

design factors & recommendations

1. natural areas cue to original landscape character

Each natural area provides a “window” for understanding and better enjoying original New Zealand. A natural area, on its own or in combination with other natural areas, may be recognised as contributing to the landscape character of the wider area or as part of a locally, regionally or nationally important landscape. Seek to protect as many of the values as possible, including such values as landform, vegetation, wildlife and their habitat, scenic, cultural/historic values.



don't detract from important geological features, with unrelated fencelines and shelter planting

Where possible protect areas that maintain the integrity of an area and the full range of vegetation cover originally present in a natural landscape. This might include rare indigenous species, habitats and communities as well as the ecological processes that link them together.

The location of boundaries will be especially important, not only for the landscape's ecological processes but also for its amenity/aesthetic and heritage landscape values. A special landscape feature, even with little remaining biodiversity value for example, may be particularly dramatic or noteworthy in an area and worth protecting as a total feature.



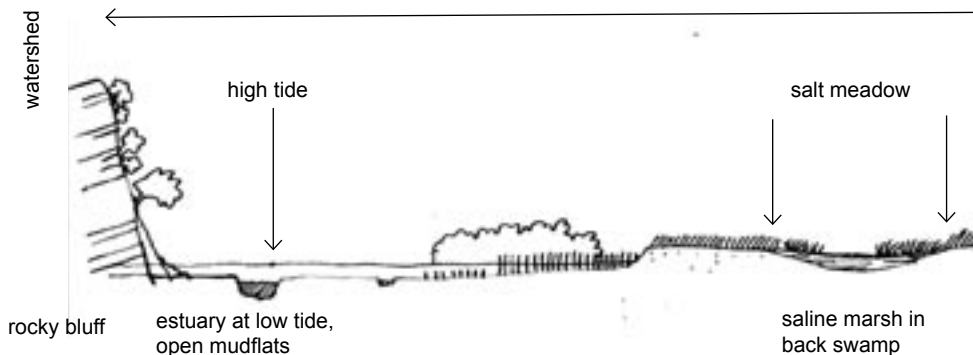
respect integrity
of headland
landform, treat
as one unit

2. remnants of original functioning ecosystems

Each natural area is a remnant of a wider functioning ecosystem. Protect areas that reflect as fully as possible the plant and animal communities that were originally present, especially those communities that have now been reduced elsewhere throughout the ecological district. The more highly “intact”, “rare”, and/or “representative” they are, the more highly valued they are likely to be.

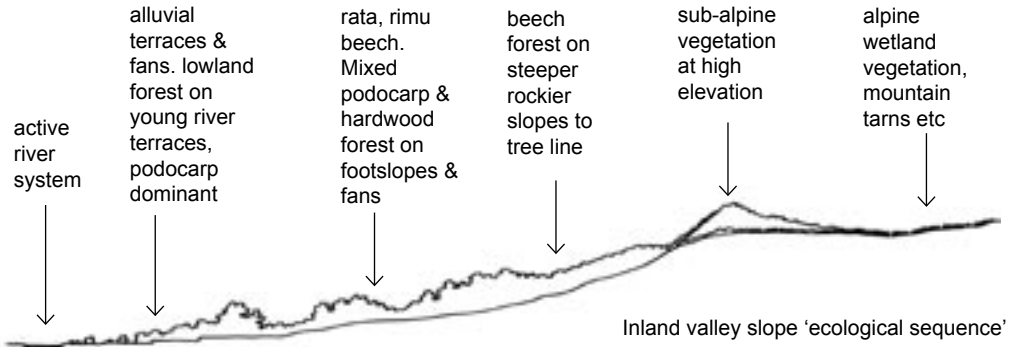
If your natural area contains rare or endangered species, determine their needs and threats³ to ensure that the area can support minimum viable populations of these species.

Even where whole ecosystems cannot be fully protected, recognise the importance some outlier areas may have for the survival of some species within the larger system. A remnant natural area may be still an essential part of that larger system. For example, small down valley areas may provide important nectar or berry food at critical times of the year and as other seasonal food reserves are diminished (e.g., riparian kowhai in late winter for the kereru which then moves higher up to ridgeline *Pseudopanax* fruits during the breeding season). Similarly, undisturbed coastal cliff areas are frequently important nesting sites for coastal bird species.



3. extend across ecological sequences

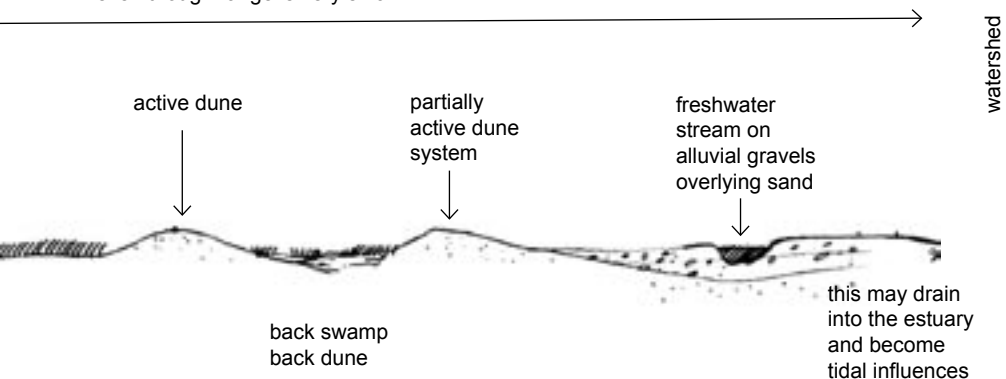
A habitat-rich protected area will include uninterrupted ecological sequences across altitudes and aspects. These sequences will be associated with changes in other attributes e.g., soil type, moisture, temperature. Even when located in very subtle terrain, it is desirable to ensure a protected area extends onto different levels. Each change in level involves habitat change.



Altitudinal continuity not only assists habitat diversity and the seasonal migration of key species but it also allows species and communities to migrate in response to variations in seasonal changes, to changes in water table, inundation, nutrient or seed supply, or, with climate and sea level change.

Where natural values have been lost in the linking of different elevations, assess the potential to re-instate the nature of the linkages such as through providing seasonal habitat for feeding or breeding needs, preferably through natural regeneration or through active restoration work.

catchment covers the full altitudinal range, even though range is very small



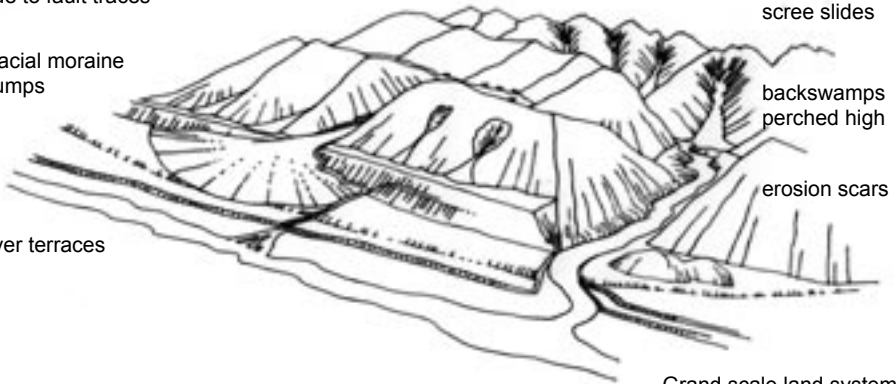
4. underlying land systems analysis

Through understanding the underlying land systems and basic processes a clearer picture of the composite ecosystems will emerge. This should include the full range of biological diversity (biodiversity) and habitats belonging naturally in the area.

unusual breaks in slope
due to fault traces

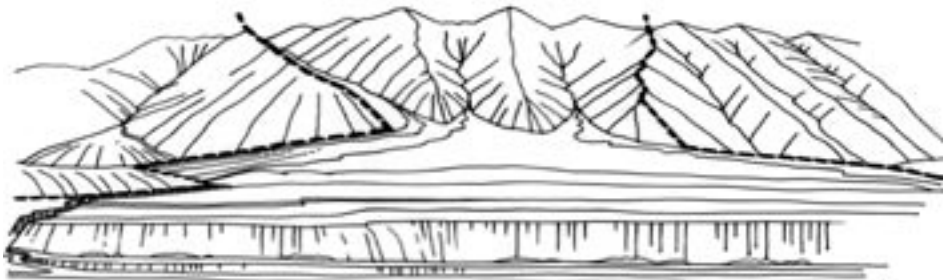
glacial moraine
dumps

river terraces



Grand scale land systems

Analyse the underlying land systems and the different geomorphological processes occurring in that system (ie what is being worn down, what is being transported, what is being built up). Identify the different landform components, the base-rock and soils. The diversity of landform and land systems, and of soil type and fertility, is important and beneficial to supporting more complex ecosystems and greater biodiversity at a range of scales. Compare the existing biodiversity with the original to ascertain the integrity and potential sustainability

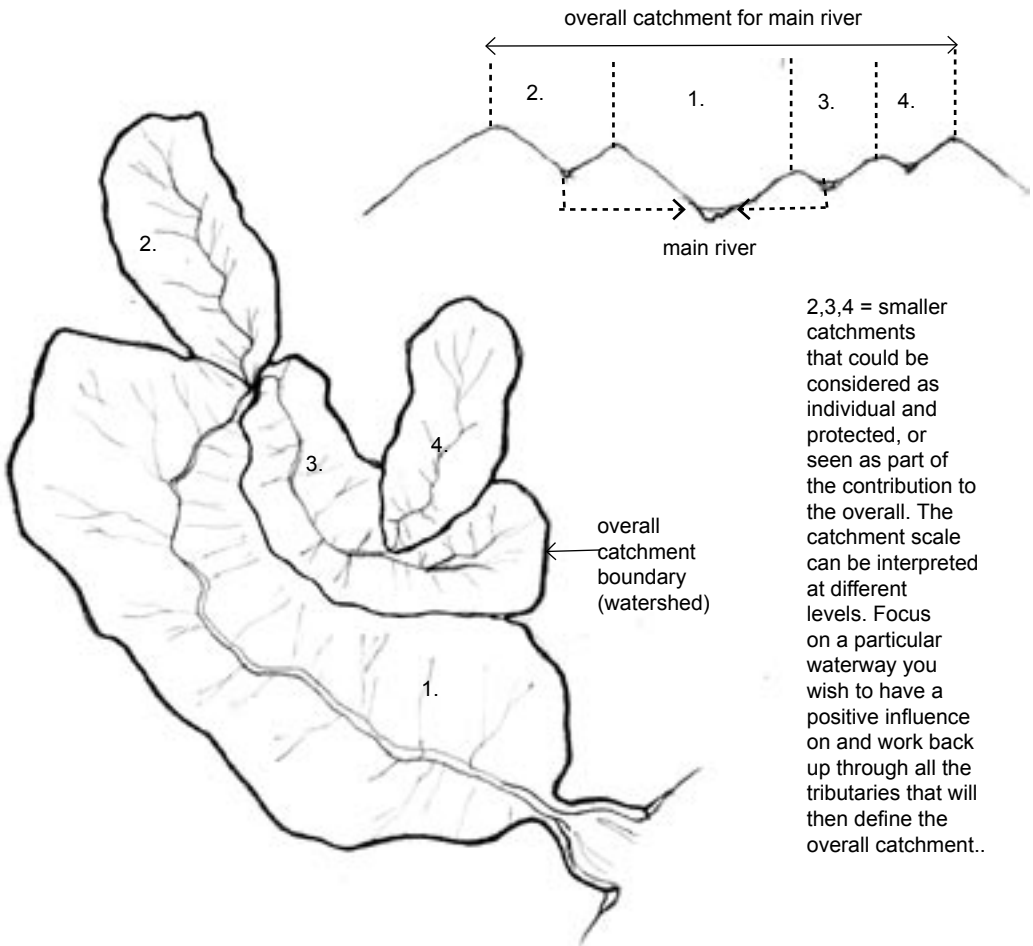


Finer scale land systems focussing on fan

5. catchment-based design

The water catchment area will provide contiguous diversity of altitude, aspect and hydrological regimes and associated vegetation and habitat diversity. Water born nutrients, seeds, spore and the movement of some micro fauna and bird species will be contained within the catchment area, as the drier ridges will form a natural boundary.

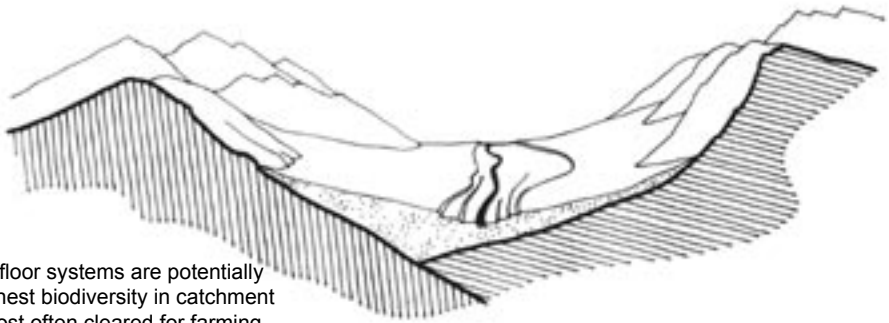
Ideally, a natural area will cover a full catchment or as many sequences within a full catchment as possible. This may be only a tributary or a sub-catchment.



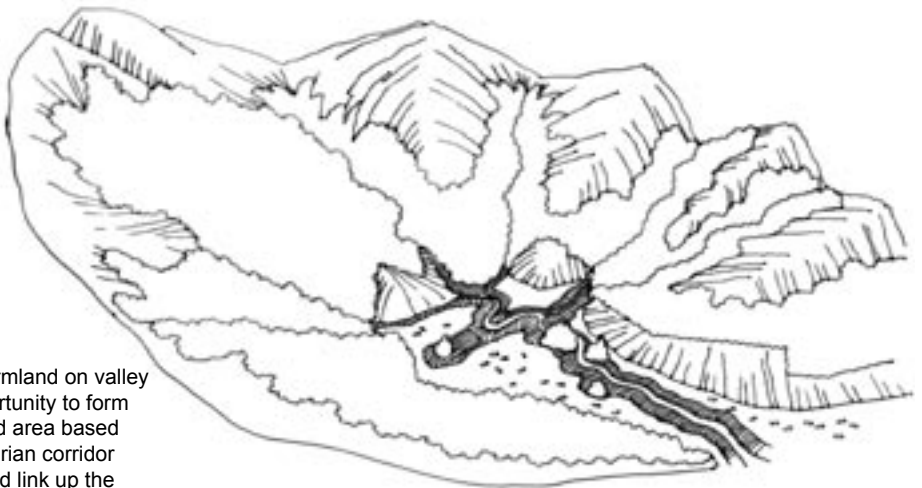
2,3,4 = smaller catchments that could be considered as individual and protected, or seen as part of the contribution to the overall. The catchment scale can be interpreted at different levels. Focus on a particular waterway you wish to have a positive influence on and work back up through all the tributaries that will then define the overall catchment..

Think beyond protecting only the steep inaccessible gullies and side slopes or eroded/eroding lands. Through protecting as much of the whole catchment as possible, it is more achievable to protect and maintain the natural nutrient cycles, energy flows and hydrological regimes that influence the biodiversity. A fuller range of habitat types is more likely to be protected with more of the catchment protected.

Frequently, the valley floor is excluded from protected area design due to previous modification, but this is often the location of the catchment's highest nutrient deposits and can potentially have the richest biodiversity. Some, if not all, of these low valley areas should therefore be included in a protected area to ensure the full sequence of ecosystem processes is included. Restoration may need to be allowed for.



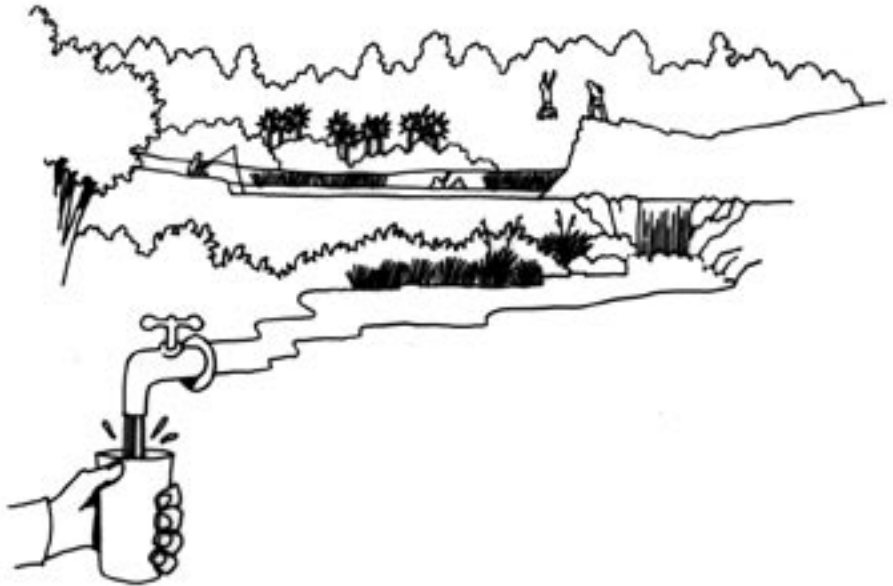
Valley floor systems are potentially the richest biodiversity in catchment and most often cleared for farming purposes.



Grazed farmland on valley floor. Opportunity to form a protected area based on the riparian corridor which could link up the other protected areas in the catchment or allow valley floor to regenerate.

When it is possible to consider only part of a catchment for protection, ascertain if it is possible to protect key habitat and the range of processes that link the ecosystems present. Consider also the invertebrate fauna, not just the more obvious bird species.

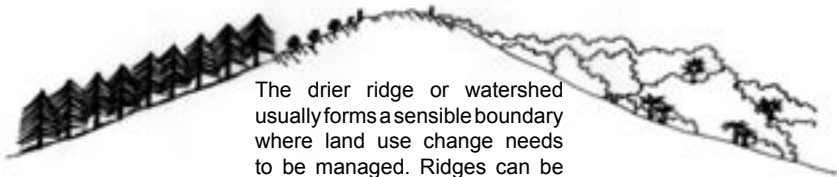
Protecting natural areas can assist in protecting water quality, as well as assisting in sustaining the water yield. It may be beneficial to 'downstream' users if a protected area protects an upper catchment above important water intakes for domestic, urban, farming or industrial use.



6. natural boundaries the most effective

The drier ridge forming the catchment's boundary often naturally limits the movement of species within the catchment. It can therefore be used to assist in managing the protected area though "containing" the less mobile indigenous species within the ecosystem and assisting in limiting the invasion of unwanted plant and animal species from outside. Some bird and animal species will of course move from within to well outside a catchment on a daily or seasonal basis in response to breeding and feeding cycles.

fence



The drier ridge or watershed usually forms a sensible boundary where land use change needs to be managed. Ridges can be easily patrolled for management, provide firebreaks & access to fight fires/store water, and limit pests.

However, it may not be appropriate to have the protected area boundary right on the catchment's ridge-crest. In some circumstances greater ecological diversity and landscape integrity can be achieved through extending beyond the catchment boundary. Ensure that all of the habitat or land within the catchment is included, then as appropriate extend beyond the catchments to link and provide habitat and landscape continuity, and/or to buffer the protected catchment lands.