TE AWARUA-O-PORIRUA WHAITUA COMMITTEE

ROUNDING OUT THE OBJECTIVES – MEMO FOR THE COMMITTEE WORKSHOP 21 JUNE 2018

Aim

This memo summarises work by the Project Team to identify any recommendations for changes to the Committee's draft freshwater and harbour objectives. As part of this work, the Project Team looked at the following:

1. Contradictions between the draft objectives, and/or the scenarios to achieve these objectives, between water management units (WMUs) where one WMU flows into another, which are:
   - upstream and downstream between the freshwater WMUs, and
   - between the freshwater WMUs and the harbour WMUs receiving environments.
2. Checking the draft objectives within freshwater WMU groups to characterise similarities and differences, and where differences existed, checking the reasons for these are recorded, and
3. Identifying any risks to the draft objectives being met from uncertainties in modelling and data.

The analysis was carried out for the water quality attributes only (i.e. *E. coli*, nitrate toxicity, ammonia toxicity, zinc and copper). We did not attempt to analyse the ecological attributes (i.e. periphyton, MCI, native fish) as these outcomes are dependent on multiple factors (e.g. water quality, flow and habitat conditions) and are consequently too complex for this method of checking for anomalies.

Things to note:

When we use the term 'the degree of effort', we are meaning the minimum effort required to achieve the draft objective according to the modelling results. Where 'WS+' has been used in the tables below, this indicates that even the Water Sensitive scenario does not achieve the chosen objective and so any mitigation options need to do more, or other things over and above, what was modelled in order to achieve the objective.

Key to levels of effort

BAU – Business as usual scenario

Imp – Improved scenario – 'moderate'

WS – Water Sensitive scenario – 'high degree of effort'

WS+ – Beyond the Water Sensitive scenario – 'high degree of effort'

Findings

1. Checking for contradictions between WMUs

(a) Upstream /downstream alignment

For this analysis we looked at the objectives for each attribute within a WMU and compared them to downstream WMUs **(Table 1)**

- Generally the objectives are set higher in the rural WMUs (e.g. Rangituhi) than in the urban WMUs
- We do not see any upstream objectives that would put downstream objectives at risk and therefore do not recommend any changes

Looking at the (minimum) degree of effort required to achieve the objective and comparing that degree of effort upstream/downstream **(Table 2)**

- Upper Kenepuru WMU requires a higher degree of effort for nitrate toxicity and copper than downstream in the Kenepuru WMU, however, this is likely due to this being a rural area that will see significant land use change (Transmission Gully)
- The Stebbings WMU requires a higher degree of effort for the zinc and copper than the Porirua WMU that it flows into. However, because Stebbings is a growth area it is recognised that it is more effective to put in water sensitive mitigations when development occurs rather than relying on retrofitting urban land uses after development
- Again, we do not see any risks to the objectives and do not recommend any changes

(b) Freshwater / harbour alignment

For this analysis we have just looked at the metal contaminants (zinc and copper) and compared the degree of effort for metals into each arm of the harbour **(Table 3).**

- The Onepoto Fringe and Pauatahanui Fringe Stream WMUs stand out as requiring a large effort compared with other established urban areas
- In the urban WMUs more effort is required for those discharging to the Pauatahanui arm than the Onepoto arm.

2. Characterising similarities and differences within WMU Groups (Table 4)

- The predominantly urban WMUs (e.g. Porirua and Kenepuru) see a high degree of effort for *E.coli* and moderate effort for other contaminants
- The predominantly rural WMUs (e.g. Kakaho and Pauatahanui) see a high degree of effort for *E.coli*
- Taupo Stream WMU has a high degree of effort across all contaminants, which is consistent with the values the Committee has indicated they have for this WMU and that

this WMU is at risk of a decrease in water quality under urban development (as is anticipated for this area)

- In the Belmont WMU the draft objective for dissolved zinc can be attained by BAU, however, an Improved level of effort could shift the objective to a B band

Belmont Stream				
Attribute	Current state	BAU	Imp	WS
Zinc	**C**	**C↑**	**B**	**A**

Recommendation

The Committee considers changing the draft objective for dissolved zinc in the Belmont WMU from C to B.

3. Risks to objectives from modelling or data quirks

- Most WMUs will require water sensitive or water sensitive + efforts to achieve the *E.coli* and ammonia objectives. However:
    - The modelling maybe overestimating *E.coli* in the upper rural WMUs and therefore the amount of effort required to achieve the objective may not be so high.

Recommendation

The Committee retains their draft objectives for *E.coli* but note that the effort required to achieve the objective in the rural WMUs may not be so high.

- The modelling may be overestimating ammonia in the rural WMUs and therefore the degree of effort required to achieve the objective may not be so high.

Recommendation

The Committee retains their draft objectives for ammonia but note that the effort required to achieve the objective in the rural WMUs may not be so high.

- Generally, in *urban* WMUs an improved level of effort is required to achieve the zinc and copper objectives. However:
    - The model may be overestimating the current state for zinc and copper in the Onepoto Fringe WMU

Recommendation

The Committee retains the draft objectives for dissolved zinc and copper in the Onepoto Fringe but note the effort required to achieve the objective may not be so high.

Key Messages

- Generally, in *rural* WMUs, where future development has been identified, water sensitive efforts will be required to achieve the zinc and copper objectives.
- Where Greenfield development is proposed, a water sensitive, or water sensitive + effort is required.
- There are a couple of exceptions to the above generalisations and they are where the Committee has indicated a high degree of value for a particular WMU and therefore, the objectives and consequently the degree of effort required to reach the objective is higher than other similar WMUs.
- While this analysis has not looked at sediment (and the objectives set at the last meeting for sediment and mud in the harbour), it is a useful reminder that to achieve the soft mud objectives, a high level of effort (water sensitive+) is likely to be required in rural areas.

Where to next?

We will need to undertake a similar analysis when we have the coastal and harbour modelling results as this information will enable us to calculate the loads of contaminants from each WMU. We may find in particular WMUs, a high degree of effort is required to achieve an objective, but that WMU may only be contributing a small portion of the total load for that contaminant. Therefore, is the degree of effort justified?

Table 1: Upstream/downstream freshwater WMU comparison: draft objectives

Porirua Catchment

Upper Kenepuru				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	A	A	A	A

Kenepuru Stream				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	B	C	B	C

Belmont Stream				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	B	C	C	C

Stebbings Stream				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	B	B	A	A

Takapu Stream				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	B	B	C	A

Rangituhi Stream				
E.Coli	Nitrate	Ammonia	Zinc	Copper
A	A	A	A	A

Porirua				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	B	C	C	C

Pauatahanui Catchment

Judgeford Stream				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	A	A	A	A

Pauatahanui				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	A	A	A	A

Duck Creek Catchment

Upper Duck Creek				
E.Coli	Nitrate	Ammonia	Zinc	Copper
B	A	A	A	A

Lower Duck Creek				
E.Coli	Nitrate	Ammonia	Zinc	Copper
C	A	A	A	A

Indicates WMU flows to another WMU

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Table 2: Upstream/downstream freshwater WMU comparison: Level of effort

Porirua Catchment

Upper Kenepuru

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	WS+	Imp	WS	WS+

Kenepuru Stream

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	Imp	Imp	Imp

Belmont Stream

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	BAU	BAU	Imp

Stebbings Stream

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS	BAU	BAU	WS+	WS+

Takapu Stream

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	BAU	Imp	BAU

Rangituhi Stream

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
Imp	BAU	BAU	BAU	BAU

Porirua

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	WS	Imp	Imp

Pauatahanui Catchment

Judgeford Stream

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	Imp	WS	BAU	Imp

Pauatahanui Stream

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS	Imp	Imp	Imp	WS

Duck Creek Catchment

Upper Duck Creek

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	Imp	Imp	WS+	WS+

Lower Duck Creek

E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	WS+	WS	WS+

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Table 3: Level of effort comparison to the harbour

Onepoto Arm

	Zinc	Copper
Intertidal	A (BAU)	A (BAU)
Subtidal	C↑ (WS+)	B↑ (WS)

Pauatahanui Arm

	Zinc	Copper
Intertidal	A/B (Imp)	A (Imp)
Subtidal	B↑ (WS)	A (Imp)

WMU (Onepoto Arm)

WMU	Dissolved zinc	Dissolved Copper
Whitireia	Imp	WS+
Hukarito Stream	WS	WS+
Mahinawa Stream	Imp	WS+
Rangituhi Stream	BAU	BAU
Stebbings Stream	WS+	WS+
Takapu Stream	Imp	BAU
Porirua	Imp	Imp
Upper Kenepuru	WS	WS+
Kenepuru Stream	Imp	Imp
Onepoto Fringe	WS+	WS+

WMU (Pauatahanui Arm)

WMU	Dissolved zinc	Dissolved Copper
Upper Duck Creek	WS+	WS+
Lower Duck Creek	WS	WS+
Pauatahanui Stream	Imp	WS
Judgeford Stream	BAU	Imp
Ration Creek	WS+	WS+
Horikiri and Motukaraka	WS+	WS+
Kakaho Stream	Imp	Imp
auatahanui fringe stream	WS	WS+

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Table 4: Level of effort comparison within WMU groups

Pukerua				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	Imp	Imp	BAU	WS+

Hongoeka to Pukerua				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	Imp	Imp	BAU	WS+

Whitireia				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	WS+	BAU	Imp	WS+

Taupo Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	WS+	WS+	WS	WS+

Horikiri and Motukaraka				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS	Imp	Imp	WS+	WS+

Kakaho Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	WS	WS	Imp	Imp

Judgeford Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	Imp	WS	BAU	Imp

Upper Duck Creek				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	Imp	Imp	WS+	WS+

Pauatahanui Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS	Imp	Imp	Imp	WS

Ration Creek				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
Imp+	WS	WS+	WS+	WS+

Lower Duck Creek				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	WS+	WS	WS+

Pauatahanui fringe streams				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
Imp	Imp	WS	WS	WS+

Rangituhi Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
Imp	BAU	BAU	BAU	BAU

Takapu Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	BAU	Imp	BAU

Upper Kenepuru				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	WS+	Imp	WS	WS+

Belmont Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	BAU	BAU	Imp

Stebbings Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS	BAU	BAU	WS+	WS+

Hukarito Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	WS+	WS	WS+

Mahinawa Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	BAU	Imp	WS+

Onepoto Fringe				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
Imp	BAU	WS	WS+	WS+

Titahi				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
Imp	Imp	WS	WS	Imp

Kenepuru Stream				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	Imp	Imp	Imp

Porirua				
E.Coli	Nitrate toxicity	Ammonia Toxicity	Dissolved zinc	Dissolved Copper
WS+	BAU	WS	Imp	Imp