

Protecting water bodies and ecosystem health practice note. Table 1: List of additional TAS to be included in regional plans to support ecosystem health. These are in addition to the compulsory attributes in the NPS-FM. This table is under development and will be added to as research is reviewed and incorporated.

Ecosystem health component	Attribute	Waterbody type					
		Rivers	Lakes	Wetlands	Groundwater	Estuary	
Water quality	Nutrient criteria	See more detailed Practice Note on nutrient criteria. Dissolved inorganic nitrogen (DIN) should be no higher than 0.63 mg/L DIN as an annual median ¹ and dissolved reactive phosphorus (DRP) should be no higher than 0.018 mg/L DRP as an annual median (and 0.054 mg/L as a 95th percentile) ^{2, 3, 4, 5, 6} . to achieve macroinvertebrate bottom lines. More stringent criteria may be needed for more sensitive values. Table on page 26 of the STAG report ⁴ provides direction on Total Nitrogen and DRP for different REC classes to manage periphyton. More stringent criteria may be required to manage more sensitive values and attributes, such as MCI.	TBC	Wetland condition index of at least 10 ⁵ .	Groundwater nutrient levels should support the ecosystem health of connected surface water bodies rather than be set at drinking water quality levels. DIN limits/targets should be < 1.0 mg/L to protect ecosystem health and drinking water ⁶ .	TBC	
	DO	DO Attributes in Table 7 of the NPS-FM apply to all parts of rivers, not just downstream of point sources ⁷ .	TBC			TBC	TBC
	Sediment	Deposited sediment cover of < 20% to protect ecosystem health and < 10% to protect trout spawning and fisheries ⁸ . Visual clarity (black disc) < 3.5m for ecosystem health ⁹ . More stringent criteria may be required to manage more sensitive values. See practice note of setting sediment limits.	TBC			TBC	TBC
Water quantity	Flows and levels	Water levels (environmental levels) within 10% of natural levels unless specific studies have been done that show greater variation can support freshwater values. See Environmental Flows and Levels; and Take Limits practice note.					
Habitat	Extent	TAS should address natural form (Riffle/pool/run sequences) and natural form and extent (e.g., river plan and braid form and sinuosity), as well as things like area of river habitat, shading, etc. The Habitat Quality Index and Natural Character Index ¹⁰ can be used to make quantitative measurements. Rapid Habitat Assessment ¹¹ and Stream Ecological Valuation ¹² might also be useful measures. See the natural form and character and river extent practice notes.	TBC	Wetland extent. Percent of original wetland remaining in region/FMU/catchment should be improved to at least 30%. This is equivalent to the level at which the Science and Technical Advisory Group consider "retains an adequate range of habitats and species required for a healthy ecosystem" ¹³ Wetland condition index of at least 10 ¹⁴ .	Stygofauna communities are a useful indicator of ecosystem health components. More work is needed in this area, see resources for current knowledge. Water quality and quantity achieves a good state of health (including no toxic effects) in groundwater and connected surface water ecosystems. This includes ecosystem processes, aquatic life (including microbial and stygofaunal community composition in groundwater) and physical habitat.	TBC	
Aquatic life	Periphyton	Only use the 17% exceedance threshold in Table 2 NPS-FM if that level of exceedance would have occurred under natural occurring processes ¹⁵ .	TBC	TBC		TBC	
	Fish communities	Fish Index of Biotic Integrity should be no lower than 18 ¹⁶ . Fish communities are resilient and their structure composition and diversity are reflective of a good state of aquatic ecosystem health.	Fish communities are resilient and their structure composition and diversity are reflective of a good state of aquatic ecosystem health.	Indigenous faunal communities (including those of birds, fish, lizards and invertebrates) are appropriate to wetland type, are resilient and their structure composition and diversity are within an acceptable range of that expected under natural conditions.		TBC	
	Lake Submerged Plant Index	TBC	Include LakeSPI Invasive Impact Index with a TAS greater than 90% ¹⁷ .	TBC	TBC		
Ecological processes	Ecosystem metabolism	Ecosystem metabolism TAS should be set above 3.0 gO ₂ m ⁻² d ⁻¹ to reflect a mild effect on ecosystem metabolism ¹⁸ .	TBC	TBC	TBC	TBC	

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- ¹ Canning, A., D., Joy, M. K., Death, R. G. (2021). Nutrient criteria to achieve New Zealand's riverine macroinvertebrate targets. <https://peerj.com/articles/11556/>
- ² Canning, A., D., Joy, M. K., Death, R. G. (2021). Nutrient criteria to achieve New Zealand's riverine macroinvertebrate targets. <https://peerj.com/articles/11556/>
- ³ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation 13 (Link to: <https://environment.govt.nz/assets/Publications/Files/freshwater-science-and-technical-advisory-group-report.pdf>)
- ⁴ <https://environment.govt.nz/assets/Publications/Files/freshwater-science-and-technical-advisory-group-report.pdf>
- ⁵ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation
- ⁶ <https://www.greenpeace.org/static/planet4-aotearoa-stateless/2022/03/6ae88aa1-submission-on-proposed-amendments-to-national-environmental-standards-for-sources-of-human-drinking-water-consultation-2022.pdf>
- ⁷ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation 5
- ⁸ <https://www.envirolink.govt.nz/assets/R4-1-Sediment-Assessment-Methods-Protocol-and-guidelines.pdf>
- ⁹ Water Quality Guidelines to Protect Trout Fishery Values. Cawthron Report No. 1205. September 2006. <https://www.horizons.govt.nz/HRC/media/Media/One%20Plan%20Documents/Water-Quality-Guideline-to-protect-Trout-Fishery-Values.pdf?ext=.pdf>
- ¹⁰ <https://www.forestandbird.org.nz/sites/default/files/2023-03/Conference%20Poster%20-%20Maintaining%20River%20Morphology%20Through%20Policy%20A1.pdf>
- ¹¹ <https://www.cawthron.org.nz/research/our-projects/rapid-habitat-assessment-protocol/>
- ¹² <https://knowledgeauckland.org.nz/media/1398/gd2011-001-stream-ecological-valuation-sev-users-guide-reprint-nov-2015.pdf>
- ¹³ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation 14
- ¹⁴ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation
- ¹⁵ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation 8
- ¹⁶ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation 9
- ¹⁷ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation 11
- ¹⁸ Freshwater Science and Technical Advisory Group. (June 2019). STAG Report to the Minister for the Environment. Recommendation 7 reflecting B band ecosystem health