

Tabled at Hearing Tuesday 19 April, 2016

Plan Change 6 Lake Forsyth/Wairewa Catchment

Hearing 19 April 2016

Existing Environment and Issues

Dr Tim Davie

Lake Forsyth/Te Roto o Wairewa



Nov 2015

Existing lake environment

- Variable often poor water quality – high in nutrients and phytoplankton
- Frequent algal and cyanobacteria blooms
- Causes uncertain but phosphorus and sediment are key factors

Cyanobacteria bloom

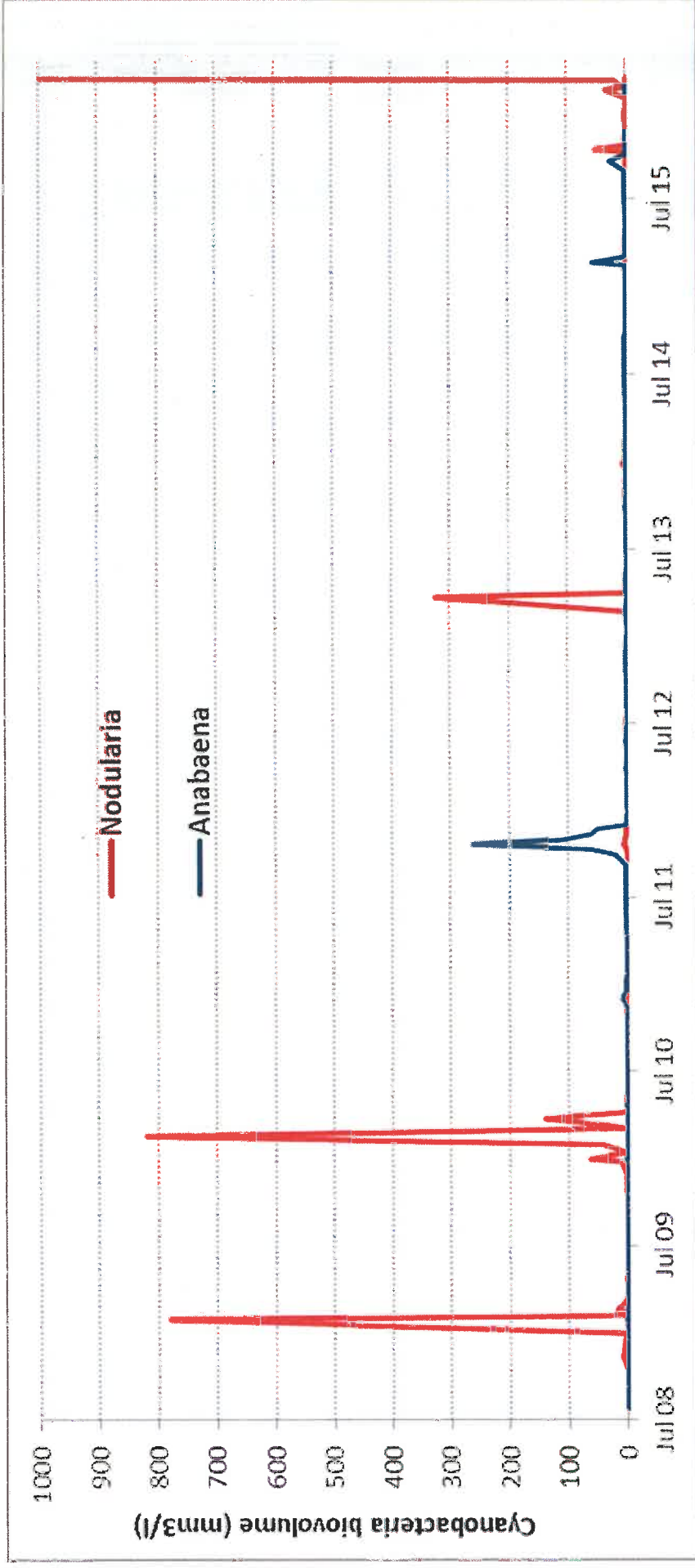


Oct 2014

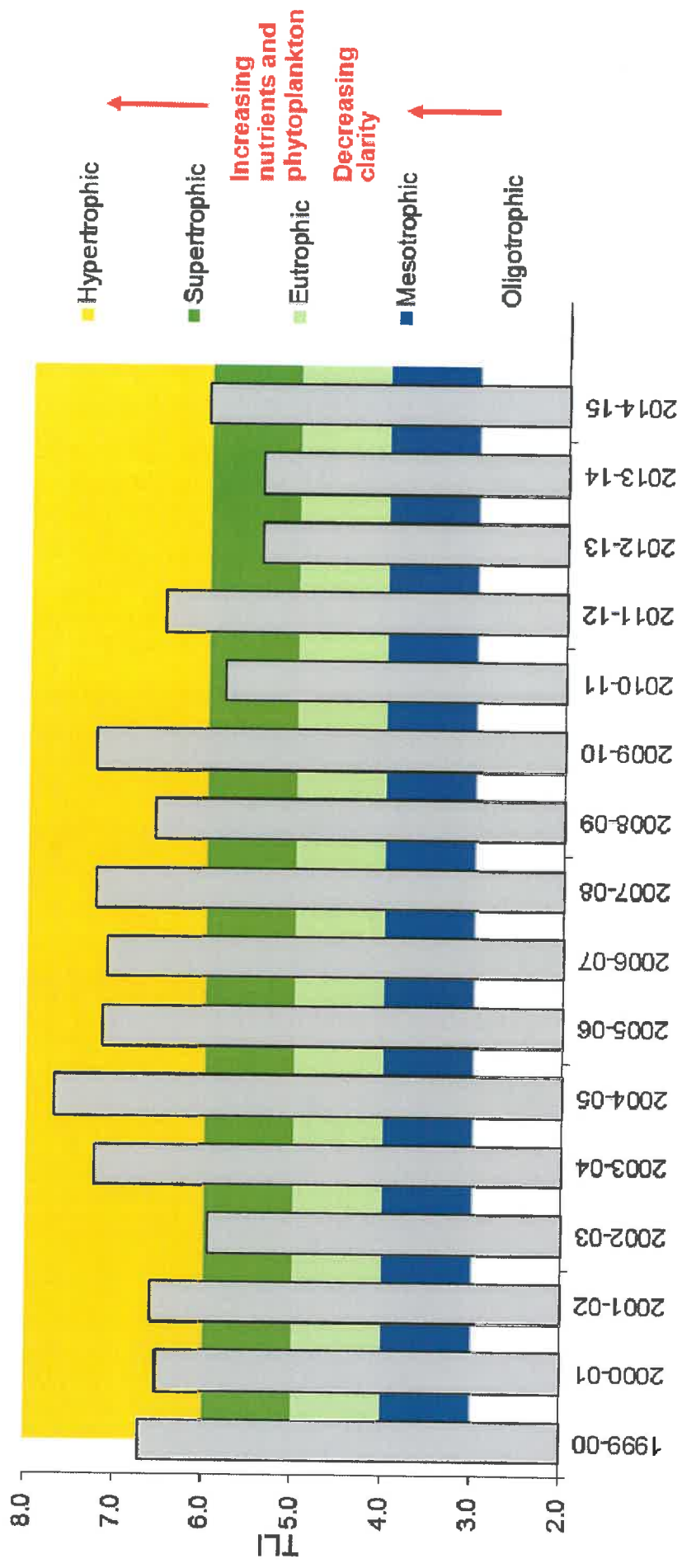


Apr 2016

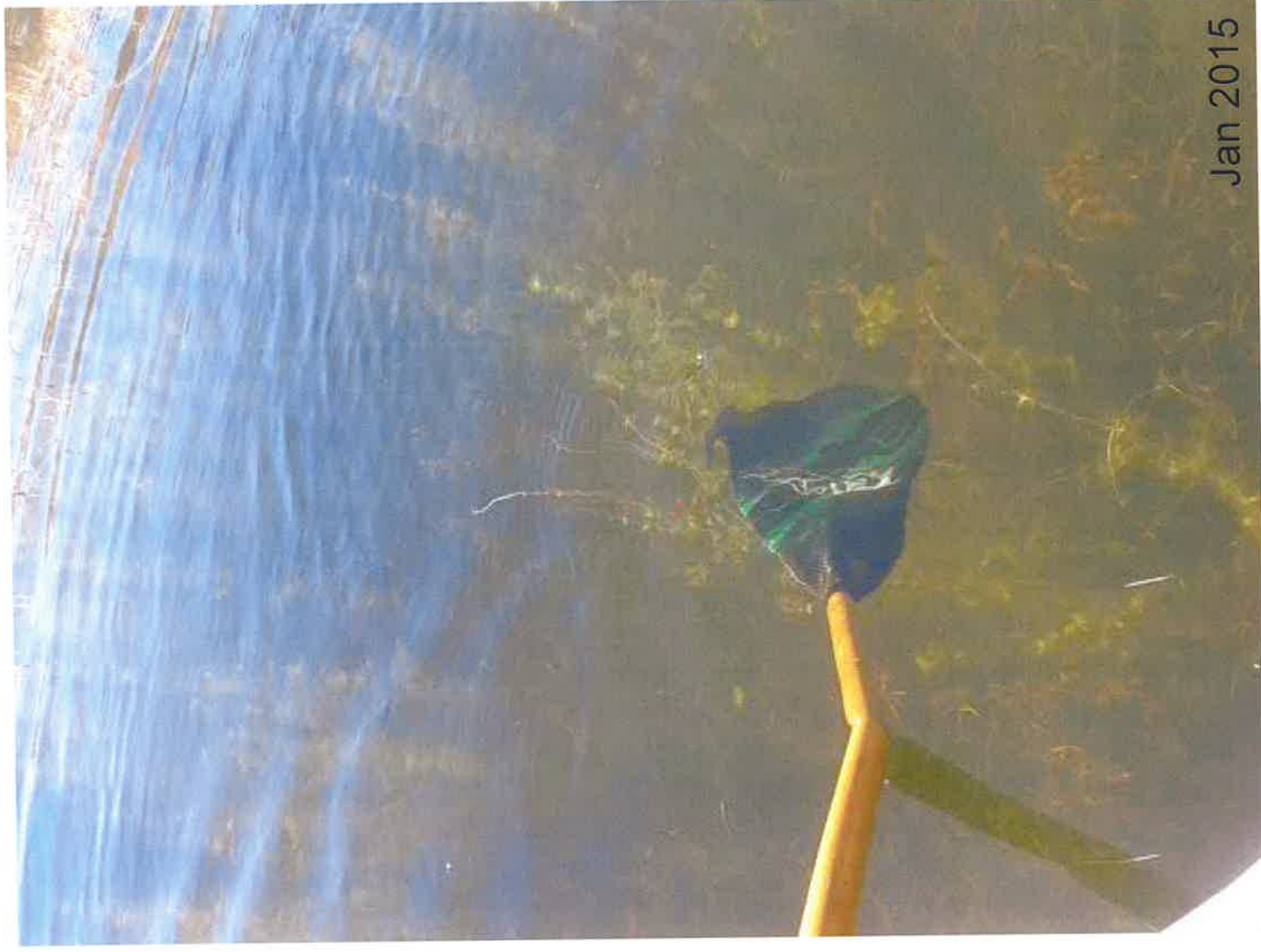
Cyanobacteria bloom occurrences



Trophic Level Index

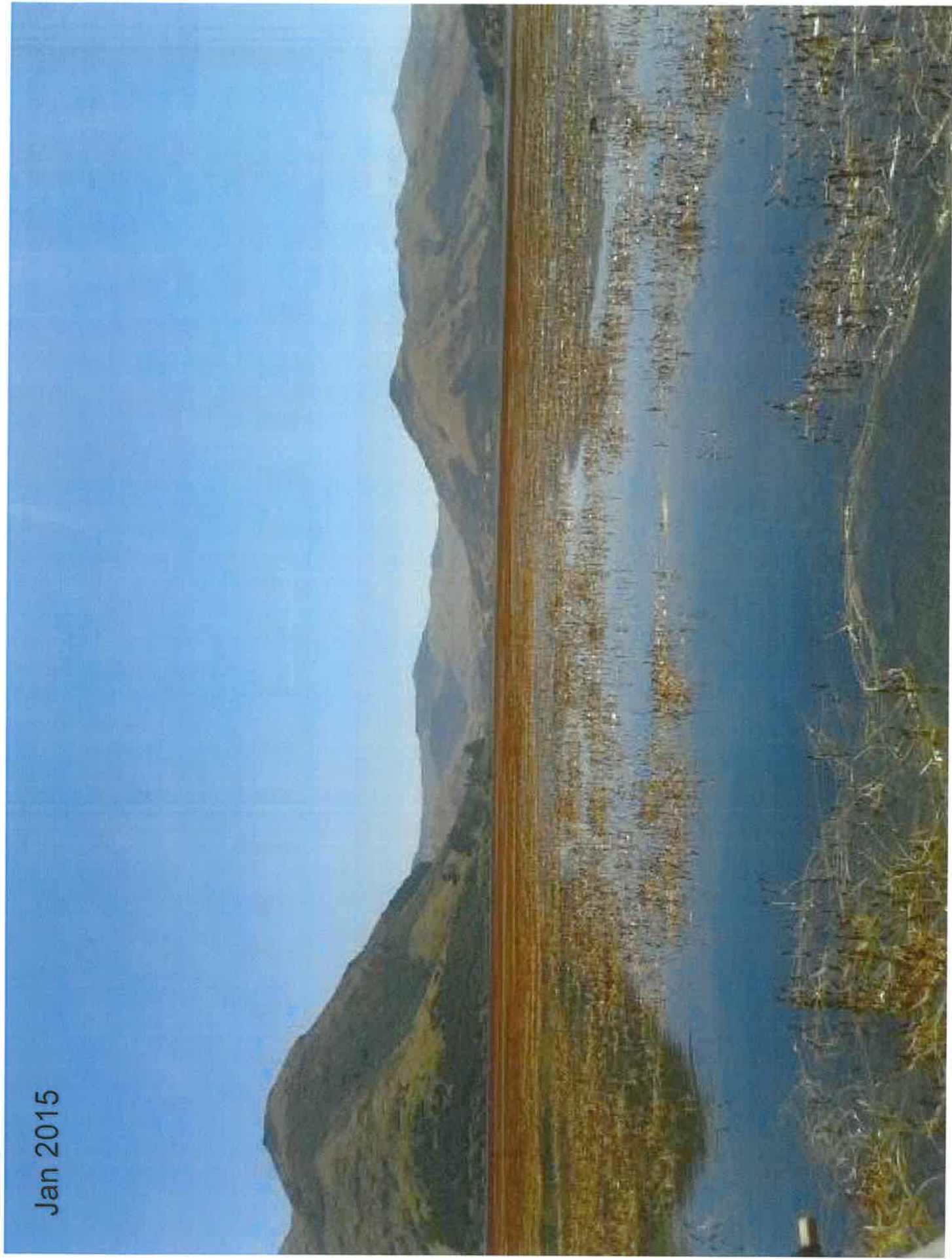


Macrophyte growth and water clarity

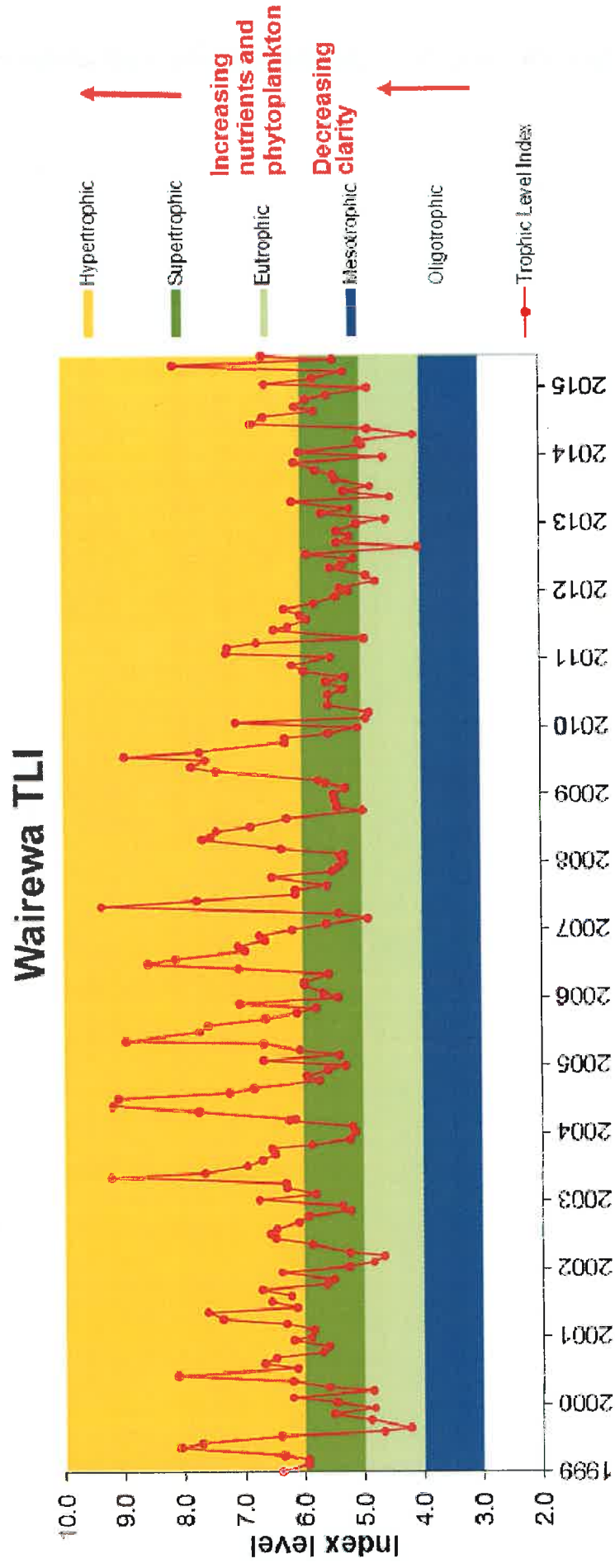


Jan 2015

Jan 2015



Trophic Level Index



Why lake water quality is an issue

- Loss of cultural health and reduced access to mahinga kai
- Blooms produce toxins harmful to people and animals
- Limits year round recreation and amenity uses of the Lake
- Suspended sediment limits growth of aquatic plants
- Water quality doesn't meet all NPSFM national bottom lines for lakes

Te Roto o Wairewa (lake) water quality

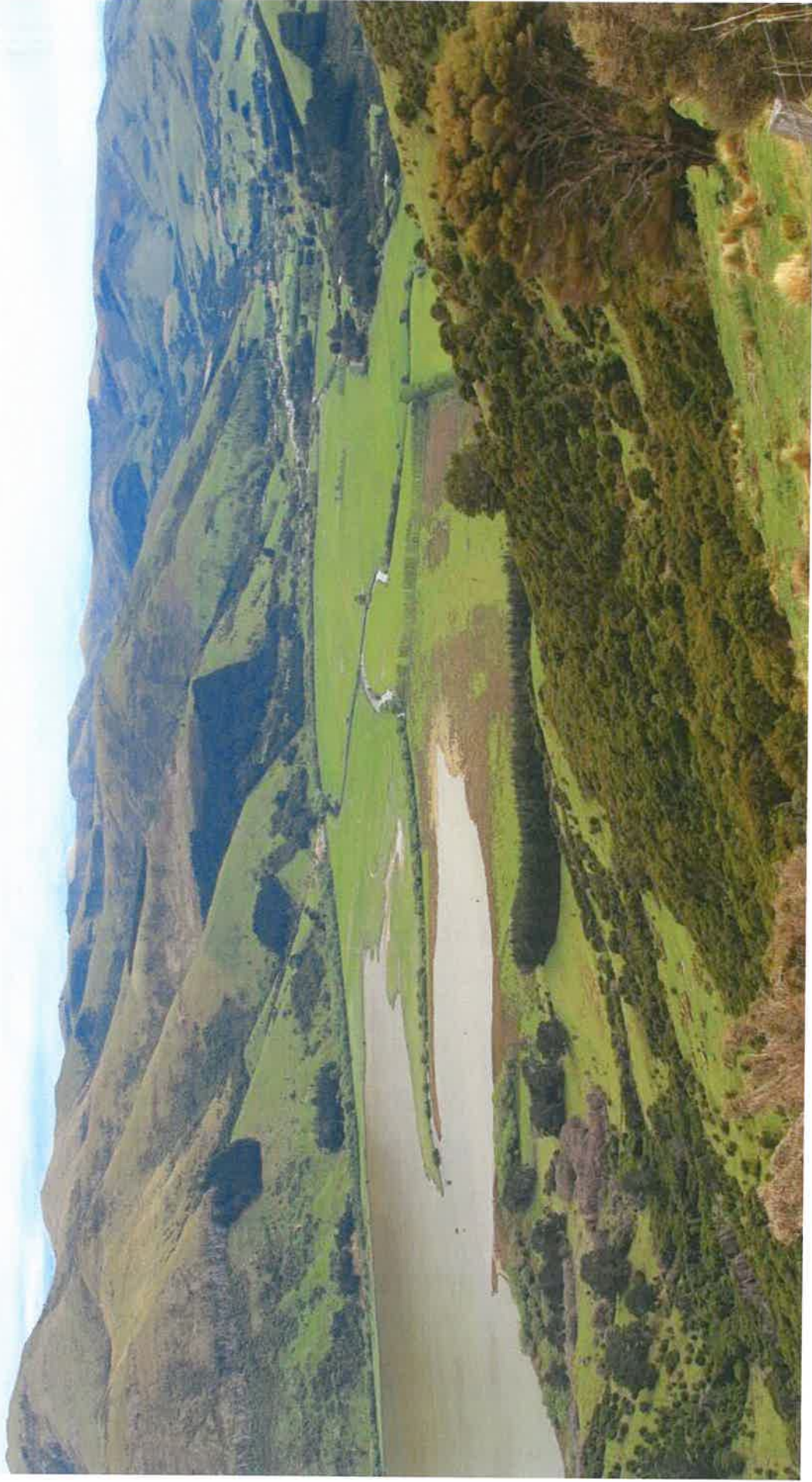
Attribute	NPS - NOF class
Total nitrogen	C / D*
Total phosphorus	D*
Chlorophyll a	D*
Ammonia	A
E. coli	A
Cyanobacteria	C**

* For freshwater lakes, N.B. Wairewa is an ICOLL

** July 2012 to June 2015 (36 samples)

Rivers

Nov 2015





Existing environment & issues (rivers)

- Fish and invertebrates relatively healthy
- Low nitrate and ammonia concentrations
- Phosphorus and E. coli concentrations elevated

But...

- Excess sediment affecting stream habitat
- Stream bank erosion main source of sediment
- Riparian vegetation poor for bank stability

Wairewa river water quality

Attribute	NPS - NOF class	
	Okuti	Okana
Nitrate nitrogen	A	A
Ammonia	A	A
E. coli	C	B

Opuahau Stream May 2014



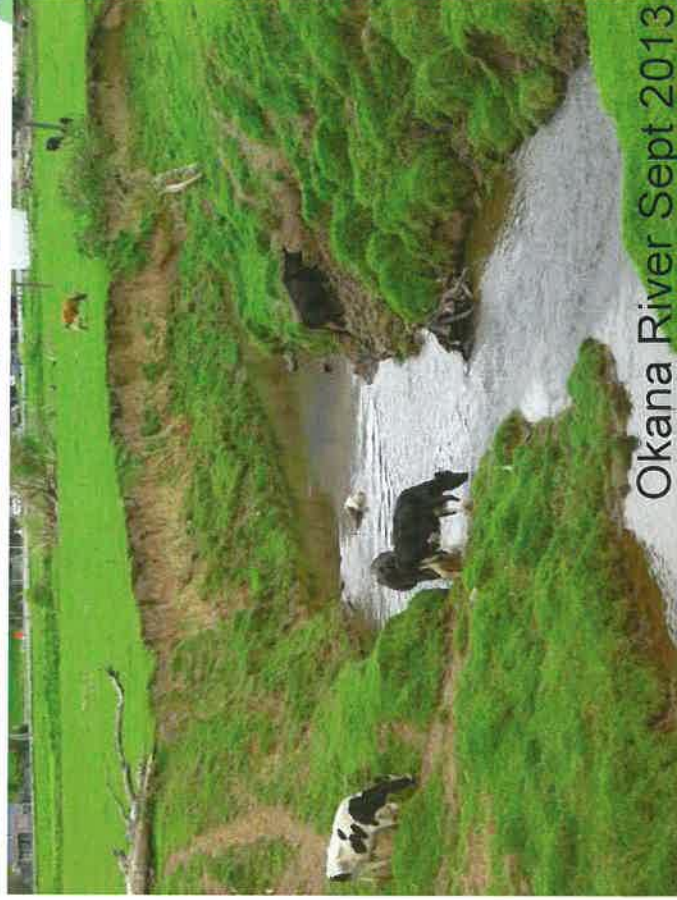
Okuti River May 2014



Okana River May 2014

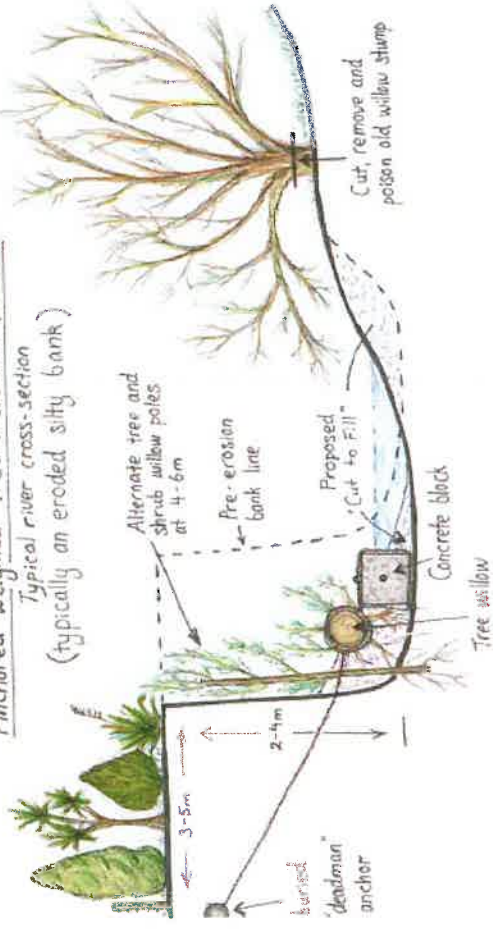


Okana River Sept 2013

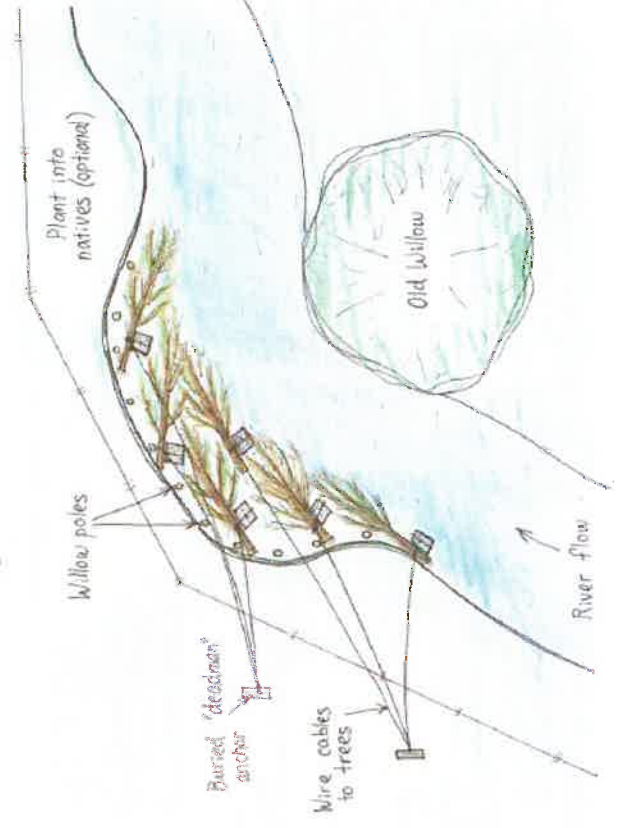


Stabilisation

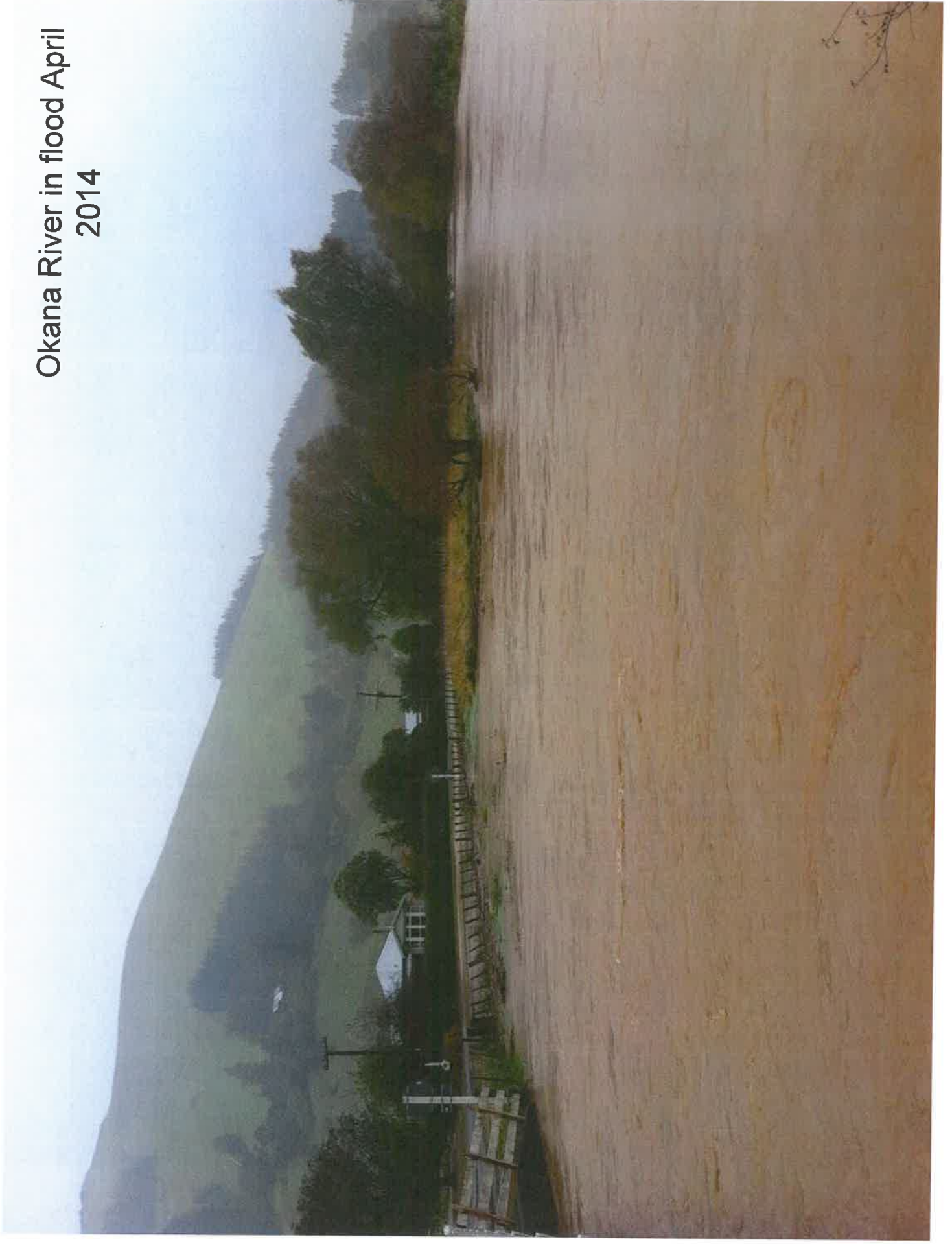
Anchored Weighted Tree Protection (AWTP)



Typical river plan view



Okana River in flood April
2014



Flood Hazard

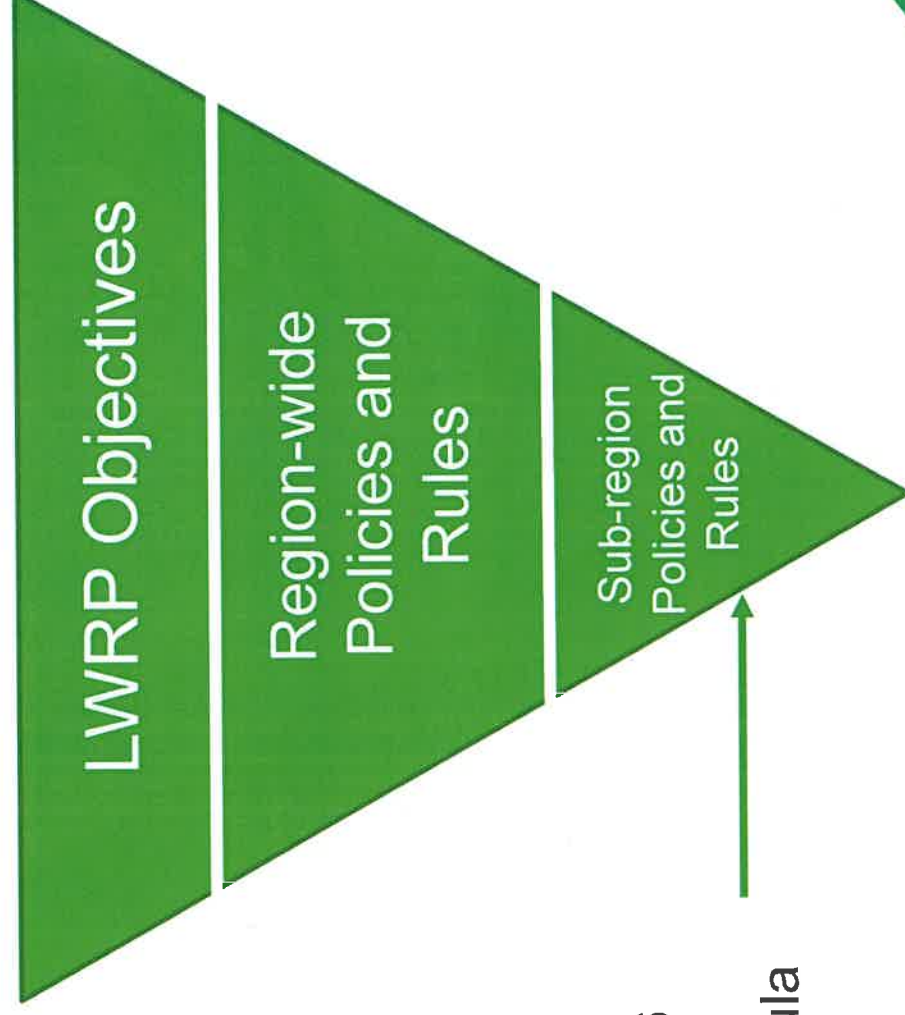
- History of flood events in due to high rainfall from steep catchment to flatter lower valley
- Three significant flood events in March and April 2014
- Wairewa Rating District established to manage tree growth and clear channel obstructions



Plan Change 6

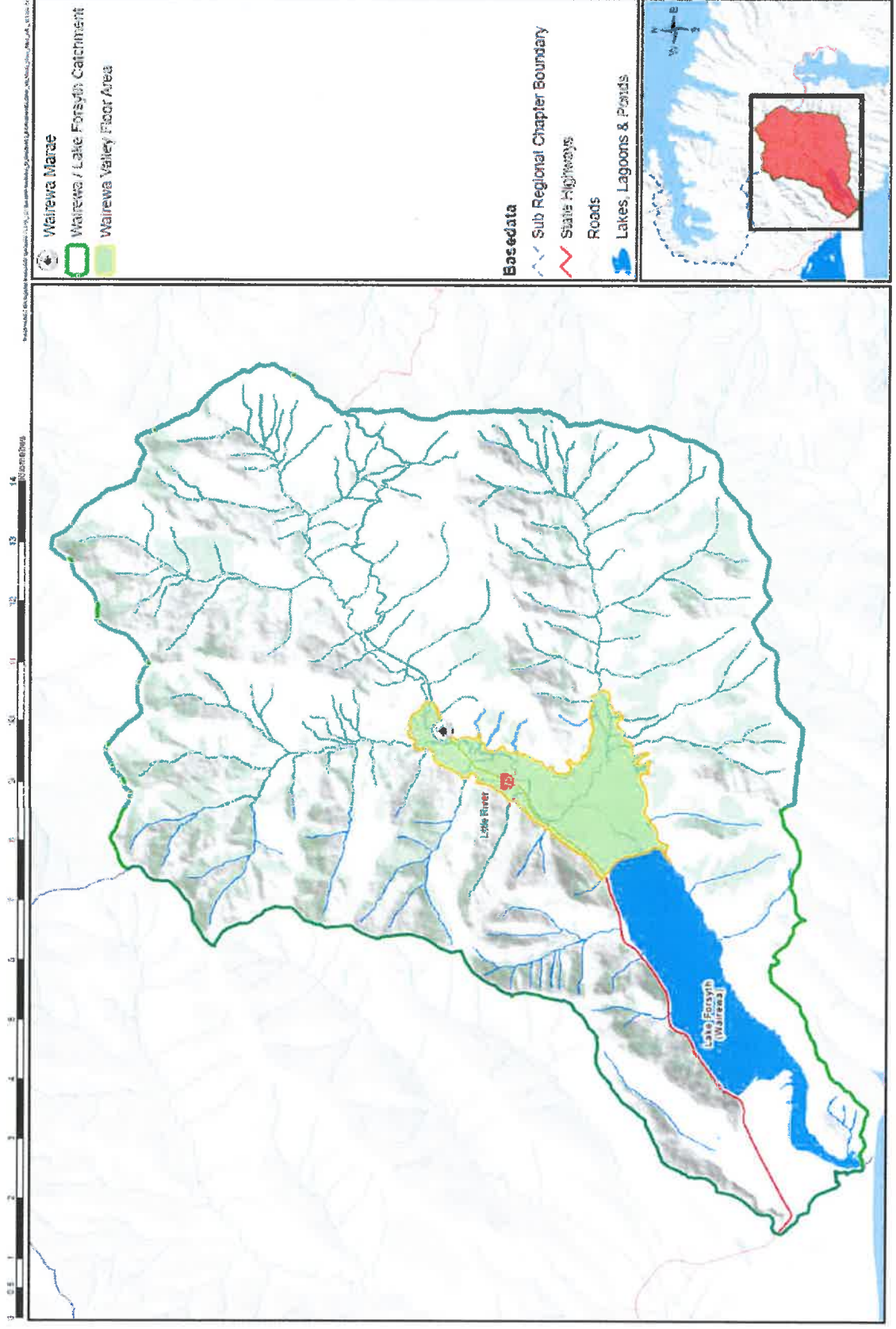
Alastair Picken

Land and Water Regional Plan Architecture



Plan Change 6
Section 10 –
Banks Peninsula

Lake Forsyth/Wairewa catchment



Purpose of Plan Change 6

- Recognise the cultural significance and recreational resources of the lake
- Address water quality issues in the lake and rivers by reducing sources of contaminants
- Support interventions that will contribute to lake restoration
- Not conflict with flood management objectives

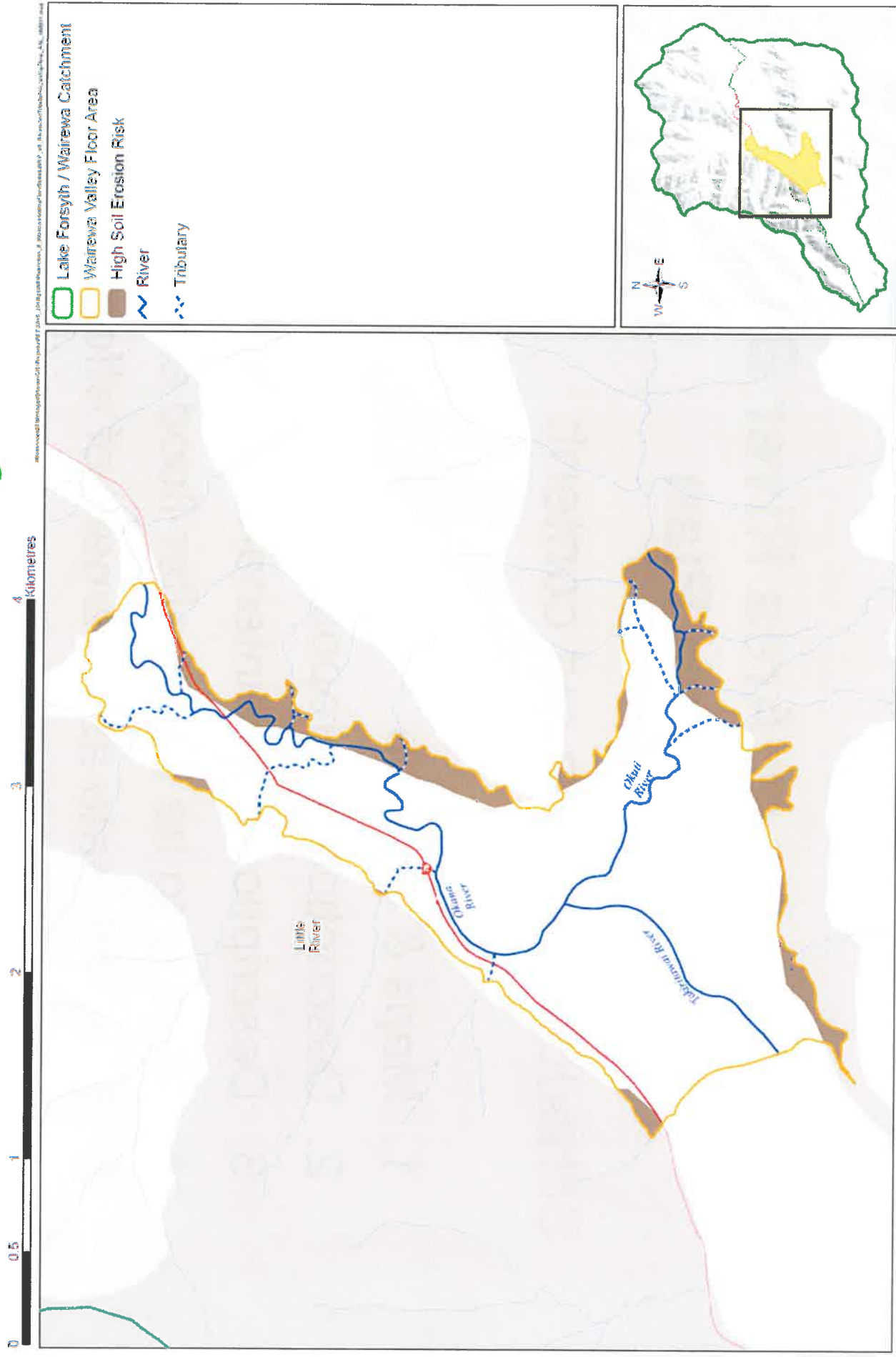
Cultural Importance

- S42A report recommends a new policy to recognise the significance of Lake Forsyth/ Te Roto o Wairewa to Ngāi Tahu *[Policy 10.4.4A]*

Addressing contaminant sources

- Enable works to stabilise river banks if done in accordance with a Valley Floor Area River Bank Erosion Plan
[Policy 10.4.1(b)(c); Rules 10.5.1, 10.5.2, 10.5.3; Schedule 24c]
- From 2020, prohibit all stock from accessing the riverbed and riparian margins of rivers and the lake within the Valley Floor Area *[Policy 10.4.1(a); Rules 10.5.4, 10.5.5]*

Stock exclusion - Valley Floor Area



Valley Floor Area River Bank Erosion Plan

Schedule 24c sets out content:

1. Maps & location
2. Description of proposed works
3. Description of maintenance programme
4. Actions to be taken after flood events
5. Proportionate assessment of effects

Wastewater discharges

- Minimise phosphorus in community wastewater discharges [*Policy 10.4.1(e)*]
- Prevent inundation of septic tanks in flood prone areas [*Policy 10.4.1 (f)*]

Intercepting contaminants upstream of the lake

- Enable the construction of a sediment retention basin and wetland *[Policy 10.4.1(d); Rule 10.5.6]*



Lake investigations

- Permit disturbance of the lake bed for purpose of investigating “historical” phosphorus

[Policy 10.4.4; Rules 10.5.7, 10.5.8]

Lake opening & closing

- Enable artificial opening and closing of the lake to support cultural values, fish passage, and water quality improvements

[Policy 10.4.4(c); Rule 10.5.9]



Freshwater outcomes

- Table 10(a) contains outcomes for the Ōkuti, Ōkana and Takiritawai Rivers
- Table 10(b) contains outcomes for Lake Forsyth/Te Roto o Wairewa

Water quality limits

- Table 10(d) contains limits for the Ōkūti and Ōkana Rivers
- Table 10(e) contains limits and targets for Lake Forsyth/Te Roto o Wairewa to be met by 2030
- Table 10(f) contains an annual phosphorus load target for the Lake to be met by 2030

NPSFM (rivers)

PC6 Table	NPSFM Attribute	Current state (2014-15) expressed as NPSFM "band"	PC6 Outcome/ Limit expressed as NPSFM "band"
10a - outcomes rivers	Periphyton	Not monitored	B
10d – limits rivers	E.coli	C (Ōkuti R)* B (Ōkana R)	A
	Nitrate	A (Ōkuti R)* A (Ōkana R)	A
	Ammonia	A (Ōkuti R)* A (Ōkana R)	A

* Five year grade (July 2010 to June 2015) because Ōkuti River only sampled quarterly

NPSFM (lakes)

PC6 Table	NPSFM Attribute	Current state (2014-15) expressed as NPSFM "band"	PC6 Outcome/ Limit expressed as NPSFM "band"
10b - outcomes lakes	Cyanobacteria	C*	C
	E.coli	A	A
10e – limits lakes	Total Phosphorus	D	C
	Total Nitrogen**	C / D	C
	Chlorophyll a	D	C
	Ammonia	A	A

* July 2012 to June 2015 (36 samples)

** Intermittently closing and opening lagoons (ICOLs) are not included in brackish lakes

Water quantity limits

- Table 10(c) contains minimum flow, restrictions and allocation limits for:
 - Ōkuti River and its tributaries
 - Ōkana and Takiritawai Rivers and their tributaries

Summary

1. Targeted plan change that works as part of the LWRP and with other non-regulatory actions to achieve community agreed freshwater outcomes
2. Enabling provisions for bank stabilisation, sediment basin/wetland, lake investigations and artificial opening/closing
3. Strong direction on stock exclusion from rivers and riparian margins in Valley Floor Area
4. Freshwater outcomes and limits that meet or exceed NPSFM national bottom lines