Past and Current Indigenous Vegetation Cover and the Justification for the Protection of Terrestrial Biodiversity within the Manawatu-Wanganui Region : Technical Report to Support Policy Development

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Past and Current Indigenous Vegetation Cover and the Justification for the Protection of Terrestrial Biodiversity within the Manawatu-Wanganui Region : Technical Report to Support Policy Development

May 2007

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Forest fragment surrounded by production land in the Tararua District
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EXECUTIVE SUMMARY

Indigenous biodiversity has been greatly reduced throughout the Manawatu-Wanganui Region. This loss is reflected in the increasingly fragmented and degraded nature of the remaining bush remnants and wetland habitats, and absence of species once common. A large proportion of the continued threats to indigenous biodiversity is best addressed through non-regulatory methods (eg. pest control). However, there remains a requirement for a regulatory framework to fully protect indigenous biodiversity from further decline as the direct result of human activities.

Amendments (2003) to the Resource Management Act 1991 have provided for an increased mandate for Regional Councils to establish policy allowing for the protection of terrestrial biodiversity, should the Territorial Local Authorities (TLAs) relinquish this role to Regional Councils. The seven TLAs within the Manawatu-Wanganui Region have agreed in principle that the Regional Council is best suited to being the lead agency for protection of terrestrial biodiversity on private land. The extent and spatial pattern of loss has been quantified to provide justification for the need for protection. 'Protection' in this report refers to conservation management of biodiversity as well as regulation designed to safeguard remaining biodiversity.

This report presents the justification for the need for protection of indigenous biodiversity, with the focus on habitat types rather than individual species *per se*. Habitat types were identified using predictive modelling, remote sensing techniques and national spatial datasets. Habitat types are classified according to current extent as a proportion of former extent to determine vulnerability for continued decline.

Additional sites of biodiversity or ecological significance can continue to be incorporated into the justification framework by way of application of nationally accepted criteria for assessing ecological significance, and by soliciting expert opinion.

Recommendations for appropriate levels of protection for terrestrial biodiversity at a regional scale are provided. How patches should be prioritised for management is a separate exercise from identifying the need for management, and incorporates more detailed analysis of individual site values. This work is not included here.

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1. Introduction

Horizons Regional Council (Horizons) has embarked on the development of its second generation Regional Policy Statement (RPS) and Regional Plans. Horizons has chosen to merge its RPS and Regional Plans into one document, the One Plan. Amendments to the Resource Management Act (RMA) in 2003 have provided the mandate to include provision for indigenous biodiversity protection within the One Plan.

Biodiversity (biological diversity) refers to the variation of biological life within any geographically defined area. Biodiversity can be expressed as difference at the gene (within a species), species (between species) or landscape (between groups of species (habitats)) level. The degree of decline in biodiversity is commonly applied as a indication of the condition and ecological health of an area.

This report deals primarily with indigenous terrestrial biodiversity which herein is referred as 'biodiversity'. Aquatic biodiversity and biodiversity values of riparian margins are dealt with elsewhere (McArthur *et al,* 2007 and Lambie, 2007 respectively). As biodiversity at the regional (landscape) scale is of primary concern, this report uses habitat types as its biodiversity 'unit'.

Prior to the development of policy, it was necessary to determine the current state of biodiversity within the Manawatu-Wanganui Region, and thus justify the need for policy and regulation. At the onset of this project the assumption was made that there was an urgent need for biodiversity protection within the Manawatu-Wanganui Region. This assumption needed to be quantified. The process started with several foundation questions:

- What was the pattern of indigenous vegetation cover present in the Region prior to human settlement?
- What indigenous vegetation cover remains in the Region today?
- What magnitude of indigenous vegetation loss has the Region experienced?
- What is the pattern of this loss?
- How does the loss of indigenous vegetation cover relate to loss of indigenous biodiversity?
- Is the remaining indigenous vegetation and biodiversity at risk of further decline?
- What actions or activities are contributing to, or directly causing, biodiversity loss?

Thus, the purpose of this report is to detail the current extent, character, and spatial pattern of terrestrial biodiversity within the Region, provide the justification for the protection of remaining biodiversity, and detail the methods by which biodiversity requiring protection can be identified. To this end this report comprises five distinct components:

1. **Defining 'habitat'**: determining what constitutes habitat and identifying habitat types present in the Region.
2. **Vegetation cover through time**: the analysis of past and current indigenous vegetation cover, and the extent of change over time.

3. **Impacts on biodiversity**: the implications of large scale habitat loss for biodiversity.
4. **Classification of habitat type**: the classification of habitat types into status categories and the mapping of the distribution for each habitat type category.
5. **Assessment of sites**: the assessment of sites for ecological significance at the property scale and how this contributes to consideration of biodiversity at the regional (landscape) scale.

These components, whilst inter-related to some degree, do not mesh seamlessly. However, they are presented together here for completeness. Conclusions and recommendations amalgamate all five sections.

1.1 Habitat type defined by indigenous vegetation as a surrogate for biodiversity

The terms 'vegetation', 'habitat' and 'biodiversity' in their purest sense do not mean the same thing (Miller, 2000), although they can be used interchangeably provided the meaning applied to the terms is clear.

'Habitat' in its purest sense, is a very species-specific concept (Miller, 2000) being an area that provides the requirements of a particular species at any point of its daily or life cycle. It is not the intention of this report to use the term habitat in this context.

Here, 'habitat type' has been used to describe particular associations of plant species. As the most visually obvious and easily predicted component of an ecosystem, indigenous vegetation cover has been classified to describe specific habitat types in order to identify difference in biodiversity pattern across the landscape. Thus, 'habitat type' (based on indigenous vegetation) has been considered a surrogate for biodiversity. By differentiating between habitat type, difference in biodiversity pattern (species variance) has been recognised by default. This applies to the difference in dominant species which define habitat types, and the variance of species which rely on the different habitat types. Consequently, habitat type can act as an umbrella for all associated species. Protection of habitat will have a flow-on effect of providing surrogate protection for the species that utilise that habitat. Conversely, a loss of a habitat type is a loss for biodiversity.

1.2 Current provisions for protection of indigenous biodiversity within the Region

The Department of Conservation (DOC), New Zealand's primary agency charged with indigenous biodiversity management, administers 423,777 ha of public conservation estate within the Manawatu-Wanganui Region. The majority of this land sits within the Central Volcanic Plateau, the ranges (Tararua, Ruahine and Kaimanawa) and in the hill country of Whanganui Forest Park. Consequently indigenous habitat of higher altitudes, high rainfall, and low potential for development are disproportionately represented. Only a very small area of lowland habitat is protected as public conservation land (Leathwick *et al.*, 2003).

The legal protection afforded to land under DOC administration has ensured the continued existence of indigenous vegetation in these areas. However, the condition of the indigenous vegetation and the habitat it provides has in many places deteriorated over time due to the persistent and wide-spread impacts of invasive species, and detrimental effects of surrounding land use. The protection of threatened species is a core responsibility of DOC, although the Department's influence on private land is constrained.

Up until now, the protection of indigenous biodiversity on private land has been primarily the mandate of Territorial Local Authorities (TLAs). For the smaller and/or poorer Districts within the Manawatu-Wanganui Region the capacity to fulfil this role has been severely restricted, both by resources and inclination. Further, each TLA approached the role in a variety of ways, and to differing degrees. Consequently, a comprehensive and consistent approach to protection of indigenous biodiversity across the Region is currently lacking.

The Queen Elizabeth II National Trust (QEII) currently administers 280 covenants throughout the Manawatu-Wanganui Region, covering an area of 6,398 ha. These areas are legally protected in perpetuity, and the landowners, in addition to any requirements under a Regional Pest Management Strategy, may choose to conduct ongoing pest control within the covenanted areas. In addition to QEII and DOC covenants on private land, the Nga Whenua Rahui fund (a contested fund serviced by DOC) has also placed kawenata (covenants) on Maori-owned land in the Region.

However, the majority of the remaining highly representative indigenous habitat that exists on private land is currently unprotected. The TLAs have limited capacity to manage this resource, and DOC's resources and influence are also limited. Therefore, it is appropriate that the Regional Council becomes the lead agency for indigenous biodiversity protection on private land.

In justifying the need for protection of biodiversity within the Region, there has been no consideration of current proportion of habitat under legal protection. This is primarily because the 'need for protection' as identified in this report refers to protection from all threats and not just those that can be mitigated through regulatory protection. It has been the experience of the Manawatu-Wanganui Region that while persistence of indigenous vegetation cover has occurred where legal protection is present (eg. public conservation land), characteristics of specific habitat types have not always been protected from deterioration or decline (eg. loss of northern rata from the Tararua Range and kamahi canopy from the Ruahine Range). Species loss can continue even within areas of habitat that have been afforded legal protection for a considerable amount of time. Consequently, as the consideration of the justification for protection includes direct threats that can be avoided through regulation as well as indirect threats that can't be, 'the need for protection' encompasses both regulatory mechanisms and non-regulatory management.

2. What constitutes habitat?

Given the reliance of this work on the use of 'habitat' as a surrogate for biodiversity, it is necessary to define what constitutes habitat in terms of both composition and extent.

Habitat type present within the Manawatu-Wanganui Region was first determined using national spatial predictive databases. This determined compositional characteristics of habitat. Secondly, criteria were developed to determine the point at which an area of indigenous vegetation was considered to be habitat. This determined the area and structure (extent) characteristics of habitat.

2.1 Expressing indigenous vegetation cover as specific (named) habitat type

Compositional characteristics of vegetation communities can be grouped like with like, and thus be defined as specific habitat type. Labels can then be applied to each distinct habitat type. National spatial predictive databases were used to identify habitat types present in the Manawatu-Wanganui Region.

In heavily modified landscapes (such as present within the Manawatu-Wanganui Region), quantitative predictive tools are useful to substitute knowledge and help determine priorities for biodiversity protection. Recently developed statistical tools have improved the ability of models to predict former vegetation cover by allowing the interpolation of environmental (point climate and landform data) and geographical (spatial pattern) layers (Leathwick, 2001; Leathwick *et al*., 2003; Leathwick *et al.*, 2004).

The 'Leathwick Predicted Potential Natural Vegetation Types (LPVT) (Leathwick, *et al.*¸ 2004) was used to determine habitat type present within the Manawatu-Wanganui Region. The LPVT defines forest pattern using statistical modelling techniques coupled with extensive forest composition data and 15 climate and soil layers. The predicted abundances for individual tree species were combined and classified to derive forest classes. Species abundance and forest composition was able to be predicted at a grid resolution of 100 m (Leathwick *et al.*, 2004). Thus, biodiversity information is applied to predictions of vegetation cover to group like with like and delimit specific habitat type. This provides the best approximation for habitat type, not the distribution of a focal species.

The methodology (for defining the tree-line, setting the upper elevation limits of sub-alpine vegetation, determining the presence of scrub, short forest, wetlands and dunelands, allowing for the beech forest distribution disjunction, regression analysis and non-hierarchical classification) followed for the LPVT reconstruction is described in Leathwick (2001) and Leathwick *et al.* (2004).

The Wetlands of National Importance (WONI) project (Ausseil *et al.*, *in press*) was in progress at the time of this analysis, and this dataset (grid layer) replaced the wetland data in LPVT. This provided more refined information on predicted wetland distribution.

The LPVT habitat types have been given names (Table 2.1) . These names are labels only, and are not intended to be a habitat description. The LPVT is predicting forest composition (not species) defined in multi-dimensional space and the habitat type names reflect this. Thus, habitat type names are a combination of species and forest type that can best indicate or characterise forest composition. Variability will exist between patches of the same habitat type. The LPVT habitat type names have been modified for the Manawatu-

Wanganui Region (Table 2.1). This was done to simplify the names to lend themselves better to policy documents, and to remove reference to species not found within the Region. The modified habitat type names have been used herein. Habitat type descriptions are provided in Appendix 1.

Table 2.1: Habitat type names identified in the Predicted Potential Natural Vegetation of New Zealand (LPVT) (Leathwick *et al.,* 2004) and habitat type names suggested for use within the Manawatu-Wanganui Region. Data associated with the habitat type 'Rimu-matai-miro-totara/kamahi forest' and 'Rimu-miro-totara/kamahi forest' have been merged (**Appendix 1**) and named as single habitat types: 'Wetland' and 'Podocarp/kamahi forest' respectively.

Habitat Type Name as per Leathwick *et al*., (2004)	Suggested Habitat Type Name for use within the Manawatu-Wanganui Region
Alpine gravel and rock	Alpine gravel and rock
Dunelands	Dunelands
Estuarine open water	Estuarine open water
Hall's totara/broadleaf forest	Hall's totara/broadleaf forest
Hall's totara/silver beech-kamahi forest-southern rata forest	Hall's totara/silver beech-kamahi forest
Hall's totara-miro-rimu/kamahi-silver beech-southern rata forest	Podocarp/kamahi-silver beech forest
Kahikatea-matai/tawa-mahoe forest	Podocarp/tawa-mahoe forest
Kahikatea-pukatea-tawa forest	Kahikatea-pukatea-tawa forest
Kahikatea-totara forest	Kahikatea-totara forest
Kauri/taraire-kohekohe-tawa forest	Hardwood/broadleaf forest
Matai-kahikatea-totara forest	Podocarp forest
Matai-totara/black/mountain beech forest	Podocarp/black/mountain beech forest
Matai-totara-kahikatea-rimu/broadleaf-fuchsia forest	Podocarp/broadleaf-fuchsia forest
Mountain beech forest	Mountain beech forest
Mountain beech-red beech forest	Mountain beech-red beech forest
Original Wetland	Wetland
Red beech-silver beech forest	Red beech-silver beech forest
Rimu/tawa-kamahi forest	Rimu/tawa-kamahi forest
Rimu-matai-miro-totara/kamahi forest	Podocarp/kamahi forest
Rimu-miro/kamahi-red beech-hard beech forest	Podocarp/kamahi-beech forest
Rimu-miro/tawari-red beech-kamahi-tawa forest	Podocarp/red beech-kamahi-tawa forest
Rimu-miro-totara/kamahi forest	Podocarp/kamahi forest
Scrub, tussock-grassland and herbfield above treeline	Scrub, tussock-grassland and herbfield above treeline
Silver beech forest	Silver beech forest

There are some inherent limitations to predictive reconstruction of forest composition. The accuracy will depend on the intensity of sampling (plot data) (Leathwick, 2001). Predictive modelling is most useful in the land areas that have experienced the most deforestation which conversely, due to the limited opportunities for data collection incur some limitations in the reliability to fully accurately predict detailed species compositions. Predictions of habitat type character are not necessarily perfectly replicated on the ground due to modification and compositional change, for example the loss of possum preferred species. This can mean compositional difference is observed between predicted and actual habitat. Further, predicted forest pattern will be less accurate in areas that have experienced a substantial change as a result of major events (eg. the central North Island following past volcanic events) (Leathwick, 2001).

At this point in time, LPVT is largely limited to woody (with exceptions) habitat types. The current inability to predict or identify locally distinctive features or the presence of threatened, uncommon or unique assemblages of species is acknowledged.

An obvious omission from the list of habitat types is indigenous scrub. Indigenous scrub, primarily kanuka and manuka scrub, has long been regarded as a useful resource, particularly for firewood. In many cases, this is a valid resource use. However, the lack of protection generally afforded to scrub discounts the ecological contribution of scrub to indigenous vegetation cover across landscapes, and equally, disregards scrub as an important initial stage in the succession to forest. The value of scrub as potential future forest is particularly important in areas where indigenous vegetation cover has been drastically reduced. Ewers *et al.* (2006) have shown that if indigenous scrub is removed from the analysis, indigenous vegetation cover across the Manawatu-Wanganui Region has been reduced to below 30% of former cover. This is confirmed by analysis conducted for this project (Overton *et al.*, 2006). It has been calculated that 1678 ha needs to be converted to indigenous forest annually for indigenous forest cover within the Region to reach 30% of land area by the year 2050. However, if indigenous scrub is included in the analysis, the indigenous forest cover for the Region (currently) sits above the 30% threshold (Ewers *et al.*, 2006).

Despite the limitations, the LPVT model provides for recognition of discrete habitat types across the landscape which would otherwise be obscured through over-simplification of vegetation cover.

2.2 Criteria for determining whether a patch of vegetation constitutes habitat

Once habitat types had been identified, it was necessary to quantify what actually met the definition of 'habitat' on the ground. It is not the intention of this work to generically incorporate every indigenous plant, constructed landscape, or assemblage of exotic vegetation that provides habitat in some way to indigenous species.

Criteria has been developed to identify size, extent and composition of areas of indigenous vegetation that qualify as habitat for the purposes of this report. It was as important to define what isn't considered habitat as it was to define what is, so two sets of criteria were developed (inclusion and exclusion criteria). The criteria was reviewed by way of expert opinion (DOC staff, local botanists and other Regional Council staff). The criteria are presented in Appendix 2.

2.3 Identification of other habitat type

Relying primarily on the LPVT predictive computer model to identify habitat type present in the Manawatu-Wanganui Region does not fully account for the full range of habitat diversity within the Region. Distinctive compositional difference between two patches of vegetation identified by LPVT as the same habitat type is not uncommon. Short-stature and non-woody habitats are currently excluded from this analysis but nonetheless contribute to the biodiversity of the Region. To overcome these limitations, additional

distinctive habitat types can be described and spatially defined by expert opinion.

It is currently harder to quantify the degree of loss of habitat types identified via expert opinion, and the methodology is open to more subjectivity, and thus is less defensible than the use of national spatial databases and predictive computer models. However, in the absence of more robust tools, the use of expert opinion is a valid method to identify some of the more obscure differences in biodiversity pattern throughout the Region. Expert opinion was employed to identify kanuka forest (as described in Appendix 1) as a distinctive habitat type found within the Region.

Aquatic habitat and important riparian margin habitat are beyond the scope of this report and have been identified in a separate process as detailed in McArthur (2007 *et al.*) and Lambie (2007).

3. Indigenous vegetation cover patterns of the Manawatu-Wanganui Region

Prior to the arrival of humans, the Manawatu-Wanganui Region was almost completely covered in indigenous vegetation. This cover was dominated by extensive forest cover (98% forest cover (Ewers *et al.*, 2006)), fire-induced tussockland on the Central Volcanic Plateau, and large areas of wetland habitat and extensive dunefield along the west coast of the Region. This dunefield is the most extensive transgressive parabolic dunefield in New Zealand (Muckersie & Shepherd, 1995). Sub-alpine and alpine habitat dominated above the treeline. Since human settlement loss of indigenous vegetation cover has been extensive and rapid, most drastically in the lowland areas of the Region.

Spatial predictive computer models that model environmental pattern were used to determine previous vegetation cover. Current indigenous vegetation cover was defined by the use of satellite imagery tools and national spatial databases. By comparing the past vegetation cover patterns with current patterns, the degree of loss within the Region was quantified.

Such methodology is robust and defensible and is increasingly recognised as a valid approach to justify the need for biodiversity protection (eg. Leathwick *et al.,* 2003; Leathwick *et al.,* 2004; Rutledge *et al*., 2004; Walker *et al*., 2004; Walker *et al*., 2006; Ministry for the Environment & Department of Conservation, 2007; Dymond *et al*., *in press*).

The causes and rates of biodiversity loss are presented.

3.1 The extent and distribution of previous indigenous vegetation cover

The highly modified nature of contemporary landscapes has drastically reduced knowledge and understanding of the environments and ecosystems that were once present. The very absence of indigenous vegetation makes it difficult to determine previous vegetation community pattern. Predictive methodologies can help describe potential compositional and spatial pattern of biodiversity across the landscape.

3.1.1 Predicting previous cover of habitat type

Landcare Research undertook an analysis of the predicted previous extent of indigenous vegetation cover in the Manawatu-Wanganui Region using Land Environments of New Zealand (LENZ) (Leathwick *et al.* 2002; Leathwick *et al*., 2003).

LENZ classifies New Zealand into units (land environments) that are internally similar to each other but which differ from other land environments. The variables used for the classification are climate, landform and soil. These variables are important for their roles in driving geographic variation in biological patterns. Thus, land environments are an approximation of potential ecosystem character, and can therefore be used to determine potential vegetation cover prior to human settlement. Environmental pattern can be applied as a surrogate for biodiversity pattern. Difference in land environment can be used to predict difference in ecosystem character.

LENZ is a hierarchical system with four geographic scales. The higher the level the greater the number of land environments. (eg. Level I has 20 land environments while Level IV has 500 land environments) (Leathwick *et al.*, 2003).

The data for this protect was assessed at LENZ Level IV (500 land environments nationally), as Level IV is an appropriate level at which to determine regional difference.

By using LENZ the patterns of distribution of previous indigenous vegetation cover can be predicted. In order to further classify variance in vegetation cover across the Region a parallel analysis of LENZ Level IV and the 'Leathwick Predicted Potential Natural Vegetation Types (LPVT) (Leathwick *et al.,.* 2004) was conducted. An explanation of LPVT and how it has been applied to the Manawatu-Wanganui Region is provided in Section 2.1. Habitat types are described in Appendix 1.

Thus, LENZ was used to predict distribution of land environments and LPVT used to predict the habitat types likely to be present there (Overton, *et al*., 2006). This enabled the mapping of predicted previous vegetation cover by habitat type, showing the extent and distribution of each predicted habitat type (Figure 3.1).

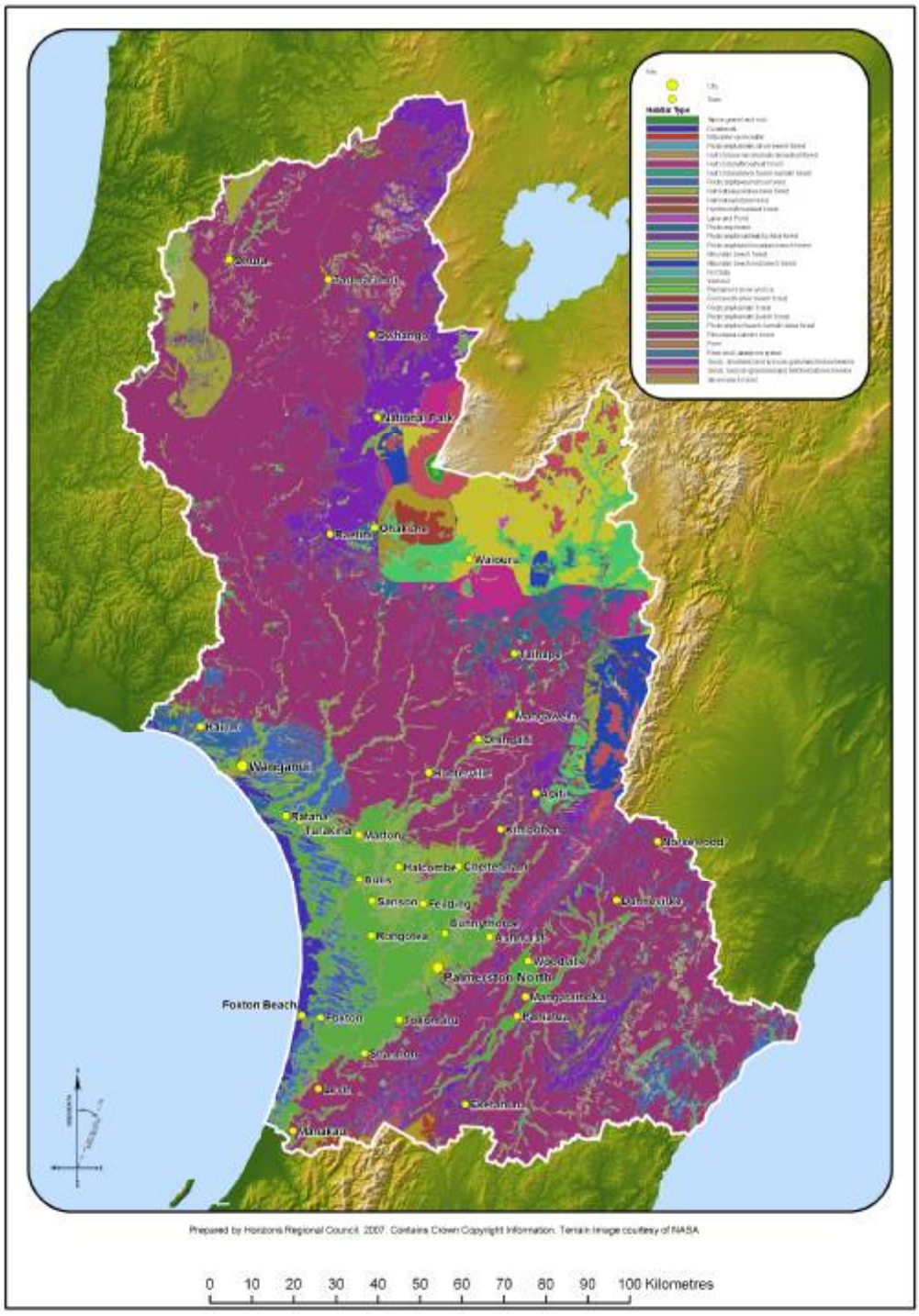

Figure 3.1: Predicted previous extent of indigenous vegetation defined by habitat type in the Manawatu-Wanganui Region.

3.2 The distribution of current indigenous vegetation cover

Current indigenous vegetation extent was delimited using the Land Cover Database2 (LCDB2). The LCDB2 is based on satellite imagery (Terralink, 2004), and translates this satellite image to land cover on the ground. The entire land cover of New Zealand has been identified and classified into land cover classes. Land cover classification for LCDB2 is a hierarchical development building on the classes identified in LCDB1. The land cover classes that relate to indigenous vegetation cover determined current extent. These landcover classes are provided in Appendix 3.

In the same manner as for the prediction of past vegetation cover patterns, the LPVT model was overlaid with LCDB2 data layers. This enabled the current vegetation cover to be expressed as specific habitat type.

As the primary concern is focussed on the remaining extent of the original habitat type, it was necessary to ensure that what was considered to be 'remaining habitat' was of the same composition (allowing for disturbance and threat-related modifications) as the original habitat. In order to do this, a rationalisation of LCDB2 landcover classes against LVPT habitat types was conducted. The LCDB2 landcover classes considered to be representative of original habitat for each of the LVPT habitat types are provided in Appendix 4.

The extent and spatial distribution of current vegetation cover is shown in Figure 3.2.

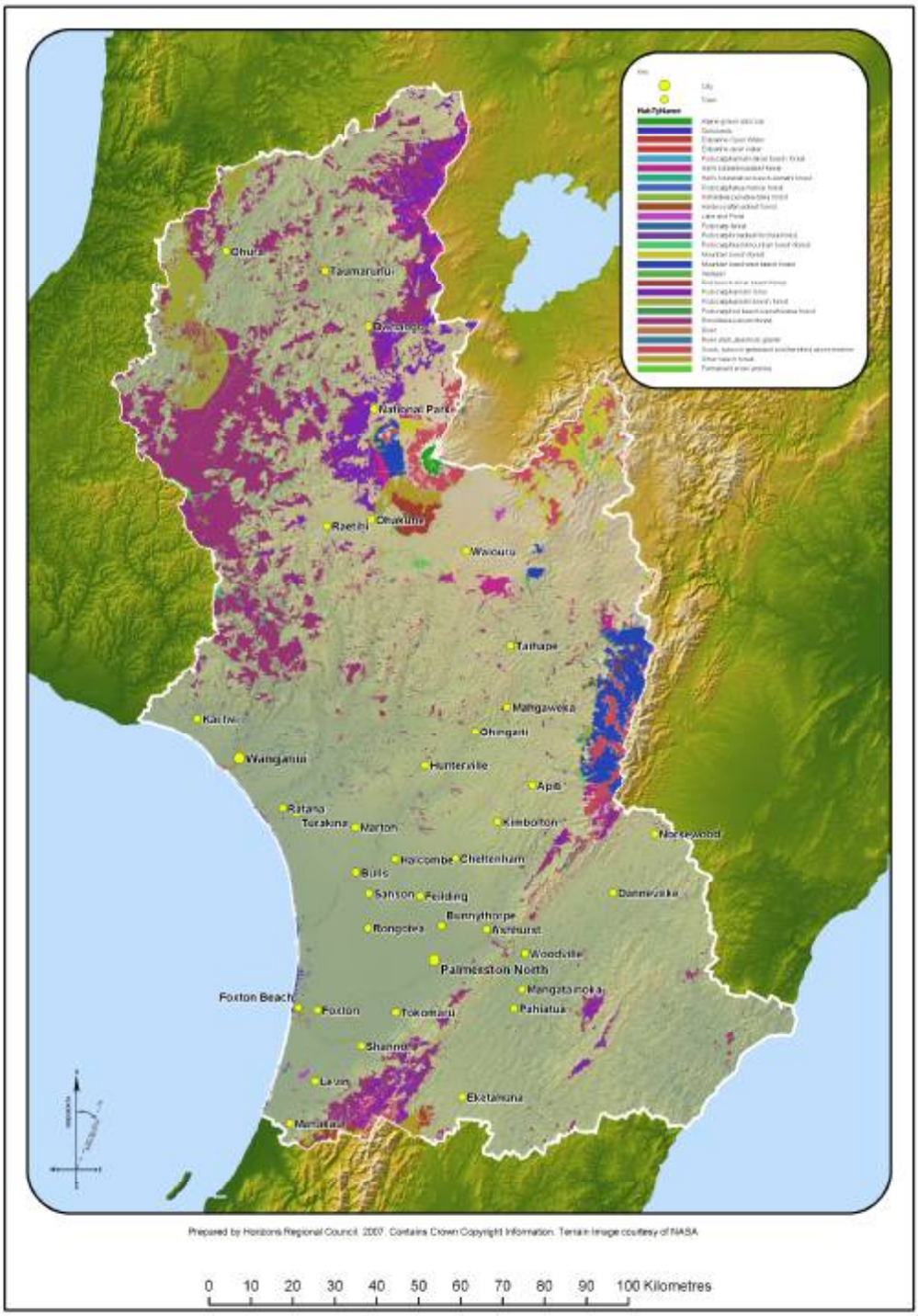

Figure 3.2: Current extent of indigenous vegetation cover defined by habitat type in the Manawatu-Wanganui Region.

3.3 The degree of change between past and current indigenous vegetation cover

Once predicted original vegetation cover and actual current cover had been established, the difference between the two was determined. The change in indigenous vegetation cover has been considerable. Of the eighty-five LENZ Level IV land environments (including wetland habitat and open water) represented in the Manawatu-Wanganui Region, the majority support only 50% or less of the original indigenous vegetation cover. Just over half of the land environments support 20% or less of the original indigenous vegetation cover (Table 3.1). Original and current extent for indigenous vegetation cover within each LENZ land environment is provided in Appendix 5.

Table 3.1: LENZ Level IV Land Environments and remaining indigenous vegetation as a proportion of original extent. Data from Overton *et al.*, 2006.

Extent of remaining indigenous vegetation extent as a proportion (%) of original extent	Number of Land Environments	Proportion (%) of total Land Environments in the Manawatu-Wanganui Region
Less than 5	18	21.2
6-10	14	16.5
11-20	12	14.1
21-30	11	12.9
31-40	6	7.1
41-50	3	3.5
51-75	7	8.2
76-100	14	16.5
Total:	85	100

Most of the loss of vegetation cover has occurred in land environments represented in lowland areas. This non-random pattern of loss is also evident when comparison is made between Figure 3.1 and Figure 3.2.

This broad analysis of change over time of indigenous vegetation cover represents a drastic loss of biodiversity. To provide qualitative information about this vegetation loss, a comparison of predicted potential previous extent with predicted current extent of each LPVT habitat type was conducted. The rate and extent of habitat loss has varied geographically and between habitat types. The degree of change between predicted original and predicted current extent is provided in Appendix 1.

3.3.1 Patterns of historic and contemporary indigenous vegetation loss

Patterns of deforestation prior to human settlement in New Zealand can be attributed to natural fire, earthquakes, volcanic activity, climate change (McGlone, 1989; Ewers, *et al*., 2006). Since human settlement deforestation has been increasingly rapid and non-random (McGlone, 1989; Ewers *et al.*, 2006) (Table 3.2). The consequential development of the land has prevented re-establishment of indigenous forest in the most part. National patterns of habitat loss were mirrored in the Manawatu-Wanganui Region, although natural dune-building phases on the west coast also played a

considerable part in the natural loss of forest cover (Cowie, 1963; Muckersie & Shepherd, 1995) prior to human settlement. Forest clearance and wetland drainage was especially rapid, attributable to the considerable proportion of the Region comprising lowland country.

Table 3.2: Rates of loss of indigenous vegetation cover from New Zealand. Estimated proportions of remaining indigenous vegetation cover are expressed as percentages of New Zealand's land surface area (data from McGlone, 1989 and Ewers *et al.*, 2006).

Cultural History	Time Period	Primary cause and reasons for loss of indigenous vegetation cover. (Area and/or pattern of greatest loss)	Estimated indigenous vegetation cover as a proportion (%) of New Zealand remaining at end of period (percentage of original cover lost)
Pre-human	> 1000 BP	Natural fire, earthquake, volcanism, lahars, natural dune-building phases, climate change. (Random events)	98
Maori settlement	1000 BP-1840	Human-induced fire, dune movement, natural events. Forest clearance to encourage bracken growth, allow for cross-country travel, assist hunting efforts. (Dry, lowland, coastal and often eastern areas).	68 (30.6)
Post-Maori settlement	1840-2007	Human-induced fire, mechanical clearance, over-grazing of sand country, dune movement, Intensive land conversion for intensive agriculture, horticulture, exotic forestry, settlement infrastructure. (Lowland and areas of mild climate suited to development, but increasingly clearance of hill country and land previously unsuited for development).	23 (76.5)

There is a clearly defined positive relationship between the suitability for human use of a landscape and the degree of habitat loss from that landscape. Those areas prone to fire or suited to agriculture and development have suffered almost complete loss of intact indigenous vegetation cover. Within the Manawatu-Wanganui Region this pattern is easily recognisable on the lowlands of, for example, Horowhenua, Manawatu, Rangitikei and Tararua Districts (Figure 3.2).

Conversely, locations characterised by cool climates, high rainfall and steep terrain have seen less habitat loss as a direct result of human activity. Further, as the demand for, and ability to develop the land in these areas was less, a greater proportion of these areas were vested in the pre-cursors of the Department of Conservation and are consequently disproportionately represented in New Zealand's reserve network.

4. Implications of large-scale loss of indigenous vegetation cover for biodiversity

Large-scale loss of indigenous vegetation has resulted in a dramatic change in the landscape, shifting from one previously dominated by continuous indigenous vegetation cover to one characterised by a matrix of land-cover dominated by production land and human-settlement infrastructure. Indigenous vegetation has been largely reduced to patches throughout the landscape, often small discrete and isolated sites.

This loss has direct implications for the vegetation communities which comprise specific habitats, and for the species which are dependent on particular habitat type. Therefore, the losses are explicit at the landscape, habitat and species scale.

The change in landscape from previously extensive areas of habitat to scattered patches of remaining habitat, is a function of habitat fragmentation. Habitat fragmentation is a wide-ranging concept that has been interpreted by different authors with different definitions, measured in different ways and at different scales (Fahrig, 2003). Here, 'fragmentation' is considered to incorporate both habitat loss and dissection of habitat as these processes occur at the landscape scale, and is considered to result in a severely detrimental impact on indigenous biodiversity. The 'fragmented landscape' discussed in the context of the Manawatu-Wanganui Region is not considered to be the endpoint of a process conducted in previous temporal space, but rather an ongoing process, as ecosystems adjust to biotic and abiotic changes associated with habitat loss and fragmentation processes.

Loss of continuity of habitat is visually obvious across the landscape and the loss of resources and consequent impacts on species population size are easy to comprehend. However, insidious, long-term implications are not restricted to the direct loss of habitat and species, and are also less obvious. For example, an increase in the isolation of remaining habitat patches (distance between habitat), a decrease in the size of habitat patches and an increase of edge habitat.

The change in habitat pattern across the landscape, and the increased proportion of exotic vegetation to habitat has negative implications for biodiversity, especially for specialist species with specific habitat requirements. Within the Manawatu-Wanganui Region species have gone extinct (eg. huia, tieke [North Island saddleback]), reduced significantly in population size and distribution (eg. northern rata, kiwi, kereru), or restricted in geographical extent (eg. North Island robin).

The loss or reduced productivity of key species (such as the pollinators and dispersers) further compromises the long term viability of habitat. The increase in edge area, associated with the processes of habitat loss and fragmentation, exposes habitat to a detrimental change in abiotic factors (warming and drying influences of exposure, wind damage, changing light, temperature and moisture levels within a system). Habitat loss results in fragmented habitat which leads to further fragmentation and habitat loss.

This change in spatial configuration of habitat also interrupts important ecological processes (including dispersal, recruitment, energy transfer etc.). Thus, detrimental impacts of habitat loss and fragmentation are not restricted to only a spatial domain, but also temporal and functional domains (Lord & Norton, 1990). Interruptions to critical processes, or at critical points (time or functionality) within a system, result in further degradation and ultimately a continued and accelerated loss, the impacts of which can be seen at the patch scale.

As the response of a population to environmental change is not always immediate, there can be a delay between habitat loss and eventual extinction of species, known as the 'extinction debt' (Hanski & Ovaskainen, 2001; Ewers, 2006). The rate through time at which this extinction debt is paid varies with the life systems of each organism and is therefore not consistent across biota.

The continued decrease in size and condition of remaining patches of indigenous habitat restricts the ability for movement of species and propagules between sites. Loss of species from the landscape, or depletion of species vigour, has consequent interruptions in the food-chain and disrupts trophic level processes. Fragmented and degraded areas of habitat are highly vulnerable to invasion by pest species (Timmins & Williams, 1991), resulting in further reduction in site and species vigour, a change in species composition, modification of the trophic levels, and can ultimately lead to the collapse of the original ecosystem.

Much of the remaining indigenous vegetation throughout the Region has fallen below self-sustaining thresholds. Consequently, without protection and restoration measures, these remaining refugia of habitat will continue to degrade and collapse. This will result in continued biodiversity loss both at the site and at landscape scale.

5. Classification of remaining indigenous vegetation

Analysis of the remaining proportion of original habitat (Section 3.3) has provided the basis from which to assess the degree of loss of biodiversity experienced within the Manawatu-Wanganui Region. As the extent of habitat loss has varied geographically and between habitat type, the degree of loss can be used to categorise habitat types.

Habitat types were categorised into 'status categories' defined by thresholds of loss. These thresholds are based on representativeness, the level at which each threshold was set by application of species-area curves and extinction threshold theory.

Representativeness:
Representativeness indicates the degree to which the remaining habitat type represents the original biodiversity pattern. The degree of loss can determine the level of 'representativeness' of a given habitat type. Habitat type that was once common and, as a result of extensive human-induced habitat loss, is now uncommon, is considered to be highly representative habitat. The concept of representativeness has been given considerable importance during this analysis.

The contribution of representative habitat to indigenous biodiversity is disproportionate to the extent and patch size of this remaining habitat. Thus, protection of representative habitat offers greater immediate biodiversity gains when compared to protection of habitat types already well represented across the landscape and within protected networks. It is important to note that representativeness is not a measure of condition, and fragments in highly modified states and relatively poor health can still contribute to representativeness.

Species-area curves and extinction thresholds:
Island biogeography theory (MacArthur & Wilson, 1967) explains species persistence as a function of habitat size and isolation. This is because extinction rates are determined by the size of habitat, while rate of colonisation of an area is a function of isolation (distance from other area). The theory shows a non-linear relationship between size and number of species, with larger areas of habitat supporting more species than smaller areas (MacArthur & Wilson, 1967; Rosenweig, 1995, Walker *et al.*, 2005), and thus species loss increases as area of habitat decreases (Figure 5.1)

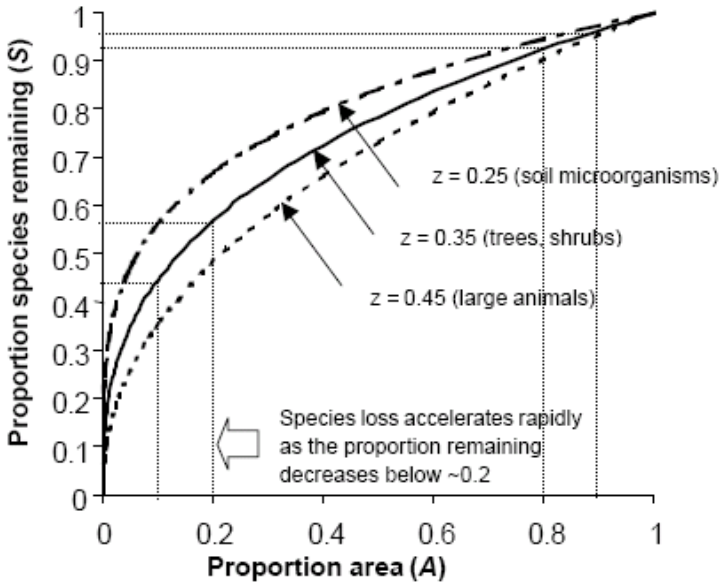

Figure 5.1: Generalised species-area curves taken from Walker *et al*. (2005). The proportions of species remaining (S) are presented in relation to the area (expressed as a proportion) of remaining indigenous habitat (A), and are given for biota of different body size. The dotted lines illustrate rate of loss of species with a decrease in habitat area.

Island biography has been applied to terrestrial ecology where fragments are 'islands' and the surrounding modified landscape is the 'sea'. While this application remains valid, the importance of scale is now also recognised (Rutledge, 2003).

The total amount of habitat is a fundamental determinant for species survival, regardless of how this habitat is spatially arranged across the landscape. (Rutledge, 2003). There is a drastic decline in species survival once a habitat extent drops below a certain threshold (Fahrig, 2001, Rutledge, 2003). This is known as the 'extinction threshold', a largely theoretical (Fahrig, 2003)

concept that has been described by Fahrig (2002) as "the minimum amount of habitat required for a population of a particular species to persist in a landscape". This minimum amount of habitat is reached when mortality is equal to reproduction across the landscape (Fahrig, 2002). When considered collectively across a landscape, even small patches of habitat contribute to the habitat minimums required for species persistence. Therefore, any further loss in habitat extent will impact on species survival (Rutledge, 2003).

Extinction thresholds are species-specific (Walker *et al.,* 2005), and dependent on population dynamics in relation to habitat requirements, resource availability, patterns and processes of habitat use, and population models (eg. such as described by CE [colonisation-extinction] or BIDE [birth-immigration-death-emigration) models]) (Hanski & Ovaskainen, 2001; Fahrig, 2002). What remains consistent is the trend of the curve, and the rapid decline in species persistence once the extinction threshold has been crossed (Walker *et al.*, 2005; Rutledge, 2003; Fahrig, 2001; Fahrig, 2002).

The species-area curve that approximates the species-area relationship for trees (and shrubs) has been used in this analysis to determine a theoretical extinction threshold. This is logical as trees can be determined by remote sensing and therefore remaining cover can be assessed. Further, the LPVT habitat types have been determined by distribution and association of dominant tree species (Section 2.1).

5.1 Assigning habitat type to status categories

This analysis identified three status categories (Table 5.1), with a further status category ('Rare' habitat type) being determined by the frequency and extent of occurrence in the landscape, rather than by analysis of proportional cover. All habitat types identified by this report fall into one of the four status categories. A consolidated list of the habitat types and previous and remaining extent figures identified by this report can be found in Appendix 1.

Table 5.1: The four categories of habitat status as identified by this report.

Status Category	Definition
Rare	Habitat types that were originally (pre-human) uncommon in the landscape and remain so. Rare habitats can be small in scale but geographically widespread or larger in scale but geographically restricted.
Threatened	Habitat types that have been reduced to 20% or less of former extent. Threatened habitat types are considered highly representative of former biodiversity pattern.
At Risk	Habitat types that have been reduced to 50% or less of former extent.
No Threat Category	Habitat types where 50% or greater of former extent remains. These habitats can provide habitat for threatened species, distinctive features, or contribute to ecological function at a landscape level. A high proportion of these habitat types are already protected as public conservation land.

The remaining extent and how this relates to the status category of each habitat type identified within the Manawatu-Wanganui Region can be expressed graphically (Figure 5.2).

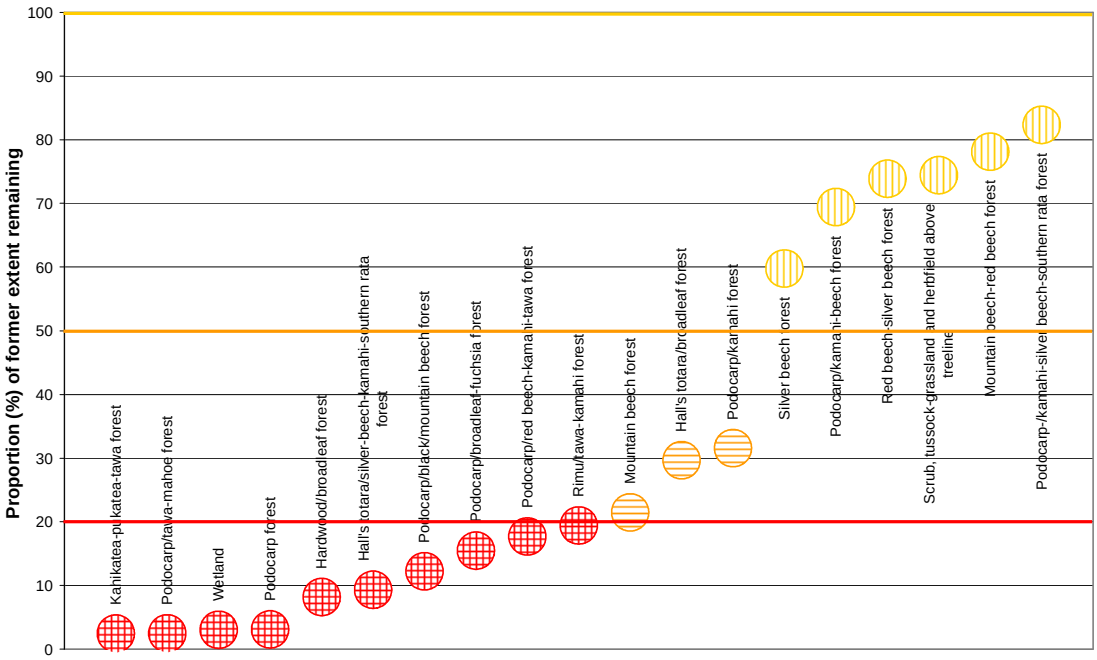

Figure 5.2: Habitat types identified in the Manawatu-Wanganui Region and remaining extent of each habitat type expressed as a proportion of previous extent. Habitat types below the horizontal red line are considered 'Threatened' habitat types (red hatched circles). Habitat types below the horizontal orange line are considered 'At Risk' habitat types (orange horizontal shaded circles). Habitat types below the horizontal yellow line are labelled 'No Threat Category' (yellow vertical shaded circles).

5.1.1 Rare habitat types

Rare habitat types are those that were always uncommon in the landscape and remain so in present times. These unique habitats tend to comprise a high number of endemic species, a high number of threatened plant species (Williams *et al*., 2006), and contribute to diversity of habitat and ecosystem across the landscape. Therefore, although often small in scale, naturally rare habitat types contribute greatly to the Region's indigenous biodiversity. The disproportionately high contribution of rare habitats to regional biodiversity warrant their inclusion in any consideration of need for habitat protection.

Rare habitats tend to be small and treeless, specialised, and occuring in extreme environments (Williams *et al*., 2006). Current national spatial datasets and remote sensing techniques tend to be ineffective on such a fine-scale and in delimiting non-forest vegetation cover. Consequently, rare habitat types that are present within the Region could not be remotely identified and classified by the same process as forest or wetland habitats.

A national programme to identify rare habitats is being implemented by Landcare Research and funded by the Foundation for Research in Science and Technology (FRST). This eight-year programme (initiated in July 2005) will ultimately identify rare ecosystems, spatially define distribution, and identify threats to and management needs of rare habitat types. Although this work is in initial stages, preliminary results (Williams *et al*., 2006) provide enough sound definition of rare habitat types to determine rare habitat types likely to be present in the Manawatu-Wanganui Region.

An initial list of rare habitat types potentially present in the Manawatu-Wanganui Region was taken from Williams *et al.* (2006) (Table 5.2).

Table 5.2: Rare habitat types within the Manawatu-Wanganui Region as identified by Williams *et al*., (2006). Rare habitats have been defined by the physical environment and named for the dominant structural vegetation class. Vegetation structure (second column) follows Atkinson, 1985. Wetland habitat found on duneland systems is included in Section 5.1.2.

Rare habitat type	Structure of indigenous vegetation communities habitat type may support	Comment
Coastal cliffs on silicic-intermediate rock	Lichenfield, herbfield, scrub, shrubland, tussockland	Private land at Cape Turnagain.
Debris flow or lahar formed by recent silicic volcanic substrates	Mossfield, scrub, forest	Mainly present within public conservation land. New flows outside of public conservation land unlikely to fulfil potential of vegetation establishment (eg. lahar flow across developed land or infrastructure).
Active dunelands formed on raw coastal sand	Grassland, sedgeland, herbfield	Threats from vehicles and invasive species. Provides habitat for threatened species. High degree of loss of former habitat extent.
Stable dunelands formed on recent coastal sand	Shrubland, grassland, tussockland, herbfield	Threats from landuse, vehicles, invasive species. Provides habitat for threatened species. High degree of loss of former habitat extent.
Inland dunelands formed on raw or recent sands inland	Scrub, tussockland, herbfield, forest	Threats from landuse, invasive species. High degree of loss of former habitat extent.
Geothermal systems characterised by excessive heat and geothermal processes	Mossfield, shrubland, scrub	One site (Ketetahi Springs), important cultural site, iwi land within public conservation estate and already has a high level of protection.

5.1.2 Threatened habitat types

Threatened habitat types are those that have been reduced to 20% or less of former extent and are therefore considered to be under-represented across the landscape. The majority (52.6%, ten habitat types) of the identified habitat types within the Manawatu-Wanganui Region fall into the threatened category (Figure 5.2). These habitat types were previously dominant throughout the lowland areas of the Region, and now exist as highly fragmented, modified and often isolated patches throughout the lowland landscape.

Habitat resilience decreases, and susceptibility to incremental loss increases as the proportion of remaining habitat is reduced to 20% of former cover (Rutledge, 2003; Walker, 2005). Even small losses of Threatened habitat type have disproportionately negative impacts.

Habitat type that has been reduced to 20% or less of former cover is considered 'Threatened' for two fundamental reasons; (1) loss has been drastic and, (2) the risk of continued loss is high.

5.1.3 At Risk habitat types

Three (15.8%) habitat types within the Manawatu-Wanganui Region fall within the 'At Risk' status category (Figure 5.2). These habitat types fall within the 20–50% range of former habitat cover remaining and are considered 'At Risk', because these habitat types could easily trend downwards, conceivably to below sustainable thresholds if they are not protected.

Protection of these habitat types can be seen as a biodiversity insurance policy – a preventative measure to avoid more habitat types joining the long list of Threatened habitat type.

Although At Risk habitat types are present across the landscape in greater extent (compared to Threatened habitat types), and remnant patches are generally larger and less isolated from each other, these habitat types remain vulnerable to the processes of habitat fragmentation and pest invasion.

Invasive animal species can also impact heavily (eg. mustalids in mountain beech forest, and possums, particularly in patches of Hall's totara/broadleaf forest and Podocarp/kamahi forest). The impact of pest plant species is more a function of patch condition, than total extent of remaining habitat across the landscape, and the smaller, irregular shaped (high proportion of edge) patches will be prone to invasion, especially those present close to settlements (Timmins & Williams, 1991; Sullivan *et al.*, 2005).

5.1.4 No Threat Category habitat types

The term 'No Threat Category' is in reference to the high proportion of remaining extent of cover, and the low risk of immediate threat to the persistence of these habitat types. The term should not be mistaken to mean that these habitat types are immune to detrimental impacts of threats in general, be they human activities or pest species.

Of the habitat types within the Manawatu-Wanganui Region, six (31.6%) have been categorised as 'No Threat Category' habitat types. These habitat types tend to be spatially concentrated on landscape less amenable to development (ie. hill and mountainous areas) and the persistence of habitat in these areas is largely due to the historic (and to some extent contemporary) lack of demand for the land. These habitat types are also well represented within the public conservation networks.

Patches of 'No Threat Category' habitat type tend to be larger, more continuous, less isolated. Therefore, these patches tend to be more functionally and structurally intact, and more resilient to impacts of invasive species. The patterns of fragmentation (especially small, isolated patches with high proportion of edge habitat) are less evident or absent.

6. Mapping status category of remaining habitat type

Habitat type can be mapped by status category and this is useful to illustrate regional patterns.

In the majority of the Region, the patches of habitat that remain are Threatened habitat type (Figure 6.1). Clear distributional trends are evident, with Threatened habitat concentrated in the areas most suited to development (warm and dry), and At Risk and No Threat Category habitat types largely found in areas of less productive potential (cold and wet), and matching the boundaries of public conservation land.

Mapping habitat by status category at this scale, whilst useful to illustrate general trends across the Region, obscures difference. To overcome this, Water Management Sub-zones (WMS) (McArthur *et al.,* 2007) were chosen as a mapping unit.

Several determinants of the WMS, such as natural watershed/catchment boundaries, underlying geology, and catchment landuse type and future potential resource pressure, influence environmental determinants of indigenous vegetation (and terrestrial biodiversity) pattern. Further, Water Management Zones are the fundamental geographic units of the integrated water quality and quantity management regime developed by Horizons, and as such provide a common mapping unit with other streams of policy. Therefore WMS were a logical mapping unit to use to present habitat status across the Region. Sub-zones were chosen over Water Management Zones to allow for more refined analysis.

Although Ecological Districts (Simpson, 1982) are considered the most logical spatial scale at which to asses ecological significance (Norton & Roper-Lindsay, 2004), and would have been a valid mapping unit for this work, WMS have been recommended to allow for a greater alignment with current and potential policy and allow for a common thread between terrestrial and aquatic biodiversity. However, the value of Ecological Districts when considering ecological significance at the patch scale has not been disregarded (Section **Error! Reference source not found.**).

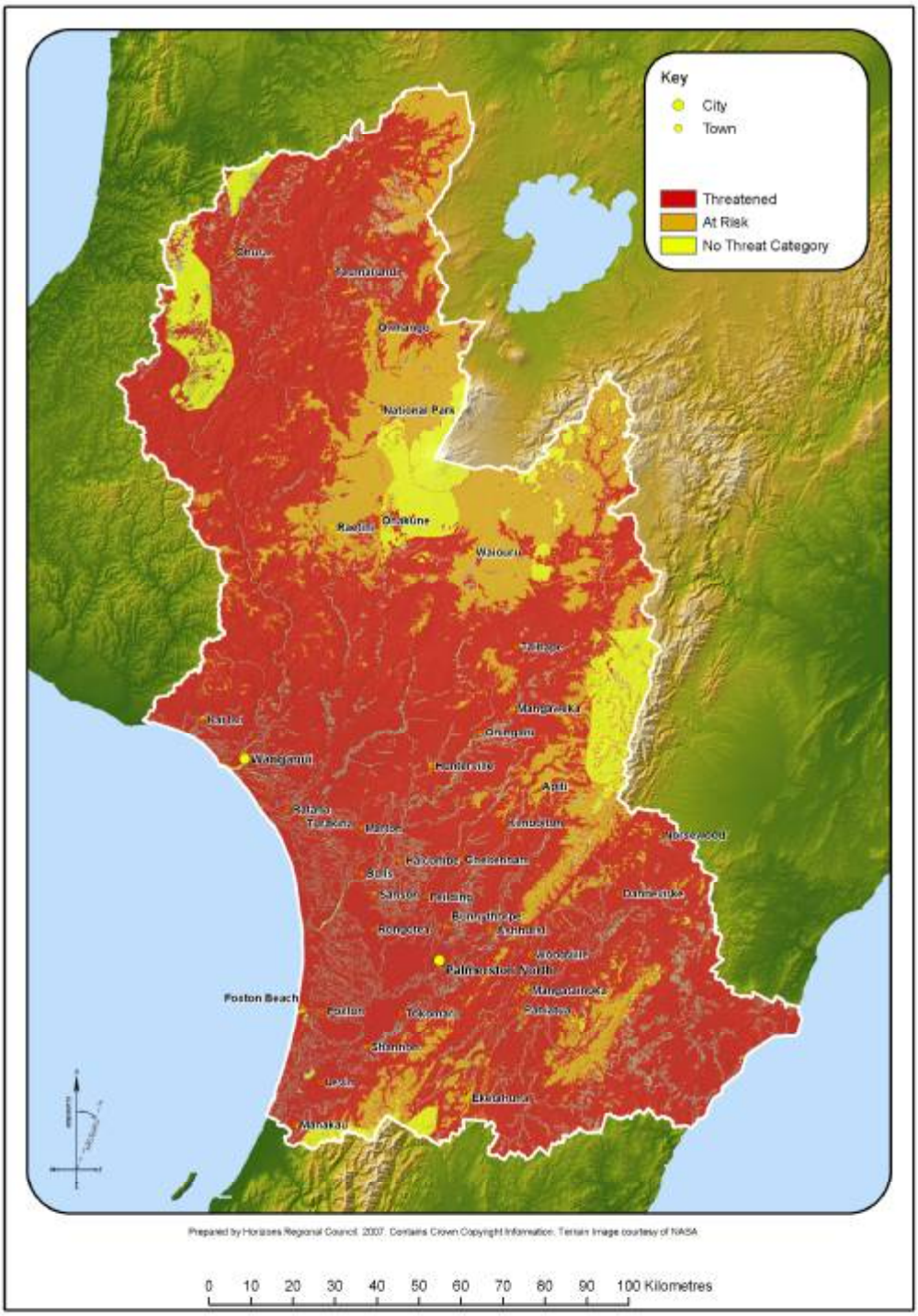

Figure 6.1: Map of the Manawatu-Wanganui Region showing the spatial pattern of Threatened, At Risk and No Threat Category habitat types at a scale of 1:1,080,000. Areas of no colour indicate areas were current vegetation cover could not be determined (Categorised as No Data).

6.1 Methodology for mapping habitat status by Water Management Sub-zone

Landcare Research (Overton *et al.*, 2006) supplied the results of the analysis of predicted and current vegetation cover in the Manawatu-Wanganui Region in the form of Geospatial Information System (GIS) layers and Excel worksheets. This information was applied to Water Management Sub-zones (WMS) in the following manner.

The Leathwick *et al.* (2004) (LPVT) habitat type analysis for the Region was used as the starting layer. The LPVT layer was clipped to the Region, and the features converted from raster to feature data. The gridcode was dissolved and the resulting shape file was joined with the corresponding LPVT Excel worksheet, and then to the LCDB2 data. This was then exported to a new shapefile which was intersected with the WMSZ layer to create a final shapefile. The shapefile was then classified based on vegetation type in LCDB2 compared with the LPVT. The area of each habitat type (predicted previous and actual current) distributed within each WMS could then be calculated. Areas were calculated using X Tools in ArcMap 9.1.

Within each WMS proportional analysis was conducted to determine the status category of the majority of the remaining habitat (Appendix 7), and thus classify each WMS according to the status of the remaining habitat type (Table 6.1). This analysis provided the means to map spatial pattern in a way that remains unchanged, regardless of the mapping scale.

Table 6.1: Coding Water Management Sub-zones according to proportional analysis of status category of remaining habitat type. It should be noted that habitat type of any status category can be found within a given WMS.

Colour Code	Indicates that remaining habitat within the WMS is:	Definition
Red	Predominantly Threatened habitat type	Greater than 50% Threatened habitat type or greater than 75% Threatened and At Risk habitat type combined.
Orange	Predominantly Threatened or At Risk habitat type	Greater than 50% At Risk habitat type or greater 50% Threatened and At Risk habitat type combined, or greater 33% Threatened habitat type.
Yellow	Predominantly No Threat Category	Greater than 65% No Threat Category habitat type.

The general trends in regional pattern of spatial distribution of habitat status remain unchanged (Figure 6.2).

The representativeness value of each habitat type was calculated at the regional scale (using LENZ IV and LCDB2), not within each WMS. Thus, WMS are merely a frame of reference for presenting the information, not a geographical unit for analysis. As the general spatial trends of remaining habitat are consistent across a variety of mapping units, WMS are a valid choice and provide a clear spatial indication of the biodiversity protection requirements.

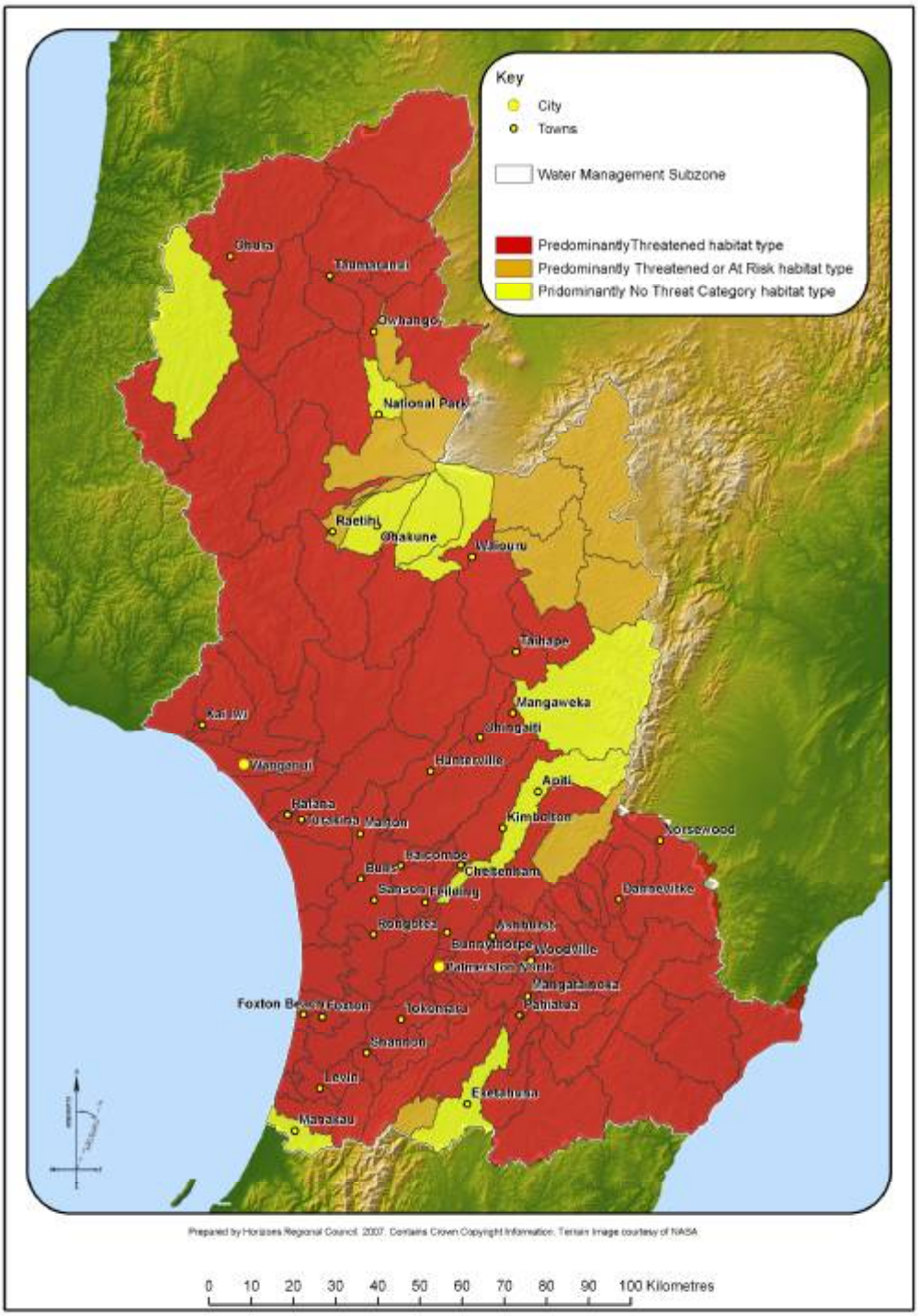

Figure 6.2: Map of the Manawatu-Wanganui Region showing Water Management Sub-zones (WMS) colour coded according to status of the remaining patches of indigenous vegetation identified as habitat type as per LPVT (Leathwick *et al.*, 2004). Percentage of habitat status category is calculated as a proportion of all the remaining LPVT habitat type within each WMS. Non-vegetated habitat types have been included in the analysis to avoid 'gaps' in the GIS data layers and because these habitat types can provide habitat for threatened species. Data is provided in Appendix 7.

7. Ecologically significant sites and consideration of threatened species

The approach outlined in previous sections is heavily focused on biodiversity value of remaining habitat with representativeness assessed at the regional (landscape) scale used as a key indicator of this. This has strong merit and allows for the capture of a sizable portion of remaining indigenous vegetation cover, and thus biodiversity. However, the emphasis on biodiversity value can potentially exclude habitats and/or discrete patches that are of importance for values other than contribution to indigenous biodiversity. For example, contribution to landscape patterns and connectivity between sites and between habitat types, or possible contribution to ecosystem processes and services. Such areas may not directly contribute to biodiversity but do contain ecological values that are worthy of protection.

Further, remote sensing techniques are an effective method in which to determine biodiversity pattern but are not sensitive enough to determine importance at the patch scale (eg. presence of threatened species).

Just as a comprehensive inventory of sites contributing to biodiversity does not exist for the Region, there is no complete list of sites of ecological significance. The lack of existing complete knowledge for the Region, combined with the inability of predictive models to identify such areas, restricts the ability to geographically define where sites of importance are, and thus direct broad-scale policy for protection of ecological significant sites.

The use of the ecological significance criteria (of which biodiversity value is just one component) can be used to identify discrete patches not detected by the analysis conducted for this project. Thus it complements identification of biodiversity values at the landscape scale with assessment of ecological significance at the patch scale.

This criteria can also be applied when assessing sites for aquatic significance and should be considered in conjunction with the Sites of Significance for Aquatic Biodiversity in the Manawatu-Wanganui Region Technical Report (McArthur *et al.*, 2007).

7.1 Criteria for determining the ecological significance of a site

The use of defendable criteria which assesses ecological significance of discrete sites is accepted methodology. (Norton & Roper-Lindsay, 2004; Environment Waikato & Wildlands Consultants, 2002).

Desktop and field-based assessment should be incorporated when determining the ecological significance of a site. These criteria can be applied to both terrestrial and aquatic biodiversity and ecological values. There are four primary criteria which are briefly described below. More detail is provided in Appendix 8.

1. Representativeness

Representativeness is a measure of how characteristic a patch of habitat is of previous biodiversity pattern. This criterion has been largely addressed by the

methods outlined in previous sections. However, an assessment of representativeness can be made at different scales and whilst the representative value of habitat type has been determined at the regional scale, this criterion can also apply at a larger (eg. national) or smaller (eg. Ecological District) scale.

2. Rarity and Distinctiveness

This criterion evaluates a site at the species level. Rarity of species is determined by the New Zealand Threat Classification System (Molloy *et al.*, 2002). This classification system has a hierarchy of threat class ranging from Nationally Critical to Range Restricted. Threat class will be taken into account when evaluating significance under this criterion.

Distinctiveness is harder to determine and describes the uncommon presence, or unique assemblage of species or habitat at any given geographical location.

3. Ecological Context

This criterion evaluates the contribution a site makes to maintaining ecosystem processes at the landscape level. Connections between fragments are vital to enable processes and for the continued functioning of ecosystems. Dispersal and movement of species, pollen, and seeds as well as physical connections such as water flows, are important components of biological and environmental links between ecosystems.

Fragmented habitat is heavily dependent on, and influenced, by surrounding land-use and presence or absence of other habitat in the vicinity. The presence of a buffer (a closely adjacent site, or edge habitat (even degraded or exotic edge), can contribute positively to the long term viability of a site.

Ecological sequences occur across the landscape and through time as a result of environmental gradients (for example the changes in vegetation from the mountains to the sea). The presence of ecological sequences in the landscape provides for a greater range of habitats which have within them more complex species assemblages and richer biological diversity than those which occur in homogeneous landscapes.

4. Previously Assessed Sites

Any site assessed at a previous time, or by a previous agency, to be of ecological significance.

In some cases, information will already exist in the Horizons database or with another agency that will identify a given site as being of ecological significance

7.2 Consideration of threatened species

Loss of a threatened species has an immediate and, unless reintroductions are possible, permanent impact on the biodiversity of the Region. Ecological criteria used to assess sites includes consideration of threatened species. Enough species population status and distribution information is available at the regional scale (but not currently available at the patch scale) to compile a list of threatened species for the Region. Presence of threatened species can act as an indicator of priority for protection of sites where they occur.

Although the Department of Conservation has the key role in protecting threatened species, habitat protection on private land is often an area where DOC has little effective jurisdiction. Horizons is well positioned to complement the protection of threatened species on private land with the protection of habitats that support threatened species. The focus for Horizons should remain on providing protection for patches of habitat that support threatened species, not on survival management for the species *per se.*

This approach is inline with Horizons' general focus on habitat protection, recognises that DOC has the mandate, knowledge and species management expertise to be the more appropriate agency to focus on species, and acknowledges that individual species contribute greatly to the Region's biodiversity.

7.2.1 Methods for identifying threatened species present in the Manawatu-Wanganui Region

The New Zealand threat classification system (Molloy *et al.*, 2002) was used to determine the threatened status of species within the Region. The New Zealand Threat Classification System divides species into categories dependent on the level of threat of extinction. Each species present in the wild within New Zealand is assessed against this classification system and assigned a category (Figure 7.1).

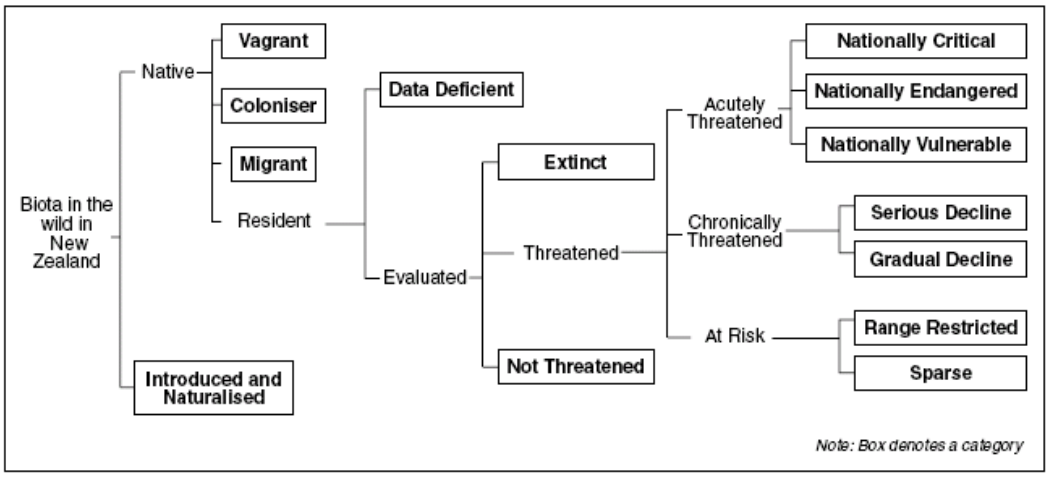

Figure 7.1: Structure of the New Zealand Threat Classification System, taken from Molloy *et al*., 2002.

From this process a list of threatened species has been developed (Hitchmough 2005). The known distribution of species included on the threatened species list is presented by DOC Conservancy boundaries. This spatial information and advice of DOC staff was used to determine which threatened species are present in the Manawatu-Wanganui Region.

The list of species provided by Hitchmough (2005) is extensive, with many of the species names listed having little meaning for many within the community. A modified list has been proposed for the purposes of developing policy (Appendix 9). This list is based on species listed in Hitchmough that are easily identifiable, and threatened species reliant on vulnerable habitats not easily identified by remote sensing techniques (eg. non-forested habitats).

Expert opinion has been solicited to identify regionally endemic species, species uncommon within the Region but not considered threatened under the Hitchmough lists, and species whose distribution within the Region, or assemblage with other species is considered ecologically distinctive. Such species have been incorporated into Appendix 9, which will be added to as knowledge around threatened species increases.

8. Conclusions

- Dramatic and extensive loss of indigenous vegetation cover and biodiversity has occurred throughout the Region, but most drastically within the lowland areas and areas less suited to development. The regional landscape has changed from one dominated by indigenous vegetation to a landscape dominated by production and human infrastructure.
- This disruption in continuity of indigenous vegetation cover has resulted in remaining indigenous habitat occuring largely in isolated patches. For many species (particularly highly vulnerable or immobile species) within these isolated patches, movement between patches has become restricted or prevented.
- Loss and degradation of biodiversity will continue in the absence of management that includes the removal of threats (direct and indirect) and restoration of habitat. Species at these sites and within these habitat types will continue to be lost. In many cases, particular habitat types will not recover to sustainable levels without the active creation of additional habitat.
- Species-area thresholds relied upon to determine sustainable habitat thresholds will miss some crucial species. Further, many patches throughout the landscape are already below these self-sustaining thresholds. Consequently, continued decline (and extinction) is inevitable, unless the condition and extent of the remaining habitat is enhanced.
- Therefore, 'protection' for biodiversity needs to have two meanings: legal protection to ensure no further habitat loss; and protection in the form of active management from threats that extends to enhancement of the habitat at property and landscape scale. This needs to include comprehensive, and in some cases aggressive, management of these habitat types.
- Despite the negative prognosis (in the absence of sustained interventionist management) for habitat types and indeed many patches of habitat that currently sit below self-sustaining thresholds, such sites should not be generically written off. They can still contribute to biodiversity pattern and maintain ecological or biodiversity worth. However, it must be acknowledged that protection is crucial, and needs to incorporate enhancement and expansion for these sites to persist in the landscape in the long-term.
- Given the degree of loss and the enormity of the task of halting biodiversity decline, prioritisation of protection is justified. This can be done by identification of habitat types present within the Region, and assigning a status category determined by the extent of remaining cover to each habitat type. Assigning status categories to habitat types acknowledges differences in loss and biodiversity value and enables consideration of specific protection needs. Status categories can provide a framework for policy development.

- The growing reliability and robustness of remote sensing techniques, predictive computer models and spatial databases has made these methodologies useful for spatially identifying biodiversity priorities.
- However, the inherent limitations of these tools is acknowledged. The scope of these methodologies is currently limited to forest, secondary forest, grey scrub and wetland habitat. Consequently, there are a number of structural vegetation classes that have not been included in this exercise, including herbfield, shrubland, and some grassland, as well as naturally rare habitat types, sites small in scale or comprising distinctive features.
- Expert opinion on the identification, distribution, composition and condition of these habitat types needs to be incorporated into methodologies for justifying the need for protection of particular habitat types or patches of habitat.
- The use of standard robust criteria for assessing the ecological significance of sites is a crucial tool that contributes to the justification of biodiversity protection at the patch scale. Ecological value needs to be considered in conjunction with biodiversity value when considering protection needs for the Region.
- Existing knowledge on particular sites, including the presence of threatened species, ecologically unusual distributions or assemblages of species, or other ecologically distinctive values, provide crucial information on biodiversity patterns within the Region. Use of this information in association with other methodologies is a valid technique for justifying the need for protection of particular habitat types or patches of habitat.
- The contribution to indigenous vegetation cover and biodiversity value afforded by scrub is recognised, as is the prolific use of this habitat type for firewood and other uses. However, the pervasive tensions between resource use and preservation remain unresolved at this point in time. Increased recognition of the contribution of scrub to biodiversity pattern as potential forest and as a considerable contributor to indigenous vegetation cover is required.

9. Recommendations

9.1 Recommendations to improve suggested approach for justifying the need for biodiversity protection

- The capability and scope of remote sensing techniques, predictive computer models and spatial databases will continue to progress. These future improvements should be incorporated into the methodology outlined here as they become available. This will provide a more thorough and complete consideration of the biodiversity priorities for the Region.
- In the interim, further analysis of the state of a wider range of habitat types needs to be included. This will require the amalgamation of several techniques including a heavy reliance on expert opinion. Although this is a much more subjective and thus less robust and repeatable methodology, it is necessary at this point in time due to the current limitations of remote sensing techniques, predictive computer models and national spatial databases. Given the high proportion of regional biodiversity found within such areas, the risk of continued loss in an absence of a framework for protection is high.

- Developments in the identification of nationally rare habitat types project should be incorporated into this project by way of inventory and spatial delimitation of these sites as the information becomes available.
- Knowledge on the condition and biodiversity value of individual sites and thus biodiversity pattern across the Region will continually increase. This needs to be reflected in the justification and priorities for biodiversity protection.

9.2 Recommendations for the development of a policy framework for the protection of biodiversity

- Generally, 'protection' should be manifested in legal protection and restoration protection (site management) in equal measures. The greatest gains in biodiversity improvement will be made through the sustained management of invasive pests, habitat enhancement (eg. restoration plantings, species replacement, expansion of habitat) and other activities for which it is difficult to regulate. However, in a landscape so characterised by biodiversity loss, a strong regulatory message is required.
- Rare and Threatened habitat types should be afforded the highest level of regulatory protection. Regulatory protection of these habitat types will need to be mirrored with an equally high level of prioritisation for non-regulatory methods of protection.
- At Risk habitat types can afford more flexibility in approach, but the need for protection remains high to ensure that the extent of these habitats across the landscape is not reduced to the point where incremental biodiversity loss becomes inevitable. Protection will prevent the potential movement from an At Risk status to a Threatened status.
- Whilst protection of 'No Threat Category' habitat types is less urgent, the ecological importance of these habitat types should not be overlooked. Larger areas of contiguous indigenous vegetation allow for ecological processes (as well as biodiversity pattern) across the landscape. Other important ecological functions provided by these habitat types include the provision of habitat for threatened and vulnerable species, and crucial environmental services (eg. soil health and persistence, climate control). While the policy and protection response can afford to be less stringent, the ecological value of large areas of indigenous habitat should be acknowledged and managed for.
- Where the impacts of a known activity are likely to impact on a site of indigenous habitat, the degree of ecological significance of the site should be assessed using the criteria for assessing ecological significance as outlined in this report. The impact of activities should be considered against any identified values within the site, and decisions made in a way that affords protection to those values. The level of protection required for such sites should focus on protecting the ecological or biodiversity values identified at the site.
- A high level of protection should be afforded to patches of habitat that are known (or can be found) to support threatened species. Any activities in or around sites providing habitat for threatened species should be considered in light of ensuring persistence of the required habitat, and thus the species. It is also strongly recommended that consideration of threat status is not restricted to those species provided in Appendix 9, but is driven by national threatened status lists (including revisions) or local expert advice.

- Non-regulatory methods for protection of biodiversity should focus on funding biodiversity management at the patch scale. This work needs to be driven by a robust prioritisation process. This process should take into account degree of threat, percent of habitat type already protected, ecological condition, and distinctive habitat types and distinctive features of patches. This should identify the best fragments within the Region. In order to do this, information collected remotely will need to be supplemented with field survey and expert opinion.

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11. Appendices

Appendix 1: Habitat types of the Manawatu-Wanganui Region

Table 11.1: Habitat name, broad habitat type description, previous and current cover, the proportion (%) of former cover remaining and status category for each of the habitat types identified in this report. The habitat type names are given as suggested for use in the Manawatu-Wanganui Region (section 2.1). Where this habitat type name differs from the original (as per the LPVT) habitat type names, the original name is provided in brackets. Where more than one habitat type has been merged, names and data for all habitat type included within the suggested habitat type name have been provided. The LPVT (Leathwick *et al*., 2004) identified 27 habitat types, 19 of which are detailed below. One habitat type ('Kahikatea-totara forest' is no longer present in the Region (previous cover of 21.875 ha), and one habitat type ('Scrub, shrubland & tussock-grassland below treeline') was not identified as ever having been present in the Region. Eighty-five hectares (0.004% of the Region) returned 'No data' during this analysis. The figures for non-vegetated habitat types have been included as they contributed to analysis elsewhere. Dunelands have been included in this table, although they are also considered to be Rare habitat type (Section 5.1.1).

Habitat Name	Habitat Description	Previous cover (ha) of habitat	Area (ha) of the Region remaining in same habitat	Proportion (%) of former cover remaining	Status Category
Forest Habitat named for and defined by dominant vegetation type					
Kahikatea-pukatea-tawa forest	This habitat type is characterised by the presence of the swamp forest species kahikatea and pukatea in association with tawa in the drier, better-drained or raised areas. Matai, rimu and totara can be present but are restricted to better-drained soils. Titoki can be locally abundant in drier areas where soils are poorly drained. This habitat type can be found on lowland alluvium and floodplains.	66,786.063	1,636.875	2.45	Threatened
Podocarp/tawa-mahoe forest (Kahikatea-matai/tawa-mahoe forest)	Podocarp/tawa-mahoe forest is dominated by tawa and mahoe. Kahikatea and matai trees are present in the canopy or as emergent trees. Rimu and totara can also be present in low numbers. Tawa, mahoe, titoki, hinau, maires and pukatea can also be present. The sub-canopy comprises common broadleaf species. This habitat type is found on dry dune land and low hill country.	85,357.563	2,117.188	2.48	Threatened
Podocarp forest (Matai-kahikatea-totara forest)	Podocarp forest is dominated by the podocarp species matai, kahikatea and totara. The dominance of any species is dependent on the drainage capability of the soil and history of past disturbance. Totara and matai are more abundant on free-draining soils, with kahikatea dominating on poorly-drained soils. Broadleaf species are commonly found in association with the podocarp species, but in less abundance, including titoki, tawa, maires and fuchsia.	37,255.250	1,152.438	3.09	Threatened
Hardwood/broadleaf forest (Kauri/taraire-kohekohe-tawa forest)	The hardwood/broadleaf forest is dominated by tawa with kamahi, hinau, black maire, and southern rata also typically present. Kahikatea, rimu and/or totara can be emergent. Titoki and rewarewa can also be a feature. The subcanopy comprises common broadleaf species.	1,042.000	85.25	8.18	Threatened

Habitat Name	Habitat Description	Previous cover (ha) of habitat	Area (ha) of the Region remaining in same habitat	Proportion (%) of former cover remaining	Status Category
Hall's totara/silver beech-kamahi (Hall's totara/silver beech-kamahi-southern rata)	This habitat type is dominated by a canopy of silver beech with kamahi also common. Podocarp species such as Hall's totara, totara, rimu and miro can be emergent at lower elevations Northern rata may be scattered throughout, although its presence will be strongly influenced by the presence (current or historic) of possum.	2,208.813	206.25	9.33	Threatened
Podocarp/black/mountain beech forest (Matai-totara/black/mountain beech forest)	This habitat type comprises black and mountain beech forest. Emergent podocarp species can be present in low numbers, including matai, totara, kahikatea and rimu and miro on wetter sites Small broadleaf trees are also likely to be present. This habitat type can be found at mid-altitudinal zones in dry climates, on free draining, relatively fertile soils.	55,561.875	6,797.438	12.23	Threatened
Podocarp/broadleaf-fuchsia forest (Matai-totara-kahikatea-rimu/broadleaf-fuchsia forest)	Podocarp/broadleaf-fuchsia forest is dominated by common broadleaf (woody flowering plants) species over which matai, totara, kahikatea or rimu are present to varying degrees. Climbers and epiphytes can be common. This habitat type tends to favour adequately drained and reasonably fertile soils. Although typically a feature of this habitat type, fuchsia is favoured by possums and may be uncommon in many areas.	591.375	91.625	15.49	Threatened
Podocarp/red-beech-kamahi-tawa forest (Rimu-miro/tawari-red beech-kamahi-tawa forest)	Red beech, kamahi and tawa dominate this mid-altitudinal habitat type. Podocarp species such as rimu and miro can be present scattered through the canopy or as emergent trees. Broadleaf species can also be present in the subcanopy and understorey.	973.500	172.313	17.70	Threatened
Rimu/tawa-kamahi forest	This habitat type is dominated by tawa and kamahi with hinau, rewarewa and mahoe common. Rimu is a feature of this habitat type, although its frequency will be dependent on the history of disturbance of the site. Miro and totara can also be present with kahikatea and matai being less common. Pukatea can be common, particularly in valleys. Black beech can be locally common (eg. inland from Wanganui). Common broadleaf species will be present in the understorey.	1,169,518.625	227,157.813	19.42	Threatened
Mountain beech forest	Mountain beech forest is dominated by mountain beech, often occuring without many other tree species although mountain conifers and other species can be present in places. The understorey is typically sparse. Mountain beech forest is a common habitat type of the mountains (especially on eastern sites), occuring at higher altitudes where soils are thinner and less fertile. Mountain beech can tolerate cold temperatures and dry winds.	93,182.938	20,017.500	21.48	At Risk
Hall's totara/broadleaf forest	Hall's totara is a dominant component of this habitat type and may be emergent above the more common broadleaf species. Kamahi can also be a component of this habitat type, with matai and miro also present at lower altitudes. This habitat type is the dominant habitat type above 800 m asl and can be found in sites where beech is absent.	71,009.500	21,078.000	29.68	At Risk
Podocarp/kamahi forest	Podocarp/kamahi forest is dominated with the podocarp species rimu, miro, kahikatea or matai, totara	205,695.250	64,926.313	31.56	At Risk

Habitat Name	Habitat Description	Previous cover (ha) of habitat	Area (ha) of the Region remaining in same habitat	Proportion (%) of former cover remaining	Status Category
(Rimu-matai-miro-totara/kamahi forest) (Rimu-miro-totara/kamahi forest)	scattered throughout in varying dominance (dependent on soil drainage) over abundant kamahi. Tawa can also be present, as well as northern rata, hinau, maires, fuchsia and mahoe.	405.750	133.313	32.85	
Silver beech forest	Silver beech can be found where rainfall is higher (compared with mountain beech), and can form almost pure forests at higher elevations. The understorey typically supports small trees and shrubs. Hall's totara, rimu, miro or kahikatea can be present at mid altitudes. Kamahi can form a subcanopy at lower elevations in wet climates.	14,876.813	8,891.563	59.76	No Threat Category
Podocarp/kamahi-beech forest (Rimu-miro/kamahi-red beech-hard beech forest)	Podocarp/kamahi-beech forest is characterised by a presence of rimu and/or miro in the canopy, in association with a understorey of kamahi, red or hard beech. Hall's totara can also be occasionally present. Kamahi tends to be dominant with the podocarp species scattered throughout. Small broadleaf trees are also likely to be present. This habitat type is an intermediate between podocarp/broadleaf forest and pure beech forest and occurs in lowland areas that have a wet, cool climate.	57,728.375	40,084.000	69.43	No Threat Category
Red beech-silver beech forest	This habitat type is defined by red beech and silver beech associations and is common throughout the mountain regions at the mid altitudinal range. At lower altitudes podocarp species (Hall's totara, miro, rimu and matai) can be present. Kamahi can be widespread but not generally abundant.	13,378.375	9,881.438	73.86	No Threat Category
Scrub, tussock-grassland and herbfield above treeline	This habitat type is present where the environment becomes inhospitable for tree species. The change between forest and vegetation above the treeline can be abrupt. Short stature woody shrubs and scrub are common, as are tussock grasses. Large and small (often inconspicuous) herbaceous species are common.	42,860.813	31,909.563	74.44	No Threat Category
Mountain beech-red beech forest	This habitat type is defined by mountain beech and red beech associations, with red beech more dominant at lower elevations and in wetter areas, and mountain beech more dominant towards the treeline and in drier areas. The understorey can be quite sparse, although some understorey comprised of broadleaf species can be present. Hall's totara and occasional kaikawaka can be present in low numbers.	37,848.563	29,572.563	78.13	No Threat Category
Podocarp/kamahi-silver beech forest (Hall's totara-miro-rimu/kamahi-silver beech-southern rata forest)	This habitat type is found at higher altitudes, often in cold and wet conditions. Kamahi dominates the canopy, with silver beech present also. Hall's totara can be present as emergent or canopy trees, with rimu and miro occasionally occuring. The presence of northern rata will be strongly influenced by the presence (current or historic) of possum. This habitat type is an intermediate between podocarp/broadleaf forest and pure beech forest.	184.063	151.563	82.34	No Threat Category
Habitat Type named for the physical environment and defined by habitat					
Dunelands	Coastal dune systems on sand country.	22,163.813	1,805.813	8.14	Threatened (also rare

Habitat Name	Habitat Description	Previous cover (ha) of habitat	Area (ha) of the Region remaining in same habitat	Proportion (%) of former cover remaining	Status Category
					habitat)
River and Lakeshore gravel	Gravels associated with rivers and lakes.	1,213.750	816.188	67.24	No Threat Category
River	Open water contained within a river channel.	4,941.000	3,641.688	73.70	No Threat Category
Lake and Pond	Open water contained within lakes and ponds.	1,426.063	1,274.188	89.35	No Threat Category
Estuarine open water	Open water contained within an estuarine system.	20.375	20	98.15	No Threat Category
Alpine gravel and rock	Gravel and rock present in the alpine zone.	1,704.375	1,703.688	99.95	No Threat Category
Permanent snow and ice	Areas above the treeline dominated by permanent snow and ice.	272.313	272.313	100	No Threat Category

Table 11.2: Wetland habitat types. Wetland habitat (generically) is considered Threatened habitat type (Table 11.1, Appendix 1), with only 7064.5 ha (3.04%) remaining of former extent (232,254.188 ha). Wetland habitat is further classified here, with wetland types taken from Johnson & Gerbeaux (2004).

Habitat Type Name	Habitat Description	Status Category
Wetland Habitat named for wetland type and defined by physical environment and vegetation type		
Dune slack	Dune slack wetlands are found in areas where wind has eroded hollows or depressions, or a topographically low area where water is permanently or seasonally ponded. Dune slack wetlands typically support herbfields.	Rare
Ephemeral	Ephemeral wetlands are usually of moderate fertility, and neutral pH, characterised by a marked seasonal high water table, ponding and drying. Change in water levels can be very dramatic to the point of complete drying, and fluctuations between aquatic and terrestrial plant species can occur. Ephemeral wetlands are fed by ground water or a adjacent water-body. Ephemeral wetlands typically support turf habitat (generally < 3 cm tall). Turf habitat contains 62% of New Zealand's threatened or uncommon plants. Ephemeral wetlands can also sometimes support rushland scrub.	Rare
Pakihi	Pakihi wetlands are often found in association with bogs and fens. Pakihi: Pakihi wetlands are rain-fed systems on mineral or sometimes peat substrate of very low fertility and low pH. Pakihi can be seasonally dry and can be found on level to rolling or sloping land in areas of high rainfall and old soils. Pakihi can support restiads, sedges, fernland, heathland and shrubland.	Rare
Seepages and Springs	These wetlands are represented by areas of water that have percolated to the surface, with the volume of water present at seepages being less than that at springs. Substrates, nutrient levels and pH can vary from site to site. Seepages and springs can be found at the point of change of slopes, and places where the water table is raised. These wetlands can support sedgeland, cushionfield, mossfield or scrub.	Rare
Swamp Swamps can support sedge, rush, reed, flax, tall herb, shrub, scrub and forest.	Swamp wetlands are generally of high fertility receiving nutrients and sediment from surface water and groundwater. Substrates are generally a combination of peat and mineral. Standing water and surface channels are often present, with the water table either permanently, or periodically, above much of the ground surface. Swamp wetland can be found on plains, valley floors and basins.	Threatened
Bogs and fens	These wetland classes are often found in association with each other. Bog: Bogs are formed on peat with rainwater the only source of water. Bogs are nutrient poor, poorly drained and aerated and usually acid. The water table is usually close to or just above the ground surface. Bogs can be found on relatively level or gently sloping ground including hill crests, basins, terraces and within other wetland classes. Bogs can support mosses, lichens, cushion plants, sedges, grasses, restiads, ferns, shrubs and trees. Fen: Wetlands of low to moderate acidity and fertility with a substrate of predominantly peat. Receives ground water and nutrients from adjacent mineral soils. The water table is usually close to or just below the surface. Fens can be found on slight slopes (eg. fans), toes of hillsides, on level ground where peat hasn't accumulated much and can grade into swamp. Fens support restiads, sedges, ferns, tall herbs, tussock grasses and scrub.	Threatened
Saltmarsh	Saltmarsh occurs within areas of tidal and saline influences (tidal and sub-tidal zones). Water sources come from ground water and adjacent saline or brackish waters. Saltmarsh can support herbfield, rushland, scrub as well as mudflats.	Threatened

Habitat Type Name	Habitat Description	Status Category
Lakes and Lagoons and their margins (including dune lakes)	The lakes in the Manawatu-Wanganui Region are associated with dune, river (including ox-bow lakes) and volcanic activities. Lakes can exist entirely within a swamp, or have elements of wetland habitat on the lake margins. Lakes can also support terrestrial habitat on the lake margins.	Threatened

Table 11.3: Habitat types as identified by expert opinion.

Habitat Type Name	Habitat Description	Status Category
Kanuka forest	Kanuka forest is dominated by almost pure stands of kanuka. Manuka and common broadleaf species can also be present scattered through the canopy or comprising the understorey. Kanuka forest can be differentiated from kanuka scrub by size (greater than 2 m tall or 20 cm diameter (dbh)) and species composition.	Threatened

Appendix 2: Criteria for determining whether a defined area of vegetation constitutes 'habitat'

In certain areas of the Region, tighter inclusion criteria applies. This is because these areas have experienced a greater degree of loss of habitat and the remaining patches of habitat represent an important contribution to the remaining extent of habitat. This is the case even when these patches are small and highly modified. Therefore, the criteria has been set at lower thresholds to pick up smaller patches in these areas. The areas of the Region where tighter criteria apply have been identified in Section **Error! Reference source not found.** and graphically represented in Figure 6.2.

Table 11.4: Criteria for determining habitat. The first column identifies habitat type as determined by The Leathwick Predicted Potential Natural Vegetation of New Zealand (LPVT) (Leathwick, *et al.*, 2007). This determines habitat by composition. The second column (A. Inclusion Criteria) determines habitat by extent and structure. The last column (B. Exclusion Criteria) indicates areas of indigenous vegetation not considered habitat for the purpose of this report.

Habitat Type included in the definition of 'woody vegetation' and 'wetland habitat'.	A. Inclusion Criteria An area of vegetation or collection of plants is considered to be habitat for indigenous plant communities and/or indigenous fauna if the area meets any of these criteria.	B. Exclusion Criteria An area of vegetation or collection of plants is not considered to be habitat for indigenous plant communities and/or indigenous fauna if the area meets any of these criteria
Woody Vegetation		
Hall's totara/broadleaf forest Hardwood/broadleaf forest Kahikatea-pukatea-tawa forest Kanuka forest Mountain beech forest Mountain beech-red beech forest Podocarp forest Podocarp/black/mountain beech forest Podocarp/broadleaf-fuchsia forest Podocarp/kamahi forest Podocarp/kamahi-beech forest Podocarp-/kamahi-silver beech forest Podocarp/red beech-kamahi-tawa forest Podocarp/silver-beech-kamahi forest Podocarp/tawa-mahoe forest Red beech-silver beech forest Rimu/tawa-kamahi forest Scrub, tussock-grassland and herbfield above treeline	i. All areas of indigenous woody vegetation greater than 0.25 ha within any Water Management Sub-zone coded red (Figure 6.2). ii. All areas of indigenous woody vegetation covering 1 ha or more within any Water Management Sub-zone coded orange or yellow (Figure 6.2). iii. Areas of contiguous indigenous woody vegetation of or greater than 0.5 ha in size, where one or more other areas of indigenous habitat (of, or greater than, 0.5 ha), is present up to 500 m away. iv. Areas of contiguous indigenous woody vegetation of or greater than 0.5 ha that support indigenous understorey vegetation. v. Non-contiguous indigenous woody vegetation present up to 50 m away from an area of contiguous indigenous vegetation of, or greater than, 0.5 ha. vi. Areas of indigenous woody vegetation of, or greater than, 0.5 ha in gully systems.	i. Areas of treeland (including windrows and scattered trees covering less than 1 ha where they exist scattered across the landscape in isolation from each other or other natural areas), excluding sites that met the criteria outlined in section A(i). ii. Woodlots of indigenous tree species planted for the purposes of timber harvest (as registered in Horizons approved database). iii. Indigenous woody vegetation planted for landscaping, horticultural (including shelter belts) or private gardening purposes.

Habitat Type included in the definition of 'woody vegetation' and 'wetland habitat'.	A. Inclusion Criteria An area of vegetation or collection of plants is considered to be habitat for indigenous plant communities and/or indigenous fauna if the area meets any of these criteria.	B. Exclusion Criteria An area of vegetation or collection of plants is not considered to be habitat for indigenous plant communities and/or indigenous fauna if the area meets any of these criteria
Silver beech forest		
	vii. Areas of riparian margin comprising indigenous woody vegetation within 5 m of a creek, stream or river bank and covering an area of, or greater than, 10 m wide and 100 m long. viii. Indigenous woody vegetation of, or greater than, 1 ha if a discrete site, or of, or greater than, 0.5 ha if adjacent to existing area of indigenous habitat, created at some time for the purpose of habitat manipulation including habitat creation, restoration, buffering. ix. An area of woody vegetation that provides life-supporting habitat to a threatened species as determined by the New Zealand Threat Classification System.	
Wetland Habitat		
Bogs and fens Ephemeral Dune slack Lakes, lagoons and their margins (including dune lakes) Pakihi Saltmarsh Seepages and springs Swamp	i. Open water associated with wetland habitat, excluding stock ponds less than 0.5 ha in area. ii. Areas of naturally occuring indigenous wetland habitat either in association with open water (fresh or estuarine), or excluding open water, of or greater than 0.1 ha. iii. Areas of artificially created wetland habitat of or greater than 0.5 ha. iv. Indigenous wetland habitat created at some time in the course of habitat restoration. v. An area of wetland vegetation that provides life-supporting habitat to a threatened species as determined New Zealand Threat Classification System.	i. Stock ponds, less than 0 5 ha, created for the purposes of stock watering, or water storage for the purposes of irrigation, (including old gravel pits but excluding lakes and areas of open water associated with wetland habitat). ii. Damp paddocks, or paddocks subject to regular ponding, dominated by pasture species in association with wetland sedge and rush species. iii. Areas of treeland (including windrows and scattered trees covering less than 1 ha, eg. cabbage trees or kahikatea trees lacking continuous canopy, or understorey vegetation, where they exist scattered across the landscape with no connection to each other or other natural areas). iv. Ditches or drains supporting raupo, flax or other wetland species (eg. *Carex* sp., *Isolepis* sp.), or areas of these species in drains or slumps associated with road reserves or rail corridors. v. A pond and/or barrier ditch system specifically designed and installed for the purpose of treatment of animal effluent. vi. Habitat created and maintained for the purposes of waste water

Habitat Type included in the definition of 'woody vegetation' and 'wetland habitat'.	A. Inclusion Criteria An area of vegetation or collection of plants is considered to be habitat for indigenous plant communities and/or indigenous fauna if the area meets any of these criteria.	B. Exclusion Criteria An area of vegetation or collection of plants is not considered to be habitat for indigenous plant communities and/or indigenous fauna if the area meets any of these criteria
		treatment. vii. Habitat created and maintained in association with hydro electric power generation. viii. Open water and associated vegetation created for landscaping purposes or amenity values where the planted vegetation is predominantly exotic, or includes assemblages of species not naturally found in association with each other, on the particular landform or at the geographical location of the created site.

Appendix 3: Indigenous land cover classes of the Landcover Database 2 (LCDB2)

Table 11.5: Land cover class of the Land Cover Database 2 (LCDB2) as sourced from the Ministry for Environment website. Shaded rows indicate land cover classes considered to be indigenous.

1st Order Class	LCDB1 Class	LCDB2 Class
Artificial surfaces	Urban Area	1. Built-up Area
	Urban Open Space	2. Urban Parkland/Open Space
	Mines and Dumps	3. Surface Mine
		4. Dump
		5. Transport Infrastructure
Bare, or Lightly Vegetated Surfaces	Coastal Sand	10. Coastal Sand and Gravel
	Bare Ground	11. River and Lakeshore Gravel and Rock
		12. Landslide
		13. Alpine Gravel and Rock
		14. Permanent Snow and Ice
		15. Alpine Grass/Herbfield
Water Bodies	Inland Water	20. Lake and Pond
		21. River
		22. Estuarine Open Water
Cropland	Primarily Horticulture	30. Short-rotation Cropland
		31. Vineyard
		32. Orchard and Other Perennial Crops
Grassland	Primarily Pastoral	40. High Producing Exotic Grassland
		41. Low Producing Grassland
	Tussock Grassland	43. Tall Tussock Grassland
		44. Depleted Grassland
	Inland Wetland	45. Herbaceous Freshwater Vegetation
Sedgeland Saltmarsh	Coastal Wetland	46. Herbaceous Saline Vegetation
		47. Flaxland
Scrub and Shrubland	Scrub	50. Fernland
		51. Gorse and/or Broom
		52. Manuka and/or Kanuka
		53. Matagouri
		54. Broadleaved Indigenous Hardwoods
		55. Sub-Alpine Shrubland
		56. Mixed Exotic Shrubland
		57. Grey Scrub
Forest		60. Minor Shelterbelts
	Major Shelterbelts	61. Major Shelterbelts
	Planted Forest	62. Afforestation (not imaged)
		63. Afforestation (imaged, post LCDB 1)
		64. Forest - harvested
		65. Pine Forest – Open Canopy
		66. Pine Forest – Closed Canopy
		67. Other Exotic Forestry
	Willows and Poplars	68. Deciduous Forest
	Indigenous Forest	69. Indigenous Forest
		70. Mangrove

Appendix 4: Land cover classes (LCDB2) used to indicate persistence of original indigenous vegetation cover

Table 11.5: Land cover classes from LCDB2 considered to indicate persistence of original cover for each LPVT habitat type. LPVT habitat types are described in Appendix 1. LCDB2 land cover classes are described in Appendix 3. LCDB2 land cover classes considered to indicate a persistence of indigenous vegetation cover, but a change from the original habitat type are Manuka or Kanuka, Broadleaved Indigenous Hardwoods and Grey Scrub unless these land cover classes indicated original habitat type.

Habitat Type Name	LCBB2 Land Cover Class considered to represent the same habitat type (original cover)
Alpine gravel and rock	Alpine Gravel and Rock
Dunelands	-
Estuarine open water	Estuarine Open Water
Hall's totara/broadleaf forest	Indigenous Forest
Hall's totara/silver beech-kamahi forest	Indigenous Forest
Podocarp/kamahi-silver beech forest	Indigenous Forest
Podocarp/tawa-mahoe forest	Indigenous Forest Broadleaved Indigenous Hardwoods
Kahikatea-pukatea-tawa forest	Indigenous Forest
Kahikatea-totara forest	Indigenous Forest
Hardwood/broadleaf forest	Broadleaved Indigenous Hardwoods
Podocarp forest	Indigenous Forest
Podocarp/black/mountain beech forest	Indigenous Forest
Podocarp/broadleaf-fuchsia forest	Indigenous Forest
Mountain beech forest	Indigenous Forest
Mountain beech-red beech forest	Indigenous Forest
Wetland	Herbaceous Freshwater Vegetation
Red beech-silver beech forest	Indigenous Forest
Rimu/tawa-kamahi forest	Indigenous Forest
Podocarp/kamahi forest	Indigenous Forest
Podocarp/kamahi-beech forest	Indigenous Forest
Podocarp/red beech-kamahi-tawa forest	Indigenous Forest
Podocarp/kamahi forest	Indigenous Forest
Scrub, tussock-grassland and herbfield above treeline	Tall Tussock Grassland Depleted Grassland
Silver beech forest	Indigenous Forest

Appendix 5: Past and current indigenous vegetation cover within each LENZ Level IV land environment.

Table 11.6: Past and current indigenous vegetation cover in the Manawatu-Wanganui Region. Original predicted extent of indigenous vegetation cover, current extent of indigenous vegetation cover, proportion of extent remaining and proportion of extent lost. Data from Overton *et al.*, 2006.

LENZ Land Environment (Level IV) Code	Elevation of Land Environment (m asl)	Original predicted extent (ha) of indigenous vegetation cover	Current extent (ha) of indigenous vegetation cover	Proportion (%) of original extent remaining	Proportion (%) of loss of extent of original habitat
Land Environments with less than 5% of original extent of indigenous vegetation remaining					
C3.2c	65	13304.38	40.50	0.3	99.7
J4.2a	20	1176.44	9.69	0.8	99.2
C3.2b	65	5553.06	54.88	0.9	99.1
F6.1d	315	19.13	0.19	0.9	99.1
C3.1b	85	19675.00	304.38	1.5	98.5
C3.2a	65	8158.06	131.56	1.6	98.4
B5.2a	100	494.56	8.88	1.7	98.3
C2.1d	85	76448.88	1385.94	1.8	98.2
C3.1a	200	6968.81	130.31	1.8	98.2
C2.1b	200	14739.44	362.38	2.4	97.6
C2.1e	200	38473.13	965.38	2.5	97.5
J4.1c	110	4880.38	144.25	2.9	97.1
D3.3a	235	9.44	0.31	3.3	96.7
F5.2c	160	7374.19	253.31	3.4	96.6
C3.2d	65	5795.38	247.69	4.2	95.8
I2.1a	75	1.38	0.06	4.5	95.5
F1.1g	20	17795.19	832.88	4.6	95.4
J4.2d	325	6113.81	282.38	4.6	95.4
Land Environments with 5-10% of original extent of indigenous vegetation remaining					
B2.1d	310	734.56	37.56	5.1	94.9
F4.1c	175	84476.75	4793.31	5.6	94.4
J4.1b	110	3374.44	203.06	6	94
Wetland	-	229874.06	13792.81	6	94
B1.3b	160	31.13	1.94	6.2	93.8
F4.1b	175	324.50	23.81	7.3	92.7
J4.1d	50	3719.63	329.00	8.8	91.2
J4.3b	110	222.06	19.75	8.8	91.2
F1.1f	325	67453.50	6017.38	8.9	91.1
F1.3d	370	119233.19	11633.63	9.7	90.3
H1.2b	20	3015.63	296.25	9.8	90.2
J4.2b	220	16106.06	1591.75	9.8	90.2
B1.3a	160	37298.94	3715.44	9.9	90.1
B2.1b	310	1558.13	155.75	9.9	90.1
Land Environments with 10-20% of original extent of indigenous vegetation remaining					
F1.4a	305	93802.13	9630.06	10.2	89.8
H1.2a	220	430.31	47.25	10.9	89.1
C2.1a	200	9938.63	1268.56	12.7	87.3
F4.1e	175	2712.94	366.13	13.4	86.6
F7.1b	520	61.69	8.63	13.9	86.1
H1.2c	220	830.69	134.69	16.2	83.8
F1.4d	305	33746.00	5717.38	16.9	83.1
F7.3d	730	24848.63	4457.38	17.9	82.1
C1.2a	130	10.75	1.94	18	82
D2.3a	235	1743.69	322.00	18.4	81.6

LENZ Land Environment (Level IV) Code	Elevation of Land Environment (m asl)	Original predicted extent (ha) of indigenous vegetation cover	Current extent (ha) of indigenous vegetation cover	Proportion (%) of original extent remaining	Proportion (%) of loss of extent of original habitat
F1.4b	305	610.06	113.06	18.5	81.5
F5.2a	160	61.81	12.25	19.8	80.2
Land Environments with 20-30% of original extent of indigenous vegetation remaining					
F7.1c	520	106.19	22.56	21.2	78.8
F4.1a	175	1228.50	264.88	21.5	78.5
J4.1a	110	1063.06	230.63	21.6	78.4
F1.2c	200	38427.69	8457.56	22	78
B1.1b	175	119.31	27.13	22.7	77.3
F4.1d	200	4.94	1.13	22.7	77.3
F1.3a	370	103368.44	23780.63	23	77
F7.3c	730	92227.63	21443.81	23.2	76.8
I2.2a	10	3.56	0.94	26.3	73.7
Unclassified		2639.19	711.06	26.9	73.1
F1.1c	325	96489.13	26850.25	27.8	72.2
C2.1c	200	3492.06	998.44	28.5	71.5
Land Environments with 30-40% of original extent of indigenous vegetation remaining					
I2.1c	75	80.13	26.38	32.9	67.1
F1.3c	370	35838.25	12126.31	33.8	66.2
F7.2b	390	76978.69	27049.31	35.1	64.9
F7.2a	390	139878.13	49982.94	35.7	64.3
H3.1b	175	225.31	88.50	39.2	60.8
K1.2b	1020	8649.31	3465.56	40	60
Land Environments with 40-50% of original extent of indigenous vegetation remaining					
F1.2a	200	7897.31	3374.19	42.7	57.3
Null	-	3352.00	1460.00	43.5	56.5
F1.4c	305	23975.38	11216.25	46.7	53.3
F7.3b	730	11873.00	5795.25	48.8	51.2
Land Environments with 50-75% of original extent of indigenous vegetation remaining					
C1.1b	370	153.56	79.75	51.9	48.1
C1.1c	370	537.13	284.38	52.9	47.1
F1.1b	325	2431.69	1334.19	54.8	45.2
F1.1e	325	537.25	306.00	56.9	43.1
F1.3b	370	34856.31	21633.25	62	38
F7.3a	730	115423.94	71916.94	62.3	37.7
E1.1d	435	313.50	209.50	66.8	33.2
Land Environments with 75-100% of original extent of indigenous vegetation remaining					
F1.1d	325	260981.94	200043.13	76.6	23.4
D2.3b	235	500.88	397.06	79.2	20.8
K1.2a	1020	12278.44	9988.81	81.3	18.7
B1.3d	160	3.88	3.50	90.3	9.7
P4.1a	1415	14167.31	12811.06	90.4	9.6
P8.2b	735	23797.31	21653.44	90.9	9.1
P7.1a	960	13921.31	13578.25	97.5	2.5
P7.1b	960	33106.13	32288.88	97.5	2.5
P7.1c	960	30580.75	29948.69	97.9	2.1
P8.2a	735	44852.13	44623.56	99.4	0.6
P4.1b	1415	7069.63	7045.44	99.6	0.4
P8.1a	1115	3733.63	3733.50	99.9	0.1
B7.1c	130	0.06	0.06	100	0
Open Water	-	10189.94	10189.94	100	0

Appendix 6: Water Management Zones within the Manawatu-Wanganui Region

Table 11.7: Water Management Zones, Sub-zones, Sub-zone codes and areas.

Parent Catchment	Water Management Zone	Water Management Sub-Zone	Sub-zone Code	Area of Sub-zone (ha)
Manawatu	Upper Manawatu	Upper Manawatu	Mana_1a	36901.51
		Mangatewainui	Mana_1b	8827.83
		Mangatoro	Mana_1c	22828.86
	Weber-Tamaki	Weber-Tamaki	Mana_2a	5284.35
		Mangatera	Mana_2b	11231.37
	Upper Tamaki	Upper Tamaki	Mana_3	3140.55
	Upper Kumeti	Upper Kumeti	Mana_4	1237.48
	Tamaki-Hopelands	Tamaki-Hopelands	Mana_5a	15477.39
		Lower Tamaki	Mana_5b	4892.94
		Lower Kumeti	Mana_5c	3365.46
		Oruakeretaki	Mana_5d	5674.35
		Raparapawai	Mana_5e	4531.50
	Hopelands-Tiraumea	Hopelands-Tiraumea	Mana_6	4157.73
	Tiraumea	Upper Tiraumea	Mana_7a	43626.77
		Lower Tiraumea	Mana_7b	13559.32
		Mangaone River	Mana_7c	13380.93
		Makuri	Mana_7d	16578.45
	Mangatainoka	Upper Mangatainoka	Mana_8a	6684.23
		Middle Mangatainoka	Mana_8b	12074.47
		Lower Mangatainoka	Mana_8c	4064.31
		Makakahi	Mana_8d	19887.85
		Mangaramarama	Mana_8e	6007.58
	Upper Gorge	Upper Gorge	Mana_9a	4790.16
		Mangapapa	Mana_9b	2662.63
		Mangaatua	Mana_9c	12270.86
		Upper Mangahao	Mana_9d	27539.57
		Lower Mangahao	Mana_9e	5156.36
	Middle Manawatu	Middle Manawatu	Mana_10a	15478.53
		Upper Pohangina	Mana_10b	21699.92
		Middle Pohangina	Mana_10c	26996.95
		Lower Pohangina	Mana_10d	6384.77
		Aokautere	Mana_10e	1738.89
	Lower Manawatu	Lower Manawatu	Mana_11a	5006.12
		Turitea	Mana_11b	4318.83
		Kahuterawa	Mana_11c	6256.35
		Upper Mangaone Stream	Mana_11d	15724.26
		Lower Mangaone Stream	Mana_11e	2540.78
		Main Drain	Mana_11f	15158.88
	Oroua	Upper Oroua	Mana_12a	32175.10
		Middle Oroua	Mana_12b	1379.79
		Lower Oroua	Mana_12c	16869.24
		Kiwitea	Mana_12d	24910.01
		Makino	Mana_12e	14952.84
	Coastal Manawatu	Coastal Manawatu	Mana_13a	21088.62
		Upper Tokomaru	Mana_13b	5537.63
		Lower Tokomaru	Mana_13c	15518.43
		Mangaore	Mana_13d	5354.65
		Koputaroa	Mana_13e	5473.43
		Foxton Loop	Mana_13f	3956.70
Rangitikei	Upper Rangitikei	Upper Rangitikei	Rang_1	51357.10

Parent Catchment	Water Management Zone	Water Management Sub-Zone	Sub-zone Code	Area of Sub-zone (ha)
	Middle Rangitikei	Middle Rangitikei	Rang_2a	25936.93
		Pukeokahu-Mangaweka	Rang_2b	71895.07
		Upper Moawhango	Rang_2c	28390
		Middle Moawhango	Rang_2d	32004.99
		Lower Moawhango	Rang_2e	20107.53
		Upper Hautapu	Rang_2f	28657.89
		Lower Hautapu	Rang_2g	10106.91
	Lower Rangitikei	Lower Rangitikei	Rang_3a	49103.27
		Makohine	Rang_3b	9711.72
	Coastal Rangitikei	Coastal Rangitikei	Rang_4a	5500.39
		Tidal Rangitikei	Rang_4b	5572.93
		Porewa	Rang_4c	15370.54
		Tutaenui	Rang_4d	13581.16
Whanganui	Upper Whanganui	Upper Whanganui	Whai_1	37937.28
	Cherry Grove	Cherry Grove	Whai_2a	11196.63
		Upper Whakapapa	Whai_2b	17697.15
		Lower Whakapapa	Whai_2c	9566.01
		Piopiotea	Whai_2d	8631.55
		Pungapunga	Whai_2e	11007.55
		Upper Ongarue	Whai_2f	62965.98
		Lower Ongarue	Whai_2g	46782.62
	Te Maire	Te Maire	Whai_3	13175.37
	Middle Whanganui	Middle Whanganui	Whai_4a	31843.26
		Upper Ohura	Whai_4b	67364.40
		Lower Ohura	Whai_4c	11181.88
		Retaruke	Whai_4d	46615.16
	Pipiriki	Pipiriki	Whai_5a	76548.44
		Tangarakau	Whai_5b	63677.51
		Whangamomona	Whai_5c	22560.72
		Upper Manganui o te Ao	Whai_5d	25584.97
		Lower Manganui o te Ao	Whai_5e	38780.59
	Paetawa	Paetawa	Whai_6	59488.47
	Lower Whanganui	Lower Whanganui	Whai_7a	24538.30
		Coastal Whanganui	Whai_7b	8110.51
		Upokongaro	Whai_7c	12933.19
		Matarawa	Whai_7d	7558.29
Whangaehu	Upper Whangaehu	Upper Whangaehu	Whau_1a	19052.94
		Waitangi	Whau_1b	5845.59
		Tokiahuru	Whau_1c	22184.55
	Middle Whangaehu	Middle Whangaehu	Whau_2	31488.48
	Lower Whangaehu	Lower Whangaehu	Whau_3a	42858.72
		Upper Makotuku	Whau_3b	2462.31
		Lower Makotuku	Whau_3c	6237.09
		Upper Mangawhero	Whau_3d	17719.38
		Lower Mangawhero	Whau_3e	40349.51
	Coastal Whangaehu	Coastal Whangaehu	Whau_4	10071.25
Turakina	Turakina	Upper Turakina	Tura_1a	53501.33
		Lower Turakina	Tura_1b	41276.63
		Ratana	Tura_1c	946.62
Ohau	Ohau	Upper Ohau	Ohau_1a	10357.28
		Lower Ohau	Ohau_1b	8527.49
East Coast	Owahanga	Owahanga	Owha_1	42738.64
	East Coast	East Coast	East_1	17990.44
	Akitio	Upper Akitio	Akit_1a	12399.7
		Lower Akitio	Akit_1b	33681.97
		Waihi	Akit_1c	12893.13

Parent Catchment	Water Management Zone	Water Management Sub-Zone	Sub-zone Code	Area of Sub-zone (ha)
West Coast	Northern Coastal	Northern Coastal	West_1	11892.28
	Kai Iwi	Kai Iwi	West_2	19166.00
	Mowhanau	Mowhanau	West_3	2901.10
	Kaitoke Lakes	Kaitoke Lakes	West_4	6886.83
	Southern Wanganui Lakes	Southern Wanganui Lakes	West_5	19225.34
	Northern Manawatu Lakes	Northern Manawatu Lakes	West_6	12484.77
	Waitarere	Waitarere	West_7	3391.04
	Lake Papaitonga	Lake Papaitonga	West_8	2230.88
	Waikawa	Waikawa	West_9	7812.45
	Lake Horowhenua	Lake Horowhenua	Hoki_1a	6247.17
		Hokio	Hoki_1b	717.39

Appendix 7: Habitat types and remaining cover in the Water Management Sub-zones of the Manawatu-Wanganui Region

Table 11.8: Named habitat found within each Water Management Sub-zone (WMSZ). Water Management Sub-zones are presented by name and code (areas, Management Zones and Parent Catchments are provided in Appendix 6). Habitat type names have been taken from Leathwick *et al.*¸(2004), and adapted for the Manawatu-Wanganui Region (Section 5). Non-vegetated habitat types have been included in this analysis to avoid 'gaps' in the GIS data layers, and as these habitat types can provide habitat for threatened species. Status Category (column 3) is determined by the proportion of former cover of habitat type remaining at the Regional, not Sub-zone scale. Proportion of each remaining habitat types has been presented in two ways: Proportion A (column 4) is the proportion of remaining habitat type as a percentage of former cover (indicating degree of loss), and Proportion B (column 5) is the proportion of remaining habitat as a percentage of total habitat cover (indicating the contribution of each habitat type to the total remaining habitat cover within each WMSZ). The area of habitat types has been summed for each of the three Status Categories (Threatened, At Risk and No Threat Category) and presented as a proportion of the total area of all habitat types (column 6). WMSZ are categorised by the proportion of each Status Category to provide an indication of the urgency for protection of indigenous habitat within each WMSZ (column 7). The urgency code can be used to provide an indication of level of regulation likely to apply in each Sub-zone. Red = Greater than 50% of the habitat type within the WMSZ is Threatened habitat or greater than 75% of the habitat type within the WMSZ is Threatened or At Risk habitat type. Orange = Greater than 50% of the habitat type within the WMSZ is either At Risk or Threatened and At Risk combined, or greater than 33% Threatened habitat type. Yellow = Greater than 65% of the habitat type within the WMSZ is No Threat Category habitat type, except where the proportion of 'No Threat Category' habitat type contributes the majority of the habitat cover within a Sub-zone, but the 'No Threat Category' sum largely comprises cover of non-vegetated habitat types. In these cases, the 'No Threat Category' figures are disregarded when determining the indicator code for the WMSZ.

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
Upper Manawatu Mana_1a	Podocarp/tawa-mahoe forest	Threatened	2.17	3.68	86.40	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.43	0.11		
	Wetland	Threatened	2.15	5.47		
	Rimu/tawa-kamahi forest	Threatened	1.88	77.15		
	Hall's totara/broadleaf forest	At Risk	47.73	8.33	11.48	
	Podocarp/kamahi forest	At Risk	1.35	3.15		
	Lake and Pond	No Threat Category	73.56	0.63	2.11	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00		
	River	No Threat Category	51.15	1.48		
Mangatewainui Mana_1b	Hall's totara/silver beech-kamahi forest	Threatened	98.02	0.64	35.86	Red
	Podocarp/tawa-mahoe forest	Threatened	3.20	0.36		
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Wetland	Threatened	1.89	0.06		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Rimu/tawa-kamahi forest	Threatened	7.47	34.80		
	Hall's totara/broadleaf forest	At Risk	63.52	20.95	63.16	
	Podocarp/kamahi forest	At Risk	45.58	42.22		
	Lake and Pond	No Threat Category	71.47	0.05	0.98	
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	100.00	0.93		
Mangatoro Mana_1c	Podocarp/tawa-mahoe forest	Threatened	3.11	7.90	47.16	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Podocarp/broadleaf-fuchsia forest	Threatened	0.00	0.00		
	Wetland	Threatened	1.32	2.15		
	Rimu/tawa-kamahi forest	Threatened	0.94	37.11		
	Hall's totara/broadleaf forest	At Risk	47.80	15.11	52.52	
	Podocarp/kamahi forest	At Risk	5.42	37.41		
	Lake and Pond	No Threat Category	51.91	0.20	0.31	
	Podocarp/kamahi-beech forest	No Threat Category	0.05	0.07		
	River	No Threat Category	26.47	0.04		
Weber-Tamaki Mana_2a	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00	91.74	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Wetland	Threatened	4.29	42.11		
	Rimu/tawa-kamahi forest	Threatened	1.00	49.62		
	Podocarp/kamahi forest	At Risk	0.00	0.00	0.00	
	Lake and Pond	No Threat Category	100.00	0.09	8.26	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00		
	River	No Threat Category	55.75	6.55		
	River and Lakeshore gravel	No Threat Category	91.67	1.62		
Mangatera Mana_2b	Podocarp/tawa-mahoe forest	Threatened	2.13	0.72	98.50	Red
	Kahikatea-pukatea-tawa forest	Threatened	1.39	0.66		
	Wetland	Threatened	0.00	0.00		
	Rimu/tawa-kamahi forest	Threatened	1.05	97.11		
	Podocarp/kamahi forest	At Risk	0.07	0.90	0.90	
	Lake and Pond	No Threat Category	62.50	0.60	0.60	
	River	No Threat Category	0.00	0.00		
Upper Tamaki	Hall's totara/silver beech-kamahi forest	Threatened	89.36	9.55	25.64	Red

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
Mana_3	Wetland	Threatened	9.98	4.64		
	Rimu/tawa-kamahi forest	Threatened	1.78	11.45		
	Hall's totara/broadleaf forest	At Risk	29.84	44.41	61.35	
	Podocarp/kamahi forest	At Risk	10.65	16.95		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	96.10	13.01	13.01	
Upper Kumeti Mana_4	Hall's totara/silver beech-kamahi forest	Threatened	51.12	35.34	42.11	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Wetland	Threatened	2.88	6.77		
	Rimu/tawa-kamahi forest	Threatened	0.00	0.00		
	Hall's totara/broadleaf forest	At Risk	9.40	57.13	57.89	
	Podocarp/kamahi forest	At Risk	0.10	0.76		
Tamaki-Hopelands Mana_5a	Podocarp/tawa-mahoe forest	Threatened	0.48	0.05	81.22	Red
	Kahikatea-pukatea-tawa forest	Threatened	1.02	0.03		
	Wetland	Threatened	5.01	40.02		
	Rimu/tawa-kamahi forest	Threatened	1.33	41.11		
	Hall's totara/broadleaf forest	At Risk	86.64	3.84	17.00	
	Podocarp/kamahi forest	At Risk	6.11	13.16		
	Lake and Pond	No Threat Category	58.33	0.49	1.78	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00		
	River	No Threat Category	47.71	1.27		
	River and Lakeshore gravel	No Threat Category	33.33	0.02		
Lower Tamaki Mana_5b	Hall's totara/silver beech-kamahi forest	Threatened	98.27	13.94	57.41	Red
	Kahikatea-pukatea-tawa forest	Threatened	24.31	1.69		
	Wetland	Threatened	11.94	33.84		
	Rimu/tawa-kamahi forest	Threatened	0.61	7.95		
	Hall's totara/broadleaf forest	At Risk	17.25	30.02	30.60	
	Podocarp/kamahi forest	At Risk	0.17	0.58		
	River	No Threat Category	100.00	0.03	11.99	
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	100.00	11.96		
Lower Kumeti Mana_5c	Hall's totara/silver beech-kamahi forest	Threatened	63.26	23.98	73.70	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Wetland	Threatened	1.89	15.58		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Rimu/tawa-kamahi forest	Threatened	0.96	34.13		
	Hall's totara/broadleaf forest	At Risk	7.84	7.29	26.30	
	Podocarp/kamahi forest	At Risk	1.72	19.02		
	River and Lakeshore gravel	No Threat Category	0.00	0.00	0.00	
Oruakeretaki Mana_5d	Hall's totara/silver beech-kamahi forest	Threatened	0.00	0.00	58.84	Red
	Kahikatea-pukatea-tawa forest	Threatened	1.43	0.46		
	Wetland	Threatened	1.51	26.04		
	Rimu/tawa-kamahi forest	Threatened	0.66	32.35		
	Hall's totara/broadleaf forest	At Risk	4.08	39.00	41.16	
	Podocarp/kamahi forest	At Risk	0.08	2.16		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	0.00	0.00	0.00	
Raparapawai Mana_5e	Hall's totara/silver beech-kamahi forest	Threatened	100.00	0.37	50.31	Red
	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00		
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Wetland	Threatened	2.06	13.23		
	Rimu/tawa-kamahi forest	Threatened	1.11	36.71		
	Hall's totara/broadleaf forest	At Risk	14.22	49.69	49.69	
	Podocarp/kamahi forest	At Risk	0.00	0.00		
Hopelands-Tiraumea Mana_6	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00	94.82	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.15	0.06		
	Wetland	Threatened	7.72	93.21		
	Rimu/tawa-kamahi forest	Threatened	0.05	1.54		
	Podocarp/kamahi forest	At Risk	0.00	0.00	0.00	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00	5.18	
	River	No Threat Category	53.64	5.18		
Upper Tiraumea Mana_7a	Podocarp/tawa-mahoe forest	Threatened	3.00	1.02	59.02	Red
	Kahikatea-pukatea-tawa forest	Threatened	4.33	0.85		
	Podocarp/broadleaf-fuchsia forest	Threatened	48.46	0.97		
	Wetland	Threatened	1.26	3.16		
	Rimu/tawa-kamahi forest	Threatened	2.02	53.00		
	Hall's totara/broadleaf forest	At Risk	30.05	1.24	39.62	
	Podocarp/kamahi forest	At Risk	15.25	38.37		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Podocarp/kamahi-beech forest	No Threat Category	11.42	1.36	1.36	
Lower Tiraumea Mana_7b	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00	54.80	Red
	Kahikatea-pukatea-tawa forest	Threatened	28.19	0.71		
	Wetland	Threatened	7.79	4.78		
	Rimu/tawa-kamahi forest	Threatened	7.71	49.30		
	Hall's totara/broadleaf forest	At Risk	75.56	6.39	42.07	
	Podocarp/kamahi forest	At Risk	28.40	35.69		
	Podocarp/kamahi-beech forest	No Threat Category	5.42	3.10	3.13	
	River	No Threat Category	70.00	0.03		
Mangaone River Mana_7c	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00	100.00	Red
	Kahikatea-pukatea-tawa forest	Threatened	2.85	1.69		
	Wetland	Threatened	0.08	3.39		
	Rimu/tawa-kamahi forest	Threatened	0.24	94.92		
	Podocarp/kamahi forest	At Risk	0.00	0.00	0.00	
Makuri Mana_7d	Podocarp/tawa-mahoe forest	Threatened	31.25	0.05	39.89	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Podocarp/broadleaf-fuchsia forest	Threatened	1.37	0.07		
	Wetland	Threatened	3.06	1.70		
	Rimu/tawa-kamahi forest	Threatened	7.30	38.07		
	Hall's totara/broadleaf forest	At Risk	16.52	8.09	57.74	
	Podocarp/kamahi forest	At Risk	6.97	49.65		
	Lake and Pond	No Threat Category	50.00	0.09	2.37	
	Podocarp/kamahi-beech forest	No Threat Category	2.35	2.28		
Upper Mangatainoka Mana_8a	Wetland	Threatened	16.83	1.36	12.25	Orange
	Rimu/tawa-kamahi forest	Threatened	17.10	10.88		
	Hall's totara/broadleaf forest	At Risk	60.17	12.71	33.60	
	Podocarp/kamahi forest	At Risk	74.30	20.89		
	Podocarp/kamahi-silver beech forest	No Threat Category	92.48	1.76	54.16	
	Red beech-silver beech forest	No Threat Category	94.60	12.25		
	Podocarp/kamahi-beech forest	No Threat Category	62.97	0.66		
	River and Lakeshore gravel	No Threat Category	60.00	0.01		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	91.17	9.08		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Silver beech forest	No Threat Category	92.22	30.40		
Middle Mangatainoka Mana_8b	Wetland	Threatened	8.24	18.36	71.49	Red
	Rimu/tawa-kamahi forest	Threatened	10.82	53.13		
	Hall's totara/broadleaf forest	At Risk	100.00	0.86	27.43	
	Podocarp/kamahi forest	At Risk	9.35	26.57		
	Podocarp/kamahi-silver beech forest	No Threat Category	89.67	0.49	1.07	
	Lake and Pond	No Threat Category	47.83	0.06		
	River	No Threat Category	63.16	0.12		
	River and Lakeshore gravel	No Threat Category	81.91	0.40		
Lower Mangatainoka Mana_8c	Kahikatea-pukatea-tawa forest	Threatened	1.67	0.23	77.74	Red
	Wetland	Threatened	3.23	66.87		
	Rimu/tawa-kamahi forest	Threatened	0.42	10.64		
	Podocarp/kamahi forest	At Risk	1.51	4.23	4.23	
	River	No Threat Category	50.53	14.41	18.04	
	River and Lakeshore gravel	No Threat Category	77.42	3.62		
Makakahi Mana_8d	Wetland	Threatened	2.42	1.56	20.41	Yellow
	Rimu/tawa-kamahi forest	Threatened	2.69	18.85		
	Podocarp/kamahi forest	At Risk	1.69	4.10	4.10	
	Red beech-silver beech forest	No Threat Category	52.63	20.25	75.49	
	Podocarp/kamahi-beech forest	No Threat Category	28.17	1.06		
	Silver beech forest	No Threat Category	82.13	54.19		
Mangaramarama Mana_8e	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00	88.53	Red
	Wetland	Threatened	0.03	0.28		
	Rimu/tawa-kamahi forest	Threatened	0.91	88.25		
	Podocarp/kamahi forest	At Risk	1.13	11.47	11.47	
Upper Gorge Mana_9a	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00	94.61	Red
	Wetland	Threatened	8.15	31.86		
	Rimu/tawa-kamahi forest	Threatened	10.40	62.75		
	Podocarp/kamahi forest	At Risk	4.31	3.61	3.61	
	River	No Threat Category	85.14	1.78	1.78	
Mangapapa Mana_9b	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00	90.27	Red
	Wetland	Threatened	0.31	0.80		
	Rimu/tawa-kamahi forest	Threatened	10.36	89.47		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Hall's totara/broadleaf forest	At Risk	0.00	0.00	9.21	
	Podocarp/kamahi forest	At Risk	5.51	9.21		
	Lake and Pond	No Threat Category	100.00	0.53	0.53	
Mangaatua Mana_9c	Hall's totara/silver beech-kamahi forest	Threatened	97.24	5.62	42.68	Red
	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00		
	Kahikatea-pukatea-tawa forest	Threatened	0.22	0.12		
	Wetland	Threatened	0.40	7.71		
	Rimu/tawa-kamahi forest	Threatened	0.57	29.23		
	Hall's totara/broadleaf forest	At Risk	11.79	33.35	52.42	
	Podocarp/kamahi forest	At Risk	4.40	19.06		
	Lake and Pond	No Threat Category	43.75	0.28	4.91	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	100.00	4.63		
Upper Mangahao Mana_9d	Hall's totara/silver beech-kamahi forest	Threatened	35.42	0.01	31.28	Red
	Wetland	Threatened	23.54	2.24		
	Rimu/tawa-kamahi forest	Threatened	23.05	29.04		
	Hall's totara/broadleaf forest	At Risk	54.99	19.31	57.76	
	Podocarp/kamahi forest	At Risk	69.42	38.45		
	Podocarp/kamahi-silver beech forest	No Threat Category	76.79	0.69	10.96	
	Lake and Pond	No Threat Category	75.00	0.01		
	Red beech-silver beech forest	No Threat Category	100.00	0.04		
	River	No Threat Category	73.17	0.26		
	River and Lakeshore gravel	No Threat Category	97.45	0.23		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	87.99	7.49		
	Silver beech forest	No Threat Category	58.78	2.25		
Lower Mangahao Mana_9e	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00	96.26	Red
	Wetland	Threatened	6.74	96.26		
	Rimu/tawa-kamahi forest	Threatened	0.00	0.00		
	Podocarp/kamahi forest	At Risk	0.01	0.02	0.02	
	River	No Threat Category	51.43	1.45	3.71	
	River and Lakeshore gravel	No Threat Category	93.33	2.26		
Middle Manawatu	Kahikatea-pukatea-tawa forest	Threatened	1.92	1.62	85.06	Red

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
Mana_10a	Wetland	Threatened	1.40	7.72		
	Rimu/tawa-kamahi forest	Threatened	14.05	75.72		
	Podocarp/kamahi forest	At Risk	2.39	1.31	1.31	
	Lake and Pond	No Threat Category	68.75	0.06	13.63	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00		
	River	No Threat Category	82.56	10.96		
	River and Lakeshore gravel	No Threat Category	73.55	2.61		
Upper Pohangina Mana_10b	Hall's totara/silver beech-kamahi forest	Threatened	80.06	6.72	29.54	Orange
	Kahikatea-pukatea-tawa forest	Threatened	15.04	0.22		
	Wetland	Threatened	50.86	3.12		
	Rimu/tawa-kamahi forest	Threatened	19.66	19.48		
	Hall's totara/broadleaf forest	At Risk	36.61	29.16	40.64	
	Mountain beech forest	At Risk	93.60	0.13		
	Podocarp/kamahi forest	At Risk	21.44	11.35		
	Mountain beech-red beech forest	No Threat Category	93.90	9.31	29.82	
	River	No Threat Category	53.23	0.42		
	River and Lakeshore gravel	No Threat Category	59.49	0.21		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	98.34	19.88		
Middle Pohangina Mana_10c	Hall's totara/silver beech-kamahi forest	Threatened	96.34	1.88	35.70	Red
	Podocarp/tawa-mahoe forest	Threatened	1.19	0.75		
	Kahikatea-pukatea-tawa forest	Threatened	11.61	3.66		
	Podocarp/black/mountain beech forest	Threatened	2.05	3.25		
	Podocarp/broadleaf-fuchsia forest	Threatened	0.00	0.00		
	Wetland	Threatened	1.79	1.00		
	Rimu/tawa-kamahi forest	Threatened	3.78	25.16		
	Hall's totara/broadleaf forest	At Risk	30.38	32.80	46.40	
	Mountain beech forest	At Risk	77.58	1.24		
	Podocarp/kamahi forest	At Risk	6.72	12.36		
	Lake and Pond	No Threat Category	68.75	0.03	17.90	
	River	No Threat Category	54.17	0.58		
	River and Lakeshore gravel	No Threat Category	62.57	0.68		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	97.11	16.60		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
Lower Pohangina Mana_10d	Kahikatea-pukatea-tawa forest	Threatened	2.23	6.51	71.89	Red
	Podocarp/broadleaf-fuchsia forest	Threatened	0.00	0.00		
	Wetland	Threatened	3.29	8.36		
	Rimu/tawa-kamahi forest	Threatened	3.29	57.02		
	Hall's totara/broadleaf forest	At Risk	0.00	0.00	0.00	
	Podocarp/kamahi forest	At Risk	0.00	0.00		
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00	28.11	
	River	No Threat Category	55.43	17.21		
	River and Lakeshore gravel	No Threat Category	63.42	10.90		
Aokautere Mana_10e	Kahikatea-pukatea-tawa forest	Threatened	13.55	92.86	100.00	Red
	Wetland	Threatened	0.00	0.00		
	Rimu/tawa-kamahi forest	Threatened	0.03	7.14		
	Podocarp/kamahi forest	At Risk	0.00	0.00	0.00	Red
Lower Manawatu Mana_11a	Kahikatea-pukatea-tawa forest	Threatened	0.35	1.24	48.84	Orange
	Rimu/tawa-kamahi forest	Threatened	1.34	1.62		
	Wetland	Threatened	3.68	45.98		
	Lake and Pond	No Threat Category	51.18	1.45	51.16	
	River	No Threat Category	80.81	41.52		
	River and Lakeshore gravel	No Threat Category	85.35	8.19		
Turitea Mana_11b	Kahikatea-pukatea-tawa forest	Threatened	12.51	1.80	98.65	Red
	Wetland	Threatened	0.88	0.82		
	Rimu/tawa-kamahi forest	Threatened	25.62	96.02		
	Podocarp/kamahi forest	At Risk	0.61	0.21	0.21	
	Lake and Pond	No Threat Category	100.00	1.08	1.14	
	River	No Threat Category	44.81	0.06		
Kahuterawa Mana_11c	Kahikatea-pukatea-tawa forest	Threatened	3.59	0.76	75.35	Red
	Wetland	Threatened	1.38	5.17		
	Rimu/tawa-kamahi forest	Threatened	5.90	69.42		
	Hall's totara/broadleaf forest	At Risk	0.00	0.00	24.65	
	Podocarp/kamahi forest	At Risk	7.60	24.65		
Upper Mangaone Stream Mana_11d	Podocarp/tawa-mahoe forest	Threatened	0.45	4.55	100.00	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.29	21.02		
	Wetland	Threatened	0.23	57.39		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Rimu/tawa-kamahi forest	Threatened	0.12	17.05		
Lower Mangaone Stream Mana_11e	Kahikatea-pukatea-tawa forest	Threatened	0.03	37.03	43.71	Red
	Wetland	Threatened	0.02	6.68		
	Rimu/tawa-kamahi forest	Threatened	0.00	0.00		
	River	No Threat Category	85.03	48.15	56.29	
	River and Lakeshore gravel	No Threat Category	100.00	8.14		
Main Drain Mana_11f	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.14	76.99	Red
	Wetland	Threatened	0.13	76.85		
	River	No Threat Category	91.36	18.72	23.01	
	River and Lakeshore gravel	No Threat Category	80.95	4.29		
Upper Oroua Mana_12a	Hall's totara/silver beech-kamahi forest	Threatened	0.00	0.00	12.73	Yellow
	Podocarp/tawa-mahoe forest	Threatened	3.72	0.59		
	Kahikatea-pukatea-tawa forest	Threatened	0.77	0.16		
	Podocarp/black/mountain beech forest	Threatened	13.56	6.21		
	Podocarp/broadleaf-fuchsia forest	Threatened	1.71	0.07		
	Wetland	Threatened	4.49	2.72		
	Rimu/tawa-kamahi forest	Threatened	2.22	2.97		
	Hall's totara/broadleaf forest	At Risk	75.07	3.01	8.34	
	Mountain beech forest	At Risk	58.96	4.28		
	Podocarp/kamahi forest	At Risk	1.02	1.05		
	Mountain beech-red beech forest	No Threat Category	91.35	76.65	78.93	
	Podocarp/kamahi-beech forest	No Threat Category	75.63	2.04		
	River	No Threat Category	60.24	0.15		
	River and Lakeshore gravel	No Threat Category	71.03	0.08		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	0.00	0.00		
Middle Oroua Mana_12b	Kahikatea-pukatea-tawa forest	Threatened	0.82	4.18	98.72	Red
	Wetland	Threatened	5.67	94.53		
	River	No Threat Category	50.00	1.28	1.28	
Lower Oroua Mana_12c	Dunelands	Threatened	0.52	2.01	79.48	Red
	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00		
	Kahikatea-pukatea-tawa forest	Threatened	1.26	22.76		
	Wetland	Threatened	0.30	54.70		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	River	No Threat Category	36.95	20.52	20.52	
Kiwitea Mana_12d	Podocarp/tawa-mahoe forest	Threatened	12.23	0.66	76.91	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.44	3.76		
	Wetland	Threatened	1.50	20.44		
	Rimu/tawa-kamahi forest	Threatened	0.81	52.05		
	Podocarp/kamahi forest	At Risk	2.20	22.68	22.68	
	Lake and Pond	No Threat Category	43.59	0.41	0.41	
Makino Mana_12e	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00	97.97	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.66	47.85		
	Wetland	Threatened	0.82	46.79		
	Rimu/tawa-kamahi forest	Threatened	0.28	3.34		
	Lake and Pond	No Threat Category	36.56	2.03	2.03	
Coastal Manawatu Mana_13a	Dunelands	Threatened	13.88	30.35	58.38	Red
	Podocarp/tawa-mahoe forest	Threatened	0.39	1.53		
	Kahikatea-pukatea-tawa forest	Threatened	0.32	0.22		
	Rimu/tawa-kamahi forest	Threatened	0.00	0.00		
	Wetland	Threatened	2.54	26.27		
	Lake and Pond	No Threat Category	37.46	0.68	41.62	
	River	No Threat Category	84.78	40.94		
	No Data	N/A	0.00	0.00	0.00	
Upper Tokomaru Mana_13b	Wetland	Threatened	1.80	0.08	78.28	Red
	Rimu/tawa-kamahi forest	Threatened	39.53	78.20		
	Hall's totara/broadleaf forest	At Risk	13.79	1.24	21.15	
	Podocarp/kamahi forest	At Risk	37.96	19.91		
	Lake and Pond	No Threat Category	92.79	0.58	0.58	
Lower Tokomaru Mana_13c	Kahikatea-pukatea-tawa forest	Threatened	0.22	1.44	92.09	Red
	Rimu/tawa-kamahi forest	Threatened	0.93	50.50		
	Wetland	Threatened	0.32	40.15		
	Podocarp/kamahi forest	At Risk	4.24	7.53	7.53	
	River	No Threat Category	100.00	0.38	0.38	
Mangaore Mana_13d	Kahikatea-pukatea-tawa forest	Threatened	1.08	0.04	71.71	Red
	Wetland	Threatened	0.75	1.43		
	Rimu/tawa-kamahi forest	Threatened	13.03	70.24		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Hall's totara/broadleaf forest	At Risk	100.00	1.03	27.83	
	Podocarp/kamahi forest	At Risk	59.68	26.80		
	River	No Threat Category	68.91	0.46	0.46	
Koputaroa Mana_13e	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00	98.26	Red
	Rimu/tawa-kamahi forest	Threatened	0.84	66.16		
	Wetland	Threatened	2.34	32.10		
	Podocarp/kamahi forest	At Risk	0.00	0.00	0.00	
	River	No Threat Category	61.43	1.74	1.74	
Foxton Loop Mana_13f	Dunelands	Threatened	19.74	16.72	79.37	Red
	Podocarp/tawa-mahoe forest	Threatened	0.42	6.74		
	Wetland	Threatened	2.16	55.91		
	River	No Threat Category	53.04	20.63	20.19	
Upper Rangitikei Rang_1	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00	4.96	Orange
	Podocarp forest	Threatened	0.00	0.00		
	Podocarp/black/mountain beech forest	Threatened	8.78	4.87		
	Wetland	Threatened	28.13	0.10		
	Rimu/tawa-kamahi forest	Threatened	0.00	0.00		
	Mountain beech forest	At Risk	47.40	61.83	61.83	
	Mountain beech-red beech forest	No Threat Category	92.86	0.03	33.20	
	River	No Threat Category	96.26	0.41		
	River and Lakeshore gravel	No Threat Category	100.00	0.02		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	84.24	31.80		
	Silver beech forest	No Threat Category	50.30	0.95		
Middle Rangitikei Rang_2a	Hall's totara/silver beech-kamahi forest	Threatened	1.96	0.37	42.78	Red
	Podocarp/tawa-mahoe forest	Threatened	11.81	0.15		
	Kahikatea-pukatea-tawa forest	Threatened	24.98	0.57		
	Podocarp forest	Threatened	0.89	1.92		
	Podocarp/black/mountain beech forest	Threatened	1.34	3.92		
	Rimu/tawa-kamahi forest	Threatened	18.29	31.76		
	Wetland	Threatened	23.52	4.08		
	Hall's totara/broadleaf forest	At Risk	8.75	29.11	46.70	
	Mountain beech forest	At Risk	7.62	17.37		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Podocarp/kamahi forest	At Risk	2.43	0.23		
	River	No Threat Category	67.72	1.15	10.52	
	River and Lakeshore gravel	No Threat Category	71.74	0.10		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	93.17	9.27		
Pukeokahu-Mangaweka Rang_2b	Hall's totara/silver beech-kamahi forest	Threatened	28.14	0.86	8.82	Yellow
	Podocarp/tawa-mahoe forest	Threatened	34.83	0.72		
	Kahikatea-pukatea-tawa forest	Threatened	15.37	0.27		
	Podocarp forest	Threatened	2.10	0.04		
	Podocarp/black/mountain beech forest	Threatened	14.19	1.27		
	Wetland	Threatened	17.65	0.48		
	Rimu/tawa-kamahi forest	Threatened	6.54	4.61		
	Podocarp/red beech-kamahi-tawa forest	Threatened	17.76	0.57		
	Hall's totara/broadleaf forest	At Risk	23.22	1.41	2.79	
	Mountain beech forest	At Risk	45.22	0.61		
	Podocarp/kamahi forest	At Risk	4.67	0.77		
	Lake and Pond	No Threat Category	79.69	0.02	88.39	
	Mountain beech-red beech forest	No Threat Category	83.07	63.74		
	Red beech-silver beech forest	No Threat Category	79.31	2.99		
	Podocarp/kamahi-beech forest	No Threat Category	31.64	5.50		
	River	No Threat Category	79.55	0.31		
	River and Lakeshore gravel	No Threat Category	80.59	0.11		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	80.51	15.71		
Upper Moawhango Rang_2c	Podocarp/black/mountain beech forest	Threatened	0.65	0.01	0.01	Orange
	Wetland	Threatened	0.00	0.00		
	Mountain beech forest	At Risk	26.76	53.95	53.95	
	Lake and Pond	No Threat Category	98.90	4.48	46.04	
	Mountain beech-red beech forest	No Threat Category	25.57	0.31		
	River and Lakeshore gravel	No Threat Category	100.00	0.01		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	81.45	41.24		
Middle Moawhango Rang_2d	Podocarp/tawa-mahoe forest	Threatened	6.53	0.17	14.17	Orange
	Podocarp forest	Threatened	2.96	4.08		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Podocarp/black/mountain beech forest	Threatened	3.62	8.35		
	Wetland	Threatened	0.00	0.00		
	Rimu/tawa-kamahi forest	Threatened	5.51	1.56		
	Podocarp/red beech-kamahi-tawa forest	Threatened	0.00	0.00		
	Hall's totara/broadleaf forest	At Risk	0.95	0.43		
	Mountain beech forest	At Risk	8.95	35.08	35.51	
	Podocarp/kamahi forest	At Risk	0.00	0.00		
	Lake and Pond	No Threat Category	68.75	0.02		
	Mountain beech-red beech forest	No Threat Category	43.94	35.14		
	Podocarp/kamahi-beech forest	No Threat Category	1.64	0.06		
	River	No Threat Category	100.00	0.21	50.32	
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	95.00	14.90		
Lower Moawhango Rang_2e	Hall's totara/silver beech-kamahi forest	Threatened	0.00	0.00		
	Podocarp/tawa-mahoe forest	Threatened	34.82	4.72		
	Kahikatea-pukatea-tawa forest	Threatened	25.67	4.60		
	Podocarp forest	Threatened	3.48	12.92	56.32	
	Podocarp/black/mountain beech forest	Threatened	0.00	0.00		Red
	Wetland	Threatened	0.63	0.05		
	Rimu/tawa-kamahi forest	Threatened	4.94	34.02		
	Hall's totara/broadleaf forest	At Risk	19.54	43.00		
	Mountain beech forest	At Risk	3.15	0.51	43.68	
	Podocarp/kamahi forest	At Risk	2.28	0.18		
Upper Hautapu Rang_2f	Hall's totara/silver beech-kamahi forest	Threatened	0.00	0.00		Red
	Podocarp forest	Threatened	4.25	5.87		
	Podocarp/black/mountain beech forest	Threatened	0.00	0.00		
	Wetland	Threatened	9.42	3.21	17.42	
	Rimu/tawa-kamahi forest	Threatened	5.22	8.22		
	Wetland	Threatened	15.33	0.13		
	Hall's totara/broadleaf forest	At Risk	21.00	78.36		
	Mountain beech forest	At Risk	3.27	3.87	82.52	
	Podocarp/kamahi forest	At Risk	5.02	0.29		
	Lake and Pond	No Threat Category	64.58	0.06	0.06	

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Mountain beech-red beech forest	No Threat Category	0.00	0.00		
Lower Hautapu Rang_2g	Podocarp/tawa-mahoe forest	Threatened	0.82	0.20	78.76	Red
	Kahikatea-pukatea-tawa forest	Threatened	3.92	0.15		
	Podocarp forest	Threatened	4.61	22.88		
	Wetland	Threatened	5.27	5.08		
	Rimu/tawa-kamahi forest	Threatened	2.29	50.46		
	Hall's totara/broadleaf forest	At Risk	11.25	1.52	21.11	
	Podocarp/kamahi forest	At Risk	13.84	19.59		
	Lake and Pond	No Threat Category	43.75	0.13	0.13	
Lower Rangitikei Rang_3a	Podocarp/tawa-mahoe forest	Threatened	7.70	0.69	74.62	Red
	Kahikatea-pukatea-tawa forest	Threatened	3.47	5.87		
	Wetland	Threatened	2.90	9.72		
	Rimu/tawa-kamahi forest	Threatened	2.63	58.34		
	Hall's totara/broadleaf forest	At Risk	0.00	0.00	0	
	Podocarp/kamahi forest	At Risk	0.00	0.00		
	Alpine gravel and rock	No Threat Category	31.25	0.02	25.38	
	Lake and Pond	No Threat Category	46.77	0.11		
	River	No Threat Category	58.24	13.32		
	River and Lakeshore gravel	No Threat Category	62.87	11.93		
Makohine Rang_3b	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00	76.16	Red
	Kahikatea-pukatea-tawa forest	Threatened	26.85	3.12		
	Podocarp forest	Threatened	0.00	0.00		
	Wetland	Threatened	2.65	1.65		
	Rimu/tawa-kamahi forest	Threatened	2.91	73.39		
	Hall's totara/broadleaf forest	At Risk	7.01	6.46	21.66	
	Podocarp/kamahi forest	At Risk	2.98	15.21		
	Lake and Pond	No Threat Category	40.00	0.13	0.18	
	River	No Threat Category	100.00	0.04		
	River and Lakeshore gravel	No Threat Category	100.00	0.01		
Coastal Rangitikei Rang_4a	Dunelands	Threatened	0.00	0.00	31.30	Red
	Podocarp/tawa-mahoe forest	Threatened	0.08	0.20		
	Kahikatea-pukatea-tawa forest	Threatened	1.25	14.84		
	Rimu/tawa-kamahi forest	Threatened	0.83	0.75		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Wetland	Threatened	0.59	15.50		
	Lake and Pond	No Threat Category	406.61	10.78	68.70	
	River	No Threat Category	57.25	31.65		
	River and Lakeshore gravel	No Threat Category	55.89	26.28		
Tidal Rangitikei Rang_4b	Dunelands	Threatened	7.95	57.05	91.90	Red
	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00		
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Wetland	Threatened	4.82	34.85		
	Estuarine open water	No Threat Category	100.00	3.34	8.10	
	River	No Threat Category	56.82	4.08		
	River and Lakeshore gravel	No Threat Category	64.59	0.67		
	No Data	N/A	0.00	0.00	0	
Porewa Rang_4c	Kahikatea-pukatea-tawa forest	Threatened	5.47	9.61	95.73	Red
	Wetland	Threatened	2.96	15.71		
	Rimu/tawa-kamahi forest	Threatened	2.95	70.42		
	Hall's totara/broadleaf forest	At Risk	40.30	0.30	2.07	
	Podocarp/kamahi forest	At Risk	7.49	1.77		
	Lake and Pond	No Threat Category	42.86	0.04	2.19	
	River	No Threat Category	51.15	0.53		
	River and Lakeshore gravel	No Threat Category	63.40	1.62		
Tutaenui Rang_4d	Podocarp/tawa-mahoe forest	Threatened	0.46	2.10	87.26	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.10	1.01		
	Wetland	Threatened	0.49	28.21		
	Rimu/tawa-kamahi forest	Threatened	2.45	55.94		
	Lake and Pond	No Threat Category	89.14	11.87	12.74	
	River	No Threat Category	30.54	0.61		
	River and Lakeshore gravel	No Threat Category	26.20	0.26		
Upper Whanganui Whai_1	Hall's totara/silver beech-kamahi forest	Threatened	0.00	0.00	45.65	Red
	Rimu/tawa-kamahi forest	Threatened	58.60	45.06		
	Wetland	Threatened	5.94	0.59		
	Hall's totara/broadleaf forest	At Risk	11.54	2.16	45.87	
	Podocarp/kamahi forest	At Risk	42.57	43.72		
	Alpine gravel and rock	No Threat Category	100.00	0.21	8.48	

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Lake and Pond	No Threat Category	95.68	0.75		
	River	No Threat Category	66.24	0.01		
	River and Lakeshore gravel	No Threat Category	98.44	0.02		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	70.11	7.49		
Cherry Grove Whai_2a	Kahikatea-pukatea-tawa forest	Threatened	2.17	0.97	69.23	Red
	Wetland	Threatened	10.04	12.25		
	Rimu/tawa-kamahi forest	Threatened	4.07	56.01		
	Podocarp/kamahi forest	At Risk	3.76	22.85	22.85	
	Lake and Pond	No Threat Category	62.50	0.36	7.93	
	River	No Threat Category	55.05	5.48		
	River and Lakeshore gravel	No Threat Category	78.64	2.09		
Upper Whakapapa Whai_2b	Wetland	Threatened	0.00	0.00	0.00	Orange
	Hall's totara/broadleaf forest	At Risk	17.65	14.52	49.46	
	Mountain beech forest	At Risk	66.40	26.31		
	Podocarp/kamahi forest	At Risk	20.64	8.62		
	Alpine gravel and rock	No Threat Category	100.00	6.53	50.54	
	Lake and Pond	No Threat Category	100.00	0.14		
	Mountain beech-red beech forest	No Threat Category	80.17	0.34		
	Permanent snow and ice	No Threat Category	100.00	0.73		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	54.91	42.80		
Lower Whakapapa Whai_2c	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00	30.52	Orange
	Rimu/tawa-kamahi forest	Threatened	75.97	27.72		
	Wetland	Threatened	62.06	2.80		
	Hall's totara/broadleaf forest	At Risk	96.19	6.46	68.73	
	Podocarp/kamahi forest	At Risk	61.77	62.27		
	River	No Threat Category	87.12	0.69	0.75	
	River and Lakeshore gravel	No Threat Category	98.46	0.06		
Piopiotea Whai_2d	Wetland	Threatened	3.89	0.91	1.08	Orange
	Rimu/tawa-kamahi forest	Threatened	3.09	0.18		
	Hall's totara/broadleaf forest	At Risk	34.54	2.40	98.91	
	Podocarp/kamahi forest	At Risk	41.96	96.50		
	Lake and Pond	No Threat Category	25.00	0.01	0.01	

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
Pungapunga Whai_2e	Kahikatea-pukatea-tawa forest	Threatened	1.15	0.02	40.10	Red
	Wetland	Threatened	0.22	0.01		
	Rimu/tawa-kamahi forest	Threatened	25.87	40.07		
	Hall's totara/broadleaf forest	At Risk	99.55	15.71	59.85	
	Podocarp/kamahi forest	At Risk	94.49	44.14		
	River and Lakeshore gravel	No Threat Category	76.60	0.05	0.05	
Upper Ongarue Whai_2f	Kahikatea-pukatea-tawa forest	Threatened	0.13	0.00	47.19	Red
	Podocarp/broadleaf-fuchsia forest	Threatened	100.00	0.04		
	Rimu/tawa-kamahi forest	Threatened	43.72	47.02		
	Wetland	Threatened	5.13	0.13		
	Hall's totara/broadleaf forest	At Risk	97.16	10.67	52.81	
	Podocarp/kamahi forest	At Risk	45.93	42.14		
	Lake and Pond	No Threat Category	56.00	0.00	0.00	
Lower Ongarue Whai_2g	Kahikatea-pukatea-tawa forest	Threatened	1.93	0.15	69.41	Red
	Wetland	Threatened	0.44	0.04		
	Rimu/tawa-kamahi forest	Threatened	18.54	69.22		
	Hall's totara/broadleaf forest	At Risk	97.61	9.25	30.27	
	Podocarp/kamahi forest	At Risk	58.55	21.02		
	Lake and Pond	No Threat Category	87.50	0.01	0.32	
	River	No Threat Category	43.78	0.29		
	River and Lakeshore gravel	No Threat Category	51.56	0.02		
Te Maire Whai_3	Kahikatea-pukatea-tawa forest	Threatened	0.23	0.00	97.25	Red
	Wetland	Threatened	6.24	1.28		
	Rimu/tawa-kamahi forest	Threatened	12.43	95.97		
	Podocarp/kamahi forest	At Risk	2.21	0.77	0.77	
	River	No Threat Category	56.17	1.77	1.98	
	River and Lakeshore gravel	No Threat Category	82.81	0.21		
Middle Whanganui Whai_4a	Podocarp/tawa-mahoe forest	Threatened	100.00	0.01	97.52	Red
	Kahikatea-pukatea-tawa forest	Threatened	26.48	0.49		
	Wetland	Threatened	20.80	0.55		
	Rimu/tawa-kamahi forest	Threatened	21.21	96.46		
	Podocarp/kamahi forest	At Risk	17.61	0.93	0.93	
	River	No Threat Category	77.82	1.54	1.55	

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	River and Lakeshore gravel	No Threat Category	88.89	0.01		
Upper Ohura Whai_4b	Kahikatea-pukatea-tawa forest	Threatened	3.99	0.19	74.39	Red
	Wetland	Threatened	1.74	0.33		
	Rimu/tawa-kamahi forest	Threatened	25.92	73.86		
	Podocarp/red beech-kamahi-tawa forest	Threatened	0.00	0.00		
	Podocarp/kamahi forest	At Risk	1.09	0.04	0.04	
	Podocarp/kamahi-beech forest	No Threat Category	73.73	25.56	25.56	
Lower Ohura Whai_4c	Kahikatea-pukatea-tawa forest	Threatened	2.85	0.81	98.88	Red
	Wetland	Threatened	3.20	1.69		
	Rimu/tawa-kamahi forest	Threatened	10.21	96.38		
	Podocarp/kamahi forest	At Risk	3.01	0.29	0.29	
	Lake and Pond	No Threat Category	0.00	0.00	0.83	
	River	No Threat Category	34.38	0.83		
Retaruke Whai_4d	Kahikatea-pukatea-tawa forest	Threatened	13.00	0.02	64.98	Red
	Wetland	Threatened	4.50	0.04		
	Rimu/tawa-kamahi forest	Threatened	29.75	64.92		
	Hall's totara/broadleaf forest	At Risk	100.00	0.04	34.88	
	Podocarp/kamahi forest	At Risk	77.94	34.83		
	Lake and Pond	No Threat Category	68.75	0.01	0.15	
	River	No Threat Category	60.12	0.07		
	River and Lakeshore gravel	No Threat Category	65.07	0.06		
Pipiriki Whai_5a	Kahikatea-pukatea-tawa forest	Threatened	100.00	0.36	94.68	Red
	Podocarp/black/mountain beech forest	Threatened	88.48	2.45		
	Podocarp/broadleaf-fuchsia forest	Threatened	100.00	0.05		
	Wetland	Threatened	88.42	0.09		
	Rimu/tawa-kamahi forest	Threatened	80.13	91.73		
	Hall's totara/broadleaf forest	At Risk	99.95	0.84	1.71	
	Podocarp/kamahi forest	At Risk	56.53	1.53		
	Podocarp/kamahi-silver beech forest	No Threat Category	79.17	0.00	3.62	
	Mountain beech-red beech forest	No Threat Category	100.00	0.02		
	Podocarp/kamahi-beech forest	No Threat Category	99.48	3.07		
	River	No Threat Category	98.51	0.52		
	River and Lakeshore gravel	No Threat Category	82.79	0.01		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
Tangarakau Whai_5b	Kahikatea-pukatea-tawa forest	Threatened	8.75	0.18	28.56	Yellow
	Wetland	Threatened	4.32	0.29		
	Rimu/tawa-kamahi forest	Threatened	41.92	28.10		
	Podocarp/kamahi forest	At Risk	71.45	0.50	0.50	
	Lake and Pond	No Threat Category	31.25	0.00	70.94	
	Podocarp/kamahi-beech forest	No Threat Category	85.33	70.93		
	River	No Threat Category	77.49	0.01		
Whangamomona Whai_5c	Kahikatea-pukatea-tawa forest	Threatened	13.53	0.46	99.43	Red
	Podocarp/black/mountain beech forest	Threatened	100.00	0.10		
	Wetland	Threatened	1.31	0.03		
	Rimu/tawa-kamahi forest	Threatened	57.81	98.83		
	Hall's totara/broadleaf forest	At Risk	100.00	0.01	0.25	
	Podocarp/kamahi forest	At Risk	100.00	0.24		
	Lake and Pond	No Threat Category	75.00	0.01	0.32	
	Mountain beech-red beech forest	No Threat Category	100.00	0.00		
	Podocarp/kamahi-beech forest	No Threat Category	86.58	0.20		
	River	No Threat Category	90.20	0.11		
Upper Manganui o te Ao Whai_5d	Podocarp/black/mountain beech forest	Threatened	47.55	0.22	7.77	Orange
	Wetland	Threatened	7.82	0.47		
	Rimu/tawa-kamahi forest	Threatened	47.24	7.08		
	Hall's totara/broadleaf forest	At Risk	78.28	5.80	46.14	
	Mountain beech forest	At Risk	50.35	1.68		
	Podocarp/kamahi forest	At Risk	64.89	38.66		
	Alpine gravel and rock	No Threat Category	100.00	2.46	46.09	
	Lake and Pond	No Threat Category	43.75	0.00		
	Mountain beech-red beech forest	No Threat Category	93.46	27.04		
	Permanent snow and ice	No Threat Category	100.00	0.35		
	Red beech-silver beech forest	No Threat Category	100.00	0.06		
	Podocarp/kamahi-beech forest	No Threat Category	93.52	4.90		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	60.55	11.28		
Lower Manganui o te Ao Whai_5e	Podocarp/tawa-mahoe forest	Threatened	6.36	0.05	82.41	Red
	Podocarp/black/mountain beech forest	Threatened	31.24	0.25		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Wetland	Threatened	17.00	0.67		
	Rimu/tawa-kamahi forest	Threatened	32.28	81.45		
	Hall's totara/broadleaf forest	At Risk	96.19	1.83	16.87	
	Podocarp/kamahi forest	At Risk	25.04	15.05		
	Lake and Pond	No Threat Category	40.00	0.00	0.71	
	River	No Threat Category	80.02	0.63		
	River and Lakeshore gravel	No Threat Category	89.82	0.08		
	Silver beech forest	No Threat Category	12.35	0.00		
Paetawa Whai_6	Podocarp/tawa-mahoe forest	Threatened	1.32	0.00	92.72	Red
	Kahikatea-pukatea-tawa forest	Threatened	16.20	0.19		
	Hardwood/broadleaf forest	Threatened	22.40	0.11		
	Podocarp/black/mountain beech forest	Threatened	59.18	4.85		
	Wetland	Threatened	22.77	0.09		
	Rimu/tawa-kamahi forest	Threatened	47.66	87.47		
	Hall's totara/broadleaf forest	At Risk	58.01	0.85	5.57	
	Podocarp/kamahi forest	At Risk	35.57	4.71		
	Lake and Pond	No Threat Category	37.45	0.07	1.72	
	Mountain beech-red beech forest	No Threat Category	31.25	0.00		
	River	No Threat Category	91.82	1.16		
	River and Lakeshore gravel	No Threat Category	86.35	0.35		
	Silver beech forest	No Threat Category	58.60	0.14		
Lower Whanganui Whai_7a	Podocarp/tawa-mahoe forest	Threatened	6.36	5.42	95.18	Red
	Kahikatea-pukatea-tawa forest	Threatened	5.45	1.58		
	Hardwood/broadleaf forest	Threatened	13.29	0.92		
	Podocarp forest	Threatened	1.24	0.11		
	Wetland	Threatened	3.70	0.90		
	Rimu/tawa-kamahi forest	Threatened	36.55	86.25		
	Podocarp/kamahi forest	At Risk	16.05	0.12	0.12	
	River	No Threat Category	68.53	4.17	4.70	
	River and Lakeshore gravel	No Threat Category	76.09	0.53		
Coastal Whanganui Whai_7b	Dunelands	Threatened	7.34	9.26	34.65	Red
	Podocarp/tawa-mahoe forest	Threatened	3.17	10.09		
	Kahikatea-pukatea-tawa forest	Threatened	2.56	10.60		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Hardwood/broadleaf forest	Threatened	8.27	3.46		
	Podocarp forest	Threatened	0.12	0.12		
	Wetland	Threatened	0.40	1.13		
	Lake and Pond	No Threat Category	73.94	1.28	65.35	
	River	No Threat Category	86.58	59.87		
	River and Lakeshore gravel	No Threat Category	73.71	4.20		
	No Data	N/A	0.00	0.00	0.00	
Upokongaro Whai_7c	Podocarp/tawa-mahoe forest	Threatened	3.78	14.32	99.20	Red
	Kahikatea-pukatea-tawa forest	Threatened	2.45	0.65		
	Hardwood/broadleaf forest	Threatened	0.00	0.00		
	Wetland	Threatened	1.88	0.84		
	Rimu/tawa-kamahi forest	Threatened	7.57	83.38		
	Podocarp/kamahi forest	At Risk	33.50	0.41	0.41	
	Lake and Pond	No Threat Category	0.00	0.00	0.39	
	River	No Threat Category	77.79	0.39		
Matarawa Whai_7d	Podocarp/tawa-mahoe forest	Threatened	6.54	78.25	99.62	Red
	Kahikatea-pukatea-tawa forest	Threatened	2.19	6.04		
	Hardwood/broadleaf forest	Threatened	1.92	0.67		
	Wetland	Threatened	1.07	2.67		
	Rimu/tawa-kamahi forest	Threatened	5.29	11.98		
	Lake and Pond	No Threat Category	100.00	0.07	0.38	
	River	No Threat Category	78.72	0.32		
Upper Whangaehu Whau_1a	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00	22.70	Yellow
	Podocarp forest	Threatened	0.00	0.00	22.70	Yellow
	Podocarp/black/mountain beech forest	Threatened	12.21	21.99	22.70	Yellow
	Wetland	Threatened	10.19	0.71		
	Hall's totara/broadleaf forest	At Risk	30.53	0.40	13.75	
	Mountain beech forest	At Risk	4.42	13.35		
	Alpine gravel and rock	No Threat Category	99.90	13.64	63.56	
	Lake and Pond	No Threat Category	98.33	0.57		
	Permanent snow and ice	No Threat Category	100.00	3.64		
	River	No Threat Category	50.00	0.08		
	River and Lakeshore gravel	No Threat Category	58.33	0.05		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	59.00	42.85		
	Silver beech forest	No Threat Category	27.91	2.72		
Waitangi Whau_1b	Podocarp/black/mountain beech forest	Threatened	0.88	73.94	73.94	Red
	Wetland	Threatened	0.00	0.00		
	Mountain beech forest	At Risk	0.15	26.06	26.06	
Tokiahuru Whau_1c	Kahikatea-totara forest	Threatened	0.00	0.00	5.85	Yellow
	Podocarp/black/mountain beech forest	Threatened	4.50	1.51		
	Wetland	Threatened	49.45	4.34		
	Mountain beech forest	At Risk	5.25	0.67	0.67	
	Alpine gravel and rock	No Threat Category	100.00	3.10	93.48	
	Lake and Pond	No Threat Category	94.63	0.08		
	Mountain beech-red beech forest	No Threat Category	1.49	0.02		
	Permanent snow and ice	No Threat Category	100.00	0.39		
	Red beech-silver beech forest	No Threat Category	69.52	47.62		
	Podocarp/kamahi-beech forest	No Threat Category	10.80	0.13		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	73.04	17.92		
	Silver beech forest	No Threat Category	51.79	24.23		
Middle Whangaehu Whau_2	Podocarp/tawa-mahoe forest	Threatened	3.88	0.06	73.91	Red
	Kahikatea-pukatea-tawa forest	Threatened	16.67	4.48		
	Kahikatea-totara forest	Threatened	0.00	0.00		
	Podocarp forest	Threatened	6.12	7.92		
	Podocarp/black/mountain beech forest	Threatened	6.32	8.70		
	Wetland	Threatened	6.68	1.90		
	Rimu/tawa-kamahi forest	Threatened	5.45	50.84		
	Hall's totara/broadleaf forest	At Risk	9.31	13.36	18.25	
	Mountain beech forest	At Risk	1.56	0.00		
	Podocarp/kamahi forest	At Risk	23.12	4.89		
	Lake and Pond	No Threat Category	43.75	0.04	7.83	
	Mountain beech-red beech forest	No Threat Category	68.75	0.10		
	Podocarp/kamahi-beech forest	No Threat Category	30.62	4.46		
	River	No Threat Category	64.17	1.98		
	Silver beech forest	No Threat Category	2.00	1.25		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
Lower Whangaehu Whau_3a	Podocarp/tawa-mahoe forest	Threatened	5.38	1.63	92.45	Red
	Kahikatea-pukatea-tawa forest	Threatened	3.39	2.53		
	Wetland	Threatened	4.78	1.34		
	Rimu/tawa-kamahi forest	Threatened	8.66	86.95		
	Hall's totara/broadleaf forest	At Risk	14.36	1.45	5.48	
	Podocarp/kamahi forest	At Risk	34.60	4.03		
	Lake and Pond	No Threat Category	42.55	0.03	2.08	
	River	No Threat Category	53.79	2.03		
	River and Lakeshore gravel	No Threat Category	50.00	0.01		
Upper Makotuku Whau_3b	Hall's totara/broadleaf forest	At Risk	100.00	23.34	50.00	Orange
	Mountain beech forest	At Risk	100.00	1.51		
	Podocarp/kamahi forest	At Risk	44.96	25.15		
	Mountain beech-red beech forest	No Threat Category	92.67	19.08	50.00	
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	62.37	10.97		
	Silver beech forest	No Threat Category	67.31	19.95		
Lower Makotuku Whau_3c	Podocarp forest	Threatened	78.13	1.37	1.55	Orange
	Wetland	Threatened	1.42	0.18		
	Rimu/tawa-kamahi forest	Threatened	0.00	0.00		
	Hall's totara/broadleaf forest	At Risk	100.00	0.03	98.45	
	Podocarp/kamahi forest	At Risk	5.49	98.41		
Upper Mangawhero Whau_3d	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00	7.08	Yellow
	Podocarp forest	Threatened	3.75	1.63		
	Podocarp/black/mountain beech forest	Threatened	20.99	4.35		
	Podocarp/broadleaf-fuchsia forest	Threatened	9.79	0.25		
	Wetland	Threatened	4.51	0.54		
	Rimu/tawa-kamahi forest	Threatened	7.57	0.31		
	Hall's totara/broadleaf forest	At Risk	40.58	1.61	25.08	
	Mountain beech forest	At Risk	65.25	0.87		
	Podocarp/kamahi forest	At Risk	24.22	22.60		
	Alpine gravel and rock	No Threat Category	100.00	0.04	67.83	
	Lake and Pond	No Threat Category	45.00	0.01		
	Red beech-silver beech forest	No Threat Category	66.01	12.40		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Podocarp/kamahi-beech forest	No Threat Category	66.94	5.52		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	52.59	6.83		
	Silver beech forest	No Threat Category	72.81	43.03		
Lower Mangawhero Whau_3e	Podocarp/tawa-mahoe forest	Threatened	16.75	0.09	71.58	Red
	Kahikatea-pukatea-tawa forest	Threatened	8.93	0.77		
	Podocarp forest	Threatened	7.21	0.81		
	Podocarp/black/mountain beech forest	Threatened	31.36	0.36		
	Wetland	Threatened	9.18	1.12		
	Rimu/tawa-kamahi forest	Threatened	11.00	68.44		
	Hall's totara/broadleaf forest	At Risk	16.56	3.68	26.43	
	Podocarp/kamahi forest	At Risk	12.44	22.75		
	Lake and Pond	No Threat Category	71.88	0.03	1.99	
	Podocarp/kamahi-beech forest	No Threat Category	46.61	0.28		
	River	No Threat Category	61.29	1.50		
	Silver beech forest	No Threat Category	69.72	0.18		
Coastal Whangaehu Whau_4	Dunelands	Threatened	8.67	19.46	72.97	Red
	Podocarp/tawa-mahoe forest	Threatened	2.18	22.58		
	Kahikatea-pukatea-tawa forest	Threatened	0.96	3.38		
	Podocarp forest	Threatened	0.00	0.00		
	Wetland	Threatened	2.94	24.59		
	Rimu/tawa-kamahi forest	Threatened	5.05	2.97		
	Lake and Pond	No Threat Category	61.90	1.28	27.03	
	River	No Threat Category	73.89	25.74		
	No Data	N/A	0.00	0.00	0.00	
Upper Turakina Tura_1a	Podocarp/tawa-mahoe forest	Threatened	17.93	0.70	69.85	Red
	Kahikatea-pukatea-tawa forest	Threatened	12.78	6.43		
	Podocarp forest	Threatened	3.70	4.71		
	Podocarp/black/mountain beech forest	Threatened	36.52	3.71		
	Rimu/tawa-kamahi forest	Threatened	3.20	51.08		
	Wetland	Threatened	10.23	3.22		
	Hall's totara/broadleaf forest	At Risk	24.60	22.96	29.87	
	Mountain beech forest	At Risk	37.51	4.99		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Podocarp/kamahi forest	At Risk	5.28	1.92		
	Lake and Pond	No Threat Category	56.94	0.27	0.28	
	River	No Threat Category	27.27	0.01		
Lower Turakina Tura_1b	Dunelands	Threatened	8.63	4.76	96.34	Red
	Podocarp/tawa-mahoe forest	Threatened	4.58	16.03		
	Kahikatea-pukatea-tawa forest	Threatened	3.31	10.03		
	Rimu/tawa-kamahi forest	Threatened	3.73	53.90		
	Wetland	Threatened	1.94	11.61		
	Podocarp/kamahi forest	At Risk	0.00	0.00	0.00	
	Lake and Pond	No Threat Category	65.83	1.32	3.66	
	River	No Threat Category	74.98	2.35		
	No Data	N/A	0.00	0.00	0.00	
Ratana Tura_1c	Dunelands	Threatened	0.87	10.25	81.79	Red
	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00		
	Kahikatea-pukatea-tawa forest	Threatened	0.00	0.00		
	Wetland	Threatened	0.30	71.54		
	Lake and Pond	No Threat Category	56.25	18.21	18.21	
Upper Ohau Ohau_1a	Wetland	Threatened	2.17	0.06	50.01	Red
	Rimu/tawa-kamahi forest	Threatened	56.63	49.95		
	Hall's totara/broadleaf forest	At Risk	87.40	10.46	25.10	
	Podocarp/kamahi forest	At Risk	89.67	14.64		
	Mountain beech-red beech forest	No Threat Category	99.60	0.23	24.88	
	Red beech-silver beech forest	No Threat Category	89.19	14.74		
	Podocarp/kamahi-beech forest	No Threat Category	64.07	3.67		
	Scrub, tussock-grassland and herbfield above treeline	No Threat Category	90.53	0.24		
	Silver beech forest	No Threat Category	84.24	6.01		
Lower Ohau Ohau_1b	Dunelands	Threatened	14.25	2.08	54.44	Red
	Podocarp/tawa-mahoe forest	Threatened	0.18	0.13		
	Kahikatea-pukatea-tawa forest	Threatened	0.27	0.05		
	Rimu/tawa-kamahi forest	Threatened	7.56	37.50		
	Wetland	Threatened	5.44	14.68		
	Podocarp/kamahi forest	At Risk	49.13	1.81	1.81	

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Estuarine open water	No Threat Category	96.02	0.99	43.75	
	Red beech-silver beech forest	No Threat Category	90.78	12.27		
	Podocarp/kamahi-beech forest	No Threat Category	66.69	30.04		
	River	No Threat Category	69.47	0.45		
	No Data	N/A	0.00	0.00	2.02	
Owahanga Owha_1	Dunelands	Threatened	0.00	0.00	39.68	Red
	Podocarp/tawa-mahoe forest	Threatened	0.91	5.49		
	Kahikatea-pukatea-tawa forest	Threatened	4.02	0.57		
	Kahikatea-totara forest	Threatened	0.00	0.00		
	Hardwood/broadleaf forest	Threatened	7.08	0.08		
	Podocarp/broadleaf-fuchsia forest	Threatened	54.23	0.89		
	Wetland	Threatened	3.34	9.29		
	Rimu/tawa-kamahi forest	Threatened	1.05	23.37		
	Hall's totara/broadleaf forest	At Risk	33.61	4.80	54.68	
	Podocarp/kamahi forest	At Risk	28.43	49.87		
	Lake and Pond	No Threat Category	0.00	0.00	5.65	
	Podocarp/kamahi-beech forest	No Threat Category	10.94	3.58		
	River	No Threat Category	58.07	2.07		
	No Data	N/A	0.00	0.00	0.00	
East Coast East_1	Dunelands	Threatened	100.00	1.29	99.94	Red
	Podocarp/tawa-mahoe forest	Threatened	0.57	4.17		
	Kahikatea-pukatea-tawa forest	Threatened	2.37	0.16		
	Kahikatea-totara forest	Threatened	0.00	0.00		
	Wetland	Threatened	4.54	7.03		
	Rimu/tawa-kamahi forest	Threatened	4.26	87.28		
	Podocarp/kamahi forest	At Risk	0.00	0.00	0.00	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00	0.06	
	River	No Threat Category	41.67	0.05		
	River and Lakeshore gravel	No Threat Category	9.98	0.01		
	No Data	N/A	0.00	0.00	0.00	
Upper Akitio Akit_1a	Podocarp/tawa-mahoe forest	Threatened	2.99	0.24	99.03	Red
	Wetland	Threatened	1.33	2.17		
	Rimu/tawa-kamahi forest	Threatened	5.46	96.63		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Hall's totara/broadleaf forest	At Risk	0.00	0.00	0.91	
	Podocarp/kamahi forest	At Risk	2.85	0.91		
	Lake and Pond	No Threat Category	29.95	0.06	0.06	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00		
Lower Akitio Akit_1b	Dunelands	Threatened	0.00	0.00	96.60	Red
	Podocarp/tawa-mahoe forest	Threatened	0.90	8.22		
	Kahikatea-pukatea-tawa forest	Threatened	4.38	0.97		
	Kahikatea-totara forest	Threatened	0.00	0.00		
	Wetland	Threatened	2.34	10.30		
	Rimu/tawa-kamahi forest	Threatened	1.60	77.12		
	Podocarp/kamahi forest	At Risk	0.00	0.00	0.00	
	Podocarp/kamahi-beech forest	No Threat Category	0.00	0.00	3.40	
	River	No Threat Category	65.41	3.40		
	No Data	N/A	0.00	0.00	0.00	
Waihi Akit_1c	Podocarp/tawa-mahoe forest	Threatened	1.10	0.26	38.49	Red
	Kahikatea-pukatea-tawa forest	Threatened	0.09	0.03		
	Podocarp/broadleaf-fuchsia forest	Threatened	0.00	0.00		
	Wetland	Threatened	1.78	4.26		
	Rimu/tawa-kamahi forest	Threatened	0.82	33.95		
	Hall's totara/broadleaf forest	At Risk	20.79	10.53	60.25	
	Podocarp/kamahi forest	At Risk	11.24	49.72		
	Podocarp/kamahi-beech forest	No Threat Category	0.32	1.26	1.26	
Northern Coastal West_1	Dunelands	Threatened	1.17	1.54	93.36	Red
	Podocarp/tawa-mahoe forest	Threatened	5.01	12.34		
	Kahikatea-pukatea-tawa forest	Threatened	1.68	3.13		
	Podocarp forest	Threatened	0.22	0.54		
	Podocarp/black/mountain beech forest	Threatened	64.74	4.55		
	Podocarp/broadleaf-fuchsia forest	Threatened	100.00	0.09		
	Wetland	Threatened	0.35	0.07		
	Rimu/tawa-kamahi forest	Threatened	13.25	71.10		
	Hall's totara/broadleaf forest	At Risk	92.25	1.66	5.65	
	Podocarp/kamahi forest	At Risk	25.67	3.99		
	Lake and Pond	No Threat Category	66.47	0.83	0.99	

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Podocarp/kamahi-beech forest	No Threat Category	3.09	0.16		
	No Data	N/A	0.00	0.00	0.00	Red
Kai Iwi West_2	Dunelands	Threatened	4.43	0.05	96.83	Red
	Podocarp/tawa-mahoe forest	Threatened	3.61	9.87		
	Kahikatea-pukatea-tawa forest	Threatened	5.43	3.39		
	Podocarp forest	Threatened	5.16	2.71		
	Podocarp/black/mountain beech forest	Threatened	18.05	1.77		
	Podocarp/broadleaf-fuchsia forest	Threatened	100.00	0.02		
	Wetland	Threatened	2.29	1.10		
	Rimu/tawa-kamahi forest	Threatened	7.52	77.93		
	Hall's totara/broadleaf forest	At Risk	88.35	0.19	1.65	
	Podocarp/kamahi forest	At Risk	3.27	1.46		
	Podocarp/kamahi-beech forest	No Threat Category	11.06	1.52	1.52	
Mowhanau West_3	Dunelands	Threatened	100.00	0.67	100.00	Red
	Podocarp/tawa-mahoe forest	Threatened	0.86	64.68		
	Kahikatea-pukatea-tawa forest	Threatened	0.62	9.24		
	Podocarp forest	Threatened	0.30	14.92		
	Wetland	Threatened	0.21	2.74		
	Rimu/tawa-kamahi forest	Threatened	1.54	7.75		
Kaitoke Lakes West_4	Dunelands	Threatened	5.00	50.31	78.23	Red
	Podocarp/tawa-mahoe forest	Threatened	1.46	13.03		
	Kahikatea-pukatea-tawa forest	Threatened	0.52	3.60		
	Hardwood/broadleaf forest	Threatened	2.11	0.93		
	Podocarp forest	Threatened	0.00	0.00		
	Wetland	Threatened	1.47	10.36		
	Rimu/tawa-kamahi forest	Threatened	0.00	0.00		
	Lake and Pond	No Threat Category	86.86	21.77	21.77	
	No Data	N/A	0.00	0.00	0.00	
Southern Wanganui Lakes West_5	Dunelands	Threatened	3.59	65.93	82.22	Red
	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00		
	Kahikatea-pukatea-tawa forest	Threatened	0.57	1.30		
	Wetland	Threatened	0.46	14.98		
	Lake and Pond	No Threat Category	81.84	17.51	17.78	

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	River	No Threat Category	100.00	0.27		
	No Data	N/A	0.00	0.00	0.00	
Northern Manawatu Lakes West_6	Dunelands	Threatened	9.13	88.87	94.15	Red
	Podocarp/tawa-mahoe forest	Threatened	0.02	0.15		
	Wetland	Threatened	0.55	5.14		
	Lake and Pond	No Threat Category	86.69	5.85	5.85	
	No Data	N/A	0.00	0.00	0.00	
Waitarere West_7	Dunelands	Threatened	2.92	88.09	100.00	Red
	Podocarp/tawa-mahoe forest	Threatened	0.00	0.00		
	Wetland	Threatened	0.98	11.91		
	Lake and Pond	No Threat Category	0.00	0.00	0.00	
	No Data	N/A	0.00	0.00	0.00	
Lake Papaitonga West_8	Dunelands	Threatened	13.61	41.65	70.21	Red
	Podocarp/tawa-mahoe forest	Threatened	0.01	0.04		
	Kahikatea-pukatea-tawa forest	Threatened	37.37	17.06		
	Wetland	Threatened	1.81	6.60		
	Rimu/tawa-kamahi forest	Threatened	4.03	4.86		
	Estuarine open water	No Threat Category	0.00	0.09	29.79	
	Lake and Pond	No Threat Category	100.00	29.70		
Waikawa West_9	Dunelands	Threatened	45.42	4.89	9.68	Yellow
	Podocarp/tawa-mahoe forest	Threatened	0.14	0.03		
	Kahikatea-pukatea-tawa forest	Threatened	0.57	0.08		
	Rimu/tawa-kamahi forest	Threatened	2.61	2.69		
	Wetland	Threatened	2.77	1.99		
	Lake and Pond	No Threat Category	0.00	0.00	90.32	
	Mountain beech-red beech forest	No Threat Category	94.78	3.81		
	Red beech-silver beech forest	No Threat Category	93.94	41.36		
	Podocarp/kamahi-beech forest	No Threat Category	64.46	44.36		
	River	No Threat Category	78.12	0.07		
	Silver beech forest	No Threat Category	100.00	0.73		
	No Data	N/A	0.00	0.00	0.00	
Lake Horowhenua Hoki_1a	Dunelands	Threatened	33.30	2.68	18.38	Red
	Podocarp/tawa-mahoe forest	Threatened	0.13	0.33		

Water Management Sub-Zone	Habitat Type Name		Proportion of habitat type (remaining cover) within Sub-zone		Proportion of Status Category)	Indication of urgency
	Name	Status Category	Proportion A	Proportion B		
	Kahikatea-pukatea-tawa forest	Threatened	0.48	1.05		
	Wetland	Threatened	2.5	9.42		
	Rimu/tawa-kamahi forest	Threatened	0.62	4.90		
	Lake and Pond	No Threat Category	99.67	81.62	81.62	
Hokio Hoki_1b	Dunelands	Threatened	26.24	83.13		
	Podocarp/tawa-mahoe forest	Threatened	0.32	2.05	95.64	
	Wetland	Threatened	2.52	10.46		Red
	Estuarine open water	No Threat Category	100.00	0.30	4.36	
	Lake and Pond	No Threat Category	86.73	4.06		

Appendix 8: Criteria for assessing ecological significance

1. Representativeness

The site contains habitat type that is under-represented (20% or less of known or likely former cover) in the Manawatu-Wanganui Region or Ecological District, or nationally.

2. Rarity and Distinctiveness

- The site supports one or more species that are classified as threatened (as determined by the New Zealand Threat Classification System; or
- The site supports a species that is endemic to the Manawatu-Wanganui Region, or any given Water Management Zone, or Water Management Sub-zone; or
- The site supports a species or community of species that is distinctive to the Manawatu-Wanganui Region.

Distinctiveness is harder to determine and describes the uncommon presence, or unique assemblage of species or habitat at any given geographical location. Examples of distinctiveness include (but are not limited to):

- A species at its distributional limit;
- Species uncommon in the area (Ecological District or Region or within the Manawatu-Wanganui Region), but common elsewhere;
- Species common in the area (localised) but uncommon elsewhere;
- A unique assemblage of species;
- A species endemic to the Ecological District or the Manawatu-Wanganui Region; or
- A species or habitat type found outside its normal distribution.

Information on the presence of threatened and distinctive species is currently incomplete and Horizons will continue to build on existing knowledge. Distinctiveness is more complex than rarity and assessment requires detailed knowledge of species' distribution and habitat patterns. Input from other agencies (eg. DOC) and organisations, (eg. botanical societies) will be invaluable in this process. Published and unpublished information on species distribution will also be incorporated where relevant.

In the first instance, this criterion is reliant on intensive field survey or reliable records sourced from previous field surveys. Where this information already exists, a desk-top assessment is possible.

3. Ecological Context

This criterion evaluates the contribution a site makes to maintaining ecosystem processes at the landscape level. Connections between fragments are vital to enable processes and for the continued functioning of ecosystems. Dispersal and movement of species, pollen, and seeds as well as physical connections such as water flows, are important components of biological and environmental links between ecosystems.

Fragmented habitat is heavily dependent on, and influenced, by surrounding land-use and presence or absence of other habitat in the vicinity. The

presence of a buffer (a closely adjacent site, or edge habitat [even degraded or exotic edge]), can contribute positively to the long term viability of a site.

Ecological sequences occur across the landscape and through time as a result of environmental gradients (for example the changes in vegetation from the mountains to the sea). The presence of ecological sequences in the landscape provides for a greater range of habitats which have within them more complex species assemblages and richer biological diversity than that which occurs in homogeneous landscapes.

- The site provides connectivity (physical connections) between two or more areas of indigenous habitat; or
- The site provides an ecological buffer (is a closely adjacent site of similar, degraded or exotic habitat that provides protection) to another area of indigenous habitat, including aquatic habitat; or
- The site is an area of indigenous habitat that forms part of an indigenous ecological sequence (connectivity between different habitat types across a gradient [eg. altitudinal or hydrological]).

Initial evaluation can be a desk-top assessment of the presence and location of ecosystem pattern across the landscape. In-field assessment will be required to determine quality and condition of the site and an objective decision made on the extent and value of the site as either a buffer or a connection between sites. Consideration will be given to species that may not be present during the time of survey but are known to frequent the area, (eg. migratory birds) or for seasonal values that the site might contain, (eg. winter food supply).

4. Previously Assessed Sites

Any site assessed at a previous time, or by a previous agency, to be of ecological significance.

In some cases, information will already exist in the Horizons database or with another agency that will identify a given site as being of ecological significance. Examples of sites already known to be of Ecological Significance include (but are not limited to):

- Horizons' wetland inventory (currently a non-exhaustive, continually updated inventory of the Region's wetland habitat);
- Horizons' Bush Remnant inventory (currently a non-exhaustive list of sites identified through desk-top analysis and continually updated and refined);
- Public Conservation Land or Department of Conservation Covenant;
- Areas of indigenous habitat protected under the Nature Heritage Fund;
- Areas of indigenous habitat protected under the Nga Whenua Rahui kawenata;
- Significant sites of aquatic habitat as identified in Schedule D;
- Areas listed in the WERI (Wetlands of Ecological and Representative Importance) database;
- Areas identified as Recommended Areas for Protection (RAP) under the Protected Natural Areas Programme;
- Areas of indigenous habitat protected under a Queen Elizabeth II Trust Open Space Covenant; and

- Some District Council Reserves or Covenants comprising indigenous habitat.

Scale of Significance

In most instances, a site will be evaluated for significance at the Ecological District level. This is because Ecological Districts broadly represent subdivision of the landscape based on ecological factors and therefore reflect the diversity of ecosystem pattern across the landscape.

However, a site may possess values or species that makes it significant at a larger spatial scale, ie. regionally, nationally or internationally. A site should always be classified by its highest level of significance.

Appendix 9: List of threatened species within the Manawatu-Wanganui Region

Table 11.9: List of threatened species in the Manawatu-Wanganui Region (modified from Hitchmough (2005)). Threat status is determined by the New Zealand Threat Classification System (Molloy *et al*., 2002) and expert opinion. This table is not an exhaustive list of threatened taxa in the Manawatu-Wanganui Region. It is a list of nationally critical to sparsely distributed species that are easily recognised or are species of rare or threatened habitats at a local scale. A brief description of preferred habitat is provided as is an indication of potential spatial distribution of species throughout the Region (as indicated by Water Management Zones or Sub-zones. A list of Water Management Zone and Sub-zone names is provided in Appendix 6. Species information is sourced from Heather & Robertson (1996), McDowell (2000), New Zealand Herpetological Society website, and The New Zealand Plant Conservation Network Website.

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
Birds				
White heron, Kotuku	*Egretta alba modesta*	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
Australasian bittern, Matuku	*Botaurus poiciloptilus*	Tall, dense beds of raupo and reds 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
Blue duck Whio	*Hymenolaimus malachorhynchos*	Fast-flowing and turbulent streams and rivers in forest hill country.	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_3d

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
Kaka (North Island)	*Nestor meridionalis septentrionalis*	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
New Zealand falcon Karearea	*Falco novaeseelandiae* "bush"	Native and pine forest and bush patches.	Nationally Vulnerable	Throughout the Region
Wrybill Ngutu-parore	*Anarhynchus frontalis*	Over winters in the 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
Kiwi (North Island brown)	*Apteryx australis mantelli*	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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
Banded dotterel	*Charadrius bicinctus*	A small wading bird of gravel beaches and river beds.	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_4
Yellow crowned parakeet, Kakariki	*Cyanoramphus auriceps*	Long-tailed bright yellow-green parrot with a golden yellow crown. A bird of native forests, preferring podocarp forest and beech forest.	Gradual Decline	Mana_8a, Mana_8b, Mana_9d, Mana_11c, Mana_13b
Long-tailed cuckoo	*Eudynamys taitensis*	Large brown bird with very long tail (as long as the body) of exotic or native forest. Has a loud harsh shriek. Migratory species arriving in New Zealand from October.	Gradual Decline	Can be widespread during migration.
Kereru, New Zealand pigeon, kukupa	*Hemiphaga novaeseelandiae*	Large pigeon with upper parts metallic green with purplish sheen and white lower breast, belly and legs. Prefers lowland native forest, also in scrub, forest fragments and utilises exotic vegetation, parks and gardens.	Gradual Decline	Throughout.
North Island saddleback, Tieke	*Philesturnus carunculatus rufusater*	Glossy black bird with bright chestnut saddle and pendulous orange-red wattles. Prefers forest and scrub. Only currently found on mainland in sanctuaries.	Range Restricted	West_2
Banded rail, Mohu-pereru	*Gallirallus philippensis assimilis*	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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
Marsh crake	*Porzana pusilla affinis*	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, Whau_1b, Whau_1c, Whau_3b, Whau_3d
Spotless crake, Puweto	*Porzana tabuensis plumbea*	Secretive bird of freshwater wetlands with raupo or sedges.	Sparse	Throughout the Region
North Island Fernbird Matata	*Bowdleria punctata vealeae*	Secretive bird of dense scrubby vegetation associated with drier wetlands, rush and tussock frost flats, saltmarshes, and low manuka scrub.	Regionally Uncommon	Throughout the region in coastal to habitats below 1000m
North Island robin, Toutouwai	*Petroica australis longipes*	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
Freshwater fish				
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 spring-fed streams, wetlands, pools of water within podocarp forest, overgrown creeks and even un-maintained roadside and farm drains.	Regionally Vulnerable	Hoki_1a, Mana_10d, Mana_11f, Mana_13a, Mana_13c, Rang_4d, West_8
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_4b
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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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
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,
Terrestrial invertebrates				
Snail	*Powelliphanta traversi tararuaensis*	Giant carnivorous land snail.	Nationally Endangered	Mana_8a, Mana_8d, Mana_9d, Mana_13d, Ohau_1a, Ohau_1b, West_9
Snail	*Powelliphanta traversi traversi*	Giant carnivorous land snail.	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
Moth	*Asaphodes stinaria*	A moth with mid-brown fore wings with two narrow transverse white bands and pale brown hingwings, 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
Snail	*Powelliphanta marchanti*	Giant carnivorous land snail.	Nationally Vulnerable	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e
Black Katipo spider	*Latrodectus atritus*	Coastal spider found in a variety of sand-dune systems associated with driftwood, vegetation, or stones. They usually inhabit foredunes and dune swales but have 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
Katipo spider	*Latrodectus katipo*	Coastal spider found in a variety of sand-dune systems associated with driftwood, vegetation, or stones. They usually inhabit foredunes and dune swales but have 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
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
Mammals				
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,

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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
Reptiles				
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
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
Wellington green gecko	*Naultinus elegans punctatus*	A velvety-skinned bright green lizard that inhabits in scrub and forest areas especially kanuka and manuka.	Gradual Decline	Throughout the Region - absent from Whai_2f, Whai_2g, Whai_4b
Speckled skink	*Oligosoma infrapunctatum*	A smooth-skinned lizard with distinctly speckled back and tail.	Gradual Decline	Throughout the Region
Striped skink	*Oligosoma striatum*	A smooth-skinned dark brown, striped lizard with prominent cream stripes on each side. It is found in epiphytes in standing trees as well as rotting ones on the ground.	Data deficient (Regionally Uncommon, Wanganui Conservancy)	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
Vascular plants				
(none known)	*Acaena rorida*	Small perennial herb from damp hollows in tussock grasslands and limestone ravines.	Nationally Critical	Rang_2a, Rang_2b

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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
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
Gardners tree daisy	*Olearia gardnerii*	Divaricating shrub-small tree found (up to 3 m) in Podocarp forest on alluvial terraces, associated with other divaricating shrubs and trees.	Nationally Critical	Rang_2f, Rang_2g
Sand daphne	*Pimelea* "Turakina"	A low-growing, grey-green shrub of sand dunes.	Nationally Critical	Tura_1b, West_5, Whau_4
Turners kohuhu	*Pittosporum turneri*	A small tree (up to 8 m) with a divaricating juvenile and sub-adult form. Grows in montane to sub-alpine forest, and on frost flat margins and 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
Swamp greenhooded 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
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 Critical	Mana_13a, Rang_4b, Tura_1b, West_1, West_4, West_5, West_6, West_7, Whai_7b, Whau_4
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
(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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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, 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
(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
(none known)	*Myosotis pygmaea* var. *glauca*	Low-growing short lived herb of open dry sandy/gravelly habitats.	Nationally Endangered	Rang_1, Rang_2c
Mountain myrrh	*Oreomyrrhis colensoi* var. *delicatula*	Perennial herb of sub-alpine ephemeral wetlands 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
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,

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Heart-leaved kohuhu	*Pittosporum obcordatum*	Divaricating tall shrub or small erect tree up to 5-8 m, growing in lowland alluvial forest, mainly in the east. Favours sites prone to summer drought and prone to 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
(non 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
(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
Swamp leek orchid	*Prasophyllum hectori*	A stout orchid of alpine wetlands. Plants are sweetly scented.	Nationally Vulnerable	Rang_2a, Whau_1a, Wahi_1, Whai_2b, Whai_2f Whai_5d
(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
Kohurangi, Kirks Daisy	*Brachyglottis kirkii* var. *kirkii*	Daisy. An epiphytic tree of lowland to lower montane forests.	Serious Decline	Throughout - coastal to montane habitats
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

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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
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
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 lake shore 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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
King fern, Para	*Marattia salicina*	Large fern favouring lowland forest karst habitats	Serious Decline	West_1, West_2, Whai_6, Whai_7a, Whai_7c
Dwarf musk/matt leaved Mazus	*Mazus novaezeelandiae* subsp. *impolitus* f. *impolitus*	A perennial creeping herb of coastal damp hollows and sand flats, amongst 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
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, 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 cliff tops, in scrub, frost flats, track sides and other seral habitats	Serious Decline	Throughout the Region

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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
Greenhood	*Pterostylis paludosa*	A greenhood 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
Yellow mistletoe Pirita Piriraki	*Alepis flavida*	A parasitic shrub, mainly of beech.	Gradual Decline	Throughout the Region
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
Sand tussock Hinarepe	*Austrofestuca littoralis*	Sand tussock up to 70 cm 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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, West_8, West_9, Whai_7a, Whai_7b, Whai_7c, Whai_7d, Whau_4
(none known)	*Coprosma obconica*	Divaricating shrub (2-3.5 m) found in a range of habitats.	Gradual Decline	Rang_2b, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Tura_1a

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
(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
(none known)	*Coprosma wallii*	Divaricating shrub to small tree (up to 3 m) growing in a range of habitats on fertile substrate (alluvial, riparian and sub-alpine), in places with cold winters and dry summers. Never associated with broad-leaved canopy trees.	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
(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
Tufted hair grass, Wavy hair grass	*Deschampsia caespitosa*	An erect tussock of coastal to sub-alpine wetlands and lake margins.	Gradual Decline	Rang_2f, Whau_1b
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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
Pygmy sundew	*Drosera pygmaea*	Small red, red-purple or green rosette forming carnivorous herb. Coastal to sub-alpine, usually in pakihi shrublands and adjoining wetlands, especially peat bogs.	Gradual Decline	Rang_2f, Whau_1a, Whau_1b
Sand spike sedge Spikesedge	*Eleocharis neozelandica*	Small, leafless, duneland wetland sedge. 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
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
Sea holly, coastal eryngo	*Eryngium vesiculosum*	A small herb of coastal gravel fields.	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
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, 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. It may be found growing in dune slacks and swales, on the margins of swamps, 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
(none known)	*Melicytus flexuosus*	Divaricating shrub (to 5 m) growing on fertile alluvial terraces and flood plains, often on forest margins and in scrub.	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
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
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
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
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
(none known)	*Ranunculus recens* var. *recens*	A small, tufted buttercup which forms dense patches. Found in alpine habitats on peaty soils developed over fresh water seepages. Flowers are yellow.	Gradual Decline	Rang_2c, Rang_2d, Rang_2e
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
(none known)	*Selliera rotundifolia*	A prostrate coastal mat-forming herb (up to 700 mm in diameter), growing in dune fields in seasonally damp swales (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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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
Teucridium	*Teucridium parvifolium*	A shrub (up to 2 m) with small leaves. Grows along fertile stream sides and river terraces in lowland dry forest and podocarp-broadleaf forest. Can also grow in forest margins, clearings and amongst scrub.	Gradual Decline	Mana_10b, Mana_10c, Mana_10d
White mistletoe Taapia pirita Tupia	*Tupeia antarctica*	A shrubby parasite to 1 m diameter of forest or scrub habitat (often in regenerating vegetation).	Gradual Decline	Throughout the Region
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
(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
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
Willowherb	*Epilobium astonii*	Heavily-branched, erect perennial herb forming compact bushes up to 300. A sub-alpine 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
(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
(none known)	*Myosotis eximia*	Low-growing perennial herb, found on limestone cliffs and talus slopes.	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
(none known)	*Simplicia buchananii*	A grass with a preference for base-rich substrates and semi-shaded situations in forest or near rock overhangs.	Range Restricted	Rang_2b, Rang_2d, Rang_2e, Rang_2f, Rang_2g, Rang_3a, Rang_3b, Tura_1a
Feeble bent	*Agrostis imbecilla*	Delicate, slender, tufted perennial grass, 150-350 mm tall. A montane, subalpine to alpine species of damp sites within tussock grassland.	Sparse	Rang_1, Rang_2a, Rang_2b, Rang_2c, Rang_2d, Rang_2e, Rang_2f, Whau_1b
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
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
Mistletoe Dwarf mistletoe Leafless mistletoe	*Korthalsella salicornioides*	Succulent mistletoe, much-branched, green, yellow-green, red-green to orange-green plant parasitising exposed branches and branchlets of host. Most commonly found parasitic on kanuka/Manuka.	Sparse	Throughout – coastal to sub-alpine habitats

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
(none known)	*Lepilaena bilocularis*	Annual, aquatic herb of lakes, brackish water, or slow-flowing 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_4
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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
Leafless pohuehue Leafless muehlenbeckia	*Muehlenbeckia ephedroides*	Prostrate twiggy shrub of coastal to sub-alpine fertile gravel to sandy soils	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, 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
(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
(none known)	*Olearia quinquevulnera*	Shrub 2.2 x 2 m. Montane to sub-alpine, on valley floors, on forest margins, clearings, amongst rocks, below cliffs and in sub-alpine scrub, often in poorly drained or permanently wet soils.	Sparse	Whai_4d, Whai_5d
Fierce lancewood	*Pseudopanax ferox*	Small tree up to 8 m tall. In grey scrub overlying pumice, on recent alluvial (coarse gravels), limestone outcrops, boulder fall, cliff faces, talus slopes and scarps. Also found as a sparse component of seasonally drought-prone 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
Koheriki	*Scandia rosifolia*	Semi-erect to somewhat openly sprawling, woody, aromatic shrub up to 1 x 1 m. Usually on cliff faces, clay banks or amongst boulders, often found along cliffs lining river gorges, more rarely in scrub.	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
(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 habitats
New Zealand spinach Kokihi Tutae-ikamoana	*Tetragonia tetragonioides*	Widely trailing perennial herb of the coastal strand zone often growing along beaches amongst driftwood, and sea weed 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_4

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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, 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
(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
Native angelica	*Gingidia montana*	Prostrate 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
Maori dock, New Zealand dock, Runa	*Rumex flexuosus*	A 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
(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
Matagouri, Wild Irishman	*Discaria toumatou*	Divaricating shrub inhabiting forest edges and scrub.	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
	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
Native cleaver, 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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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, 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 sub-alpine mistletoe. Usually found parasitising 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
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
Alpine yellow forget-me-not	*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

Common Name	Scientific Name	Description[2]	Status[1]	Water Management Zones, or Sub-zones where these species may occur
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
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. It rarely grows in full sun.	Vagrant	Mana_10a, Mana_10e, Mana_11b, Mana_11c
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
(none known)	*Euchiton polylepis*	Stoloniferous, perennial daisy of lowland to sub-alpine 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
Papataniwha	*Lagenifera montana*	Small herb with leaves in a rosette at base of plant from sub-alpine to alpine seeps, cushion bogs, swamps, lake and tarn margins, wet tussock grassland and stream banks, 600-900 m 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
(none known)	*Pimelea aridula* agg.	Erect schrub 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
Greenhood	*Pterostylis irwinii*	A large, slender, long-leaved orchid from damp areas in light scrub or near forest tracksides.	Data Deficient	Whai_4d, Whai_5d
Grassland wheatgrass	*Stenostachys laevis*	Perennial grass of tussock grasslands, grey scrub, shaded cliff faces, lake sides and flushes.	Data Deficient	Rang_2a, Rang_2b

Appendix 10: Full names of species mentioned in the text

Table 11.10: Full names of species mentioned in the text

Common Name	Formal Name
Birds	
Huia	*Heteralocha acutirostris*
Kereru	*Hemiphaga novaeseelandiae*
Kiwi	*Apteryx australis mantelli*
North Island Robin	*Petroica australis longipes*
Tieki, North Island saddleback	*Philesturnus carunculatus rufusater*
Vascular plants	
Black beech	*Nothofagus solandri* var. *solandri*
Fuchsia	*Fuchsia excorticata*
Hall's totara	*Podocarpus cunnnghamii*
Hard beech	*Nothofagus truncate*
Hinau	*Elawocarpus dentatus*
Kahikatea	*Dacrycarpus dacrydioides*
Kaikawaka	*Libocednis bidwillii*
Kamahi	*Weinmannia racemosa*
Kanuka	*Kunzea ericoides* var. *ericoides*
Kauri	*Agathus australis*
Kohekohe	*Dysoxylum spectabile*
Mahoe	*Melicytus ramiflorus*
Manuka	*Leptospermum scoparium* var. *scoparium*
Maries	*Nestegis montana; Nestegis cunnnghamii; Nestegis lanceolata*
Matai	*Prumnopitys taxifolia*
Miro	*Prumnopitys ferruginea*
Mountain beech	*Nothofagus solandri* var. *cliffortioides*
Northern rata	*Metrosideros robusta*
Pukatea	*Laurelia novae-zelandiae*
Raupo	*Typha orientalis*
Red beech	*Nothofagus fusca*
Rewarewa	*Knightia excelsa*
Silver beech	*Nothofagus menziesii*
Southern rata	*Metrosideros umbellata*
Taraire	*Beilschmiedia tarairi*
Tawa	*Beilschmiedia tawa*
Tawari	*Ixerba brexiodies*
Titoki	*Alectryon excelsus* subsp. *excelsus*
Totara	*Podocarpus totara* var. *totara*

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