

BEFORE THE HEARING PANEL

AT HAMILTON

IN THE MATTER

of the Resource
Management Act 1991

AND

IN THE MATTER

of the Proposed Waikato
Regional Plan Change 1
Waikato and Waipā River
Catchments

AND

IN THE MATTER

of Variation 1 to the
Proposed Waikato
Regional Plan Change 1
Waikato and Waipā River
Catchments

**STATEMENT OF EVIDENCE IN CHIEF OF DR HUGH ALLISTER ROBERTSON
FOR THE DIRECTOR-GENERAL OF CONSERVATION**

FRESHWATER WETLANDS, INCLUDING WHANGAMARINO WETLAND

BLOCK 2

3 May 2019

Department of Conservation

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INTRODUCTION

1. My full name is Hugh Allister Robertson.
2. I hold the position of Principal Science Advisor-Freshwater in the Aquatic Unit, Department of Conservation. I have been in this role since October 2008.
3. I am presenting this evidence for the Director-General of Conservation in relation to protecting and restoring the values of wetland ecosystems through addressing water quality pressures in the Waikato and Waipā catchments.

QUALIFICATIONS AND EXPERIENCE

4. My qualifications and experience are set out in my statement of evidence prepared for Block 1 dated 15 February 2019.

CODE OF CONDUCT

5. While this is not an Environment Court hearing, I have read the Environment Court “Code of conduct for expert witnesses”, and I agree to abide by it. I have prepared this Statement in accordance with that Code. I confirm that my evidence is within my area of expertise. I have not omitted to consider any material facts known to me that alter or detract from the opinions I express in this Statement. I have acknowledged the material used or relied on in forming my opinions and in the preparation of this Statement.

SCOPE OF EVIDENCE

6. I have been asked to provide evidence on matters being addressed in Block 2 of the Proposed Waikato Regional Plan Change 1, relating to:
 - i. Management of diffuse nutrients to protect and restore wetland ecosystem health
 - ii. Farm Environment Plans and stock exclusion
 - iii. Prioritised implementation

7. For each of these topics, my evidence addresses the application of relevant policies, rules and schedules in PC1 to freshwater wetlands in the PC1 area, taking into account the objectives of PC1 and the Vision and Strategy for the Waikato River.

MATERIAL CONSIDERED

8. Key documents and information I have used in preparing this evidence are:
 - i. Proposed PC1
 - ii. S42A Officer's Report for Block 2, and associated amendments to PC1
 - iii. Operative Waikato Regional Policy Statement
 - iv. Operative Waikato Regional Plan
 - v. Vision and Strategy for the Waikato River
 - vi. Evidence in Chief (EIC) of Ms Kathryn McArthur and Dr Simon Stewart in relation to the Block 2 topics, particularly in relation to setback distances in Schedule C

MANAGEMENT OF DIFFUSE NUTRIENTS TO PROTECT AND RESTORE WETLANDS

9. The proposed PC1 puts forward a suggested policy and rule framework to protect and restore the Waikato and Waipā river catchments by reducing discharges of nutrients, sediment and microbial pathogens.
10. The management of diffuse discharges of nitrogen, phosphorus and sediment is critical not only for lakes and rivers, but also for wetlands (refer my EIC presented in Block 1).
11. As it stands, the Waikato Regional Policy Statement provides limited, and generally high-level, policy direction to 'maintain and enhance wetland quality and extent' (Objective 3.16) and requiring regional plans to protect the significant values of wetlands, to achieve limits and targets, and manage effects from changes in land use and discharges (Policy 8.2.2).

12. However, the Operative Waikato Regional Plan (WRP) does not contain any specific policies or rules that require the impacts of diffuse discharges on wetlands to be addressed. That is, the WRP has no specific provisions or mechanisms to manage or limit the impacts of diffuse nitrogen, phosphorus or sediment on wetlands.

13. The total area of natural freshwater wetlands in the PC1 geographical area is 15,817 ha, with the Lower Waikato FMU having the largest extent of wetlands. In comparison the total area of lakes in PC1 is only 6022 ha. Figure 1 below illustrates the distribution and extent of wetlands in the Lower Waikato FMU.

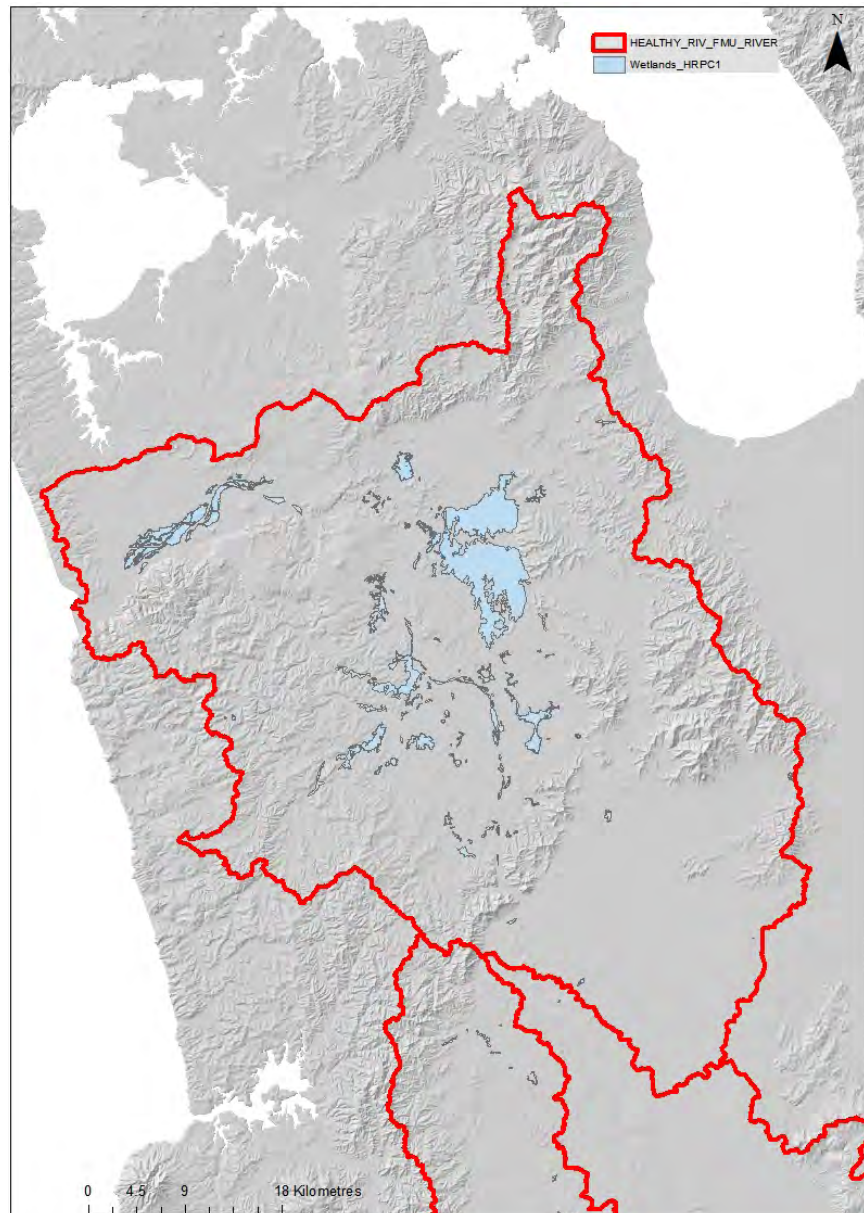


Figure 1. Extent of freshwater wetlands in Lower Waikato FMU. Freshwater wetlands are depicted as blue polygons. Red lines are the FMU boundaries. Source data: FENZ Geodatabase.

14. Given the substantial extent of wetlands in the PC1 geographical area, the fact that many wetlands in the Waikato and Waipā catchments are hydrologically connected to rivers, streams and lakes, and the susceptibility of wetland ecological values to water quality decline, in my opinion it is vital that the policy and rule framework in PC1 adequately provides for the protection and restoration of wetlands if it is to give effect to the Vision and Strategy.
15. Policy 1 of the notified version of PC1 amends the WRP to '*Manage and require reductions in sub-catchment-wide diffuse discharges of nitrogen, phosphorus, sediment and microbial pathogens*'.
16. The S42 A Officers' Report recommends an amendment to Policy 1 so that instead it specifically seeks to '*Reduce catchment wide and sub-catchment diffuse discharges*'.
17. I support this amendment to Policy 1. Given the degree of land use change in the Waikato and Waipā catchments, and the water quality impacts that the regions wetlands are subjected to (Browne et al. 2005, Clarkson et al. 1999, Shearer 1997, Blyth 2011, Environment Waikato 2008), in my opinion only a reduction in diffuse discharges at sub-catchment scales will ensure the ecosystem health values of wetlands are protected and restored.
18. As presented in my evidence for Block 1, increased levels of nitrogen and phosphorus have an incremental impact on wetland values. Even low levels of contamination from diffuse run-off can lead to a decline in ecosystem health (e.g. reduced dominance of indigenous wetland plants, Fig. 2).

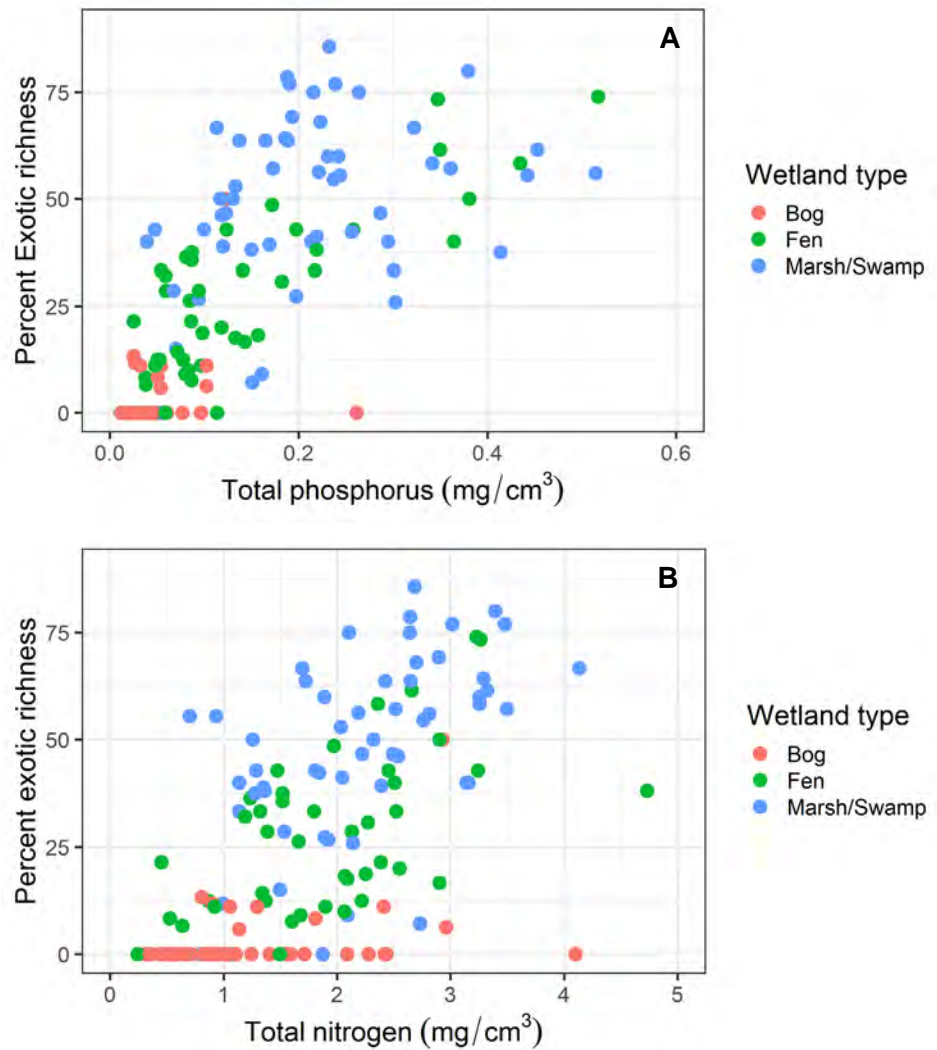


Figure 2: Relationship between soil total phosphorus (**A**) and soil total nitrogen (**B**) and the prevalence (richness) of exotic wetland plants in three New Zealand wetlands (Whangamarino, O Tu Wharekai, Awarua). Source: DOC.

19. Within Policy 1 of PC1 there is a provision that enables '*activities with a low level of contaminant discharge to water bodies*'. If the 'low level' of discharge does in fact relate to very low concentrations and loads of nutrients and sediment then this provision may be appropriate, in terms of protecting and restoring wetlands. That is, since addressing the main contaminant sources should be priority.
20. However, PC1 does not define what a 'low level' of contaminant discharge is. This lack of definition presents a significant risk, in that highly sensitive wetlands (e.g. wetlands with low fertility, for

example peat bogs once common in the North Island and now confined to a few regions such as the Waikato) may be subject to ongoing diffuse discharges because of issues in interpreting Policy 1. Even a low level of discharge into a low fertility wetland can be detrimental. In my opinion, a specific numeric value for what constitutes a low level of contaminant discharge needs to be defined based on the sensitivity of different wetland types (Johnson & Gerbeaux 2004) to degradation from poor water quality. Or alternatively, and in the absence of data for many wetlands in the Waikato and Waipā catchments, the specific land use activities that relate to a 'low level' or 'low risk' of contaminant discharge need to be defined in PC1.

21. I also agree with the evidence of Ms McArthur (para 8-9) that recommends an effects-based approach to focus on sub-catchments where contaminants are 'moderate' and 'high'. This reiterates the need for a definition of the threshold between 'low' and 'moderate' levels of contaminant discharge to be defined.
22. Due to the need for a precautionary approach to be taken to the management of wetlands, I propose that PC1 definition of 'low level' refers to land use activities that have relatively low water quality contaminant discharge and/or leaching rates (e.g. in the <25th percentile across the sub-catchment).
23. In summary, I recommend that PC1 is amended so that:
 - Policy 1 is amended to *Reduce catchment wide and sub-catchment diffuse discharges...*
 - Policy 1 is amended to provide a definition of what constitutes a *low level* of contaminant discharge for different water bodies and sub-catchments.

FARM ENVIRONMENT PLANS AND STOCK EXCLUSION

24. The development, implementation and monitoring of Farm Environment Plans (FEPs) is proposed in PC1 as one of the key

instruments for achieving the catchment-wide and sub-catchment reduction in nutrient and sediment contaminants.

25. In principle, I support the proposed application of FEPs, but only to the degree that the FEPs adequately provide a tool to reduce nutrient and sediment contamination in freshwater wetlands situated on-farm and receiving wetland environments lower in the catchment.
26. To be effective in protecting and restoring wetlands from water quality impacts, the FEP needs to include activities/tasks to:
 - i. Identify and map all wetlands (and the types of wetlands present – Johnson and Gerbeuax 2004) that are situated 1) on-farm and 2) at adjacent or downstream sites in the sub-catchment*
 - ii. Explicitly identify sources of N, P and Sediment to these wetlands originating from, or passing through, the farm property.*
 - iii. Identify where drainage or flood mitigation is contributing to water quality contamination of wetlands*
 - iv. Complete a risk assessment for wetlands situated 1) on-farm and 2) at adjacent or downstream sites in the sub-catchment*
 - v. Require mitigation strategies to address N, P and sediment contamination of wetlands 1) on-farm and 2) at adjacent or downstream sites in the sub-catchment*
 - vi. Require restoration strategies to reduce the extent and dominance of exotic weed species that have established in response to water quality decline*
 - vii. Require set-backs (buffers) of 10m from all wetlands for specific activities, including:*
 - a. fertiliser application*
 - b. stock fencing*
 - c. effluent discharge*
 - d. drain construction or enhancement, i.e. measures in the FEP to ensure there are no new drains constructed or deepened within wetlands, or within 10m of the wetland boundary*

27. In my opinion, the notified version of Schedule 1 (Requirements for Farm Environment Plans) is inadequate in relation to protecting and restoring natural wetlands in the PC1 geographical area.
28. There is almost no direction in Schedule 1 that FEPs need to ensure water quality impacts on natural wetlands are addressed. Except for identifying the location of wetlands, the FEP protocol does not adequately or explicitly include any of the other items listed in Paragraph 26 to ensure wetlands on-farm and at adjacent or downstream sites in the sub-catchment are sustainably managed and restored.
29. In addition to setbacks for fertiliser application, stock fencing and effluent discharge, it is also recommended that setbacks apply to draining of wetlands and construction of drains near to wetlands. That is, because the lowering and fluctuation of wetland water tables has a direct impact on nutrient cycling in wetlands. For example, water table fluctuations contribute directly to release of phosphorus (Aldous et al. 2005, Sorrell et al. 2007, Olila et al. 1997).
30. To ensure FEPs are effective in protecting and restoring wetlands from water quality contamination caused by altered hydrological regimes (i.e. drains) a minimum setback of 10m for all new drains or drain deepening is recommended. The recommended setback of 10m is considered conservative, given drains can influence wetland hydrology at distances of >50m.
31. Schedule 1 at present promotes the use of natural wetlands as nutrient/sediment deposition areas. It recommends that '*measures to detain floodwaters and settle out or otherwise remove sediment, nitrogen, phosphorus and microbial pathogens (e.g. detention bunds, sediment traps, natural and constructed wetlands)*' are identified. I do not support this being included in Schedule 1, as natural wetlands are sensitive to nutrient and sediment loading.

32. I recommend that Schedule 1 is amended to ensure that FEPs adequately promote the reduction of nutrient and sediment contaminant entering natural wetlands. Schedule 1 should ensure that the *risk assessment* required by the FEP includes wetlands and *mitigation strategies and actions* are also identified to reduce nitrogen, phosphorus and sediment inputs to natural wetlands.
33. A related issue is the management of stock exclusion from wetlands, and in particular, the definition of the buffer or setback distance from the perimeter of wetlands that is required to protect and restore ecosystem health.
34. It is proposed in Schedule C that stock (cattle, horses, deer and pigs) are excluded using fencing from wetlands, including constructed wetlands, specifically:
- *1 metre from the outer edge of the bed for land with a slope of less than 15 degrees; and*
 - *3 metres from the outer edge of the bed for land with a slope between 15 and 25 degrees*
35. A review of stock impacts from grazing in wetlands (Reeves & Champion 2004) concluded that there is often significant impact of stock on wetland vegetation. These impacts are not limited to cattle, horses, deer and pigs. While there were fewer studies on water quality impacts due to stock grazing, several studies identified elevated levels of nitrogen and phosphorus due to stock access (Reeves & Champion 2004). In my opinion this confirms the importance of excluding all stock from wetlands as proposed in Schedule C, including goats and sheep.
36. Goats and Sheep, as with other grazing animals, have direct impacts on vegetation and soil structure that are in the riparian zones adjacent to wetlands. Presence of goats and sheep within the buffer zone will reduce the biomass of existing vegetation, limit the growth of new vegetation (such as tussock forming grasses and sedges), and contribute to soil erosion. The loss of dense vegetation and soil disturbance in the buffer zone will reduce the

attenuation capacity and lead to higher levels of discharge of nutrients and sediment to wetlands in the Waikato and Waipā catchments. This would be inconsistent with the Vision and Strategy for the Waikato River. I therefore recommend that goats and sheep are also excluded from riparian buffer zones in Schedule C.

37. The setback distances in the proposed PC1 are for 1 metre or 3 metres from waterbodies, including any wetland. No technical evidence has been presented to justify the 1m or 3m distances for wetlands.
38. Provision of adequate riparian buffers for freshwater wetlands is important to facilitate the attenuation of nutrients, limit erosion and limit sediment transport into wetlands.
39. I agree with the evidence of Ms McArthur that “*Setback distances from water bodies and (preferably vegetated) riparian buffers are needed that provide effective reductions in the risk of contaminants reaching water, not just from the direct effects of stock in waterways, but also through providing effective buffers between farmland, cultivated land and water to reduce overland flow of contaminants and erosion from de-vegetated, cultivated or stock-trampled river banks*”. This applies equally to wetlands systems. As described in the evidence I presented in Block 1, transport of nitrogen, phosphorus and sediment to wetlands is a critical driver of the degradation of wetland ecosystem health.
40. The S42A report cited research published by Holmes et al (2016) that recommended a 5m setback to manage fine-sediment deposition. However, no other literature on setback distances is referred to, and the S42A analysis did not recommend an amendment to the 1m and 3m recommendations in Schedule C.
41. In my opinion, the 1m and 3m setback distances proposed in PC1 are insufficient. Effective reduction of nutrient and sediment

contaminants from reaching wetlands require greater setback distances.

42. I agree with the evidence presented by Ms McArthur that provides a review of relevant literature on adequate setback distances to protect aquatic functions. The literature review identifies a setback distance of 10m is generally required to filter and strip sediment and nutrients from entering waterways (sometimes greater, e.g. >20m). This recommendation equally applies to wetland systems. Ms McArthur's evidence recommends a minimum setback distance of 10m is applied in Schedule C.
43. Parkyn (2004) in a report prepared for the Ministry of Agriculture and Forestry (MAF) concluded that a riparian buffers of 10m are appropriate for capturing finer particles of sediment (and bound phosphorus) and removing nitrate. This report examined a range of publications from New Zealand and overseas. Given wetland systems of the Waikato and Waipā catchments are sensitive to water quality contamination, it is appropriate to apply a minimum setback of 10m to natural wetlands in PC1.
44. Setbacks are also recommended for constructed wetlands, to maximise the ability for constructed systems to perform nutrient attenuation at the farm and sub-catchment scale.
45. I note the evidence of Dr Stewart recommends a minimum setback distance of 20m is applied to all lakes in PC1. Where the lake system has a fringing wetland system, it is important that both the lake and wetland setbacks are applied.
46. Schedule C recommends that the setbacks are applied to the bed of waterbodies. For wetlands, it is important that the 'bed' of the wetland includes intermittent/ephemeral wetland habitats that may be seasonally inundated and not only wetlands that are permanently wet.
47. A definition or guidelines of what constitutes the bed of wetland will be required for all policies and rules relating to wetlands.

Delineation of the boundary of wetlands (i.e. the edge of the 'bed') is informed by the presence or absence of:

- wetland plant species (vegetation), and/or
- hydric soils, and
- wetland hydrology (noting that water levels can be seasonal)

48. Tools have been published in New Zealand to inform wetland bed delineation based on vegetation (Clarkson 2014) and hydric soils (Fraser et al. 2018). It is recommended that these tools are applied in Schedule 1 (FEPs) and Schedule C (setbacks) to ensure the bed of wetlands are accurately delineated.

49. In summary, I recommend that PC1 is amended so that:

- Schedule 1 (FEPs) includes a specific focus on the reduction of nutrient and sediment contaminants from natural wetlands, ensuring the risk assessment required by the FEP includes wetlands, and that mitigation strategies and actions are also identified to reduce nitrogen, phosphorus and sediment inputs to natural wetlands.
- Schedule C is amended so that goats and sheep are also excluded from wetlands and associated riparian setbacks, in addition to cattle, horses, deer and pigs.
- Schedule C is amended to require a setback distance of 10m from all wetlands
- Schedule C is amended to ensure the definition of the bed of a wetland includes intermittent/ephemeral wetland habitats. The definition of a bed of a wetland must take into account the presence of wetland vegetation and/or hydric soils and wetland hydrology. Informed by delineation guidelines (Clarkson 2014, Fraser et al. 2018).

PRIORITISED IMPLEMENTATION

50. A prioritised approach to the implementation of PC1 is appropriate in my opinion. This prioritised approach should take into account water bodies that have very high values and which are vulnerable to historical and ongoing degradation due to poor water quality.

51. The notified version of PC1, under Policy 8, set out a prioritisation of sub-catchments in Table 3.11-2. Policy 8 also prioritised implementation for:
- *Sub-catchments where there is a greater gap between the water quality targets[^] in Objective 1 (Table 3.11-1) and current water quality; and*
 - *Lakes Freshwater Management Units[^]; and*
 - *Whangamarino Wetland*
52. In the evidence I presented for Block 1, I presented information describing the international significance of Whangamarino Wetland and the high level of nutrient and sediment contaminants the wetland environment is receiving, which is impacting on ecosystem health.
53. I support the prioritisation of the Whangamarino sub-catchments as presented in the notified version of Table 3.11-2. That is, since all contributing sub-catchments to Whangamarino are identified as Priority 1, with one exception (refer paragraph below).
54. As I presented in my evidence for Block 1, the Waikato at Mercer sub-catchment (#9) has been appropriately combined with the Maramarua River sub-catchment. The Maramarua sub-catchment is a contributing sub-catchment to Whangamarino Wetland and it is important that this sub-catchment is mapped separately and identified as a Priority 1 sub-catchment to be consistent with other Whangamarino sub-catchments (refer to Figure 3).
55. In the S42 A officer's report it is recommended to delete the specific reference to Whangamarino Wetland and Lake Freshwater Management Units. I do not support this amendment to Policy 8, and instead consider it important that the priority assigned to Whangamarino is clear, particularly given Objective 6 of PC1, and Policy 15 to 'Protect and make progress towards restoration of Whangamarino Wetland by reducing the diffuse discharge of

nitrogen, phosphorus, sediment and microbial pathogens in the sub-catchments that flow into the wetland’.

56. In summary, I recommend that PC1:

- Retains the Priority 1 status assigned to all contributing sub-catchments for Whangamarino Wetland as detailed in Table 3.11-2
- Separately delineates Maramarua sub-catchment and assigns a Priority 1 status to ensure a whole of catchment approach is applied to Whangamarino Wetland
- Retains specific reference to Whangamarino Wetland as a site for priority implementation in Policy 8

Dr Hugh A. Roberston



3 May 2019

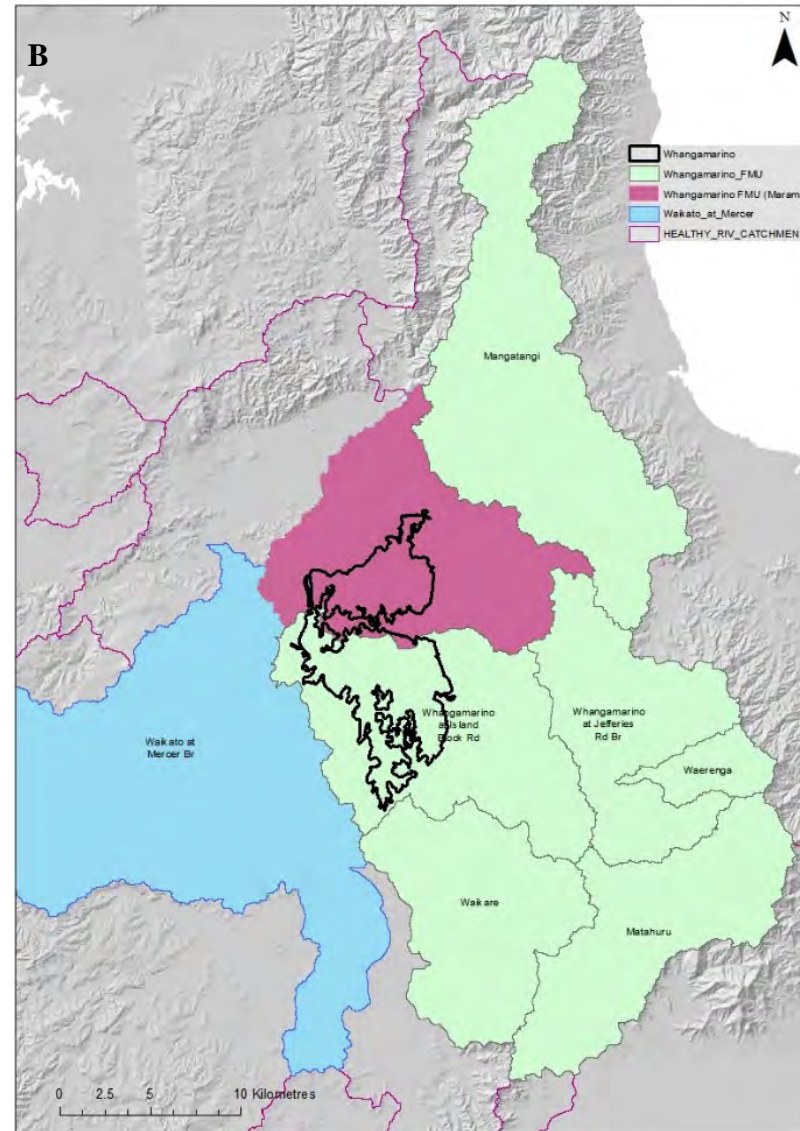
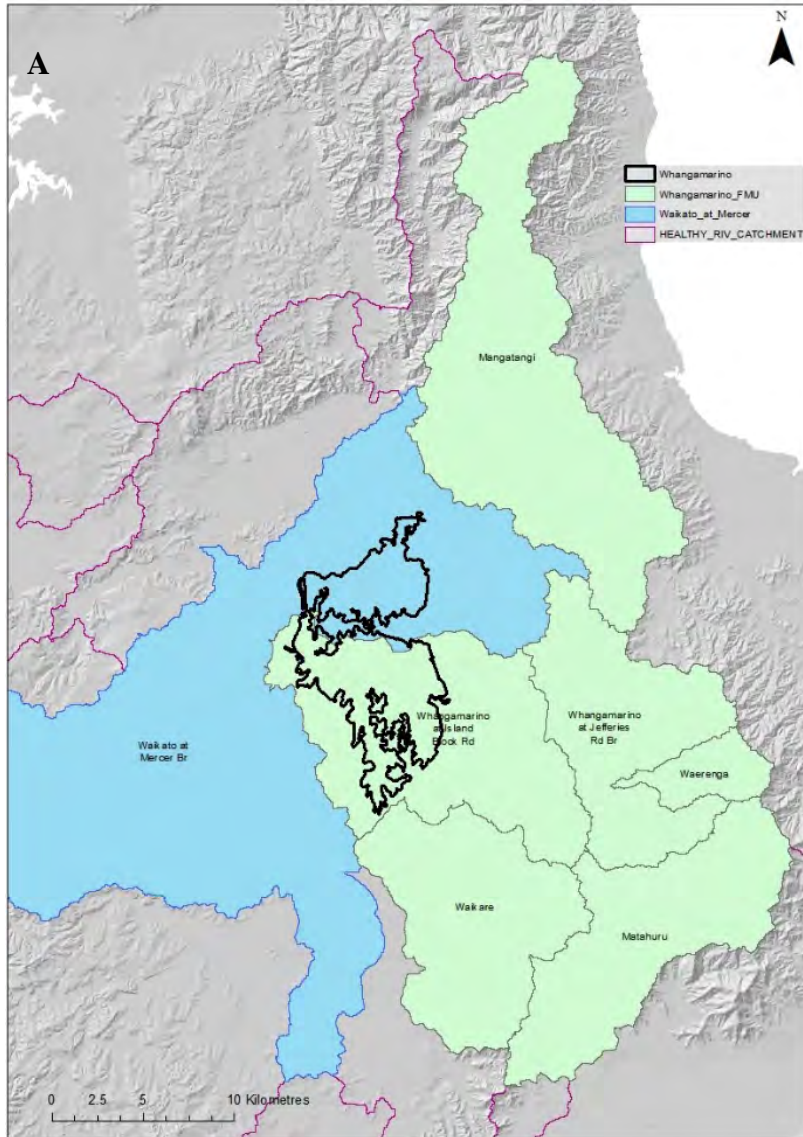


Figure 3. Geographical boundary of the sub-catchments that contribute to Whangamarino Wetland.

Note it is proposed to split the Waikato at Mercer sub-catchment (A) to ensure the Maramarua sub-catchment is identified as Priority 1 for implementation (as shown in B).

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