

Image by Mark Wapstra

| Scientific name: | <i>Eryngium ovinum</i> A.Cunn., <i>Geogr. Mem. New South Wales</i> [Field]: 358 (1825)  |  |  |  |  |
|------------------|---|--|--|--|--|
| Common Name:     | blue devil (Wapstra et al. 2005)  |  |  |  |  |
| Group:           | vascular plant, dicotyledon, family Apiaceae  |  |  |  |  |
| Status:          | Threatened Species Protection Act 1995: vulnerable<br>Environment Protection and Biodiversity Conservation Act 1999: Not listed |  |  |  |  |
| Distribution:    | Endemic status: <b>not endemic to Tasmania</b><br>Tasmanian NRM Region: <b>South</b>  |  |  |  |  |







Plate 1. Eryngium ovinum: habit and flowers (image by Mark Wapstra)



SUMMARY: Eryngium ovinum (blue devil) is a perennial herb in the Apiaceae (carrot) family with distinctive spiny foliage and metallic-blue flower-heads. It is known in Tasmania from about 24 sites in the State's southeast and east, usually growing in fertile heavy soils in grasslands and grassy woodlands below about 350 m elevation. The species is poorly reserved, with the majority of sites on unsecured private land and most subpopulations are thought to be small, making them subject to inadvertent or chance events. The risk is exacerbated as the species may become confined to rootstock or the soil seed store during unfavourable periods. Eryngium ovinum is subject to a range of threatening processes, including historical and contemporary depletion and modification of habitat, competition by weeds, and inappropriate disturbance regimes (e.g. grazing, fire and mechanical disturbance).

## IDENTIFICATION AND ECOLOGY

*Eryngium ovinum* is a perennial species, dying down during autumn, emerging in late winter, and flowering in summer. In late winter the plant develops a rosette of narrow, spiny, divided leaves with the flowering stems extending and producing a mass of crowded bright blue thistle-like flower heads on rigid branched stems by mid summer. The terminal flowerheads open first, followed by those on the side branches below, with each flower lasting several weeks (Ollerenshaw 1981). The species is likely to be pollinated by a wide range of flies, mosquitoes, gnats and bees.

*Eryngium ovinum* recruits from seed, with germination substantially inhibited by darkness (Morgan 1998), a trait conducive to the formation of a persistent seed bank with recruitment reliant on the formation of gaps, most likely through factors such as periodic drought or disturbance. This is supported by evidence of the proliferation of the species following disturbance at some sites. *Eryngium ovinum* is relatively long-lived, with some plants thriving at the Australian National Botanic Gardens for ten years or more (Ollerenshaw 1981). It is likely that the species can survive long periods of drought, regenerating from rootstock after the breaking of drought and

disturbance such as flood, wildfire and heavy grazing.

## Survey techniques

Surveys for *Eryngium ovinum* are best undertaken in November to January when the plants have reached their full stature and the distinctive metallic-blue flower-heads are obvious.

# Description

Eryngium ovinum is an erect glabrous perennial herb to about 60 cm tall, with a short rootstock and clusters of blackish tubers. The basal leaves are up to 45 cm long and divided into segments which are linear and spine-tipped. The main flowering stem arises from the base of the plant and is one to three times branched from a pair of opposite spiny bracts about 7 to 35 cm above ground level, and then dichotomously or ternately branched from succeeding pairs of bracts, producing a rather rigid dichasial inflorescence. The strongly ribbed flowering stems and flowering heads are usually metallic blue. The globular, thistle-like flowering heads are mostly 10 (to 15) mm long and 10 mm wide. The bracteoles of the involucre and apex are 15 to 20 mm long with those subtending the flowers conspicuous and exceeding the flowers by 8 to 15 mm. The petals are bluishpurple with a fringed apex. The fruit is 4 to 5 mm long, with acute bladdery scales, and is crowned by the persistent sepals.

[description based on Curtis 1963, Harden 1992, Walsh & Entwisle 1999]

# Confusing species

*Eryngium ovinum* is a highly distinctive species due to its growth habit, spiky leaf morphology and flower colour. The only potentially confusing species in Tasmania is *Eryngium vesiculosum* (prickfoot), a widespread and common species, which is believed to co-occur with *Eryngium ovinum* at one site. *Eryngium vesiculosum* has leafy stems that are prostrate rather than erect, and also has much smaller flower-heads that are greyish-blue, whereas those of *Eryngium ovinum* are greenish at first but finish a deep metallic-blue.



### DISTRIBUTION AND HABITAT

*Eryngium ovinum* occurs in New Zealand, and in South Australia, Victoria, the Australian Capital Territory, New South Wales, Queensland and Tasmania. Within Tasmania the species occurs mostly in the far southeast, with outlying occurrences on the central east coast near Little Swanport (Figure 1).

In Tasmania Eryngium ovinum occurs in eucalypt woodland/forest with a grassy or lightly shrubby understorey (Plate 2). The dominant eucalypt is usually *Eucalyptus ovata* (black gum) or Eucalyptus globulus (blue gum), but may also include Eucalyptus tenuiramis and Eucalyptus amygdalina. Eryngium ovinum may also occur in grassland, with Themeda triandra native (kangaroo grass) and Poa species prominent. Soils are relatively deep and fertile, usually derived from Tertiary basalt or Jurassic dolerite, while landform ranges from broad flats, toe slopes, gentle saddles, broad ridges and moist upper slopes. The elevation of known sites ranges from close to sea level to about 350 m, with most sites below about 150 m.



**Plate 2.** *Eucalyptus ovata* grassy woodland habitat of *Eryngium ovinum* (image by Mark Wapstra)

#### **POPULATION PARAMETERS**

*Eryngium ovinum* is known in Tasmania from about 24 subpopulations (Table 1). Many sites do not have estimates of either plant numbers or the area occupied, making estimates of the total population problematic. In Tasmania the species has a linear range of 83 km and extent of occurrence of 2,600 km<sup>2</sup>. Reliable estimates for the total area of occupancy are not available.

The largest known subpopulation, at the Pontville Smalls Arms Range Complex and private land to its south, consists of more than 100,000 plants over several hectares of native grassland, while several subpopulations number in the 1000s. Most of the other subpopulations are represented by apparently low numbers (10 to 50 plants) and small areas of occupancy.

Curtis (1963) described the distribution of Eryngium ovinum in Tasmania as 'local, recorded from one locality near Bellerive in southern Tasmania'. Despite the distinctiveness of the species and its apparent predilection for the fringes of the Greater Hobart area in easily accessible habitat, the species went unrecorded again until 1980 when it was discovered at Flagstaff Gully a few kilometres north of Bellerive, with additional sites recorded since. This suggests that the likelihood of new subpopulations being detected is high, particularly as large areas of mainly private land within the current extent of occurrence have only been subject to cursory botanical surveys. Range infillings and minor range extensions are considered a high probability.

#### **RESERVATION STATUS**

Three subpopulations of *Eryngium ovinum* are contained wholly, or in part, on private property subject to conservation covenants established under the Tasmanian *Nature Conservation Act 2002* (Table 1).

#### CONSERVATION ASSESSMENT

*Eryngium ovinum* was listed as endangered on the original schedules of the Tasmanian *Threatened Species Protection Act 1995* and downlisted to vulnerable in 2001 following the discovery of five new subpopulations. While the number of subpopulations have doubled since, the status of the species in the disjunct East Coast location and other recorded sites that have not been seen in the past decade need to be assessed before considering a further change in the conservation status of the species.



|     | Subpopulation  | Tenure                                     | NRM<br>Region | 1:25000<br>Mapsheet | Year last<br>(first) seen | Area<br>occupied<br>(ha) | Number of individuals                  |
|-----|--|--|---------------|---------------------|---------------------------|--------------------------|--|
| 1   | Boomer Creek,<br>Little Swanport                                 | private property & road reserve            | South         | Royalty             | 1996<br>(1989)            | 0.35                     | 1900                                   |
| 2   | Tasman Highway,<br>Pontypool                                     | private property                           | South         | Royalty             | 2002<br>(1993)            | < 0.001                  | unknown                                |
| 3   | Fulham Road<br>(near Camden Brook)                               | private property                           | South         | Dunalley            | 2000                      | unknown                  | <b>c.</b> 50                           |
| 4   | Fulham Road<br>(near Fulham Point)                               | private property                           | South         | Dunalley            | 2000                      | unknown                  | numerous on<br>road shoulder           |
| 5   | Flaggy Creek   | private property                           | South         | Carlton             | 2011                      | 0.15                     | <b>c.</b> 30                           |
| 6   | Nelsons Tier Road  | private property                           | South         | Sorell              | 2010<br>(2001)            | 5.2                      | 10s to 100s in<br>each of 8<br>patches |
| 7   | Pawleena Reservoir   | private property                           | South         | Runnymede           | 1993<br>(1992)            | 0.3                      | restricted, but<br>plentiful           |
| 8   | Sorell Rivulet   | private property                           | South         | Runnymede           | 2001<br>(1993)            | 1–5                      | 1000s                                  |
| 9   | Black Charlies Opening   | private property & public reserve          | South         | Runnymede           | 2008<br>(1992)            | 0.3+                     | 1000s                                  |
| 10  | Fingerpost Road  | private property                           | South         | Runnymede           | 2011<br>(early 1990s)     | 0.0001                   | 4                                      |
| 11  | Colebrook Road   | private property                           | South         | Runnymede           | early 1990s               | unknown                  | unknown                                |
| 12a | Pontville Small Arms<br>Range Complex                            | Commonwealth<br>(Department of<br>Defence) | South         | Tea Tree            | 2012<br>(1996)            | 5.2                      | 122,000<br>±16,600                     |
| 12b | Pontville (south of & contiguous with 12a)                       | private property                           | South         | Tea Tree            | 2012<br>(1996)            | c. 2                     | 1000s                                  |
| 13  | Tea Tree Road  | private property)                          | South         | Tea Tree            | 2007                      | 0.002                    | 34                                     |
| 14  | E side of Jordan River,<br>opposite Woodrieve                    | private property                           | South         | Tea Tree            | 2004                      | 0.001                    | 6                                      |
| 15  | Summerfield Hill   | private property *                         | South         | Broadmarsh          | 2006                      | unknown                  | unknown                                |
| 16  | Grahams Creek Road   | private property *                         | South         | Broadmarsh          | 2006                      | 0.02                     | 20                                     |
| 17  | Strathelie, Broadmarsh   | private property                           | South         | Broadmarsh          | 1996<br>(1988)            | unknown                  | 254                                    |
| 18  | Cross Rivulet  | private property *                         | South         | Hobart              | 2006                      | unknown                  | unknown                                |
| 19  | Canopus Road,<br>Cambridge                                       | private property                           | South         | Hobart              | 2010                      | 0.0001                   | 12                                     |
| 20  | valley outside Bellerive,<br>near the old Sorell<br>railway line | unknown                                    | South         | Hobart              | 1920s?                    | unknown                  | unknown                                |
| 21  | Bellerive  | unknown                                    | South         | Hobart              | 1929                      | unknown                  | unknown                                |
| 22a | Flagstaff Gully  | private property                           | South         | Hobart              | 1996<br>(1980)            | 0.005                    | <b>c.</b> 30                           |
| 22b | Flagstaff Gully reservoir  | Southern Water                             | South         | Hobart              | 2005<br>(2000)            | 0.002                    | 36                                     |
| 23a | Jim Bacon Memorial<br>Reserve, Springfield,<br>Moonah            | Glenorchy City<br>Council reserve          | South         | Hobart              | 2013<br>(1999)            | 2.7                      | 1000s                                  |
| 23b | Mayhill Court, West<br>Moonah                                    | private property                           | South         | Hobart              | 2004                      | 0.0001                   | 1 (not seen in recent years)           |

Table 1. Population summary for Eryngium ovinum in Tasmania

.....



|    | Subpopulation                           | Tenure                         | NRM<br>Region | 1:25000<br>Mapsheet | Year last<br>(first) seen | Area<br>occupied<br>(ha)   | Number of individuals |
|----|---|--------------------------------|---------------|---------------------|---------------------------|--|-----------------------|
| 24 | Queens Domain on<br>disused sports oval | Hobart City<br>Council reserve | South         | Hobart              | early 1900s               | anecdotal report of a single<br>plant not seen since (AVK<br>Environmental<br>Management 2008) |                       |
|    |   |                                |               |                     |                           |  |                       |

NRM = Natural Resource Management region

\* covered wholly or partly by a conservation covenant under the Tasmanian Nature Conservation Act 2002

#### THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

Most subpopulations of Eryngium ovinum in Tasmania are subject to a wide range of threatening processes, including historical and contemporary depletion and modification of habitat (through urban and industrial sprawl agricultural expansion), inappropriate and disturbance regimes (e.g. stock grazing, fire intensity), mechanical frequency and disturbance (e.g. from farm machinery, roadside maintenance, stock trampling, quarrying, timber harvesting), construction road and maintenance, competition with weeds, and stochastic events.

Land clearing and/or habitat modification: Native vegetation has been extensively cleared and/or modified over much of the southern Midlands and fertile hinterlands of the east and southeast coast of Tasmania, where Eryngium ovinum appears to be restricted. While the species may have a naturally scattered distribution, the contemporary occurrences in southeast Tasmania appear to be, at least partially, the result of land clearing (e.g. through urban and industrial sprawl in the greater Hobart to Brighton area) and vegetation modification practices. At least two subpopulations occur on land that has been subdivided since their discovery. The single individual could not be re-located at the Mayhill Court site in West Moonah in recent years and the status of the Canopus Road subpopulation is not known. Some sites are free from the anthropogenic threat of land clearing and habitat modification, such as those on land with conservation covenants, the subpopulation at Pontville on land owned and managed by the Commonwealth Department of Defence which places certain legislative obligations on the site's management (North Barker Ecosystem Services 2012) and the subpopulation in the Jim Bacon Memorial Reserve which is managed by Glenorchy City Council as a bushland reserve.

Inappropriate fire regimes: The grassland and grassy woodland habitat of *Eryngium ovinum* is highly adapted to fire, and the species itself is known to regenerate from rootstock after medium intensity fire (AVK Environmental Management 2008). However, the species may be impacted deleteriously if the fire frequency and/or intensity increases or is followed by more intensive grazing or proliferation of competitive weeds.

Weeds: Several subpopulations occur in sites severely infested with woody weeds (e.g. gorse, *Ulex europaeus*), and more ubiquitous herbs and exotic grasses. *Eryngium ovinum* is likely to be poorly competitive with dense woody weeds, although it appears to persist at sites with a lower density of weeds (e.g. in the Jim Bacon Memorial Reserve where the species is thriving).

Inappropriate grazing and disturbance regime: Parts of some subpopulations are subject to stock grazing and stock trampling, which could lead to changes in population structure. Anecdotal reports suggest that heavy grazing may be to the detriment of the species, though light to moderate grazing may be beneficial by reducing surrounding competitive vegetation. More intensive primary production (e.g. ploughing, enrichment, sowing, etc.) may lead to local extinctions.

**Quarrying:** At least two subpopulations occur at sites where rock and gravel material has been extracted (Black Charlies Opening and Flagstaff Gully). The degree to which these activities have affected the species has not been evaluated.



**Timber harvesting:** At least two subpopulations occur at sites subject to native forest silviculture (Sorell Rivulet and Nelsons Tier Road). While known patches of one subpopulation were excluded from harvesting, the species proliferated on landings, snig tracks and amongst selectively harvested grassy forest, presumably recruiting from soil stored seed. Selective harvesting was permitted over the part of the other subpopulation though the impact of this activity has not been assessed.

Road construction and roadside maintenance: Some subpopulations occur on the verge of public roads or property access which are subject tracks. to periodic maintenance such as scraping and slashing. The construction of the roads is likely to have resulted in the loss of part of the subpopulations, and continued maintenance may, if not undertake carefully, further degrade the supporting habitat. Several plants are known to have been destroyed during the construction of the Brighton Bypass.

Linear infrastructure: The species likely to have been locally and temporarily affected by the installation of linear infrastructure such as telecommunications cables but subpopulations may benefit from the disturbance in the longer term. For example, the species has apparently proliferated along the once-cleared Telstra line near Sorell Rivulet.

**Stochastic risk:** The apparently low numbers of individuals in several highly localised subpopulations exposes them to the risk of local extinctions due to unforeseen human activities or stochastic events. The risk is exacerbated as subpopulations may become restricted to rootstock or the soil seed store in unfavourable times.

## MANAGEMENT STRATEGY

## Management objectives

The main objectives for the recovery of *Eryngium ovinum* are to prevent the inadvertent destruction of subpopulations, maintain the viability of existing subpopulations, and promote recruitment.

## What has been done?

**Survey and monitoring:** The subpopulation at the Pontville Small Arms Range Complex was subjected to a detailed survey and a monitoring plan was prepared in 2012 (North Barker Ecosystem Services 2012).

**Roadside management**: In September 1992 a number of plants that were to be impacted by road-works at Black Charlies Opening were removed to the Royal Tasmanian Botanical Gardens with 90 plants grown on and planted close to the original site within a road reserve in May 1993.

**Management planning:** An environmental management plan has been prepared for the Jim Bacon Memorial Reserve (ECO*tas* 2011). The plan is being implemented, with significant progress in improving the condition of the species' grassy woodland habitat.

*Ex situ* conservation: Seed was collected from the Black Charlies Opening subpopulation in 2008 for long-term conservation storage at the Tasmanian Seed Conservation Centre based at the Royal Tasmanian Botanical Gardens in Hobart.

## What is needed?

Agencies, groups or individuals may assist with some or all of the following recovery actions. Coordinated efforts may achieve the best and most efficient results.

- provide information and extension support to relevant Natural Resource Management committees, local councils, government agencies, the local community and development proponents on the locality, significance and management of known subpopulations and potential habitat;
- surveys sites that have not been visited in the past decade to determine their status, condition of habitat and threats;
- undertake extension surveys radiating out from the known sites into areas of potential habitat;
- closely monitor a subset of subpopulations to better understand the response of the species to management actions and disturbance such as roadside maintenance



activities, fire, grazing, slashing, weed removal and native forest silviculture;

- monitor compliance with existing covenants and revise management prescriptions where appropriate;
- ensure that existing and proposed activities do not impact significantly on the species, taking cumulative and indirect impacts, as well as the potential impacts of fragmentation into consideration;
- develop management agreements with private landowners and public land managers, and ensure that current priorities for the species are incorporated into the Private Land Conservation Program's (DPIPWE) reservation strategies.

## BIBLIOGRAPHY

- AVK Environmental Management (2008). Queens Domain Fire Management Plan. Report prepared by AVK Environmental Management (Sandford) for Hobart City Council.
- Curtis, W.M. (1963) The Student's Flora of Tasmania Part 2. Government Printer, Hobart.
- ECOtas (2011). Ecological Reserve Management Plan for the Jim Bacon Memorial Reserve, West Moonah, Tasmania. Report by Environmental Consulting Options Tasmania (ECOtas) for Glenorchy City Council.
- Harden, G.J. 91992). Flora of New South Wales: Volume 3. New South Wales University Press, Kensington.
- Morgan, J.W. (1998). Comparative germination responses of 28 temperate grassland species. *Australian Journal of Botany* 46(2): 209–219.
- North Barker Ecosystem Services (2012). Pontville Small Arms Range Complex: Terrestrial Biodiversity Monitoring Plan. Report for Department of Defence.
- Ollerenshaw, N. (1981). *Eryngium ovinum*. Posted at http://www.anbg.gov.au/gnp/ gnp11/eryngium-ovinum.html. [accessed 17.01.2013]
- Walsh, N.G. & Entwisle, T.J. (1999). Flora of Victoria Volume 4 Dicotyledons Cornaceae to Asteraceae. Inkata Press, Carlton.

Wapstra, H., Wapstra, A., Wapstra, M. & Gilfedder, L. (2005, updated online annually). *The Little Book of Common Names for Tasmanian Plants*. Department of Primary Industries, Water & Environment, Hobart.

**Prepared** in January 2013 under the provisions of the Tasmanian *Threatened Species Protection Act 1995*. Approved by the Secretary and published in April 2014.

**Cite as:** Threatened Species and Marine Section (2014). *Listing Statement for* Eryngium ovinum *(blue devil)*. Department of Primary Industries, Parks, Water and Environment, Tasmania.

## View:

www.dpipwe.tas.gov.au/threatenedspecieslists

**Contact details:** Threatened Species and Marine Section, Department of Primary Industries, Parks, Water and Environment, GPO Box 44 Hobart Tasmania Australia 7001. Ph. (03) 61654340; fax (03) 62333477; threatenedspecies.enquiries@dpipwe.tas.gov.au

**Permit:** It is an offence to collect, disturb, damage or destroy this species unless under permit.

