**Figure WTL4: Classification framework for palustrine and estuarine wetlands**

| **Level I**<br>**Hydrosystem** | **Level IA**<br>**Sub-System** | **Level II**<br>**Wetland Class** | **Level IIA**<br>**Wetland Form** | **Level III**<br>**Structural Class**<br>**[examples]** | **Level IV**<br>**Dominant Cover**<br>**[examples]** |
|---|---|---|---|---|---|
| Estuarine<br>*(Alternating saline and fresh water)* | Intertidal | Saltmarsh | Estuary | [e.g. herbfield] | [e.g. Zostera] |
| | Subtidal | Seagrass meadows | Lagoon | [e.g. (wire) rushland] | [e.g. Leptocarpus/Juncus] |
| | Non-tidal | Algalflat | Dune slack | [e.g. forest] | [e.g. Avicennia] |
| | Inter-dunal | Mudflat | | [e.g. wormfield] | [e.g. Polychaetel |
| | | Cobbleflat | | [e.g. cocklebed] | [e.g. Austrovenus] |
| | | Rocky reef | | [e.g. gravelfield] | [e.g. Diatomfelt] |
| | | Sandflat | | [e.g. musselreef] | [e.g.-: Perna] |
| | | | | [e.g. sand] | [e.g. Muehlenbeckia] |
| Palustrine<br>*Vegetation emergent over fresh water, not including floating plants)* | Permanent<br>Ephemeral | Marsh | Shore | [e.g. reedland] | [e.g. Typha] |
| | | Swamp | Artificial | [e.g. algalbed] | [e.g. Enteromorpha] |
| | | Fen | Slope | [e.g. macrophyte bed] | [e.g. Ruppia] |
| | | Bog | Channel | [e.g. sedgeland] | [e.g. Carex] |
| | | Flush | Flat | [e.g. cushionfield] | [e.g. Leptospermum/ Cordyline] |
| | | Seep | Basin | [e.g. rushland] | [e g. Donatia] |
| | | | Pool | [e.g. rockfield] | [e.g. Schoenus] |
| | | | | | [e.g. Nostoc] |
| | | | | | [e.g. Spirogyra] |
| Basis of discrimination:<br>Hydrological setting, Salinity | Flow Regime | Substrate, pH, Chemistry | Land Form | Biotic Structure | Dominant species |

Source: Clarkson *et al*, Handbook for monitoring wetland condition, Ministry for the Environment

### Figure WTL5: Wetland Record Sheet

| | |
|---|---|
| Wetland name: | Date: |
| Region: | GPS/Grid Ref: |
| Altitude: | No. of plots sampled: |

| Classification: I System | IA Subsystem | II Wetland Class | IIA Wetland Form |
|---|---|---|---|
| | | | |

Field team:

| Indicator | Indicator components | Specify and Comment | Score 0– 5[9] | Mean score |
|---|---|---|---|---|
| Change in hydrological integrity | Impact of manmade structures | | | |
| | Water table depth | | | |
| | Dryland plant invasion | | | |
| Change in physico-chemical parameters | Fire damage | | | |
| | Degree of sedimentation/erosion | | | |
| | Nutrient levels | | | |
| | von Post index | | | |
| Change in ecosystem intactness | Loss in area of original wetland | | | |
| | Connectivity barriers | | | |
| Change in browsing, predation and harvesting regimes | Damage by domestic or feral animals | | | |
| | Introduced predator impacts on wildlife | | | |
| | Harvesting levels | | | |
| Change in dominance of native plants | Introduced plant canopy cover | | | |
| | Introduced plant understorey cover | | | |
| Total wetland condition index /25 | | | | |

Main vegetation types:

Native fauna:

Other comments:

| Pressure | Rating[10] | Specify and Comment |
|---|---|---|
| Modifications to catchment hydrology | | |
| Water quality within the catchment | | |
| Animal access | | |
| Key undesirable species | | |
| % catchment in introduced vegetation | | |
| Other pressures | | |
| Total wetland pressure index /30 | | |

Source: Clarkson *et al*, Handbook for monitoring wetland condition, Ministry for the Environment, August 2002.

### Part B: Assessing ecological significance

To assess ecological significance, site information contained on the wetland record sheet will be evaluated in terms of the criteria described below. Note that the bald scores for wetland

[9] Assign degree of modification thus: 5=v. low/ none, 4=low, 3=medium, 2=high, 1=v. high, 0=extreme

[10] Assign pressure scores as follows: 5=very high, 4=high, 3=medium, 2=low, 1=very low, 0=none

condition and pressure as given on the wetland record sheet cannot be directly translated into an assessment of ecological or hydrological significance. However, the scores and comments on the field sheet will assist in assessing the relative significance of similar types of wetlands (e.g., comparing several high country lake-edge wetlands from within the same ecological district).

### B.1.1 Criteria for assessing ecological significance of wetlands

Various criteria and methodologies used for assessing ecological significance under section 6(c) of the Resource Management Act have been developed to assist territorial authorities in the identification of significant natural areas (SNAs) for their district plans. A similar but slightly different approach can be applied to assess the ecological significance of wetlands surveyed for a regional plan. The SNA approach is not fully transferable, because both the context of the assessment and the present pattern of wetland distribution in the wider landscape are different and necessitate some changes to method. The hydrological component, so important to an overall assessment of a wetland's significance is another point of difference. Thus, for example, it is quite possible that wetlands considered of only low or moderate ecological significance under an SNA process may rank more highly in this exercise.

The criteria and methods used for assessing ecological significance under the RMA described by Norton and Roper-Lindsay (1999) have been widely used by a number of local authorities, and will be used, in modified form, to assess the ecological significance of wetlands for this plan. Under this approach, the four main criteria for assessing ecological significance are:

(a) Representativeness

(b) Rarity/distinctiveness

(c) Ecological context

(d) Viability

#### *B.1.1.1* Representativeness

Representativeness compares elements of natural diversity (usually ecosystem diversity) in the present landscape with the same patch of landscape as it existed at some time in the past. Ideally the only changes should be those that would have occurred naturally (that is, without human intervention).

Since wetlands can seldom be regarded as climax ecosystems, with ongoing change being more typical, the most fundamental question to be answered is: which time in the past? Wetland change was much more marked following European settlement, and a baseline can be established with greater certainty for this than for any earlier period.

Ideally, then, the plan would be aiming to identify a range and distribution of wetlands in the region that is representative of the immediate pre-European period, but there is a problem. With the passing of more than 150 years, irrespective of European settlement, wetlands would have continued to change naturally. It is not simply a matter of establishing what a particular landscape was once like and trying to represent that, there have to be some adjustments.

In making these adjustments, two of three possible kinds of change are relevant:

(a) Natural evolutionary changes in response to variations in the natural background, including, changes to climate, changes to adjacent ecosystems, and natural hydrological changes.

(b) Induced evolutionary changes in response to bush and forest clearance, land drainage, rivers trained to single courses, and naturalisation of a whole range of exotic plant and animal species.

The third kind of wetland change includes deliberate wetland destruction and wetland loss as the direct result of land development. This is not taken into account when deciding representativeness, since it is not a natural process.

Any assessment of representativeness also needs a spatial scale to define the landscape patch being represented. Ecological districts provide a well-established and suitable frame of reference for this purpose.

Assessing wetland representativeness begins, then, with developing an understanding of the types and extent of wetlands in each ecological district immediately before European settlement. This baseline must then be adjusted for changes that would have occurred since, either entirely naturally or induced by environmental changes.

For example, it is generally unrealistic to expect to adequately represent plains swamp forest now that almost all the plains have become pasture. Often the best that can be hoped for is to represent the sort of wetland such a swamp forest would probably have evolved into given the changes that have occurred, and excluding any deliberate damage.

In adjusting the baseline to the present day, sources of information may include early survey maps, soil maps, the Land Cover Database, and Land Environments New Zealand, together with relevant studies of wetland ecology and ecological change.

While soil mapping provides little insight into ecosystem character, it affords a particularly useful and easily accessible baseline for determining wetland loss within an ecological district.

This is valuable information because the greater the wetland loss, the more significant what is left becomes. Given similar condition, wetlands in an ecological district that has only two or three percent of its original wetlands are more significant than where a much higher percentage still remains.

Land Environments are also helpful. They identify climatic and landform factors likely to influence the distribution of species. Land Environments can predict the likely natural occurrence of wetlands in an area, allowing what actually exists to be assessed not only in terms of potential extent but also ecological character.

It is generally to be expected that:

(1) Lowland wetlands that retain even a small proportion of their original character will be of *very high* representative significance because their previous extent has been so vastly reduced.

(2) Coastal wetlands will generally be of high representative significance as they have likewise been substantially reduced from their previous extent and are likely to have retained a higher proportion of their original character.

(3) Hill and high country wetlands having retained more of their original extent and character will tend to be distinguished to a greater degree by ecological functioning and health rather than by mere existence. These wetlands may well present a wider array of representative significance levels.

#### *B.1.1.2 Rarity/distinctiveness*

This criterion looks at the presence of particular indigenous species or groups of species within a site. It recognises that it is not only the common and typical features of our environment that contribute to ecosystem functioning and health.

A significant habitat need not be predominantly indigenous provided there is rarity or distinctiveness in the indigenous species found there. Rarity in this context need not mean nationally rare, but rare at a local or regional level. Species rarity is assessed on knowledge of the species taxonomy and distribution.

Classification systems for rarity are still evolving and being developed to overcome problems such as the need to distinguish between species that are naturally rare and species that are

rare because of human influences. In assessing rarity, the best authorities currently available should be used.

Distinctiveness refers to unusual species, communities or habitats. Distinctive species may or may not be rare nationally. They can be common nationally and rare locally. The assessment of distinctiveness must be based on a good understanding of species and habitat distributions. Factors to consider include:

(a) The presence of a species or habitat at a national distributional limit.

(b) The presence of a species or habitat that only occurs in that area (i.e., an endemic species).

(c) The presence of a species or habitat that although common elsewhere is particularly uncommon in that ecological district.

Distinctiveness can also encompass the seasonal presence of migratory species in the area. In assessing rarity/distinctiveness, particular attention is drawn to the possibility of the area being Canterbury mudfish (*Neochanna burrowsius*) habitat.

#### *B.1.1.3 Ecological context*

Wetlands do not occur in isolation, but as part of a wider landscape in which ecosystems interact and connect in a variety of ways. In the lowlands, hill country and inter-montane basins of Canterbury, the ecological landscape is typically patches and corridors of remnant indigenous or semi-indigenous ecosystems within a matrix dominated by agricultural, urban and plantation systems. Both the matrix and the patches/corridors can contain a mixture of native and exotic elements. There are cases where a corridor or patch of great value to native fauna is made up of exotic plant species.

Ecological context is most important to animals able to make use of corridors to move between patches. Context can also be important in assessing waterways and wetlands that depend for so many of their characteristics on the wider catchment. Examples of wetlands that could be ecologically significant on the basis of context alone include:

(a) Wetland remnants that provide stepping stones for birds between larger wetland areas.

(b) A wetland within an area of native shrubland or mixed gorse and native shrubland where each ecosystem provides connectivity between the other.

(c) Wetlands where adjacent vegetation provides vital buffering from grazing animals or other pressures.

(d) A wetland connected to a river will be more valuable to native fish habitat than another wetland that might have more native plant species but no river connection.

(e) A site that might have low botanical significance but provides seasonal food for native birds.

**Ecological context** is assessed on the actual or potential role of a site in:

(1) Enhancing connectivity between patches.

(2) Buffering or otherwise influencing a specific site.

(3) Providing seasonal habitat for particular indigenous species.

#### *B.1.1.4 Viability*

The viability criterion does not consider the significance of sites *per se*, but is an assessment of priority for protection management and the type of management needed.

Viability relates to the likely future condition of a wetland site. Such places need not only to be significant now, but also have potential to be significant in the future. Factors that should be considered include:

(a) The type of ecosystems, habitats or species present and how well their ecological requirements are met.

(b) The presence of disturbance—plant or animal pests, land uses, extent of fencing, water takes or discharges.

(c) The size of the area.

(d) The shape of the area.

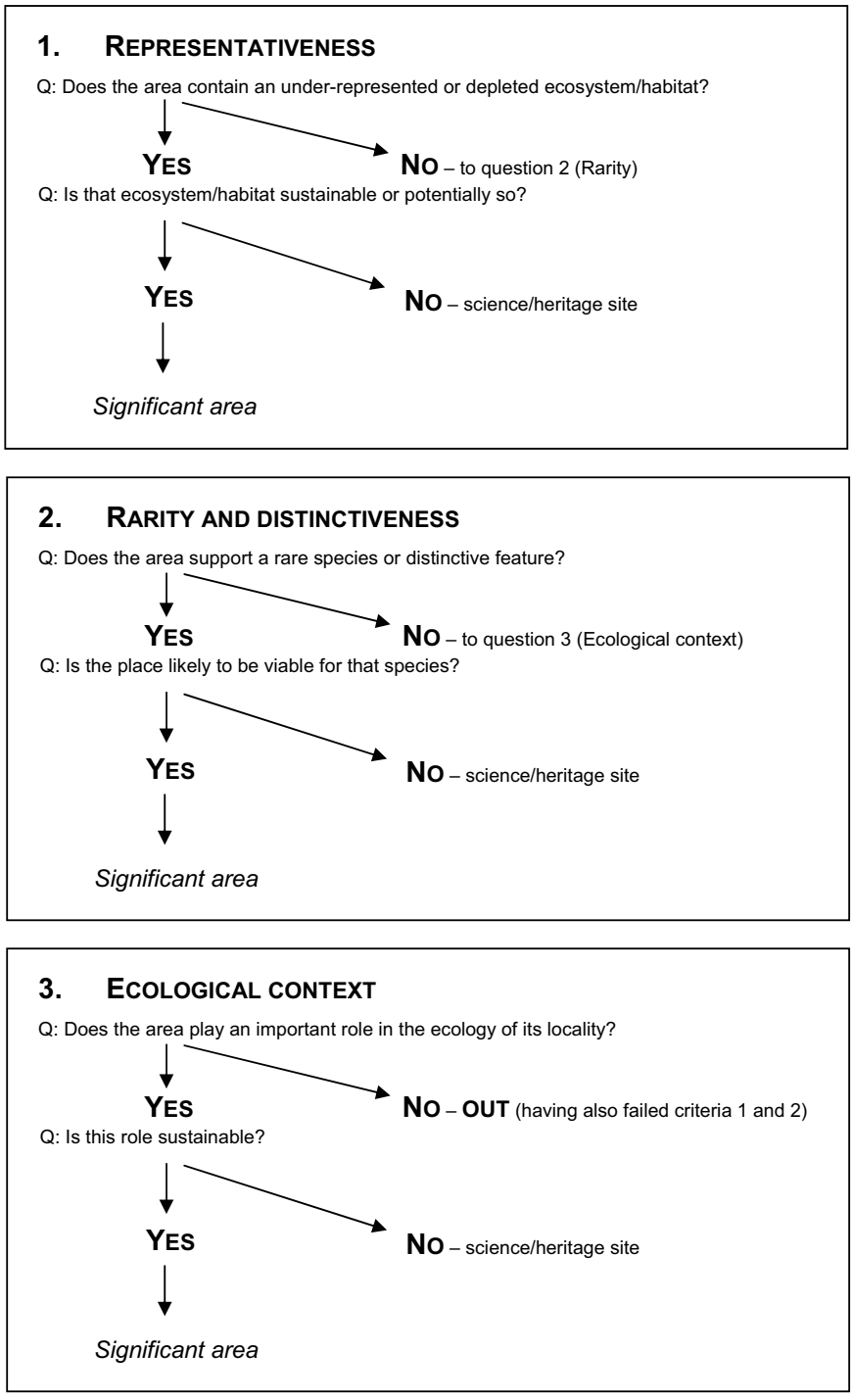
(e) Ecological context—the distance to other areas and habitats.

(f) Conservation management needed to achieve self-sustainability, and the feasibility of that.

### B.1.2 Applying the criteria

This flow chart shows application of the criteria used in assessing ecological significance. Each site is evaluated sequentially for the three main criteria—representativeness, rarity/distinctiveness and ecological context. The viability factor is evaluated as a sub-criterion for each of the three main criteria, and must be satisfied in each case.

**Figure WTL6: Ecological significance flow chart**



## Part C: Recording hydrological factors

### C.1.1 Hydrological information for wetland and catchment

The form reproduced below as Figure WTL7 provides a standardised field record of information relevant to the quantity and quality of water in the wetland and its catchment. This information, together with the ecological field records will inform subsequent assessment of the wetland's significance.