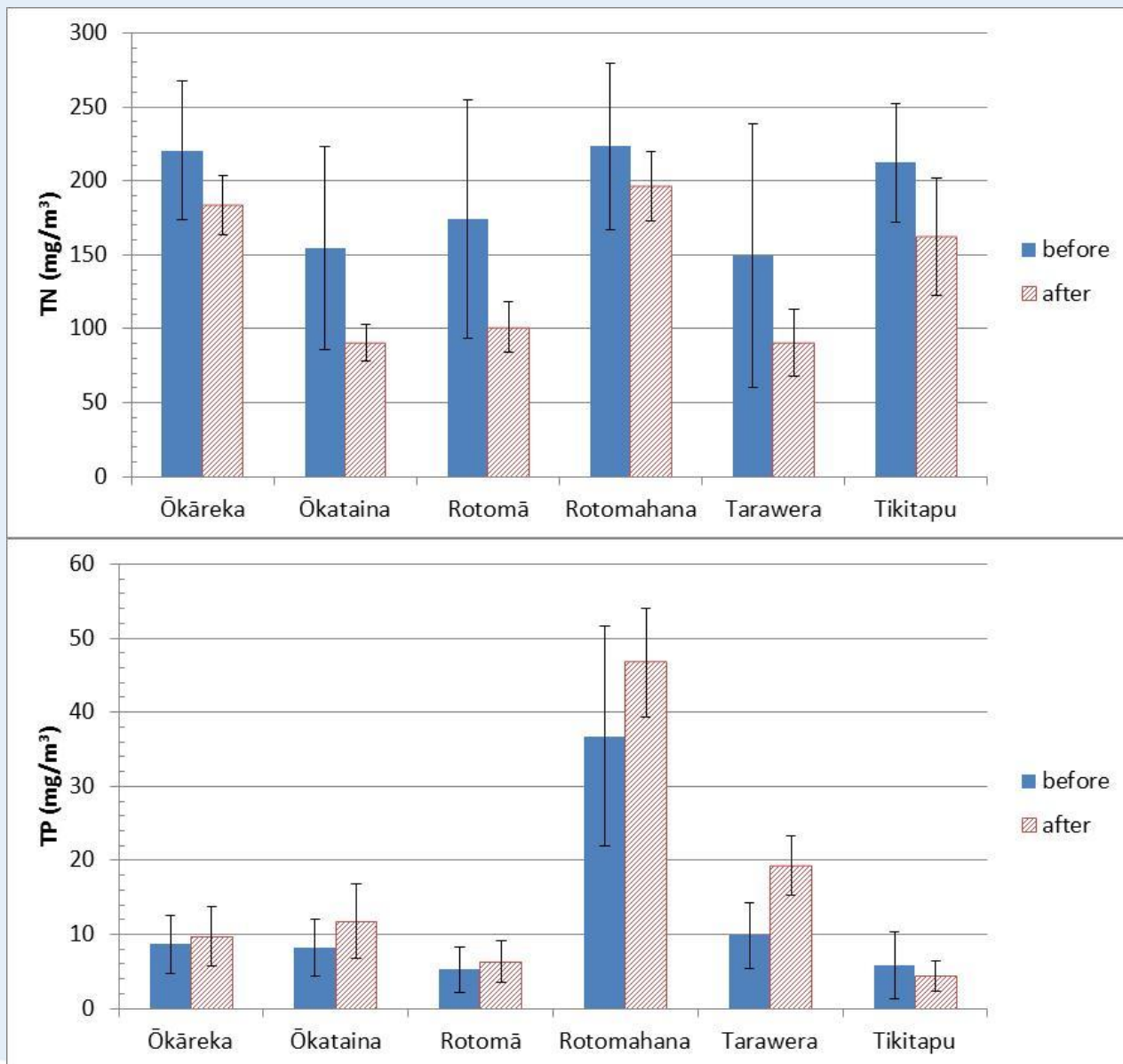


Adjusting for the method change

- Chose 'reference sites'
 - Few pressures, relatively stable, no trend in nitrate
 - 4 rivers and 6 lakes (top + bottom water)
- Compared 4 year median before 2008 with 4 year median after 2010.
- Regression analysis to identify an adjustment factor
- Repeated with seasonal data = result very similar (but points not independent)

Comparison of average TN & TP

results for the three year period before July 2009 and after July 2010.



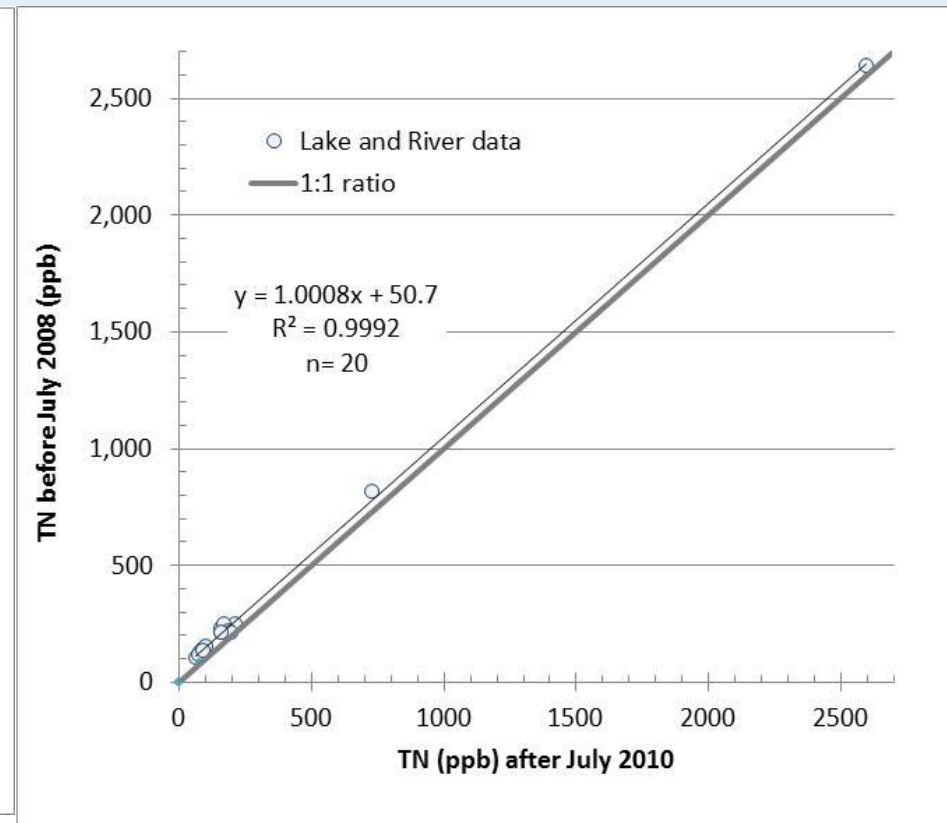
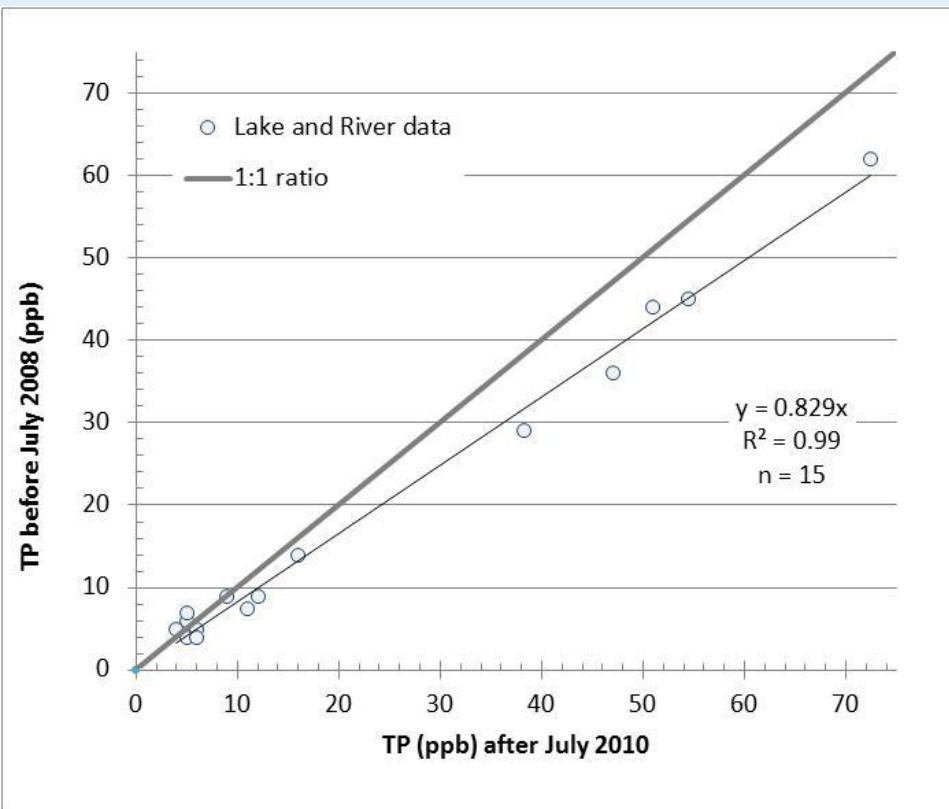
Adjustment factor

$$[\text{TN old}] = [\text{TN new}] + 50.7 \text{ mg/m}^3$$

$$R^2 = 0.9992, n = 20$$

$$[\text{TP old}] = 0.829 [\text{TP new}]$$

$$R^2 = 0.99, n = 15$$



Implications

- Little impact on TLI
 - The changes in TN and TP largely cancel out
 - Effect on lake TLI of -0.16 to +0.15 TLI units
- Impact on trend analysis if not adjusted
- Big influence on TN:TP ratios if not adjusted

Moving Forward

- When /how should an adjustment factor be applied?
 - Trend analysis spanning 2008 – 2009 period
 - Calculating TLI - adjust to old method
 - All TN and TP data? - could be problematic
 - Should TLI targets be changed to reflect the new method?
- Which method is considered more accurate, the new or old?
 - The now has less variance
- Is our adjustment appropriate?
 - Different statistical approaches?
 - Re-calibrate instruments?

