

## Ecological enhancement advice

Plants communities reflect the underlying hydrology and soils, as well as the climate and nutrient input. These all come together in the different ecosystem types found across the Hurunui.

The past vegetation of the Hurunui would have been a mosaic of varied plant communities reflecting the extreme diversity in the physical environment across the district. These would have included dry woodlands, such as kanuka, tussocklands and broadleaf/podocarp forest of tötara and matai in the more fertile areas. There were also extensive areas of swamp wetlands as well as fens, bogs and coastal wetlands.

Sites can be a complicated mix of plant communities, grading from dryland/terrestrial (land-based) to open water, and from low to high nutrient. They might include rare plants and groups of plants.

The way the plant species change between land-to-freshwater, recent-to-ancient soils and mid-stream-to-bank margin is called a 'vegetation sequence'.



Figure 1: Dryland vegetation sequence supporting different vegetation communities. (Image from Native plants natural to Canterbury Plains by the Department of Conservation).

The first step in a well-planned restoration planting project should aim to recreate vegetation communities and sequences that once naturally occurred in that ecosystem type

### Developing your plan

Restoration projects aim to recreate the vegetation sequences that once naturally occurred in that ecosystem type.

There are a few questions that you should consider before developing a restoration plan for an area:

#### 1. What is the ecosystem type?

Finding out what type of ecosystem your site is/was, is helpful because different ecosystem types have specific nutrient and hydrological regimes that favour distinctive plant communities. Note that larger sites may be made up of more than

one ecosystem type. This information will provide a framework for the most appropriate species and environmental conditions to aim for.

## 2. What is the underlying hydrology and soils?

This is extremely important as it determines which plants should be placed where and marks the boundaries of potential habitat.

## 3. What animals live in/use the area?

E.g. birds, lizards, insects (moths, butterflies, and wētā, etc), fish and freshwater mussels.



Figure 2. Left: “waste areas’, rough pasture, rocky piles, anywhere that hasn’t been cultivated maybe potential lizard habitat Right: *Muehlenbeckia complexa* along fenceline creating important habitat for insects and butterflies

#### 4. What should remain?

Identifying any remnant plants of the original native cover is a good start point. It indicates where, and with which species, to start your planting project, as well as information on the native vegetation or habitats for animals that should not be negatively affected by any restoration work. In the Hurunui much of the remnant biodiversity can be short stature and look a bit austere.



Figure 3: Dryland ecosystems in the Hurunui might not have tall trees but often have diverse orchids, moss, lichen, and herb fields

#### 5. What needs to be removed or excluded?

This might be pest weeds that cannot be outcompeted by native plants, even if natives have re-established, such as tall fescue, domestic and pest animals that will damage plants through grazing and trampling, or prey on native wildlife. However, it is important to note that even non-native plants, such as willows, can provide some habitat for birds and lizards. Therefore, it's important to consider what negative impacts removing the exotic vegetation could have.

#### 6. What will take care of itself?

Most native plants can re-establish once weeds like tall fescue are destroyed. Restoration planting should be aimed at boosting existing biodiversity and outcompeting weeds rather than 'creating' an ecosystem type from scratch. Many projects spend thousands of dollars on restoration planting while ignoring the negative effects of weeds long-term – this results in unsuccessful restoration, wastes time and resources, and demoralises volunteers.

#### 7. What species should I be planting?

The important considerations are Ecosourcing and Ecositing:

**Ecosourcing** is where you grow native plants from locally-sourced seeds, taken only from plants that naturally grow in that area. (see ecosourcing guidelines)

**Ecositing** means trying to recreate an ecosystem that used to exist in an area. It involves matching each plant species to its preferred habitat.

New Zealand bush can be made up of a complex array of plant species and communities, depending on the local climate, soil type, slope, moisture and fertility.

To successfully recreate an ecosystem you need to choose the right species for each part of your site. Putting the right plants in the right place means they will be more likely to survive and a more natural forest will be created. Once you're familiar with your site this will be relatively easy. For example, it will be obvious to plant kahikatea and swamp flax in the wetter valley bottoms, tōtara on drier alluvial areas, and ngaio on exposed coastal sites.

It's also important to have the right balance of plants. For example, the big podocarp trees (mataī, tōtara, kahikatea ect) will normally only make up a small percentage of a forest canopy, so don't plant too many of them compared to other species. For forest areas, a good rule of thumb is to plant 50 canopy species for every 1,000 hardy colonising plants such as mānuka.

Please contact your local biodiversity officer for a plant list suitable to your site.

### **Draw up a map**

An effective starting point for developing a Restoration Plan is a sketch map. A bird's-eye view sketch map is important as it helps to summarise knowledge about the natural and/ or man-made features of the restoration site. It is a practical tool for defining, for example, management zones and locations of permanent plots for monitoring. The map can be hand drawn using a range of resources such as aerial photos, topographic maps and Google Earth combined with your own knowledge.

The following features should be included:

- Vegetation types
- Water sources and outflows, hydrological modifications, water level
- Soil type(s)
- Natural, man-made and cultural features

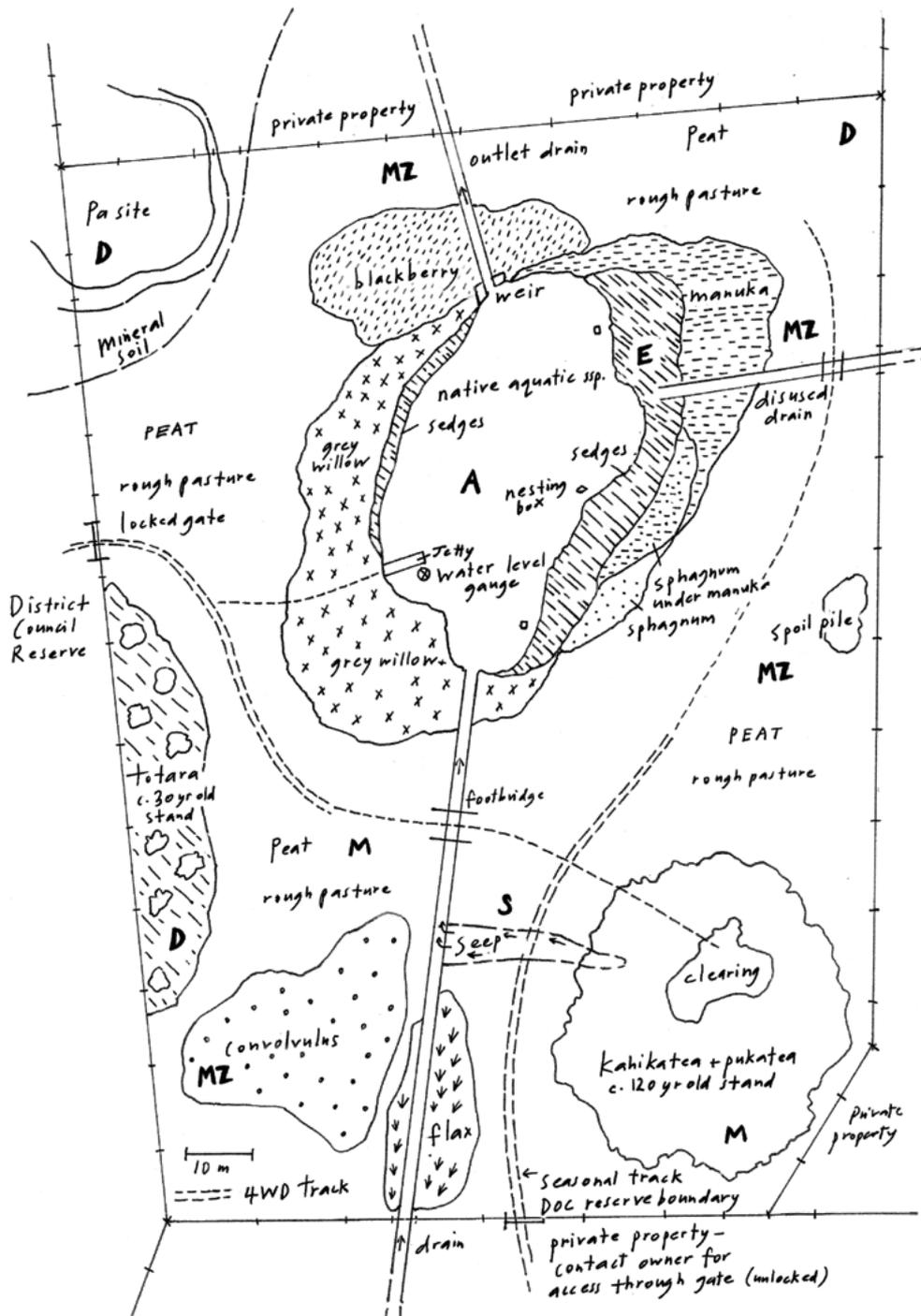


Figure 4: Wetland sketch map including planting zones (Image from *Wetland restoration: a handbook for New Zealand freshwater systems.*)

Info from:

Peters, M., & Clarkson, B. (2010). *Wetland restoration: a handbook for New Zealand freshwater systems*. Manaaki Whenua Press, Landcare Research.

Department of Conservation. (2016) *Waimea Inlet restoration: information for communities on best practice approaches*.

Department of Conservation. (2021) *Native plants natural to Canterbury Plains brochure*