

DESKTOP DELINEATION AND ASSESSMENT OF SIGNIFICANCE OF WETLANDS OF THE WELLINGTON REGION



METHODOLOGY & RESULTS

Prepared for
Greater Wellington Regional Council

by
Boffa Miskell Limited

Front Cover Photo:

Flax and toe toe tussockland with manuka and emergent cabbage tree, at Te Harakeke Swamp.

Bibliographic reference:

Boffa Miskell Ltd. 2011: Desktop delineation and assessment of significance of wetlands of the wellington region methodology & results. Prepared for Greater Wellington Regional Council. November 2011. 50p.

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Document Status:	FINAL
Version:	V.3. 29 November 2011

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1 Introduction

1.1 Background

Greater Wellington Regional Council is seeking to identify and map wetlands of regional significance. The first stage of this project is a desktop analysis and identification of sites, using existing sources of information and recently flown, high resolution, aerial photography of the Wellington Region.

From the desktop analysis, four groups of sites are to be identified.

1. Sites which are clearly of regional (or greater) importance and which do not require further field investigation;
2. Sites which are clearly of regional (or greater) importance but which require further definition through field investigation;
3. Sites which are potentially of regional significance, but where information is lacking to confirm this and additional field investigation is required;
4. Sites which are clearly not of regional significance and which do not require further study.

This report describes the methods used to:

- Identify and delineate wetlands;
- Combine and interpret information on each site from the range of datasets available;
- Develop significance criteria, and describe the significance of each site;
- Develop a ranking system that will assist in determining whether or not each site is regionally significant.

The process undertaken is a form of ranking. It should be noted that there is a risk in ranking sites that those scoring low or very low will be discarded as having little or no value. However, all wetlands identified by this study have some value and those that do not meet the criteria for inclusion as Regionally Significant are still likely to be important within the District.

1.2 Data Sets

A number of data sets were used for this study, based on studies carried out by a range of organisations over a number of decades. It is considered extremely unlikely that any site of regional significance will not have been captured and described by one or more of the following data sets.

GIS Layers

- GWRC_Wet (n=263 wetland sites);
- GWRC_Hydro (n=284);
- GWRC_Extent (n=359);
- PCC EcoSites (n=211) & Recommended (n=117);
- KCDC Ecosites (n=189) & Recommended (n=172);
- DOC Ecosites (Wellington Sites, n=2,125);
- DOC PNAP Reports (Wellington Sites, n=257);
- DOC Conservation Units (Wellington Sites, n=191);
- QEII Covenants (Wellington Sites, n=274);
- DOC Freshwater Environments of New Zealand FENZ (n=359).
- GWRC Aerial Photography (Flown Jan 2010)
- GWRC Lidar 1 m contour information (Parts of Kapiti, Lower Hutt, Southern Wairarapa)

References

- AUSSEIL et al. Wetlands of National Importance (Wellington Sites, n=34);

- Todd et al, DOC River mouths and Estuaries (Wellington Sites, n=45);
- DOC Conservation Management Strategy CMS (Wellington Sites, n=30).
- GWRC Tender Document (n=41);
- Cromarty & Scott A directory of wetlands in NZ (Wellington Sites, n=2)

Other

Generally the databases used were developed at a national, regional, or district scale. There are a large number of other potential sources of information that are usually site specific. These could not be interrogated within the constraints of this study. These include Botanical Society species lists, OSNZ species lists, university studies of sites, and assessments of effects for development projects throughout the region.

However the analysis databases have been set up in such a way that information from additional sources can be added and the significance assessments updated accordingly.

Overall, it is our view that these additional sources of data will help to refine some aspects of the assessment, for example providing more data on rare plants or the presence of native birds, but are unlikely to significantly alter to a major degree the overall assessments of significance.

1.3 Delineation

The methodology was designed with repeatability in mind. That is another person of equal experience presented with the same data, both graphical and numeric, would produce a similar result. The following steps were followed:

Main Data Set

- The process started by merging the two key GWRC data sets, GWRC_Wet and GWRC_Hydro. These two sets together provided good context for the wetlands, both describing their type and influences. Together they contained 284 site records.
- Wetlands from other datasets that intersected the 284 sites jointly identified in the Regional Council datasets were then identified and sorted into a master table.
- A large number of sites from the various datasets did not intersect, and a process was then carried out of filtering sites where the metadata clearly indicated that no wetland was present or, where the description suggested a wetland was present, by locating and viewing each site on aerial photographs.
- For many sites a decision was made that wetland did not exist (misidentification of bush or pasture), or that it was entirely artificial (stock ponds) and it was not mapped.
- A final dataset of 292 wetlands was developed.
- The master spreadsheet was converted into a Wetland_Potential GIS layer to direct the delineation that followed.

Delineation

- For digitising each site, the maximum aerial zoom used was 1:1,000. At higher magnifications pixelation of the aerial images began to distort colour and clarity. Also, after some experimentation, 1:1,000 was determined to provide sufficient accuracy to readily meet the requirements of the tender, accuracy to 10 m;
- The wetland margin was first delineated using image colour and texture as the guide. Colour was the most obvious delineator of wetland vegetation where there was a gradation from wetland turf to pasture. Texture was helpful where there was a clear delineation between grazed pasture and sedge or rush communities, although it is noted that in the aerial photographs rank pasture, especially containing cocksfoot and Yorkshire fog can appear to have the same texture as wetland sedges and rushes.
- When available, 1 m contours (derived from LIDAR) were then used to refine the boundary. Contours were provided that covered about half of the Kapiti Coast, parts of the Lower Hutt

Valley and parts of southern Wairarapa. Where they were available they were very useful in defining wetland depressions that were otherwise invisible in the colour aerials;

- Lakes over 1 ha in area were identified and excluded from the total area of the wetland as required by GWRC. However, it should be noted that the lake habitat was included in the assessment of values of the wetland proper. Initially an attempt was made to capture mudflats and gravel bars as part of a wetland and not the lake. However, this proved impossible because each waterbody had differing degrees of clarity some being highly turbid, and it became clear that the state of a tide (estuary) and fullness of some lakes and lagoons varied. It was therefore impossible to guarantee consistent results within and between sites, and a high degree of subjectivity came into play. After some experimentation it was decided that the boundary of a waterbody would be defined by the extent of emergent or marginal wetland vegetation. Using the extent of vegetation ensured a more consistent and repeatable approach.
- Finally, decisions were made regarding the joining of wetland fragments. If two wetland fragments lay within 50 m of each other they were joined and named as one. There was often debate regarding the combination of sites and several sites are discussed in more detail later in this report.

1.4 Significance Assessment

Three key considerations drove the development of assessment criteria. They were:

- The assessment had to be able to be carried out using only the information contained within the datasets provided, or other readily accessible regional or district inventories.
- The assessment had to take account of sites where there was no data (other than aerial photography). For these sites it needed to provide some consistent criteria for “potential” value without introducing speculation and arbitrary decisions.
- The assessment had to be repeatable, that is, another ecologist with the same data and the same assessment criteria would derive the same or similar results.

The starting point was the criteria contained within the Proposed Regional Policy Statement (Policy 22) as follows.

Policy 22: 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:

GWRC CRITERIA	
Representativeness:	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: <ul style="list-style-type: none"> (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).
Rarity:	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:	Diversity: the ecosystem or habitat has a natural diversity of ecological units, ecosystems, species and physical features within an area.
Context:	Ecological context of an area: the ecosystem or habitat: <ul style="list-style-type: none"> (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.

Given the assessment needed to be carried out based on a desktop analysis, we began by determining what information could be obtained from existing data sets for each of the Policies broad criteria. After some experimentation, nine criteria were developed that were amenable, with limitations, to definition based on a desktop analysis of the data sets available. They are:

CRITERIA	Assessment criteria amenable to definition based on desktop analysis of data available.
Representativeness	1. As recorded in previous studies (required some interpretation)
	2. LENZ Threat Class (GIS)
	3. Rare / Uncommon Habitats recorded (count)
Rarity	4. Rare / Uncommon Flora recorded (count)
	5. Rare / Uncommon Fauna recorded (count)
Diversity	6. Number of community types listed or visible (count, required some interpretation)
Context	7. Degree of physical and landscape connectivity to other wetlands and waterbodies, and buffering from adjacent land uses (from aerial photography & GIS)
	8. Records of seasonal migrant, or noted for breeding (count or interpret)
OTHER (Not used for assessment of significance)	
Level of Modification	Structures and physical modification (including vegetation clearance) / Artificial
Size	Relevant to considerations of island biogeography (GIS)

Initially it was hoped to eliminate artificial wetlands from the data set, but it became apparent that most created ponds and wetlands, were formed in existing wetlands, and there was rarely a clear cut distinction between natural, artificial and modified. After discussion with GWRC, it was agreed that a criteria for the degree of modification was needed and this final criteria was added.

For each of the eight criteria above a series of descriptions were developed that would allow the ranking of each site from Very High to Very Low. These criteria were initially developed to allow for assessment of significance based solely on desktop data. They were later refined through workshops with GWRC and their external reviewer (Wildland Consultants) to allow for their wider use during field investigations. These updated criteria are provided here, though the assessment largely remains unchanged. However, these discussions led to the refinement of the significance assessment process for determination of site context and buffering.

The following sections describe the assessment criteria in greater detail and provide examples of its application to individual sites. A complete table of criteria is attached (Appendix 6).

1.5 Data Limitations:

There are a number of limitations on the quality of data which is presented in this report.

- No sites in this process have been verified by field survey. For many of the sites almost no information was given in the source inventory, so any judgement made regarding their value or importance which is based on aerial photography and GIS interpretation must be considered incomplete.
- Some inventories are considerably out of date. Some sites may have been degraded since their original survey, others may no longer exist. Some sites appear to have been “enhanced” through excavation and revegetation.
- Most inventories have been user driven and concentrate solely on a particular feature, species or habitat of perceived importance or describe land of specific tenure such as Scenic Reserves. As a result, for some sites, there is a wealth of information, for others we only know that they have been recorded by a particular author as having value. Some inventories are themselves prepared in whole or part from earlier inventories and we have endeavoured to avoid use of these in this analysis.

2 Assessment Methodology

2.1 Representativeness

Two categories were considered for the assessment of representativeness, the threat class of the land environment that was intersected by each site, and the representativeness of the site as described by other studies.

2.1.1 Ecosystems and habitats that are representative of their type (Criteria 1)

In addition to considering how much of an ecological component is still represented in the landscape, an assessment of representativeness needs to consider how representative those components are of their original or natural condition.

The following criteria have been developed for this component of the Policy 22 assessment.

Score	1. Representative
5	<p>Definition: 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.</p> <p>Reference Site: Lake Kohangatera</p>
4	<p>Definition: 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.</p> <p>Reference Site: Taupo Swamp Complex</p>
3	<p>Definition: 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).</p> <p>Reference Site: Lake Waiorongomai Wetlands</p>
2	<p>Definition: Wetlands that retain only limited elements that are typical of the natural diversity of an ecological district.</p> <p>Reference Site: Pylon Swamp</p>
1	<p>Definition: Wetlands that contain little or no elements that are representative of the natural diversity of an ecological district.</p> <p>Reference Site: Hutt River Mouth</p>

For the desktop assessment the analysis was based on conclusions drawn from three main datasets, DOC PNAP survey results (Foxton 1990, Wairarapa Plains 2000, and Wairarapa East 2004), DOC Ecosites summaries (GIS), and Council SNA surveys (Porirua 2001, Kapiti Coast 2003).

The scores were an amalgamation of knowledge, as many sites were described in multiple surveys. We note that each survey consulted used different methodologies and objectives, and some interpretation was necessary. Also the surveys are sometimes separated by a number of years, with inevitable changes to some sites which led to discrepancies between studies that required consideration.

As a general guide, if a previous study had rated a site 'high' for representativeness and described it as the best or one of the best remaining of its type, it would score a 5. If a previous study had rated it high for representativeness and described it as a good or one of the better remaining of its type, it would score a 4. If a previous study had scored it high or moderate-high, but had identified major limitations to its health or integrity it would score a 3 or lower. Similar decisions were made where the early studies had scored the site moderate or low.

Where no earlier assessments and rankings were available, an assessment was made based on what information was present together with its visual appearance in aerial photography.

Note that most early surveys were not limited to the wetland, but included consideration of all contiguous indigenous habitats. For some of the sites that were described by these studies the wetland was only a

small component of the wider site. So while the study might rank the wider site as Very High or High, the wetland component may have been of more limited value. A decision was made on the ranking of these wetland components based on the descriptions provided.

2.1.2 Ecosystems and habitats that were once typical or commonplace (Criteria 2)

In order to determine which of the wetlands identified within this study lay within land environments which have experienced excessive loss, the delineated wetland extents were laid over the LENZ Threat Map. Where a site crossed multiple areas of differing threat, the highest threat class was used. The threat classes and scores used were as follows:

Score	2. LENZ Threat Classes
5	Definition: Acutely Threatened Reference Site: Muaupoko swamp forest
	Definition: Chronically Threatened Reference Site: Tora Coast Wetlands
3	Definition: At Risk (20-30%) Reference Site: Wainuiomata Waterworks Swamp
2	Definition: Critically Under protected (> 30%) Reference Site: Opouwae River Swamp
1	Definition: Under protected or No Threat Category Reference Site: Mt Cone Turf Bog

2.1.3 Example of Assessment

An example of the assessment (including both LENZ and Representativeness) follows:

Wetland ID	1	2
Wetland Name	South Waikawa Beach Dune Lake	Huritini Swamp
Council EcoS Notes	Not on dbase	Foxton Dune lake. One of the few remaining dune lake and wetland associations within Foxton Ecological District and is representative of a formally more common habitat. However, the site is modified and exotic species are common. Provides habitat for bamboo spike sedge and kapungawha. Protected by DOC Covenant.
Doc EcoS Notes 1	A very small dune slack with a fringe of <i>Schoenoplectus tabernaemontani</i> with <i>Isolepis prolifer</i> . Stock has full access. Reeds have been grazed and there is considerable pugging down to the water's edge. This lake is a Wildlife Refuge but seems to have diminished.	<ul style="list-style-type: none"> • <i>Open water-wetland</i> • <i>reedland on dune lake</i> • <i>shrubland on dune lake</i> • <i>sedgeland on dune lake</i> • <i>flaxland on dune lake</i>
DoC EcoS Notes 2		<ul style="list-style-type: none"> • <i>SSWI Mod / WERI 2</i> • <i>Species: Bird: NZ pigeon</i> • <i>Open water-wetland</i> • <i>Species: Plant: Eleocharis sphacelata Tall spike rush (WILD)</i> • <i>Habitat could be improved by fencing and blocking the drainage outlet to raise the water level (WERI)</i> • <i>RAP 1: Good waterfowl habitat. Large areas of Eleocharis sphacelata, now uncommon in the ED (Ravine 1992).</i>
RAP Notes	-	PRIORITY 1: <ul style="list-style-type: none"> • <i>Representativeness H Many of these shallow lakes have</i>

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		<p><i>been drained so the vegetation communities found here were probably once common in the ecological district</i></p> <ul style="list-style-type: none"> • <i>Diversity H High density of emergent communities especially for a relatively small area.</i> • <i>Special Features M good waterfowl habitat.</i> • <i>Naturalness M</i> • <i>Viability H</i> • <i>Size & Shape M</i> • <i>Buffering P</i>
AREA (ha)	0.68	26.23
WERISIG	-	2
Doc EcoS Rank	-	H
REP SCORE Criteria 1	1	4
LENZ THREAT Criteria 2	4	5

2.2 Rarity

Rarity was divided into three categories for this analysis; habitats, fauna and flora. Essentially the assessments were based on a count of features or species presented in existing records. Sites were scored as follows.

2.2.1 Rare and distinctive biological communities and physical features that are unusual or rare (Criteria 3)

The following criteria have been developed for this component of the Policy 22 assessment.

Score	3. Communities / Habitats
5	Definition: Large and diverse indigenous communities and habitats that are rare / uncommon. Reference Site: Allen – Lowes Bush
4	Definition: Several indigenous communities and habitats that are rare / uncommon. Reference Site: Te Hapua Swamp Complex A
3	Definition: A single rare / uncommon indigenous habitat / community recorded. Reference Site: El Rancho Wetlands
2	Definition: No rare / uncommon habitat / community recorded (but habitat may support rarity > 3 ha). Reference Site: Te Hapua Swamp Complex D
1	Definition: No rare / uncommon habitat / community recorded. Site small to very small. Reference Site: Ladel Bend Wetlands

For the desktop assessment the analysis was based on conclusions drawn from three main datasets, DOC PNAP survey results (Foxton 1990, Wairarapa Plains 2000, Wairarapa East 2004), DOC Ecosites summaries (GIS), and Council SNA surveys (Porirua 2001, Kapiti Coast 2003).

2.2.2 Rarity – Rare/Uncommon Flora (Criteria 4)

The following criteria have been developed for this component of the Policy 22 assessment.

Score	4. Flora
5	Definition: Large and diverse populations / communities of threatened / uncommon flora. Reference Site: Mt Cone Turf Bog
4	Definition: A small number of two or more nationally threatened species, or large numbers of a regionally threatened species of rare flora. Reference Site: Waikanae Saltmarsh
3	Definition: A small number of one or more regionally threatened species, or large numbers of locally threatened species of flora. Reference Site: Kakaho Saltmarsh
2	Definition: A small number of one or more locally threatened species of flora. Reference Site: Hutt River Mouth
1	Definition: No rare or uncommon flora recorded. Reference Site: Karori Dam

For the desktop assessment the analysis was based on records contained in three main datasets, DOC PNAP survey results (Foxton 1990, Wairarapa Plains 2000, Wairarapa East 2004), DOC Ecosites summaries (GIS), and Council SNA surveys (Porirua 2001, Kapiti Coast 2003).

2.2.3 Rarity – Rare/Uncommon Fauna (Criteria 5)

The following criteria have been developed for this component of the Policy 22 assessment.

Score	5. Fauna
5	Definition: A small number of two or more nationally threatened species, or large numbers of a regionally threatened species of rare flora. Reference Site: Wairarapa Moana Wetland Complex
4	Definition: A small number of one or more regionally threatened species, or large numbers of locally threatened species of flora. Reference Sites: Lake Pounui
3	Definition: A small number of one or more regionally threatened species, or large numbers of locally threatened species of flora. Reference Sites: Taumata Oxbow
2	Definition: A small number of one or more locally threatened species of flora. Reference Sites: Huritini Swamp
1	Definition: No rare or uncommon flora recorded. Reference Sites: Sim's Wetland

For the desktop assessment the analysis was based on records contained in three main datasets, DOC PNAP survey results (Foxton 1990, Wairarapa Plains 2000, Wairarapa East 2004), DOC Ecosites summaries (GIS), and Council SNA surveys (Porirua 2001, Kapiti Coast 2003).

2.2.4 Example of Assessment

An example of this assessment (including all four criteria) follows.

Wetland ID	1	2
Wetland Name	South Waikawa Beach Dune Lake	Huritini Swamp
AREA (ha)	0.686587	26.2343
SUMMARY: Rare and Threatened Communities and features	None recorded	WERI: 2 Vegetation communities found here were probably once common in the ecological district. Large areas of <i>Eleocharis sphacelata</i> , now uncommon in the ED (Ravine 1992).
COMMUNITY SCORE Criteria 3	1	3
SUMMARY: Rare and Threatened Flora	None recorded	<i>Eleocharis sphacelata</i> Tall spike rush.
FLORA SCORE Criteria 4	1	2
SUMMARY: Rare and Threatened Fauna	None recorded	NZ pigeon (not threatened)
FAUNA SCORE Criteria 5	1	2

As described above, where there were no records of rare or threatened species or migrants' sites were ranked '2' if they were large and likely to have sufficient habitat or '1' if they were small and less likely to have appropriate habitat.

2.3 Indigenous Diversity

One category was developed for the assessment of diversity. It was based on the diversity of indigenous communities or habitats, and was based entirely on the number of recorded or identifiable features or communities present. We were unable to consider species diversity due to the lack of site specific species lists. Sites were scored as follows.

2.3.1 A natural diversity of ecological units, ecosystems, species and physical features (Criteria 6)

The following criteria have been developed for this component of the Policy 22 assessment.

Score	6. Communities
5	Definition: A high diversity of indigenous wetland types and structural classes (greater than 5) and a high diversity of species of flora and fauna. Reference Site: Te Hapua Swamp Complex A
4	Definition: All the types of above but of a smaller scale (greater than 5) or a high diversity of species of flora and fauna within a wetland of lower type diversity. Reference Site: Huritini Swamp
3	Definition: Moderate diversity of wetland types and structural classes (3 to 5) with a high indigenous component and moderate species diversity. Reference Site: Osbournes Swamp
2	Definition: Low diversity of wetland types and structural classes (2 to 3) and low species diversity. Reference Site: Andrews Pond
1	Definition: Wetland monoculture 1 to 2 wetland types and structural classes, and low species diversity. Reference Site: Okiwai Lagoon

For the desktop assessment the number of structural classes of plant communities present at each site was identified from historical descriptions, or for those sites which have not been previously described, from interpretation of aerial photographs. Structural classes, based on those in Johnson and Gerbeaux (2004), were used as these were generally reported on consistently in historical descriptions.

Three additions to the structure classes were made for this study to recognise non-vegetated areas of habitat; i.e. deep water, shallow water and mudflats. Many descriptions included the size and depth of the ponds or lakes found within the wetlands, and these each provide different habitats for flora and fauna. Similarly mudflats, while not having vegetation are still important components of wetlands ecology, and were typically included in descriptions.

We also included dry forest as a type. Dry forest, when present, contributes to the ecological sequence and habitat diversity of a wetland. Note that while dry forest was included for its contribution to overall wetland diversity, it was not included in the wetland delineations.

The structural classes used were:

- Dry forest buffer
- Swamp forest
- Treeland
- Swamp scrub
- Shrubland
- Flaxland
- Tussockland
- Reedland
- Rushland
- Sedgeland
- Grassland
- Fernland
- Cushionfield
- Herbfield
- Mossfield
- Emergent vegetation
- Floating vegetation
- Submerged vegetation
- Mudflats
- Shallow water
- Deep water

2.3.2 Example of Assessment

An example of this assessment is as follows:

Wetland ID	1	2
Wetland Name	South Waikawa Beach Dune Lake	Huritini Swamp
Doc EcoS Notes 1	A very small dune lack with a fringe of <i>Schoenoplectus tabernaemontani</i> with <i>Isolepis prolifer</i> . Stock has full access. Reeds have been grazed and there is considerable pugging down to the water's edge. This lake is a Wildlife Refuge but seems to have diminished.	Open water-wetland Reedland on dune lake Shrubland on dune lake Sedgeland on dune lake Flaxland on dune lake
DoC EcoS Notes 2	-	SSWI Mod / WERI 2 Species: Bird: NZ pigeon Open water-wetland Species: Plant: <i>Eleocharis sphacelata</i> Tall spike rush (WILD) Habitat could be improved by fencing and blocking the drainage outlet to raise the water level (WERI) RAP 1: Good waterfowl habitat. Large areas of <i>Eleocharis sphacelata</i> , now uncommon in the ED (Ravine 1992).
GWRC Hydro 2	-	1: Reedland 2: Open water
GWRC Hydro 3	-	1: raupo 2: dune lake
AREA (ha)	0.68	26.2
SUMMARY of Communities	<ul style="list-style-type: none"> • Open water • Reed fringe • Pasture 	<ul style="list-style-type: none"> • Deep water • Shallow water • Reedland • Sedgeland • Tussockland • Shrubland
DIVERSITY SCORE Criteria 6	1	4

2.4 Context

Two categories were considered for the assessment of context: the degree of connectivity and buffering of each site, and the use of the site by seasonal migrants or as a core breeding habitat for resident species of conservation concern. Note that the method and assessment for category 8 was carried out as part of the Rarity assessment described above.

2.4.1 Enhances physical connectivity, or buffering of representative, rare or diverse indigenous ecosystems or habitats (Criteria 7)

The following criteria have been developed for this component of the Policy 22 assessment.

SCORE	7. Buffering & Connectivity
5	<p>Definition: 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.</p> <p>Reference Sites: Lake Pounui, Te Harakeke</p>
4	<p>Definition: 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.</p> <p>Reference Sites: Taupo Swamp</p>
3	<p>Definition: A physical connection (stream, drain, and bush) to other nearby waterbodies but modification limits ecological service, unlikely to buffer or enhance other sites. Has limited buffering.</p> <p>Reference Sites: Lake Waiorongomai</p>
2	<p>Definition: No physical connection to other waterbodies or indigenous vegetation but other wetland sites in close proximity (0.5 – 1 km). Is poorly buffered.</p> <p>Reference Sites: Andrews Pond</p>
1	<p>Definition: No physical connection to other waterbodies or indigenous vegetation and very isolated (>1 km). Has little or no buffering from adjoining land uses.</p> <p>Reference Sites: Taumata Oxbow</p>

For the desktop assessment the analysis was done from aerial photography and GIS mapping. The data was divided into three categories which reflected different elements connectivity and buffering and which could be measured or described by desktop analysis.

For an assessment of buffering the range of land uses that surrounded each site were recorded as simple percentages into the following types.

- % Native forest, bush & scrub
- % River, estuary, dune
- % Pasture & shrubland
- % Pine, willow, exotic
- % Urban, residential
- % Road & rail

For landscape connectivity the distance of each site from other wetlands was calculated by GIS and divided into the following:

- < 0.5 km to nearest wetland system
- 0.5 - 1.0 km to nearest wetland system
- > 1.0 km to nearest wetland system

For hydrological connectivity, obvious stream and drain linkages to neighbouring wetlands, and connections to the ocean and headwaters was assessed using aerial photographs and topographical maps.

This data, together with considerations of wetland form and buffering were combined as follows:

Score	Buffering	Landscape Connectivity	Hydrological Connectivity
5	>50% native	3+ other wetlands within 500 m	Unbroken link to sea and headwaters
4	20-50% natives	2-3 other wetlands within 500 m	Unbroken link to sea or headwaters
3	>50% pine	1 other wetland within 500 m	Unbroken link to adjacent water body
2	>50% pasture	Closest wetland 1 km-500 m away	Limited connectivity to adjacent waterbody
1	>50% urban	Greater than 1 km to closest wetland	No hydrological connection

For Buffering the categories were formed as follows. Any wetland with greater than 50% native or scrub forest as a margin scored 5. Any wetland with a native forest margin which formed between 20% and 50% scored a 4. Any wetland with a pine margin greater than 50% scored 3 and so on.

Landscape connectivity assumes that clusters of wetlands are likely to have greater ecological value as a group than wetlands which are entirely isolated. The ranges of 500 m and 1 km are relatively arbitrary, but intended to consider issues such as seasonal movements of cryptic wetlands species.

Generally for Hydrological connectivity sites that were headwater wetlands (e.g. Mount Cone), wetlands in streams, estuarine wetlands, and river mouths scored a 5. Wetlands on a river terrace scored a 2 or 3 as many were oxbow cut-offs, or had no obvious connection to the main channel. Wetlands on coastal terraces typically scored a 3 or 4, typically having a single connection to the sea which was often ephemeral. Dammed streams scored a 2 or 3, assuming they were still connected to the headwater unless, as is the case of the lower Karori Reservoir and swamp forest, they lie between two dams. Dune wetlands and lagoons on the Kapiti Coast and isolated wetlands on the Wairarapa Plains were assessed individually, with a focus on the presence of farm drains or irrigation channels, and their proximity to major rivers.

The analysis involved a degree of subjectivity. In general, however, sites that had a freshwater connection to other sites or the sea, had native forest buffering part of their margins and / or were part of a wetland complex scored more highly. Wetlands that had no surface water links, were entirely surrounded by pine, pasture or had a major urban influence, and were very isolated scored very low.

The final score for Criteria 7 was the maximum score achieved within any of the three categories above.

2.4.2 Example of Assessment

Wetland ID	1	2
Wetland Name	South Waikawa Beach Dune Lake	Huritini Swamp
SUMMARY: Site Context	Very small lake and wetland / somewhat isolated (1 wetland < 500 m) / no surface water connections / predominantly in pasture (>50%)	Moderate sized dune wetland / part of wetland complex (3+ sites < 550 m) / no surface water connections / predominantly in pasture (>50%)
Distance to Nearest (km)	0.31	0.06
Native Bush & Scrub	0%	0%
River Estuary Dune	0%	0%
Pasture & shrubland	100%	40%
Pine & Willow	0%	60%
Urban Residential	0%	0%
Buffering	2	2
Land Connectivity	3	5

Hydro Connectivity	1	1
CONNECTIVITY SCORE	3	5
Criteria 7		

Note that none of these criteria deal with the issue of subsurface hydrological connectivity, i.e. whether links to groundwater remain intact, modified or severed. This could not be determined from the data available and is unlikely to be identified through normal field investigations.

2.4.3 Provides seasonal or core habitat for protected or threatened indigenous species (Criteria 8)

The presence of migrants or of core breeding habitat was assessed using the following criteria

SCORE	8. Seasonal patterns / core habitat for indigenous fauna
5	Definition: Large and diverse seasonal population of migrants and / or a core breeding habitat for more than three threatened or protected resident species. Reference Site: Waikanae Saltmarsh
4	Definition: 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. Reference Sites: Waingawa Swamp
3	Definition: Records of breeding by a threatened or protected species, and or a record of an itinerant migrant. Reference Sites: Simcox Lake
2	Definition: No migrants recorded but the habitat is likely to support their presence. Reference Sites: Lake Kaitawa
1	Definition: No migrants recorded (and visible habitat unlikely to support) Reference Sites: Raumati South Peatlands

For the desktop assessment the analysis was based on records contained in three main datasets, DOC PNAP survey results (Foxton 1990, Wairarapa Plains 2000, Wairarapa East 2004), DOC Ecosites summaries (GIS), and Council SNA surveys (Porirua 2001, Kapiti Coast 2003).

Note; this criteria was included in the rarity spreadsheet due to the similarity of information used for its analysis.

2.4.4 Example of Assessment

An example of this assessment (including all four criteria) follows.

Wetland ID	1	2
Wetland Name	South Waikawa Beach Dune Lake	Huritini Swamp
AREA (ha)	0.69	26.2
"SUMMARY: Migrants / core breeding habitat"	Nil	SSWI M Special Features M Good waterfowl habitat.
MIGRANT SCORE	1	3
Criteria 8		

2.5 Other: Modification

While the degree of modification to a site is implicit in the analysis carried out in previous sections, in particular under representativeness, the GWRC_Wet GIS dataset provided a description and scores for modification at 157 of the sites and it was felt this information provided important additional context for each site. For the remaining 135 sites an assessment was made based on other descriptions of the site, and study of the aerial photographs.

In the GWRC_Wet dataset scores were provided for four categories: structures, modification, buffers and grazing effects. The results for each were averaged for the site to give a score which fit within the following five categories. The assessment criteria were as follows:

2.5.1 Degree of physical modification / fragmentation

Score	Modification
5	Definition: No physical modification apparent. No detrimental inputs. Reference Site: Mt Cone
4	Definition: Natural wetlands with some structures, clearance but minor in extent and some detrimental inputs. Reference Sites: Nga Manu
3	Definition: Natural wetlands but with extensive modification or fragmentation to parts or margins and / or sign detrimental inputs. Reference Sites: Te Hapua Complex
2	Definition: Natural wetlands almost entirely fragmented or modified by physical works and / or vegetation removal and / or contaminated inputs. Reference Sites: Okiwai Lagoons
1	Definition: Entirely artificial (drains, ponds, dams, rushland in pasture) Reference Sites: Henley Lakes

Capturing this information in future surveys will also provide important information to assist in site management.

This information has not been used in the assessment of significance.

2.5.2 Example of Assessment

An example of this assessment is as follows.

Wetland ID	1	26
Wetland Name	South Waikawa Beach Dune Lake	Te Hapua Swamp Complex A
Artificial 1	Natural dune lake	Although some open water is artificial
Artificial Y-N	N	N
Structures	Surrounding dune system has been cleared and drained for farm land. No structures.	Northern end of wetland is drained. Artificial water bodies.
Structure Score	4	3
Modified	Wetland has been reduced considerably in extent.	Groundwater catchment now in pasture
Modified Score	4	3
Buffer	Grazed paddocks	In some parts landowners are trying to establish a vegetated buffer.
Buffer Score	4	4

Grazed	Grazing to water's edge. Severe pugging. Indigenous wetland vegetation considerably reduced due to grazing.	Some parts are leased for grazing dry stock
Grazed Score	5	3
Calculation From GWRC_Wet	2	3
MODIFIED SCORE	2	3

The four scores (structures, modified, buffer, grazed) were averaged and the result transferred to the Assessment. Where there was no GWRC score, a score was developed from aerial photographs and other information available.

[Note that the GWRC scores were in reverse order to those used for this assessment (i.e. 1 equalled very good, 5 equalled very poor). The scores were therefore reversed (see calculation from GWRC_wet)].

We note that this criterion was included as an indicator of condition, not significance, but it was felt that given the considerable degree of modification of many sites its inclusion was necessary.

2.6 Other: Size

While size is not a factor included in the proposed Policy 22 assessment criteria it is an acknowledged contributor to the ecological functioning of ecological systems which forms part of the science of island biogeography.

Therefore, to provide additional context to each site and to assist in its description the size of the wetland was calculated by GIS and divided into the following five classes:

Score	Size
5	vl = very large, greater than 20 ha
4	l = large, 10 to 20 ha
3	m = medium, 3 to 10 ha
2	s = small, 1 to 3 ha
1	vs = very small, less than 1 ha

This information has not been used in the assessment of significance.

3 Results

The eight assessment criteria and the following methods of scoring were developed to place sites with a number of higher than average ecological values into categories of Very High and High value. Sites that fall within these two categories are considered Regionally Significant and sites of Very High value are potentially nationally significant.

Where good data is available for each site we are confident this method will score a site correctly. Where sites have a small or out of date body of knowledge they will tend to score lower. These sites need to be identified and additional study carried out to confirm their status. This is discussed in section 3.3.

3.1 Scoring

From the analysis described in the previous sections, a summary table was compiled for each site as follows:

Criteria		Representativeness		Rarity			Diversity	Context		Assessment Ranking		
ID	Wetland Name	1. Represent Score	2. LENZ Threat	3. Community Score	4. Flora Score	5. Fauna Score	6. Diversity Score	7. Connectivity Score	8. Migrant Score	Median of Score	Sum of Scores	Proposed Rank
149	Lake Kohangapiripiri	5	5	4	4	4	5	5	3	4.50	35	5
235	Mount Cone Turf Bog	5	1	5	5	2	4	5	1	4.50	28	5
99	Horokiri saltmarsh	4	5	4	3	3	5	5	4	4.00	33	4
48	Nga Manu Wetland	5	5	3	3	4	4	5	3	4.00	32	4
98	Motukaraka saltmarsh / Ration Point	4	5	4	3	3	4	5	4	4.00	32	4

A median score was derived from all 8 criteria. A median was used in preference to a mean or sum of scores to prevent scores being inflated or depressed by a single large or small number (e.g. the LENZ score of 5 for South Waikawa Beach Dune Lake would have given a mean score of 2, whereas the median is 1.0. Or alternatively the LENZ Score of 1 for Mt Cone Turf Bog would have depressed its score from a median of 4.0 to a mean of 3.0).

Five bands of significance were used, and converted to scores of 5, 4, 3, 2, and 1. Ranking of scores was then done as follows.

MEDIAN BANDS	SCORE	ECOLOGICAL VALUES
4.1 – 5.0	5	Very High
3.1 – 4.0	4	High
2.1 – 3.0	3	Moderate
1.1 – 2.0	2	Lower
0.0 – 1.0	1	Very Low

A median score of 5 is considered Very High, 4 as High, 3 as Moderate, 2 as Low, and 1 as Very Low. The sites were then sorted, first by their median scores, then their summed counts so that within each band they were sorted from highest to lowest for additional context.

No attempt was made to weight scores, for instance giving representativeness a higher weighting than the presence of rare flora. In our view, the simpler and more transparent the system, the better, given the limitations on the data used.

3.2 Regional Significance

We recommend the following approach:

- All sites that score 4 & 5, have been extensively studied, their values well documented and many have been cited as being nationally or regionally significant by historic studies. In our view no further investigation is required for these sites to be warrant regional significance status, although some still require a site visit to confirm their extent.
- Sites that score 3 generally have a good body of knowledge and their values have been documented to the extent that all can be considered significant at the District Level. However, for some sites historical surveys have been less comprehensive and with further investigation their significance may be found to be higher, and some of these sites may be elevated to regional status. This is particularly so at the upper end of this band. Additional field study is therefore recommended.
- All sites score 2 have been studied and found to have some limited ecological value which makes them locally significant or; there is no information about them but the analysis of GIS and aerial data suggests they have some values that would make them significant at the local level. For the purpose of this project these sites are clearly not regionally significant and no further work is required.
- Sites that scored 1 have either been studied and do not have wetland values that make them significant or, there is little or no information about them but the analysis of GIS and aerial data suggests they have very low value and are unlikely to be significant. For the purpose of this project these sites are clearly not regionally significant and no further work is required.

Using the method discussed above has produced the following results:

Rank	Count	Sub totals	TOTAL Sites
Very High	10 sites	37 Sites (Believed to be Nationally or Regionally Significant)	292 Sites
High	27 sites		
Moderate	62 Sites	Significant at District Level, some sites may be Regionally Significant and require further investigation to confirm.	
Low	116 sites	Sites Locally significant only.	
Very Low	77 sites	These sites may not be significant or may be locally significant.	

The full list of sites follows in Appendix 2.

3.3 Additional Study

The tender required the desktop analysis to identify four groups of sites:

1. Sites which are clearly of regional (or greater) importance and which do not require further field investigation;
2. Sites which are clearly of regional (or greater) importance but which require further definition through field investigation;
3. Sites which are potentially of regional significance, but where information is lacking to confirm this and field investigation is required to confirm significance; and
4. Sites which are clearly not of regional significance and which do not require further study.

The detail of this analysis is provided in Appendix 3. For each site uncertainty over regional significance was identified by:

“**Y**” - Regionally Significant Sites (Score 4 & 5);

“**P**” - Potentially Regionally Significant Sites (Score 3), and

“**U**” - Unlikely to be Regionally Significant Sites (Score 1, 2 & 3).

Those sites that were considered to be potentially regionally significant (P sites) were sites which:

- Currently score ‘4’ (high value) but where it is not clear if this ranking relates to wetland or other values (1 site only, site 225 Bankview);
- Currently score ‘3’ (moderate value) but for which earlier descriptions suggest a higher ranking should be considered; or
- Currently score ‘3’ (moderate value), appear in aerial photographs to be large and intact, but are very poorly described, and therefore warrant additional consideration (e.g. Site 178 Rathkeale College Bush).

Those sites that were considered to not be regionally significant (U sites) were sites which:

- Currently score ‘3’ (moderate) and for which there is no supporting information, either descriptive (earlier studies) or visual (aerial photographs), that suggest this score should be higher; or
- Currently score ‘1’ (very low), or ‘2’ (low).

The requirement for additional fieldwork to delineate sites was identified as:

- “**Y**” - sites where uncertainty remains over wetland extent due to inability to confidently identify wet / dry boundaries within forest, scrub or grassland.
- “**N**” - sites where wetland extent is clearly defined and could be delineated with confidence, or where sites are protected and accurate delineation is not required.

The results of this are summarised in the following table. It concludes that 19 sites that are regionally significant do not require any further work, and 17 sites that are regionally significant require further delineation. Finally it identifies 21 sites that may be regionally significant but require additional field investigation.

RANK	Very High	High	Moderate	Low	Very Low
Regionally Significant (Y) No further work required (N)	5	14			
Regionally Significant (Y) Requires field work to confirm delineation (Y)	5	12			
Potentially Significant (P) Requires field work to confirm assessment of significance (Y)		1	20		
Not regionally significant (U) No further work required (N)			40	116	77

4 Discussion

4.1 Tender Requirements

a) Accuracy

The tender required development of shape files for each wetland to an accuracy of 1:2,000 (with a margin of error of ± 10 m). We have typically digitised the shape files at a scale of between 1:1,000 and 1:1,500 and, where the wetland margins can be clearly identified, are comfortable that they are to an accuracy of ± 10 m.

b) Changes to wetland extent

We have reviewed a number of sites to get some idea of how this can be achieved. In reality the significant range of accuracy of delineation between different data sources makes this extremely difficult. A number of examples are attached (Appendix 1) which shows the considerable variability in delineation by different agencies. These differences are due to a number of factors:

- The scale at which sites have been defined;
- The purpose of the earlier delineation;
- Whether the mapping was limited to wetlands or included all contiguous indigenous vegetation;
- Whether the wetlands were defined off topographical maps or aerial photographs;
- The season the aerals were flown (lake level and pasture colour). and
- The quality of the aerial photographs;

Other factors that make comparisons between this and other datasets difficult, is whether adjacent sites are treated singly or in isolation (we have generally combined adjacent sites) and whether the mapped areas include or exclude waterbodies (we have excluded waterbodies over 1 ha in size and included waterbodies smaller than 1 ha).

Despite these issues Appendix 4 provides a comparison of sites between GWRC_Wet and this project, the two datasets most easily compared. There are 201 sites in common between these two datasets. A further 190 sites were added by this project from other datasets, and do not have equivalent sites in the GWRC_wet dataset.

A simple comparison of areas for those sites in common (excluding Wairarapa Moana and Lake Onoke which skew the results) gives the results in the following table. This suggests a reduction in wetland area of 182 ha or 13%. This number needs to be treated with caution for the reasons described above.

	BML Wetlands (ha)	GWRC Wetlands (ha)	Difference in Area (ha)	Difference in Area (%)
201 Wetlands in common between GWRC_Wet & this delineation (excluding lakes/lagoons > 1 ha).	1231.7	1413.9	-182.2	- 13%

The photographs provided for this study were very good, and we suggest the delineation that has been carried out will provide a solid baseline for future work, assuming the methodology described at the beginning of this report is followed.

c) Significance Assessment

The tender required the assessment of significance of the identified wetlands, using methodology agreed with GWRC, and consistent with Policy 22 of the proposed RPS.

We have developed assessment criteria for this project that has been tailored to the need to carry out the assessment as a desktop exercise. The criteria have followed, where possible Policy 22, but some deviation from this has been necessary due to the quality of information available.

The methodology has been discussed with GWRC and additional explanation has been provided above as a result.

d) Justification for significance rating

While the methodology described above can provide a way of sorting or ranking sites, the final decision on where the line for significance will be drawn still needs discussion and guidance from GWRC, and for some sites additional field survey.

Once the cut-off point has been chosen (i.e. uncertain sites within the Moderate band), we are confident the assessment has been carried out in as transparent a manner as possible so that those sites chosen as regionally significant clearly meet the criteria developed.

e) Wetlands requiring field definition:

The results of this analysis are provided in Section 3.3 and Appendix 3.

f) Land Use

The tender required a record of adjacent land use where information was available. This has been carried out as part of our assessment of Context.

g) Other Sites

The tender identified 33 sites for special consideration in this study. They included sites currently listed in the Wellington Regional Policy Statement and sites listed in the Regional Freshwater Plan, together with sites known to Council staff. These sites scored as follows:

ID	Name	SCORE
243	Wairarapa Moana Wetlands	5
101	Pauatahanui Inlet Saltmarsh	5
150	Lake Kohangatera	5
39	Te Harakeke Wetland	5
149	Lake Kohangapiripiri	5
99	Horokiri saltmarsh	4
98	Motukaraka saltmarsh / Ration Point	4
88	Taupo Swamp Complex	4
215	Allens - Lowes Bush	4
93	Kakaho Saltmarsh	4
212	Waingawa Swamp	4
155	Turakirae Head	4
82	MacKay's Crossing Swamp	4
66	Muaupoko Swamp Forest	4
141	Orongorong Swamp	4
213	Fensham & Cobden Bush & Wetland	4
103	Duck Creek Saltmarsh	4
122	Renata-Aston-Elder Ridge Turf	4
3	Lake Waiorongomai Wetlands	3
79	Queen Elizabeth Park Bush and Wetlands	3
125	Maymorn Ridge	3

221	Carters Bush / Pike Lagoon	3
236	Omega Bogs and Tarns	3
14	Waitohu River Mouth Saltmarsh	3
224	Kourarau Dam	3
140	Skull Gully Wetland	2
139	Mohaka Street Wetland	2
136	Hutt Rivermouth	2
199	"Motuwaireka Rivermouth & Shelton Wetland; Orui Wetland (Riversdale Lagoon and Ureti Wetland)"	2
246	Pukio Oxbow	2
114	Opau Stream Wetland A	2
86	Swampy Gully, Battle Hill	1
113	Opau Stream Wetland B	1

4.2 Other Matters

Numbering and Sorting

Each wetland that has been delineated by this process has been sorted and numbered for easy reference. They have been sorted first by District Council, then by northing and easting to produce the site ID used throughout this document.

Coastal and Marine Terrace and Dune Wetlands

There are a large number of sites on the south and east coast which include identification of wetlands in their descriptions. However, the significance assessments for these sites provided by other studies are often related more to dry land habitat such as dune, dry scrub, beach, rock stacks and reefs, rather than the wetland portions of the sites. Any sites on these coastal terraces, which lie within the regionally significant band, will need to be visited to confirm their values.

Swamp Forest

The accuracy of wetland delineation is also doubtful where a wetland merges into forest. Any forested sites that fall within the regionally significant band, will need to be visited to define the boundary of swamp, semi-swamp, and dry forest and confirm their extent and ecological value.

In addition, we note that a number of small forest fragments which are included in some of the datasets may no longer be true swamp forest, in particular those on the Wairarapa Plains where drainage surrounding these sites is evident.

Te Hapua

Historically Te Hapua wetland has been divided into four separate clusters. After discussion with GWRC these clusters were re-defined based on clear connectivity, or lack of, and on the degree of modification, with several groups largely created and two largely intact. There are now six separate groups, two which lie some distance to the east and probably should not be considered as part of the Te Hapua complex. These revised clusters should be confirmed.

Lake Wairarapa

After discussion with GWRC it was agreed that the assessment for this waterbody and wetland complex should combine all areas that were contiguous with the lake or directly connected. This was because many of the normally discrete wetlands referred to in documents have been separated based on land ownership, not ecological distinctiveness. The assessment for this wetland therefore includes the following named wetlands.

GWRC_Wet	Doc_EcoSites	Doc Conservation Units
163: Lake Domain	129: Ruamahanga Floodway Wetland	S27001 Lake Wairarapa Wetland Conservation Area
167: Simmonds Lagoon	13: Floodway Lake	S27001 Lake Wairarapa Wetland Conservation Area
169: Big Haywoods	1465: Allsops Bay Shrubland	S27002 Matthews & Boggy Pond Wildlife Reserve
170: Little Haywards	1474: Mangatete Stream	S27004 Allsops Bay Wildlife Reserve
175: JK Donald Reserve	149: Turners Lagoon	S27008 Wairarapa Lake Shore Scenic Reserve
180: Unsurveyed site 3	158: Wairio Ponds	S27047 Turner Wildlife Reserve
183: Makakiki Backwater	2340: Lake Wairarapa Wetland Stewardship Extension-Part"	S27047 Turner Wildlife Reserve
186: Pierce Block	34: Donalds/Haywoods Wetland	S27048 Turners Lagoon Wildlife Reserve
189: Dune Block	4: Bartons Lagoon	S27050 Roto Marginal Strip
193: Simms Cabbage Tree Swamp	518: Tauherenikau Delta	S27058 Owhanga Landing Reserve
194: Boggy Pond	58: Lake Wairarapa	
197: Mathews Lagoon	58: Lake Wairarapa	
204: Waiorongamai DoC Covenant	581: Western Lake Road Bush	
213: Papatahi Neville Davies	581: Western Lake Road Bush	
214: Davies Swamp	6: Boggy Pond	
268: Barrys puddle	63: Makakahi Backwater	
	71: Matthews Lagoon	
	9: Domain Lagoon	

One wetland that lay some distance from the main Wairarapa-Moana system, but which could be included within it is "Carters Bush / Pikes Lagoon". This site lies in farmland, 550 m to the north of Lake Wairarapa.

Pauatahanui Inlet

After discussion with GWRC it was agreed not to combine the Pauatahanui Inlet wetlands, on the basis that they are isolated by urban development including the imposition of SH56 and Grays Road on the estuary margins. The assessment for this wetland therefore treats each of the following wetlands as separate sites.

- Horokiri Raupo Swamp
- Kakaho Saltmarsh
- Camborne Scarp wetland
- Motukaraka saltmarsh / Ration Point
- Horokiri saltmarsh
- Pauatahanui Inlet - Tidal Flats
- Pauatahanui Inlet Saltmarsh
- Duck Creek Saltmarsh

Lakes

There were 23 wetlands that had waterbodies over 1 ha in size. These waterbodies were separately delineated and their area was deducted from the area of the surrounding wetland. These waterbodies and their sizes were:

LAKE NAME	AREA (ha)
Lake Wairarapa - Open Water	7092.49
Lake Onoke Open Water	709.83
Lake Pounui - Open Water	44.83
Lake Kohangatara - Open Water	16.75
Lake Kaitawa - Open Water	15.52
Lake Kohangapiripiri - Open Water	10.79

WETLANDS OF THE WELLINGTON REGION
Desktop Delineation and Assessment of Significance

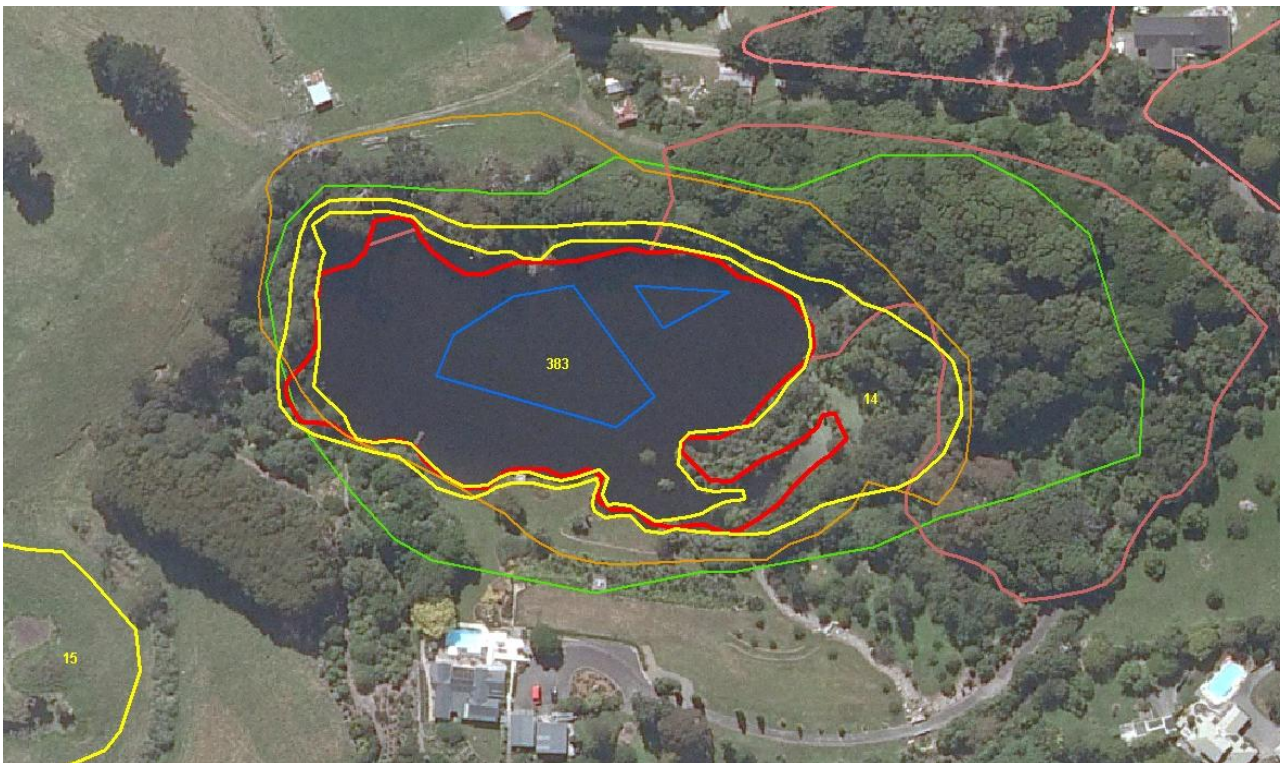
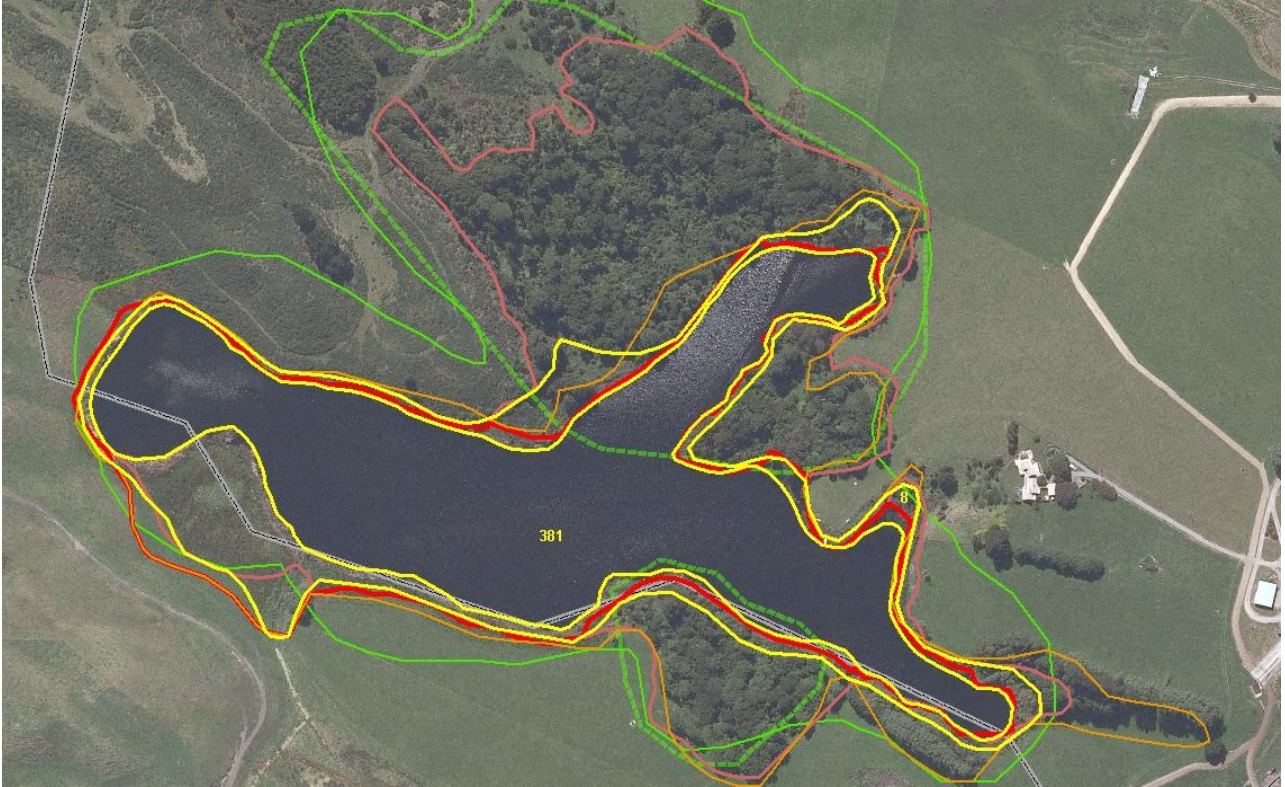
Lake Kopureherehere - Open Water	7.06
Lake Waiorongomai - Open Water	5.56
O Te Pua Lagoon - Open Water	5.24
Kourarau Dam - Open Water	4.38
Lake Nganoke - Open Water	4.14
Makara Estuary - Open Water	3.26
Waimanu Lagoons - Open Water	2.86
Sutherland Wetland- Open Water	2.76
Lower Karori Reservoir - Open Water	2.63
Ruamahanga Loop - Open Water	2.34
Hidden Lakes - Open Water	1.95
Otaki River Mouth Lagoon - Open Water	1.88
Lake Hurutini - Open Water	1.66
Lake Kiriwhakapapa - Open Water	1.53
Campbells Dam - Open Water	1.40
Ratanui Swamp - Open Water	1.16
Upper Karori Reservoir - Open Water	1.12
Lake Rotopotakataka - Open Water	0.99
Waimeha Lagoon - Open Water	0.99

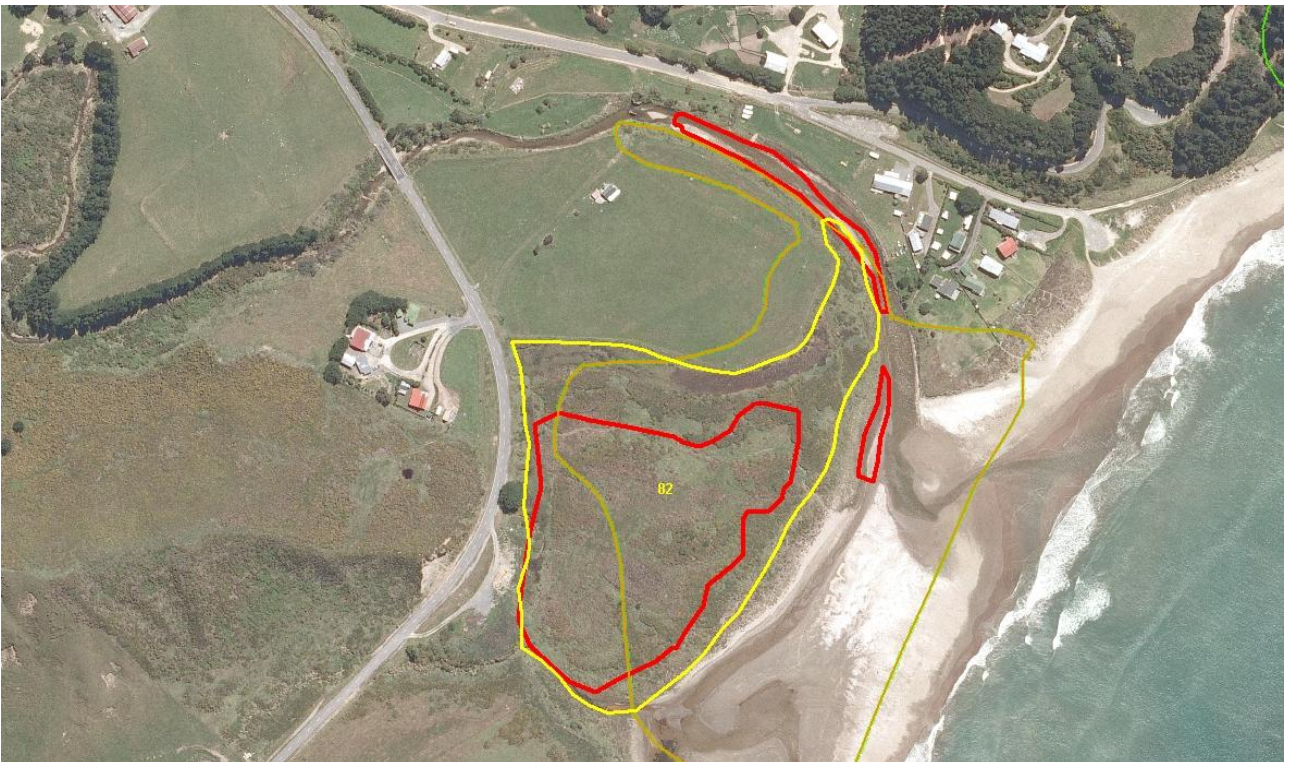
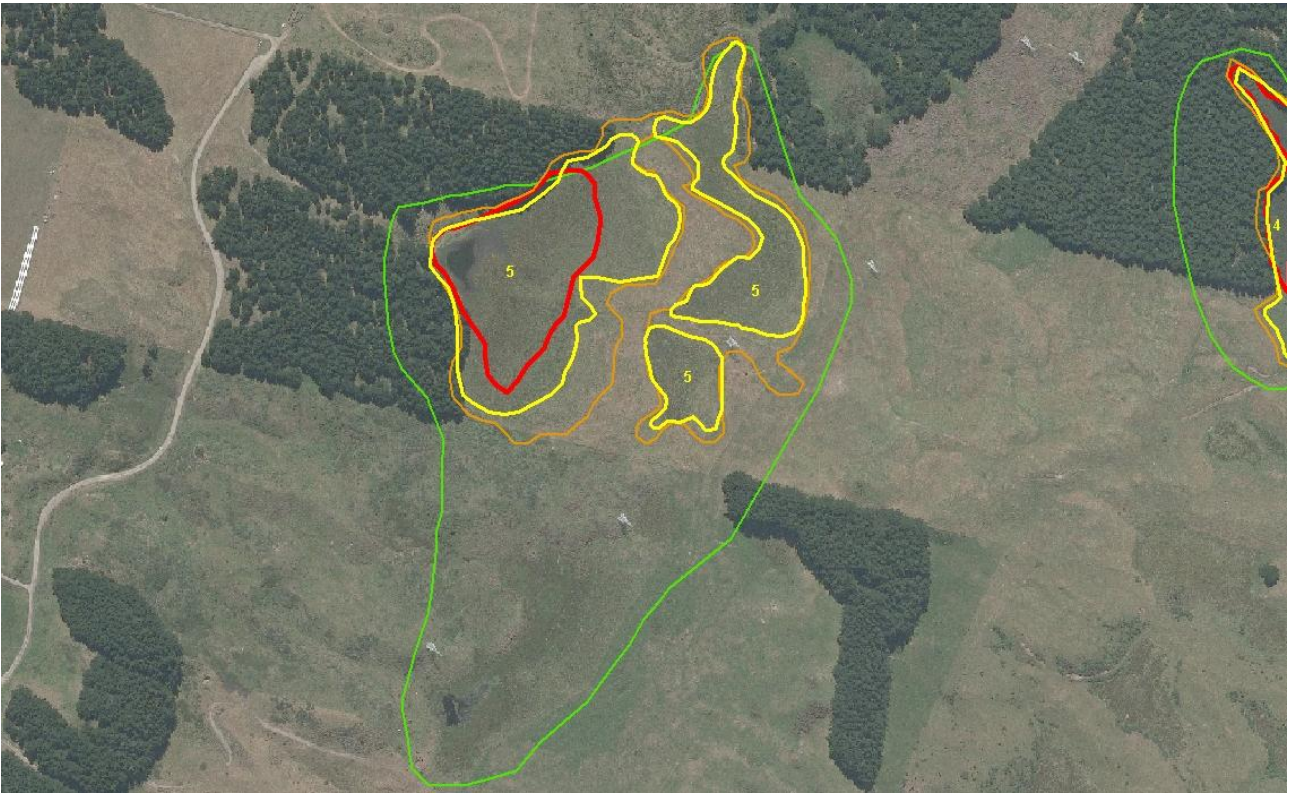
5 Conclusions

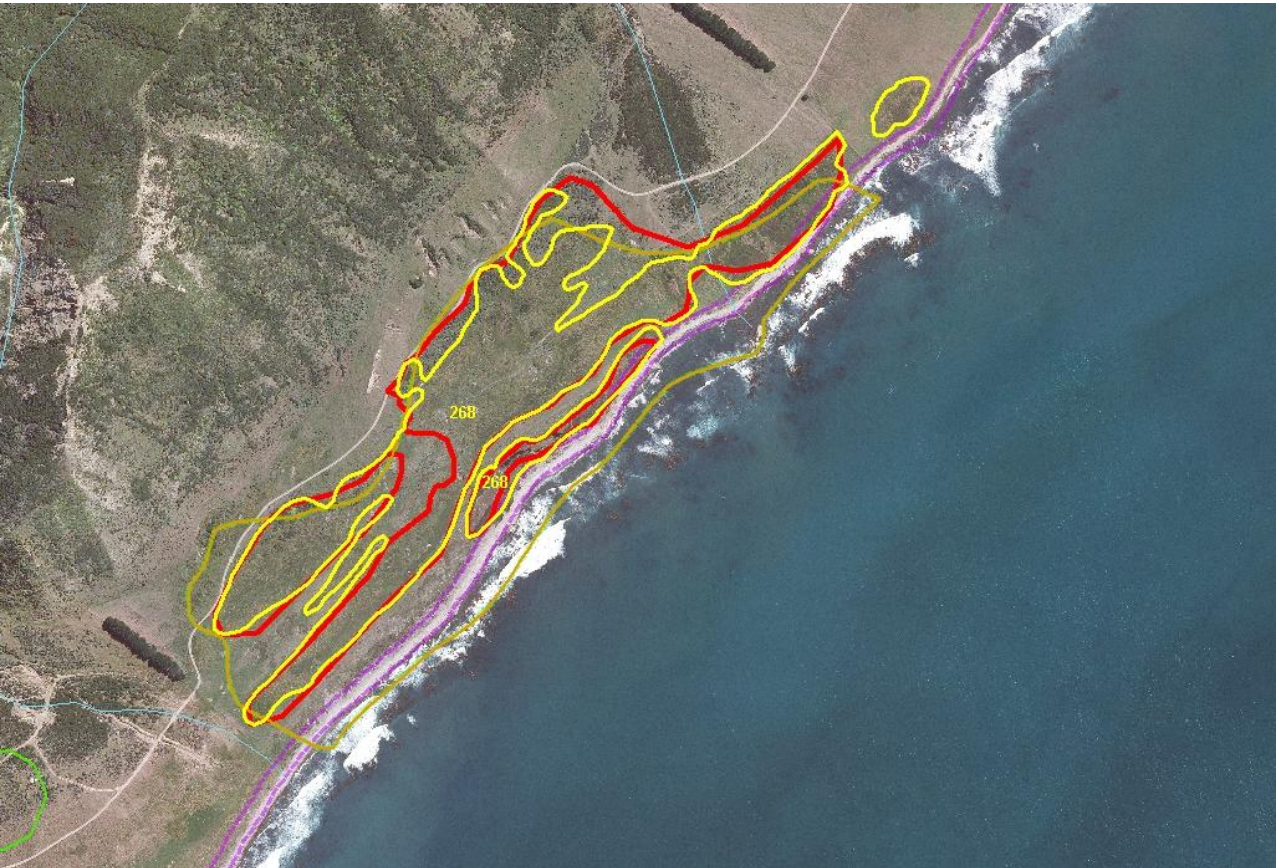
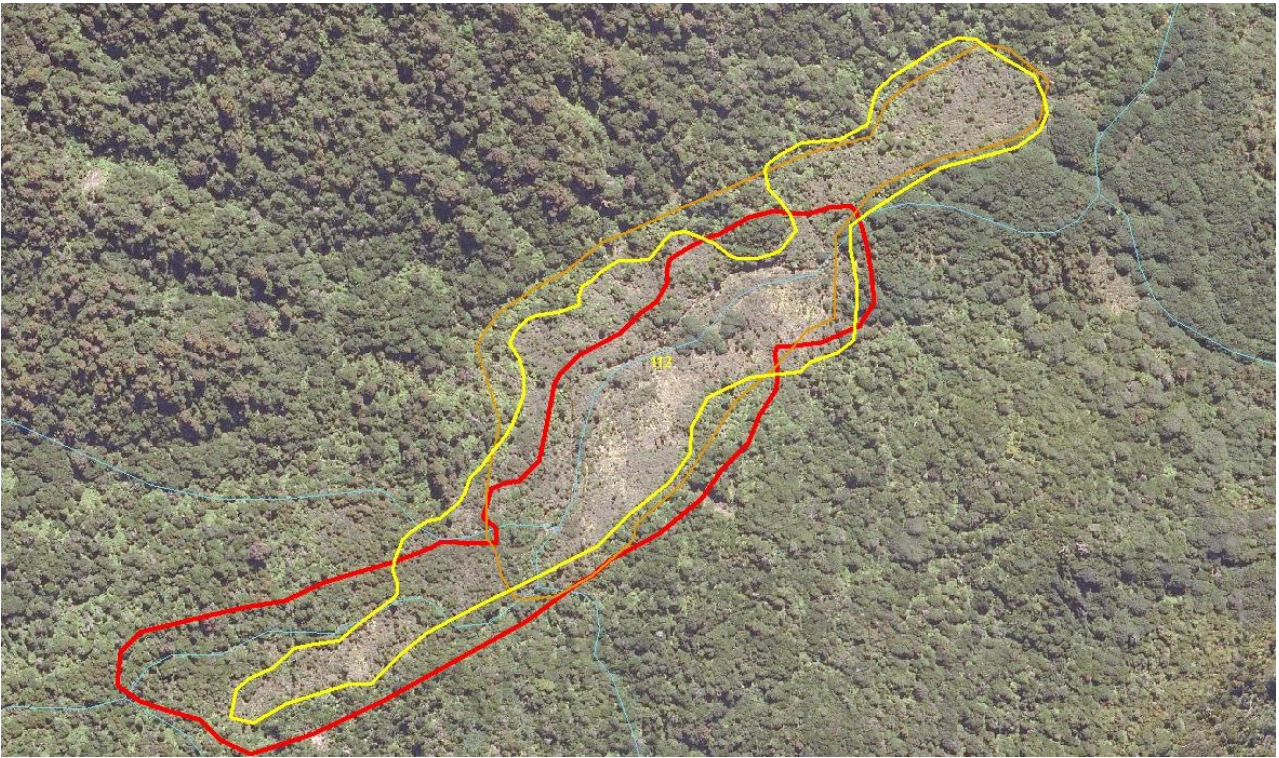
- This study has considered 4,954 records from 17 national, regional or district data sets and extracted those that relate to wetlands within the Wellington Region.
- From these data sets a total of 292 wetlands have been identified and their boundaries digitised. The methodology for this has been described to enable future repeatability.
- For each of these wetlands the information contained within each of the datasets has been combined and presented in a series of spreadsheets to allow for analysis of each sites values.
- In addition a range of information on the size, connectivity, diversity, buffering, and isolation of each site has been derived from GIS analysis and interpretation of high resolution aerial photography.
- A set of assessment criteria have been developed, based on Policy 22 of the Proposed Regional Policy Statement, but modified to enable analysis of these sites based solely on a desktop study with the obvious limitations that creates. The methodology for applying these criteria has been described in detail to enable future repeatability.
- A number of problems with delineation and assessment have been identified and described.
- Each of the sites has been assessed and given a score, then sorted into ranks from Very High to Very Low. It is considered any site with the VH and H ranks is significant at a national or regional level. All sites within the M band are considered locally significant and may be significant at the regional level although for a number of sites this needs to be confirmed. Sites within the L band are significant, but are likely to be so at the District Level. Sites within the VL band may not be significant.
- The results suggest that 36 sites are regionally significant, a further 21 sites are potentially regionally significant, but some additional consideration is required to confirm this. 158 sites are of local value, and 77 sites have very low values and are likely to not be significant.
- Finally this report has identified those wetlands requiring further study. In total 17 wetlands that are regionally significant require field survey to confirm their extent in areas where aerial photography was unclear. A further 21 wetlands require field survey to confirm whether they are regionally or locally significant.

APPENDIX 1: Examples of differing delineations from current databases

All Databases combined: **Blue** is GWRC_Hydro; **Red** is GWRC_wet; **Ochre** is GWRC_extnt; **Green solid** is DoC_Ecosite; **Green dashed** is DoC RAP; **Brown** is KCDC_Ecosite; **Yellow** is this project delineation.







APPENDIX 2: Wetland Sites Ranking

Results of Desktop Study Ranking (5=Very High to 1=Very Low)

ID	Wetland Name	Significance Assessment								Ranking		
		Represent Score	LENZ Threat	Community Score	Flora Score	Fauna Score	Diversity Score	Connectivity Score	Migrant Score	Median of Score	Sum of Scores	SCORE
Wetland sites considered nationally or regionally significant)												
243	Wairarapa Moana Wetlands	5	5	5	4	5	5	5	5	5.00	39	5
56	Waikanae Saltmarsh	5	5	4	4	5	5	5	5	5.00	38	5
26	Te Hapua Swamp Complex A	5	5	4	4	5	5	5	4	5.00	37	5
101	Pauatahanui Inlet Saltmarsh	5	5	4	3	5	5	5	5	5.00	37	5
150	Lake Kohangatera	5	5	5	3	4	5	5	4	5.00	36	5
261	Lake Pounui	5	5	5	3	4	5	5	4	5.00	36	5
39	Te Harakeke Wetland	5	5	3	3	5	5	5	4	5.00	35	5
149	Lake Kohangapiripiri	5	5	4	4	4	5	5	3	4.50	35	5
100	Pauatahanui Inlet - Tidal Flats	5	5	4	2	5	3	5	5	5.00	34	5
235	Mount Cone Turf Bog	5	1	5	5	2	4	5	1	4.50	28	5
99	Horokiri saltmarsh	4	5	4	3	3	5	5	4	4.00	33	4
48	Nga Manu Wetland	5	5	3	3	4	4	5	3	4.00	32	4
98	Motukaraka saltmarsh / Ration Point	4	5	4	3	3	4	5	4	4.00	32	4
265	Lake Onoke (incl Pounui Lagoon & Kiriwai Lagoon)	4	5	3	3	4	5	5	3	4.00	32	4
7	Lake Kopureherehere	5	5	4	3	3	4	5	2	4.00	31	4
88	Taupo Swamp Complex	4	5	4	4	4	4	5	1	4.00	31	4
215	Allens - Lowes Bush	5	5	5	3	3	4	4	2	4.00	31	4
93	Kakaho Saltmarsh	4	5	4	3	3	4	5	2	4.00	30	4
49	Kapiti Island Swamp Forest	4	5	4	3	3	4	5	1	4.00	29	4
212	Waingawa Swamp	5	5	2	4	4	3	2	4	4.00	29	4
123	Martin River Wetland	4	4	2	4	3	4	5	2	4.00	28	4
225	Bankview	5	4	4	4	1	3	5	1	4.00	27	4
155	Turakirae Head	3	5	4	3	4	3	5	3	3.50	30	4
176	Whakatiki River Mouth	3	5	4	3	3	4	5	3	3.50	30	4
2	Huritini Swamp	5	5	3	2	2	4	5	3	3.50	29	4
82	MacKay's Crossing Swamp	3	5	3	4	4	3	4	3	3.50	29	4
27	Te Hapua Swamp Complex D	4	5	2	2	3	4	5	3	3.50	28	4
66	Muaupoko Swamp Forest	4	5	4	2	3	3	5	2	3.50	28	4
76	Raumatī South Peatlands B	4	5	3	3	2	4	5	2	3.50	28	4
141	Orongorongo Swamp	5	5	2	2	2	5	5	2	3.50	28	4
10	Lake Kaitawa & Keelings Bush	4	5	3	2	3	4	4	2	3.50	27	4
21	Otaki River Mouth Lagoon & Rangiruru Wetland	2	5	2	2	4	3	5	4	3.50	27	4
213	Fensham & Cobden Bush & Wetland	4	5	4	3	3	2	4	2	3.50	27	4
20	Haruatai Park Forest	4	5	4	2	2	3	4	2	3.50	26	4
102	Te Onepoto Wetland	4	5	3	3	1	4	5	1	3.50	26	4
103	Duck Creek Saltmarsh	4	5	4	1	2	3	5	2	3.50	26	4
122	Renata-Aston-Elder Ridge Turf	5	1	4	4	2	3	5	2	3.50	26	4
Wetland sites that are significant at a District scale or may elevate to regional significant with additional investigationn												
16	O te Pua (Pukehou / Pritchard's Swamp)	4	5	3	3	3	3	4	3	3.00	28	3
31	Okupe Lagoon	5	5	3	2	3	3	4	3	3.00	28	3
196	Orui A Whareama River Mouth	5	5	3	3	2	3	5	2	3.00	28	3
3	Lake Waiorongomai Wetlands	3	5	3	2	4	3	4	3	3.00	27	3
112	Makara Rvr Mth	3	5	2	2	3	3	5	4	3.00	27	3
15	Ngatotara Lagoon	3	5	3	2	3	3	4	3	3.00	26	3
23	Otaki River Mouth South	3	5	2	2	4	2	5	3	3.00	26	3

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		Represent Score	LENZ Threat	Community Score	Flora Score	Fauna Score	Diversity Score	Connectivity Score	Migrant Score	Median of Score	Sum of Scores	SCORE
50	Waimeha Lagoon - Victor Weggerly Reserve	3	5	3	2	4	3	3	3	3.00	26	3
54	El Rancho Wetlands	3	5	3	3	2	3	5	2	3.00	26	3
191	Otahoua Swamp	5	5	3	3	2	2	4	2	3.00	26	3
239	Turners Lagoon	3	5	2	2	3	4	5	2	3.00	26	3
79	Queen Elizabeth Park Bush and Wetlands	3	5	3	4	2	3	3	2	3.00	25	3
125	Maymorn Ridge	5	1	4	3	2	3	5	2	3.00	25	3
221	Carters Bush / Pike Lagoon	3	5	2	4	2	3	4	2	3.00	25	3
234	Honeycomb Rock Terrace	3	5	3	4	3	2	2	3	3.00	25	3
236	Omega Bogs and Tarns	5	1	4	2	2	4	5	2	3.00	25	3
267	Whangaimoana Stream Mouth	3	5	3	3	2	2	5	2	3.00	25	3
75	Raumati South Peatlands A	3	5	3	3	1	3	5	1	3.00	24	3
173	Hidden Lakes	3	5	2	1	3	4	5	1	3.00	24	3
269	Tuturumuri Swamp A	3	5	2	3	2	3	4	2	3.00	24	3
240	Ruamahanga Loop	3	5	2	2	3	3	2	3	3.00	23	3
283	Tora Coast (d)	2	4	3	3	2	3	4	2	3.00	23	3
12	Waimanguru Lagoon (Forest Lake)	1	5	3	2	3	3	3	2	3.00	22	3
85	Muri Road Wetland	3	5	3	1	1	3	5	1	3.00	22	3
263	Lake Nganoke	3	5	3	1	4	2	3	1	3.00	22	3
247	Oporua Bush A	3	5	3	3	1	2	3	1	3.00	21	3
186	Solway Remnant A	3	5	3	3	1	1	3	1	3.00	20	3
124	Whakatikei Headwater Swamp	3	5	2	2	2	4	5	2	2.50	25	3
29	Te Hapua Wetland Complex C	3	5	2	2	2	3	5	2	2.50	24	3
30	Te Hapua Wetland Complex B	3	5	3	2	2	2	5	2	2.50	24	3
89	Plimmerton Swamp East	3	5	2	2	2	3	5	2	2.50	24	3
184	Unknown QE2	3	5	2	2	2	3	5	2	2.50	24	3
195	Whareama Rivermouth	2	5	2	2	4	1	5	3	2.50	24	3
206	Patanui Stream Mouth	2	5	2	2	3	2	5	3	2.50	24	3
223	Taumata Oxbow	4	5	2	2	3	4	2	2	2.50	24	3
6	Pylon Swamp	2	5	3	2	3	2	5	1	2.50	23	3
14	Waitohu River Mouth Saltmarsh	1	5	2	2	3	2	5	3	2.50	23	3
51	Osbourne's Swamp	2	5	3	2	2	3	4	2	2.50	23	3
60	Tini Bush	5	5	3	1	1	2	5	1	2.50	23	3
80	Queen Elizabeth Park Railway Wetlands	2	5	2	3	2	2	4	3	2.50	23	3
126	Whakariki Wetland	3	5	2	2	2	4	3	2	2.50	23	3
167	Mataikona River Mouth Swamp	2	5	2	2	3	1	5	3	2.50	23	3
178	Rathkeale College Bush	4	5	2	3	2	3	2	2	2.50	23	3
227	Kaiwhata River Oxbow	3	5	2	2	3	2	4	2	2.50	23	3
228	Kaiwhata River Mouth	1	5	2	2	4	1	5	3	2.50	23	3
266	Wharekauhau Swamp	3	4	2	2	2	3	5	2	2.50	23	3
289	Opouawe Rivermouth	1	5	2	2	3	1	5	4	2.50	23	3
4	Simcox Lake	1	5	2	2	3	1	5	3	2.50	22	3
34	Pekapeka Road Swamp	3	5	2	2	3	3	2	2	2.50	22	3
144	Wainuiomata Waterworks Swamp Upper	3	3	2	2	2	3	5	2	2.50	22	3
145	Wainuiomata Waterworks Swamp Lower	3	3	2	2	2	3	5	2	2.50	22	3
248	Oporua Bush B, C, D	3	5	2	3	2	2	3	2	2.50	22	3
290	White Rock Beach A	2	5	2	4	3	1	2	3	2.50	22	3
117	Karori Dam	2	1	2	1	4	3	5	3	2.50	21	3
154	Wainuiomata River Mouth	1	5	2	3	1	1	5	3	2.50	21	3
220	Brazendale	3	5	1	1	3	2	5	1	2.50	21	3
222	Taumata Stream	1	5	2	1	3	1	5	3	2.50	21	3
224	Kourarau Dam	1	5	2	2	3	3	2	3	2.50	21	3
64	Ratanui Swamp	2	5	1	1	3	2	3	3	2.50	20	3

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		Represent Score	LENZ Threat	Community Score	Flora Score	Fauna Score	Diversity Score	Connectivity Score	Migrant Score	Median of Score	Sum of Scores	SCORE
193	Ruamahanga River Terrace	4	5	1	3	1	2	3	1	2.50	20	3
203	Ruakaka Pond	3	5	2	1	3	3	2	1	2.50	20	3
159	Manawa-David Dalziel	1	4	2	2	3	3	3	1	2.50	19	3
Wetlands of limited value that may be significant at a District level.												
25	Rahui Road Bush C / Croads Bush Gully	5	5	4	2	2	2	2	2	2.00	24	2
107	Porirua Harbour (Onepoto Arm) - Tidal Flats	2	5	2	2	2	3	5	2	2.00	23	2
177	Matahiwi Bush II	3	5	2	2	2	2	5	2	2.00	23	2
69	Kapiti Airfield Wetland A	2	5	2	3	2	2	4	2	2.00	22	2
133	Blue Mountain Bush Swamp Forest	4	5	2	2	3	2	2	2	2.00	22	2
140	Skull Gully Wetland	4	3	2	2	2	2	5	2	2.00	22	2
170	Trimble Trust	3	4	2	2	2	2	5	2	2.00	22	2
171	Gary Daniells	2	5	2	2	2	2	5	2	2.00	22	2
174	Okau Stream Mouth	3	5	2	2	2	1	5	2	2.00	22	2
259	Unknown 26	3	5	2	2	2	2	4	2	2.00	22	2
5	Simcox Swamp	2	5	2	2	2	2	5	1	2.00	21	2
8	Wairongomai Road Manuka Wetland	2	5	2	2	2	3	4	1	2.00	21	2
32	Te Hapua Swamp Complex F	2	5	2	2	2	3	3	2	2.00	21	2
33	Kowhai Stream Mouth (Hadfields)	3	4	2	2	2	1	5	2	2.00	21	2
41	Waimeha Stream Mouth	2	5	2	2	2	1	5	2	2.00	21	2
81	Wainui Stream Mouth	2	5	2	2	2	1	5	2	2.00	21	2
128	Stock Car wetland	3	5	2	2	2	1	5	1	2.00	21	2
139	Mohaka Street Wetland	2	5	2	2	2	1	5	2	2.00	21	2
172	Kiriwhakapapa Lagoon	3	5	2	2	2	3	2	2	2.00	21	2
182	"Humpy" Stream Mouth	2	5	2	2	2	1	5	2	2.00	21	2
189	Otahome Stream Mouth	2	5	2	2	2	1	5	2	2.00	21	2
198	Orui C & D	3	5	2	2	2	3	2	2	2.00	21	2
208	Waikaraka Stream Mouth	2	5	2	2	2	1	5	2	2.00	21	2
210	Homewood Dam	2	5	2	2	3	2	3	2	2.00	21	2
242	Rototawai Lake	2	5	3	2	3	2	2	2	2.00	21	2
256	Unknown (not Battery Pond)	2	5	2	2	2	1	5	2	2.00	21	2
272	Rerewhakaaitu Rivermouth	2	5	2	2	2	1	5	2	2.00	21	2
286	Otekaha Stream mouth, Cape Palliser	2	5	2	2	2	1	5	2	2.00	21	2
287	Tora Coast (b)	4	4	2	2	2	1	4	2	2.00	21	2
292	White Rock Beach B	2	4	2	4	2	2	2	3	2.00	21	2
24	Mangaone Stream Mouth	2	4	2	2	2	1	5	2	2.00	20	2
28	Te Hapua Swamp Complex E	2	5	2	2	2	2	3	2	2.00	20	2
77	Poplar Ave Wetland	2	5	2	2	2	2	3	2	2.00	20	2
78	Whareroa Estuary	2	4	2	2	2	1	5	2	2.00	20	2
136	Hutt Rivermouth	1	5	2	2	3	1	5	1	2.00	20	2
142	Gracefield Scrub / Waiau Wetland	2	5	2	2	2	1	4	2	2.00	20	2
153	Unsurveyed site 1	2	5	4	1	2	1	4	1	2.00	20	2
188	Henley Lakes A	1	5	2	2	2	2	4	2	2.00	20	2
197	Whareama Dune System Wetland	3	5	2	2	2	2	2	2	2.00	20	2
199	"Motuwaireka Rivermouth & Shelton Wetland	2	5	2	1	3	1	5	1	2.00	20	2
200	Riversdale South Dunes	2	5	2	2	2	2	3	2	2.00	20	2
211	Egan (a)	1	5	2	2	3	2	2	3	2.00	20	2
214	Clareville wetland	2	5	2	2	2	2	3	2	2.00	20	2
218	Main Road Swamp (Foreman)	2	5	2	2	2	2	3	2	2.00	20	2
253	Waituna Western Bush	3	5	1	1	1	3	5	1	2.00	20	2
274	Oterei River Mouth	1	5	2	2	2	1	5	2	2.00	20	2
275	Makotukutuku Stream mouth (Washpool) Cape Palliser	2	4	2	2	2	1	5	2	2.00	20	2

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		Represent Score	LENZ Threat	Community Score	Flora Score	Fauna Score	Diversity Score	Connectivity Score	Migrant Score	Median of Score	Sum of Scores	SCORE
276	Castle River	3	2	2	2	2	2	5	2	2.00	20	2
279	Awheaiti Stream Mouth	2	4	2	2	2	1	5	2	2.00	20	2
282	Pararaki Stream mouth, Cape Palliser	2	4	2	2	2	1	5	2	2.00	20	2
45	Ngarara Road Wetland D	1	5	1	3	3	1	4	1	2.00	19	2
73	Wharemauku Stream Mouth	2	5	1	1	2	1	5	2	2.00	19	2
162	Kakaumu Dams North	1	5	2	2	2	3	3	1	2.00	19	2
166	Cambell / Connell Dam	1	5	2	2	2	2	2	3	2.00	19	2
226	Wainuioru River Bush	1	5	1	2	2	2	5	1	2.00	19	2
229	Caledonia Wetland	2	5	2	2	2	2	2	2	2.00	19	2
13	Lake Rotopotakataka (Forest Lake)	2	1	2	1	3	3	4	2	2.00	18	2
19	Otaki Stewardship area wetland	2	4	2	2	2	1	4	1	2.00	18	2
37	Unsurveyed Site 5	1	5	2	2	2	1	3	2	2.00	18	2
118	Karori Reservoir Swamp Forest	3	3	3	1	1	1	5	1	2.00	18	2
146	Unsurveyed wetland	3	3	1	1	3	1	5	1	2.00	18	2
157	Waipaua Stream Shrubland	1	5	2	2	2	2	2	2	2.00	18	2
161	Owhanga Coast (Chimnes)	3	2	2	2	2	3	2	2	2.00	18	2
163	Manuka flats	1	4	2	2	2	3	3	1	2.00	18	2
164	Kakaumu Dam West	1	5	2	2	3	1	3	1	2.00	18	2
165	Kakaumu Dam East	1	5	2	2	3	1	3	1	2.00	18	2
192	Ruamahunga Oxbow	3	5	1	1	1	3	3	1	2.00	18	2
202	Uriti Pont Lagoon	1	5	2	2	2	1	3	2	2.00	18	2
216	Carterton Golf Course	1	5	2	2	2	1	3	2	2.00	18	2
233	Glenburn Station	2	4	2	2	2	2	2	2	2.00	18	2
244	Mahaki Swamp	3	5	2	2	1	2	2	1	2.00	18	2
246	Pukio Oxbow	2	5	2	2	2	1	2	2	2.00	18	2
258	Battery Pond	2	3	2	1	2	3	3	2	2.00	18	2
284	Tora Coast (c)	2	4	3	2	1	2	3	1	2.00	18	2
109	Okiwai Lagoon and Wetlands	1	5	2	1	2	1	3	2	2.00	17	2
131	Mangaroa Swamp South	2	4	2	2	2	1	2	2	2.00	17	2
219	Gretel Dick Wetland	1	5	2	2	2	1	2	2	2.00	17	2
238	Elm Grove (Kempton)	3	5	2	1	1	2	2	1	2.00	17	2
251	Te Hopai Lagoon	1	5	2	2	2	1	2	2	2.00	17	2
255	Waihora Lagoon	3	4	1	1	1	2	2	3	2.00	17	2
288	Tora Coast (a)	2	4	2	2	2	1	2	2	2.00	17	2
72	Andrews Pond	2	5	2	1	1	2	2	1	2.00	16	2
179	Titoki Dams Wetland	1	4	2	1	3	1	2	2	2.00	16	2
231	Watipu Farm Dam	2	4	2	1	1	3	2	1	2.00	16	2
291	Te Kaukau Point Seal Haulout	2	2	3	2	2	1	2	2	2.00	16	2
293	Punaruksu Lagoon	2	4	1	3	1	2	2	1	2.00	16	2
42	Ngarara Bush	4	5	2	1	1	1	5	1	1.50	20	2
96	Mana Island	2	5	1	1	1	3	5	1	1.50	19	2
249	Moeraki	2	5	1	1	1	3	5	1	1.50	19	2
59	Turf Farm Dune Forest	2	5	1	4	1	1	3	1	1.50	18	2
63	Otaihanga Landfill South	2	5	1	1	1	3	4	1	1.50	18	2
74	Kaitawa Reserve Swamp Forest	3	5	1	1	1	2	4	1	1.50	18	2
87	Battle Hill Ponds	2	5	1	1	1	3	4	1	1.50	18	2
135	Korokoro Stream Mouth	1	5	1	1	2	1	5	2	1.50	18	2
187	Solway Remnants B	3	5	1	1	1	2	4	1	1.50	18	2
270	Tuturumuri Swamp B	3	5	1	1	1	2	4	1	1.50	18	2
53	Waimanu Lagoons	2	5	3	1	1	1	3	1	1.50	17	2
84	Bells Bush	2	4	1	1	1	2	5	1	1.50	17	2
106	Romesdale Lagoon	2	5	1	1	1	3	3	1	1.50	17	2
114	Opau Stream Wetland A	3	2	1	1	1	3	5	1	1.50	17	2
119	Karori Reservoir	1	3	2	1	3	1	5	1	1.50	17	2
217	Allens Bush	2	5	1	1	1	3	3	1	1.50	17	2
262	Kiriwai farm	2	4	1	1	1	2	5	1	1.50	17	2

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22	269-281 SH1 Otaki	2	5	1	1	1	2	3	1	1.50	16	2
108	Aotea Lagoon	1	5	2	2	1	1	3	1	1.50	16	2
156	Owahanga Tussockland	2	5	1	3	1	1	2	1	1.50	16	2
252	Donalds Wetland	2	5	1	1	1	3	2	1	1.50	16	2
134	Johnson's Road Wetland	2	5	1	1	1	2	2	1	1.50	15	2
138	Waiwhetu Rivermouth	1	1	2	1	2	1	5	2	1.50	15	2
180	D Cook Wetland	1	5	2	2	1	1	2	1	1.50	15	2
285	Kawakawa Dune Hollow	2	4	1	1	1	2	3	1	1.50	15	2
160	Bushgate	2	4	1	1	1	2	2	1	1.50	14	2
232	Waimoana Wetland	2	4	1	1	1	2	2	1	1.50	14	2
277	Opouawe River Swamp B	2	2	1	1	1	2	2	1	1.50	12	2
280	Kaiwaka Road A	2	2	1	1	1	2	2	1	1.50	12	2
281	Kaiwaka Road B	2	2	1	1	1	2	2	1	1.50	12	2
Wetlands that may not be significant or insufficient information												
92	Horokiri Raupo Swamp	3	5	1	1	1	1	5	1	1.00	18	1
205	Wairongo Stream Wetland	1	5	3	1	1	1	5	1	1.00	18	1
18	Otaki Porirua Trust Board Wetland	1	5	1	1	1	2	5	1	1.00	17	1
65	Reikorangi Road Bush D	2	5	1	1	1	1	5	1	1.00	17	1
86	Swampy Gully, Battle Hill	2	5	1	1	1	1	5	1	1.00	17	1
97	Camborne Scarp wetland	2	5	1	1	1	1	5	1	1.00	17	1
110	Cannons Creek Lakes	1	5	1	1	1	2	5	1	1.00	17	1
111	Hawkins Gully Wetland	2	5	1	1	1	1	5	1	1.00	17	1
121	Sinclair Head	5	5	1	1	1	1	2	1	1.00	17	1
129	Wi Tako Ghania wetland	1	5	2	1	1	1	5	1	1.00	17	1
132	Mangaroa Swamp	3	5	1	1	1	1	4	1	1.00	17	1
181	Ngakaukau Stream Mouth	1	5	1	1	1	1	5	2	1.00	17	1
268	Pahaoa	2	5	1	1	1	1	5	1	1.00	17	1
271	Tuturumuri Swamp C	1	5	1	1	1	3	4	1	1.00	17	1
46	Unknown	1	5	1	1	1	1	5	1	1.00	16	1
58	Lion Downs Bush	3	5	1	1	1	1	3	1	1.00	16	1
61	Otaihanga Landfill North	2	5	1	1	1	1	4	1	1.00	16	1
62	Otaihanga Landfill Central	2	5	1	1	1	1	4	1	1.00	16	1
70	Kapiti Road Wetland A	1	5	1	1	3	1	3	1	1.00	16	1
90	The Glenn Wetland	1	5	1	1	1	1	5	1	1.00	16	1
91	West Horokiri Wetland	1	5	1	1	1	1	5	1	1.00	16	1
95	Motukaraka West Wetland	1	5	1	1	1	1	5	1	1.00	16	1
130	Ladel Bend Wetland	3	3	1	1	1	1	5	1	1.00	16	1
147	Sugarloaf Bush	3	3	1	1	1	1	5	1	1.00	16	1
175	Davidson Wetland	2	4	1	1	1	1	5	1	1.00	16	1
185	Rare Animal Farm	1	5	1	1	3	1	3	1	1.00	16	1
201	Uriti Point	1	5	3	1	1	1	3	1	1.00	16	1
204	Wairongo Road wetland	1	5	3	1	1	1	3	1	1.00	16	1
209	Le Grove Wetland	1	5	1	1	1	1	5	1	1.00	16	1
257	McCreary Pond	3	3	1	1	1	1	5	1	1.00	16	1
9	Wairongomai Road Swamp / Lake Purehurehu	1	5	1	1	1	1	4	1	1.00	15	1
11	Sims Wetland	1	5	1	1	1	2	3	1	1.00	15	1
43	Ngarara Road Wetland A	1	5	1	1	1	1	4	1	1.00	15	1
44	Ngarara Road Wetland B	1	5	1	1	1	1	4	1	1.00	15	1
47	Ngarara Road Wetland C	1	5	1	1	1	1	4	1	1.00	15	1
57	Ngarara Lake	1	5	1	1	1	1	4	1	1.00	15	1
71	Kapiti Airfield Wetland B	1	5	1	1	1	1	4	1	1.00	15	1
94	Unsurveyed Site	1	4	1	1	1	1	5	1	1.00	15	1
104	Papakowhai Bush	1	5	1	1	1	1	4	1	1.00	15	1
127	Gratton's Wetland	2	5	1	1	1	1	3	1	1.00	15	1

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ID	Wetland Name	Significance Assessment								Ranking		
		Represent Score	LENZ Threat	Community Score	Flora Score	Fauna Score	Diversity Score	Connectivity Score	Migrant Score	Median of Score	Sum of Scores	SCORE
148	Wainuiomata River Bush A	2	4	1	1	1	1	4	1	1.00	15	1
151	Paiaka Stream Wetland	2	3	1	1	1	1	5	1	1.00	15	1
237	Woodside Bush Fragments	3	5	1	1	1	1	2	1	1.00	15	1
241	Hikiinui Road Lagoon	1	5	2	1	1	1	3	1	1.00	15	1
245	Wairongomai	1	4	1	1	1	1	5	1	1.00	15	1
264	Turanganui Pond	1	5	2	1	1	1	3	1	1.00	15	1
17	K201 Recommended	1	5	1	1	1	2	2	1	1.00	14	1
35	Unknown	1	5	1	1	1	2	2	1	1.00	14	1
36	Unsurveyed Site 12	1	5	1	1	1	1	3	1	1.00	14	1
38	Unsurveyed Site 11	1	5	1	1	1	1	3	1	1.00	14	1
40	Unknown	1	5	1	1	1	1	3	1	1.00	14	1
55	Waikanae River Oxbow	1	5	1	1	1	1	3	1	1.00	14	1
67	Crown Hill Manuka Bush	2	5	1	1	1	1	2	1	1.00	14	1
68	Kapiti Airfield Raupo Swamp	1	5	1	1	1	1	3	1	1.00	14	1
83	Whareroa Farm Bush F	1	5	1	1	1	2	2	1	1.00	14	1
105	Papakowhai Lagoon	1	5	1	1	1	1	3	1	1.00	14	1
116	Kaiwharawhara Stream Mouth	1	1	1	1	2	1	5	2	1.00	14	1
143	Unsurveyed 16	1	5	1	1	1	1	3	1	1.00	14	1
168	Waimeha Trust Covenant	1	3	1	1	1	1	5	1	1.00	14	1
250	Dunrobin Loop	1	5	2	1	1	1	2	1	1.00	14	1
278	Awhea River	1	1	1	1	3	1	5	1	1.00	14	1
1	South Waikawa Beach Dune Lake	1	4	1	1	1	1	3	1	1.00	13	1
113	Opau Stream Wetland B	1	2	1	1	1	1	5	1	1.00	13	1
115	Quartz Hill Swamp	1	5	1	1	1	1	2	1	1.00	13	1
120	Red Rocks	4	2	1	1	1	1	2	1	1.00	13	1
137	Mowlem Bush	1	5	1	1	1	1	2	1	1.00	13	1
183	Henley Lakes	1	5	1	1	1	1	2	1	1.00	13	1
190	Waipawa Stream Wetland	1	5	1	1	1	1	2	1	1.00	13	1
194	Willy Cranswick Wetland	1	5	1	1	1	1	2	1	1.00	13	1
207	Homewood Road Unsurveyed	1	5	1	1	1	1	2	1	1.00	13	1
230	Burkhardt Wetlands	1	5	1	1	1	1	2	1	1.00	13	1
260	Ti Kouka Swamp	1	5	1	1	1	1	2	1	1.00	13	1
273	Tora Road Wetland	1	5	1	1	1	1	2	1	1.00	13	1
158	Spot 424 Bog	1	4	1	1	1	1	2	1	1.00	12	1
169	T J Campbell Covenant	1	1	1	1	1	1	5	1	1.00	12	1
152	Unsurveyed 11	1	3	1	1	1	1	2	1	1.00	11	1
254	M. Sutherland	2	1	1	1	1	2	2	1	1.00	11	1

APPENDIX 3: Recommendation for Additional Investigations

Regionally Significant

- **“Yes”:** (Category 4 & 5) no further investigation required.
- **“Potentially”** (Category 3) further investigation recommended to confirm significance, based on recommendations of earlier studies and observations from this desktop analysis.
- **“Unlikely”** (Category 3) no further investigation recommended.

Additional Field Work to Delineate

- **“Y”** Identifies those sites where uncertainty remains over wetland extent due to inability to confidently identify wet / dry boundaries within forest, scrub or grassland.
- **“N”** Identifies sites where wetland extent is clearly defined and could be delineated with confidence, or where sites are protected and accurate delineation is not required.

ID	Wetland Name	SCORE	RAP	SSWISIG	WERISIG	Cncl EcoS Rank	Regionally Significant Y/P/U	Additional Field work to delineate	Notes
243	Wairarapa Moana Wetlands	5	Y	M-H	4		Y	N	Separate project
56	Waikanae Saltmarsh	5	Y	M-H	4	R	Y	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.
101	Pauatahanui Inlet Saltmarsh	5		M-H	4	SES 1	Y	Y	Some uncertainty on eastern and southern margin adjacent to township.
26	Te Hapua Swamp Complex A	5	Y	H	4	R	Y	Y	Already extensive field work in some areas, and some boundaries fixed by mediation. Recommend discussion with KCDC before fixing based on this desktop.
261	Lake Pounui	5		M-H	4		Y	Y	Extent of wetland west and north into gully system unclear in aerials. And extent of swamp vs. dry forest cannot be defined by aerial.
150	Lake Kohangatera	5		M-H	4		Y	N	Happy with delineation
149	Lake Kohangapiripiri	5		M	3		Y	N	Happy with delineation
39	Te Harakeke Wetland	5	Y	M-H	3	R	Y	Y	Generally happy with delineation, but some margins extend into manuka and extent of wet and dry scrub could be checked.
100	Pauatahanui Inlet - Tidal Flats	5		M-H	4	R	Y	N	Happy with delineation
235	Mount Cone Turf Bog	5		H			Y	N	Protected (DOC) so accurate delineation not needed. Note though that cannot accurately determine extent of wet grassland from dry tussockland from aerial photos.
99	Horokiri saltmarsh	4		M-H	4	SES 3	Y	N	Happy with delineation
265	Lake Onoke (incl Pounui Lagoon & Kiriwai Lagoon)	4	Y	M-H	4		Y	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
98	Motukaraka saltmarsh / Ration Point	4				SES 3	Y	N	Happy with delineation
48	Nga Manu Wetland	4		M-H	3	R	Y	Y	Presence/Extent of swamp forest cannot be determined in aerials.
215	Allens - Lowes Bush	4	Y	M			Y	Y	Extent of wetland into wet pasture and forest not clear in aerials.
88	Taupo Swamp Complex	4			4	SES 1	Y	N	Happy with delineation
7	Lake Kopureherehere	4	Y	M-H	2	R	Y	Y	Presence/Extent of swamp forest cannot be determined in aerials.
176	Whakatiki River Mouth	4	Y				Y	Y	Extent of turf, wet scrub and dune vegetation unable to be accurately defined from aerial photo.
155	Turakirae Head	4	Y	H			Y	Y	Extent of turf, wet scrub and dry boulderfield vegetation unable to be accurately defined from aerial photo.
93	Kakaho Saltmarsh	4		M-H	4	SES 1	Y	N	Happy with delineation
212	Waingawa Swamp	4	Y	M	2		Y	N	Happy with delineation

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ID	Wetland Name	SCORE	RAP	SSWISIG	WERISIG	Cncl EcoS Rank	Regionally Significant Y/P/U	Additional Field work to delineate	Notes
82	MacKay's Crossing Swamp	4		M	2	R	Y	N	Happy with delineation
49	Kapiti Island Swamp Forest	4					Y	N	Protected (DOC) so accurate delineation not needed. Note though that accurate extent of swamp forest cannot be determined from aerials.
2	Huritini Swamp	4	Y	M	2	R	Y	Y	Wetland extent into pine and weedland cannot be defined from aerials.
141	Orongorongo Swamp	4					Y	N	Protected (DOC) so accurate delineation not needed. Note though that accurate extent of wetland into dry forest cannot be determined from aerial photos.
123	Martin River Wetland	4		M-H			Y	N	Protected (GWRC) so accurate delineation not needed. Note though that accurate extent of wetland into dry forest cannot be determined from aerial photos.
76	Raumati South Peatlands B	4					Y	N	Happy with delineation
66	Muaupoko Swamp Forest	4				R	Y	Y	Presence/Extent of swamp forest cannot be determined in aerials.
27	Te Hapua Swamp Complex D	4	Y	H	4	R	Y	Y	Already extensive field work in some areas, and some boundaries fixed by mediation. Recommend discussion with KCDC before fixing based on this desktop.
225	Bankview	4	Y				P	Y	Uncertain about ranking of this site. Need to review. Extent of wetland beneath forest margin.
213	Fensham & Cobden Bush & Wetland	4	Y	M			Y	Y	Extent of wetland into forest not clear in aerial photos.
21	Otaki River Mouth Lagoon & Rangiruru Wetland	4		M	2	R	Y	Y	Uncertain how much mapped as wetland is dry shrubland.
10	Lake Kaitawa & Keelings Bush	4	Y	M-H	3	R	Y	N	Extent of wetland into wet pasture in south and west, and into forest in NE not clear in aerials.
122	Renata-Aston-Elder Ridge Turf	4		H			Y	N	Protected (DOC) so accurate delineation not needed. Note though that cannot accurately determine extent of wet grassland from dry tussockland from aerial photos.
103	Duck Creek Saltmarsh	4		M-H	4	SES 2	Y	N	Happy with delineation
102	Te Onepoto Wetland	4				SES 3	Y	N	Happy with delineation
20	Haruatai Park Forest	4	Y	Potential		R	Y	Y	Presence/Extent of swamp forest cannot be determined in aerials.
196	Orui A Whareama River Mouth	3	Y				P	Y	Extent of wetland into wet pasture unclear and likely to be highly seasonal.
31	Okupe Lagoon	3			3		U	N	Protected (DOC) so accurate delineation not needed. Happy with delineation
16	O te Pua (Pukehou / Pritchard's Swamp)	3	Y	M	2	R	P	Y	Extent generally clear except northern fingers into wet pasture
112	Makara Rvr Mth	3		Potential	2		U	N	Happy with delineation
3	Lake Waiorongomai Wetlands	3	Y	M-H	3		U	Y	Each data set dramatically different and extent of wetland/wet pasture likely to be highly seasonal.
239	Turners Lagoon	3	Y				U	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
191	Otahoua Swamp	3	Y				U	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
54	El Rancho Wetlands	3				R	P	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.
50	Waimeha Lagoon - Victor Weggery Reserve	3		M-H	3	R	P	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.
23	Otaki River Mouth South	3		M	2		U	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.
15	Ngatotara Lagoon	3	Y	M	2	R	P	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
267	Whangaimoana	3					U	Y	Dry /wet pasture and wetland margin unclear and likely to

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ID	Wetland Name	SCORE	RAP	SSWISIG	WERISIG	Cncl EcoS Rank	Regionally Significant Y/P/U	Additional Field work to delineate	Notes
	Stream Mouth								be highly seasonal.
236	Omega Bogs and Tarns	3			0		U	N	Protected (DOC) so accurate delineation not needed. Note though that cannot accurately determine extent of wet grassland from dry tussockland from aerial photos.
234	Honeycomb Rock Terrace	3	Y				P	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
221	Carters Bush / Pike Lagoon	3		Potential	2		P	Y	Presence/Extent of swamp forest cannot be determined in aerials.
125	Maymorn Ridge	3		H			P	N	Protected (DOC) so accurate delineation not needed. Note though that cannot accurately determine extent of wet grassland from dry tussockland from aerial photos.
124	Whakatikei Headwater Swamp	3		M-H			P	Y	GWRC land but at risk of forestry so not protected. Some boundaries into pine unclear. Presence of swamp forest needs to be confirmed.
79	Queen Elizabeth Park Bush and Wetlands	3	Y	M	2	L	P	Y	Presence/Extent of swamp forest cannot be determined in aerials.
269	Tuturumuri Swamp A	3					U	Y	Extent of wetland into willow and scrub unclear in aerials.
223	Taumata Oxbow	3		M	2		U	N	Happy with delineation
206	Patanui Stream Mouth	3	Y	Potential	2		P	N	Happy with delineation
195	Whareama Rivermouth	3	Y		0		U	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
184	Unknown QE2	3					P	Y	Presence/Extent of swamp forest cannot be determined in aerials.
173	Hidden Lakes	3		Potential	2		U	Y	Presence/Extent of swamp forest cannot be determined in aerials.
89	Plimmerton Swamp East	3				SES 1 SES 5	P	Y	Happy with extent of main wetland. Need to check extent of wetland into upper arms of tributaries.
75	Raumati South Peatlands A	3				L	U	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.
30	Te Hapua Wetland Complex B	3		H		L	U	Y	as for site 26
29	Te Hapua Wetland Complex C	3		H		R	P	Y	as for site 26
289	Opouawe Rivermouth	3			0		U	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
283	Tora Coast (d)	3	Y				P	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
266	Wharekauhau Swamp	3		H	2		U	Y	Aerial heavily shadowed. Need to confirm inland extent.
240	Ruamahanga Loop	3		M	2		U	N	Happy with delineation
228	Kaiwhata River Mouth	3			0		U	N	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
227	Kaiwhata River Oxbow	3					U	N	Happy with delineation
178	Rathkeale College Bush	3					P	Y	Presence/Extent of swamp forest cannot be determined in aerials. Very little printed information on this site.
167	Mataikona River Mouth Swamp	3					U	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
126	Whakarikei Wetland	3		M-H			P	Y	GWRC land but at risk of forestry so not protected. Some boundaries into pine unclear. Presence of swamp forest needs to be confirmed.
80	Queen Elizabeth Park Railway Wetlands	3	Y	M	2		U	Y	Extent of wetland into wet pasture unclear and likely to be highly seasonal.
60	Tini Bush	3	Y			R	P	Y	Presence/Extent of swamp forest cannot be determined in aerials.
51	Osbourne's Swamp	3				R	P	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.

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ID	Wetland Name	SCORE	RAP	SSWISIG	WERISIG	Cncl Ecos Rank	Regionally Significant Y/P/U	Additional Field work to delineate	Notes
14	Waitohu River Mouth Saltmarsh	3		M	2		U	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
6	Pylon Swamp	3		M-H	3	L	U	Y	Extent of wetland into wet pasture unclear and likely to be highly seasonal.
290	White Rock Beach A	3	Y				U	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
263	Lake Nganoke	3		M-H	3		U	Y	Wetland extent into pine and willow unclear.
248	Oporua Bush B, C, D	3		Potential			U	Y	Presence/Extent of swamp forest cannot be determined in aerials.
145	Wainuiomata Waterworks Swamp Lower	3		H			U	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.
144	Wainuiomata Waterworks Swamp Upper	3					U	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.
85	Muri Road Wetland	3				SES 1	U	Y	Presence/Extent of swamp forest cannot be determined in aerials.
34	Pekapeka Road Swamp	3		M-H	3	R	P	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
12	Forest LakeS	3		M-H	3	L	U	Y	Wetland extent into pine, willow and dry forest unclear.
4	Simcox Lake	3		M	2		U	Y	Extent of wetland into weedland not clear.
247	Oporua Bush A	3		Potential			U	Y	Presence/Extent of swamp forest cannot be determined in aerials.
224	Kourarau Dam	3		M	2		U	Y	Extent of wetland into pasture at southern end unclear.
222	Taumata Stream	3		Potential	2		U	Y	Presence/Extent of swamp forest cannot be determined in aerials.
220	Brazendale	3					U	Y	Presence/Extent of swamp forest cannot be determined in aerials.
154	Wainuiomata River Mouth	3		M	2		U	Y	Dry /wet pasture and wetland margin unclear and likely to be highly seasonal.
117	Karori Dam	3		M-H			U	N	Happy with delineation
203	Ruakaka Pond	3		Potential	2		U	N	Happy with delineation
193	Ruamahanga River Terrace	3	Y				U	N	Happy with delineation
186	Solway Remnant A	3					U	Y	Presence/Extent of swamp forest cannot be determined in aerials.
64	Ratanui Swamp	3					U	Y	Presence/Extent of swamp forest cannot be determined in aerials.
159	Manawa-David Dalziel	3					U	Y	Extent of wet and dry scrub and pasture unclear in aerial photos. May have over-estimated wetland extent.

NOTE: The conclusions of other assessments of these sites are provided for context (RAP, SSWIG, WERISIG, Cncl Ecosite). However, those assessments did not always relate solely to the wetland component of a site. For example Site 290 (White Rock Beach) has been recommended for protection (RAP). However, the key values of this site relate to both its geology and the continuum of ecological environments from shingle beach, wetland, dry duneland and limestone outcroppings. Wetlands therefore only from a small part of this sites value and are not of themselves regionally significant.

APPENDIX 4: Differences in delineated wetland area

The following table compares the “GWRC_wet” dataset and the areas produced by this project. The sites are sorted from largest increase in area to largest decrease in area (ha). There are 201 sites in common. A further 190 sites were added by this project from other datasets, and do not have equivalent sites in the GWRC_wet dataset for comparison.

BML ID	WETLAND_NAME	BML Wetlands (ha)	GWRC Wetlands (ha)	Difference in Area (ha)	Difference in Area (%)
243	Wairarapa Moana Wetlands	1928.4	1547.4	381.0	125%
155	Turakirae Head	46.8	2.6	44.2	1812%
125	Maymorn Ridge	24.0	4.0	20.0	606%
39	Te Harakeke Wetland	80.2	66.9	13.3	120%
219	Gretel Dick Wetland	7.2	0.3	6.9	2200%
283	Tora Coast (d)	9.1	2.5	6.6	363%
176	Whakatiki River Mouth	7.9	3.1	4.8	258%
214	Clareville wetland	5.1	1.2	3.9	416%
76	Raumati South Peatlands B	5.0	1.6	3.4	315%
6	Pylon Swamp	5.1	1.8	3.3	284%
197	Whareama Dune System Wetland	4.8	1.6	3.2	309%
124	Whakatikei Headwater Swamp	10.4	7.4	3.1	141%
8	Wairongomai Road Manuka Wetland	7.3	4.3	3.0	169%
15	Ngatotara Lagoon	8.1	5.1	3.0	158%
66	Muaupoko Swamp Forest	6.1	3.2	3.0	193%
233	Glenburn Station	4.6	1.7	2.9	269%
202	Uriti Pont Lagoon	3.7	1.0	2.7	372%
139	Mohaka Street Wetland	7.1	4.4	2.7	161%
69	Kapiti Airfield Wetland A	2.6	0.1	2.5	4382%
290	White Rock Beach A	3.2	0.7	2.5	465%
210	Homewood Dam	3.6	1.1	2.5	322%
198	Orui C & D	5.6	3.1	2.4	177%
288	Tora Coast (a)	14.7	12.5	2.2	118%
292	White Rock Beach B	3.0	0.8	2.2	366%
16	O te Pua (Pukehou / Pritchard's Swamp)	27.4	25.5	1.9	108%
18	Otaki Porirua Trust Board Wetland	2.9	1.0	1.9	294%
217	Allens Bush	2.9	1.1	1.8	269%
12	Waimanguru Lagoon (Forest Lake)	3.0	1.2	1.8	253%
259	Unknown 26	3.8	2.2	1.6	172%
163	Manuka flats	4.7	3.2	1.5	145%
21	Otaki River Mouth Lagoon & Rangiruru Wetland	5.2	3.8	1.5	139%
221	Carters Bush / Pike Lagoon	22.9	21.5	1.4	106%
28	Te Hapua Swamp Complex E	2.7	1.4	1.3	191%
255	Waihora Lagoon	3.2	1.9	1.3	165%
206	Patanui Stream Mouth	6.0	4.8	1.1	124%
83	Whareroa Farm Bush F	1.1	0.0	1.1	2810%
19	Otaki Stewardship area wetland	3.8	2.8	1.1	138%
30	Te Hapua Wetland Complex B	4.3	3.3	1.0	131%
14	Waitohu River Mouth Saltmarsh	7.3	6.3	1.0	116%
170	Trimble Trust	4.6	3.6	1.0	127%
242	Rototawai Lake	9.4	8.4	1.0	111%
145	Wainuiomata Waterworks Swamp Lower	4.8	3.8	0.9	125%
37	Unsurveyed Site 5	3.2	2.3	0.9	140%
31	Okupe Lagoon	10.6	9.7	0.9	109%

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BML ID	WETLAND_NAME	BML Wetlands (ha)	GWRC Wetlands (ha)	Difference in Area (ha)	Difference in Area (%)
88	Taupo Swamp Complex	40.1	39.2	0.9	102%
180	D Cook Wetland	3.0	2.1	0.9	141%
90	The Glenn Wetland	1.5	0.6	0.9	243%
181	Ngakaukau Stream Mouth	1.0	0.2	0.9	587%
225	Bankview	2.6	1.8	0.8	144%
34	Pekapeka Road Swamp	5.0	4.3	0.7	116%
230	Burkhart Wetlands	2.4	1.7	0.7	138%
191	Otahoua Swamp	3.1	2.4	0.7	127%
209	Le Grove Wetland	0.9	0.3	0.6	344%
235	Mount Cone Turf Bog	9.3	8.6	0.6	107%
115	Quartz Hill Swamp	1.5	0.9	0.6	171%
154	Wainuiomata River Mouth	1.6	1.0	0.5	153%
226	Wainuioru River Bush	0.9	0.4	0.5	217%
252	Donalds Wetland	1.5	1.1	0.5	142%
211	Egan (a)	3.3	2.8	0.4	116%
114	Opau Stream Wetland A	2.9	2.5	0.4	118%
92	Horokiri Raupo Swamp	1.2	0.8	0.4	149%
99	Horokiri saltmarsh	6.6	6.2	0.4	106%
109	Okiwai Lagoon and Wetlands	3.0	2.6	0.4	114%
20	Haruatai Park Forest	7.3	7.0	0.4	105%
77	Poplar Ave Wetland	3.5	3.1	0.4	112%
94	Unsurveyed Site	1.1	0.7	0.4	148%
87	Battle Hill Ponds	1.2	0.9	0.3	138%
108	Aotea Lagoon	3.0	2.7	0.3	111%
137	Mowlem Bush	0.7	0.4	0.3	173%
161	Owhanga Coast (Chimnes)	5.2	4.9	0.3	106%
260	Ti Kouka Swamp	1.1	0.8	0.3	132%
55	Waikanae River Oxbow	0.5	0.2	0.2	204%
185	Rare Animal Farm	0.6	0.3	0.2	167%
249	Moeraki	1.8	1.5	0.2	114%
91	West Horokiri Wetland	2.0	1.8	0.2	111%
232	Waimoana Wetland	1.2	1.0	0.2	120%
266	Wharekauhau Swamp	5.4	5.2	0.2	104%
127	Gratton's Wetland	1.2	1.0	0.2	118%
220	Brazendale	1.6	1.5	0.2	111%
280	Kaiwaka Road A	1.5	1.3	0.1	111%
253	Waituna Western Bush	1.5	1.4	0.1	109%
95	Motukaraka West Wetland	0.6	0.5	0.1	127%
277	Opouawe River Swamp B	1.2	1.1	0.1	111%
273	Tora Road Wetland	0.6	0.5	0.1	121%
175	Davidson Wetland	0.4	0.3	0.1	140%
22	269-281 SH1 Otaki	0.8	0.7	0.1	113%
160	Bushgate	1.0	0.9	0.1	110%
1	South Waikawa Beach Dune Lake	0.7	0.6	0.1	114%
285	Kawakawa Dune Hollow	0.6	0.6	0.1	115%
262	Kiriwai farm	1.1	1.0	0.1	108%
72	Andrews Pond	1.3	1.3	0.1	106%
97	Camborne Scarp wetland	0.2	0.1	0.1	148%
287	Tora Coast (b)	12.6	12.5	0.1	101%
227	Kaiwhata River Oxbow	2.3	2.2	0.1	103%

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103	Duck Creek Saltmarsh	1.2	1.2	0.1	105%
281	Kaiwaka Road B	0.6	0.6	0.1	110%
102	Te Onepoto Wetland	0.9	0.8	0.0	105%
216	Carterton Golf Course	2.1	2.1	0.0	102%
247	Oporua Bush A	2.3	2.3	0.0	102%
130	Ladel Bend Wetland	2.6	2.5	0.0	101%
143	Unsurveyed 16	0.2	0.2	0.0	113%
93	Kakaho Saltmarsh	2.4	2.4	0.0	101%
251	Te Hopai Lagoon	12.1	12.1	0.0	100%
238	Elm Grove (Kempton)	1.6	1.6	0.0	100%
186	Solway Remnant A	1.9	1.9	0.0	100%
187	Solway Remnants B	1.0	1.1	0.0	97%
245	Wairongomai	0.3	0.3	0.0	90%
101	Pauatahanui Inlet Saltmarsh	37.1	37.1	0.0	100%
98	Motukaraka saltmarsh / Ration Point	1.0	1.0	0.0	97%
237	Woodside Bush Fragments	2.2	2.2	0.0	98%
67	Crown Hill Manuka Bush	0.5	0.6	0.0	93%
152	Unsurveyed 11	0.6	0.7	0.0	94%
153	Unsurveyed site 1	2.0	2.0	0.0	98%
203	Ruakaka Pond	2.5	2.6	0.0	98%
205	Wairongo Stream Wetland	0.5	0.6	0.0	92%
231	Watipu Farm Dam	2.8	2.8	-0.1	98%
60	Tini Bush	1.3	1.3	-0.1	96%
258	Battery Pond	1.0	1.1	-0.1	94%
89	Plimmerton Swamp East	3.3	3.4	-0.1	98%
147	Sugarloaf Bush	2.2	2.3	-0.1	97%
11	Sims Wetland	0.7	0.8	-0.1	90%
177	Matahiwi Bush II	1.9	2.0	-0.1	96%
151	Paiaka Stream Wetland	1.1	1.2	-0.1	92%
70	Kapiti Road Wetland A	0.6	0.7	-0.1	86%
257	McCreary Pond	1.2	1.3	-0.1	90%
123	Martin River Wetland	8.4	8.6	-0.1	98%
58	Lion Downs Bush	1.5	1.7	-0.1	91%
36	Unsurveyed Site 12	0.6	0.8	-0.2	80%
84	Bells Bush	0.2	0.4	-0.2	52%
194	Willy Cranswick Wetland	0.4	0.6	-0.2	66%
199	Motuwaireka Rivermouth & Shelton Wetland	2.0	2.2	-0.2	91%
126	Whakarikei Wetland	6.6	6.9	-0.2	97%
270	Tuturumuri Swamp B	1.0	1.2	-0.2	81%
166	Cambell / Connell Dam	4.3	4.6	-0.2	95%
112	Makara Rvr Mth	5.4	5.7	-0.3	96%
54	El Rancho Wetlands	8.5	8.8	-0.3	97%
106	Romesdale Lagoon	0.7	1.0	-0.3	72%
59	Turf Farm Dune Forest	0.2	0.5	-0.3	38%
204	Wairongo Road wetland	0.5	0.8	-0.3	59%
218	Main Road Swamp (Foreman)	4.2	4.6	-0.4	92%
201	Uriti Point	0.3	0.8	-0.4	46%
13	Lake Rotopotakataka (Forest Lake)	0.6	1.0	-0.4	56%
254	M. Sutherland	2.9	3.4	-0.5	85%
141	Orongorongo Swamp	5.5	6.0	-0.5	91%

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BML ID	WETLAND_NAME	BML Wetlands (ha)	GWRC Wetlands (ha)	Difference in Area (ha)	Difference in Area (%)
284	Tora Coast (c)	2.3	2.9	-0.5	82%
86	Swampy Gully, Battle Hill	1.4	2.0	-0.6	71%
74	Kaitawa Reserve Swamp Forest	0.4	1.0	-0.6	40%
264	Turanganui Pond	0.8	1.4	-0.6	55%
171	Gary Daniells	4.5	5.1	-0.7	87%
120	Red Rocks	1.0	1.6	-0.7	58%
128	Stock Car wetland	3.1	3.8	-0.7	81%
183	Henley Lakes	1.6	2.4	-0.7	69%
248	Oporua Bush B, C, D	7.9	8.7	-0.8	91%
212	Waingawa Swamp	11.6	12.4	-0.8	94%
293	Punaruku Lagoon	0.5	1.3	-0.8	39%
269	Tuturumuri Swamp A	4.0	4.9	-0.9	82%
2	Huritini Swamp	26.2	27.1	-0.9	97%
188	Henley Lakes A	3.2	4.1	-0.9	78%
64	Ratanui Swamp	1.5	2.5	-1.0	61%
38	Unsurveyed Site 11	0.7	1.7	-1.0	40%
172	Kiriwhakapapa Lagoon	6.2	7.2	-1.0	86%
276	Castle River	3.0	4.1	-1.1	74%
56	Waikanae Saltmarsh	19.5	20.6	-1.1	95%
119	Karori Reservoir	0.1	1.2	-1.1	7%
200	Riversdale South Dunes	2.6	3.8	-1.2	69%
82	MacKay's Crossing Swamp	8.5	9.7	-1.2	88%
50	Waimeha Lagoon - Victor Weggery Reserve	4.1	5.3	-1.2	77%
173	Hidden Lakes	1.0	2.3	-1.3	45%
146	Unsurveyed wetland	0.7	2.1	-1.4	34%
29	Te Hapua Wetland Complex C	7.4	8.9	-1.5	83%
236	Omega Bogs and Tarns	3.0	4.5	-1.6	65%
148	Wainuiomata River Bush A	0.8	2.5	-1.7	31%
159	Manawa-David Dalziel	0.6	2.6	-2.0	23%
117	Karori Dam	0.4	2.6	-2.2	15%
53	Waimanu Lagoons	0.6	3.2	-2.6	20%
5	Simcox Swamp	7.3	10.1	-2.8	72%
215	Allens - Lowes Bush	47.6	50.8	-3.2	94%
213	Fensham & Cobden Bush & Wetland	4.3	7.5	-3.2	57%
239	Turners Lagoon	12.2	15.6	-3.4	78%
223	Taumata Oxbow	10.4	14.1	-3.7	74%
224	Kourarau Dam	4.0	8.2	-4.2	49%
85	Muri Road Wetland	2.5	7.0	-4.5	35%
3	Lake Waiorongomai Wetlands	10.1	15.1	-5.0	67%
48	Nga Manu Wetland	26.1	32.0	-5.9	82%
4	Simcox Lake	4.2	10.1	-5.9	42%
7	Lake Kopureherehere	3.1	9.2	-6.1	33%
263	Lake Nganoke	1.2	8.3	-7.0	15%
140	Skull Gully Wetland	2.9	10.0	-7.1	29%
80	Queen Elizabeth Park Railway Wetlands	9.7	16.8	-7.1	58%
51	Osbourne's Swamp	2.4	9.7	-7.3	25%
32	Te Hapua Swamp Complex F	1.6	8.9	-7.3	18%
134	Johnson's Road Wetland	0.6	8.5	-7.9	7%
149	Lake Kohangapiripiri	19.6	30.6	-11.0	64%
26	Te Hapua Swamp Complex A	38.0	50.0	-12.1	76%

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BML ID	WETLAND_NAME	BML Wetlands (ha)	GWRC Wetlands (ha)	Difference in Area (ha)	Difference in Area (%)
79	Queen Elizabeth Park Bush and Wetlands	3.4	16.8	-13.4	20%
10	Lake Kaitawa & Keelings Bush	15.2	31.2	-16.0	49%
150	Lake Kohangatera	72.0	88.9	-16.9	81%
27	Te Hapua Swamp Complex D	12.0	50.0	-38.1	24%
261	Lake Pounui	19.3	63.9	-44.6	30%
131	Mangaroa Swamp South	63.0	148.6	-85.5	42%
265	Lake Onoke (incl Pounui Lagoon & Kiriwai Lagoon)	252.3	798.3	-546.0	32%
Sites added during this study (not in GWRC_Wet)					
9	Wairongomai Road Swamp / Lake Purehurehu	2.4	-	-	-
17	K201 Recommended	2.5	-	-	-
23	Otaki River Mouth South	10.4	-	-	-
24	Mangaone Stream Mouth	4.1	-	-	-
25	Rahui Road Bush C / Croads Bush Gully	6.8	-	-	-
33	Kowhai Stream Mouth (Hadfields)	2.2	-	-	-
35	Unknown	1.0	-	-	-
40	Unknown	1.7	-	-	-
41	Waimeha Stream Mouth	17.0	-	-	-
42	Ngarara Bush	0.9	-	-	-
43	Ngarara Road Wetland A	1.3	-	-	-
44	Ngarara Road Wetland B	0.7	-	-	-
45	Ngarara Road Wetland D	2.5	-	-	-
46	Unknown	2.0	-	-	-
47	Ngarara Road Wetland C	0.6	-	-	-
49	Kapiti Island Swamp Forest	0.5	-	-	-
57	Ngarara Lake	1.6	-	-	-
61	Otaihanga Landfill North	0.8	-	-	-
62	Otaihanga Landfill Central	1.3	-	-	-
63	Otaihanga Landfill South	1.4	-	-	-
65	Reikorangi Road Bush D	1.7	-	-	-
68	Kapiti Airfield Raupo Swamp	0.3	-	-	-
71	Kapiti Airfield Wetland B	0.8	-	-	-
73	Wharemauku Stream Mouth	2.9	-	-	-
75	Raumati South Peatlands A	2.1	-	-	-
78	Whareroa Estuary	5.6	-	-	-
81	Wainui Stream Mouth	9.4	-	-	-
96	Mana Island	1.2	-	-	-
100	Pauatahanui Inlet - Tidal Flats	466.8	-	-	-
104	Papakowhai Bush	0.8	-	-	-
105	Papakowhai Lagoon	0.5	-	-	-
107	Porirua Harbour (Onepoto Arm) - Tidal Flats	250.8	-	-	-
110	Cannons Creek Lakes	1.1	-	-	-
111	Hawkins Gully Wetland	1.3	-	-	-
113	Opau Stream Wetland B	0.2	-	-	-
116	Kaiwharawhara Stream Mouth	1.1	-	-	-
118	Karori Reservoir Swamp Forest	0.2	-	-	-
121	Sinclair Head	1.7	-	-	-
122	Renata-Aston-Elder Ridge Turf	31.3	-	-	-
129	Wi Tako Ghania wetland	2.0	-	-	-
132	Mangaroa Swamp	1.7	-	-	-
133	Blue Mountain Bush Swamp Forest	7.7	-	-	-

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BML ID	WETLAND_NAME	BML Wetlands (ha)	GWRC Wetlands (ha)	Difference in Area (ha)	Difference in Area (%)
135	Korokoro Stream Mouth	1.3	-	-	-
136	Hutt Rivermouth	3.3	-	-	-
138	Waiwhetu Rivermouth	1.3	-	-	-
142	Gracefield Scrub / Waiau Wetland	4.0	-	-	-
144	Wainuiomata Waterworks Swamp Upper	6.5	-	-	-
156	Owahanga Tussockland	1.0	-	-	-
157	Waipaua Stream Shrubland	3.6	-	-	-
158	Spot 424 Bog	2.2	-	-	-
162	Kakaumu Dams North	3.2	-	-	-
164	Kakaumu Dam West	2.2	-	-	-
165	Kakaumu Dam East	3.2	-	-	-
167	Mataikona River Mouth Swamp	3.4	-	-	-
168	Waimeha Trust Covenant	0.2	-	-	-
169	T J Campbell Covenant	2.4	-	-	-
174	Okau Stream Mouth	14.7	-	-	-
178	Rathkeale College Bush	13.2	-	-	-
179	Titoki Dams Wetland	0.4	-	-	-
182	"Humpy" Stream Mouth	28.1	-	-	-
184	Unknown QE2	5.2	-	-	-
189	Otahome Stream Mouth	12.2	-	-	-
190	Waipawa Stream Wetland	0.6	-	-	-
192	Ruamahunga Oxbow	0.9	-	-	-
193	Ruamahanga River Terrace	1.1	-	-	-
195	Whareama Rivermouth	73.9	-	-	-
196	Orui A Whareama River Mouth	8.0	-	-	-
207	Homewood Road Unsurveyed	1.7	-	-	-
208	Waikaraka Stream Mouth	10.0	-	-	-
222	Taumata Stream	2.3	-	-	-
228	Kaiwhata River Mouth	5.1	-	-	-
229	Caledonia Wetland	3.8	-	-	-
234	Honeycomb Rock Terrace	6.6	-	-	-
240	Ruamahanga Loop	9.9	-	-	-
241	Hikiinui Road Lagoon	1.3	-	-	-
244	Mahaki Swamp	3.9	-	-	-
246	Pukio Oxbow	5.4	-	-	-
250	Dunrobin Loop	2.2	-	-	-
256	Unknown (not Battery Pond)	3.6	-	-	-
267	Whangaimoana Stream Mouth	14.5	-	-	-
268	Pahaoa	2.5	-	-	-
271	Tuturumuri Swamp C	1.5	-	-	-
272	Rerewhakaaitu Rivermouth	6.8	-	-	-
274	Oterei River Mouth	0.7	-	-	-
275	Makotukutuku Stream mouth (Washpool)	5.6	-	-	-
278	Awhea River	1.0	-	-	-
279	Awheaiti Stream Mouth	13.1	-	-	-
282	Pararaki Stream mouth, Cape Palliser	12.2	-	-	-
286	Otekaha Stream mouth, Cape Palliser	40.9	-	-	-
289	Opouawe Rivermouth	29.2	-	-	-
291	Te Kaukau Point Seal Haulout	4.7	-	-	-

APPENDIX 5: Data Table Example

Wetland ID	26
Object ID	513
Wetland Name	Te Hapua Swamp Complex A
SUMMARY: Site Context	Very large dune wetland / part of wetland complex / a freshwater link / in pasture
ET_X	1775110
ET_Y	5479592
PERIM (m)	9517
AREA (ha)	37.97
TA	1. Kapiti Coast District
Distance to Nearest (km)	0
Nearest Object ID	27
Bioclimatic Zone	Coastal
Hydrologic Class	Palustrine
Wetland Type	Swamp
GWRC Extent ID	192, Part 193, 197, 59
GWRC Wet ID	38
Wet Name	38: Te Hapua Wetland Complex A
Artificial 1	although some open water is artificial
Artificial Y-N	N
Structures	Northern end of wetland is drained. Artificial water bodies.
Structure Score	3
Modified	Groundwater catchment now in pasture
Modified Score	3
Buffer	In some parts landowners are trying to establish a vegetated buffer
Buffer Score	4
Fenced	Only partially fenced
Grazed	Some parts are leased for grazing dry-stock
Grazed Score	3
GWRC Hydro ID	209.00
GWRC Hydro 2	1: Flaxland
GWRC Hydro 3	1: Harakeke Mostly at the edges
Cncl EcoS ID	K055 K193
Cncl EcoS Name	K055: Te Hapua Road, Swamp A K193: Recommended eco-site
Cncl EcoS Rank	R
Cncl EcoS Notes	Large representative example of habitat that was formally characteristic of the area. Provides habitat for spotless crake. Also <i>Ranunculus macropus</i> , <i>Carex dipsacea</i> , <i>Potentilla anserinioides</i> , (Enright & John 2001) and other species becoming uncommon in the Wellington Region including <i>Gratiola sexdentata</i> , kapungawha and <i>Baumea articulata</i> . Protected in parts by QEII Covenant - with a further area under negotiation.
DoC EcoS ID	334
DoC EcoS Name	334: TE HAPUA ROAD SWAMP A
Doc EcoS Dist	Foxton

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WERISIG	4
SSWISIG	H
Doc EcoS Rank	H
Doc EcoS Notes 1	Open water-wetland flaxland on sand plain
DoC EcoS Notes 2	Complex swamp system in good condition, diverse avifauna. Rural development nearby (WERI) Large diversity of bird species. Large variety of habitats(SSWI) Part of a more extensive system (MERPNA, NZWSNHR) RAP1. Good waterfowl habitat (though artificial)(F
RAP ID	9
RAP Name	RAP9: Te Hapua Road Swamp
RAP Rank	1
RAP Notes	Representativeness H Best example of once extensive wetland communities Diversity L Special Features M Good waterfowl habitat Naturalness H Viability M Will deteriorate slowly unless watertable restored. Size & Shape M Buffering M Partly fenced. Buffered by wetness and density.
DOC CU ID	Na
DoC CU Name	Na
DoC CU Notes	Na
QEII Site ID	5/07/320 5/07/468 5/07/571 5/07/446 5/07/291.1 5/07/291.2 5/07/443 5/07/356
QEII Site Notes	Na
GWRC Tender	Na
Estuary ID	Na
Estuary Rank	Na
Estuary Notes	Na
DoC CMS	Y
AUSSEIL ID	(106) 09
AUSSEIL Score	0.40
RAMSAR	Na
Bibliography	Ravine 1992 NZWSNHR SSWI 26/17 3 FOXTONPNA RAP9 MANER 16 Wildland Doc Ecosite Aussiel et al FENZ GWRC_Wet

APPENDIX 6: Assessment Criteria

Updated following the workshop on 9 September 2011

Rank	Representativeness		Rarity			Diversity	Context	
	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).		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.	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.	
	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. Example: Lake Kohangatera	Acutely Threatened Example: Muaupoko Swamp Forest	Large and diverse indigenous communities and habitats that are rare / uncommon. Example: Allen – Lowes Bush	Large and diverse populations / communities of threatened / uncommon flora. Example: Mt Cone Turf Bog	A small number of two or more nationally threatened species, or large numbers of a regionally threatened species of rare flora. Example: Wairarapa Moana Wetlands	A high diversity of indigenous wetland types and structural classes (5+) and a high diversity of species of flora and fauna. Example: 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. Example: Lake Pounui	Large and diverse seasonal population of migrants and / or a core breeding habitat for more than three threatened or protected resident species. Example: 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. Example: Taupo Swamp	Chronically Threatened Example: Tora Coast Wetlands	Several indigenous communities and habitats that are rare / uncommon. Example: 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. Example: Waikanae Saltmarsh	A small number of one or more regionally threatened species, or large numbers of locally threatened species of flora. Example: 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. Example: 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. Example: 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. Example: 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). Example: Lake Wairongomai Wetlands	At Risk (20-30%) Example: Wainuiomata Waterworks Swamp	A single rare / uncommon indigenous habitat / community recorded Example: El Rancho Wetlands	A small number of one or more regionally threatened species, or large numbers of locally threatened species of flora. Example: Kakaho Saltmarsh	A small number of one or more regionally threatened species, or large numbers of locally threatened species of flora. Example: Taumata Oxbow	Moderate diversity of wetland types and structural classes (3-5) with a high indigenous component and moderate species diversity. Example: Osbornes 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 Example: Lake Wairongomai	Records of breeding by a threatened or protected species, and or a record of an itinerant migrant. Example: Lake Wairongomai Wetlands
2	Wetlands that retain only limited elements that are typical of the natural diversity of an ecological district. Example: Pylon Swamp	Critically Under protected (> 30%) Example: Opouawe River Swamp	No rare / uncommon habitat / community recorded (but habitat may support rarity > 3 ha) Example: Te Hapua Swamp Complex D	A small number of one or more locally threatened species of flora. Example: Hutt River Mouth	A small number of one or more locally threatened species of flora. Example: Huritini Swamp	Low diversity of wetland types and structural classes (2-3) and a low species diversity. Example: 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. Example: Andrews Pond	No migrants recorded but the habitat is likely to support their presence. Example: Lake Waimanguru - Forest Lakes
1	Wetlands that contain little or no elements that are representative of the natural diversity of an ecological district. Example: Hutt River Mouth	Under protected or No Threat Category Example: Mt Cone Turf Bog	No rare / uncommon habitat / community recorded. Site small to very small. Example: Ladel Bend Wetland	No rare or uncommon flora recorded. Example: Karori Dam	No rare or uncommon flora recorded. Example: Sims Wetland	Wetland monoculture 1-2 wetland types and structural classes, and low species diversity. Example: Okiwai Lagoon	No physical connection to other waterbodies or indigenous vegetation and very isolated (>1km). Has little or no buffering from adjoining land uses. Example: Taumata Oxbow	No migrants recorded (and visible habitat unlikely to support) Example: Pylon Swamp