

## A Systematic Flora Survey, Floristic Classification and High-Resolution Vegetation Map of Lord Howe Island

Paul Sheringham<sup>1\*</sup>, Peter Richards<sup>2</sup>, Phil Gilmour<sup>3</sup>, Jill Smith<sup>1</sup> and Ernst Kemmerer<sup>4</sup>

<sup>1</sup> Department of Planning, Industry and Environment, Locked Bag 914 COFFS HARBOUR NSW 2450

<sup>2</sup> 17 Coronation Avenue, SAWTELL NSW 2452

<sup>3</sup> 523 Roses Rd, GLENIFFER, NSW 2454

<sup>4</sup> Cradle Coast NRM, PO Box 338, BURNIE TAS 7320

\* Author for correspondence: [paul.sheringham@environment.nsw.gov.au](mailto:paul.sheringham@environment.nsw.gov.au)

**Abstract:** The present study took advantage of the availability of high resolution ADS40 digital imagery to 1) systematically resample the vegetation of the Lord Howe Island Group (LHIG, excluding Ball's Pyramid); 2) conduct a numerical analysis of the floristic data; 3) map vegetation extent and the distribution of vegetation communities and 4) compare the resultant classification and mapping with those of Pickard (1983). In July 2013, a total of 86 full floristic and 105 rapid floristic sites were sampled across the island, based on a stratified random sampling design. A hierarchical agglomerative clustering strategy (Flexible UPGMA) and Bray-Curtis dissimilarity coefficient with default beta, along with nearest neighbour analysis to identify anomalous site allocations, was used to analyze the floristic data. In total 33 vegetation communities were delineated and mapped: 19 mapping units from the full floristic analysis; 7 variants identified within five of the above 19 groups; 3 mapping units from analysis of canopy-only floristic data; and 4 mapping units recognised in previous studies that are mapped but were not sampled in this survey. The resultant list of vegetation communities and non-vegetation mapping units, along with their equivalence to Pickard (1983) and DECC (2007) units, is provided.

222 plant taxa were recorded in the survey, including 47 exotic taxa. Weeds are a common component of some communities, particularly coastal strandline communities, the shrublands of the southern mountains and regenerating vegetation on landslips. The threatened plants *Xylosma parvifolia*, *Lepidorrhachis mooreana*, and *Geniostoma huttonii* were recorded in floristic sites. Two communities, Gnarled Mossy Cloud Forest and Lagunaria Swamp Forest are listed as Critically Endangered Ecological Communities under the NSW *Biodiversity Conservation Act 2016* (BC Act). Coastal Saltmarsh, an Endangered Ecological Community listed under the BC Act, also occurs on the main island. An assessment of the conservation status of the vegetation communities recognised in the present study is provided. A number of communities warrant further consideration for listing as threatened ecological communities.

Significant improvement in vegetation community attribution and spatial resolution was possible with the high-resolution digital imagery, however Pickard's 1983 classification and mapping was found to be a comprehensive and accurate description of the island's vegetation considering the imagery available at the time.

This project has resulted in greatly improved accuracy of vegetation mapping linework for the LHIG. The Pickard (1983) vegetation map comprised 321 individual polygons, whereas the new map includes 1 840 polygons of sufficient accuracy to support detailed environmental planning programs, particularly within the Settlement area where spatial accuracy in the delineation of native vegetation is critical. The new vegetation communities were applied to the updated linework to complete the project. Detailed profiles were compiled of each vegetation community for which enough information was available. These profiles should prove useful in field identification of vegetation types and the assessment of their conservation status.

*Cunninghamia* (2020) 20: 035–098

doi:10.7751/cunninghamia.2020.20.002

## Introduction

The oceanic Islands of Australia and the Pacific Ocean have unique assemblages of flora and fauna that reflect their long history of evolution in isolation. The Lord Howe Island Group (LHIG) is no exception, with nearly half of the native plant species of the Group found nowhere else in the world (Green 1994; DECC 2007; Hutton 2010a, 2010b).

The first vegetation classification and mapping for the LHIG was prepared by Pickard (1974, 1983), utilising black-and-white aerial photography, a decade undertaking numerous meandering traverses across the island on foot and by boat, and 73 floristic-site surveys (Pickard 1974, 1983; Clarke 1974). The aerial photography used was captured in April 1966 at scales of 1:18 700 and 1:21 400. A digital version of Pickard's map was created for operational purposes by the New South Wales (NSW) Department of Environment and Conservation in the 1990s, and this was later revised by Hunter (Hunter 2002; Hunter and Hodgson 2005). The main limitation of the Pickard vegetation mapping is that positional accuracy is not sufficient to effectively manage vegetation and environmental planning issues on the island, especially within the Settlement, an area of approximately 160 ha consisting of those parts of the main island outside of the Permanent Park Preserve (PPP; see Study Area below), and which supports human habitation and infrastructure as well as a mixture of cleared and vegetated land. Accurate vegetation mapping is a vital management and conservation tool, as it supports a variety of environmental planning processes, particularly as legislation becomes more specific regarding the definition of threatened ecological communities.

In 2012, high-resolution digital aerial imagery of the LHIG was captured by NSW Land and Property Information (LPI; <http://www.lpi.nsw.gov.au/> [verified 7 July 2016]) – the primary provider of land information services in NSW – at 10 cm resolution using a Leica Geosystems® Airborne Digital Sensor (ADS40 Digital Image Acquisition System). At that time, the NSW Office of Environment and Heritage (OEH) was engaged by the Lord Howe Island Board (LHIB) to undertake vegetation mapping for the Settlement area of Lord Howe Island (LHI) using the new imagery and applying the vegetation classification developed by Pickard (1983). The purpose of the Settlement mapping project was to upgrade the spatial accuracy of vegetation mapping so that it could be used operationally by the LHIB at a scale of 1:1 000.

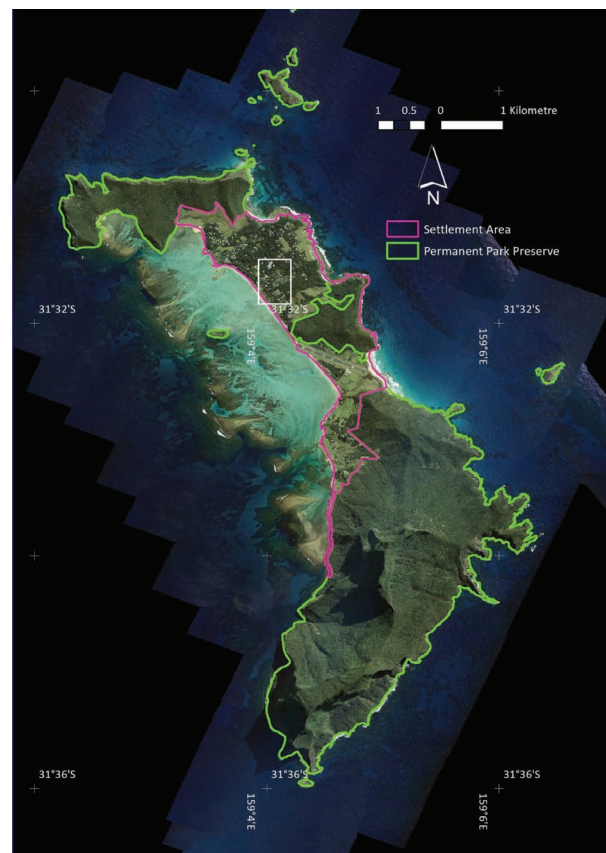
Following the successful completion of the Settlement mapping project, the LHIB and OEH undertook to complete the vegetation mapping of the rest of the LHIG, although excluding Balls Pyramid. Furthermore, it was determined that this new mapping should be underpinned by a revised vegetation classification based on a stratified random sampling design for floristic survey to gather sufficient plot-based data for rigorous statistical analysis of the vegetation of the LHIG. The vegetation communities identified form the basis of a new and complete vegetation map of the LHIG (excluding Balls Pyramid). The communities identified in this study are compared with those described by Pickard (1983), and detailed profiles of each vegetation community have

been prepared (See Appendix 1). The vegetation mapping, classification and accompanying profiles will support local environmental planning and provide baseline data that may be used to measure changes in floristic composition and structure over time.

## Study Area

Many previous reports, including those of Recher and Clarke (1974), Pickard (1983), Green (1994), DECC (2007) and Hutton (2008), provide accounts of the geology, physiography, soils, climate, history of settlement, flora, fauna, and vegetation of the LHIG to varying levels of detail and comprehensiveness. A brief overview of the study area is provided here.

The LHIG is located 760 kilometres north-east of Sydney and 600 kilometres east of Port Macquarie. It consists of the main island and a number of smaller surrounding islands. The Group was first sighted by Henry Lidgbird Ball in 1788, aboard the HMS Supply. It was first settled in 1834. Most of the LHIG (about 75%) is now protected within the Lord Howe Island Permanent Park Preserve (PPP). The PPP was created in January 1982 with the purpose of preserving native flora and fauna in accordance with the *Lord Howe Island Act 1953* (NSW) and the *National Parks and Wildlife Act 1974* (NSW). It is managed by the LHIB.



**Fig. 1.** Lord Howe Island Group (excluding Balls Pyramid), showing location of the Settlement Area and the Permanent Park Preserve. The white rectangle denotes the location of Figure 5.

### Climate

The LHIG has wet and cool winters, with a mean daily maximum temperature of 18.9 C and minimum of 13.5 C. Summers are drier, and mild to warm, with a mean daily maximum of 25.7 C and a minimum of 19.2 C. Average annual rainfall is 1510 mm (Bureau of Meteorology 2015), however annual rainfall has been declining in recent decades (Auld & Leishman 2015). Pickard (1983) cites LHIG mean annual rainfall of 1676 mm, based upon data from the years 1886 to 1967. Temperatures on the high plateau of Mt Gower (875 m above sea level [asl]) are 6–8 C cooler than at sea level (LHIB 2002). The rainfall in the mountainous southern half of the island is considerably higher owing to orographic influences (LHIB 2002).

### Landform and Geology

The LHIG consists of the rugged southern mountains, the lower elevation and less rugged central hills, the flat to undulating lowlands, the northern hills and offshore islands. The southern mountains are composed of basalt and tuff and rise to 875 m asl at the summit of Mt Gower. The central hills are predominantly basaltic, but also include some areas of calcarenite. The lowlands are composed mainly of calcarenite with small areas of basalt, alluvial clays and aeolian sands. The northern hills, like the other mountainous parts of the island, are composed mainly of basalt with small areas of tuff and calcarenite. The offshore islands comprise tuff and breccia.

### Botanical studies

A detailed history of botanical studies on the LHIG is given in Pickard (1983). The following provides a brief summary of the major botanical studies since that publication. Interestingly, Pickard (1983) makes no mention of a pattern analysis of the LHIG vegetation undertaken by Clarke (1974), whose classification and ordination analysis, based upon data collected by himself and Pickard, indicated that the distribution of the flora of the LHIG was responding primarily to exposure, elevation and disturbance. Pickard (pers. comm. Jan 2020) subsequently performed his own pattern analyses of those data, which he included in his unpublished MSc thesis (Pickard 1978, not sighted) but which were omitted from his 1983 paper.

In the same year that Pickard published his landmark study and map of the vegetation of the LHIG (Pickard 1983), Rodd and Pickard (1983) published a census of LHIG vascular plants and Pickard (1983a) undertook a subjective assessment of the rareness and threat status of the LHIG vascular flora. Pickard (1984) described the spatial and temporal distribution of exotic plants on the LHIG (see the discussion of LHIG weeds below).

The most notable botanical study since Pickard (1983) is the monograph of the vascular flora of the LHIG by Green (1994), completed as part of the *Flora of Australia* series. More recently, rare plant surveys were undertaken by Hutton (2001, 2005) who undertook extensive traverses to identify

and document the location and size of populations of a suite of threatened and rare plant species. Hunter (2002) and Hunter and Hodgson (2005) undertook a review, based upon field validation, of the vegetation associations of parts of the Settlement area as part of the public exhibition of a proposed map of significant native vegetation (based upon Pickard's 1983 map). The floristics and structure of the mossy cloud forest of the Mt Gower summit was studied by Harris *et al.* (2005). The Lord Howe Island Biodiversity Management Plan (DECC 2006, 2007) provides detailed information on significant flora and vegetation communities. The vegetation of several of the offshore islands of the LHIG is described in detail in Carlile and Priddel (2013a–f) and Carlile *et al.* (2013).

### Methods

#### *Update of Pickard mapping and extant vegetation linework*

Digital aerial imagery of the LHIG, at 10-cm resolution, captured using Airborne Digital Sensor (ADS40 Digital Image Acquisition System, by Leica Geosystems®), became available from LPI in January 2012. Using this imagery, aerial photography interpretation (API) was undertaken for this project using ArcGIS (versions 9.0 and 10.1; ESRI™) with an orthorectified stereo image (non-stereo imagery was sometimes used, particularly when viewing very rugged terrain) in normal colour and an enhanced image which was stretched in the 600–700-nm range to improve resolution of patterns in the vegetation.

Using the digital version of the Pickard (1983) vegetation map as a template, the ADS40 imagery was used to refine the spatial accuracy of the extent of vegetation of Pickard's linework. This included trimming areas of the Pickard linework where it extended beyond extant vegetation or land mass and adding areas such as isolated trees and smaller remnants of vegetation that were not mapped by Pickard. This produced a refined draft map that incorporated Pickard's polygons and attributions.

#### *Site selection*

A stratified random sampling design was employed using the refined Pickard linework described above, based upon the assumption that the identified vegetation types broadly represent a surrogate for underlying environmental variables. The number of sites to be sampled within each vegetation type was weighted by area. Vegetation types with small total areas were allocated a minimum of one site, whereas vegetation types with larger areal extents were allocated a proportionately greater number of sites. Not all sites that were selected were surveyed, and the actual number of sites completed in some vegetation types varied from the number allocated for a number of reasons, including access and time constraints, the detection of dissimilar vegetation patterns within individual polygons, and opportunistic survey of vegetation types detected in the course of field survey. Table 1 summarises the number of full floristic and rapid floristic survey sites planned and completed for each Pickard vegetation type.

### Field survey

Sampling of floristic sites was undertaken during July 2013. Site coordinates were uploaded into hand-held GPS units to facilitate navigation to each site.

### Full floristic surveys

Floristic data were gathered within a 20m × 20m quadrat positioned as close as possible to the pre-selected site location. Biophysical information including slope, aspect, geology, lithology and evidence of disturbance were recorded. Vegetation structural information (height range, dominant species, foliage cover) was recorded for each discernible vegetation stratum, and all vascular plant species present within the quadrat were recorded and assigned a modified Braun-Blanquet (1932) cover-abundance score between 1 and 6 as follows:

Score	Cover
1	<5% projected foliage cover – uncommon
2	<5% projected foliage cover – common
3	6–20% projected foliage cover
4	21–50% projected foliage cover
5	51–75% projected foliage cover
6	76–100% projected foliage cover

Plant samples were taken for later examination when the correct identity was uncertain. Plant nomenclature and taxonomy followed that of the National Herbarium of NSW, Royal Botanic Gardens, Sydney (PlantNET 2019). Photographs were taken at each site for use in community profiles and for future reference.

### Rapid floristic surveys

Rapid floristic sites were identical to full floristic sites in positioning of the site and collection of locality information. However, the only floristic data recorded were up to six dominant species in the upper tree stratum, and up to three dominant species in each lower stratum, along with an estimate of the percentage foliage cover of each stratum. Photographs were taken at each site for future reference.

### Data entry

All the information collected during full floristic and rapid floristic surveys was entered directly into the NSW Government central flora database (BioNet Vegetation Information System [VIS]), which underpins all native vegetation regulation and assessment in NSW (see <http://www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm> [Accessed 10 Feb 2020]).

### Data analysis

Data from 86 full floristic sites and 105 rapid floristic sites (using canopy taxa only) were investigated using a hierarchical agglomerative clustering strategy available in the software PATN (Belbin 1990, 1995) to determine

the main floristic groups for the study area. Separate full floristic and canopy-only (combining canopy data from all sites) analyses were undertaken. Exotic taxa were included in the full floristic analysis. The Bray-Curtis association measure (Bray & Curtis 1957) was used to determine similarity of sites. A hierarchical classification of sites was then derived from a clustering strategy using a beta value of –1 in a flexible unweighted pair group arithmetic averaging (UPGMA) analysis. A nearest-neighbour analysis was then used to identify potentially misclassified sites, and a fidelity analysis applied to the resultant floristic groups, arising from the full floristic analysis, to identify diagnostic (indicator) species for each group (Bedward 1999).

### Final community list

At the completion of floristic analyses, a complete vegetation community list for the LHIG was compiled by merging or splitting full floristic and canopy-only groups, and adding those vegetation types or mapping units that were not sampled during the current survey but were recognised and described in previous surveys (*viz.* Pickard 1983; Hutton 2001; DECC 2007). Note that the terms ‘vegetation community’, ‘vegetation type’ and ‘mapping unit’, may be used interchangeably, except where ‘mapping unit’ refers to a non-vegetation feature, such as Sand Beach, Boulder Beach, Cliff, and so on.

### API and attribution of polygons

The linework for the vegetation map was reattributed using the resultant complete list of vegetation communities and other map units. Linework was revised where necessary and equivalence to Pickard (1983) and DECC (2007) communities allocated where possible.

### Preparation of community profiles

Detailed profiles of each LHIG vegetation community sampled and recognised in this study, and for which floristic and physiognomic data were available, were prepared. A summary of the information contained in each profile is provided below (see Appendix 1 Community profiles). Those communities that were not sampled or visited during the current survey are listed but a detailed community profile is not provided.

**Table 1 Floristic survey site allocation based on refined Pickard (1983) mapping. ‘Area’ is the area of each vegetation type mapped. For Full floristic and Rapid floristic sites, ‘Planned’ is the number of pre-selected survey sites and ‘Completed’ is the number of sites done during this study. Note that only those Pickard vegetation types in which floristic sites were selected are listed here.**

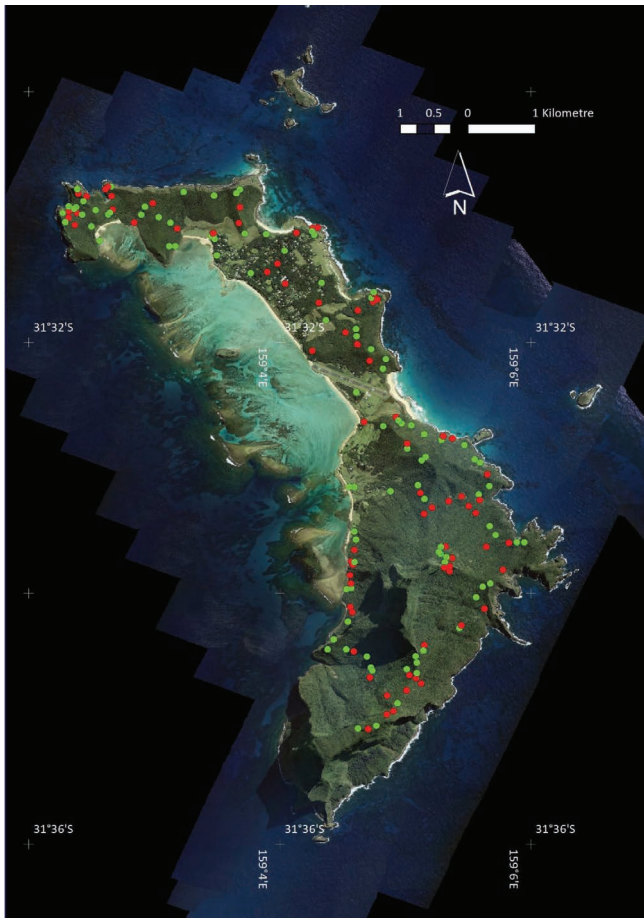
Pickard (1983) vegetation type		Area (ha)	Full floristic sites		Rapid floristic sites	
Code	Name		Planned	Completed	Planned	Completed
Ac	<i>Aegiceras corniculatum</i>	2.0	1	2	2	2
Ax	<i>Atriplex cinerea</i>	0.8	0	0	1	0
BBB	Basalt boulder beach	15.9	1	1	0	0
BhDf	<i>Bubbia howeana</i> – <i>Dracophyllum fitzgeraldii</i>	27.9	3	1	2	2
C/CBB	Calcarenite/coral boulder beach	6.8	0	0	2	1
Ca	<i>Cassinia tenuifolia</i>	26.2	2	2	2	2
Ca-Pp	<i>Cassinia tenuifolia</i> / <i>Poa poiiformis</i>	9.0	4	4	4	6
Cf	<i>Cleistocalyx fullageri</i>	136.2	5	5	13	11
Cg	<i>Cryptocarya gregsonii</i>	6.1	1	1	1	0
Cl	<i>Cyperus lucidus</i>	3.4	0	0	0	1
Cliffs	Cliffs	169.0	8	7	4	3
Cq	<i>Chionanthus quadristamineus</i>	92.9	4	2	7	2
Cq-Hb	<i>Chionanthus quadristamineus</i> / <i>Howea belmoreana</i>	7.1	2	1	3	3
CSB	Coral sand and beach	28.0	0	6	1	0
DaCt	<i>Drypetes australasica</i> – <i>Cryptocarya triplinervis</i>	394.4	15	15	22	19
DaCtC	<i>Drypetes australasica</i> – <i>Cryptocarya triplinervis</i> (calcarenite variant)	1.9	1	1	0	2
DaCtX	<i>Drypetes australasica</i> – <i>Cryptocarya triplinervis</i> (exposed variant)	66.5	5	6	13	12
DfMn	<i>Dracophyllum fitzgeraldii</i> – <i>Metrosideros nervulosa</i>	43.1	2	2	3	3
DfMn Lm-DaCt	<i>Dracophyllum fitzgeraldii</i> – <i>Metrosideros nervulosa</i> / Lowland Mixed Forest / <i>Drypetes australasica</i> – <i>Cryptocarya triplinervis</i>	4.1	0	0	2	2
Dv	<i>Dodonaea viscosa</i>	7.7	1	0	3	2
Hb	<i>Howea belmoreana</i>	60.5	3	3	3	2
Hc	<i>Hedyscepe canterburyana</i>	32.2	1	1	1	0
Hf	<i>Howea forsterana</i>	187.3	6	8	13	12
Hf-Cq	<i>Howea forsterana</i> / <i>Chionanthus quadristamineus</i>	2.3	0	1	1	1
Hf-Hb	<i>Howea forsterana</i> / <i>Howea belmoreana</i>	2.3	0	0	2	1
LM	Lowland Mixed Forest	196.4	13	12	10	11
Lp	<i>Lagunaria patersonia</i>	5.0	0	0	1	1
MFH	Mixed Fern and Herb	8.5	0	0	1	0
Mh	<i>Melaleuca howeana</i>	25.4	4	2	2	0
Pf	<i>Pandanus forsteri</i>	20.8	2	2	2	2
Pp	<i>Poa poiiformis</i>	13.8	0	1	2	2
<b>Total</b>			<b>84</b>	<b>86</b>	<b>123</b>	<b>105</b>

## Results

### Field survey

A total of 191 survey sites (86 full floristic and 105 rapid floristic) was sampled during this study. Figure 2 shows the

location of all survey sites. Overall, 222 plant taxa were recorded in floristic sites, including three threatened species and 47 exotic species (Appendix 2).



**Fig. 2.** Location of floristic survey sites. Red dots = full floristic sites; Green dots = rapid floristic sites

### Data analysis

A dendrogram resulting from the numerical analysis of all data from the full floristic sites is shown in Figure 3. Twenty-four plant communities were derived at a dissimilarity measure of 0.65. A twenty-fifth group was excluded as it represented recent post-disturbance regeneration (see Figure 3). Two major groupings, split on the basis of relative species richness, were apparent in the full floristic dendrogram. The first grouping comprised communities with low species richness, including coastal grasslands and sedgelands, swamp forests and saltmarsh, and fernlands and shrublands of exposed, rocky areas. The second grouping contained species-rich oceanic rainforests of the lowlands and southern and northern hills, and montane cloud forests of the southern mountains. Within these two major groupings five sub-groups were discernible:

- Grasslands, herblands and shrublands of coastal areas. Includes beach strandline grasslands, and sedgelands, herblands and shrublands of beaches, headlands and cliffs in near-coastal areas.
- Wetlands of coastal creeks and estuaries. Includes Sallywood Swamp Forest, mangrove and saltmarsh.

- Heathlands/Shrublands of rocky areas. A group of heathland, shrubland and fernland communities ranging from low to high altitudes on steep slopes of rocky coastal hills and ridges of the southern mountains.
- Oceanic Cloud Forests. Includes the cloud forests of the summit plateaux of Mt Gower and Mt Lidgbird.
- Oceanic Rainforests. A large grouping of Oceanic Rainforests distributed across low to high altitude areas.

Analysis of canopy-only data from all 191 floristic sites resulted in the recognition of three additional communities: Group 3 – Grey Mangrove low estuarine forest; Group 4 – River Mangrove low estuarine forest; and Group 19 – *Pandanus* – *Metrosideros* riparian forest. A dendrogram of the canopy-only group analysis is provided in Figure 4. The remaining canopy-only groups were equivalent to existing full floristic groups.

A saltmarsh community (Community 7: Saltwater Couch saltmarsh of poorly drained, brackish flats) and two rainforest communities (Community 19: Maulwood – Kentia Palm – Cotton-wood – Greybark lowland forest; and Community 22: Hill Rose – Forky-tree forest of rocky creeks and slopes) that had not been recognised in previous studies were identified and mapped in the current study.

### Final community list

This survey has resulted in the recognition of 39 mapping units for the LHIG. This list is compiled from:

- 19 mapping units formed from the full floristic analysis, including seven (7) mapping unit variants that were identified in five (5) of these floristic groups;
- Three (3) mapping units from analysis of canopy-only floristic data;
- Four (4) mapping units recognised by Pickard (1983), Hutton (2001) or DECC (2007) that are mapped but were not sampled in this survey.

Three map units identifying non-specific native vegetation (Environmental Plantings, Native Regeneration and Native Remnant) and 10 map units representing physiographic features or non-native vegetation were also delineated during this study. Table 2 presents the complete listing of vegetation communities (map units) along with their equivalence to Pickard (1983) and DECC (2007) vegetation types, where relevant.

Waterfall communities are described as occurring on vertical cliffs on the northern and western faces of Mt Gower, down to approximately 500 m asl (DECC 2007). The main plant species present are *Blechnum geniculatum*, *Blechnum howeanum*, *Machaerina insularis* and *Elatostema grande*. These communities are not included in this map and report, as they are of extremely restricted occurrence, generally inaccessible, and cannot be detected using API.

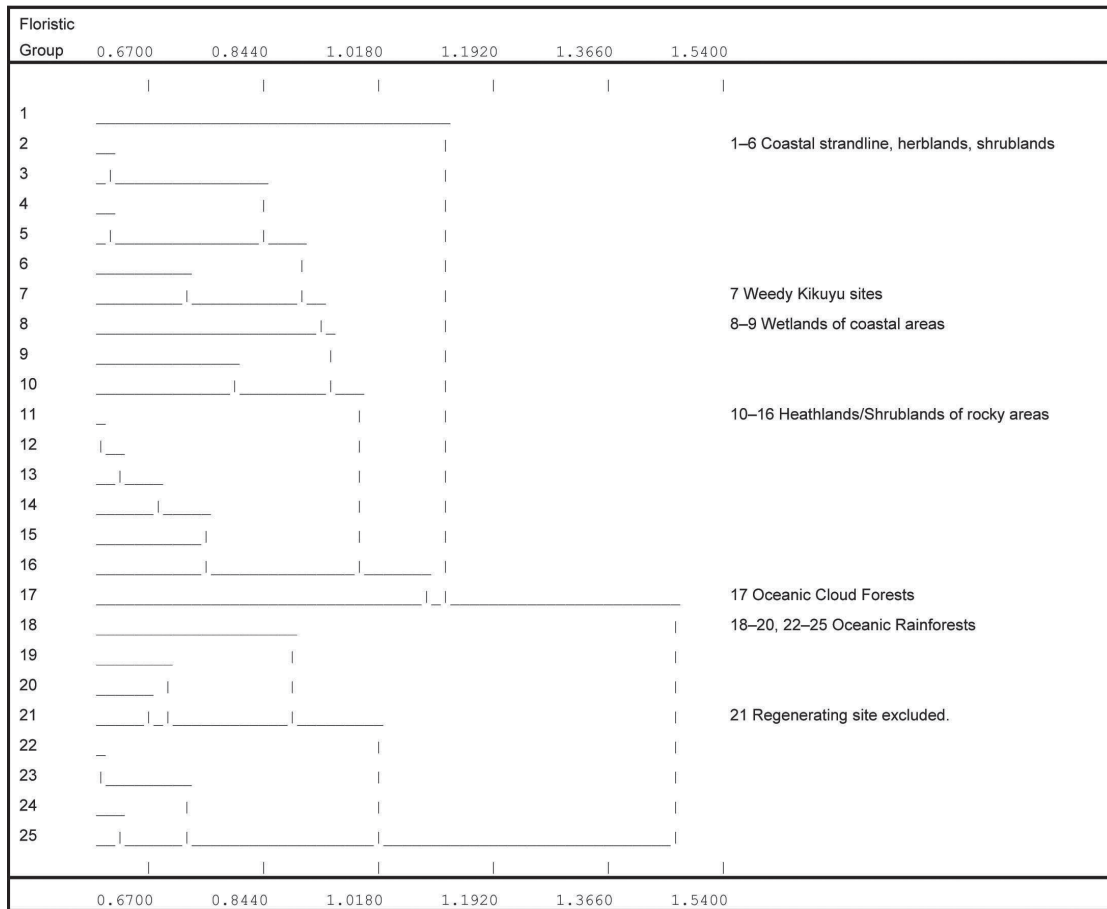


Fig. 3. Dendrogram from analysis of full floristic sites.

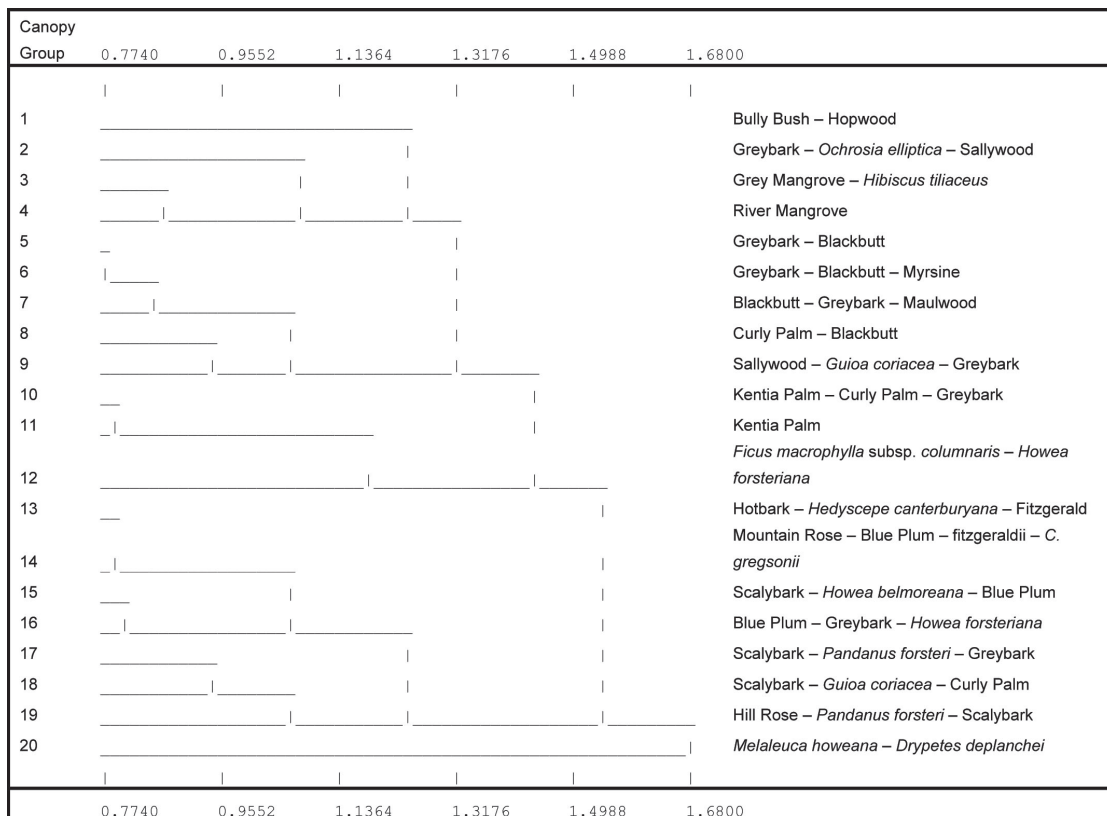


Fig. 4. Dendrogram from analysis of canopy-only data of all floristic sites.

*Community profiles*

Detailed profiles of each LHIG vegetation community sampled and recognised in this study, and for which floristic

and physiognomic data were available, have been prepared to assist in the identification of these types in the field, particularly for environmental planning purposes. The detailed profiles are presented in Appendix 1.

**Table 2** Vegetation communities identified in this study and their equivalence to previous classifications. The Community number is also the map unit number and code, and the community name is also the mapping unit name

Community number	Community name	Pickard (1983)	DECC (2007)
1	Coastal Spinifex – Dune Bean – Club Rush – <i>Melanthera biflora</i> – Saltwater Couch beach strandline grassland	Coral Sand Beach and Dune	Coral Sand Beach and Dune
2	<i>Melanthera biflora</i> – Saltwater Couch herbland/grassland on coral boulder beaches and rocky headlands	Calcarenite and Coral Boulder Beach	Calcarenite and Coral Boulder Beach
2	<i>Melanthera biflora</i> – Saltwater Couch herbland/grassland on coral boulder beaches and rocky headlands	Cliff	Cliff
3	Grey Saltbush shrubland of exposed talus slopes	<i>Atriplex cinerea</i> Orthophyll Dwarf Scrub	Saltbush ( <i>Atriplex cinerea</i> ) Dwarf Scrub
4	Chaff Flower – Ice Plant – Saltwater Couch – Pigface herbland/grassland of rock shelves and cliffs	<i>Ipomoea cairica</i> – <i>Carpobrotus glaucescens</i> Evergreen Broad-leaved Weedy Vegetation	<i>Ipomoea cairica</i> – <i>Carpobrotus glaucescens</i> Herbland
4	Chaff Flower – Ice Plant – Saltwater Couch – Pigface herbland/grassland of rock shelves and cliffs	Part of Cliff	Part of Cliff
5	Tea Tree shrubland on exposed rocky slopes	<i>Melaleuca howeana</i> Straight Narrow Sclerophyll Scrub	<i>Melaleuca howeana</i> Closed Scrub
6	Sallywood swamp forest of poorly drained, low-lying areas	<i>Lagunaria patersonia</i> Broad Orthophyll Sclerophyll Forest	Sallywood <i>Lagunaria patersonia</i> Closed Swamp Forest
7	Saltwater Couch saltmarsh of poorly drained, brackish flats	No equivalent	No equivalent
8	Bully Bush – Hopwood shrubland on shallow rocky soils	<i>Cassinia tenuifolia</i> Straight Narrow Sclerophyll Scrub	Bully Bush ( <i>Cassinia tenuifolia</i> ) Closed Scrub
8	Bully Bush – Hopwood shrubland on shallow rocky soils	<i>Dodonaea viscosa</i> Evergreen Broad Sclerophyll Scrub	<i>Dodonaea viscosa</i> Closed Scrub
9	Common Reed – Leafy Flat Sedge – Couch grassland or sedgeland of northern hills and offshore islands	<i>Cyperus lucidus</i> Sclerophyll Tall Grass	<i>Cyperus lucidus</i> Sedgeland
10	Fishbone Fern – Boat Vine – Bat’s Wing Fern fernland on boulder slopes at cliff bases	Mixed Fern and Herb	Mixed Fern and Herb
11	Bully Bush – Tea Tree – Mountain Daisy rocky heathland of the southern mountains	Part of Cliff	Related to <i>Alyxia squamulosa</i> – <i>Coprosma inopinata</i> Dwarf Scrub
12a	Kentia Palm forest on coral sand and calcarenite	<i>Howea forsteriana</i> Megaphyllous Broad Sclerophyll Forest	Kentia Palm <i>Howea forsteriana</i> Closed Sclerophyll Forest
12b	Banyan – Kentia Palm forest on coral sand and calcarenite	<i>Howea forsteriana</i> Megaphyllous Broad Sclerophyll Forest	Kentia Palm <i>Howea forsteriana</i> Closed Sclerophyll Forest
13a	Hotbark – Fitzgerald gnarled mossy cloud forest	<i>Bubbia howeana</i> – <i>Dracophyllum fitzgeraldii</i> Gnarled Mossy Forest	<i>Bubbia howeana</i> – <i>Dracophyllum fitzgeraldii</i> Gnarled Mossy Forest
13b	Mountain palm low closed forest	<i>Hedyscepe canterburyana</i> Megaphyllous Broad Sclerophyll Forest	Big Mountain Palm <i>Hedyscepe canterburyana</i> Closed Sclerophyll Forest
13c	Fitzgerald – Mountain Rose low closed forest	<i>Dracophyllum fitzgeraldii</i> – <i>Metrosideros nervulosa</i> Evergreen Broad Sclerophyll Scrub	<i>Dracophyllum fitzgeraldii</i> – <i>Metrosideros nervulosa</i> Closed Scrub
14	Scalybark – Blue Plum – Curly Palm closed forest of sheltered slopes or valleys	<i>Cleistocalyx fullagarii</i> Rainforest	Scalybark ( <i>Syzygium fullagarii</i> ) Closed Forest
15a	Blue Plum – Curly Palm – Scalybark closed forest on rocky slopes	<i>Chionanthus quadristamineus</i> Rainforest	Blue Plum <i>Chionanthus quadristamineus</i> Closed Forest



Community number	Community name	Pickard (1983)	DECC (2007)
15a	Blue Plum – Curly Palm – Scalybark closed forest on rocky slopes	Part of <i>Howea belmoreana</i> Megaphyllous Broad Sclerophyll Forest	Part of Curly Palm <i>Howea belmoreana</i> Closed Sclerophyll Forest, <i>Pandanus forsteri</i> Closed Sclerophyll Forest
15b	Forky-tree closed forest along gullies	<i>Pandanus forsteri</i> Megaphyllous Broad Sclerophyll Forest	<i>Pandanus forsteri</i> Closed Sclerophyll Forest
16a	Scalybark – Curly Palm – Greybark – Cedar – Maulwood – Forky-tree lowland mixed closed forest on slopes of the southern mountains	Lowland Mixed Rainforest	Lowland Mixed Closed Forest
16b	Curly Palm closed sclerophyll forest	<i>Howea belmoreana</i> Megaphyllous Broad Sclerophyll Forest	Curly Palm <i>Howea belmoreana</i> Closed Sclerophyll Forest
17a	Greybark – Blackbutt rainforest	<i>Drypetes australasica</i> – <i>Cryptocarya triplinervis</i> Rainforest	Greybark – Blackbutt ( <i>Drypetes deplanchei</i> – <i>Cryptocarya triplinervis</i> ) Closed Forest
17b	Greybark – Blackbutt low closed forest on exposed basalt slopes	<i>Drypetes australasica</i> – <i>Cryptocarya triplinervis</i> Exposed Facies Rainforest	Greybark – Blackbutt ( <i>Drypetes deplanchei</i> – <i>Cryptocarya triplinervis</i> ) Low Closed Forest on Exposed Basalt
17c	Greybark – Blackbutt low closed forest on exposed calcarenite	<i>Drypetes australasica</i> – <i>Cryptocarya triplinervis</i> Exposed Calcarenite Facies Rainforest	Greybark – Blackbutt ( <i>Drypetes deplanchei</i> – <i>Cryptocarya triplinervis</i> ) Low Closed Forest on Exposed Calcarenite
18	Kentia Palm – Greybark rainforest of low to mid-altitude slopes	<i>Drypetes australasica</i> – <i>Cryptocarya triplinervis</i> Rainforest	Kentia Palm ( <i>Howea forsteriana</i> ) Closed Sclerophyll Forest
18	Kentia Palm – Greybark rainforest of low to mid-altitude slopes	<i>Howea forsteriana</i> Megaphyllous Broad Sclerophyll Forest	Greybark – Blackbutt ( <i>Drypetes deplanchei</i> – <i>Cryptocarya triplinervis</i> ) Closed Forest
19	Maulwood – Kentia Palm – Cottonwood – Greybark lowland forest	No equivalent	No equivalent
20	Grey Mangrove low open woodland of brackish creeks	<i>Avicennia marina</i> var. <i>australasica</i> Open Broad Sclerophyll Scrub	Mangrove ( <i>Avicennia marina</i> var. <i>australasica</i> ) Open Swamp Scrub
21	River Mangrove tall shrubland of brackish creeks	<i>Aegiceras corniculata</i> Broad Sclerophyll Swamp Scrub	Mangrove <i>Aegiceras corniculata</i> Closed Swamp Scrub
22	Hill Rose – Forky-tree forest of rocky creeks and slopes	No equivalent	No equivalent
23	<i>Poa poiformis</i> tussock grassland of offshore islands and exposed coastal slopes	<i>Poa poiformis</i> Orthophyll Short Grass	<i>Poa poiformis</i> Grassland
24	<i>Pouzolzia australis</i> – Kava closed shrubland on exposed wet rocky slopes	<i>Boehmeria calophleba</i> – <i>Macropiper excelsum</i> var. <i>psittacorum</i> Broad Orthophyll Scrub	<i>Boehmeria calophleba</i> – <i>Macropiper hooglandii</i> Closed Scrub
25	<i>Alyxia squamulosa</i> – <i>Coprosma inopinata</i> low shrubland on narrow exposed rocky ridges	No equivalent	<i>Alyxia squamulosa</i> – <i>Coprosma inopinata</i> Dwarf Scrub
26	Black Plum – King Fern low closed forest of the southern mountains	Part of <i>Cryptocarya gregsonii</i> Rainforest	Part of <i>Cryptocarya gregsonii</i> Closed Forest
Boulder Beach	Beach	Basalt boulder beach	Basalt boulder beach
Cliff	Cliff	Cliff	Cliff, waterfall cliff
Dam	Dam	–	–
Ep	Environmental plantings	–	–
Estuary	Estuary	–	–
Ex	Exotic	–	–
Ls	Landslip	–	–
Ng	Native regeneration	Part of Disturbed areas?	–
Np	Plantation	–	–
Nr	Native remnant	Part of Disturbed areas?	–
Rock	Rock	Cliff	Cliff
Sand Beach	Beach	Coral sand beach and dune	Coral sand beach and dune
Water	Water	–	–

## Discussion

### Map resolution

This study has resulted in the production of a high-resolution vegetation community map for the LHIG with greatly improved accuracy of linework compared with existing mapping. As an indication of the increase in the level of detail, the Pickard (1983) vegetation map comprised 321 individual polygons, whereas the new vegetation map comprises 1840 polygons of sufficient accuracy to support environmental planning, particularly within the Settlement area where spatial accuracy in the delineation of native vegetation is critical. Figure 5 provides a graphic comparison of the accuracy of the two vegetation maps by overlaying both sets of linework on an aerial image of part of the Settlement area. The high-resolution ADS40 imagery used in this study also enabled the current study to map much smaller vegetated remnants (down to crowns of individual paddock trees in some instances). By comparison, the minimum polygon size in the Pickard (1983) map is about 0.1 ha. The high resolution of this mapping will greatly improve the ability of the LHIB to assess, manage and monitor vegetation communities and their responses to weed management, biosecurity, conservation assessment, ecological restoration and threat mitigation.

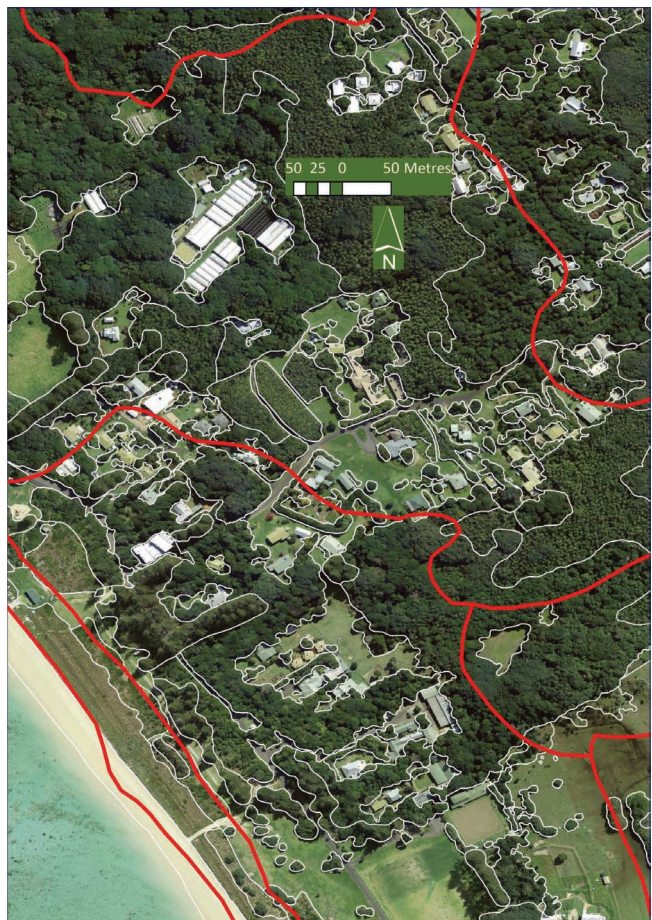
The current study utilised stratified, random sampling of floristic survey data to inform floristic analyses, resulting in a new vegetation community classification for the LHIG. Although this approach differed from the iterative, field traverse-based approach undertaken by Pickard (1983), the latter classification is considered robust and, indeed, underpinned initial site selection and linework attribution in the current study. Pickard's classification, in conjunction with observations made during intensive fieldwork for the current study, also strongly influenced post-analysis recognition of 'mappable' variants within vegetation communities. The only departure from consensus with this earlier work is where our floristic analysis identified a distinct lowland rainforest community (Community 19).

### Threats

Threats to the vegetation of the LHIG include climate change (including rises in sea level), exotic pathogens, feral animals and weeds (see below). Keith (2004), Auld and Hutton (2004), Harris *et al.* (2005) and Auld and Leishman (2015) discuss the impact of climate change upon the oceanic cloud forests of LHI. The summits and upper slopes of the southern mountains on LHI are regularly and consistently shrouded in cloud, creating the moist, cool environment required by the unique vegetation communities that occur there. One potential effect of climate change is an upward shift in the elevation at which clouds form, with obvious negative implications for the moisture-dependent cloud forest ecosystems (Auld and Hutton 2004, Auld and Leishman 2015). Other effects of climate change include a predicted increase in the frequency and severity of droughts and storm events, which could have a significant impact on the vegetation and plants of the

LHIG, and sea-level rise, which potentially threatens low-lying vegetation communities (DECC 2007).

The exotic pathogen *Phytophthora cinnamomi* has recently been recorded from the main island and there are a number of plant taxa endemic to the LHIG that are closely related to taxa in other parts of the world that have been severely affected by *P. cinnamomi* (Auld and Hutton 2004). Strategies aimed at, among other things, controlling the entry and spread of *P. cinnamomi* have been developed and implemented for the LHIG (LHIB 2014, 2015; Department of the Environment 2014; AECOM 2016). For instance, boot-cleaning stations are now provided at the beginning of walking tracks into the southern mountains.



**Fig. 5.** Comparison of the current mapping linework (white lines) with the Pickard (1983) linework (red lines) in part of the Settlement area. The location of this area is shown in Figure 1 above. The underlying image is the 2012 ADS40 10 cm imagery used in the current study.

The fungal pathogen Myrtle Rust, *Austropuccinia psidii*, was detected for the first time on Lord Howe Island in October 2016. Fortunately, early detection and implementation of a rigorous control program appears, to date, to have successfully eradicated it (Makinson 2018).

The threat to the native vegetation of the LHIG by feral rodents (Black Rat *Rattus rattus* and House Mouse *Mus musculus*) is well documented. The draft Lord Howe Island Rodent Eradication Plan (LHIB 2009) provides a detailed review of the impact of rodents on the biodiversity of the

LHIG. Auld *et al.* (2010) found that juvenile palms were rare or absent in areas unbaited for rodents. Predation on seeds of component species of the cloud forest, especially the endemic Big (*Hedyscepe canterburyana*) and Little (*Lepidorrhachis mooreana*) Mountain Palms, is a threat to the survival of the community (Auld and Leishman 2015). A program of rodent eradication was proposed (LHIB 2009) to eliminate this threat to the native vegetation of the LHIG. The eradication program was implemented in 2019, with initial results indicating outstanding success (LHIREP 2019).

### Weeds

Weeds are a common and significant component of some vegetation communities of the LHIG, particularly coastal strandlines and headlands, shrublands of the southern mountains, regenerating vegetation on landslips and other disturbed areas, and near human settlement (Pickard 1984, Le Cussan 2006, LHIB 2016a). In total, 47 weed species were recorded in floristic sites during the current survey (21% of the number of all plant species in floristic sites). Where a weed species constitutes a significant component of, or poses a serious threat to, a LHIG vegetation community, that species is listed in the relevant community profile (see Appendix 1).

Since 2004, the LHIB has implemented a program to attempt the eradication of 25 priority invasive weed species. As a result of this program, by 2014 the impact of dense and widespread weed infestations on the LHIG had been reduced by an estimated 80% (LHIB 2006, 2016a). Based on floristic surveys and general field observations during the current study, the most important weeds on LHI are (in alphabetical order by scientific name): Crofton Weed (*Ageratina adenophora*), Ground Asparagus (*Asparagus aethiopicus*), Coastal Morning Glory (*Ipomoea cairica*), Formosan Lily (*Lilium formosanum*), Kikuyu (*Cenchrus clandestinus*), Cherry Guava (*Psidium cattleianum* var. *cattleianum*) and Buffalo Grass (*Stenotaphrum secundatum*). Our observations broadly concur with findings reported in the draft 2016 Weed Management Strategy (LHIB 2016b).

### Threatened and extinct plant species

Eleven species of plant recorded from the LHIG are listed as Endangered or Critically Endangered under the NSW *Biodiversity Conservation Act 2016 (BC Act)*. Six of these species are also listed as either Endangered or Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Table 3 lists the threatened plant species and their status under NSW and Commonwealth legislation.

Two plant species, *Hypolepis elegans* and *Solanum bauerianum*, are listed as presumed extinct under the *BC Act*. *Solanum bauerianum* is now considered to be extinct globally, and has not been relocated, despite surveys in areas of its past distribution on the LHIG (Pickard 1983a; Hutton 2005). The decline and extinction of *Solanum bauerianum* may have been caused by clearing and fragmentation of habitat for settlement, and consumption by cattle, goats,

rodents and pigs (NSW Scientific Committee 2010). Although *Hypolepis elegans* is listed as presumed extinct in NSW, collections of this species have been made from LHI as recently as 2018 (AVH 2020). Both Green (1994) and Hutton (2010b) record *H. elegans* as “common, especially in open areas”. Most recently, Hutton considers it to be ‘not common but still fairly widespread’ (I. Hutton pers. comm. per C. Stehn Feb 2020).

The LHI Biodiversity Management Plan (DECC 2007) lists several native plant taxa as presumed extinct on LHI, none of which are listed under either the *BC Act* or the *EPBC Act*. One species on that list, *Marsdenia tubulosa*, has since been collected on Mt Gower (AVH 2020). The other species listed in the Biodiversity Management Plan are common in other parts of the world and are either represented by one or two early records from LHI (*Paspalum vaginatum*, *Tetragonia implexicoma*) or mentioned as present on LHI in an early report (*Scaevola taccada*) (Green 1994). Similarly, Rodd & Pickard (1983) provide a list of plant taxa considered native to, but now presumed extinct on, the LHIG. One species on that list, Lord Howe Island Morning Glory (*Calystegia affinis*), has since been collected on LHI and is listed as Critically Endangered under the *BC Act* and *EPBC Act* (Table 3). *Solanum bauerianum* has since been listed as Presumed Extinct (Table 3). *Pandanus pedunculata* (now *P. tectorius*) was known from a single plant on LHI, which died in 1975 (Green 1994), and *Pseuderanthemum grandiflorum* (now *P. pelagicum*) is native to Vanuatu and the LHI specimen is likely a mis-labelled collection from Vanuatu (Green 1994).

Three threatened species were recorded in floristic plots during the current survey:

Mountain Xylosma (*Xylosma parvifolia*)  
Endangered (*BC & EPBC Acts*)

A shrub to 2 m tall with rounded, serrate leaves, that grows on ridges in the southern mountains (DECC 2007). In the present survey it was recorded in Community 10. The site was located on a steep narrow ridge above the Goathouse and below Mt Lidgbird.

Little Mountain Palm (*Lepidorrhachis mooreana*)  
Critically Endangered (*BC & EPBC Acts*)

A stout, dwarf palm to 2 m tall growing in sheltered closed forests of the mountain summits (DECC 2007). In the present survey it was recorded as a dominant in Community 13b. It was recorded in one full floristic site on the ascent to Mt Gower.

*Geniostoma huttonii* Endangered (*BC & EPBC Acts*)

A scrambling shrub to 1 m tall that grows in the southern mountains on shaded cliffs from mid- to high altitudes. In the present survey it was recorded in Community 14.

**Table 3** Threatened and extinct plant species recorded for the LHIG. CE = Critically Endangered; E = Endangered; Ex = Extinct

Scientific name	Common name	Status	
		<i>BC Act</i>	<i>EPBC Act</i>
<i>Anthosachne kingiana</i> subsp. <i>kingiana</i> (listed as <i>Elymus multiflorus</i> subsp. <i>kingianus</i> )	Phillip Island Wheat Grass	CE	CE
<i>Caesalpinia bonduc</i>	Knicker Nut	E	
<i>Calystegia affinis</i>	Lord Howe Island Morning Glory	CE	CE
<i>Carmichaelia exsul</i>	Lord Howe Island Broom	E	
<i>Chamaesyce psammogeton</i>	Sand Spurge	E	
<i>Coprosma inopinata</i>	Small-leaved Currant Bush	E	
<i>Geniostoma huttonii</i>	Hutton's Geniostoma	E	E
<i>Hypolepis elegans</i>		Ex	
<i>Lepidorrhachis mooreana</i>	Little Mountain Palm	CE	CE
<i>Melicope vitiflora</i>	Coast Euodia	E	
<i>Polystichum moorei</i>	Rock Shield Fern	E	E
<i>Solanum bauerianum</i>		Ex	
<i>Xylosma parvifolia</i>	Mountain Xylosma	E	E

### Threatened Ecological Communities

Lord Howe Island supports two vegetation communities that are currently listed as Critically Endangered Ecological Communities (CEEC) under the *BC Act*: Gnarled Mossy Cloud Forest on Lord Howe Island (Community 13 of this study, occurring on the summit plateaux and ridges of Mts Gower and Lidgbird), and *Lagunaria* Swamp Forest on Lord Howe Island (Community 6 of this study), which was formerly more widespread on the low-lying flats within the Settlement area but has suffered severe decline since human settlement. No LHIG vegetation communities are currently listed as threatened under the *EPBC Act*.

Gnarled Mossy Cloud Forest was mapped by Pickard (1983) as occupying 28 ha of the Mt Gower summit plateau and a very narrow strip along the western edge of the summit of Mt Lidgbird. The current study mapped 26 ha of Community 13a Hotbark – Fitzgerald gnarled mossy cloud forest, similar to the area identified by Pickard (1983). However, floristic analyses undertaken during the current study did not separate two other distinct communities that were recognised by Pickard (1983) from Community 13a of the current study: *Hedyscepe canterburyana* closed forest and *Dracophyllum* – *Metrosideros* closed scrub. These two communities were recognised, post-analysis, as mappable variants of Community 13 in the current study: 13b Mountain Palm low closed forest and 13c Fitzgerald – Mountain Rose low closed forest. Although some parts of the latter two communities would represent the Gnarled Mossy Cloud Forest CEEC, other parts, especially lower elevation occurrences, would not.

*Lagunaria* Swamp Forest was mapped by Pickard (1983) in five locations, covering a total of 6 ha. Pickard noted at the time that all remnants had been destroyed or were sufficiently disturbed to render successful natural regeneration unlikely. DECC (2007) noted the existence of one remnant stand near Cobbys Corner, and remnant trees remaining in some other stands. The current study mapped very small remnants of this type on a swampy flat at North Bay, along Settlement

Creek, behind Pinetrees, near Cobbys Corner and at Soldier Creek. The total extent of all occurrences was only 0.8 ha.

Most vegetation communities recognised by the current study should be assessed for eligibility for listing as threatened ecological communities under the *BC Act*. Table 4 lists each community, its level of representation within the PPP and a threat status based upon a subjective analysis of the overall extent of the community, the current level of formal protection, and the perceived vulnerability of each community to known threatening processes. Those communities with an assigned threat status of High or Very High in Table 4 should be assessed for eligibility for listing as threatened ecological communities. Structural, floristic, habitat, distribution and threat information for all communities is provided in the vegetation community profiles (Appendix 1).

### Vegetation classification database

The vegetation classification for the LHIG arising from this study should be incorporated into the NSW Vegetation Classification module of the BioNet Vegetation Information System (VIS), the government repository of all vegetation and floristic data and which underpins native vegetation regulation and assessment in NSW (see [www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm](http://www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm) [Accessed 10 Feb 2020]). In order to achieve this, the classification requires submission to the NSW Plant Community Type Change Control Panel (PCTCCP) for approval. For details refer to <http://www.environment.nsw.gov.au/research/PCTchangecontrol.htm> (Verified 10 Feb 2020). The PCTCCP was established to maintain and improve the quality of the NSW Master Plant Community Type Classification that is managed within the Vegetation Classification database. Inclusion of the new LHIG vegetation classification into the database would ensure ongoing management, maintenance and review of this valuable dataset.

**Table 4 Conservation status of the plant communities of the LHIG, and representation in the PPP. Threat status is based on a subjective analysis of the extent of a community, its current level of formal protection, and perceived vulnerability to threatening processes; CEEC indicates a Critically Endangered Ecological Community currently listed under the BC Act.**

Community number	Community name	Representation in PPP	Threat status
1	Coastal Spinifex – Dune Bean – Club Rush – <i>Melanthera biflora</i> – Saltwater Couch beach strandline grassland	Poor (16%)	High
2	<i>Melanthera biflora</i> – Saltwater Couch herbland/grassland on coral boulder beaches and rocky headlands	Good (58%)	Moderate
3	Grey Saltbush shrubland of exposed talus slopes	Good (60%)	High
4	Chaff Flower – Ice Plant – Saltwater Couch – Pigface herbland/grassland of rock shelves and cliffs	Very Good (95%)	High
5	Tea Tree shrubland on exposed rocky slopes	Very Good (97%)	Low
6	Sallywood swamp forest of poorly drained, low-lying areas	Very Poor (<1%)	CEEC
7	Saltwater Couch saltmarsh of poorly drained, brackish flats	None (0%)	Very High
8	Bully Bush – Hopwood shrubland on shallow rocky soils	Very Good (98%)	Moderate
9	Common Reed – Leafy Flat Sedge – Couch grassland or sedgeland of northern hills and offshore islands	Very Poor (<1%)	Very High
10	Fishbone Fern – Boat Vine – Bat’s Wing Fern fernland on boulder slopes at cliff bases	Very Good (98%)	Moderate
11	Bully Bush – Tea Tree – Mountain Daisy rocky heathland of the southern mountains	All (100%)	High
12a	Kentia Palm forest on coral sand and calcarenite	Moderate (33%)	Very High
12b	Banyan – Kentia Palm forest on coral sand and calcarenite	Good (70%)	Very High
13a	Hotbark – Fitzgerald gnarled mossy cloud forest	All (100%)	CEEC
13b	Mountain Palm low closed forest	All (100%)	Very High (CEEC in part)
13c	Fitzgerald – Mountain Rose low closed forest	All (100%)	High (CEEC in part)
14	Scalybark – Blue Plum – Curly Palm closed forest of sheltered slopes or valleys	Very Good (98%)	High
15a	Blue Plum – Curly Palm – Scalybark closed forest on rocky slopes	Very Good (99%)	High
15b	Forky-tree closed forest along gullies	Very Good (98%)	Very High
16a	Scalybark – Curly Palm – Greybark – Cedar – Maulwood – Forky-tree lowland mixed closed forest on slopes of the southern mountains	Very Good (99%)	High
16b	Curly Palm closed sclerophyll forest	Very Good (98%)	High
17a	Greybark – Blackbutt rainforest	Very Good (83%)	Moderate
17b	Greybark – Blackbutt low closed forest on exposed basalt slopes	Medium	Moderate
17c	Greybark – Blackbutt low closed forest on exposed calcarenite	All (100%)	Very High
18	Kentia Palm – Greybark rainforest of low to mid altitude slopes	Very Good (93%)	High
19	Maulwood – Kentia Palm – Cotton-wood – Greybark lowland forest	None (0%)	Very High
20	Grey Mangrove low open woodland of brackish creeks	None (0%)	Very High
21	River Mangrove tall shrubland of brackish creeks	None (0%)	Very High
22	Hill Rose – Forky-tree forest of rocky creeks and slopes	All (100%)	High
23	<i>Poa poiformis</i> tussock grassland of offshore islands and exposed coastal slopes	All (100%)	High
24	<i>Pouzolzia australis</i> – Kava closed shrubland on exposed wet rocky slopes	All (100%)	Very High
25	<i>Alyxia squamulosa</i> – <i>Coprosma inopinata</i> low shrubland on narrow exposed rocky ridges	All (100%)	Very High
26	Black Plum – King Fern low closed forest of the southern mountains	All (100%)	Very High

## Conclusion

This report describes the methodology and results of floristic survey, floristic analyses and classification, and high-resolution, fine-scale mapping of the vegetation communities of the LHIG. A total of 222 plant species, including 47 introduced species, were recorded from 191 floristic plots. All floristic data gathered during the project were entered into the BioNet Vegetation Information System flora survey database. The resultant vegetation classification

and map identifies a total of 39 map units, including 26 native vegetation communities (plus seven variants within five of these communities) and 13 non-native vegetation or non-vegetation units. Three communities that had not been recognised in previous studies were identified in the course of this project: a saltmarsh community, a lowland rainforest community, and a rainforest community of rocky riparian sites. Detailed community profiles, containing structural, floristic, habitat, distribution and threat information, along with photographs and maps, were prepared to aid in field

identification and assessment. Based upon threat information and level of formal protection within the Permanent Park Preserve, each community was allocated a threat status. Those assessed as having a ‘High’ or ‘Very High’ threat status should be considered for nomination as threatened ecological communities.

The high resolution of this mapping will greatly improve the ability of the LHIB to undertake detailed environmental planning and to assess, manage and monitor vegetation communities and their responses to weed management, biosecurity, conservation assessment, ecological restoration and threat mitigation throughout the LHIG.

### Acknowledgements

We thank Dave Kelly (then Manager, Environment and Community Development, LHIB) for the inception, administration and organisation of the project. Sue Bower (Flora Management Officer, LHIB) and Hank Bower (Manager Environment – World Heritage) provided excellent assistance with planning field surveys as well as good company in the field and after work. Ian Hutton gave valuable assistance in the field and generously shared his deep knowledge of the flora of the LHIG. Christo Haselden, Nelson Retmook, Louis Shick, Bruce ‘Gilly’ Thompson, and John Trehy provided enthusiastic assistance with field work. Doug Binns assisted with the floristic analyses. Thanks also to Dave Kelly, Ian Hutton, Sue Bower and Hank Bower for critically reviewing both the vegetation map and the original accompanying report. Dr John Pickard provided a constructive review of this manuscript which has improved the final product.

### References

- AECOM (2016) *Draft Lord Howe Island Biosecurity Strategy 2016*. AECOM, Townsville, Qld.
- AVH (2020) *Australia’s Virtual Herbarium*, Council of Heads of Australasian Herbaria. Available at <http://avh.chah.org.au> (Accessed Feb 2020).
- Auld, T. D. and Hutton, I. (2004) Conservation issues for the vascular flora of Lord Howe Island. *Cunninghamia* **8** (4): 490–500.
- Auld, T. D. and Leishman, M. R. (2015) Ecosystem risk assessment for Gnarled Mossy Cloud Forest, Lord Howe Island, Australia. *Austral Ecology* **40**: 364–372.
- Auld, T. D., Hutton, I., Ooi, M. J. K. and Denham, A. (2010) Disruption of recruitment in two endemic palms on Lord Howe Island by invasive rats. *Biological Invasions* **12** (9): 3351–3361.
- Bedward, M. (1999) *Fidel: A Utility to Profile Classification Groups in Terms of Attribute Fidelity*. Unpublished report for NSW National Parks and Wildlife Service Southern CRA Unit, Queanbeyan, NSW.
- Belbin, L. (1990) *PATN Pattern Analysis Package*. CSIRO, Canberra.
- Belbin, L. (1995) *PATN Technical Reference Manual*. CSIRO Division of Wildlife & Ecology, Canberra.
- Braun-Blanquet, J. (1932) *Plant Sociology: The Study of Plant Communities*. Koeltz Scientific Books, Koenigstein. Translated, revised and edited by Fuller, G. D. & Conrad, H. S. (1983).
- Bray, J. R. and Curtis, J. T. (1957) An ordination of upland forest communities of southern Wisconsin. *Ecological Monographs* **27**: 325–349.
- Bureau of Meteorology (2015) Lord Howe Island meteorological data. Accessed online at [http://www.bom.gov.au/climate/averages/tables/cw\\_200839.shtml](http://www.bom.gov.au/climate/averages/tables/cw_200839.shtml) (Verified 20 Jul 2016).
- Carlile, N. and Priddel, D. (2013a) Seabird Islands No. 257: Tenth of July Island, Lord Howe Group, New South Wales. *Corella* **37** (4): 86–87.
- Carlile, N. and Priddel, D. (2013b) Seabird Islands No. 258: South Island, Lord Howe Group, New South Wales. *Corella* **37** (4): 88–89.
- Carlile, N. and Priddel, D. (2013c) Seabird Islands No. 257: Tenth of June Island, Lord Howe Group, New South Wales. *Corella* **37** (4): 86–87.
- Carlile, N. and Priddel, D. (2013d) Seabird Islands No. 260: Soldiers Cap, Lord Howe Group, New South Wales. *Corella* **37** (4): 92–93.
- Carlile, N. and Priddel, D. (2013e) Seabird Islands No. 261: Muttonbird Island, Lord Howe Group, New South Wales. *Corella* **37** (4): 94–96.
- Carlile, N. and Priddel, D. (2013f) Seabird Islands No. 262: Blackburn Island, Lord Howe Group, New South Wales. *Corella* **37** (4): 97–99.
- Carlile, N., Priddel, D. and Bower, H. (2013) Seabird Islands No. 256: Roach Island, Lord Howe Group, New South Wales. *Corella* **37** (4): 82–85.
- Clarke, S. S. (1974) *Pattern Analysis of the Vegetation*. Appendix D, pages 37–46. In Recher, H. F. and Clarke, S. S. (Eds). *Environmental Survey of Lord Howe Island*. A report to the Lord Howe Island Board. The Australian Museum, Department of Environmental Studies, Sydney.
- Department of the Environment (2014) *Threat Abatement Plan for Disease in Natural Ecosystems Caused by Phytophthora cinnamomi*. Commonwealth of Australia, Canberra. Available at <https://www.environment.gov.au/biodiversity/threatened/publications/threat-abatement-plan-disease-natural-ecosystems-caused-phytophthora-cinnamomi> (Verified 16 Jul 2016).
- DECC (2007) *Lord Howe Island Biodiversity Management Plan*. Department of Environment and Climate Change (NSW), Sydney.
- Green, P. S. (1994) *Flora of Australia. Vol. 49 Oceanic Islands. 1*. Australian Government Publishing Service, Canberra.
- Harris, R., Cassis, G., Auld, T., and Hutton, I. (2005) Floristics and structure of the mossy cloud forest of Mt Gower summit, Lord Howe Island. *Pacific Conservation Biology* **11**: 246–256.
- Hunter, J. (2002) *Vegetation and Habitat of Significance Within the Settlement area of Lord Howe Island*. An internal report for the Lord Howe Island Board. NSW Department of Environment and Conservation.
- Hunter, J. and Hodgson, G. (2005) *Revised Vegetation Map of Lord Howe Island*. Metadata statement held by NSW Department of Environment and Conservation.
- Hutton, I. (2001) *Rare Plant Surveys – Lord Howe Island*. A report prepared for the NSW Scientific Committee, Hurstville (Sydney), NSW.
- Hutton, I. (2005) *Rare Plant Survey 2 – Lord Howe Island*. Unpublished report.
- Hutton, I. (2008) *A Guide to World Heritage Lord Howe Island*. The author, Lord Howe Island.
- Hutton, I. (2010a) *A Field Guide to the Plants of Lord Howe Island*. The author, Lord Howe Island.
- Hutton, I. (2010b) *A Field Guide to the Ferns of Lord Howe Island*. The author, Lord Howe Island.
- Keith, D. A. (2004) *From Ocean Shores to Desert Dunes: The Vegetation of New South Wales and the ACT*. Department of Environment and Conservation, Sydney.

- Le Cussan, J. (2006) Eradication of invasive alien plants on Lord Howe Island, NSW using three *Asparagus* species (*Asparagus asparagoides* (L.) Druce, *A. plumosus* Baker and *A. aethiopicus* L.) as case studies. *Plant Protection Quarterly* 21(3): 117-121.
- LHIB (2002) *Draft Review of the Permanent Park Preserve Plan of Management*. Report to the Lord Howe Island Board.
- LHIB (2006) *Lord Howe Island Weed Management Strategy 2006*. Lord Howe Island Board.
- LHIB (2009) *Draft Lord Howe Island Rodent Eradication Plan*. Lord Howe Island Board.
- LHIB (2014) *Lord Howe Island Plant Importation Strategy*. Lord Howe Island Board.
- LHIB (2015) *Myrtle Rust and Phytophthora Prevention: Protecting Paradise*. Lord Howe Island Board. [Brochure]
- LHIB (2016a) *Lord Howe Island Weed Eradication Program Results 2004 – 2014*. Lord Howe Island Board.
- LHIB (2016b) *Draft Lord Howe Island Weed Management Strategy 2016–2026*. Lord Howe Island Board.
- LHIREP (2019) *Lord Howe Island Rodent Eradication Project Newsletter updates August – December 2019*. Available online at <https://lhiodenteradicationproject.org/news-updates/>.
- Makinson, R.O. (2018) Myrtle Rust reviewed: the impacts of the invasive pathogen *Austropuccinia psidii* on the Australian environment. Plant Biosecurity Cooperative Research Centre, Canberra.
- NSW Scientific Committee (2010) *Solanum bauerianum – species presumed extinct listing*. NSW Scientific Committee Final Determination. Available at <http://www.environment.nsw.gov.au/determinations/solanumbauerianumFD.htm> (Verified Feb 2020).
- Pickard, J. (1974) *Vegetation Map (in colour) and notes*. Appendix C, pages 27–36 (+ enclosed map) **In** Recher, H. F and Clarke, S. S. (Eds). *Environmental Survey of Lord Howe Island*. A report to the Lord Howe Island Board. The Australian Museum, Department of Environmental Studies, Sydney.
- Pickard, J. (1978) *Vegetation of Lord Howe Island*. MSc thesis, Department of Botany, University of Sydney.
- Pickard, J. (1982) Catastrophic disturbance and vegetation on Little Slope, Lord Howe Island. *Australian Journal of Ecology* 7 (2): 169–178.
- Pickard, J. (1983) *Vegetation of Lord Howe Island*. *Cunninghamia* 1(2): 133–265.
- Pickard, J. (1983a) Rare or threatened vascular plants of Lord Howe Island. *Biological Conservation* 27 (2): 125–139.
- Pickard, J. (1984) Exotic Plants on Lord Howe Island: Distribution in Space and Time, 1853-1981. *Journal of Biogeography* 11 (3): 181–208.
- PlantNET (2019) *The NSW Plant Information Network System*. Royal Botanic Gardens and Domain Trust, Sydney. Available at <http://plantnet.rbg Syd.nsw.gov.au> [Accessed June 2019].
- Recher, H. F and Clarke, S. S. (Eds) (1974) *Environmental Survey of Lord Howe Island*. A report to the Lord Howe Island Board. The Australian Museum, Department of Environmental Studies, Sydney.
- Rodd, A. N. and Pickard, J. (1983) Census of vascular flora of Lord Howe Island. *Cunninghamia* 1 (2): 267–280.
- Walker, J. and Hopkins, M. S. (1990) *Vegetation*. Pages 58–86 **In** McDonald, R. C., Isbell, R. F., Speight, J. G., Walker, J. and Hopkins, M. S. (Eds) *Australian Soil and Land Survey Field Handbook*. 2nd edition. Inkata Press, Melbourne.

## Appendix 1- Plant Community Descriptions

Detailed profiles of each LHIG vegetation community sampled and recognised in this study, and for which there were floristic and physiognomic data, have been prepared to assist in the identification of the vegetation types in the field, particularly for environmental planning.

Each profile is structured as follows.

### Vegetation Formation — Vegetation Class:

**Vegetation Formation** is the broad vegetation group described in Keith (2004) and distinguished by structural (height, cover, strata) and physiognomic (growth forms, leaf types) characteristics. Examples include Rainforests, Grasslands and Heathlands.

**Vegetation Class** is a finer grouping described in Keith (2004) and which identifies floristically related groups within each Vegetation Formation. Examples include Oceanic Rainforests, Maritime Grasslands and Coastal Headland Heaths.

**Community:** The community number and a concise name of the community, which may include some details of floristics, structure, distribution and habitat. Common plant names, rather than scientific nomenclature, are used in this name. The community number and community name are also the mapping unit number (and code) and mapping unit name.

**Scientific name:** A more complete description of the floristics of the community. It includes scientific names of dominant or characteristic species in each vegetation stratum, commencing with the tallest stratum. Names within each stratum are separated by a dash, and each stratum is separated by a forward slash. (Note that the database uses hyphens between names within strata.)

**Equivalent vegetation types:** Lists equivalency to other vegetation classifications, mainly Pickard (1983) and DECC (2007).

**Community photographs:** An image or images of the community is provided, where possible. Photographs are usually taken at a floristic site or in close proximity to a floristic site. Images of variants of vegetation communities are also provided where possible.

**Structure:** Provides the vegetation structural type, in accordance with the structural classification of Walker and Hopkins (1990).

**Description:** Summarises the structure and floristic composition of the vegetation community. Includes information collected about each community during API and field surveys.

**Habitat:** Describes where the community occurs in terms of elevation, terrain, geology, soils, exposure, moisture, and other environmental characteristics.

**Sample sites:** Lists all full floristic sites sampled within this vegetation community during the current survey. Communities 20, 21 and 22, which were delineated by the canopy-only analysis, are represented by rapid floristic sites only.

**Floristic Group:** Lists the PATN analysis floristic group that the community represents. Applies to those groups recognised in either the full floristic or canopy-only analyses.

**Mean number of native species per plot:** Calculated for communities with full-floristic site data only; presented plus or minus one standard deviation (although only the mean is given where only one full-floristic site was sampled for the community).

**Indicator native species:** Summarises the diagnostic, or indicator, species that characterise the vegetation community. These are identified by fidelity analysis for communities with full floristic site data, or from field observations where such data do not exist (see 'Fidelity table' below).

**Number of exotic species recorded in plots:** Listed only for communities for which full-floristic data are available.

**Common exotic species:** Lists dominant or widespread exotic species, based upon site-based floristic data and field observations.

**Threatened species:** Identifies flora species that are listed as threatened under the NSW *Biodiversity Conservation Act 2016 (BC Act)* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* that are known to occur within the vegetation community.

**Disturbance and condition:** Describes the general condition of the community and notes locations and causes of disturbance.

**Areal extent:** Total extent of community mapped in this study (in hectares) and extent as a percentage of the total area of the LHIG that was *mapped* in this study.

**Areal extent and % of type in PPP:** Total extent (in hectares) and the proportion of the community within the Permanent Park Preserve (PPP), excluding Balls Pyramid. The PPP covers all the LHIG outside of the Settlement area (Figure 1) and was formally gazetted in 1982 in order to protect native flora and fauna.

**Conservation significance and threats:** Identifies the habitat value of the community for threatened fauna, lists current threats, and may provide information regarding the ecological role of the community.

**Fidelity tables:** These tables provide the output of the fidelity analysis (Bedward 1999) of recognised floristic groups (communities) for which full floristic information was available. The tables identify for each species:

- Group score: The median (i.e. 50<sup>th</sup> percentile) cover-abundance score of the species in the floristic group.
- Group frequency: The proportion of floristic sites assigned to the floristic group that the species occurs in, e.g. 1 = species recorded in 100% of sites, 0.25 = species recorded in 25% of sites.
- Non-group score: The median (i.e. 50<sup>th</sup> percentile) cover-abundance score of each species in all other floristic groups.



- Non-group frequency: The proportion of all sites assigned to all other floristic groups in which that species occurs.
- Fidelity class: Positive = the taxon is diagnostic for the floristic group; Negative = taxon is generally absent from the floristic group; Constant = the taxon displays similar frequency and cover across a number of floristic groups; Uninformative = the taxon is insufficiently recorded to provide meaningful analysis. Exotic species are indicated by an asterisk preceding the scientific name.

#### Grasslands — Maritime Grasslands

#### Community 1 Coastal Spinifex – Dune Bean – Club Rush – *Melanthera biflora* – Saltwater Couch beach strandline grassland

**Scientific name:** *Spinifex sericeus* – *Vigna marina* – *Ficinia nodosa* – *Melanthera biflora* – *Sporobolus virginicus* var. *virginicus*.

**Equivalent vegetation types:** Coral Sand Beach and Dune (Pickard 1983); Coral Sand Beach and Dune (DECC 2007).



**Structure:** Mixed, closed, low to tall sod grassland or sedgeland.

**Description:** This community is usually a low, dense grassland or sedgeland. Scattered emergent shrubs of Bully Bush (*Cassinia tenuifolia*), Red Berrywood (*Ochrosia elliptica*) and Hopwood (*Dodonaea viscosa* subsp. *burmanniana*) may be present. Common ground layer species are Coastal Spinifex (*Spinifex sericeus*), Dune Bean (*Vigna marina*), Club Rush (*Ficinia nodosa*), *Melanthera biflora*, Saltwater Couch (*Sporobolus virginicus* var. *virginicus*), Pigface (*Carpobrotus glaucescens*), *Tylophora biglandulosa*, Beach Morning Glory (*Ipomoea brasiliensis*) and Coastal Jack Bean (*Canavalia rosea*). The tall herb Crinum Lily (*Crinum pedunculatum*) is sometimes present. Weeds such as Kikuyu (*Cenchrus clandestinus*) and Buffalo Grass (*Stenotaphrum secundatum*) are common.

**Habitat:** Occurs on unconsolidated calcareous beach dunes, such as those at North, Old Settlement, Neds, Blinky and Lagoon Beaches.

**Sample sites:** ( $N = 8$ ) LHI001, LHI003, LHI005, LHI006, LHI008, LHIFF62, LHIFF85, LHIFF86.

**Floristic Group:** 1.

**Mean number of native species per plot:**  $7.1 \pm 0.7$ .

**Indicator native species:** *Spinifex sericeus*, *Vigna marina*, *Ficinia nodosa*, *Melanthera biflora*, *Sporobolus virginicus* var. *virginicus*, *Calystegia soldanella*, *Actites megalocarpus*.

**Number of exotic species recorded in plots:** 23.

**Common exotic species:** *Cakile edentula*, *Cenchrus clandestinus*, *Euphorbia paralias*, *Hydrocotyle bonariensis*, *Hypochaeris radicata*, *Lobularia maritima*, *Stenotaphrum secundatum*.

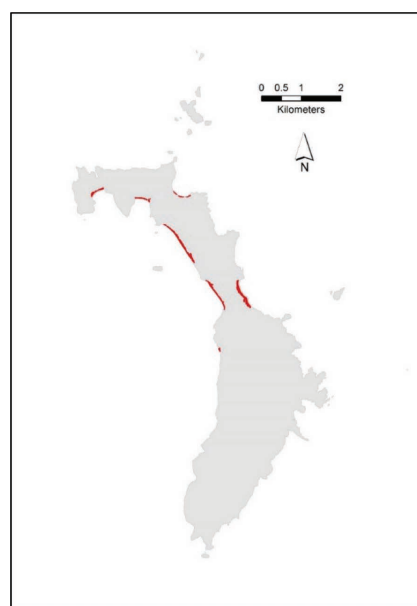
**Threatened species:** *Chamaesyce psammogeton* (Endangered – BC Act).

**Disturbance and Condition:** Weed disturbance is common in this community and some areas are dominated by weeds, especially Buffalo Grass and Kikuyu.

**Areal extent:** 9.26 ha (0.62% of mapped area).

**Areal extent and proportion in PPP:** 1.47 ha (15.86%).

**Conservation significance and threats:** This community provides habitat for *Chamaesyce psammogeton* and the Lord Howe Island Skink (*Oligosoma lichenigera*). It also provides breeding habitat for Wedge-tailed Shearwaters (*Ardenia pacifica*) and Sooty Terns (*Onychoprion fuscata*). Invasion by weeds is widespread and some areas are highly disturbed by infrastructure (such as boat sheds) and human recreational use. Coastal erosion and recession potentially threatens Lagoon Beach. The Blinky Beach dunes have been significantly modified to facilitate airport operations. This community plays an important role in consolidation of potentially mobile beach dunes.



**Key Diagnostic Species Floristic Group 1**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Spinifex sericeus</i>	4	1	1	0.01	positive
<i>Vigna marina</i>	3	1	1	0.04	positive
<i>Ficinia nodosa</i>	3	0.88	2	0.14	positive
<i>Melanthera biflora</i>	3	0.75	3	0.09	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	3	0.75	3	0.09	positive
* <i>Cakile edentula</i>	2	0.88	1	0.01	positive
<i>Ipomoea brasiliensis</i>	2	0.75	2	0.01	positive
<i>Calystegia soldanella</i>	2	0.5	0	0	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.59	negative
<i>Drypetes deplanchei</i>	0	0	2	0.73	negative
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	0	0	2	0.53	negative
<i>Oplismenus imbecillis</i>	0	0	2	0.5	negative
<i>Parsonsia howeana</i>	0	0	2	0.68	negative
<i>Smilax australis</i>	0	0	2	0.60	negative
<i>Carpobrotus glaucescens</i>	3	0.25	2	0.05	uninformative
<i>Tylophora biglandulosa</i>	3	0.25	1	0.04	uninformative

**Community 2 *Melanthera biflora* – Saltwater Couch herbland/grassland on coral boulder beaches and rocky headlands**

**Scientific name:** *Melanthera biflora* – *Sporobolus virginicus* var. *virginicus* – *Canavalia rosea*.

**Equivalent vegetation types:** Calcarenite and Coral Boulder Beach; Cliff (Pickard 1983); Calcarenite and Coral Boulder Beach; Cliff (DECC 2007).



**Structure:** Mixed, low to tall forbland/sod grassland.

**Description:** A variable coastal community with the ground layer dominated by *Melanthera biflora* or Saltwater Couch (*Sporobolus virginicus* var. *virginicus*). Other common species include Chaff Flower (*Achyranthes aspera*), Coastal Jack Bean (*Canavalia rosea*), Beach Bean (*Ipomoea brasiliensis*), Club Rush (*Ficinia nodosa*), *Tylophora biglandulosa* and Crinum Lily (*Crinum pedunculatum*). A sparse upper layer of emergent shrubs or small trees of Sallywood (*Lagunaria patersonia* subsp. *patersonia*), Kentia Palm (*Howea forsteriana*) and Bully Bush (*Cassinia tenuifolia*) may be present.

**Variation:** Varies from almost 100% cover on basaltic soil on steep slopes to very low cover among coral or basalt boulders on footslopes or flats behind beaches.

**Habitat:** Usually occurs on rocky calcarenite flats in near-coastal areas exposed to the ocean, or occasionally on basalt slopes, mainly in the northern half of the island.

**Sample sites:** ( $N = 4$ ) LHI002, LHI007, LHIF60, LHIF67.

**Floristic Groups:** 2, 3, 7.

**Mean number of native species per plot:**  $7.0 \pm 3.2$ .

**Indicator native species:** *Melanthera biflora*, *Achyranthes aspera*, *Canavalia rosea*, *Sporobolus virginicus* var. *virginicus*.

**Number of exotic species recorded in plots:** 10.

**Common exotic species:** *Ipomoea cairica*, *Melilotus indicus*, *Paspalum dilatatum*, *Plantago lanceolata*, *Cenchrus clandestinus*, *Sonchus oleraceus*, *Taraxacum officinale*, *Vicia sativa*.

**Disturbance and Condition:** The condition of this community varies, with some sites dominated by weeds such as Kikuyu (*Cenchrus clandestinus*).

**Areal extent:** 5.74 ha (0.38% of mapped area).

**Areal extent and % of type in PPP:** 3.31 ha (57.72%).

**Conservation significance and threats:** May provide breeding habitat for Black-winged Petrels (*Pterodroma nigripennis*), Sooty Terns (*Onychoprion fuscata*) and Little Shearwaters (*Puffinus assimilis*). Weed invasion is a threat, particularly along low calcarenite headlands between Blinky Beach and Neds Beach.

**Key Diagnostic Species Floristic Group 2**



Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Melanthera biflora</i>	5	1	2	0.13	positive
<i>Howea forsteriana</i>	3	1	2	0.32	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	3	1	1	0.29	positive
<i>Achyranthes aspera</i>	3	0.5	2	0.08	positive
<i>Canavalia rosea</i>	3	0.5	2	0.04	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	3	0.5	3	0.14	positive
<i>Ficinia nodosa</i>	2	0.5	2	0.22	positive
<i>Ipomoea brasiliensis</i>	2	0.5	2	0.07	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	0.5	2	0.48	positive
* <i>Sonchus oleraceus</i>	2	0.5	1	0.11	positive
* <i>Taraxacum officinale</i>	2	0.5	0	0	positive

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Parsonsia howeana</i>	3	1	2	0.61	constant

**Key Diagnostic Species Floristic Group 3**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Melanthera biflora</i>	5	1	3	0.14	positive
* <i>Paspalum dilatatum</i>	3	1	2	0.01	positive
<i>Achyranthes aspera</i>	2	1	3	0.08	positive
<i>Canavalia rosea</i>	2	1	3	0.04	positive
* <i>Chloris gayana</i>	2	1	0	0	positive
* <i>Ipomoea cairica</i>	2	1	1	0.24	positive
* <i>Cenchrus clandestinus</i>	2	1	3	0.05	positive
<i>Stephania japonica</i> var. <i>timoriensis</i>	2	1	1	0.27	positive

**Key Diagnostic Species Floristic Group 7**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
* <i>Cenchrus clandestinus</i>	5	1	3	0.05	positive
<i>Canavalia rosea</i>	3	1	2	0.04	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.54	negative
<i>Drypetes deplanchei</i>	0	0	2	0.67	negative
<i>Parsonsia howeana</i>	0	0	2	0.62	negative
<i>Smilax australis</i>	0	0	2	0.55	negative

*Heathlands — Coastal Headland Heath***Community 3 Grey Saltbush shrubland of exposed talus slopes**

**Scientific name:** *Atriplex cinerea* – *Myoporum insulare* / *Sporobolus virginicus* – *Achyranthes aspera* – *Melanthera biflora*.

**Equivalent vegetation types:** *Atriplex cinerea* Orthophyll Dwarf Scrub (Pickard 1983); Saltbush (*Atriplex cinerea*) Dwarf Scrub (DECC 2007).



**Structure:** Mid-high to tall chenopod shrubland.

**Description:** A shrubland community dominated by Grey Saltbush (*Atriplex cinerea*), with Juniper (*Myoporum insulare*) also occurring in the shrub layer. Common species in the ground layer include *Melanthera biflora*, Saltwater Couch (*Sporobolus virginicus* var. *virginicus*) and Chaff Flower (*Achyranthes aspera*). *Lepidium howei-insulae* and Sea Celery (*Apium prostratum* subsp. *howense*) are present in this community but are uncommon in other floristic groups.

**Habitat:** On steep slopes of talus debris below sea-cliffs, usually with a thin layer of coral sand over basalt or tuff. Restricted to the sea-cliffs of Malabar, and between Neds Beach and Middle Beach.

**Sample sites:** ( $N = 1$ ) LHIFF70; this is a locality below Malabar and difficult to access.

**Floristic Group:** 4.

**Mean number of native species per plot:** 8.

**Indicator native species:** *Atriplex cinerea*, *Myoporum insulare*.

**Number of exotic species recorded in plots:** 0.

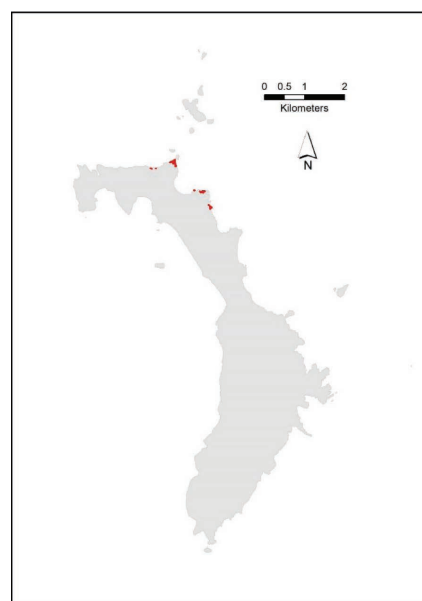
**Common exotic species:** *Cenchrus clandestinus*, *Stenotaphrum secundatum*.

**Disturbance and Condition:** Occurrences below Malabar and at Searles Point are in good condition, but there is some Kikuyu (*Cenchrus clandestinus*) and Buffalo Grass (*Stenotaphrum secundatum*) in occurrences near Neds Beach.

**Areal extent:** 0.92 ha (0.06% of mapped area).

**Areal extent and % of type in PPP:** 0.55 ha (59.31%).

**Conservation significance and threats:** This is a very restricted plant community on LHI that could be threatened by stochastic events, such as major storms, and weed invasion.

**Key Diagnostic Species Floristic Group 4**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Atriplex cinerea</i>	5	1	0	0	positive
<i>Achyranthes aspera</i>	2	1	3	0.08	positive
<i>Melanthera biflora</i>	2	1	3	0.14	positive
<i>Myoporum insulare</i>	2	1	1	0.12	positive

*Grasslands — Maritime Grasslands*

**Community 4 Chaff Flower – Ice Plant – Saltwater Couch – Pigface herbland/grassland of rock shelves and cliffs**

**Scientific name:** *Achyranthes aspera* – *Sesuvium portulacastrum* – *Sporobolus virginicus* var. *virginicus* – *Carpobrotus glaucescens*.

**Equivalent vegetation types:** *Ipomoea cairica* – *Carpobrotus glaucescens* Evergreen Broad-leaved Weedy Vegetation; part of Cliffs (Pickard 1983); *Ipomoea cairica* – *Carpobrotus glaucescens* Herbland; part of Cliff (DECC 2007).



**Structure:** Low to mid-high mixed herbland or sod grassland.

**Description:** A herbland/grassland community of exposed rocky coastal sites in which Chaff Flower (*Achyranthes aspera*), Ice Plant (*Sesuvium portulacastrum*) and Saltwater Couch (*Sporobolus virginicus* var. *virginicus*) variously dominate. Pigface (*Carpobrotus glaucescens*), New Zealand Spinach (*Tetragonia tetragonioides*) and *Melanthera biflora* are also common. Occasional stunted emergent Cotton Wood (*Celtis conferta* subsp. *amblyphylla*), Tea Tree (*Melaleuca howeana*) or Greybark (*Drypetes deplanchei*) may occur. The introduced Five-leaf Morning Glory (*Ipomoea cairica*) is common in some areas.

**Variation:** Each of the dominants may form pure stands at the local scale.

**Habitat:** Occurs on exposed rocky sites near the ocean, on basalt, breccia and tuff, as well as calcarenite rock shelves. Main area of occurrence is the sea-cliffs and rock shelves of

the northern hills, Hells Gates and Mutton Bird, Roach, and Tenth of June Islands.

**Sample sites:** (*N* = 2) LHI004, LHIF80.

**Floristic Group:** 5.

**Mean number of native species per plot:** 9.0 ± 0.0.

**Indicator native species:** *Sesuvium portulacastrum*, *Achyranthes aspera*, *Carpobrotus glaucescens*, *Tetragonia tetragonioides*, *Sporobolus virginicus* var. *virginicus*, *Apium prostratum* subsp. *howense*, *Portulaca oleracea*, *Senecio howeanus*.

**Number of exotic species recorded in plots:** 6.

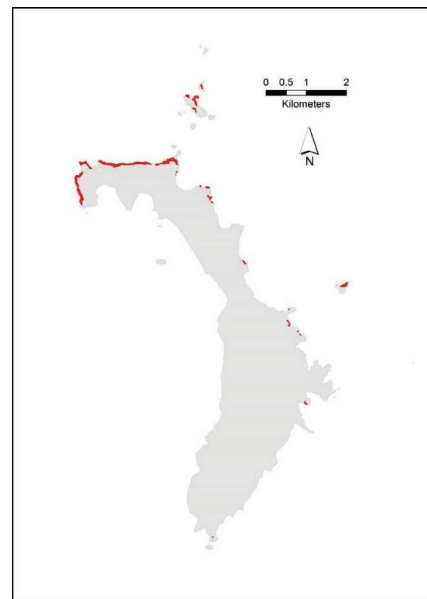
**Common exotic species:** *Ipomoea cairica*, *Parietaria debilis*, *Sonchus oleraceus*.

**Disturbance and Condition:** Generally in good condition with some minor weed infestations.

**Areal extent:** 13.94 ha (0.93% of mapped area).

**Areal extent and % of type in PPP:** 13.25 ha (95.08%).

**Conservation significance and threats:** Provides nesting habitat for a number of seabird species, particularly on Roach Island. Some occurrences may be threatened by extreme storm events, sea-level rise and degradation by weed invasion (particularly *Ipomoea cairica*).



**Key Diagnostic Species Floristic Group 5**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Achyranthes aspera</i>	4	1	2	0.07	positive
<i>Sesuvium portulacastrum</i>	4	1	0	0	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	4	1	3	0.13	positive
<i>Carpobrotus glaucescens</i>	3	1	2	0.05	positive
<i>Melanthera biflora</i>	3	1	3	0.13	positive
<i>Tetragonia tetragonioides</i>	3	1	2	0.05	positive
<i>Apium prostratum</i> subsp. <i>howense</i>	2	1	1	0.01	positive
<i>Portulaca oleracea</i>	2	0.5	0	0	positive
<i>Senecio howeanus</i>	1	0.5	0	0	positive

*Heathlands — Coastal Headland Heaths***Community 5 Tea Tree shrubland on exposed rocky slopes**

**Scientific name:** *Melaleuca howeana* / *Achyranthes aspera* / *Sporobolus virginicus* var. *virginicus* – *Poa poiiformis*.

**Equivalent vegetation types:** *Melaleuca howeana* Straight Narrow Sclerophyll Scrub (Pickard 1983); *Melaleuca howeana* Closed Scrub (DECC 2007).



**Structure:** Closed to open, tall to very tall shrubland.

**Description:** A shrubland dominated by Tea Tree (*Melaleuca howeana*), with occasional emergent Curly Palm (*Howea belmoreana*) and Sallywood (*Lagunaria patersonia* subsp. *patersonia*). Other shrub species present include Juniper (*Myoporum insulare*), Bully Bush (*Cassinia tenuifolia*) and Christmas Bush (*Alyxia ruscifolia*). The vines *Parsonsia howeana* and *Muehlenbeckia complexa* may be present. The ground layer is usually sparse under dense shrubs, or dense in more open sites. Common species include Chaff Flower (*Achyranthes aspera*), Saltwater Couch (*Sporobolus virginicus* var. *virginicus*), Pigface (*Carpobrotus glaucescens*), *Melanthera biflora*, Club Rush (*Ficinia nodosa*), *Poa poiiformis*, *Oplismenus imbecillis* and New Zealand Spinach (*Tetragonia tetragonioides*).

**Habitat:** Occurs on steep rocky slopes, exposed cliff tops, regenerating landslips, rock outcrops, ridge lines, and rocky

foreshores of bays. Usually occurs between sea level and 150 m altitude but occasionally higher.

**Sample sites:** ( $N = 3$ ) LHIFF03, LHIFF005, LHIFF07.

**Floristic Groups:** 6, 11.

**Mean number of native species per plot:**  $11.7 \pm 7.2$ .

**Indicator native species:** *Melaleuca howeana*, *Achyranthes aspera*.

**Number of exotic species recorded in plots:** 11.

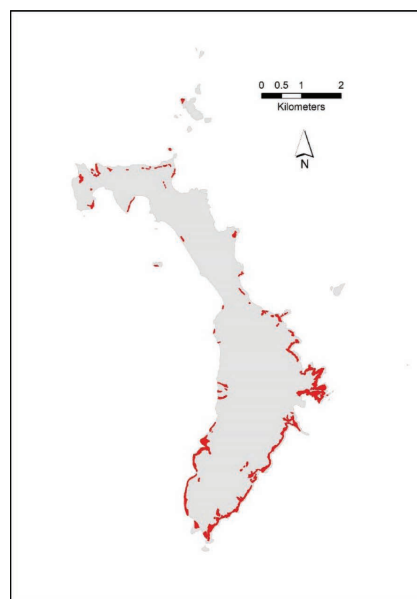
**Common exotic species:** *Bromus catharticus*, *Chenopodium murale*, *Ipomoea cairica*.

**Disturbance and Condition:** Generally in good condition except for stochastic disturbance such as landslips (Pickard 1982), and localised weed incursions.

**Areal extent:** 60.6 ha (4.03% of mapped area).

**Areal extent and % of type in PPP:** 59 ha (97.37%).

**Conservation significance and threats:** Provides nesting habitat for Sooty Terns (*Onychoprion fuscata*), Common Noddies (*Anous stolidus*), Black-winged Petrels (*Pterodroma nigripennis*) and Little Shearwaters (*Puffinus assimilis*).

**Key Diagnostic Species Floristic Group 6**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
* <i>Bromus catharticus</i>	4	1	2	0.01	positive
<i>Melaleuca howeana</i>	4	1	2	0.10	positive
<i>Achyranthes aspera</i>	3	1	3	0.07	positive
* <i>Chenopodium murale</i>	3	1	1	0.02	positive
* <i>Ipomoea cairica</i>	3	0.5	1	0.23	positive
<i>Carpobrotus glaucescens</i>	2	1	3	0.05	positive
<i>Commelina cyanea</i>	2	0.5	1	0.26	positive
<i>Cotula australis</i>	2	0.5	1	0.01	positive
<i>Ficinia nodosa</i>	2	0.5	2	0.20	positive
<i>Microlaena stipoides</i> var. <i>stipoides</i>	2	0.5	0	0	positive
<i>Nicotiana forsteri</i>	2	0.5	0	0	positive
<i>Cenchrus clandestinus</i>	2	0.5	3	0.05	positive

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Poa poiformis</i> var. <i>poiformis</i>	2	0.5	1	0.11	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	2	0.5	3	0.14	positive
<i>Tetragonia tetragonioides</i>	2	1	2	0.05	positive

### Key Diagnostic Species Floristic Group 11

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Melaleuca howeana</i>	4	1	2	0.11	positive
<i>Myoporum insulare</i>	3	1	1	0.13	positive
<i>Alyxia ruscifolia</i>	2	1	1	0.42	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	1	1	0.29	positive
<i>Myrsine platystigma</i>	2	1	1	0.32	positive
<i>Oplismenus imbecillis</i>	2	1	2	0.45	positive
<i>Pandorea pandorana</i> subsp. <i>austrocaledonica</i>	2	1	1	0.45	positive
<i>Solanum nigrum</i>	2	1	1	0.12	positive
<i>Parsonsia howeana</i>	3	1	2	0.61	constant
<i>Drypetes deplanchei</i>	2	1	2	0.66	constant



*Forested Wetlands — Coastal Swamp Forests*

**Community 6 Sallywood swamp forest of poorly drained, low-lying areas**

**Scientific name:** *Lagunaria patersonia* subsp. *patersonia* / *Aegiceras corniculata* – *Hibiscus tiliaceus* – *Myoporum insulare* / *Commelina cyanea*.

**Equivalent vegetation types:** *Lagunaria patersonia* Broad Orthophyll Sclerophyll Forest (Pickard 1983); Sallywood *Lagunaria patersonia* Closed Swamp Forest (DECC 2007).



**Structure:** A mid-high to tall closed to open forest.

**Description:** This community is dominated by Sallywood (*Lagunaria patersonia* subsp. *patersonia*) with occasional Cottonwood Hibiscus (*Hibiscus tiliaceus*) and Blackbutt (*Cryptocarya triplinervis* var. *triplinervis*). A sparse mid-layer of River Mangrove (*Aegiceras corniculata*) or Juniper (*Myoporum insulare*), or both, is usually present. The ground layer varies from dense to sparse, and common species are Blue Wandering Jew (*Commelina cyanea*) and Kikuyu (*Cenchrus clandestinus*).

**Variation:** Some of the small areas mapped as this community are recently revegetated sites.

**Habitat:** Restricted to areas of moist alluvium along Soldiers Creek, Cobbys Corner near the Golf Course, Pinetrees, Settlement Creek and behind North Beach. Most examples of this community are regenerating, and adult trees are showing signs of dieback. A large area of this community was lost during construction of the airport (Pickard 1983).

**Sample sites:** ( $N = 1$ ) LHIFF37.

**Key Diagnostic Species Floristic Group 8**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Commelina cyanea</i>	6	1	1	0.26	positive
<i>Aegiceras corniculatum</i>	3	1	1	0.01	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	3	1	1	0.29	positive
* <i>Stenotaphrum secundatum</i>	2	1	4	0.07	positive
* <i>Araucaria heterophylla</i>	1	1	0	0	positive
* <i>Aster subulatus</i>	1	1	0	0	positive
<i>Triglochin striata</i>	1	1	0	0	positive

**Floristic Group:** 8.

**Mean number of native species per plot:** 5.

**Indicator native species:** *Lagunaria patersonia* subsp. *patersonia*, *Aegiceras corniculatum*, *Hibiscus tiliaceus*, *Commelina cyanea*, *Triglochin striata*.

**Number of exotic species recorded in plots:** 3.

**Common exotic species:** *Cenchrus clandestinus*, *Stenotaphrum secundatum*.

**Disturbance and Condition:** The few remnants of this community are disturbed and in poor condition.

**Areal extent:** 0.89 ha (0.06% of mapped area).

**Areal extent and % of type in PPP:** 0.04 ha (4.33%).

**Conservation significance and threats:** A highly restricted community that continues to be degraded by weeds, grazing and exposure. It is also threatened by mechanical opening of creek lines during potential flooding events. Even before European settlement this community would have occupied only a small area, and most has been cleared, as it occurs on flat, relatively fertile sites.

**Endangered Ecological Community:** *Lagunaria* Swamp Forest on Lord Howe Island (Critically Endangered Ecological Community).



*Saline Wetlands — Saltmarshes*

**Community 7 Saltwater Couch saltmarsh of poorly drained, brackish flats**

**Scientific name:** *Avicennia marina* subsp. *australasica* / *Sporobolus virginicus*.

**Equivalent vegetation types:** Part of *Avicennia marina* subsp. *australasica* Broad Sclerophyll Swamp Scrub; part of *Aegiceras corniculatum* Broad Sclerophyll Swamp Scrub (Pickard 1983); part of Mangrove (*Avicennia marina* var. *australasica*) Open Swamp Scrub; part of Mangrove *Aegiceras corniculatum* Closed Swamp Scrub (DECC 2007).



**Structure:** Low closed sod grassland.

**Description:** Scattered emergent shrubs of Grey Mangrove (*Avicennia marina* subsp. *australasica*), River Mangrove (*Aegiceras corniculatum*) or *Hibiscus tiliaceus* may occur in this community. The ground layer is dominated by a dense cover of Saltwater Couch (*Sporobolus virginicus* var. *virginicus*), with occasional Crinum Lily (*Crinum pedunculatum*).

**Habitat:** Occurs along a small creek line growing in alluvium and mud that is rarely influenced by saltwater incursion. Located only at Settlement Creek.

**Sample sites:** (*N* = 1) FF71.

**Floristic Group:** 9.

**Mean number of native species per plot:** 10.

**Key Diagnostic Species Floristic Group 9**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	5	1	3	0.14	positive
<i>Avicennia marina</i> subsp. <i>australasica</i>	2	1	0	0	positive
<i>Hibiscus tiliaceus</i>	1	1	0	0	positive

**Indicator native species:** *Sporobolus virginicus* var. *virginicus*, *Hibiscus tiliaceus*, *Avicennia marina* subsp. *australasica*.

**Number of exotic species recorded in plots:** 1.

**Common exotic species:** *Stenotaphrum secundatum*.

**Disturbance and Condition:** The small examples of this community are in reasonable condition as they occur in a fenced-off area of assisted native regeneration.

**Areal extent:** 0.3 ha (0.02% of mapped area).

**Areal extent and % of type in PPP:** 0 ha (0%).

**Conservation significance and threats:** A highly restricted community in a specialised habitat. It may be threatened by mechanical opening of creek lines during potential flooding events. It could be replaced by mangrove or Sallywood (*Lagunaria patersonia* subsp. *patersonia*) communities over time.

**Endangered Ecological Community:** Floristically equivalent to Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregion.

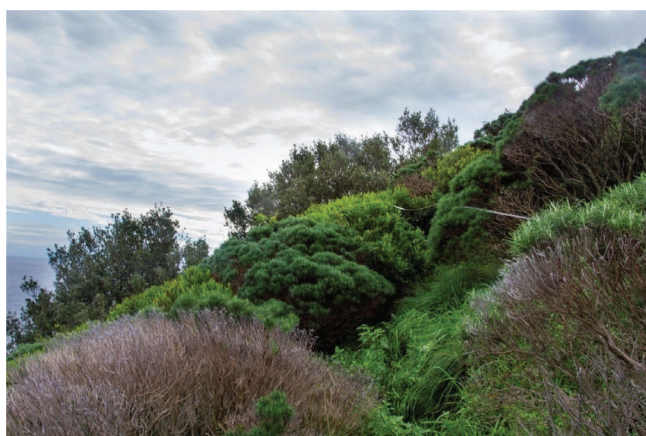


## Heathlands — Coastal Headland Heaths

**Community 8 Bully Bush – Hopwood shrubland on shallow rocky soils**

**Scientific name:** *Lagunaria patersonia* subsp. *patersonia* – *Drypetes deplanchei* / *Cassinia tenuifolia* – *Dodonaea viscosa* subsp. *burmanniana* – *Melaleuca howeana* / *Muehlenbeckia complexa* / *Ficinia nodosa* – *Sporobolus virginicus* var. *virginicus* – *Poa poiformis*.

**Equivalent vegetation types:** *Cassinia tenuifolia* Straight Narrow Sclerophyll Scrub; *Dodonaea viscosa* Evergreen Broad Sclerophyll Scrub (Pickard 1983); Bully Bush (*Cassinia tenuifolia*) Closed Scrub; *Dodonaea viscosa* Closed Scrub (DECC 2007).



**Structure:** Mid-high to tall closed to open shrubland.

**Description:** A shrubland community with a sparse, emergent upper layer of Greybark (*Drypetes deplanchei*) and Sallywood (*Lagunaria patersonia* subsp. *patersonia*) often present. There is an open to dense shrub layer dominated by Bully Bush (*Cassinia tenuifolia*) or Hopwood (*Dodonaea viscosa* subsp. *burmanniana*), or both, with occasional Tea Tree (*Melaleuca howeana*). The vines *Muehlenbeckia complexa* and Boat Vine (*Pandorea pandorana* subsp. *austrocaledonica*) are common in the mid- and ground layers, the latter including Saltwater Couch (*Sporobolus virginicus* var. *virginicus*), *Poa poiformis*, Leafy Flat Sedge (*Cyperus lucidus*) and Club Rush (*Ficinia nodosa*).

**Variation:** The two floristic groups included in this community differ, with Group 10 being shrubbier and weedier than Group 13, which has more Saltwater Couch and Club Rush, and fewer weeds. Some areas may represent regeneration from previous clearing for grazing, and may, in time, transform into Greybark – Blackbutt rainforest.

**Habitat:** Located on steep slopes below cliffs, rocky ridges and regenerating landslips with shallow soils derived from basalt and breccia.

**Sample sites:** ( $N = 4$ ) LHIFF001, LHIFF02, LHIFF04, LHIFF077.

**Floristic Groups:** 10, 13.

**Mean number of native species per plot:**  $14 \pm 4.2$ .

**Indicator native species:** *Cassinia tenuifolia*, *Dodonaea viscosa* subsp. *burmanniana*, *Muehlenbeckia complexa*, *Pandorea pandorana* subsp. *austrocaledonica*.

**Number of exotic species recorded in plots:** 12.

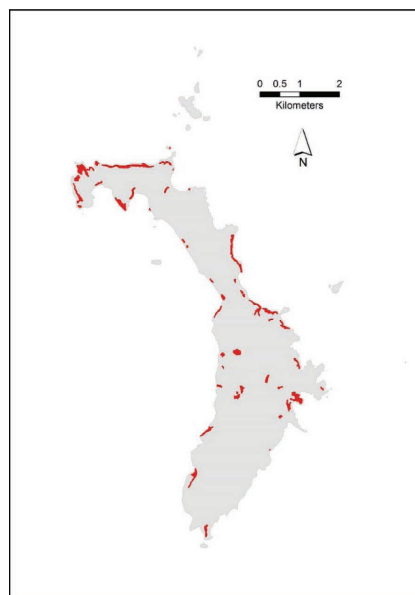
**Common exotic species:** *Bidens pilosa*, *Lilium formosanum*, *Sporobolus africanus*.

**Disturbance and Condition:** Generally in good condition, although some sites, particularly on recent landslips, can be weedy. This community was sometimes severely affected by goats in the past.

**Areal extent:** 37.38 ha (2.49% of mapped area).

**Areal extent and % of type in PPP:** 34.73 ha (92.91%).

**Conservation significance and threats:** This community is an important coloniser of disturbed sites, such as landslips (Pickard 1982). Provides nesting habitat for Sooty Terns (*Onychoprion fuscata*), Common Noddies (*Anous stolidus*) and Black-winged Petrels (*Pterodroma nigripennis*).

**Key Diagnostic Species Floristic Group 10**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Cassinia tenuifolia</i>	3	1	1	0.24	positive
<i>Dodonaea viscosa</i> subsp. <i>burmanniana</i>	3	1	1	0.32	positive
<i>Muehlenbeckia complexa</i>	3	1	2	0.11	positive
<i>Pandorea pandorana</i> subsp. <i>austrocaledonica</i>	3	1	1	0.44	positive

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
* <i>Sporobolus africanus</i>	3	0.5	2	0.02	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	1	2	0.29	positive
<i>Oxalis rubens</i>	2	1	1	0.04	positive
<i>Pimelea congesta</i>	2	0.5	2	0.05	positive
<i>Poa poiformis</i> var. <i>poiformis</i>	2	0.5	1	0.11	positive
* <i>Cyclosporum leptophyllum</i>	1	0.5	0	0	positive
* <i>Cynodon dactylon</i>	1	0.5	0	0	positive
* <i>Parietaria judaica</i>	1	0.5	0	0	positive
* <i>Torilis nodosa</i>	1	0.5	0	0	positive
<i>Drypetes deplanchei</i>	3	0.5	2	0.67	constant
<i>Parsonia howeana</i>	2	1	2	0.61	constant

### Key Diagnostic Species Floristic Group 13

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Cassinia tenuifolia</i>	4	1	1	0.24	positive
<i>Ficinia nodosa</i>	3	1	2	0.19	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	3	0.5	3	0.14	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	1	2	0.29	positive
<i>Melaleuca howeana</i>	2	1	2	0.10	positive
<i>Melanthera biflora</i>	2	0.5	3	0.14	positive
<i>Drypetes deplanchei</i>	2	1	2	0.65	constant

## Grasslands — Maritime Grasslands

**Community 9 Common Reed – Leafy Flat Sedge – Couch grassland or sedgeland of northern hills and offshore islands**

**Scientific name:** *Phragmites australis* – *Cyperus lucidus* – *Cynodon dactylon*.

**Equivalent vegetation types:** *Cyperus lucidus* Sclerophyll Tall Grass (Pickard 1983); *Cyperus lucidus* Sedgeland (DECC 2007).

**Structure:** Closed low to very tall grassland, or mid-high to tall sedgeland.

**Description:** Includes a variety of sedgelands and grasslands dominated by Common Reed (*Phragmites australis*), Leafy Flat Sedge (*Cyperus lucidus*) or Couch (*Cynodon dactylon*). Emergent Sallywood (*Lagunaria patersonia* subsp. *patersonia*) and Tea Tree (*Melaleuca howeana*) are sometimes present. The vines *Parsonsia howeana* and *Muehlenbeckia complexa* occur with Common Reed, and the tall herb Crinum Lily (*Crinum pedunculatum*) is sometimes present. Other ground layer species include Saltwater Couch (*Sporobolus virginicus* var. *virginicus*), *Poa poiformis* and Blue Wandering Jew (*Commelina cyanea*).

**Variation:** **Variant 9a:** dominated by Common Reed; **Variant 9b:** dominated by Couch; **Variant 9c:** dominated by Leafy Flat Sedge. Variants 9a and 9b could also be classified as Freshwater Wetlands (Keith 2004).



New Gulch with Variant 9a (Common Reed reedland) the pale brown patch on the right and Variant 9c (Leafy Flat Sedge) the pale patch on the left.



Variant 9a: Common Reed reedland.



Variant 9b: Couch grassland.

**Habitat:** This community mainly occurs along valleys and drainage lines in the northern hills on North Ridge basalt. Sedgelands dominated by *Cyperus lucidus* are also found on Roach Island and Muttonbird Island.

**Sample sites:** ( $N = 1$ ) LHIFF17.

**Floristic Group:** 12.

**Mean number of native species per plot:** 10.

**Indicator native species:** *Phragmites australis*, *Cyperus lucidus*, *Crinum pedunculatum*.

**Number of exotic species recorded in plots:** 1.

**Common exotic species:** *Aster subulatus*, *Ipomoea cairica*.

**Disturbance and Condition:** The condition of this community varies: the small site near North Bay (Variant 9b) is weedy, whereas other sites have few weeds (note that Couch [*Cynodon dactylon*] is treated by Green [1994] as a naturalised species in the LHIG, but the National Herbarium of NSW [PlantNET 2015] regards this species as native). The North Bay site was probably originally dominated by Leafy Flat Sedge and Crinum Lily. Areas on offshore islands, such as Roach and Muttonbird Islands, are constantly disturbed by nesting seabirds.

**Areal extent:** 2.25 ha (0.15% of mapped area).

**Areal extent and % of type in PPP:** 2.07 ha (92.12%).

**Conservation significance and threats:** Restricted to small areas. Occurrences on offshore islands provide nesting habitat for seabirds, and habitat for the Lord Howe Island Cockroach (*Panathesia lata*).



### Key Diagnostic Species Floristic Group 12

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Phragmites australis</i>	4	1	0	0	positive
<i>Muehlenbeckia complexa</i>	3	1	2	0.12	positive
<i>Commelina cyanea</i>	2	1	1	0.26	positive
* <i>Ipomoea cairica</i>	2	1	1	0.24	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	1	1	0.29	positive
<i>Poa poiformis</i> var. <i>poiformis</i>	2	1	1	0.11	positive
<i>Stephania japonica</i> var. <i>timoriensis</i>	2	1	1	0.27	positive
<i>Parsonsia howeana</i>	4	1	2	0.61	constant

### Heathlands — Coastal Headland Heath

#### Community 10 Fishbone Fern – Boat Vine – Bat’s Wing Fern fernland on boulder slopes at cliff bases

**Scientific name:** *Ficus macrophylla* subsp. *columnaris* – *Drypetes deplanchei* / *Nephrolepis cordifolia* – *Pandorea pandorana* subsp. *austrocaledonica* – *Microsorium pustulatum* subsp. *howense* – *Histiopteris incisa* / *Dendrobium gracilicaule* var. *howeanum* – *Peperomia urvilleana*.

**Equivalent vegetation types:** Mixed Fern and Herb (Pickard 1983); Mixed Fern and Herb (DECC 2007).



**Structure:** Closed to open low to tall fernland.

**Description:** There may be a sparse emergent layer of Banyan (*Ficus macrophylla* subsp. *columnaris*) with isolated Tea Tree (*Melaleuca howeana*) and Greybark (*Drypetes deplanchei*). Boat Vine (*Pandorea pandorana* subsp. *austrocaledonica*) is common in these shrubs as well as in the ground layer. The ground layer is rocky with an open cover dominated by Fishbone Fern (*Nephrolepis cordifolia*) and *Microsorium pustulatum* subsp. *howense*. The orchid *Dendrobium gracilicaule* var. *howeanum*, Elkhorn Fern (*Platycerium bifurcatum*) and *Peperomia urvilleana* are also common on the boulders.

**Variation:** The description of this community is based on sampling of a single low-altitude site. Other areas mapped as this community at higher altitudes are dominated by different fern and herb species, such as combinations of *Pteris microptera*, Bat’s Wing Fern (*Histiopteris incisa*), *Carex brunnea* and *Elatostema reticulatum*. Emergent trees or shrubs at higher altitudes include Fitzgerald (*Dracophyllum fitzgeraldii*) and Big Mountain Palm (*Hedyscepe canterburyana*).

**Habitat:** Grows on steep talus slopes at the bases of cliffs and on boulder fields, mainly in the southern mountains.

**Sample sites:** ( $N = 1$ ) LHIFF54.

**Floristic Group:** 14.

**Mean number of native species per plot:** 18.

**Indicator native species:** *Asplenium polyodon*, *Dendrobium gracilicaule* var. *howeanum*, *Nephrolepis cordifolia*, *Microsorium pustulatum* subsp. *howense*, *Pandorea pandorana* subsp. *austrocaledonica*, *Platycerium bifurcatum*; for higher altitude sites not sampled *Pteris microptera*, *Histiopteris incisa*, *Carex brunnea*, *Elatostema reticulatum*.

**Number of exotic species recorded in plots:** 4.

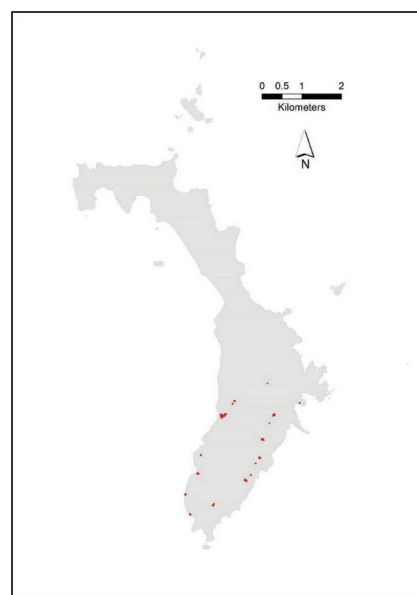
**Common exotic species:** *Ageratina adenophora*, *Lilium formosanum*.

**Disturbance and Condition:** Some sites have dense infestations of Crofton Weed (*Ageratina adenophora*) and Formosan Lily (*Lilium formosanum*) and are subject to natural disturbance from water and rock fall.

**Areal extent:** 1.78 ha (0.12% of island area).

**Areal extent and % of type in PPP:** 1.75 ha (98.38%).

**Conservation significance and threats:** A highly restricted community threatened by weed invasion.



**Key Diagnostic Species Floristic Group 14**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Pandorea pandorana</i> subsp. <i>austrocaledonica</i>	4	1	1	0.45	positive
<i>Nephrolepis cordifolia</i>	3	1	2	0.17	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	3	1	2	0.47	positive
<i>Platynerium bifurcatum</i>	3	1	1	0.26	positive
<i>Asplenium polyodon</i>	2	1	1	0.02	positive
<i>Dendrobium gracilicaule</i> var. <i>howeanum</i>	2	1	1	0.21	positive
* <i>Lilium formosanum</i>	2	1	1	0.22	positive
<i>Peperomia urvilleana</i>	2	1	2	0.08	positive
* <i>Digitaria ciliaris</i>	1	1	0	0	positive



### Heathlands — Coastal Headland Heath

#### Community 11 Bully Bush – Tea Tree – Mountain Daisy rocky heathland of the southern mountains

**Scientific name:** *Cassinia tenuifolia* – *Dracophyllum fitzgeraldii* – *Melaleuca howeana* – *Olearia ballii* / *Dendrobium moorei* – *Ficinia nodosa* – *Hydrocotyle hirta*.

**Equivalent vegetation types:** Probably related to Cliffs (Pickard 1983); related to *Alyxia squamulosa* – *Coprosma inopinata* Dwarf Scrub (DECC 2007).



**Structure:** Mid-high open shrubland.

**Description:** An open shrubland dominated by Bully Bush (*Cassinia tenuifolia*), Tea Tree (*Melaleuca howeana*) and Mountain Daisy (*Olearia ballii*), with *Xylosma parvifolia*, *Westringia viminalis* and *Pimelea congesta* also present. The sparse ground cover consists of *Poa poiformis* var. *poiformis*, Club Rush (*Ficinia nodosa*), *Euchiton involucratus*, Pennywort (*Hydrocotyle hirta*) and *Brachyscome segmentosa*. Ferns such as Coarse Maidenhair Fern (*Adiantum hispidulum*) and Horseshoe Fern (*Pyrrhosia confluens*) also occur. Two species of ground orchid were recorded in the community: *Pterostylis curta* and an undescribed species of *Corybas*.

**Variation:** Similar shrubland communities, such as Community 25, occur on difficult-to-access rocky ridges.

**Habitat:** Found on exposed ridges at intermediate to high altitude in the southern mountains. Soils are very shallow and rocky with frequent rock outcrops.

#### Key Diagnostic Species Floristic Group 15

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Cassinia tenuifolia</i>	3	1	1	0.25	positive
<i>Adiantum hispidulum</i>	2	1	1	0.17	positive
<i>Dendrobium moorei</i>	2	1	1	0.11	positive
<i>Dracophyllum fitzgeraldii</i>	2	1	1	0.11	positive
<i>Euchiton involucratus</i>	2	1	1	0.01	positive
<i>Ficinia nodosa</i>	2	1	2	0.2	positive
<i>Hydrocotyle hirta</i>	2	1	1	0.02	positive
* <i>Hypochoeris radicata</i>	2	1	2	0.06	positive
* <i>Lilium formosanum</i>	2	1	1	0.22	positive
<i>Melaleuca howeana</i>	2	1	2	0.11	positive

**Sample sites:** ( $N = 1$ ) LHIFF76.

**Floristic Group:** 15.

**Mean number of native species per plot:** 29.

**Indicator native species:** *Cassinia tenuifolia*, *Dendrobium moorei*, *Dracophyllum fitzgeraldii*, *Ficinia nodosa*, *Hydrocotyle hirta*, *Melaleuca howeana*, *Olearia ballii*, *Xylosma parvifolia*.

**Number of exotic species recorded in plots:** 6.

**Common exotic species:** *Hypochoeris radicata*, *Lilium formosanum*.

**Threatened species:** *Xylosma parvifolia* (Endangered – BC Act).

**Disturbance and Condition:** Apart from occurrence of weeds at low density, this community is generally in good condition.

**Areal extent:** 0.3 ha (0.02% of mapped area).

**Areal extent and % of type in PPP:** 0.3 ha (100%).

**Conservation significance and threats:** A highly restricted community with a number of rare and endemic species.



Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Melicope polybotrya</i>	2	1	1	0.11	positive
<i>Olearia ballii</i>	2	1	1	0.01	positive
<i>Pimelea congesta</i>	2	1	2	0.05	positive
<i>Poa poiformis</i> var. <i>poiformis</i>	2	1	1	0.11	positive
<i>Pterostylis curta</i>	2	1	0	0	positive
<i>Pyrrhosia confluens</i> var. <i>confluens</i>	2	1	0	0	positive
<i>Westringia viminalis</i>	2	1	1	0.01	positive
<i>Brachyscome segmentosa</i>	1	1	0	0	positive
<i>Corybas</i> spp.	1	1	0	0	positive
<i>Echinopogon caespitosus</i> var. <i>caespitosus</i>	1	1	0	0	positive
<i>Lobelia anceps</i>	1	1	0	0	positive
<i>Luzula longiflora</i>	1	1	0	0	positive
<i>Wahlenbergia insulae-howei</i>	1	1	0	0	positive
<i>Xylosma parvifolia</i>	1	1	0	0	positive

## Rainforests — Oceanic Rainforests

**Community 12 Kentia Palm – Banyan forest on sand or calcarenite of coastal lowlands**

**Scientific name:** *Ficus macrophylla* subsp. *columnaris* / *Howea forsteriana* / *Asplenium milnei*.

**Equivalent vegetation types:** *Howea forsteriana* Megaphyllous Broad Sclerophyll Forest (Pickard 1983); Kentia Palm *Howea forsteriana* Closed Sclerophyll Forest (DECC 2007).



Variant 12a: Kentia Palm forest.

**Structure:** Mid-high to tall closed forest.

**Description:** A floristically simple tall forest dominated by Kentia Palm (*Howea forsteriana*) and Banyan (*Ficus macrophylla* subsp. *columnaris*). The ground is densely covered by fallen palm fronds and other tree species are sometimes present as scattered trees and seedlings. The upper, mid- and lower layers are represented by different aged cohorts of Kentia Palm. In both variants, trees and seedlings of other rainforest trees, such as Cotton-wood (*Celtis conferta* subsp. *amblyphylla*), Blackbutt (*Cryptocarya triplinervis* var. *triplinervis*) and Sallywood (*Lagunaria patersonia* subsp. *patersonia*), are uncommon to rare. In some sites there is a sparse ground cover of combinations of *Asplenium milnei*, *Carex brunnea* and *Oplismenus imbecillis*.

**Variation:**

**Variant 12a: Kentia Palm forest on coral sand and calcarenite.** Stands are dominated by Kentia Palm with rare emergent Banyan; the mid- and lower layers are also dominated by Kentia Palm.

**Variant 12b: Banyan – Kentia Palm forest on coral sand and calcarenite.** Areas dominated by large emergent Banyan and Kentia Palm.

**Habitat:** Mainly found on deep sandy soils, mainly on Neds Beach Calcarenite, in sheltered areas on flat to undulating terrain. Occurrences on the eastern side of Mt Gower occur on talus slopes below basalt cliff lines.

**Sample sites:** ( $N = 3$ ) LHIFF40, LHIFF41, LHIFF42.

**Floristic Group:** 16.

**Mean number of native species per plot:**  $4.3 \pm 3.0$ .

**Indicator native species:** *Ficus macrophylla* subsp. *columnaris*, *Howea forsteriana*.

**Number of exotic species recorded in plots:** 0.

**Common exotic species:** *Asparagus plumosus*.

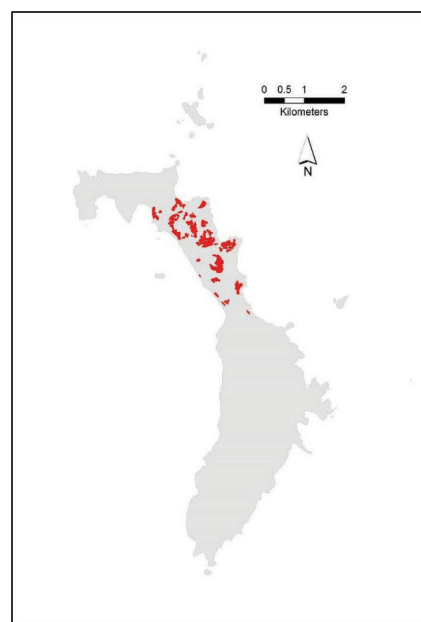
**Disturbance and Condition:** This community is generally in good condition. The ground surface is regularly disturbed by nesting Flesh-footed Shearwaters (*Ardenna carneipes*) between Neds Beach and Blinky Beach. Some areas within the Settlement area have populations of garden-escape weeds. Rodents eat the seed of the Kentia Palm and may affect regeneration of Palms. Some areas would have been cleared for grazing or urban development. Dieback has affected trees in this community where clearing has exposed it to salt-laden winds.

**Areal extent:** Variant 12a: 39.32 ha (2.62% of mapped area); Variant 12b: 18.07 ha (1.2% of island area).



Variant 12b: Banyan – Kentia Palm forest.

**Areal extent and % of type in PPP:** Variant 12a: 13.32 ha (33.89%); Variant 12b: 12.64 ha (69.95%).



Variant 12a



Variant 12b

**Conservation significance and threats:** This community provides the main nesting areas for Flesh-footed Shearwaters. Weeds and urban expansion could threaten this community.

#### Key Diagnostic Species Floristic Group 16

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Ficus macrophylla</i> subsp. <i>columnaris</i>	5	0.67	1	0.10	positive
<i>Howea forsteriana</i>	4	1	2	0.31	positive
<i>Drypetes deplanchei</i>	1	0.67	2	0.66	negative
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	1	0.33	2	0.54	negative
<i>Celtis conferta</i> subsp. <i>amblyphylla</i>	2	0.33	2	0.29	uninformative
<i>Howea belmoreana</i>	2	0.33	3	0.37	uninformative
<i>Asplenium milnei</i>	1	0.33	1	0.48	uninformative
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	1	0.33	2	0.30	uninformative
<i>Olea paniculata</i>	1	0.33	2	0.45	uninformative

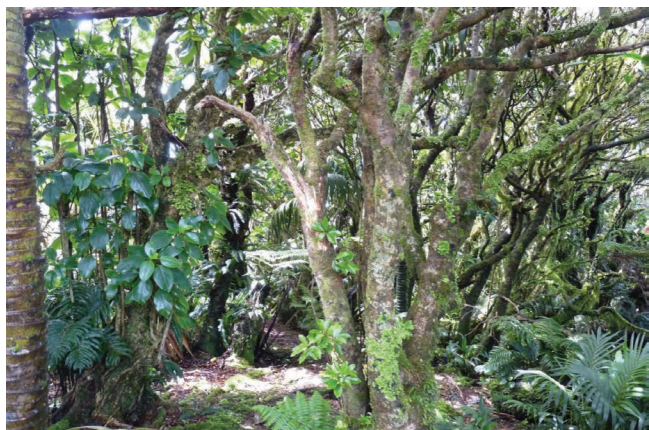
## Rainforests — Oceanic Cloud Forests

**Community 13 Hotbark – Fitzgerald – Big Mountain Palm – Mountain Rose oceanic closed forests of high-altitude parts of the southern mountains**

**Scientific name:** *Bubbia howeana* – *Dracophyllum fitzgeraldii* – *Hedyscepe canterburyana* – *Metrosideros nervulosa* / *Negria rhabdothamnoides* – *Lepidorrhachis mooreana* – *Cyathea howeana* / *Elatostema reticulatum* – *Lastreopsis nephrodioides*.

**Equivalent vegetation types:** *Bubbia howeana* – *Dracophyllum fitzgeraldii* Gnarled Mossy All the best - Forest; *Hedyscepe canterburyana* Megaphyllous Broad Sclerophyll Forest; *Dracophyllum fitzgeraldii* – *Metrosideros nervulosa* Evergreen Broad Sclerophyll Scrub (Pickard 1983); *Bubbia howeana* – *Dracophyllum fitzgeraldii* Gnarled Mossy Forest; Big Mountain Palm *Hedyscepe canterburyana* Closed Sclerophyll Forest; *Dracophyllum fitzgeraldii* – *Metrosideros nervulosa* Closed Scrub (DECC 2007).

**Structure:** Dwarf to low closed forest.



Variant 13a: Hotbark – Fitzgerald gnarled mossy cloud forest.



Variant 13b: Mountain palm low closed forest.



Variant 13c: Fitzgerald – Mountain Rose low closed forest.

**Description:** A variable community in which Hotbark (*Bubbia howeana*), Fitzgerald (*Dracophyllum fitzgeraldii*) and Big Mountain Palm (*Hedyscepe canterburyana*) are always present and abundant in the upper to middle layers. Other species present in the upper stratum include Native Blackbutt (*Cryptocarya gregsonii*), Mountain Rose (*Metrosideros nervulosa*) and Island Apple (*Dysoxylum pachyphyllum*). Pumpkin Tree (*Negria rhabdothamnoides*) is abundant in the mid-layer. Epiphytic ferns and orchids, such as *Blechnum contiguum*, *Cephalomanes bauerianum* and *Dendrobium moorei*, as well as mosses, are common, particularly in the gnarled mossy cloud forest. The ground layer includes Rainforest Spinach (*Elatostema reticulatum*), *Lastreopsis nephrodioides* and *Carex brunnea*.

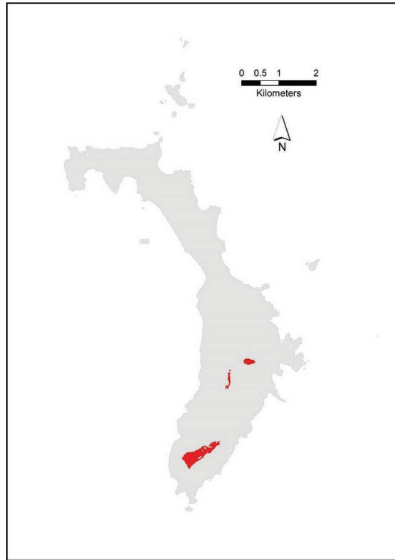
**Variation:**

**Variant 13a: Hotbark – Fitzgerald gnarled mossy cloud forest.** Areas in which Hotbark (*Bubbia howeana*), Fitzgerald (*Dracophyllum fitzgeraldii*) and Pumpkin Tree (*Negria rhabdothamnoides*) are most abundant and palms are less common.

**Variant 13b: Mountain palm low closed forest.** Occurs in areas of the Mt Gower Plateau and the slopes of Mt Lidgbird where Little Mountain Palm (*Lepidorrhachis mooreana*) or Big Mountain Palm (*Hedyscepe canterburyana*), or both, are abundant.

**Variant 13c: Fitzgerald – Mountain Rose low closed forest.** Occurs on more exposed sites with shallow rocky soils and is dominated by Fitzgerald (*Dracophyllum fitzgeraldii*) and Mountain Rose (*Metrosideros nervulosa*).

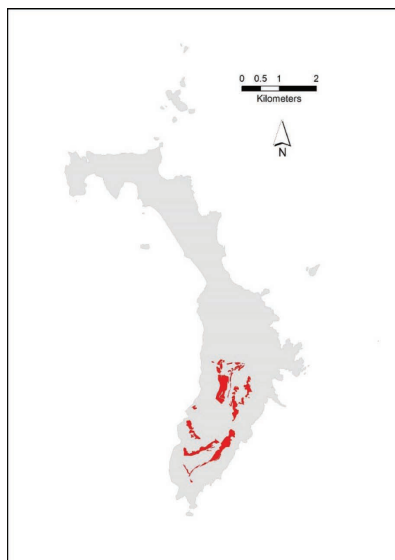
**Habitat:** Occurs at high altitudes on mountain slopes and plateaux of Mt Lidgbird and Mt Gower.



Variant 13a



Variant 13b



Variant 13c

**Sample sites:** ( $N = 5$ ) LHIFF10, LHIFF30, LHIFF74, LHIFF75, LHIFF79.

**Floristic Group:** 17.

**Mean number of native species per plot:**  $35.7 \pm 10.3$ .

**Indicator native species:** *Negria rhabdotohamnoides*, *Bubbia howeana*, *Hedyscepe canterburyana*, *Dracophyllum fitzgeraldii*, *Metrosideros nervulosa*, *Blechnum contiguum*, *Cyathea howeana*, *Elatostema reticulatum*.

**Number of exotic species recorded in plots:** 1.

**Common exotic species:** *Ageratina adenophora*.

**Threatened species:** *Carmichaelia exsul* (Endangered – BC Act); *Lepidorrhachis mooreana* (Critically Endangered – BC Act).

**Disturbance and Condition:** This community is generally in good condition, although disturbance from localised landslips and burrowing by Providence Petrels (*Pterodroma solandri*) can result in occurrence of weed species, particularly Crofton Weed (*Ageratina adenophora*).

**Areal extent:** Variant 13a: 25.92 ha (1.73% of island area); Variant 13b: 35.12 ha (2.34% of island area); Variant 13c: 68.78 ha (4.58% of island area).

**Areal extent and % of type in PPP:** Variant 13a: 25.92 ha (100%); Variant 13b: 35.12 ha (100%); Variant 13c: 68.78 ha (100%).

**Conservation significance and threats:** This community is restricted in distribution, is dominated by endemic plant species, and provides habitat for threatened plant species. Given its occurrence at high altitude and dependence on high moisture levels, it is vulnerable to the effects of climate change. It also provides nesting habitat for Providence Petrels. Predation on palm seeds and seedlings by rodents is a threat to the survival of the community (Auld and Leishman 2015).

**Endangered Ecological Community:** Community 13a is equivalent to Gnarled Mossy Cloud Forest on Lord Howe Island Critically Endangered Ecological Community (CEEC). Parts of communities 13b and 13c are also equivalent to this CEEC, particularly where they occur on the summit areas of the mountains.

**Key Diagnostic Species Floristic Group 17**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Dracophyllum fitzgeraldii</i>	3	1	1	0.06	positive
<i>Bubbia howeana</i>	3	1	1	0.15	positive
<i>Elatostema reticulatum</i>	3	0.8	2	0.06	positive
<i>Lepidorrhachis mooreana</i>	3	0.2	0	0	positive
<i>Hedyscepe canterburyana</i>	2	1	2	0.01	positive
<i>Negria rhabdothamnoides</i>	2	1	0	0	positive
<i>Cryptocarya gregsonii</i>	2	0.8	0	0	positive
<i>Dendrobium moorei</i>	2	0.8	1	0.07	positive
<i>Dysoxylum pachyphyllum</i>	2	0.8	1	0.26	positive
<i>Lastreopsis nephrodioides</i>	2	0.8	1	0.01	positive
<i>Metrosideros nervulosa</i>	2	0.8	2	0.05	positive
<i>Pittosporum erioloma</i>	2	0.6	1	0.03	positive
<i>Polystichum whiteleggei</i>	2	0.6	1	0.09	positive
<i>Blechnum contiguum</i>	2	0.4	0	0	positive
<i>Blechnum patersonii</i> subsp. <i>patersonii</i>	2	0.4	0	0	positive
<i>Cephalomanes bauermanianum</i>	2	0.4	0	0	positive
<i>Tmesipteris truncata</i>	2	0.4	0	0	positive
<i>Cyathea brevipinna</i>	2	0.2	0	0	positive
<i>Grammitis nudicarpa</i>	2	0.2	0	0	positive
<i>Hymenophyllum moorei</i>	2	0.2	0	0	positive
<i>Cyathea howeana</i>	1	0.8	0	0	positive
<i>Blechnum howeanum</i>	1	0.6	0	0	positive
<i>Elaeocarpus costatus</i>	1	0.6	0	0	positive
<i>Leptospermum polygalifolium</i> subsp. <i>howense</i>	1	0.4	0	0	positive
<i>Calanthe triplicata</i>	1	0.2	0	0	positive
<i>Grammitis wattsi</i>	1	0.2	0	0	positive
<i>Phlegmariurus varius</i>	1	0.2	0	0	positive
<i>Machaerina insularis</i>	1	0.2	0	0	positive
<i>Microsorium scandens</i>	1	0.2	0	0	positive
<i>Olearia mooneyi</i>	1	0.2	0	0	positive
<i>Pterostylis</i> spp.	1	0.2	0	0	positive

*Rainforests — Oceanic Rainforests***Community 14 Scalybark – Blue Plum – Curly Palm closed forest of sheltered slopes or valleys**

**Scientific name:** *Syzygium fullagarii* – *Chionanthus quadristamineus* / *Howea belmoreana* – *Atractocarpus stipularis* – *Coprosma putida* / *Carex brunnea* – *Nephrolepis cordifolia* – *Pteris microptera*.

**Equivalent vegetation types:** *Cleistocalyx fullagarii* Rainforest (Pickard 1983); Scalybark (*Syzygium fullagarii*) Closed Forest (DECC 2007).



**Structure:** Tall to very tall closed forest.

**Description:** A forest community in which the canopy is clearly dominated by Scalybark (*Syzygium fullagarii*). Other less common trees include Blue Plum (*Chionanthus quadristamineus*), Cedar (*Guioa coriacea*), Forky-tree (*Pandanus forsteri*) and Island Apple (*Dysoxylum pachyphyllum*). There is a dense mid-layer of Curly Palm (*Howea belmoreana*), with Green Plum (*Atractocarpus stipularis*), Hotbark (*Bubbia howeana*), Stinkwood (*Coprosma putida*) and *Xylosma maidenii* also occurring. The epiphytic Elkhorn (*Platycerium bifurcatum*) is common on trees. There is a sparse ground layer of *Carex brunnea*, *Asplenium milnei*, *Pteris microptera* and *Microsorium pustulatum* subsp. *howense*. Fishbone Fern (*Nephrolepis cordifolia*) is occasionally common in rocky sites.

**Habitat:** Primarily occurs at low to mid-altitudes on sheltered slopes, with stony basalt soils, in the central hills and southern mountains. There are also small patches in the northern hills. Particularly common below Mt Gower in Erskine Valley, the eastern slopes below Mt Lidgbird, and on both sides of the Smoking Tree Ridge to Intermediate Hill.

**Sample sites:** ( $N = 6$ ) LHIFF15, LHIFF18, LHIFF20, LHIFF45, LHIFF59, LHIFF83.

**Floristic Group:** 18.

**Mean number of native species per plot:**  $18.7 \pm 9.7$ .

**Indicator native species:** *Syzygium fullagarii*, *Howea belmoreana*, *Guioa coriacea*, *Chionanthus quadristamineus*, *Geniostoma huttonii*, *Platycerium bifurcatum*.

**Number of exotic species recorded in plots:** 0.

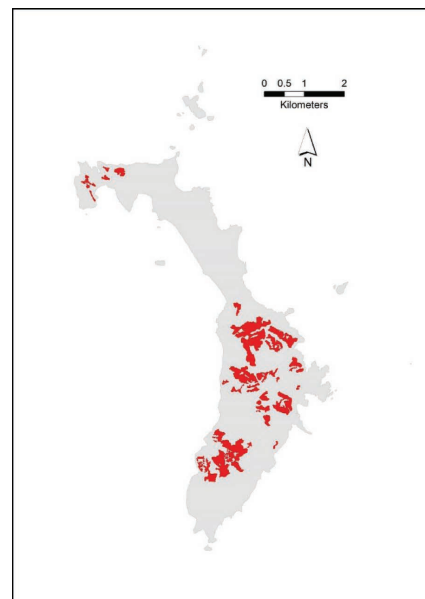
**Common exotic species:** *Asparagus aethiopicus*, *Psidium cattleianum* var. *cattleianum*, *Cenchrus clandestinus*.

**Disturbance and Condition:** Occurrences in the southern mountains (e.g. Erskine Valley) are in good condition with little disturbance, but some stands north of Mt Lidgbird and near-cleared areas are more at risk from weed invasion.

**Areal extent:** 196.12 ha (13.06% of mapped area).

**Areal extent and % of type in PPP:** 190.92 ha (97.35%).

**Conservation significance and threats:** A community dominated by endemic species and which provides nesting habitat for Providence Petrels (*Pterodroma solandri*). It is threatened by weed infestation where it is adjacent to cleared paddocks and Settlement areas, and dieback from exposure of the edge of the forest by clearing.





**Key Diagnostic Species Floristic Group 18**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Howea belmoreana</i>	3	1	3	0.33	positive
<i>Syzygium fullagarii</i>	3	1	2	0.3	positive
<i>Chionanthus quadristamineus</i>	3	0.67	2	0.15	positive
<i>Guioa coriacea</i>	2	1	2	0.34	positive
<i>Atractocarpus stipularis</i>	2	0.67	2	0.3	positive
<i>Dysoxylum pachyphyllum</i>	2	0.67	1	0.26	positive
<i>Platycerium bifurcatum</i>	2	0.67	1	0.24	positive
<i>Carex brunnea</i>	2	0.5	2	0.44	positive
<i>Xylosma maidenii</i>	2	0.5	2	0.34	positive
<i>Geniostoma huttonii</i>	1	0.17	0	0	positive
<i>Drypetes deplanchei</i>	2	0.67	2	0.66	constant
<i>Nephrolepis cordifolia</i>	3	0.33	2	0.16	uninformative
<i>Sophora howinsula</i>	3	0.33	1	0.12	uninformative

*Rainforests — Oceanic Rainforests***Community 15 Blue Plum – Curly Palm – Scalybark – Forky-tree closed forest on rocky slopes and gullies**

**Scientific name:** *Chionanthus quadristamineus* – *Howea belmoreana* – *Syzygium fullagarii* / *Geniostoma petiolosum* – *Coprosma* sp. nov. – *Coprosma putida* / *Nephrolepis cordifolia* – *Microsorium pustulatum* subsp. *howense* – *Carex brunnea*.

**Equivalent vegetation types:** *Chionanthus quadristamineus* Rainforest; *Howea belmoreana* Megaphyllous Broad Sclerophyll Forest; *Pandanus forsteri* Megaphyllous Broad Sclerophyll Forest (Pickard 1983); Blue Plum *Chionanthus quadristamineus* Closed Forest; Curly Palm *Howea belmoreana* Closed Sclerophyll Forest; *Pandanus forsteri* Closed Sclerophyll Forest (DECC 2007).



Variant 15a: Blue Plum – Curly Palm – Scalybark closed forest on rocky slopes.

**Structure:** Low to mid-high closed forest.

**Description:** A species-rich forest community in which Blue Plum (*Chionanthus quadristamineus*) is the dominant canopy species, with Curly Palm (*Howea belmoreana*) also abundant in either the canopy or the mid-storey. Other less common canopy species include Scalybark (*Syzygium fullagarii*), Cedar (*Guioa coriacea*), Island Apple (*Dysoxylum pachyphyllum*) and Blackbutt (*Cryptocarya triplinervis* var. *triplinervis*). Common species in the mid-storey include *Coprosma* sp. nov., Stinkwood (*Coprosma putida*), Boar Tree (*Geniostoma petiolosum*) and Hill Rose (*Metrosideros sclerocarpa*). Fishbone Fern (*Nephrolepis cordifolia*), *Carex brunnea* and *Microsorium pustulatum* subsp. *howense* are the most common ground-cover species.

**Variation:**

**Variant 15a: Blue Plum – Curly Palm – Scalybark closed forest on rocky slopes.**

**Variant 15b: Forky-tree closed forest along gullies.** A variant occurring along creek lines and lower slopes that is dominated by Forky-tree (*Pandanus forsteri*). A community recognised by Pickard (1983) that was not discerned in the numerical analysis for this survey.



Variant 15b: Forky-tree closed forest along gullies.

**Habitat:** Occurs in the southern mountains, on Mt Lidgbird Basalt, at mid- to high altitudes.

**Sample sites:** ( $N = 7$ ) LHIFF16, LHIFF19, LHIFF35, LHIFF47, LHIFF48, LHIFF53, LHIFF64.

**Floristic Group:** 20.

**Mean number of native species per plot:**  $38.2 \pm 3.3$ .

**Indicator native species:** *Chionanthus quadristamineus*, *Howea belmoreana*, *Geniostoma petiolosum*, *Coprosma* sp. nov., *Coprosma putida*, *Nephrolepis cordifolia*, *Microsorium pustulatum* subsp. *howense*.

**Number of exotic species recorded in plots:** 5.

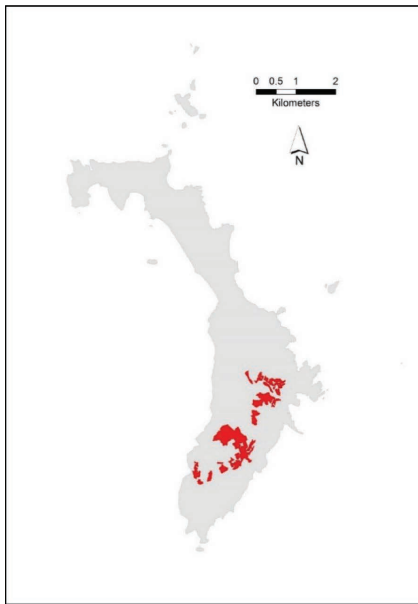
**Common exotic species:** *Ageratina adenophora*, *Lilium formosanum*.

**Disturbance and Condition:** This vegetation type is generally in good condition with minor weed infestations, and little disturbance apart from natural landslips.

**Areal extent:** Variant 15a: 78.39 ha (5.22% of mapped area); Variant 15b: 6.37 ha (0.42% of mapped area).

**Areal extent and % of type in PPP:** Variant 15a: 78.39 ha (100%); Variant 15b: 6.32 ha (99.21%).

**Conservation significance and threats:** A community dominated by endemic species. It provides nesting habitat for Providence Petrels (*Pterodroma solandri*).



Variant 15a



Variant 15b

### Key Diagnostic Species Floristic Group 20

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Howea belmoreana</i>	4	0.86	3	0.33	positive
<i>Chionanthus quadristamineus</i>	4	0.71	2	0.14	positive
<i>Syzygium fullagarii</i>	3	0.71	3	0.32	positive
<i>Nephrolepis cordifolia</i>	2	1	2	0.10	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	1	2	0.43	positive
<i>Carex brunnea</i>	2	0.86	2	0.41	positive
<i>Geniostoma petiolosum</i>	2	0.86	1	0.14	positive
<i>Guioa coriacea</i>	2	0.86	2	0.34	positive
<i>Coprosma</i> sp. nov.	2	0.71	1	0.05	positive
<i>Coprosma putida</i>	2	0.71	2	0.25	positive
<i>Elatostema reticulatum</i>	2	0.71	3	0.05	positive
<i>Marsdenia rostrata</i>	2	0.57	1	0.06	positive
<i>Metrosideros sclerocarpa</i>	2	0.57	1	0.08	positive
<i>Olea paniculata</i>	2	0.57	2	0.43	positive
<i>Peperomia tetraphylla</i>	1	0.14	0	0	positive
* <i>Potentilla indica</i>	1	0.14	0	0	positive
<i>Psychotria carronis</i>	1	0.14	0	0	positive
<i>Drypetes deplanchei</i>	2	0.86	2	0.65	constant
<i>Parsonsia howeana</i>	2	0.71	2	0.61	constant
<i>Howea forsteriana</i>	3	0.14	3	0.35	uninformative

## Rainforests — Oceanic Rainforests

**Community 16 Scalybark – Curly Palm – Greybark – Cedar – Maulwood – Forky-tree lowland mixed closed forest on slopes of the Southern Mountains**

**Scientific name:** *Syzygium fullagarii* – *Howea belmoreana* – *Drypetes deplanchei* – *Guioa coriacea* / *Pandanus forsteri* – *Xylosma maidenii* – *Atractocarpus stipularis* – *Coprosma putida* – *Smilax australis* / *Asplenium milnei* – *Oplismenus imbecillis*.

**Equivalent vegetation types:** Lowland Mixed Rainforest; *Howea belmoreana* Megaphyllous Broad Sclerophyll Forest (Pickard 1983); Lowland Mixed Closed Forest; Curly Palm *Howea belmoreana* Closed Sclerophyll Forest (DECC 2007).



Variant 16a: Scalybark – Curly Palm – Greybark – Cedar – Maulwood – Forky-tree lowland mixed closed forest on slopes of the Southern Mountains.

**Structure:** Mid-high to tall closed forest.

**Description:** This floristically diverse forest is characterised by a variable overstorey. The most common trees are Scalybark (*Syzygium fullagarii*), Curly Palm (*Howea belmoreana*), Greybark (*Drypetes deplanchei*), Cedar (*Guioa coriacea*), Blackbutt (*Cryptocarya triplinervis* var. *triplinervis*), Maulwood (*Olea paniculata*) and Forky-tree (*Pandanus forsteri*). There is a mid-layer of Curly Palm (*Howea belmoreana*), Kentia Palm (*Howea forsteriana*), Green Plum (*Atractocarpus stipularis*), Stinkwood (*Coprosma putida*) and *Xylosma maidenii*. The ground layer comprises *Asplenium milnei*, *Carex brunnea* and *Oplismenus imbecillis*. Vines such as *Parsonsia howeana*, Lawyer Vine (*Smilax australis*), Whip Vine (*Flagellaria indica*) and jasmines (Stiff Jasmine *Jasminum volubile* and Jasmine *Jasminum didymum* var. *didymum*) are also common. The epiphytic fern Elkhorn (*Platyterium bifurcatum*) occurs frequently, usually growing on the trees.



Variant 16b: Curly Palm closed sclerophyll forest.

**Variation:**

**Variant 16a: Scalybark – Curly Palm – Greybark – Cedar – Maulwood – Forky-tree lowland mixed closed forest on slopes of the southern mountains.** This variant has a variable overstorey and is widespread in the central hills and around Mt Lidgbird in the southern mountains.

**Variant 16b: Curly Palm closed sclerophyll forest.** This variant is dominated by Curly Palm (*Howea belmoreana*) and occurs on slopes and gullies at mid- to low altitudes in the southern mountains and northern hills. It is uncommon in the central hills and lowlands.

**Habitat:** Occurs on basalt and breccia at low to intermediate altitudes on gentle to moderate slopes, usually on mid-slopes or gullies.

**Sites:** ( $N = 16$ ) LHIFF13, LHIFF14, LHIFF26, LHIFF31, LHIFF32, LHIFF33, LHIFF44, LHIFF46, LHIFF50, LHIFF52, LHIFF56, LHIFF58, LHIFF63, LHIFF78, LHIFF81, LHIFF84.

**Floristic Group:** 21.

**Mean number of native species per plot:**  $29 \pm 5.8$ .

**Indicator native species:** *Howea belmoreana*, *Guioa coriacea*, *Drypetes deplanchei*, *Xylosma maidenii*, *Atractocarpus stipularis*, *Smilax australis*, *Asplenium milnei*, *Oplismenus imbecillis*.

**Number of exotic species recorded in plots:** 7.

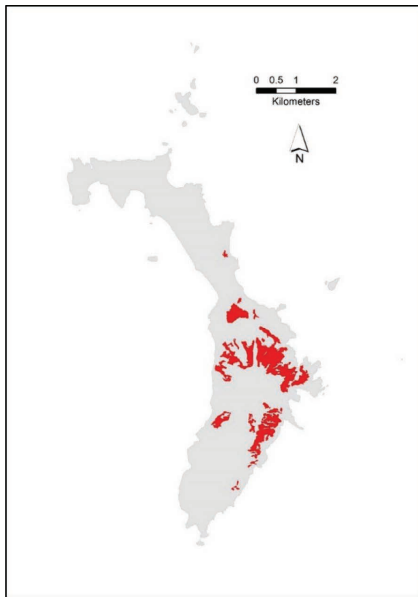
**Common exotic species:** *Lilium formosum*, *Asparagus aethiopicus*, *Psidium cattleyanum* var. *cattleyanum*.

**Disturbance and Condition:** Generally in good condition although some areas, particularly at low elevation near cleared land or the Settlement area, are affected by weeds.

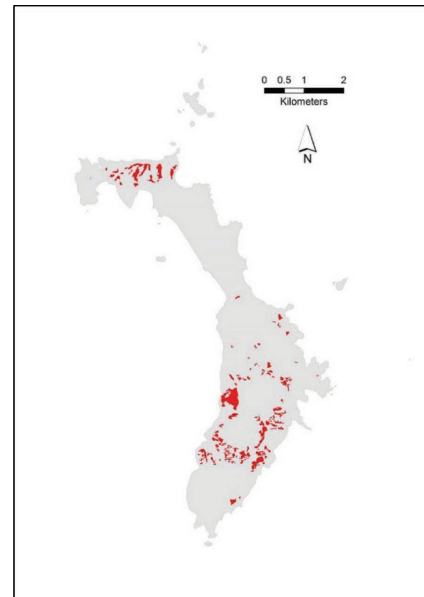
**Areal extent:** Variant 16a: 168.02 ha (11.19% of mapped area); Variant 16b: 77.46 ha (5.16% of mapped area).

**Areal extent and % of type in PPP:** Variant 16a: 166.34 ha (99%); Variant 16b: 76.48 ha (98.74%).

**Conservation significance and threats:** A community dominated by endemic species. Provides nesting habitat for Providence Petrels (*Pterodroma solandri*).



Variant 16a



Variant 16b

### Key Diagnostic Species Floristic Group 21

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Howea belmoreana</i>	3	0.88	3	0.26	positive
<i>Syzygium fullagarii</i>	3	0.69	3	0.27	positive
<i>Smilax australis</i>	2	1	1	0.44	positive
<i>Asplenium milnei</i>	2	0.94	1	0.37	positive
<i>Guioa coriacea</i>	2	0.94	1	0.26	positive
<i>Oplismenus imbecillis</i>	2	0.94	2	0.34	positive
<i>Olea paniculata</i>	2	0.88	2	0.34	positive
<i>Pandanus forsteri</i>	2	0.88	1	0.21	positive
<i>Xylosma maidenii</i>	2	0.88	1	0.23	positive
<i>Carex brunnea</i>	2	0.81	2	0.36	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	2	0.81	2	0.47	positive
<i>Atractocarpus stipularis</i>	2	0.75	1	0.23	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	0.75	2	0.41	positive
<i>Coprosma putida</i>	2	0.69	2	0.2	positive
<i>Jasminum didymum</i> subsp. <i>didymum</i>	2	0.63	2	0.19	positive
<i>Jasminum volubile</i>	2	0.63	1	0.23	positive
<i>Geniostoma petiolosum</i>	2	0.5	1	0.13	positive
<i>Clematis glycinoides</i>	1	0.13	0	0	positive
<i>Alyxia squamulosa</i>	1	0.06	0	0	positive
<i>Mucuna gigantea</i> subsp. <i>gigantea</i>	1	0.06	0	0	positive
<i>Ophioglossum pendulum</i>	1	0.06	0	0	positive
<i>Pellaea paradoxa</i>	1	0.06	0	0	positive
<i>Pittosporum undulatum</i>	1	0.06	0	0	positive
<i>Drypetes deplanchei</i>	3	0.88	2	0.61	constant
<i>Parsonsia howeana</i>	2	0.81	2	0.57	constant
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	3	0.25	2	0.31	uninformative
<i>Symplocos candelabrum</i>	3	0.13	1	0.09	uninformative

*Rainforests — Oceanic Rainforests***Community 17 Greybark – Blackbutt rainforest at low to intermediate altitudes**

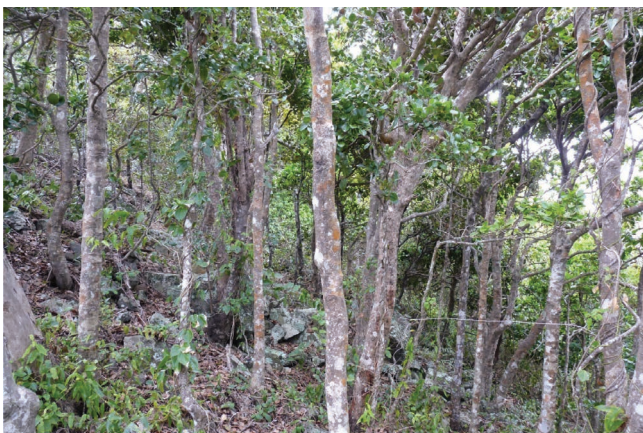
**Scientific name:** *Drypetes deplanchei* – *Cryptocarya triplinervis* var. *triplinervis* – *Olea paniculata* – *Celtis conferta* subsp. *amblyphylla* / *Myrsine platystigma* – *Alyxia ruscifolia* / *Smilax australis* – *Parsonsia howeana* – *Jasminum didymum* subsp. *didymum* / *Oplismenus imbecillis* – *Asplenium milnei* – *Carex brunnea*.

**Equivalent vegetation types:** *Drypetes australasica* – *Cryptocarya triplinervis* Rainforest; *Drypetes australasica* – *Cryptocarya triplinervis* Exposed Facies Rainforest; *Drypetes australasica* – *Cryptocarya triplinervis* Exposed Calcarenite Facies Rainforest (Pickard 1983); Greybark – Blackbutt (*Drypetes deplanchei* – *Cryptocarya triplinervis*) Closed Forest; Greybark – Blackbutt (*Drypetes deplanchei* – *Cryptocarya triplinervis*) Low Closed Forest on Exposed Basalt; Greybark – Blackbutt (*Drypetes deplanchei* – *Cryptocarya triplinervis*) Low Closed Forest on Exposed Calcarenite (DECC 2007).

**Structure:** Dwarf to tall closed forest.



Variant 17a: Greybark – Blackbutt rainforest.



Variant 17b: Greybark – Blackbutt low closed forest on exposed basalt slopes.



Variant 17c: Greybark – Blackbutt low closed forest on exposed calcarenite.

**Description:** This community varies structurally depending on the substrate and degree of exposure. Greybark (*Drypetes deplanchei*) and Blackbutt (*Cryptocarya triplinervis* var. *triplinervis*) are usually dominant in the canopy. Other less common trees include Cotton-wood (*Celtis conferta* subsp. *amblyphylla*), Maulwood (*Olea paniculata*) and Sallywood (*Lagunaria patersonia* subsp. *patersonia*). There is a sparse to dense mid-layer of shrubs including Hopwood (*Dodonaea viscosa* subsp. *burmanniana*), *Myrsine platystigma*, Christmas Bush (*Alyxia ruscifolia*), *Xylosma maidenii* and Tamana (*Elaeodendron curtispiculum*). Vines such as Lawyer Vine (*Smilax australis*), jasmine (Stiff Jasmine [*Jasminum volubile*] and Jasmine [*J. didymum* subsp. *didymum*]) and *Parsonsia howeana* are common. Ground-layer species include *Carex brunnea*, *Asplenium milnei* and *Oplismenus imbecillis*.

**Variation:**

**Variant 17a: Greybark – Blackbutt rainforest.** This is a taller, more species-rich variant of the community, occurring on sheltered to intermediate aspects on deeper soils derived from basalt, breccia and calcarenite. Widespread on northern hills, central lowlands and hills and the southern mountains.

**Variant 17b: Greybark – Blackbutt low closed forest on exposed basalt slopes.** This variant occupies exposed sites on ridges and areas exposed to the ocean. It is often a low, viney, near-impenetrable scrub of Greybark and Hopwood. This variant is most common in the northern hills, less common in the central lowlands and southern mountains.

**Variant 17c: Greybark – Blackbutt low closed forest on exposed calcarenite.** A variant of the community recognised by Pickard (1983), occurring on a ridge of exposed calcarenite in the northern hills.

**Habitat:** This community is widespread at low to mid-altitudes, on exposed, sheltered and intermediate slopes, and in littoral locations exposed to the ocean.

**Sample sites:** ( $N = 12$ ) LHIFF22, LHIFF23, LHIFF24, LHIFF25, LHIFF26, LHIFF27, LHIFF31, LHIFF38, LHIFF43, LHIFF49, LHIFF51, LHIFF69.

**Floristic Group:** 22.

**Mean number of native species per plot:**  $26.5 \pm 4.8$ .

**Indicator native species:** *Drypetes deplanchei*, *Cryptocarya triplinervis* var. *triplinervis*, *Olea paniculata*, *Myrsine platystigma*, *Alyxia ruscifolia*, *Smilax australis*, *Jasminum didymum* subsp. *didymum*, *Oplismenus imbecillis*.

**Number of exotic species recorded in plots:** 10.

**Common exotic species:** *Ageratina adenophora*, *Ipomoea cairica*, *Asparagus aethiopicus*, *Asparagus plumosus*, *Psidium cattleianum* var. *cattleianum*.

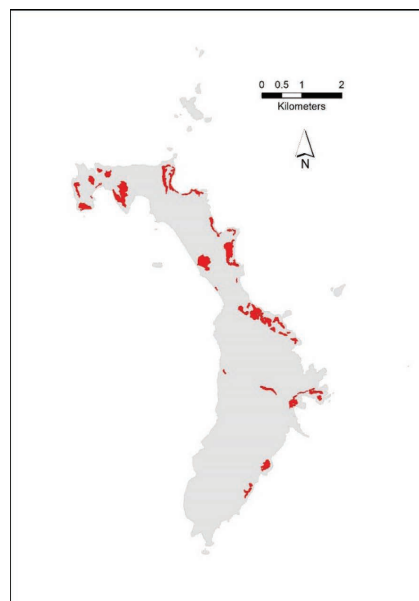
**Threatened species:** None recorded.

**Disturbance and Condition:** The condition of this community varies from good, with minor weed incursions, to poor with major weed infestations and edge effects from clearing near the Settlement and cleared areas. Significant areas, of Variant 17a in particular, would have been cleared for urban development and grazing.

**Areal extent:** Variant 17a: 247.44 ha (16.48% of mapped area); Variant 17b: 80.52 ha (5.36% of mapped area); Variant 17c: 0.71 ha (0.05% of mapped area).

**Areal extent and % of type in PPP:** Variant 17a: 207.03 ha (83.67%); Variant 17b: 74.54 ha (92.57%); Variant 17c: 0.71 ha (100%).

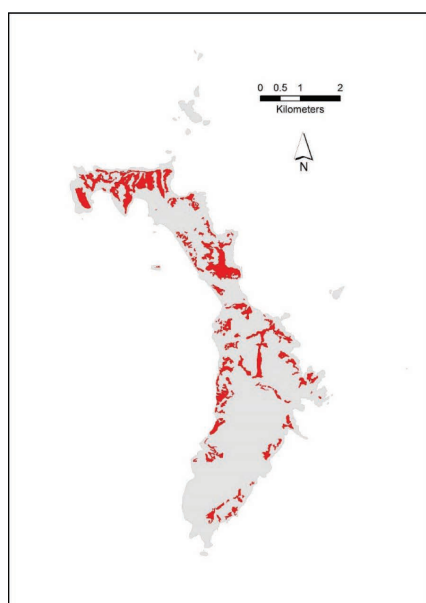
**Conservation significance and threats:** A widespread community that provides habitat for Lord Howe Woodhens (*Gallirallus sylvestris*), Lord Howe Flax Snail (*Placostylus bivaricosus*) and nesting Flesh-footed Shearwaters (*Ardenna carneipes*). It is threatened by weed invasion, exposure of edges and grazing, particularly in areas near the Settlement and cleared land.



Variant 17b



Variant 17c



Variant 17a

**Key Diagnostic Species Floristic Group 22**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	3	1	1	0.46	positive
<i>Ochrosia elliptica</i>	3	0.08	0	0	positive
<i>Myrsine platystigma</i>	2	1	1	0.22	positive
<i>Olea paniculata</i>	2	1	2	0.35	positive
<i>Oplismenus imbecillis</i>	2	1	2	0.36	positive
<i>Smilax australis</i>	2	1	1	0.47	positive
<i>Jasminum didymum</i> subsp. <i>didymum</i>	2	0.92	2	0.16	positive
<i>Alyxia ruscifolia</i>	2	0.83	1	0.37	positive
<i>Jasminum volubile</i>	2	0.83	1	0.22	positive
<i>Asplenium milnei</i>	2	0.67	1	0.45	positive
<i>Dodonaea viscosa</i> subsp. <i>burmanniana</i>	2	0.67	1	0.28	positive
<i>Carex brunnea</i>	2	0.58	2	0.42	positive
<i>Celtis conferta</i> subsp. <i>amblyphylla</i>	2	0.58	2	0.24	positive
<i>Geitonoplesium cymosum</i>	2	0.58	1	0.11	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	0.58	1	0.26	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	0.58	2	0.46	positive
<i>Alyxia lindii</i>	2	0.08	0	0	positive
<i>Coprosma prisca</i>	1	0.17	0	0	positive
<i>Dianella intermedia</i>	1	0.08	0	0	positive
<i>Zanthoxylum pinnatum</i>	1	0.08	0	0	positive
<i>Drypetes deplanchei</i>	3	1	2	0.61	constant
<i>Parsonsia howeana</i>	2	1	2	0.55	constant
* <i>Ageratina adenophora</i>	4	0.17	1	0.10	uninformative
<i>Cassinia tenuifolia</i>	3	0.33	1	0.24	uninformative



*Rainforests — Oceanic Rainforests***Community 18 Kentia Palm – Greybark rainforest of low to mid-altitude slopes**

**Scientific name:** *Howea forsteriana* – *Drypetes deplanchei* / *Howea forsteriana* – *Homalanthus populifolius* – *Alyxia ruscifolia* / *Parsonsia howeana* – *Smilax australis* / *Oplismenus imbecillis* – *Psilotum nudum* – *Microsorium pustulatum* subsp. *howense*.

**Equivalent vegetation types:** Intermediate between *Drypetes australasica* – *Cryptocarya triplinervis* Rainforest and *Howea forsteriana* Megaphyllous Broad Sclerophyll Forest (Pickard 1983); intermediate between Kentia Palm (*Howea forsteriana*) Closed Sclerophyll Forest and Greybark – Blackbutt (*Drypetes deplanchei* – *Cryptocarya triplinervis*) Closed Forest (DECC 2007).



**Structure:** Mid-high to tall closed forest.

**Description:** A forest in which Kentia Palm (*Howea forsteriana*) and Greybark (*Drypetes deplanchei*) are common. Other trees are present at lower cover abundance and frequency including Forky-tree (*Pandanus forsteri*), Curly Palm (*Howea belmoreana*), Blackbutt (*Cryptocarya triplinervis* var. *triplinervis*), Cotton-wood (*Celtis conferta* subsp. *amblyphylla*) and Tamana (*Elaeodendron curtispiculum*). There is a mid-layer of small rainforest trees and palms, including Kentia Palm, *Coprosma putida* and Dog Wood (*Homalanthus populifolius*). The ground layer is sparse and consists of *Microsorium pustulatum* subsp. *howense*, *Asplenium milnei*, Skeleton Fork-fern (*Psilotum nudum*) and *Oplismenus imbecillis*. The vines *Parsonsia howeana* and Lawyer Vine (*Smilax australis*) are also common in the ground and mid-layers.

**Habitat:** This community occurs on a range of habitats at low to mid-altitudes, often on sheltered lower to mid-slopes in the northern and central hills, and lower slopes in the southern mountains. It occurs on both basalt and calcarenite/coral derived soils.

**Sample sites:** ( $N = 4$ ) LHIFF29, LHIFF34, LHIFF36, LHIFF39.

**Floristic Group:** 23.

**Mean number of native species per plot:**  $18.5 \pm 1.3$ .

**Indicator native species:** *Howea forsteriana*, *Drypetes deplanchei*, *Homalanthus populifolius*, *Alyxia ruscifolia*, *Parsonsia howeana*, *Oplismenus imbecillis*, *Psilotum nudum*, *Microsorium pustulatum* subsp. *howense*.

**Number of exotic species recorded in plots:** 6.

**Common exotic species:** *Lilium formosanum*, *Ipomoea cairica*.

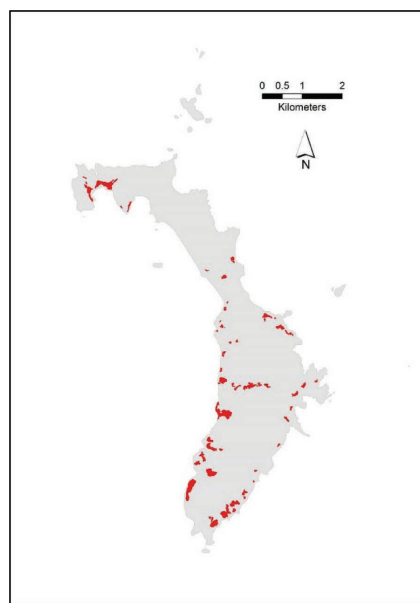
**Threatened species:** None recorded.

**Disturbance and Condition:** This community is generally in reasonable condition, although minor weed incursions occur, especially near habitation and cleared land.

**Areal extent:** 50.76 ha (3.38% of mapped area).

**Areal extent and % of type in PPP:** 47.22 ha (93.03%).

**Conservation significance and threats:** Provides habitat for Lord Howe Woodhens (*Gallirallus sylvestris*) and Lord Howe Flax Snail (*Placostylus bivaricosus*), and breeding habitat for Flesh-footed Shearwaters (*Ardenna carneipes*).



**Key Diagnostic Species Floristic Group 23**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Howea forsteriana</i>	4	1	2	0.31	positive
<i>Homalanthus populifolius</i>	2	1	1	0.28	positive
<i>Oplismenus imbecillis</i>	2	1	2	0.43	positive
<i>Psilotum nudum</i>	2	1	1	0.17	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	0.75	2	0.46	positive
<i>Alyxia ruscifolia</i>	2	0.5	1	0.43	positive
<i>Carex brunnea</i>	2	0.5	2	0.44	positive
<i>Howea belmoreana</i>	2	0.5	3	0.37	positive
* <i>Lilium formosanum</i>	2	0.5	1	0.22	positive
<i>Pandanus forsteri</i>	2	0.5	1	0.33	positive
<i>Drypetes deplanchei</i>	3	1	2	0.65	constant
<i>Parsonsia howeana</i>	2	1	2	0.60	constant
<i>Elaeodendron curtispiculum</i>	3	0.25	1	0.15	uninformative

## Rainforests — Oceanic Rainforests

**Community 19 Maulwood – Kentia Palm – Cotton-wood – Greybark lowland forest**

**Scientific name:** *Olea paniculata* – *Howea forsteriana* – *Celtis conferta* subsp. *amblyphylla* – *Drypetes deplanchei* / *Howea forsteriana* – *Parsonsia howeana* – *Flagellaria indica* – *Trophis scandens* subsp. *megacarpa* / *Asplenium milnei* – *Oplismenus imbecillis*.

**Equivalent vegetation types:** Intermediate between *Drypetes australasica* – *Cryptocarya triplinervis* Rainforest and *Howea forsteriana* Megaphyllous Broad Sclerophyll Forest (Pickard 1983); intermediate between Kentia Palm (*Howea forsteriana*) Closed Sclerophyll Forest and Greybark – Blackbutt (*Drypetes deplanchei* – *Cryptocarya triplinervis*) Closed Forest (DECC 2007).



**Structure:** Mid-high to very tall closed forest.

**Description:** A tall closed forest with a mixed canopy of Maulwood (*Olea paniculata*), Cotton-wood (*Celtis conferta* subsp. *amblyphylla*), Kentia Palm (*Howea forsteriana*), Banyan (*Ficus macrophylla* subsp. *columnaris*), Blackbutt (*Cryptocarya triplinervis* var. *triplinervis*), and Greybark (*Drypetes deplanchei*). There is a sparse mid-layer characterised by Kentia Palm and Cotton-wood. Vines are often present in various layers including *Parsonsia howeana*, *Trophis scandens* subsp. *megacarpa* and Lawyer Vine (*Smilax australis*). A sparse ground layer is sometimes present with *Asplenium milnei*, *Oplismenus imbecillis*, *Carex brunnea* and young palms.

**Habitat:** Occurs on flats to undulating hills in and around the Settlement area between the Clear Place and Old Settlement Beach, largely on Neds Beach Calcarenite but also on alluvial and marine sands and clays. Some of the best examples are located in Stevens Reserve.

**Sample sites:** ( $N = 5$ ) LHIFF61, LHIFF65, LHIFF68, LHIFF72, LHIFF73.

**Floristic Group:** 24.

**Mean number of native species per plot:**  $13.5 \pm 5.1$ .

**Indicator native species:** *Cryptocarya triplinervis* var. *triplinervis*, *Drypetes deplanchei*, *Parsonsia howeana*, *Celtis conferta* subsp. *amblyphylla*, *Ficus macrophylla* subsp. *columnaris*, *Flagellaria indica*, *Howea forsteriana*, *Olea paniculata*, *Trophis scandens* subsp. *megacarpa*.

**Number of exotic species recorded in plots:** 1.

**Common exotic species:** *Ipomoea cairica*.

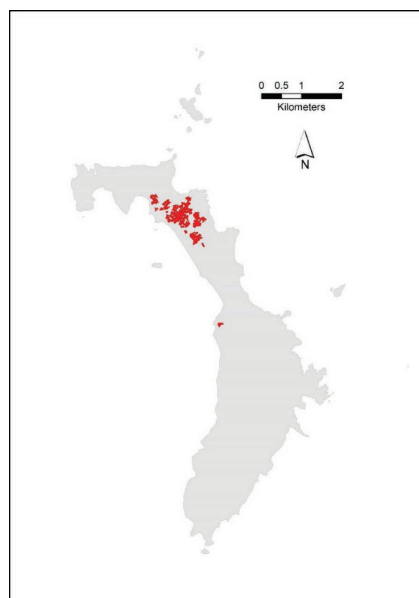
**Threatened species:** None recorded.

**Disturbance and Condition:** This community is in variable condition with some areas in good condition, but others affected by weeds (mainly garden escapes), and planted trees such as Camphor Laurel (*Cinnamomum camphora*) and Tallowwood (*Eucalyptus microcorys*) near Stevens Reserve.

**Areal extent:** 35.12 ha (2.34% of mapped area).

**Areal extent and % of type in PPP:** 0 ha (0%).

**Conservation significance and threats:** A community not recognised in previous studies that is restricted to the Settlement area and is not represented in the Permanent Park Preserve. It provides habitat for the Lord Howe Woodhen (*Gallirallus sylvestris*) and Lord Howe Flax Snail (*Placostylus bivaricosus*). A significant amount of this community has probably been cleared since human settlement and what remains is threatened by garden-escape weeds, clearing and die-back as a result of exposure from adjacent cleared areas.



**Key Diagnostic Species Floristic Group 24**

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Olea paniculata</i>	4	1	2	0.41	positive
<i>Howea forsteriana</i>	3	1	2	0.30	positive
<i>Celtis conferta</i> subsp. <i>amblyphylla</i>	3	0.8	2	0.26	positive
<i>Ficus macrophylla</i> subsp. <i>columnaris</i>	3	0.6	1	0.09	positive
<i>Trophis scandens</i> subsp. <i>megacarpa</i>	2	0.8	1	0.35	positive
<i>Flagellaria indica</i>	2	0.6	1	0.33	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	3	0.6	2	0.53	constant
<i>Drypetes deplanchei</i>	2	1	2	0.64	constant
<i>Parsonsia howeana</i>	2	1	2	0.59	constant
<i>Guioa coriacea</i>	3	0.2	2	0.40	uninformative
<i>Pandorea pandorana</i> subsp. <i>austrocaledonica</i>	3	0.4	1	0.46	uninformative
<i>Howea belmoreana</i>	3	0.2	3	0.38	uninformative

*Saline Wetlands — Mangrove Swamps***Community 20 Grey Mangrove low open woodland of brackish creeks**

**Scientific name:** *Avicennia marina* subsp. *australasica*.

**Equivalent vegetation types:** *Avicennia marina* var. *australasica* Open Broad Sclerophyll Scrub (Pickard 1983); Mangrove (*Avicennia marina* var. *australasica*) Open Swamp Scrub (DECC 2007).



**Description:** Sampled in rapid floristic sites only and identified in the canopy-only floristic analysis. This community was not sampled with any full floristic plots during the current study owing to the extremely small extent of its distribution. Descriptions of this community are in Pickard (1983) and DECC (2007).

**Sample sites:** ( $N = 1$ ) LHIRP06.

**Areal extent:** 0.015 ha (0.001% of mapped area).

**Areal extent and % of type in PPP:** 0 ha (0%).

**Conservation significance and threats:** An extremely restricted community represented by fewer than 50 individual adult Grey Mangrove plants located mainly at the mouth of Old Settlement Creek, with several scattered trees on the western shore of Hunter Bay. Potentially threatened by rising sea level.



*Saline Wetlands — Mangrove Swamps***Community 21 River Mangrove tall shrubland of brackish creeks**

**Scientific name:** *Aegiceras corniculatum*.

**Equivalent vegetation types:** *Aegiceras corniculata* Broad Sclerophyll Swamp Scrub (Pickard 1983); Mangrove *Aegiceras corniculatum* Closed Swamp Scrub (DECC 2007).



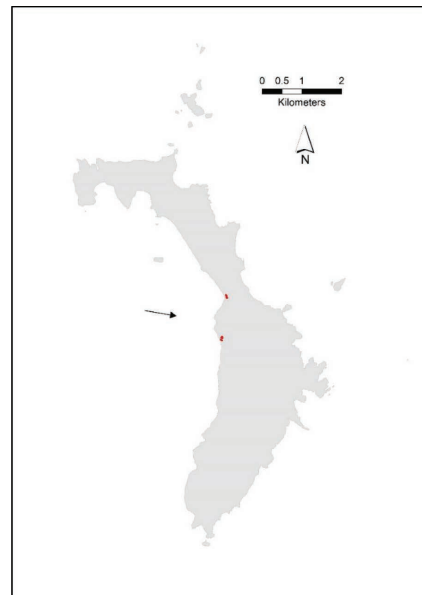
**Description:** Sampled in rapid floristic sites only and identified in the canopy-only floristic analysis. This community was not sampled with any full floristic plots during the current study owing to its extremely small distribution. Descriptions of this community can be found in Pickard (1983) and DECC (2007).

**Sample sites:** ( $N = 1$ ) LHIRP07.

**Areal extent:** 0.14 ha (0.01% of island area).

**Areal extent and % of type in PPP:** 0 ha (0%).

**Conservation significance and threats:** An extremely restricted community occurring in very small patches at the mouths of Old Settlement Creek (too rare to map here), Soldiers Creek and Cobbys Corner. Threatened by invasion of pasture grasses, disturbance by cattle, and potentially threatened by rising sea level.



*Rainforests — Oceanic Rainforests***Community 22 Hill Rose – Forky-tree forest of rocky creeks and slopes**

**Scientific name:** *Metrosideros sclerocarpa* – *Pandanus forsteri* – *Chionanthus quadristamineus* / *Dracophyllum fitzgeraldii* – *Pandanus forsteri* / *Machaerina insularis* – *Carex brunnea* – *Microsorium pustulatum* subsp. *howense*.

**Equivalent vegetation types:** No clear equivalent vegetation types.



**Structure:** Low to mid-high open or closed forest.

**Description:** A community sampled in rapid floristic sites and identified in the canopy-only floristic analysis. Hill Rose (*Metrosideros sclerocarpa*) dominates, with Forky-tree (*Pandanus forsteri*) and Blue Plum (*Chionanthus quadristamineus*) often present. Other trees include Green Plum (*Atractocarpus stipularis*), Cedar (*Guioa coriacea*) and Scalybark (*Syzygium fullagarii*). Mid-layer species include Fitzgerald (*Dracophyllum fitzgeraldii*), Forky-tree and Hill Rose. Christmas Bush (*Alyxia ruscifolia*) is sometimes present. A sparse ground cover comprises *Carex brunnea*, *Microsorium pustulatum* subsp. *howense* and *Machaerina insularis*, which is the most common ground layer species at one site in Erskine Valley. The common name ‘Hill Rose’ is suggested here for *Metrosideros sclerocarpa* to avoid confusion with Mountain Rose used for *M. nervulosa* and which occurs at higher elevation than the former species.

**Habitat:** This community most commonly occurs on rocky riparian sites at low to mid-altitudes in the southern mountains. It is often associated with rocky creek beds such as Dinner Run, Rocky Run and Erskine Creek.

**Sample sites:** ( $N = 3$ ) LHIRP117, LHIRP120, LHIRP129.

**Indicator native species:** *Metrosideros sclerocarpa*, *Pandanus forsteri*, *Machaerina insularis*.

**Number of exotic species recorded in plots:** 0.

**Common exotic species:** None recorded.

**Threatened species:** None recorded.

**Disturbance and Condition:** Generally in good condition and little disturbance other than from water flows in creeks.

**Areal extent:** 1.11 ha (0.07% of mapped area).

**Areal extent and % of type in PPP:** 1.11 ha (100%).

**Conservation significance and threats:** A community dominated by endemic species that occupies very small areas of a specific habitat. Not recognised in previous studies.



*Grasslands — Maritime Grasslands***Community 23 *Poa poiiformis* tussock grassland of offshore islands and exposed coastal slopes**

**Scientific name:** *Poa poiiformis* – *Commelina cyanea* – *Cyperus lucidus* – *Ficinia nodosa*.

**Equivalent vegetation types:** *Poa poiiformis* Orthophyll Short Grass (Pickard 1983); *Poa poiiformis* Grassland (DECC 2007).



**Structure:** Mid-high to tall tussock grassland.

**Description:** This community was not sampled with any full floristics plots during the current study owing to the difficulty in accessing the main occurrences on offshore islands. Descriptions of this community can be found in Pickard (1983) and DECC (2007). Excellent descriptions of the vegetation occurring on each offshore island that supports nesting seabirds are provided in Carlile and Priddel (2013a–f) and Carlile *et al.* (2013).

**Habitat:** Occurs on windswept offshore islands and headlands on the main island.

**Indicator native species:** *Poa poiiformis*.

**Disturbance and Condition:** Offshore occurrences are generally in good condition apart from disturbance by nesting seabirds. The community on Blackburn Island is dominated by the exotic Rhodes Grass (*Chloris gayana*). Some occurrences on the main island are severely affected by Kikuyu (*Cenchrus clandestinus*).

**Areal extent:** 9.23 ha (0.61% of mapped area).

**Areal extent and % of type in PPP:** 9.23 ha (100%).

**Conservation significance and threats:** Provides key nesting sites for a number of seabird species, such as Masked Boobies (*Sula dactylatra*), Wedge-tailed Shearwaters (*Ardenna pacifica*) and Sooty Terns (*Onychoprion fuscata*).





*Rainforests — Oceanic Cloud Forests***Community 24 *Pouzolzia australis* – Kava closed shrubland on exposed wet rocky slopes**

**Scientific name:** *Hedyscepe canterburyana* – *Negria rhabdothamnoides* / *Pouzolzia australis* – *Macropiper hooglandii* / *Elatostema reticulatum* – *Gahnia howeana* – *Machaerina insularis*.

**Equivalent vegetation types:** *Boehmeria calophleba* – *Macropiper excelsum* var. *psittacorum* Broad Orthophyll Scrub (Pickard 1983); *Boehmeria calophleba* – *Macropiper hooglandii* Closed Scrub (DECC 2007).



**Structure:** Tall to very tall closed shrubland.

**Description:** This community was not sampled during the current study owing to the difficulty accessing sites where it occurs. Descriptions of this community can be found in Pickard (1983) and DECC (2007).

**Common exotic species:** *Ageratina adenophora*.

**Threatened species:** None recorded.

**Disturbance and Condition:** Areas at the foot of high cliffs on the south-eastern faces of Mounts Gower and Lidgbird (see image above) have been mapped as this community, but they are frequently disturbed by landslips and are drier than the higher elevation areas where this community also occurs. These cliff-base sites appear to be dominated by Kava (*Macropiper hooglandii*) and a variety of ferns, as well as often being heavily infested with Crofton Weed (*Ageratina adenophora*), and *Pouzolzia australis* may be absent.

**Areal extent:** 11.22 ha (0.75% of mapped area).

**Areal extent and % of type in PPP:** 11.22 ha (100%).

**Conservation significance and threats:** A restricted community supporting a suite of endemic plant species in a specific habitat. Despite its apparent remoteness, it is seriously threatened by Crofton Weed. Provides nesting habitat for Providence Petrels (*Pterodroma solandri*).



*Heathlands — Coastal Headland Heaths***Community 25** *Alyxia squamulosa* – *Coprosma inopinata*  
low shrubland on narrow exposed rocky ridges**Scientific name:** *Alyxia squamulosa* – *Coprosma inopinata*  
– *Xylosma parvifolia*.**Equivalent vegetation types:** *Alyxia squamulosa* –  
*Coprosma inopinata* Dwarf Scrub (DECC 2007).**Structure:** Dwarf to mid-high shrubland.**Description:** This community was not sampled during the current study owing to the difficult access to sites where it occurs. Descriptions of this community can be found in Hutton (2001) and DECC (2007).**Habitat:** Known from two exposed, high-elevation, narrow ridgelines – the ridgeline running south-east from ‘The Pimple’ on Mt Lidgbird (see above image) and the Razorback off Mt Gower.**Indicator native species:** *Alyxia squamulosa*, *Coprosma inopinata*, *Xylosma parvifolia*.**Threatened species:** *Carmichaelia exsul*, *Coprosma inopinata*, *Geniostoma huttonii*, *Xylosma parvifolia* (all Endangered – *BC Act*).**Disturbance and Condition:** Little disturbance, and generally no weeds recorded by Hutton (2001). However, recent surveys by S. Bower *et al.* (unpublished data) recorded *Solanum nigrum*, *Lilium formosanum*, *Ageratina adenophora* and other weeds at The Pimple site.**Areal extent:** 0.89 ha (0.06% of mapped area).**Areal extent and % of type in PPP:** 0.89 ha (100%).**Conservation significance and threats:** An extremely restricted low shrubland community supporting a number of threatened endemic plant species. No threats apparent, apart from the potential for plants to be trampled by the very occasional, and foolhardy, bushwalker (Hutton 2001; DECC 2007).

*Rainforests — Oceanic Cloud Forests***Community 26 Black Plum – King Fern low closed forest of the southern mountains**

**Scientific name:** *Cryptocarya gregsonii* – *Hedyscepe canterburyana* / *Marattia howeana* / *Asplenium pteridoides*.

**Equivalent vegetation types:** Part of *Cryptocarya gregsonii* Rainforest (Pickard 1983); part of *Cryptocarya gregsonii* Closed Forest (DECC 2007).



**Structure:** Low closed forest.

**Description:** This community was not sampled during the current study owing to the difficult access to sites where it occurs. Information for this community is from I. Hutton (pers. comm. 2013 – 2016). The canopy is dominated by Black Plum (*Cryptocarya gregsonii*) with occasional Big Mountain Palm (*Hedyscepe canterburyana*) and Fitzgerald (*Dracophyllum fitzgeraldii*). There is a mid-layer of King Fern (*Marattia howeana*) and *Macropiper hooglandii*, with a sparse ground layer of *Asplenium pteridoides* and *Pteris microptera*.

**Habitat:** Restricted to a small saddle on the southern spur of Mt Lidgbird (arrowed in above image). May also occur on the upper part of Little Pocket.

**Indicator native species:** *Cryptocarya gregsonii*, *Marattia howeana*.

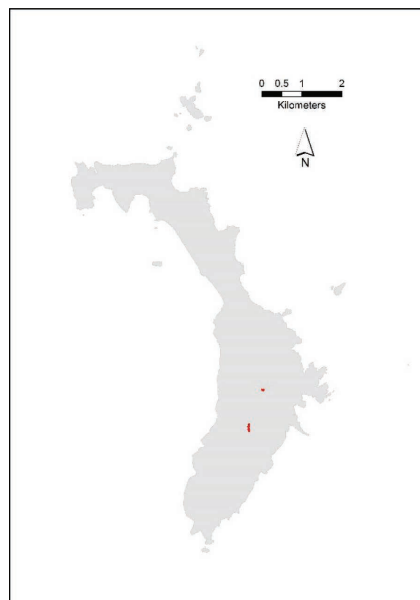
**Common exotic species:** None recorded.

**Disturbance and Condition:** In good condition although there is significant soil disturbance from nesting Providence Petrels (*Pterodroma solandri*).

**Areal extent:** 0.83 ha (0.06% of mapped area).

**Areal extent and % of type in PPP:** 0.83 ha (100%).

**Conservation significance and threats:** A very restricted community with several rare endemic species. Provides nesting habitat for Providence Petrels.



## Appendix 2 List of plant species recorded in floristic sites

Taxa are listed alphabetically by family and genus within classes. Nomenclature follows that currently adopted by the National Herbarium of NSW, Royal Botanic Gardens, Sydney (PlantNet 2019). Status: \* = Exotic taxon; BC-E = listed as Endangered under the NSW BC Act.

Class / Family	Status	Scientific name	Authority	Common name
<b>Class Lycopsidea - Club Mosses and Quill Worts</b>				
Lycopodiaceae		<i>Phlegmariurus varius</i>	(R.Br.) A.R. Field & Bostock	Long Clubmoss
<b>Class Filicopsida - Ferns</b>				
Aspleniaceae		<i>Asplenium goudeyi</i>	D.L.Jones	
Aspleniaceae		<i>Asplenium milnei</i>	Carruth.	
Aspleniaceae		<i>Asplenium surrogatum</i>	P.S.Green	
Aspleniaceae		<i>Asplenium polyodon</i>	G.Forst.	Sickle Spleenwort
Athyriaceae		<i>Diplazium melanochlamys</i>	(Hook.) T.Moore	
Blechnaceae		<i>Blechnum contiguum</i>	Mett.	
Blechnaceae		<i>Blechnum howeanum</i>	T.C.Chambers & P.A.Farrant	
Blechnaceae		<i>Blechnum patersonii</i> subsp. <i>patersonii</i>	(R.Br.) Mett.	Strap Water Fern
Blechnaceae		<i>Doodia caudata</i>	(Cav.) R.Br.	Rasp Fern
Cyatheaceae		<i>Cyathea brevipinna</i>	Baker ex Benth.	Tree Fern
Cyatheaceae		<i>Cyathea howeana</i>	Domin	Tree Fern
Cyatheaceae		<i>Cyathea macarthurii</i>	(F.Muell.) Baker	Tree Fern
Cyatheaceae		<i>Cyathea robusta</i>	(C.Moore) Holttum	Tree Fern
Dryopteridaceae		<i>Lastreopsis nephrodioides</i>	(Baker) Tindale	
Dryopteridaceae		<i>Polystichum whiteleggei</i>	Watts	
Hymenophyllaceae		<i>Cephalomanes bauerianum</i>	(Endl.) P.S.Green	
Hymenophyllaceae		<i>Hymenophyllum howense</i>	Brownlie	
Lomariopsidaceae		<i>Nephrolepis cordifolia</i>	(L.) Presl	Fishbone Fern
Ophioglossaceae		<i>Ophioglossum pendulum</i>	L.	Ribbon Fern
Polypodiaceae		<i>Grammitis nudicarpa</i>	Copel.	
Polypodiaceae		<i>Grammitis wattsi</i>	Copel.	
Polypodiaceae		<i>Microsorium pustulatum</i> subsp. <i>howense</i>	(Tindale & P.S.Green) Bostock	Kangaroo Fern
Polypodiaceae		<i>Microsorium scandens</i>	(G.Forst.) Tindale	Fragrant Fern
Polypodiaceae		<i>Pyrrosia confluens</i> var. <i>confluens</i>	(R.Br.) Ching	Horseshoe Felt Fern
Polypodiaceae		<i>Platycterium bifurcatum</i>	(Cav.) C.Chr.	Elkhorn
Psilotaceae		<i>Tmesipteris truncata</i>	(R.Br.) Desv.	
Psilotaceae		<i>Psilotum nudum</i>	(L.) P.Beauv.	Skeleton Fork-fern
Pteridaceae		<i>Adiantum hispidulum</i>	Sw.	Rough Maidenhair Fern
Pteridaceae		<i>Pellaea paradoxa</i>	(R.Br.) Hook.	Sickle Fern
Pteridaceae		<i>Pteris microptera</i>	Mett. ex Kuhn	
Tectariaceae		<i>Arthropteris tenella</i>	(G.Forst.) J.Sm. ex Hook.f.	
Thelypteridaceae		<i>Cyclosorus dentatus</i>	(Forssk.) Ching	
<b>Class Coniferopsida - Conifers</b>				
Araucariaceae	*	<i>Araucaria heterophylla</i>	(Salisb.) Franco	Norfolk Island Pine
<b>Class Magnoliopsida - Magnoliidae</b>				
Acanthaceae		<i>Avicennia marina</i> subsp. <i>australasica</i>	(Walp.) J.Everett	Grey Mangrove
Aizoaceae		<i>Sesuvium portulacastrum</i>	L.	Ice Plant
Aizoaceae		<i>Tetragonia tetragonioides</i>	(Pall.) Kuntze	Native Spinach
Amaranthaceae		<i>Achyranthes aspera</i>	L.	Chaff Flower
Apiaceae		<i>Apium prostratum</i> subsp. <i>howense</i>	P.S.Short	Sea Celery
Apiaceae	*	<i>Cyclospermum leptophyllum</i>	(Pers.) Sprague ex Britton & P.Wilson	Slender Celery

Class / Family	Status	Scientific name	Authority	Common name
Apiaceae	*	<i>Hydrocotyle bonariensis</i>	Lam.	Kurnell Curse
Apiaceae		<i>Hydrocotyle hirta</i>	A.Rich. ex R.Br.	Hairy Pennywort
Apiaceae	*	<i>Torilis nodosa</i>	(L.) Gaertn.	Knotted Hedge-parsley
Apocynaceae		<i>Alyxia ruscifolia</i>	R.Br.	Christmas Bush
Apocynaceae		<i>Alyxia squamulosa</i>	C.Moore & F.Muell.	Climbing Fishbone Fern
Apocynaceae		<i>Marsdenia rostrata</i>	R.Br.	Common Milk Vine
Apocynaceae		<i>Tylophora biglandulosa</i>	(Endl.) F.Muell.	
Apocynaceae		<i>Ochrosia elliptica</i>	Labill.	Red Berrywood
Apocynaceae		<i>Parsonsia howeana</i>	J.B. Williams	
Araliaceae		<i>Polyscias cissodendron</i>	(C.Moore & F.Muell.) Harms	Island Pine
Asteraceae		<i>Actites megalocarpus</i>	(Hook. f.) Lander	Dune Thistle
Asteraceae	*	<i>Ageratina adenophora</i>	(Spreng.) R.M.King & H.Rob.	Crofton Weed
Asteraceae	*	<i>Aster subulatus</i>	Michx.	Wild Aster
Asteraceae	*	<i>Bidens pilosa</i>	L.	Cobbler's Pegs
Asteraceae		<i>Brachyscome segmentosa</i>	C.Moore & F.Muell.	Lord Howe Island Daisy
Asteraceae		<i>Cassinia tenuifolia</i>	Benth.	Bully Bush
Asteraceae	*	<i>Cirsium vulgare</i>	(Savi) Ten.	Spear Thistle
Asteraceae	*	<i>Conyza parva</i>	Cronquist	
Asteraceae		<i>Cotula australis</i>	(Sieber ex Spreng.) Hook.f.	Carrot Weed
Asteraceae		<i>Euchiton involucratus</i>	(G.Forst.) Holub	
Asteraceae	*	<i>Hypochaeris radicata</i>	L.	Catsear
Asteraceae		<i>Lordhowea insularis</i>	(Benth.) B.Nord.	
Asteraceae		<i>Melanthera biflora</i>	(L.) Wild	
Asteraceae		<i>Olearia ballii</i>	(F.Muell.) Hemsl.	Mountain Daisy
Asteraceae		<i>Olearia mooneyi</i>	(F.Muell.) Hemsl.	Pumpkin Bush
Asteraceae	*	<i>Senecio elegans</i>	L.	Purple Groundsel
Asteraceae		<i>Senecio howeanus</i>	Belcher	
Asteraceae	*	<i>Sonchus oleraceus</i>	L.	Sow Thistle
Asteraceae	*	<i>Taraxacum officinale</i>	Weber	Dandelion
Bignoniaceae		<i>Pandorea pandorana</i> subsp. <i>austrocaledonica</i>	(Bureau) P.S.Green	Boat Vine
Brassicaceae	*	<i>Cakile edentula</i>	(Bigelow) Hook.	American Sea Rocket
Brassicaceae		<i>Lepidium howei-insulae</i>	Thell.	Mustard & Cress
Brassicaceae	*	<i>Lobularia maritima</i>	(L.) Desv.	Sweet Alyssum
Campanulaceae		<i>Wahlenbergia insulae-howeii</i>	Lothian	
Cannabaceae		<i>Celtis conferta</i> subsp. <i>amblyphylla</i>	(F.Muell.) P.S.Green	Cotton-wood
Caryophyllaceae	*	<i>Cerastium glomeratum</i>	Thuill.	Mouse-ear Chickweed
Celastraceae		<i>Elaeodendron curtispiculum</i>	Endl.	Tamana
Chenopodiaceae		<i>Atriplex cinerea</i>	Poir.	Grey Saltbush
Chenopodiaceae		<i>Carpobrotus glaucescens</i>	(Haw.) Schwantes	Pigface
Chenopodiaceae	*	<i>Chenopodium murale</i>	L.	Nettle-leaf Goosefoot
Convolvulaceae		<i>Ipomoea brasiliensis</i>	(L.) Sweet	Beach Bean
Convolvulaceae	*	<i>Ipomoea cairica</i>	(L.) Sweet	Coastal Morning Glory
Convolvulaceae		<i>Calystegia soldanella</i>	(L.) Roem. & Schult.	
Crassulaceae		<i>Crassula sieberiana</i>	(Schult. & Schult.f.) Druce	Australian Stonecrop
Elaeocarpaceae		<i>Elaeocarpus costatus</i>	M.Taylor	
Ericaceae		<i>Dracophyllum fitzgeraldii</i>	C.Moore & F.Muell.	Fitzgerald
Ericaceae		<i>Leucopogon parviflorus</i>	(Andrews) Lindl.	
Euphorbiaceae	*	<i>Euphorbia cyathophora</i>	Murray	Painted Spurge
Euphorbiaceae	*	<i>Euphorbia paralias</i>	L.	Sea Spurge
Euphorbiaceae		<i>Homalanthus populifolius</i>	Graham	Bleeding Heart
Euphorbiaceae		<i>Baloghia inophylla</i>	(G.Forst.) P.S.Green	Brush Bloodwood
Fabaceae		<i>Canavalia rosea</i>	(Sw.) DC.	Coastal Jack Bean

Class / Family	Status	Scientific name	Authority	Common name
Fabaceae	*	<i>Melilotus indicus</i>	(L.) All.	King Island Melilot
Fabaceae		<i>Mucuna gigantea</i> subsp. <i>gigantea</i>	(Willd.) DC.	Burny Bean
Fabaceae	*	<i>Vicia sativa</i>	L.	Common Vetch
Fabaceae		<i>Sophora howinsula</i>	(W.R.B.Oliv.) P.S.Green	Lignum Vitae
Fabaceae		<i>Vigna marina</i>	(Burm.) Merr.	Dune Bean
Flacourtiaceae		<i>Xylosma maidenii</i>	Sleumer	
Flacourtiaceae	BC-E	<i>Xylosma parvifolia</i>	Jessup	Mountain Xylosma
Gesneriaceae		<i>Negria rhabdothamnoides</i>	F.Muell.	Pumpkin Tree
Lamiaceae		<i>Westringia viminalis</i>	B.J.Conn & M.E.Tozer	
Lauraceae		<i>Cryptocarya gregsonii</i>	Maiden	Black Plum
Lauraceae		<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	R.Br.	Blackbutt
Lobeliaceae		<i>Lobelia anceps</i>	L.f.	
Loganiaceae	BC-E	<i>Geniostoma huttonii</i>	B.J.Conn	
Loganiaceae		<i>Geniostoma petiolosum</i>	C.Moore & F.Muell.	Boar Tree
Malvaceae		<i>Hibiscus tiliaceus</i>	L.	Cottonwood Hibiscus
Malvaceae		<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	(Andrews) G.Don	Sallywood
Meliaceae		<i>Dysoxylum pachyphyllum</i>	Hemsl.	Island Apple
Menispermaceae		<i>Stephania japonica</i> var. <i>timoriensis</i>	(DC.) Forman	Snake Vine
Moraceae		<i>Ficus macrophylla</i> subsp. <i>columnaris</i>	(C.Moore) D.J.Dixon	Banyan
Moraceae		<i>Trophis scandens</i> subsp. <i>megacarpa</i>	(P.S.Green) P.S.Green	Burny Vine
Myrsinaceae		<i>Aegiceras corniculatum</i>	(L.) Blanco	River Mangrove
Myrtaceae		<i>Leptospermum polygalifolium</i> subsp. <i>howense</i>	Joy Thomps.	
Myrtaceae		<i>Melaleuca howeana</i>	Cheel	Tea Tree
Myrtaceae		<i>Metrosideros nervulosa</i>	C.Moore & F.Muell.	Mountain Rose
Myrtaceae		<i>Metrosideros sclerocarpa</i>	J.W.Dawson	Hill Rose
Myrtaceae	*	<i>Psidium cattleianum</i> var. <i>cattleianum</i>	Sabine	Cherry Guava
Myrtaceae		<i>Syzygium fullagarii</i>	(F.Muell.) Craven	Scalybark
Nyctaginaceae		<i>Pisonia brunoniana</i>	Endl.	Punkwood
Oleaceae		<i>Jasminum didymum</i> subsp. <i>didymum</i>	G.Forst.	Jasmine
Oleaceae		<i>Jasminum volubile</i>	Jacq.	Stiff Jasmine
Oleaceae		<i>Olea paniculata</i>	L.	Maulwood
Oleaceae		<i>Chionanthus quadristamineus</i>	F.Muell.	Blue Plum
Onagraceae	*	<i>Oenothera tetraptera</i>	Cav.	
Oxalidaceae	*	<i>Oxalis corniculata</i>	L.	
Oxalidaceae		<i>Oxalis rubens</i>	Haw.	
Piperaceae		<i>Macropiper excelsum</i> subsp. <i>psittacorum</i>	(Endl.) Sykes	Kava
Piperaceae		<i>Macropiper hooglandii</i>	I.Hutton & P.S.Green	Kava
Piperaceae		<i>Peperomia tetraphylla</i>	(G.Forst.) Hook. & Arn.	Four-leaved Pepper Plant
Piperaceae		<i>Peperomia urvilleana</i>	A.Rich.	
Pittosporaceae		<i>Pittosporum erioloma</i>	C.Moore & F.Muell.	Hedge Laurel
Pittosporaceae	*	<i>Pittosporum undulatum</i>	Vent.	Snowdrop Tree
Plantaginaceae	*	<i>Plantago lanceolata</i>	L.	Plantain
Polygonaceae		<i>Muehlenbeckia complexa</i>	(A.Cunn.) Meisn.	Wire Vine
Polygonaceae		<i>Rumex brownii</i>	Campd.	Swamp Dock
Portulacaceae		<i>Portulaca oleracea</i>	L.	Purslane
Primulaceae		<i>Myrsine mcomishii</i>	(Sprague) Jackes	
Primulaceae		<i>Myrsine platystigma</i>	F.Muell.	
Putranjivaceae		<i>Drypetes deplanchei</i>	(Brongn. & Gris) Merr.	Greybark
Ranunculaceae		<i>Clematis glycinoides</i>	DC.	Headache Vine
Rosaceae	*	<i>Potentilla indica</i>	(Jacks.) Th.Wolf	Indian Strawberry
Rubiaceae		<i>Atractocarpus stipularis</i>	(F.Muell.) Puttock	Green Plum
Rubiaceae		<i>Psychotria carronis</i>	C.Moore & F.Muell.	Black Grape
Rubiaceae	*	<i>Richardia</i> spp.		

Class / Family	Status	Scientific name	Authority	Common name
Rubiaceae		<i>Coprosma huttoniana</i>	P.S.Green	
Rubiaceae		<i>Coprosma lanceolaris</i>	F.Muell.	
Rubiaceae		<i>Coprosma prisca</i>	W.R.B.Oliv.	Goatwood
Rubiaceae		<i>Coprosma putida</i>	C.Moore & F.Muell.	Stinkwood
Rubiaceae		<i>Coprosma sp. nov</i>		
Rutaceae		<i>Melicope contermina</i>	C.Moore & F.Muell.	
Rutaceae		<i>Melicope polybotrya</i>	(C.Moore & F.Muell.) T.G.Hartley	
Rutaceae		<i>Sarcomelicope simplicifolia</i> subsp. <i>simplicifolia</i>	(Endl.) T.G.Hartley	Yellow Wood
Rutaceae		<i>Zanthoxylum pinnatum</i>	(J.R.Forst. & G.Forst.) W.R.B.Oliv.	Yellow Wood
Santalaceae		<i>Exocarpos homalocladus</i>	C.Moore & F.Muell.	Grass Tree
Sapindaceae		<i>Dodonaea viscosa</i> subsp. <i>burmanniana</i>	(DC.) J.G.West	Hop Bush
Sapindaceae		<i>Guioa coriacea</i>	(Radlk.) Radlk.	Cedar
Sapotaceae		<i>Planchonella howeana</i>	(F.Muell.) Pierre	
Scrophulariaceae		<i>Myoporum insulare</i>	R.Br.	Boobialla
Solanaceae		<i>Nicotiana forsteri</i>	Roem. & Schult.	
Solanaceae	*	<i>Physalis ixocarpa</i>	Brot. ex Hornem.	Ground Cherry
Solanaceae	*	<i>Solanum nigrum</i>	L.	Blackberry Nightshade
Symplocaceae		<i>Symplocos candelabrum</i>	Brand	
Thymelaeaceae		<i>Pimelea congesta</i>	C.Moore & F.Muell.	
Urticaceae		<i>Parietaria debilis</i>	G.Forst.	Native Pellitory
Urticaceae	*	<i>Parietaria judaica</i>	L.	Pellitory
Urticaceae		<i>Elatostema reticulatum</i>	Wedd.	Rainforest Spinach
Viscaceae		<i>Korthalsella rubra</i>	(Tiegh.) Engl.	Jointed Mistletoe
Winteraceae		<i>Bubbia howeana</i>	(F.Muell.) Tieg.	Hotbark
<b>Class Magnoliopsida - Liliidaceae</b>				
Amaryllidaceae		<i>Crinum pedunculatum</i>	R.Br.	River Lily
Arecaceae		<i>Hedyscepe canterburyana</i>	(C.Moore & F.Muell.) H.Wendl. & Drude	Big Mountain Palm
Arecaceae		<i>Howea belmoreana</i>	(C.Moore & F.Muell.) Becc.	Curly Palm
Arecaceae		<i>Howea forsteriana</i>	(C.Moore & F.Muell.) Becc.	Kentia Palm
Arecaceae	BC-E	<i>Lepidorrhachis mooreana</i>	(F.Muell.) O.F.Cook	Little Mountain Palm
Asparagaceae	*	<i>Asparagus aethiopicus</i>	L.	Ground Asparagus
Asparagaceae	*	<i>Asparagus plumosus</i>	Baker	Climbing Asparagus
Commelinaceae		<i>Commelina cyanea</i>	R.Br.	Native Wandering Jew
Cyperaceae		<i>Carex breviculmis</i>	R.Br.	
Cyperaceae		<i>Carex brunnea</i>	Thunb.	Greater Brown Sedge
Cyperaceae		<i>Cyperus lucidus</i>	R.Br.	Leafy Flat Sedge
Cyperaceae		<i>Ficinia nodosa</i>	(Rottb.) Goetgh., Muasya & D.A.Simpson	Club Rush
Cyperaceae		<i>Gahnia howeana</i>	R.O.Gardner	
Cyperaceae		<i>Machaerina insularis</i>	(Benth.) T.Koyama	
Flagellariaceae		<i>Flagellaria indica</i>	L.	Whip Vine
Iridaceae		<i>Dietes robinsoniana</i>	(C.Moore & F.Muell.) Klatt	Lord Howe Wedding Lily
Juncaceae		<i>Luzula longiflora</i>	Benth.	
Juncaginaceae		<i>Triglochin striata</i>	Ruiz & Pav.	Water Ribbons
Liliaceae	*	<i>Lilium formosanum</i>	A.Wallace	Formosan Lily
Luzuriagaceae		<i>Geitonoplesium cymosum</i>	(R.Br.) A.Cunn. ex Hook.	Scrambling Lily
Orchidaceae		<i>Calanthe triplicata</i>	(Willemet) Ames	Christmas Orchid
Orchidaceae		<i>Corybas spp.</i>		
Orchidaceae		<i>Dendrobium gracilicaule</i> var. <i>howeanum</i>	Maiden	
Orchidaceae		<i>Dendrobium moorei</i>	F.Muell.	
Orchidaceae		<i>Pterostylis curta</i>	R.Br.	
Orchidaceae		<i>Pterostylis spp.</i>		

Class / Family	Status	Scientific name	Authority	Common name
Pandanaceae		<i>Pandanus forsteri</i>	C.Moore & F.Muell.	Forky-tree
Phormiaceae		<i>Dianella intermedia</i>	Endl.	Flax Lily
Poaceae	*	<i>Bromus catharticus</i>	Vahl	Prairie Grass
Poaceae	*	<i>Cenchrus clandestinus</i>	(Hochst. ex Chiov.) Morrone	Kikuyu
Poaceae	*	<i>Chloris gayana</i>	Kunth	Rhodes Grass
Poaceae		<i>Cynodon dactylon</i>	(L.) Pers.	Blue Couch
Poaceae	*	<i>Digitaria ciliaris</i>	(Retz.) Koeler	Summer Grass
Poaceae		<i>Echinopogon caespitosus</i> var. <i>caespitosus</i>	C.E.Hubb.	Hedgehog Grass
Poaceae	*	<i>Ehrharta erecta</i>	Lam.	Panic Veldtgrass
Poaceae	*	<i>Melinis minutiflora</i>	P.Beauv.	Molasses Grass
Poaceae		<i>Microlaena stipoides</i> var. <i>stipoides</i>	(Labill.) R.Br.	Weeping Meadow Grass
Poaceae		<i>Oplismenus imbecillis</i>	(R.Br.) Roem. & Schult.	Creeping Beard Grass
Poaceae	*	<i>Paspalum dilatatum</i>	Poir.	Paspalum
Poaceae	*	<i>Paspalum mandiocanum</i>	Trin.	Broadleaf Paspalum
Poaceae		<i>Phragmites australis</i>	(Cav.) Trin. ex Steud.	Native Reed
Poaceae	*	<i>Poa annua</i>	L.	Winter Grass
Poaceae		<i>Poa poiformis</i> var. <i>poiformis</i>	(Labill.) Druce	Coast Tussock Grass
Poaceae		<i>Spinifex sericeus</i>	R.Br.	Spinifex
Poaceae	*	<i>Sporobolus africanus</i>	(Poir.) Robyns & Tournay	Parramatta Grass
Poaceae		<i>Sporobolus virginicus</i> var. <i>virginicus</i>	(L.) Kunth	Saltwater Couch
Poaceae	*	<i>Stenotaphrum secundatum</i>	(Walter) Kuntze	Buffalo Grass
Smilacaceae		<i>Smilax australis</i>	R.Br.	Lawyer Vine