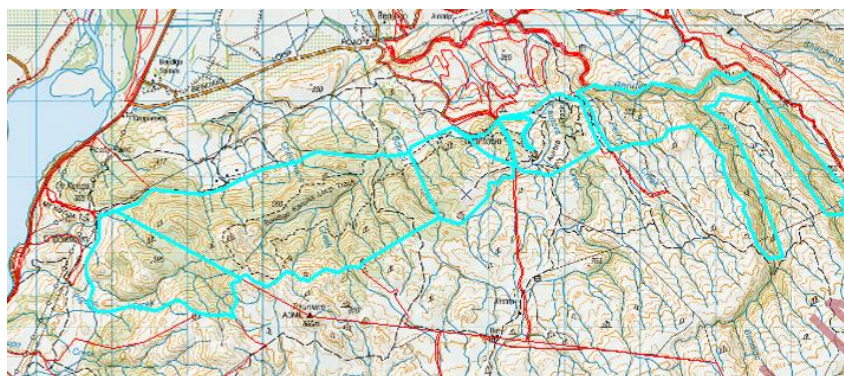


Bendigo Scenic and Historic Reserves - recommended EMU for inclusion in Ecosystem Optimisation process as TI2 ecosystem

Introduction

Bendigo SR and HR were created via the Tenure Review of Bendigo Station in the early 1990s. The Historic Reserve was created in recognition of the abundant remains of hard-rock gold mining, and the Scenic Reserve to protect the landscape and allow for recreation. Together they encompass around 1,100ha of kanuka shrubland/forest, rock outcrop and herbfield on the western side of the Dunstan Range (shown outlined in blue below).



Landform diversity

The EMU sits around the western face of the Dunstan Mountains, ranging in altitude from around 350 to 750m asl. Although generally north-west facing, the series of gullies running through it, as well as the small hilltops at the western end, give it a range of aspects and slopes. The large and frequent rock outcrops are a feature of the EMU, and create further variety in habitats, as well as fire refuges from which the current vegetation doubtless spread after past burning.

Ecosystem diversity

The location of the EMU (on the edge of what might be considered the real drylands), as well as relict vegetation on the Pisa Range on the opposite side of Lake Dunstan, suggests that the current kanuka-dominated vegetation has been induced from a more diverse, later successional forest type. This probably contained Halls totara, silver beech, bog pine and *Phyllocladus alpinus* with a diverse understory, with dense shrubland on drier or more exposed sites.

Corresponding ecosystem types from the Department's Ecosystem Classification (DM-786829) would be a dominance of Hall's totara, mountain toatoa, broadleaf forest, (CF1) with components of kanuka, *Olearia* scrub/ treeland (TI2) and possibly areas of bog pine, mountain celery pine scrub/ forest (TI1).

Current Vegetation

The Reserves are currently heavily dominated by kanuka, making them and the surrounding scrubby areas stand out against the grassland-dominated hills beside and above them. The largest kanuka are found in the gullies and are at least 4m tall, making this vegetation significantly taller than most woody vegetation at this altitude in Central Otago. Other native woody species scattered through the reserves include *Corokia cotoneaster*, *Olearia lineata*, *O. odorata*, *Coprosma propinqua*, *Melicytus alpinus*, occasional *Myrsine divaricata* and *Sophora*

microphylla, and climbers such as *Muehlenbeckia complexa* and *Rubus schmidelioides*. The relevant PNAP report mentions Halls totora and *Phyllocladus alpinus* in the Scotts Creek RAP; this may or not be within the boundary of the Historic and Scenic Reserves recommended for the EMU.

The current vegetation is very much TI2, which represents a mid-successional stage of a process that would ideally lead to TI1 or CF1 climax communities. The lack of a nearby seed source (10km to the nearest Halls totara remnant) determines that this succession will not continue without intervention. For this reason part of a prescription should include establishing a series of 'enclaves' of species such as Halls totara, bog pine and *Phyllocladus alpinus* within the EMU. These species would then be left to spread naturally within the EMU.

Plant Species Values

The spring annuals *Myosotis brevis* (Nationally Endangered), *Myosurus minimus* subsp *novae-zelandiae* (Nationally Critical) and *Ceratocephala pungens* (Nationally Critical) grow on seasonally damp soils or shaded faces within the kanuka shrubland of the EMU.

The grassy mat sedge *Carex inopinata* (Nationally Endangered) has its type specimen from Mt Koina (just outside the EMU) and is highly likely to be present within it. It requires a dry, fertile but shaded habitat, which should be provided in abundance by the kanuka shrubland..

The mistletoe *Korthalsella salicornioides* (Naturally Uncommon) is present on kanuka within the EMU. *Olearia lineata* (Declining) is scattered throughout the EMU.

Fauna values

The Bendigo Reserves supports populations of the common lizard species McCanns skink (*Oligosoma maccanni*) and the Cromwell gecko (*Woodworthia* 'Cromwell'). Native birds include grey warbler (*Gerygone igata*), silvereye (*Zosterops lateralis*), fantail (*Rhipidura fuliginosa*) harrier (*Circus approximans*), falcon (*Falco novaeseelandiae* var 'eastern') and bellbirds (*Anthornis melanura*). Tomtits are present on the Pisa Range and may occasionally use the Bendigo shrublands. The incidence of all of these birds is likely to increase as the shrubland spreads.

Current Management

Fencing

All of the EMU apart from the two 'fingers' running up Bendigo and Clearwater Creeks are rabbit-fenced. The fence is inspected and maintained biannually to facilitate rabbit control. Little maintenance is generally required due to the dry climate and low stock pressure, however wild pigs occasionally bust through in places.

The current commitment to fencing would probably suffice, should the EMU be selected as an optimised site.

Weeds

The main weeds of concern are wilding pines and *Clematis tangutica*. The former are currently controlled as required by helicopter-borne contractors. The latter is a more serious concern, as it would be extremely difficult to control if it got into the EMU. At the moment it is present at low densities in the privately held land surrounding the EMU and is controlled by the Department via ground-based methods.

Other woody weeds are at low densities, and as the kanuka continues to spread the potential for pioneer weed species will diminish.

Should the prevalence of either of the above weed species in the surrounding landscape increase, a greater response will be required. This would be easily justified if the site were selected in the optimisation process.

Animal Pests

Wild goats are sometimes present and are controlled via helicopter hunting on a regular basis. Deer and pigs are present in low numbers, and no dedicated control of them happens at the moment. The greatest problem pigs cause seems to be their damage to the fence, rather than to biodiversity values. The current level of ungulate control would probably suffice if the site was selected in the optimisation process.

Although hares are not common at this site rabbits are present in (at times) high numbers. They are regularly controlled via night-shooting, and with aerial poison drops as the need, and neighbouring landowner buy-in, dictates.

Rabbits probably play a role in creating habitat for the spring annual species and at their current level do not appear to be limiting the spread of the shrubland. For these reasons, the current level of control would probably suffice under an optimised management regime.

Fire

As the site is generally steep, west facing, dry and heavily vegetated it is at great risk of fire. In its favour it is easily visible from State Highways 8 and 6, and has an excellent water source for helibuckets in the form of Lake Dunstan.

NHMS Species Optimisation

The EMU features as a site in the original *Myosotis brevis* and *Myosurus minimus* subsp *novae-zelandiae* species prescriptions. Advice from the Area was that these species could be better managed at sites where their distribution was better known and populations more concentrated, therefore the recommendation was to change the Bendigo sites to ones nearer Alexandra.

No other species prescriptions use Bendigo as a site.

Comparison to other TI2 ecosystem units in Central Otago area

EMU	Size	Ecological Values	Ease of management	Synergies
Bendigo HR and SR	1100ha	Scattered to dense shrubland/forest dominated by kanuka; moderate threatened species values	Within 1 hour of Area Office, reasonable vehicle access around half the perimeter and within the Reserves in places.	RPMS weed and rabbit control already undertaken, as is pine and <i>Clematis tangutica</i> control.
Gimmerburn	Around 0.5ha of shrubland,	PNAP report suggests low diversity of	Private land with QE2 covenant, 1	None.

	surrounded by cultivated paddock	common species eg <i>Olearia odorata</i> , <i>Melicytus alpinus</i> .	hour from Area Office.	
Kyeburn Gravel Reserve	7ha, mix of private and TLA reserve	Extensive and dense exotic broom in gravel reserve, scattered matagouri possibly with <i>Olearia odorata</i> , <i>Melicytus alpinus</i> on private land.	Unknown – gravel reserve apparently unused at the moment, no discussion to date with private landowner.	None.
Fiddlers Flat – Home Hills (assuming recommended changes to polygon are made)	290ha: 180ha PCL and 110ha conservation covenant.	Mix of shrubland types from dense riparian to scattered on dry terrace; high threatened species values.	Mix of PCL and conservation covenant ca 1 hour from Area Office	1 species prescription and another if our recommended changes are made; RPMS weed and rabbit control

Other factors/values

- The site is around an hour from the Central Otago (and Wanaka) Area Offices and has reasonable 4wd access around the perimeter.
- It is easily accessible to the public, with walking tracks to historic features, and a longer walking/biking loop through the middle of it. It is recognised by the public as the closest thing we have to forest in the drylands and valued as such.
- Pre-1900 alluvial and hard-rock gold-mining remains are found in the Historic Reserve and to a lesser degree the Scenic Reserve.
- Adopting the site as an Ecosystem site will allow us to continue the work we do there, and add to its value as an advocacy site for dryland conservation.
- Several vineyards are located below the Reserves; at least one of these has an interest in revegetation projects. There is potential that a vineyard/community driven project could be used to achieve the introduction of later successional woody species.