



**ASSESSMENT OF ECOLOGICAL VALUES OF LAND OWNED BY GRAZING
NORTH LIMITED AT NGAWHATO INFORM A PROPOSED PLAN CHANGE**

CONFIDENTIAL

Prepared for

FAR NORTH DISTRICT HOLDINGS LIMITED

NZE Quality System:

Document Reference	:	p:\ Projects\2018 276
Report Revision	:	1
Report Status	:	Final
Prepared by	:	Dr Gary Bramley
Reviewed by	:	Tricia Scott
Approved by	:	Tricia Scott
Date Created	:	05 February 2019
Date Issued	:	23 September 2019

Consultation

Ecological
Assessments

Resource Consent
Applications

Compliance
Monitoring

Water Quality
Monitoring

Environmental
Management

Pest Reduction
Advice

Enrichment
Planting

Restoration
Advice

TABLE OF CONTENTS

SECTIONS

INTRODUCTION	2-5
1.1 BACKGROUND	2-5
1.2 ECOLOGICAL CONTEXT	2-6
2. TERRESTRIAL ECOLOGICAL VALUES	2-8
2.1 INTRODUCTION.....	2-8
2.2 RIPARIAN AREAS.....	2-9
2.3 FOREST VEGETATION	2-11
2.4 WETLANDS	2-14
2.5 FAUNA VALUES.....	2-16
3. ECOLOGICAL OPPORTUNITIES	3-17
3.1 BACKGROUND	3-17
3.2 MAXIMISING INDIGENOUS VEGETATION	3-17
3.3 BUFFERING SENSITIVE HABITATS.....	3-17
3.4 CONNECTING HABITAT FRAGMENTS.....	3-18
3.5 RESTORING DEGRADED AREAS.....	3-18
3.6 IMPLEMENTING EFFECTIVE PEST CONTROL.....	3-18
4. ECOLOGICAL CONSTRAINTS	4-19
4.1 BACKGROUND	4-19
4.2 RECOMMENDATIONS.....	4-19
5. PLANNING MATTERS	5-20
5.1 FAR NORTH DISTRICT PLAN	5-20
5.2 NORTHLAND REGIONAL POLICY STATEMENT	5-22
6. ASSESSMENT OF EFFECTS	6-24
7. REFERENCES	7-25

APPENDICES:

Appendix A: Plant Species List

Appendix B: Bird Species List

AUTHORS:

Dr Gary Bromley – Ecologist

Gary holds a PhD (Biology, 1999) and an MSc (Hons) in Ecology. Gary has been self-employed since 2000 as an Ecologist. Prior to this he lectured at the University of Waikato and tutored at Waikato Polytechic. A northland local Gary has a strong knowledge in New Zealand flora and fauna and has produced seven scientifically published papers. He carries out a range of ecological work including producing Assessments of Ecological Significance, Assessments of Environmental Effects, restoration plans, weed and pest management plans and provides advice on ecological matters to landowners. Gary has been a judge for the Northland Ballance Farm Environment awards and is presently chairman of the Puketi Forest Trust and Tahawai Te Kohanga Reo. In 2003 Gary received the RFBPS “Old Blue” award for contribution to Conservation in Northland and in 2007 received an award for Contribution in Conservation of Northlands Biodiversity from the Northland Biodiversity Enhancement Group.

Tricia Scott – Environmental Biologist

Tricia is the Director of NZ Environmental Limited and holds a BSc (Biology) and an NZCS (Paramedical). Tricia has more than 20 years' experience testing and assessing habitats, and physical and chemical parameters in water, soils, air and biological material. The work includes; establishing baseline conditions and assessing effects of activities on the environment. The reports aim to provide relevant information that enable management plans and remediation actions to be developed and/or sufficient information to enable decision makers to determine appropriate resource consent approval and/or conditions. Tricia has been working in the assessment and remediation of soils on HAIL or contaminated sites since the inception of the current National Environmental Standards (NES) in January 2011. Tricia has trained and worked at senior level in diagnostic laboratories for Neurophysiology, and in Respiratory and Cardiac Function (in New Zealand and Australia). Tricia has also worked as a quality control and laboratory testing technician. Tricia actively undertakes continuing professional development in the national environmental standards and other professional disciplines. Tricia is a member of WasteMINZ and ALGA.

COPYRIGHT: The concepts and information contained in this document are the property of NZ Environmental Limited. Use or copying of this document in whole or in part without the written permission of NZ Environmental constitutes an infringement of copyright.

LIMITATION: This report has been prepared on behalf of and for the exclusive use of NZ Environmental's Client and is subject to and is issued in connection with the provisions of the agreement between NZ Environmental and its Client. NZ Environmental accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

EXECUTIVE SUMMARY

Far North Holdings Limited proposes a private plan change for approximately 204 ha of land owned by Grazing Northland Limited to enable creation of the Ngawha Innovation and Enterprise Park. The land is situated on State Highway 12 north of Kaikohe Golf Course and the Kaikohe A&P Showgrounds.

The Site is located within the Kaikohe Ecological District and Northland Ecological Region. The Kaikohe Ecological District covers approximately 62,800ha, of which only 2,001ha is protected, almost half at one site. Of the natural areas remaining in 2000, 51% was forest, 34% shrubland, 1.5% swamp forest and swamp shrubland, 3.5% wetland, and 10% lakes or open water. The district includes a number of unique ecological features, including Lake Omapere, the largest freshwater lake in Northland.

Ecological values at the site include volcanic broadleaf forest, broadleaf podocarp forest, kahikatea swamp forest, wetlands and riparian areas. Indigenous vegetation at the Site includes 17.9ha of wetland and 8.7ha of forest, some of which has been recognised as a significant natural area in the Protected Natural Area Programme surveys of the district. Wetlands are also a regional and national priority for protection on private land. The majority of the Site drains west to the Waima River which enters the Hokianga Harbour near Rawene. Two wetland areas at the south of the property drain east to the Waitangi River which enters the Bay of Islands at Haruru Falls. The Site is surrounded by residential and lifestyle properties, dairy and drystock farms. Approximately 30.07ha of planting and restoration is proposed across the Site, predominantly to protect and enhance riparian areas and buffer existing wetlands.

The ecological opportunities at the site arise from maximising the extent and quality of the indigenous vegetation, buffering sensitive habitat such as streams and wetlands, connecting habitat fragments, restoring degraded areas and implementing effective pest control for protection of fauna.

Having given regard to the policies and objectives in the Far North District Plan we consider that achieving resource consent to undertake activities in any of the wetlands or any of the three largest forest blocks (Including the one which forms part of Kopenui Stream Remnants as identified by Conning and Miller (2000)) would be difficult to support on ecological grounds. On that basis those areas should be avoided.

Minor works affecting areas with ecological value, such as stream crossings, surface water takes or short sections of stream removal (via culverting or other method) might be ecologically defensible provided that sufficient improvements are made to other areas of the stream within the Site to offset or compensate for any adverse effects. Activities affecting streams at the Site would need to be considered on a case by case basis.

We consider that the policies and objectives of the Far North District Plan and Northland Regional Policy Statement would be given effect to if the following recommendations are incorporated into the proposed plan change:

- Retention of all existing wetland, forest and indigenous riparian vegetation.
- A weed management plan to be prepared for the Site by a suitably qualified and experienced ecologist and implemented effectively.
- A pest control plan for the Site to control feral cats, rats, possums and mustelids to be developed by a suitably qualified and experienced ecologist and implemented effectively.
- The keeping of domestic pets at the Site to be banned.
- A restoration planting plan for the Site to be prepared by a suitably qualified and experienced ecologist with the aim of restoring degraded habitat (particularly riparian habitats), buffering sensitive habitats such as wetlands and streams, connecting existing habitats and recreating appropriate habitats at the Site.

- All indigenous vegetation and habitats (including newly created habitats) at the site to be formally protected either through the plan change or via covenanting.

We have recommended an additional 30.07ha of planting across the site, including 2.7 ha of wetland buffer planting, 20.4ha of riparian buffer planting and approximately 7ha of planting to re-establish ecological connections across the Site.

INTRODUCTION

1.1 BACKGROUND

Grazing Northland Limited is the owner of a property situated approximately opposite (north of) Ngawha Springs Road and the existing Kaikohe Golf Course, Kaikohe. The property comprises eleven lots including: Lot 1 DP 172355 (24.34ha), Lot 1 DP 336520 (4.95ha), Lot 2 DP 196311 (5.96ha), Lot 1 DP 196320 (89.98ha), Pt Orauruwharo 5B1A (1.36ha), Lot 1 DP 190387 (29.74ha), Lot 1 DP 196319 (0.62ha), Orauruwharo 5B2C (1.02ha) and Reiwhatia B1 (24.55ha), Lot 2 DP 185847 (0.87ha) and Section 15S Te Pua Settlement (21.28ha). This property is referred to here as 'the Site' and comprises approximately 204.7 ha which is currently operated as a dairy farm with a small area of pine plantation which has recently been harvested. The area is zoned Rural Production in the Far North District Plan. The location of the property is shown in Figure 1.1.

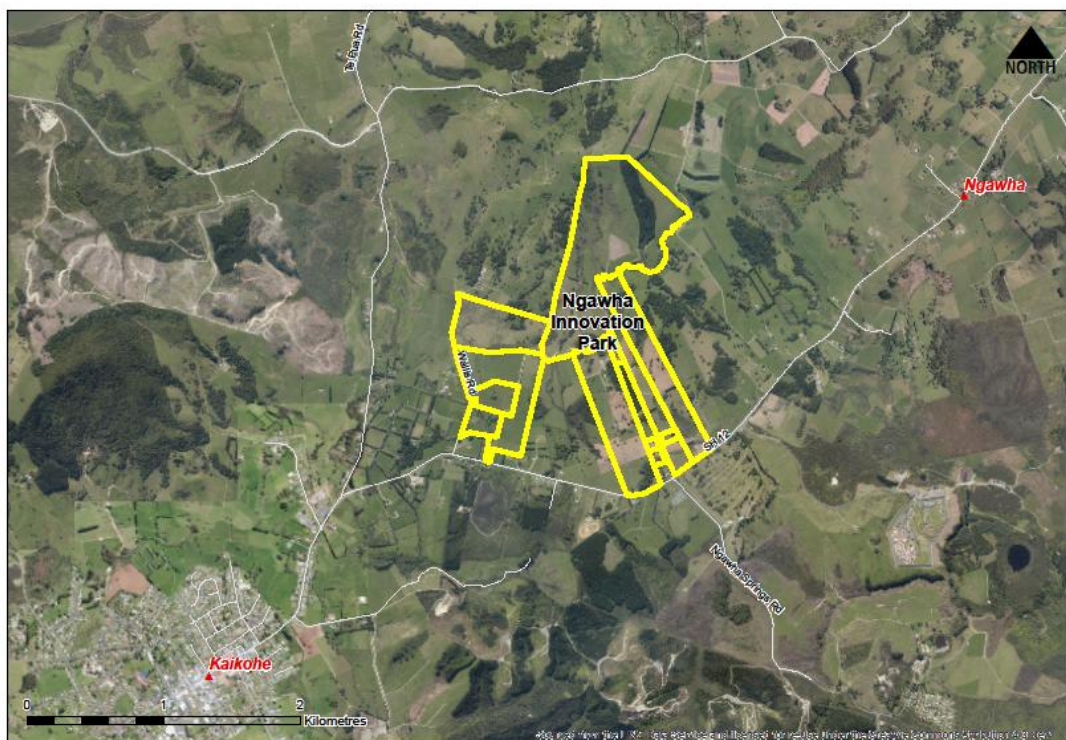


Figure 1.1: Location of Grazing Northland Limited's property, Ngawha, Kaikohe.

Far North Holdings Limited is the commercial trading and asset management arm of the Far North District Council. Far North Holdings Limited proposes a private plan change of the land owned by Grazing Northland Limited to enable creation of the Ngawha Innovation and Enterprise Park at the Site.

New Zealand Environmental Limited was retained in November 2018 to assess the terrestrial ecological values of the site and identify constraints and opportunities with respect to those ecological values, as well as assessing the environmental effects of the proposed plan change. This information is required to inform the proposed plan change application.

1.2 ECOLOGICAL CONTEXT

The Site is located in the Kaikohe Ecological District (ED) and Northland Ecological Region (McEwen 1987, Brook 1996). The Kaikohe Ecological District is located in the centre of the mid-north between the Bay of Islands in the east and the Hokianga Harbour in the west. The district is centred approximately on Lake Omapere and adjoins the Puketi ED to the north, the Hokianga ED to the west and north-west. Kerikeri ED to the east and Tangihua ED to the south. The district extends from the Waima River in the west to Pakaraka in the east and includes the upper catchments of the Waitangi River.

Conning and Miller (2000) mapped and briefly described most of the areas of indigenous natural vegetation within the Kaikohe Ecological District and also provided an analysis of the main vegetation types as well as information on threatened species and other taxa of scientific interest present in the district as part of the Protected Natural Areas Programme ('PNAP' in 1994 and 1995. The Kaikohe ED covers approximately 62,800 ha, approximately 13,190ha (21%) of which comprises natural areas (Conning and Miller 2000). Conning and Miller (2000) identified 84 natural areas scattered across the district. Of the natural areas identified, 51% was forest, 34% shrubland, 1.5% swamp forest and swamp shrubland, 3.5% wetland, and 10% lakes or open water (Conning and Miller 2000). The protected natural areas within the Kaikohe ED cover only 2,001ha, almost half of which comprises one site (Conning and Miller 2000).

The Kaikohe Ecological District contains several distinct features including:

- Lake Omapere, which is the largest freshwater body in Northland;
- South and east of Lake Omapere, volcanic cones and basalt lava flows have produced some of the best examples of volcanic broadleaf forest in the Northland Region. These forests are seasonally important kukupa (*Hemiphaga novaeseelandiae*) habitat;
- Where water flow has been impeded remnants of swamp forest and wetland sometimes occur;
- The geothermal and gumland heath area of Ngawha Springs is unique in the Northland Region.

The underlying geology of Mangakahia Complex sedimentary and basaltic volcanic rock types is typical of the Kaikohe ED, which contains a high diversity of vegetation types, including some which are regionally and nationally rare such as gumland, mature podocarp forest, volcanic broadleaf forest, swamp shrubland, and swamp forests. Manuka-kanuka shrubland, broadleaf-podocarp and secondary podocarp forest and are the most common vegetation types within the district (Conning and Miller 2000).

The majority of the vegetation within the Kaikohe Ecological District has been cleared for farming, forestry and human settlement. The district extends from sea level at the head of the Hokianga Harbour to 360m asl and has a mild, humid and generally windy climate, winds being predominantly from the south-west. The average rainfall is 1,766 mm per year, with most rainfall occurring during winter. The driest months are January and November. The District is also subject to periodic cyclonic storms in late summer and early autumn which bring heavy rainfall and may have widespread effects such as floods, slips and windfalls. Heavy rainfall also occurs when northeasterly flows arise between ridges of high pressure to the east and troughs over the Tasman Sea. The mean annual temperature is 14.7°C. The District has about 2000 hours of bright sunshine per year. (Conning and Miller 2000).

Conning and Miller (2000) considered that the priority areas for protection in the Kaikohe Ecological District included gumlands, wetlands, mature podocarp, kauri and volcanic broadleaf forests, as well as areas of kiwi habitat.

Having evaluated the sites with indigenous vegetation throughout the district, Conning and Miller grouped them according to two levels of ecological significance, with Level 1 sites being of the highest ecological value and Level 2 sites supporting populations of indigenous flora and fauna, but of generally lower ecological value than Level 1 sites. Part of one natural area identified by Conning and Miller (2000) (Site P05/036 Kopenui Stream Remnants) is located within the Site, with three others nearby (P05/035 Youngs Kahikatea Remnant, P05/037 Ngawha Bush and P05/038 Remuera Settlement Road Remnants). The closest of these (Youngs Kahikatea Remnant) is approximately 725m east of the part of Kopenui Stream Remnants occurring at the Site. Kopenui Stream Remnants is a Level 2 site where the vegetation is an example of volcanic broadleaf forest with frequent puriri (*Vitex lucens*) and occasional kahikatea (*Dacrycarpus dacrydioides*) and taraire (*Beilschmiedia tarairi*). This forest type was once typical of the area east of Lake Omapere, but is now rare (Conning and Miller 2000). Together the three Kopenui Stream Remnants cover 18.6ha and their ecological value is limited by their small size.

The majority of the Site drains west via headwater tributaries of Kopenui Stream which enter the Wairoro Stream which drains south and west to the Punakitere River, Taheke River and ultimately the Waima River which enters the Hokianga Harbour near Rawene. Nearest State Highway 12 are two small headwater wetlands which drain east to the Ngawha Stream which flows east to the Waiaruhe River before joining the Waitangi River and entering the Bay of Islands at Haruru Falls. The Site is surrounded by residential and lifestyle properties, dairy and drystock farms and is located near the Kaikohe Golf Course, Ngawha Prison, Kaikohe Speedway, Kaikohe A&P Showgrounds and the Kaikohe Public Cemetery.

2. TERRESTRIAL ECOLOGICAL VALUES

2.1 INTRODUCTION

The Site is currently used as a dairy farm and as such the majority of the vegetation across the site is exotic pasture or fodder crops such as maize (*Zea mays*). Ecological values are scattered across the site, often associated with streams and riparian areas. There are three main areas of ecological value as follows:

- Riparian areas associated with streams which include varying elements of indigenous vegetation. As described in Section 1.2 above, several first order tributaries of Kopenui Stream arise in the gullies on the property and merge before exiting the Site at Wallis Road and there are terrestrial ecological values associated with these streams.
- Forest. There are eight small areas of forest scattered across the site, including the part which forms a portion of the Kopenui Stream Remnants site identified by Conning and Miller (2000).
- Wetlands. There are a number of areas where drainage is impeded and wetlands have formed. These are typically associated with the streams at locations where the gradient is low or water movement is otherwise slowed down.

These areas of ecological value are shown in Figure 2.1 and described in more detail below. There are also isolated individual mature trees (particularly totara and puriri trees) which provide a food source and roosting and nesting habitat for birds across the landscape, but which are of lower ecological value than areas of contiguous habitat.

A list of the plant species recorded is provided as Appendix 1. No plants of particular conservation concern were recorded, although several species considered to be “Threatened (Nationally vulnerable)” (de Lange et al. 2017) as a result of myrtle rust arrival in New Zealand do occur at the Site including manuka (*Leptospermum scoparium* var. *scoparium*) and akatea (*Metrosideros perforata*). The effect of myrtle rust on native species is yet to be demonstrated and all species in the Myrtaceae family are considered threatened until the effects are known.

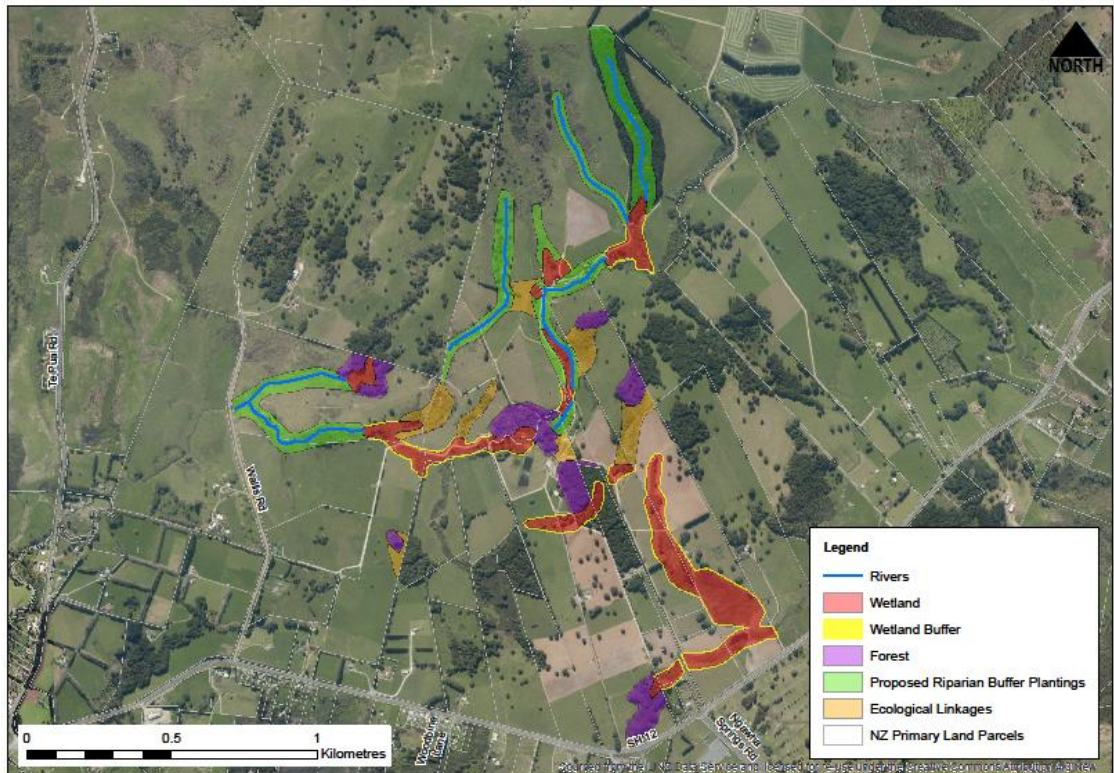


Figure 2.1: Extent of ecological values in riparian, forest and wetland locations at the Site.

2.2 RIPARIAN AREAS

Most of the riparian areas on the property have been fenced to exclude cattle. Streamside vegetation includes rank pasture grasses (particularly kikuyu, *Cenchrus clandestinus*) and common shrubs such as pate (*Schefflera digitata*), karamu (*Coprosma robusta*), mahoe (*Melicactus ramiflorus*) and tree ferns such as mamaku (*Cyathea medullaris*) and wheki (*Dicksonia squarrosa*) as well as small trees such as totara (*Podocarpus totara*) and kahikatea. The most common weeds present in riparian areas are gorse (*Ulex europaeus*) and woolly nightshade (*Solanum mauritianum*), but pampas (*Cortaderia selloana*) and small-leaved privet (*Ligustrum sinense*) are also present at some locations.

As well as providing habitat for terrestrial flora and fauna such as birds and lizards, riparian vegetation also acts to buffer aquatic habitats from adjoining land uses and improve water and aquatic habitat quality by reducing nutrient, sediment and debris runoff, slowing water movement, moderating water flow, reducing water temperature, providing instream feeding, resting and spawning habitat (in the form of roots, fallen branches and leaves) and stabilising stream banks. The riparian vegetation at the Site varies in quality and extent but will be fulfilling all those ecological functions to varying degrees according to location.

Examples of riparian vegetation are shown in plates 2.1 and 2.2.



Plate 2.1: Riparian vegetation at Kopenui Stream, Kaikohe.



Plate 2.2: Riparian vegetation at Kopenui Stream, Kaikohe.

In terms of habitat, such riparian vegetation plays an important role in connecting the larger areas of better quality habitat across the site. The riparian habitats are generally of low –

moderate ecological value. There is considerable potential for improvement of the riparian habitats at the site which would, in turn, improve the aquatic habitats. This matter is dealt with more in Section 3 below.

2.3 FOREST VEGETATION

There are eight discrete areas of forest at the Site as shown in Figure 2.1. Together these areas cover approximately 8.7ha. Dominant species at each location varies, but overall there are three distinct forest types: volcanic broadleaf forest dominated by puriri and taraire (two areas), broadleaf podocarp forest dominated by totara with common puriri, taraire and towai (five areas) and kahikatea forest (one small area).

Many of the forested areas are fenced to exclude livestock, although it appears that either this fencing is ineffective or cattle have been allowed regular access. The canopy vegetation is in relatively good condition, however as a result of regular livestock access the understorey and ground layer are either largely absent or dominated by exotic species (particularly wandering jew (*Tradescantia fluminensis*). Where present the indigenous understorey comprises common species like hangehange (*Geniostoma ligustrifolium*), kawakawa (*Piper excelsum*), silver fern (*Cyathea dealbata*), mapou (*Myrsine australis*) and pigeonwood (*Hedycarya arborea*). The forest areas include some large mature individuals with diameters at breast height up to 1m and heights of more than 22m. Examples of the forest vegetation at the Site are shown in Plates 2.3 – 2.5. The small area of kahikatea forest is subject to grazing and has an understorey of exotic pasture species as shown in Plate 2.6.



Plate 2.3: Understorey of broadleaf – podocarp forest at the Site, Kaikohe.



Plate 2.4: Volcanic broadleaf forest at the Site, Kaikohe.



Plate 2.5: Understorey of wandering jew (*Tradescantia fluminensis*) within volcanic broadleaf forest.



Plate 2.6: Kahikatea Forest remnant at the Site.

2.4 WETLANDS

There are several small wetland areas associated with Kopenui Stream and the headwaters of Ngawha Stream as shown in Figure 2.1. Together these areas occupy 17.9ha and range in quality from low to high. Whilst some adjoin pasture, others are surrounded, either completely or in part, by forest. Vegetation at wetland areas includes sedges and rushes including raupo (*Typha orientalis*), lake club rush (*Schoenoplectus tabernaemontani*), *Machaerina teretifolia*, *Carex virgata*, *Cyperus ustulatus*, exotic grasses such as browntop (*Agrostis capillaris*) and swamp millet (*Isachne globosa*) and ferns such as wheki and swamp kiokio (*Parablechnum minus*). Examples of wetland vegetation are shown in Plates 2.7 – 2.9.



Plate 2.7: Low quality wetland at the Site.



Plate 2.8: Wetland surrounded by forest at the Site.



Plate 2.9: Headwater wetland which drains to Ngawha Stream, Kaikohe.

2.5 FAUNA VALUES

Birds encountered during the site visit were common native and exotic species typical of farmland and residential gardens. A list of bird species recorded is provided in Appendix 2. The only species of conservation interest recorded was one New Zealand pipit (*Anthus novaeseelandiae*). Pipits are regarded as “At Risk (declining)” (Robertson et al. 2017).

The only mammals recorded were hedgehogs (*Erinaceus europaeus*) and hares (*Lepus europaeus*) but rats (*Rattus norvegicus*, *R. rattus*), mice (*Mus musculus*), brushtail possums (*Trichosurus vulpecula*), mustelids (*Mustela nivalis*, *M. erminea* and *M. putorius furo*), rabbits (*Oryctolagus cuniculus*) and feral cats (*Felis catus*) are all likely to occur at the Site or pass through it.

3. ECOLOGICAL OPPORTUNITIES

3.1 BACKGROUND

The proposal to apply for a private plan change affecting the Site creates an opportunity to achieve ecological and other outcomes that would not accrue under the status quo. These outcomes would be achieved by way of rules and other mechanisms put forward as part of the plan change and provided for as part of any future development. The Site currently includes a range of habitat types which are of varying ecological value, some of which (e.g. wetlands) are a regional and national priority for protection on private land (Department of Conservation and Ministry for the Environment 2007). The ecological opportunities at the site arise from the following:

- Maximising indigenous vegetation
- Buffering sensitive habitats
- Connecting habitat fragments
- Restoring degraded areas
- Implementing effective pest control for fauna

Each of these matters is dealt with in more detail below.

3.2 MAXIMISING INDIGENOUS VEGETATION

Maximising the extent of indigenous vegetation would be achieved by avoiding indigenous vegetation clearance in the first instance. We recommend that all the areas of indigenous vegetation identified in Figure 2.1 be retained for that purpose. In addition to retaining vegetation, the buffering of sensitive habitats, connection of habitat fragments and restoring of degraded areas will require a programme of native species planting. By creating riparian buffers of 5 – 20m each side of streams and around wetlands and establishing continuous habitat as shown in Figure 2.1 additional habitat will be created and existing habitats will be buffered and secured.

Figure 2.1 shows an additional 30.07ha of planting across the site, including 2.7 ha of wetland buffer planting, 20.4ha of riparian buffer planting and approximately 7ha of planting to re-establish ecological connections.

3.3 BUFFERING SENSITIVE HABITATS

Additional planting around wetlands and streams where indigenous vegetation is lacking would serve to more effectively buffer those habitats from adjacent landuses and protect the ecological values they contain. It is proposed to establish buffers of between 5m and 20m in width (depending on local topography) so as to maximise any ecological benefits. We have also proposed planting around the small area of kahikatea forest in order to improve the ecological viability and sustainability and increase the extent of this rare habitat type. These areas would be planted with appropriate, locally sourced species according to a planting plan prepared by a suitably qualified and experienced ecologist who would oversee and monitor the planting to achieve the desired results which is restoration of appropriate vegetation types typical of the Kaikohe Ecological District. This would have

ecological benefits at the Site, but would also positively affect downstream habitats in both the Waima and Waitangi catchments.

3.4 CONNECTING HABITAT FRAGMENTS

Many species (such as kukupa and tui (*Prosthemadera novaeseelandiae*) travel widely throughout the landscape on a seasonal and annual basis and make use of a variety of habitat types throughout the year. Other, more poorly mobile species, such as large invertebrates (e.g. kauri snails *Paryphanta* spp.) or lizards will not move through the landscape unless there is continuous suitable habitat. This restricts their populations and can result in ongoing declines. By replanting key areas and establishing habitat connectivity across the Site the potential for biodiversity enhancement will be maximised and a wider range of species will be catered for than would otherwise be the case. Figure 2.1 shows three areas where ecological connection could be established to maximise the overall ecological benefits of the proposal.

3.5 RESTORING DEGRADED AREAS

The forest, wetland and riparian areas at the Site have been subjected to livestock grazing and also have a substantial weed presence. The area which was formerly pine plantation also has a substantial weed presence which will require addressing in order to maximise the ecological benefits of any development at the Site. Restoring these areas by effective weed control and supplementary planting (if required) would restore indigenous dominance to the natural areas of the Site and allow for natural ecological succession and other processes which are currently compromised by the abundance of weeds and lack of suitable seed sources and pollinators/seed dispersers. We recommend that a weed management plan and complementary supplementary planting plan be prepared for the Site to address restoration where it is required. The supplementary planting plan could form part of the planting plan for buffering sensitive habitats and connecting habitat fragments and should be prepared by a suitably qualified and experienced ecologist.

3.6 IMPLEMENTING EFFECTIVE PEST CONTROL

In order to protect indigenous fauna at the site pest mammals including possums, cats, rats, hedgehogs, mice and mustelids require control. Herbivores such as rabbits and hares might require control until plantings are established, but are unlikely to pose a long term threat to the ecological values at the Site.

We recommend a control programme be designed by a suitably qualified and experienced ecologist and implemented so as to protect native wildlife at the Site. Ideally any control would be integrated with existing operations being undertaken in the surrounding areas (e.g. Top Energy's Ngawha site).

4. ECOLOGICAL CONSTRAINTS

4.1 BACKGROUND

The presence of ecological values at the Site poses constraints on any development undertaken there. In particular the Chapter 12 of the Far North District Plan¹ outlines rules relating to clearance of indigenous vegetation throughout the district. The nature of the vegetation at the Site means that beyond the permitted activity thresholds, vegetation clearance at the Site would require resource consent as either a restricted discretionary or discretionary activity (depending on the specific circumstances). The District Plan also contains policies, objectives and rules relating to effects on lakes, rivers and wetlands (including riparian areas).

4.2 RECOMMENDATIONS

Having given regard to the policies and objectives in the Far North District Plan we consider that achieving resource consent to undertake activities in any of the wetlands or any of the three largest forest blocks (Including the one which forms part of Kopenui Stream Remnants as identified by Conning and Miller (2000)) would be difficult to support on ecological grounds. On that basis those areas should be avoided. In relation to the smaller forest areas removal or modification would need to be accompanied by mitigating actions sufficient to address the adverse effects on those habitats.

Minor works affecting areas of ecological value such as stream crossings, surface water takes or short sections of stream removal (via culverting or other method) might be ecologically defensible provided that sufficient improvements are made to other areas of the stream within the Site to offset or compensate for any adverse effects. Activities affecting streams at the Site would need to be considered on a case by case basis.

Earthworks necessary to develop the Site would require best practice erosion and sediment control in accordance with a site environmental management plan which includes protection and buffering of indigenous habitats in order to address adverse effects, but such management should be achievable.

Disposal of wastewater or stormwater would best be achieved with constructed solutions, rather than using natural ecosystems for water treatment. Disposal of treated water to local streams should be required to meet water quality standards so as to protect aquatic habitats.

¹ Chapter 12.1 of the Far North District Plan relates to indigenous vegetation in Outstanding Landscapes and Chapter 12.2 relates to other indigenous vegetation clearance throughout the district. Chapter 12.7 provides for activities in lakes, rivers and wetlands.

5. PLANNING MATTERS

5.1 FAR NORTH DISTRICT PLAN

The objectives of the Far North District Plan relating to indigenous flora and fauna are outlined in Section 12.2.3 of the plan. The objectives are:

12.2.3.1 To maintain and enhance the life supporting capacity of ecosystems and the extent and representativeness of the District's indigenous biological diversity.

12.2.3.2 To provide for the protection of, and to promote the active management of areas of significant indigenous vegetation and significant habitats of indigenous fauna.

12.2.3.3 To recognise issues of wellbeing including equity for landowners in selecting methods of implementation.

12.2.3.4 To promote an ethic of stewardship.

These objectives are supported by the policies outlined in Section 12.2.4 as follows:

12.2.4.1 That areas of significant indigenous vegetation and significant habitats of indigenous fauna be protected for the purpose of promoting sustainable management with attention being given to:

- (a) maintaining ecological values;
- (b) maintaining quality and resilience;
- (c) maintaining the variety and range of indigenous species contributing to biodiversity;
- (d) maintaining ecological integrity; and
- (e) maintaining tikanga Maori in the context of the above.

Note: In determining whether a subdivision, use or development is appropriate in areas containing significant indigenous vegetation and significant habitats of indigenous fauna, Council shall consider each application on a case by case basis, giving due weight to Part II of the Act as well as those matters listed above.

12.2.4.2 That the significance of areas of indigenous vegetation be evaluated by reference to the criteria listed in Appendix III of the Northland Regional Policy Statement (refer also to definition of "significant" in 12.2.5.6).

12.2.4.3 That adverse effects on areas of significant indigenous vegetation and significant habitats of indigenous fauna are avoided, remedied or mitigated by:

- (a) seeking alternatives to the disturbance of habitats where practicable;
- (b) managing the scale, intensity, type and location of subdivision, use and development in a way that avoids, remedies or mitigates adverse ecological effects;
- (c) ensuring that where any disturbance occurs it is undertaken in a way that, as far as practicable:
 - (i) minimises any edge effects;
 - (ii) avoids the removal of specimen trees;
 - (iii) does not result in linkages with other areas being lost;

(iv) avoids adverse effects on threatened species;

(v) minimises disturbance of root systems of remaining vegetation;

(vi) does not result in the introduction of exotic weed species or pest animals;

(d) encouraging, and where appropriate, requiring active pest control and avoiding the grazing of such areas.

12.2.4.4 That clearance of limited areas of indigenous vegetation is provided for.

12.2.4.5 That the contribution of areas of indigenous vegetation and habitats of indigenous fauna to the overall biodiversity and amenity of the District be taken into account in evaluating applications for resource consents.

12.2.4.6 That support is given to programmes for weed and pest control, including support for community pest control areas established by the Northland Regional Council under the Regional Pest Management Strategies, in areas of significant indigenous vegetation and significant habitats of indigenous fauna and surrounding lands.

12.2.4.7 That community awareness of the need and reasons for protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna be promoted.

12.2.4.8 That restoration and enhancement of indigenous ecosystems is based on plants that would have occurred naturally in the locality and is sourced from local genetic stock where practicable.

12.2.4.9 That the Council will work with landowners and communities to ensure outcomes are achieved in an effective and equitable manner.

12.2.4.10 In order to protect areas of significant indigenous fauna:

(a) that dogs (excluding working dogs), cats, possums, rats, mustelids and other pest species are not introduced into areas with populations of kiwi, dotterel and brown teal;

(b) in areas where dogs, cats, possums, rats, mustelids and other pest species are having adverse effects on indigenous fauna their removal is promoted.

12.2.4.11 That when considering resource consent applications in areas identified as known high density kiwi habitat, the Council may impose conditions, in order to protect kiwi and their habitat.

12.2.4.12 That habitat restoration be promoted.

12.2.4.13 That the maintenance of riparian vegetation and habitats be recognised and provided for, and their restoration encouraged, for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna, preservation of natural character and the maintenance of general ecosystem health and indigenous biodiversity.

12.2.4.14 That when considering an application to clear areas of significant indigenous vegetation or significant habitats of indigenous fauna, enabling Maori to provide for the sustainable management of their ancestral land will be recognised and provided for by Council.

In order to give effect to these policies and objectives, we recommend that the following be incorporated into the proposed plan change:

- Retention of all existing wetland, forest and indigenous riparian vegetation.
- A weed management plan to be prepared for the Site by a suitably qualified and experienced ecologist and implemented effectively.

-
- A pest control plan for the Site to control feral cats, rats, possums and mustelids to be developed by a suitably qualified and experienced ecologist and implemented effectively.
 - The keeping of domestic pets at the Site to be banned.
 - A restoration planting plan for the Site to be prepared by a suitably qualified and experienced ecologist with the aim of restoring degraded habitat (particularly riparian habitats), buffering sensitive habitats such as wetlands and streams, connecting existing habitats and recreating appropriate habitats at the Site.
 - All indigenous vegetation and habitats (including newly created habitats) at the site to be formally protected either through the plan change or via covenanting.

Provided that these actions are undertaken effectively and consistently in accordance with site management plans prepared by a suitably qualified and experienced ecologist we consider that the objectives and policies of the Far North District Plan would be given effect to by the proposed plan change.

5.2 NORTHLAND REGIONAL POLICY STATEMENT

Objective 3.4 of the Northland Regional Policy Statement is to:

Safeguard Northland's ecological integrity by:

- a) Protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna;
- b) Maintaining the extent and diversity of indigenous ecosystems and habitats in the region; and
- c) Where practicable, enhancing indigenous ecosystems and habitats particularly where this contributes to the reduction in the overall threat status of regionally and nationally threatened species.

Policy 3.15 is to maintain and / or improve (amongst other matters) areas of significant indigenous vegetation and significant habitats of indigenous fauna by supporting, enabling and positively recognising active management arising from the efforts of landowners, individuals, iwi, hapū and community groups.

Objective 3.4 is supported by Policy 4.4.1 relating to the maintenance and protection significant ecological areas and habitats, specifically:

- (1) In the coastal environment, avoid adverse effects, and outside the coastal environment avoid, remedy or mitigate adverse effects of subdivision, use and development so they are no more than minor on:
 - (a) Indigenous taxa that are listed as threatened or at risk in the New Zealand Threat Classification System lists;
 - (b) Areas of indigenous vegetation and habitats of indigenous fauna, that are significant using the assessment criteria in Appendix 5;
 - (c) Areas set aside for full or partial protection of indigenous biodiversity under other legislation.
- (2) In the coastal environment, avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of subdivision, use and development on:
 - (a) Areas of predominantly indigenous vegetation;

(b) Habitats of indigenous species that are important for recreational, commercial, traditional or cultural purposes;

(c) Indigenous ecosystems and habitats that are particularly vulnerable to modification including estuaries, lagoons, coastal wetlands, dunelands, intertidal zones, rocky reef systems, eelgrass, northern wet heathlands, coastal and headwater streams, floodplains, margins of the coastal marine area and freshwater bodies, spawning and nursery areas and saltmarsh.

(3) Outside the coastal environment and where clause (1) does not apply, avoid, remedy or mitigate adverse effects of subdivision, use and development so they are not significant on any of the following:

(a) Areas of predominantly indigenous vegetation;

(b) Habitats of indigenous species that are important for recreational, commercial, traditional or cultural purposes;

(c) Indigenous ecosystems and habitats that are particularly vulnerable to modification, including wetlands, dunelands, northern wet heathlands, headwater streams, floodplains and margins of freshwater bodies, spawning and nursery areas.

(4) For the purposes of clause (1), (2) and (3), when considering whether there are any adverse effects and/or any significant adverse effects:

(a) Recognise that a minor or transitory effect may not be an adverse effect;

(b) Recognise that where the effects are or maybe irreversible, then they are likely to be more than minor;

(c) Recognise that there may be more than minor cumulative effects from minor or transitory effects.

(5) For the purpose of clause (3) if adverse effects cannot be reasonably avoided, remedied or mitigated then it maybe appropriate to consider the next steps in the mitigation hierarchy i.e. biodiversity offsetting followed by environmental biodiversity compensation, as methods to achieve Objective 3.4.

Objective 3.15 is supported by Policy 4.4.2 which is to support voluntary efforts of landowners and community groups, iwi and hapū, to achieve Objective 3.15.

Provided that the recommendations outlined above are implemented effectively and consistently across the Site then the proposed plan change would give effect to the objectives and policies included within the Northland Regional Policy Statement.

6. ASSESSMENT OF EFFECTS

The ecological values of the Site currently range from low to moderately high and are dispersed across the Site with the highest value habitats being the wetlands and remnants of volcanic forest. Some of the habitats present at the Site would be considered significant with respect to Appendix III of the Northland Regional Policy Statement and others comprise predominantly indigenous vegetation. There is considerable potential to improve the terrestrial, wetland and riparian ecological values at the Site, but the necessary management actions are unlikely to occur without the type of incentive provided by the proposed plan change.

The proposed plan change would change the current rural production zoning to a special purpose one which anticipates a higher intensity of development of an industrial and commercial (rather than residential) nature. Once any development takes place the current farming would cease and the level of human activity at the Site would increase. Any changes would be permanent.

Human activity brings with it an increase in weed and pest pressure as well as increased disturbance due to activity, lighting and noise. Development will also require earthworks and will likely also require disposal of stormwater and wastewater at the site. Other effects will depend on the type of development proposed.

These activities have the potential to adversely affect the ecological values at the site, but provided that the management actions described in Section 3 are implemented effectively, the effects of the proposal would generally be positive because livestock would be removed from the site, weeds and pests would be continuously managed, sensitive habitats would be restored and buffered from adjoining landuses, habitats would be connected across the site, additional habitat would be created (by planting) and instream aquatic habitats would be improved. These outcomes are consistent with the policies and objectives of the relative planning instruments.

7. REFERENCES

- Brook, F.J. 1996: Classification of the ecological districts of Northland. Unpublished report prepared for Northland Conservancy, Department of Conservation, Whangarei.
- Conning, L. and Miller, N. 1999. Natural areas of Kerikeri Ecological District Reconnaissance Survey Report for the Protected Natural Areas Programme. New Zealand Protected Natural Areas Programme 42. Department of Conservation, Northland Conservancy, Whangarei. 254 pp.
- de Lange, P.J., Rolfe, J.R., Barkla, J.W., Courtney, S.P., Champion, P.D., Perrie, L.R., Beadel, S.M., Ford, K.A., Breitwieser, I., Schonberger, I., Hindmarsh-Walls, R., Heenan, P.B., Ladley, K. 2018: Conservation status of New Zealand indigenous vascular plants, 2017. New Zealand Threat Classification Series 22. Department of Conservation, Wellington. 82 pp.
- Dunn, N.R., Allibone, R.M., Closs, G.P., Crow, S.K., David, B.O., Goodman, J.M., Griffiths, M., Jack, D.C., Ling, N., Waters, J.M., Rolfe, J.R. 2018. Conservation status of New Zealand freshwater fishes, 2017. New Zealand Threat Classification Series 24. Department of Conservation, Wellington. 11 pp.
- McEwen, W.M. 1987. Ecological Regions and Districts of New Zealand. Third Revised Edition in Four 1:500,000 Maps. New Zealand Biological Resources Centre, Department of Conservation, Wellington.
- Robertson, H.A., Baird, K., Dowding, J.E., Elliott, G.P., Hitchmough, R.A., Miskelly, C.M., McArthur, N., O'Donnell, C.F.J., Sagar, P.M., Scofield, R.P., Taylor, G.A. 2017. Conservation status of New Zealand birds, 2016. New Zealand Threat Classification Series 19. Department of Conservation, Wellington. 23 pp.

APPENDIX A Plant Species List

Latin Name	Common Name
Dicotyledonous trees and shrubs	
<i>Acacia melanoxylon</i> *	blackwood
<i>Acca sellowiana</i> *	feijoa
<i>Beilschmiedia tarairi</i>	taraire
<i>Berberis glaucocarpa</i> *	barbary
<i>Casuarina glauca</i> *	river oak
<i>Coprosma areolata</i>	thin leaved coprosma
<i>Coprosma grandifolia</i>	kanono
<i>Coprosma rhamnoides</i>	
<i>Coprosma robusta</i>	karamu
<i>Coprosma spathulata</i> subsp. <i>spathulata</i>	
<i>Cryptomeria japonica</i> *	Japanese cedar
<i>Cupressus macrocarpa</i> *	macrocarpa
<i>Dacrydium cupressinum</i>	rimu
<i>Dacrydium dacrydioides</i>	kahikatea
<i>Dysoxylum spectabile</i>	kohekohe
<i>Ficus carica</i> *	fig
<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>	hangehange
<i>Hedycarya arborea</i>	pigeonwood
<i>Knightia excelsa</i>	rewarewa
<i>Laurelia novae-zelandiae</i>	pukatea
<i>Leptospermum scoparium</i> var. <i>scoparium</i>	manuka
<i>Ligustrum sinense</i> *	small leaved privet, Chinese privet

<i>Meliccytus ramiflorus</i>	mahoe
<i>Myrsine australis</i>	mapou
<i>Podocarpus totara</i>	totara
<i>Pinus radiata</i> *	radiata pine
<i>Piper excelsum</i>	kawakawa
<i>Pittosporum tenuifolium</i>	kohuhu
<i>Populus deltoides</i> *	necklace poplar
<i>Pyrus communis</i> *	pear
<i>Salix fragilis</i> *	crack willow
<i>Schefflera digitata</i>	pate
<i>Solanum mauritianum</i> *	woolly nightshade
<i>Ulex europaeus</i> *	gorse
<i>Vitex lucens</i>	puriri
<i>Weinmannia silvicola</i>	towai
Lianes and climbers	
<i>Calystegia sepium</i> subsp. <i>roseata</i>	pink bindweed
<i>Freycinetia banksii</i>	kiekie
<i>Muehlenbeckia australis</i>	large-leaved pohuehue
<i>Metrosideros perforata</i>	akatea
<i>Ripogonum scandens</i>	supplejack
<i>Rubus fruticosus</i> agg.*	blackberry
<i>Tecomera capensis</i> *	cape honeysuckle
Dicot herbs	
<i>Anagallis arvensis</i> subsp. <i>arvensis</i> var <i>arvensis</i> *	pimpernel
<i>Anthemis cotula</i> *	stinking mayweed
<i>Apium nodiflorum</i> *	water celery

<i>Bellis perennis</i> *	lawn daisy
<i>Brassica rapa</i> var. <i>oleifera</i>	rape, wild turnip
<i>Chenopodium album</i> *	fathen
<i>Carduus tenuiflorus</i> *	winged thistle
<i>Cirsium vulgare</i> *	scotch thistle
<i>Coriandrum sativum</i> *	coriander
<i>Daucus carota</i> *	wild carrot
<i>Erigeron bonariensis</i> *	wavy-leaved fleabane
<i>Erigeron sumatrensis</i> *	broad-leaved fleabane
<i>Hydrocotyle heteromeria</i>	waxweed
<i>Leucanthemum vulgare</i> *	oxeye daisy
<i>Leontodon taraxacoides</i> *	dandelion
<i>Lotus pedunculatus</i> *	lotus
<i>Oenanthe pimpinelloides</i> *	parsley dropwort
<i>Persicaria decipiens</i>	
<i>Persicaria lapathifolia</i> *	
<i>Persicaria maculosa</i>	willow weed
<i>Phytolacca octandra</i> *	inkweed
<i>Plantago lanceolata</i> *	narrow-leaved plantain
<i>Plantago major</i> *	broad-leaved plantain
<i>Portulaca oleracea</i> *	purslane
<i>Prunella vulgaris</i> *	selfheal
<i>Ranunculus repens</i> *	creeping buttercup
<i>Rumex obtusifolius</i> *	broad leaved dock
<i>Senecio bipinnatisectus</i> *	Australian fireweed
<i>Senecio jacobaea</i> *	ragwort
<i>Senecio vulgaris</i> *	groundsel
<i>Solanum nigrum</i> *	deadly nightshade

<i>Solanum pseudocapsicum</i> *	Jerusalem cherry
<i>Sonchus asper</i> *	prickly sow thistle
<i>Sonchus oleraceus</i> *	sow thistle
<i>Stachys sylvatica</i> *	hedge woundwort
<i>Trifolium pratense</i> *	red clover
<i>T. repens</i> *	white clover
<i>Verbena bonariensis</i> *	purple top
<i>Veronica persica</i> *	scrambling speedwell
<i>Viola odorata</i> *	violet
Herbaceous monocots	
<i>Agapanthus praecox</i> subsp. <i>orientalis</i> *	agapanthus
<i>Astelia hastata</i>	perching lily
<i>Crocasmia x crocosmiiflora</i>	montbretia
<i>Lemna disperma</i>	common duckweed
<i>Potamogeton cheesemanii</i>	red pondweed
<i>Tradescantia fluminensis</i> *	wandering jew
<i>Zantedeschia aethiopica</i> *	arum lily
Monocot trees and shrubs	
<i>Bambusa oldhamii</i> *	Oldham's bamboo
<i>Cordyline australis</i>	ti kouka, cabbage tree
<i>Phormium tenax</i>	harakeke, New Zealand flax
<i>Phyllostachus aurea</i> *	walking stick bamboo
<i>Rhopalostylis sapida</i>	nikau
Grasses, sedges and rushes	
<i>Agrostis capillaris</i> *	browntop

<i>Bromus willdenowii</i> *	prairie grass
<i>Carex geminata</i>	rautahi
<i>Carex uncinata</i>	hook sedge
<i>Carex virgata</i>	swamp sedge, pukio
<i>Cenchrus clandestinus</i> *	kikuyu
<i>Cortaderia selloana</i> *	pampas
<i>Cyperus ustulatus</i>	giant umbrella sedge
<i>Dactylis glomerata</i> *	cocksfoot
<i>Digitaria sanguinalis</i> *	summer grass
<i>Echinochloa crus-galli</i> *	barnyard grass
<i>Ehrharta erecta</i> *	veldt grass
<i>Eleusine indica</i> *	crow's foot grass
<i>Holcus lanatus</i> *	Yorkshire fog
<i>Isachne globosa</i> *	swamp millet
<i>Juncus effusus</i> var. <i>effusus</i> *	soft rush
<i>Juncus pallidus</i>	leafless rush
<i>Lolium perenne</i> *	perennial ryegrass
<i>Machaerina teretifolia</i>	
<i>Oplismenus hirtellus</i> var. <i>imbecilis</i>	
<i>Paspalum dilatatum</i> *	paspalum
<i>Phleum pratense</i> *	timothy
<i>Poa annua</i> *	annual poa
<i>Schoenoplectus tabernaemontani</i>	kuawa
<i>Typha orientalis</i>	raupo
<i>Zea mays</i> *	maize
Ferns and Fern Allies	
<i>Asplenium flaccidum</i>	hanging spleenwort
<i>Asplenium oblongifolium</i>	shining spleenwort

<i>Asplenium polyodon</i>	sickle spleenwort
<i>Cyathea dealbata</i>	silver fern
<i>Cyathea medullaris</i>	mamaku
<i>Dicksonia squarrosa</i>	rough tree fern, wheki
<i>Doodia australis</i>	rasp fern
<i>Microsorium pustulatum</i>	hounds tongue fern
<i>Microsorium scandens</i>	mokimoki, fragrant fern
<i>Notogrammitis billardierei</i>	common strap fern
<i>Paesia scaberula</i>	ring fern
<i>Parablechnum minus</i>	swamp kiokio
<i>Parablechnum novae-zelandiae</i>	kiokio
<i>Parapolystichum microsorium</i> subsp. <i>pentangulare</i>	
<i>Pteridium esculentum</i>	bracken
<i>Pyrrhosia elaeagnifolia</i>	leather-leaf fern

*denotes introduced and naturalised species

APPENDIX B
Bird Species List

Latin name	Common name
<i>Acridotheres tristis</i> *	Indian myna
<i>Alauda arvensis</i> *	skylark
<i>Anthus novaeseelandiae</i>	New Zealand pipit
<i>Carduelis carduelis</i> *	European goldfinch
<i>Circus approximans</i>	Australasian harrier
<i>Gerygone igata</i>	grey warbler
<i>Gymnorhina tibicen</i> *	Australian magpie
<i>Passer domesticus</i> *	house sparrow
<i>Phasianus colchicus</i> *	ring-necked pheasant
<i>Porphyrio melanotus</i> *	pukeko
<i>Platycercus eximius</i>	eastern rosella
<i>Prothemadera novaeseelandiae</i>	tui
<i>Rhipidura fuliginosa placabilis</i>	fantail
<i>Todiramphus sanctus</i>	kingfisher
<i>Turdus philomelos</i> *	song thrush

*denotes introduced and naturalised species