

**BEFORE THE PROPOSED NATURAL RESOURCES PLAN HEARINGS PANEL**

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of water quality provisions

**AND**

**IN THE MATTER** of the submissions and further  
submissions set out in the S42A  
Officer Report

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**STATEMENT OF PRIMARY EVIDENCE OF PHILIPPA NOEL  
CRISP ON BEHALF OF WELLINGTON REGIONAL COUNCIL**

**TECHNICAL – Water quality in regards to objectives for natural wetlands**

**12 January 2018**

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**1. SUMMARY**

- 1.1 My name is Philippa Noel Crisp.
- 1.2 I have been asked to provide evidence in response to submissions received coded to topic Water Quality for the following specific matters:
  - (a) Revision of Table 3.7 Natural Wetlands
- 1.3 The scope of my evidence includes the revision of measures for natural wetlands detailed in Table 3.7 for Objective O25 of the Proposed Natural Resources Plan
- 1.4 My evidence was developed using background research and scientific knowledge of the wetland types present in the Wellington region.
- 1.5 My Evidence addresses matters raised in the submissions of Royal Forest and Bird Protection Society (S353/027), Minister of Conservation (S75/027) and Federated Farmers
- 1.6 My recommendation is that the submission requests for the use of numeric, rather than narrative values be declined as numeric measures are not available at this time. However I agree that the term balance is not scientifically useful and suggest replacement with text that links attributes to wetland type (see wording changes in Attachment B).
- 1.7 The wetland types - seepages and saltmarsh have been added to Table 3.7, as these wetland types were identified by GWRC staff as gaps.

## **2. INTRODUCTION**

2.1 My name is Philippa Noel Crisp. I am the Team Leader of the Terrestrial Ecosystems and Quality team of the Environmental Science Department at Greater Wellington Regional Council. I have a PhD in Agronomy and a post-graduate Diploma in Environmental Studies. I have over 20 years' experience in monitoring and research associated with terrestrial ecology, including wetlands. A full copy of my qualifications and experience is available in **Attachment A** to my evidence.

2.2 I am providing technical evidence relating to Objective O25 of the Proposed Natural Resources Plan for the topic -Water Quality.

## **3. CODE OF CONDUCT**

3.1 I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note and that I agree to comply with the code. My evidence in this statement is within my area of expertise. I have not omitted to consider material facts known to me that might alter to detract from the opinions which I express.

## **4. SCOPE**

4.1 I have been asked to provide evidence in response to submissions received coded to topic Water Quality for the following matters:

(a) Revision of Table 3.7. Natural Wetlands

## **5. REVISION OF TABLE 3.7 NATURAL WETLANDS**

5.1 Royal Forest and Bird Protection Society (S353/027) and Minister of Conservation (S75/027) request that numeric or objective measures be used in Table 3.7, rather than narrative or subjective objectives. Forest and Bird supports Table 3.7 in part, but requests greater certainty by including measurable objectives where possible. The submitter is concerned at the use of subjective words such as "balanced" and "appropriate" as they import a degree of uncertainty. The Minister of Conservation shares these concerns, stating that terms such as 'balanced' have no clear ecological meaning or context, and requesting more specificity within the tables where narrative objectives are used, replacing these terms with clear,

meaningful terms that support the objective. Federated Farmers have requested that all tables in Objective O28 be removed as they are subjective and, as such, are generic, not specific.

- 5.2 Rangitāne o Wairarapa (S279/036) have requested that these tables be amended to be clear that 'appropriate for the area' means that the presence, quantities, size and quality should represent what is expected in each area based on natural distribution and natural habitat.”
- 5.3 Response:
- 5.4 Table 3.7 sets out the desired outcomes for aquatic ecological health in natural wetlands. The table contains key indicators of ecosystem health that contribute to the functioning of wetlands and are appropriate attributes for the Wellington region.
- 5.5 Numeric measures for wetland health are still in the development phase, e.g. while it is known that moderate to high fluctuations in water levels are a characteristic of swamps, the actual degree of water level change for a healthy swamp has not been determined as yet. Numeric objectives are not appropriate until there is technically robust data available to numerically define many wetland physical and biological attributes. However, there is good understanding of the environmental state that represents healthy, functioning wetland ecosystems and these can be described with narrative criteria when linked to specific wetland type, e.g. the physiochemical and hydrological status of bogs versus swamps.
- 5.6 The term “balance’ has been replaced with ‘appropriate’ for wetlands, as I consider that the latter term is more relevant to the concept of the range of conditions expected for different wetland types. While the word ‘appropriate’ is also subjective, the term is being used here in the sense that a healthy wetland will have the plant and animal communities present that would naturally be found in the wetland of that type, e.g. mosses in a bog or raupo in a swamp. Information about these communities is readily accessible (e.g. in Johnson and Gerbeaux 2004. Appropriate also means that the plants present are indigenous plants native to the area (i.e. not

species that have been brought in from other areas of New Zealand). I agree with Rangitāne o Wairarapa that “appropriate” refers to the presence of communities and species that would be expected in each area based on natural distribution and natural habitat. I suggest that a footnote be added to Table 3.7 to clarify this definition of “appropriate”.

- 5.7 It is important to maintain the variety of wetland types in the region. Wetland types are determined by water flows and on the geological setting of the wetland site. The combination of hydrology and soil characteristics at different wetland sites provides the drivers for the development of different floral (and faunal) communities. Information about different wetland types and their characteristics can be found in Johnson and Gerbeaux 2004.
- 5.8 The different types of wetlands have different hydrological and physiochemical regimes. Bogs receive water from rainfall only, i.e. not from groundwater and streams. This results in a low nutrient system with vegetation that is adapted to those conditions, e.g. mosses. A fen receives water from both rain and groundwater and so generally has a higher nutrient level than a bog, but lower than that of a swamp or marsh. In the case of the two latter wetland types, nutrients can be transported through stream, river or lake inputs.
- 5.9 Rangitane o Wairarapa Inc have raised in Submission S279/036 that birds are missing from Objective O25. It is also noted that Table 3.8 Coastal waters includes invertebrates and that there should be consistency where possible between the tables.
- 5.10 Response:
- 5.11 I agree that Table 3.7 should include all fauna naturally present, rather than just fish. A healthy wetland will have faunal communities that would naturally be present in that habitat, which include species of birds, lizards and invertebrates, as well as fish. I recommend that Table 3.7 be amended to include those species.
- 5.12 Different types of wetlands identified in Table 3.7 are bogs, fens,

swamps and marshes. I note that two key wetland types have not been included in the table; seepages and saltmarshes. These wetlands have been identified as specific wetland types in the NZ wetland classification system (see Johnson and Gerbeaux 2004) and should be included in Table 3.8 so that this table provides a comprehensive basis for defining wetland ecosystem health.

5.13 Seepages differ from bogs and fens in that these wetlands are formed under specific geological conditions. They occur on gently sloping terrain and are supplied by a moderate to steady flow of ground or surface water. They are located primarily where groundwater is pushed to surface at a change of slope or an impermeable base raises the water table.

5.14 While saltmarsh is included in Table 3.8 Coastal Waters, this wetland type also has a terrestrial component. Terrestrial insects, bird species, such as fernbird, and some plant species also make use of saltmarsh habitat. I therefore recommend that saltmarsh be added to Table 3.7 in order to ensure that both the aquatic and terrestrial components of the wetland system are covered.

## **6. CONCLUSION**

6.1 My evidence provides recommendations regarding submissions made on the Objective O25, natural wetlands under Proposed Natural Resources Plan topic Water Quality.

6.2 The key issues raised in submissions include the request for the use of numeric, rather than narrative values in Table 3.7. My evidence has addressed each outstanding submission and provided recommendations as to whether the relief sought in the submissions should, in my opinion, be supported based on my assessments and assessment made and information gathered by myself.

## **7. REFERENCES**

7.1 Johnson, P. and Gerbeaux, P. 2004. *Wetland Types in New Zealand*. Department of Conservation, New Zealand.

## **Attachment A**

### **Qualifications and experience**

#### **Qualifications**

I am the Team Leader of the Terrestrial Ecosystem and Quality Team of the Environmental Science Department of WRC. I oversee scientific investigations, monitoring and research associated with terrestrial ecology in the Wellington region. Wetland monitoring and science investigations are part of the team's work programme. The team has developed GWRC's wetland database and gathered knowledge of the types and presence of wetlands in the region.

I have over 20 years of experience in ecological restoration and monitoring. I have been with the GWRC for over 15 years. Prior to working in the Environmental Science Department, I was the Team Leader, Strategy and Environment in the Parks Department where I oversaw park planning and all activities associated with ecological restoration and monitoring of the indigenous ecosystems in 50,000ha of WRC parks and forests. I have also been involved in both management and monitoring activities at Wairarapa Moana (Lake Wairarapa and surrounding wetlands) for the past 12 years.

I worked at the Department of Conservation in various roles related to monitoring and management of indigenous species and ecosystems prior to obtaining a role at WRC.

I have gained a Bachelor of Agricultural Science (First Class Hons) from Canterbury University, a PhD (Agronomy) from La Trobe University and a post-graduate Diploma in Environmental Studies from Victoria University of Wellington.

I am currently a committee member of the National Wetland Trust of New Zealand, as well as a member of the New Zealand Plant Conservation Network (NZPCN), having served as President of NZPCN for the past three years. I am also a member of the Ecological Society of New Zealand.

**Attachment B**  
**Evidence from other experts**

Table 3.7 Natural Wetlands					
Wetland type	Biology			Water quality	Water quantity
	Plants <u>Flora</u>	Fish <u>Fauna</u>	Mahinga kai species	Nutrient status	Water regime
<b>Bog</b>	Indigenous plant communities are <u>appropriate<sup>2</sup> to wetland type</u> , are resilient and their structure, composition and diversity are <u>balanced within an acceptable range of that expected under natural conditions</u>	Indigenous <u>fish faunal</u> communities (including those of birds, fish, lizards and <u>invertebrates</u> ) are <u>appropriate to wetland type</u> , are resilient and their structure, composition and diversity are <u>balanced within an acceptable range of that expected under natural conditions</u>	Mahinga kai species, including taonga species, are present in, or are migrating through, the wetland and are in quantities, size and of a quality that is appropriate to the area	Low or very low	Water table depth and hydrologic regime is appropriate to the wetland type
<b>Fen</b>				Low to moderate	
<b>Seepage</b>				<u>Low to high</u>	
<b>Saltmarsh<sup>1</sup></b>				<u>Moderate to high</u>	
<b>Swamp</b>				Moderate to high	
<b>Marsh</b>				Moderate to high	

<sup>1</sup> refers to the Terrestrial component of saltmarshes; coastal saltmarsh is provided for by Table 3.8

<sup>2</sup> Appropriate refers to communities naturally found in the different wetland types, and indigenous species that are native to the area (i.e. species expected to be present based on natural distribution and habitat)