# **Action Statement**

Flora and Fauna Guarantee Act 1988

No. 98

# Marble Daisy-bush (*Olearia* astroloba) and Silurian Limestone *Pomaderris* Shrubland

# 1. Marble Daisy-bush (Olearia astroloba)

### **Description**

The Marble Daisy-bush (*Olearia astroloba*) is a small shrub which grows to approximately 0.5 m in height. The stems are erect, smooth and pale green when young, turning brown when mature. The distinctive grey-green leaves are crowded, alternate and sessile, with dentate margins towards the apex. The inflorescence is a solitary, terminal capitulum, 15 – 32 mm in diameter. The inner disc florets are purple and bisexual, while the outer ray florets are female, violet and have three minute lobes at the apex (Lander & Walsh 1989). Flowering occurs continuously from approximately June through to March (G. Earl pers. obs.); the peak flowering period appears to be June - July (Lander & Walsh 1989).

### Distribution

The Marble Daisy-bush is endemic to Victoria. The only known population occurs at Marble Gully Nature Conservation Reserve, near Bindi in the Tambo valley north-east of Swifts Creek, East Gippsland.

### **Abundance**

It is estimated that approximately 1000 individuals exist, dispersed over about 40 ha.

### **Important populations**

Persistence of the sole population at Marble Gully is critical to the survival of this species.



Marble Daisy- bush (*Olearia astroloba*)
Photo: Neville Walsh



Silurian Limestone *Pomaderris* Shrubland Photo: Neville Walsh





### Habitat

Marble Daisy-bush occurs in Silurian Limestone Pomaderris Shrubland on a steep (approximately 40° - 60°), north-facing site. Drooping Sheoak (Allocasuarina verticillata) and Silver Bundy (Eucalyptus nortonii) are occasional emergents (Lander & Walsh 1989). Kangaroo Grass (Themeda triandra) and Winged Everlasting (Ozothamnus adnatus) are particularly common at the site. Soils are skeletal and derived from Silurian limestone / marble. The common name 'Marble Daisy-bush' (Earl & Bramwell 1999) reflects this species' close association with marble. The single known site is approximately 600 m above sea level (Earl & Bramwell 1999). Mean annual rainfall at the site is approximately 645 mm per year.

### Life history and ecology

Following the 2003 fires in eastern Victoria, key questions about the life history and ecology of the Marble Daisy-bush relate to its capacity to recover after fire. Marble Daisy-bush is a perennial plant that flowers annually and appears to produce substantial quantities of viable seed. The pollination mechanism is not known. Monitoring following the 2003 fires indicates that this species can regenerate both by re-sprouting and by seed germination (Coates *et al* 2004).

### **Conservation status**

### **National conservation status**

Marble Daisy-bush is listed as <u>vulnerable</u> under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.* 

### Victorian conservation status

Marble Daisy-bush is listed as <u>threatened</u> under the Victorian *Flora and Fauna Guarantee Act 1988.* 

Marble Daisy-bush is considered <u>vulnerable</u> in Victoria according to DSE's *Advisory List of Rare or Threatened Plants in Victoria* – 2005 (DSE 2005).

### **Decline and threats**

### <u>Inappropriate fire regimes</u>

The known population of Marble Daisy-bush appears to be recovering well from the 2003 fires. However, a further fire within a short period could adversely affect the species, especially if the soil seed store had not been adequately replenished. The relatively low fuels loads mean that an intense fire is unlikely to occur in the near future. Applied fire (ecological burning or fuel reduction burning) should not be considered prior to 2013, and after then only after careful risk assessment and tests of the soil seed store are implemented.

### Weeds

The relatively high pH and fertility of the limestone-derived soil provide great potential for environmental weed invasion, particularly if the soil is disturbed. Subsequent competition from environmental weeds could threaten the ecological viability and integrity of the Silurian Limestone *Pomaderris* Shrubland in which Marble Daisy-bush occurs, and therefore threaten the long-term survival of the species.

The most serious environmental weeds at Marble Gully that threaten the Silurian Limestone *Pomaderris* Shrubland are Blackberry (*Rubus fruiticosus* spp. agg.) and Horehound (*Marrubium vulgare*).

Horehound occurs mainly on the lower slopes of the north-western section of the Silurian Limestone *Pomaderris* Shrubland. Minor infestations have been recorded near rabbit warrens and on top of Hill 1, possibly transported by humans (Peel 1993, P. Kelly pers. comm.).

Horehound is an aggressive weed which chemically inhibits the growth of neighbouring plants. It is prevalent in disturbed areas and is thought to have been introduced to Marble Gully by rabbits, which were once abundant there. Horehound seeds are readily transported by livestock and other mammalian vectors in fur, and in human clothing. The impact of Horehound on Marble Daisy-bush conservation of is unknown. Although Horehound is perhaps unlikely to out-compete mature Marble Daisy-bush plants, it may inhibit recruitment.

A research program into the biological control of Horehound is in progress. Initial trials are being conducted by the Keith Turnbull Research Institute on affected pastures at Ensay, not far from Marble Gully. Initial tests of trial biological control agent's host-specificity found that Marble Daisy-bush is not at risk from the control agent (J. Weiss pers. comm.).

### **Browsing**

Browsing by rabbits may affect seedling success of Marble Daisy-bush.

### **Existing conservation measures**

### General

- The access track into Marble Gully was upgraded in 1991.
- The site is reserved as 'Marble Gully Nature Conservation Reserve' and management responsibility was transferred to Parks Victoria in 2005.

### **Marble Daisy-bush**

• Monitoring of Marble Daisy-bush commenced in September 1989 and has continued on an

- annual basis. This information is stored on the VROTPop monitoring database. Plant density, growth rate and population demographics were most recently assessed in 2006/07 (and compared with 2004 data).
- In 1988, cuttings of Marble Daisy-bush were collected for propagation at the Royal Botanic Gardens, Melbourne. Seed collected in April 1992 has been propagated by the Australian Daisy Study Group, which is affiliated with the Society for Growing Australian Plants (SGAP).
- A poster describing Marble Daisy-bush has been produced and displayed at DSE offices in Bairnsdale and Swifts Creek, and at the East Gippsland Shire's Omeo office.
- In June 1995, Marble Gully was added to the List of the Register of the National Estate for its very high botanical significance (AHC 1995).

- Weed management has continued annually, including spraying of Blackberry Horehound and thistles in Old Hut Creek gully and on lower slopes of Hill 1.
- Threats to population were assessed in 2004 2007.
- Fire response characteristics of the species have been investigated.
- DSE has investigated the details of intensity and behaviour of the January 2003 fire.
- Detailed monitoring was conducted in January-February 2004 and 2006 following the 2003 fire. Data was collected by DSE as part of the Fire Recovery Program.
- A post-fire recovery plan for the species has been developed.

### **Conservation objectives and actions**

### Long term objective

To ensure that the Marble Daisy-bush can survive, flourish and retain its potential for evolutionary development in the wild.

### **Intended management actions**

The intended management actions listed below are further elaborated in DSE's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities.

### Objective I To improve knowledge of biology, ecology and management requirements

Action	Targets	Responsibility
Conduct priority research projects.     Investigate pollination, seed set, soil seed store, seed longevity and germination requirements.	<ul> <li>Pollination mechanism identified.</li> <li>Soil seed store monitored.</li> <li>Seed longevity determined.</li> </ul>	DSE Biodiversity & Ecosystem Services, Royal Botanic Gardens Melbourne (RBG)
2. Undertake detailed population monitoring and collect demographic information. Implement post-fire monitoring program for Marble Daisybush at Marble Gully.	Post-fire monitoring program implemented.	DSE, Parks Victoria

### Objective II To improve the extent and/or condition of habitat

Action	Targets	Responsibility
3. Assess threat posed by rabbits, weeds, fuel loads and cattle in the vicinity of the populations and to the community in general.	• Threat assessment completed and management responses implemented as required.	DSE Gippsland

- 4. Control introduced animals to reduce grazing. Implement rabbit control if rabbit monitoring reveals significant threat to Marble Daisy-bush and the general community. Cattle grazing needs to be addressed through appropriate fencing and co-operation from adjacent landholder.
- Annual monitoring of cattle and rabbits Parks Victoria completed.
- Control measures implemented as required.
- 5. Manage environmental weeds. Spot-spray blackberry, thistle and horehound seedlings on slopes adjacent to populations and in the community in general.
- No increase in distribution, cover or Parks Victoria abundance of environmental weeds.
- 6. Protect habitat from fire. When fuel levels are high enough to carry fire, protect site from unplanned fire until Marble Daisy-bush and other seed regenerators have sufficient soil- or canopy-stored seed.
- Fire is excluded from Marble Gully until Parks Victoria at least 2013.

### Objective III To increase number of populations or individuals

Action	Targets	Responsibility
7. Collect reproductive material. Collect seed from representative sample of population for <i>ex situ</i> storage and reintroduction (part of Millennium Seed Bank project).	f I	RBG
8. Prepare a reintroduction plan. Prepare a plan identifying potential sites on Hill and determining numbers to be planted site preparation and site condition prerequisites.	 ,	DSE, Parks Victoria, RBG
9. Implement reintroduction plan. This is subject to meeting habitat preconditions Implement reintroduction plan including ongoing management and monitoring components.	• Reintroduced population established.	DSE Parks Victoria RBG

### Objective IV To increase community awareness and support

Action			T	argets	Responsibility	
10. Involve volunteer	community s in recovery ac	groups tivities.	and	•	Opportunities for involvement identified, promoted and supported.	DSE, Parks Victoria, RBG

## 2. Silurian Limestone *Pomaderris* Shrubland

### **Description**

Silurian Limestone *Pomaderris* Shrubland is a dense shrubland dominated by the rare shrub Limestone Pomaderris (*Pomaderris oraria* subsp. *calcicola*), with occasional emergent Drooping Sheoke (*Allocasuarina verticillata*) and Silver Bundy (*Eucalyptus nortonii*) (Lander and Walsh 1989). Peel (1993) recorded considerable structural variation in Limestone *Pomaderris* Shrubland communities, ranging from grassland to shrubland and woodland forms. The community is characterised by a unique assemblage of plant taxa, including rare or threatened and disjunct plant species (Peel 1993). Table 1 summarises the current status of significant species recorded at Marble Gully.

Table 1. Significant taxa recorded at Marble Gully in Silurian Limestone *Pomaderris* Shrubland vegetation.

Taxon	Common Name	DSE Advisory List status (DSE 2005)
Arthropodium sp. 1 (robust glaucous)	Tall Vanilla-lily	Rare
Asplenium trichomanes subsp. quadrivalens	Common Spleenwort	Rare
Austostipa scabra subsp. falcata	Rough Spear-grass	None - disjunct occurrence
Desmodium varians	Slender Tick-trefoil	Poorly known
Irenepharsus magicus	Elusive Cress	Rare
Isoetopsis graminifolia	Grass Cushion	None - disjunct occurrence
Olearia astroloba	Marble Daisy-bush	Vulnerable
Ozothamnus adnatus	Winged Everlasting	Vulnerable
Pimelea flava subsp. dichotoma	Diosma Rice-flower	Rare
Pimelea pauciflora	Poison Rice-flower	Rare
Pomaderris oraria subsp. calcicola	Limestone Pomaderris	Rare
Ptilotus spathulatus	Pussy Tails	None - disjunct occurrence
Pultenaea densifolia	Dense Bush-pea	Rare
Senna aciphylla	Sprawling Cassia	Rare
Vittadinia tenuissima	Delicate New Holland Daisy	Rare

### **Distribution**

The only known occurrence of Silurian Limestone *Pomaderris* Shrubland is at Marble Gully Nature Conservation Reserve, near Bindi in the Tambo River valley north-east of Swifts Creek, East Gippsland.

### **Extent and condition**

The Silurian Limestone *Pomaderris* Shrubland community extends over about 40 ha in a single patch. Although there is some weed invasion at the margins, the vegetation is generally in very good condition.

### **Important occurrences**

The occurrence of Silurian Limestone *Pomaderris* Shrubland at Marble Gully is critical to the survival of this community, as it is not known in any other location.

### **Habitat**

Silurian Limestone *Pomaderris* Shrubland occurs on steep, rocky slopes, usually at inclines of greater than 30° with a northerly aspect. The skeletal terra rossa soils are derived from marble, with low to medium organic content (Peel 1993). The site is approximately 600 m above sea level and is very open and exposed. The area receives a well-distributed mean annual rainfall of 646 mm, with mild summers and cold winters (LCC 1982).

### Life history and ecology

Coates *et al.* (2004) assessed the recovery of Silurian Limestone *Pomaderris* Shrubland following the 2003 fire. The fire burnt 40 ha at high intensity and covered almost all of the community. Generally, the community is recovering well with extensive re-sprouting and seedling regeneration. Structurally important species such as Marble Daisy-bush, Drooping Sheoke and Silver Bundy are re-sprouting and regenerating from seed. In contrast, very few seedling or resprouting Silver Banksia (*Banksia marginata*) were recorded post-fire. At the time of post-fire monitoring (in 2004 and 2006), approximately 80 native species present before the fire were not re-recorded, while some native species were recorded for the first time at the site.

### **Conservation status**

### **National conservation status**

Silurian Limestone *Pomaderris* Shrubland is listed as <u>endangered</u> under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999.

### **Victorian conservation status**

Silurian Limestone *Pomaderris* Shrubland is listed as <u>threatened</u> under the Victorian *Flora and Fauna Guarantee Act* 1988.

### **Decline and threats**

### Inappropriate fire regimes

Following the absence of fire for more than 100 years (Coates *et. al.* 2004), there is a risk that if further fire affected Silurian Limestone *Pomaderris* Shrubland within a brief period (e.g. 10 years), it would cause a decline in some characteristic species that depend on seed germination for persistence.

### Weeds

The most serious environmental weeds that occur at Marble Gully and threaten the Silurian Limestone *Pomaderris* Shrubland are Blackberry (*Rubus fruiticosus* spp. agg.) and Horehound (*Marrubium vulgare*).

Horehound occurs mainly on the lower slopes of the north-western section of the Silurian Limestone *Pomaderris* Shrubland. Minor infestations have been recorded near rabbit warrens and on top of Hill 1, possibly transported by humans (Peel 1993, P. Kelly pers. comm.).

Blackberry infestations are largely restricted to the gully line of Old Hut Creek, though some plants occur within the Silurian Limestone *Pomaderris* Shrubland.

Other environmental weeds at Marble Gully that may impact on Silurian Limestone *Pomaderris* Shrubland include Sweet Briar (*Rosa rubiginosa*), Pimpernel (*Anagallis arvensis*) and a range of introduced grasses and herbs (Peel 1993).

### **Grazing/Browsing**

Although Peel (1993) recorded that domestic stock and rabbits graze the margins of the community, he described their impact as minimal. Numbers of cattle in the vicinity of Marble Gully appeared to increase following the 2003 fire, but their impact has been largely confined to the banks and lower slopes around Old Hut Creek.

### **Existing conservation measures**

### General

- Spraying has been undertaken annually from 1993-1997 along Old Hut Creek to prevent the spread of blackberries into Silurian Limestone *Pomaderris* Shrubland. Horehound occurrence at the base of Hill 1 was sprayed in 1996. Aerial 1080 baiting of rabbits was carried out by the adjacent landholder in about 1995, but was not specifically targeted at public land (T. Fitzpatrick pers. comm., J. Armit pers. comm.).
- The access track into Marble Gully was upgraded in 1991.
- The site is reserved as 'Marble Gully Nature Conservation Reserve' and management responsibility was transferred to Parks Victoria in 2005.

### Limestone Pomaderris Shrubland Community

- Peel (1993) undertook a survey of the *Pomaderris* shrublands growing on limestone geologies of East Gippsland. Four distinct floristic communities of Limestone *Pomaderris* Shrubland were identified as a result of this work. The vegetation occurring at Marble Gully has been identified as Silurian Limestone *Pomaderris* Shrubland.
- An unsuccessful attempt was made to protect site from fire in January 2003. Fire suppression activities did not impact on the community.
- Threats were assessed during the post-fire recovery program and site visits by DSE and Parks Victoria staff 2004 2007. The main threats are weeds: Horehound, thistles and Blackberry. Cattle pose a significant threat due to lack of fencing.
- Environmental weed management has been conducted.
- Fire recovery plots were established in February 2004 to monitor the response of the community to fire.

### **Conservation objectives and actions**

### Long term objective

To ensure that there is a net gain in the extent and condition of Silurian Limestone *Pomaderris* Shrubland.

### **Intended management actions**

Objective I To improve knowledge of community ecology and management requirements

Ac	tion	Targets	Responsibility
1.	Monitor transects annually in November - December. Establish two additional permanent transect lines on Hill 3 using the same methodology described in Coates <i>et al.</i> (2004).	<ul><li>Annual monitoring completed.</li><li>New transects established.</li></ul>	DSE Gippsland
2.	Conduct additional surveys to establish the location of rare or threatened plant populations. Individuals should be permanently marked and assessed regularly.	<ul> <li>Surveys completed.</li> <li>Populations mapped and recorded on relevant databases.</li> </ul>	DSE, Parks Victoria, Royal Botanic Gardens Melbourne (RBG)
3.	Conduct additional surveys to locate species previously recorded and compile fire responses.	<ul><li>Additional surveys completed.</li><li>Fire response information collated.</li></ul>	DSE, Parks Victoria, RBG
4.	Assess the ongoing condition of the community.	<ul> <li>Community condition and threats assessed annually.</li> </ul>	DSE Gippsland, Parks Victoria, RBG

### Objective II To improve the extent and/or condition of the community

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Ac	tion	Targets	Responsibility		
5.	Prepare a fire management plan for Silurian Limestone Pomaderris Shrubland.	• Fire Management Plan prepared.	Parks Victoria		
6.	Ensure permanent exclusion of cattle from Silurian Limestone Pomaderris Shrubland.	<ul><li>Fences and gates erected/maintained.</li><li>Cattle excluded from reserve.</li></ul>	Parks Victoria		
7.	Assess threats posed by domestic stock, rabbits, weeds and fuel loads.	<ul><li>Threat assessment completed.</li><li>Management responses implemented as required.</li></ul>	DSE Gippsland		
8.	Manage environmental weeds. Control Horehound and Blackberry, particularly along Old Hut Creek Track and the lower slopes of Hills 1 and 2.	• No increase in distribution, cover or abundance of environmental weeds.	DSE Gippsland		
9.	Control rabbits if they start to affect species recovery or spread weed species.	<ul><li>Rabbit browsing monitored.</li><li>Management action implemented as required.</li></ul>	Parks Victoria		
10.	Protect habitat from fire. When fuel levels are high enough to carry fire, attempt to protect site from unplanned fire until soil- and canopy-seed stores recover.	• Fire excluded from Marble Gully until at least 2013.	DSE Gippsland		

### Objective III To increase community awareness and support

Action			Targets		Responsibility	
11. Involve volunteer	community s in recovery ac	groups tivities.	and	•	Opportunities for involvement identified, promoted and supported.	DSE, Parks Victoria, RBG

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