

TASMANIAN MUSEUM AND ART GALLERY'S EXPEDITION OF DISCOVERY II – THE FLORA AND FAUNA OF MUSSELROE WIND FARM, CAPE PORTLAND, NORTHEAST TASMANIA

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(with one text-figure, nine plates, two tables and one appendix)

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Flora and fauna surveys were conducted at the Musselroe Wind Farm property in 2018 and 2019 as part of the Tasmanian Museum and Art Gallery's ongoing research, collection-building and nature-discovery program. The property was found to have significant ecological and nature conservation values and this survey program increases the number of vouchered taxa known for the area to 1336 primarily from the targeted groups of vascular plants, bryophytes, lichens, butterflies, moths, beetles, freshwater invertebrates, snails and slugs. Many threatened taxa were recorded and several of the taxa, chiefly lichens and invertebrates, are new to science or new records for Tasmania. This survey significantly expands our knowledge of the flora and fauna of the Cape Portland area and serves as a baseline for a property with a mix of farming and environmental conservation management.

Key Words: Species discovery, biodiversity, multidisciplinary survey, Cape Portland, wind farm, threatened species.

INTRODUCTION

The Tasmanian Museum and Art Gallery's (TMAG) expedition to the Musselroe Wind Farm was the second in a series of multidisciplinary biological surveys conducted by the museum under the banner of its Expeditions of Discovery. The aims and rationale for the surveys, as discussed by Baker *et al.* (2019), are to: build TMAG's collections of flora and fauna from under- and poorly sampled parts of Tasmania; document the species of plants and animals present; discover new or hitherto overlooked species; and highlight the role that baseline species-discovery research plays in understanding and managing Tasmania's biota. The first expedition, conducted at the *Wind Song* property at Little Swanport in 2017, recorded 885 taxa, including several new to science or new records for Tasmania (McCarthy & Kantvilas 2018, Baker *et al.* 2019, Elix *et al.* 2019, Elix & Kantvilas 2020).

The Musselroe Wind Farm was chosen as it contains a diverse range of habitats, it has a limited number of vouchered collections held in museums and herbaria, and the project had the enthusiastic support of the land managers, Woolnorth Wind Farm Holding Pty Ltd. The survey focused on vascular plants, bryophytes, lichens, butterflies, moths, beetles, freshwater invertebrates, snails and slugs, with other taxonomic groups recorded opportunistically. Here we present an inventory and discussion of the plants, lichens and animals identified and offer an insight into a biodiverse corner of Tasmania. These results serve as a benchmark for future studies in

other parts of Tasmania and to guide natural resource management on the property.

MATERIALS AND METHODS

The property

The Musselroe Wind Farm is situated in Tasmania's far northeast (fig. 1), approximately 20 km north of Gladstone. It is a mixed-use enterprise, managed primarily to produce renewable energy via 56 wind turbines, and with a secondary use of cattle grazing. The property covers about 5500 ha and is bordered by approximately 30 km of reserved coastline. A large proportion has been cleared for grazing and converted into improved pasture, and this area is also the footprint for most of the wind farm. The Cape Portland Wildlife Sanctuary (CPWS) (844 ha), a private reserve managed by the Musselroe Wind Farm, is located on the western side of the property. The location of the property relative to adjacent reserved areas is shown in figure 1.

The property has a diverse range of natural wetlands, six of which are listed in the Directory of Important Wetlands for supporting native plant or animal taxa or communities considered threatened at the national level (Environment Australia 2001). The survey area is dominated by low rounded hills formed from Jurassic dolerite interspersed with poorly drained flats of Quaternary sands of aeolian, marine and lacustrine origin (Jennings & Sutherland 1969). There are scattered Cenozoic basalt flows in the

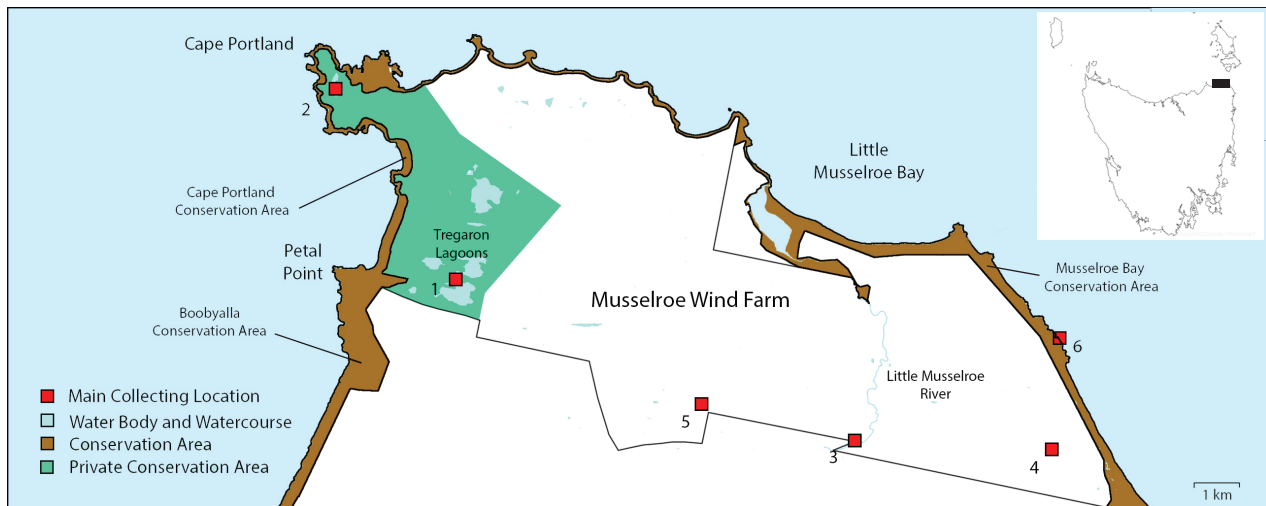


FIGURE 1 – Location of Musselroe Wind Farm: showing main collecting locations and reserve boundaries. 1: Tregaron Lagoons; 2: The Salties; 3: The Bullseye; 4: The Prairie; 5: Xanthorrhoea Ridge; 6: Abalone Rocks.

western half, as well as small exposures of the Cape Portland Complex, a Cretaceous intrusive porphyry, mostly west of Cape Portland Road. A small outcrop of Triassic sandstone is exposed just west of the original homestead. The easternmost extremity of the property is underlain by Devonian granite (McClenaghan 2005), which is exposed at the coast.

The climate of northeastern Tasmania corresponds to the Köppen classification of Cfb (temperate, warm summer, without dry season (Peel *et al.* 2007)). The nearest Tasmanian mainland weather station to Cape Portland is at Irapuna/Eddystone Point, where average temperatures fluctuate from 6.9–13°C in winter to 13.9–21.1°C in summer. Modelling by LandTasmania, following methods prescribed in Webb *et al.* (2015), suggests average minimum temperatures of 4.5–6.5°C for July and 12.1–12.9°C for January, with average maximum temperatures of 13.1–13.5°C in July and 21.5–22.5°C in January (LIST 2020). Rainfall has a distinct peak during the winter months and is lowest during January and February, with an annual average of 754 mm (BOM 2020). Although there is a closer weather station at nearby Swan Island, its temperatures are strongly influenced by its small island location, and less likely to accurately reflect those at the study site.

Most of the Cape Portland property is farmland or land previously cleared for agriculture and now managed for conservation. The western two-thirds of the property (west of the Little Musselroe River) is improved pasture actively managed for cattle grazing. In comparison, the eastern third of the property consists of a mosaic of unimproved pasture, formerly managed for grazing but now managed for conservation as it supports areas of native vegetation. Significant areas of native *Poa* grassland occur in the area north of Tregaron Lagoons, between Charmouth Hill and Cape Portland. Native saline-tolerant vegetation is widespread in the Tregaron Lagoons area, along the northern coastal fringe south of Lanoma Point and along the shores of the Little Musselroe estuary.

A large area of coastal heathland containing a significant proportion of shrub and scrubland with a closed canopy occupies the eastern third of the property, in a triangle bounded approximately by the coast to the northeast, the Little Musselroe River and estuary to the west, and the southern boundary. Small but significant areas of *Melaleuca ericifolia* swamp forest occur along the course of the Little Musselroe River and at Tregaron Lagoons, while patches of *Allocasuarina verticillata* forest occupy higher well-drained ground along dune tops and ridges.

Over a period of about five years to 2018, substantial infestations of the declared weed species Gorse *Ulex europaeus* and African Boxthorn *Lycium ferocissimum* were controlled using Australian Government funding through NRM North. The works were undertaken in areas of high-priority native vegetation where livestock have been excluded. These sites continue to be managed for conservation. The farmland areas are maintained according to a weed management plan with weed infestations of Gorse, Horehound *Marrubium vulgare* and various species of thistle managed to minimise their spread into high conservation areas.

The area has been visited by biologists numerous times, particularly to undertake surveys prior to the establishment of the wind farm. Whilst extensive in their coverage, the results of those studies are not publicly available and have generated relatively few herbarium/museum voucher specimens which add value to data included in platforms such as the *Australasian Virtual Herbarium* AVH or *Atlas of Living Australia* ALA. Prior to this survey only 220 vascular plant taxa and about 165 animal taxa were formally listed for the area (ALA 2020, AVH 2020).

Expertise and timing

The survey involved four botanists and four zoologists from TMAG staff, as well as two honorary zoologist researchers. The property was surveyed during 5–9 November 2018, with follow-up invertebrate sampling and trap-sample

collection on 16 December 2018 and 16 January 2019, and additional flora, lichen and invertebrate sampling from 9–11 September 2019.

Sampling methods

Sampling was based on a strategic selection of survey sites that represented the major vegetation types and was confined mostly to de-stocked and regenerating areas (fig. 1). The major survey sites were allocated a local name for ease of identification (table 1) and each site was surveyed in detail to cover relevant habitats for target taxa.

Specimens of vascular plants, bryophytes and lichens were collected and lodged in the Tasmanian Herbarium, with limited duplicates distributed to other herbaria nationally and internationally under TMAG's formal specimen exchange program. Several vascular plant taxa were recorded only by observation due to sampling difficulties (e.g., tall eucalypt trees) or lack of fertile material. All possible substrata for lichen and bryophytes, including rocks, soil, bark, wood and charcoal, were examined.

Moths were collected mainly by ultraviolet light-traps. White sheets and bucket traps were used, but some were also collected from malaise traps set for general insect sampling. Beetles, other insects and other arthropods were sampled through a mix of direct observation, hand collection, including the use of hand nets and a beating tray, and trapping using malaise traps and yellow pan traps. These taxonomic groups were also collected from light-traps set for sampling moths. Molluscs were recorded through hand-searching and collection. Other invertebrates and vertebrates were recorded incidentally. Specimens were lodged in the TMAG Zoology collections, with some mollusc specimens retained by specialists until identifications were completed.

Information from all survey material curated and accessioned into the TMAG collection will be made available on the *Australasian Virtual Herbarium* and/or the *Atlas of Living Australia*.

Specimen identification

Specimens were identified utilising standard equipment and techniques, with comparison to TMAG's reference collections when necessary. Lichens were identified in the

laboratory using low-power and high-power microscopy of hand-cut sections of the thallus (vegetative tissue) and apothecia (reproductive structures), mounted in water, 10% KOH, 50% HNO₃, lactophenol cotton blue, ammoniacal erythrosin and Lugol's iodine. Routine chemical analyses using thin-layer chromatography followed standard methods (Orange *et al.* 2010). Some moth specimens were identified using the reference collections of the Australian National Insect Collection (ANIC) (CSIRO, Canberra) and the Biosecurity Tasmania Insect Collection at the New Town Research Laboratories of the Department of Primary Industries, Parks, Water and Environment.

Nomenclature and distribution

Vascular plant nomenclature follows de Salas and Baker (2021) and common names follow Wapstra *et al.* (2005). Nomenclature for mosses and liverworts is in accordance with the *Australian Moss Name Index* (ABRS 2018a), the *Checklist of Australian Liverworts and Hornworts* (McCarthy 2006) and *Tropicos* (Tropicos.org, 2018). Lichen nomenclature mainly follows McCarthy (2020). Nomenclature for land snails follows Stanistic *et al.* (2017). For all other vertebrate and invertebrate taxa identified to species, nomenclature follows the *Australian Faunal Directory* (ABRS 2018b).

Undescribed, partially identified or new species of insect are annotated with a unique epithet based on the registration number of an exemplar specimen from the TMAG collections, such as '*Euryglossa* sp. TMAG_F96120'. In cases where specimens can be associated with previously collected material, existing epithets are adopted. Insect specimens that could only be identified to a higher taxonomic rank than species are annotated with 'unplaced'. Moth distributions and rarity were determined, in part, by referring to specimens in ANIC.

RESULTS

Diversity

A total of 1417 taxa was recorded (table 2). This comprises 244 vascular plants, plus a further 119 collected in the past but not recorded in this survey (appendix 1.1); 33 mosses and seven liverworts (appendix 1.2); 206 lichens (appendix 1.3); and 735 invertebrates (714 insects, 5 spiders, 4 crustaceans and 12 gastropod molluscs) (appendix 1.4). In addition, five species of reptile, six species of mammal and 62 species of bird were observed or their presence detected (appendix 1.5).

Vegetation types observed were largely consistent with TASVEG 4.0 mapping (DPIPWE 2020). Smaller-scale unmapped features of interest include a dune, vegetated with an almost-perfect monoculture of Southern Grasstree *Xanthorrhoea australis* at Xanthorrhoea Ridge, and unmapped areas of *Melaleuca ericifolia* swamp forest along the western margin of the Musselroe Bay estuary. Skeletal sandy soils on granitic outcrops at the far eastern end of the property supported a heathland community distinct from other heathland areas. For vascular plants, the most species-

TABLE 1 — Main collecting sites at Musselroe Wind Farm

| Site | Latitude | Longitude |
|--------------------------------------|------------|-------------|
| Tregaron Lagoons | 40°46'19"S | 147°58'24"N |
| The Salties, Cape Portland | 40°44'43"S | 147°56'35"N |
| The Bullseye, Little Musselroe River | 40°48'12"S | 148°03'28"N |
| The Prairie | 40°48'31"S | 148°06'21"N |
| Xanthorrhoea Ridge | 40°46'19"S | 148°00'58"N |
| Abalone Rocks | 40°47'14"S | 148°06'01"N |

diverse sites were The Salties (57 taxa) (pl. 1), The Bullseye (40 taxa) (pl. 2) and Abalone Rocks (31 taxa) (pl. 3), with the main families represented being the Asteraceae (35 taxa), Poaceae (32 taxa), Fabaceae (29 taxa) and Cyperaceae (25 taxa). A low-rainfall bryophyte flora is dominated by mosses over liverworts, with the best-represented families being the Pottiaceae (9 species) and Bryaceae (5 species), both adapted to dry conditions. The most species-diverse sites for bryophytes are The Salties, with all 15 taxa recorded growing on soil and Abalone Rocks, where four epiphytes were found in dense shrubbery behind the beach and nine on rocks or soil. The property supports a diverse array of lowland, coastal, low-rainfall lichens, including many novelties (see below). The richest habitats for lichens are coastal rocks, with granite and dolerite supporting subtly different species assemblages; dry woodlands dominated by *Allocasuarina verticillata*, where lichens colonise wood, bark, rocks and consolidated soil; isolated large granite outcrops in scrubby heathland; and *Melaleuca ericifolia*-dominated swampy woodland, where the papery bark of the oldest trees supports a highly specialised suite of epiphytes (see below). Artificial habitats, including fence posts, treated pine rails and mortar, are also well-colonised.

The sites with the highest diversity in insect taxa lie in the eastern heathlands at The Prairie (181 taxa) (pl. 4); the Tregaron

Lagoons environs (172 taxa) (pl. 5); and the landward portion of the Cape Portland headland beyond the enclosed paddocks (141 taxa). The most taxon-rich insect groups were the beetles (with 265 taxa), flies (147 taxa) then moths (136 taxa). A high diversity of moths was found in The Bullseye lagoon area, including several rare species and new records (see below). A number of characteristic or noteworthy invertebrates found during this survey are illustrated in plate 6 and plate 7.

Novelties

Flora

Botanical novelties were limited to the lichens and mosses. Twenty lichen taxa were recorded for Tasmania for the first time and are reported elsewhere (Kantvilas *et al.* 2020). These include: *Lecanora strobilina* and *Ramonia absconsa*, first records for the Southern Hemisphere, with the latter previously known only from the type collection from South Carolina; *Arthothelium endoaurantiacum*, *Collema crispum* and *Gyalecta pellucida*, first records for Australia; and *Austroparmelina corrugativa*, *Amandinea conranensis*, *Bacidia laurocerasi*, *Buellia extenuatella*, *Catinaria atropurpurea*, *Diploschistes euganeus*, *D. gyrophoricus*, *Endocarpon crassisporum*, *Lecanora pseudogangaleoides* subsp. *pseudogangaleoides*, *Opegrapha niveoatra*, *O. spodopolia*,



PLATE 1 – Succulent saline herbfield at The Salties (Cape Portland), dominated by *Sarcocornia blackiana* and *S. quinqueflora*.



PLATE 2 – The Bullseye, a freshwater lagoon flanked by *Melaleuca ericifolia* on the Little Musselroe River.

O. varia, *Physcia austrostellaris*, *Trapelia concentrica* and *Xanthoparmelia xerica*, all known previously from mainland Australia, with the last-mentioned otherwise known only from its type collection from South Australia. Whilst some of these novelties were recorded only during the survey, most were found to be already represented by unidentified existing herbarium specimens from other Tasmanian localities.

Taxonomic work will continue on some as yet unidentified collections. The unidentified species of *Ramboldia* and *Trapelia* may well be new to science.

Several mosses represent significant range extensions in Tasmania, including *Brachymenium preissianum*, recorded from exposed lime mortar at the ruins of an old homestead at Home Beach within the CPWS, and previously known

PLATE 3 – Granite outcrops on the east coast of the property. These support a rich lichen flora with the reddish *Caloplaca gallowayi* often dominant.



PLATE 4 – Coastal heathland at The Prairie. The sparsely vegetated area in the foreground provides habitat for the threatened plant species *Stylidium beaugleholei*.



PLATE 5 – Lagoon habitat of the aquatic plant species *Myriophyllum muelleri* and *Stuckenia pectinata* in the southern part of the Tregaron Lagoons.



only from Hobart, and *Campylium polygamum*, previously reported only from Chimney Pot Hill (near Hobart) and Lake St Clair, and found on boggy ground at The Bullseye. The Australian endemic moss, *Archidium stellatum*, a species of dry areas, and previously reported for South Australia and Victoria, is a new record for Tasmania, recorded

TABLE 2 — Overview of taxa recorded from Musselroe Wind Farm and surrounding coastal reserves

| Group | Total taxa | Introduced species |
|----------------------------------|------------|--------------------|
| Vascular Plants | 363 | 65 |
| Dicotyledons | 238 | 43 |
| Magnoliids | 3 | |
| Gymnosperms | 0 | |
| Monocotyledons | 116 | 22 |
| Pteridophytes | 6 | |
| Bryophytes | 40 | 1 |
| Liverworts | 7 | |
| Mosses | 33 | 1 |
| Lichens | 206 | |
| Invertebrates – Lepidoptera | 137 | 1 |
| Invertebrates – Coleoptera | 251 | 6 |
| Invertebrates – Other Insects | 326 | 1 |
| Archaeognatha | 1 | |
| Blattodea | 4 | |
| Dermaptera | 3 | |
| Diptera | 133 | |
| Hemiptera | 73 | |
| Hymenoptera | 89 | 1 |
| Mantodea | 2 | |
| Mecoptera | 1 | |
| Neuroptera | 4 | |
| Odonata | 1 | |
| Orthoptera | 15 | |
| Invertebrates – Other Arthropods | 9 | |
| Araneae | 5 | |
| Amphipoda | 2 | |
| Decapoda | 1 | |
| Isopoda | 1 | |
| Invertebrates – Gastropoda | 12 | 4 |
| Vertebrates | 73 | 6 |
| Birds | 62 | 5 |
| Mammals | 6 | 1 |
| Reptiles | 5 | 0 |
| Total | 1417 | 84 |

from exposed soil in windswept tussock sedgeland with outcropping dolerite at The Salties near Cape Portland.

Fauna

Many invertebrate specimens remain unidentified or only partially identified (e.g., to family or genus level) and upon further research may well prove to be undescribed species or species newly recorded from Tasmania: these species are annotated with a '+' in appendix 1.4. Seven taxa are new to science: the fly *Axinia* sp. TMAG_F5984 and the beetle *Idiophyes* sp. TMAG_F98611 (both from the Tregaron Lagoons area); the moths *Limnaecia* sp. TMAG_F107740 (found at The Prairie) (pl. 7D), *Batrachedra* sp. TMAG_F99720, *Edosa* sp. TMAG_F99719 and *Peraglyphis* sp. TMAG_F99734 (all from The Bullseye lagoon area); and the snail *Scelidoropa* sp. 'Little Musselroe' (also from The Bullseye lagoon area). Four species were previously known only from the Australian mainland and are newly recorded for Tasmania: the beetle *Liparochrus* (not yet assigned to species) (Cape Portland headland trackway and Little Musselroe River crossing), and the moths *Scythrophanes stenoptera* (The Bullseye lagoon area), *Thalarcha phalarota* (Xanthorrhoea Ridge), and *Taxeotis intermixtaria* (eastern heathlands). Significant rediscoveries in a Tasmanian context include the fly *Acridophagus paganus* (pl. 7B; found in the eastern heathlands and on Xanthorrhoea Ridge) and the moths *Eutorna intonsa* (found at the Little Musselroe River crossing), *Araeostoma ANIC* sp. 01 (Cape Portland trackway and eastern heathlands), *Philenora* sp. TMAG_F108002 (The Bullseye lagoon area), *Paramsacta marginata* (The Prairie and Little Musselroe River crossing) (pl. 7C), *Barea atmophora* and *B. exarcha* (both The Bullseye lagoon area), and *Bida radiosella* (eastern heathlands). Two further significant rediscoveries are also threatened species and are discussed further below.

Threatened species

Flora

The Musselroe Wind Farm is known for supporting populations of threatened species, some of which, for example *Thelymitra antennifera*, have been monitored by the Tasmanian Department of Primary Industries, Water and Environment. In the present survey 12 vascular plant species listed as rare and two species listed as vulnerable under Tasmania's *Threatened Species Protection Act 1995* were recorded (appendix 1.1). Scarlet Sundew *Drosera glanduligera* (rare) is a new record for the area and was found growing in the southeasternmost corner of the property on poorly drained, moss-covered granite rock plates in shrubby heathland (pl. 8A) and in open heathland at Xanthorrhoea Ridge. Neither population is within reserves on the property. The parasitic herb Golden Dodder *Cuscuta tasmanica* (rare) was observed as large populations at two wetlands within the CPWS (pl. 8B), parasitising a range of species including Running Marshflower *Ornduffia reniformis*, Creeping Buttons *Leptinella reptans* and Prickfoot *Eryngium vesiculosum*. Roundleaf Wiltonia *Wiltonia rotundifolia* (rare) (pl. 8C) was recorded at Tregaron Lagoons as a common component of

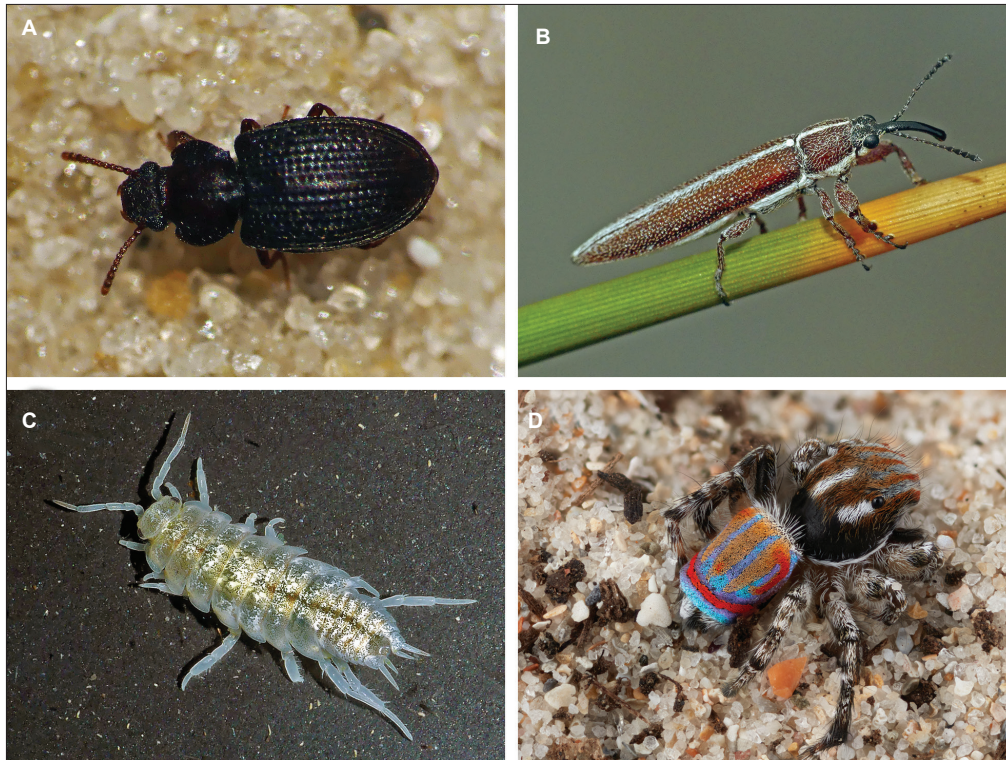


PLATE 6 – A. The Darkling-beetle *Hyocis bakewelli*. B. The Belid Weevil *Stenobelus tibialis* on coastal *Juncus kraussii*. C. Salt-lake Slater *Haloniscus searlei*, a scyphacid isopod of saline lagoons listed as Endangered in Tasmania (photographed specimen is from Tunbridge Lagoon). D. The largely dune-dwelling Peacock-spider *Maratus tasmanicus*.

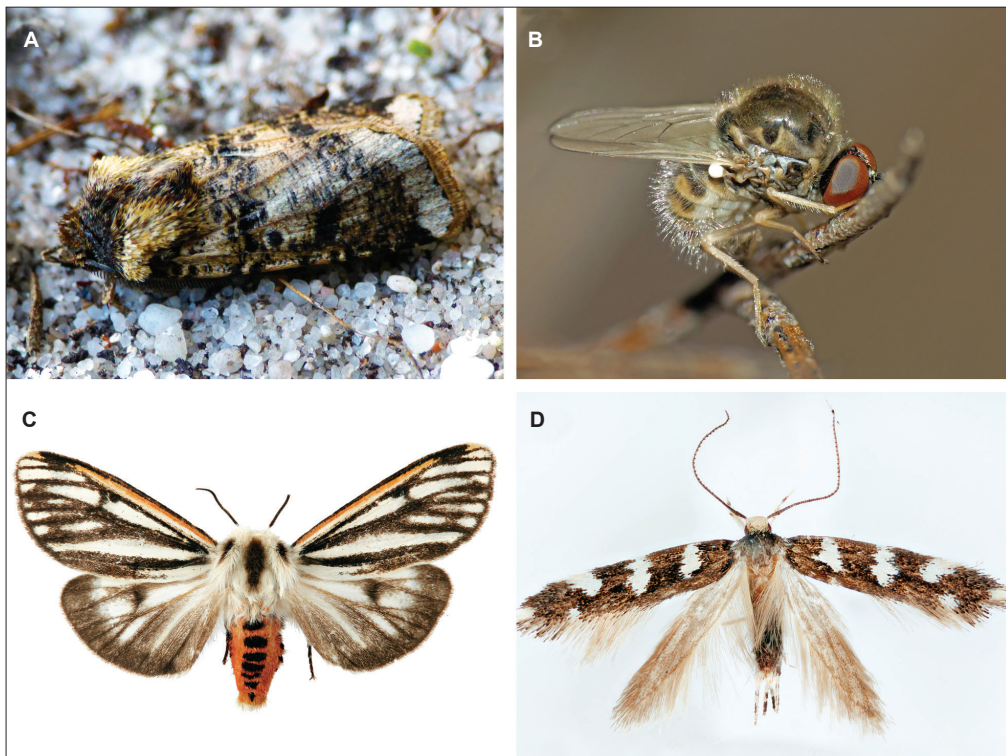


PLATE 7 – A. Male Variable Cutworm *Agrotis porphyricollis*. B. Mythicomyiine bee-fly *Acridophagus paganicus*. C. Male *Paramsacta marginata*. D. *Limnaecia* sp. TMAG_F107740.



PLATE 8 –Threatened flora recorded from Musselroe Wind Farm. **A.** Scarlet Sundew *Drosera glanduligera*. **B.** Golden Dodder *Cuscuta tasmanica*. **C.** Roundleaf Wilsonia *Wilsonia rotundifolia*. **D.** Silky Wilsonia *Wilsonia humilis*.

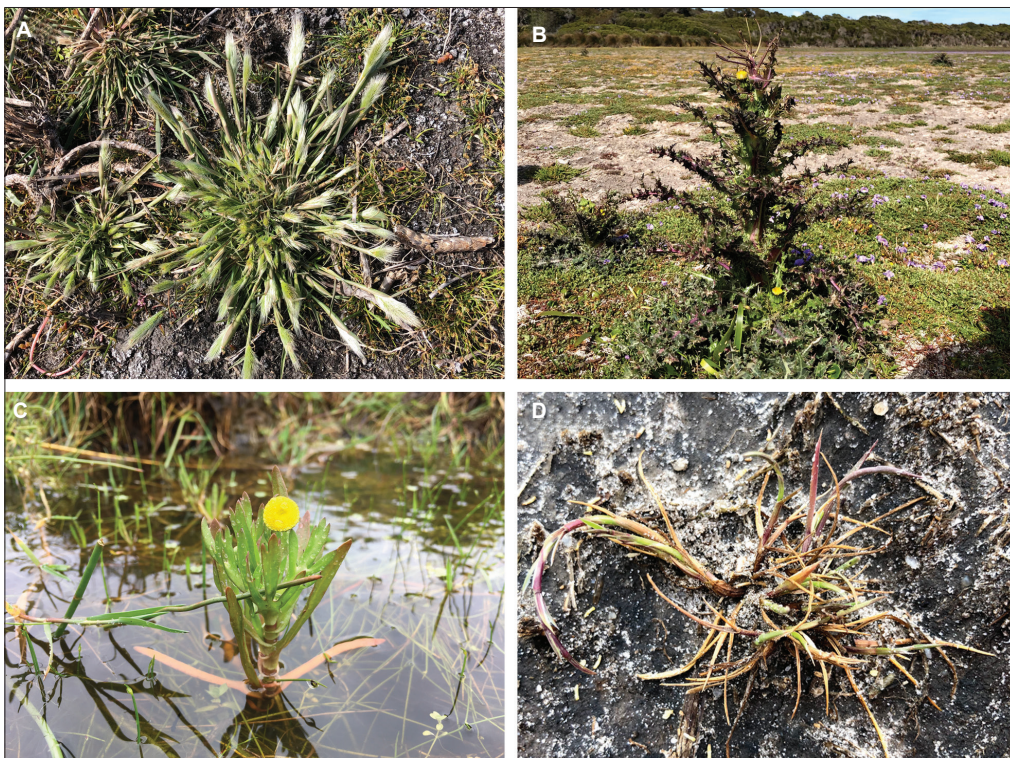


PLATE 9 – Introduced species recorded from Musselroe Wind Farm. **A.** Annual Beardgrass *Polypogon monspeliensis*. **B.** Prickly Sowthistle *Sonchus asper*. **C.** Water Buttons *Cotula coronopifolia*. **D.** Coast Barbggrass *Parapholis incurva*.

the dry lagoon margin flora, and outside of the CPWS at a dried-up wetland south of Lanoma Point. Silky Wilsonia *Wilsonia humilis* (rare) was recorded at The Salties, within the CPWS, but restricted to a few small patches amongst dolerite rocks on the margin of the saltmarsh (pl. 8D).

Juniper Wattle *Acacia ulicifolia* (rare) was recorded approximately 1 km east of the Little Musselroe River, close to the southern boundary of the property. Slender Velvetbush *Lasiopetalum baueri* (rare) grew as heavily wind-pruned shrubs at the rocky margin of the saltlake at The Salties. Helicopter Bush *Spyridium vexilliferum* var. *vexilliferum* (rare) was recorded at Xanthorrhoea Ridge. A small but locally common population of Sand Grass tree *Xanthorrhoea arenaria*, listed as vulnerable on the Tasmanian *Threatened Species Protection Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, was found south of the Little Musselroe estuary. This appears to be the first record of the species from the Musselroe Wind Farm property. Shining Dogwood *Pomaderris paniculosa* subsp. *paralia* (rare) was recorded from The Salties and at The Prairie.

Two threatened species of the aquatic genus *Myriophyllum* were recorded. Tiny Watermilfoil *Myriophyllum integrifolium*, a first record for the area and listed as vulnerable, was found adjacent to Xanthorrhoea Ridge. Hooded Watermilfoil *Myriophyllum muelleri*, listed as rare, was recorded in the southern part of the Tregaron Lagoons (pl. 5), with locally abundant Fennel Pondweed *Stuckenia pectinata*. The tiny ephemeral triggerplant, Blushing Triggerplant *Stylidium beaugleholei* (rare) was recorded at The Prairie where it is locally abundant (pl. 4). Tiny Arrowgrass *Triglochin minutissima* (rare) was recorded occasionally in soil accumulated in damp crevices amongst granite rocks on the coast of Great Musselroe Bay.

Sixteen further species of threatened vascular flora have been previously recorded from the area (ALA 2020) but were not observed during this survey (appendix 1.1).

No listed threatened species of bryophytes and lichens were recorded, although many non-vascular plants are considered uncommon and may well qualify for listing. For example, lichens include the naturally rare Tasmanian endemics *Bactropsora paludicola*, *Eugeniella farinosa* (only the second record) and *Porina meridionalis*, and the equally rare (in Tasmania) *Caloplaca pulcherrima*, *Ocellomma rediuntum*, *Ramonia absconsa* and *Gyalecta pellucida*, all restricted to *Melaleuca ericifolia*-dominated swamps, which are themselves a vegetation type of very high conservation value, especially for cryptogams. Other uncommon, noteworthy species recorded included *Arthothelium endoauranticaum* (from coastal scrub), *Endocarpon crassisporum* (from coastal grassland), and *Xanthoparmelia xerica* and the endemic *Lepra dactylinella* (from granite outcrops in heathland).

Fauna

A single adult male of the Schayer's Grasshopper *Schayera baiulus* (Driessen *et al.* 2020), listed as endangered on the Tasmanian *Threatened Species Protection Act 1995*, was collected (9 November 2018) from the dunes behind Lemons Beach. Its identification is provisional, because no other

specimens of an adult male of this species are known from collections. The species was last recorded in 1988, when single specimens were found at Rushy Lagoon in the northeast, and Woolnorth in the northwest (Key 1991). Prior to that it was only known from the specimens associated with its original description (Erichson 1842, Key 1990).

Saline lagoons on the Cape Portland headland and towards the northern coastline hosted the salt-lake slater *Haloniscus searlei*. This isopod, an aquatic member of an otherwise terrestrial lineage, is associated with inland saline lagoons across southern Australia but is very rare in Tasmania, where it is listed as endangered and only known from two inland saline lagoons in the Midlands (Threatened Species Section 2021). Its presence in near-coastal lagoons at Cape Portland/Musselroe Bay is surprising and significantly enhances our understanding of the habitat requirements of this species.

Four threatened bird species and one threatened mammal species were observed. Hooded Plover *Thinornis cucullatus* (nationally vulnerable) were seen on all visited stretches of sandy shore, as well as on exposed windblown sand in the vicinity of the saltpans inland from the northern coastline. Fairy Tern *Sternula nereis* (vulnerable) were observed feeding just offshore along the northern coastline. Wedge-tailed Eagle *Aquila audax fleayi* (endangered) and White-Bellied Sea-eagle *Haliaeetus leucogaster* (vulnerable) were observed at various places on the property but no nests of either species were located. Tasmanian Devil *Sarcophilus harrisii* (endangered) scats were observed along many of the tracks walked and are known to occur in the general area.

Exotic and pest species

Forty-nine species of introduced vascular plants were recorded (appendix 1.1). Common agricultural weeds include Winged Slender Thistle *Carduus tenuiflorus*, Variegated Thistle *Silybum marianum*, Capeweed *Arctotheca calendula*, Horehound *Marrubium vulgare*, Great Brome *Bromus diandrus* and Sweet Vernalgrass *Anthoxanthum odoratum*. Two shrubs that have become dominant components in parts of the landscape are Gorse *Ulex europaeus* and African Boxthorn *Lycium ferocissimum*. At the ruins of the old homestead at Home Beach, several species of garden origin have become naturalised including Century Plant *Agave americana*, Bearded Iris *Iris × germanica* and Caper Spurge *Euphorbia lathyris*. This area also hosted many species of introduced grasses and herbs. Common introduced species in wetland habitats include: Annual Beardgrass *Polypogon monspeliensis* (pl. 9A), Prickly Sowthistle *Sonchus asper* (pl. 9B), Water Buttons *Cotula coronopifolia* (pl. 9C), Buckshorn Plantain *Plantago coronopus* and Coast Barbggrass *Parapholis incurva* (pl. 9D). Drier coastal habitats included: Sweet Melilot *Melilotus indicus*, Winged Slender Thistle, African Boxthorn, Gorse, Scarlet Pimpernel *Lysimachia arvensis* and Fourleaf Allseed *Polycarpon tetraphyllum*. Coastal beach and foreshore supported Searocket *Cakile maritima*, Marram Grass *Ammophila arenaria*, African Boxthorn, Sea Spurge *Euphorbia paralias* and Buckshorn Plantain. Largely weed-free areas include the main eastern part of the property east of the Little Musselroe River (The Prairie) and other areas

of intact heathland. Four species, Winged Slender Thistle, African Boxthorn, Gorse and Horehound are declared weeds under the Tasmanian *Weed Management Act 1999*. The invasive South African Weed Orchid *Disa bracteata* Sw., a significant weed on mainland Australia but in the early stages of invasion in Tasmania, was recorded in the area in 2013 (Wapstra *et al.* 2020), but not seen during this survey.

Sixteen further species of introduced flora were previously recorded from the area (ALA 2020) but not observed during this survey (appendix 1.1). Only one species of introduced moss, *Eurhynchium praelongum*, was found growing in a disturbed site at Xanthorrhoea Ridge.

Remarkably few introduced insect species were collected (appendix 1.4). The list comprises Honeybee *Apis mellifera*, Eleven-spotted Ladybird *Coccinella undecimpunctata*, Sea-rocket Flea-beetle *Psylliodes marcida* and the cow-dung-feeding Dor-beetle *Geotrupes spiniger* and *Aphodius lividus*, all of European origin; the first two are now widespread across the state; the third is a new record for Tasmania and Australia but has since been discovered at several other localities on the Tasmanian north and east coast in association with its non-native foodplant *Cakile* species; while the fourth and fifth are found primarily in the east and northeast. Two more beetle species, *Attagenus pelli* and *Necrobia rufipes*, both associated with carrion, are cosmopolitan although it is possible that in Australia and Tasmania they represent early European introductions (the former is associated with pelts and the latter with cured meats). Both are rarely recorded in Tasmania.

Four introduced gastropods, all widespread species of European origin, were found (appendix 1.4): Small Pointed Snail *Prietocella barbara*, Garden Snail *Cornu aspersum*, Hedgehog Slug *Arion intermedius* and Striped Field-slug *Lehmannia nyctelia*. A fifth European species, Garlic Snail *Oxychilus alliarius*, was found at Little Musselroe and is highly likely to occur on the property.

Nine native moth species considered to be agricultural pests were collected. Most were noctuid moths: Bogong Moth *Agrotis infusa*, Brown Cutworm *Agrotis munda*, Variable Cutworm *Agrotis porphyricollis* (pl. 7A), Sugarcane Stem Borer *Bathytricha truncata*, Native Budworm *Helicoverpa punctigera* and Southern Armyworm *Persectania ewingii*. Two pest moth species from other families were the Small Tabby *Etiella behrii*, a pyralid which feeds on legumes, and the tortricid *Acropolitis rudisana*, which can be a pest on grapes. The only introduced lepidopteran recorded was the Cabbage White Butterfly *Pieris rapae*, another known pest species.

DISCUSSION

Although a significant proportion of the Cape Portland property has been converted to improved pasture for cattle grazing, it retains pockets of high-quality undisturbed native habitat, such as The Salties, The Prairie and Xanthorrhoea Ridge (table 1).

Open treeless areas show evidence of intense grazing pressure from the high density of macropods and Wombats

Vombatus ursinus, particularly along the eastern side of the property, with grasses closely cropped to ground level. A significant proportion of open ground in the eastern heathlands is dominated by less-than-palatable spiny shrubs, including Prickly Moses *Acacia verticillata* and Ploughshare Wattle *A. gunnii*, as well as tougher sedges (especially *Gabnia* species) and Sagg *Lomandra longifolia*. In contrast, more palatable seasonal herbs were conspicuously rare or absent. The greatest diversity of insects was found in the eastern heathlands, including many habitat specialists. The seasonal moth fauna was largely typical of that which can be found during spring in coastal heathlands, and in vegetation dominated by *Allocasuarina*, *Acacia* and native and introduced grasses, apart from the notable absence of eucalypt feeders due to the almost total absence of *Eucalyptus* on the property. This collection included around 13% of the Lepidoptera in Tasmania. No Tasmanian endemic species were recorded, probably because vegetation types were typical of the more general southern Australian autochthonous flora. The eastern heathlands proved to be the most diverse site for Lepidoptera, with almost 60 taxa recorded. The fauna here was dominated by geometrid species that feed on *Acacia*, *Kunzea*, *Allocasuarina*, *Leptospermum* and low-growing shrubs such as *Epacris*. The noctuid fauna was also relatively diverse with 15 species; those with the highest abundance were grass-feeders such as the Variable Cutworm and agricultural pests such as Bogong Moth and Southern Armyworm.

The area surrounding the saline lagoons around The Salties and extending inland as far as the paddock fences is species-rich for plants and animals, perhaps due to the diverse mosaic of habitat types present in a relatively small area, including coastal grassland, saline and freshwater shallow lagoons, rocky marsupial lawn, rocky headland and foreshore, dunes, and seasonally wet grassland and heathland. In addition to The Salties, a pocket of high species richness in and around a shallow but permanent freshwater habitat supported *Melaleuca ericifolia* closed forest and regenerating grassland and heathland known as The Bullseye. Permanent bodies of fresh (rather than brackish or saline) water are generally rare on the property, and mostly associated with the course of the Little Musselroe River and areas of low elevation to the east.

Given the history of the Cape Portland property and its current land use, the relatively high number (65 taxa) of naturalised, exotic vascular plants is not surprising. Large tracts of the property consist of improved pasture and, consequently, contain many species of agricultural weeds. Most of these taxa are annual and perennial herbs and grasses, and were recorded in pastures, along roadsides and fence lines within the property and around areas of habitation. Many of the species of introduced plants are likely to have originated from past agricultural activities and the relatively high number of lepidopteran pests is likely a result of the modified agricultural environment prevalent in the area. Recent efforts to control invasive exotic plants have had a positive effect, with control of African Boxthorn being particularly successful. Many of the introduced plants recorded during the survey can

form widespread and intractable populations, including species such as Annual Beardgrass, Prickly Sowthistle, Water Buttons, Buckshorn Plantain and Coast Barbgrass. Small-scale infestations of Century Plant, Bearded Iris and Caper Spurge have most likely persisted at the site of the old homestead at the northern end of Home Beach since it was inhabited and have spread to a small extent to the immediate surrounding area.

Previous surveys of the property have recorded 16 species of threatened flora that were not identified during this survey. This could be at least partly due to this survey not coinciding with the flowering time of these species (particularly orchids), or the species having been recorded from areas or habitats not sampled in this survey.

The property has outstanding ecological and nature conservation values, although these are not evenly distributed: areas of enclosed pasture tend to have little value whereas the established reserves within the property have the highest. Notably, several threatened species occur outside of reserves.

The property contains large areas of vegetation that is highly susceptible to *Phytophthora cinnamomi* root rot, particularly high-density populations of Southern Grasstree *Xanthorrhoea australis*, small populations of Sand Grasstree *X. arenaria*, and large areas of damp heathland. The mosaic of heathland and scrub northeast of The Prairie has developed at least partly as a response to fire history, and future fire management will play a role on the proportions of these two habitat types.

Threatened beach-nesting shorebirds such as Fairy Tern, Hooded Plover and Sooty Oystercatcher *Haematopus fuliginosus* are very sensitive to disturbance from humans, dogs, trail-bikes and four-wheel-drives; the relative lack of such disturbance at Musselroe (other than at Lemons Beach) affords them an increasingly rare degree of protection. These same environments are also well-known foraging refugia for a large number of international migratory waders, including summer and winter visitors such as Double-banded Plover *Charadrius bicinctus* that are declining globally.

The high density of native grazing marsupials has had a significant impact in shaping the habitats and species richness of the property. For instance, high species richness among threatened species is concentrated particularly in the non-wooded but still naturally vegetated parts of the surveyed area, including marsupial lawns and the edges of lagoons and runnels, and this may be due at least partly to grazing pressure that keeps shading by perennial shrubs to a minimum. However, areas of the property east of the Little Musselroe River exhibit extremely high grazing pressure (from native marsupials), and a reduced diversity of herbaceous plants.

In conclusion, the Cape Portland property hosts a number of vascular plant, animal and lichen species that, while common or at least present on mainland Australia, in Tasmania are restricted to the northeasternmost corner of the island. Despite its long history of management for grazing, the property retains significant natural values, including high-quality patches of unusual vegetation (e.g., the almost pure stand of Southern Grasstree at Xanthorrhoea

Ridge), and a high proportion of threatened plant and animal species.

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APPENDIX 1

Flora and fauna of the Musselroe Wind Farm

Taxa marked with * were observed during the survey but not collected; # were taxa recorded prior to the survey but not recorded during the survey; - were recorded prior to the survey and during the survey; i are introduced taxa in Tasmania; r, x, e and v are considered rare, extinct, endangered and vulnerable under Tasmania's Threatened Species Protection Act 1995; + are new records for Tasmania; ? are taxa that have an uncertain status, i.e., uncertain whether they are introduced to Tasmania or native.

Appendix 1.1: Vascular Plants of Musselroe Wind Farm

EUDICOTS

Aizoaceae

- * *Carpobrotus rossii* (Haw.) Schwantes
- *# *Disphyma crassifolium* (L.) L.Bolus subsp. *clavellatum* (Haw.) Chinnock
- *Tetragonia implexicoma* (Miq.) Hook.f.

Amaranthaceae

- *Hemichroa pentandra* R.Br.
- *Rhagodia candolleana* Moq. subsp. *candolleana*

Apiaceae

- *Apium prostratum* Labill. ex Vent. subsp. *prostratum* var. *filiforme* (A.Rich.) Kirk
- Apium prostratum* Labill. ex Vent. subsp. *prostratum* var. *prostratum*
- # *Daucus glochidiatus* (Labill.) Fisch., C.A.Mey. & Ave-Lall.
- Eryngium vesiculosum* Labill.
- Xanthosia tasmanica* Domin

Apocynaceae

- # *Alyxia buxifolia* R.Br.

Araliaceae

- # *Hydrocotyle callicarpa* Bunge
- Hydrocotyle capillaris* F.Muell. ex Klatt
- # *Hydrocotyle foveolata* H.Eichler
- # *Hydrocotyle muscosa* R.Br. ex A.Rich.
- Hydrocotyle sibthorpioides* Lam.

Asteraceae

- Actites megalocarpus* (Hook.f.) Lander
- *Angianthus preissianus* (Steetz) Benth.
- i- *Arctotheca calendula* (L.) K.Lewin
- Brachyscome aculeata* (Labill.) Less.
- # *Brachyscome graminea* (Labill.) F. Muell.
- *Brachyscome parvula* Hook.f.
- r# *Calocephalus lacteus* Less.
- i *Carduus tenuiflorus* Curtis
- Cassinia aculeata* (Labill.) R.Br. subsp. *aculeata*
- e# *Cassinia rugata* N.G.Walsh
- *Chrysocephalum apiculatum* (Labill.) Steetz subsp. *apiculatum*
- *Coronidium scorpioides* (Labill.) Paul G.Wilson
- # *Cotula australis* (Sieber ex Spreng.) Hook.f.
- i- *Cotula coronopifolia* L.

- r# *Cotula vulgaris* var. *australasica* J.H.Willis
- # *Craspedia glauca* (Labill.) Spreng.
- # *Craspedia rosulata* Rozefelds & A.M.Buchanan
- # *Cymbonotus preissianus* Steetz
- # *Gnaphalium indutum* Hook.f. subsp. *indutum*
- i# *Hypochaeris glabra* L.
- i *Hypochaeris radicata* L.
- Lagenophora stipitata* (Labill.) Druce
- *Leptinella longipes* Hook.f.
- Leptinella reptans* (Benth.) D.G.Lloyd & C.J.Webb
- Leptorhynchus squamatus* (Labill.) Less. subsp. *squamatus*
- *Leucophyta brownii* Cass.
- # *Millotia tenuifolia* Cass. var. *tenuifolia*
- *Olearia lepidophylla* (Pers.) Benth.
- # *Ozothamnus turbinatus* DC.
- Senecio glomeratus* Desf. ex Poir.
- r# *Siloxerus multiflorus* (Nees) P.S.Short
- i *Silybum marianum* (L.) Gaertn.
- i *Sonchus asper* (L.) Hill
- i- *Sonchus oleraceus* L.
- i *Vellereophyton dealbatum* (Thunb.) Hilliard & B.L.Burt

Boraginaceae

- # *Cynoglossum australe* R.Br.
- Hackelia suaveolens* (R.Br.) Dimon & M.A.M.Renner

Brassicaceae

- i *Brassica tournefortii* Gouan
- i- *Cakile maritima* Scop. subsp. *maritima*
- i *Capsella bursa-pastoris* (L.) Medik.

Campanulaceae

- Lobelia anceps* L.f.
- *Lobelia irrigua* R.Br.
- Lobelia pedunculata* R.Br.
- # *Wahlenbergia gracilentia* Lothian
- Wahlenbergia gymnoclada* Lothian

Caryophyllaceae

- i- *Cerastium glomeratum* Thuill.
- i# *Cerastium semidecandrum* L.
- Colobanthus apetalus* (Labill.) Druce var. *apetalus*
- i *Polycarpon tetraphyllum* (L.) L.
- i# *Sagina maritima* Don
- i# *Silene nocturna* L.
- *Spergularia tasmanica* (Kindb.) L.G.Adams
- Stellaria angustifolia* Hook. subsp. *tenella* (Benth.) C.H.Mill. & J.G.West
- Stellaria pallida* (Dumort.) Crép.

Casuarinaceae

- Allocasuarina littoralis* (Salisb.) L.A.S.Johnson
- *Allocasuarina monilifera* (L.A.S.Johnson) L.A.S.Johnson
- Allocasuarina paludosa* (Sieber ex Spreng.) L.A.S.Johnson
- Allocasuarina verticillata* (Lam.) L.A.S.Johnson

Celastraceae

- Stackhousia monogyna* Labill.

Chenopodiaceae

- * *Sarcocornia blackiana* (Ulbr.) A.J.Scott

*# *Sarcocornia quinqueflora* (Bunge ex Ung.-Sternb.)
A.J.Scott

Suaeda australis (R.Br.) Moq.

Suaeda maritima (L.) Dumort subsp. *maritima*

Tecticornia arbuscula (R.Br.) K.A.Sheph. & Paul
G.Wilson

Convolvulaceae

r# *Calystegia soldanella* (L.) Roem. & Schult.

- *Convolvulus angustissimus* R.Br. subsp. *angustissimus*

r- *Cuscuta tasmanica* Engelm.

- *Dichondra repens* J.R.Forst. & G.Forst.

Wilsonia backhousei Hook.f.

r- *Wilsonia humilis* R.Br.

r *Wilsonia rotundifolia* Hook.

Crassulaceae

Crassula decumbens Thunb. var. *decumbens*

Crassula sieberiana (Schult. & Schult.f.) Druce

Dilleniaceae

Hibbertia hirticalyx Toelken

Hibbertia prostrata Hook.

Hibbertia sericea (R.Br. ex DC.) Benth. var. *sericea*

Droseraceae

- *Drosera auriculata* Backh. ex Planch.

r *Drosera glanduligera* Lehm.

Drosera hookeri R.P.Gibson, B.J.Conn & Conran

Drosera macrantha Endl. subsp. *planchonii* (Hook.f.)
ex Planch.) N.G.Marchant

- *Drosera peltata* Thunb.

Elaeocarpaceae

Tetratheca pilosa Labill. subsp. *pilosa*

Ericaceae

Epacris impressa Labill.

Epacris lanuginosa Labill.

Leucopogon collinus (Labill.) R.Br.

- *Leucopogon parviflorus* (Andrews) Lindl.

- *Leucopogon virgatus* (Labill.) R.Br. var. *virgatus*

- *Monotoca elliptica* (Sm.) R.Br.

Styphelia adscendens R.Br.

- *Styphelia ericoides* Sm.

Styphelia humifusa (Cav.) Pers.

Euphorbiaceae

- *Amperea xiphioclada* (Sieber ex Spreng.) Druce var.
xiphioclada

i *Euphorbia lathyris* L.

i *Euphorbia paralias* L.

i *Euphorbia peplus* L.

Fabaceae

- *Acacia gunnii* Benth.

Acacia longifolia (Andrews) Willd. subsp. *sophorae*
(Labill.) Court

Acacia melanoxylon R.Br.

Acacia myrtifolia (Sm.) Willd.

Acacia suaveolens (Sm.) Willd.

- *Acacia terminalis* (Salisb.) J.F.Macbr.

r *Acacia ulicifolia* (Salisb.) Court

- *Acacia verticillata* (L'Hér.) Willd. subsp. *ovoidea*
(Benth.) Court

- *Acacia verticillata* (L'Hér.) Willd. subsp. *verticillata*

- *Aotus ericoides* (Vent.) G.Don

- *Bossiaea cinerea* R.Br.

- *Bossiaea prostrata* R.Br.

Dillwynia sericea A.Cunn.

v# *Glycine latrobeana* (Meisn.) Benth.

Hovea heterophylla A.Cunn. ex Hook.f.

Kennedia prostrata

i- *Melilotus indicus* (L.) All.

- *Platylobium triangulare* R.Br.

Pultenaea dentata Labill.

Pultenaea stricta Sims

Pultenaea tenuifolia R.Br. & Sims

i*# *Trifolium campestre* Schreb.

i *Trifolium dubium* Sibth.

i- *Trifolium repens* L.

i# *Trifolium resupinatum* L.

i- *Trifolium subterraneum* L.

i *Trifolium tomentosum* L.

i *Ulex europaeus* L.

i- *Vicia sativa* L. subsp. *nigra* (L.) Ehrh.

Gentianaceae

i- *Centaurium erythraea* Rafn

Cicendia filiformis (L.) Delarbre

r# *Schenkia australis* (R.Br.) G.Mans.

- *Sebaea albidiflora* F.Muell.

Sebaea ovata (Labill.) R.Br.

i# *Erodium botrys* (Cav.) Bertol.

i# *Erodium cicutarium* (L.) L'Hér. ex Aiton

Geranium brevicaule Hook.

i# *Geranium molle* L.

Geranium retrorsum L'Hér. ex DC.

Geranium solanderi Carolin

Goodeniaceae

Goodenia humilis R.Br.

- *Goodenia lanata* R.Br.

Haloragaceae

Gonocarpus micranthus Thunb. subsp. *micranthus*

v *Myriophyllum integrifolium* (Hook.f.) Hook.f.

r- *Myriophyllum muelleri* Sond.

Myriophyllum simulans Orchard

Myriophyllum variifolium Hook.f.

Hypericaceae

Hypericum gramineum G.Forst.

Lamiaceae

i *Marrubium vulgare* L.

Linaceae

Linum marginale A.Cunn.

Loganiaceae

Mitrasacme pilosa Labill. var. *stuartii* Hook.f.

Lythraceae

Lythrum hyssopifolia L.

Malvaceae

r- *Lasiopetalum baueri* Steetz

- *Lawrencia spicata* Hook.

Menyanthaceae

Ornduffia reniformis (R.Br.) Tippery & Les

Myrsinaceae

i *Lysimachia arvensis* (L.) U.Manns & Anderb.

Myrtaceae

Calytrix tetragona Labill.

- Eucalyptus nitida* Hook.f.
Eucalyptus pauciflora Sieber ex Spreng. subsp. *pauciflora*
- # *Euryomyrtus parviflora* Miq.
 - *Kunzea ambigua* (Sm.) Druce
 - *Leptospermum laevigatum* (Gaertn.) F.Muell.
Leptospermum scoparium J.R.Forst. & G.Forst.
 - *Melaleuca ericifolia* Sm.
 # *Melaleuca squarrosa* Donn ex Sm.
- Orobanchaceae**
 i# *Parentucellia latifolia* (L.) Caruel
- Oxalidaceae**
Oxalis radicata A.Rich.
 # *Oxalis rubens* Haw.
 i# *Oxalis corniculata* L. subsp. *corniculata*
- Phrymaceae**
 - *Thyridia repens* (R.Br.) W.R.Barker & Beardsley
- Phyllanthaceae**
 - *Poranthera microphylla* Brongn.
- Pittosporaceae**
Billardiera mutabilis Salisb.
 - *Bursaria spinosa* Cav. subsp. *spinosa*
- Plantaginaceae**
 - *Callitriche stagnalis* Scop.
 # *Gratiola nana* Benth.
 - *Plantago bellidioides* Decne.
 i- *Plantago coronopus* L. subsp. *coronopus*
 # *Plantago hispida* R.Br.
 # *Plantago varia* R.Br.
Veronica gracilis R.Br.
- Polygalaceae**
 - *Comesperma volubile* Labill.
- Polygonaceae**
 i- *Acetosella vulgaris* Fourr.
 - *Muehlenbeckia adpressa* (Labill.) Meisn.
 # *Rumex brownii* Campd.
- Portulacaceae**
Calandrinia calyptrata Hook.f.
 r# *Calandrinia granulifera* Benth.
 - *Montia australasica* (Hook.f.) Pax & K.Hoffm.
- Primulaceae**
Lysimachia arvensis (L.) U.Manns & Anderb.
- Proteaceae**
 - *Banksia marginata* Cav.
Hakea teretifolia (Salisb.) Britten subsp. *hirsuta* (Endl.) R.M.Barker
Lomatia tinctoria (Labill.) R.Br.
- Ranunculaceae**
 - *Clematis microphylla* DC.
Ranunculus amphitrichus Colenso
Ranunculus sessiliflorus R.Br. ex DC. var. *sessiliflorus*
Ranunculus trichophyllus Chaix
- Rhamnaceae**
 - *Pomaderris apetala* Labill. subsp. *apetala*
Pomaderris apetala Labill. subsp. *maritima* N.G.Walsh & Coates
Pomaderris elliptica Labill. var. *diemenica* N.G.Walsh & Coates
- # *Pomaderris oraria* F.Muell. ex Reissek subsp. *oraria*
 r- *Pomaderris paniculosa* F.Muell. ex Reissek subsp. *paralia* N.G.Walsh
Pomaderris pilifera N.A.Wakef. subsp. *pilifera*
 *# *Pomaderris racemosa* Hook.
 r- *Spyridium vexilliferum* (Hook.) Reissek var. *vexilliferum*
- Rosaceae**
 # *Acaena echinata* Nees
 - *Acaena novae-zelandiae* Kirk
 *# *Acaena pallida* (Kirk) Allan
- Rubiaceae**
 # *Asperula conferta* Hook.f.
 # *Galium australe* DC.
 i *Galium murale* (L.) All.
 i *Sherardia arvensis* L.
- Rutaceae**
Boronia parviflora Sm.
Correa alba Andrews var. *alba*
- Santalaceae**
Leptomeria drupacea (Labill.) Druce
- Scrophulariaceae**
 - *Myoporum insulare* R.Br.
- Solanaceae**
 i- *Lycium ferocissimum* Miers
Solanum laciniatum Aiton
- Stylidiaceae**
 r *Stylidium beaugleholei* J.H.Willis
 # *Stylidium graminifolium* Sw.
 r# *Stylidium perpusillum* Hook.f.
- Theophrastaceae**
Samolus repens (J.R.Forst. & G.Forst.) Pers. var. *repens*
- Thymelaeaceae**
 - *Pimelea glauca* R.Br.
 - *Pimelea humilis* R.Br.
Pimelea linifolia Sm.
 - *Pimelea serpyllifolia* R.Br. subsp. *serpyllifolia*
- Urticaceae**
Urtica incisa Poir.
- Violaceae**
Viola cleistogamoides (L.G.Adams) Seppelt
 - *Viola hederacea* Labill. subsp. *hederacea*
- MAGNOLIIDS**
- Lauraceae**
 - *Cassytha glabella* R.Br. f. *dispar* (Schltdl.) J.Z.Weber
 # *Cassytha pedicellosa* J.Z.Weber
Cassytha pubescens R.Br.
- MONOCOTS**
- Asparagaceae**
 i* *Agave americana* L.
 # *Arthropodium minus* R.Br.
 # *Arthropodium pendulum* DC.
 # *Chamaescilla corymbosa* (R.Br.) F.Muell. ex Benth. var. *corymbosa*
 - *Lomandra longifolia* Labill.
 # *Thysanotus patersonii* R.Br.

Asphodelaceae

- # *Bulbine bulbosa* (R.Br.) Haw.
- # *Bulbine glauca* (Raf.) E.M.Watson
- Bulbine semibarbata* (R.Br.) Haw.

Centrolepidaceae

- *Centrolepis aristata* (R.Br.) Roem. & Schult.
- *Centrolepis polygyna* (R.Br.) Hieron.
- *Centrolepis strigosa* (R.Br.) Poir. subsp. *strigosa*

Colchicaceae

- Burchardia umbellata* R.Br.
- # *Wurmbea dioica* (R.Br.) F.Muell. subsp. *dioica*

Cyperaceae

- Baumea juncea* (R.Br.) Palla
- Carex appressa* R.Br.
- *Carex breviculmis* R.Br.
- *Eleocharis acuta* R.Br.
- Eleocharis spachelata* R.Br.
- # *Ficinia nodosa* (Rottb.) Goetgh., Muasya & D.A.Simpson
- Gahnia filum* (Labill.) F.Muell.
- *Gahnia trifida* Labill.
- # *Isolepis cernua* (Vahl) Roem. & Schult.
- Isolepis hookeriana* Boeckeler
- ?i *Isolepis levynsiana* Muasya & D.A.Simpson
- *Isolepis marginata* (Thunb.) A.Dietr.
- Isolepis platycarpa* (S.T.Blake) Soják
- # *Isolepis setacea* (L.) R.Br.
- # *Isolepis subtilissima* Boeckeler
- *Lepidosperma concavum* R.Br.
- # *Lepidosperma ensiforme* (Rodway) D.I.Morris
- # *Lepidosperma gladiatum* Labill.
- Lepidosperma inops* F.Muell. ex Rodway
- # *Lepidosperma laterale* R.Br.
- Schoenoplectus pungens* (Vahl) Palla
- # *Schoenus apogon* Roem. & Schult.
- # *Schoenus lepidosperma* (F.Muell.) K.L.Wilson subsp. *lepidosperma*
- *Schoenus nitens* (R.Br.) Poir.
- Schoenus tesquorum* J.M.Black

Hemerocallidaceae

- # *Dianella brevicaulis* (Ostenf.) G.W.Carr & P.F.Horsfall
- Dianella revoluta* R.Br. var. *revoluta*

Hypoxidaceae

- # *Pauridia glabella* (R.Br.) Snijman & Kocyan var. *glabella*
- # *Pauridia vaginata* (Schltdl.) Snijman & Kocyan var. *vaginata*

Iridaceae

- *Diplarrena moraea* Labill.
- i- *Iris germanica* L.
- # *Patersonia fragilis* (Labill.) Asch. & Graebn.

Juncaceae

- i *Juncus bufonius* L.
- # *Juncus capitatus* Weigel
- *# *Juncus kraussii* Hochst. subsp. *australiensis* (Buchenau) Snogerup
- Juncus sarophorus* L.A.S.Johnson
- # *Luzula densiflora* (H.Nordensk.) Edgar

- # *Luzula meridionalis* H.Nordensk.

Juncaginaceae

- # *Cynnogeton alcockiae* (Aston) Mering & Kadereit
- Cynnogeton procerum* (R.Br.) Buchenau
- r- *Triglochin minutissima* F.Muell.
- # *Triglochin nana* F.Muell.
- *Triglochin striata* Ruiz & Pav.

Orchidaceae

- # *Caladenia latifolia* R.Br.
- v# *Caladenia patersonii* R.Br.
- # *Cyrtostylis reniformis* R.Br.
- r# *Cyrtostylis robusta* D.L.Jones & M.A.Clem.
- # *Diuris chryseopsis* D.L.Jones
- # *Diuris orientis* D.L.Jones
- x# *Diuris palustris* Lindl.
- Diuris sulphurea* R.Br.
- # *Glossodia major* R.Br.
- Microtis arenaria* Lindl.
- # *Pterostylis curta* R.Br.
- r# *Pterostylis sanguinea* D.L.Jones & M.A.Clem.
- # *Pterostylis tasmanica* D.L.Jones
- v# *Pterostylis ziegelieri* D.L.Jones
- x# *Thelymitra antennifera* (Lindl.) Hook.f.
- # *Thelymitra exigua* Jeanes

Poaceae

- i* *Agrostis capillaris* L. var. *capillaris*
- i *Aira caryophyllea* L. subsp. *caryophyllea*
- i *Aira elegantissima* Schur
- i *Aira praecox* L.
- i* *Ammophila arenaria* (L.) Link subsp. *arenaria*
- i *Anthoxanthum odoratum* L.
- *Austrostipa flavescens* (Labill.) S.W.L.Jacobs & J.Everett
- Austrostipa stipoides* (Hook.f.) S.W.L.Jacobs & J.Everett
- i *Bromus diandrus* Roth
- i *Bromus hordeaceus* L.
- i *Cynosurus echinatus* L.
- *Distichlis distichophylla* (Labill.) Fassett
- i *Holcus lanatus* L.
- r# *Lachnagrostis robusta* (Vickery) S.W.L.Jacobs
- i- *Lagurus ovatus* L.
- i- *Parapholis incurva* (L.) C.E.Hubb.
- *Phragmites australis* (Cav.) Trin. ex Steud.
- i# *Poa annua* L.
- Poa poiiformis* (Labill.) Druce var. *poiiformis*
- Poa rodwayi* Vickery
- i# *Polypogon maritimus*?? var. *subspatheaceus* (Req.) Parl.
- i *Polypogon monspeliensis* (L.) Desf.
- Puccinellia stricta* (Hook.f.) C.H.Blom
- *Rytidosperma caespitosum* (Gaudich.) Connor & Edgar
- Rytidosperma setaceum* (R.Br.) Connor & Edgar
- *Rytidosperma tenuius* (Steud.) A.Hansen & Sunding
- *Themeda triandra* Forssk.
- i# *Thinopyrum junceiforme* (Á.Löve & D.Löve) Á.Löve
- i *Vulpia bromoides* (L.) Gray
- i# *Vulpia myuros* (L.) C.C.Gmel. f. *myuros*
- i# *Vulpia myuros* f. *megalura* (Nutt.) Stace & R.Cotton

- *Zoysia macrantha* Desv. subsp. *walshii* Night.
- Potamogetonaceae**
- # *Lepilaena cylindrocarpa* (Körn. ex Müll.Stuttg) Benth.
Potamogeton cheesemanii A.Benn.
- r *Stuckenia pectinata* (L.) Börner
- Restionaceae**
- # *Apodasmia brownii* (Hook.f.) B.G.Briggs &
L.A.S.Johnson
- Empodisma minus* (Hook.f.) L.A.S.Johnson &
D.F.Cutler
- # *Hypolaena fastigiata* R.Br.
- *Leptocarpus tenax* (Labill.) R.Br.
- Ruppiaceae**
- *Ruppia polycarpa* R.Mason
- Xanthorrhoeaceae**
- v *Xanthorrhoea arenaria* D.J.Bedford
- Xanthorrhoea australis* R.Br.
- Zosteraceae**
- # *Zostera muelleri* Irmisch ex Asch. subsp. *muelleri*

PTERIDOPHYTES

- Adiantaceae**
- *Adiantum aethiopicum* L.
- Dennstaedtiaceae**
- Pteridium esculentum* (G.Forst.) Cockayne subsp.
esculentum
- Dicksoniaceae**
- Dicksonia antarctica* Labill.
- Lindsaeaceae**
- Lindsaea linearis* Sw.
- Ophioglossaceae**
- # *Ophioglossum lusitanicum* L.
- Selaginellaceae**
- # *Selaginella gracillima* (Kunze) Spring ex Salomon

Appendix 1.2: Bryophytes of Musselroe Wind Farm

MOSSES

- Amblystegiaceae**
- Campylium polygamum* (Schimp.) C.E.O.Jensen
- Archidiaceae**
- Archidium stellatum* I.G.Stone
- Brachytheciaceae**
- Eurhynchium praelongum* (Hedw.) Bruch & Schimp.
- Rhynchostegium tenuifolium* (Hedw.) Reichardt
- Bryaceae**
- i *Brachymenium preissianum* (Hampe) A.Jaeger
- Bryum dichotomum* Hedw.
- Bryum* sp.
- Orthodontium lineare* Schwägr.
- Rosulabryum capillare* (Hedw.) J.R.Spence
- Rosulabryum subtomentosum* (Hampe) J.R.Spence
- Dicranaceae**
- Campylopus bicolor* (Müll.Hal.) Wilson

- Campylopus introflexus* (Hedw.) Brid.
- Ditrichaceae**
- Ceratodon purpureus* (Hedw.) Brid.
- Grimmiaceae**
- Grimmia pulvinata* (Hedw.) Hook.f. & Wilson var.
africana (Hedw.) Hook.f. & Wilson
- Hypnaceae**
- Hypnum cupressiforme* Hedw.
- Lembophyllaceae**
- Lembophyllum clandestinum* (Hook.f. & Wilson)
Lindb. ex Paris
- Weymouthia cochlearifolia* (Schwägr.) Dixon
- Orthotrichaceae**
- Macrocoma tenuis* (Hook. & Grev.) Vitt subsp. *tenuis*
- Zygodon minutus* Müll.Hal. & Hampe
- Polytrichaceae**
- Polytrichum juniperinum* Hedw.
- Pottiaceae**
- Barbula calycina* Schwägr.
- Barbula crinita* Schultz
- Didymodon torquatus* (Taylor) Catches.
- Syntrichia antarctica* (Hampe) R.H.Zander
- Syntrichia papillosa* (Wilson) Jur.
- Tortella* sp.
- Tortula muralis* Hedw.
- Triquetrella papillata* (Hook.f. & Wilson) Broth.
- Weissia* sp.
- Racopilaceae**
- Racopilum cuspidigerum* (Schwägr.) Ångstr. var.
convolutaceum (Müll.Hal.) Zanten & Dijkstra
- Sematophyllaceae**
- Sematophyllum homomallum* (Hampe) Broth.
- Thuidiaceae**
- Thuidiopsis furfurosa* (Hook.f. & Wilson) M.Fleisch.
- Thuidiopsis sparsa* (Hook.f. & Wilson) Broth.

LIVERWORTS

- Acrobolbaceae**
- Lethocolea pansa* (Taylor) G.A.M.Scott &
K.G.Beckm.
- Aytoniaceae**
- Asterella drummondii* (Hook.f. & Taylor) R.M.Schust.
ex D.G.Long
- Frullaniaceae**
- Frullania falciloba* Taylor ex Lehm.
- Geocalycaceae**
- Chiloscyphus semiteres* (Lehm.) Lehm. & Lindenb.
- Lejeuneaceae**
- Siphonolejeunea nudipes* (Hook.f. & Taylor) Herzog
- Marchantiaceae**
- Marchantia berteriana* Lehm. & Lindenb.
- Metzgeriaceae**
- Metzgeria furcata* (L.) Dumort

Appendix 1.3: Lichens of Musselroe Wind Farm

- Amandinea australasica* Blaha, H.Mayrhofer & Elix
Amandinea coniops (Wahlenb.) M.Choisy ex Scheid. & H.Mayrhofer
- + *Amandinea conranensis* Elix & P.M.McCarthy
Amandinea decedens (Nyl.) Blaha & H.Mayrhofer
Amandinea punctata (Hoffm.) Coppins & Scheid.
Anisomeridium disjunctum P.M.McCarthy & Kantvilas
Anisomeridium polypori (Ellis & Everh.) M.E.Barr
- + *Arthrobelium endoaurantiacum* Makhija & Patw.
Arthrobelium ampliatum (C.Knight & Mitt.) Müll. Arg.
- Austroparmelina conlabrosa* (Hale) A.Crespo, Divakar & Elix
- + *Austroparmelina corrugativa* (Kurok. & Filson) Elix & Kantvilas
Austroparmelina pseudorelicina (Jatta) A.Crespo, Divakar & Elix
- + *Bacidia laurocerasi* (Delise ex Duby) Zahlbr.
Bacidia septosior (Nyl.) Zahlbr.
Bacidia stenospora C.Knight
Bacidia wellingtonii (Stirt.) D.J.Galloway
Bactrospora paludicola Kantvilas
Buellia aeruginosa A.Nordin, Owe-Larsson & Elix
Buellia amandineaeformis Elix & Kantvilas
Buellia dissa (Stirt.) Zahlbr.
- + *Buellia extenuatella* Elix & Kantvilas
Buellia halonioides Elix
Buellia homophylia (C.Knight) Zahlbr.
Buellia schaeferi De Not.
Buellia stellulata (Taylor) Mudd var. *stellulata*
Buellia stellulata (Taylor) Mudd var. *tasmanica* Elix & Kantvilas
Buellia suttonensis Elix & A.Knight
Caloplaca bartlettii S.Y.Kondr. & Kärnefelt
Caloplaca beagleholei S.Y.Kondr. & Kärnefelt
Caloplaca bermaguiana S.Y.Kondr. & Kärnefelt
Caloplaca cf. *chrysojeta* (Vain. ex Räsänen) Domb.
Caloplaca cinnabarina (Ach.) Zahlbr.
Caloplaca cranfieldii S.Y.Kondr. & Kärnefelt
Caloplaca eos S.Y.Kondr. & Kärnefelt
Caloplaca ferdinandmuelleri S.Y.Kondr. & Kärnefelt
Caloplaca gallowayi S.Y.Kondr., Kärnefelt & Filson
Caloplaca holocarpa (Hoffm.) A.E.Wade aggr.
Caloplaca cf. *irrubescens* (Nyl.) Zahlbr.
Caloplaca jackelxii S.Y.Kondr., Kärnefelt & A.Thell
Caloplaca kilcundaensis S.Y.Kondr. & Kärnefelt
Caloplaca lateritia (Taylor) Zahlbr.
Caloplaca maccarthyi S.Y.Kondr., Kärnefelt & Elix
Caloplaca pulcherrima (Müll.Arg.) S.Y.Kondr. & Kärnefelt
Caloplaca subglobulata (Nyl.) Zahlbr.
Caloplaca tomareeana S.Y.Kondr. & Kärnefelt
Candelariella vitellina (Hoffm.) Müll.Arg.
Candelariella xanthostigmoides (Müll.Arg.) R.W.Rogers
- Catillaria austrolittoralis* Kantvilas & van den Boom
- + *Catinaria atropurpurea* (Schaer.) Vezda & Poelt
Chrysothrix xanthina (Vain.) Kalb
Cladia aggregata (Sw.) Nyl.
Cladia inflata (F.Wilson) D.J.Galloway
Cladia retipora (Labill.) Nyl.
Cladia sullivanii (Müll.Arg.) W.Martin
Cladonia capitellata (Hook.f. & Taylor) C.Bab. var. *squamatica* A.W.Archer
Cladonia humilis (With.) J.R.Laundon var. *humilis*
Cladonia krempelhuberi (Vain.) Zahlbr.
Cladonia merochlorophaea Asahina
Cladonia neozelandica Vain. var. *striata* (A.W.Archer) Kantvilas
Cladonia ochrochlora Flörke
Cladonia praetermissa A.W.Archer var. *praetermissa*
Cliostomum griffithii (Sm.) Coppins
Coenogonium luteum (Dicks.) Kalb & Lücking
- + *Collema crispum* (Huds.) Weber ex F.H.Wigg.
Collema glaucophthalmum Nyl. var. *glaucophthalmum*
Collema glaucophthalmum Nyl. var. *implicatum* (Nyl.) Degel.
Diploicia canescens (Dicks.) A.Massal. subsp. *canescens*
- + *Diploschistes euganeus* (A.Massal.) J.Steiner
- + *Diploschistes gyrophoricus* Lumbsch & Elix
- + *Endocarpon crassissporum* P.M.McCarthy & Filson
Eugeniella farinosa P.M.McCarthy & Elix
Flavoparmelia haysomii (C.W.Dodge) Hale
Flavoparmelia rutidota (Hook.f. & Taylor) Hale
Flavoparmelia soledians (Nyl.) Hale
- + *Gyalecta pellucida* (Coppins & Malcolm) Baloch & Lücking
Halecania subsquamosa (Müll.Arg.) van den Boom & H.Mayrhofer
Halegrapha mucronata (Stirt.) Lücking
Herteliidea pseudobotryosa R.C.Harris, Ladd & Printzen
Heterodea muelleri (Hampe) Nyl.
Heterodermia obscurata (Nyl.) Trevis.
Heterodermia tremulans (Müll.Arg.) W.L.Culb.
Hyperphyscia adglutinata (Flörke) H.Mayrhofer & Poelt
Hypotrachyna revoluta (Flörke) Hale
Japewiella pruinosula (Müll.Arg.) Kantvilas
Lecanora casuarinophila Lumbsch
Lecanora dispersa (Pers.) Sommerf.
Lecanora aff. *farinacea* Fée
Lecanora farinacea Fée
Lecanora flavopallida Stirt.
Lecanora galactiniza Nyl.
Lecanora mobergiana Lumbsch & Elix
- + *Lecanora pseudogangaleoides* Lumbsch subsp. *pseudogangaleoides*
Lecanora saligna (Schrad.) Zahlbr.
- + *Lecanora strobilina* (Spreng.) Kieff.
Lecanora subcoarctata (C.Knight) Hertel
Lecanora subtecta (Stirt.) Kantvilas & LaGreca
Lecanora symmicta (Ach.) Ach.
Lecanora wilsonii Müll.Arg. subsp. *wilsonii*

- Lecidella granulosa* (Nyl.) Knoph & Leuckert var. *granulosa*
Lecidella leptolomoides (Müll.Arg.) Elix
Lecidella sublaticida (C.Knight) Hertel
Lecidella xylogena (Müll.Arg.) Kantvilas & Elix
Leimonis erratica (Körb.) R.C.Harris & Lendemer
Leptra dactylinella (Kantvilas & Elix) A.W.Archer & Elix
Leptogium crispatellum Nyl.
Lichina intermedia (C.Bab.) M.Schultz
Maronea constans (Nyl.) Hepp
Megalaria laureri (Hepp ex Th.Fr.) Hafellner
Megalaria melaloma (C.Knight) Kantvilas
Megalaria melanotropa (Nyl.) D.J.Galloway
Menegazzia caesiopruinosa P.James
Menegazzia subpertusa P.James & D.J.Galloway
Micarea almbornii Coppins
Micarea byssacea (Th.Fr.) Czarnota, Guzow-Krzem. & Coppins
Micarea melaenida (Nyl.) Coppins
Monerolechia badia (Fr.) Kalb
Notoparmelia signifera (Nyl.) A.Crespo, Ferencova & Divakar
Ocellomma rediuntum (Hasse) Kantvilas & Gueidan
Ochrolechia africana Vain.
Ochrolechia apiculata Versegly
Ochrolechia gyrophorica (A.W.Archer) A.W.Archer & Lumbsch
Opegrapha sp. (GK 285/18; HO 595582)
Opegrapha atra Pers.
+ *Opegrapha niveoatra* (Borrer) J.R.Laundon
+ *Opegrapha spodopolia* Nyl.
+ *Opegrapha varia* Pers.
Pannaria elixii P.M.Jørg. & D.J.Galloway
Paraporpidia aff. *glauca* (Taylor) Rambold
Paraporpidia leptocarpa (C.Bab. & Mitt.) Rambold & Hertel
Parmotrema neopustulatum Kurok.
Parmotrema ochrocrinitum Elix & J.Johnst.
Parmotrema perlatum (Huds.) M.Choisy
Parmotrema reticulatum (Taylor) M.Choisy
Pertusaria crassilabra Müll.Arg.
Pertusaria lophocarpa Körb.
Pertusaria pertractata Stirt.
Physcia albata (F.Wilson) Hale
Physcia austrocaesia Elix
+ *Physcia austrostellaris* Elix
Physcia neonubila Elix
Physcia poncinsii Hue
Placidium squamulosum (Ach.) Breuss
Porina corrugata Müll.Arg.
Porina elegantula Müll.Arg.
Porina meridionalis P.M.McCarthy
Porina raphidiophora (Nyl.) Müll.Arg.
Porina subargillacea Müll.Arg.
Porpidia crustulata (Ach.) Hertel & Knoph
Punctelia borrieri (Sm.) Krog
Punctelia pseudocoralloidea (Gyeln.) Elix & Kantvilas
Ramalina caespitella G.N.Stevens
Ramalina canariensis J.Steiner
Ramalina celsi (Spreng.) Krog & Swinscow
Ramalina fissa (Müll.Arg.) Vain.
Ramalina inflata (Hook.f. & Taylor) Hook.f. & Taylor
Ramboldia sp. (GK 242/19)
Ramboldia blastidiata Kantvilas & Elix
Ramboldia laeta (Stirt.) Kalb, Lumbsch & Elix
Ramboldia petraeoides (Nyl. ex C.Bab. & Mitt.) Kantvilas & Elix
Ramboldia stuartii (Hampe) Kantvilas & Elix
+ *Ramonia absconsa* (Tuck.) Vezda
Rhizocarpon geographicum (L.) DC.
Rhizocarpon reductum Th.Fr.
Rinodina asperata (Shirley) Kantvilas
Rinodina australiensis Müll.Arg.
Rinodina blastidiata Matzer & H.Mayrhofer
Rinodina oleae Bagl.
Rinodinella fertilis (Körb.) Elix var. *fertilis*
Schismatomma occultum (C.Knight & Mitt.) Zahlbr.
Teloschistes chrysophthalmus (L.) Th.Fr.
Teloschistes spinosus (Hook.f. & Taylor) J.S.Murray
Teloschistes velifer F.Wilson
Tephromela alectoronica Kalb
Tephromela atra (Huds.) Hafellner
Thelenella tasmanica H.Mayrhofer & P.M.McCarthy
Toninia aromatica (Sm.) A.Massal.
Trapelia sp. (GK 226/19)
+ *Trapelia concentrica* Elix & P.M.McCarthy
Tyloballia verrucosa (Müll.Arg.) Kantvilas
Usnea cornuta Körb.
Usnea rubrotincta Stirt.
Usnea torulosa (Müll.Arg.) Zahlbr.
Verrucaria muralis Ach.
Xanthoparmelia australasica D.J.Galloway
Xanthoparmelia bungendorensis (Elix) Elix & J.Johnst.
Xanthoparmelia conranensis (Elix) Elix
Xanthoparmelia digitiformis (Elix & P.M.Armstr.) Filson
Xanthoparmelia elixii Filson
Xanthoparmelia filsonii Elix & J.Johnst.
Xanthoparmelia flavescens (Gyeln.) D.J.Galloway
Xanthoparmelia microcephala Elix & Kantvilas
Xanthoparmelia microphyllizans Elix
Xanthoparmelia mougeotina (Nyl.) D.J.Galloway
Xanthoparmelia neotinctina (Elix) Elix & J.Johnst.
Xanthoparmelia streimannii (Elix & P.M.Armstr.) Elix & J.Johnst.
Xanthoparmelia subprolixa (Nyl. ex Kremp.) O.Blanco *et al.*
Xanthoparmelia tasmanica (Hook.f. & Taylor) Hale
Xanthoparmelia verisidiosa (Essl.) O.Blanco *et al.*
Xanthoparmelia xanthomelaena (Müll.Arg.) Hale
+ *Xanthoparmelia xerica* (Elix) Elix
Xanthoria sp. (GK 394/18)
Xanthoria angustata S.Y.Kondr. & Karnefelt
Xanthoria coomae S.Y.Kondr. & Karnefelt
Xanthoria elixii S.Y.Kondr. & Karnefelt
Xanthoria ligulata (Körb.) P.James

Appendix 1.4: Invertebrate taxa of Musselroe Wind Farm

ARTHROPODS

ARCHAEOGNATHA

Meinertellidae

Machiloides hickmani Womersley, 1939

BLATTODEA

Blaberidae

Calolampira irrorata (Fabricius, 1775)

Blattidae

- + Blattidae unplaced sp. TMAG_F95715
- Drymaplaneta* cf. *communis* Tepper, 1893
- Platyzosteria biglumis* (Saussure, 1864)

COLEOPTERA

Anamorphidae

- + *Idiophyes* sp. TMAG_F98611

Anthicidae

- Anthicidae unplaced sp. TMAG_F95636
- Anthicidae unplaced sp. TMAG_F98784
- Anthicidae unplaced sp. TMAG_F98926
- Lagrioida australis* Champion, 1895
- Mecynotarsus leai* Pic, 1942
- Trichananca victoriensis* Blackburn, 1891

Anthribidae

- Anthribidae unplaced TFIC sp. 04
- Araecerus palmaris* (Pascoe, 1882)

Belidae

- Pachyura australis* Hope, 1834
- Rhinotia bidentata* (Donovan, 1805)
- Stenobelus tibialis* (Blackburn, 1893)

Buprestidae

- Germanica lilliputana* (Thomson, 1879)
- Melobasis innocua* Thomson, 1879
- Melobasis nervosa* (Boisduval, 1835)

Cantharidae

- Chauliognathus lugubris* (Fabricius, 1801)
- Chauliognathus tricolor* (Castelnau, 1840)
- Heteromastix* unplaced

Carabidae

- Amblytelus brevis* Blackburn, 1892
- Bembidion proprium* Blackburn, 1888
- Carabidae unplaced sp. TMAG_F95840
- Carabidae unplaced sp. TMAG_F97712
- Carabidae unplaced sp. TMAG_F1148372
- Clivina vagans* Putzeys, 1866
- Clivina vittata* Sloane, 1896
- Demetrída* sp. TMAG_F98712
- Hypharpax peronii* (Castelnau, 1867)
- Loxandrus* sp. TMAG_F95857
- Notonomus politulus* (Chaudoir, 1865)
- Philophlaeus simsoni* Sloane, 1920
- Prosopognmus chalybeipennis* (Chaudoir, 1843)
- Pseudoceneus sollicitus* (Erichson, 1842)
- Sarothrocrepis integra* Baehr, 2018
- Scaraphites rotundipennis* (Dejean, 1825)
- Scopodes* sp. TMAG_F96081

Cerambycidae

- Ancita crocogaster* (Boisduval, 1835)

- Ancita marginicollis* (Boisduval, 1835)
- Bethelium diversicorne* (White, 1846)
- Callidiopini unplaced sp. TMAG_F100860
- Callidiopini unplaced sp. TMAG_F33390
- Cerambycinae unplaced sp. TMAG_F96396
- Enchoptera apicalis* Saunders, 1850
- Hesthesis cingulatus* (Kirby, 1818)
- Neissa inconspicua* Pascoe, 1866
- Nenenia* sp. TMAG_F98558
- Stenoderus suturalis* (Olivier, 1795)
- Uracanthus* sp. TMAG_F95575

Chrysomelidae

- Agetinus subcostata* (Chapuis, 1874)
- Aporocera viridipennis* (Saunders, 1842)
- Arsipoda* sp. TMAG_F98512
- Chaetocnema* sp. TMAG_F95720
- Ditropidus* unplaced
- Euryspa albipennis* (Germar, 1848)
- Geloptera jugularis* (Erichson, 1842)
- Geloptera* sp. TMAG_F41254
- Monolepta* unplaced
- Paropsis charybdis* Stål, 1860
- Paropsis porosa* Erichson, 1842
- Paropsisterna nobilitata* (Erichson, 1842)
- Paropsisterna oblitterata* (Erichson, 1842)
- Pelioschema* unplaced
- +i *Psylliodes marcida* (Illiger, 1807)

Cleridae

- Blackburniella intricata* (Blackburn, 1891)
- Eleale simplex* (Newman, 1840)
- Eunatalis porcata* (Fabricius, 1787)
- Lemidia cicatricosa* Lea, 1907
- Lemidia* sp. TMAG_F98680
- Lemidia subaenea* Gorham, 1877
- i? *Necrobia rufipes* (DeGeer, 1775)
- Neoscrobiger* sp. TMAG_F95985

Coccinellidae

- Cleobora mellyi* (Mulsant, 1850)
- Coccinella transversalis* Fabricius, 1781
- i *Coccinella undecimpunctata* Linnaeus, 1758
- Coccinellidae unplaced sp. TMAG_F98853
- Coccinellidae unplaced TFIC sp. 22
- Harmonia conformis* (Boisduval, 1835)
- Micraspis frenata* (Erichson, 1842)
- Rhyzobius hirtellus* Crotch, 1874
- Rhyzobius* sp. TMAG_F98708
- Rhyzobius pelion* Tomaszewska, 2010
- Rhyzobius* TFIC sp. 05
- Rhyzobius* TFIC sp. 15
- Rhyzobius* TFIC sp. 35
- Rhyzobius ventralis* (Erichson, 1842)

Corylophidae

- Holopsis* unplaced
- Sericoderus* TFIC sp. 05

Curculionidae

- Aades cultratus* (Fabricius, 1775)
- Aoplocnemis* unplaced
- Aphela algarum* Pascoe, 1870
- Aphela helopoides* Pascoe, 1865

- Cnestus pseudosolidus* (Schedl, 1936)
 Cryptorhynchini unplaced sp. TMAG_F95457
 Cryptorhynchini unplaced sp. TMAG_F95499
 Curculionidae unplaced sp. TMAG_F58817
 Curculionidae unplaced sp. TMAG_F95604
 Curculionidae unplaced sp. TMAG_F96050
 Curculionidae unplaced sp. TMAG_F98766
 Curculionidae unplaced sp. TMAG_F98811
Epamoebus ziczac Lea, 1909
Ethemaia sellata Pascoe, 1865
Gerymassa picticornis Blackburn, 1893
Gonipterus unplaced
Haplonyx casuarinae (Lea, 1909)
 Leptopiini unplaced sp. TMAG_F41329
 Leptopiini unplaced sp. TMAG_F95510
 Leptopiini unplaced sp. TMAG_F95890
 Leptopiini unplaced sp. TMAG_F96210
 Leptopiini unplaced sp. TMAG_F98700
Leptopius duponti (Boisduval, 1835)
Mandalotus TFIC sp. 14
Melanterius acaciae Lea, 1899
Merimnetes oblongus (Blanchard, 1853)
Meriphus sp. TMAG_F96628
Neolaemosaccus narinus (Pascoe, 1872)
Neolaemosaccus sp. TMAG_F96154
Orthorhinus klugii Boheman, 1835
Orthorhinus TFIC sp. 02
Pelororhinus margaritaceus Erichson, 1842
Pelororhinus TFIC sp. 01
Pentamimus australis (Erichson, 1842)
Pseudotimareta subterranea (Lea, 1908)
Rhamphus acaciae Lea, 1895
Sclerorhinus bubalus (Olivier, 1807)
Scotasmus litoralis (Lea, 1911)
Storeus albosignatus (Blackburn, 1890)
Storeus sp. TMAG_F98972
 Tychiini unplaced TFIC sp. 18
- Dermestidae**
 i?+*Attagenus pellio* (Linnaeus, 1758)
Trogoderma TFIC sp. 01
- Dytiscidae**
Antiporus sp. TMAG_F97815
Chostonectes unplaced
Exocelina australiae (Clark, 1863)
Lancetes lanceolatus (Clark, 1863)
Limbodessus gemellus (Clark, 1862)
Megaporus unplaced
Necterosoma penicillatum (Clark, 1862)
Onychohydus scutellaris (Germar, 1848)
Platynectes unplaced
Rhantus suturalis (Macleay, 1825)
Sternopriscus tasmanicus Sharp, 1882
Sternopriscus sp. TMAG_F97431
- Elateridae**
Agrypnus impresicollis (Elston, 1924)
Agrypnus pictipennis (Candèze, 1857)
Agrypnus TFIC sp. 01
Conoderus erubescens (Candèze, 1859)
Conoderus fabrilis (Erichson, 1842)
Conoderus TFIC sp. 03
Conoderus TFIC sp. 11
Conoderus TFIC sp. 12
 Elateridae unplaced sp. TMAG_F95495
 Elateridae unplaced sp. TMAG_F98582
 Elateridae unplaced sp. TMAG_F98981
 Elateridae unplaced TFIC sp. 10
 Elateridae unplaced TFIC sp. 32
Enischmelater specularis (Candèze, 1889)
Paracardiophorus sp. TMAG_F95158
Paracardiophorus sp. TMAG_F95439
- Geotrupidae**
 i *Geotrupes spiniger* Marsham, 1802
- Histeridae**
Saprinus laetus Erichson, 1834
Teretrius sorellensis Blackburn, 1903
- Hybosoridae**
 + *Liparochrus* sp. TMAG_F95801
- Hydraenidae**
 + *Gymnochthebius* sp. TMAG_F96374
- Hydrophilidae**
Berosus unplaced
Cercyon sp. TMAG_F96383
Enochrus sp. TMAG_F94420
Hydrophilus latipalpus Castelnau, 1840
Limnoxenus zealandicus (Broun, 1880)
Paracymus unplaced
- Hygrobiidae**
Hygrobia australasiae (Clark, 1862)
- Latridiidae**
Corticicara TFIC sp. 02
- Leiodidae**
Choleva TFIC sp. 01
Eublackburniella sp. TMAG_F41310
 Leiodidae unplaced sp. TMAG_F41346
Zeadolopus unplaced
- Lucanidae**
Syndesus cornutus (Fabricius, 1801)
- Lycidae**
Xylobanus simplicicornis (Lea, 1909)
- Meloidae**
Palaestra cyanipennis (Pascoe, 1860)
- Melyridae**
Dicranolaius cinctus (Redtenbacher, 1867)
Hypattalus exilis Lea, 1909
 Melyridae unplaced sp. TMAG_F98714
 Melyridae unplaced sp. TMAG_F98715
- Mordellidae**
Glipostenoda TFIC sp. 09
Mordella promiscua Erichson, 1842
 Mordellidae unplaced sp. TMAG_F98627
- Nitidulidae**
Epuraea meyricki (Blackburn, 1891)
- Phalacridae**
Austroporus melas (Lea, 1932)
 Phalacridae unplaced sp. TMAG_F44443
- Phycosecidae**
Phycosecis litoralis Pascoe, 1875

Ptinidae

- Deltocryptus* sp. TMAG_F98780
 Ptinidae unplaced sp. TMAG_F98630
 Ptinidae unplaced sp. TMAG_F98874
Ptinus exulans Erichson, 1842

Rhipiceridae

- Rhipicera femorata* Kirby, 1818

Salpingidae

- Orphanotrophium* TFIC sp. 01

Scarabaeidae

- Adoryphorus coulonii* (Burmeister, 1847)
 i *Aphodius lividus* (Olivier, 1789)
Aplopsis evexa (Britton, 1957)
Atenius brouni (Sharp, 1876)
Automolius depressus (Blanchard, 1850)
Cheiroplatys latipes (Guérin-Méneville, 1831)
Diphucephala colaspoides (Gyllenhal, 1817)
Diphucephala smaragdula Boisduval, 1835
Heteronyx cervina (Boisduval, 1835)
Heteronyx pilosellus Blanchard, 1850
Heteronyx tasmanicus Blackburn, 1909
Liparetrus discipennis Guérin-Méneville, 1831
Liparetrus sericeus Macleay, 1871
 Melolonthinae unplaced sp. TMAG_F95945
 Melolonthinae unplaced sp. TMAG_F98770
Onthophagus fuliginosus Erichson, 1842
Onthophagus posticus Erichson, 1842
Onthophagus pronus Erichson, 1842
Onthophagus sp. TMAG_F97557
Phyllotocus macleayi Fischer, 1823
Phyllotocus rufipennis (Boisduval, 1835)
Sericesthis nigrolineata Boisduval, 1835

Scirtidae

- Spilotocyphon spilotus* (Blackburn, 1892)

Scraptiidae

- Scraptia laticollis* Champion, 1895

Silphidae

- Promaphila lacrymosa* (Schreibers, 1802)

Staphylinidae

- Aleochara blackburni* Bernhauer & Scheerpeltz, 1926
 Aleocharinae unplaced sp. TMAG_F41202
Bledius aterrimus Fauvel, 1877
Cafius australis (L. Redtenbacher, 1868)
Cafius sabulosus Fauvel, 1877
Cafius seriatus Fauvel, 1877
Creophilus erythrocephalus (Fabricius, 1775)
Paederus cruenticollis Germar, 1848
Quedius sp. TMAG_F98639
 Staphylininae unplaced sp. TMAG_F96390

Tenebrionidae

- Adelium brevicorne* Blessig, 1861
Adelium tenebroides Erichson, 1842
Atoichus bicolor (Blackburn, 1893)
Bassianus colydioides (Erichson, 1842)
Ecnolagria rufescens (Boisduval, 1835)
Edylius canescens Champion, 1894
Hyocis bakewelli Pascoe, 1866
Isopteron aversum (Pascoe, 1869)
Isopteron triviale (Erichson, 1842)

- Meneristes australis* (Boisduval, 1835)
Nocar depressusculus (Macleay, 1872)
Pachycoelia sulcicollis Boisduval, 1835
Pemanoa tasmanica (Carter, 1915)
Pterohelaeus peltatus (Erichson, 1842)
Saragus costatus (Solier, 1848)
Sphargeris physodes Pascoe, 1860
 Tenebrionidae unplaced sp. TMAG_F95884
Tetragonomenes ruficornis (Champion, 1894)
Titaena columbina Erichson, 1842

Throscidae

- + Throscidae unplaced sp. TMAG_F98854

Trogidae

- Omorgus australasiae* (Erichson, 1842)

Trogossitidae

- Leperina decorata* (Erichson, 1842)

DERMAPTERA**Anisolabididae**

- Euborellia brunneri* (Dohrn, 1864)
Gonolabis unplaced

Labiduridae

- Labidura riparia* (Pallas, 1773)

DIPTERA**Acroceridae**

- + *Ogcodes* sp. TMAG_F95695

Asilidae

- Bathypogon nigrinus* Ricardo, 1912
Cerdistus caliginosus (White, 1914)
Cerdistus flavicinctus (White, 1914)
Cerdistus vittipes (Macquart, 1847)
Leptogaster sp. TMAG_F98958
Neoaratus hercules (Wiedemann, 1828)
Neoscleropogon unplaced

Australimyziidae

- Australimyza mcalpinei* Brake & Mathis, 2007

Bibionidae

- Dilophus* unplaced

Bombyliidae

- Acridophagus paganicus* (White, 1916)
Aleucosia atherix (Newman, 1841)
Aleucosia calophthalma (Thomson, 1869)
Comptosia ocellata (Newman, 1841)
Exechohypopion nigricostatum (Macquart, 1850)
Exechohypopion velox (White, 1916)
Meomyia fasciculata (Macquart, 1840)
Villa fuscicostata (Macquart, 1846)

Calliphoridae

- Calliphora hilli* Patton, 1925
Calliphora stygia (Fabricius, 1782)
 Calliphoridae unplaced sp. TMAG_F97634
 Calliphorinae unplaced sp. TMAG_F99027
Onesia sp. TMAG_F98547

Canacidae

- Canacidae unplaced sp. TMAG_F41340
 Canacidae unplaced sp. TMAG_F41341

Chamaemyiidae

- Chamaemyiidae unplaced sp. TMAG_F96118

Chironomidae

- Chironomidae unplaced sp. TMAG_F41374

- Chironomidae unplaced sp. TMAG_F95551
 Chironomidae unplaced sp. TMAG_F96041
 Chironomidae unplaced sp. TMAG_F96042
- Chloropidae**
Apotropina ornatipennis (Malloch, 1923)
 Chloropidae unplaced sp. TMAG_F96424
 Chloropidae unplaced sp. TMAG_F98232
Pemphigonotus sp. TMAG_F97691
- Coelopidae**
Amma blancheae McAlpine, 1991
Chaetocoelopa sydneyensis (Schiner, 1868)
Gluma musgravei McAlpine, 1991
Gluma nitida McAlpine, 1991
Rhis whitleyi McAlpine, 1991
- Dolichopodidae**
 Dolichopodidae unplaced sp. TMAG_F41283
 Dolichopodidae unplaced sp. TMAG_F41365
 Dolichopodidae unplaced sp. TMAG_F115776
 Dolichopodidae unplaced sp. TMAG_F97581
Heteropsilopus cingulipes (Walker, 1835)
 Hydrophorinae unplaced sp. TMAG_F57575
 Sciapodinae unplaced sp. TMAG_F97453
- Empididae**
 Empididae unplaced sp. TMAG_F40378
 Empididae unplaced sp. TMAG_F41210
 Empididae unplaced sp. TMAG_F41274
 Empididae unplaced sp. TMAG_F41359
 Empididae unplaced sp. TMAG_F41360
- Ephydriidae**
Ephydrella unplaced
 + Ephydriidae unplaced sp. TMAG_F95706
 Ephydriidae unplaced sp. TMAG_F98245
Hydrellia tritici Coquillett, 1903
Scatella sp. TMAG_F59706
- Heteromyzidae**
Diplogeomyza wirthi McAlpine, 1967
- Hybotidae**
 Hybotidae unplaced sp. TMAG_F96039
- Lauxaniidae**
 Lauxaniidae unplaced sp. TMAG_F41248
 Lauxaniidae unplaced sp. TMAG_F96423
Paranomina unicolor Hendel, 1907
Sapromyza mallochiana Evenhuis & Okadome, 1989
- Limoniidae**
Gynoplistia sp. TMAG_F95911
 Limoniidae unplaced sp. TMAG_F96199
- Lonchaeidae**
 Lonchaeidae unplaced sp. TMAG_F6351
- Muscidae**
Coenosia sp. TMAG_F47332
Helina sp. TMAG_F12791
Lispe cana (Walker, 1849)
 Muscidae unplaced sp. TMAG_F41290
 Muscidae unplaced sp. TMAG_F41370
 Muscidae unplaced sp. TMAG_F99028
- Mycetophilidae**
 Mycetophilidae unplaced sp. TMAG_F41206
- Nemestrinidae**
Trichophthalma punctata (Macquart, 1846)
- Piophilidae**
 Piophilidae unplaced sp. TMAG_F41358
- Platystomatidae**
Duomyia decora (Macquart, 1846)
Lamprogaster laeta (Macquart, 1835)
Rivellia unplaced
- Pyrgotidae**
Cardiacera cf. *anthonyi* (Paramonov, 1958)
Cardiacera sp. TMAG_F95804
- Rhinophoridae**
 + *Axinia* unplaced sp. TMAG_F5984
- Sarcophagidae**
Oxysarcodexia varia (Walker, 1836)
Protomiltogramma laticeps Malloch, 1930
Sarcophaga sp. TMAG_F72915
 Sarcophaginae unplaced sp. TMAG_F96711
- Sciaridae**
 Sciaridae unplaced sp. TMAG_F41293
 Sciaridae unplaced sp. TMAG_F96040
- Sepsidae**
Parapalaeosepsis plebeia (De Meijere, 1906)
- Simuliidae**
 Simuliidae unplaced sp. TMAG_F41364
- Sphaeroceridae**
Thoracochoeta unplaced
- Stratiomyidae**
Inopus rubriceps (Macquart, 1847)
Octarthria brunnipennis (Fuller, 1934)
Odontomyia sp. TMAG_F96259
- Syrphidae**
Eumerus argyrogaster Ferguson, 1926
Eumerus latipes Macquart, 1846
Melangyna viridiceps (Macquart, 1847)
Orthoprosopa grisea (Walker, 1835)
Psilota coerulea Macquart, 1846
Psilota femoralis Schiner, 1868
Simosyrphus grandicornis (Macquart, 1842)
Xanthandrus agrolas (Walker, 1849)
- Tabanidae**
Dasybasis gentilis (Erichson, 1842)
Dasybasis neocirrus (Ricardo, 1917)
Dasybasis neolatifrons (Ferguson & Hill, 1922)
Dasybasis sp. TMAG_F46925
Dasybasis sp. TMAG_F96260
Mackerrasus microdonta (Macquart, 1847)
Scaptia auriflua (Donovan, 1805)
- Tachinidae**
Chaetophthalmus similis (Walker, 1853)
Microtropesa nigricornis Macquart, 1851
Polychaeta sp. TMAG_F95700
Rutilia sp. TMAG_F96000
Rutilia sp. TMAG_F97587
Rutilia sp. TMAG_F97588
Rutilia sp. TMAG_F97671
Rutilia vivipara (Fabricius, 1805)
 Tachinidae unplaced sp. TMAG_F95526
 Tachinidae unplaced sp. TMAG_F96034
 Tachinidae unplaced sp. TMAG_F96355
 Tachinidae unplaced sp. TMAG_F98551

Tachinidae unplaced sp. TMAG_F98553
 Tachinidae unplaced sp. TMAG_F98650
 Tachinidae unplaced sp. TMAG_F98761
Tritaxys heterocera (Macquart, 1846)

Tephritidae

Austrotephritis bushi (Hardy & Drew, 1996)
Sphenella ruficeps (Macquart, 1851)
Trupanea prolata Hardy & Drew, 1996

Therevidae

Acraspisa sp. TMAG_F95917
Acupalpa sp. TMAG_F96343
Anabarhynchus fuscoapicatus Lyneborg, 2001
Anabarhynchus maritimus Hardy, 1916
Bonjeania segnis (White, 1916)
Ectinorhynchus sp. TMAG_F47017
Evansomyia sp. TMAG_F41156

HEMIPTERA

Acanthosomatidae

Acanthosomatidae unplaced sp. TMAG_F57832
Duadicus pallidus Dallas, 1851
Elasmostethus sp. TMAG_F98349
Eupolemus sp. TMAG_F96017
Eupolemus sp. TMAG_F96098
Hiarchas sp. TMAG_F95667
Stauralia chloracantha Dallas, 1851

Achilidae

Argeleusa sp. TMAG_F57755

Alydidae

Mutusca brevicornis (Dallas, 1852)

Aradidae

Prosympiestus sp. TMAG_F98259

Callipappidae

Callipappus unplaced

Cercopidae

Bathyllus albicinctus (Erichson, 1842)

Cicadellidae

Cicadellidae unplaced sp. TMAG_F95683

Cicadidae

Diemeniana euronotiana (Kirkaldy, 1909)
Gelidea torrida (Erichson, 1842)

Coreidae

Agriopocoris unplaced
Gelonus tasmanicus (Le Guillou, 1841)

Corixidae

Diaprepocoris barycephala Kirkaldy, 1897
Sigara australis (Fieber, 1851)
Sigara neboissi Lansbury, 1970

Cydnidae

Adrisa atra (Dallas, 1851)
Adrisa sp. TMAG_F98735
 Cydnidae unplaced sp. TMAG_F96412
Macroscyrtus sp. TMAG_F6477

Enicocephalidae

Oncyclocotis tasmanicus (Westwood, 1837)

Flatidae

Siphanta cf. *hebes* (Walker, 1851)
Siphanta tasmanica Fletcher, 1985

Gelastocoridae

Nerthra sp. TMAG_F97681

Membracidae

Acanthuchus trispinifer (Fairmaire, 1846)
Ceraon tasmaniae (Fairmaire, 1846)

Micronectidae

Micronecta annae Kirkaldy, 1905
Micronecta robusta Hale, 1922

Miridae

Miridae unplaced sp. TMAG_F41263
 Miridae unplaced sp. TMAG_F41342
 Miridae unplaced sp. TMAG_F57255
 Miridae unplaced sp. TMAG_F95673
 Miridae unplaced sp. TMAG_F95825
 Miridae unplaced sp. TMAG_F96013
 Miridae unplaced sp. TMAG_F96014
 Miridae unplaced sp. TMAG_F96106
Pseudopantilius australis (Walker, 1873)

Notonectidae

Anisops deanei Brooks, 1951
Enithares woodwardi Lansbury, 1968

Ochteridae

Ochterus unplaced

Pentatomidae

Anaxilaua vesiculosus (Herrich-Schäffer, 1840)
Buthumka sp. TMAG_F59527
Cuspicona stenuella Walker, 1868
Diaphyta rosea Bergroth, 1912
Dictyotus caenosus (Westwood, 1837)
Eribotes hobartensis Distant, 1910
Mycoolona atricornis (Westwood, 1837)
Ocirrhoë unimaculata (Westwood, 1837)
Oechalia schellenbergii (Guérin, 1831)
Omyta centrolineata (Westwood, 1837)
Oncocoris geniculatus (Dallas, 1851)
 Pentatomidae unplaced sp. TMAG_F46979
Platycoris sp. TMAG_F95442

Piesmatidae

Mcateella sp. TMAG_F47683

Psyllidae

Psyllidae unplaced sp. TMAG_F103116
 Psyllidae unplaced sp. TMAG_F41260
 Psyllidae unplaced sp. TMAG_F41261

Pyrrhocoridae

Dindymus versicolor (Herrich-Schäffer, 1853)

Reduviidae

Coranus trabeatus Horváth, 1902
Gminatus australis (Erichson, 1842)
Nyllius asperatus Stål, 1859
Peirates fuliginosus (Erichson, 1842)
 Reduviidae unplaced sp. TMAG_F96314
 Reduviidae unplaced sp. TMAG_F96443

Rhyparochromidae

Brentiscerus putoni (White, 1878)
Plinthisus woodwardi Slater & Sweet, 1977
 Rhyparochromidae unplaced sp. TMAG_F95961
 Rhyparochromidae unplaced sp. TMAG_F98732
 Rhyparochromidae unplaced sp. TMAG_F98787

HYMENOPTERA

Apidae

- i *Apis mellifera* Linnaeus, 1758
- Exoneura* unplaced

Bethylidae

- Bethylidae unplaced sp. TMAG_F96401

Braconidae

- Braconidae unplaced sp. TMAG_F95810
- Braconinae unplaced sp. TMAG_F95643
- Braconinae unplaced sp. TMAG_F95828

Chalcididae

- Chalcididae unplaced sp. TMAG_F97622
- Chalcididae unplaced sp. TMAG_F97623

Chrysididae

- Chrysididae unplaced sp. TMAG_F98977

Dryinidae

- Dryinidae unplaced

Colletidae

- Callomelitta* sp. TMAG_F3998
- Euhesma maculifera* (Michener, 1965)
- Euryglossa* sp. TMAG_F96120
- Leioproctus* sp. TMAG_F3995
- Leioproctus* sp. TMAG_F95642
- Leioproctus* sp. TMAG_F97230
- Pachyprosopis* sp. TMAG_F96175
- Perilampus* sp. TMAG_F96179

Crabronidae

- Podagritys* sp. TMAG_F13427
- Podagritys* sp. TMAG_F95864
- Tachysphex* unplaced

Eucharitidae

- Eucharitidae unplaced sp. TMAG_F99017

Evaniidae

- Acanthinevania* sp. TMAG_F100787

Formicidae

- Amblyopone australis* Erichson, 1842
- Anonychomyrma biconvexa* (Santschi, 1928)
- Camponotus claripes* Mayr, 1876
- Camponotus consobrinus* (Erichson, 1842)
- Camponotus gasseri* (Forel, 1894)
- Camponotus hartogi* Forel, 1902
- Camponotus* sp. TMAG_F96335
- Camponotus terebrans* (Lowne, 1865)
- Formicidae unplaced sp. TMAG_F98752
- Iridomyrmex* sp. TMAG_F101247
- Myrmecia forficata* (Fabricius, 1787)
- Myrmecia pilosula* Smith, 1858
- Ochetellus* sp. TMAG_F98800
- Pheidole* unplaced
- Polyrbachis patiens* Santschi, 1920
- Polyrbachis* sp. TMAG_F7097
- Polyrbachis* sp. TMAG_F95827
- Rhytidoponera tasmaniensis* Emery, 1898

Gasteruptionidae

- Gasteruptionidae unplaced sp. TMAG_F96406

Halictidae

- Halictidae unplaced sp. TMAG_F4052
- Halictidae unplaced sp. TMAG_F98518
- Lasioglossum* sp. TMAG_F4140

Ichneumonidae

- Ceratomansa* unplaced
- Dusona* sp. TMAG_F98948
- Echthromorpha intricatoria* (Fabricius, 1804)
- Eriostethus* unplaced
- Habronyx* sp. TMAG_F96407
- Heteropelma* sp. TMAG_F63139
- Ichneumonidae unplaced sp. TMAG_F32289
- Ichneumonidae unplaced sp. TMAG_F95586
- Ichneumonidae unplaced sp. TMAG_F95829
- Ichneumonidae unplaced sp. TMAG_F95868
- Ichneumonidae unplaced sp. TMAG_F98739
- Ichneumonidae unplaced sp. TMAG_F98944
- Ichneumonidae unplaced sp. TMAG_F99011
- Labena* sp. TMAG_F72904
- Netelia* unplaced
- Ophioninae unplaced sp. TMAG_F31846
- Stenarella victoriae* (Cameron, 1912)

Mutillidae

- Odontomyrme cordatiformis* Lelej, 1983

Pompilidae

- Ageniellini unplaced
- Cryptocheilus australis* (Guérin-Méneville, 1838)
- Pompilidae unplaced sp. TMAG_F59520
- Pompilidae unplaced sp. TMAG_F97700
- Pompilidae unplaced sp. TMAG_F98802
- Pompilidae unplaced sp. TMAG_F98834
- Pompilidae unplaced sp. TMAG_F98838
- Pompilidae unplaced sp. TMAG_F99012
- Pompilidae unplaced sp. TMAG_F99014
- Psoropempula* sp. TMAG_F57286
- Sphictostethus* sp. TMAG_F98745
- Turneromyia* unplaced

Sphecidae

- Podalonia tydei* (Le Guillou, 1841)
- Prionyx* unplaced

Tiphiidae

- Catocheilus apterus* (Olivier, 1811)
- Diamma bicolor* Westwood, 1835
- Lophocheilus villosus* Guérin-Méneville, 1842
- Neozeleboria carinicolis* Turner, 1915
- Neozeleboria volatilis* (Smith, 1859)
- Rhagigaster scalae* (Dalla Torre, 1897)
- Thynninae* unplaced sp. TMAG_F95644
- Thynninae* unplaced sp. TMAG_F96172
- Thynninae* unplaced sp. TMAG_F96405
- Thynninae* unplaced sp. TMAG_F97084
- Thynnoides mesopleuralis* Turner, 1912

Vespididae

- Paralastor* unplaced

LEPIDOPTERA

Anthelidae

- Anthela acuta* (Walker, 1855)
- Anthela nicothoe* (Boisduval, 1832)
- Anthela ocellata* (Walker, 1855)
- Munychryiinae unplaced

Batrachedridae

- + *Batrachedra* sp. TMAG_F99720

Cosmopterigidae+ *Limnaecia* sp. TMAG_F107740**Cossidae***Endoxyla lituratus* (Donovan, 1805)**Crambidae**

Crambidae unplaced

Crambinae unplaced

Eudonia cleodorialis (Walker, 1859)*Metasia capnochroa* (Meyrick, 1884)*Prothostola microphaellus* (Walker, 1866)

Pyraustinae unplaced

Tipanaea patulella Walker, 1863*Uresiphita ornithopteralis* (Guenée, 1857)**Depressariidae***Eutorna intonsa* Meyrick, 1906**Elachistidae***Chrysoclista* unplaced

Elachistinae unplaced

Erebidae*Acyphas semiochrea* (Herrich-Schäffer, 1855)

Erebidae unplaced

Halone sejuncta (R. Felder & Rogenhofer, 1875)*Palaeosia* unplaced*Paramsacta marginata* (Donovan, 1805)*Philenora* sp. TMAG_F108002*Praxis edwardsii* Guenée, 1852*Scoliacma* unplaced*Spilosoma canescens* (Butler, 1875)+ *Thalarcha phalarota* Meyrick, 1886**Geometridae***Anachloris uncinata* (Guenée, 1857)*Antasia flavicapitata* (Guenée, 1857)*Capusa senilis* Walker, 1857*Chloroclystis filata* (Guenée, 1858)*Chlorocoma assimilis* (Lucas, 1888)*Chlorocoma externa* (Walker, 1861)*Chrysolarentia insulsata* (Guenée, 1858)*Chrysolarentia mecynata* (Guenée, 1857)*Chrysolarentia ptochopis* (Turner, 1907)*Crypsiphona tasmanica* Óunap & Viidalepp, 2009*Dichromodes ainaria* Guenée, 1857*Dichromodes confluaria* (Guenée, 1857)*Dichromodes consignata* (Walker, 1861)*Dichromodes euscia* Meyrick, 1890*Dichromodes longidens* Prout, 1910*Dichromodes stilbiata* (Guenée, 1857)*Dichromodes* unplaced*Dinophalus serpentaria* (Guenée, 1864)*Eccymatoge callizona* (Lower, 1894)*Epyaxa agelasta* (Turner, 1904)*Epyaxa subidaria* (Guenée, 1857)*Gastrina cristaria* Guenée, 1857*Hydriomenini* unplaced *severata* (Guenée, 1857)*Idiodes apicata* Guenée, 1857Lithinini unplaced *goniota**Melanodes anthracitaria* Guenée, 1857*Microdes villosata* Guenée, 1857*Nisista serrata* (Walker, 1857)*Oenochroma* unplaced*Oenochroma vinaria* Guenée, 1857*Pasiphilodes testulata* (Guenée, 1857)*Phrissogonus laticostata* (Walker, 1862)*Psilosticha mactaria* (Guenée, 1857)*Rhynchopsota delogramma* Lower, 1903*Scioglyptis* unplaced*Scopula optivata* (Walker, 1861)*Scopula perlata* (Walker, 1861)*Syneora mundifera* (Walker, 1860)+ *Taxeotis intermixtaria* (Walker, 1861)**Gracillariidae***Polysoma eumetalla* (Meyrick, 1880)**Heliozelidae***Heliozela* unplaced

Heliozelidae unplaced

Hesperiidae*Ocybadistes walkeri* Heron, 1894**Lasiocampidae***Pararguda nasuta* (Lewin, 1805)**Limacodidae***Doratifera pinguis* (Walker, 1855)**Lycanidae***Theclinesstes serpentatus* (Herrich-Schäffer, 1869)**Noctuidae***Agrotis infusa* (Boisduval, 1832)*Agrotis munda* Walker, 1857*Agrotis porphyricollis* Guenée, 1852*Bathytricha truncata* (Walker, 1856)*Dasygaster pammacha* Guenée, 1852*Ectopatria* "DPILMBrownsshortpecten"*Ectopatria* unplacedHadenini unplaced species inquirenda *exarans* Lucas, 1894Hadenini unplaced species inquirenda *ligniplena* Walker, 1857*Helicoverpa punctigera* (Wallengren, 1860)

Noctuidae unplaced

Persectania ewingii (Westwood, 1839)*Proteuxoa bistrigula* (Walker, 1857)*Proteuxoa melanographa* (Turner, 1908)*Proteuxoa* sp. nr *flexirena* (Walker, 1865)**Nolidae***Nola* ANIC sp. 03

Nolidae unplaced

Notodontidae*Epicoma melanospila* (Wallengren, 1860)*Psalidostetha banksiae* (Lewin, 1805)+ *Scythrophanes stenoptera* Turner, 1926**Nymphalidae***Heteronympha merope* (Fabricius, 1775)*Vanessa kershawi* (McCoy, 1868)*Vanessa itea* (Fabricius, 1775)**Oecophoridae***Araeostoma* ANIC sp. 01*Barea atmophora* Turner, 1916*Barea exarcha* (Meyrick, 1883)*Barea* unplaced*Bida radiosella* (Walker, 1863)

Oecophoridae unplaced

Oxythecta hieroglyphica Meyrick,
 + *Philobota olympias* Meyrick, 1889
Philobota sp. TMAG_F058300
Wingia group unplaced

Pieridae

*i *Pieris rapae* (Linnaeus, 1758)

Plutellidae

Plutella xylostella (Linnaeus, 1758)

Psychidae

Psychidae unplaced

Pyrilidae

Etiella behrii (Zeller, 1848)
Faveria tritalis (Walker, 1863)
Meyriccia latro (Zeller, 1873)
 Phycitinae unplaced
Stericta marmorea (Warren, 1891)

Pyraloidea

Pyraloidea unplaced

Saturniidae

Opodiphthera helena (White, 1843)

Scythrididae

Scythris rhabducha Meyrick, 1897

Sphingidae

Hippotion scrofa (Boisduval, 1832)

Tineidae

+ *Edosa* sp. TMAG_F99719
Monopis icterogastra (Zeller, 1852)

Tortricidae

Acropolitis ptychosema Turner, 1927
Acropolitis rudisana (Walker, 1863)
Cochylis cf ANIC sp. 01
Epiphyas epichorda (Meyrick, 1910)
 Eucosmini unplaced
Euphona ammochroa (Lower, 1893)
Holocola unplaced
Meritastis ANIC sp. 02
 Olethreutinae unplaced
 + *Peraglyphis* sp. TMAG_F99734
Strepsicrates ejectana (Walker, 1863)
Subfurcatana unplaced
Syllomatia unplaced
Symphygas nephaulia (Meyrick, 1910)

Tortricidae

Tortricidae unplaced

Xyloryctidae

Xyloryctidae unplaced

MANTODEA

Mantidae

Orthodera ministralis (Fabricius, 1775)
Tenodera australasiae (Leach, 1814)

MECOPTERA

Bittacidae

Harpobittacus australis (Klug, 1838)

NEUROPTERA

Chrysopidae

Apertochrysa edwardsi (Banks, 1940)

Chrysopidae

+ *Mallada signatus* (Schneider, 1851)

Hemerobiidae

Micromus tasmaniae (Walker, 1860)

Mantispidae

Campion australasiae (Guérin-Méneville, 1844)

ODONATA

Lestidae

Austrolestes analis (Rambur, 1842)

ORTHOPTERA

Acrididae

+ *Austroicetes frater* (Brancsik, 1897)
Austroicetes vulgaris (Sjöstedt, 1931)
Cirphula pyrrhocnemis (Stål, 1861)
Gastrimargus musicus (Fabricius, 1775)
Goniaea australasiae (Leach, 1814)
Macrotona australis (Walker, 1870)
 e+ *Schayera baiulus* (Erichson, 1842)
 + *Schizobothrus flavovittatus* Sjöstedt, 1921
 + *Urnisa rugosa* de Saussure, 1884

Gryllidae

+ *Lepidogryllus parvulus* (Walker, 1869)

Morabidae

+ *Vandiemenella viatica* (Erichson, 1842)

Tetrigidae

Paratettix argillaceus (Erichson, 1842)

Tettigoniidae

Conocephalus bilineatus (Erichson, 1842)
Zaprochilus australis (Brullé, 1835)

Trigonidiidae

+ *Bobilla bakali* Otte & Alexander, 1983

OTHER ARTHROPODS

ARANEAE (SPIDERS)

Araneidae

Argiope keyserlingi Karsch, 1878
Austracantha minax (Thorell, 1859)

Lycosidae

Tetrallycosa oraria (L. Koch, 1876)

Salticidae

Maratus tasmanicus Otto & Hill, 2013

Sparassidae

Neosparassus diana (L. Koch, 1875)

CRUSTACEA - AMPHIPODA

Chiltoniidae

Austrochiltonia australis (Sayce, 1901)
Austrochiltonia subtenuis (Sayce, 1902)

CRUSTACEA - DECAPODA

Parastacidae

Engaeus unplaced

CRUSTACEA - ISOPODA

Scyphacidae

e+ *Haloniscus searlei* Chilton, 1920

GASTROPODA

Arionidae

*i *Arion intermedius* Normand, 1852

Charopidae

Scelidoropa officeri (Legrand, 1871)
 + *Scelidoropa* sp. "Little Musselroe"
Scelidoropa sp. "Pioneer"

Helicidae*_i *Cornu aspersum* (Muller, 1774)**Hygromiidae***_i *Prietocella barbara* (Linnaeus, 1758)**Imacidae***_i *Lehmannia nyctelia* (Bourguignat, 1861)**Punctidae***Paralaoma hobarti* (Cox, 1868)*Laomavix collisi* (Brazier, 1877)*Magilaoma* sp. "Tasmania"**Succineidae***Austrosuccinea australis* (Férussac, 1821)**Tomichiidae***Coxiella straita* (Reeve, 1842)

* *Calidris ruficollis* (Pallas, 1776)
 * *Calyptorhynchus funereus* (Shaw, 1794)
 *_i *Carduelis carduelis* (Linnaeus, 1758)
 * *Cereopsis novaehollandiae* Latham, 1801
 * *Charadrius ruficapillus* Temminck, 1822
 * *Chroicocephalus novaehollandiae* (Stephens, 1826)
 * *Chrysococcyx basalis* (Horsfield, 1821)
 * *Chrysococcyx lucidus* (Gmelin, 1788)
 * *Circus approximans* Peale, 1848
 * *Colluricincla harmonica* (Latham, 1801)
 * *Coracina novaehollandiae* Gmelin, 1789
 * *Corvus tasmanicus* Mathews, 1912
 * *Coturnix ypsilophora* Bosc, 1792
 * *Cracticus torquatus* (Latham, 1801)
 * *Cygnus atratus* (Latham, 1790)
 *_i *Dacelo novaeguineae* (Hermann, 1783)
 * *Egretta novaehollandiae* (Latham, 1790)
 * *Epthianura albifrons* (Jardine & Selby, 1828)
 * *Falco berigora* Vigors & Horsfield, 1827
 * *Fulica atra* Linnaeus, 1758
 * *Gymnorhina tibicen* (Latham, 1801)
 * *Haematopus fuliginosus* Gould, 1845
 * *Haematopus longirostris* Vieillot, 1817
 *_v *Haliaeetus leucogaster* Gmelin, 1788
 * *Hirundo neoxena* (Gould, 1842)
 * *Hydroprogne caspia* (Pallas, 1770)
 * *Larus pacificus* Latham, 1801
 * *Malurus cyaneus* (Ellis, 1782)
 * *Pachycephala pectoralis* (Latham, 1801)
 * *Pelecanus conspicillatus* Temminck, 1824
 * *Petroica boodang* (Lesson 1838)
 * *Phalacrocorax carbo* (Linnaeus, 1758)
 * *Phylidonyris novaehollandiae* (Latham, 1790)
 * *Rhipidura albiscapa* Gould, 1840
 * *Sericornis humilis* Gould, 1838
 * *Stagonopleura bella* (Latham, 1801)
 *_v *Sternula nereis* (Gould, 1843)
 * *Strepera fuliginosa* (Gould, 1837)
 * *Strepera versicolor* (Latham, 1801)
 *_i *Sturnus vulgaris* Linnaeus, 1758
 * *Tadorna tadornoides* (Jardine & Selby, 1828)
 * *Thalasseus bergii* (Lichtenstein, 1823)
 *_v *Thinornis cucullatus* (Vieillot, 1818)
 * *Tribonyx mortierii* du Bus de Gisignies, 1840
 *_i *Turdus merula* Linnaeus, 1758
 * *Vanellus miles* (Boddaert, 1783)
 * *Vanellus tricolor* (Vieillot, 1818)
 * *Zosterops lateralis* (Latham, 1801)

Appendix 1.5: Vertebrate taxa of Musselroe Wind Farm

REPTILES

* *Tiliqua nigrolutea* (Quoy & Gaimard, 1824)
 * *Cyclodomorphus casuarinae* (Duméril and Bibron, 1839)
 * *Rankinia diemensis* Gray, 1841
 * *Austrelaps superbis* (Günther, 1858)
 * *Notechis scutatus* Peters, 1861

MAMMALS

* *Macropus rufogriseus* (Desmarest, 1817)
 * *Macropus giganteus* Shaw, 1790
 * *Thylogale billardierii* (Desmarest, 1822)
 * *Vombatus ursinus* (Shaw, 1800)
 *_e *Sarcophilus harrisii* (Boitard, 1841)
 *_i *Oryctolagus cuniculus* (Linnaeus, 1758)

BIRDS

* *Acanthiza chrysorrhoa* (Quoy & Gaimard, 1830)
 * *Acanthiza pusilla* (Shaw, 1790)
 * *Acanthorhynchus tenuirostris* (Latham, 1801)
 *_i *Alauda arvensis* Linnaeus, 1758
 * *Anas castanea* (Eyton, 1838)
 * *Anas superciliosa* Gmelin, 1789
 * *Anthochaera chrysoptera* (Latham, 1801)
 * *Anthochaera paradoxa* (Daudin, 1800)
 * *Anthus australis* (Gmelin, 1789)
 *_e *Aquila audax fleayi* Condon & Amadon, 1954
 * *Arenaria interpres* (Linnaeus, 1758)
 * *Artamus cyanopterus* (Latham, 1801)
 * *Cacomantis flabelliformis* Latham, 1801
 * *Cacomantis pallidus* (Latham, 1801)
