Report to Healthy Rivers Wai Ora Committee 19 June 2015 – Decision Required

File No:	03 04 14, 23 10 09
Date:	20 May 2015
To:	Chief Executive Officer
From:	Independent CSG Chair and Director Science and Strategy
Subject:	**Collaborative Stakeholder Group's preferred options for the first round of limit and scenario modelling**
Section	B (for Recommendation to council)

Purpose

The purpose of this report is to:

- provide background and context to the process of developing the CSGs preferred options for the first round of limit and scenario modelling
- present the CSGs preferred options for the first round of limit and scenario modelling.

Recommendations:

1. That the report **Collaborative Stakeholder Group's preferred options for the first round of limit and scenario modelling** (Doc # 3405808 dated 20 May 2015) be received for information.
2. That the Collaborative Stakeholder Group's preferred options for the first round of limit and scenario modelling is endorsed and recommended to Council for approval. The four scenarios are set out in full in Attachment 3 and in summary they are:
   - 1st scenario - Restore
   - 2nd scenario - Protect and at least restoring to reach minimum acceptable standard for all attributes
   - 3rd scenario - Protect and some restoring but not fully swimmable
   - 4th scenario - Protect but not restore.
3. That the Collaborative Stakeholder Group's proposal for an additional two scenarios to be modelled later in the year is endorsed and recommended to Council for approval. These are; the baseline (status quo) report required for Section 32 RMA and the very aspirational scenario based on what may have been 1863 conditions.

Background

Prior to CSG11 (23/24 April) background work was undertaken by the CSGs independent facilitator, some members of the Technical Leaders Group (TLG) and WRC project staff. The objective was to pull together information from CSG discussions at previous workshops and an initial discussion with river iwi staff and Waikato River Authority (WRA) staff (providing helpful context about what was important from a river iwi perspective) into a suite of strawman narrative scenarios for presentation and discussion at CSG11 (see Attachment 1). This background collation work was undertaken for two reasons; firstly in preparation for CSG

around identifying scenarios for the first round of limit and scenario modelling by the TLG, and secondly, to make best use of face-to-face CSG workshop time.

It is important to note that in the In the Healthy Rivers/Wai Ora project 'scenarios' refer to possible futures. Scenarios are initially about water quality outcomes and the setting of limits and targets to achieve those outcomes.

This paper outlines the context and process of the development of the first suite of scenarios. The CSG recognises that the Vision and Strategy is the ultimate aspirational goal or 'scenario'. In light of this, other the other scenarios should not be viewed as alternatives, but rather as potential stepping stones on the way to achieving the Vision and Strategy.

Summary of scenarios discussion at CSG11

At CSG11 the CSG discussed the 'strawman' scenarios in small groups (including input from the WRA and river iwi staff present on the day) followed by reporting back to the whole group. An approach was then agreed regarding the five strawman narrative scenarios shown in Attachment 1. The strawman scenarios are based on different levels of 'protect and restore'. CSG took the earlier input on board, modifying the scenarios to better reflect the feedback from river iwi staff and WRA staff. An example of this is the recognition from river iwi staff that achieving the Vision and Strategy is a multi-decadal goal, but that if there are aspects or attributes which could be achieved earlier that should be investigated. In response, the CSG requested a scenario be modelled where some attributes are achieved earlier than others.

The suggested variations to the suite of 'strawman' scenarios were as follows:

- Run more variations on scenario 3 and 4 for example:
    - A 'restore' scenario that focuses on lifting *E.coli* to a minimum of 'B' at 95 percentile with all other attributes at all sites moving up one band
    - A 'Minimum Acceptable Standard' scenario where *E.coli* is lifted to a 'B' band at 95 percentile and any other attribute currently a 'D' is lifted to a 'C'
    - A scenario focused on achieving gains in some attributes (*E.coli*, P) faster than others

The TLG only have capacity to run a maximum of five scenarios in the given timeframe for the first round of modelling. If new scenarios are added in, options to keep the number of scenarios run in the first round to five include the following:

- Consider combining scenarios 1 and 2
- Run scenario 5 (a status quo or baseline scenario) later. This scenario is considered necessary to meet RMA S32 requirements but will not be acceptable under the Vision and Strategy
- Leave the third suggested variation above until the second round of modelling.

Ultimate expression of Kiingi Taawhiao's Vision

During the discussion with river iwi staff and WRA staff, the desire was expressed to include a more aspirational scenario. This can be seen as the ultimate expression of the Vision and Strategy. Some people referred to it as "what Kiingi Taawhiao saw when he looked at the river in 1863". In other words, a river that supplied plentiful food for the people, who had deep connections and where the land in the catchment was still largely in native vegetation or in food crops. The exact level to set this at would require more discussion preferably in light of further information on what attribute states might have been historically.

HRWO Workshop at Karapiro

On 11 May the HRWO committee held a workshop at Karapiro for the purpose of receiving background information on selected CSG processes and decisions. This included a summary of the CSG process towards identifying Freshwater Management Units (FMUs), an update on the revised Policy Selection Criteria (PSC) and a first high level look at the "strawman" suite of scenarios under development for the first round of limit and scenario modelling. It was noted at the time that the scenarios were a work in progress.

Summary of discussion at CSG12 on redrafted scenarios

In the time period between CSG11 and CSG12 TLG members reviewed the CSG strawman scenarios (with suggested variations) to provide a further technical check on the suggested suite for the first round of modelling. This advice, including a re-drafted set of scenarios, was delivered back to the CSG at CSG12 and discussed during a workshop session. Attachment 2 shows the list of redrafted scenarios presented at CSG12 for discussion.

CSG first reviewed the development process to date, including prior CSG discussions, input from WRA and River Iwi staff and ongoing advice from TLG.

There was further discussion around the very aspirational scenario that describes how the rivers were before any degradation (identified in discussion with River Iwi staff) and the further work required in order to undertake modelling of that specific scenario. Advice from the TLG is that an '1863 model' can be run even in the presence of hydro dams, by setting land use to majority native bush cover. It was agreed by CSG that this aspirational scenario and the baseline scenario required for Section 32 RMA analysis (but not an acceptable option under the Vision and Strategy) be modelled later in the year (in keeping with the revised project timeline).

The CSG discussed in small groups the quantum of change required from current state to scenario state in order to reach the water quality targets (using attribute bands) specified under each of the proposed scenarios (Attachment 2). Detailed information was provided from TLG allowing CSG to discuss the level and degree of change required for each attribute across the four contaminants in each FMU area.

CSG then discussed the scenarios shown in Attachment 2. It was noted that scenarios (i) and (ii) were similar in many respects with perhaps scenario (ii) being a little more aspirational than scenario (i). In small groups the CSG members debated which they preferred. Their aim was to have as a wide range of future scenarios as possible, but not so many as to make the comparison overly complicated. Groups came back and reported their discussions and preferences. Discussion continued for some time, with the decision being that one of the aspirational options could be removed in preference for the other given their similarity. The outcome of that discussion was that the CSG agreed to put scenario (ii) forward (as in attachment 2) with one change – that being changing total phosphorus (TP) in the lower Waikato to the same level as in scenario (i). With this change agreed the previous scenario (ii) was adjusted to be used in the first round of scenarios for modelling by TLG. The other three scenarios remained as they were written in Attachment 2.

The four scenarios the CSG settled on at their workshop of 4/5 June, (set out in Attachment 3) is needed to get the TLG started on a first round of modelling and that there will be an opportunity for tweaking before finalising the second (and final) round of modelling by TLG.

Other matters discussed included:

- The CSG are having to make some calls on the scenarios to be modelled without having all the information, for example, the monetary cost of the level of restore and

protect. For this reason, it is important to have a full range, so the results can be compared.

- The CSG will focus on whether the river values are being met when they assess the results that will come back from TLG after each of the scenarios is modelled.
- The TLG will continue to provide more information around the connection and interdependencies between attributes. For instance, the nitrogen and phosphorus technical work has not yet been given to the CSG, since it is still being finalised by the TLG. Therefore, the July CSG meeting will allow the CSG to further explore questions around 'does phosphorus matter in the lower river for algal growth?'

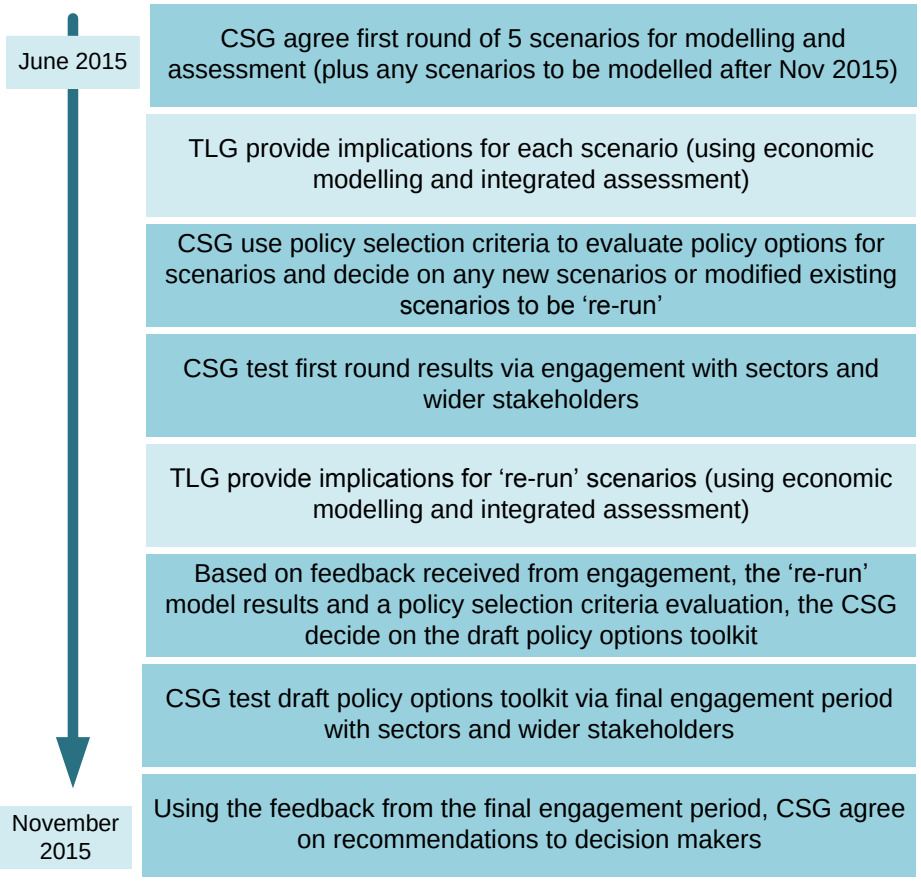
Next Steps

Now that the first round scenarios (see Attachment 3) have been confirmed by CSG the TLG will work to provide the implications for each scenario through economic modelling and an integrated assessment framework. The integrated assessment framework will look at the impacts of the targets, limits and policies and provide information on the potential economic, environmental, cultural and social impacts. Using this information, and the agreed Policy Selection Criteria, the CSG will evaluate potential policy options and solutions for each scenario.

During discussions, the CSG had some questions and directed TLG to come back to CSG13 (early July) with further information regarding phosphorus in the lower Waikato FMU.

The figure below shows the next steps for scenario development and engagement from June to November. A more detailed plan is currently under development and yet to be agreed by the CSG.

Timeframe for scenario development and testing
June – November 2015



The CSG recognises that the Vision and Strategy is the ultimate goal or 'scenario'. Hence the other scenarios should not be viewed as alternatives, but rather as potential stepping stones on the way to achieving the Vision and Strategy. For example one scenario is aimed at looking at what it would take to achieve no further degradation and another looks at what it would take to achieve a substantial improvement in water quality for swimming, taking food and healthy biodiversity.

The timeframe above, in June 2015, refers to the CSG agreeing any scenarios to be modelled after November 2015. This refers to a 'baseline' or status quo model that is required to meet the requirements of section 32 of the RMA but is not an acceptable scenario under the Vision and Strategy.

Assessment of significance

Having had regard to the decision making provisions in the Local Government Act 2002 and the council's Policy on Significance, a decision in accordance with the recommendation is not considered to have a high degree of significance.

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List of Attachments

Attachment 1: Strawman narrative scenarios presented to CSG in April (CSG11)

Attachment 2: Redrafted Scenarios after CSG11 (updated 6 May)

Attachment 3: CSG agreed scenarios for the first round of modelling (CSG12)

Attachment 1: Suite of strawman narrative scenarios *(as discussed at CSG11)*

Draft Scenarios for CSG, river iwi, WRA to workshop together on Friday 24 April

Introduction to scenarios

Building a set of scenarios that consist of a range of outcomes allows the CSG to explore some future possibilities. It is not expected that one or another scenario is chosen; the Vision and Strategy still stands as the ultimate state to be aspired to. The scenario exploration allows identification of pathways towards the Vision and Strategy and their associated speed and direction.

- Scenarios initially describe water quality outcomes. Ways to meet these outcomes through actions on the land will then be identified. How scenarios impact prosperous communities (social, economic, cultural impact) will come through the Integrated Assessment.
- Scenarios are based on different levels of 'protect and restore' for water quality for the Waikato and Waipā Rivers, for the 4 contaminants.
- Further work needs to be done on the lakes, so these are currently excluded from scenarios.
- Initially we are working with key water quality attributes relating to recreation and ecological health. Work on attributes is ongoing, including further understanding of nutrient dynamics (which will inform the TP and TN levels required to achieve the chlorophyll attribute), additional biological indicators, narrative and Mātauranga Māori attributes.
- Once scenarios for the water are agreed, the TLG will work on modelling what would be required to achieve them. The Integrated Assessment will then assess the impacts. Once the impacts/ options for achieving them on the land are modelled, different scenarios or options for achieving outcomes may be re-modelled, where time permits. This might include different states for contaminants or different FMUs, different timeframes (i.e. different intermediate scenarios), or different options on the land to achieve them.

Possible scenarios for discussion Friday 24 April

No	Narrative description	Attributes			
		E. coli	Clarity	Algae (Chlorophyll)	Nutrients
1	**Water quality for swimming, taking food and healthy biodiversity well restored and protected** Means: Swimmable in all seasons and across range of flows, main stem and tributaries. Water quality excellent for ecological health. [River iwi staff preferred scenario]	**Upper** Main stem shows improvement within A band. Tributaries A. **Middle** Main stem A Tributaries B **Lower and Waipa** B	**Upper** Main stem reaches A. Tributaries reach B. **Middle** Main stem reaches B. Tributaries reach C. **Lower and Waipa** Main stem and tribs C.	**Upper** A for median and maximum **Middle** B for median and A for maximum **Lower** B for median and maximum	**TP** Raise to an A to Ohaki Bridge, B for rest of river. **TN** Raise to an A at Ohakuri, B for rest of river. **Nitrate N** Lift to A throughout **Ammonium** Lift median to A, max to B.
2	**Substantial improvement in water quality for swimming, taking food and healthy biodiversity** Means: Swimmable in all seasons for microbes and clarity (at least 1m – using current regime where samples from top 10% of flows are excluded), main stem and tributaries. Water quality supports ecological health. [Represents CSG thinking so far on what to aim for, with questions still to answer]	**Upper** Tributaries B at 95%ile **Middle** Main stem at Horotiu and tributaries B at 95%ile **Lower and Waipa** B at 95%ile, main stem and tributaries	**Upper** Main stem A to Ohakuri, B below Ohakuri and in tributaries (with some improvement if already B) **Middle** Main stem B, tributaries C **Waipa** Upper stem B, lower stem and tributaries minimum C **Lower Waikato** C in main stem and tribs	**Upper** B, with no further degradation of A sites, possibly expanding A areas, keeping Narrows at high B for max, and reaching B for median. **Middle** B for median and max. **Lower** B for median and max (may take longer timeframe)	**TP** Maintain where already A, and raise to B throughout – timeframe is the question **TN** Initial target – no degradation. Then aim to raise to a 'B' (with no degradation of A areas), but acknowledge it may be at a slower rate than for P. **Ammonia and nitrate** Lift C sites to a B. Might need some B sites to lift also – depending on effects on species
3.	**Some improvement in water quality for swimming, taking food and healthy biodiversity**	**Upper** Tributaries B at 95%ile **Middle** Horotiu B at 95%ile	**No further degradation at any site, and minimum of:** **Upper**	**Upper** B, with no further degradation of A sites **Middle**	**TP** Maintain where already an A or B, lift C sites in Upper and Middle to B and lift

	Means: Main stem suitable for swimming in Upper and Middle river, and in parts of Waipa. Lower river tributaries and main stem wadeable but may not reach swimmable (B at 95%ile). ['Protect' + some 'restoring']	Tributaries B at median but may not be B at 95%ile **Lower** Tribs min B at med. Main stem may not be B 95%ile. **Waipa** Tributaries A at median, some are B at 95%ile.	Main stem B, tributaries C **Middle** Main stem B, tributaries C **Waipa and Lower** Main stem and tributaries C	B for median and maximum **Lower** C but no degradation at Huntly (currently a B for max).	Lower river to C. **TN** No further degradation; lift to a B for Middle river. **Nitrate N** Lift C sites to a B. **Ammonia** Lift median to a B.
4.	No further degradation in spite of lags. Means: No drop in current water quality, in spite of projected extra load currently in groundwater. [Scenario represents 'protect' but not 'restore']	**All sites** Current state maintained throughout with no further degradatio**n.**			
5.	Projection given current state and trends, if no plan change put in place. [This scenario does not meet the Vision and Strategy but analysis of what happens without a Plan Change is required under S32 of RMA]	**All sites** Future water quality modelled if policy remains as status quo (no Plan change but continue current financial incentives, industry strategies, voluntary actions by landowners and rules in the Regional Plan). Means: Current water state plus projected trends including intensification/ conversions, current mitigations, lags in groundwater, current constraints (e.g. Var 6).			

Attachment 2: Redrafted Scenarios after CSG11 (updated 26 May)

No	Narrative description	Attributes			
		E. coli	**Clarity**	**Algae (Chlorophyll)**	**Nutrients**
(i) Was 2	**Water quality for swimming, taking food and healthy biodiversity restored and protected** Means: Swimmable in all seasons for microbes and clarity, (min 1m, using current regime where samples collected in upper 10% of flows are excluded), main stem and tributaries. Water quality supports ecological health. [Represents a level of 'Restore' identified though CSG attribute workshopping]	**Upper** Main stem and A sites on tributaries maintain or get better. All tributaries reach min of B at 95%ile **Middle** Main stem B at 95%ile Tributaries B at 95%ile **Lower and Waipa** B at 95%ile, main stem and tributaries	**Upper** Main stem reaches A to Ohakuri, B below Ohakuri. Tributaries reach B (with some improvement if already B). **Middle** Main stem reaches B. Tributaries reach C. **Waipa** Upper stem B, lower stem and tributaries minimum C **Lower** Main stem and tribs C.	**Upper** A for median and maximum to Waipapa, keeping Narrows at high B for max, and reaching B for median. **Middle** B for median and maximum **Lower** B for median and maximum	**TP** Maintain where already A, raise to B for rest of river. **TN** Raise to a B (with no degradation of A areas), but acknowledge it may be at a slower rate than for P. **Nitrate N toxicity** Lift to A throughout **Ammonium toxicity** Lift C sites to a B, might need some B sites to lift also, depending on effects on species.
ii New	**Substantial improvement in water quality for swimming, taking food and healthy biodiversity** Means: Swimmable in all seasons for microbes and clarity. Water quality supports ecological health. Some improvement in all parameters.	**Upper** Main stem remains A. Tributaries min B at 95%ile **Middle** Main stem A at Narrows at 95%ile; Horotiu and tributaries B **Lower and Waipa** Main stem and tributaries B at 95%ile	**Upper** Main stem A to Waipapa, tributaries go up 1 band **Middle** Main stem B, tributaries go up 1 band **Waipa** Upper stem B, lower stem C, tributaries go up 1 band	**Upper** A sites improve. B sites to A, C sites to B. **Middle** B for median, A for max. **Lower** B for median and max; Huntly moves to B for med and A for max.	**TP** A sites improve in upper, all other sites up one band. **TN** Improve where already A, all sites to Waipapa to A, rest of river to B. **Ammonium and nitrate** Improve where already A, other sites go up 1 band.

	[Represents CSG suggestion of E. coli to B, all others up one band – 'Restore']		**Lower Waikato** C in main stem and tribs		
iii New	**Focus on raising to acceptable standard without trying to restore other sites or attributes** Means: No degradation where currently A, B or C band. Focus on lifting any D to C; lift E. coli to above MAS for swimming throughout. ['Protect' + least 'restoring' to reach minimum acceptable standard for all attributes]	**No further degradation at any site, and minimum of:** **Upper** Raise all tributaries to B at 95%ile. **Middle** Raise Horotiu and all tributaries to B at 95%ile. **Lower** Raise main stem and all tributaries to B at 95%ile. **Waipa** Raise main stem and all tributaries to B at 95%ile.	**No further degradation at any site, and minimum of C throughout:** **Upper** Main stem B, tributaries C **Middle** Main stem and tribs C **Waipa** Maintain where currently B or C and lift to C where currently D. **Lower** Raise main stem and all tributaries to C	**No further degradation at any site.**	**TP** Maintain where already an A B or C, lift Lower river to C. **TN** No further degradation. **Nitrate N** No further degradation **Ammonia** No further degradation.
iv Was 3	**Some general improvement in water quality for swimming, taking food and healthy biodiversity** Means: Some improvement across all attributes. Main stem suitable for swimming in Upper and Middle river, and in parts of Waipa but not Lower river. Lower, middle and some Waipa river tributaries wadeable but may not reach	**Upper** Tributaries B at 95%ile **Middle** Narrows stays at A 95%ile Horotiu gets to B at 95%ile Tributaries B at median but may not be B at 95%ile **Lower** Tribs min B at med. Main stem may not be B 95%ile. **Waipa**	**No further degradation at any site, and minimum of:** **Upper** Main stem B, all tributaries C **Middle** Main stem B, tributaries C **Waipa and Lower** Main stem and tributaries C	**Upper** B, with no further degradation of A sites **Middle** B for median and maximum **Lower** C but no degradation at Huntly (currently a B for max).	**TP** Maintain where already an A or B Lift C sites in Upper and Middle to B and lift Lower river to C. **TN** No further degradation; lift to a B for Middle river. **Nitrate N** Lift C sites to a B.

	swimmable (B at 95%ile). ['Protect' + some 'restoring' but not fully swimmable]	Tributaries A at median, some are B at 95%ile.			**Ammonia** Lift median to a B.
v Was 4	**No further degradation in spite of lags.** Means: No drop in current water quality, in spite of projected extra load currently in groundwater. ['Protect' but not 'restore']	**All sites** Current state maintained throughout with no further degradation**.**			

Model later:

1	**Aspirational restoration**	**Natural state and edible kai** A scenario that models the condition in 1863. Or a scenario achieves edible kai in a raw state.
BAU Was 5.	**Projection given current state and trends, if no plan change put in place.** [This scenario does not meet the Vision and Strategy but analysis of what happens without a Plan Change is required under S32 of RMA]	**All sites** Future water quality modelled if policy remains as status quo (no Plan change but continue current financial incentives, industry strategies, voluntary actions by landowners and rules in the Regional Plan). Means: Current water state plus projected trends including intensification/ conversions, current mitigations, lags in groundwater, current constraints (e.g. Var 6).

Attachment 3: CSG agreed scenarios for the first round of modelling (CSG12)

No	Narrative description	Attributes			
		E. coli	**Clarity**	**Algae (Chlorophyll)**	**Nutrients**
1st	**Substantial improvement in water quality for swimming, taking food and healthy biodiversity** Means: Swimmable in all seasons for microbes and clarity. Water quality supports ecological health. Some improvement in all parameters. [Represents CSG suggestion of E. coli to B, TP to minimum B, all others up one band – 'Restore']	**Upper** Main stem remains A. Tributaries min B at 95%ile **Middle** Main stem A at Narrows at 95%ile; Horotiu and tributaries B **Lower and Waipa** Main stem and tributaries B at 95%ile	**Upper** Main stem A to Waipapa, tributaries go up 1 band **Middle** Main stem B, tributaries go up 1 band **Waipa** Upper stem B, lower stem C, tributaries go up 1 band **Lower Waikato** C in main stem and tribs	**Upper** A sites improve. B sites to A, C sites to B. **Middle** B for median, A for max. **Lower** B for median and max; Huntly moves to B for med and A for max.	**TP** Maintain where already A, raise to B for rest of river. **TN** Improve where already A, all sites to Waipapa to A, rest of river to B. **Ammonium and nitrate** Improve where already A, other sites go up 1 band.
2nd	**Focus on raising to acceptable standard without trying to restore other sites or attributes** Means: No degradation where currently A, B or C band. Focus on lifting any D to C; lift E. coli to above MAS for swimming throughout. ['Protect' + least 'restoring' to reach minimum acceptable	**No further degradation at any site, and minimum of:** **Upper** Raise all tributaries to B at 95%ile. **Middle** Raise Horotiu and all tributaries to B at 95%ile. **Lower** Raise main stem and all tributaries to B at 95%ile.	**No further degradation at any site, and minimum of C throughout:** **Upper** Main stem B, tributaries C **Middle** Main stem and tribs C **Waipa** Maintain where currently B or C and lift to C where currently D.	**No further degradation at any site.**	**TP** Maintain where already an A B or C, lift Lower river to C. **TN** No further degradation. **Nitrate N** No further degradation **Ammonia** No further degradation.

	standard for all attributes]	**Waipa** Raise main stem and all tributaries to B at 95%ile.	**Lower** Raise main stem and all tributaries to C		
3rd	**Some general improvement in water quality for swimming, taking food and healthy biodiversity** Means: Some improvement across all attributes. Main stem suitable for swimming in Upper and Middle river, and in parts of Waipa but not Lower river. Lower, middle and some Waipa river tributaries wadeable but may not reach swimmable (B at 95%ile). ['Protect' + some 'restoring' but not fully swimmable]	**Upper** Tributaries B at 95%ile **Middle** Narrows stays at A 95%ile Horotiu gets to B at 95%ile Tributaries B at median but may not be B at 95%ile **Lower** Tribs min B at med. Main stem may not be B 95%ile. **Waipa** Tributaries A at median, some are B at 95%ile.	**No further degradation at any site, and minimum of:** **Upper** Main stem B, all tributaries C **Middle** Main stem B, tributaries C **Waipa and Lower** Main stem and tributaries C	**Upper** B, with no further degradation of A sites **Middle** B for median and maximum **Lower** C but no degradation at Huntly (currently a B for max).	**TP** Maintain where already an A or B Lift C sites in Upper and Middle to B and lift Lower river to C. **TN** No further degradation; lift to a B for Middle river. **Nitrate N** Lift C sites to a B. **Ammonia** Lift median to a B.
4th	**No further degradation in spite of lags.** Means: No drop in current water quality, in spite of projected extra load currently in groundwater. ['Protect' but not 'restore']	**All sites** Current state maintained throughout with no further degradation**.**			