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| IN THE MATTER OF | The Resource Management Act 1991 |
| AND | |
| IN THE MATTER OF | Hearings on submissions concerning the proposed Horizons Regional Council One Plan for the Manawatu-Wanganui Regional Council |

# STATEMENT OF EVIDENCE OF GRAEME LA COCK

## INTRODUCTION

### My qualifications/experience

1 My name is Graeme Dennis La Cock. I have a Bachelor of Science, a Bachelor of Science (Honours) in botany, and a Master of Science in botany. All three degrees were awarded by Rhodes University, South Africa. I have over 25 years of post-graduate work experience in biological research and conservation. For the past 11 years I have been a technical support officer for the Department of Conservation based in Wanganui.

2 As a technical support officer I am responsible for providing staff with advice and guidance on weeds and threatened plant management issues. I was the Department's representative on the Coastal Dune Vegetation Network's management committee from November 2003 until it was superseded by the Dune Restoration Trust of New Zealand last year. I am currently a trustee of this Trust. I am familiar with the dune systems I refer to in my evidence.

3 I have read the Environment Court's practice note Expert Witnesses – Code of Conduct and I agree to comply with it.

## INTRODUCTION

4 For the purposes of this evidence I will refer to coastal sand dunes as those active dunelands that owe their physical, landscape and ecological character to the ongoing and very recent movement of sand by wind (Hilton et al., 2000).

5 Coastal dune ecosystems comprise several components that in combination provide the overall dynamism that is an essential element of a functional dune ecosystem. These separate components include the foredune which is typically vegetated with sand binding plants such as the grass spinifex (*Spinifex sericeus*) or the sedge pingao (*Desmoschoenus spiralis*) in the Manawatu-Wanganui region, the rear or back dunes immediately behind the foredunes, swales, parabolic and transgressive mobile dunes, and dune slacks and ephemeral

wetlands between or behind the dunes. Further inland stable dunes that are vegetated with shrubs and herbs occur. Hesp (2000) gives a good overview of the form and function of coastal dunes.

6 Coastal sand dunes:

a. Act as an essential store of sediment protecting the hinterland from storm erosion and potential sea level rise;

b. With vegetation, trap windblown sand and stabilise beaches and dunes;

c. Provide specialised habitats for plants, birds and animals;

d. Along with beaches, represent one of the most dynamic natural ecosystems in our environment;

e. Provide us with a range of unique landforms and ecosystems with high natural character value;

f. Act as a filter for rainwater and groundwater, and provide a range of aquatic habitats (e.g. dune lakes) (Hesp, 2000).

7 The Proposed One Plan and Fleur Maseyk (2008) in her evidence identify in Table E1 components of the dune system, and in Table E3 list some threatened species that occur in a dune system that would not in my opinion be adequately protected solely by the protection of the identified components. I do not believe that these components can be properly protected without protecting the other components of dune systems that are crucial for their establishment, health and functioning.

8 In my evidence I will provide an overview of the state of coastal dune systems nationally and regionally, including their previous management, discuss how dunes are dealt with in the Proposed One Plan and in Ms Maseyk's evidence, and suggest alternative provisions that in my opinion would lead to adequate protection of active mobile dunefields in the region.

## THE NATIONAL SITUATION

9 Recent estimates suggest that only 21,000 ha of sand dunes remain in New Zealand – just 11.6% of the original extent (Ministry for the Environment, 2007a). This estimate would be based on similar predictive methodology to that used in the Proposed One Plan analysis (see Maseyk, 2007, 2008).

10 Hilton et al. (2000) assessed changes in the extent of sand dunes between the 1950s and 1990s, based on aerial photography. They assessed that 69.9% of sand dunes had been lost in that time (38,949 ha remaining). They identified the main reasons for this reduction as being the stabilisation and then afforestation of the active dunelands. Other activities, including agricultural development, sand mining, urbanisation, uncontrolled grazing by stock, waste disposal and military activities have caused local degradation, but account for a minor proportion of the area of active duneland lost (Hilton et al., 2000).

11 I believe that the difference between these two figures could be easily explained by the Hilton et al. (2000) study being based on a 1950s start date, by which time large tracts of dunes had already been stabilised, and the Ministry for the Environment (2007a) figures being based on potential habitat. However, I believe both studies reflect a high level of loss of dune habitat throughout New Zealand, and highlight the need to protect what remains.

12 Fleur Maseyk in her evidence (paragraph 68) recognises that the predictive methodology used for the Proposed One Plan does not fully account for the full range of habitat diversity in the Region. At a finer scale Williams et al. (2007) defined a national framework of 72 rare ecosystems, eight of which have included in the Proposed One Plan (Ms Maseyk's evidence, para 68)[1]. Williams et al (2007) used the criterion that the habitat occupied less than 0.5% of the New Zealand land mass historically. Active sand dunes, stable sand dunes and dune slacks are recognised as three of these ecosystems. The national

[1] My colleague Ms Hawcroft has identified a number of other rare ecosystems present in the Region and suggests that provision should be made for their protection.

framework lists “Himatangi, Manawatu” as the example locality nationally of each of these ecosystem types.

## THE REGIONAL SITUATION

13 Hilton et al. (2000) assessed the Manawatu region as having reduced from 16,627 ha of active duneland in the 1950s to 2,360 ha in the 1990s, a loss of over 81%. The Manawatu was, nationally, the region with the highest proportional loss of dunes. Work commissioned for the Proposed One Plan indicate the Manawatu dunelands as declining from 22,164 ha to 1,806 ha (i.e. 8.14% remaining) (Maseyk, Appendix 3, 2008). Again both studies reflect the scale of significance of loss of dune habitat throughout the region.

14 The principal reason for this loss of habitat has been the stabilisation and then afforestation of once-mobile dunes between Wanganui and Hokio Beach (McKelvey (1999). The only significant stretch of active duneland not backed by commercial pine plantations along this coast is that between Foxton and Himatangi, hereafter referred to as the Foxtangi dunes. However other activities affecting the active dune system, such as conversion to more intensive pastoral farming (particularly if accompanied by irrigation and ‘soil improvement’), residential subdivision and (possibly) wind farms are also likely to lead to further cumulative modification and loss of the active dunelands during the plan period.

15 Hesp (2001) provides a good overview of dune stabilisation work in the Manawatu region and the historical use of the dunes. Although most areas were afforested with commercial plantations, stabilisation in the Foxtangi area culminated in the planting of narrow strips of pines along the margins of some of the active dunes by 1966 (Hesp, 2001). Aerial photographs taken for the Manawatu-Wanganui District Council in 2005 reveal a belt of trees still present. This belt of trees is not farmed, and very little conversion to pasture or suitable grazing appears to exist between this belt and the sea, although one pasture with drinking troughs was observed.

16 A sand dune and beach vegetation inventory for the North Island (Partridge, 1992) identified the sand dunes north of Foxton Beach as a site of national importance, and the second most important site on the Wanganui-Manawatu coast after the Harakeke dunes. The latter site has subsequently been conserved as the Whitiau Scientific Reserve, and is managed by the Department of Conservation. It is backed by pine plantations.

17 Ravine (1992) also recognised the Foxtangi dunes as a recommended area for protection in the Foxton Ecological District Survey Report for the Protected Natural Areas Programme.

18 Ravine (1992) referred to an unidentified *Pimelea* in these dunes. This plant is referred to as *Pimelea* "Turakina" in the Proposed One Plan. This plant has now been formally named as *Pimelea actea* (Burrows, 2008). De Lange et al. (2004) in their assessment of the threat status of New Zealand plants placed *Pimelea actea* in the highest threat category, namely acutely threatened: nationally critical. Currently this is the only known site for naturally occurring populations of this plant. Another dune species, *Selliera rotundifolia*, is endemic to the sand plains of Horizons region (Heenan et al 1997).

19 Several other threatened plants occur here or have been recorded from here in the past (Esler, 1969; Ravine 1992, de Lange et al. 2004). Ogle (2008) lists 32 species threatened and uncommon species that occur on the sand country of the Foxton Ecological District north of the Manawatu River (after de Lange et al., 2004). At least 18 of these are reliant on active dune systems, including the critically threatened sand gentian, *Sebae obvata*, which is found naturally nowhere else in New Zealand (Dopson et al 1999). Other species occur on coastal cliffs and in wetlands.

20 The Foxtangi Dunes have, in my opinion, the best foredune on the Manawatu-Wanganui coast, and I would regard one of the dune slacks observed on a recent visit as one of the best examples I have seen in my work on this coastline. However, other dune slacks similar to the one I observed will be lost and others will develop as dunes become destabilised and stabilised. The area is volatile – Hesp (2001) identified that 20 new parabolic dunes had become established in the 10km stretch between Foxton and Himatangi between 1990 and 2000. He attributed their establishment to natural causes as well as recreational activity and possibly rabbits. It is this ability to cope with change that I consider to be critical to the future functioning of dunes in the region.

21 In a recent visit to the Foxtangi dunes vehicle tracks, particularly of motorcycles, were evident throughout. Stephenson (1999) undertook an international review of the impact of vehicles on beaches that he applied in a New Zealand context. He concluded that impacts of vehicles on biota were severe, and that New Zealand dunes would have a nil carrying capacity.

22 At a local level three years ago I assisted a student with research on the impacts of vehicles on spinifex runners at Castlecliff Beach, Wanganui. Spinifex-dominated dunes extend seaward through the growth of spinifex down the dune, trapping the new sand. He found that 69% of all runners on a dune to which vehicles had access had been snapped off. This included all runners, even those that had not been driven over due to subtle changes in the dune formation. Essentially every runner that had been driven over was damaged, even if it was under the sand. Only 2% of runners on a protected dune were damaged.

23 In my opinion I do not believe that recreational vehicles should have access to any active or stable dune system in the region.

## NATIONAL INITIATIVES FOR CONSERVATION OF COASTAL DUNES

24 In its strategy document entitled "Protecting our places" the Ministry for the Environment (2007b) set four national priorities for protection of biodiversity on private land. The second of these is to protect indigenous vegetation associated with sand dunes and wetlands. The justification for this priority is detailed in Ministry for the Environment (2007a).

25 The policies in Chapter 1 of The New Zealand Coastal Policy Statement (1994) also identify the national importance given to preservation of the natural character of the coast, and protection of the areas of significant indigenous vegetation and significant habitats of indigenous fauna; landscapes; and the integrity, functioning and resilience of the coastal environment. Mr Watts refers in more detail to these statutory requirements in his evidence.

## **PROTECTION OF COASTAL DUNES IN THE** PROPOSED ONE PLAN

26 Elements of the dunes are afforded some protection through the following provisions in the Proposed One Plan as notified, or as recommended for amendment by Ms Maseyk :

a. Rule 12-5 protects foredunes from vegetation clearance on the West Coast.

b. Foredunes are described in the glossary of the plan as extending 200 m from the seaward vegetation. However, while this would encompass a significant proportion of the active duneland, I would estimate from aerial photographic information that in places these habitats extend 400 or 500 metres inland (including at Foxtangi).

c. Schedule E habitat types include:

    i. Grassland and sedgeland on active dunelands;

ii. tussockland, herbfield or shrubland on stable dunelands and

iii. dune slacks are identified as vegetative habitat.

However these specific habitats occur within a wider mosaic which includes other habitats (including bare sand) and exotic plants within the dune ecosystem.

27 In her proposed revisions to Table E3, Ms Maseyk (2008) proposes retention of *Pimelea* "Turakina" (now *P. actea*) and several other species that are not adequately protected by provisions elsewhere in Schedule E and are reliant on dune habitat, including *Pimelea arenaria* and *Selliera rotundifolia.* However a number of other highly significant dune species, such as katipo spiders, which are currently listed in Table E3, are not retained.

28 Whilst the description of habitat on p.E-6 of Table E2 in the proposed plan includes reference to 'species which can be sparsely distributed and in association with areas of unvegetated ground' and the inclusion of 'any vegetation' that contains E3 species (e.g. *Pimelea actea*) goes some way toward broadening the term 'habitat' to include the active dune ecosystem these provisions do not provide adequate certainty that the purposes of the Act will be achieved or that the plan gives adequate effect to Policy 1.1.2 of the NZCPS.

29 Protection of indigenous vegetation associated with sand dunes (and indeed wetlands) relies upon protection of the physical substrates and processes which they rely upon.

30 One habitat type was added to the Proposed One Plan based on expert opinion (Maseyk, paragraph 68, 2008). In my opinion the protection of dunes would be better served in the One Plan by the following amendments that would recognise dunes as an active habitat, rather than a selection of components from within the active dune system. This approach complements that taken by my colleague, Ms Hawcroft, in respect of other rare ecosystem types.

## CONCLUSIONS

31 The proposed One Plan goes some way towards recognising and attempting to provide for protection of the nationally significant dune ecosystems in Horizons Region. However, in my opinion a number of changes similar to those described below would greatly enhance the Plan.

## SUGGESTED AMENDMENTS

32 Amend definition of rare and threatened habitats in the glossary to read

> "Rare and threatened habitats are areas of indigenous habitat and/or physical substrate of a type identified in Table E.1 as being 'rare' and 'threatened' respectively, and which meet the criteria described in Table E.2 for determining whether an area of indigenous vegetation and/or physical substrate constitutes a 'habitat' for the purposes of this plan."

33 A similar change for 'at risk habitats'.

34 Change the emphasis of description of active dunelands in Table E1 to give greater emphasis to physical substrate and physical processes (and provide more consistency with the definition from Hilton et al (2000) by

a. deleting the following habitat type categories:

   i. Grassland and sedgeland on active dunelands

   ii. Dune slack

b. adding the following habitat type:

| Habitat type named for the physical environment and defined by habitat | | |
|---|---|---|
| Active dunelands | Active dunelands comprise areas of raw coastal sand in the form of dunes and dune hollows and slacks interspersed with indigenous and non-indigenous vegetation (invasive or planted). Includes mosaics of raw unstable sands, grassland, sedgeland, scrub, tussockland, low-growing or semi-woody herbs, small trees, together with dune slack wetlands. | Rare |

35 I agree with the changes to Table E2 as recommended on pages 76 and 77 of Fleur Maseyk's evidence, but suggest it may be appropriate to include the following

a. Table E2 (a) Add new criterion: 'Areas of active duneland covering at least 0.1 ha'.

b. Table E2 (b) Add the above to the sites excluded under b(i)

c. Table E2 (b) also add (as areas excluded from active dunelands)

i. Existing established areas of forestry planted for commercial production purposes on active dunelands (if not already included as 'treeland' or 'woodlots')

ii. Existing established areas cultivated and planted as pastoral grassland for farming purposes

iii. Urban areas and other areas where active dunelands have been irreversibly modified (such as car parks)

iv. Formed roads and other existing infrastructure sites and corridors

v. Any area more than 600 metres inland of the boundary of the coastal marine area

d. Make consequential amendment to the definition of 'indigenous habitat' within the definition of indigenous vegetaaion (see p.67 of Fleur Maseyk's report)

e. And consequential amendments to the 'Interpreting Schedule E' section.

36 I believe that these provisions would protect the active dune systems in the region, specifically the nationally important Foxtangi Dunes ecosystem. The protection of the belt of pines that separates the Foxtangi dunes from farmland would lead to these dunes being protected in their active state, with sand being able to move in under the pines before it slowed to a halt. This will contribute to the overall protection of biodiversity throughout the Manawatu-Wanganui Region.

37 Landowners have always allowed me, my colleagues and other researchers access to the dunes on their land. Without this support a lot of the information presented here would have been difficult to obtain. I'd like to acknowledge this ongoing and willing support from them.

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