

CENTRAL HAWKE'S BAY



Assessment of Natural Heritage for the Review of the Central Hawke's Bay District Plan



Table of Contents

Executive Summary	1
1 Introduction.....	5
1.1 Context and Purpose	5
1.2 Objectives	5
1.3 Approach to the Assessment	6
1.4 Location	7
2 Policy Framework	8
2.1 RMA Summary	8
2.2 Determining Ecological Significance	9
2.3 Existing Plan Provisions	10
2.4 HBRC Provisions	10
2.5 Examples of Other Approaches	11
2.6 Tools for Policy Development	11
3 Methodology.....	13
3.1 Literature Review	13
3.2 GIS Mapping and Analysis	13
3.2.1 Base spatial data	13
3.2.2 Design scale	14
3.2.3 Minimum Mapping Unit (MMU)	14
3.2.4 Descriptive attributes	14
3.2.5 Significance assessments	14
4 Ecological Character of the CHBD	14
4.1 General Overview	14
4.2 Heretaunga ED	16
4.3 Ruahine ED	16
4.4 Eastern Hawke's Bay ED	17
4.5 Puketoi ED	18
5 Threatened Biodiversity of the CHBD	19
5.1 Extent of Nationally Threatened Environments within CHBD	19
5.2 Predicted Indigenous Landcover	22
5.3 At Risk, Threatened and Notable Species Records	32
5.3.1 At Risk and Threatened flora	32
5.3.2 At Risk and Threatened fauna	32
6 Results of the ASNCV Site Reviews and Assessment	36
6.1 Proposed Significance Criteria	36
6.2 Reviewed Significant Site Inventory	37
6.3 Ecosystem Composition Analysis	40
6.4 Limitations of the Assessment	42
7 Conclusions.....	44
8 Recommendations	45
Acknowledgements.....	47
Glossary	48
References and Selected Bibliography	51
APPENDIX I - Reviewed Alternative Significance Criteria.....	53
APPENDIX II - Criteria for the Assessment of Significance of Natural Areas	58
APPENDIX III - Types of Legal Protection	59
APPENDIX IV - Confidence Levels for Significant Natural Area Assessments	60
APPENDIX V - ASNCV Site Review Summaries	61
APPENDIX VI - Species glossary	66
APPENDIX VII - Historically Rare Terrestrial Ecosystems.....	71
APPENDIX VIII - Long-tailed bat location data	73
APPENDIX IX - Department of Conservation - Conservation Status system	74

List of Figures

Figure 1. Location of the Central Hawke's Bay District in a regional and national context.....	7
Figure 2. Planning and policy frameworks for protecting significant natural features.....	12
Figure 3. Ecological Districts of Central Hawke's Bay.....	15
Figure 4. Threatened Environment Classification.....	21
Figure 5. Predicted historic vegetation cover.....	24
Figure 6. Current predicted indigenous vegetation cover.....	25
Figure 7. Historic Wetland Coverage of the Central Hawke's Bay District.....	30
Figure 8. Current wetland coverage of the Central Hawke's Bay District.....	31
Figure 9. Indigenous species records distributions across CHB.....	35
Figure 10. Overview of ASNCVs of CHBDC.....	38

List of Tables

Table 1. Ecological District areas of Central Hawke's Bay.....	14
Table 2. LENZ areas per Ecological Districts within CHBDC.....	20
Table 3. Predicted indigenous landcover of Central Hawke's Bay.....	23
Table 4. Comparison of CHB to Hawke's Bay region remaining vegetation types.....	27
Table 5. Threat status classes for ecosystems (Walker et al., 2007).....	28
Table 6. Relative protection of vegetation types by Region and District.....	28
Table 7. Distribution of indigenous vegetation.....	29
Table 8. Wetland coverage of the Central Hawke's Bay District.....	29
Table 9. Threatened and At Risk flora.....	32
Table 10. Threatened and At Risk freshwater fauna.....	33
Table 11. Threatened and At Risk herpetofauna.....	33
Table 12. Threatened and At Risk bird species within the CHBD.....	33
Table 13. Threatened and At Risk mammals of the Central Hawke's Bay.....	34
Table 14. Threatened and At Risk Invertebrates of the Central Hawke's Bay.....	34
Table 15. Proposed significance criteria.....	37
Table 16. Significant sites by Ecological District.....	39
Table 17. Confidence levels of reviewed ASNCVs.....	39
Table 18. Significant sites with some form of legal protection within CHBDC.....	40
Table 19. Ecosystem/vegetation type of significant sites within CHB district.....	41
Table 20. Area of significant sites matching HBRC ecosystems (from site reviews).....	42

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Executive Summary

Project Brief

Kessels Ecology has been contracted to undertake an assessment of natural heritage of the Central Hawke's Bay District as a part of the Central Hawke's Bay District Plan Review. Currently, natural heritage of the Central Hawke's Bay focuses on 'Areas of Significant Nature Conservation Value' (ASNCV), which are generally based on the Department of Conservation's Recommended Areas for Protection (RAP). The Central Hawke's Bay is undergoing a full review, and therefore natural heritage and natural features are being reviewed to fulfil obligations under the Resource Management Act (1991). The review includes derivation of best practice criteria for natural feature significance assessments, analysis of current ASNCV's, and provision of recommendations for identification of features meeting the newly developed criteria, which were not previously identified. The derivation of significance criteria was developed based on the review of other District and Regional Council criteria, as the Hawke's Bay Regional Council does not prescribe significance criteria. This report provides the background and a summary of the baseline inventory of the District's ecologically significant sites, ASNCV's, and which are proposed to be termed 'Significant Natural Areas' (SNA's). This report is accompanied by a supporting document containing the site sheets of reviewed ASNCVs, and a dataset compiled during the review process.

Summary of Methodology

The district is covered by four Ecological Districts; Ruahine, Heretaunga, Eastern Hawke's Bay, and Puketoi.

The "Proposed Significant Natural Areas of the Central Hawke's Bay District" are derived from previously termed ASNCV sites, which were reviewed for significance. This was carried out through analysis and interpretation of aerial photography along with information from ecological reports and data, and local ecological knowledge. The data comprises a provisional inventory of significant sites and proposed SNAs of the District. It is subject to revision through consultation with the Hawke's Bay District Council and other stakeholders.

As there are currently no 'significance criteria' recommended by the Hawke's Bay Regional Council (HBRC), other District Council and Regional Council criteria were reviewed, and the criteria used in this project are derived from external bodies' criteria. While the criteria have been selected in order to cover all valuable biodiversity aspects, the use of other criteria from other regions and districts may allow for potential gaps specific to Central Hawke's Bay District (CHBD) sites. To minimise any gaps, other local authority criteria were reviewed and used to create a recommended Central Hawke's Bay (CHB) ecological significance criteria.

Information used for identifying, describing and assessing sites included all available biological data sets, past reports and inventories, key protected areas and flora/fauna species records, and databases, such as the Land Cover Database (v3) (LCDB3), Land Environments of New Zealand (LENZ), and Freshwater Ecosystems of New Zealand (FENZ). As part of this exercise, a dataset of threatened flora and fauna species in the District was researched and prepared.

To determine whether a site was significant it was assessed against the five criteria defined in section 6.1 and Appendix II of the report. Generally, if a site met one or more of these

criteria, it was considered a significant site. Sites that were not found to be significant were classified as 'not likely significant'.

Given this natural heritage review was largely a desktop study, an attribute called "Confidence Level" was used to indicate the amount of confidence in the accuracy of the significance assessment of a site. This was dependent upon the accuracy and availability of information about the site. In general, where reports of the site existed, or abundant data was available, the confidence level was considered "high". Where the main vegetation type could be confidently determined, but other aspects such as health or species composition could not, the confidence level was considered "medium". Where the main vegetation type could not be confidently determined (e.g. indigenous vs. exotic scrub), and no other criteria were met, confidence levels were considered "low".

As part of the SNA assessment process, past records of threatened indigenous species were included. However, many species, such as kākā, falcon and migratory birds are highly mobile, with large territories and vast home ranges. Other indigenous fauna species, such as long-tailed bats and many freshwater fish species have complex, poorly understood habitat utilisation requirements, often involving exotic habitats (e.g. bats), and marine (e.g. fish). It can be difficult to predict where these species may utilise suitable habitats throughout a year, so habitat utilisation is probably much broader than specific points in time and place such as the sites recorded in the databases utilised in this report.

The key outputs of this project are to produce both a detailed report and a GIS-based data set of all sites assessed, including attributes for the following:

- Spatial information, ownership and protection status of each site;
- Descriptions of key vegetation, ecosystem and habitat types, as well as significant flora and fauna species;
- Derivation of the five significance criteria used in site assessments, which sites meet specific criteria, confidence, threats, and opportunities for management (where appropriate); and
- A summary of the data from the Land Environments of New Zealand (LENZ) analysis for the Central Hawke's Bay District.

Summary of Key Findings and Results

Nationally Threatened Environments within the District were identified using the Threatened Environment Classification. The first five categories are referred to as "Threatened Environments", whereas category six is considered "Not-Threatened". The majority of land in the Central Hawke's Bay District is categorised as "threatened" (92.3 %), meaning in effect, any remaining natural feature within this category can be considered Nationally Threatened. Only a small portion is considered "Not-Threatened" (<8 %). The significant sites (proposed SNAs) occur over all classes, the largest being the Ruahine State Forest Park, which is largely in category 6, indicating more than 30% indigenous cover and more than 20% has some form of protection.

A total of 46 confirmed Threatened and At Risk species (10 flora species and 36 fauna species) have been recorded as being present within the District according to the DOC BioWeb Database, local experts, and the New Zealand Freshwater Fish Database (NZFFDB).

As a part of this study, 62 ASNCVs were assessed, with 54 sites identified as significant sites, comprising an extent of 23,729 ha. The District covers approximately 332,792 ha, therefore, approximately 7% of the District's area is of ecological significance (proposed significant natural areas), though there is disproportionate coverage of some ecosystem types within the 23,729 ha included.

Forty sites (74.1% of significant sites) have been accredited a high confidence level. A total of 8 sites (14.8 % of significant sites) were assessed with a medium confidence level, and a total of 6 sites (11.1%) had a low confidence level.

Twenty-six significant sites (48.1% of the significant sites) have some form of legal protection, under statute or covenant. This includes both private and public land.

The sites were matched as well as possible to ecosystem/vegetation types from the HBRC predicted vegetation. The most represented ecosystem/vegetation types (based on area) were mountain beech - red beech forest and podocarp forest (largely of the Ruahine Range), as well as by shingle/braided rivers, coastal vegetation and estuary/river mouth. Small-leaved - broadleaved - beech type, podocarp/broadleaved forest type, black beech - podocarp - broadleaved forest type, and broadleaved - small-leaved forest type were also common.

Many of the ecosystem and vegetation types within the district were predicted to be Acutely Threatened, e.g. podocarp - broadleaved forest, while others were predicted to be extinct e.g. podocarp forest. A comparison of the HBRC predicted vegetation dataset to the existing vegetation (confirmed from existing site information) indicates more podocarp - broadleaved vegetation type exists than was predicted. Podocarp - based vegetation is in fact extant, though it was predicted extinct. Furthermore, many of the sites predicted as rimu / tawa - kamahi (Acutely Threatened) were found to be other vegetation types. As many of the sites' vegetation types did not match the HBRC predicted vegetation type, it is possible the predicted vegetation types are often not a reliable indicator of existing vegetation type.

As well as the underrepresented forest vegetation types, manuka and kanuka scrub covers approximately 2% of the District, and wetland habitat covers less than 1% of its original extent in the District.

Conclusions and Recommendations

The district has some 23,729 ha of significant sites covering ~7% of the District's total area (332,792 ha) which are SNA candidates. This indicates the Central Hawke's Bay is a district with very little remaining indigenous cover overall. Some ecosystem/vegetation types retain much of their original extent, such as most podocarp-beech types. This is because most remnants of this type occur in very steep areas, such as the Ruahine Ranges. Other vegetation types predominantly occurring in lowlands have retained very little of their former extent, such as kahikatea-pukatea-tawa forest, which presently covers some 729 ha; a mere 1% of its HBRC predicted historic extent.

These under-represented ecosystem types are largely within LENZ Nationally Threatened Environment categories, in effect confirming that the lowland, coastal and plains of the District have very few natural features left, and hence very low biodiversity values for indigenous fauna and flora. Overall, the Hawke's Bay Region retains a higher percentage of indigenous ecosystems/vegetation (~22%) compared to the Central Hawke's Bay District (~7%). Generally, the Central Hawke's Bay District retains fewer indigenous ecosystems, and the existing significant sites do not cover all ecosystem/vegetation types which were historically

predicted present. Given the smaller area of the district compared to the region it can be expected that there would be lower vegetation type diversity, however, the percentage retained of some ecosystem/vegetation types highlights the types requiring higher levels of concern from a conservation management perspective. Any Acutely Threatened ecosystem/vegetation types within the CHBD should be prioritised for conservation purposes.

Fifty-four of the previously mapped 62 ASNCV sites reviewed were found to be significant based on the significance criteria above used. Two sites, 61 and 62 did not have existing polygons, which have been subsequently created and included in boundary adjustment recommendations.

Significant sites should be termed Significant Natural Areas (SNAs) for name simplicity and cohesion with the terminology other regions and districts.

Many sites that were not existing ASNCV's were noted during the review process. The HBRC predicted vegetation type maps provide an overview of likely indigenous vegetation, and also show the existing ASNCV sites, often in close proximity to other potentially significant sites that have not been assessed. Due to the scope within this project, it was not possible to isolate and assess these potentially significant sites, however, where possible, sites with continuity with existing significant sites were suggested for inclusion through boundary adjustments. Many of the potentially significant sites remaining unassessed would likely be considered significant due to meeting one or more of the significance criteria established, and the criteria could be used to identify these sites, though ground-truthing would likely be more crucial for accuracy.

Much indigenous vegetation recognised in the HBRC dataset (adjusted LCDB3) is present which has not been previously assessed. These areas will require further investigation, and could be evaluated against the significance criteria developed for the review of the ASNCV sites.

Many At Risk and Threatened species were found to be present. The threat status of species is important and has had a significant bearing on the significance assessment. Very little information is available on the abundance and distribution of these species at present. Specific studies for at risk and threatened species could highlight further areas being significant.

Further work is required to confirm the status of some sites, and identify or confirm features of sites that were not determined through desktop analysis. Assessment of sites not included in the existing ASNCV list is required to provide a more accurate inventory of the biodiversity values of the Central Hawke's Bay. It is likely many significant sites exist that are not currently considered.

Management recommendations for the proposed SNA's include: strong policy to protect indigenous vegetation from clearance, with implementation of the policy of high importance; potential for conservation lot provisions to encourage landholder management of private property sites (encouraging fencing from stock and animal/plant pest control); increased landholder engagement in a voluntary, educational, and supportive manner; and prioritisation of sites for management purposes based on the criteria fulfilled. Management of sites should address the key threats listed above, with adaptive management plans recommended for the most ecologically valuable sites found within the district.

1 Introduction

1.1 Context and Purpose

Kessels Ecology was commissioned by the Central Hawke's Bay District Council (CHBDC) to undertake an assessment of the natural heritage of the district as part of the Council's review of the *Operative Central Hawke's Bay District Plan* (CHBDC 2003, referred to as 'the Operative Plan' in this report). The review of the natural heritage provisions is required for three primary purposes:

1. Performance standards – that the performance standards and significance criteria reflect best practice and allow for appropriate management measures;
2. Areas of Significant Nature Conservation Value (ASNCV) – To assess the condition and spatial extent of existing ASNCV already mapped in the Operative District Plan; and the boundaries of any existing ASNCV that may have been incorrectly identified should be removed or amended (e.g., where through better quality aerial photography now available or other available data, there are obvious mapping errors); and
3. Identify any obvious new ASNCV which should be identified and considered for inclusion on the Operative Plan maps

The existing performance standards relating to natural heritage areas within the Operative Plan are generally restricted to the Rural Zone (section 4.9).

ASNCV are defined in Section 2.2 of the Operative Plan as "*plant and animal communities and habitats that are rare or unique, or which provide good representation of the plant communities that existed more widely in the District before vegetation clearance*" and are generally based on the Department of Conservation's (DOC) Recommended Areas for Protection (RAP) and include Council and Department of Conservation reserves.

Reference to ASNCV is made in the following sections of the Operative Plan:

- Section 2.1.2 – Land Use Consents (information required to be submitted);
- Section 4.0 – The Rural Zone (indirect reference to ASNCV as 'areas of natural significance');
- Section 9.4.2 – Mitigation of adverse impacts of subdivision development;
- Section 9.9.3 – Council's right to control the location and relationship of ASNCV to subdivision design; and
- Appendix D – Schedule of ASNCV, i.e., a list of locations as provided in the maps that accompany the Operative Plan.

1.2 Objectives

Given time constraints, the natural heritage assessment was undertaken as a desktop review with no field validation. Therefore, in order to meet the two main purposes of this assessment (refer to Section 1.1); the following objectives were nominated by Council:

1. Develop a methodology or methodologies for:
 - a) Undertaking an assessment of the existing natural heritage provisions in the operative Plan and review of ASNCV identified on the Plan Maps and Appendix D. The review

of the existing ASNCV on the Plan Maps is anticipated to be primarily a desk top exercise with limited or no ground truthing. Also, for the purposes of this review, it is proposed that the boundaries of Department of Conservation Recommended Areas for Protection currently identified as ASNCV will be retained without amendment.

- b) The assessment of natural heritage documented in the Operative Plan in relation to the provisions for natural values included in the Hawke's Bay Regional Policy Statement and Plan, and with reference to the approach adopted in district plans of adjacent local authorities and best practice elsewhere in the country.
 - c) The development of a set of recommendations for addressing natural heritage in the Operative Plan. This may or may not involve the formulation of a specific chapter on natural heritage.
 - d) The formation and drafting of revised provisions to apply to natural heritage within the district, where appropriate.
 - e) Recommended amendment to the Operative Plan Maps and to the schedule of ASNCV in Appendix D.
 - f) To provide a set of recommendations for consultation with landowners for the next phase of the Operative Plan Review, where appropriate.
2. The methodology for the assessment of the tasks outlined above will meet the requirements of the Resource Management Act 1991 relating to the preparation of a District Plan and section 32 evaluation requirements.
 3. It is assumed that input from members of the District Plan Subcommittee regarding local knowledge will be one of the considerations in the final determination and confirmation of natural heritage provisions for the draft Plan.

1.3 Approach to the Assessment

In order to efficiently meet the objectives of the natural heritage assessment (as nominated by Council and listed in Section 1.2), Kessels Ecology adopted the following process:

1. Review of the Operative Plan –the Operative Plan was reviewed and guidance provided on current best practice as it relates to Council's RMA obligations for protecting significant habitats of indigenous fauna and flora as well as sustaining the District's biodiversity values.
2. Review of ASNCV – a desktop review ASNCV sites listed in the Operative Plan was conducted including additional local biodiversity information such as The Hawke's Bay Biodiversity Strategy (2015) and the comprehensive Hawke's Bay Biodiversity Inventory prepared by the Hawke's Bay Regional Council in 2014. The various GIS layers were analysed against recent aerial photographs and all boundaries and vegetation types were examined. Additional sites likely to be ASNCV were listed only (detailed analysis was outside the scope of this report). Council provided all required GIS datasets.
3. The five categories defined by the Department of Conservation (DOC) as 'Threatened Environments' (Walker et al 2005) were utilised in the Geographical Information Systems (GIS) analysis to allow for a robust definition and analysis of the District's

ASNCV and enable a ranking process which may help in developing policy and performance standards.

4. The main output of the assessment was a 'Section 32' report (this report), which presents the outcome of the review of the Operative Plan provisions, presentation of a synopsis of approaches used by other Districts, the results of the review of existing and potential new ASNCV and recommendations for the natural heritage section of any revised Operational Plan (when that occurs).

1.4 Location

The Central Hawke's Bay District is mapped in Figure 1. The District is centred on the townships of Waipawa and Waipukurau in the lower North Island of New Zealand and is bound by the Pacific Ocean to the east and the Ruahine Ranges to the west. The district spans over approximately 332,792 ha of land.

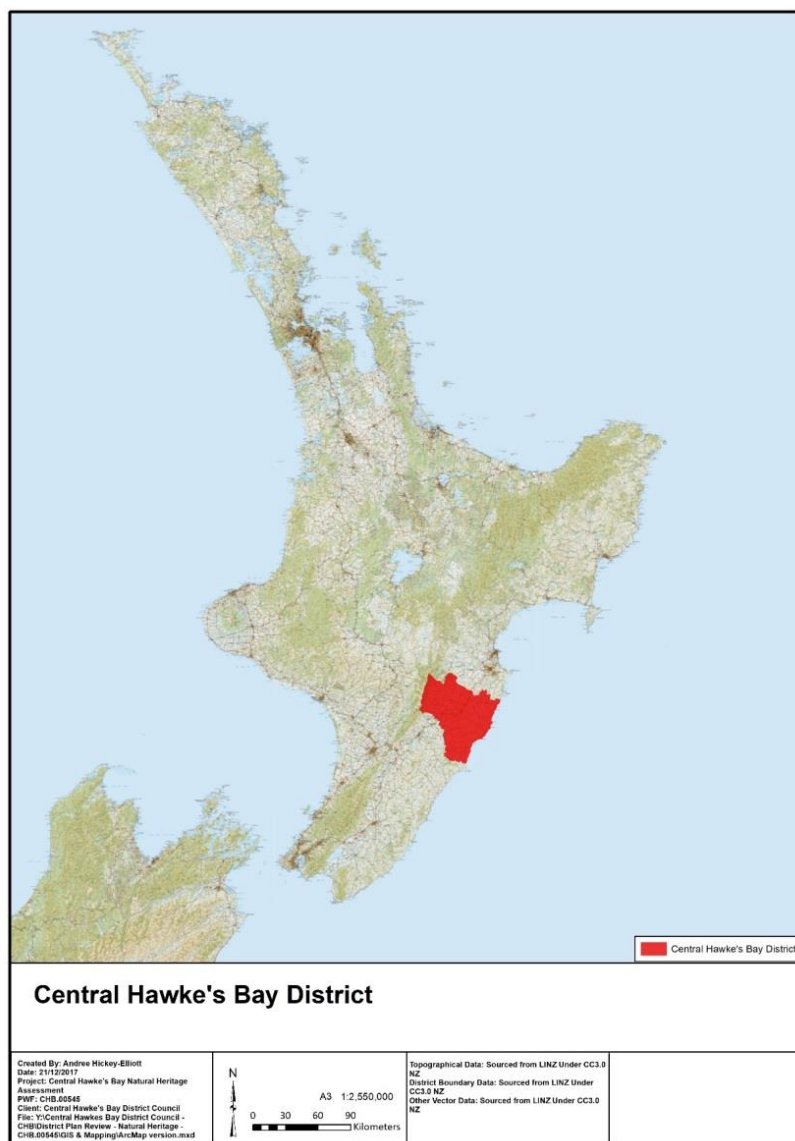


Figure 1. Location of the Central Hawke's Bay District in a regional and national context.

2 Policy Framework

2.1 RMA Summary

The *Resource Management Act 1991* (RMA), with its emphases on sustainable management, means the Council has a responsibility to provide for the protection of areas of “significant indigenous vegetation and significant habitats of indigenous fauna” as a matter of national importance (section 6(c), RMA).

Council must give primacy to the provisions of Part II of the RMA, in particular Section 6(c): “the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.”

An assessment of “significant” for a site, based on its biodiversity status and condition, does not infer that no activity can take place on the site. Rather, Council may wish to maintain and protect the significant natural values of the District through the resource consent process.

Determining significant areas of indigenous vegetation and fauna habitat within the district is currently constrained by the lack of an up-to-date and accurate inventory of the natural resource.

Other parts of the RMA of direct relevance are:

Section 5(2)(a); “to sustain the potential of natural and physical resources to meet the foreseeable needs of future generations”;

Section 5 (2)(b); “to safeguard the life supporting capacity of ecosystems”;

Section 7(d); “the intrinsic values of ecosystems”; and

Section 7(g); “any finite characteristics of natural and physical resources”.

Section 6 of the RMA requires that every policy, plan and resource consent must ensure that the matters of natural character, landscapes, biodiversity, public access, Maori culture and heritage, and historical heritage are recognised and provided for. Thus, such matters cannot be considered and then discarded. This applies even to relatively benign consented activities, such building a farm bridge, and also to permitted activities such as fertiliser application or maintaining a farm race. While the onus is on statutory authorities to meet the requirements of Section 6, in practice any application for a resource consent cannot be in breach of the provisions of Section 6.

The decision-making functions of the RMA are undertaken by Regional and District Councils. District Councils are responsible for the effects of land use, including subdivision and, as a result, have a key role in ensuring that the statutory requirements of section 6 are met, using methods such as rules.

The RMA amendments of 2002 included new functions for Regional and District Councils – (s30) - these are the protection, including methods, of indigenous biodiversity as well as the maintenance and enhancement of ecosystems in terms of water bodies and coastal water. Both these subsections are closely aligned to section 6(c), which requires the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna. While District Councils will remain the lead agency regarding section 6(c), Regional Councils have to take a greater role in the identification and protection of sites as a result of these changes.

2.2 Determining Ecological Significance

Ensuring that the existing characteristics that identify natural areas as significant indigenous vegetation and/or significant habitats of indigenous fauna are protected in an appropriate way from adverse effects when using or developing natural and physical resources is an important aspect of the RMA. Thus robust methods to determine significance are considered to be critical for any district plan policy, if it is to be consistent with the RMA and relevant regional policy statement.

In determining whether a site is significant such as to require protection in terms of section 6(c), ecologists apply a set of criteria in conjunction with professional judgement. Two of the most widely accepted criteria are those detailed by Whaley *et al.* (1995) and by Norton & Roper-Lindsay (2004).

Whaley *et al.* (1995) listed the following criteria which should be considered when determining ecological significance:

- Representativeness: How representative is the area of the full range of ecological diversity in the present natural landscape?;
- Diversity and pattern: What is the diversity of the ecological units and pattern of vegetation types represented?;
- Rarity/special features: Presence of locally or nationally threatened species or ecosystems;
- Naturalness/intactness: Extent of indigenous species and natural communities in the area;
- Size and shape: Influence of size and shape of the area on ecological viability;
- Inherent ecological viability/long-term sustainability: Will the features of the area maintain themselves in the long-term?;
- Buffering/surrounding landscape/connectivity: Extent to which an area is buffered from modifying influences. Distance from modifying influences and other natural areas;
- Fragility and threat: Threat process and agents, effects of proposed modification; and
- Management input: Nature and scale/intervention necessary & restoration potential.

Norton & Roper-Lindsay (2004) criteria are as follows:

1. Rarity and distinctiveness, i.e., the site supports a species that is:
 - known to be threatened, or
 - at its national distributional limit, or
 - endemic to the area, or
 - locally uncommon.
2. Representativeness, i.e., the site supports the ecosystem that is:
 - less than c. 10% of its former extent in the ecological district, or
 - a high-quality example of its type, where less than c. 20% of this ecosystem remains in the ecological district c.f. its former extent.
3. Ecological context, i.e., the site:
 - enhances connectivity between patches, or
 - buffers or similarly enhances the ecological values of a specific site of value, or
 - provides seasonal or "core" habitat for specific indigenous species.
4. Sustainability, i.e., a site is considered sustainable if:

- key ecological processes remain viable or still influence the site, and
- key ecosystems within the site are known to be or are likely to be resilient to existing or potential threats under some realistic level of management activity, and
- existing or potential land and water uses in the area around the site could be feasibly modified to protect ecological values.

The Norton & Roper-Lindsay and Whaley *et al.* criteria have been referenced or applied in several Environment Court cases.¹

Where a given feature passed the 'threshold' for consideration as meeting the significance criteria in each case it will be a matter for a professional ecologist's subjective assessment, on the basis of site evaluation and ecological context, whether that feature should be classified as section 6(c) significant. Despite a feature, or part of a feature nominally being significant using these criteria, it must also pass a higher threshold, in terms of ecological function and integrity when applying section 6(c) and this is where ground truthing is most useful. Ground truthing, as opposed to aerial mapping reviews, can determine the extent of threats a site faces, and how these threats are affecting the core values and functionality of the site.

Buffering and connectivity are criteria where an ecologist's professional opinion is required to interpret significance on a case by case basis. This is because a site may form a crucial buffer for, or enhanced connectivity with an adjacent or nearby core site with, more mature, diverse and under-represented vegetation types, and as such could also, with suitable management, such as fencing from stock and to a lesser extent on-going animal pest control, be self-sustaining. In these cases, the vegetation in itself would not necessarily be of section 6(c) significance, but by virtue of the fact that it is immediately contiguous to, and buffers or connects, vegetation that is inherently of section 6(c) status it can be assigned the same classification. Often this buffer vegetation is fragmented, grazed, subject to animal browsing and periodically cleared or thinned as part of normal farming practices (that being a permitted activity) – or a combination of the above. Despite being subject to these degrading influences there are many fragments within the Central Hawke's Bay (CHB) that likely retain an important buffering or connectivity role, and may require to be elevated to be considered significant / draft significant natural area (SNA) status accordingly.

2.3 Existing Plan Provisions

The Operative Central Hawke's Bay District Plan includes sites termed Areas of Significant Nature Conservation Value (ASNCV), which have been included in policy documentation for many years. These sites are largely based on the Department of Conservation's (DOC) Recommended Areas for Protection (RAP) sites, from the Protected Natural Areas Programme (PNAP) which began in the 1980s. These sites have not since been reviewed in depth to assess current values, and other previously unknown sites may also be present that are not accounted for in the current Operative District Plan.

2.4 HBRC Provisions

The Hawke's Bay Regional Council has not prescribed criteria for the assessment of natural areas, as their approach has been that all indigenous ecosystems remaining are valuable

¹ See for example *Upland Landscape Protection Society Inc v Clutha District Council* C085/2008 and *Long Bay-Okura Great Park Society Inc v North Shore City Council* A078/2008

(pers. comm. K. Hashiba, 11/10/2017). Therefore, Kessels has derived criteria utilising the criteria of other Councils which have been found to be effective in their areas.

2.5 Examples of Other Approaches

Adjacent to Central Hawke's Bay District is Hastings District. Hastings District Council's Operative District Plan includes significance criteria, which can be found in Appendix I. Other Regional Council criteria were also considered to allow a more robust review of significance criteria which would be appropriate for the Central Hawke's Bay; Waikato Regional Council's criteria, and Horizons criteria can be found in Appendix I.

2.6 Tools for Policy Development

There are a wide range of methods and "tools" available to CHBDC to achieve its RMA requirements to protect significant natural areas and biodiversity values. These are shown in Figure 2. Opportunities for Council to meet its RMA obligations include:

- Financial and educational assistance to community groups;
- Implementation of District Plan policies that encourage voluntary covenants and assistance with management and restoration as well as rules to prevent clearance of vegetation or changing of drainage patterns;
- Significant opportunities for subdivision proposals to incorporate ecological linkages between coastal habitats, river and stream margins and inland habitats;
- Assistance should be given to those landowners undertaking protection and enhancement of these natural features;
- Council needs to continue maintaining and enhancing its partnerships with landowners who have large and significant ecological significant areas, Landcare groups, tangata whenua, HBRC, DOC, and other agencies and stakeholders in order to provide focused and efficient assistance to worthy protection and enhancement projects; and

Policies that encourage voluntary/subdivision covenants and assistance with management appear to be successful in other districts, but improvements can be made in subdivision incentives and ecological significance determination. While population growth may not be sufficient in the CHBD to achieve noticeable benefits at this point in time, conservation lot provisions may future proof and encourage land development and population growth in rural areas.

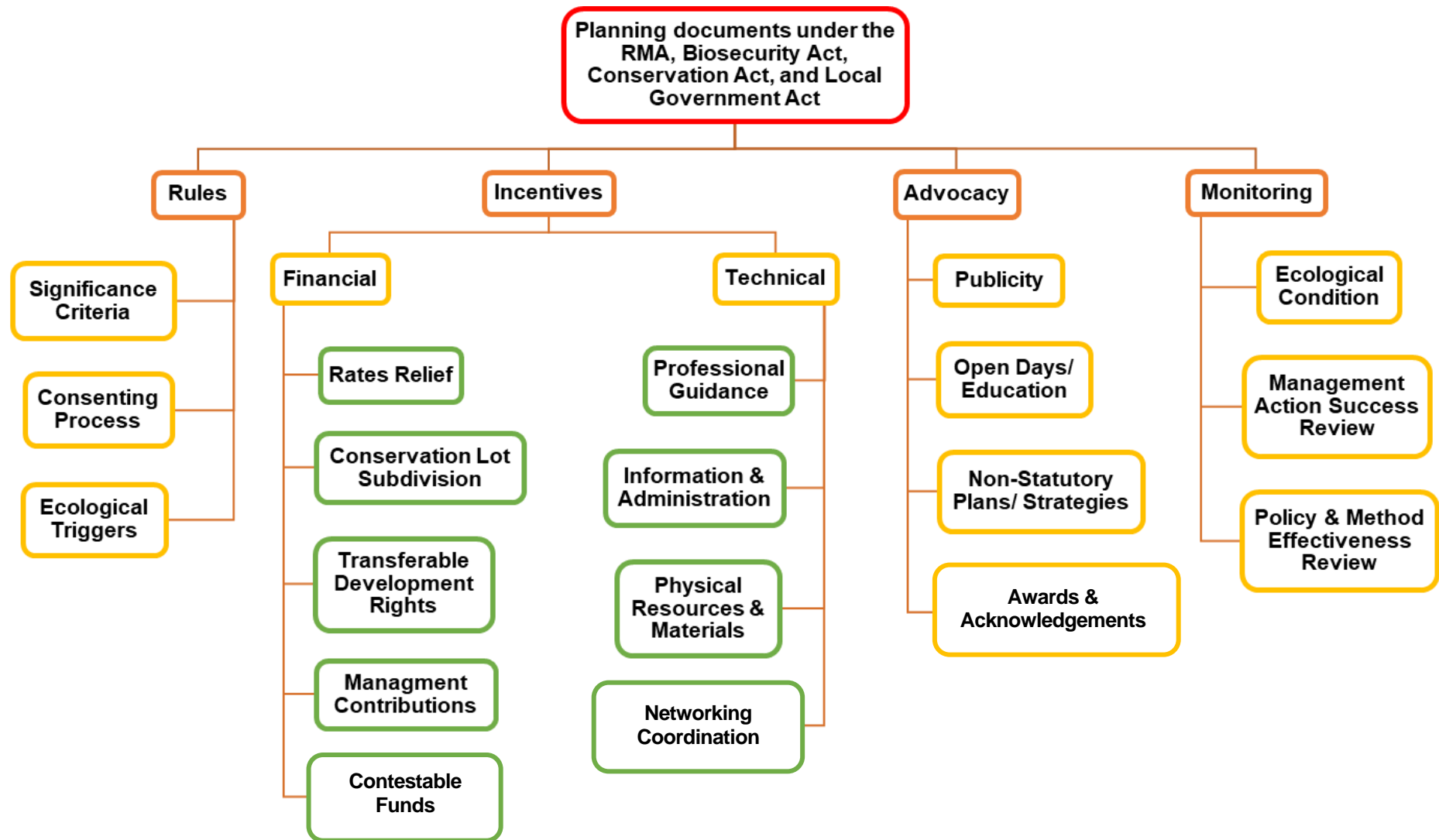


Figure 2. Planning and policy frameworks for protecting significant natural features and enhancing biodiversity.

3 Methodology

The Areas of Significant Nature Conservation Value (ASNCV) site identification and significance assessments were conducted as a desktop analysis, with no field validation or survey undertaken. The assessments were conducted using orthorectified aerial photography, existing ecological information sourced from reports and databases, and the knowledge of Kessels Ecology staff and Hawke's Bay Ecologists.

The desktop analysis reviewed 62 ASNCV sites, covering an area of approximately 23,729 ha, which equates to approximately 7% of the District land area.

The methodology for the desktop review process consisted of four stages: a literature review, Geographical Information Systems (GIS) mapping and analysis, an assessment of the significance of sites, and quality control and review by Kessels and a Hawke's Bay Ecologist.

3.1 Literature Review

A review of available existing information was undertaken to determine the ecological characteristics of the Central Hawke's Bay District. All key documents, databases and maps were reviewed to enable a gap analysis of where further information may be needed and therefore, site visits may be required. This included searching both electronic and paper sources together with the personal observations of local experts and employees of other ecological organisations. A list of primary sources of information used for the literature review is provided in the References.

3.2 GIS Mapping and Analysis

GIS shapefile data of ASNCV sites and 2015 orthorectified aerial imagery of the district was provided by Central Hawke's Bay District Council. Other data such as Hawke's Bay Regional Council predicted ecosystem/vegetation types, threatened bird habitat data, and protection data was provided by Hawke's Bay Regional Council (HBRC). Land Information New Zealand (LINZ) was used to obtain other data such as Land Environments of New Zealand (LENZ) Threatened Environment Classification (TEC), and other topographic spatial data.

Additional datasets were added to provide an ecological context and a basis for individual site assessments. Key datasets included: territorial boundaries, legal protection boundaries (e.g. DOC, QEII, and District Council covenants), and Ecological District boundaries. A dataset of threatened flora and fauna species was used in the assessment of the significance of sites. Databases used included the New Zealand Freshwater Fish Database (NZFFDB), BioWeb (administered by DOC), and the threatened bird habitat data provided by HBRC.

Sites were assessed individually, and site sheets completed containing all the relevant compiled information on a site. These site sheets have been included in a separate supporting document. An Excel spreadsheet of the sites was completed to collate site description and significance assessment information.

3.2.1 Base spatial data

The main mapping layers utilised in this review and assessment were: aerial imagery of the District (2015), ASNCV site shapefiles, BioWeb shapefiles, NZFFDB shapefiles, HBRC's edited LCDB3

Mapping layers, HBRC threatened bird habitat shapefiles, LENZ TEC shapefiles, and FENZ shapefiles, along with Google Earth for reviewing site changes over the past ~14 years.

3.2.2 Design scale

The design scale of the ASNCV data is 1:10,000. For the purpose of producing this layer the data was not captured, edited or used at a scale greater than 1:5,000 (i.e. half of the design scale).

3.2.3 Minimum Mapping Unit (MMU)

For the purposes of this project the MMU was 0.5 ha per individual polygon, rounded to the nearest 0.01 ha. Areas of indigenous vegetation smaller than 0.5 ha were not mapped or assessed unless they were a part of a larger multi-polygon site.

3.2.4 Descriptive attributes

Attributes compiled included: name, size, ecosystem/vegetation type, general location, At-Risk/Threatened indigenous species found present, LENZ Threatened Environments Classes present, and predicted vegetation type (HBRC).

3.2.5 Significance assessments

The criteria for the Central Hawke's Bay were derived from the criteria considered of key importance in other Council criteria (Appendix I). Appendix II contains the draft significance assessment criteria. It was concluded that the system of a site meeting one or more resulting in site significance was a valuable method as sites are then recognised for biodiversity values which may otherwise be excluded if all criteria are required to trigger significance. Criteria met by individual sites were recorded in site sheets and the master spreadsheet in Appendix IV.

4 Ecological Character of the CHBD

4.1 General Overview

The Central Hawke's Bay District lies across four Ecological Districts (EDs): Heretaunga, Ruahine, Eastern Hawke's Bay, and Puketoi (Figure 3). A description of each of these is provided in Sections 5.2 to 5.5 and has been taken from the Department of Conservation Report *Ecological Regions and Districts of New Zealand* (1987).

The four EDs are all of separate Ecological Regions, which are listed in Table 1 below. In-depth descriptions of the EDs follow.

Table 1. Ecological District areas of Central Hawke's Bay.

Ecological Region	Ruahine	Hawke's Bay	Eastern Hawke's Bay	Pahiatua
Ecological District	Ruahine	Heretaunga	Eastern Hawke's Bay	Puketoi
ED Area within Central Hawke's Bay (ha)	26182	129925	170136	6693

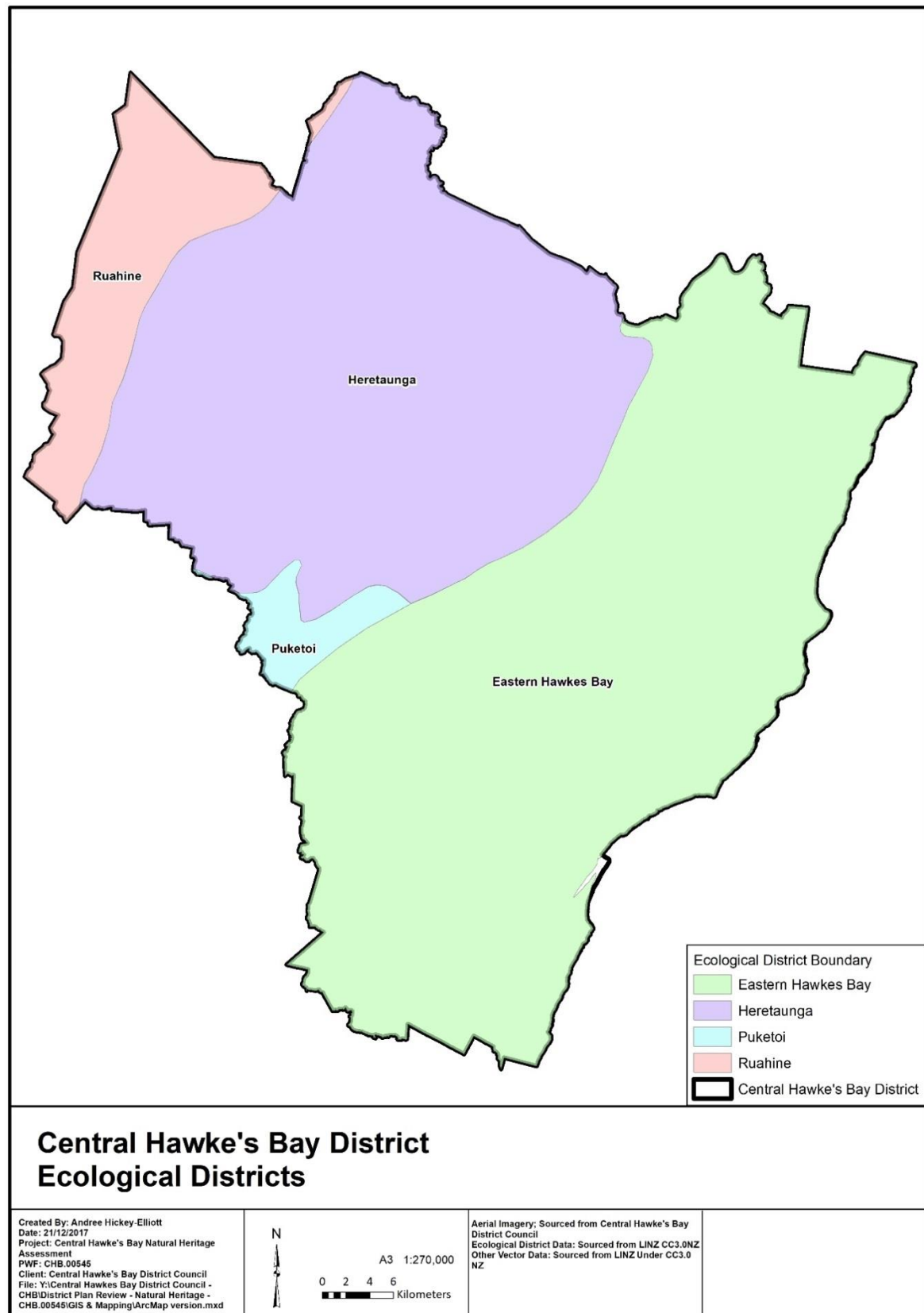


Figure 3. Ecological Districts of Central Hawke's Bay.

4.2 Heretaunga ED

Overview and Landforms

Extensive broad plains, river terraces, low rolling downlands and hill country composed of Pleistocene and Holocene gravels and alluvium: much of hill country and terrace land mantled by loess; a number of aggrading rivers flow across the fertile Heretaunga and Ruataniwha plains.

Bioclimatic Zones

The driest area in the North Island with frequent summer droughts: rainfall 800-1000 mm p.a.

Geology and Soils

Clayey textured soils with compact, pale coloured subsoils on higher terrace, rolling and hilly land from loess, alluvium and sedimentary rocks; droughty soils but winter drainage may be poor. In the N composite soils, the upper part is from volcanic ashes (Taupo, Waimahia, Tongariro); in higher rainfall areas in the W and SW subsoils are browner, more friable and less droughty. Alluvial soils on river flats, fertile but range in texture from sands and gravels (some pumiceous) to clays, natural drainage excessive to poor; parts liable to flooding, saline areas around Ahuriri lagoon.

Vegetation

Formerly included podocarp-hardwood forest in the S on the western foothills (rimu-matai-totara); a few large areas of coastal forest (ngaio, tītoki with tōtara and other podocarps in places); scrub, fern and short tussockland in the central and northern parts, largely fire-induced during the Polynesian era.

Fauna

This is a highly modified ED which nevertheless still contains important wetlands, e.g. Ahuriri estuary (not located within CHBD), Lake Hatuma, many swamps and a disproportionate representation of gravel riverbed habitats. These are essential for the breeding of birds which spend much of their time feeding elsewhere, e.g. pasture and coastline. Breeding black-fronted dotterel reach their peak of abundance in N.Z., banded dotterel and pied stilt are also very common. Dabchick and banded rail are also common. Both marsh and spotless crane occur near Napier. L. Poukawa is a useful wetland and key reference site of palynology, ash showers and richest single site for sub-fossil birds in N.Z.

Reptiles

Spotted skink (*Leiopisma lineoocellatum*) occurs along the coast near Napier (northern limit) and at Haumoana; the closest populations are in eastern Wairarapa E.D. near Flat Point.

Modifications

Very little indigenous vegetation remains: hill country and downland almost entirely in pasture, intensive horticulture and cropping on Heretaunga Plains.

4.3 Ruahine ED

Overview and Landforms

Steep rapidly rising mountain land: in the N a complex of fault blocks with rivers in deep gorges; southwards the main Ruahine and Wakarara Ranges arch in a SSW direction, reaching 1733 and 1013 m a.s.l. respectively. Four subsidiary ranges (Mokai Patea,

Hikurangi, Whanahuia and Ngamoko) run off obliquely from the central region, NW and SW from the main axis; valleys V-shaped, steep sided; drained by rivers flowing W and E.

Bioclimatic Zones

Cool, humid climate, high rainfall (1100 to over 4000 mm p.a.), heavy rainfalls at times from south and south-east; above 1100 m snowfall contributes up to 10 per cent of total precipitation, snow may lie from May-October; very high winds, predominantly from the NW.

Geology and Soils

Underlain by Triassic-Jurassic greywacke, argillite and bedded alternating greywacke and argillite (0.01-1 m thick beds); two prominent faults - Ruahine and Mohaka; Ruahine Range being uplifted about 4 mm per year.

Mainly strongly leached shallow steepland soils from greywacke but in the N variable cover of layered volcanic ash and soils somewhat deeper; small areas of deeper, more fertile hill soils from Tertiary sedimentary rocks; strongly leached volcanic ash soils from loess with fine-textured andesitic ash; and shallow stony soils in terrace and rolling land.

Vegetation

Range crests carry snowgrass (*Chionochloa albens*) and red tussock; above forest a subalpine scrub dominated by *Olearia*, *Senecio* or *Dracophyllum* species. Three important forest areas: in the N mountain beech is dominant, or alternates with red tussock; in the central area mountain beech with occasional kaikawaka is dominant above 1097 m a.s.l., red beech below; in the western area kaikawaka is common above 1097 m, red beech below; some black beech occurs on lower slopes, with podocarps and minor hardwoods (*Weinmannia*, *Nestegis*, *Elaeocarpus*).

The Wakarara Range is dominated by fire induced scrub; sparse areas of beech forest.

Flora

There is an unusual occurrence of a few silver beech trees on West of range (Mokai Patea). Rare plants include *Euphrasia disperma*, *Geum leiospermum*, *Senecio glaucophyllum* subspecies *discoideus*. Endemic species: *Myosotis eximia*, *Hebe colensoi* var *colensoi*, *H. colensoi* var *hillii*.

Fauna

Bird species include blue duck, N.Z. falcon, yellow-crowned parakeet, kākā (not widespread). North Island born kiwi are also present. The southern limit of blue duck in North Island is reached in northern Ruahine. They have disappeared from southern Ruahine, Manawatu Gorge and Tararua in the last 20 years. Snails include populations of *Powelliphanta marchanti*.

4.4 Eastern Hawke's Bay ED

Overview and Landforms

Low rounded hills mostly below 600 m a.s.l. (highest point 646 m), prominent river terraces; drained to Hawke's Bay via Tukituki River in the N, and to the E via Porangahau and Akitio Rivers; along the coast low rocky headlands and rolling hills separate elongated shallow bays with narrow coastal platforms; longitudinal sand-dune systems cover wave cut platforms. Pirimu Lake, Horsehoe Lake and Wanstead Swamp are important large wetlands.

Bioclimatic Zones

Very warm summers, day temperatures occasionally exceed 32°C with dry NW winds; droughts may occur in spring and summer; moderate winters; rainfall 1000-2000 mm p.a. with winter maximum.

Geology and Soils

Mostly Tertiary sandstone and siltstone and late Cretaceous argillite, greywacke, conglomerate and 10-1000 mm bedded alternating greywacke and argillite with some Pliocene shelly limestone in the N.

Mainly moderately deep to shallow hill and steepland soils from Tertiary sandstone, siltstone and limestone and more indurated Cretaceous argillites, greywacke and conglomerates, under a summer dry climate; natural fertility moderate to high; moderate to severe slipping and slumping occurs in some areas; soils on argillite and greywacke shallower, less fertile and more droughty; in higher rainfall areas, soils more leached, subsoils browner and more friable. Small areas of deep compact poorly drained soils from loess on rolling lands; alluvial soils, generally poorly drained on river flats; stony and shallower droughty soils on terraces; excessively drained sandy soils on coastal dunes.

Vegetation

Originally mixed hardwood-totara forest (tawa and kamahi largely absent) on rolling hills; tall podocarp forest (matai, kahikatea, totara) on terraces; one limestone area with higher rainfall, at approximately 600 m at head of Maraetotara Valley has tawa dominated forest; black beech occurs in the S, little beech elsewhere.

Fauna

Habitat has been much modified, unimportant for forest birds; main significance is the estuary at Porangahau (major estuary on east coast S of Ahuriri) and world's only mainland gannetry (also one of the largest in the world) at Cape Kidnappers. Tukituki R. in NE provides important riverbed habitat for black-fronted dotterel, comparable to Heretaunga E.D. N.Z. dabchick widespread, also N.Z. shoveler; N.Z. scaup and grey teal in places. Small population of N.Z. falcon near Cape Kidnappers. Australasian bittern, spotless crane and marsh crane are also found utilising wetlands of the ED.

Reptiles recorded include speckled skink (*Leiolopisma infracinctum*) recorded from Waimarama (only other North I. populations in Hamilton, Kaiangaroa and Wairarapa Plains E.Ds.).

Modifications

Largely modified: much Polynesian clearance; now farmed (intensive sheep and cash crops in the N, semi-extensive sheep and cattle elsewhere); adventive plants severely modify coastal sand-dune communities.

4.5 Puketoi ED

Overview and Landforms

Low ranges and dissected hills mostly over 300 m a.s.l., highest point 803 m; drained mostly to the W, ultimately via Manawatu River; in the S drained southwards via Ruamahanga River.

Bioclimatic Zones

Cool, wet hill climate with very heavy rains at times from S and SE; rainfall mainly 1200-2000 mm p.a.

Geology and Soils

Mainly underlain by Pliocene calcareous sandy mudstone, sandstone, alternating mudstone and sandstone, and shelly limestone which form long steep-sided ridges and bluffs, such as Puketoi Range; Pleistocene non-marine and marine gravel, sand and mudstone forms more subdued hills to the N where Holocene alluvium forms terraces; the Waewaepa Range, W of Makuri Stream consists of Jurassic-early Cretaceous greywacke and argillite.

Soils from greywacke, argillite and Tertiary sandstone, mudstone and limestone; soils in higher rainfall areas have firm to friable yellowish brown subsoils, moderately to strongly leached; in lower rainfall areas soils generally more fertile, subsoils paler and more compact; moderate to severe erosion occurs in some areas.

Vegetation and Modifications

Original rimu-rata/tawa and rimu-rata/kamahi forest largely cleared for farming (mostly semi-extensive sheep and cattle); riparian black beech and red beech occurs very locally in north-western corner; otherwise beech species absent.

5 Threatened Biodiversity of the CHBD

5.1 Extent of Nationally Threatened Environments within CHBD

Nationally Threatened Environments within the Central Hawke's Bay District were identified using the Land Environments of New Zealand (LENZ) Threatened Environment Classification developed (TEC) by Landcare Research. Walker et al. (2015) proposed a threat classification for the remaining indigenous biodiversity in New Zealand's environments based on three components: how much indigenous cover remains within land environments, how much land is legally protected, and how past loss of indigenous cover and natural heritage protection are distributed across New Zealand's landscape. The Threatened Environment Classification (2012) combines LENZ (LENZ; Leathwick et al., 2003); the land cover classes of the fourth Land Cover Database (LCDBv4.0); and the protected areas network, identifying legally protected areas for the purpose of natural heritage protection.

Maps of Threatened Environment Classification, prepared at LENZ Level IV (i.e. 500 land environments nationally), show land environments with various amounts of indigenous vegetation cover and legal protection. The aim of the Threatened Environment Classification is to protect indigenous vegetation associated with land environments that have more than 70% of their former indigenous cover removed and/or only a small portion of this land (less than 20%) is protected for natural heritage purposes. From a national level, Landcare Research have mapped New Zealand's rarest and most threatened ecosystems. This national level information provides part of the biodiversity picture that is needed to inform resource management decisions at the regional and local level (MfE, 2015). Any land within threat classes 1-5 is considered a Threatened Environment.

In the Central Hawke's Bay all six Threatened Environment Classes are present, the majority of the Central Hawke's Bay is included in the highest TEC; ~72% of the land, and the next most common Class is the second highest (Table 2, Figure 4). This indicates the Central Hawke's Bay is a district with very little remaining indigenous cover overall. In terms of Nationally Threatened Environments, classes one to five are considered 'Threatened', and

class six 'Not Threatened' meaning 92.3%, or 302,811.8 ha of the land is classed as a Nationally Threatened Environment. Some areas including rivers beds and wetlands are not included in the data.

Table 2. LENZ areas per Ecological Districts within CHBDC.

Threat Class (Category)	Area (ha)	Percent
< 10% indigenous cover left (1)	236,886	72 %
10-20% indigenous cover left (2)	45,078	14 %
20-30% indigenous cover left (3)	6,690	2 %
> 30 % left and < 10% protected (4)	13,186	4 %
> 30 % left and 10-20% protected (5)	973	<1 %
> 30 % left and > 20% protected (6)	25,411	8 %
Total	328,224	100%

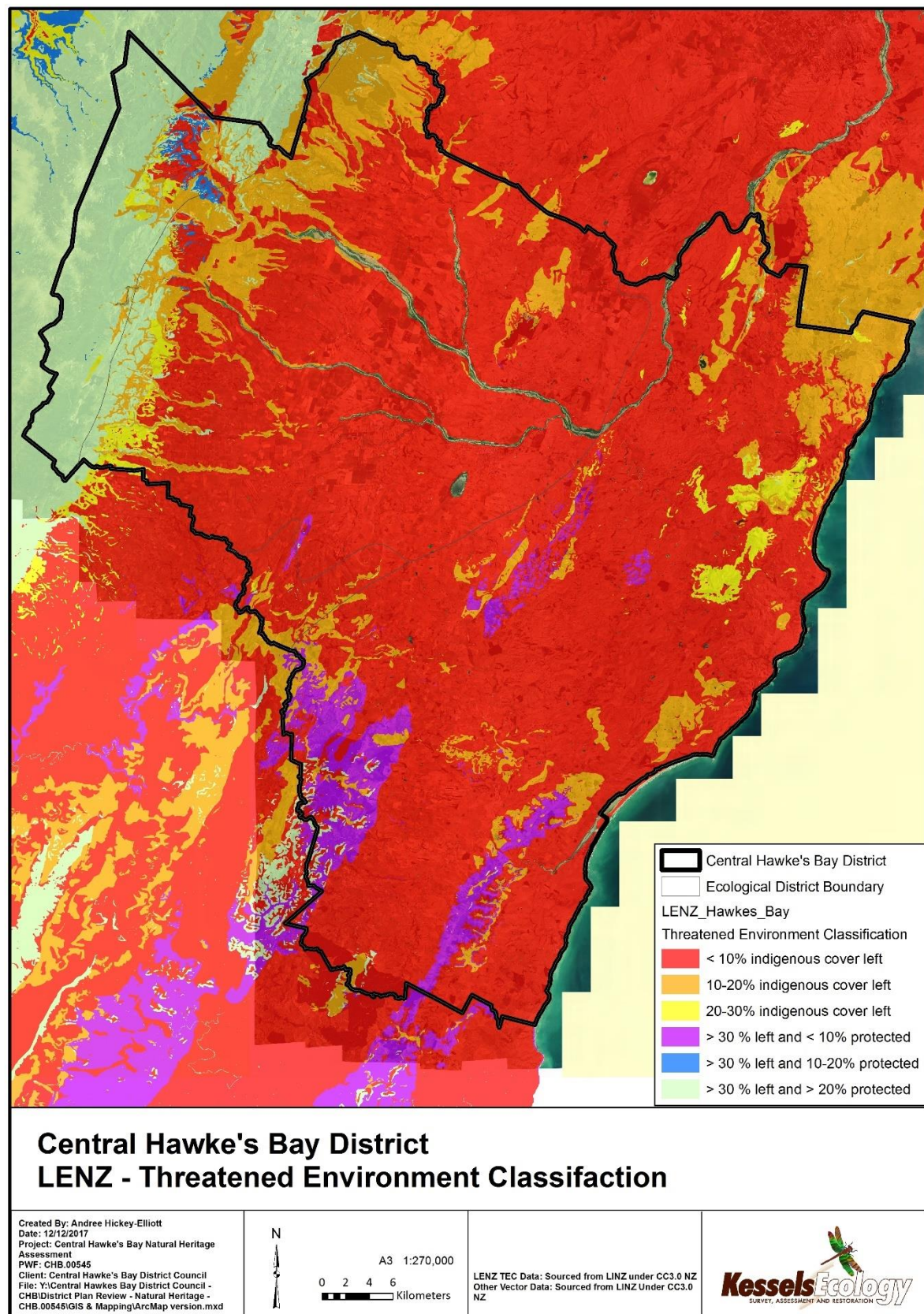


Figure 4. Threatened Environment Classification.

5.2 Predicted Indigenous Landcover

Historic vegetation cover in the Central Hawke's Bay is very different to current predicted indigenous vegetation cover based on the Hawke's Bay Regional Council (HBRC) dataset (Figure 5, Figure 6, Table 3). Historically, 100% of landcover, approximately 332,792 ha, was in indigenous landcover. The table below shows 324,408 ha as predicted historically, the remainder likely being unclassified. Currently, approximately 29,598 ha is predicted to be in indigenous vegetation, equating to 6.9% of the historic classified vegetation cover, and 6.7% coverage of the region. Aside from the Ruahine Ranges, there is little indigenous vegetation cover remaining, particularly in areas of high relief with productive soils, such as those on the alluvial flats of the Tukituki and Waipawa Rivers. Some ecosystem/vegetation types retain much of their original extent, such as most podocarp-beech types, which may be because they occur in very steep areas, such as the Ruahine Ranges. Other types occurring in easy higher relief terrain have retained very little of their former extent, such as kahikatea-pukatea-tawa forest, which is predicted to cover 729 ha, a mere 1% of its predicted historic extent. Some types have no remaining coverage predicted, typically podocarp-based vegetation types. Wetland ecosystems are discussed following further ecosystem analysis, as the historic versus current areas of wetland are derived from the Freshwater Ecosystems of New Zealand (FENZ) database.

Table 3. Predicted indigenous landcover of Central Hawke's Bay.

HBRC Predicted Habitat Type Coverage	Historic Cover (ha)	Current Cover (ha)	% Remaining
Podocarp/kamahi-beech forest	7,815	4,648	59%
Podocarp/red beech-kamahi-tawa forest	164	113	69%
Podocarp/kamahi forest	1,949	413	21%
Red beech-silver beech forest	77	25	32%
Mountain beech-red beech forest	9,556	8,338	87%
Mountain beech forest	92	54	59%
Podocarp/broadleaved forest	1,092	31	3%
Podocarp/black/mountain beech forest	871	312	36%
Scrub, tussock-grassland and herbfield	1489	339	23%
Rimu/tawa-kamahi forest	160,469	7,686	5%
Kahikatea-pukatea-tawa forest	90,812	729	1%
Podocarp forest	59	-	-
Podocarp/tawa-mahoe forest	53,105	463	1%
Podocarp/broadleaf-fuchsia forest	9	-	-
Hall's totara/broadleaf forest	110.00	69	63%
Hall's totara/silver-beech-kamahi forest	16	4	25%
Wetland *	607 (HBRC) 66,238 (FENZ)	- 275 (FENZ)	- 0.4%
Dunelands	28	1	3.6
Manuka/kanuka scrub	-	6344 (not incl % remaining calculation)	
Unclassified	3932-	785	
Total excl Manuka/kanuka	332,252	24,010	7%
Total	332,252		

* FENZ data not used in total area calculations due to overlap with vegetation typology of HBRC dataset.

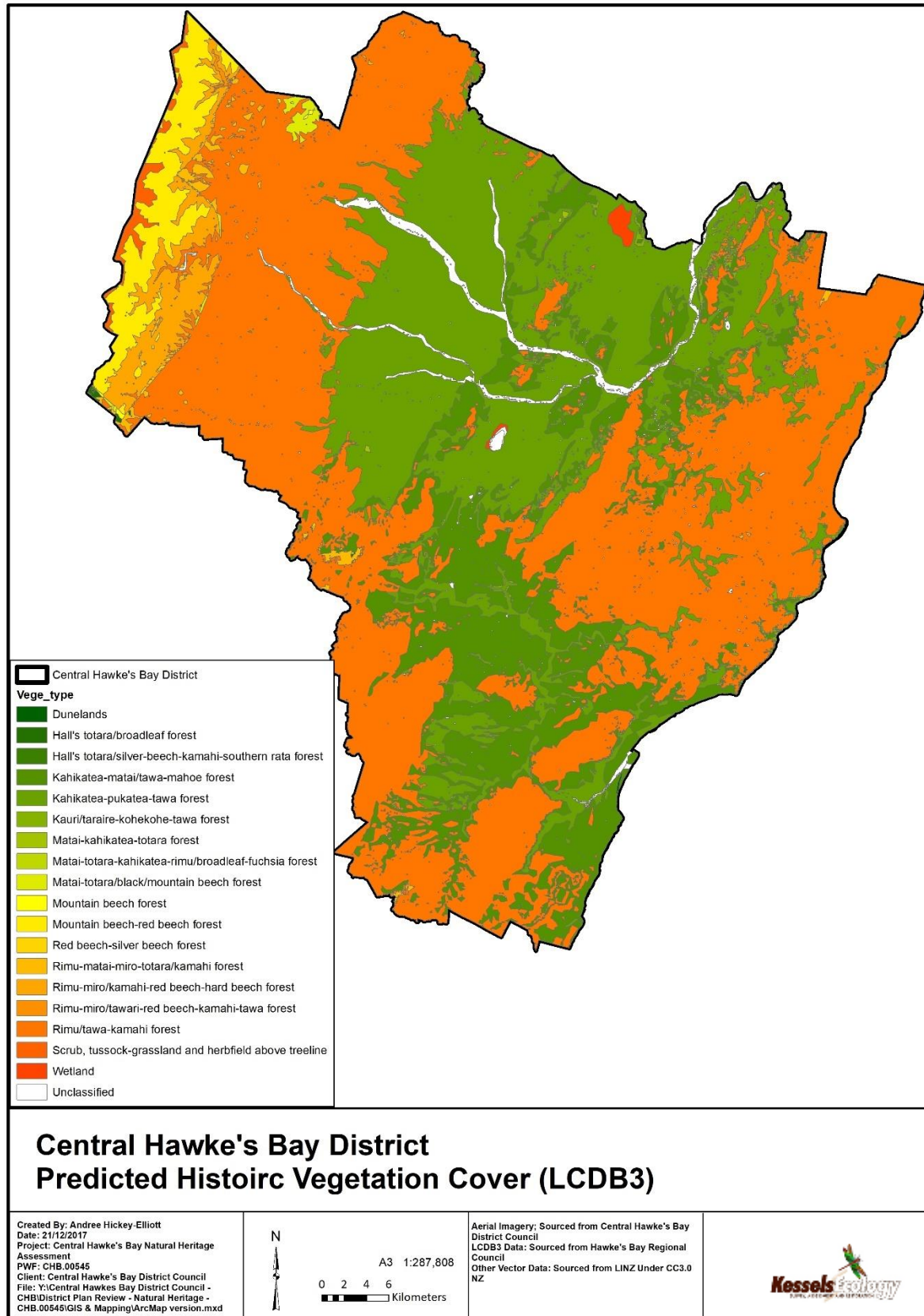


Figure 5. Predicted historic vegetation cover.

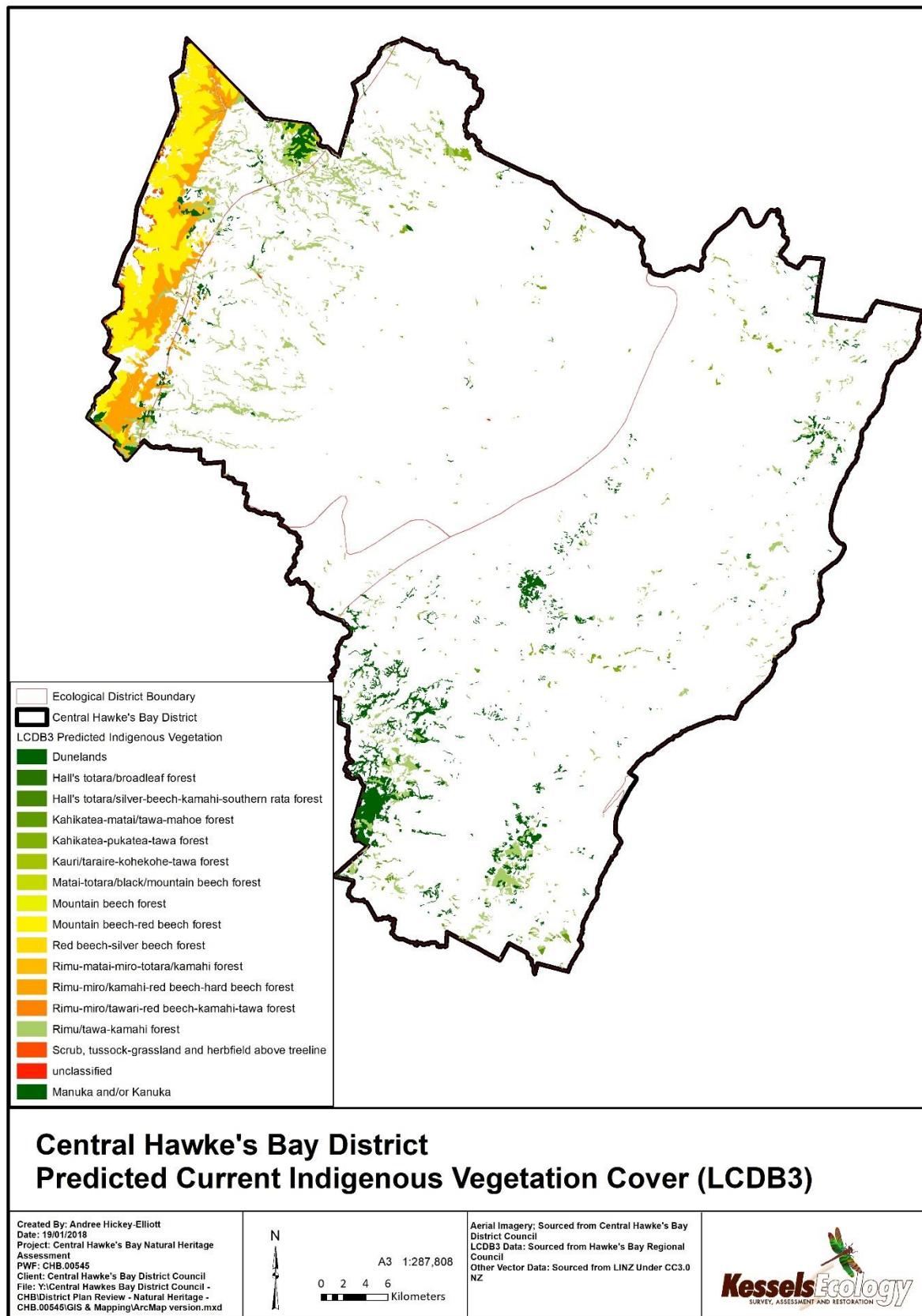


Figure 6. Current predicted indigenous vegetation cover.

The Central Hawke's Bay predicted vegetation cover (HBRC dataset derived from LCDB3) retains fewer vegetation types compared to the Hawke's Bay Region, and generally retains lower coverage of individual types compared to that of the region as a whole (Table 4). Multiple vegetation types were presumed extinct at the district scale, including podocarp, which was found present among the reviewed significant sites. Many of the ecosystem/vegetation types are Acutely Threatened (<10% remaining), some Chronically Threatened (10-20% remaining) with some At Risk (20-30% remaining), and others Better Protected, Less Reduced (>30% remaining).

Overall, the Hawke's Bay Region retains a higher percentage of indigenous ecosystems/vegetation (~22%) compared to the Central Hawke's Bay District (~6.7%). Generally, the Central Hawke's Bay District retains fewer indigenous ecosystems, and the existing significant sites do not cover all ecosystem/vegetation types historically predicted present. Given the smaller area of the District compared to the Hawke's Bay Region it can be expected that there would be lower vegetation type diversity, however the percentage retained of some ecosystem/vegetation types highlights the types requiring higher levels of concern from a conservation management perspective. Any Acutely Threatened ecosystem/vegetation types should be prioritised for conservation purposes within the District.

Table 4. Comparison of CHBD to Hawke's Bay region remaining vegetation types.

HBRC Predicted Habitat Type Coverage	Hawke's Bay Region				Central Hawke's Bay District			
	Historic Cover (ha)	Current Cover (ha)	% Remaining	Threat Class Regional Scale	Historic Cover (ha)	Current Cover (ha)	% Remaining	Threat Class District Scale
Podocarp/kamahi-beech forest	89,181	68,377	77%	Less Reduced, Better Protected	7,815	4,648	59%	Less Reduced, Better Protected
Podocarp/red beech-kamahi-tawa forest	38,662	17,424	45%	Less Reduced, Better Protected	164	113	69%	Less Reduced, Better Protected
Podocarp/kamahi forest	35,759	6,735	19%	Chronically Threatened	1,949	413	21%	At Risk
Podocarp/kamahi forest	7	-	0%	Presumed Regionally Extinct	-	-	-	Presumed Regionally extinct
Silver beech forest	16,560	16,036	97%	Less Reduced, Better Protected	-	-	-	N/A
Red beech-silver beech forest	123,718	103,821	84%	Less Reduced, Better Protected	77	25	32%	Less Reduced, Better Protected
Mountain beech-red beech forest	46,127	39,386	85%	Less Reduced, Better Protected	9,556	8,338	87%	Less Reduced, Better Protected
Mountain beech forest	36,523	13,362	37%	Less Reduced, Better Protected	92	54	59%	Less Reduced, Better Protected
Podocarp/broadleaved forest	8,143	238	3%	Acutely Threatened	1,092	31	3%	Acutely Threatened
Podocarp/black/mountain beech forest	42,354	3,961	9%	Acutely Threatened	871	312	36%	Less Reduced, Better Protected
Rimu/tawa-kamahi forest	607,146	40,971	7%	Acutely Threatened	160,469	7,686	5%	Acutely Threatened
Kahikatea-pukatea-tawa forest	252,710	2,444	1%	Acutely Threatened	90,812	729	1%	Acutely Threatened
Podocarp forest	4,575	103	2%	Acutely Threatened	59	-	-	Presumed Locally Extinct
Podocarp/tawa-mahoe forest	69,452	1,466	2%	Acutely Threatened	53,105	463	1%	Acutely Threatened
Podocarp/broadleaf-fuchsia forest	2,774	338	12%	Chronically Threatened	9	-	0%	Presumed Locally Extinct
Hall's totara/broadleaf forest	3,919	833	21%	At Risk	110	69	63%	Less Reduced, Better Protected
Hall's totara/silver-beech-kamahi forest	174	10	6%	Acutely Threatened	16	4	25%	At Risk
Dunelands	215	1	<1%	Acutely Threatened	28	1	3.6	Acutely Threatened
Scrub, tussock-grassland and herbfield	8,386	2,217	26%	Acutely Threatened	1,489	339	23%	At Risk
Wetland	9,971	15	0%	Acutely Threatened	607 (HBRC) 66,238 (FENZ)	275 (FENZ)	0.4% (FENZ)	Acutely Threatened
Manuka/kanuka scrub/forest	-	126,567		9% landcover of region	-	6,344		1.9% District Landcover
Unknown	-	-			-	785		
Total	1,396,360	306,804	22.0		324,408	29,598	6.9	



The ecosystem/vegetation types were assigned threat statuses utilising the Walker et al. (2007) methodology based on their existing predicted landcover compared to their original predicted landcover (Table 5). Many of the ecosystem/vegetation types of both the Central Hawke's Bay District and Hawke's Bay Region are Acutely Threatened.

Table 5. Threat status classes for ecosystems (Walker et al., 2007).

Threat Category	Threat Class
<10% left	Acutely Threatened
10%-20% left	Chronically Threatened
20-30 % left	At Risk
>30% left, <10% protected	Chronically Under-protected
>30% left, 10-20% protected	Under-protected
>30% left, >20% protected	Less Reduced, Better Protected

Protection of the various predicted vegetation/ecosystem types favours types which are more common, and typically less under-represented, at both district and regional scale. The exception is Hall's totara vegetation types, which have such small coverage that protection may have been a priority (Table 6). Acutely Threatened vegetation types of podocarp/broadleaved forest, rimu/tawa-kamahi forest, and kahikatea-pukatea-tawa forest, have very low protection levels of just 6%, 10% and 15% respectively.

Table 6. Relative protection of vegetation types by Region and District.

HBRC Dataset Predicted Vegetation Type	Hawke's Bay		Central Hawke's Bay	
	Protected (ha)	Protected (%)	Protected (ha)	Protected (%)
Podocarp/kamahi-beech forest	56,272	82%	3,484	75%
Podocarp/red-beech-kamahi-tawa forest	10,779	62%	109	96%
Podocarp/kamahi forest	4,028	60%	231	56%
Podocarp/kamahi forest	-	-	-	-
Silver beech forest	13,868	86%	-	-
Red beech-silver beech forest	65,328	63%	5	20%
Mountain beech-red beech forest	37,439	95%	8,109	97%
Mountain beech forest	10,507	79%	55	100%
Podocarp/broadleaved forest	46	19%	2	6%
Podocarp/black/mountain beech forest	3,395	86%	193	62%
Rimu/tawa-kamahi forest	10,847	26%	805	10%
Kahikatea-pukatea-tawa forest	222	9%	111	15%
Podocarp forest	45	44%	-	-
Podocarp/tawa-mahoe forest	353	24%	28	6%
Podocarp/broadleaf-fuchsia forest	35	10%	-	-
Hall's totara/broadleaf forest	492	59%	62	90%
Hall's totara/silver beech-kamahi forest	10	100%	4	90%
Manuka/kanuka scrub	-	-	661	10%
Total	213,666	68%	13,857	58%

In the Central Hawke's Bay District indigenous ecosystems/vegetation of significance is more evenly distributed between public and private land, compared to that of the region as a whole (CHB:56 public to 44 private versus HB 67:33). Therefore, private landholders will require active engagement for successful conservation of indigenous ecosystems (Table 7).

Table 7. Distribution of indigenous vegetation.

Distribution of Indigenous Vegetation	Hawke's Bay Region		Central Hawke's Bay District	
	ha	%	ha	%
On Public Land (DOC, NWR)	211,593	67%	12,755	56%
On Private (Including QEII)	103,912	33%	10,130	44%
Total Remaining Indigenous Forest	315,505		22,885	

Wetland coverage for both historic and current area estimates was obtained through the FENZ database. Historic wetland coverage of the District totalled approximately 66,237 ha (Table 8). Current wetland coverage totals 275 ha, approximately 0.4% of historic area coverage, therefore, wetlands in Central Hawke's Bay are an Acutely Threatened ecosystem type (Figure 7, Figure 8). Historically, wetlands covered approximately 20% of the total land area of the Central Hawke's Bay; currently they cover less than 0.1% of the district's total area. Swamp was the dominant wetland type of the district historically, covering approximately 58,795 ha (89% of total coverage). Swamp remains dominant (73% of total current wetland coverage), though its extent has been significantly reduced to approximately 200 ha (0.3% of its historic area coverage). Bog and fen wetlands are now presumed extinct from the district; both historically contributed 34 ha and 122 ha respectively, less than 1% of the total wetland area (Table 8, Figure 7, Figure 8). Seepage areas have increased in coverage compared to historic area, though proportionally they cover a small percentage of the total wetland area. Seepage area increase may be due anthropocentric environmental modifications. Many wetlands remaining have been significantly modified from their natural state, however, due to the rarity of wetlands, and their associated functions and habitat provisions, such sites remain of high ecological value.

Table 8. Wetland coverage of the Central Hawke's Bay District.

FENZ Wetland Coverage	Historic		Current		Remaining
	Area (ha)	% Total Wetland	Area (ha)	% Total Wetland	% of Area
Bog	34	<0.1%	-	-	-
Fen	122	0.18%	-	-	-
Marsh	7,283	11%	64	23%	0.9%
Seepage	4	<0.1%	11	4%	275%
Swamp	58,795	89%	200	73%	0.3%
Total Wetland Coverage	66,238		275		0.4%
CHB Wetland Coverage	66,238/332,792	20%	275/332,792	<0.1%	

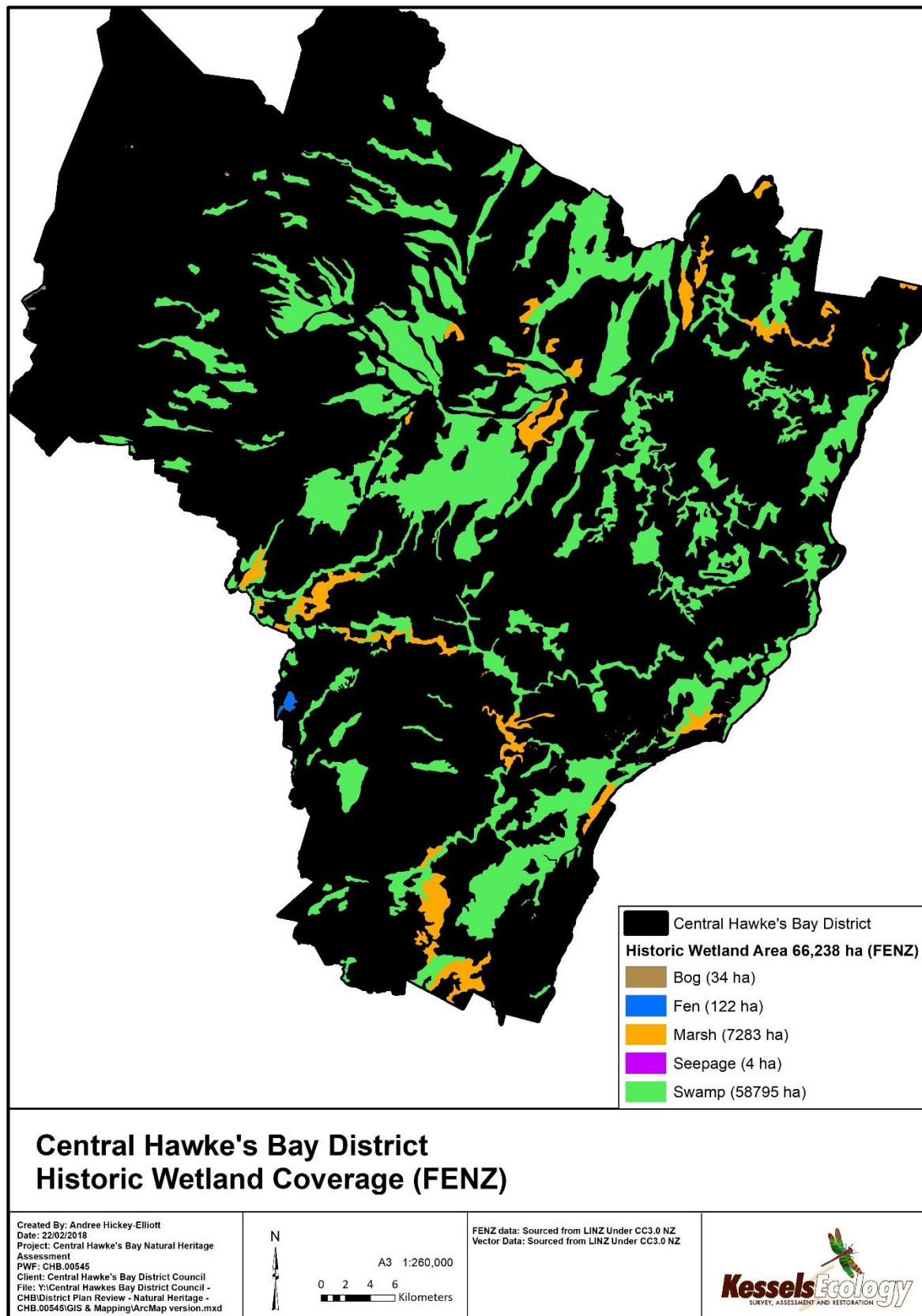


Figure 7. Historic Wetland Coverage of the Central Hawke's Bay District based on the FENZ database.

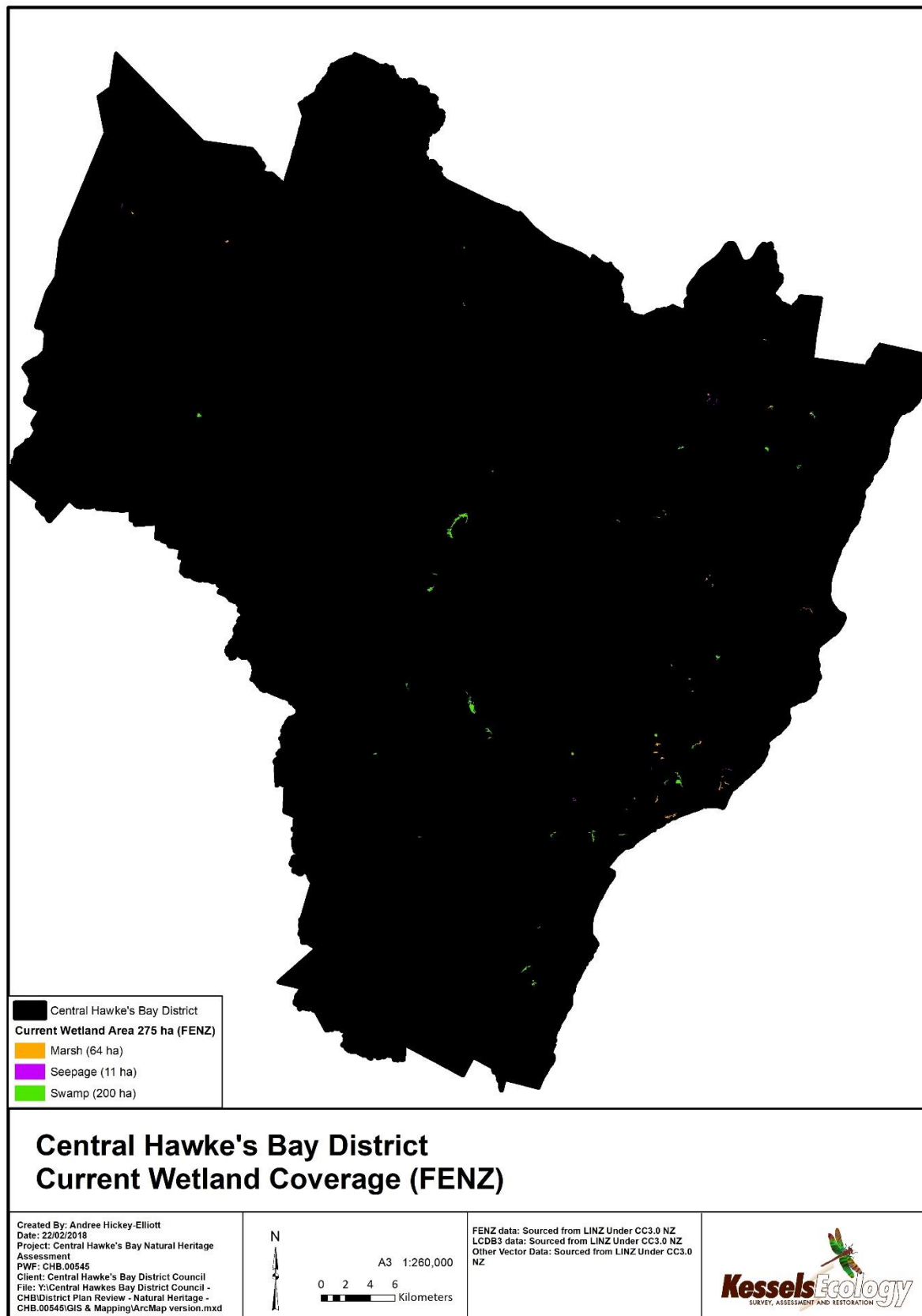


Figure 8. Current wetland coverage of the Central Hawke's Bay District based on the FENZ database.

5.3 At Risk, Threatened and Notable Species Records

A total of 46 Nationally Threatened and At Risk species (defined by the Department of Conservation, refer to Appendix IV) have been recorded as present within the District, and were found through the BioWeb spatial dataset (administered by DOC), BIMS spatial dataset and NZFFDB (administered by NIWA), and from records held by Kessels Ecology, and other ecologists of the Hawke's Bay region (e.g. Robertson et al., 2017; Hitchmough et al., 2016; O'Donnell et al., 2012; de Lange et al., 2013; Goodman et al., 2014; Grainger et al., 2014). These threatened species are listed in Tables 8-11. Threat classification was determined using the New Zealand Threat Classification System manual (Townsend et al., 2008) and successive documents.

5.3.1 At Risk and Threatened flora

Within Central Hawke's Bay district, 10 Nationally Threatened and At Risk plant species have been recorded (Table 9) (based on de Lange et al., 2013). Threatened plant species are at risk of rapidly becoming locally extinct if a management regime changes or a new pest or disease strikes a local population. Threatened plants situated on privately owned, unprotected land are particularly vulnerable.

Table 9. Threatened and At Risk flora.

Species	Common name	Threat status
<i>Adiantum formosum</i>	Giant maidenhair	At Risk - Relict
<i>Alepis flavida</i>	Yellow mistletoe	At Risk - Declining
<i>Anogramma leptophylla</i>	Jersey fern	Threatened - Nationally Vulnerable
<i>Coprosma pedicellata</i>	Swamp mingmingi	At Risk - Declining
<i>Mazus novaezeelandiae</i> subsp. <i>novaezeelandiae</i>	Dwarf musk	At Risk - Declining
<i>Myosotis petiolata</i> var. <i>petiolata</i>	Forget-me-not	Threatened - Nationally Critical
<i>Myriophyllum robustum</i>	Stout water milfoil	At Risk - Declining
<i>Pittosporum obcordatum</i>	Heart-leaved kohuhu	Threatened - Nationally Vulnerable
<i>Teucrium parvifolium</i>	Teucrium	At Risk - Declining
<i>Urtica linearifolia</i>	Swamp nettle	At Risk - Declining

5.3.2 At Risk and Threatened fauna

As part of the SNA assessment process, past records of threatened indigenous fauna species were included. However, many species, such as kākā and NZ falcon, are highly mobile and have large territories and vast home ranges. It is therefore difficult to predict where these species may utilise suitable habitats throughout a year, so habitat utilisation is probably much broader than specific points in time as shown on a static database.

Other fauna species, such as the long-tailed bat, are regularly being discovered in new sites and habitats as ecological investigations for resource consents and/or scientific research are conducted in conjunction with improved survey methods and technology. To this extent, the significant sites database needs to be regularly updated to reflect this.

The following tables list the Nationally Threatened / At Risk fauna species recorded in the District, while Figure 9 shows indigenous species records across the District.

Freshwater fish

Within the Central Hawke's Bay district eight Threatened and At Risk freshwater fish species have been previously recorded in the NZFFDB, or recorded present in reports such as Hughey et al., 2012 (Table 10). Scientific names and threat status are based on Goodman et al., 2014.

Table 10. Threatened and At Risk freshwater fauna.

Species	Common name	Threat status
<i>Anguilla dieffenbachii</i>	Longfin eel	At Risk - Declining
<i>Cheimarrichthys fosteri</i>	Torrentfish	At Risk - Declining
<i>Galaxias brevipinnis</i>	Koaro	At Risk - Declining
<i>Galaxias divergens</i>	Dwarf galaxias	At Risk - Declining
<i>Galaxias maculatus</i>	Inanga	At Risk - Declining
<i>Geotria australis</i>	Lamprey	Threatened - Nationally Vulnerable
<i>Gobiomorphus hubbsi</i>	Bluegill bully	At Risk - Declining
<i>Gobiomorphus huttoni</i>	Redfin bully	At Risk - Declining

Herpetofauna

Within the Central Hawke's Bay district, several species of herpetofauna that are or may be Threatened or At Risk have been previously recorded in the BioWeb Database, or in NatureWatch NZ (2018) (Table 11) (Hitchmough et al., 2016 & Newman et al., 2013). Common gecko are also present.

Table 11. Threatened and At Risk herpetofauna.

Species	Common name	Threat status
<i>Leiopelma waitomoensis</i>	Waitomo frog	Presumed extinct
<i>Naultinus punctatus</i>	Wellington green gecko	At Risk - Declining
<i>Woodworthia maculatus</i>	Common gecko	Not Threatened
Unknown	Unidentified gecko	Unknown
Unknown	Unidentified tuatara	Unknown

Bird species

Within the Central Hawke's Bay, 23 species of birds that are Threatened or At Risk have been previously recorded (Table 12) (based on Robertson et al., 2017).

Table 12. Threatened and At Risk bird species within the CHBD.

Species	Common name	Threat status
<i>Acanthisitta chloris granti</i>	North Island rifleman	At Risk - Declining
<i>Anas superciliosa</i>	Grey duck	Threatened - Nationally Critical
<i>Anthus novaeseelandiae</i>	New Zealand pipit	At Risk - Declining
<i>Ardea modesta</i>	White heron	Threatened - Nationally Critical
<i>Botaurus poiciloptilus</i>	Bittern	Threatened - Nationally Critical
<i>Bowdleria punctata</i>	North Island fernbird	At Risk - Declining
<i>Charadrius bicinctus</i>	Banded dotterel	Threatened - Nationally Vulnerable
<i>Charadrius obscurus</i>	New Zealand dotterel	At Risk - Recovering
<i>Chlidonias albostratus</i>	Black-fronted tern	Threatened - Nationally Endangered
<i>Egretta sacra</i>	Reef heron	Threatened - Nationally Endangered
<i>Elseymoris melanops</i>	Black-fronted dotterel	At Risk - Naturally Uncommon
<i>Falco novaeseelandiae</i>	New Zealand falcon	At Risk - Recovering

Species	Common name	Threat status
<i>Gallirallus philippensis</i>	Banded rail	At Risk - Declining
<i>Hydroprogne caspia</i>	Caspian tern	Threatened - Nationally Vulnerable
<i>Hymenolaimus malacorhynchos</i>	Blue duck	Threatened - Nationally Vulnerable
<i>Larus bulleri</i>	Black-billed gull	Threatened - Nationally Critical
<i>Larus novaehollandiae</i>	Red-billed gull	At Risk - Declining
<i>Nestor meridionalis</i>	North Island kākā	At Risk - Recovering
<i>Phalacrocorax carbo</i>	Black shag	Threatened - Naturally Uncommon
<i>Phalacrocorax sulcirostris</i>	Little black shag	At Risk - Naturally Uncommon
<i>Poliiocephalus rufopectus</i>	New Zealand dabchick	At Risk - Recovering
<i>Porzana pusilla</i>	Marsh crane	At Risk - Declining
<i>Porzana tabuensis</i>	Spotless crane	At Risk - Declining

Mammals

In the Central Hawke's Bay only one known Threatened mammal exists, the North Island long-tailed bat (Table 13) (based on O'Donnell et al., 2012). Some survey data was obtained from Kay Griffiths which provides known long-tailed bat locations, this data can be found in Appendix VIII.

Table 13. Threatened and At Risk mammals of the Central Hawke's Bay.

Species	Common name	Threat status
<i>Chalinolobus tuberculatus</i> "North Island"	North Island long-tailed bat	Threatened – Nationally Vulnerable

Invertebrates

One freshwater invertebrate present in the district, freshwater mussel, is known to be At Risk - Declining. While *Powelliphanta* snails are present, their threat status is indeterminate, though they are known to be undergoing population declines due to human induced land use change, and predation, and have previously been listed as in 'Serious Decline' (Grainger et al., 2013, Hitchmough, 2002,) (Table 14). Hawke's Bay tree weta are also present (Trewick et al., 2016).

Table 14. Threatened and At Risk Invertebrates of the Central Hawke's Bay.

Species	Common name	Threat Status
<i>Echyridella menziesi</i>	Freshwater mussel	At Risk - Declining
<i>Hemideina trewicki</i>	Hawke's Bay tree weta	At Risk - Relict
<i>Powelliphanta marchanti</i>	Powelliphanta land snail	Unknown

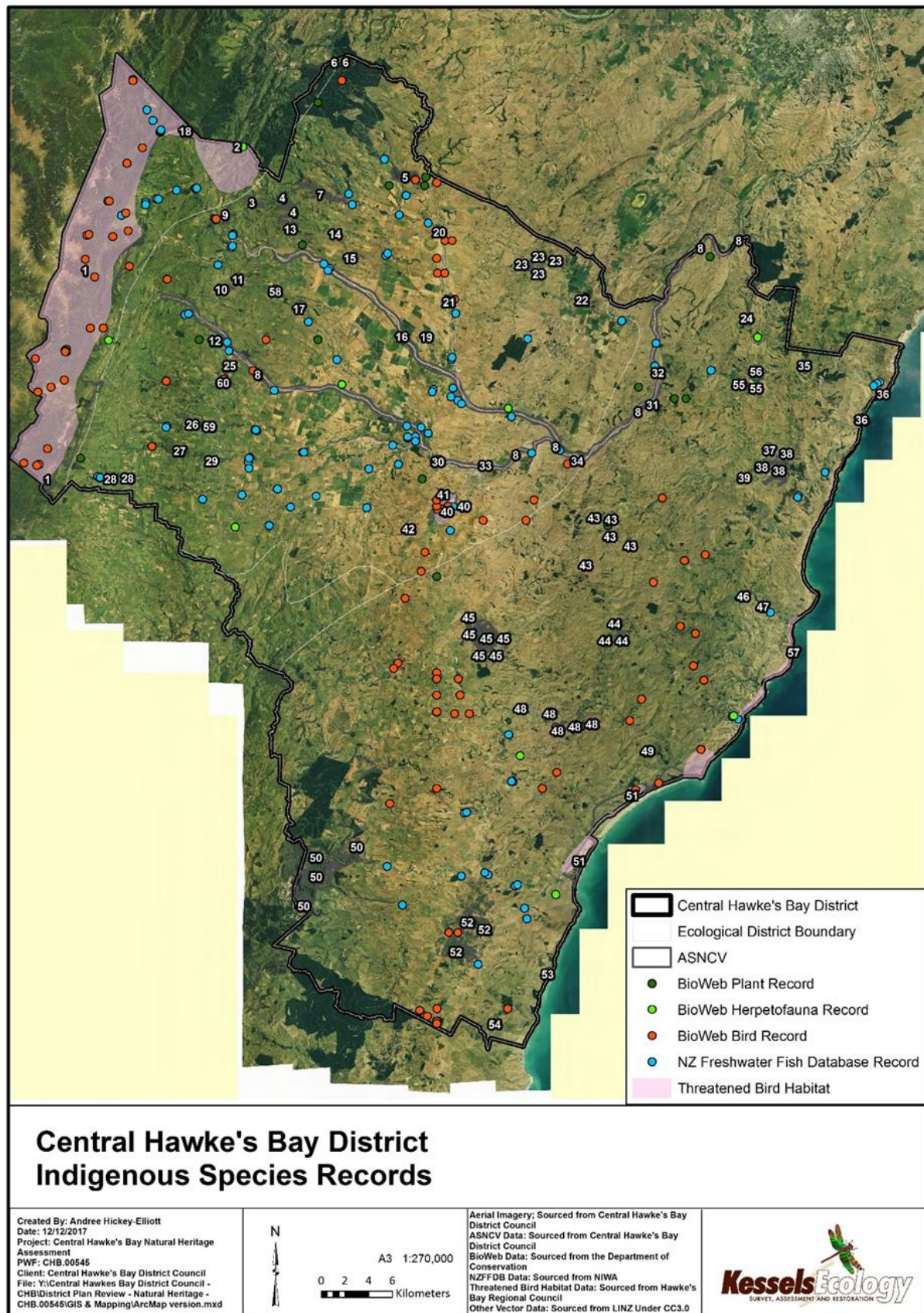


Figure 9. Indigenous species records distributions across CHB.

6 Results of the ASNCV Site Reviews and Assessment

6.1 Proposed Significance Criteria

The drafted significance assessment criteria are defined below in Table 15, and are also located in Appendix II for ease of use in future referencing. These criteria have been selected to cover an array of the values considered in Whaley *et al.* (1995), aforementioned in section 2.2. The criteria were also developed taking into account other existing local body significance criteria (See Appendix I).

Criterion 1 considers underrepresented ecosystem/vegetation types as those with less than 30% original coverage remaining. Alignment with the Regional Council's use of 30% (used in the HBRC biodiversity Inventory) was selected to allow for consistency in classification throughout the region (HBRC data set; HBRC, 2014).

Criterion 2 provides regard to potentially more common indigenous ecosystem and vegetation types which may occur on land classified as a Threatened Environment. To align with the classification system, land classed in categories 1-5 was considered a Threatened Environment, and was therefore the standard utilised (Leathwick *et al.*, 2003; Walker *et al.*, 2015).

Criterion 3 provides regard to areas that may not be rare indigenous vegetation, but may provide habitat required or utilised by nationally Threatened or At Risk fauna or flora. Threatened and At Risk species require retainment of all habitat utilised as habitat loss is a major contributing factor to extinctions in New Zealand.

Criterion 4 considers the ecosystem types that are rare and uncommon to New Zealand, and are a significant biodiversity asset to the Central Hawke's Bay. Rare ecosystem types provide unique habitat and resources which are important for local biodiversity.

Criterion 5 provides consideration of sites that may not be considered otherwise important, but are known to be a large example of indigenous habitat, and may therefore provide significant refuge and future regenerative properties which require protection to reduce clearance risks. Such sites, while not necessarily currently comprising rare ecosystems, vegetation types, or rare species, may do so in future, and provide an opportunity for a significant area to remain in a relatively natural state, with reduced edge effects which impact smaller sites.

Other potential criteria could have included intactness and naturalness of the sites, however due to the limited ability of remaining indigenous sites to be intact and in a complete natural state, these criteria were not considered to provide additional value to the significance assessment of the Central Hawke's Bay.

Table 15. Proposed significance criteria.

Significance Criteria: Site must meet one or more of the following criteria:	
1	Site contains underrepresented indigenous ecosystem/vegetation type (HBRC dataset <30% remaining is underrepresented)
2	Site contains indigenous dominated vegetation on land of a Threatened Environment Class from 1-5
3	Site is habitat / a migratory pathway for At Risk or Threatened indigenous fauna or flora and is utilised regularly
4	Site contains a rare ecosystem type (e.g. braided river, wetland)
5	Site represents large example of indigenous vegetation (>20 ha)

6.2 Reviewed Significant Site Inventory

Fifty-four of the 62 Areas of Significant Nature Conservation Value (ASNCV) sites reviewed were found to be significant based on the significance criteria above (Appendix VI). All of the sites with existing polygons are mapped in Figure 10. Two sites, 61 and 62 did not have existing polygons, which have been subsequently created and included in boundary adjustment recommendations. Confidence levels were also included to rate the certainty in the site's status based on information and knowledge available in site assessment. For example, the Ruahine State Forest Park (Site 1) had ample information both in existing reports, and in the databases utilised, while other sites such as Site 18 (Bush Margin on Makaro River) had much less site information available. A few sites of significance span across two EDs, and some large areas with no significant sites existing can be observed. A small area of Puketoi ED is present, but contains no significant sites (Figure 10).

Some sites were located within close proximity to one another, such as sites 4 and 13. Corridors and links between sites are important for maintaining biodiversity values, and reducing the risk of external effects severely impacting a site. Consideration could be given to improving the corridors and links between various sites.

Significant sites could be termed draft Significant Natural Areas (SNAs) for name simplicity and cohesion with other local authority terminology.

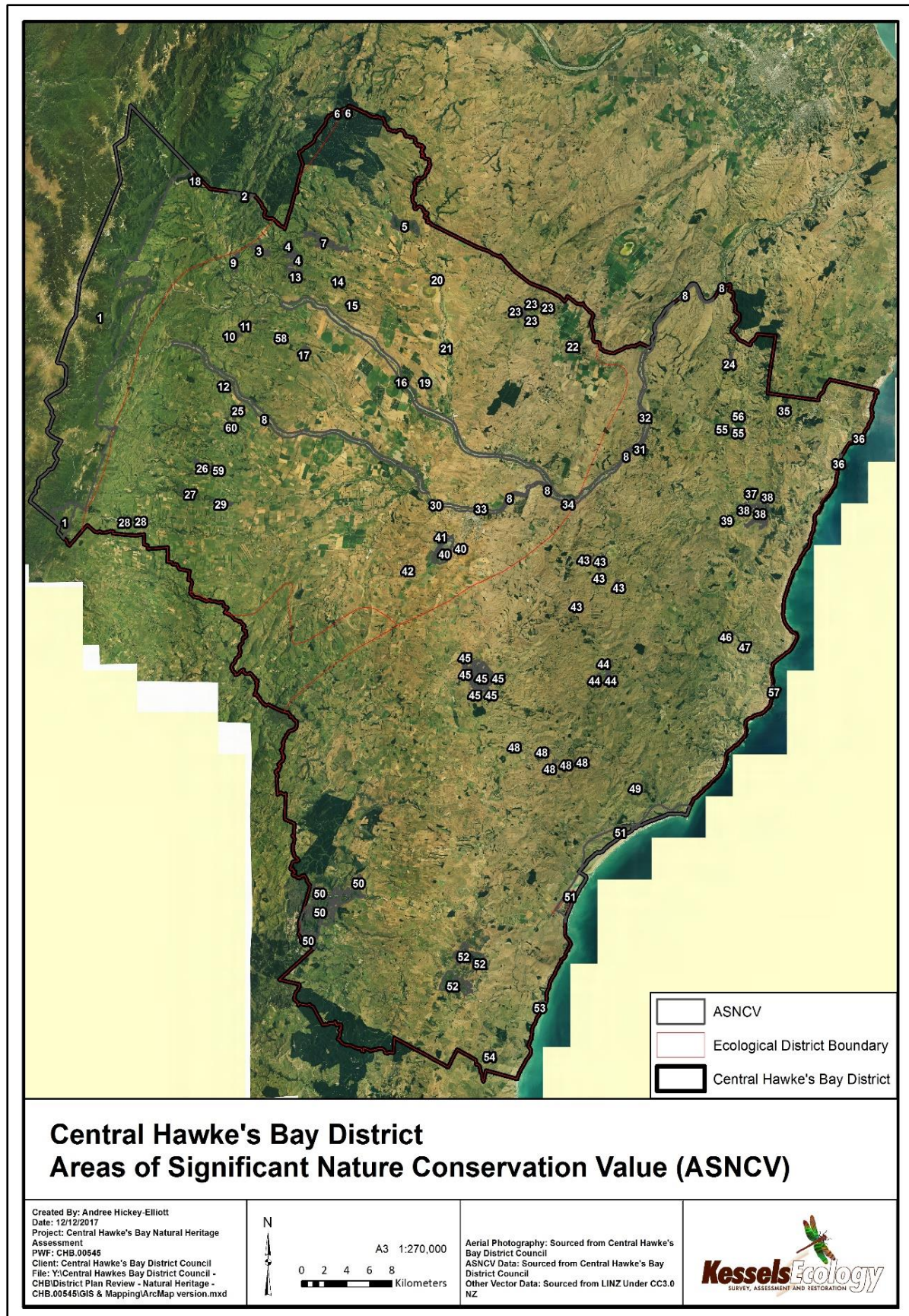


Figure 10. Overview of ASNCVs of CHBDC

Of the significant sites, the Heretaunga ED contains the most (32 sites), however, the Ruahine ED contains the highest area of coverage at 59%, due to the sizeable Ruahine State Forest Park (Table 16). Heretaunga and Eastern Hawke's Bay EDs had significant sites covering 3% of the land, and Puketoi the smallest ED contains no existing ASNCVs and therefore no reviewed significant sites.

Site boundaries were found to be variable in accuracy; recommended changes can be viewed in the supporting document containing site sheets. Many sites were found to include additional areas of vegetation which could be incorporated into the sites. It was also found that in many cases, the site was surrounded by other possibly significant areas, which require further attention.

Indigenous terrestrial vegetation was the most common type of significant site, with braided rivers following. Wetlands comprised few of the sites, with Lake Hatuma contributing the majority of significant freshwater/wetland site area.

The sites generally hadn't experienced significant observable changes since 2004-2005 (Google imagery backdating availability), with exception to site 45 and site 37. A search through time in Google Earth indicated site 45 had been impacted by herbicide, with large areas of the site affected. The Tukituki Characterisation Report (MWH, 2011) supported this, affirming that during a site visit, significant loss of vegetation due to aerial spraying had occurred. Site 37 has had drainage channels created, and this can also be viewed in Google Earth. Site sheets in the supporting document include images of those site changes.

Table 16. Significant sites by Ecological District.

Ecological Region	Ruahine	Hawke's Bay	Eastern Hawke's Bay	Pahiatua	Total Over District
Ecological District	Ruahine	Heretaunga	Eastern Hawke's Bay	Puketoi	
ED Area within Central Hawke's Bay (ha)	26,182	12,9925	170,136	6,693	332,936
Significant Reviewed Sites	4 (1 split)	32 (2 split)	20 (1 split)	0	54
Area of Significant Reviewed Sites (ha)	15,557	3,800	4,379	0	23,729
% of Significant Sites Area	59%	3%	3%	0	7

Confidence levels varied due to varied information available on a site by site basis. Generally confidence levels were high that site significance had been correctly determined, however some sites lacked information other than predicted vegetation, and so confidence was reduced (Table 17). Sites that were determined not likely to be significant, or were overlapping and required merging, were ranked as low confidence due to a lack of ground truthing, and site visits are recommended before any site is officially removed/ranked insignificant. Further information of how confidence levels were defined can be found in Appendix IV.

Table 17. Confidence levels of reviewed ASNCVs.

Confidence Level	High	Medium	Low	Not Likely Significant/Merged - Low
No. of Sites	40	8	6	8

Twenty six of the 54 significant sites had some form of legal protection, these sites and their protection type are listed in Table 18. Twenty of the sites with protection were government

forms, such as Stewardship Areas, six were QEII National Trust Open Space private land covenants, and one Nga Whenua Rahui Kawenata covenant.

While near half of the sites have some form of protection, the majority is based on public land, indicating landholder engagement on private sites may require further involvement to improve protection of significant sites.

Table 18. Significant sites with some form of legal protection within CHBDC.

Site No.	Site Name	Form of Protection
1	Ruahine State Forest Park	Conservation Park - s.19 Conservation Act 1987
2	Gwavas Conservation Area	Stewardship Area - s.25 Conservation Act 1987
8	Tukituki River	Some Under Stewardship Area
15	Te Pah	Most under QEII
16	Waipawa River	Some Under Fixed Marginal Strip - s.24(3) Conservation Act 1987
18	Makaro Rive Margin	Conservation Park - s.19 Conservation Act 1987
20	Mangaonuku Stream No. 1	Fixed Marginal Strip - s.24(3) Conservation Act 1987
21	Mangaonuku Stream No. 2	Fixed Marginal Strip - s.24(3) Conservation Act 1987
22	Otane Wildlife Reserve	Government Purpose Reserve - s.22 Reserves Act 1977
28	Makaretu River	Fixed Marginal Strip - s.24(3) Conservation Act 1987
29	Mangatewai Scenic Reserve	Scenic Reserve - s.19(1)(a) Reserves Act 1977
35	Paeroa	Part QEII
36	Kairakau Beach	Part Nga Whenua Rahui kawenata
40	Lake Hatuma	Some Stewardship Area - s.25 Conservation Act 1987
41	Hatuma Conservation Area	Stewardship Area - s.25 Conservation Act 1987
43	Mangarouhi Stream	Some QEII
44	Bush Trig	Some QEII
48	Huatokitoki Stream	Some QEII, Some Scenic Reserve - s.19(1)(a) Reserves Act 1977
51	Porangahau	Small Area Stewardship Area - s.25 Conservation Act 1987
54	McLeans Bush	Scenic Reserve - s.19(1)(a) Reserves Act 1977
55	Elsthorpe Reserve	Scenic Reserve - s.19(1)(a) Reserves Act 1977
58	Springhill Bush	Scenic Reserve - s.19(1)(a) Reserves Act 1977
59	Monckton Reserve	Scenic Reserve - s.19(1)(a) Reserves Act 1977
60	A'Deanes Bush	Scenic Reserve - s.19(1)(a) Reserves Act 1977
61	Inglis Bush	Scenic Reserve - s.19(1)(a) Reserves Act 1977
62	Horseshoe Lake	QEII

6.3 Ecosystem Composition Analysis

From the reviewed sites of significance, there were 25 different ecosystem types/vegetation types present (Table 19). These sites were compared against the Hawke's Bay Regional Council (HBRC) dataset of vegetation types to determine the site's closest fit to predicted vegetation types.

From the sites reviews, it was noticed that many sites predicted to be rimu/tawa-kamahi forest were in fact other vegetation types, meaning this Acutely Threatened vegetation type may retain less than the predicted 5 % within the district, while other vegetation types may potentially retain slightly more, in particular podocarp; presumed locally extinct.

Table 19. Ecosystem/vegetation type of significant sites within CHB district.

Type	Area (ha)	No of Sites	Match to HBRC Ecosystem/ Vegetation Type	Threat Status
Beech - podocarp - small-leaved	29	1	Podocarp/black/mountain beech forest	Acutely Threatened
Beech - broadleaved - podocarp	34	1	Podocarp/black/mountain beech forest	Acutely Threatened
Black beech	46	1	Podocarp/black/mountain beech forest	Acutely Threatened
Black beech - podocarp - broadleaved forest	509	1	Podocarp/black/mountain beech forest	Acutely Threatened
Broadleaved - beech	26	1	Hall's totara/silver beech-kamahi forest	Acutely Threatened
Broadleaved -small leaved	574	5	Hall's totara/silver beech-kamahi forest	Acutely Threatened
Broadleaved - podocarp	133	4	Podocarp/broadleaved forest	Acutely Threatened
Podocarp - broadleaved	650	17	Podocarp/broadleaved forest	Acutely Threatened
Podocarp / black beech	82	1	Podocarp/black/mountain beech forest	Acutely Threatened
Podocarp/ broadleaved- black beech forest	36	1	Podocarp/black/mountain beech forest	Acutely Threatened
Podocarp forest; mountain beech & red beech forest; scrub, tussock-grassland and herbfields	4622; 8254; 2642	1	Podocarp forest; mountain beech-red beech forest; scrub tussock-grassland and herbfields	Acutely Threatened; Less Reduced, Better Protected; At Risk
Podocarp/ broadleaved- beech forest	40	2	Podocarp/kamahi-beech forest	Less Reduced, Better Protected
Podocarp	12	2	Podocarp forest	Acutely Threatened
Podocarp - beech	35	1	Podocarp/black/mountain beech forest	Acutely Threatened
Podocarp - small-leaved - broadleaved	75	1	Podocarp/broadleaved forest	Acutely Threatened
Small-leaved - broadleaved - beech	1000	1	Manuka/kanuka, podocarp/kamahi-beech forest	N/A, Less Reduced, Better Protected
Small-leaved scrub and flaxland	46	1	Manuka/kanuka scrub	N/A ~2% landcover in district
Small leaved scrub (manuka/kanuka)	28	2	Manuka/kanuka scrub	N/A ~2% landcover in district

Type	Area (ha)	No of Sites	Match to HBRC Ecosystem/ Vegetation Type	Threat Status
Coastal vegetation	22	1	N/A	
Scrub/rush wetland	27	1	Wetland	Acutely Threatened
Willow wetland	93	2	Wetland	Acutely Threatened
Shingle/braided river bed	3,262	2	N/A	
Coastal vegetation and estuarine /river mouth	1,198	1	N/A	
Lake	251	2	N/A	
Exotic	3	1	Exotic	
Total	23,729	54		

From the sites that were fitted to HBRC ecosystem/vegetation types, eight of the HBRC ecosystem/ vegetation were present. From this, it can be estimated that approximately 14,045 ha are of an Acutely Threatened ecosystem/vegetation type, and approximately 3,518 ha is of an At Risk ecosystem/vegetation type (Table 20). As the sites have been assigned HBRC dataset vegetation / ecosystem type categories in 'best fit' the results can only be considered estimates.

Table 20. Area of significant sites matching HBRC ecosystems (from site reviews).

Match of Significant sites to HBRC Dataset	Threat Status	Area (ha)
Mountain beech-red beech forest	Less Reduced, Better Protected	8254
Podocarp/black/mountain beech forest	Acutely Threatened	854
Hall's totara/silver beech-kamahi forest	Acutely Threatened	599
Podocarp/broadleaved forest	Acutely Threatened	209
Podocarp forest	Acutely Threatened - Presumed locally extinct	4634
Scrub tussock-grassland and herbfields	At Risk	2642
Podocarp/kamahi-beech forest	Less Reduced, Better Protected	1040
Manuka/kanuka scrub	N/A ~2% District Landcover	73
Wetland	Acutely Threatened	120

6.4 Limitations of the Assessment

As there are currently no 'significance criteria' recommended by the Hawke's Bay Regional Council, other District Council and Regional Council criteria were reviewed and the criteria used in this project derived from external bodies' criteria. While the criteria have been selected in order to cover all valuable biodiversity aspects, the use of other criteria from other regions and districts may allow for potential gaps specific to Central Hawke's Bay District sites. To minimise any gaps, multiple Council's criteria were reviewed and used in Central Hawke's Bay significance criteria derivation.

The review of existing ASNCV sites and that of the natural heritage of the Central Hawke's Bay occurred through desktop analysis, with very little to no ground truthing carried out. Many information sources were used in compiling information on each site, including geospatial information through ArcGIS, the BioWeb Database, the New Zealand Freshwater Fish

Database, HBRC threatened bird habitat data, recent and past reports on sites including the DOC Conservancy Report (1987), the Tukituki Characterisation Report (MWH, 2011), as well as local expert knowledge. With the use of google earth, the aforementioned information, and searching sites online, it is expected that the information provided can conclude generally valid and accurate information for site analysis. Ground truthing was not carried out due to time constraints, however many sites have been previously visited and therefore this information was weighted heavier where considered to be reported by a reputable source.

Some layers providing information on sites, such as the HBRC dataset, relied on predicted vegetation coverage through analysis of climatic variables, soil variables, along with many others, and therefore acts only as an indicator of likely present vegetation. Due to the noticeable variation between predicted vegetation, and vegetation confirmed present, it is noted that the source cannot be heavily relied on to inform vegetation type, and therefore vegetation type of sites reviewed was considered based on multiple sources.

The accuracy of the spatial boundaries of the sites in the data set is dependent on the data from which the boundaries are derived, with ground truthing being the ultimate method to ensure a high level of accuracy. Aerial photo base spatial analysis is limited by the date of the photo, the resolution of the photo and the ability of the assessor to determine the vegetation types presented. In general, the positional accuracy of aerial photography can be considered to be at worst within +/- 30 m.

This inventory includes mostly areas comprising indigenous terrestrial and freshwater wetland vegetation, but also areas with a mixture of exotic and indigenous vegetation which provide habitat for indigenous fauna species. As a consequence, it is important to recognise that just because an area is largely dominated by exotic vegetation does not necessarily mean it does not provide significant habitat values for indigenous fauna or flora species. These values may not be readily apparent when looking at maps or spatial data alone.

Many sites that were not existing ASNCV sites were noticed during the review process. The HBRC dataset vegetation maps provide an overview of likely indigenous vegetation, and also shows the existing ASNCV sites, often with close proximity to other potentially significant sites which have not been assessed. Due to the scope within this project, it was not possible to isolate and assess these potentially significant sites, however, where possible, sites with continuity with existing significant sites were suggested for inclusion through boundary adjustments. Many of the potentially significant sites remaining unassessed would likely be considered significant due to meeting one or more of the significance criteria established, and the criteria could be used to identify these sites, though ground-truthing would likely be more crucial for accuracy.

7 Conclusions

This assessment provides data and an assessment of the Areas of Nature Conservation Value sites within the Central Hawke's Bay District which will assist the District Council in the development of policies, incentives and rules in relation to their obligations of the Resource Management Act as part of the Proposed District Plan development. In addition, the dataset and management recommendations can provide strategic direction for restoration of the reviewed significant sites, as well as provide guidelines for future assessments.

To determine whether a site was significant it was assessed against the five derived significance criteria created for the Central Hawke's Bay District Council, based on reviewed alternative criteria of other regions and districts.

Nationally Threatened Environments within the District were identified using the Threatened Environment Classification developed by Landcare Research (LENZ). The first five categories are referred to as "Threatened Environments", whereas category six is considered "Not-Threatened". The vast majority of land in the District is categorised as "Threatened" (>92%), and only a small portion is considered "Not-Threatened" (~8%).

A total of 46 confirmed Threatened and At Risk species, including flora, and fauna species have been recorded present in the CHB. The threat status of species is important and has had a significant bearing on the significance assessment. For example, the long-tailed bat is ranked at a Nationally Vulnerable threat status meaning that an SNA where this species has been found and was considered to use the site on a regular basis was considered significant. However, many species, such as N.Z. kākā and N.Z. falcon, are highly mobile and have large territories and vast home ranges. It is therefore difficult to predict where these species may utilise suitable habitats throughout a year, so habitat utilisation is probably much broader than specific points in time as shown on a static database, which made the use of the HBRC threatened bird habitat data especially valuable.

As a consequence of this study, the 62 existing ASNCV sites were assessed, with 54 sites identified as significant (proposed SNAs), comprising an extent of 23,729 ha. Therefore, approximately 7% of the District consists of significant sites and much of this is protected land within the Ruahine Conservation Park. This is a very low amount compared to many other districts; for example, the recently reviewed Waikato District had a coverage of approximately 16.4% of the District. Very few natural features exist within the lowland, plain or coastal areas of the District where indigenous ecosystems are most threatened (based on LENZ TEC assessment).

Much indigenous vegetation recognised in the HBRC dataset (adjusted LCDB3) has not been previously assessed or listed within the ASNCV sites. These areas will require further investigation, and could be evaluated against the significance criteria developed for the review of the ASNCV sites.

8 Recommendations

The management of significant sites (proposed to be termed 'Significant Natural Areas' - SNA), and potential significant sites, should align with the Hawke's Bay Regional Council Biodiversity Strategy.

The findings of this report suggest further work is required, and highlights the importance of remaining indigenous vegetation, both existing significant sites, and currently unassessed sites. The following points highlight the key recommendations from the findings of the report.

- Further assessment requirements:

Site investigation: rapid site validation (vegetation validation) visits are recommended for existing sites listed as 'site visit recommended' in order to confirm or identify site characteristics/significance category.

Some sites such as braided/shingle rivers could be re-evaluated for extent and size/connectivity to ensure site coverage is appropriate for all CHB systems.

Further site assessments of any areas that may contain significant sites (draft SNA's), should be identified based on Hawke's Bay Regional Council (HBRC) dataset predicted vegetation layer, Freshwater Ecosystems of New Zealand (FENZ) wetland layer/ BioWeb Database records, and assessed using the significance criteria detailed in this report (site minimum of 0.5 ha). Such sites would require ground-truthing.

- Policy recommendations:

Key threats to sites are considered in policy: stock damage, pest animal damage, vegetation clearance, and invasive weeds.

Conservation lot provisions could be considered in policy as an incentive for landholders to work on management of identified and potential significant sites (draft SNA's).

The Council should continue to support and implement robust policy on indigenous vegetation clearance, as little remaining indigenous vegetation remains in the District. The Council should also consider policy on fencing and stock management as the impacts of stock on isolated indigenous habitats contained on agricultural land can be detrimental.

The Council should also consider policy on land drainage that may 'have an impact on a waterbody or wetland which qualifies as significant based on the proposed criteria.' It may also be prudent to include a blanket policy of prohibited drainage that may affect wetlands or waterbodies which are over 0.5 ha, to avoid drainage or hydrological change to wetlands not yet assessed.

The Council should consider policy on forestry harvesting techniques and requirements to minimise damage to indigenous vegetation, and consider long-tailed bat potential roosts if possible.

- Management recommendations:

Management prioritisation of sites that are within the top three most at risk Threatened Environment Classes, or sites which provide habitat for nationally At Risk / Threatened species. Sites qualifying based on size or with fewer of these qualifying criteria should be of lower comparative priority.

The management of significant sites should align with Regional Council plans, strategy and projects where appropriate to promote the coordination, and therefore, pooling of resources in order to maximise potential biodiversity gains.

Provisions to improve the linkages and corridors between sites would be of significant value in improving the self-sustainability of the sites, while some sites could be merged and expanded, others could require more significant management actions to promote linkages with other natural areas.

Landowner consultation: contact, discussion, education and incorporation of landholders could be significantly beneficial for biodiversity values. Renewing knowledge and enthusiasm of stakeholders with privately owned sites can lead to improved biodiversity outcomes and lower inputs required by the Council long-term.

Once further investigations have been made into potential and existing sites requiring site visits, a combination of prioritisation of sites and landowner engagement may initiate further management adaptations.

Acknowledgements

This natural heritage assessment relies heavily on the personal experience and knowledge of a number of key people as well as institutional knowledge. Consequently, a large number of people assisted with this project, including staff from Central Hawke's Bay District Council, Hawke's Bay Regional Council, and local experts. Many thanks for your help and sharing of knowledge.

From Hawke's Bay Regional Council, the always patient and friendly help of Keiko Hashiba is gratefully acknowledged.

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Local experts consulted for additional information included John Cheyne and Kay Griffith - thank you for your contribution.

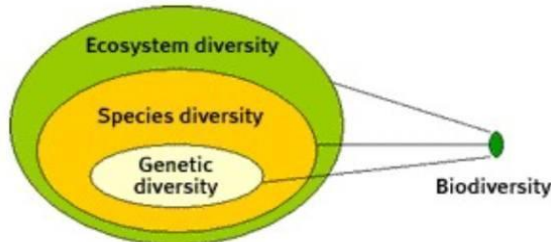
Glossary

At Risk: This means a species facing a longer-term risk of extinction in the wild (either because of severely reduced or naturally small population size or because the population is declining but buffered by either a large total population or a slow rate of decline) as identified in the New Zealand Threat Classification System lists.

Biodiversity (or biological diversity): Section 2 of the Resource Management Act 1991 (RMA) provides a definition for biodiversity: "the variability among living organisms, and the ecological complexes of which they are a part, including diversity within species, between species, and of ecosystems"; and/or is simply a way of defining the variety of life on Earth. This includes the different:

- types of animals, birds, fish, insects, plants, bacteria and other species;
- characteristics within a species, for example, how one giant skink differs from another;
- ways species live together, for example, how wood pigeons help to sow seeds;
- types of places species live together, for example, kauri forest or streams;
- ways in which species interact with their environment, for example, kahikatea forest likes to be seasonally flooded. the composition and abundance of species and communities in an ecosystem; and
- 'engines' that makes ecosystems work; e.g. the energy links which drive the interactions between trees, insects, birds and fish.

Biodiversity can be represented at three different levels as shown below:



(from MfE web site, 2003)

Biodiversity is also about New Zealand's biological wealth. Much of our economy is based on the use of biological resources and we benefit from the "services" provided by healthy ecosystems. These include providing raw materials, purifying water, decomposing waste, cycling nutrients, creating and maintaining soils, and regulating climate.

Ecology: (from Greek: οἶκος, oikos, "house, household, housekeeping, or living relations"; -λογία, -logia, "study of") Ecology is the interdisciplinary scientific study of the interactions between organisms and the interactions of these organisms with their environment.

Ecological District: A local part of New Zealand where the features of geology, topography, climate and biology, plus the broad cultural pattern, inter-relate to produce a characteristic landscape and range of biological communities unique to that area. In New Zealand, 268 Ecological Districts have been identified and mapped (at 1:500,000 scale; McEwen, 1987).

Ecosystems: Are communities of living things (animals, plants, fungi, bacteria and other micro-organisms) that interact with each other and their physical environment (soil, rock, minerals, air, water, temperature, salinity). The roles of the animals and plants, and their abundance, are inseparably bound up with the numbers of other organisms and the amounts of materials available, and with the kinds of physical forces acting at any time. There are ceaseless exchanges of materials, and of energy between living things and their environment, following cyclic pathways which are perpetually repeated, for example the carbon and nitrogen cycles. These cycling systems are characteristic of ecological systems, or ecosystems for

short; and/or an interacting system of living and non-living parts such as sunlight, air, water, minerals and nutrients. Ecosystems can be small and short-lived, for example, water-filled tree holes or rotting logs on a forest floor, or large and long-lived such as forests or lakes.

Endemic species: An endemic species is one that exists naturally in a particular environment or location (e.g. New Zealand), and does not exist naturally anywhere else.

Exotic species/Introduced species: A plant or animal species that has been brought to New Zealand by humans, either by accident or design. A synonym is 'Introduced species'.

Ground truthing: Undertaking a site visit of a natural feature to assess its ecological values, as well as to verify if what was found in literature and relevant databases is reflected on the ground.

Habitat: A habitat (which is Latin for "it inhabits") is an ecological or environmental area that is inhabited by a particular animal and plant species. It is the natural environment in which an organism lives, or the physical environment that surrounds (influences and is utilized by) a species population.

Indeterminate: Not able to be determined, defined or described accurately due to a lack of information.

Indigenous species: A plant or animal species that occurs naturally without the assistance of humans in New Zealand. A synonym is 'native'.

Indigenous vegetation: Any local indigenous plant community containing throughout its growth the complement of native species and habitats normally associated with that vegetation type or having the potential to develop these characteristics. It includes vegetation with these characteristics that has been regenerated with human assistance following disturbance, but excludes plantations and vegetation that have been established for commercial purposes.

Protected: This means the site is on private and/or public land and/or water that is legally protected by statute or covenant (e.g. under the Conservation Act 1987, Reserves Act 1977, etc.) and/or other type of legal protection. A list and categorisation of protection types that were applied for the Waikato SNA is included in Appendix III.

SNA: The short term for Significant Natural Areas. SNA means "...areas of significant indigenous vegetation and significant habitats of indigenous fauna" as defined in (Section 6(c) of RMA).

Terrestrial ecosystems: Terrestrial ecosystems can be defined in the most general of terms as the various communities of organisms that inhabit the land in interaction with their environment. In the context of this project, terrestrial ecosystem types are permanently or intermittently dry areas with emergent vegetation dominated by forest, scrub and/or shrubland, or tussock land.

Threatened Species: A species faces a very high risk of extinction in the wild and includes nationally critical, nationally endangered and nationally vulnerable species as identified in the New Zealand Threat Classification System lists.

Threat Status: National Threat classification systems for ranking threatened species.

Unprotected: This means the site is on private and/or public land and/or water where there is no legal protection status. If it is unknown whether they are protected or not, then it is "indeterminate"

Wetland: Permanently or intermittently wet areas, shallow water and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions (Resource Management ACT 1991). The vegetation may be exotic and/or native woody plants such as willows or manuka, and/or herbaceous plants such as sedges, rushes, raupo (*Typha*), or mosses such as Sphagnum. "Willow wetlands" are wetland areas with a canopy dominated by exotic willows, but often contain native vegetation beneath the willows.

Definitions are primarily sourced from:

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Ministry for the Environment & Department of Conservation. 2011. *Proposed National Policy Statement on Indigenous Biodiversity*. Retrieved from <http://www.mfe.govt.nz/publications/biodiversity/indigenous-biodiversity/proposed-national-policy-statement/index.html>

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APPENDIX I - REVIEWED ALTERNATIVE SIGNIFICANCE CRITERIA

Hastings District Council

The following has been extracted from Section 17.1.3 the Hastings District Plan:

Policy LSP1

To identify and recognise the Districts Outstanding Natural Features and Landscapes by the following criteria, factors, values and associations:

Natural Science Factors

- (i) **Representativeness**
Natural features and landscapes are clearly and recognisably characteristic of the area, district or region. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character exceptionally and in essence. Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.
- (ii) **Research and Education**
Natural features and landscapes are valued for the contribution they make to research and education.
- (iii) **Rarity**
Natural features are unique or rare in the district, region or nationally, and few comparable examples exist.

Aesthetic Value

- (iv) **Coherence**
The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.
- (v) **Vividness**
Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes are symbolic of an area due to their recognisable and memorable qualities.
- (vi) **Naturalness**
Natural features and landscapes appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.
- (vii) **Intactness**
Natural systems are intact and aesthetically coherent and do not display significant visual signs of human influence, modification, intervention or manipulation.

Expressiveness (Legibility)

Natural features and landscapes clearly demonstrate the natural processes that formed them. Exceptional examples of natural process in landscape exemplify the particular processes that formed that landscape.

Transient Values

The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) contributes exceptionally to the character, qualities and values of the landscape. Landscapes are widely recognised for their transient features and the contribution these make to the landscape.

Shared and Recognised Values

Natural features and landscapes are widely known and exceptionally valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.

Mana Whenua Values

Natural features and landscapes are clearly special or widely known and exceptionally influenced by their connection to the Maori values inherent in the place.

Historical Associations

Natural features and landscapes are clearly and widely known and exceptionally influenced by their connection to the historical values inherent in the place.

Waikato Regional Council

The following has been extracted from the WRC RPS Section 11A:

Previously assessed site	
1.	It is indigenous vegetation or habitat for indigenous fauna that is currently, or is recommended to be, set aside by statute or covenant or by the Nature Heritage Fund, or Nga Whenua Rahui committees, or the Queen Elizabeth the Second National Trust Board of Directors, specifically for the protection of biodiversity, and meets at least one of criteria 3-11.
Ecological values	
2A	In the coastal environment, it is indigenous vegetation or habitat that has reduced in extent or degraded due to historic or present anthropogenic activity to a level where the ecological sustainability of the ecosystem is threatened.
3.	It is vegetation or habitat for indigenous species or associations of indigenous species that are: classed as threatened or at risk, or endemic to the Waikato region.
4.	It is indigenous vegetation or habitat type that is under-represented (20% or less of its known or likely original extent remaining) in an Ecological District, or Ecological Region, or nationally.
5.	It is indigenous vegetation or habitat that is, and prior to human settlement was, nationally uncommon such as geothermal, chenier plain, or karst ecosystems, hydrothermal vents or cold seeps.
6.	It is wetland habitat for indigenous plant communities and/or indigenous fauna communities (excluding exotic rush/pasture communities) that has not been created and subsequently maintained for or in connection with: waste treatment; wastewater renovation; hydro electric power lakes (excluding Lake Taupō); water storage for irrigation; or water supply storage; unless in those instances they meet the criteria in Whaley et al. (1995).
7.	It is an area of indigenous vegetation or naturally occurring habitat that is large relative to other examples in the Waikato region of similar habitat types, and which contains all or almost all indigenous species typical of that habitat type.
8.	It is aquatic habitat (excluding artificial water bodies, except for those created for the maintenance and enhancement of biodiversity or as mitigation as part of a consented activity) that is within a stream, river, lake, groundwater system, wetland, intertidal mudflat or estuary, or any other part of the coastal marine area and their margins, that is critical to the self-sustainability of an indigenous species within a catchment of the Waikato region, or within the coastal marine area. In this context "critical" means essential for a specific component of the life cycle and includes breeding and spawning grounds, juvenile nursery areas, important feeding areas and migratory and dispersal pathways of an indigenous species. This includes areas that maintain connectivity between habitats.
9.	It is an area of indigenous vegetation or habitat that is a healthy and representative example of its type because: its structure, composition, and ecological processes are largely intact; and if protected from the adverse effects of plant and animal pests and of adjacent land and water use (e.g. stock, discharges, erosion, sediment disturbance), can maintain its ecological sustainability over time.
10.	It is an area of indigenous vegetation or habitat that forms part of an ecological sequence, that is either not common in the Waikato region or an ecological district, or is an exceptional, representative example of its type.
Role in protecting ecologically significant area	
11.	It is an area of indigenous vegetation or habitat for indigenous species (which habitat is either naturally occurring or has been established as a mitigation measure) that forms, either on its own or in combination with other similar areas, an ecological buffer, linkage or corridor and which is necessary to protect any site identified as significant under criteria 1-10 from external adverse effects.

Horizons

The following is extracted from the Horizons Oneplan Schedule F:

Table F.2(a):

An area of any habitat type described in Table F.1 must meet at least one of the following criteria that apply to the relevant habitat type before it qualifies as a *rare habitat**, *threatened habitat** or *at-risk habitat** for the purposes of this Plan.

Forest*, Treeland*, Scrub* or Shrubland* Habitat Types Classified as Threatened or At-risk

i. Areas of *continuous* indigenous** vegetation where:

- (a) if it is habitat type classified as Threatened then the habitat must cover at least 0.25 ha, or
 - (b) if it is habitat type classified as At-risk then the habitat must cover at least 0.5 ha where:
 - 1. it supports *indigenous** understorey vegetation, or
 - 2. it is present within a gully system, or
 - (c) if it is habitat type classified as At-risk the habitat must cover at least 1 ha unless (b) above applies.
- Or

ii. Areas of *discontinuous* indigenous** vegetation where:

- (a) if it is habitat type classified as Threatened where it occurs as *treeland** it covers at least 1 ha, or
- (b) if it is habitat type classified as At-risk where it occurs as *treeland** it covers at least 2 ha, or
- (c) if it is habitat type classified as either Threatened or At-risk other than *treeland** it covers at least 1 ha except if it is present within 50 m of an area of *continuous* indigenous** vegetation it covers at least 0.5 ha.

Or

iii. Areas containing *Olearia gardnerii*, *Pittosporum obcordatum*, *Coprosma obconica*, *Coprosma wallii*, *Melicytus flexuosus*, *Pseudopanax ferox* or *Discaria toumatou* covering at least 0.1 ha.

Or

iv. An area of *indigenous** vegetation of any size containing *Powelliphanta* land snails.

Or

v. An area of *woody vegetation** of any size or species composition (including exotic vegetation) within 20 m landwards from the top of the *river*[^] bank adjacent to an area identified in Schedule B as being a Site of Significance - Aquatic.

Or

vi. Areas of *indigenous** vegetation that have been established for the purpose of habitat manipulation including habitat creation, restoration and buffering, where such an area covers at least 1 ha as a discrete *site** or at least 0.5 ha where it is adjacent to an existing area of *indigenous** habitat.

Or

Tussockland* Habitat Type Classified as At-risk

vii. An area of *indigenous* tussockland** covering at least 0.5 ha.

Or

Wetland[^] Habitat Types Classified as Threatened

viii. Areas of naturally occurring *indigenous* wetland[^]* habitat covering at least 0.1 ha.

Or

ix. Areas of *indigenous** vegetation that have been established in the course of *wetland[^]* habitat restoration.

Or

x. Areas of artificially created *indigenous* wetland[^]* habitat covering at least 0.5 ha.

Or

Naturally Uncommon Habitat Types and Wetland[^] Habitat Types Classified as Rare

xi. Habitat type that is classified as Rare that covers at least 0.05 ha.

Or

- xii. Areas of *indigenous** habitat created at some time in the course of dune habitat restoration (including dune stabilisation).

Table F.2(b):

If an area of any habitat type described in Table F.1 meets any of the following criteria it must not be *rare habitat**, *threatened habitat** or *at-risk habitat** for the purposes of this Plan.

***Forest**, *Treeland**, *Scrub**, or *Shrubland** Habitat Types Classified as Threatened or At-risk**

- i. Areas of *indigenous** *tree** species planted for the purposes of timber harvest.

Or

- ii. *Indigenous** vegetation planted for landscaping, horticultural, shelter belts, gardening or amenity purposes.

Or

***Wetland** Habitat Types Classified as Rare or Threatened**

- iii. Damp gully heads, or paddocks subject to regular ponding, *dominated** by pasture or exotic species in *association** with *wetland** sedge and rush species.

Or

- iv. Ditches or drains supporting raupo, flax or other wetland species (eg., *Carex* sp., *Isolepis* sp.), or populations of these species in drains or slumps associated with road reserves or rail corridors.

Or

- v. Areas of *wetland** habitat specifically designed, installed and maintained for any of the following purposes:

(a) stock watering (including stock ponds), or

(b) *water** storage for the purposes of fire fighting or irrigation (including old gravel pits), or

(c) treatment of animal effluent (including pond or barrier ditch systems), or

(d) wastewater treatment, or

(e) sediment control, or

(f) any hydroelectric power generation scheme, or

(g) *water** storage for the purposes of *public water supplies**.

Or

- vi. Areas of *wetland** habitat maintained in relation to the implementation of any *resource consent** *conditions** or agreements relating to the *operation** of any hydroelectric power scheme currently lawfully established.

Or

- vii. Open *water** and associated vegetation created for landscaping purposes or amenity values where the planted vegetation is predominately 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**.

***Tussockland** Habitat Type Classified as At-risk**

- viii. Red tussock regenerating through pasture dominated by exotic grass species.

APPENDIX II - CRITERIA FOR THE ASSESSMENT OF SIGNIFICANCE OF NATURAL AREAS

Significance Criteria: Site must meet one or more of the following criteria:	
1	Site contains underrepresented indigenous ecosystem/vegetation type (HBRC dataset <30% remaining is underrepresented)
2	Site contains indigenous dominated vegetation on land of a Threatened Environment Class from 1-5
3	Site is habitat / a migratory pathway for At Risk or Threatened indigenous fauna or flora, which is regularly utilised
4	Site contains a rare ecosystem type (e.g. braided river, wetland)
5	Site represents large example of indigenous vegetation (>20 ha)

APPENDIX III - TYPES OF LEGAL PROTECTION

This appendix lists the possible legal mechanisms, or types of legal protection that have been applied to protect natural areas within the Central Hawke's Bay District.

- Conservation Park
- Nature Reserve
- Scientific Reserve
- Scenic Reserve
- Conservation Park
- Wilderness Area
- Ecological Area
- Sanctuary Area
- Watercourse Area
- Wildlife Management Reserve / Government Purpose Reserve (Wildlife Management)
- Wildlife Refuge / Government Purpose Reserve (Wildlife Refuge)
- Wildlife Reserve / Government Purpose Reserve (Wildlife Reserve)
- Wildlife Sanctuary / Government Purpose Reserve (Wildlife Sanctuary)
- Nga Whenua Rahui Kawenata Covenant
- QEII Open Space Covenant
- Stewardship Area / Conservation Area
- Recreation Reserve
- Sanctuary Area
- Watercourse Area
- Historic Reserve
- Marginal Strip
- Local Purpose Reserve (Esplanade)

APPENDIX IV - CONFIDENCE LEVELS FOR SIGNIFICANT NATURAL AREA ASSESSMENTS

The following table is adapted from Wildland Consultants Contract Report No. 1080 (DOC# 1396563). It lists the definitions and factors that are considered when applying a Confidence Level to the significance assessment of a site.

Confidence Level	Definition
High	<p>High level of confidence in assessment.</p> <p>Ecological information about the site is:</p> <ul style="list-style-type: none"> Comprehensive Reliable Applicable and/or recent Site specific <p>Sites with a high confidence rating include:</p> <ul style="list-style-type: none"> Relatively large, well-studied, protected areas e.g. Whareorino Forest. Protected areas that are well known as habitats for threatened species, e.g. Mahoenui giant weta Scientific Reserve, Mapara Scenic Reserve (a habitat for kokako). Unprotected sites that have been identified as recommended areas for protection in a protected natural areas survey. Other sites that have been the subject of fauna and/or flora surveys and the information is comprehensive, reliable, recent and site-specific. <p>Sites with a high confidence level generally have a low requirement for field survey.</p>
Medium	<p>Moderate level of confidence in assessment.</p> <p>Ecological information about the site is:</p> <ul style="list-style-type: none"> Relatively comprehensive Reliable Not entirely applicable/ recent More likely to be general than site-specific, e.g. the information applies to a larger tract of indigenous vegetation, of which the site is a relatively small part. <p>Sites with a moderate confidence rating include:</p> <ul style="list-style-type: none"> Sites where the assessment is based on ecological information that does not meet all of the criteria for a high confidence level. Sites that are contiguous with a site that has a high confidence level, and information about the contiguous site is assumed to be applicable to the site that is being assessed. Sites that have been recognised on the basis of a record of a single species without meeting other criteria. Sites for which incomplete ecological information exists, and for which targeted surveys may result in records of threatened species. <p>Sites with a medium confidence level generally have a requirement for field survey.</p>
Low	<p>Low level of confidence in the assessment.</p> <p>Ecological information about the site is not available or is:</p> <ul style="list-style-type: none"> Not comprehensive Unreliable Out-dated General <p>Sites with a low confidence rating include:</p> <ul style="list-style-type: none"> Very small protected sites e.g. marginal strips. Unprotected sites within ecological districts where a protected natural areas survey has not been undertaken. Sites that have met criteria for significance, solely on the basis of a record of a species (e.g. kiwi, kokako) that is probably extinct at the site. <p>Sites with a low confidence level have a high requirement for field survey.</p>

APPENDIX V - ASNCV SITE REVIEW SUMMARIES

Site Number	Site Name	Eco District	Ownership	Site Description (Reviewed)	Size (ha)	Site Significant	Criteria Met	Site Confidence	Visit required	Boundary adjustment	Reviewed Size (ha)
1	Ruahine State Forest Park	R	Crown	Lowland mixed podocarp forest +scrub tussock grassland and herbfields	15517.87	Yes	1, 3, 4, 5	High	No	Recommended	16339.55301
2	Gwavas Conservation Area	R	Crown	Beech -podocarp - kanuka/manuka	29.1	Yes	3, 5	High	Yes	Recommended	917.0306729
3	Manaoho No. 2	H	Private (RAP 24 -H)	Black beech forest	45.51	Yes	2	High	No	Recommended	56.62280598
4	Manaoho No. 1	H	Private (RAP 26 -H)	Podocarp/ black beech forest	82.27	Yes	1, 5	Med	No	Recommended	112.2296291
5	Puahanui Bush	H	Private (RAP20 -H)	Podocarp - broadleaved forest	161.02	Yes	1, 2, 3, 5	High	No	Recommended	169.0303583
6	Poporangi Stream	R/H	Private (RAP 17 - H)	Podocarp - broadleaved -beech forest	1.44 R / 11.70 H	Yes	1,2	High	No	Recommended	41.53680156
7	Mangamauku Stream	H	Private (RAP 21 -H)	Podocarp - broadleaved forest	115.28	Yes	1,2, 5	High	No	Recommended	160.5518029
8	TukiTuki River	H/E	Crown (RAP 42- H) / 7 Private (RAP 35 -H)	Shingle / braided river	1444.6 H/ 642.52 E	Yes	3, 4, 5	High	No	Recommended	1755.202171
9	Smedley Bluffs	H	Private (RAP 25 - H)	Broadleaved - beech forest / treeland	25.67	Yes	1, 2,	Med	Yes	Recommended	52.8124333
10	Worsnops	H	Private (RAP 32- H)	Podocarp - broadleaved forest and treeland	19.1	Yes	1, 2,	High	No	Recommended	18.28106505
11	Condor	H	Private (RAP 31- H)	Podocarp - broadleaved forest	29.7	Yes	1, 2, 5	High	No	Recommended	27.17948427
12	Khyber Pass	H	Private (RAP 34 -H)	Podocarp forest	2.16	Yes	1, 2	Med	Yes	Recommended	1.622687975
13	Holden's No. 2	H	Private (RAP 27 -H)	Podocarp broadleaved forest & treeland	25.28	Yes	1, 2	High	No	Recommended	41.66764567
14	Holden's Bush	H	Private (RAP 28 -H)	Podocarp - broadleaved forest	4.6	Yes	1, 2	High	No	Recommended	5.882257488
15	Te Pah	H	Private (RAP 29 -H)	Podocarp - broadleaved forest	39.75	Yes	1, 2, 5	High	No	Recommended	46.98491914
16	Waipawa River	H	Crown	Shingle / braided river	1175.18	Yes	3, 4, 5	High	No	Recommended	1376.358517
17	Gunsons	H	Private (RAP 33 -H)	Podocarp - broadleaved forest	19.36	Yes	1, 2	High	No	Recommended	28.39366028
18	Bush Margin on Makaroro River	R	Crown	Broadleaved -kanuka treeland	8.25	Yes	1, 2	Low	Yes	Recommended	12.92017159

Site Number	Site Name	Eco District	Ownership	Site Description (Reviewed)	Size (ha)	Site Significant	Criteria Met	Site Confidence	Visit required	Boundary adjustment	Reviewed Size (ha)
19	Eastern Equities	H	Private (RAP 35 -H)	Kanuka treeland	11.77	Yes	1, 2	High	No	Recommended	10.99389097
20	Mangaonuku Stream No. 1 Marinal Strip	H	Crown	Riparian margin-Exotic	1.81	Not Likely		Low	Yes		4.556766184
21	Mangaonuku Stream No. 2 Marinal Strip	H	Crown	Riparian margin-Exotic	2.53	Yes	3	Med	Yes	Recommended	7.479929258
22	Otane Wildlife Reserve	H	Crown	Peat willow wetland	19.51	Yes	4	High	No	Recommended	69.41165316
23	Highfield	H	Private (RAP 30 – H)	Podocarp -broadleaved forest / treeland	49	Yes	1, 2, 5	High	No	Recommended	96.33842535
24	Silver Range	H	Private (Rap 8 - E)	Manuka scrub	15.76	Yes	1	Low	Yes	Recommended	6.867998243
25	Barnsdale	H	Private (RAP 36 - H)	Podocarp forest	10.15	Yes	1, 2, 3	High	No	Recommended	12.84329699
26	Herricks	H	Private (RAP37 -H)	Podocarp -beech forest and treeland	34.71	Yes	1, 2, 4, 5	High	No	Recommended	51.50474796
27	Mangatewai River	H	Private (RAP 38-H)	Beech -broadleaved -podocarp forest and treeland	34.31	Yes	1, 2, 3, 5	High	Yes	Recommended	37.41074345
28	Makaretu River	H	Private (RAP 39 –H)	Podocarp - broadleaved forest	21.01	Yes	1, 2	High	Yes	Recommended	28.1511452
29	Mangatewai Scenic	H	Crown (Scenic Reserve)	Podocarp- broadleaved - beech forest and treeland	27.33	Yes	1, 2, 5	High	No	Recommended	32.62908876
30	Tukituki River Lindsay Bush	H	Crown (Scenic Reserve)	Podocarp - broadleaved forest	12.2	Yes	1, 2, 3	High	No	Recommended	10.4748306
31	Tukituki River Marginal Strip	E	Crown	Exotic dominated	7.02	Not Likely, small area		Low	Yes	Recommended	3.365572301
32	Patangata Conservation Area	E	Crown (Conservation Area)	Pasture	1.88	Not likely		Low	Yes		
33	Ford Conservation Area	H	Crown (Conservation Area)	Pasture and housing	1.11	Not Likely		Low	Yes		
34	Mangatarata Conservation Area	H	Crown (Conservation Area)	mixed exotic and regenerating scrub	1.11	Part of site 8		Low	No	Merge into site 8	

Site Number	Site Name	Eco District	Ownership	Site Description (Reviewed)	Size (ha)	Site Significant	Criteria Met	Site Confidence	Visit required	Boundary adjustment	Reviewed Size (ha)
35	Paeroa	E	Private (RAP 10 – E)	Broadleaved - podocarp forest	29.27	Yes	1, 2, 5	High	No	Recommended	30.74158816
36	Kairakau Beach	E	Private (RAP 11- E)	Coastal vegetation	21.54	Yes	3	Low	Yes	Recommended	61.08681996
37	Motonui	E	Private (RAP 12 – E)	Scrub / rush wetland	26.97	Yes	4, 5	Low	Yes	Recommended	8.833123535
38	Waterfalls Stream	E	Private (RAP 13 – E)	Broadleaved small-leaved forest treeland and scrub	194.98	Yes	1, 2, 5	High	No	Recommended	299.4582151
39	Te Atua Trig	E	Private (RAP 14 – E)	Broadleaved small-leaved forest scrub	10.61	Yes	2	High	Yes	Recommended	10.15002235
40	Lake Hatuma	H	Crown / Private (RAP 41 – H)	Lake	201.74	Yes	3, 4, 5	High	No	Recommended	195.3777435
41	Hatuma Conservation Area	H	Crown (Conservation Area)	Willow wetland	73.9	Yes	3, 4, 5	High	No	Recommended	67.78036305
42	Hatuma Domain	H	Crown (Recreation Reserve)	Exotic grassland	5.53	Not Likely		Low	Yes		
43	Mangarouhi Stream-Waiwhero Stream	E	Private (RAP 15 – E)	Podocarp -broadleaved forest and treeland	40.48	Yes	1, 2, 3	High	No	Recommended	52.64069187
44	Bush Trig	E	Private (RAP 19 – E)	Broadleaved - podocarp forest and treeland	48	Yes	1, 2	High	No	Recommended	59.23620292
45	Motuotaria	E	Private (RAP 18 – E)	Broadleaved - small leaved forest and scrub	331.67	Yes	1, 2, 5	Med	No	Recommended	410.5549116
46	Roundway	E	Private (RAP 16 – E)	Broadleaved - podocarp forest and treeland	40.69	Yes	1, 2, 5	Med	Yes	Recommended	63.71162403
47	Pourere	E	Private (RAP 17 – E)	Broadleaved - podocarp forest and treeland	15.35	Yes	1, 2	Low	Yes	Recommended	13.48000755
48	Huatokitoki Stream	E	Private (RAP 20 – E)	Podocarp – small-leaved – broadleaved forest and treeland	75.23	Yes	1, 2, 3, 5	High	Yes	Recommended	64.43845548
49	Parimahu	E	Private (RAP 21 – E)	Broadleaved –small-leaved forest & treeland /scrub	28.09	Yes	1, 2, 5	High	Yes	Recommended	32.92847878
50	Te Tohe Stream	E	Private (RAP 23 – E)	Small-leaved –broadleaved –beech forest / scrub	999.97	Yes	1, 5	Med	No	Recommended	1562.688435
51	Porangahau	E	Private (RAP 22- E)	Costal vegetation and estuary/river mouth	1198.19	Yes	3, 5	High	No	Recommended	1911.134535

Site Number	Site Name	Eco District	Ownership	Site Description (Reviewed)	Size (ha)	Site Significant	Criteria Met	Site Confidence	Visit required	Boundary adjustment	Reviewed Size (ha)
52	Mangamaire Valley	E	Private (RAP 24 – E)	Black beech - podocarp – broadleaved forest	509.14	Yes	1, 2, 5	High	Yes	Recommended	1459.012826
53	Cook's Tooth Coastal Faces	E	Private (RAP 26 – E)	Small-leaved scrub and flaxland	45.71	Yes	1, 2, 5	Low	Yes	Recommended	111.43951
54	Mc Leans Bush Scenic Reserve	E	Crown (Scenic Reserve)	Podocarp - broadleaved forest	28.26	Yes	1, 2, 5	High	Yes	Recommended	40.71171197
55	Elsthorpe Scenic Reserve	E	Crown (Scenic Reserve)	Podocarp - broadleaved forest	35.73	Yes	1, 2	High	No	Recommended	36.81786597
56	Elsthorpe Domain Recreation Reserve	E	Crown (Recreation Reserve)	Exotic grassland	5.15	Not Likely		Low	Yes		
57	Pourerere Conservation Area	E	Crown (Conservation Area)	Impervious surfaces and exotic grassland	0.5	Not Likely		Low	Yes		
58	Springhill Bush Scenic Reserve	H	Crown (Scenic Reserve)	Podocarp-broadleaved forest	4.97	Yes	1, 2	High	No	Recommended	6.209941855
59	Monckton Reserve	H	Crown (Scenic Reserve)	Podocarp-broadleaved forest	16.03	Yes	1, 2	High	No	Recommended	41.26632357
60	A'Deanes Bush	H	Crown (Scenic Reserve)	Podocarp/ broadleaved- black beech forest	36.44	Yes	1, 2, 5	High	No	Recommended	44.68691733
61	Inglis Bush	H	Crown (Scenic Reserve)	Podocarp-broadleaved forest	27.92	Yes	1, 2, 3	High	No	Recommended	27.92366696
62	Horseshoe Lake	E	Private	Lake	49.48	Yes	3, 4, 5	Med	Yes	Recommended	49.48288491

APPENDIX VI - SPECIES GLOSSARY

Notable flora and fauna species from the district are listed here with common and scientific name. Threatened species are listed with their threat status in relevant sections above; the list is by no means a complete species list.

Avifauna

Scientific name	Common name
<i>Acanthisitta chloris</i>	Rifleman
<i>Anarhynchus frontalis</i>	Wrybill
<i>Anas chlorotis</i>	Brown teal
<i>Anas gracilis</i>	Grey teal
<i>Anas rhynchos</i>	Australasian Shoveler
<i>Anas superciliosa</i>	Grey duck
<i>Anthornis melanura melanura</i>	Bellbird
<i>Anthus novaeseelandiae novaeseelandiae</i>	New Zealand pitpit
<i>Apteryx mantelli</i>	North Island brown kiwi
<i>Ardea modesta</i>	White heron
<i>Botaurus poiciloptilus</i>	Australasian bittern
<i>Bowdleria punctata vealeae</i>	North Island fernbird
<i>Charadrius bicinctus bicinctus</i>	Banded dotterel
<i>Charadrius obscurus</i>	New Zealand dotterel
<i>Chlidonias albostratus</i>	Black fronted tern
<i>Chrysococcyx lucidus lucidus</i>	Shining cuckoo
<i>Circus approximans</i>	Australasian Harrier
<i>Cyanoramphus auriceps</i>	Yellow-crowned parakeet
<i>Cyanoramphus novaezelandiae novaezelandiae</i>	Kakariki
<i>Egretta novaehollandiae</i>	White faced heron
<i>Egretta sacra</i>	Reef heron
<i>Elseyornis melanops</i>	Black-fronted dotterel
<i>Eudynamis taitensis</i>	Long-tailed cuckoo
<i>Falco novaeseelandiae</i>	New Zealand falcon
<i>Gallirallus philippensis</i>	Banded rail
<i>Gerygone igata</i>	Grey warbler
<i>Haematopus finschi</i>	New Zealand pied oystercatcher
<i>Haematopus unicolor</i>	Variable oystercatcher
<i>Hemiphaga novaeseelandiae novaeseelandiae</i>	Kereru
<i>Himantopus himantopus leucocephalus</i>	Pied stilt
<i>Hydroprogne caspia</i>	Caspian tern
<i>Hymenolaimus malacorhynchos</i>	Blue duck
<i>Larus bulleri</i>	Black billed gull
<i>Larus dominicanus dominicanus</i>	Southern Black-backed Gull

<i>Larus novaehollandiae scopulinus</i>	Red billed gull
<i>Limosa lapponica</i>	Bar-tailed godwit
<i>Mohoua albigilla</i>	Whitehead
<i>Nestor meridionalis</i>	Kākā
<i>Ninox novaeseelandiae novaeseelandiae</i>	Morepork
<i>Petroica australis longipes</i>	North Island Robin
<i>Petroica macrocephala</i>	Tomtit
<i>Phalacrocorax carbo novaehollandiae</i>	Black shag
<i>Phalacrocorax sulcirostris</i>	Little black shag
<i>Phalacrocorax melanoleucos brevirostris</i>	Little shag
<i>Platalea regia</i>	Royal spoonbill
<i>Poliocephalus rufopectus</i>	New Zealand dabchick
<i>Porphyrio melanotus melanotus</i>	Pukeko
<i>Porzana pusilla affinis</i>	Marsh crake
<i>Porzana tabuensis plumbea</i>	Spotless crake
<i>Prothemadera novaeseelandiae novaeseelandiae</i>	Tui
<i>Rhipidura fuliginosa placabilis</i>	Fantail
<i>Todiramphus sanctus vagans</i>	New Zealand Kingfisher
<i>Zosterops lateralis lateralis</i>	Silvereye
<i>Vanellus miles novaehollandiae</i>	Spur-winged Plover

Mammals

Scientific name	Common name
<i>Chalinolobus tuberculatus</i>	North Island long-tailed bat

Fish

Scientific name	Common name
<i>Anguilla australis</i>	Shortfin eel
<i>Anguilla dieffenbachii</i>	Longfin eel
<i>Cheimarrichthys fosteri</i>	Torrentfish
<i>Galaxias brevipinnis</i>	Koaro
<i>Galaxias fasciatus</i>	Banded kokopu
<i>Galaxias galaxias</i>	Dwarf galaxias
<i>Galaxias maculatus</i>	Inanga
<i>Gobiomorphus cotidianus</i>	Common bully
<i>Gobiomorphus gobioides</i>	Giant bully
<i>Gobiomorphus hubbsi</i>	Bluegill bully
<i>Gobiomorphus huttoni</i>	Redfin bully
<i>Retropinna retropinna</i>	Smelt

Invertebrates

Scientific name	Common name
<i>Echyridella menziesi</i>	Freshwater mussel
<i>Powelliphanta marchanti</i>	Powelliphanta land snail

Herpetofauna

Scientific name	Common name
<i>Naultinus elegans</i>	Green gecko
<i>Oligosoma infrapunctatum</i>	Speckled skink
<i>Oligosoma lineocellatum</i>	Spotted skink
<i>Woodworthia maculatus</i>	Common gecko

Plants

Scientific name	Common name
<i>Alectryon excelsus</i>	Titoki
<i>Aristotelia serrata</i>	Wineberry
<i>Beilschmiedia tawa</i>	Tawa
<i>Brachyglottis kirkii</i>	Kohurangi
<i>Brachyglottis repanda</i>	Rangiora
<i>Bulbophyllum tuberculatum</i>	
<i>Carex secta</i>	Purei
<i>Carmichaelia australis</i>	Common broom
<i>Carpodetus serratus</i>	Marbleleaf
<i>Chionochloa rubra</i>	Red tussock
<i>Coprosma arborea</i>	Mamangi
<i>Cordyline australis</i>	Cabbage tree
<i>Cordyline banksii</i>	forest cabbage tree
<i>Coriaria arborea</i> var. <i>arborea</i>	Tutu
<i>Corokia cotoneaster</i>	Korokio
<i>Corybas carsei</i>	Swamp helmet orchid
<i>Corybas rotundifolius</i>	Helmet orchid
<i>Corynocarpus laevigatus</i>	Karaka
<i>Coprosma grandifolia</i>	Kanono
<i>Coprosma lucida</i>	Shiny karamu
<i>Coprosma propinqua</i>	Mingimingi
<i>Coprosma repens</i>	Taupata
<i>Coprosma rhamnoides</i>	Thorny coprosma
<i>Coprosma robusta</i>	Karamu
<i>Coprosma rotundifolia</i>	Round-leaved coprosma
<i>Coprosma tenuifolia</i>	Wavy-leaved coprosma

<i>Coprosma virescens</i>	
<i>Cyclosorus interruptus</i>	
<i>Dacrycarpus dacrydioides</i>	Kahikatea
<i>Dacrydium cupressinum</i>	Rimu
<i>Dactylanthus taylorii</i>	Wood rose
<i>Drosera</i> spp.	Sundews
<i>Elaeocarpus hookerianus</i>	Pokaka
<i>Empodisma minus</i>	Wire rush
<i>Empodisma robustum</i>	Wire rush
<i>Euphrasia disperma</i>	Slender-flowered eyebright
<i>Ficinia spiralis</i>	Pingao
<i>Fuscospora cliffortioides</i>	Mountain beech
<i>Fuscospora truncata</i>	Hard beech
<i>Fuscospora solandri</i>	Black beech
<i>Geum leiospermum</i>	Geum
<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>	Hangehange
<i>Gleichenia dicarpa</i>	Tangle fern
<i>Hebe colensoi</i> var. <i>colensoi</i>	
<i>Hebe colensoi</i> var. <i>hillii</i>	
<i>Hedycarya arborea</i>	Pigeonwood
<i>Helichrysum lanceolatum</i>	
<i>Hoheria sexstylosa</i>	Lacebark
<i>Juncus gregiflorus</i>	Wiwi
<i>Juncus holoschoenus</i>	
<i>Knightia excelsa</i>	Rewarewa
<i>Kunzea ericoides</i>	Kanuka
<i>Laurelia novae-zelandiae</i>	Pukatea
<i>Leptospermum scoparium</i>	Manuka
<i>Libocedrus plumosa</i>	Kawaka
<i>Libocedrus bidwillii</i>	Kaikawaka
<i>Lophomyrtus obcordata</i>	New Zealand myrtle
<i>Lycopodiella serpentina</i>	Bog clubmoss
<i>Melicytus micranthus</i>	Swamp mahoe
<i>Melicytus ramiflorus</i>	Mahoe
<i>Melicope simplex</i>	Poataniwha
<i>Metrosideros robusta</i>	Northern rata
<i>Myoporum laetum</i>	Ngaio
<i>Myosotis eximia</i>	
<i>Myosotis petiolata</i>	Forget-me-not
<i>Myriophyllum robustum</i>	Stout water milfoil
<i>Myrsine australis</i>	Mapou

<i>Myrsine divaricata</i>	Weeping mapou
<i>Nestegis cunninghamii</i>	Black maire
<i>Nestegis lanceolata</i>	White Maire
<i>Nestegis montana</i>	Narrow-leaved Maire
<i>Nothofagus fusca</i>	Red beech
<i>Oleria furfuracea</i>	Akepiro
<i>Pennantia corymbosa</i>	Kaikomako
<i>Phebalium nudum</i>	Mairehau
<i>Phyllocladus trichomanoides</i>	Tanekaha
<i>Pittosporum kirkii</i>	Thick-leaved kohukohu
<i>Podocarpus cunninghamii</i>	Hall's totara
<i>Podocarpus totara</i>	Totara
<i>Prasophyllum hectorii</i>	Swamp leek orchid
<i>Prumnopitys ferruginea</i>	Miro
<i>Prumnopitys taxifolia</i>	Matai
<i>Pseudopanax laetus</i>	Broadleaved fivefinger
<i>Pseudowintera colorata</i>	Horopito
<i>Pterostylis paludosa</i>	Swamp greenhood
<i>Pterostylis</i> spp.	Greenhood orchids
<i>Ptisana salicina</i>	King fern
<i>Schefflera digitata</i>	Pate
<i>Sophora microphylla</i>	Kowhai
<i>Syzygium maire</i>	Swamp maire
<i>Thelymitra</i> spp.	Sun orchids
<i>Thismia rodwayi</i>	Thismia
<i>Typha orientalis</i>	Raupo
<i>Urtica ferox</i>	Tree Nettle
<i>Utricularia australis</i>	Yellow bladderwort
<i>Utricularia delicatula</i>	Bladderwort
<i>Weinmannia racemosa</i>	Kamahi

APPENDIX VII - HISTORICALLY RARE TERRESTRIAL ECOSYSTEMS

The following table relating to rare terrestrial ecosystems of the Hawke's Bay has been pulled from the HBRC Report: Hawke's Bay Biodiversity Inventory (2014). NB: not all of the ecosystem types may occur within the Central Hawke's Bay, however, all types have been retained for consistency of quotation.

Table H-1: Historically rare terrestrial ecosystems represented in Hawke's Bay. Williams et al. (2007) have classified seventy two historically rare terrestrial ecosystems. Experts identified the following ecosystems as being present in the region. Expert comments on the level of threats and modification associated with each ecosystem are based on expert knowledge, i.e. not necessarily published elsewhere. This is not an exhaustive list of sites, and there are likely to be more locations that may be classified as one of the Historically Rare Ecosystems. Descriptions of ecosystem types are available at Landcare Research website (<http://www.landcareresearch.co.nz/publications/factsheets/rare-ecosystems/>).

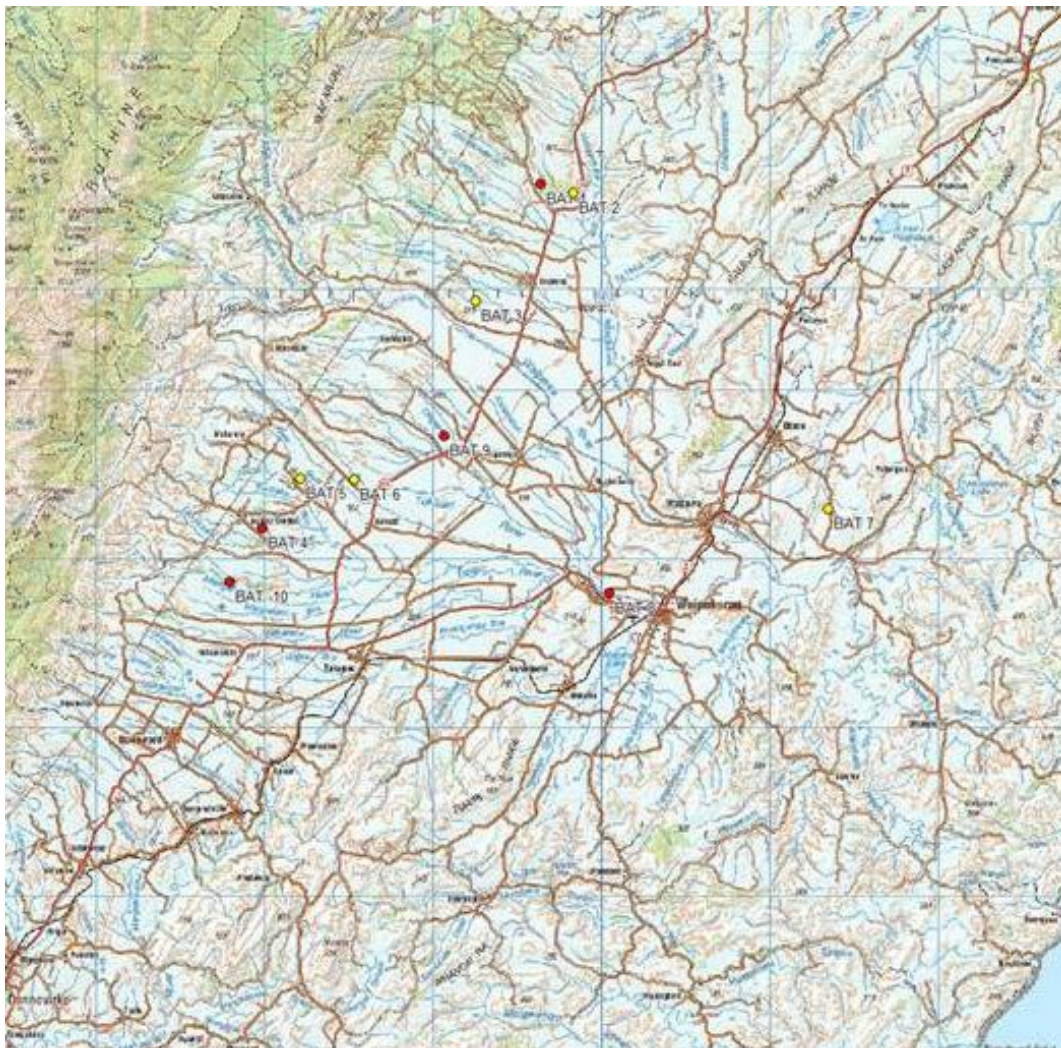
Ecosystem Category	Ecosystem Type	Geographical Distribution, Hawke's Bay Region	Comments
Coastal	Active sand dunes	Beaches from Mahia Peninsula to Whangaehu. Best examples at Ocean Beach, Rangaiika and Mahanga.	Much modified and highly vulnerable.
	Shingle beaches	Most of Hawke Bay shore. Best examples at Whakaki, Bay View and Te Awanga.	Much modified and highly vulnerable, particularly to vehicle damage.
	Coastal rock stacks	Cape Kidnappers, Karamea (Red Island), Hinemahanga Rocks (off Kairakau Beach).	Small, few in number, erosion-prone and vulnerable to weed invasion, predators and disturbance by people.
	Coastal cliffs on acidic rocks	Cape Kidnappers, Earthquake Slip, Mahia Peninsula, other smaller sites.	Erosion-prone and vulnerable to weed invasion, predators and disturbance by people.
	Calcareous coastal cliffs	Napier, Kairakau	Erosion-prone and vulnerable to weed invasion, predators and disturbance by people.
Inland and alpine	Screes of acidic rocks	Mountain lands and steep foothills	Vegetation is heavily modified in farmed sites; otherwise affected by browsing animals.
	Frost flats (Old tephra plain > 500 years old)	Ripia and Waipunga Valleys, second and third biggest frost flats remaining in New Zealand (Smale, unpublished). One of the frost flat remnants is located entirely on private land, and the other's land tenure is a combination of private, Maori and DoC lands. The major threats to this ecosystem are weed invasion, agrichemical drift from the surrounding land use, and off-road vehicle use damaging the ecosystem.	Critically endangered primarily due to weed invasion, topdressing drift and off-road vehicle use.
	Frost hollows	Urewera National Park, Kaweka Forest Park, Ruahine Forest Park; places where cold air ponds nightly.	Distinctive vegetation, largely intact, except for feral animal impact (browsing, pig rooting, trampling).
	Boulderfields of acidic rocks	Mountain lands and steep foothills	Vegetation is heavily modified in farmed sites; otherwise affected by browsing animals.

	Calcareous cliffs, scarps and tors	Te Mata Peak, Maungaharuru Range, Te Waka Range and similar sites.	Sites containing unique plants adapted to limestone and found nowhere else, also endemic land snails. Highly vulnerable to feral animals (pigs, deer, goats, possums, stoats, rats, etc.).
	Braided riverbeds	The lower reaches of the Mohaka, Tutaekuri, Ngaruroro, Tukituki and Waipawa rivers and some of their tributaries.	Highly vulnerable to weed invasion and disturbance by domestic stock, feral animals and people. Key habitat for some threatened species of plants and animals.
	Cloud forests	Uplands of Urewera National Park; southern Ruahine Forest Park.	Affected by feral animals, so less intact and biodiverse than in the past.
Induced by native vertebrates	Seabird burrowed soils	Current: Waikawa (Portland Island) and Motu-o-Kura (Bare Island). Recent past (prior to human arrival and in places as late as the 19 th century): Mahia Peninsula; Cape Kidnappers; most coastal dunes, scarps, headlands and knolls; some inland and mountain places such as Titiokura and Wharetiti (Wharite Peak).	The current sites are highly vulnerable to rodents and predators (stoats, ferrets, cats, dogs), also to disturbance by people. Potential sites such as Cape Sanctuary are similarly vulnerable. Past sites are detectable through DNA and mineral traces in soil.
	Marine mammal haulouts	N.Z. fur seal haulouts are confirmed at Waikawa (Portland Island), Cape Kidnappers, Motu-o-Kura (Bare Island) and Hinemahanga Rocks (off Kairakau Beach). Any of the beaches could have individual fur seals, sea lions, elephant seals or leopard seals hauling out occasionally.	Highly vulnerable to human disturbance.
Wetlands	Lake margins	Lowlands: Lakes Oingo, Runanga, Poukawa and Hatuma are all regionally significant. Uplands: Lakes Waikaremoana and Waikareiti are among the best (most intact) upland lakes in New Zealand; Kaweka Forest Park contains some good though much smaller examples.	The best examples are formally protected, but are all vulnerable to weed invasion, feral animal browsing and predators.
	Cushion bogs	Small examples in the mountain lands of Urewera National Park, Kaweka Forest Park and Ruahine Forest Park; flattish upland places where drainage is impeded and the water supply is permanent. Often on ridge tops.	Distinctive vegetation of wetland cushion plants. Water supply and bog condition somewhat affected by feral deer and hares, due mainly to browse of adjacent vegetation and tracking.
	Ephemeral wetlands	Small examples in the Te Waka and Maungaharuru Ranges; upland places where water ponds in winter but dries up in summer.	Mostly within farmland, so badly affected by cattle. Special plants have been found there in the past.
	Tarns	Small upland tarns occur in the Maungaharuru and Te Waka, either in hanging basins or on high plateaux. In the Ruahine Range many tarns occur on high ridges, mainly in the central and northern portions. Tarns also occur at Kaipo Lagoon, Urewera National Park.	Drainage patterns and vegetation are somewhat modified by feral deer.
	Estuaries	Estuaries of substance occur at Mahia (Maungawhio Lagoon), Wairoa, Napier, Waitangi and Porangahau. Small estuarine systems are at the mouths of most of the smaller rivers and main streams.	Some localised protection and ecological restoration, but otherwise vulnerable to domestic stock, weed invasion, predators and human disturbance.
	Lagoons	Coastal lagoons occur at the mouth of the Wairoa River and in a series on the coastal strip to the east. The largest and most diverse is Whakaki Lagoon.	Some localised protection and ecological restoration, but otherwise vulnerable to artificial drainage, domestic stock, weed invasion, predators and human disturbance.

APPENDIX VIII - LONG-TAILED BAT LOCATION DATA

All data has been provided by Kay Griffith, a local Ecologist of the Hawke's Bay. This data has been utilised with her permission.

Site Information
Mangamate stream/ Puahanui Bush
Puahanui Bush - 130 ha of lowland podocarp – likely roost site
Moncktons SR
A'Deane's SR
Inglis Bush SR
Lindsays Bush SR
Pattersons Bush
Mangatewai SR
Lake Hatuma



Map of location sites - Recent data records in yellow, red recordings are from historic recordings.

APPENDIX IX - DEPARTMENT OF CONSERVATION - CONSERVATION STATUS SYSTEM

