



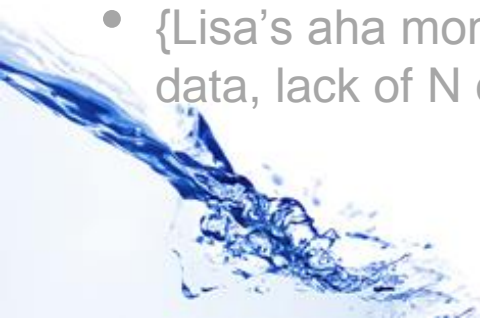
Nitrate and sampling summary

Lisa McGlinchey and Joseph Thomas

29 January 2015

Nitrate summary report

- Summarises guidelines and recommended limits for:
 - Human drinking water
 - Nitrate toxicity for fish/invertebrates (NOF)
 - Nitrate toxicity corrected for water hardness
 - Nitrate toxicity for stygofauna protection
 - Nuisance plant (periphyton/algae) growth (trigger for investigation)
 - FLAG Ecosystem health and cultural/spiritual levels for Waterwheel
- Summarises data and analysis for Te Waikoropupu Springs data
- Still to do summary for Motupipi & Limestone aquifer nitrates
- Some remaining questions raised at end for scientists, FLAG and iwi
- {Lisa's aha moments in preparing report: anzecc triggers, data outliers, latest data, lack of N correlations with anything}



TWS nitrate results compared to guideline levels

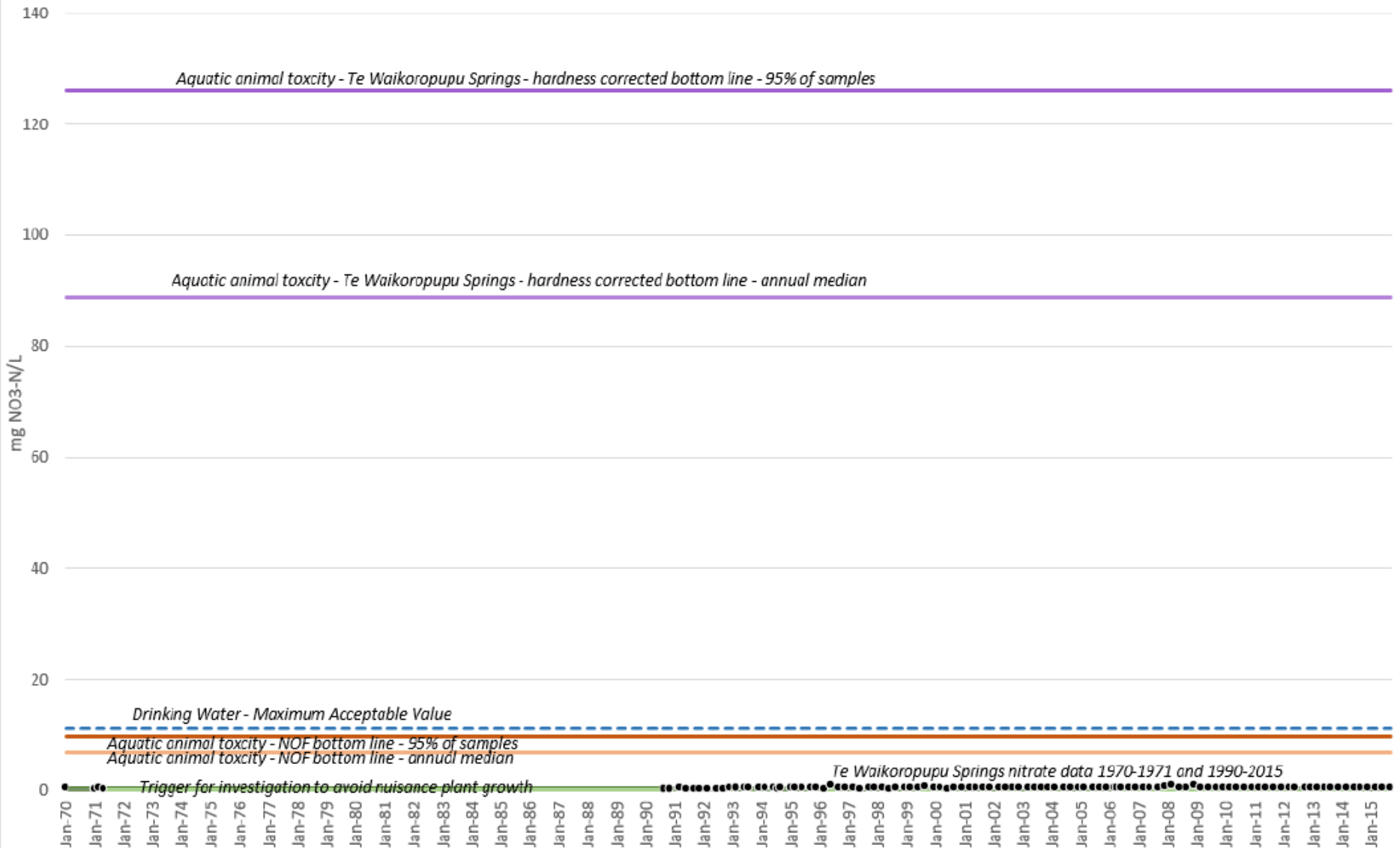
- Dec 2015 nitrate result still being processed
- Based on results so far for 2015 TWS gets 'A's all round
- Suggestion of improvement recently - time will tell...

TWS GRADE	No. of samples	Nuisance plant growth (lowland)	Ecohealth / Cultural & Spiritual	Drinking Water	Stygofauna protection	NOF toxicity	Corrected toxicity
2015	3	below	A	A	A	A (na)	A
2014	4	below	B	A	A	A (na)	A
2013	4	at	B	A	A	A (na)	A
2012	4	above	B	A	A	A (na)	A
2011	4	at	B	A	A	A (na)	A



TWS nitrate results compared to guidelines

Comparison of nitrate guideline levels and Te Waikoropupu Springs nitrate data



Remaining questions:

1. What is the appropriate threshold for nitrates for avoiding adverse changes in periphyton growth in Te Waikoropupu Springs?

- a. Is there currently periphyton growth in the main spring or below the main spring?
- b. Would the macrophyte community in the springs/river help to avoid excessive periphyton growth?



Remaining questions:

2. Is there a nitrate problem or not?

- a. Is there a trend of relevance in the Te Waikoropupu Springs nitrate data to date?

- b. What is the likely cause of the low and high data in the data record?
– Is there sufficient uncertainty over the outlier data points that they should be excluded from any data analysis?

- c. Has the range of measured nitrate affected the mauri of the springs? If not – at what level would the mauri be affected?



Remaining questions:

3. How confident are we of the link between land use practice in the recharge area and nitrate levels in the springs?

- a. How does/might land use management practices relate to changes in levels observed in receiving waters?
- b. What further monitoring or investigations would clarify the link between land use and springs water quality?
- c. What level of precaution is needed for finalising nitrate limits for Te Waikoropupu Springs taking into account any potential future risks?
- d. Is some form of adaptive management an effective approach?



What next?

- FLAG discussion on summary report
 - Any concerns or epiphanies?
- Suggested steps:
 - Put key science questions to scientist group commissioned by landowners
 - Discuss aspects with iwi including effects on mauri
 - Once we have feedback/discussion on these then revisit setting of nitrate limit for Te Waikoropupu Springs



Questions/Comments?



Sampling Summary

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Sampling (recent, current and proposed)

- River Water SOE – standard SW sampling ongoing
- Te Waikoropupu Springs:
 - **Temperature** – Joseph has sonde in the spring – will pull out at end of summer to download data
 - **Clarity** – Trevor has initiated in conjunction with salmon farm monitoring, some issues with equipment being resolved
 - **Nitrate** - currently done quarterly as part of gw quality suite
- Pohara Creek / Beach
 - **E.coli** investigations following swimming alerts
- Takaka **groundwater survey** starting in Feb 2016
 - ~50 sites in Takaka Valley area
 - Done every 10yrs – 1996, 2006 (previous data in the Takaka Water Resources Report)
 - Results expected June-July

Nitrates in Te Waikoropupu Springs

- Offer of time from FLAG to undertake monitoring
- Discussion points:
 - TDC GW monitoring is best practice for trend analysis, as per GNS (national and international protocol)
 - Ideally should do full suite of water quality parameters, not just nitrate (~\$250 lab cost per time)
 - Rationale for FLAG monitoring unclear – frequency and duration
 - Any further data is helpful
 - What further information would increased sampling frequency tell us?
 - What are the highest priorities for sampling for Takaka Catchment?
 - What is the best use of staff and FLAG members time and money?
 - More detailed periphyton and macro-invertebrate surveys across district?
 - Further source analysis of nitrates in Takaka limestone aquifer / Motupipi?
 - Investigation of effects of sinkholes in dairy land?
 - Further work into cultural and spiritual attributes?
 - Others?

