



R2948

# ASSESSMENT OF FOUR POTENTIAL ECOLOGICAL SITES OR EXTENSIONS, KAPITI COAST DISTRICT



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# Assessment of Four Potential Ecological Sites or Extensions, Kapiti Coast District

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Contract Report No. 2948

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**Reviewed and approved for release by:**



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## 1. INTRODUCTION

The Kapiti Coast District Plan contains a Heritage Register which lists ecological, geological and heritage sites. Kapiti Coast District Council is currently reviewing and updating the District Plan and, as part of this project, commissioned Wildland Consultants to undertake an assessment of four potential ecological or heritage sites or potential extensions to existing ecological sites selected by Council staff for inclusion and protection under the Plan. Sites include:

- Potential ecological/heritage sites;
- Extension of existing sites;
- Amendment of existing sites.

Wildland Consultants previously undertook similar surveys for Kapiti Coast District Council in 2003 and 2007.

## 2. OBJECTIVES

The primary objectives of this project are to:

- Survey each potential site to collect ecological information;
- Assess each site to determine whether it is significant and its level of ecological significance using criteria consistent with Policy 22 of the Proposed Regional Policy Statement, Policy 3.7 of the Draft Kapiti Coast District Plan and the Greater Wellington for Determining Significance (Appendices 1, 2, and 3);
- Assess one site for ethno-botanic values;
- Accurately define the boundaries of the sites using GPS and aerial photography;
- Rank each site according to the above criteria (Appendix 4);
- Make a recommendation, with a statement of justification, as to whether or not each site should be included in the Heritage Register as an ecological site.

## 3. METHODS

Background and existing information on the sites was collated, and access and landowner contact details were discussed with Council staff.

Fieldwork was undertaken in June and July 2012. Four sites were visited during the survey, one of which was viewed from the road only. A further three sites selected by Council for inclusion in this study were not visited because permission to access the sites was not given.

Field survey sites are listed below:

- Site 1 - *Te Horo Gravel Beach*: A 4.5 km stretch of beach between Te Horo Beach settlement and the mouth of the Otaki River. Gravel beach systems are historically rare and increasingly under threat.
- Site 2 - *Forest Lakes Mahinga Kai (Orchard)*: A lowland forest remnant within and adjacent to ecosite number K218 that may be the remnants of a historic titoki/karaka mahinga kai (orchard).
- Site 3 - *Forest Lakes Canal/Drain*: A *Carex* swamp either side of a canal/drain exiting from Lake Waitawa (ecosite number K009).
- Site 4 - *Te Hapua Road Forest*: A small lowland forest remnant south of Te Horo.

Figures illustrating these sites can be found in Appendix 5 and colour plates are in Appendix 7.

The following information was collected at each site:

- A brief description of the site, dominant vegetation, species composition and habitat types (Appendix 4);
- Observed fauna (indigenous and introduced);
- Threats from invasive flora and fauna;
- Effects of human activity and management requirements;
- Rank the significance of each habitat against Regional Council and District Council criteria (Appendix 4).

At the potential mahinga kai site information was collected on the presence/absence of anomalous species, and correlation with archaeological sites as described in Stowe (2007).

All sites have been mapped in ArcMap Version 9 and digital GIS shapfiles with an associated attribute table have been supplied to the Council.

## 4. RESULTS

Tables with the results of the significance assessments are presented in Appendix 4. An abridged form of these is contained in the attribute table associated with the ArcMap shapefile. Three sites (Forest Lakes Mahinga Kai (Orchard), Forest Lakes Canal/Drain, and Te Horo Gravel Beach) abut or overlap existing ecological sites on the Heritage Register of the Kapiti Coast District plan. Where an overlap occurs it will be necessary for Council officers to edit the shapefile polygons accordingly.

## 4.1 Te Horo Gravel Beach

This 4.5 km gravel beach is the only example of its kind in the Foxton Ecological District. Gravel beaches are naturally rare ecosystems (Williams *et al.* 2007), occurring only when there is a sufficient supply of gravel sediment either from rivers or coastal cliffs. Williams *et al.* (2007) defined New Zealand's naturally uncommon ecosystems as those with an estimated maximum total area of <0.5% of New Zealand's land area. Holdaway *et al.* (2012) have assessed gravel beaches as having a threat status of Endangered, because of their continuing reduction in ecological function as a result of weed invasion and loss of indigenous vegetation cover.

The Te Horo Beach has experienced a loss of indigenous vegetation and invasion by exotic plants since early European arrival. Cockayne (1911) described the vegetation of dunelands throughout New Zealand although he said nothing specifically about gravel beach environments. The dunes of the Manawatu and Kapiti coasts were already greatly modified when he arrived in the area, which had been settled 50 or 60 years earlier. By 1957 Carnahan, writing about the coastal dunes of the area, listed very few indigenous plants, indicating that after 100 years of settlement, indigenous ecosystems were not faring well.

Gravel beaches further south in Cook Strait Ecological District and also those east of Wellington Harbour have been surveyed extensively by botanists (Clelland 1984; Orchard 1995; Wassilief no date; Druce 1972; and Sawyer and Rebergen 2000). However, because those beaches are generally wider, below cliffs, or remote from farmland (e.g. Onoke Spit) they tend to have less pressure from weeds. Abiotic factors, particularly the composition of the substrate, are major influences on the growth and establishment of gravel beach plants (Wiser *et al.* 2010). Like the gravel coast between Makara and Titahi Bay, Te Horo Beach has a large amount of driftwood deposited over the beach gravels, and this may also influence the species composition. The driftwood comprises not only large logs (valued by locals for firewood) but also smaller debris that forms a thick mat behind the storm berm (Plate 1, Appendix 7).

This site is of local significance (see Appendix 4) based on meeting thresholds described in Appendix 3. It is feasible to restore this site and it is recommended for inclusion on the Heritage Register.

## 4.2 Forest Lakes Mahinga Kai (Orchard)

Kapiti Coast District Council asked Wildlands to survey this site to see if there was any evidence that it was a Mahinga kai (orchard). Note that this site overlaps with proposed eco-site K218 (Figure 3, Appendix 5). The horse paddock portion of the site was also assessed for ecological significance. The portion of the potential Mahinga kai within proposed eco-site K218 has been previously assessed for ecological significance (Wildlands 2007).

### 4.2.1 Evidence of Maori arboriculture

Evidence for Māori sites of plant cultivation include: the occurrence of species outside their normal distributional range (excluding contemporary planting or

naturalisation) or; an anomalous ecological context (Stowe 2007). Distribution information can be augmented with data on nearby archaeological sites and the co-occurrence of other plants of ethno-botanical significance (see Table 1). The term cultivation can encompass a broad spectrum of practices, from weeding around naturally occurring ‘wild’ plants to full domestication.

Table 1: List of indigenous plant species for which the co-occurrence may indicate that a site is an area of historic Māori cultivation (from Stowe 2007).

| Maori Name        | Scientific Name                               |
|-------------------|---|
| Karaka            | <i>Corynocarpus laevigatus</i>                |
| Titoki            | <i>Alectryon excelsus</i>                     |
| Whau              | <i>Entelea arborescens</i>                    |
| Tawa              | <i>Beilschmiedia tawa</i>                     |
| Pōhutukawa        | <i>Metrosideros excelsa</i>                   |
| Kowhai            | <i>Sophora</i> spp.                           |
| Ti                | <i>Cordyline</i> spp.                         |
| Puka              | <i>Meryta sinclairii</i>                      |
| Koromiko          | <i>Hebe salicifolia</i> and allied spp.       |
| Titirangi, napuka | <i>Hebe speciosa</i>                          |
| Kakabeak          | <i>Clianthus puniceus</i> , <i>C. maximus</i> |
| Kanuka            | <i>Kunzea</i> spp.                            |
| Tutu              | <i>Coriaria</i> spp.                          |
| Poroporo          | <i>Solanum</i> spp.                           |
| Akeake            | <i>Dodonea viscosa</i>                        |
| Totara            | <i>Podocarpus totara</i>                      |
| Hinau             | <i>Elaeocarpus dentatus</i>                   |
| Rewarewa          | <i>Knightsia excelsa</i>                      |

Of the above species, the remnant forest at Forest Lakes includes titoki, karaka (*Corynocarpus laevigatus*), ti kouka, and tawa (Plates 2, 3, and 4, Appendix 7). However, these species are common components of coastal forest in the district. Although it is outside its natural distributional range, karaka has been naturalised in Kapiti forests for many years. This makes it difficult to discern whether or not these particular specimens are anomalous. The titoki and karaka emerge high above the current forest canopy of kohekohe (*Dysoxylum spectabile*), karaka and mahoe (*Melicytus ramiflorus*), indicating that they are probably considerably older than the rest of the forest (Plate 3), while the tawa trees, which are in the southern part of the forest, are not emergent above the canopy and are of lower stature than the emergent titoki and karaka.

The Kapiti Coast District Plan Heritage Register contains a list of archaeological sites in the district, none of which are close to Forest Lakes (Figure 1). However, this does not rule out the possibility that there was Maori habitation and possibly also cultivation at this site.

Further research by a suitably qualified ethno-botanist may show that this is a mahinga kai site. Whether it is then registered as an ecological site or an archaeological site is a matter for District Planners to decide.





Figure 1: Forest Lakes potential mahinga kai site (green dots) and the nearest archaeological site from the District Plan Heritage Register (red dot). The dashed line (top right) marks the Kapiti District northern boundary.

#### 4.2.2 Ecological significance of trees in the horse paddock

The trees in the horse paddock are not ecologically significant according to the Greater Wellington Regional Council and Kapiti Coast District Plan criteria (Appendix 4).

### 4.3 Forest Lakes Canal/Drain

This relict canal historically drained Lake Waitawa. The lake is currently listed on the Heritage Register as Ecosite K009. The lake exit is now at the top of the canal close to the lake and connects to Waitohu Stream several kilometres away. Trophic level indicators show that the lake is now supertrophic (Perrie and Milne 2012) and this is likely to apply to the canal as well. The lake and canal are one of four registered coarse fishing sites in the Wellington region.

This site comprises the canal (Plate 5), plus wetlands that buffer both the canal and Lake Waitawa (Plates 6 and 7). The canal is approximately 10 m wide and 350 m long, and the banks have a dense cover of *Carex secta*. There is a second reach of the canal south of the Conference Centre driveway. However, this reach is extremely degraded and is not considered ecologically significant. The wetlands comprise harakeke (*Phormium tenax*) flaxland, purei (*Carex secta*) sedgeland, raupo (*Typha orientalis*) reedland, raupo/ti kouka (cabbage tree; *Cordyline australis*) reed-treeland, *Juncus edgariae*/harakeke rush-flaxland, and *Salix* spp. treeland (Figure 3, Appendix 5).

There is a Department of Conservation record for dabchick (*Poliiocephalus rufopectus*, threat status Nationally Vulnerable (Miskelly *et al.* 2008), at Forest Lakes (Wildland Consultants 2003).

The brief for this project was restricted to the canal. However, the wetland was included in the assessment, and it is also significant due to its size, shape, and its high level of indigenous plant cover, and because it provides important habitat for dabchick, and buffering and connectivity with Lake Waitawa. For these factors, the wetland area has been included in the canal site and the whole site is recommended for inclusion on the Heritage Register as of regionally significance.

#### 4.4 Te Hapua Road Forest

This small 0.1 ha site was surveyed from the road as permission to access the site was not granted by the landowner. It contains lowland forest, with karaka, rewarewa (*Knightia excelsa*), and tawa (*Beilschmiedia tawa*) emergent over a diverse canopy (Plate 8, Appendix 7). The canopy includes both indigenous and exotic plant species, for example nīkau (*Rhopalostylis sapida*) and *Magnolia* species. The northern and western edges form part of a large garden (Plate 9).

This site appears to be in good condition, although weeds may be present in the understorey (this could not be determined from the road). Although it only contains limited elements typical of the lowland forest of Foxton Ecological District, such remnant forest is acutely threatened (LENZ) and this site is within 500 m of two other larger forest remnants, therefore it is recommended for inclusion on the Heritage Register as locally significant.

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## CRITERIA: PROPOSED RPS AND KAPITI COAST DISTRICT COUNCIL DRAFT PLAN REVIEW

Policy 22 Proposed Regional Policy Statement (Version incorporating decisions from hearings, May 2010)

Identifying indigenous ecosystems and habitats with significant indigenous biodiversity values - district and regional plans

District and regional plans shall identify indigenous ecosystems and habitats with significant indigenous biodiversity values that meet one or more of the following criteria:

- (a) Representativeness: high representativeness values are given to particular ecosystems and habitats that were once typical and commonplace in a district or in the region, and:
  - (i) are no longer commonplace (less than about 30% remaining); or
  - (ii) are poorly represented in existing protected areas (less than about 20% legally protected).
- (b) Rarity: the ecosystem or habitat has biological physical features that are scarce or threatened in a local, regional or national context. This can include individual species, rare and distinctive biological communities and physical features that are unusual or rare.
- (c) Diversity: the ecosystem or habitat has a natural diversity of ecological units, ecosystems, species and physical features within an area.
- (d) Ecological context of an area: the ecosystem or habitat:
  - (i) enhances connectivity or otherwise buffers representative, rare or diverse indigenous ecosystems and habitats; or
  - (ii) provides seasonal or core habitat for protected or threatened indigenous species.
- (e) Tangata whenua values: the ecosystem or habitat contains characteristics of special spiritual, historical or cultural significance to tangata whenua, identified in accordance with tikanga Maori.

### 8.1.1 Explanation

Policy 22 sets out criteria as guidance that must be considered in identifying indigenous ecosystems and habitats with significant biodiversity values. These criteria need to be considered in all assessments but the relevance of each will depend on the individual cases.

Policy 22 will ensure that significant biodiversity values are identified in district and regional plans in a consistent way. Wellington Regional Council, and district and city councils are required to assess indigenous ecosystems and habitats against all the criteria. To be identified as having significant biodiversity values, an indigenous ecosystem or habitat must fit one or more of the listed criteria.

Regional plans will identify indigenous ecosystems and habitats with significant biodiversity values in the coastal marine area, wetlands and the beds of *lakes* and *rivers*. District plans will identify indigenous ecosystems and habitats with significant

biodiversity values for all land, except the *coastal marine area* and the beds of lakes and rivers.

### Kapiti Coast District Plan Review Draft Eco-Site Criteria Policy 3.7 - Identify Significant Biodiversity

Significant indigenous vegetation and significant habitats of indigenous fauna in the District will be identified by using the following criteria:

- a) Representativeness;
- b) Rarity;
- c) Diversity;
- d) Distinctiveness;
- e) Ecological context of an area;
- f) Tangata whenua values; and
- g) Sustainability and resilience.

#### Explanation

To protect *natural areas and features* including areas and remnants of *significant indigenous vegetation* and *significant habitats of indigenous fauna*, they must first be identified.

Assessment will be against all the criteria listed and the determination of significance will be undertaken or peer reviewed by a suitably qualified person (as determined by Council's Sustainable Development Manager).

Section 6(c) of the RMA requires protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna, therefore the District Plan must identify indigenous ecosystems and habitats with significant biodiversity values for all land, except where Regional Council justification applies.

#### Draft Criteria Definitions

- Representativeness: high representativeness values are given to particular ecosystems and habitats that were once typical and commonplace in a district or in the region, and:
  - a) are no longer commonplace (less than about 30% remaining); or
  - b) are poorly represented in existing protected areas (less than about 20% legally protected).
- Rarity: the ecosystem or habitat has biological physical features that are scarce or threatened in a local, regional or national context. This can include individual species, rare and distinctive biological communities and physical features that are unusual or rare.
- Diversity: the ecosystem or habitat has a natural diversity of ecological units, ecosystems, species and physical features within an area.
- Distinctiveness: the ecosystem, habitat or species contains a large/dense population of viable species or is largely in its natural state or restorable, or is an uninterrupted ecological sequence, or contains significant land forms.
- Continuity and linkage within landscape: provides, or has potential to provide, corridor/ buffer zone to an existing area.

- Landscape integrity: the significance to the original character of the landscape, or its isolation (does it stand out or blend in), or whether it has a role in landscape protection
- Ecological context of an area: the ecosystem or habitat:
  - a) enhances connectivity or otherwise buffers representative, rare or diverse indigenous ecosystems and habitats;
  - b) provides seasonal or core habitat for protected or threatened indigenous species;
  - c) has the ability to be restored (when the difficulty, cost and time of restoration are considered).
- Tangata whenua values: the ecosystem or habitat contains characteristics of special spiritual, historical or cultural significance to tangata whenua, identified in accordance with tikanga Maori, which may include factors such as:
  - a) traditionally important for Maori;
  - b) recreational values;
  - c) significant landscape value;
  - d) protection of soil values;
  - e) water catchment protection;
  - f) recreation or tourism importance;
  - g) aesthetic coherence.
- Sustainability and Resilience: factors contributing to the long term viability of the feature and its contribution to the wider natural environment:
  - a) size and shape of area;
  - b) activities occurring on the boundaries which may affect its sustainability;
  - c) adjoins another protected area;
  - d) links (actual or potential) with other ecosystems, habitat or species; or
  - e) easily managed.

GREATER WELLINGTON SIGNIFICANCE ASSESSMENT CRITERIA - WETLAND EXAMPLES

| Rank | Representativeness   |   | Rarity   |   |  | Diversity   | Context  |   |
|------|--|---|--|---|--|---|--|---|
|      | 1 Representative   | 2 LENZ  | 3 Habitats   | 4 Flora   | 5 Fauna  | 6 Communities   | 7 Connectivity   | 8 Seasonal patterns   |
| 5    | Wetlands that are typical and characteristic of those originally present prior to human occupation; or a wetland that is the best example of its type remaining in the region.<br><b>Example:</b> Lake Kohangatera   | Acutely Threatened<br><b>Example:</b> Muaupoko Swamp Forest               | Large and diverse indigenous communities and habitats that are rare / uncommon.<br><b>Example:</b> Allen - Lowes Bush              | Large and diverse populations / communities of threatened / uncommon flora.<br><b>Example:</b> Mt Cone Turf Bog   | Large and diverse populations / communities of threatened / uncommon fauna..<br><b>Example:</b> Wairarapa Moana Wetlands                                       | A high diversity of indigenous and structural classes (5+) and a high diversity of species of flora and fauna.<br><b>Example:</b> Te Hapua Swamp Complex A                        | Key part of extensive system of wetlands and waterways that may extend uninterrupted from the wetland margins to forests, coasts and rivers that is functionally natural, largely intact and well buffered.<br><b>Example:</b> Lake Pounui | Large and diverse seasonal population of migrant birds and / or a core breeding habitat for more than three threatened or protected resident species.<br><b>Example:</b> Waikanae Saltmarsh   |
| 4    | Wetlands that are typical and characteristic of those originally present prior to human occupation, but where parts of the wetland are not in original condition; or a wetland that is the best example of its type remaining in the ecological district.<br><b>Example:</b> Taupo Swamp | Chronically Threatened<br><b>Example:</b> Tora Coast Wetlands             | Several indigenous communities and habitats that are rare / uncommon.<br><b>Example:</b> Te Hapua Swamp Complex A                  | A small number of two or more nationally threatened species, or large numbers of a regionally threatened species of rare flora.<br><b>Example:</b> Waikanae Saltmarsh | A small number of two or more nationally threatened species, or large numbers of a regionally threatened species of rare fauna.<br><b>Example:</b> Lake Pounui | All the types of above but of a smaller scale ( 5+) or a high diversity of species of flora and fauna within a wetland of lower type diversity.<br><b>Example:</b> Huritini Swamp | All the elements of above but of a smaller scale (< 10 ha wetland). Is buffered from adjoining land uses at least in part, by native vegetation.<br><b>Example:</b> Taupo Swamp  | Small numbers of a variety of migrant species, and / or large numbers of a single migrant species relies on site and/or an important breeding habitat for between 1 and 3 threatened or protected resident species.<br><b>Example:</b> Te Harakeke Wetlands |
| 3    | Wetlands that are typical and characteristic examples of the original or current natural diversity of wetland types in the ecological district (but not the best examples remaining).<br><b>Example:</b> Lake Wairongomai Wetlands   | At Risk (20-30%)<br><b>Example:</b> Wainuiomata Waterworks Swamp          | A single rare / uncommon indigenous habitat / community recorded<br><b>Example:</b> El Rancho Wetlands                             | A small number of one or more regionally threatened species, or large numbers of locally threatened species of flora.<br><b>Example:</b> Kakaho Saltmarsh             | A small number of one or more regionally threatened species, or large numbers of locally threatened species of fauna.<br><b>Example:</b> Taumata Oxbow         | Moderate diversity of wetland types and structural classes (3-5) with a high indigenous component and moderate species diversity.<br><b>Example:</b> Osbournes Swamp              | A physical connection (stream, drain, bush) to other nearby waterbodies but modification limits ecological service, unlikely to buffer or enhance other sites. Has limited buffering.<br><b>Example:</b> Lake Wairongomai                  | Records of breeding by a threatened or protected species, and or a record of an itinerant migrant.<br><b>Example:</b> Lake Wairongomai Wetlands   |
| 2    | Wetlands that retain only limited elements that are typical of the natural diversity of an ecological district.<br><b>Example:</b> Pylon Swamp   | Critically Under protected (>30%)<br><b>Example:</b> Opouawe River Swamp  | No rare / uncommon habitat / community recorded (but habitat may support rarity >3 ha)<br><b>Example:</b> Te Hapua Swamp Complex D | A small number of one or more locally threatened species of flora.<br><b>Example:</b> Hutt River Mouth  | A small number of one or more locally threatened species of fauna.<br><b>Example:</b> Huritini Swamp   | Low diversity of wetland types and structural classes (2-3) and low species diversity.<br><b>Example:</b> Andrews Pond  | No physical connection to other waterbodies or indigenous vegetation but other wetland sites in close proximity (0.5 - 1 km). Is poorly buffered.<br><b>Example:</b> Andrews Pond  | No migrants recorded but the habitat is likely to support their presence.<br><b>Example:</b> Lake Waimanguru - Forest Lakes   |
| 1    | Wetlands that contain little or no elements that are representative of the natural diversity of an ecological district.<br><b>Example:</b> Hutt River Mouth  | Under protected or No Threat Category<br><b>Example:</b> Mt Cone Turf Bog | No rare / uncommon habitat / community recorded. Site small to very small.<br><b>Example:</b> Ladel Bend Wetland                   | No rare or uncommon flora recorded.<br><b>Example:</b> Karori Dam   | No rare or uncommon fauna recorded.<br><b>Example:</b> Sims Wetland  | Wetland monoculture 1-2 wetland types and structural classes, and low species diversity.<br><b>Example:</b> Okiwai Lagoon   | No physical connection to other waterbodies or indigenous vegetation and very isolated (>1 km). Has little or no buffering from adjoining land uses.<br><b>Example:</b> Taumata Oxbow  | No migrants recorded (and visible habitat unlikely to support)<br><b>Example:</b> Pylon Swamp   |

## THRESHOLDS FOR DETERMINING THE LOCAL, REGIONAL AND NATIONAL SIGNIFICANCE OF WETLANDS IN THE WELLINGTON REGION

| Significance Level | Threshold   |
|--------------------|---|
| National           | <p>A score of '5' in any of the following significance criteria described in Appendix 2:</p> <ul style="list-style-type: none"> <li>- Representative</li> <li>- Habitats</li> <li>- Flora</li> <li>- Fauna</li> <li>- Communities.</li> </ul>   |
| Regional           | <p>A score of '4' in any of the following significance criteria described in Appendix 2:</p> <ul style="list-style-type: none"> <li>- Representative</li> <li>- Habitats</li> <li>- Flora</li> <li>- Fauna</li> <li>- Communities.</li> </ul> <p><u>OR</u></p> <p>Three or more scores of '3' in any of the following significance criteria described in Appendix 2:</p> <ul style="list-style-type: none"> <li>- Representative</li> <li>- Habitats</li> <li>- Flora</li> <li>- Fauna</li> <li>- Communities.</li> </ul> |
| Local              | A score of '2' in any of the significance criteria described in Appendix 2.   |



## SIGNIFICANCE ASSESSMENT AND RANKING OF SITES SURVEYED

Key

|   |  |
|---|--|
| <b>KCDC_SITE</b> , KCDC site ID           | <b>GWRC_DB</b> , Greater Wellington databases                            |
| <b>SITE_NAME</b> , Site name              | <b>RECENT_REF</b> , Most recent reference                                |
| <b>SITE_SUMM</b> , Site summary           | <b>REPRSNT</b> , Representativeness                                      |
| <b>GRID_REF_X</b> , Grid reference X      | <b>LENZ_THRET</b> , LENZ threat  |
| <b>GRID_REF_Y</b> , Grid reference Y      | <b>HABITATS</b> , Habitats   |
| <b>LOCAL_AUTH</b> , Local authority       | <b>FLORA</b> , Flora   |
| <b>STATUS</b> , Status                    | <b>FAUNA</b> , Fauna   |
| <b>AREA_HA</b> , Site area ha             | <b>COMMUNITS</b> , Communities   |
| <b>ADJAC_LAND</b> , Adjacent land use     | <b>CONNECT</b> , Connectivity  |
| <b>CONDITION</b> , Condition              | <b>MGRNT_BIRD</b> , Migrant birds - Seasonal patterns                    |
| <b>LAND_MGNT</b> , Land management issues | <b>SIGNIFI_LEV</b> , Significance level score: national, regional, local |
| <b>REFS</b> , References                  | <b>SIGNIF_JUST</b> , Significance justification                          |
| <b>REPRESENTNES</b> , Representativeness  | <b>DIVERSITY</b> , Diversity   |
| <b>RARITY</b> , Rarity                    | <b>ECO_CONTXT</b> , Ecological context                                   |

Regional Significance Assessments

| <b>TE HORO GRAVEL BEACH</b> |   |
|-----------------------------|---|
| <b>KCDC_SITE</b>            | K231  |
| <b>SITE_NAME</b>            | Te Horo Gravel Beach.   |
| <b>SITE_SUMM</b>            | 4.5 km long gravel beach south of the Otaki River. Approx. 100 m wide strip behind a driftwood-covered storm berm backed by sand dunes. Vegetation grades from turf and mat plants to windshorn shrubs and trees. |
| <b>GRID_REF_X</b>           | NZTM East 1783452.7.  |
| <b>GRID_REF_Y</b>           | NZTM North 5489178.9.   |
| <b>LOCAL_AUTH</b>           | Kapiti Coast District Council.  |
| <b>STATUS</b>               | Mixed ownership, Territorial Authority and Private.   |
| <b>AREA_HA</b>              | 13.35   |
| <b>ADJAC_LAND</b>           | Pasture, horticulture and urban.  |
| <b>CONDITION</b>            | Poor. Extensive weeds, few indigenous plants, damaged by vehicle traffic in places.   |
| <b>LAND_MGNT</b>            | Weeds.  |
| <b>REFS</b>                 | Wiser S. <i>et al.</i> 2010: Journal of Vegetation Science; Holdaway R.J. <i>et al.</i> 2012: Conservation Biology.   |
| <b>GWRC_DB</b>              | NA.   |
| <b>RECENT_REF</b>           | None.   |
| <b>REPRSNT</b>              | 2 - retains only limited elements that are typical and characteristic of a gravel beach in the region.  |
| <b>LENZ_THRET</b>           | Chronically Threatened (Acutely Threatened adjacent to township).   |
| <b>HABITATS</b>             | 3 - an uncommon indigenous habitat (gravel beach, >3 ha), may support rarity.   |
| <b>FLORA</b>                | 1 - No rare or uncommon flora recorded.   |
| <b>FAUNA</b>                | 1 - No rare or uncommon fauna recorded.   |
| <b>COMMUNITS</b>            | 2 - Low diversity of vegetation types (grassland, gravelfield, herbfield, shrubland) and low species diversity.   |
| <b>CONNECT</b>              | 3 - Physical connection to Otaki River Estuary and Mangaone Stream, has limited buffering.  |
| <b>MGRNT_BIRD</b>           | 2 - No migrants recorded but the habitat is likely to support their presence in low numbers.  |
| <b>SIGNIFI_LEV</b>          | Locally significant - score of 2 in any of the significance criteria above.   |
| <b>SIGNIF_JUST</b>          | Uncommon habitat, good connectivity for birds.  |
| <b>REPRESENTNES</b>         | Poorly represented in existing KCDC protected areas.  |

| <b>TE HORO GRAVEL BEACH</b> |  |
|-----------------------------|--|
| RARITY                      | Physical features scarce in a national context and within the Ecological District, but not within the Wellington Region. |
| DIVERSITY                   | Low indigenous plant diversity.  |
| ECO_CONXT                   | Has the ability to be restored.  |

| <b>FOREST LAKES MAHINGA KAI (ORCHARD) HORSE Paddock AREA ONLY</b> |  |
|---|--|
| KCDC_SITE   | K232   |
| SITE_NAME   | Forest Lakes Mahinga Kai (orchard).  |
| SITE_SUMM   | A cluster of karaka and titoki trees of considerable height indicating great age. The majority of these are in pasture while the remainder are part of a, possibly younger, forest ecosystem. Overlaps with proposed Ecosite K218. |
| GRID_REF_X  | 1783452.7  |
| GRID_REF_Y  | 5489178.9  |
| LOCAL_AUTH  | KCDC   |
| STATUS  | Private  |
| AREA_HA   | 1.08 ha  |
| ADJAC_LAND  | Pasture, forest.   |
| CONDITION   | Poor, all trees are exposed to wind, some are dead, most show signs of stress.   |
| LAND_MGNT   | Exposed to wind.   |
| REFS  | Stowe 2007.  |
| GWRC_DB   | None   |
| RECENT_REF  | None   |
| REPRSNT   | None   |
| LENZ_THRET  | 5 - Acutely Threatened.  |
| HABITATS  | N/A  |
| FLORA   | N/A  |
| FAUNA   | N/A  |
| COMMUNITS   | N/A  |
| CONNECT   | N/A  |
| MGRNT_BIRD  | N/A  |
| SIGNIFI_LEV   | None   |
| SIGNIF_JUST   | N/A  |
| REPRESENTNES  | N/A  |
| RARITY  | N/A  |
| DIVERSITY   | N/A  |
| ECO_CONXT   | N/A  |
| TANGATAWHEN   | The appearance of a species in an anomalous ecological context. Possibly traditionally important to Māori.   |

| <b>FOREST LAKES CANAL/DRAIN</b> |  |
|---------------------------------|--|
| KCDC_SITE                       | K233   |
| SITE_NAME                       | Forest Lakes Canal/Drain.  |
| SITE_SUMM                       | This canal originally drained Lake Waitawa. Lake exit is now on the canal near the lake. Surrounded by wetlands that buffer the canal and lake. Contains perch, tench and rudd for coarse fishery. |
| GRID_REF_X                      | E1783201   |
| GRID_REF_Y                      | N5489230   |
| LOCAL_AUTH                      | Kapiti Coast District Council.   |
| STATUS                          | Private.   |
| AREA_HA                         | 4.84 ha  |
| ADJAC_LAND                      | Lake, horse pasture, residential.  |
| CONDITION                       | Poor, grazing, terrestrial and aquatic weeds, introduced fish, supertrophic, cyanobacteria, long residence time (~351 days).   |
| LAND_MGNT                       | Grazing pressure, terrestrial and aquatic weeds.   |

| <b>FOREST LAKES CANAL/DRAIN</b> |   |
|---------------------------------|---|
| REFS                            | Wildlands 2003, dabchick.   |
| GWRC_DB                         | Unknown.  |
| RECENT_REF                      | Perrie & Milne 2012 Lake water quality.                               |
| REPRSNT                         | 2 - Retains only limited elements typical of the Ecological District. |
| LENZ_THRET                      | 5 - Acutely Threatened.   |
| HABITATS                        | 1 - No rare or uncommon habitat recorded.                             |
| FLORA                           | 1 - No rare or uncommon flora.  |
| FAUNA                           | 4 - Dabchick (Nationally Vulnerable).                                 |
| COMMUNITIS                      | 3 - Moderate diversity with high indigenous component.                |
| CONNECT                         | 3 - Connected and buffers Lake Waitawa.                               |
| MGRNT_BIRD                      | 3 - Dabchick records.   |
| SIGNIFI_LEV                     | Regionally significant.   |
| SIGNIF_JUST                     | Fauna, communities, connectivity, migrant birds.                      |
| REPRESENTNES                    | 2   |
| RARITY                          | Dabchick.   |
| DIVERSITY                       | 1   |
| ECO_CONTXT                      | Connectivity, seasonal habitat.                                       |

| <b>TE HAPUA ROAD</b> |  |
|----------------------|--|
| KCDC_SITE            | K234   |
| SITE_NAME            | Te Hapua Road  |
| SITE_SUMM            | Small forest fragment (large karaka-rewarewa trees emergent over diverse canopy). Fenced from pasture but gardened. Includes large exotic trees. NB: assessed from road. |
| GRID_REF_X           | E1776726   |
| GRID_REF_Y           | N5478306   |
| LOCAL_AUTH           | Kapiti Coast District Council.   |
| STATUS               | Private.   |
| AREA_HA              | 0.52 ha.   |
| ADJAC_LAND           | Pasture.   |
| CONDITION            | No wind damage, no visible signs of weeds.   |
| LAND_MGNT            | Unknown.   |
| REFS                 | None.  |
| GWRC_DB              | None.  |
| RECENT_REF           | None.  |
| REPRSNT              | 2 - Contains limited elements typical of diversity in Ecological District.   |
| LENZ_THRET           | Acutely Threatened.  |
| HABITATS             | 3 - A single rare indigenous habitat (lowland forest).   |
| FLORA                | Unknown.   |
| FAUNA                | Unknown.   |
| COMMUNITIS           | Unknown.   |
| CONNECT              | 2 - no physical connection but other sites in close proximity.   |
| MGRNT_BIRD           | Unknown.   |
| SIGNIFI_LEV          | Locally significant.   |
| SIGNIF_JUST          | Rare lowland forest with other sites in close proximity.   |
| REPRESENTNES         | Yes, less than 10% of such indigenous vegetation left.   |
| RARITY               | No.  |
| DIVERSITY            | No.  |
| ECO_CONTXT           | Yes - enhances connectivity and could be restored.   |

## REFERENCES

- Holdaway R.J., Wiser S.K., Williams P.A. 2012: Status assessment of New Zealand's naturally uncommon ecosystems. *Conservation Biology* 26: 619-629.
- Perrie A. and Milne J.R. 2012: Lake water quality and ecology in the Wellington Region - State and trends. Greater Wellington Regional Council.
- Stowe C. 2007: A review of the endemic trees (and shrubs) cultivated by Maori in Aotearoa (New Zealand) from 1769-1840. Contract report for Ngati Hine.
- Wildland Consultants 2003: Kapiti Coast District Council 2002-2003 ecological sites survey. *Wildland Consultants Ltd Contract Report No. 662*. Prepared for Kapiti Coast District Council. 57 pp.
- Wiser S.K., Buxton, R.P., Clarkson, B.R., Richardson, S.J., Rogers, G.M., Smale, M.C. and Williams, P.A. 2010: Climate, landscape and microenvironment interact to determine plant community composition in naturally discrete gravel beach communities. *Journal of Vegetation Science* 21: 657-671.

SITE AND VEGETATION TYPE  
MAPS OF FOUR SITES,  
KAPITI DISTRICT





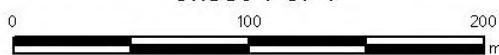
Lake contours  
 Site boundary



**Data Acknowledgment**  
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**Figure 2. Te Horo Gravel Beach Road**

Sheet 1 of 4



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 www.wildlands.co.nz, 0508 WILDNZ  
 Scale: 1:3,000  
 Date: 19/07/2012  
 Cartographer: FM  
 Format: A3



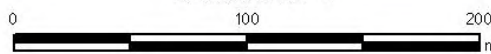


**Lake contours**  
 Site boundary



**Data Acknowledgment**  
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 File: Figure Te Horo Beach Rd.mxd

**Figure 2. Te Horo Gravel Beach Road**  
 Sheet 2 of 4



**Wildlands**  
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 Scale: 1:3,000  
 Date: 19/07/2012  
 Cartographer: FM  
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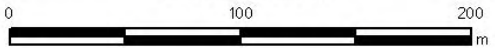


**Lake contours**  
 Site boundary



**Data Acknowledgment**  
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 Ref: 05 0145  
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 File: Figure Te Horo Beach Rd.mxd

**Figure 2. Te Horo Gravel Beach Road**  
 Sheet 3 of 4



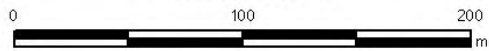
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 Date: 19/07/2012  
 Cartographer: FM  
 Format: A3



**Lake contours**  
 Site boundary



**Figure 2. Te Horo Gravel Beach Road**  
 Sheet 4 of 4

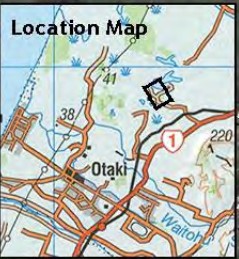
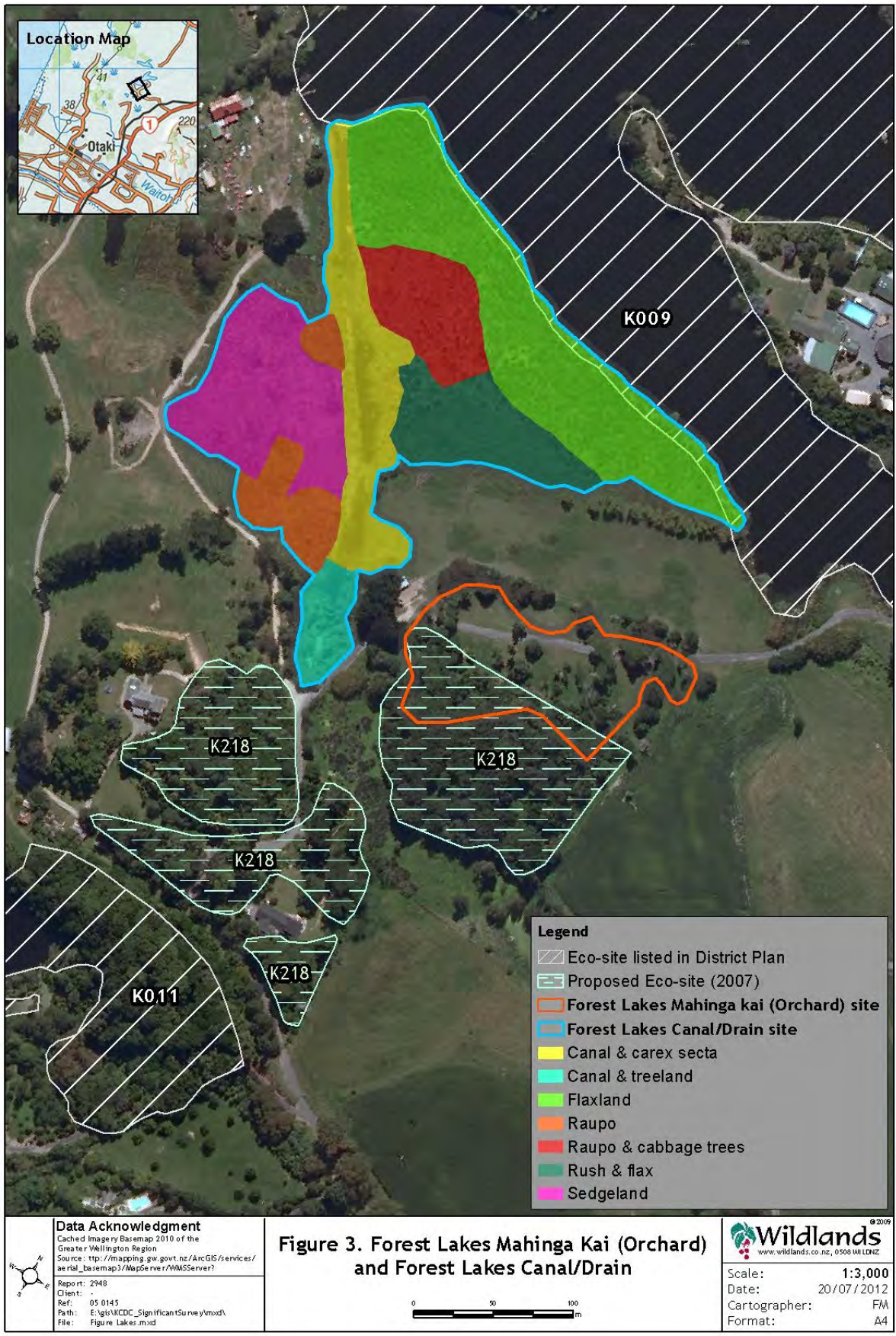


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**Wildlands**  
 www.wildlands.co.nz, 0508 WILDNZ  
 Scale: 1:3,000  
 Date: 19/07/2012  
 Cartographer: FM  
 Format: A3







- Legend**
- Eco-site listed in District Plan
  - Proposed Eco-site (2007)
  - Forest Lakes Mahinga kai (Orchard) site
  - Forest Lakes Canal/Drain site
  - Canal & carex secta
  - Canal & treeland
  - Flaxland
  - Raupo
  - Raupo & cabbage trees
  - Rush & flax
  - Sedgeland

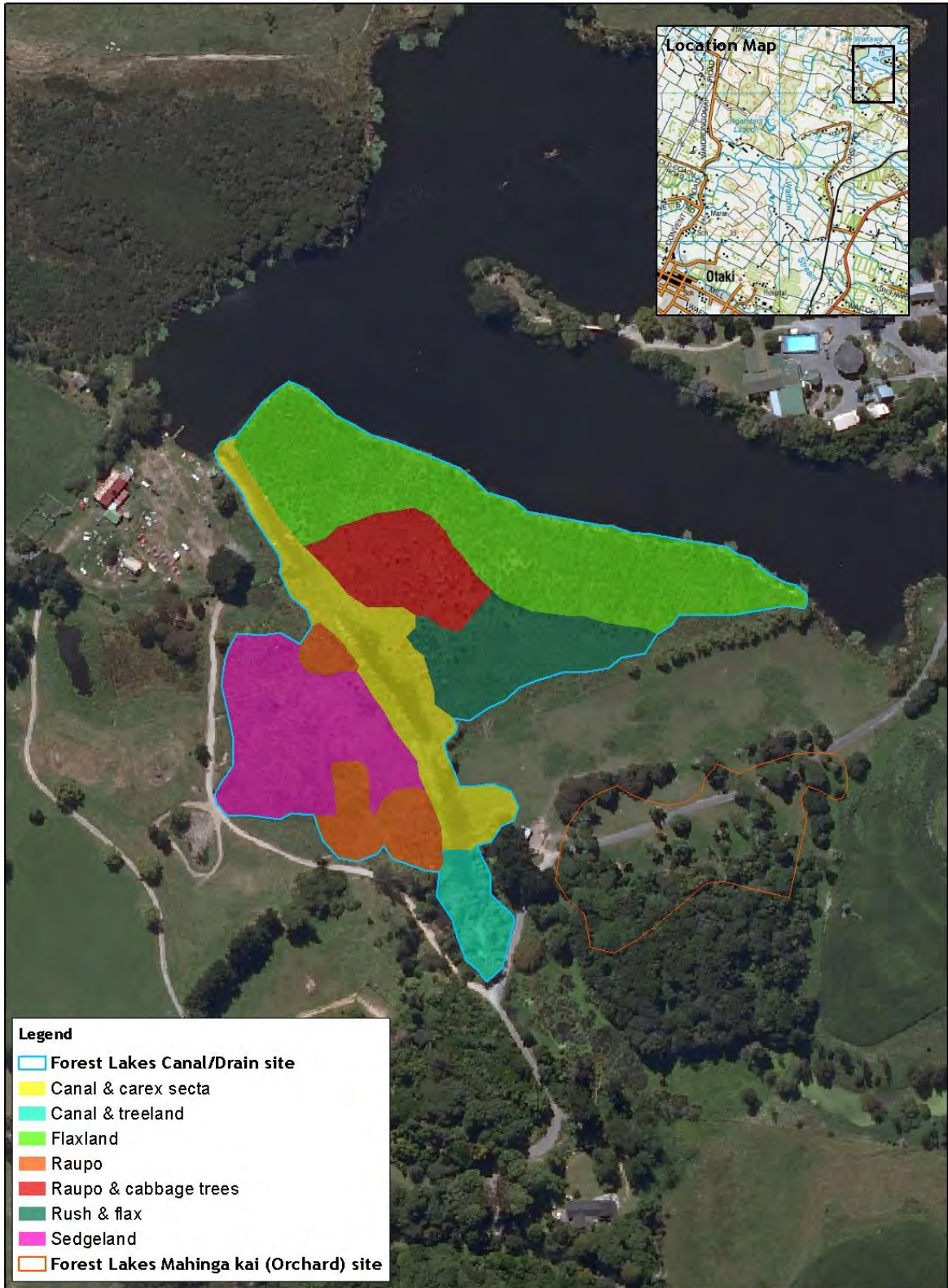
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**Figure 3. Forest Lakes Mahinga Kai (Orchard) and Forest Lakes Canal/Drain**



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 Date: 20/07/2012  
 Cartographer: FM  
 Format: A4





- Legend**
- Forest Lakes Canal/Drain site
  - Canal & carex secta
  - Canal & treeland
  - Flaxland
  - Raupo
  - Raupo & cabbage trees
  - Rush & flax
  - Sedgeland
  - Forest Lakes Mahinga kai (Orchard) site

**Data Acknowledgment**  
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 File: Figure Lakes.mxd

**Figure 3. Forest Lakes Mahinga Kai (Orchard) and Forest Lakes Canal/Drain**



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 Date: 20/07/2012  
 Cartographer: FM  
 Format: A4



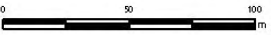


**Legend**

□ Site boundary

**Data Acknowledgment**  
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 Ref: 05 0145  
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 File: Figure Hapua.mxd

**Figure 4: Te Hapua Road**



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Scale: 1:2,578  
 Date: 20/07/2012  
 Cartographer: FM  
 Format: A4

## FIELD SHEET TEMPLATE

**Site Name:** \_\_\_\_\_

Location/street address \_\_\_\_\_

|   |  |                                     |  |   |              |
|---|--|-------------------------------------|--|---|--------------|
| <b>Number:</b>  |  |                                     | <b>Grid Reference:</b>                                   |   |              |
| <b>GPS:</b><br>- Northing<br>- Easting                      |  |                                     | <b>Local Authority:</b>                                  | <b>Area (ha):</b>                           |              |
| <b>Status:</b><br><i>Please circle</i>                      | Unprotected (private)<br>Protected (Crown Land /DOC or LINZ)<br>Other ( <i>state</i> ) ..... |                                     | Protected (QEII covenant)<br>Protected (Council reserve) |   |              |
| <b>Landform</b><br><i>Please circle</i>                     | River/stream terrace<br>Estuary  | Alluvial plain<br>Wetland           | Lake/pond<br>Beach - gravel                              | Dune - hill<br>Other ( <i>state</i> ).....  | Dune - swale |
| <b>Wetland hydrosystem and type</b><br><i>Please circle</i> | <b>Palustrine</b><br>Swamp<br>Ephemeral  | <b>Riverine</b><br>Fen<br>Saltmarsh | <b>Estuarine</b><br>Bog<br>Seepage                       | <b>Lacustrine</b><br>Marsh<br>Shallow water |              |
| <b>Rare ecosystem type</b><br><i>Please circle</i>          | Dune deflation hollows<br>wetlands<br>gravel beaches   | coastal turfs<br>damp sand plains   | lake margins<br>dune slacks                              | ephemeral<br>seepages and flushes           |              |

**Vegetation and Habitat Types:** *e.g. Cyperus ustulatus sedgeland, tall fescue grassland, open water.*

**Vegetation and Indigenous Flora:** *Please note dominant species, weed threats and whether any threatened flora are known from this site.*

**Fauna:** *Note any species seen and whether there is habitat to support threatened or uncommon fauna species.*

**Condition / Pressures:** *Please circle*

Excellent      Slightly degraded      Moderately degraded      Largely degraded

*List pressures: (e.g. weeds, grazing, hydrological modification etc.)*

**Adjacent Land Use:** *Please circle*

Beef                  Dairy                  Sheep                  Horticulture  
Forestry              Recreational Reserve      Native forest

Other (*list*):

**Land Management Issues:** *e.g. drainage, stock grazing, urban intensification.*

**Criteria Triggered in RPS:**

Representativeness      Rarity      Diversity      Ecological context

**Significance Assessment:** *Please circle (refer to BML significance assessment criteria table)*

|                    |           |                   |           |
|--------------------|-----------|-------------------|-----------|
| Representativeness | 1 2 3 4 5 | LENZ Threat       | 1 2 3 4 5 |
| Habitats           | 1 2 3 4 5 | Flora             | 1 2 3 4 5 |
| Fauna              | 1 2 3 4 5 | Communities       | 1 2 3 4 5 |
| Connectivity       | 1 2 3 4 5 | Seasonal patterns | 1 2 3 4 5 |

**Significance Level:** *Please circle.*

Local                  Regional                  National

**Significance Justification:** *Describe key features of the site, listing numbers of threatened flora, fauna and ecosystem types.*

SITE PHOTOGRAPHS





Plate 1: Driftwood debris mantles the gravel behind the storm berm on Te Horo Beach. This debris, and the frequency at which it accumulates, has a strong influence on the establishment of beach gravel plants.



Plate 2: Forest Lakes titoki and karaka grove. Similar sized titoki and karaka, and also tawa are present in the forest remnant visible behind the grove.





Plate 3: Mahinga kai site. Titoki (14 m tall) clearly emergent above the canopy of the forest remnant (proposed eco-site K218) indicating that they are considerably older than the trees in the canopy below.



Plate 4: Mahinga kai site. Dead and dying titoki and karaka trees above the canopy and outside the forest in the pasture.





Plate 5: Forest Lakes Canal/Drain. *Carex secta* dominates the banks of the waterway, which is covered with the indigenous aquatic fern *Azolla filiculoides*.



Plate 6: The end of the Forest Lakes Canal/Drain where it meets the driveway.





Plate 7: View across the horse paddock to the Forest Lakes Canal/Drain wetland. Lake Waitawa is in the middle distance between the cabbage trees and the dark coloured indigenous forest remnant.



Plate 8: Te Hapua Road Forest from the south-east. The forest remnant is buffered well at this edge by regenerating mahoe (*Melicytus ramiflorus*) and kawakawa (*Macropiper excelsum*).



Plate 9: Te Hapua Road Forest from the north. The trees in the foreground are exotic and line the driveway to the house, which is behind the trees on the right.



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