IN THE MATTER OF	The Resource Management Act 1991
AND	
IN THE MATTER OF	Hearings on Submissions Concerning the Proposed Horizons Regional Council One for the Manawatu-Wanganui Region

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STATEMENT OF EVIDENCE OF AMY HAWCROFT

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1 INTRODUCTION

1 My full name is Amy Laura Hawcroft.

2 I am employed as an ecologist by the Department of Conservation, Wanganui Conservancy. I have been employed by the Department of Conservation between 2002 and the present. I hold a BSc (Hons) in Geography and an MSc in Geography.

3 The Wanganui Conservancy extends from the Mokau River mouth in Taranaki inland to Taumaranui and Waiouru, down the spine of the Ruahine Range and out to the Manawatu River mouth near Foxton. This largely overlaps with Horizons Region. I have become familiar with a wide range of forest and other habitat types in the Conservancy through my work providing technical assistance with vegetation monitoring programmes. This work has included measurement of permanent forest and grassland plots; field surveys of pest animal impacts on forest and grassland habitats; review and analysis of datasets and reports describing vegetation status and trend; surveys of scrub and forest remnants; and preparation of land protection cases for the Nature Heritage Fund.

4 I am familiar with forest ecology and assessment of indigenous habitat to which these hearings relate. This evidence draws on my knowledge, various published scientific papers and reports, and expert advice from other Department of Conservation technical officers and field staff.

5 I have read the Environment Court's Code of Conduct for Expert Witnesses, and I agree to comply with it. I confirm that the issues addressed in this brief of evidence are within my area of expertise.

6 I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

1.1 Scope of evidence

7 Today I will provide evidence to support statements made by the Department of Conservation in its' submission on the proposed One Plan, in particular points relating to Schedule E.

8 In general, the Department was supportive of the biodiversity protection provisions included in the Plan. Some changes were sought to ensure that particular habitats or species would be adequately protected. For instance, the Department proposed the addition of 22 significant species to Table E3.

9 Since then, having been involved in the Pre-hearing meetings and discussions with Horizons staff, we have modified our position somewhat. The approach we have taken is to:

a. identify the habitats those species rely on

b. determine whether the habitats are adequately protected by the One Plan

c. seek the inclusion of the habitats for protection, rather than focussing on individual species

10 For this reason, some of my evidence will differ slightly from the Department's submission.

1.1.1 Structure of this document

11 My evidence will deal with the following:

a. The significance of biodiversity in the Horizons region;

b. Extent of remaining biodiversity, rates of loss and other threats to its values;

c. The criteria Horizons have used to assess significance and the scientific adequacy of this approach;

d. Limitations of the Horizons approach and suggested additions to Table E1;

e. The efficiency and effectiveness of the approach taken by Horizons, including a summary of suggested alterations to Table E3 and a comparison of the Horizon's approach with other methods of identifying and protecting significant sites.

12 Matters I will not discuss include:

a. Reasons for biodiversity protection. This is a given objective of the proposed One Plan.

b. Detailed provisions for the protection of dune ecosystems and processes. These are covered in Mr La Cock's evidence.

c. I will only briefly touch on non-regulatory approaches.

1.2 Executive Summary

13 Horizons Region has high biodiversity values, encompassing a wide range of habitat types, some nationally significant, and supporting many indigenous plants and animals, many rare and endangered. Some of these species occur nowhere else. However, this biodiversity has been considerably reduced in extent, especially in the flat, fertile, lowland areas. The remaining biodiversity is now at risk from further reduction in extent and gradual degradation from long-term consequences of fragmentation and exotic pests.

14 The approach taken by Horizons to quantify existing biodiversity and identify threats is sound. They have used the best information available, drawing on a combination of national data sets, locally ground-truthed where possible, and expert opinion. Their assessment of the state of biodiversity in the Region is accurate.

15 GIS based modelling of potential extent of natural vegetation and its comparison to current extent is a widely used and practical approach to identify threatened biodiversity. However, the use of broad-brush models based on generally expected patterns can overlook some important rare and unusual habitats. The use of predicted potential vegetation may overlook seral habitats. Consequently, I consider that the habitat classification provided in Table E1 should be supplemented to recognise six important rare and seral habitats:

a. Tussock grassland below treeline

b. Kowhai forest and scrub

c. karst landscape features: sinkholes, cave entrances, caves and cracks

d. Calcareous, sedimentary, volcanic or ultrabasic cliffs, scarps and tors

e. Coastal cliffs

f. Calcareous, sedimentary or ultrabasic screes

g. Calcareous, sedimentary, volcanic or ultrabasic boulderfields

16 I believe the effectiveness of Table E2 (a) would be improved by including criteria that recognise (i) the small size of many rare ecosystems and (ii) the importance of bare substrate as habitat:

17 Those changes, together with recognition of sand dune ecosystems (as discussed by my colleague); protection of the habitats already listed in Schedule E; and non-regulatory approaches outlined in Chapter 7 of the proposed One Plan will provide adequate protection for much of the indigenous biodiversity - including threatened species - that occurs on private land in Horizons Region.

18 However, there are a few highly vulnerable species which require a precautionary approach whereby habitats of those particular species are also protected. These species are listed in Appendix 3.

19 The combination of a schedule that identifies habitats as likely to be more or less significant (rare, threatened, at risk or no-threat) and the requirement for site-specific decisions where habitat is likely to be significant is a practical middle ground between a default vegetation clearance and land disturbance rule (which assumes all habitat is significant) and a schedule of significant sites (which assumes any sites not in the schedule are not important).

20 In addition to this executive summary I will present slides to illustrate a number of the habitats and species mentioned here.

2 BIODIVERSITY VALUES OF HORIZONS REGION

21 Horizons Region includes a wide range of physical environments. Climates range from the typically mild temperatures and high rainfall of inland Whanganui to the cold winters and summer aridity experienced in Taihape and in the Wairarapa. Underlying geology ranges from central North Island volcanic andesite to ancient marine limestones to post-glacial beach deposits (Suggate 1978). Landforms may be high mountain ranges, deeply dissected, steep hill country or rolling plains. Soils range from deep, highly fertile volcanic ash deposits to recently formed sandy soils. This diversity of environments supports many different habitat types and species.

22 Biological diversity also reflects history, both in terms of land formation, climate change and species evolution and dispersal, effects which take place over many thousands of years.

23 The Region includes parts of the central and southern North Island biogeographic zones. It also captures the "floristic gap" in the lower North Island (roughly between the southern Ruahine and central Tararua Ranges). This area is of high scientific value. It marks the southern distributional limit of many central or northern species, the northern limit of various southern species, and the absence of others that might be expected because they are found to the north and south (Rogers 1989). In some instances, disjunct distributions are related to the absence of particular habitats (e.g. high altitude ephemeral wetlands). In other cases, where species are absent from apparently suitable habitat, this reflects pre-historic periods of high sea level (species remained in places above sea level) and the nature of tectonic uplift (species remained in places that were less folded and fractured during mountain building events) (Rogers 1989). These distributional patterns should be considered when evaluating the distinctiveness of particular areas of indigenous habitat.

24 Recent events such as pre-European fires, are also important, and created – for instance – much of the distinctive character of the Central Plateau (e.g. sub–alpine red tussock grasslands).

25 Many of the habitats and species present in the Horizons Region are highly significant. Obviously, some of these, such as high altitude herb fields, are largely protected in the Conservation Estate, but others are often found on private land.

2.1 Nationally significant habitats

26 Examples of nationally significant habitats which occur on private land in Horizons Region are lowland forest remnants, wetlands and karst ecosystems. As Mr La Cock shall show, it also includes a highly significant dune ecosystem.

27 Lowland habitats are very important for conservation. Altitude Plant diversity decreases as altitude increases, so lowland forests have high species richness (Ogden 1997; Bellingham et al. 1999; Ohlemuller & Wilson 2000). The lowland and coastal zones support more than half New Zealand's acutely threatened plant species (de Lange et al. 2004).

28 The Land Administered by the Department (LAD), although biased toward high altitude, inland, areas does include an extensive area of lowland forest, Whanganui National Park. This is obviously a place of great ecological value, but it falls almost entirely in the Matemateaonga Ecological District (ED), which is papa hill country, characterised by deeply incised river trenches; steep, highly erosive hill slopes; and narrow sandstone ridges. The climate is cool and wet (Department of Conservation 2006). It is clearly a very different habitat to that of the gently rolling Manawatu plains or Foxton sand country.

29 Wetlands are areas of transition between land and water. These areas contribute to ecosystem processes, mitigating flood events and improving water quality, and provide habitat for many plants and animals. Horizons Region contains many significant wetlands, including the Manawatu Estuary which is internationally recognised (Hunt 2007). Historic vegetation of the Manawatu and Horowhenua areas included extensive wetlands and swamp forest (Esler 1978; Duguid 1990). Wetlands are nationally important and have been specifically identified as a priority for protection (Ministry for the Environment 2007). Collectively, wetland habitat types support 133 (16%) of New Zealand's rare and threatened plants (de Lange et al. 2004) and several of these species have national strongholds within the Horizons region (eg. swamp greenhood, *Pterostylis micromega*). Many of the indigenous

birds that occur on private land in Horizons Region are found in wetland habitats (Appendix 4).

30 Karst landscapes are formed in limestone or other water soluble rock. These rock types are distributed throughout New Zealand, but the Horizon's Region includes a relatively large area of calcareous rock. The landforms, soils and microclimates associated with the dissolution of these rock types create distinctive assemblages of plants and animals: the karst ecosystem (Department of Conservation 1999). A published inventory of caves and karst identifies two regionally important sites in Horizons Region, both in private ownership (Worthy 1990) and there may be others.

2.2 Nationally significant species

31 The Horizons region supports nationally important populations of many rare and endangered plants and fauna. The botanical province "Lower North Island" (which also includes Wellington) supports 142 threatened and uncommon plant species (de Lange et al. 2004).

32 Some plant species are endemic to the "floristic gap" area and consequently have strongholds in Horizons Region: a kowhai (*Sophora godleyii),* a native daphne (*Pimelea actea),* two small herbs (*Selliera rotundifolia* and *Mazus novaezeelandiae ssp. novaezeelandiae)* and Gardner's tree daisy (Heenan et al. 2001). All occur on private land, and the latter four are threatened species. Other threatened species that were once more widespread, such as *Sebea ovata,* a dune herb, are now limited to the Region.

33 Horizons is also a stronghold of some animal species such as the small-scaled skink (*Oligosoma microlepis*), the giant landsnails (*Powelliphanta marchanti and P. traversi tararuaensis*) and whio (*Hymenolaimus malachorhynchos*)

3 STATUS OF REMAINING BIODIVERSITY

34 Although it includes many very valuable habitats and species, the biodiversity remaining in the Horizons Region is a small and fragmented piece of what was once

present. These remnants are at risk from vegetation clearance, land disturbance and changes to hydrology.

3.1 Vegetation clearance and modification

35 Many of the significant forest and wetland habitats in the Horizons Region have been extensively cleared and modified in the past. The current extent of these habitats is a small fraction of the original cover.

36 Research summarised in the Technical Report produce by Horizons (Maysek 2007) clearly shows the extent and distribution of habitat loss in the Region. Only 23% of the pre-human vegetation cover remains, and vegetation has been disproportionately lost from lowland areas most suitable for agriculture and development.

37 These results are supported by similar analyses made at the national scale. Originally, 82% of New Zealand was forested, now 24% is (Ewers et al. 2006). This loss has been uneven across the landscape. Walker et al (2006) quantified indigenous vegetation remaining in 500 level IV land environments (Leathwick et al. 2003) and found that 284 of the 500 (covering 42% of New Zealand's land area) have less than 30% of their original cover left, and of those, 158 (covering 22% of New Zealand) have less than 10%. Vegetation has been disproportionately cleared from lowland and coastal areas and from highly productive agricultural land (Walker et al. 2006).

38 Protected Natural Area (PNA) reports for specific Ecological Districts (ED) or Regions have quantified habitat loss at a local scale. The same patterns are evident. For example, the Eastern Wairarapa ED (largely lowland and coastal) was estimated to have only 11% of its original vegetation cover remaining (Beadel et al. 2004). In contrast, in Taumaranui ED (inland, lowland and submontane) 25% of original vegetation cover remains, but this is mostly on steep slopes and at higher altitude. Less than 10% remains on the terraces, plateaus, rolling plains and other flat landforms (Bibby et al. 2000).

39 Little of the remaining habitat in the highly productive lowland EDs, is protected in the Conservation Estate. For instance, at the time of their PNA surveys, LAD

covered nearly 15% of the Taumaranui ED and 31% of the Matemateaonga ED, but less than one percent of the Eastern Hawke's Bay and Manawatu Plains EDs (Maxwell et al. 1993; Ravine 1995; Ravine 1996; Bibby et al. 2000)

40 Loss of indigenous vegetation and habitats is an ongoing threat to biodiversity. Walker et al (2006) compared land cover measured in 1996 and in 2001 and showed that 17 204ha of indigenous vegetation were cleared, usually via conversion to production forest, indigenous forest harvest, or conversion or pasture. It is interesting to note that most of the individual areas cleared were small, usually less than 5ha (Ewers et al. 2006).

41 Most indigenous vegetation clearance occurred in places which already had little indigenous vegetation remaining (Walker et al. 2006). This suggests that the various protection measures applied over that time did not succeed in halting the loss of indigenous vegetation, and a more targeted regulatory approach may be necessary.

42 Even where forest remains broadly intact it can be substantially altered by selective harvest of large trees. There are currently 64 permits for the harvest of indigenous timber covering 9242ha of forest on private land in the Region, and three current indigenous forestry plans covering 1302ha (M.A.F., pers. comm. June 2008).

43 Wetland habitats in particular are at risk from land disturbance, including modification to drainage regimes (Aussseil et al. unpublished report). In the North Island wetlands are thought to cover 4.9% of their original extent, and loss has been particularly marked in Horizons Region – 2.6% remain (Aussseil et al. unpublished report). Wetland clearance is ongoing. In 2005, Whanganui Area Staff re-visited 17 wetlands categorised as Recommended Areas for Protection (Bibby et al. 2000) in five years earlier. They found that two no longer had any identifiable natural value, and seven were still recognisable but so highly degraded that it would require substantial investment to reverse this trend. This represents more than 50% of those highly significant habitats being lost in five years (J. Campbell, unpublished data, 2005).

3.2 Other sources of damage

44 In addition to the direct effect of vegetation clearance, much of the remaining habitats in the Horizons Region are at risk from more insidious damage from ongoing consequences of fragmentation, including the effects of introduced mammals (stock and feral animals), weed invasion, and changes to ecosystem processes.

45 The outcomes of habitat fragmentation may not be evident for generations after the initial clearance (Ewers et al. 2006). Fragmentation refers to the breaking up of once contiguous habitat into smaller units set in a matrix of a different habitat type (often developed land). It can be taken to mean a change in configuration or both a change in configuration and a reduction in extent. I use the latter sense here. After fragmentation, factors such as patch size, shape, and surrounding land use (e.g. indigenous scrub, pasture or production forestry) all influence habitat composition (Ohlemuller et al. 2004)

46 Small habitat patches are strongly influenced by conditions in the surrounding landscape. The edges of habitat patches in pastoral landscapes are lighter, drier, windier and more prone to temperature extremes than interior habitat (Norton 2002). They can also have higher levels of available nutrients such as phosphorus, calcium, magnesium and potassium due to fertiliser application on adjoining land (Stevenson 2004). This promotes development of different vegetation and animal communities in edge habitat (Ewers et al. 2007). Where patches are small, these conditions may influence much of the habitat and will alter vegetation composition and the quality of habitat for fauna (Ewers & Didham 2006).

47 Habitat remnants are often unprotected from browsing stock, which has detrimental effects on biodiversity. Recent research (Smale et al. 2008) has shown that isolated patches of indigenous forest in pasture landscapes which are open to grazing stock have:

a. Shorter and more open canopies;

b. More open understoreys;

c. Scarce groundcover vegetation and leaf litter;

d. Fewer species, including absence of orchids and ferns that require high humidity;

e. More large, old trees, and fewer young trees to replace them (instead a small suite of short shrubs and tree ferns dominate)

48 Some of these effects are reversible and forests will recover after fencing (Smale et al. 2005). However, other changes resulting from fragmentation are likely to require active management if biodiversity is to be maintained.

49 Exotic plant species such as *Tradescantia* have significant effects on indigenous vegetation structure and composition (Standish et al. 2001) and on invertebrate communities (Toft et al. 2001). Where these pests become established, active intervention may be needed to restore the full range of biodiversity in a habitat. The conditions that prevail at habitat edges facilitate the growth of weeds at the expense of indigenous plants (Hawcroft 2002). Consequently, small habitat patches with little surrounding indigenous habitat are susceptible to weed invasion (Ohlemuller et al. 2006), especially seral habitats such as grassland (Ecroyd & Brockerhoff 2005).

50 Indigenous fauna in small, fragmented habitat patches may face increased risk of predation and competition from introduced species. However, this predation relationship has not yet been found in fragmented New Zealand forests, possibly because many of predators (cats, mustelids and rodents) are widespread in a range of habitats, possibly because little research has been conducted (Boulton et al. 2008)

51 Extensive forests are often a mosaic of different stages of vegetation development, some patches may be dominated by very large, mature trees, others covered by a dense stand of young trees regenerating after a slip or wind damage. This mosaic of habitats contributes to overall diversity (Ogden 1997). Fragmentation breaks up this mosaic and reduces the chances of species that rely on seral habitat, like some threatened mistletoes, being able to colonise new sites. This can lead to local extinction (Sawyer & Rebergen 2001).

52 The pro-active management approaches described in the Chapter 7 of the proposed One Plan should help manage some of these threats to indigenous biodiversity.

4 ROBUSTNESS OF HORIZON'S APPROACH TO ASSESSING SIGNIFICANCE

53 Assessment of significance typically rests on representativeness, rarity, 'intactness' and landscape context (Norton & Roper-Lindsay 2004). These are the criteria assessed by the Nature Heritage Fund (Head et al. 2004). Although the exact terms vary, the same criteria were used during the PNA Programme (Myers et al. 1987) and are used to prioritise areas for management by the Department (Department of Conservation 1994). In my opinion, the proposed One Plan applies these criteria to reach a logical, robust classification of habitats that require protection.

4.1 Representativeness

54 The proposed One Plan classification of habitats as threatened or at risk in Table E1 is largely an assessment of representativeness. I will briefly asses each of the three methods used to derive information about representativeness:

a. Modelling the vegetative cover expected for particular environment using the approach developed by Leathwick et al (2001).

b. Reconstruction of past vegetation patterns based on extant vegetation and other evidence (e.g. the approach taken to identify wetland habitat)

c. Expert knowledge (published and unpublished)

55 Modelling was used to identify forest habitats that are threatened or at risk. Comparison of potential and actual vegetation cover (as a indicator of biodiversity) using Land Environments (to represent environmental diversity) and the Land Cover Database (LCDB, to represent the extent of indigenous vegetation) is an accepted technique (Walker et al. 2008) which was applied to develop the Threatened Environment Classification (T.E.C). The T.E.C. is promoted by the national 'Protecting our Places' initiative (Ministry for the Environment 2007).

56 Horizon's approach differs from the T.E.C. approach in two ways. First, comparisons are made at a regional rather than a national scale. This is appropriate, as that is the scale at which management will take place. Second, rather than comparing area of the Land Environment with area of indigenous vegetation, it compared the area of each forest type that could potentially occur, given the particular environmental conditions, with the actual area of forest as shown in the LCDB.

57 Forest type was predicted by:

a. identifying relationships between known distributions of tree species (from vegetation survey plots) and environmental drivers

b. using those relationships to reconstruct potential distributions of each species based on the environment at regular points across the area of interest

c. grouping together species with similar distributions to form expected forest types.

This process has been described in a published article (Leathwick 2001). Leathwick modelled the distribution of 37 tree species, using information from nearly 15 000 vegetation survey plots and found that predicted forest types closely resembled those reported in the literature based on other sources. However, he noted that predictions would be less robust in areas where there had been considerable natural disturbance (e.g. volcanism) and where vegetation survey plots were patchy. He also acknowledged that small tree species that could be locally important were not included.[1]

58 Horizons has done a lot of work to identify current and historic wetlands – a review of historical information, analysis of soil maps, species distributions, satellite images, aerial photographs, and extensive field survey (Janssen et al. 2005). This information was then incorporated into the Waterways of National Importance programme to identify significant wetlands (Aussseil et al. unpublished report). It is

[1] I am not certain to what extent the unpublished work used by Horizons corrected these problems

appropriate that this more detailed information was used to supplement the model described above.

59 Expert knowledge was used to identify particular habitats of limited extent that were unlikely to be recognised by the broad-brush modelling approaches. Expert knowledge is a recognised source of information, which been applied in national programmes to identify – among other things - ED boundaries (Myers et al. 1987), threatened species (de Lange et al. 2004) and rare ecosystems (Williams et al. 2007).

60 These techniques are current best-practise, and - as I noted above - conclusions reached by Horizons are consistent with the findings made by a national review, in various PNA reports and other publications.

4.1.1 Thresholds

61 The classification of habitats as threatened if less than 20% of the original extent remains is an well-supported threshold (Ministry for the Environment 2007; Walker et al. 2008). This is the threshold used in the T.E.C. It is based on generalised species-area curves, which show a sharp decline in the number of species likely to survive if more habitat is lost. Note however that some species will be lost at higher points on the curve. Other authors use a 30% threshold (Leathwick et al. 2003).

62 The additional class of 'at risk' used by Horizons is a justifiable measure to limit the chance of habitats that are currently more widespread falling into that highly vulnerable category. It also provides more security for the maintenance of species and ecological processes. As the T.E.C. guide notes, there is no rationale for assuming that 20% of original extent is enough to sustain biodiversity into the future (Walker et al. 2007).

63 Species which require large areas of habitat will become locally extinct at thresholds over 20%. Kaka are an example of a species limited to a few extensive and unmodified forests. They have very large home ranges, and it has been estimated more than 500km² of lowland forest is needed to maintain a viable population (Leech et al. 2008). However, this may not need to be contiguous as kaka from Kapiti Island have been reported feeding in small bush patches on the

mainland (A. Perfect, pers. comm. 2008). Other species, such as short-tailed bats, exclusively use extensive, mature forest habitats and are unlikely to survive in highly fragmented areas (O'Donnell et al. 2006). Loss of these species has implications for processes such as pollination and seed dispersal which are necessary for long-term maintenance of indigenous vegetation and habitat across the landscape.

4.2 Context and sustainabilty

64 The criteria in Table E2 account for the 'sustainability' component of significance. Characteristics of a habitat remnant such as: size; intactness (presence of understorey vegetation in forest); distance from other habitat patches; and potential to "buffer" adjoining habitat, including waterways and wetlands all contribute to its overall significance.

65 It should be noted that even small forest patches can add considerably to biodiversity, for instance of invertebrates (Harris & Burns 2000). In addition, small or degraded patch of habitat can indirectly add to landscape biodiversity – by buffering the edges of other remnants or significant waterways, by contributing to corridors for wildlife movement, by providing food for mobile species at a certain time of year and so on (Norton & Roper-Lindsay 2004).

4.3 Rarity

66 Two elements of rarity are considered in the proposed One Plan: presence of rare habitats, and presence of rare or threatened species.

67 Originally rare habitats have been identified by reference to a recent review of published documents and expert opinion. This is the best available information at present (Williams et al. 2007). This publication is a component of an ongoing research programme and it is to be hoped that as more information becomes available it will be included in future plans.

68 Wetland and dune habitats are interesting in this context, because they have been identified nationally as originally rare, but in Horizons Region can also be classified as threatened – that is, less than 20% of the original extent of those systems remains.

69 The inclusion of particular rare and threatened species which occur in the Horizons region in Table E3 also accounts for rarity. Further comments about Table E3 are made below.

5 LIMITATIONS OF THIS APPROACH AND SUGGESTED CHANGES TO TABLE E1

5.1 Additional threatened and at-risk habitats to be included

70 Predictive modelling as a tool for identifying potential habitats is a useful tool, but it must be remembered that the descriptions of vegetation that it creates are generalisations. These general forest type descriptions, while very useful, have some limitations. Specific concerns are that:

a. Descriptions rest on the predicted climax forest types that would occupy a site. In fact, natural disturbance processes mean that various different stages of forest development may occupy each environment. These different stages contribute much to biodiversity. Seventy percent of rare plants are found in non-forest habitats – often associated with non–climax (successional) communities (Rogers & Walker 2002).

b. The stochastic (random) nature of plant dispersal, and past histories of sea level change and mountain building events means that not all species predicted to occur on a site occupy that site. For instance, beech is not present in some habitats it might theoretically occupy.

c. These descriptions are based on widespread, landscape level environmental patterns. Small, local differences in are unlikely to be captured.

71 The revised definition of predicted forest types (Maysek 2008) seems ambiguous, as it is not clear whether position on the ground as shown in the map cited as Leathwick et al (2005), regardless of current species composition or some other criteria are definitive. If the former, this is a comprehensive classification that will capture all indigenous vegetation in a landscape. If the latter, it may overlook some important, previously widespread, habitats that are of high ecological value.

72 The addition of two more habitat types would increase the sensitivity of the current habitat classifications to some of the atypical and spatially limited, but regionally important, habitat types present in the Horizons :

a. Tussock grasslands below the tree line.

b. Riparian and river terrace broad-leaf forest or scrub dominated by kowhai and other semi-deciduous species.

5.1.1 Tussock grasslands below the tree line

73 The original DOC submission requested the inclusion of a habitat defined as “fire induced tussock grasslands” but I think the name proposed above more appropriate as it does not require any historical reconstruction to identify, and captures important habitats (areas with frequent disturbance regimes, high water tables and/or temperature inversion) that are thought to have been grassland since the last glaciation (Rogers 1993). This habitat type also includes some areas which are seral grassland as a result of anthropogenic fires, which may be considered unnatural, and are at risk from succession to woody vegetation types. However, the central North Island grasslands as a whole have been described as having very high conservation value as “part of the national heritage” (Rogers 1994)

74 Rogers (1989) estimates that 34% of the tussock grasslands that covered much of the Moawhango ED in 1840 remain, of which 79% are in Ministry of Defence lands around Waiouru. This proportion of vegetation remaining suggests tussock grasslands should be treated as an “at risk” habitat type. Threats are natural succession, and vegetation clearance via conversion to high producing pasture or forestry.

75 Grassland below the tree line is the habitat of the rare hookgrass, *Uncinia strictissima*, which is generally found in association with red tussock, silver tussock and a range of exotic grasses (Simpson 2001) and has been recorded on private land in Horizons Region. This habitat is threatened by natural succession processes, vegetation clearance for conversion to high producing pasture of forestry, and land disturbance associated with construction projects.

5.1.2 kowhai-broadleaf forest or scrub

76 Riparian, river terrace and bluffs covered in hardwood forest and scrub dominated by semi-deciduous species such as kowhai, ribbonwood and hoheria are an important habitat in the Rangitikei. Manuka or kanuka, koromiko and other broad-leafed shrubs or small trees are also likely to be present. They seem to be a seral vegetation type found in frequently disturbed sites such as riparian cliffs or steep terrace risers. *Sophora godleyi*, the species of kowhai endemic to the western North Island, is confined to such habitats (Heenan et al. 2001). Extremes of moisture availability may also be important. A similar assemblage is found on the Horowhenua plains (Duguid 1990).

77 These forests are notable for the absence of a dense continuous canopy of tawa or kamahi. The predominance of semi-deciduous species allows high levels of light to reach the understorey, which provides habitat for a suite of divaricating shrubs, including many threatened species (Parkinson unpublished report). Discontinuous canopies with kowhai, ribbonwood and hoheria are typical of heart-leaved kohuhu habitat (Clarkson & Clarkson 1994).

78 Kowhai forest was recognised as a distinctive vegetation type in the Rangitikei PNA report and several sites containing various kowhai dominated communities were prioritised for protection (Lake & Whaley 1995)[2]. Kowhai is also an important component of forest edge vegetation in the Eastern Wairarapa (Beadel et al. 2004).

79 *Sophora microphylla*, kanuka, hoheria and ribbonwood are specifically mentioned by Leathwick (2001) as trees that distinguish dry, eastern forests (for which the Rangitikei has an affinity) but could not be included in his predicted forest types. Note also that the initial rare ecosystem classification considered including riparian kowhai forest, but it was omitted on grounds that it was more likely to be threatened (that is, previously much more extensive).

[2] Unfortunately, much of the PNA survey work in the Wanganui and Rangitikei areas was completed before *S. godleyi* was described, so plants are recorded as either *S. microphylla* or *S. tetraptera*, both of which may also be present.

5.2 Additional rare habitat types to be included

80 The concept of rare ecosystems was developed to complement modelling approaches like that taken by Horizons. It is generally accepted that small environments with very specific characteristics are not predicted by broad-scale Land Environments (Walker et al. 2006). Often succession is delayed on rare habitats, so they support seral vegetation communities such as shrubland rather than forest.

81 As well as seral vegetation, raw substrate (such as exposed bedrock, boulders or sand) is often an important component of rare ecosystems. Soil age, nature of parent material, and landform are key criteria for rare ecosystem identification.

82 Non-vegetative characteristics of habitat can also be very important attributes from a species' perspective. For instance, skinks often occupy rock piles or screes because they provide physical protection from predators and assist with thermoregulation (Alison Perfect, pers. comm. July 2008).

83 Rare ecosystems may be biodiversity hotspots, or may support only a few species. However, these are often species with very small niches, which are not common elsewhere. Consequently, rare ecosystems' contribution to biodiversity belies their extent. For instance, rare ecosystems support 50% of New Zealand's nationally threatened plant species, and nearly 40% of nationally threatened butterflies and moths (Williams et al. 2007). Nearly all of the species used to characterise the lower North Island floristic gap occupy non-forest habitats below the tree line, for instance where waterlogged or very free draining substrates prevent tree growth (Rogers 1989).

84 The Proposed One Plan recognises the importance of wetlands and dunes, which are two nationally rare ecosystems. However, for these and other rare ecosystems, the current definition of habitat purely in terms of vegetative cover is problematic.

85 The Department's submission noted that a number of rare ecosystems present in the Region were not included in Table E1:

a. karst landscape features: sinkholes, cave entrances, caves and cracks in karst

b. Calcareous, sedimentary, volcanic or ultrabasic cliffs, scarps and tors

c. Coastal cliffs

86 A fourth habitat, wet cliff faces, was sought for inclusion, but we now consider that this will be captured by the classification of seepage.

87 Further discussion and research has identified the following additional rare ecosystem types present in the Horizons Region:

a. Calcareous, sedimentary or ultrabasic screes

b. Calcareous, sedimentary, volcanic or ultrabasic boulderfields

88 Inclusion of each of these additional rare ecosystems will protect the habitat of one or more of the significant species listed in Table E3. They will also contribute to overall regional biodiversity protection. The special features of each of these habitats are summarised below.

5.2.1 Karst landscape features

89 Sinkholes, cave entrances and cracks in karst are all semi-subterranean ecosystems. This habitat type includes three ecosystems identified by Williams et al (2006) that are characterised by raw calcareous bed rock and by landform. Cover may be bare substrate, herbfield, shrubland, tussock land or flaxland. Examples of sinkhole habitat types in Horizons Region may be seen around Moawhanga-iti. Examples of cave habitats may be seen at the Piripiri Caves in the Ruahine foothills. Cracks in karst may be seen throughout the area of calcareous bedrock around the North Western Ruahine.

90 Various indigenous species use habitat provided by caves and other expressions of karst bedrock. Some species are casual users, like weta or long tailed-bats, which use limestone caves and crevices as roosting sites (Sedgely & O'Donnell 2004). There is also a group of animals that are only found in cave environments, some of which maybe very rare (Department of Conservation 1999). Often these species have not been well studied.

91 Karst ecosystems are threatened by vegetation clearance, quarrying and mining. As well as obvious effects on surface landforms, more subtle changes can take within cave systems below ground. Hence, changes to hydrology (e.g. via water extraction or dam construction) and water chemistry are also important threats (Urich 2002).

5.2.2 Cliffs, scarps and tors

92 Calcareous cliffs and bluffs are characterised by parent material (bedrock, which may be sedimentary, calcareous or ultrabasic) and topography (near vertical). Cover may include bare substrate, herbfield, tussockland or shrubland (Williams et al. 2007). Examples of such habitat types in Horizons Region may be seen near Makuri. Rare species which use this habitat include small scaled skinks, which have been found on a limestone bluff in the Ruahine foothills (K. Gebauer, pers. comm. 2008). Various rare plant species, including the grass *Trisetum drucei* (Edgar 1998) and the forget-me-not *Myosotis eximia*, which are both central North Island endemics with southern distributional limits in Horizons Region (Rogers 1989), are found on limestone cliffs and bluffs.

93 Cliffs (inland and coastal) are the most important habitat for threatened plants nationally (de Lange et al. 2004). Though there no species endemic to this ecosystem and the Horizons region, the ecosystem type does support several regionally rare and threatened species (e.g. *Hebe colensoi* and *Scandia rosifolia*). In addition, this ecosystem type is often highly natural and unmodified.

5.2.3 Coastal cliffs and turfs

94 Coastal cliffs are characterised by raw substrates, very steep topography, and a coastal climate. Cover may include: bare substrate, lichenfield, herbfield, scrub, shrubland and tussock land (Williams et al. 2007). In addition, the habitat is influenced by high levels of salinity in the air. Coastal turfs are another rare ecosystem type, often found at either the foot or head of coastal cliffs. They are characterised by raw substrate, high levels of salinity, and extremely exposed conditions. Cover is bare substrate or herbfield. (Williams et al. 2007). Rare species which rely on the habitat provided by coastal turfs include the pygmy forget-me-not, *Myosotis pygmaea* var. *minutiflora* (Sinclair et al. 1998).Examples of such

habitat types in Horizons Region may be seen along the coast north of Castlecliff Beach in Wanganui and at Cape Turnagain on the east coast.

95 Coastal cliffs and talus (rock piles at the foot of cliffs) provide habitat for c. 18% of New Zealand's rare or threatened plants (Rogers & Walker 2002). Rare species which rely on the habitat provided by coastal cliffs around the Manawatu-Whanganui Region include shore spurge, *Euphorbia glauca* (Sinclair et al. 1998), *Leptinella dispersa*, native monkey musk *Mimulus repens* and native sow thistle, *Sonchus kirkii* (J. Campbell, pers. comm. 2008).

5.2.4 Screes and boulderfields

96 Screes and boulderfields are talus landforms (material that has fallen from a cliff or slope) characterised by raw substrate. Components of scree range from gravel to cobble size. The main cover is bare substrate. The components of boulderfields are larger, and cover may include bare substrate, lichenfield, shrubland, scrub or forest (Williams et al. 2007). Examples of such habitat types in Horizons Region may be seen near Springvale Bridge. Lizard species such as the small scaled skink, which is endemic to Horizon's region, rely on the habitat provided by screes and boulderfields (K. Gerbauer, unpublished data, 2008). Talus habitats are also important for rare plants, and support over 100 rare and threatened species nationally (de Lange et al. 2004). "Un-consolidated substrates" are an important habitat for the species with disjunct distributions that characterise the lower North Island floristic gap (Rogers 1989).

97 All of the rare ecosystems described above are highly distinctive and easily recognised in the field.

98 Inclusion of these rare habitats in Table E1 will require some changes to Table E2 as well, to recognise that bare substrate is an important component of habitat, and to allow for the very small size of some of these habitats. An appropriate minimum size would be 100m².

6 EFFICIENCY AND EFFECTIVENESS OF HORIZON'S APPROACH

6.1 Provisions for the protection of individual species

99 As noted above, the Manawatu-Wanganui Region contains significant national populations of many plant and animal species. For some highly threatened species, it supports the largest remaining populations, for others, it includes the only known habitat on which a species exists. It is important that the Regional Council strives to protect the habitat of these highly significant species. However, I understand that the Plan must be an efficient and effective way of achieving those goals.

100 Table E3 ensures that, even while some habitats might fall through the cracks in the definitions provided in Table E1, the presence of those species will allow them to be included.

101 However, landowners should have certainty about what they can do on their properties, and is unreasonable to expect landowners to have perfect knowledge about rare species that may be present, especially as some are hard to recognise. Consequently, we have reviewed our submission regarding Table E3, and have greatly reduced the number of species we seek to have included. The definitions in Table E1, especially with the additions suggested above, should adequately capture the habitats of many of these species, and I expect assessors would identify such species if the habitat triggers a resource consent application.

102 Appendices 3 and 4 of this document show my opinion of the status of each of the species listed in Table E3 of the proposed One Plan, and the additional species listed in the Departments submission. The main points are summarised here:

6.1.1 Species to be removed from Table E3 (Appendix 4)

103 Discussion among DOC staff determined that 34 species, mostly wetland dwellers, are likely to be adequately protected by the habitat classifications in Table E1 of the proposed One Plan. Examples of such species are the swamp greenhood orchid, swamp buttercup (*Ranunculus macropus*) and Australasian bittern.

104 Fourteen species were considered likely to be adequately protected by other provisions in the proposed One Plan. These were mostly freshwater species, such as whio and giant kokopu, protected by listing of aquatic sites of significance in Schedule D or coastal birds, such as the black fronted tern or northern New Zealand dotterel protected by the foredune setback in Rule 12.5 (and the recognition of dunes and coastal cliffs as a rare habitat). If these provisions are altered then the status of these species should be reconsidered, as some are extremely rare and threatened.

105 Fifty-five species were considered likely to be adequately protected by other means. These are species that are relatively well represented on LAD or properties where protection agreements are in place; have some habitats that will be protected by the classification in Table E1, or are primarily threatened by factors outside the scope of this Plan (e.g. predation). Examples are North Island brown kiwi and dactylanthus. Another is the mistletoe *Korthasella salicorniodes*, which will have some habitat protected as kanuka forest. In some instances, it was considered that advocacy or wild animal management programmes are likely to be more important for the species' survival.

106 Twenty four species are likely to be adequately protected provided that the additional habitat types identified above are added to Table E1. Of those, 4 are likely to benefit from the protection of tussock grasslands (e.g. a hookgrass, *Uncinia strictissima*); 10 may benefit from the protection of coastal cliffs (e.g. shore puha, *Sonchus kirkii*); 7 from the protection of inland cliffs, scarps and tors (e.g. koheriki, *Scandia rosifolia*); and seven from the protection of screes and boulderfields (e.g. small scaled skink, *Oligosoma microlepis*)[3]. A number of species partially protected by other means, including the mistletoes *Ileostylus micranthus* and *Tupeia antartica* and several small-leaved shrubs *Teucridium parvilfolium* will have some potential habitat protected as kowhai forest.

107 Fourteen species are likely to be covered by adequate protection of dune habitats as discussed by my colleague.

[3] Some species may benefit from protection of more than one habitat type, e.g. the daisy, *Lagenifera montana* is found in wetland habitat, tussock grassland and screes/boulderfields.

108 Appendix 4 provides a rationale for the exclusion of each species from Table E3.

6.1.2 Species to remain in Table E3 (Appendix 3)

109 However, while those provisions go a long way towards protecting most of the habitat used by these special animals and plants, I agree with Ms Maysek that there are species which are inadequately protected. The criteria I used to identify such species were:

a. One or more populations of the species are known to depend on habitat on private land in Horizon's Region

b. The population is nationally significant (i.e. the only known occurrence, a national stronghold, of high scientific importance).

c. The population is at risk of vegetation clearance and/or land disturbance.

d. The population uses a habitat unlikely to be protected by other provisions of the proposed One Plan.

110 Twelve species have been identified that meet these criteria. However, this does not place an undue burden on landowners, as most are extremely limited in extent, and each will affect only small parts of a limited number of properties.

111 I support the inclusion of *Olearia gardneri*, as recommended by Ms Maysek (Maysek 2008). Three of the remainder she recommended are dune species, which could be adequately protected by appropriate recognition of dune habitats (as discussed by Mr La Cock) and two are species of coastal cliffs, which would be protected if these rare habitats are included in Table E1.

112 In my opinion, the following species should also be included in the revised Table E3, for the following reasons:

a. *Powelliphanta traversi traversi* and *P. traversi tararuaensis* are endangered species. Significant populations of both species occur on private land. Both are endemic to Horizons Region, making it the national stronghold of these species. Loss of their forest habitat is the principal cause for the decline of these species and has occurred as recently as 1997

(Walker 2003). The snails can live in very small forest remnants which are unlikely to meet requirements of Table E2.

b. *Olearia gardneri* or Gardner's tree daisy is critically endangered (the third rarest tree in New Zealand) and found only in the lower North Island. Its stronghold is in the upper Rangitikei, where most of the known sites are on private land. It grows on disturbed lowland sites with high light levels and high fertility such as slips and river margins. As the Region's indigenous vegetation has been cleared and fragmented, natural processes of disturbance and succession have been interrupted, reducing habitat availability (Clarkson & Clarkson 1994). Gardners tree daisy is threatened by further habitat loss, stock browsing on seedlings and competition with weeds for sites to establish (Ogle 2003). It has been the subject of a considerable advocacy campaign.

c. *Coprosma obconica* is a small leaved, divaricating tree. It is found in a range of vegetation types on high fertility soils, often derived from calcareous bedrock. It is threatened by habitat loss, competition from weeds and browse. *C. obconica* is limited to a very small area in the central North Island, although more common in the South Island (De Lange & Gardner 2002). This is of scientific interest as it reflects the "floristic gap" described above (Rogers 1989). *C. obconica* is a host for *Korthalsella* mistletoes (De Lange & Gardner 2002).

d. *Coprosma wallii* is another small leaved, divaricating tree. Like Gardners tree daisy, *C. wallii* requires high light levels and disturbed ground to establish and it is threatened by habitat loss and competition with exotic species. (Parkinson unpublished). In addition to its rarity, this species' presence in the Region is of scientific interest as it reflects the "floristic gap" described above (Rogers 1989).

e. *Melicytus flexuosus* is a rare shrubby mahoe species. There are scattered populations from Pureora to Taihape, and some in the South Island – another 'floristic gap' species. It is threatened by the limited availability of

disturbed habitat, competition from weeds, and browsing animals (Molloy & Druce 1994).

f. *Simplicia* species is an undescribed grass known from only one small site near the Kawhatau River. The habitat is grazed pasture with a sparse canopy of mature indigenous trees. Removal of the trees would destroy the habitat (G. La Cock, pers. comm. 2008). This population is considered of great scientific value (P. de Lange, pers. comm. 2006). Other *Simplicia*, S. *laxa* and S. *buchananii* are also threatened. They are found on open ground in dry forest on base-rich soils and calcareous outcrops. Threats are lack of habitat and weed invasion (Johnson 1995).

g. *Pseudopanax ferox* or fierce lancewood is a rare tree, similar to common lancewood but the purplish-black juvenile foliage has wider, hooked teeth. Few wild populations are known in the North Island, most in the far north (Department of Conservation, BioWeb Database, accessed July 2008). It is found on a range of substrates, including recent sand and alluvial gravel soils, talus slopes, cliffs, scarps and tors in association with forest or scrub. It is naturally scarce and threatened by browsing animals including possums and stock. Fierce lancewood is thought by the New Zealand Plant Conservation Network to be more threatened than its current classification reflects (www.nzpcn.org.nz accessed July 2008). In addition to its rarity, this species' presence in the Region is of scientific interest as it reflects the "floristic gap" described above (Rogers 1989).

h. Heart leaved kohuhu *(Pittosporum obcordatum*) is a shrub or small tree with slender divaricating branches and small, often heart shaped leaves. It has a very local distribution in Horizons Region, around Taihape. It has specific habitat requirements, occurring on lowland river terraces which are droughty in summer and waterlogged and frosty in winter. It is at risk from habitat loss through forest and scrub clearance and from stock browse (Clarkson & Clarkson 1994).

i. *Discaria toumatou* or matagouri is a distinctive spiny divaricating shrub or small tree. Small populations have been recorded on the dry flats and sand

dunes of Manawatu and Foxton (Elder 1966). These remnants of once extensive "prickly flats"(Chrystall 1976) are at risk of vegetation clearance and browsing stock.

j. *Pterostylis irwinii* is a greenhood orchid. The site in Horizons Region, near Erua, is one of only two in the country. In total, less than 100 plants are known to exist. It occupies seral riparian forest habitat (Dopson et al. 1999).

k. *Celmisia* 'mangaweka' is a daisy not yet formally named. It is known from one small site in the Ruahine foothills, where it grows among a mixture of indigenous broadleaved shrubs and exotic species. The habitat is a steep bluff of calcareous sedimentary rock prone to frequent slipping (Department of Conservation, BioWeb Database, accessed July 2008). The Horizons Region is a stronghold for this species, which is at risk from vegetation clearance and land disturbance. It is hoped that more potential habitat will be protected by inclusion of riparian kowhai forest and calcareous bluffs as threatened and rare habitats respectively in Table E1.

113 Suggested wording for a revised Table E3, which includes these species and defines the habitats they depend on, is provided in Appendix 3.

114 I recognise that the inclusion of these species may be problematic for administration of the Plan. It is not expected that habitats will be completely protected from current land uses such as stock grazing, but they are at risk of vegetation clearance or land disturbance. Some are also the subject of advocacy programmes, as this is likely to be equally necessary for their survival. However, there is a concern that change of ownership may leave these habitats vulnerable to clearance.

6.2 Alternative approaches to identifying significant indigenous vegetation and habitats

115 I have already discussed Horizon's method of assessing significance and have shown that it reflects the best available science. However it has some limitations and could be substantially improved by the addition of some ecosystems and habitats which were not captured in the initial assessment. In closing, I would like

to briefly compare two other commonly used methods for the identification and protection of significant indigenous habitats, with the proposed One Plan.

116 As noted above, criteria for assessing significance are generally agreed upon. The question is the time and space over which significance is assessed. One approach is to have a one-off, comprehensive survey that generates a schedule of significant areas. Rules then apply to those sites until the schedule is updated. There is no need for on-ground inspections. Another approach is to assume that every area is significant, and to require an on-ground inspection whenever a potentially harmful activity such as vegetation clearance is carried out.

6.2.1 Schedules of significant areas

117 Schedules of significant areas rely on comprehensive and up to date information about the distribution of indigenous vegetation and animals. Such information is not available for much of the Manawatu-Wanganui Region.

118 I do not think it is appropriate to adopt the lists of Recommended Areas for Protection (RAPs) from PNA reports. The PNA survey was explicitly designed to identify areas representative of the original biodiversity of an ED that were not captured in the current conservation estate. The intent was to prioritise sites for purchase, not to create a plan to provide for long-term maintenance of biodiversity. The PNA survey focused on conserving the pattern of biodiversity, the geographic distribution of different communities on different landforms, and maintaining processes was a secondary concern. However both processes are necessary for conservation (Walker et al. 2006).

119 Further, as seen in the Taumaranui wetland example above, the information contained in PNA reports rapidly becomes dated. Survey data is also limited in extent, reflecting access and time constraints at the time of survey. To demonstrate the incompleteness of the PNA surveys, the Rangitikei PNA survey programme focused survey attention to sites greater than 10 hectares in size and only surveyed smaller sites if there was prior knowledge of significance or special features (N.Singers pers com 2008). The report also does not list any *Olearia gardneri* sites as RAPs, yet populations on private land are crucial for the species' survival (Ogle 2003).

120 However, the information in PNA schedules is still very useful. These lists highlight areas that are known to be comparatively more significant and should be used to guide decisions about where non−regulatory methods to protect and/or enhance biodiversity could be focused, and to assess consent applications.

121 A comprehensive schedule would require a substantial investment of time and ongoing commitment of resources to keep information up to date. This may not be most efficient use of the Council's resources.

122 In terms of effectiveness for biodiversity protection, the schedule of significant areas approach would probably capture much the same suite of sites that will be captured by the proposed One Plan approach, that is:

a. Representative habitats which have largely been cleared from the region

b. Rare ecosystems and habitats of rare or threatened species

c. Priority given to sites that are more intact and contribute more to landscape processes

123 There is a chance that some rare ecosystems or habitats of species that would be detected during a comprehensive survey are not listed in Schedule E. However, there is also no guarantee that all species and habitats would be detected during surveys. That risk exists in any system for identifying significant natural areas (Norton & Roper-Lindsay 2004).

124 It is much preferable to have a process that triggers an inspection that will be site-specific and up to date, rather than relying on patchy and dated information.

6.2.2 General vegetation clearance rules

125 Rules requiring consent for any vegetation clearance or land disturbance would also use some version of those three criteria for assessing significance. This approach would minimise the risk that an ecosystem or species not recognised in Schedule E would be unprotected. However, this could be considered to come at a cost in terms of efficiency, as virtually any activity would require resource consent.

126 The proposed One Plan approach is a practical middle-ground, where rules are tailored to reflect the potential values that are at risk in different habitat types.

7 CONCLUSIONS

127 Horizons Region has high biodiversity values, encompassing a wide range of habitat types, some nationally significant, and supporting many indigenous plants and animals, many rare and endangered. Some of these species occur nowhere else.

128 However, this biodiversity has been considerably reduced in extent, especially in the flat, fertile, lowland areas. The remaining biodiversity is now at risk from further reduction in extent and from gradual degradation from long-term consequences of fragmentation and exotic pests.

129 The approach taken by Horizons to quantify existing biodiversity and identify threats is sound. They have used the best information available, drawing on a combination of national data sets, locally ground-truthed where possible, and expert opinion. Their assessment of the state of biodiversity in the Region is accurate.

130 GIS based modelling of potential extent of natural vegetation and its comparison to current extent is a widely used and practical approach to identify threatened biodiversity. However, the use of broad-brush models based on generally expected patterns can overlook some important rare and unusual habitats. The use of predicted potential vegetation may overlook important seral habitats.

131 Consequently, the habitat classification provided in Table E1 should be supplemented to account for important rare and seral habitats that occur on private land in the Region.

132 The inclusion of those habitats, together with the habitats already listed in Schedule E, will provide adequate protection for the great majority of threatened species that occur on private land in Horizons Region. However, there are a few highly vulnerable species which require a precautionary approach where known habitats of the particular species are also protected.

133 The combination of a schedule that identifies habitats as likely to be more or less significant (rare, threatened, at risk or no-threat) and the requirement for site-

specific decisions where habitat is likely to be significant is a practical middle ground between a default vegetation clearance and land disturbance rule (which assumes all habitat is significant) and a schedule of significant sites (which assumes any sites not in the schedule are not important).

7.1 Suggested alterations to Schedule E

134 Amend Table E4 to include consideration of distributional limits, disjunct populations and type localities of species.

135 Six additional rare, threatened or at risk habitats to be added to Table E1 (Appendix 1).

136 Two criteria to be added to Table E2 (a) to recognise the importance of bare substrate as habitat and to provide for protection of turf communities associated with coastal cliffs (Appendix 2).

137 Twelve species to be retained in Table E3 (Appendix 3).

138 One hundred and forty one species to be removed from Table E3 (Appendix 4).

APPENDIX 1: Habitats to be included in Table E1

Habitat Type Name	Defined As	Rule Stream Classification	Indicative Description
Tussock grassland below tree-line	grassland dominated by indigenous species (>50% cover) e.g. Chionochlora rubra	At risk	red tussock grassland, silver tussock grassland, occasional woody shrubs e.g. hebe, dracophyllum maybe present
Kowhai-broadleaf forest	woody vegetation with kowhai and/or lacebark common (>30% cover) in the canopy or subcanopy and a mixture of other indigenous broadleaf species present	Threatened	low forest, often with a mixture of small tree species and shrubs. Often on cliffs and bluffs near rivers, on river terraces or terrace risers. Species likely to be present (as well as kowhai) are lacebark, ribbonwood, kanuka and divaricating shrubs.
Karst landforms	sinkholes, cave entrances, caves and cracks in karst defined in Williams et al (2007)	Rare	Dolines, tomos and blind valleys, caves, cracks in exposed calcareous rock. Vegetation may include herbs, grasses, flaxes and shrubs.
Cliffs, scarps and tors	Cliffs, scarps and tors (any rock type) defined in Williams et al (2007)	Rare	Very steep faces including bare rock and some indigenous vegetation: herbs, grasses and scrub.
Coastal cliffs	coastal cliffs (any rock type) defined in Williams et al (2007)	Rare	Very steep faces in the coastal zone, including bare rock and some indigenous vegetation: herbs, grasses, flaxes and scrub.
Screes and boulderfields	screes and boulderfields (any rock type) defined in Williams et al (2007)	Rare	Slopes covered in shingle, cobbles or rock, often at the toe of a steeper slope. May have scattered vegetation cover: herbs, grasses and scrub.

APPENDIX 2: Criteria to be included in Table E2 (a)

i. Areas of indigenous vegetation and/or naturally occurring bare substrate that form part of a rare Habitat Type covering at least 0.05ha.

ii. Areas of naturally occurring bare substrate, lichenfield, herbfield or mossfield on flat or gently sloping topography within 20m of coastal cliffs.

APPENDIX 3: Species suggested for inclusion in Table E3

Species	Proper name	Description	Rank	Sites	Basis
Snail	*Powelliphanta traversi tararuaensis*	Giant carnivorous land snail. Habitat is podocarp-broadleaf forest or tree fern scrub on fertile, alluvial soils, found on raised flats (between 450 and 650m a.s.l.) in the north-western Tararua Ranges	Nationally Endangered	Mana_8a, Mana_8d, Mana_9d, Mana_13d, Ohau_1a, Ohau_1b, West_9	Refer to paragraph 112a of this document
Snail	*Powelliphanta traversi traversi*	Giant carnivorous land snail. Habitat is small stands of lowland forest on deep, moist soils around Levin in Horowhenua. Do not occur on sandy dune soils to the west or in the steep hill country to the east.	Nationally Endangered	Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Rang_4a, Rang_4b, Rang_4d, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	Refer to paragraph 112a of this document
Gardners tree daisy	*Olearia gardnerii*	Divaricating shrub/small tree (typically to 3.5m high). Multi-stemmed, with coppery branches, sparse round leaves and small white flowers. Habitat is small clearings and forest edges in naturally disturbed sites, with have high light levels and fertile soils. It may grow in association with exotic pasture grasses and weeds, indigenous scrub (including other divaricating species such as small-leaved mahoe and mountain wineberry) and open podocarp-broadleaf forest (often with semi-deciduous species such as kowhai).	Nationally Critical	Rang_2f, Rang_2g	Refer to paragraph 112b of this document
Heart-leaved kohuhu	*Pittosporum obcordatum*	Divaricating tall shrub or small tree to 5-8 m. Habitat is lowland river flats and colluvial toeslopes, in areas prone to summer drought and water-logging and frost during winter.	Nationally Endangered	Akit_1a, Akit_1b, Akit_1c, East_1, Mana_1a, Mana_1c, Mana_2a, Mana_2b, Mana_3, Mana_4, Mana_5a, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_6, Mana_7a, Mana_7b, Mana_7c, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9b, Mana_9c, Mana_9d, Mana_9e, Owha_1	Refer to paragraph 112h of this document

Species	Proper name	Description	Rank	Sites	Basis
(none known)	*Coprosma obconica*	Erect, divaricating shrub or small tree (2-3.5 m) with small leaves and whitish fruits streaked with violet-purple. Habitat is high fertity, base rich soils such as alluvial deposits or limestone outcrops.	Gradual Decline	Rang_2b, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Tura_1a	Refer to paragraph 112c of this document
(none known)	*Coprosma wallii*	Divaricating shrub to small tree (up to 3 m). Habitat is well-lit sites (forest edges or clearings) on fertile, frequently disturbed sites including river terraces, frost flats and alluvial deposits at the toe of slips or slumps in places with cold winters and dry summers.	Gradual Decline	Mana_10b, Mana_10c, Mana_10d, Mana_12a, Mana_12d, Rang_2b, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b	Refer to paragraph 112b of this document
(none known)	*Melicytus flexuosus*	Divaricating shrub (to 5 m) with erect tortuous stems, and slender, nearly leafless branches that are tightly interlaced to make a tangled bush. Habitat is disturbed, well-lit sites in forest or scrub on fertile alluvial terraces and floodplains that are frosty in winter and droughty in summer.	Gradual Decline	Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3b, Tura_1a, Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2f, Whai_2g, Whai_3, Whai_4a, Whai_4b, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d, Whau_3e	Refer to paragraph 112e of this document
(none known)	*Simplicia* near Kawhatau River	Small, spreading grass with narrow leaves. The flower is a panicle of small spikelets. Habitat is open ground in shade on a fertile, base-rich substrate.	Range Restricted	Rang_2b, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Tura_1a	Refer to paragraph 112f of this document
Fierce lancewood	*Pseudopanax ferox*	Small tree up to 8 m tall. Habitat is freely draining soils e.g. sand, pumice, recent alluvial gravels, talus slopes, cliffs, scarps and tors. Maybe in association with scrub or seasonally droughtprone but otherwise cold and wet alluvial forests.	Sparse / Regionally Uncommon	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whau_1b	Refer to paragraph 112g of this document
Matagouri Wild Irishman	*Discaria toumatou*	Spiny divaricating shrub. Habitat is forest edge and scrub on freely draining shingle fans, river terraces and sand dunes.	Regionally Uncommon	Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Rang_4a, Rang_4b, Rang_4d, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	Refer to paragraph 112i of this document
Greenhood	*Pterostylis irwinii*	Large, slender, long-leaved orchid with an upright, finely hairy flower in spring. Habitat is low seral vegetation on a river margin with sheild fern, small trees and shrubs.	Data Deficient	Whai_4d, Whai_5d	Refer to paragraph 112j of this document

Species	Proper name	Description	Rank	Sites	Basis
Celmisia	*Celmisia* mangaweka	Tufted, perennial herb up to 30cm tall with rosettes of silvery-green leaves, which may be joined by underground stems. Leaves are narrow (up to 18 cm by 1.5 cm), unevenly wrinkled and have small, widely spaced teeth. The slender, hairy, flower stalks stand above the rosette. The daisy-like yellow centred, white flower is 3-5 cm across. Habitat is steep, alkaline, sedimentary bluffs and slips, areas of high light, with sparse, shrubby vegetation.	nationally critical/ regionally uncommon		Refer to paragraph 112k of this document

Appendix 4: Species that may be removed from Table E3

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
White heron Kotuku	*Egretta alba modesta*	Found in wetlands, estuaries and damp pasture.	Nationally Critical	Hoki_1a, Hoki_1b, Mana_10a, Mana_10d, Mana_13a, Mana_13e, Mana_13f, Mana_9a, Mana_9b, Mana_9c, Owha_1, Tura_1b, Tura_1c, West_5, West_7, West_8, Whai_2b, Whau_3e, Whau_4	**Habitat protected in Table E1** - wetland
Australasian bittern Matuku	*Botaurus poiciloptilus*	Found in tall, dense beds of raupo and reeds in freshwater wetlands and wet pasture.	Nationally Endangered	Hoki_1a, Hoki_1b, Mana_10a, Mana_10c, Mana_10d, Mana_10e, Mana_11a, Mana_11b, Mana_11c, Mana_11d, Mana_11e, Mana_11f, Mana_12a, Mana_12b, Mana_12c, Mana_12d, Mana_12e, Mana_13a, Mana_13b, Mana_13c, Mana_13d, Mana_13e, Mana_13f, Ohau_1a, Ohau_1b, Rang_3a, Rang_4a, Rang_4b, Rang_4c, Rang_4d, Tura_1b, Tura_1c, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7a, Whai_7b, Whai_7d, Whau_4	**Habitat protected in Table E1** - wetland
Blue Duck Whio	*Hymenolaimus malachorhynchos*	Found in fast-flowing and turbulent streams and rivers in forest hillcountry.	Nationally Endangered	Rang_2a, Rang_2b, Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2f, Whai_2g, Whai_3, Whai_4d, Whai_5a, Whai_5d, Whai_5e, Whau_1a, Whau_1c, Whau_3b, Whau_3c, Whau_3des may occur	**Habitat protected elsewhere in POP** - SOS aquatic in Schedule D, advocacy programme

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Kaka (North Island)	*Nestor meridionalis septentrionalis*	Found in large native forest tracts.	Nationally Endangered	Akit_1c, Mana_1c, , Mana_3, Mana_7b, Mana_7d, Mana_8a, Mana_8b, Mana_8d, Mana_9d, Mana_9e, Mana_10a, Mana_10b, Mana_10c, Mana_11b, Mana_11c, Mana_12a, Mana_13b, Ohau_1a, Ohau_1b, Owha_1, Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2f, Rang_2g, Rang_3b, Tura_1a, West_9, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2f, Whai_2g, Whai_3, Whai_4a, Whai_4b, Whai_4c, Whai_4d, Whai_5a, Whai_5b, Whai_5c, Whai_5d, Whai_5e, Whau_1a, Whau_1c, Whau_2, Whau_3b, Whau_3d, Whau_3e	**Other protection mechanisms** - some Habitat protected in Table E1 (forest), some Habitat protected as LAD.
New Zealand falcon Karearea	*Falco novaeseelandiae "bush"*	Found in native and pine forest and bush patches.	Nationally Vulnerable	Throughout the Region	**Other protection mechanisms** - some Habitat protected in Table E1 (forest) and elsewhere in POP (scrub on HEL) some Habitat protected as LAD, Wildlife Act applies, advocacy programme
Wrybill Ngutu-parore	*Anarhynchus frontalis*	Over-winters in North Island estuaries.	Nationally Vulnerable	East_1, Mana_13a, Ohau_1a, Ohau_1b, Tura_1b, West_5, West_7, West_8, West_9, Whai_7b, Whau_4	**Habitat protected in Table E1** - wetland

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Kiwi (North Island Brown)	*Apteryx australis mantelli*	Found in forest, scrubland and undeveloped farmland, swamps and pine forest particularly where native vegetation remains in gullies.	Serious Decline	Mana_10b, Mana_10c, Mana_12a, Rang_1, Rang_2b, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2f, Whai_2g, Whai_3, Whai_4a, Whai_4b, Whai_4c, Whai_4d, Whai_5a, Whai_5b, Whai_5c, Whai_5d, Whai_5e, Whau_1a, Whau_1c, Whau_3b, Whau_3d, Whau_3e	**Other protection mechanisms** - some habitat protected in Table E1 (forest) and elsewhere in POP (scrub on HEL), some habitat protected through commercial forestry best practise, some habitat protected as LAD, advocacy programme
Banded dotterel	*Charadrius bicinctus*	A small wading bird of gravel beaches and riverbeds.	Gradual Decline	Hoki_1b, Mana_10a, Mana_10e, Mana_11a, Mana_11b, Mana_11c, Mana_11d, Mana_11e, Mana_13a, Mana_13c, Mana_13f, Mana_6, Mana_7b, Mana_8c, Mana_8e, Mana_9a, Mana_9d, Mana_9e, Ohau_1b, Rang_2c, Rang_2d, Rang_2f, Rang_4b, Tura_1b, Tura_1c, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_1a, Whau_1b, Whau_1c, Whau_4species may occur	**Habitat protected elsewhere in POP** - Riparian Habitat in Schedule D
Banded rail Mohu-pereru	*Gallirallus philippensis assimilis*	Found in saltmarsh and rush-covered freshwater wetlands.	Sparse	Hoki_1, Mana_7, Mana_8, Mana_9, Mana_10, Mana_11, Mana_12, Mana_13, Owha_1, Rang_2, Rang_3, Rang_4, Tura_1, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_2, Whai_3, Whai_4, Whai_5, Whai_6, Whai_7, Whau_2, Whau_3, Whau_4	**Habitat protected in Table E1** - wetland
Marsh crake	*Porzana pusilla affinis*	Found in raupo swamps.	Sparse	Throughout – except Rang_1, Rang_2c, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_4d, Whai_5d, Whai_5e, Whau_1a,	**Habitat protected in Table E1** - wetland

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
				Whau_1b, Whau_1c, Whau_3b, Whau_3d	
North Island fernbird Matata	*Bowdleria punctata vealeae*	Secretive bird of dense scrubby vegetation associated with drier wetlands, rush and tussock frostflats, saltmarshes, and low manuka scrub.	Regionally Uncommon	Throughout the Region from coastal to Habitats below 1000m	**Habitat protected in Table E1** - some habitat protected in Table E1 (wetland) and elsewhere in POP (scrub on HEL), some habitat protected as LAD, Wildlife Act applies
Spotless crake Puweto	*Porzana tabuensis plumbea*	Secretive bird of freshwater wetlands with raupo or sedges.	Sparse	Throughout the Region	**Habitat protected in Table E1** - wetland
North Island robin Toutouwai	*Petroica australis longipes*	Found in mature native forest, sometimes seen in mature exotic forest and old scrub.	Regionally Uncommon	Rang_1, Rang_2c, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2f, Whai_2g, Whai_3, Whai_4a, Whai_4b, Whai_4c, Whai_4d, Whai_5a, Whai_5b, Whai_5c, Whai_5d, Whai_5e, Whau_1a, Whau_1c, Whau_3b, Whau_3d, Whau_3e	**Other protection mechanisms** - some habitat protected in Table E1 (forest), some habitat protected as LAD

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Brown mudfish	*Neochanna apoda*	A cigar-shaped, sandy grey-brown coloured fish of 175 mm in length. The head is small with a large mouth with equal length jaws and fleshy lips. Brown mudfish occupy clear water in a range of Habitats including springfed streams, wetlands, pools of water within podocarp forest, overgrown creeks and even unmaintained roadside and farm drains.	Regionally Vulnerable	Hoki_1a, Mana_10d, Mana_11f, Mana_13a, Mana_13c, Rang_4d, West_8	**Habitat protected elsewhere in POP** - SOS aquatic in Schedule D, advocacy programme
Giant kokopu	*Galaxias argenteus*	A dark-coloured stout fish (length of about 240 mm) with a long broad head and a large mouth with about equal length jaws and thick, fleshy lips. Giant kokopu are found in streams and wetlands not far from the sea, not venturing very far inland. Affected by loss of riparian spawning Habitat.	Regionally Vulnerable	Hoki_1a, Rang_4a, Rang_4bpecies may occur	**Habitat protected elsewhere in POP** - SOS aquatic in Schedule D
Short-jawed kokopu	*Galaxias postvectis*	A large (150-200 mm, but can reach 350 mm), sleek fish, with a long bluntly pointed snout that overhangs mouth and lower jaw distinctly receding. Affected by loss of riparian spawning Habitat.	Regionally Vulnerable	Mana_7b, Mana_8a, Mana_8d, Mana_9c, Mana_9e, Mana_11c, Mana_13d, Ohau_1b, Owha_1, Rang_2b, West_9, Whai_2g, Whai_3, Whai_4a, Whai_5b, Whai_5c, Whai_5e, Whai_6	**Habitat protected elsewhere in POP** - SOS aquatic in Schedule D

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Banded kokopu	Galaxias fasciatus	Banded kokopu can be distinguished from the other galaxiid species by the presence of the thin, pale, vertical bands along the sides and over the back of the fish. Adult banded kokopu usually live in very small tributaries where there is virtually a complete overhead canopy of vegetation. This vegetation does not have to be native bush.	Regionally Vulnerable (pers. comm. expert)	Akit_1a, Akit_1b, Mana_9e, Mana_11c, Mana_12a, Mana_13b, Ohau_1a, Ohau_1b, West_5, West_8, Whai_5b, Whai_5e	**Habitat protected elsewhere in POP** - SOS aquatic in Schedule D
Lamprey	*Geotria australia*	A jawless fish with a toothed, funnel-like sucking mouth, which bores into the flesh of other fishes to suck their blood. Lampreys live mostly in coastal and fresh waters, although at least one species, Geotria australis, probably travels significant distances in the open ocean. Affected by loss of riparian spawning Habitat.	Regionally Vulnerable	Mana_1a, Mana_9a, Mana_10a, Mana_11b, Ohau_1b, Whai_5e, Whai_6, Whai_7c	**Habitat protected elsewhere in POP** - SOS aquatic in Schedule D
Moth	*Asaphodes stinaria*	A moth with mid-brown fore wings with two narrow transverse white bands and pale brown hindwings, from forest edge and grassland Habitats, including wetlands and tussock grasslands. Coastal to montane.	Nationally Endangered	Akit_1, East_1, Hoki_1, Mana_1, Mana_2, Mana_3, Mana_4 Mana_5, Mana_6, Mana_7, Mana_8, Mana_9, Mana_10, Mana_11, Mana_12, Mana_13, Ohau_1, Owha_1, Rang_1, Rang_2, Rang_3, Rang_4, Tura_1, West_1, , West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_3, Whai_4a, Whai_4c, Whai_4d, Whai_5, Whai_6, Whai_7, Whau_1, Whau_2, Whau_3, Whau_4	**Other protection mechanisms** - Some potential habitat protected as LAD, some potential habitat protected in Table E1

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Black Katipo spider	*Latrodectus atritus*	Coastal spider found in a variety of sand-dune systems associated with driftwood, vegetation or stones. Usually inhabits foredunes and dune swales but has been found associated with dunes several kilometres from the sea.	Serious Decline	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional habitat in Table E1** - Dunes
Katipo spider	*Latrodectus katipo*	Coastal spider found in a variety of sand-dune systems associated with driftwood, vegetation or stones. Usually inhabits foredunes and dune swales but has been found associated with dunes several kilometres from the sea.	Serious Decline	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional Habitat in Table E1** - Dunes
Forest ringlet	*Dodonidia helmsii*	Forest butterfly. The reported larval host plant is Gahnia setifolia, growing in beech forests.	Gradual Decline	Mana_10, Mana_1a, Mana_1b, Mana_3, Mana_4, Mana_5, Mana_9b, Mana_9c, Rang_1, Rang_2, Whai_1, Whai_2, Whai_4, Whai_5, Whai_6, Whai_7a, Whau_1c, Whau_3	**Other protection mechanisms** - Some habitat protected as LAD
Short-tailed bat (Northern) (Central), Pekapeka	*Mystacina tuberculata rhyacobia*	A bat with grey-brown fur, long ears and a tail that pierces the tail membrane. Restricted to old growth indigenous forest. Forages in the forest interior and generally flies within 10 m of the ground.	Nationally Endangered/Range Restricted	Rang_1, Rang_2, Whai_1, Whai_2, Whai_2g, Whai_3, Whai_4, Whai_5d, Whai_5e, Whau_1, Whau_2, Whau_3	**Other protection mechanisms** - Some habitat protected in Table E1 (forest), some habitat protected as LAD, advocacy programme

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Long-tailed bat (North Island), Pekapeka	Chalinolobus tuberculata	A bat with dark brown fur, short ears and tail within the tail membrane. Tail membrane with a distinct pouch. Found in indigenous and exotic forest, this bat is an aerial insectivore, flying high and swallow-like.	Nationally Vulnerable	Hoki_1a, Mana_10, Mana_11, Mana_12, Mana_13, Mana_1a, Mana_1b, Mana_2a, Mana_2b, Mana_3, Mana_4, Mana_5, Mana_6, Mana_7a, Mana_7b, Mana_7c, Mana_8, Mana_9, Ohau_1a, Ohau_1b, Rang_1, Rang_2, Rang_3a, Rang_3b, Rang_4c, Tura_1a, West_2, West_9, Whai_1, Whai_2, Whai_3, Whai_4, Whai_5, Whai_6, Whai_7a, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3	**Other protection mechanisms** - Some Habitat protected in Table E1 (forest), some Habitat protected as LAD, Wildlife Act applies, advocacy programme
Small-scaled skink	*Oligosoma microlepis*	A smooth skinned grey, striped lizard with prominent dark stripes on each side.	Regionally Vulnerable	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whau_1b	**additional habitat in Table E1** - screes and boulderfields
Pacific gecko	*Hoplodactylus pacificus*	A velvety-skinned lizard in a variety of shades of brown and grey, with paler patches which may be stripey, or irregular markings. Lives on the ground, but will climb trees. Found in a variety of Habitats.	Gradual Decline	Throughout – except Rang_1, Rang_2c, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_3b, Whau_3d	**Other protection mechanisms** - Some habitat protected by Table E1 (with additional habitats – cliffs, scarps and tors; screes and boulderfields)
Wellington green gecko	*Naultinus elegans punctatus*	A velvety skinned bright green that inhabits scrub and forest areas especially kanuka and manuka.	Gradual Decline	Throughout - absent from Whai_2f, Whai_2g, Whai_4b	**Other protection mechanisms** - Some habitat protected by Table E1 (with additional habitats – cliffs, scarps and tors; screes and boulderfields) and protected elsewhere in POP (scrub on HEL)

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Speckled skink	*Oligosoma infrapunctatum*	A smooth skinned lizard with distinctly speckled back and tail.	Gradual Decline	Throughout the Region	**Other protection mechanisms** - Some habitat protected by Table E1 (forest) and protected elsewhere in POP (coastal setback, scrub on HEL), some Habitat protected as LAD
Striped skink	*Oligosoma striatum*	A smooth-skinned dark brown striped lizard with prominent cream stripes on each side. Found in epiphytes in standing trees as well as rotting trees on the ground.	Data deficient / Regionally Uncommon	West_1, West_2, West_3, Whai_4a, Whai_4b, Whai_4c, Whai_4d, Whai_5a, Whai_5b, Whai_5c, Whai_5d, Whai_5e, Whai_6, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_3a, Whau_3c, Whau_3e	**Other protection mechanisms** - Some Habitat protected by Table E1 (forest) and protected elsewhere in POP (scrub on HEL), some Habitat protected as LAD
Southern North Island speckled skink	*Oligosoma aff. Infrapunctatum* "Southern North Island"	A smooth skinned lizard superficially similar to common or speckled skinks	Nationally endangered		**Other protection mechanisms** - Some Habitat protected by Table E1 (forest) and protected elsewhere in POP (coastal setback, scrub on HEL), some Habitat protected as LAD, advocacy programme
(none known)	*Acaena rorida*	Small perennial herb from damp hollows in tussock grasslands and limestone ravines.	Nationally Critical	Rang_2a, Rang_2b	**Other protection mechanisms** - habitat protected by Nga Whenua Rahui

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Sneezeweed	*Centipeda minima*	Prostrate annual herb of ephemerally wet areas – partially dried lake, pond or stream margins.	Nationally Critical / Regionally Uncommon	Hoki_1a, Hoki_1b, Mana_10a, Mana_10c Mana_10d, Mana_10e, Mana_11a Mana_11b, Mana_11c, Mana_11d Mana_11e, Mana_11f, Mana_12a Mana_12b, Mana_12c, Mana_12d Mana_12e, Mana_13a, Mana_13b Mana_13c, Mana_13d, Mana_13e, Mana_13f, Ohau_1a, Ohau_1b, Rang_3a, Rang_4a, Rang_4b, Rang_4c, Rang_4d, Tura_1b, Tura_1c, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7a, Whai_7b, Whai_7d, Whau_4	**Habitat protected in Table E1** - wetland
Mudwort	*Limosella* "Manutahi"	Prostrate herb from mud or damp ground.	Nationally Critical / Regionally Rare	Hoki_1a, Hoki_1b, Mana_12c, Mana_13a Mana_13f, Ohau_1b, Rang_4a, Rang_4b, Rang_4d, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional Habitat in Table E1** - coastal cliffs and turfs
Sand daphne	*Pimelea actea*	A low-growing grey-green shrub of sand dunes.	Nationally Critical	Tura_1b, West_5, Whau_4	**additional Habitat in Table E1** - Dunes
Turners kohuhu	*Pittosporum turneri*	A small tree (up to 8 m) with a divaricating juvenile and sub-adult form. Grows in montane to subalpine forest, and on frostflat margins and in scrub alongside streams.	Nationally Critical	Mana_1a, Mana_1b, Mana_10b, Mana_10c, Mana_12a, Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2f, Whai_2g, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d, Whau_3e	**Other protection mechanisms** - Habitat protected as LAD

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Swamp green-hooded orchid	*Pterostylis micromega*	An orchid (150-380 mm) with conspicuous green flower, found in bogs, fens, and swamps.	Nationally Critical	Tura_1c, West_1, West_2, West_3, West_4, Whai_2b, Whai_4d, Whai_5d, Whai_5e, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_1a, Whau_1c, Whau_3b, Whau_4	**Habitat protected in Table E1** - wetland
Sebaea	*Sebaea ovata*	Annual erect herb (50-33 mm), growing in damp, sparsely-vegetated dune slacks, depressions, and associated sand plains. One of most threatened plant species in New Zealand.	Nationally Critica	Mana_13a, Rang_4b, Tura_1b, West_1, West_4, West_5, West_6, West_7, Whai_7b, Whau_4	**additional Habitat in Table E1** - Dunes
Water brome	*Amphibromus fluitans*	Grass of fertile, seasonally dry wetlands and edges of shallow lakes and lagoons.	Nationally Endangered	Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Rang_4a, Rang_4b, Rang_4d, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**Habitat protected in Table E1** - wetland
(none known)	*Crassula peduncularis*	Prostrate annual herb of seasonally damp coastal turfs, marine terraces and ephemeral wetlands.	Nationally Endangered	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional Habitat in Table E1** - coastal cliffs and turfs
Hairy willowherb	*Epilobium hirtigerum*	Woody herb of coastal/lowland to montane habitats. A short-lived species of open ground, seepages on cliff faces, sparsely vegetated wetland margins, braided riverbeds, lake edges and swamps.	Nationally Endangered	Akit_1a, Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_1a, Mana_1b, Mana_1c, Mana_2a, Mana_2b, Mana_3, Mana_4, Mana_5a, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_6, Mana_7a, Mana_7b, Mana_7c, Mana_7d, Mana_8a, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9b, Mana_9c, Mana_9d,	**Other protection mechanisms** - some Habitat protected in Table E3 (wetland), some habitat protected on LAD

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
				Mana_11c, Mana_13a, Mana_13c, Mana_13d, Mana_13e, Ohau_1a, Ohau_1b, Owha_1, West_7, West_8, West_9, Whai_2e, Whai_2f, Whai_2g, Whai_4b	
Nau Cook's scurvy grass	*Lepidium oleraceum*	Woody herb found in fertile and friable coastal soils and rock crevices associated with seabird roosts.	Nationally Endangered	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional habitat in Table E1** - coastal cliffs and turfs
(none known)	*Myosotis "Volcanic Plateau"*	Low-growing short-lived herb of alpine sand and shingle Habitats.	Nationally Endangered/ Regionally Vulnerable	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whau_1b	**Other protection mechanisms** - Only significant populations are on MOD land
(none known)	*Myosotis pygmaea var. glauca*	Low growing short-lived herb of open dry sandy/gravelly Habitats.	Nationally Endangered	Rang_1, Rang_2c	**Other protection mechanisms** - Only significant populations are on MOD land
Mountain myrrh	*Oreomyrrhis colensoi var. delicatula*	Perennial herb of subalpine ephemeral wetlands and flushed tarns.	Nationally Endangered	Mana_10b, Mana_10c, Mana_1a, Mana_1b, Mana_3, Mana_4, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_9c, Mana_12a, Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2e	**Other protection mechanisms** - Only significant populations are on MOD land
Stalked adder's tongue fern	*Ophioglossum petiolatum*	Fern consisting of a wide sterile blade and a conspicuous fertile spike.	Nationally endangered	Hoki_1a, Hoki_1b, West_7, West_8,	**Habitat protected in Table E1** - wetland

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
(none known)	*Uncinia strictissima*	Rush-like sedge forming dense tufts. Found in lowland scrub, swamps, lake margins and in damp clears within lowland forest.	Nationally Endangered	Rang_2c, Rang_2f, Whai_1, Whai_2b, Whai_2c, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d, Whau_3e	**additional habitat in Table E1** - tussock grassland
(none known)	*Myosotis pygmaea var. minutiflora*	Low growing short-lived herb of coastal shingle Habitats.	Nationally Vulnerable	Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Rang_4a, Rang_4b, Rang_4d, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional habitat in Table E1** - coastal cliffs and turfs
(none known)	*Ranunculus ternatifolius*	Small perennial herb of damp sites in forests, scrub and tussock grassland.	Nationally Vulnerable	Rang_2a, Rang_2b, Whai_4d, Whai_5d	**Other protection mechanisms** - Habitat protected by Nga Whenua Rahui
Kohurangi, Kirks Daisy	*Brachyglottis kirkii var. kirkii*	An epiphytic tree daisy of lowland to lower montane forests.	Serious Decline	Throughout - coastal to montane Habitats	**Other protection mechanisms** - Some Habitat protected in Table E1 (forest), some Habitat protected on LAD
Sea sedge	Carex litorosa	Sedge of salty and brackish marshes.	Serious Decline	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**Habitat protected in Table E1** - wetland and coastal setback

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Pua o te reinga Dactylanthus Woodrose	*Dactylanthus taylorii*	A root parasite of about 30 cm diameter, with unbranched shoots of about 20 cm long with pinkish brown, scale-like leaves of about 15 mm. These shoots support spikes of tiny flowers when they emerge above the ground. This plant grows on the roots of about 30 native hardwood species.	Serious Decline	Mana_1a, Mana_1b, Mana_10b, Mana_10c, Mana_10d, Mana_11d, Mana_12a, Mana_12d, Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Rang_4c, Rang_4d, Tura_1a, Tura_1b, Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2f, Whai_2g, Whai_3, Whai_4a, Whai_4b, Whai_4c, Whai_4d, Whai_5d, Whai_5e, Whai_6, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3a, Whau_3b, Whau_3c, Whau_3d, Whau_3e, Whau_4	**Other protection mechanisms** - Some Habitat protected in Table E1 (forest), some Habitat protected on LAD
Native carrot New Zealand carrot	*Daucus glochidiatus*	Herb of coastal to montane cliff faces, rock outcrops, talus slopes, tussock grasslands and open forests.	Serious Decline	Akit_1a, Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_1a, Mana_1b, Mana_1c, Mana_2a, Mana_2b, Mana_3, Mana_4, Mana_5a, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_6, Mana_7a, Mana_7b, Mana_7c, Mana_7d, Mana_8a, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9b, Mana_9c, Mana_9d, Mana_9e, Mana_11c, Mana_13a, Mana_13b, Mana_13c, Mana_13d, Mana_13e, Ohau_1a, Ohau_1b, Owha_1, West_7, West_8, West_9	**additional Habitat in Table E1** - tussock grassland, cliffs, scarp and tors, screes and boulderfields
Waiu-atua sand milkweed shore spurge	*Euphorbia glauca*	Perennial herbaceous coastal plant up to 1 m, with red stems, bluish-green leaves and milky sap. Grows on coastal cliffs, banks and talus slopes, sand dunes and rocky lakeshore scarps.	Serious Decline	Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Rang_4a, Rang_4b, Rang_4d, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional Habitat in Table E1** - coastal cliffs and turfs

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Pygmy clubrush	Isolepis basilaris	A very small rush species 3-9 cm across. Leaves are bright green above and reddish-brown below. Grows in dune lakes, damp, sandy or silty margins of lagoons, tarns, ephemeral lakes and rivers in fresh or brackish water.	Serious Decline	Mana_13a, Rang_4b, Rang_4b, West_5, West_6	**Habitat protected in Table E1** - wetland
King fern Para	*Marattia salicina*	Large fern favouring lowland forest karst Habitats.	Serious Decline	West_1, West_2, Whai_6, Whai_7a, Whai_7c	**additional habitat in Table E1** - karst landscapes
Dwarf musk/matt leaved Mazus	*Mazus novaezeelandiae subsp. impolitus f. impolitus*	A perennial creeping herb of coastal damp hollows and sand flats, sandy turf and coastal pasture.	Serious Decline	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional habitat in Table E1** - Dunes
Dwarf musk	*Mazus novaezeelandiae subsp. novaezeelandiae*	A perennial creeping herb of lowland swamp forest, pasture and forest margins.	Serious Decline	Akit_1b, East_1, Hoki_1a, Hoki_1b, Mana_1a, Mana_1b, Mana_2a, Mana_2b, Mana_3, Mana_5a, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_6, Mana_7b, Mana_7c, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9c, Mana_9d, Mana_9e, Mana_10a, Mana_10d, Mana_11a, Mana_11b, Mana_11c, Mana_11d, Mana_11e, Mana_11f, Mana_12a, Mana_12b, Mana_12c, Mana_12d, Mana_12e, Mana_13a, Mana_13c, Mana_13d, Mana_13e, Mana_13f, Ohau_1b, Owha_1, Rang_3a, Rang_4a, Rang_4b, Rang_4c, Rang_4d, Tura_1b, Tura_1c, West_1, West_2, West_3,	**other protection mechanisms** - Some habitat protected in Table E1 (forest, wetland), some habitat protected on LAD, landowner liaison required

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
				West_4, West_5, West_6, West_7, West_8, West_9, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_4	
(none known)	*Pimelea tomentosa*	An erect, grey-green, leafy shrub of open clifftops, scrub, frostflats, track sides and other seral Habitats.	Serious Decline	Throughout the Region	**additional habitat in Table E1** - cliffs, scarps and tors; also screes and boulderfields
Kirk's kohuhu Thick-leaved kohukohu	*Pittosporum kirkii*	A small, openly-branched shrub which is usually epiphytic, rarely terrestrial, in coastal to montane forest.	Serious Decline	Rang_1, Rang_2a, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Tura_1a, Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2f, Whai_2g, Whai_3, Whai_4a, Whai_4b, Whai_4c, Whai_4d, Whai_5a, Whai_5b, Whai_5c, Whai_5d, Whai_5e, Whai_6, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d, Whau_3e	**Other protection mechanisms** - Some habitat protected in Table E1 (forest), some habitat protected on LAD
Green-hood	*Pterostylis paludosa*	A green-hood orchid up to 180 mm tall in peat bogs and heathlands, usually in well-lit sites amongst mosses and sedges.	Serious Decline	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2f, Whai_2g, Whai_3, Whai_4a, Whai_4b, Whai_4c, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d, Whau_3e	**Habitat protected in Table E1** - wetland

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Yellow mistletoe Pirita Piriraki	*Alepis flavida*	A parasitic shrub, mainly of beech.	Gradual Decline	Throughout the Region	**Other protection mechanisms** - some Habitat protected as LAD
Jersey fern Annual fern	*Anogramma leptophylla*	A small fern of clay banks, rock faces and alluvial banks.	Gradual Decline	Akit_1b, Akit_1c, East_1, Mana_1c, Mana_5a, Mana_6, Mana_7a, Mana_7b, Mana_7c, Mana_7d, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9d, Mana_9e, Owha_1	**additional Habitat in Table E1** - Habitat is partially protected by addition of coastal cliffs and cliffs, scarps and tors to Table E1
Sand tussock Hinarepe	*Austrofestuca littoralis*	Tussock up to 70cm tall found in coastal dunes, particularly foredunes and dune hollows and sandy and rocky places.	Gradual Decline	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional Habitat in Table E1** - Dunes
Climbing groundsel	*Brachyglottis sciadophila*	Slender, twining or tangling climber often draped over host plant in a dense mass or creeping along ground. Lowland, along forest margins or in alluvial forest.	Gradual Decline/ Regionally Uncommon	Akit_1b, East_1, Hoki_1a, Hoki_1b, Mana_1a, Mana_1b, Mana_2a, Mana_2b, Mana_3, Mana_5a, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_6, Mana_7b, Mana_7c, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9c, Mana_9d, Mana_9e, Mana_10a, Mana_10d, Mana_11a, Mana_11b, Mana_11c, Mana_11d, Mana_11e, Mana_11f, Mana_12a, Mana_12b, Mana_12c, Mana_12d, Mana_12e, Mana_13a, Mana_13c, Mana_13d, Mana_13e, Mana_13f, Ohau_1b, Owha_1, Rang_3a, Rang_4a, Rang_4b, Rang_4c, Rang_4d, Tura_1b, Tura_1c, West_1, West_2, West_3, West_4, West_5, West_6, West_7,	**Other protection mechanisms** - Some Habitat protected in Table E1 (forest), some Habitat protected on LAD

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
				West_8, West_9, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_4	
(none known)	*Coprosma pedicellata*	Shrub or small tree (up to 9 m) of kahikatea-dominated alluvial forest.	Gradual decline	Akit_1b, East_1, Hoki_1a, Hoki_1b, Mana_1a, Mana_1b, Mana_2a, Mana_2b, Mana_3, Mana_5a, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_6, Mana_7b, Mana_7c, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9c, Mana_9d, Mana_9e, Mana_10a, Mana_10d, Mana_11, Mana_12, Mana_13a, Mana_13c, Mana_13d, Mana_13e, Mana_13f, Ohau_1b, Owha_1, Rang_3a, Rang_4a, Rang_4b, Rang_4c, Rang_4d, Tura_1b, Tura_1c, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_4	**Habitat protected in Table E1** - kahikatea forest types
(none known)	*Crassula manaia*	Minute annual herb of coastal turf and associated fine silt and gravel.	Gradual Decline/ Regionally Uncommon	West_1, West_2, West_3, Whai_7a, Whai_7b	**additional habitat in Table E1** - coastal cliffs and turfs
Tufted hair grass Wavy hair grass	*Deschampsia caespitose*	An erect tussock of coastal to subalpine wetlands and lake margins.	Gradual Decline	Rang_2f, Whau_1b	**Habitat protected in Table E1** - wetland

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Pingao Golden sand sedge	*Desmoschoenus spiralis*	A coarse-leaved, yellow sand-binding plant of coastal fore-dunes.	Gradual Decline	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional habitat in Table E1** - Dunes
Pygmy sundew	*Drosera pygmaea*	Small red, red-purple or green rosette-forming carnivorus herb. Coastal to subalpine, usually in pakihi shrublands and adjoining wetlands, especially peat bogs.	Gradual Decline	Rang_2f, Whau_1a, Whau_1b	**Habitat protected in Table E1** - wetland
Sand spike sedge Spikesedge	*Eleocharis neozelandica*	Small, leafless, duneland wetland sedge. Found on damp sand flats, often near streams or in places where fresh water filters through the sand at depth or in ephemeral wetlands. Currently only known from one site in the Region.	Gradual Decline	Mana_13a, Rang_4b, Rang_4b, West_5, West_6	**Habitat protected in Table E1** - wetland
Marsh willowherb	*Epilobium chionanthum*	A small, clumped herb with white flowers found in swamps and wet swards of grasses or sedges near lake and river margins, or in bogs (below 900 m).	Gradual Decline	Whai_1, Whai_2e, Whai_2f, Whai_2g, Whai_4b	**Habitat protected in Table E1** - wetland
Sea holly, coastal eryngo	*Eryngium vesiculosum*	A small herb of coastal gravelfields.	Gradual Decline	Akit_1b, East_1, Hoki_1b, Mana_13a, Mana_7a, Mana_7c, Mana_7d, Ohau_1b, Owha_1, West_7, West_8, West_9	**Habitat protected in Table E1** - wetland and coastal setback
Gunnera	*Gunnera arenaria*	Small-leaved prostrate coastal species of damp sand ground, dune slacks and swales, and along tidal river margins and coastal sandstone bluffs.	Gradual Decline	Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Rang_4a, Rang_4b, Rang_4d, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8,	**additional habitat in Table E1** - Dunes, also partly protected by coastal cliffs

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
				West_9, Whai_7b, Whau_4	
New Zealand iris Mikoikoi	*Libertia peregrinans*	An iris with hard copper-orange-coloured leaves (15-70 cm long) with prominent dark orange veins. A primarily coastal or lowland species of sandy, peaty or pumiceous soils. Found growing in dune slacks and swales, on the margins of swamps and in open poorly draining ground under scrub.	Gradual Decline	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_2f, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_1a, Whau_1b, Whau_4	**additional habitat in Table E1** - Dunes
Scarlet mistletoe Korukoru Pirita Roeroe	*Peraxilla colensoi*	A parasitic shrub up to 3 m across, mainly in silver beech forest.	Gradual Decline	Throughout the Region - absent from Whai_2f, Whai_2g, Whai_4b	**Other protection mechanisms** - some Habitat protected as LAD
Red mistletoe Pikirangi Pirita Roeroe Pirinoa	*Peraxilla tetrapetala*	A parasitic shrub up to 2 m across, mainly in coastal to montane beech forest.	Gradual Decline	Throughout the Region	**Other protection mechanisms** - some Habitat protected as LAD
Sand daphne Autetaranga Toroheke Sand pimelea	*Pimelea arenaria*	Prostrate coastal shrub (less than 30 cm) found on the landward side of the foredunes, back hollows and blowouts. Small white flowers on the ends of the branches.	Gradual Decline	Mana_13a, Rang_4b, Rang_4b, West_5, West_6	**additional habitat in Table E1** - Dunes
Swamp buttercup	*Ranunculus macropus*	*Semi-aquatic to aquatic rosette herb, usually found in coastal to lowland raupo-dominated wetlands.*	Serious Decline	Throughout – coastal to lowland Habitats	**Habitat protected in Table E1** - wetland
Raukawa	*Raukaua edgerleyi*	*A large shrub or small tree up to 10 m tall with separate adult and juvenile phases. Prefers cloud forests.*	Gradual Decline	Throughout – lowland to upper montane Habitats	**Not considered at risk**

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
(none known)	*Selliera rotundifolia*	*A prostrate coastal mat-forming herb (up to 700 mm in diameter), growing in dune fields in seasonally damp wales (ephemeral wetlands) and occasionally found along the margins of slow-flowing tidal streams.*	Gradual Decline	Mana_13a, Rang_4b, Rang_4b, West_5, West_6	**additional habitat in Table E1** - Dunes
New Zealand sow thistle Puha Shore puha	*Sonchus kirkii*	Biennial to perennial herb up to 1 m tall of coastal Habitat, usually on cliff faces in or around damp seepages.	Gradual Decline	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional habitat in Table E1** - coastal cliffs
Teucridium	*Teucridium parvifolium*	A shrub (up to 2 m) with small leaves. Habitat is fertile stream sides and river terraces in lowland dry forest, podocarp-broadleaf forest and scrub.	Gradual Decline	Mana_10b, Mana_10c, Mana_10d	**Other protection mechanisms** - some habitat protected in Table E1 (forest)
White mistletoe Taapia pirita Tupia	*Tupeia antarctica*	A shrubby parasite to 1 m diameter. Clusters of round white fruit follow small yellow-green flowers. Habitat is seral vegetation, on short-lived trees such as five finger, putaputaweta and Pittosporum.	Gradual Decline	Throughout the Region	**Other protection mechanisms** - partially protected on LAD, partially protected by addition of kowhai forest type
Swamp nettle	*Urtica linearifolia*	Sparingly branched herb which inflicts a painful sting. found in fertile swamps, lakes and river margins, swampy shrubland and forest.	Gradual Decline	Throughout – lowland to montane. Absent from Whai_2f, Whai_2g, Whai_4b	**Habitat protected in Table E1** - wetland
(none known)	*Brachyglottis turneri*	*A tall herb (daisy) of stream margins.*	Range Restricted / Regionally Uncommon	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whai_4b, Whai_5b, Whai_5c, Whau_1b	**additional habitat in Table E1** - cliffs, scarps and tors

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Sand coprosma	Coprosma acerosa	Coastal shrub in sand dunes and dune hollows.	Range Restricted	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional habitat in Table E1** - Dunes
Willowherb	*Epilobium astonii*	Heavily branched, erect perennial herb forming compact bushes up to 300 mm. A subalpine to alpine species (760-1370 m a.s.l.) usually found on cliff faces, often along canyon and gorge walls, sometimes on exposed boulders along ridge lines.	Range Restricted	Mana_10b, Mana_10c, Mana_12a, Rang_2a, Rang_2b	**Other protection mechanisms** - some Habitat protected as LAD
(none known)	*Leptinella dispersa subsp. rupestris*	Creeping, perennial herb forming loose patches or compact turf depending on local conditions. Inhabits the margins of freshwater swamps and wetlands bordering saltmarsh, sometimes in deep hollows or on shaded cliff faces.	Range Restricted	West_1, West_2, West_3, Whai_7a, Whai_7b	**Habitat protected in Table E1** – wetland. Some habitat protected by addition of cliffs, scarps and tors to Table E1
(none known)	*Myosotis eximia*	Low-growing perennial herb found on limestone cliffs and talus slopes. This species is endemic to the central North Island and found in the Ruahine Ranges and Moawhangao ED	Range Restricted	Mana_10b, Mana_10c, Mana_1a, Mana_1b, Mana_3, Mana_4, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_9c, Mana_12a, Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2e	**additional habitat in Table E1** - cliffs, scarps and tors; also screes and boulderfields
Feeble bent	*Agrostis imbecilla*	Delicate, slender, tufted perennial grass, 150-350 mm tall. A montane, subalpine to alpine species of damp site within tussock grassland.	Sparse	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whau_1b	**additional habitat in Table E1** - tussock grassland

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Gossamer grass	*Anemanthele lessoniana*	*Erect, tufted perennial grass. Sea level to montane forest, forest margins, scrub and on cliff faces and associated talus.*	Sparse/Regionally Uncommon	Mana_10b, Mana_10c, Mana_10d, Mana_11d, Mana_12a, Mana_12d, Rang_2a, Rang_2b, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Rang_4c, Rang_4d, Tura_1a, Tura_1b, Whai_6, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_1a, Whau_1b, Whau_2, Whau_3a, Whau_3c, Whau_3d, Whau_3e, Whau_4	**Other protection mechanisms** - Some habitat protected in Table E1 (forest), some habitat protected on LAD, some habitat protected by addition of cliffs, scarps and tors to Table E1
Parsley fern Patotara	*Botrychium australe*	*Red-green (bronze) to bright green fleshy fern. A species of open ground, short and tall tussock grassland, forest clearings, shrubland, river flats, reverting pasture and seasonally flooded ground.*	Sparse	Throughout the Region	**Other protection mechanisms** - some habitat protected in Table E1, some habitat protected as LAD
Mistletoe Dwarf mistletoe Leafless mistletoe	*Korthalsella salicornioides*	Succulent mistletoe, much branched, green, yellow-green to red-green plant parasitizing exposed branches and branchlets of host. Habitat is seral vegetation: shrubland and scrub on plants of kanuka, manuka and shrubby Coprosma species.	Sparse	Throughout – coastal to subalpine Habitats	**Habitat protected elsewhere in POP** - some habitat protected as scrub on HEL, also protected in Table E1 (kanuka forest) and adding kowhai forest
(none known)	*Lepilaena bilocularis*	Annual, aquatic herb of lakes, brackish water, or slowflowing rivers. Usually found in shallow fresh water Habitats not far from the coast.	Sparse	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4spe	**Habitat protected in Table E1** - wetlands

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Native musk Maori musk Native monkey flower	*Mimulus repens*	Mat-forming, succulent, perennial herb. Strictly coastal in permanently damp or soggy saline mud or silt soils.	Sparse	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4	**additional habitat in Table E1** - coastal cliffs and turfs, also some Habitat protected as wetland
Leafless pohuehue Leafless muehlenbeckia	*Muehlenbeckia ephedroides*	Prostrate twiggy shrub of coastal to subalpine fertile gravel to sandy soils. Dry free draining fertile. Highly threatened in the North Island, relatively rare.	Sparse	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_10a, Mana_10b, Mana_10c, Mana_10d, Mana_10e, Mana_11a, Mana_11b, Mana_11c, Mana_11d, Mana_11e, Mana_11f, Mana_12a, Mana_12b, Mana_12c, Mana_12d, Mana_12e, Mana_13a, Mana_13b, Mana_13c, Mana_13d, Mana_13e, Mana_13f, Mana_1b, Mana_1c, Mana_3, Mana_4, Mana_5a, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_6, Mana_7a, Mana_7b, Mana_7c, Mana_7d, Mana_8a, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9b, Mana_9c, Mana_9d, Mana_9e, Ohau_1a, Ohau_1b, Owha_1, Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Rang_4a, Rang_4b, Rang_4c, Rang_4d, Tura_1a, Tura_1b, Tura_1c, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_2g, Whai_3, Whai_4a, Whai_4b, Whai_4c, Whai_4d, Whai_5a, Whai_5b, Whai_5c, Whai_5d, Whai_5e,	**Other protection mechanisms** - some habitat protected in LAD, some habitat protected in MOD land

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
				Whai_6, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3a, Whau_3b, Whau_3c, Whau_3d, Whau_3e, Whau_4	
(none known)	*Myosotis spathulata*	Prostrate perennial herb, on or near rock outcrops, under rock overhangs, on ledges or amongst rubble in forest or shrubland.	Sparse	Akit_1a, Akit_1b, Akit_1c, East_1, Mana_10a, Mana_10b, Mana_10c, Mana_10d, Mana_12a, Mana_1a, Mana_1b, Mana_1c, Mana_2a, Mana_2b, Mana_3, Mana_4, Mana_5a, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_6, Mana_7b, Mana_9a, Mana_9b, Mana_9c, Mana_9e, Rang_2a, Whai_1, Whai_2e, Whai_2f, Whai_2g, Whai_4b	**additional habitat in Table E1** – cliffs, scarps and tors; screes and boulderfields
(none known)	*Olearia quinquevulnera*	Shrub 2.2 x 2 metres. Montane to subalpine, on valley floors, on forest margins, clearings, amongst rocks, below cliffs and in subalpine scrub, often in poorly drained or permanently wet soils.	Sparse	Whai_4d, Whai_5d	**Other protection mechanisms** - Habitat protected as LAD

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Koheriki	*Scandia rosifolia*	Semi-erect to somewhat open sprawling, woody, aromatic shrub up to 1 x 1 metres. Habitat is steep rocky sites and boulderfields, often on river margins. May also occur on coastal cliffs.	Sparse	Mana_1a, Mana_1b, Mana_2b, Mana_3, Mana_4, Mana_5b, Mana_5c, Mana_5d, Mana_5e, Mana_9a, Mana_9b, Mana_9c, Mana_10a, Mana_10c, Mana_10d	**additional habitat in Table E1** - cliffs, scarps and tors
(none known)	*Stegostyla atradenia*	Orchid favouring infertile substrates, especially clay podzols and pumice soils, usually in thick leaf litter under kanuka/manuka.	Sparse	Throughout - coastal to montane	**Other protection mechanisms** - partially covered by Table E1 (kanuka forest), partially covered by other parts of One Plan (scrub on HEL)
New Zealand spinach Kokihi Tutae-ikamoana	*Tetragonia tetragonioides*	Widely trailing perennial herb of the coastal strand zone often growing along beaches amongst driftwood and seaweed but also in sand dunes, on boulder and cobble beaches, on cliff faces and rock ledges.	Sparse	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Owha_1, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_7b, Whau_4m	**additional habitat in Table E1** - Dunes
Sun orchid	*Thelymitra formosa*	Very stout orchid which at flowering is up to 0.8 m tall. Stem dark red-green or dark green. Mainly found in lowland to montane wetlands, scrub and open forest.	Sparse	Akit_1b, Akit_1c, East_1, Hoki_1a, Hoki_1b, Mana_1c, Mana_5a, Mana_6, Mana_7a, Mana_7b, Mana_7c, Mana_7d, Mana_8a, Mana_8b, Mana_8c, Mana_8d, Mana_8e, Mana_9a, Mana_9d, Mana_9e, Mana_10e, Mana_11b, Mana_13a, Mana_13b, Mana_13c, Mana_13d, Mana_13e, Ohau_1a, Ohau_1b, Owha_1, Rang_1, Rang_2c, Rang_2f, West_7, West_8, West_9, Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_4d, Whai_5d, Whai_5e, Whau_1a,	**Other protection mechanisms** - habitat partially protected in Table E3 (wetland)

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
				Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d	
Bristle fern	*Trichomanes colensoi*	Colony-forming fern of dark recesses, rock faces and overhangs, usually near to or partially immersed in water.	Sparse	Throughout the Region	**Habitat protected in Table E1** - Forest
(none known)	*Trisetum drucei*	Dense, tufted grass up to 600 mm. A cliff dwelling species preferring calcareous mudstones, siltstones, sandstones, and marble and limestone.	Sparse	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3b, Whau_1b	**additional habitat in Table E1** - karst landscapes
Native angelica	*Gingidia montana*	Prostate montane herb.	Regionally Rare	Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d	**additional habitat in Table E1** - cliffs, scarps and tors; also screes and boulderfields
Maori dock New Zealand dock Runa	*Rumex flexuosus*	Rhizomatous herb with broadly oval leaves.	Regionally Rare	Mana_1a, Mana_1b, Mana_10b, Mana_10c, Mana_12a, Rang_2a, Rang_2b, Rang_2c, Rang_2e, Rang_2f, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d, Whau_3e	**Other protection mechanisms** - not classified as threatened, quite widespread

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
(none known)	*Coprosma virescens*	Divaricating shrub inhabiting forest edges and scrub.	Regionally Uncommon	Mana_10b, Mana_10c, Mana_10d, Mana_11d, Mana_12a, Mana_12d, Rang_2a, Rang_2b, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Rang_4c, Rang_4d, Tura_1a, Tura_1b, Whai_6, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_1a, Whau_1b, Whau_2, Whau_3a, Whau_3c, Whau_3d, Whau_3e, Whau_4	**Other protection mechanisms** - partially protected on LAD, partially protected in Table E3 (forest)
A sedge	*Schoenus nitens*	Wetland sedge 5-25 cm tall with pale green leaves with purplish tips growing in moist dune hollow and brackish swamps near the coast.	Regionally Uncommon	Mana_13a, Rang_4b, Rang_4b, West_5, West_6	**Habitat protected in Table E1** - wetland
Native cleaver or native bedstraw	*Galium trilobum*	Perennial herb with straggling, slender stems, 10-70 cm long. Leaf stems 0.5-3 mm long. Leaves 2-10 mm long. Lowland to upland. In shady, damp and wet places such as forest margins, scrub, stream and lake sides, moist pastures and tussockland, shrubland, rushland in seepage and near swamp.	Regionally Uncommon	Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d	**Other protection mechanisms** - some Habitat protected in Table E1 (forest, wetland), some habitat protected by addition of tussock grassland
Green mistletoe	*Ileostylus micranthus*	A coastal to lowland mistletoe that prefers shrubland and secondary regrowth.	Regionally Uncommon	Hoki_1a, Hoki_1b, Mana_10a, Mana_10b, Mana_10c, Mana_10d, Mana_10e, Mana_11a, Mana_11b, Mana_11c, Mana_11d, Mana_11e, Mana_11f, Mana_12a, Mana_12b, Mana_12c, Mana_12d, Mana_12e, Mana_13a, Mana_13b, Mana_13c, Mana_13d, Mana_13e, Mana_13f, Ohau_1a, Ohau_1b, Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Rang_4a, Rang_4b, Rang_4c, Rang_4d,	**Other protection mechanisms** - widespread, some habitat protected by addition of kowhai forest to Table E3

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
				Tura_1a, Tura_1b, Tura_1c, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_6, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_1a, Whau_1b, Whau_2, Whau_3a, Whau_3c, Whau_3d, Whau_3e, Whau_4	
Dwarf mistletoe	*Korthasella clavata*	Coastal to subalpine mistletoe. Usually found parasitizing shrubs within grey scrub communities, also found on shrubs and trees within montane alluvial forest.	Regionally Uncommon	Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d	**Other protection mechanisms** - some Habitat protected as LAD
Native mint Mokimoki	*Mentha cunninghamii*	Prostrate herb of lowland to high montane grassland and open Habitats, such as cliffs, river banks, lakesides, sometimes in swampy ground.	Regionally Uncommon	Whai_1, Whai_2a, Whai_2b, Whai_2c, Whai_2d, Whai_2e, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d	**Other protection mechanisms** - Habitat protected by Nga Whenua Rahui and on MOD land
Alpine yellow forget-menot	*Myosotis australis "yellow"*	Low mat herb with yellow flowers, found in tussock grasslands.	Regionally Uncommon	Mana_10c, Mana_12a, Mana_1a, Mana_1b, Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2e, Rang_2f, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_4d, Whai_5d, Whai_5e, Whau_1a, Whau_1b, Whau_1c, Whau_2, Whau_3b, Whau_3c, Whau_3d, Whau_3e	**Other protection mechanisms** - some habitat protected on LAD, other habitat may be protected in Table E1 (wetland) and by addition of tussock grassland
Small prostrate milfoil	*Myriophyllum votschii*	Small branching bright green herb with leaves only 1- 3 mm long, growing in coastal damp sands, inland on lake margins and in shallow waters.	Regionally Uncommon	Mana_13a, Rang_4b, Rang_4b, West_5, West_6	**Habitat protected in Table E1** - wetland

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
Giant maiden-hair	*Adiantum formosum*	Tall, widely creeping fern from alluvial forest and gorge sides. Usually found in shaded sites amidst drifts of leaf litter. Rarely grows in full sun.	Vagrant	Mana_10a, Mana_10e, Mana_11b, Mana_11c	**Other protection mechanisms** - Habitat protected as LAD
New Zealand sneezewort	*Centipeda aotearoana*	Annual to short-lived perennial prostrate herb forming circular patches 10-30 cm diameter, from open damp ground, lake, tarn and river margins, ephemeral wetlands and drains.	Data Deficient	West_3, West_4, Whai_7a, Whai_7b, Whai_7d	**Habitat protected in Table E1** - wetland
(none known)	*Euchiton polylepis*	Stoloniferous, perennial daisy, lowland to subalpine in damp places, especially stream sides and damp hollows in grassland, cliffs and rocky places.	Data Deficient	Hoki_1a, Hoki_1b, Mana_12c, Mana_13a, Mana_13f, Ohau_1b, Rang_2c, Rang_2d, Rang_2f, Rang_4a, Rang_4b, Tura_1b, West_1, West_2, West_3, West_4, West_5, West_6, West_7, West_8, West_9, Whai_1, Whai_2b, Whai_2c, Whai_2d, Whai_5d, Whai_5e, Whai_7b, Whau_1a, Whau_1b, Whau_1c, Whau_3b, Whau_3c, Whau_3d, Whau_4	**Other protection mechanisms** - some Habitat is protected in LAD, other possible habitat maybe protected in Table E1 (wetland) and by addition of tussock grassland
Papataniwha	*Lagenifera montana*	Small herb with leaves in a rosette at base of plant from subalpine to alpine seeps, cushion bogs, swamps, lake and tarn margins, wet tussock grassland and stream banks, 600-900m altitude, occasionally lower.	Data Deficient	Mana_8a, Mana_8d, Mana_9d, Ohau_1a,Whai_1, Whai_2b, Whai_2c, Whai_2d,Whai_4d, Whai_5d, Whai_5e, Whau_1a,Whau_1b, Whau_1c, Whau_3b, Whau_3c,Whau_3d	**Habitat protected in Table E1** - wetland, additional potential habitat protected as tussock grassland

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
(none known)	*Pimelea aridula agg.*	Erect shrub up to 1 m tall of lowland to montane grassland and rocky places	Data Deficient	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whau_1b	**Other protection mechanisms** - Partially protected on LAD, and MOD land, partially protected by addition of tussock grassland, cliffs, bluffs and tors, screes and boulderfields.
Grassland wheatgrass	*Stenostachys laevis*	Perennial grass of tussock grasslands, grey scrub,shaded cliff faces, lake sides and flushes.	Data Deficient	Rang_2a, Rang_2b	**additional habitat in Table E1** - tussock grassland
Ornate skink	*Cyclodina ornata*		gradual decline		**additional habitat in Table E1** - screes and boulderfields
brown skink	*Cyclodina selandicum*		sparse		**Other protection mechanisms** - some habitat protected in Table E1 (forest), advocacy
black fronted tern	*Sterna albostriata*		nationally endangered		**Habitat protected elsewhere in POP** - coastal setback and dunes
grey duck	*Annas superciliosa superciliosa*		nationally endangered		**Other protection mechanisms** - habitat protected in Table E1 (wetlands, forest) and on LAD; Habitat loss is not principal threat

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
northern NZ dotterel	*Charadrius obscurus aquilonius*		nationally vulnerable		**Habitat protected elsewhere in POP** - coastal setback, also addition of coastal cliffs and dunes to Table E1
reef heron	*Egretta sacra sacra*		nationally vulnerable		**Habitat protected in Table E1** - wetland
black billed gull	*Larus bulleri*		serious decline		**Habitat protected elsewhere in POP** - coastal setback, also addition of coastal cliffs and dunes to Table E1
North Island rifleman	*Acanthisitta chloris granti*		gradual decline		**Other protection mechanisms** - Some habitat protected in Table E1 (forest), Some Habitat protected as LAD, Wildlife Act applies
northern little blue penguin	*Eudyptula minor iredalei*		gradual decline		**Habitat protected elsewhere in POP** - coastal setback
red billed gull	*Larus nvaehollandiae scopulinus*		gradual decline		**Habitat protected elsewhere in POP** - coastal setback, also addition of coastal cliffs and dunes to Table E1

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
white fronted tern	*Sterna striata striata*		gradual decline		**Habitat protected elsewhere in POP** - coastal setback, also addition of coastal cliffs and dunes to Table E1
yellow-crowned kakariki	*Cyanohamphus auriceps*		gradual decline		**Other protection mechanisms** - Some habitat protected in Table E1 (forest), Some habitat protected as LAD
black shag	*Phaloacrocoras carbo novaehollandiae*		sparse		**Habitat protected in Table E1** - Wetland
NZ dabchick	*Poloicephalus rufopectus*		range restricted		**Habitat protected in Table E1** - Wetland
little black shag	*Phalacrocoraz sulcirostris*		range restricted		**Habitat protected in Table E1** - Wetland
NI saddleback	*Phileaturnus carunculatus rufusater*		range restricted		**Other protection mechanisms** - habitat protected as LAD.
Carabid beetle	*Brullea antartica*		sparse		**additional Habitat in Table E1** - Dunes
snail	*powelliphanta marchanti*		serious decline		**Other protection mechanisms** - Habitat protected as LAD, other habitat picked up as karst landscape features

Species	Proper name	Description	Rank	Sites	Assesment of protection in proposed One Plan (POP)
cress	*Cardamine* 'reparoa bog'		nationally uncommon		**Other protection mechanisms** - Habitat protected by Nga Whenua Rahui
longfin eel					**Other protection mechanisms** - some habitat protected as LAD, some habitat protected elsewhere in POP (Rule 12-5 and Schedule D)
koaro					**Habitat protected in Table E1** - wetland

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