Waiapu Catchment Technical Advisory Group

Hui 2 – Report 3: State of Environment – Baseline Attribute State and Target Attribute States

Summary of questions for the Advisory Group

- *Should we adopt the proposed approach for setting water quality targets? What should change?*
- *Are there some targets which should be prioritised? Why?*

1. Introduction

The first part of developing a catchment plan under the NPSFM is identifying the vision, values and environmental outcomes for the catchment. Once these are established then we can consider how well the catchment water quality and quantity meet those environmental outcomes – and what action might need to be taken to either maintain the values, or to improve the situation where environmental outcomes are not being met.

2. State of Environment

The Ngā Wai o Waiapu Catchment Plan background report outlines the state of environment as understood by the Council, based on its water monitoring programme. This compares the water quality to the National Objectives Framework of the government. Under this framework, sites can be rated as A, B, C, D or E band. There is a National Bottom Line that sites must meet, or action taken by the Council to improve water quality.

Generally, this shows that water quality across much of the catchment rivers is good in relation to nutrients such as nitrate and phosphate, with most sites being in the A band for nitrogen, the B band for ammonia and the A band for periphyton (freshwater algae that bloom where there are high nutrient levels). Most sites are in the B or C band for phosphate, but with Gisborne's geology being high in

phosphorus, this represents a natural condition. Similarly, dissolved oxygen levels in rivers across the catchment are very good with all sites within the A band.

However, E.coli levels in some locations fall below safe swimming thresholds, and in a few locations below the national bottom line. Sediment levels – both of deposited fine sediment and suspended fine sediment, are also very high in many parts of the catchment and often fall below the national bottom lines. Due to high sediment levels, there are many locations where severe effects on aquatic life are felt, with some locations falling below the national bottom line for macroinvertebrate (freshwater insect) health.

In terms of lakes, Lake Ratahi at Te Puia Springs is monitored by the Council and shows very poor water quality in relation to total nitrogen, ammonia and suspended fine sediment.

Council monitoring shows that there are some aspects of water quality where there has been a trend of degradation over time. These include some sites where there is a degrading trend for suspended fine sediment (Lake Ratahi, Tapuaeroa River and Poroporo River) for E.coli (Tapuaeroa River, Waiapu River, Mangaoporo River and Poroporo River), ammonia (Tapuaeroa River and Poroporo River) and macroinvertebrates (Poroporo River).

It's important to recognise that the extreme rates of erosion and sedimentation drive water quality in the major river systems, which have very high sediment loads, but that sediment levels are much lower in many smaller streams which are the habitats of many native fish and native freshwater species. Some of these smaller streams are monitored in terms of ecological health and show a much better picture than the big rivers.

But, as is discussed further below, degrading water quality in the large rivers is a significant issue that must be addressed.

3. Baseline Attribute States

The NPSFM requires that water quality must not degrade from the Baseline Attribute State. This is set as being the water quality for each attribute as of September 2017. In the Waiapu Catchment there has been some water quality degradation particularly in the Tapuaeroa, Mangaoporo, Poroporo and Waiapu Rivers and in Lake Ratahi since the Baseline Attribute State was set.

Key attributes for which the baseline attribute states (BAS) have been calculated are outlined in the table below. Some of this is based on modelled data as actual field measurements are not available for all sites and attributes.

In **Appendix 1**, the baseline states are presented alongside "Reference States" (based on modelling). The Reference States give an indication of what we could expect if the catchment was fully returned to native vegetation. This information will help us understand what might be possible in terms of improvement.

The information is presented in relation to "Bands" in relation to each attribute/indicator.

- A Band represents a good state of water quality for the attribute
- B Band is impacted but still reasonably healthy
- C Band is quite heavily impacted
- D Band is below the national bottom line and considered degraded

The information on Baseline States is summarised in the table below:

Baseline Attribute State - 2017 and Trends

Monitoring Site	Periphyton	Fish	Macroinvertebrates	Deposited Sediment	Phosphate	E.coli	Ammonia	Nitrate	Suspended Fine Sediment	Dissolved Oxygen
Mata Upper	A	B	A	A						
Waipiro Stream	A	B	D ↓	D						
Ihungia River	A	B	D	D	A ↓↓	C ↓↓	B ↓↓	A	D ↓↓	A
Mata River - Pouturu	A	B	D ↓	A	B ↓	B	B ↓↓	A	D	D
Mata River - Aorangi	A	B	B	A	B ↓	B	A ↓↓	A	D ↓	
Makarika Stream	A		D							
Koeutumara Stream	A		C	C						
Mangaokura Stream	A		A	A						
Tapuaeroa River	A		B	A	C	A	B	A	D	
Waiapu River	A	B	B	B	C ↓↓	C ↓↓	B ↓↓	A	D ↓↓	
Mangaoporo River - Tutumatai	A	B	B	A	C ↓↓	A ↓	B ↓↓	A	D	
Mangaoporo River - Mangaoporo	A		C	A						
Huitariki Stream	A		B	A						
Waitekaha Stream	A		C ↓	C						
Poroporo River	A	B	D ↓↓	D	C ↓	C ↓↓	B ↓	A	C	B
Lake Ratahi					↓	↓				

↓ = Degrading

↓↓ = Strongly Degrading

4. Implications of Baseline States

The high sediment loads, generated from landscape scale erosion, is the major issue in this catchment. Modelling indicates that even with total revegetation of the whole Waiapu catchment, it is unlikely that sediment levels in the most impacted rivers would ever reach national bottom lines. The catchment has been irrevocably damaged. For sediment, a key focus therefore is not seeing things get worse and in preventing more gullies opening up.

There are several rivers with degrading trends of E.coli and ammonia (normally generated from animal urine) and therefore the sources of this need to be investigated. It is likely domestic stock and intensification along the flats, as there is

little/no stock exclusion from waterways, but pests should be investigated as a source of E.coli.

There are several headwater streams monitored in the catchment that are very healthy. While the large rivers will not return to this state, these "reference" sites provide a good idea of what could be achieved in impacted smaller streams – provided there are no gullies within the stream catchment. These small streams provide the major good habitat in the catchment and are a likely priority for protection and improvements.

Missing Attributes/Gaps in the Data

The information in this report only covers some of the water quality attributes we are required to set Baseline and Target Attribute States for in the catchment plan.

Further monitoring has been undertaken over the summer of 2024/2025 to try and fill some of the data gaps, so that we can identify baseline and current states for these attributes to inform catchment plans. We hope to see the data from this monitoring in the next few months.

Particular areas where we need more information for the Ngā Wai o Waiapu Catchment Plan are:

- Fish
- Deposited fine sediment
- Dissolved oxygen

5. Setting Target Attribute States

A key component of the Catchment Plan is the identification of target attribute states (TAS) and the timeframes to achieve them. For many parts of the catchment, current water quality may not support the values or environmental outcomes sought. However, improving water quality is not a fast nor easy process and the sediment problems in much of the catchment are beyond improvement in timeframes of decades. In those circumstances, the initial focus should be on preventing further degradation. The target attribute states need to take the catchment towards those environmental outcomes, and the NPS-FM directs that these need to be both realistic but also ambitious.

The approach taken in other catchment plans in setting target attribute states has been:

- Recognising that water quality problems are difficult and slow to address. Targets need to be ambitious but realistic.
- Where the water quality attribute is within the A or B band, the target should generally be to maintain the current state. This recognizes that that water quality attribute is not likely to be a major contributor to not achieving environmental outcomes.
- Where the water quality attribute is currently degrading, and/or below the national bottom line and/or at a level where it is impacting on the values of the waterbody, targets of improvement are set.
- For degrading attributes the first five-year target focusses on stabilising water quality and halting the degrading trend. The second five-year target is

generally to reverse the degrading trend and the longer-term target (15-20 years) is to reach the national bottom line (NBL) or the next band.
- Depending on how bad things are, for attributes below the national bottom line or where values are not being met, interim targets are to improve within a band, with longer term (15-20 year) targets to meet national bottom lines or the next band.

In the Waiapu catchment, because of the landscape scale sediment generation and the volumes moving into main stem rivers, generally where this attribute is in the D or E band it is considered that no realistic target of improvement can be set. Improvements in sediment within smaller rivers and streams may however be possible.

Questions
Should we use a similar approach for setting targets in the Waiapu Catchment Plan? What should change? **Are there some things which should be prioritised?**

Key Definitions Used in this Report

Attribute: A measurable indicator of water quality
- chemical e.g. nitrate levels (mg/L)
- biological e.g. Macroinvertebrate index (MCI)
- Physical e.g. visual clarity (metres)

Baseline Attribute State: What an attribute was like on 7 September 2017. Measured at specified monitoring sites.

Target Attribute State: What we want that attribute to be like to achieve the environmental outcomes.

Interim Targets: 10-year milestones on the path to the Target Attribute State.

Appendices
Appendix 1: Baseline Attribute States, Reference States and Recent Changes

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Council Monitoring Site	Baseline Attribute State – Sept 2017	Reference State (modelled if catchment fully revegetated with natives)	Recent Trends/Changes	Comment
Ratahi Roto	Phytoplankton – D Band Ammonia in outlet stream– C Band Nitrate in outlet stream– A Band Total Nitrogen – D Band Total Phosphate – C Band Dissolved Reactive Phosphorus in outlet stream – A Band Suspended fine sediment in outlet stream– D Band E.coli in outlet stream– A Band Dissolved oxygen in outlet stream – A band Submerged Plants (Natives) – D band Submerged Plants (invasive) – B Band	Ammonia – A Band Nitrate – A Band Dissolved Reactive Phosphorus – C Band E.coli – A Band	Strong degrading trend for Total Nitrogen, Degrading Trend for dissolved reactive phosphate and E.coli attributes	Baseline state recognises that the lake is eutrophic and its ecosystem function is compromised. While the lake is safe for swimming, degrading trends are a concern and need to be addressed in the Action Plan
Mata Upper	Periphyton – A Band Fish – B Band Macroinvertebrates – A Band Deposited Fine Sediment – A Band	Macroinvertebrates – A Band	No trends	This is a very healthy upper catchment stream. It provides a good reference to what much of the catchment would once have been like.
Waipiro Stream at Te Puia	Periphyton – A Band Fish – B Band Macroinvertebrates – D Band Deposited Fine Sediment – D Band	Macroinvertebrates – C Band	Slight declining trend in macroinvertebrate health	Sedimentation of this stream has affected macroinvertebrate health. As a small stream the source of sediment may be

				able to be managed.
Ihungia River at Ihungia Road Bridge	Periphyton - A Band Ammonia – B Band Nitrate – A Band Suspended Fine Sediment – D Band E.coli – C Band Fish – B Band Macroinvertebrates – D Band Deposited Fine Sediment – D Band Dissolved Reactive Phosphorus – A Band Dissolved Oxygen – A Band	Ammonia – A Band Nitrate – A Band Dissolved Reactive Phosphorus – B Band E.coli – A Band Macroinvertebrates – B Band	Ammonia, Turbidity, E.coli and Dissolved Reactive Phosphorus strong degrading trends. Slight trend of degradation in relation to Dissolved Inorganic Nitrogen, Total Nitrogen and Total Phosphorus.	Sediment is the main problem in this river which is impacted by multiple gullies and landscape scale erosion. The degrading trend of Dissolved Phosphorus likely relates to the increased sedimentation. Realistically it will be difficult to get any improvement in water quality in this river over the next 50-100 years, even if the subcatchment was entirely revegetated. E.coli degrading trend could be as a result of the increasing pest numbers in the subcatchment.
Mata Rver at Pouturu Bridge	Periphyton - A Band Ammonia – B Band Nitrate – A Band Suspended Fine Sediment – D Band E.coli – B Band Fish – B Band Macroinvertebrates – D Band Deposited Fine Sediment – A Band Dissolved Reactive Phosphorus – B Band Dissolved Oxygen – D Band	Amonia – A Band Nitrate – A Band Dissolved Reactive Phosphorus – B Band E.coli – A Band Macroinvertebrates – B Band	Strong degrading trend for ammonia Degrading trend for dissolved reactive phosphorus and macroinvertebrates.	Its not clear what is driving the degrading trend for ammonia. Has been significant revegetation in this catchment over last 10-15 years, altnough there are very large gullies present driving the high sediment loads. Some attributes have seen improving trends (eg nitrogen, turbidity, E.coli) which reflect the revegetation that has already occurred.

Mata River at Aorangi	Periphyton - A Band Ammonia – B Band Nitrate – A Band Suspended Fine Sediment – D Band E.coli – B Band Fish – B Band Macroinvertebrates – B Band Deposited Fine Sediment – A Band Dissolved Reactive Phosphorus – B Band	Amonia – A Band Nitrate – A Band Dissolved Reactive Phosphorus – A Band E.coli – A Band Macroinvertebrates – C Band	Strong degrading trend for ammonia Degrading trend for dissolved reactive phosphorus, turbidity	Its not clear what is driving the degrading trend for ammonia. Has been significant revegetation in this catchment over last 10-15 years, although there are very large gullies present driving the high sediment loads. E.coli has an improving trend. Given the number of gullies in the catchment will be unlikely to see improvements in sediment levels over the next 50-100 years.
Makarika Stream at Keelan Road	Periphyton - A Band Macroinvertebrates – D Band	Macroinvertebrates – B Band	No trends identified	Little water quality data to draw conclusions from but there are several large gullies in this catchment likely driving high sediment loads and impaction macroinvertebrate populations.
Koeutumara Stream at Ihungia Road	Periphyton - A Band Macroinvertebrates – C Band Deposited Fine Sediment – C Band	Macroinvertebrates – B Band		Sediment impacted stream but gives a good idea of what might be achievable in the longer term for the Makarika.
Mangaokura Stream	Periphyton - A Band Macroinvertebrates – A Band Deposited Fine Sediment – A Band	Macroinvertebrates – A Band	No trends identified	This is a very healthy upper catchment stream. It provides a good reference to what much of the catchment

				would once have been like.
Tapuaeroa River at Tapuaeroa Road	Periphyton - A Band Ammonia – B Band Nitrate – A Band Suspended Fine Sediment – D Band E.coli – A Band Fish – B Band Macroinvertebrates – B Band Deposited Fine Sediment – A Band Dissolved Reactive Phosphorus – C Band	Amonia – A Band Nitrate – A Band Dissolved Reactive Phosphorus – B Band E.coli – A Band Macroinvertebrates – B Band	Water quality record is too short to see any trends	There are many large gullies in this catchment, including the largest in the Wairongomai subcatchment. No human activity is likely to improve sediment levels significantly over the next 50-100 years.
Waiapu River at Rotokautuku Bridge	Periphyton - A Band Ammonia – B Band Nitrate – A Band Suspended Fine Sediment – D Band E.coli – C Band. Poor levels as a primary contact site Fish – B Band Macroinvertebrates – B Band Deposited Fine Sediment – B Band Dissolved Reactive Phosphorus – C Band	Amonia – A Band Nitrate – A Band Dissolved Reactive Phosphorus – B Band E.coli – A Band Macroinvertebrates – C Band	Strong degrading trend for ammonia, turbidity, E.coli and dissolved reactive phosphorus	Very substantial activity across the whole catchment is needed to see any impacts on water quality. Given the number of gullies in the catchment will be unlikely to see improvements in sediment levels over the next 50-100 years. Degrading E.coli trend is a concern – these must be quite close to the sampling point as both the Tapuaeroa and Mata Rivers have reasonably good E.coli levels.
Mangaoporo River at Tutumatai Bridge	Periphyton - A Band Ammonia – B Band Nitrate – A Band	Amonia – A Band Nitrate – A Band Dissolved Reactive	Strong degrading trend for ammonia, and dissolved reactive phosphorus	Its not clear what is driving the degrading trend for ammonia. Has been significant

	Suspended Fine Sediment – D Band E.coli – A Band Fish – B Band Macroinvertebrates – B Band Deposited Fine Sediment – A Band Dissolved Reactive Phosphorus – C Band Dissolved Oxygen – B Band	Phosphorus – C Band E.coli – A Band Macroinvertebrates – B Band	Recent degrading trend for E.coli	revegetation in this catchment over last 10-15 years, although there are very large gullies present driving the high sediment loads. Degrading E.coli trend is a concern as this is recent and may represent impacts of land use change.
Mangaoporo River at Mangaoporo Road	Periphyton - A Band Macroinvertebrates – C Band Deposited Fine Sediment – A Band	Macroinvertebrates – B Band	No trends identified	Sediment impacted stream but gives a good idea of what might be achievable in the longer term for other streams in this part of the catchment.
Huitariki Stream	Periphyton - A Band Macroinvertebrates – B Band Deposited Fine Sediment – A Band	Macroinvertebrates – A Band	No trends identified	This is a very healthy upper catchment stream. It provides a good reference to what much of the catchment would once have been like.
Waitekaha Stream at Tuparoa Road	Periphyton - A Band Macroinvertebrates – C Band Deposited Fine Sediment – C Band	Macroinvertebrates – B Band	Degrading trend for macroinvertebrates	It is not clear what is driving the degrading trend for macroinvertebrates.
Poroporo River at Rangitukia Bridge	Periphyton - A Band Ammonia – B Band Nitrate – A Band Suspended Fine Sediment – C Band E.coli – C Band – Poor as primary contact site Fish – B Band	Amonia – A Band Nitrate – A Band Dissolved Reactive Phosphorus – B Band E.coli – A Band Macroinvertebrates – B Band	Strong degrading trend for macroinvertebrates, E.coli Degrading trend for dissolved reactive phosphorus and ammonia.	Degrading E.coli trend is a concern as this is recent and may represent impacts of land use change. Has been significant revegetation in this catchment

	Macroinvertebrates – D Band Deposited Fine Sediment – D Band Dissolved Reactive Phosphorus – C Band Dissolved Oxygen – B Band			over last 10-15 years, although there are very large gullies present driving the high sediment loads. No human activity is likely to improve sediment levels significantly over the next 50-100 years.