





Impact of Water Quality Standards and Water Bodies where Meridian Operates in the Waiau Catchment

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Scope of evidence

- Water quality standards in Appendix E of the SWLP
 - **Temperature**
 - Periphyton
 - Macroinvertebrate Community Index (MCI)
- Water quality and diversion of waters
- Discharges and mixing zones
- Lakes "Natural state waters"
 <u>Natural water quality shall not be altered</u>
- Waiau River "Lake fed"
 <u>Standards in Appendix E</u>

	NPS-FM (revised 2017)	"Clean Water" 2017	Appendix E SWLP
Periphyton	Bottom line 200 mg/m ²		< 50 mg/m ² , monthly mean 15 mg/m ²
	No more than 8% of samples		<u>Averaged across full</u> <u>width</u>
	Instream N and P criteria required		
Temperature	ΝΑ		Not exceed 21°C, 11°C in winter, <1 or 3°C depending on temp
Macroinvertebrate MCI	Monitor if <80 or declining	Monitor – action plan	MCI shall not exceed 90, QMCI 4.5
	Key sites in FMU	Only "wadeable"	



Blackmount

Redcliff

Excelsior

Station Bridge

- Waiau River a unique case because of the presence of invasive didymo – high chl a, low MCI.
- Because of didymo the Waiau River and unregulated Mararoa would regularly breach the NPS-FM and SWLP standards – unavoidable and not due to Meridian's activities.
- Only permanent and unnatural contaminants should have no change from natural state and RMZ applied.
- Potential breaches in Manapouri from diversion for which Meridian have consent and greater risk in lower Waiua River if water in Mararoa declines in quality.

Additional slides



Periphyton monitoring sites up until 2015

Temperature



- At least Key Bridge (Mararoa unregulated), Excelsior, Jericho and Tuatapere would breach proposed 21°C standard (Appendix E)
- Standard should be a 95th%ile or increased to 22.5 ^oC



Locations of the periphyton and invertebrate annual monitoring sites on the Lower Waiau and Mararoa Rivers. MLC = Manapouri Lake Control (flow recorder location). The flow recorder for the Mararoa (Mararoa @ Cliffs) is close to the confluence of the Mararoa and Lower Waiau just upstream of the MLC

- Standard chlorophyll a shall not exceed 50 mg/m² at any time or exceed a monthly mean of 15 mg/m² (footnote averaged across full width of the stream or river)
- Didymo first discovered in 2004 in Mararoa Catchment (unregulated)
 - Found in cold, nutrient-poor waters (DRP < 2 ug/L, DIN > 10 mg/L < 400 mg/L), lake fed rivers
- Fortnightly measurements over summer/autumn on Waiau as part of comprehensive management programme – supplementary flows
- Standard of 200 mg/m² would occasionally be breached, 50 mg/m² would often be breached unachievable 15 mg/m² unable to be met, cant wade across

MCI

- Provides a useful indicator of river health
- Need to take into account didymo which changes the macroinvertebrate community to one with low MCI (below standard of 90)
- Surveys in Mararoa and lower Waiau Rivers show standard would regularly be breached and cannot be avoided (3 of 4 sites in 2015)
- Meridian releases additional high flows when water available but breaches still unavoidable
- A MCI of 90 should not apply to didymo impacted waters but noting that revised 2017 NPS-FM has requirements where MCI is under 80

- Water quality in Mararoa deteriorating and increased risk of poorer quality water being diverted into Lake Manapouri for which Meridian has consents
 - Potential breaches of SWLP standards and NPS-FM attribute states in lakes (N, P, E.coli)

----> Increased risk of breaches in lower Waiau River

- Standards must be met following reasonable mixing
- At times Meridian needs to carry out infrastructure upgrades (eg new slipway)
 - Plumes of higher turbidity altering "natural quality"

Extra

