Table 3.11-1 Lake attributes

Dr Ngaire Phillips – 17 July 2019

Why change the table?

- no short term targets currently in the table

- long term targets set at NOF National Bottom Line (NBL) or to maintain current conditions when lake attributes in better than NBL

- doesn't addresses the intent of Objective 1 in PC1 (long term restoration and protection of water quality

- isn't consistent with realising the potential to improve water quality in some lakes

- FMU classification doesn't capture variability of lake attributes

What changes are needed?

- short term targets

- more aspirational targets for lakes that are better than bottom line or that just exceed the D band threshold

- alternative FMU derivation method that reflects variability

3

What did we do?

- used WRC data (annual medians for the 2010 - 2014 for Chla, TN and TP (as per TLG 2015))

- identified lakes that have water quality attributes that are a) already better than the NOF bottom line or b) are at or only just below the NOF bottom line

- set targets for these lakes that reflect their existing state and restoration goals and seek an improvement in the NOF band, in preference to maintaining them at their current level

Current and predicted NOF bands (extract)

Lake FMU	Lake	Current Lake Water Quality State information (2010-2014) from TLG memo to CSG dated 17/9/2015			DG-C proposed approach - 80 year target		
		Annual median Chla (mg/m^3)	Annual Median TN (mg/m^3)	Annual Median TP (mg/m^3)	Annual median Chla (mg/m^3)	Annual Median TN (mg/m^3)	Annual Median TP (mg/m^3)
Dune	Otamatearoa	2	471	10	A	A	A
Dune	Puketi	2	493	14	A	A	A
Peat	Rotomanuka	11	1073	18	B	B/C	A
Peat	Rotoroa	8	809	20	B	B	A
Peat	Serpentine E	9	1496	22	B	B/C	B
Peat	Maratoto	5	1777	25	A	C	B
Peat	Serpentine N	13	1191	30	B	B/C	B
Peat	Serpentine S	12	934	31	B	B	B
Peat	Rotokotuku	31	1107	65	D	B/C	C
Peat	Kainui	28	1576	75	C	C	C
Peat	Areare	25	1747	82	C	C	D

Deriving short term targets

- calculated the change in values assuming a 20% improvement for each lake (based on WRC 2010-2014 data)

PC1 Lake FMU	Lake	Annual median Chla (mg/m^3)				DG-C proposed approach - 80 year target
		Current		Short-term target (20% improvement on current value)		
Dune	Otamatearoa	2	A	1.6	A	A
Dune	Puketi	2	A	1.6	A	A
Peat	Kainui	28	D	22.4	D	C
Peat	Mangahia	59	D	47.2	D	D
Peat	Maratoto	5	C	4	B	A
Peat	Whakatangi	5?	5?	?	?	?
Peat	Ngaroto	70	D	56	D	D
Peat	Rotoroa	8	C	6.4	C	B
Peat	Areare	25	D	20	D	C

Proposed short and long term lake water quality targets (PC1 FMU delineation)

PC1 FMUs	Annual median Chla (mg/m^3)				Annual Median TN (mg/m^3)				Annual Median TP (mg/m^3)			
	Short-term target (20% improvement on current value)		Long term year target (80 years)		Short-term target (20% lower than current)		Long term year target (80 years)		Short-term target (20% lower than current)		Long term year target (80 years)	
Dune	2	A	2	A	386	B	300	A	10	A	10	A
Peat	20	D	12	C	1296	D	750	C	63	D	50	C
Riverine	29	D	12	C	1473	D	750	C	92	D	50	C
Volcanic	28	D	12	C	946	D	625	B-C	110	D	50	C

- Short-term target = 20% improvement on current state (medians for each FMU)
- Long term targets as per PC1 Table 3.11-1, except red text, which are targets proposed by Director-General that reflect what is considered achievable based on current state

Method for Deriving Lake FMUs

- Simplistic

  – based on a single category variables (geomorphic features reflecting lake formation) influencing lake ecology and functioning

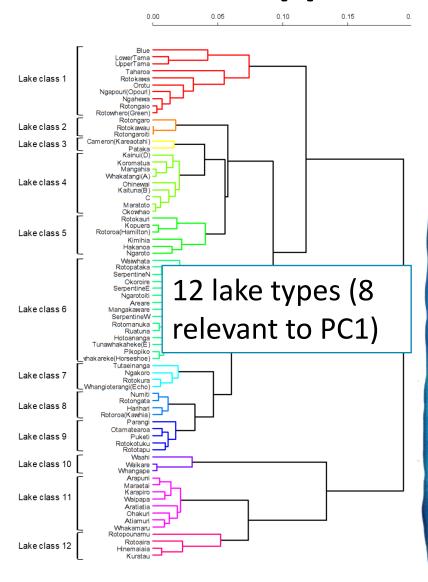 – doesn't reflect diversity of lake characteristics

- Why is this important?

  – Limits effectiveness of monitoring programmes

  – Doesn't reflect fundamental drivers of lake ecosystem processes

Lake FMUs should be derived from multi-variate analysis

Multi-variate classification approach

- Based on 14 variables known to influence and control lake ecological process and ecosystem functions

- Reflects complexity and variability of Waikato/Waipā lakes

- Variables should align with monitoring purpose

12 lake types (8 relevant to PC1)

Ozkundakci, D. (2015) An approach for reconciling the lake type classification for the Waikato region. Waikato Regional Council document #3679149

Proposed short and long term lake water quality targets (alternative FMU delineation)

FMU#	Annual median Chla (mg/m^3)				Annual Median TN (mg/m^3)				Annual Median TP (mg/m^3)			
	Short-term target*		Long term year target (80 years)		Short-term target *		Long term year target (80 years)		Short-term target *		Long term year target (80 years)	
1	33	D	12	C	674	C	500	B	124	D	50	C
4	22	D	12	C	1489	D	750	C	94	D	50	C
5	30	D	12	C	1186	D	750	C	79	D	50	C
6	12	C	5 - 12	B-C	1197	D	500-750	B-C	50	C	50	C
7	24	D	12	C	1218	D	750	C	97	D	50	C
9	2	A	2	A	394	B	300	A	11	B	10	A
10	46	D	12	C	1488	D	800	C	95	D	50	C

- Short-term target = 20% improvement on current state (medians for each FMU)
- Long term targets as per PC1 Table 3.11-1, except red text, which are targets proposed by Director-General that reflect what is considered achievable based on current state

Relevant FMU's from Ozkundakci, D. (2015)