

# PIT ROAD RESERVE

Mike Harding

Woodbury, mikeharding@ihug.co.nz

## Introduction

Pit Road Reserve lies on the southwest side of Pit Road at Coopers Creek, South Canterbury, approximately eight kilometres northwest of Geraldine. Approximately half the 21 ha reserve is an excavated gravel pit that lies three to five metres below the original land surface. The other half, along the western and southern boundaries, is flat or slightly undulating grassland most of which supports young planted radiata pine trees.

The reserve is on the southeast-sloping floodplain of Coopers Creek, between the present beds of the Orari and Rangitata rivers. It ranges in altitude from approximately 175 m at its northwest corner to approximately 165 m at its southeast corner. The present channel of Coopers Creek lies just east of the reserve. Coopers Creek is a tributary of the Orari River, joining the river just a few kilometres from the coast.

The reserve lies on river gravel, sand and silt. It is in a climate zone characterized by warm summers with occasional hot northwest winds and cool winters with frequent frosts and occasional snow. Prevailing winds are from the northwest. Annual precipitation is approximately 700 mm.

Pit Road Reserve lies at the inland edge of Low Plains Ecological District (ED), within Canterbury Plains Ecological Region (McEwen 1987). Low Plains ED covers a large area of coalesced fans of glacial outwash gravel and alluvial deposits, from sea level to 300 m altitude, between Pegasus Bay in the north and Timaru in the south. This part of Low Plains ED adjoins Geraldine ED (in Pareora Ecological Region) to the west.

The original (pre-human) vegetation of Low Plains ED is likely to have been predominantly danthonia (*Rytidosperma*) grassland on recently-deposited gravel, silver tussock grassland and matagouri-*Coprosma* shrubland at more stable sites, and kanuka-kowhai treeland or low-forest on older terraces (Steven & Meurk 1996; Harding 2009). Mossfield and herbfield would have been present at stony free-draining sites and cabbage tree and flax present beside stream channels.

There are few sizeable areas of uncultivated grassland or shrubland remaining in Low Plains ED. The unexcavated part of Pit Road Reserve is one of the largest areas of uncultivated grassland in this part of the ecological district. Most other undeveloped grasslands are confined to narrow strips on roadsides.

Pit Road Reserve lies in the “Southern Lowlands” (L1.2a) Level IV Land Environment (Leathwick et al. 2003). Less than 1% of this Land Environment is formally protected. Under the threat classification system proposed by Walker et al. (2005), this Land Environment is “acutely threatened”, as it has less than 10% of the original vegetative cover remaining.

## **Vegetation**

The five main plant communities at the reserve are described separately below, though the communities frequently inter-grade with one another. Naturalized (exotic) species are indicated with an asterisk (\*). All vascular plant species observed at the reserve are listed in Table 1 (page 53).

### ***Terrace grassland***

Grassland is the most extensive plant community on the un-excavated terrace and dominates sites with deeper soils. It grades to mossfield/stonefield and supports some species typical of that community. Young (ca. 10 year-old) pine trees are present in rows over most of the grassland, though grassland remains (for the time) dominant between the rows of pine trees.

The grassland community is dominated by Chewings fescue\* (*Festuca rubra* ssp. *commutata*), sweet vernal\* (*Anthoxanthum odoratum*), browntop\* (*Agrostis capillaris*) and *Rytidosperma clavatum*. Other grasses present are *Rytidosperma merum*, *Elymus solandri* and occasional swards of cocksfoot\* (*Dactylis glomerata*) and tall oat grass\* (*Arrhenatherum elatius*). Scattered through most parts of this grassland community are moss and creeping pohuehue (*Muehlenbeckia axillaris*) (Fig. 1, page 46). Also present are hybrids between the “at risk” (declining) low-shrub *Muehlenbeckia ephedroides* and creeping pohuehue.

Other grassland species present and patchily distributed in this community are catsear\* (*Hypochoeris radicata*), narrow-leaved plantain\* (*Plantago lanceolata*), sheep’s sorrel\* (*Rumex acetosella*), stonecrop\* (*Sedum acre*), yarrow\* (*Achillea millefolium*), mouse-ear hawkweed\* (*Pilosella officinarum*), white clover\* (*Trifolium repens*), viper’s bugloss\* (*Echium vulgare*), woolly mullein\* (*Verbascum thapsus*) and Australian sheep’s bur\* (*Acaena agnipila*). Native species present are patotara (*Leucopogon fraseri*), wire moss (*Polytrichum juniperinum*), woolly moss (*Racomitrium* sp.) and lichens, including *Chondropsis semiviridis*. Rarely present are *Geranium sessiliflorum* var. *novaezelandiae* and a mat *Coprosma* (*petriei* ?). Four plants of fescue tussock (*Festuca novae-zelandiae*) are present within the pine trees at the southwest part of the reserve.



**Figure 1** A boulder copper butterfly feeding on *Muehlenbeckia axillaris*.

Scattered plants and clumps of broom\* (*Cytisus scoparius*) are present throughout. Occasionally present are gorse\* (*Ulex europaeus*), hawthorn\* (*Crataegus monogyna*) and prickly Moses\* (*Acacia verticillata*). Low bushes of matagouri (*Discaria toumatou*) are present at the southwest part of the reserve and occasionally elsewhere. One plant that closely resembles the “at risk” (declining) shrub *Coprosma acerosa* is present beside the northern edge of the planted pines at the eastern boundary of the reserve. Planted trees of macrocarpa\* (*Cupressus macrocarpa*), cedar\* (*Cedrus* sp.) and Cootamundra wattle\* (*Acacia baileyana*) are present at the reserve boundary. Elder\* (*Sambucus nigra*), male fern\* (*Dryopteris filix-mas*) and (interestingly) prickly shield fern (*Polystichum vestitum*) and necklace fern (*Asplenium flabellifolium*) are present in the shelter of an open shed near the reserve entrance.

### ***Terrace mossfield/stonefield***

This community is present at stony free-draining sites on the un-excavated terrace. It is best represented between the planted pines and the pit edge, along the northwest (Pit Road) boundary of the reserve and at the southeast corner of the reserve. This community is also present at locations throughout the planted pines, though is more affected there by naturalized grasses.

It is a low-stature community, dominated by moss (including woolly moss) and creeping pohuehue. Other widespread and common species are *Muehlenbeckia* hybrids, patotara, wire moss, *Carex breviculmis* and *Chondropsis semiviridis*. Scattered through this community, at varying densities, are grasses: browntop\*, sweet vernal\*, Chewings fescue\*,

*Rytidosperma clavatum*, *Rytidosperma merum*, *Elymus solandri* and *Elymus scaber*\*.

Occasionally present, and patchily distributed, are the following indigenous species: *Geranium sessiliflorum* var. *novaezealandiae*, *Dichondra repens*, mat *Coprosma*, *Oxalis exilis* and *Acaena inermis*. A prostrate native broom, *Carmichaelia corrugata*, is present at two locations and *Raoulia monroi* at one location.

Other species present depending on disturbance history are tall oat grass\*, cocksfoot\*, silvery hair grass\* (*Aira caryophyllea*), vulpia hair grass\* (*Vulpia bromoides*), mouse-ear hawkweed\*, yarrow\*, viper's bugloss\*, catsear\*, sheep's sorrel\*, narrow-leaved plantain\*, Australian sheep's bur\*, white clover\*, stonecrop\*, haresfoot trefoil\* (*Trifolium arvense*), St John's wort\* (*Hypericum perforatum*) and broom\*.

### ***Pit-side grassland/herbfield***

The sides of the excavated pit are in most places loose stones and soil at the angle of repose (ca. 30°), with small steeper banks at the top of the slopes. Vehicle tracks traverse the pit sides at several locations. Plant communities on the pit sides range from a dense sward of naturalized grasses to open stonefield.

Open stony communities are dominated by moss, mouse-ear hawkweed\* and catsear\*. Other species commonly present are king devil hawkweed\* (*Pilosella piloselloides*), tall oat grass\*, Chewings fescue\*, yarrow\*, St John's wort\*, viper's bugloss\*, haresfoot trefoil\*, creeping pohuehue, woolly moss, *Chondropsis semiviridis*, *Muehlenbeckia ephedroides* and creeping pohuehue.

The small banks at the pit edge are frequently dominated by *Muehlenbeckia ephedroides*, creeping pohuehue, patotara and/or moss. Present at some locations are mat *Coprosma* and *Carex breviculmis*.

At other locations the pit sides are dominated by a dense sward of naturalized grasses, predominantly Chewings fescue\*, tall oat grass\*, cocksfoot\* and browntop\*. Also present here and on piles of rubble are scattered plants of broom\*, hawthorn\*, oak\* (*Quercus* sp.), silver wattle\* (*Acacia dealbata*), gorse\*, tree lupin\* (*Lupinus arboreus*), foxglove\* (*Digitalis purpurea*), oxeye daisy\* (*Leucanthemum vulgare*), velvety nightshade\* (*Solanum chenopodioides*), nodding thistle\* (*Carduus nutans*), great bindweed\* (*Calystegia silvatica*) and occasionally pampas\* (*Cortaderia* sp.), young pine\* (*Pinus radiata*) and Douglas fir\* (*Pseudotsuga menziesii*) trees.

### ***Pit-floor stonefield/herbfield***

Most parts of the pit floor are dominated by naturalized grasses. However, at some free-draining sites, a stonefield/herbfield community is present.

The best example of this is at the western part of the pit where a large (more recently excavated?) basin is relatively free of naturalized grasses.

Open parts of this area are dominated by narrow-leaved plantain\*, browntop\* and moss. Other species present are Chewings fescue\*, mouse-ear hawkweed\*, catsear\*, hawkbit\* (*Leontodon taraxacoides*), viper's bugloss\*, woolly mullein\*, haresfoot trefoil\*, sheep's sorrel\*, sand spurrey\* (*Spergularia rubra*), clovers\* (*Trifolium* spp.), sweet vernal\*, *Lachnagrostis lyallii*, *Elymus solandri*, patotara, moss, wire moss, lichens (including *Chondropsis semiviridis*) and occasionally young browsed broom\* plants.

Denser patches of vegetation on this western pit floor are dominated by creeping pohuehue, *Muehlenbeckia* hybrids, browntop\*, Chewings fescue\*, mouse-ear hawkweed\* and moss (including *Campylopus clavatus*). Also present are *Rytidosperma merum*, *Rytidosperma clavatum*, *Wahlenbergia gracilis*, narrow-leaved plantain\*, viper's bugloss\*, Australian sheep's bur\*, yarrow\* and tall oat grass\*.

Additional indigenous plant species present on boulder piles at the pit margins are *Dichondra repens*, *Oxalis exilis* and *Epilobium microphyllum*.

### ***Pit-floor grassland***

Pit floor grasslands are variable but mostly dominated by either Chewings fescue\* or Kentucky bluegrass\* (*Poa pratensis*). Other grasses commonly present are browntop\*, sweet vernal\*, tall oat grass\* and cocksfoot\*. Patchily distributed are the indigenous grasses *Rytidosperma clavatum*, *Rytidosperma merum* and *Lachnagrostis lyallii*. Other species present are patches of moss and creeping pohuehue, and occasionally *Muehlenbeckia* hybrids, sweet brier\* (*Rosa rubuginosa*), *Juncus gregiflorus* and grey willow\* (*Salix cinerea*).

Some parts of the pit floor are periodically inundated. These ephemeral wetland areas are variously dominated by sand spurrey\*, *Lachnagrostis lyallii*, creeping bent\* (*Agrostis stolonifera*), catsear\* and/or jointed rush\* (*Juncus articulatus*). Other species commonly present are Chewings fescue\*, tall oat grass\*, broad-leaved dock\* (*Rumex obtusifolius*), white clover\*, yarrow\*, dandelion\* (*Taraxacum officinale*), creeping buttercup\* (*Ranunculus repens*), Californian thistle\* (*Cirsium arvense*), *Rorippa sylvestris*\*, narrow-leaved plantain\*, prickly sow thistle\* (*Sonchus asper*) and hawksbeard\* (*Crepis capillaris*).

Several crack willow\* (*Salix fragilis*) trees are present beside small damp areas on the pit floor.

### **Flora**

Twenty-six indigenous vascular plant species were recorded at Pit Road Reserve: seven shrub or sub-shrub species, five grasses, two orchids, two

ferns, one sedge, one rush, and eight herb species. At least four indigenous moss and several lichen species are present.

The number of indigenous plant species present at the reserve compares very favourably with the number of plant species at other grassland sites in the area. Very few other areas in Low Plains Ecological District, surveyed as part of Timaru District Council's Significant Natural Areas (SNA) Project, support more than five indigenous plant species.

### ***At-risk species***

Pit Road Reserve supports populations of three plant species listed as “at risk” (declining) by de Lange et al. (2009): *Coprosma acerosa*; *Muehlenbeckia ephedroides* (Fig. 2, below) and *Raoulia monroi*, and one “data deficient” species, *Rytidosperma merum*.

The reserve supports the largest known population of *Muehlenbeckia ephedroides* in this part of Low Plains Ecological District and probably the largest population in Timaru District. It is dominant in places at the pit edge, and occasionally present on the floor of the excavated pit. More common and widely distributed is a leafy prostrate/sprawling form, presumably a hybrid between *Muehlenbeckia ephedroides* and *Muehlenbeckia axillaris*.



**Figure 2** A large clump of *Muehlenbeckia ephedroides* at the southern edge of the pit.

Two small plants of the low shrub *Coprosma acerosa* were observed at the reserve. It is an unusual upright form of *Coprosma acerosa*. Leaf stipules

and branchlet hairiness most closely resemble *Coprosma acerosa* (ii) (Eagle 2006), though the leaves (notably the presence of hairs) most closely resemble *Coprosma brunnea*, as described by Eagle (2006a). However, *Coprosma brunnea* is officially regarded as a form of *Coprosma acerosa* (Connor & Edgar 1987). The recently published checklist of New Zealand indigenous vascular plants notes that *Coprosma acerosa* is a variable species with at least five recognised races, most, if not all, of which warrant formal description at some level of taxonomic rank (de Lange & Rolfe 2010). Regardless of its status, this species has not been recorded at lowland sites in Timaru District during SNA surveys and recorded by Wilson (1991) at only one other location in lowland South Canterbury.

The indigenous grass, *Rytidosperma merum*, is present throughout the reserve. The “data deficient” status of this species (de Lange et al. 2009) indicates that there is insufficient information about the species to place it in (or exclude it from) a threat category (Townsend et al. 2008). This species was formally identified by the Landcare Research Plant Identification Service. It has not been recorded previously from South Canterbury (Nick Head, DOC, pers. comm.).

### ***Locally-uncommon species***

A number of locally uncommon species are present at the reserve, notably mat *Coprosma (petriei ?)* and fescue tussock. The presence of prickly shield fern and necklace fern, both in the shelter of an old vehicle shed, is interesting. Neither species was recorded elsewhere in the reserve. It is likely they have been introduced to the reserve through human activity.

### **Ecological values**

Pit Road Reserve supports an example of indigenous vegetation that is moderately representative of that originally present in Low Plains Ecological District. It is one of the best remaining (and few in public ownership) examples of this grassland/mossfield community in this part of the ecological district. While much of the indigenous vegetation at the reserve is modified by the presence of naturalized herbs and grasses, woody weeds and young planted pine trees, the reserve still supports a good number of indigenous species and has good potential for restoration.

Uncultivated surfaces are now rare in the ecological district. Such surfaces are largely confined to narrow strips along roadsides and are, in most places, substantially modified. Pit Road Reserve is one of the largest and most intact areas of its type remaining in this part of the ecological district. Approximately half the reserve comprises an uncultivated and relatively unmodified (except for the presence of young pine trees) alluvial surface. Other parts of the reserve are modified by former extraction of gravel but provide disturbed habitats that are suitable for colonisation by some

indigenous plant species (e.g. *Rytidosperma merum* and *Lachnagrostis lyallii*). The reserve also provides a relatively extensive area of habitat for common bird species, lizards and invertebrates.

### **Plant and animal pests**

Pit Road Reserve is largely dominated by naturalized plant species, as is typical for lowland alluvial sites in Canterbury. The most ubiquitous naturalized species are the grasses: Chewings fescue, browntop and sweet vernal; and the herbs: catsear, narrow-leaved plantain, mouse-ear hawkweed, yarrow and viper's bugloss. Other naturalized species are dominant at particular sites, such as Kentucky blue grass and sand spurrey on parts of the pit floor.

A number of naturalized woody species are present at the reserve, though only broom and gorse are common. Woody plant pests, with the notable exception of broom, are mostly confined to the excavated pit.

The only introduced animals observed at the reserve were hares, rabbits and hedgehogs. Other ubiquitous introduced mammals, such as possums, rats, mice, mustelids and cats, are likely to be present.

### **Management history**

There is little readily available information about the early management of Pit Road Reserve. Gary Foster (Timaru District Council) advises that gravel was extracted from the reserve until about 1986. The pines were planted ten years ago. It appears that, prior to the planting of pines, the reserve was grazed periodically by sheep though never cultivated. Hard-fill and other debris have been deposited at parts of the reserve, notably on parts of the pit floor and at the northern corner of the reserve.

The reserve was recorded as a notable site in the draft Protected Natural Areas Programme report for the Low and High Plains ecological districts (Steven & Meurk 1996). It is described, along with other sites of the "Coopers Creek channel", as follows: "*The margins of a disused shingle pit at Pit Road Coopers Creek settlement also provide a surprisingly undisturbed refuge for dryland plants. A detailed survey is likely to reveal additional native grass and herb species. This pit site and the creek channel near Palmers Rd are the least disturbed areas*".

Timaru District Council is responsible for management of the reserve. Reserve management is undertaken as part of Council's rural parks maintenance contract. Management has been primarily control of brush weeds (broom, gorse and hawthorn).



## **Proposed management**

A recent proposal by herpetologist Hermann Frank to create a lizard sanctuary in lowland South Canterbury focussed attention on the reserve. Closer investigation revealed the important botanical values. Consequently, Timaru District Council has endorsed a new management strategy to protect and enhance indigenous biodiversity values of the reserve. Important management actions underway or proposed are removal of recently-planted pine trees, deposition of river boulders to provide lizard habitat, erection of a dividing fence to allow resumption of controlled grazing by sheep over part of the reserve, continued control of woody weeds, predator control, and vegetation monitoring.

## **Acknowledgements**

Gary Foster, Timaru District Council, for funding the botanical investigation of the reserve; Nick Head (DoC) and Alice Shanks for assistance with identification of grasses.

## **References**

- Connor HE, Edgar E 1987. Name changes in the indigenous New Zealand Flora 1960-1986 and *Nomina Nova IV*, 1983-1986. *New Zealand Journal of Botany* 25: 115–170.
- de Lange PJ, Norton DA, Courtney SP, Heenan PB, Barkla JW, Cameron EK, Hitchmough R, Townsend AJ 2009. *Threatened and Uncommon Plants of New Zealand (2008 Revision)*. *New Zealand Journal of Botany* 47: 61–96.
- de Lange PJ, Rolfe JR 2010. *New Zealand Indigenous Vascular Plant Checklist 2010*. Wellington, New Zealand Plant Conservation Network.
- Eagle AL 2006. *Eagle's complete trees and shrubs of New Zealand*. Wellington, Te Papa Press.
- Eagle AL 2006a. Supplement to Eagle's Complete Trees and Shrubs of New Zealand. Additional Notes. Dunedin, Botanical Society of Otago.
- Harding MA 2009. *Canterbury land protection strategy*. Wellington, Nature Heritage Fund.
- Leathwick J, Wilson G, Rutledge D, Wardle P, Morgan F, Johnston K, McLeod M, Kirkpatrick R 2003. *Land Environments of New Zealand*. Auckland, David Bateman.
- McEwen WM (editor) 1987. *Ecological regions and districts of New Zealand*. Third revised edition (Sheet 4). New Zealand Biological Resources Centre Publication No.5. Wellington, Department of Conservation.

Steven JC, Meurk CD 1996. Low and High Plains Ecological Districts, Plains Ecological Region, Canterbury. Protected Natural Areas Programme Survey Report (unpublished draft).

Townsend AJ, de Lange PJ, Duffy CAJ, Miskelly CM, Molloy J, Norton DA 2008. New Zealand threat classification system manual. Wellington, Department of Conservation.

Walker S, Price R, Rutledge D 2005. New Zealand's remaining indigenous vegetation cover: recent changes and biodiversity protection needs. Landcare Research Contract Report LC0405/038.

Wilson HD 1991. Distribution maps of small-leaved shrubs in Canterbury and Westland. Canterbury Botanical Society Journal 25: 3–81.

**Table 1** Plant species recorded at Pit Road Reserve, 2011 and 2012.

<b>Scientific Name</b>	<b>Common Name</b>	<b>Form</b>	<b>Abundance</b>
<i>Acacia baileyana</i> *	Cootamundra wattle	tree	R
<i>Acacia dealbata</i> *	silver wattle	tree	R
<i>Acacia verticillata</i> *	prickly Moses	tree	R
<i>Acaena agnipila</i> *	Australian sheep's bur	herb	C
<i>Acaena inermis</i>		herb	R
<i>Achillea millefolium</i> *	yarrow	herb	A
<i>Agrostis capillaris</i> *	browntop	grass	A
<i>Agrostis stolonifera</i> *	creeping bent	grass	O
<i>Aira caryophylla</i> *	silvery hair grass	grass	O
<i>Anthoxanthum odoratum</i> *	sweet vernal	grass	A
<i>Arrhenatherum elatius</i> *	tall oat grass	grass	C
<i>Asplenium flabellifolium</i>	necklace fern	fern	R
<i>Bromus</i> sp. *		grass	O
<i>Calystegia silvatica</i> *	great bindweed	climber	R
<i>Campylopus clavatus</i>		moss	C
<i>Carmichaelia corrugata</i>		sub-shrub	R
<i>Carduus nutans</i> *	nodding thistle	herb	O
<i>Carex breviculmis</i>		sedge	O
<i>Chondropsis semiviridis</i>		lichen	O
<i>Cerastium fontanum</i> *	mouse-ear chickweed	herb	O
<i>Cirsium arvense</i> *	Californian thistle	herb	O
<i>Coprosma acerosa</i>		sub-shrub	R
<i>Coprosma</i> sp.	<i>petriei</i> or <i>atropurpurea</i>	sub-shrub	R
<i>Cortaderia</i> sp. *	pampas grass	grass	R
<i>Crataegus monogyna</i> *	hawthorn	tree	R

<i>Crepis capillaris</i> *	hawksbeard	herb	O
<i>Cytisus scoparius</i> *	broom	shrub	C
<i>Dactylis glomerata</i> *	cocksfoot	grass	C
<i>Dianthus armeria</i> *	Deptford pink	herb	O
<i>Dichondra repens</i>		herb	O
<i>Digitalis purpurea</i> *	foxglove	herb	O
<i>Discaria toumatou</i>	matagouri	shrub	R
<i>Dryopteris filix-mas</i> *	male fern	fern	R
<i>Echium vulgare</i> *	viper's bugloss	herb	A
<i>Elymus scaber</i> *		grass	O
<i>Elymus solandri</i>	blue wheat grass	grass	O
<i>Epilobium microphyllum</i>		herb	R
<i>Erica lusitanica</i> *	Spanish heath	shrub	R
<i>Festuca novae-zelandiae</i>	fescue tussock	grass	R
<i>Festuca rubra</i> ssp. <i>commutata</i> *	Chewings fescue	grass	A
<i>Galium aparine</i> *	cleavers	herb	O
<i>Geranium sessiliflorum</i>		herb	R
<i>Holcus lanatus</i> *	Yorkshire fog	grass	O
<i>Hypericum perforatum</i> *	St Johns wort	herb	O
<i>Hypochoeris radicata</i> *	catsear	herb	A
<i>Juncus articulatus</i> *	jointed rush	rush	O
<i>Juncus edgariae</i>		rush	O
<i>Lachnagrostis lyallii</i>		grass	O
<i>Leontodon taraxacoides</i> *	hawkbit	herb	O
<i>Leucanthemum vulgare</i> *	oxeye daisy	herb	O
<i>Leucopogon fraseri</i>	patotara	sub-shrub	C
<i>Linum bienne</i> *	pale flax	herb	O
<i>Linum catharticum</i> *	purging flax	herb	O
<i>Logfia minima</i> *		herb	O
<i>Lotus pedunculatus</i> *	lotus	herb	O
<i>Lupinus arboreus</i> *	tree lupin	herb	O
<i>Microtis unifolia</i>		orchid	O
<i>Muehlenbeckia axillaris</i>	creeping pohuehue	sub-shrub	C
<i>Muehlenbeckia ephedroides</i>		sub-shrub	C
<i>M. ephedroides x axillaris</i>		sub-shrub	C
<i>Orobanche minor</i> *	broom rape	herb	O
<i>Oxalis exilis</i>		herb	O
<i>Poa pratensis</i> *	Kentucky bluegrass	grass	C

<i>Pilosella officinarum</i> *	mouse-ear hawkweed	herb	C
<i>Pilosella piloselloides</i> *	king devil hawkweed	herb	O
<i>Pinus radiata</i> *	radiata pine	tree	C
<i>Plantago lanceolata</i> *	narrow-leaved plantain	herb	A
<i>Polytrichum juniperinum</i> <sup>i</sup>	wire moss	moss	C
<i>Polystichum vestitum</i>	prickly shield fern	fern	R
<i>Pseudotsuga menziesii</i> *	Douglas fir	tree	R
<i>Quercus sp.</i> *	oak	tree	R
<i>Racomitrium pruinosum</i>	woolly moss	moss	O
<i>Ranunculus repens</i> *	creeping buttercup	herb	O
<i>Raoulia monroi</i>		herb	R
<i>Rorippa sylvestris</i> *		herb	O
<i>Rosa rubiginosa</i> *	sweet briar	shrub	R
<i>Rumex acetosella</i> *	sheep's sorrel	herb	C
<i>Rumex obtusifolius</i> *	broad-leaved dock	herb	O
<i>Rytidosperma clavatum</i>		grass	C
<i>Rytidosperma merum</i>		grass	C
<i>Salix cinerea</i> *	grey willow	tree	O
<i>Salix fragilis</i> *	crack willow	tree	O
<i>Sambucus nigra</i> *	elder	tree	R
<i>Sedum acre</i> *	stonecrop	herb	O
<i>Senecio quadridentatus</i>		herb	R
<i>Silene latifolia</i> *	white campion	herb	R
<i>Sisymbrium officinale</i> *	hedge mustard	herb	O
<i>Solanum chenopodioides</i> *	velvety nightshade	herb	O
<i>Sonchus asper</i> *	prickly sow thistle	herb	O
<i>Spergularia rubra</i> *	sand spurrey	herb	C
<i>Taraxacum officinale</i> *	dandelion	herb	O
<i>Thelymitra longifolia</i>		orchid	R
<i>Trifolium arvense</i> *	haresfoot trefoil	herb	C
<i>Trifolium dubium</i> *	suckling clover	herb	O
<i>Trifolium glomeratum</i> *	clustered clover	herb	O
<i>Trifolium repens</i> *	white clover	herb	C
<i>Trifolium subterraneum</i> *	subterranean clover	herb	C
<i>Ulex europaeus</i> *	gorse	shrub	O
<i>Verbascum thapsus</i> *	woolly mullein	herb	O
<i>Vulpia bromoides</i> *	vulpia hair grass	grass	O
<i>Wahlenbergia gracilis</i>		herb	R

A = abundant; C = common; O = occasional; R = rare. Naturalized (exotic) species are indicated with an asterisk\*.