

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



A PROJECT UNDERTAKEN ON BEHALF OF THE LORD HOWE ISLAND BOARD

Paul Sheringham, Peter Richards, Phil Gilmour and Ernst Kemmerer



Final Report – September 2016

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Lord Howe Island Board

PO Box 5 / Bowker Avenue
Lord Howe Island NSW 2898

Phone: +61 2 6563 2066

Fax: +61 2 6563 2127

Email: administration@lhib.nsw.gov.au

Website: <http://www.lhib.nsw.gov.au/>

For additional information or any enquiries regarding the report please contact the Lord Howe Island Board Administration Office at the above address.

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Paul Sheringham (NSW Office of Environment and Heritage, Coffs Harbour)

Peter Richards (Consultant Ecologist, Sawtell, NSW)

Phil Gilmour (Senior Botanist, Eco Logical Australia Pty Ltd)

Ernst Kemmerer (NSW Office of Environment and Heritage, Coffs Harbour)



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Executive Summary

A vegetation classification and map was first produced for the Lord Howe Island Group (LHIG) by Pickard in 1983 utilising 1966 black-and-white aerial photography at scales of 1:18 700 and 1:21 400. However, the positional accuracy of the Pickard map is insufficient for effective management of vegetation and environmental planning issues, especially within the Settlement area of the island. In 2012, ADS40 digital aerial imagery was captured for the LHIG at 10-cm resolution. The NSW Office of Environment and Heritage (OEH) was engaged to undertake vegetation mapping for the Settlement area of Lord Howe Island (LHI) utilising the new imagery. The purpose of this project was to improve the spatial accuracy of vegetation mapping such that it can be used operationally by the Lord Howe Island Board (LHIB) at a scale of 1:1 000.

Following the successful completion of the above project, the LHIB and OEH undertook to complete the vegetation mapping of the remainder of the LHIG (excluding Balls Pyramid), and to derive a new vegetation classification based upon a stratified random sampling design of a sufficient number of floristic survey sites to enable rigorous statistical analysis of floristic data to be performed. A total of 86 full floristic and 105 rapid floristic sites were sampled across the main island in July 2013. Floristic analysis involved a hierarchical agglomerative clustering strategy (Flexible UPGMA) and a Bray-Curtis dissimilarity coefficient with default beta, followed by a nearest-neighbor analysis to identify any anomalous site allocations. Two analyses were undertaken: (1) analysis of full floristic data from all 86 full floristic sites; and (2) analysis of canopy-only species data from all 191 floristic sites.

At the completion of floristic analyses, a complete vegetation community list for the LHIG was compiled from the results of both floristic analyses and addition of vegetation types that were not sampled during the current survey but had been recognised and described in previous surveys. This resulted in the recognition of 33 vegetation communities compiled from:

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

A saltmarsh and two rainforest communities that were not recognised in previous studies were identified and mapped in the current study. In total, 222 plant taxa were recorded in floristic sites, including 47 exotic species. Weeds are a common component of some communities, particularly coastal strandline communities, the shrublands of the southern mountains and regenerating vegetation on landslips.

The new vegetation communities were applied to the updated linework to complete the project. Detailed profiles were compiled of each vegetation community for which sufficient information was available. These profiles should prove useful in field identification of vegetation types and assessment of their conservation status.

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 vegetation 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.



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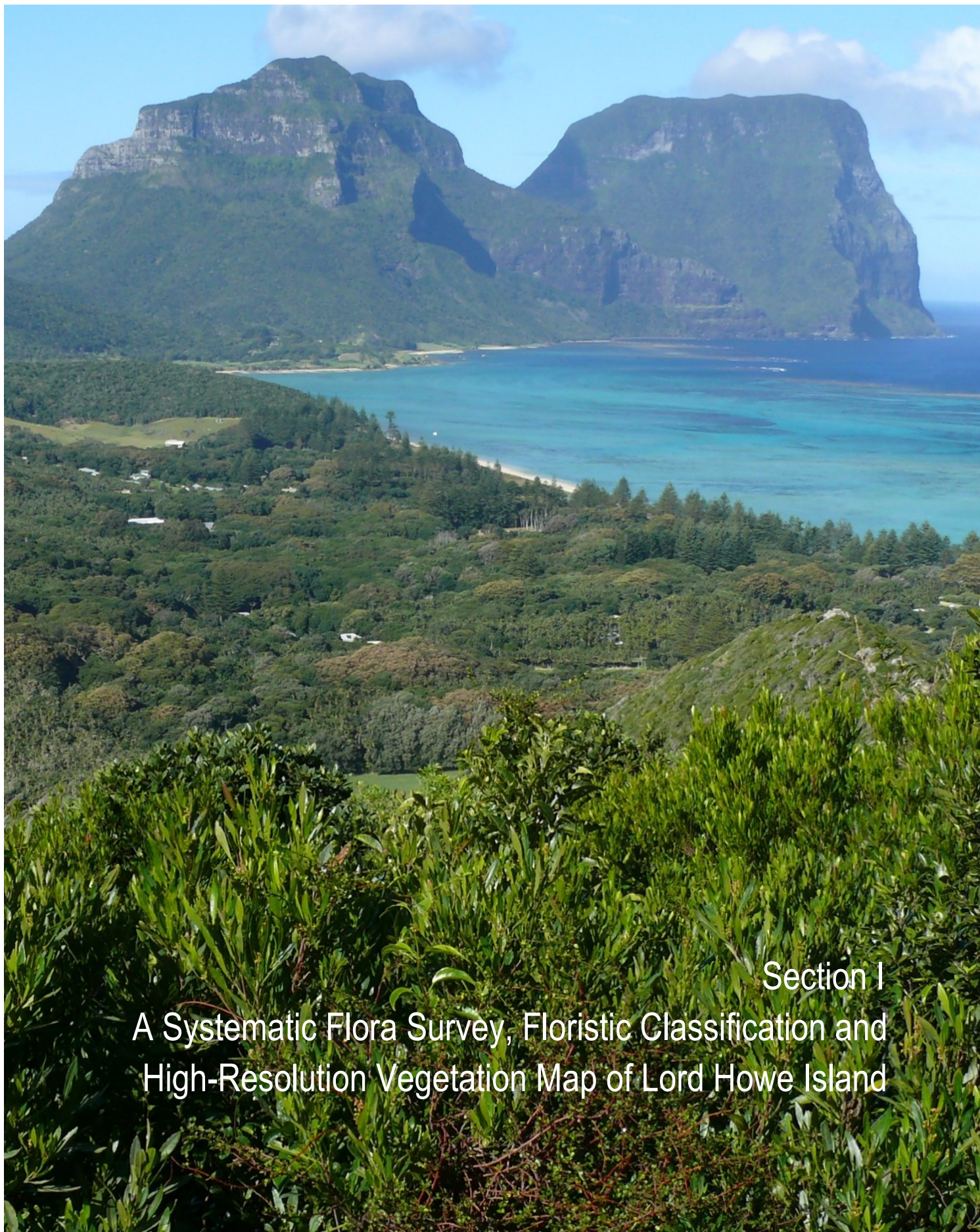
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Abbreviations

API	aerial photography interpretation
asl	above sea level
<i>EPBC Act</i>	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
LHI WD	Lord Howe Island Weeds Database
LHI WMS	<i>Weed Management Strategy for Lord Howe Island</i> (LHIB 2006)
LHI	Lord Howe Island
LHIB	Lord Howe Island Board
LHIG	Lord Howe Island Group
LPI	NSW Land and Property Information
Mt	Mount
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PCTCCP	NSW Plant Community Type Change Control Panel
PPP	Permanent Park Preserve
<i>TSC Act</i>	<i>Threatened Species Conservation Act 1995</i> (New South Wales)
VCA	NSW Vegetation Classification and Assessment (VCA) module of the NSW Vegetation Information System (VIS)
VIS	NSW Vegetation Information System (OEH VIS Flora Survey Module 2.0, available at www.bionet.nsw.gov.au [verified 1 Feb 2016])

Standard units and their abbreviations are used, including: ha, hectares; km, kilometres.



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

1 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, numerous meandering traverses across the island on foot, 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 (Figure 1). 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 or endangered 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 an Airborne Digital Sensor (ADS40 Digital Image Acquisition System). At that time, the NSW Office of Environment and Heritage (OEH) was engaged 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 Lord Howe Island Board (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 Section II). 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.

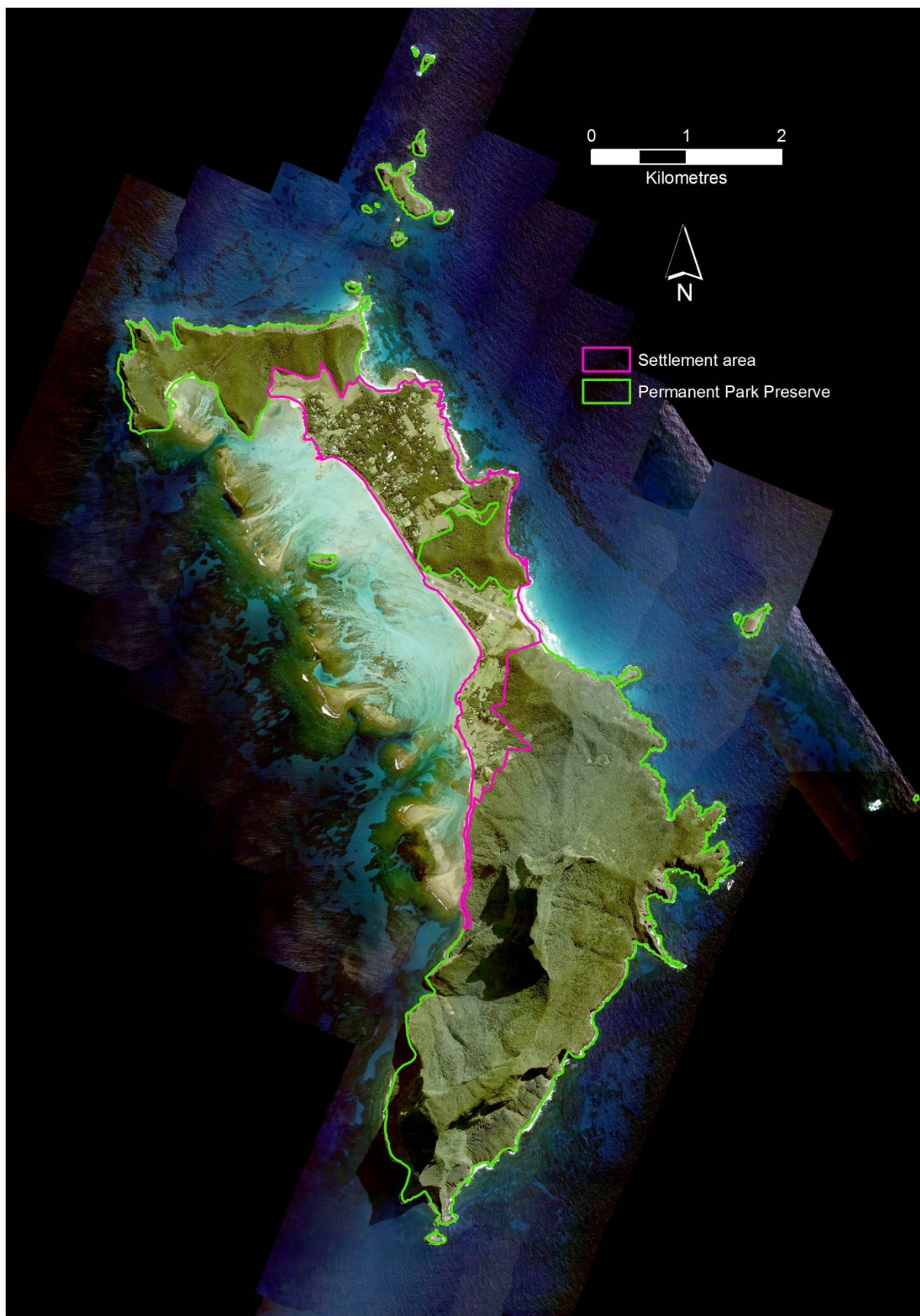


Figure 1 Location of the Settlement area and Permanent Park Preserve.

2 Study area

Many previous reports, including those of Recher and Clarke (1974), Pickard (1983), Green (1994), DECC (2007) and Hutton (2008), provide detailed and comprehensive summaries of the geology, physiography, soils, climate, history of settlement, and flora and fauna, as well as early reports of the vegetation of the LHIG. 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; Figure 1). 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.

2.1 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). 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 of cloud and rainfall (LHIB 2002).

2.2 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.

2.3 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.

Rare plant surveys were completed by Hutton (2001, 2005) who undertook extensive traverses of LHI in order to identify and document the location and size of populations of a suite of threatened and rare plant species. Perhaps the most notable botanical study

undertaken since Pickard was the monograph of the vascular flora of the LHIG by Green (1994), undertaken as part of the *Flora of Australia* series. 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).

3 Methods

3.1 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, Redlands, CA) 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.

3.2 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.

3.3 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. Floristic survey protocols used during this study are provided in Appendix 1.

Full floristic surveys

Floristic data were gathered within a 20m × 20-m 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% – uncommon
2	<5% – common
3	6–20%
4	21–50%
5	51–75%
6	76–100%

Plant samples were taken for later examination when the correct identity was uncertain. Photographs were taken at each site for future reference.

Rapid floristic surveys

Rapid floristic sites were similar 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.

3.4 Data entry

All the information collected during full floristic and rapid floristic surveys was entered directly into the NSW Government central flora database (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 1 October 2015]).

3.5 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).

3.6 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.

3.7 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.

3.8 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 Section II 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 Foristic 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 actually 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 poiformis</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

Pickard (1983) vegetation type		Area (ha)	Full floristic sites		Rapid floristic sites	
Code	Name		Planned	Completed	Planned	Completed
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</i> <i>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 poiformis</i>	13.8	0	1	2	2
Total			84	86	123	105

4 Results

4.1 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).

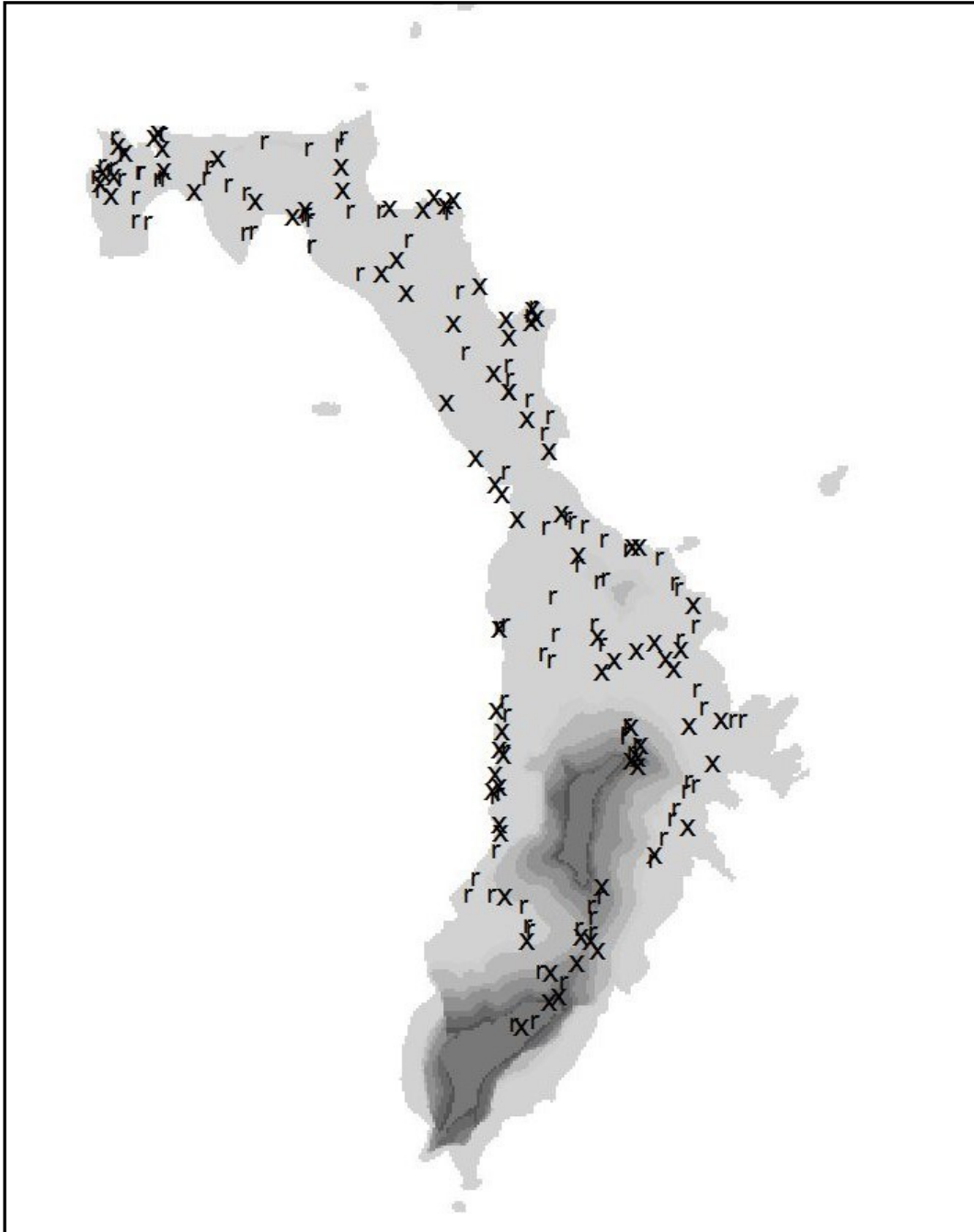


Figure 2 Location of floristic survey sites. x = Full floristic site; r = Rapid floristic site

4.2 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 sedgeland, 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 sedgeland, 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.

4.3 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.

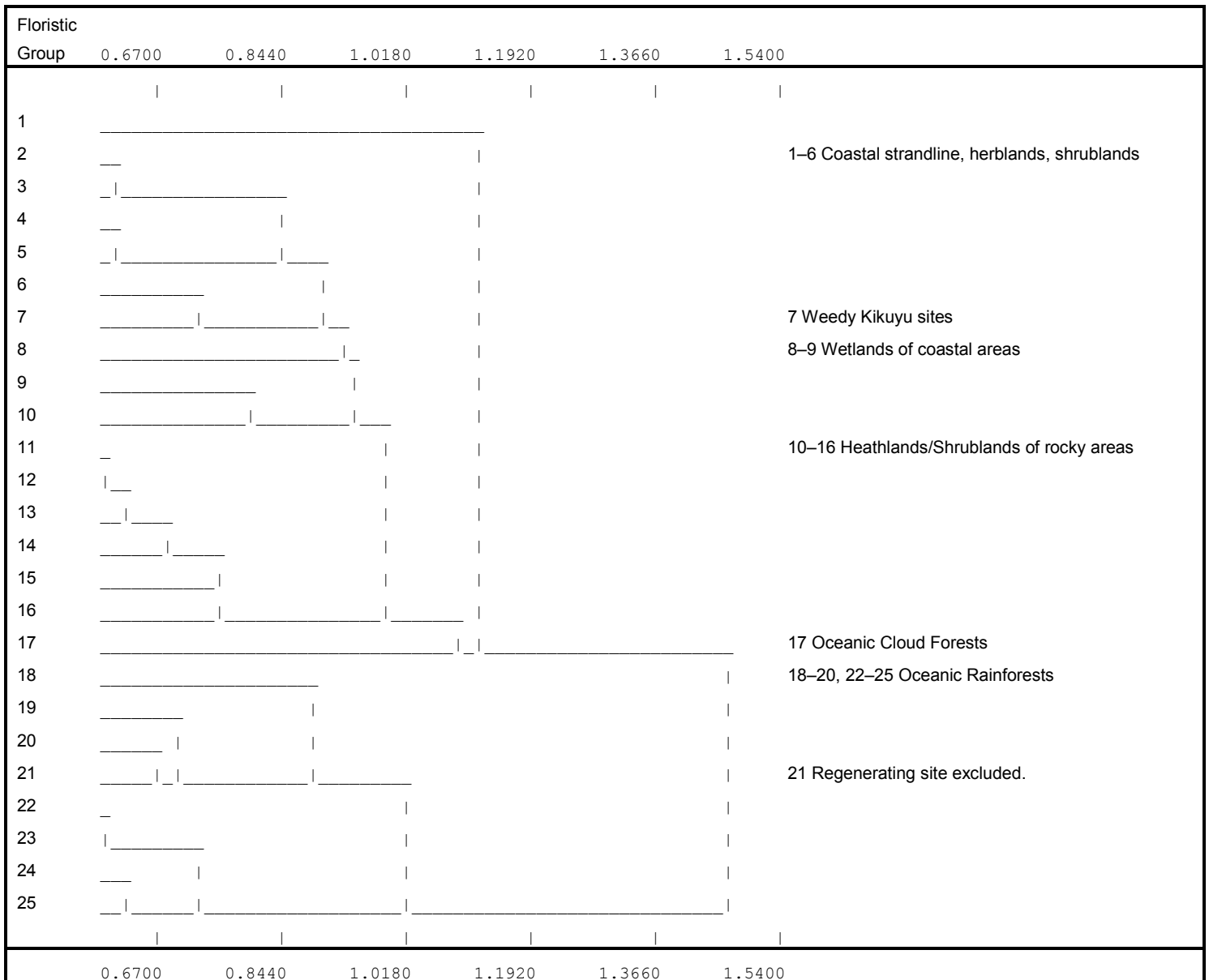


Figure 3 Dendrogram from analysis of full floristic sites.

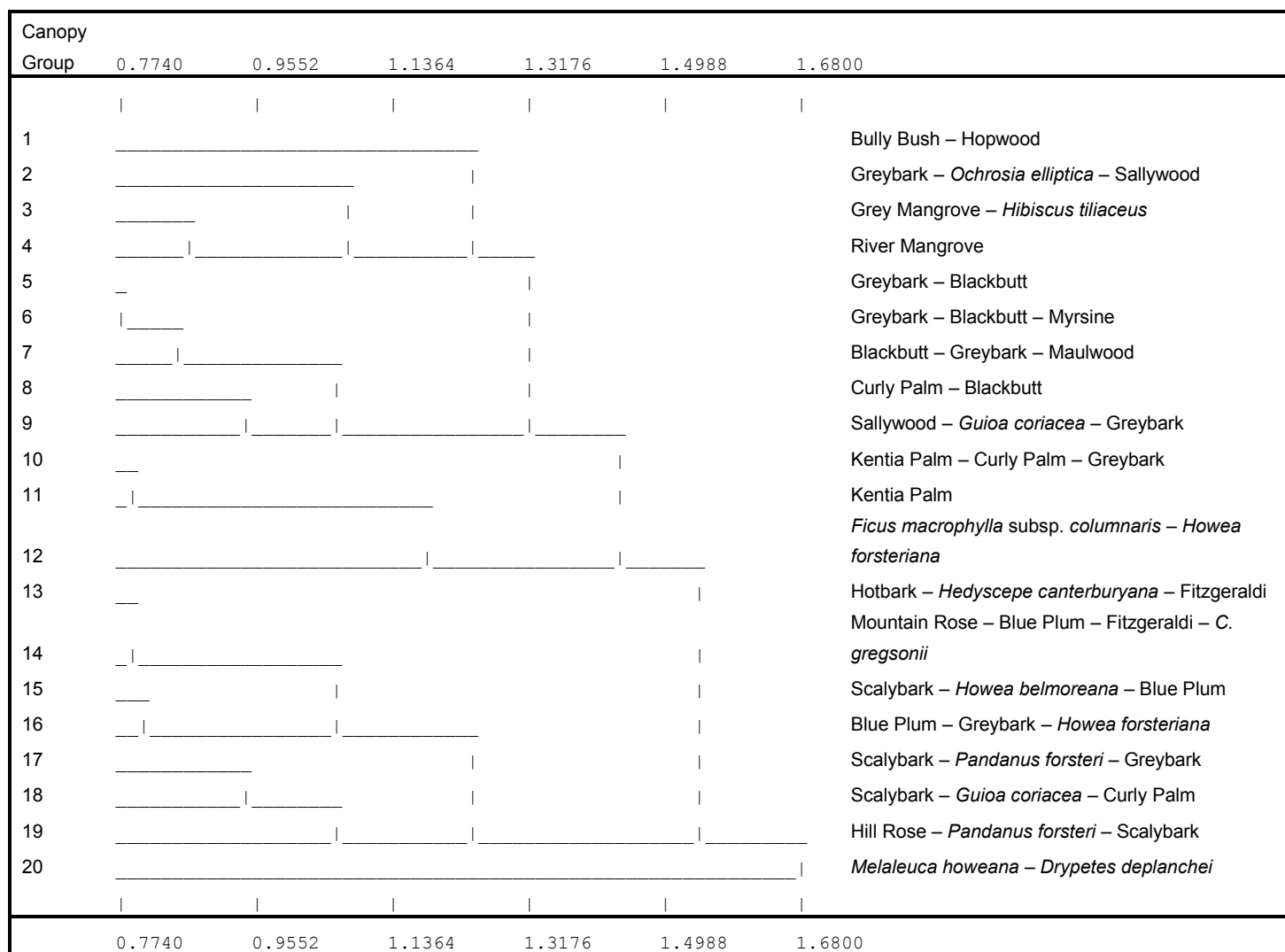


Figure 4 Dendrogram from analysis of canopy-only data of all floristic sites.

4.4 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 Section II.

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

Community number	Community name	Pickard (1983)	DECC (2007)
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>Zygogynum howeanum</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
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

Community number	Community name	Pickard (1983)	DECC (2007)
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 – Cotton-wood – 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

Community number	Community name	Pickard (1983)	DECC (2007)
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	–	–

5 Discussion

5.1 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 tree 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 general consensus with this earlier work is where our floristic analysis identified a distinct lowland rainforest community (Community 19).

5.2 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) and Harris *et al.* (2005) 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). 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



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

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.

The threat to the native vegetation of the LHIG by feral rodents (Black Rats *Rattus rattus* and House Mice *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, in particular 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 is currently proposed, which will hopefully eliminate this threat to the native vegetation of the LHIG (LHIB 2009).

5.3 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. 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 Section II).

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 (*Pennisetum clandestinum*), 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).

5.4 Threatened and extinct plant species

Eleven species of plant recorded from the LHIG are listed as Endangered or Critically Endangered under the NSW *Threatened Species Conservation Act 1995 (TSC 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 *TSC 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 (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, three separate herbarium collections of this species were apparently made from LHI as recently as 2000 (AVH 2016), and Green (1994) recorded *H. elegans* as 'common, especially in open areas'.

The LHI Biodiversity Management Plan (DECC 2007) lists several native plant taxa as presumed extinct on LHI, none of which is listed under either the *TSC Act* or the *EPBC Act*. One species on that list, *Marsdenia tubulosa*, has since been collected on Mt Gower (AVH 2016). 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 *TSC 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).

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

Scientific name	Common name	Status	
		<i>TSC 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

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

Mountain Xylosma (*Xylosma parvifolia*) Endangered (*TSC & 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 (TSC & 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 (TSC & 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.

5.5 Threatened Ecological Communities

Lord Howe Island supports two vegetation communities that are currently listed as Critically Endangered Ecological Communities (CEEC) under the *TSC 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.

A number of vegetation communities recognised by the current study should be assessed for eligibility for listing as threatened ecological communities under the *TSC 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 (Section II).

5.6 Vegetation classification database

The vegetation classification for the LHIG arising from this study should be incorporated into the NSW Vegetation Classification and Assessment (VCA) module of the NSW 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 [Accessed 1 October 2015]). 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 1 October 2015). The PCTCCP was established to maintain and improve the quality of the NSW Master Plant Community Type Classification that is managed within the VCA database. Inclusion of the new LHIG vegetation classification into the VCA 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 TSC 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

Community number	Community name	Representation in PPP	Threat status
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

5.7 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 in the course of the project were entered into the OEH Vegetation Information System flora survey database. The resultant vegetation classification and map identifies a total of 39 map units, including 26 native vegetation 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.



Section II Vegetation Community Profiles

Vegetation Community Profiles

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 *Threatened Species Conservation Act 1995 (TSC 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 of 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. 50th 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. 50th 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 asiaticum* var. *pedunculatum*) is sometimes present. Weeds such as Kikuyu (*Pennisetum clandestinum*) 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 ± 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*, *Euphorbia paralias*, *Hydrocotyle bonariensis*, *Hypochaeris radicata*, *Lobularia maritima*, *Pennisetum clandestinum*, *Stenotaphrum secundatum*.

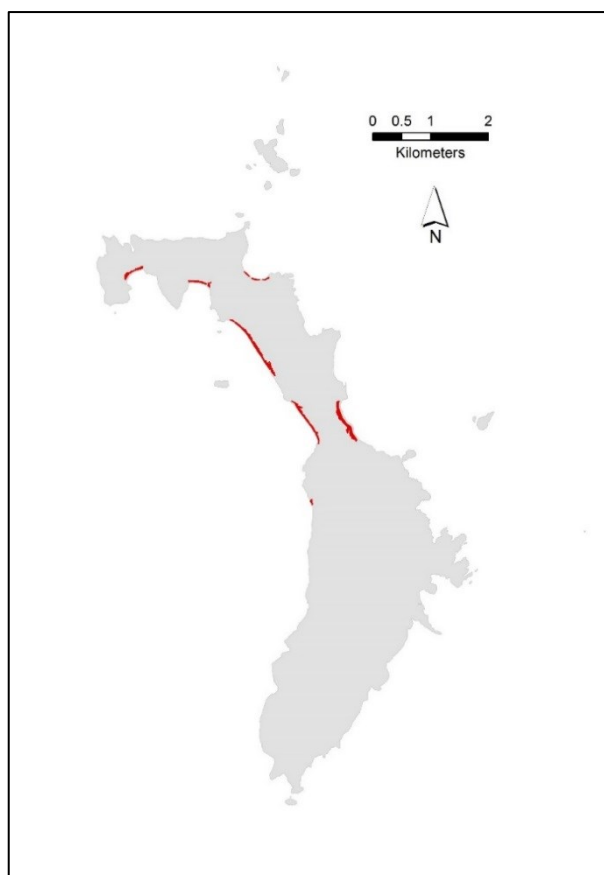
Threatened species: *Chamaesyce psammogeton* (Endangered – TSC Act).

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 (*Ardenna 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.



Floristic Group 1 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Spinifex sericeus</i>	4	1	1	0.01282	positive
* <i>Stenotaphrum secundatum</i>	4	0.625	2	0.02564	positive
<i>Vigna marina</i>	3	1	1	0.03846	positive
<i>Ficinia nodosa</i>	3	0.875	2	0.141	positive
<i>Melanthera biflora</i>	3	0.75	3	0.08974	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	3	0.75	3	0.08974	positive
* <i>Hydrocotyle bonariensis</i>	3	0.5	0	0	positive
* <i>Cakile edentula</i>	2	0.875	1	0.01282	positive
<i>Ipomoea brasiliensis</i>	2	0.75	2	0.01282	positive
* <i>Hypochaeris radicata</i>	2	0.625	2	0.01282	positive
<i>Calystegia soldanella</i>	2	0.5	0	0	positive
* <i>Lobularia maritima</i>	2	0.5	0	0	positive
* <i>Euphorbia cyathophora</i>	2	0.25	0	0	positive
* <i>Senecio elegans</i>	2	0.25	0	0	positive
* <i>Euphorbia paralias</i>	1	0.5	0	0	positive
* <i>Actites megalocarpus</i>	1	0.125	0	0	positive
* <i>Oenothera tetraptera</i>	1	0.125	0	0	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5897	negative
<i>Drypetes deplanchei</i>	0	0	2	0.7308	negative
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	0	0	2	0.5256	negative
<i>Oplismenus imbecillis</i>	0	0	2	0.5	negative
<i>Parsonsia howeana</i>	0	0	2	0.6795	negative
<i>Smilax australis</i>	0	0	2	0.6026	negative
<i>Carpobrotus glaucescens</i>	3	0.25	2	0.05128	uninformative
* <i>Pennisetum clandestinum</i>	3	0.25	2	0.03846	uninformative
<i>Tylophora biglandulosa</i>	3	0.25	1	0.03846	uninformative

Grasslands — Maritime Grasslands

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 asiaticum* var. *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 ± 3.2 .

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

Number of exotic species recorded in plots: 10.

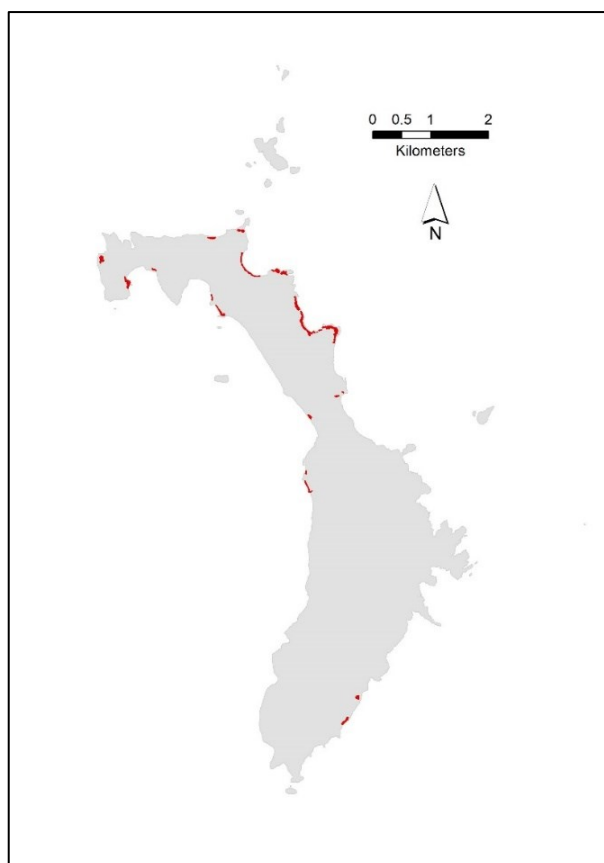
Common exotic species: *Ipomoea cairica*, *Melilotus indicus*, *Paspalum dilatatum*, *Plantago lanceolata*, *Pennisetum clandestinum*, *Sonchus oleraceus*, *Taraxacum officinale*, *Vicia sativa*.

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

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.



Floristic Group 2 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Melanthera biflora</i>	5	1	2	0.131	positive
<i>Howea forsteriana</i>	3	1	2	0.3214	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	3	1	1	0.2857	positive
<i>Achyranthes aspera</i>	3	0.5	2	0.08333	positive
<i>Canavalia rosea</i>	3	0.5	2	0.03571	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	3	0.5	3	0.1429	positive
<i>Ficinia nodosa</i>	2	0.5	2	0.2024	positive
<i>Ipomoea brasiliensis</i>	2	0.5	2	0.07143	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	0.5	2	0.4762	positive
* <i>Sonchus oleraceus</i>	2	0.5	1	0.1071	positive
* <i>Taraxacum officinale</i>	2	0.5	0	0	positive
<i>Parsonsia howeana</i>	3	1	2	0.6071	constant
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	1	0.5	2	0.5357	negative
<i>Drypetes deplanchei</i>	0	0	2	0.6786	negative

<i>Smilax australis</i>	0	0	2	0.5595	negative
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Floristic Group 3 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Melanthera biflora</i>	5	1	3	0.1412	positive
* <i>Paspalum dilatatum</i>	3	1	2	0.01176	positive
<i>Achyranthes aspera</i>	2	1	3	0.08235	positive
<i>Canavalia rosea</i>	2	1	3	0.03529	positive
* <i>Chloris gayana</i>	2	1	0	0	positive
* <i>Ipomoea cairica</i>	2	1	1	0.2353	positive
* <i>Pennisetum clandestinum</i>	2	1	3	0.04706	positive
<i>Stephania japonica</i> var. <i>timoriensis</i>	2	1	1	0.2706	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5412	negative
<i>Drypetes deplanchei</i>	0	0	2	0.6706	negative
<i>Parsonsia howeana</i>	0	0	2	0.6235	negative
<i>Smilax australis</i>	0	0	2	0.5529	negative

Floristic Group 7 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
* <i>Pennisetum clandestinum</i>	5	1	3	0.04706	positive
<i>Canavalia rosea</i>	3	1	2	0.03529	positive
* <i>Melilotus indicus</i>	2	1	0	0	positive
* <i>Plantago lanceolata</i>	2	1	1	0.01176	positive
* <i>Vicia sativa</i>	2	1	0	0	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5412	negative
<i>Drypetes deplanchei</i>	0	0	2	0.6706	negative
<i>Parsonsia howeana</i>	0	0	2	0.6235	negative
<i>Smilax australis</i>	0	0	2	0.5529	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: ($N = 1$) LHIF70; 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.

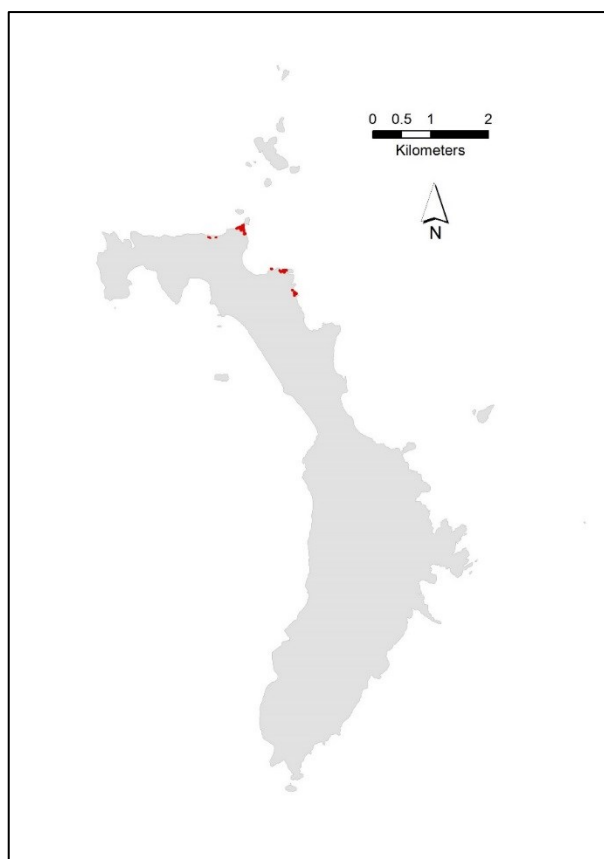
Common exotic species: *Pennisetum clandestinum*, *Stenotaphrum secundatum*.

Disturbance and Condition: Occurrences below Malabar and at Searles Point are in good condition, but there is some Kikuyu (*Pennisetum clandestinum*) 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.



Floristic Group 4 Fidelity Table

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	0.08235	positive
<i>Melanthera biflora</i>	2	1	3	0.1412	positive
<i>Myoporum insulare</i>	2	1	1	0.1294	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5412	negative
<i>Drypetes deplanchei</i>	0	0	2	0.6706	negative
<i>Parsonsia howeana</i>	0	0	2	0.6235	negative
<i>Smilax australis</i>	0	0	2	0.5529	negative

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, LHIFF80.

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.

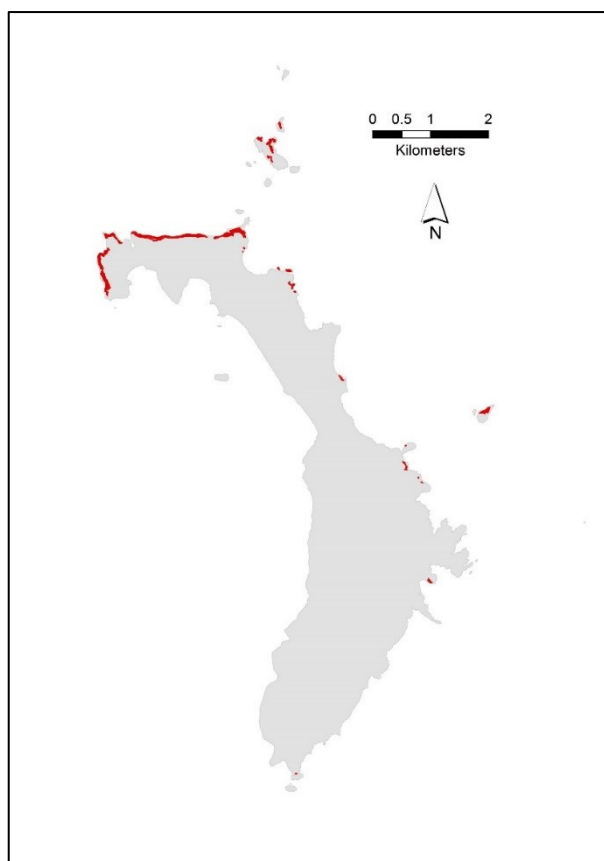
Common exotic species: *Ipomoea cairica*, *Parietaria debilis*, *Sonchus oleraceus*.

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*).



Floristic Group 5 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Achyranthes aspera</i>	4	1	2	0.07143	positive
<i>Sesuvium portulacastrum</i>	4	1	0	0	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	4	1	3	0.131	positive
<i>Carpobrotus glaucescens</i>	3	1	2	0.04762	positive
<i>Melanthera biflora</i>	3	1	3	0.131	positive
<i>Tetragonia tetragonioides</i>	3	1	2	0.04762	positive
<i>Apium prostratum</i> subsp. <i>howense</i>	2	1	1	0.0119	positive
* <i>Ipomoea cairica</i>	2	0.5	1	0.2381	positive
<i>Portulaca oleracea</i>	2	0.5	0	0	positive
* <i>Sonchus oleraceus</i>	2	0.5	1	0.1071	positive
* <i>Parietaria debilis</i>	1	0.5	0	0	positive
<i>Senecio howeanus</i>	1	0.5	0	0	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5476	negative
<i>Drypetes deplanchei</i>	0	0	2	0.6786	negative
<i>Parsonsia howeana</i>	0	0	2	0.631	negative
<i>Smilax australis</i>	0	0	2	0.5595	negative

Heathlands — Coastal Headland Heaths

Community 5 Tea Tree shrubland on exposed rocky slopes

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

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 poiformis*, *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 ± 7.2.

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

Number of exotic species recorded in plots: 11.

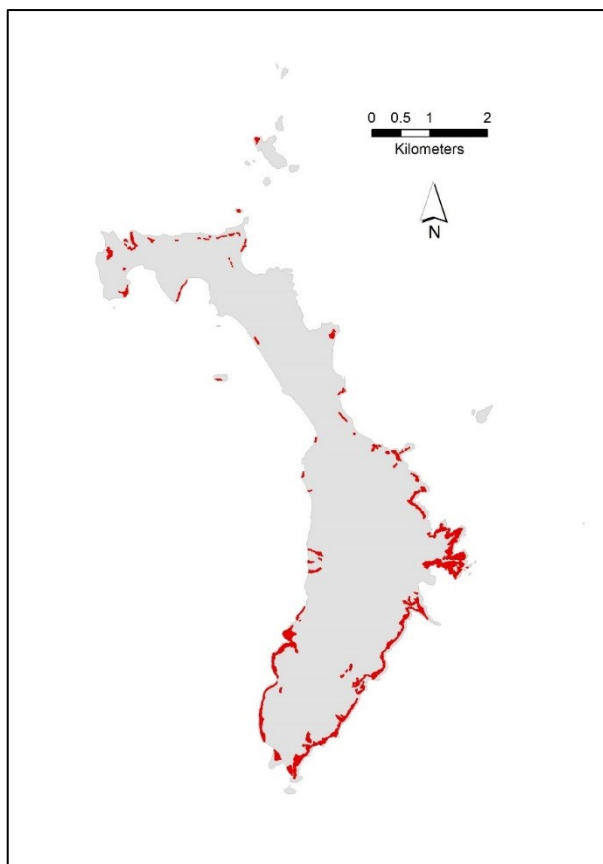
Common exotic species: *Bromus catharticus*, *Chenopodium murale*, *Ipomoea cairica*.

Disturbance and Condition: Generally in good condition except for stochastic disturbance, 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*).



Floristic Group 6 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
* <i>Bromus catharticus</i>	4	1	2	0.0119	positive
<i>Melaleuca howeana</i>	4	1	2	0.09524	positive
<i>Achyranthes aspera</i>	3	1	3	0.07143	positive
* <i>Chenopodium murale</i>	3	1	1	0.02381	positive
* <i>Ipomoea cairica</i>	3	0.5	1	0.2381	positive
<i>Carpobrotus glaucescens</i>	2	1	3	0.04762	positive
* <i>Cerastium glomeratum</i>	2	0.5	1	0.04762	positive
<i>Commelina cyanea</i>	2	0.5	1	0.2619	positive
<i>Cotula australis</i>	2	0.5	1	0.0119	positive
<i>Ficinia nodosa</i>	2	0.5	2	0.2024	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>Paspalum dilatatum</i>	2	0.5	3	0.0119	positive
<i>Pennisetum clandestinum</i>	2	0.5	3	0.04762	positive
<i>Poa poiformis</i> var. <i>poiformis</i>	2	0.5	1	0.1071	positive
* <i>Richardia</i> spp.	2	0.5	0	0	positive
* <i>Solanum nigrum</i>	2	1	1	0.1071	positive
* <i>Sonchus oleraceus</i>	2	1	1	0.09524	positive
* <i>Sporobolus africanus</i>	2	0.5	3	0.02381	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	2	0.5	3	0.1429	positive
<i>Tetragonia tetragonioides</i>	2	1	2	0.04762	positive

Floristic Group 11 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Melaleuca howeana</i>	4	1	2	0.1059	positive
<i>Myoporum insulare</i>	3	1	1	0.1294	positive
<i>Alyxia ruscifolia</i>	2	1	1	0.4235	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	1	1	0.2941	positive
<i>Myrsine platystigma</i>	2	1	1	0.3176	positive
<i>Oplismenus imbecillis</i>	2	1	2	0.4471	positive
<i>Pandorea pandorana</i> subsp. <i>austrocaledonica</i>	2	1	1	0.4471	positive
<i>Solanum nigrum</i>	2	1	1	0.1176	positive
<i>Parsonsia howeana</i>	3	1	2	0.6118	constant
<i>Drypetes deplanchei</i>	2	1	2	0.6588	constant
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	1	1	2	0.5294	negative
<i>Smilax australis</i>	0	0	2	0.5529	negative

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 (*Pennisetum clandestinum*).

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.

Floristic Group: 8.

Mean number of native species per plot:
5.

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

Number of exotic species recorded in plots: 3.

Common exotic species: *Stenotaphrum secundatum*, *Pennisetum clandestinum*.

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%).

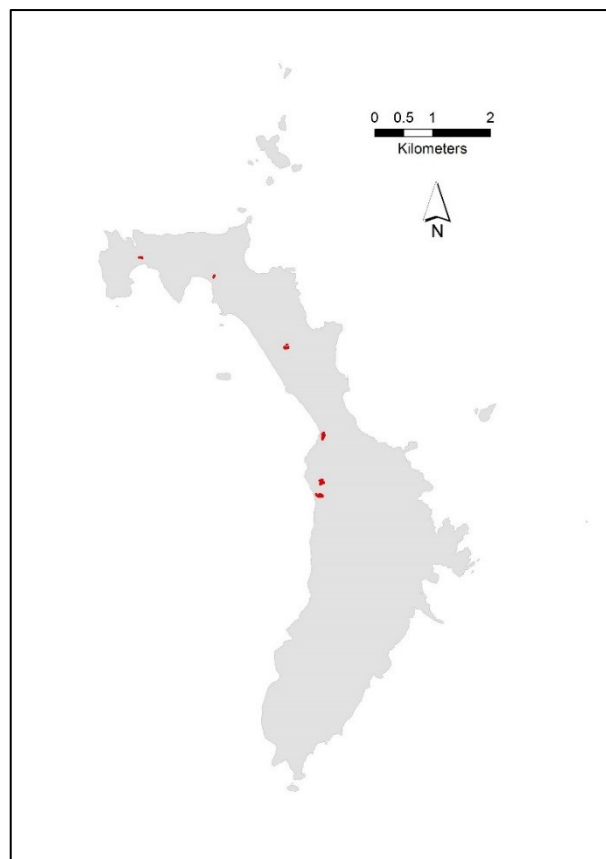
Conservation significance and threats:

A highly restricted community that continues to be degraded by weeds, grazing and exposure. It is also threatened by mechanical opening of creeklines 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).

Floristic Group 8 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Commelina cyanea</i>	6	1	1	0.2588	positive
<i>Aegiceras corniculatum</i>	3	1	1	0.01176	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	3	1	1	0.2941	positive
* <i>Stenotaphrum secundatum</i>	2	1	4	0.07059	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
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5412	negative
<i>Drypetes deplanchei</i>	0	0	2	0.6706	negative
<i>Parsonsia howeana</i>	0	0	2	0.6235	negative
<i>Smilax australis</i>	0	0	2	0.5529	negative



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 asiaticum* var. *pedunculatum*).

Habitat: Occurs along a small creekline 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.

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.

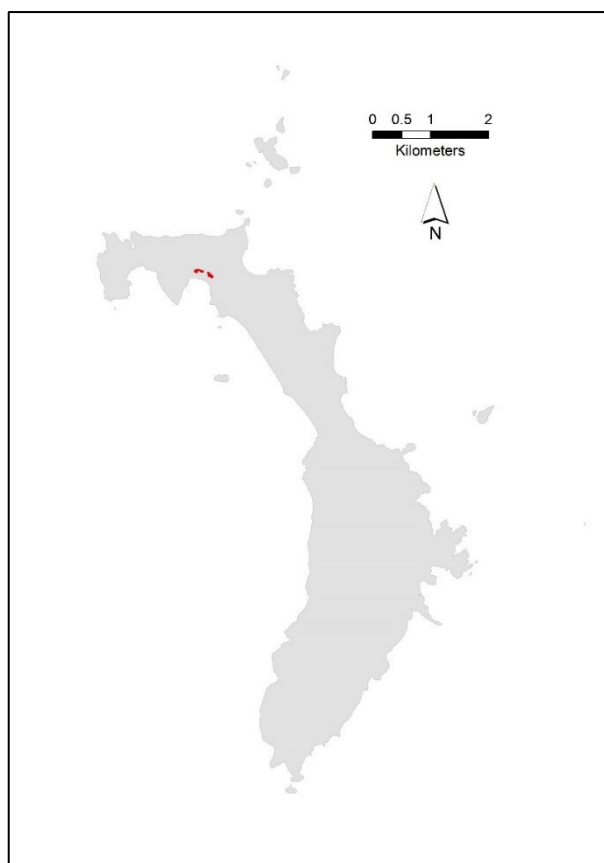
Areal extent: 0.3 ha (0.02% of mapped area).

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 creeklines 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.



Floristic Group 9 Fidelity Table

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	0.1412	positive
<i>Avicennia marina</i> subsp. <i>australasica</i>	2	1	0	0	positive
<i>Hibiscus tiliaceus</i>	1	1	0	0	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5412	negative
<i>Drypetes deplanchei</i>	0	0	2	0.6706	negative
<i>Parsonsia howeana</i>	0	0	2	0.6235	negative
<i>Smilax australis</i>	0	0	2	0.5529	negative

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 ± 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.

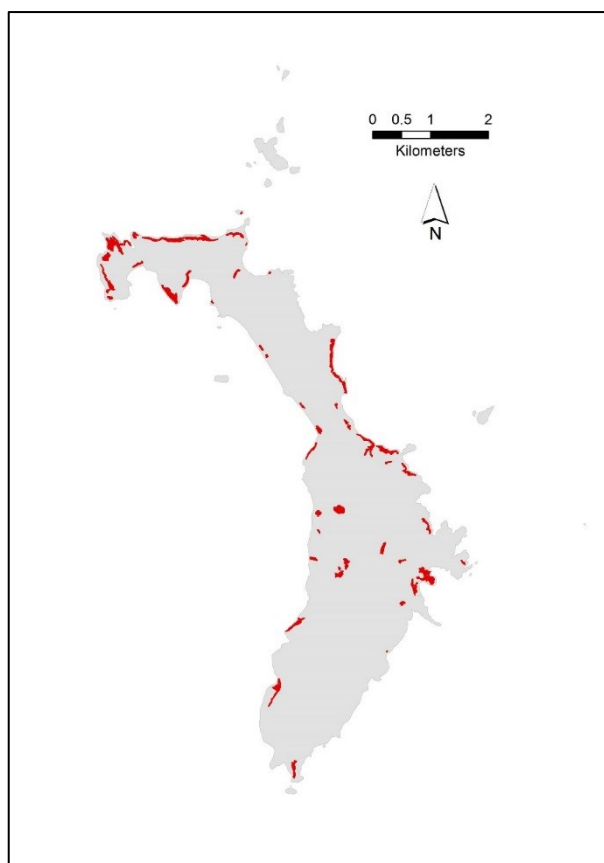
Common exotic species: *Bidens pilosa*, *Lilium formosanum*, *Sporobolus africanus*.

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. Provides nesting habitat for Sooty Terns (*Onychoprion fuscata*), Common Noddies (*Anous stolidus*) and Black-winged Petrels (*Pterodroma nigripennis*).



Floristic Group 10 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Cassinia tenuifolia</i>	3	1	1	0.2381	positive
<i>Dodonaea viscosa</i> subsp. <i>burmanniana</i>	3	1	1	0.3214	positive
<i>Muehlenbeckia complexa</i>	3	1	2	0.1071	positive
<i>Pandorea pandorana</i> subsp. <i>austrocaledonica</i>	3	1	1	0.4405	positive
* <i>Sporobolus africanus</i>	3	0.5	2	0.02381	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	1	2	0.2857	positive
<i>Oxalis rubens</i>	2	1	1	0.03571	positive
<i>Pimelea congesta</i>	2	0.5	2	0.04762	positive
<i>Poa poiformis</i> var. <i>poiformis</i>	2	0.5	1	0.1071	positive
* <i>Cyclospermum 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	0.6667	constant
<i>Parsonsia howeana</i>	2	1	2	0.6071	constant
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	1	0.5	2	0.5357	negative
<i>Smilax australis</i>	0	0	2	0.5595	negative

Floristic Group 13 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Cassinia tenuifolia</i>	4	1	1	0.2381	positive
<i>Ficinia nodosa</i>	3	1	2	0.1905	positive
<i>Sporobolus virginicus</i> var. <i>virginicus</i>	3	0.5	3	0.1429	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	1	2	0.2857	positive
<i>Melaleuca howeana</i>	2	1	2	0.09524	positive
<i>Melanthera biflora</i>	2	0.5	3	0.1429	positive
<i>Drypetes deplanchei</i>	2	1	2	0.6548	constant
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	1	0.5	2	0.5357	negative
<i>Parsonsia howeana</i>	0	0	2	0.631	negative
<i>Smilax australis</i>	0	0	2	0.5595	negative

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 asiaticum* var. *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) to right and Variant 9c (Leafy Flat Sedge) 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: *Pragmites australis*, *Cyperus lucidus*, *Crinum asiaticum* var. *pedunculatum*.

Number of exotic species recorded in plots: 1.

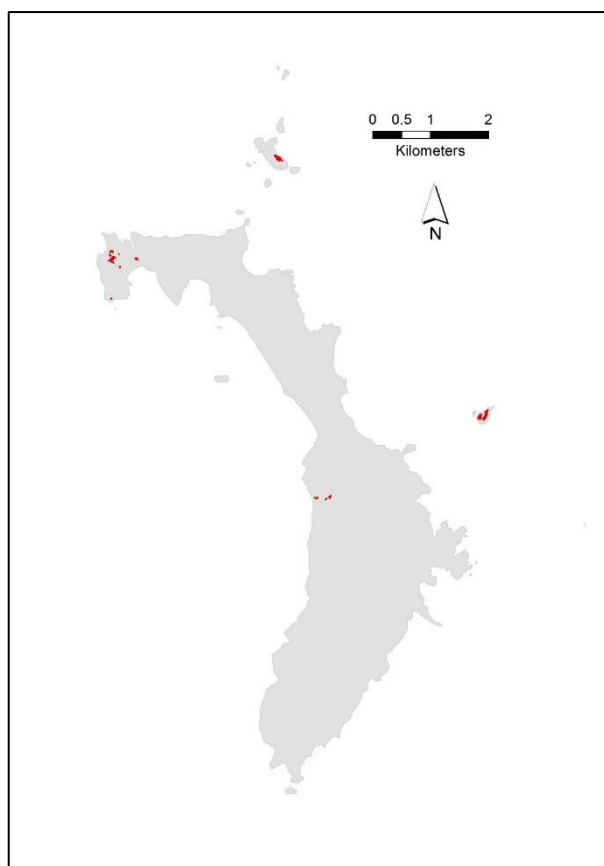
Common exotic species: *Aster subulatus*, *Ipomoea cairica*.

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*).



Floristic Group 12 Fidelity Table

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	0.1176	positive
<i>Commelina cyanea</i>	2	1	1	0.2588	positive
* <i>Ipomoea cairica</i>	2	1	1	0.2353	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	1	1	0.2941	positive
<i>Poa poiformis</i> var. <i>poiformis</i>	2	1	1	0.1059	positive
<i>Stephania japonica</i> var. <i>timoriensis</i>	2	1	1	0.2706	positive
<i>Parsonsia howeana</i>	4	1	2	0.6118	constant
<i>Drypetes deplanchei</i>	1	1	2	0.6588	negative
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5412	negative
<i>Smilax australis</i>	0	0	2	0.5529	negative

Heathlands — Coastal Headland Heaths

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*, *Platynerium bifurcatum*; for higher altitude sites not sampled *Pteris microptera*, *Histiopteris incisa*, *Carex brunnea*, *Elatostema reticulatum*.

Number of exotic species recorded in plots: 4.

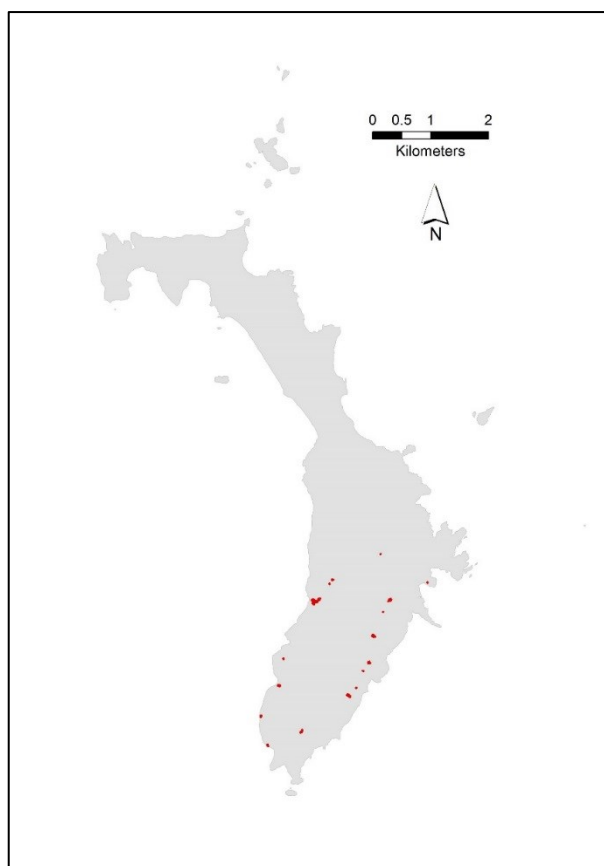
Common exotic species: *Ageratina adenophora*, *Lilium formosanum*.

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.



Floristic Group 14 Fidelity Table

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	0.4471	positive
<i>Nephrolepis cordifolia</i>	3	1	2	0.1647	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	3	1	2	0.4706	positive
<i>Platyserium bifurcatum</i>	3	1	1	0.2588	positive
<i>Asplenium polyodon</i>	2	1	1	0.02353	positive
<i>Dendrobium gracilicaule</i> var. <i>howeanum</i>	2	1	1	0.2118	positive
* <i>Lilium formosanum</i>	2	1	1	0.2235	positive
<i>Peperomia urvilleana</i>	2	1	2	0.08235	positive
* <i>Digitaria ciliaris</i>	1	1	0	0	positive
<i>Drypetes deplanchei</i>	1	1	2	0.6588	negative
<i>Parsonsia howeana</i>	1	1	2	0.6118	negative
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5412	negative
<i>Smilax australis</i>	0	0	2	0.5529	negative

Heathlands — Coastal Headland Heaths

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 involucratu*s, Pennywort (*Hydrocotyle hirta*) and *Brachyscome segmentosa*. Ferns such as Coarse Maidenhair Fern (*Adiantum hispidulum*) and Horseshoe Fern (*Pyrossia 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.

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: *Hypochaeris radicata*, *Lilium formosanum*.

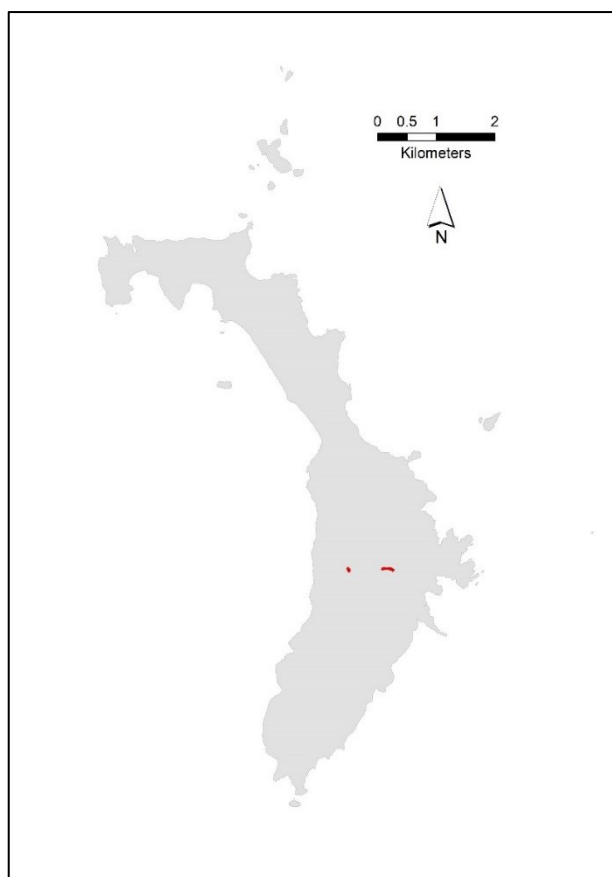
Threatened species: *Xylosma parvifolia* (Endangered – TSC Act).

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.



Floristic Group 15 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Cassinia tenuifolia</i>	3	1	1	0.2471	positive
<i>Adiantum hispidulum</i>	2	1	1	0.1647	positive
<i>Dendrobium moorei</i>	2	1	1	0.1059	positive
<i>Dracophyllum fitzgeraldii</i>	2	1	1	0.1059	positive
<i>Euchiton involucratus</i>	2	1	1	0.01176	positive
<i>Ficinia nodosa</i>	2	1	2	0.2	positive
<i>Hydrocotyle hirta</i>	2	1	1	0.02353	positive
* <i>Hypochaeris radicata</i>	2	1	2	0.05882	positive
* <i>Lilium formosanum</i>	2	1	1	0.2235	positive
<i>Melaleuca howeana</i>	2	1	2	0.1059	positive
<i>Melicope polybotrya</i>	2	1	1	0.1059	positive
<i>Olearia ballii</i>	2	1	1	0.01176	positive
<i>Pimelea congesta</i>	2	1	2	0.04706	positive
<i>Poa poiformis</i> var. <i>poiformis</i>	2	1	1	0.1059	positive
<i>Pterostylis curta</i>	2	1	0	0	positive
<i>Pyrrosia confluens</i> var. <i>confluens</i>	2	1	0	0	positive
<i>Westringia viminalis</i>	2	1	1	0.01176	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-howeii</i>	1	1	0	0	positive
<i>Xylosma parvifolia</i>	1	1	0	0	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	0	0	2	0.5412	negative
<i>Drypetes deplanchei</i>	0	0	2	0.6706	negative
<i>Parsonsia howeana</i>	0	0	2	0.6235	negative
<i>Smilax australis</i>	0	0	2	0.5529	negative

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 imbecillus*.

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 ± 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.

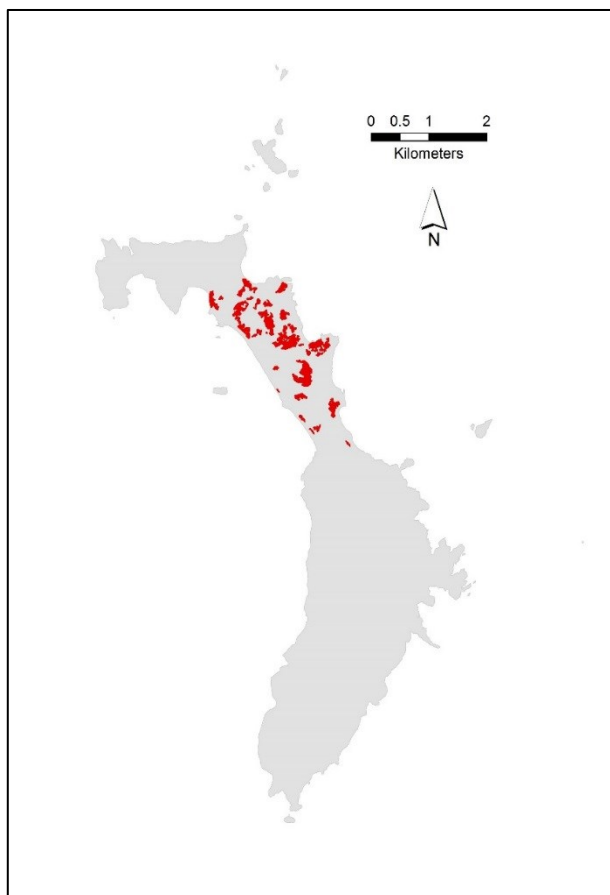
Areal extent: Variant 12a: 39.32 ha (2.62% of mapped area); Variant 12b: 18.07 ha (1.2% of island area).



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.

Floristic Group 16 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Ficus macrophylla</i> subsp. <i>columnaris</i>	5	0.6667	1	0.09639	positive
<i>Howea forsteriana</i>	4	1	2	0.3133	positive
<i>Drypetes deplanchei</i>	1	0.6667	2	0.6627	negative
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	1	0.3333	2	0.5422	negative
<i>Parsonsia howeana</i>	0	0	2	0.6386	negative
<i>Smilax australis</i>	0	0	2	0.5663	negative
<i>Celtis conferta</i> subsp. <i>amblyphylla</i>	2	0.3333	2	0.2892	uninformative
<i>Howea belmoreana</i>	2	0.3333	3	0.3735	uninformative
<i>Asplenium milnei</i>	1	0.3333	1	0.4819	uninformative

<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	1	0.3333	2	0.3012	uninformative
<i>Olea paniculata</i>	1	0.3333	2	0.4458	uninformative

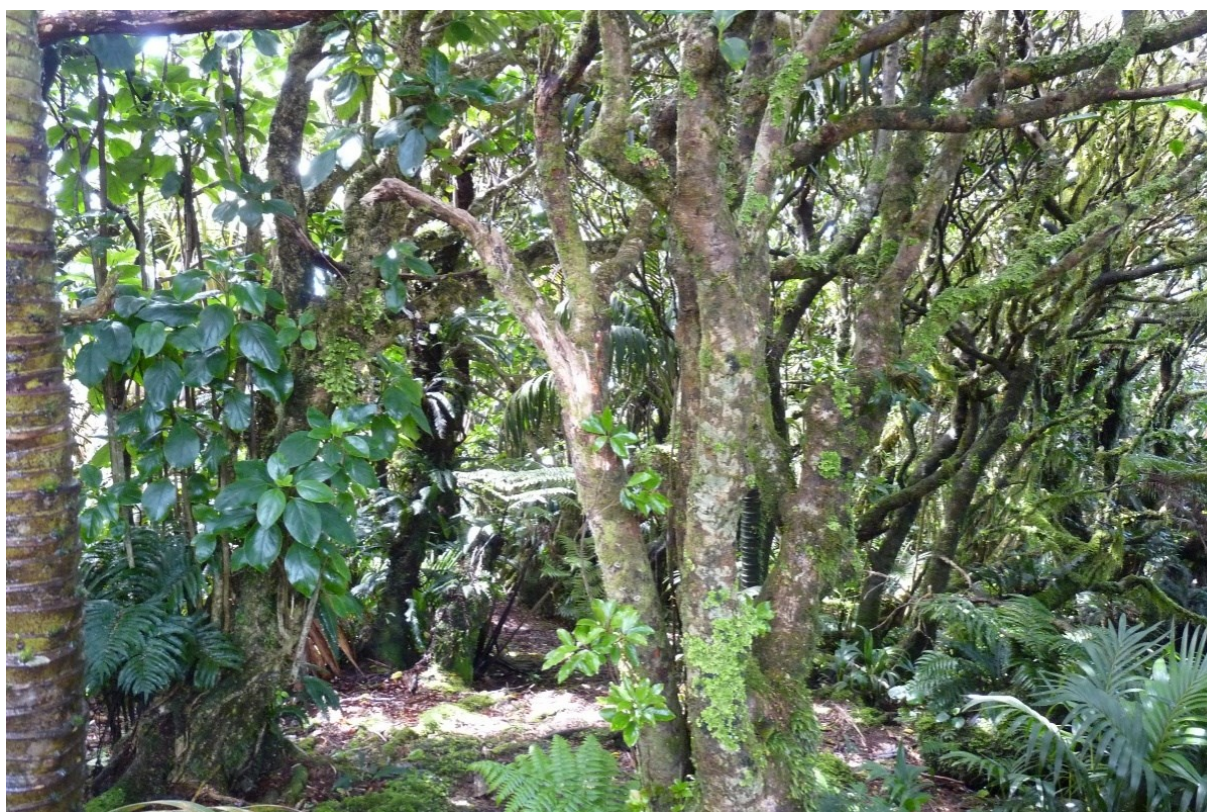
Rainforests — Oceanic Cloud Forests

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

Scientific name: *Zygogynum howeanum* – *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* Megapyllous Broad Sclerophyll Forest; *Dracophyllum fitzgeraldii* – *Metrosideros nervulosa* Evergreen Broad Sclerophyll Scrub (Pickard 1983); *Zygogynum howeanum* – *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.

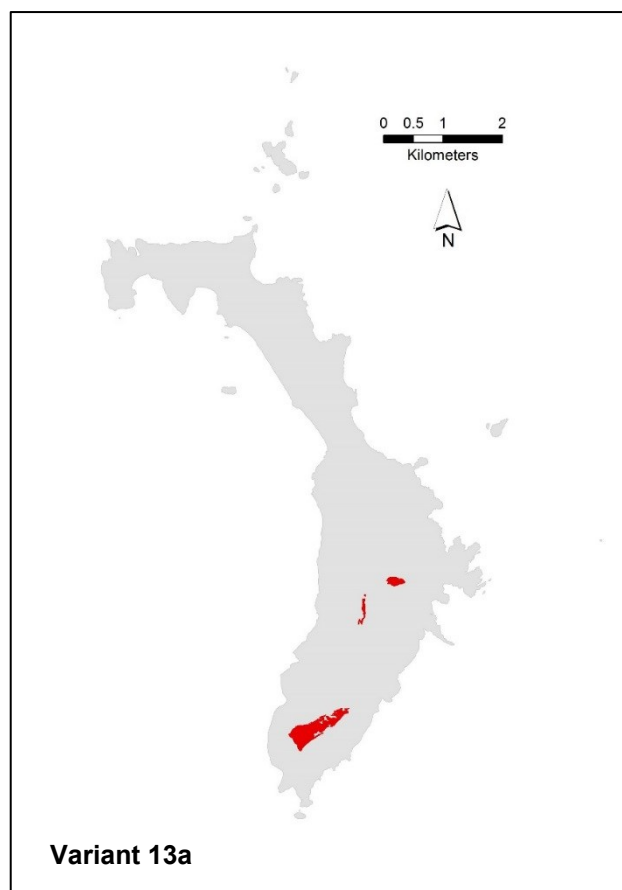


Variant 13b: Mountain palm low closed forest.



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

Description: A variable community in which Hotbark (*Zygogynum howeanum*), 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*.

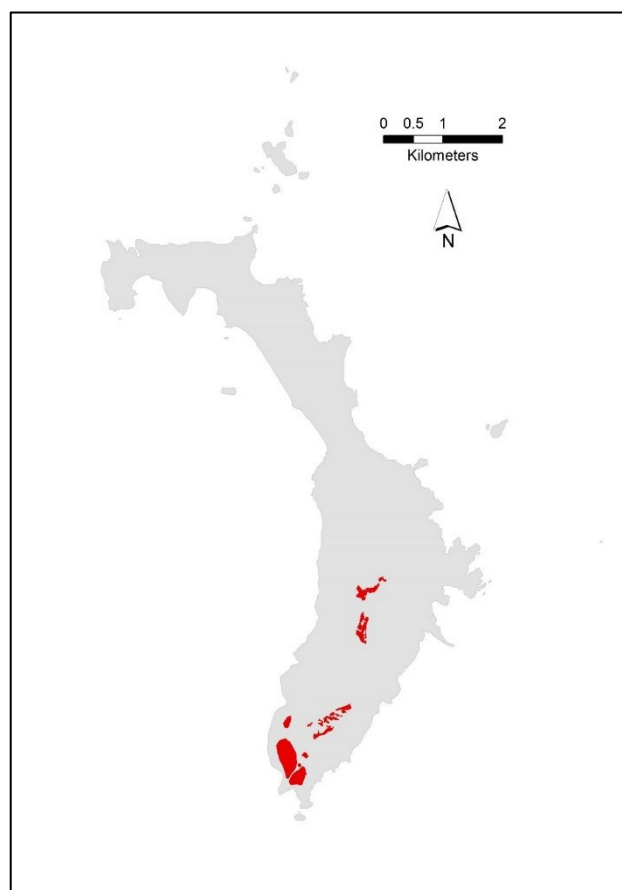


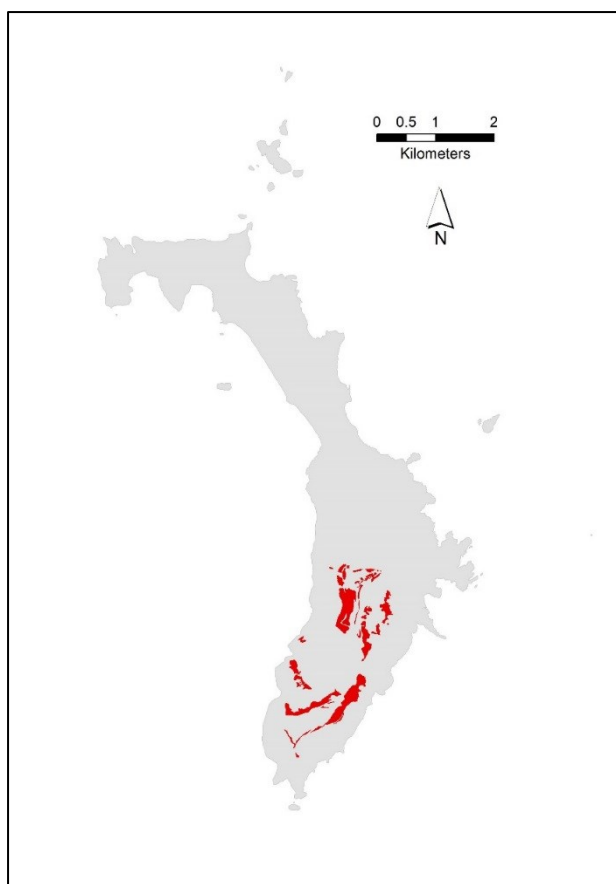
Variation:

Variant 13a: Hotbark – Fitzgerald gnarled mossy cloud forest. Areas in which Hotbark (*Zygogynum howeanum*), 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*).





mooreana (Critically Endangered – TSC Act).

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

Variant 13b

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

Floristic Group: 17.

Mean number of native species per plot: 35.7 ± 10.3 .

Indicator native species: *Negria rhabdothamnoides*, *Zygogynum howeanum*, *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 – TSC Act); *Lepidorrhachis*

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.

Floristic Group 17 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Dracophyllum fitzgeraldii</i>	3	1	1	0.06173	positive
<i>Zygogynum howeanum</i>	3	1	1	0.1481	positive
<i>Elatostema reticulatum</i>	3	0.8	2	0.06173	positive
<i>Lepidorrhachis mooreana</i>	3	0.2	0	0	positive
<i>Hedyscepe canterburyana</i>	2	1	2	0.01235	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	0.07407	positive
<i>Dysoxylum pachyphyllum</i>	2	0.8	1	0.2593	positive
<i>Lastreopsis nephrodioides</i>	2	0.8	1	0.01235	positive
<i>Metrosideros nervulosa</i>	2	0.8	2	0.04938	positive
<i>Pittosporum erioloma</i>	2	0.6	1	0.02469	positive
<i>Polystichum whiteleggei</i>	2	0.6	1	0.08642	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 bauerianum</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 wattsii</i>	1	0.2	0	0	positive
<i>Huperzia varia</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
<i>Parsonsia howeana</i>	2	0.4	2	0.6296	negative
<i>Drypetes deplanchei</i>	1	0.6	2	0.6667	negative
<i>Smilax australis</i>	1	0.6	2	0.5432	negative
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	1	0.4	2	0.5432	negative

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 (*Zygogynum howeana*), Stinkwood (*Coprosma putida*) and *Xylosma maidenii* also occurring. The epiphytic Elkhorn (*Platyserium bifurcatum*) is common on trees. There is a sparse

ground layer of *Carex brunnea*, *Apslenium milnei*, *Pteris microptera* and *Microsorium pustulatum* subsp. *howensis*. 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 ± 9.7 .

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

Number of exotic species recorded in plots: 0.

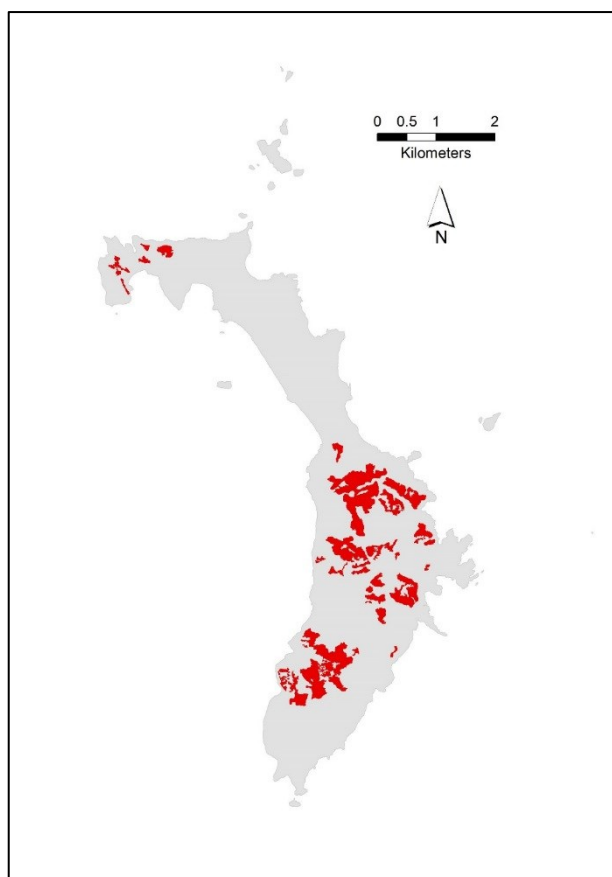
Common exotic species: *Asparagus aethiopicus*, *Psidium cattleianum* var. *cattleianum*, *Pennisetum clandestinum*, *Pennisetum clandestinum*.

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.



Floristic Group 18 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Howea belmoreana</i>	3	1	3	0.325	positive
<i>Syzygium fullagarii</i>	3	1	2	0.3	positive
<i>Chionanthus quadristamineus</i>	3	0.6667	2	0.15	positive
<i>Guioa coriacea</i>	2	1	2	0.3375	positive
<i>Atractocarpus stipularis</i>	2	0.6667	2	0.3	positive
<i>Dysoxylum pachyphyllum</i>	2	0.6667	1	0.2625	positive
<i>Platycerium bifurcatum</i>	2	0.6667	1	0.2375	positive
<i>Carex brunnea</i>	2	0.5	2	0.4375	positive
<i>Xylosma maidenii</i>	2	0.5	2	0.3375	positive
<i>Geniostoma huttonii</i>	1	0.1667	0	0	positive
<i>Drypetes deplanchei</i>	2	0.6667	2	0.6625	constant
<i>Smilax australis</i>	2	0.1667	2	0.575	negative
<i>Parsonsia howeana</i>	1	0.6667	2	0.6125	negative
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	1	0.3333	2	0.55	negative
<i>Nephrolepis cordifolia</i>	3	0.3333	2	0.1625	uninformative
<i>Sophora howinsula</i>	3	0.3333	1	0.125	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).

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.

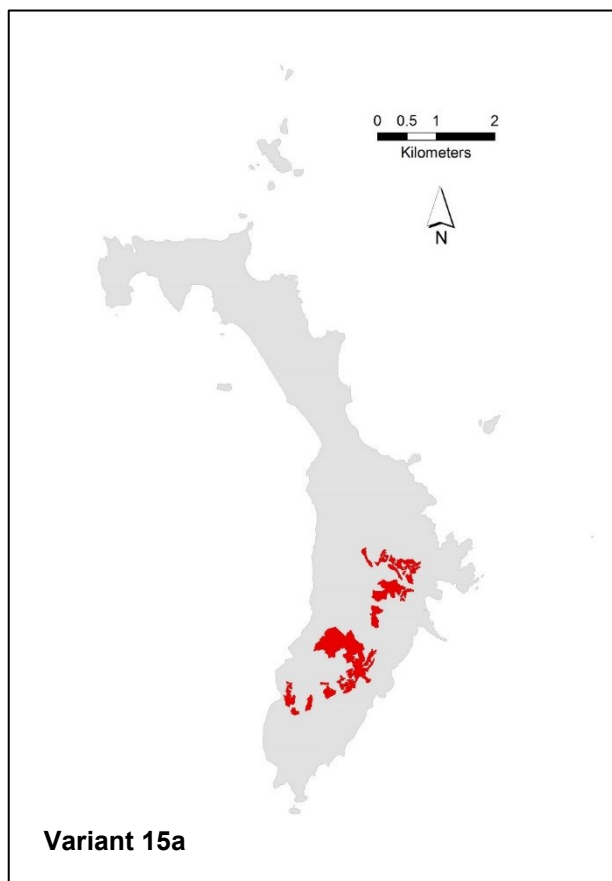
Variant 15b: Forky-tree closed forest along gullies. A variant occurring along creeklines and lower slopes that is dominated by Forky-tree (*Pandanus forsteri*). A community recognised by Pickard (1983) that was not discerned in the numerical analysis for this survey.

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 ± 3.3.





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



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

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.

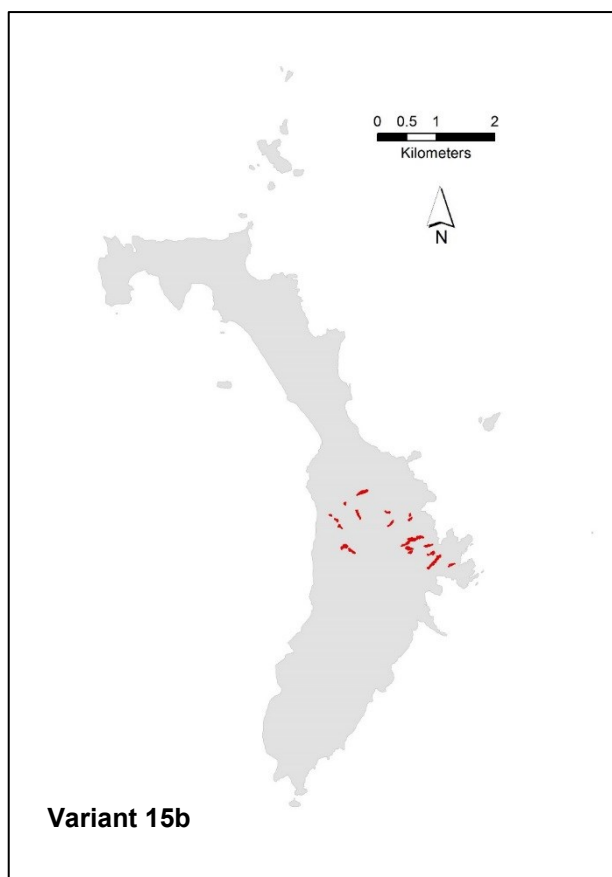
Common exotic species: *Ageratina adenophora*, *Lilium formosanum*.

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*).



Floristic Group 20 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Howea belmoreana</i>	4	0.8571	3	0.3291	positive
<i>Chionanthus quadristamineus</i>	4	0.7143	2	0.1392	positive
<i>Syzygium fullagarii</i>	3	0.7143	3	0.3165	positive
<i>Nephrolepis cordifolia</i>	2	1	2	0.1013	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	1	2	0.4304	positive
<i>Carex brunnea</i>	2	0.8571	2	0.4051	positive
<i>Geniostoma petiolosum</i>	2	0.8571	1	0.1392	positive
<i>Guioa coriacea</i>	2	0.8571	2	0.3418	positive
<i>Coprosma</i> sp. <i>nov</i>	2	0.7143	1	0.05063	positive
<i>Coprosma putida</i>	2	0.7143	2	0.2532	positive
<i>Elatostema reticulatum</i>	2	0.7143	3	0.05063	positive
<i>Marsdenia rostrata</i>	2	0.5714	1	0.06329	positive
<i>Metrosideros sclerocarpa</i>	2	0.5714	1	0.07595	positive
<i>Olea paniculata</i>	2	0.5714	2	0.4304	positive
<i>Peperomia tetraphylla</i>	1	0.1429	0	0	positive
* <i>Potentilla indica</i>	1	0.1429	0	0	positive
<i>Psychotria carronis</i>	1	0.1429	0	0	positive
<i>Drypetes deplanchei</i>	2	0.8571	2	0.6456	constant
<i>Parsonsia howeana</i>	2	0.7143	2	0.6076	constant
<i>Smilax australis</i>	1	0.7143	2	0.5316	negative
<i>Howea forsteriana</i>	3	0.1429	3	0.3544	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

jasmine (Stiff Jasmine [*Jasminum volubile*] and Jasmine [*J. Didymium*]) are also common. The epiphytic fern Elkhorn (*Platynerium 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 ± 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.

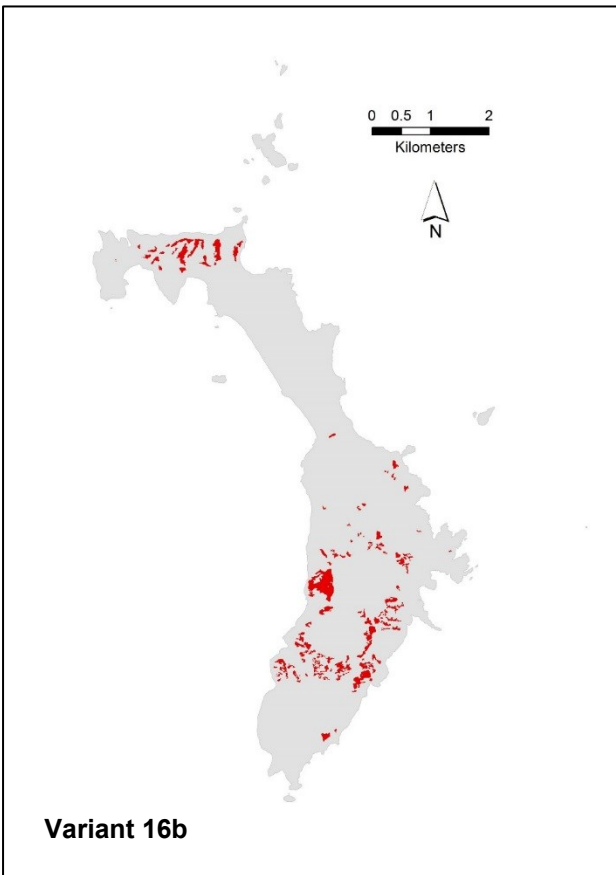
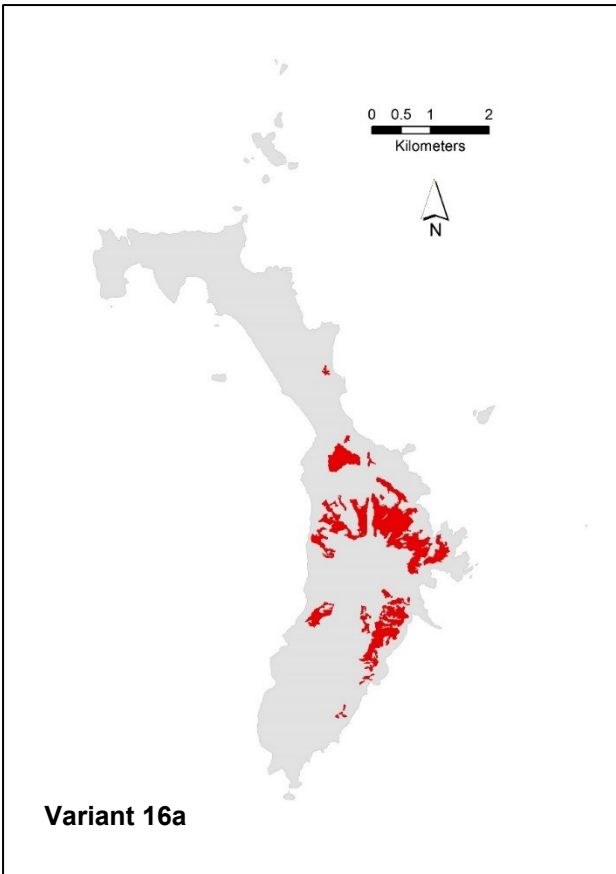
Areal extent: Variant 16a: 168.02 ha (11.19% of mapped area); Variant 16b: 77.46 ha (5.16% of mapped area).

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*).

Floristic Group 21 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Howea belmoreana</i>	3	0.875	3	0.2571	positive
<i>Syzygium fullagarii</i>	3	0.6875	3	0.2714	positive
<i>Smilax australis</i>	2	1	1	0.4429	positive
<i>Asplenium milnei</i>	2	0.9375	1	0.3714	positive
<i>Guioa coriacea</i>	2	0.9375	1	0.2571	positive
<i>Oplismenus imbecillis</i>	2	0.9375	2	0.3429	positive
<i>Olea paniculata</i>	2	0.875	2	0.3429	positive
<i>Pandanus forsteri</i>	2	0.875	1	0.2143	positive
<i>Xylosma maidenii</i>	2	0.875	1	0.2286	positive
<i>Carex brunnea</i>	2	0.8125	2	0.3571	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	2	0.8125	2	0.4714	positive
<i>Atractocarpus stipularis</i>	2	0.75	1	0.2286	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	0.75	2	0.4143	positive
<i>Coprosma putida</i>	2	0.6875	2	0.2	positive
<i>Jasminum didymum</i> subsp. <i>didymum</i>	2	0.625	2	0.1857	positive
<i>Jasminum volubile</i>	2	0.625	1	0.2286	positive
<i>Geniostoma petiolosum</i>	2	0.5	1	0.1286	positive
<i>Clematis glycinoides</i>	1	0.125	0	0	positive
<i>Alyxia squamulosa</i>	1	0.0625	0	0	positive
<i>Mucuna gigantea</i> subsp. <i>gigantea</i>	1	0.0625	0	0	positive
<i>Ophioglossum pendulum</i>	1	0.0625	0	0	positive
<i>Pellaea paradoxa</i>	1	0.0625	0	0	positive
<i>Pittosporum undulatum</i>	1	0.0625	0	0	positive
<i>Drypetes deplanchei</i>	3	0.875	2	0.6143	constant
<i>Parsonsia howeana</i>	2	0.8125	2	0.5714	constant
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	3	0.25	2	0.3143	uninformative
<i>Symplocos candelabrum</i>	3	0.125	1	0.08571	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* / *Oplimenus 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.

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 Cottonwood (*Celtis conferta* subsp. *amblyphylla*), Maulwood (*Olea paniculata*) and Sallywood (*Lagunaria patersonia* subsp. *patersonia*). There is a sparse to dense mid-layer of



Variant 17a: Greybark – Blackbutt rainforest.



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

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. *didymium*]) 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.

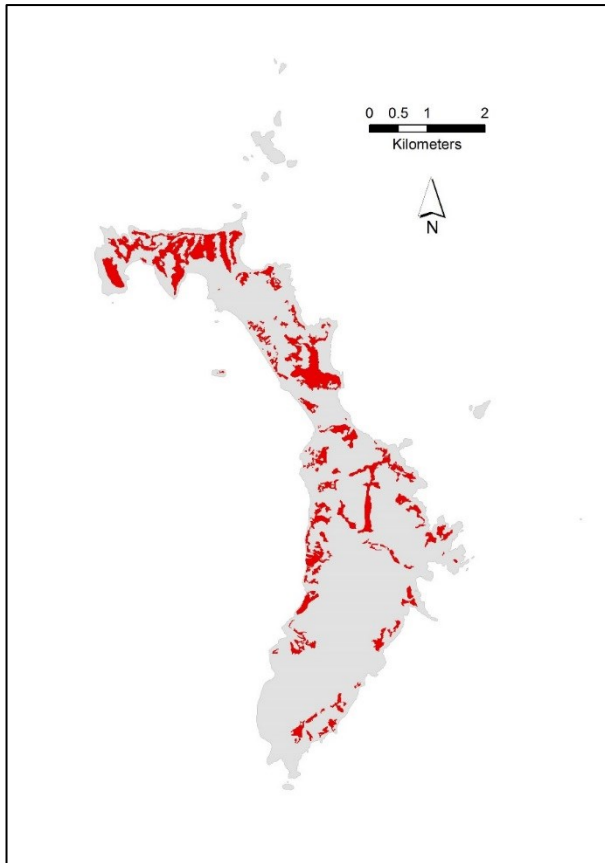
Variant 17c: Greybark – Blackbutt low closed forest on exposed calcarenite. A variant of the community recognised by Pickard (1983), occurring on a ridge of exposed calcarenite in the northern hills.

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

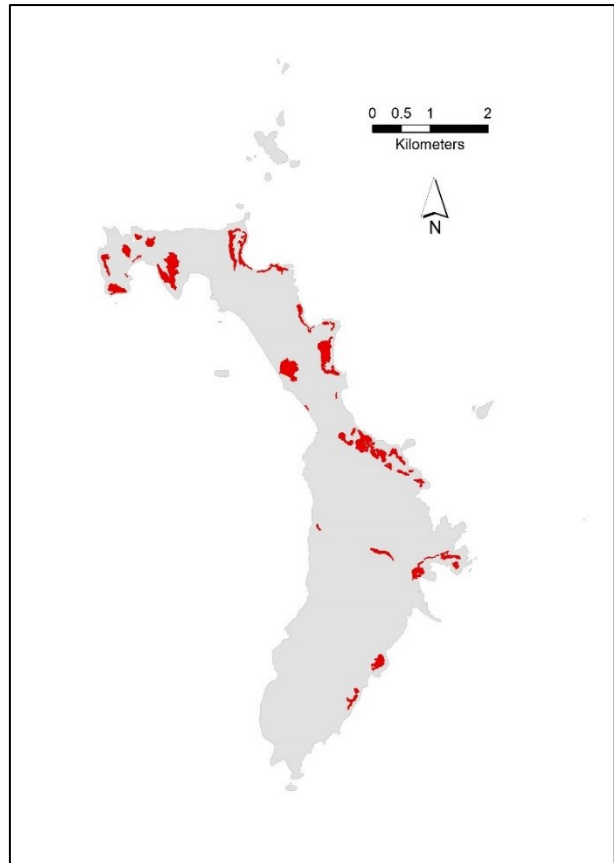
Sample sites: ($N = 12$) LHIFF22, LHIFF23, LHIFF24, LHIFF25, LHIFF26, LHIFF27, LHIFF31, LHIFF38, LHIFF43, LHIFF49, LHIFF51, LHIFF69.

Floristic Group: 22.

Variant 17a



Variant 17b



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

Mean number of native species per plot: 26.5 ± 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 cattleyanum* var. *cattleyanum*.

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.



Floristic Group 22 Fidelity Table

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	0.4595	positive
<i>Ochrosia elliptica</i>	3	0.08333	0	0	positive
<i>Myrsine platystigma</i>	2	1	1	0.2162	positive
<i>Olea paniculata</i>	2	1	2	0.3514	positive
<i>Oplismenus imbecillis</i>	2	1	2	0.3649	positive
<i>Smilax australis</i>	2	1	1	0.473	positive
<i>Jasminum didymum</i> subsp. <i>didymum</i>	2	0.9167	2	0.1622	positive
<i>Alyxia ruscifolia</i>	2	0.8333	1	0.3649	positive
<i>Jasminum volubile</i>	2	0.8333	1	0.2162	positive
<i>Asplenium milnei</i>	2	0.6667	1	0.4459	positive
<i>Dodonaea viscosa</i> subsp. <i>burmanniana</i>	2	0.6667	1	0.2838	positive
<i>Carex brunnea</i>	2	0.5833	2	0.4189	positive
<i>Celtis conferta</i> subsp. <i>amblyphylla</i>	2	0.5833	2	0.2432	positive
<i>Geitonoplesium cymosum</i>	2	0.5833	1	0.1081	positive
<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	2	0.5833	1	0.2568	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	0.5833	2	0.4595	positive
<i>Alyxia lindii</i>	2	0.08333	0	0	positive
<i>Coprosma prisca</i>	1	0.1667	0	0	positive
<i>Dianella intermedia</i>	1	0.08333	0	0	positive
<i>Zanthoxylum pinnatum</i>	1	0.08333	0	0	positive
<i>Drypetes deplanchei</i>	3	1	2	0.6081	constant
<i>Parsonsia howeana</i>	2	1	2	0.5541	constant
* <i>Ageratina adenophora</i>	4	0.1667	1	0.09459	uninformative
<i>Cassinia tenuifolia</i>	3	0.3333	1	0.2432	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 curtispendulum*). 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 ± 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*.

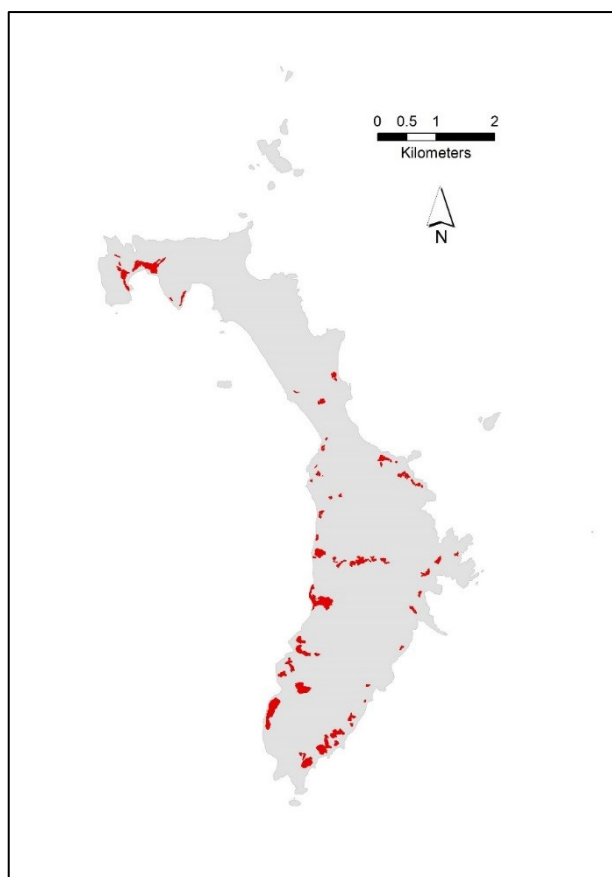
Threatened species: None recorded.

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*).



Floristic Group 23 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Howea forsteriana</i>	4	1	2	0.3049	positive
<i>Homalanthus populifolius</i>	2	1	1	0.2805	positive
<i>Oplismenus imbecillis</i>	2	1	2	0.4268	positive
<i>Psilotum nudum</i>	2	1	1	0.1707	positive
<i>Microsorium pustulatum</i> subsp. <i>howense</i>	2	0.75	2	0.4634	positive
<i>Alyxia ruscifolia</i>	2	0.5	1	0.4268	positive
<i>Carex brunnea</i>	2	0.5	2	0.439	positive
<i>Howea belmoreana</i>	2	0.5	3	0.3659	positive
* <i>Lilium formosanum</i>	2	0.5	1	0.2195	positive
<i>Pandanus forsteri</i>	2	0.5	1	0.3293	positive
<i>Drypetes deplanchei</i>	3	1	2	0.6463	constant
<i>Parsonsia howeana</i>	2	1	2	0.5976	constant
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	2	0.25	2	0.5488	negative
<i>Smilax australis</i>	1	1	2	0.5244	negative
<i>Elaeodendron curtipendulum</i>	3	0.25	1	0.1463	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 ± 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*.

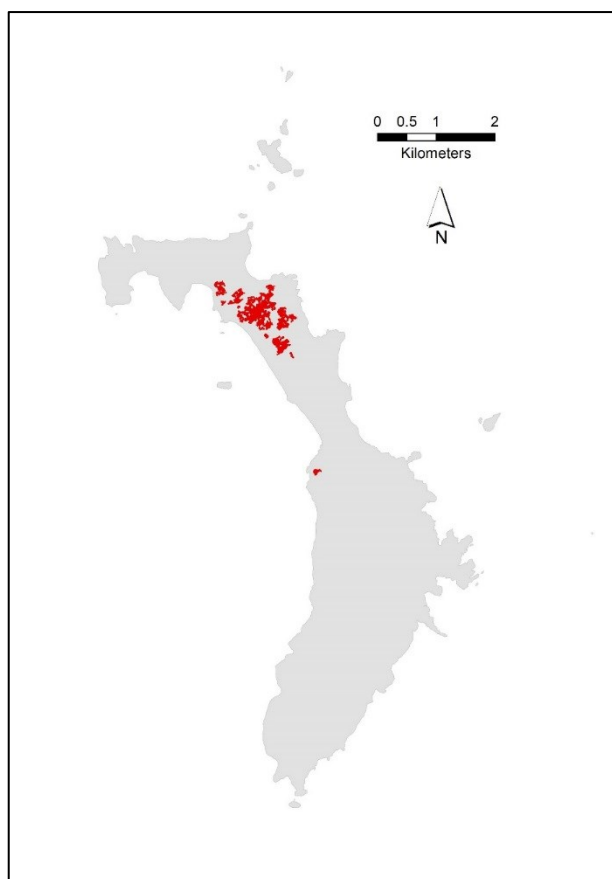
Threatened species: None recorded.

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 Lord Howe Woodhens (*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.



Floristic Group 24 Fidelity Table

Scientific name	Group score	Group frequency	Non-group score	Non-group frequency	Fidelity class
<i>Olea paniculata</i>	4	1	2	0.4074	positive
<i>Howea forsteriana</i>	3	1	2	0.2963	positive
<i>Celtis conferta</i> subsp. <i>amblyphylla</i>	3	0.8	2	0.2593	positive
<i>Ficus macrophylla</i> subsp. <i>columnaris</i>	3	0.6	1	0.08642	positive
<i>Trophis scandens</i> subsp. <i>megacarpa</i>	2	0.8	1	0.3457	positive
<i>Flagellaria indica</i>	2	0.6	1	0.3333	positive
<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	3	0.6	2	0.5309	constant
<i>Drypetes deplanchei</i>	2	1	2	0.642	constant
<i>Parsonsia howeana</i>	2	1	2	0.5926	constant
<i>Smilax australis</i>	1	1	2	0.5185	negative
<i>Guioa coriacea</i>	3	0.2	2	0.3951	uninformative
<i>Pandorea pandorana</i> subsp. <i>austrocaledonica</i>	3	0.4	1	0.4568	uninformative
<i>Howea belmoreana</i>	3	0.2	3	0.3827	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.

Community 20 Grey Mangrove low open woodland of brackish creeks.



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.

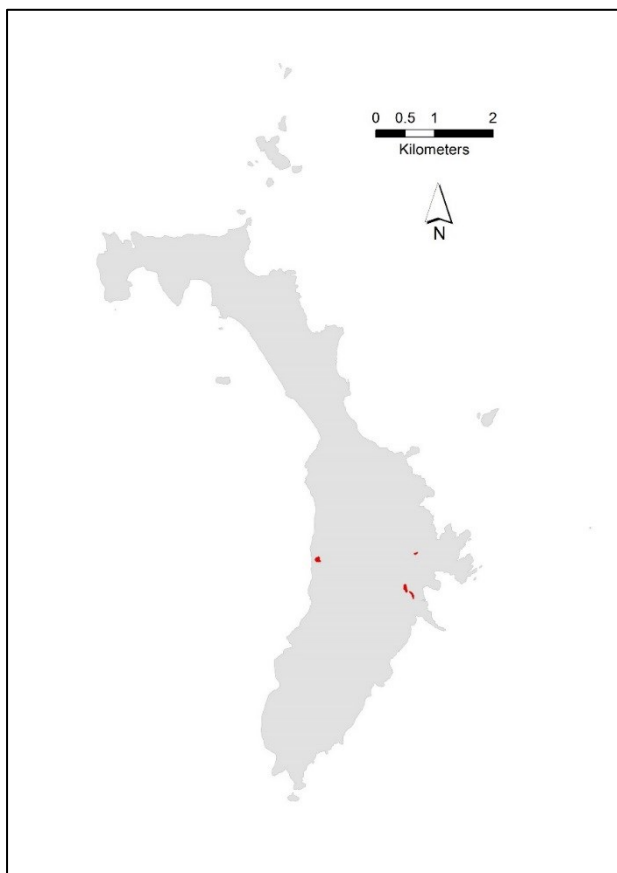
Threatened species: None recorded.

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 poiformis* tussock grassland of offshore islands and exposed coastal slopes

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

Equivalent vegetation types: *Poa poiformis* Orthophyll Short Grass (Pickard 1983); *Poa poiformis* 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.

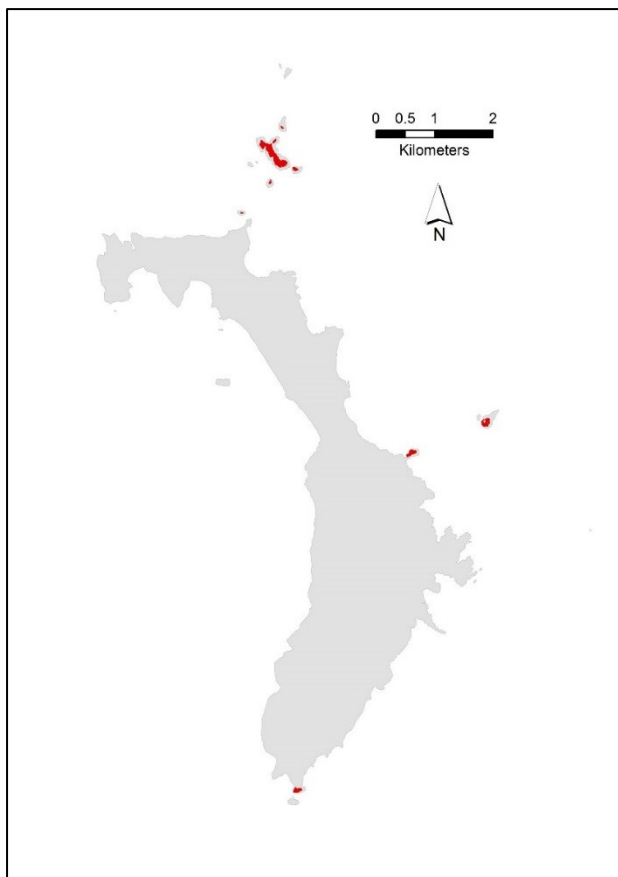
Indicator native species: *Poa poiformis*.

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 (*Pennisetum clandestinum*).

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* – *Macherina 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 with full floristics plots 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.

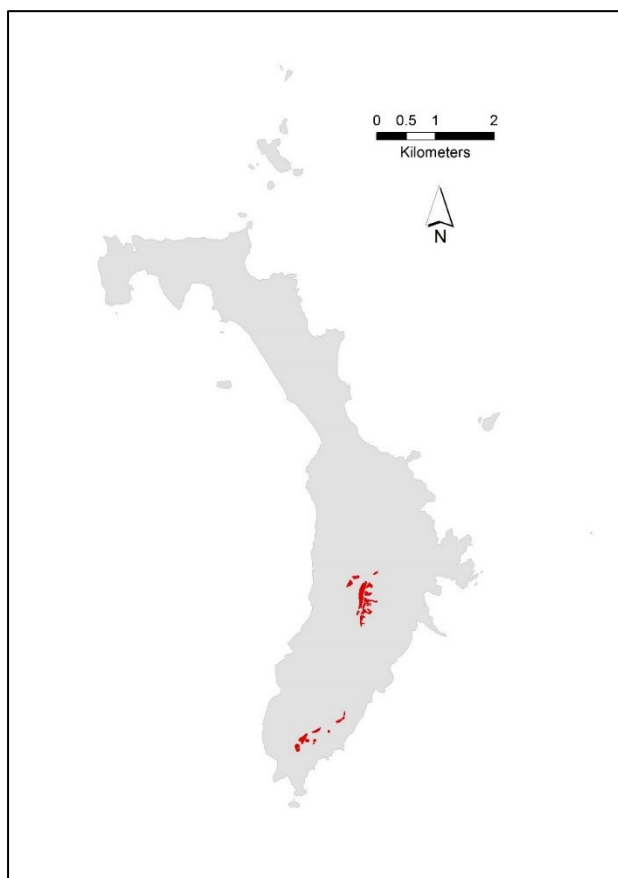
Disturbance and Condition: Areas at the foot of high cliffs on the south-eastern faces of Mounts Gower and Lidgbird (see profile image above) have been mapped as this community, but they are frequently disturbed by landslips and are drier than the higher elevation areas where this community also occurs. 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 with any full floristics plots 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 – TSC 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 with any full floristic plots during the current study owing to the difficult access to sites where it occurs. Information for this community is from I. Hutton (pers. comm., 2013–16). 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*.

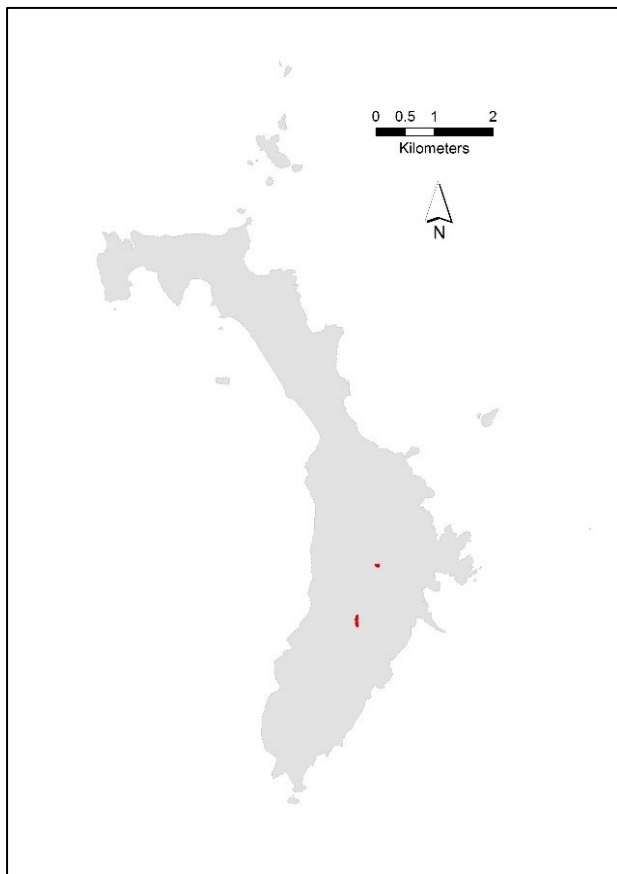
Common exotic species: None recorded.

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.



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Appendix 1 Vegetation survey pro formas

Full floristic vegetation survey pro forma

Vegetation Forms

NPWS Vegetation Survey Form						
Location: Lord Howe Island, <i>Malabas</i>					Recorders: <i>PR + PG</i>	
Date	<i>20 17/13</i>	YETI Survey Name	Plot No. <i>FF023</i>		<i>WPT 012 PG</i>	
AMG grid reference	Datum: <i>GDA94</i>	Zone: <i>57</i>	Easting: <i>505806</i>	Northing: <i>6513277</i>		
Base Plot size	<i>20 x 20 m</i>	Orientation of plot	Bearing of °	Permanent Marker	No	Photo # & orientation <i>569-69 PG</i>
Structure & Composition						
Keith Class						
PCT:						
NVIS Level V (Structure) within 0.04 ha						
Stratum	Species name	% Cover	Height to crown (m)			
Upper	<i>Cryptocarya triplinervis</i>	3	Upper Stratum Height to crown (m)			
Upper	<i>Drypetes deplanchei</i>	3	Min	Max		
Upper	<i>Olea paniculata</i>	3	4	5		
Mid	<i>Alyxia roseifolia</i>	2	Mid Stratum Height to crown (m)			
Mid	<i>Myrsine platystrigata</i>	2	Min	Max		
Mid	<i>Drypetes deplanchei</i>	2	1	2		
Ground	<i>Jasminum simplicifolium</i>	3	Ground Stratum Height to crown (m)			
Ground	<i>Carex bunnea</i>	2	Min	Max		
Ground	<i>Oplismenus imbecillus</i>	2	0	0.5		
Litter		Cover % <i>50</i>	Cryptogam	Notes:		
Bare ground		—	Rock	<i>30</i>		
Tree health		Healthy	Branchlets dead	Small branches dead	Main branches dead	Trees dead
Age structure		Early regeneration	Advanced regeneration	Uneven age	Mature	Senescent
Plot Disturbance	Severity code	Age code	Observational evidence:	Severity code	Age code	Observational evidence:
Clearing (inc. logging)				Grazing		
Cultivation (inc. pasture)				Fire damage		
Soil erosion				Storm damage		
Firewood collection				Other		
Severity: 0=no evidence, 1=light, 2=moderate, 3=severe			Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)			
Physiography (from Yellow Book)						
Morphological Type		Landform Pattern		Lithology	<i>Basalt</i>	
Site Soil Type	<i>sh. br loam</i>	Slope	<i>30 °</i>	Aspect	<i>80 °</i>	

m

Site No:

No.	Str	GF	Species	CA	CAPS code	No.	Str	GF	Species	CA	CAPS code
1	C		<i>Dryopteris deplanchetii</i>	3		35					
2	C		<i>Cryptantha topiensis</i>	3		36					
3	C		<i>Olea paniculata</i>	3		37					
4	C		<i>Myrsine platystigma</i>	3		38					
5			<i>Pandorea pandorana</i>	2		39					
6			<i>Jasminum simplicifolium</i>	3		40					
7			<i>J. dichyrmum</i>	2		41					
8			<i>Parsonsia leucantha</i>	2		42					
9			<i>Micondonia pustulatum</i>	2		43					
10	C		<i>Dodonaea villosa</i>	2		44					
11			<i>Desmodium macropus</i>	2		45					
12			<i>Opismenus imbedellii</i>	2		46					
13			<i>Carex sp. (various/barricada)</i>	1		47					
14			<i>Carex bunnia</i>	2		48					
15			<i>Alyxia nilifolia</i>	2		49					
16			<i>Geitonopeltis cyathosum</i>	2		50					
17			<i>Asplenium milleef</i>	2		51					
18			<i>Peperomia unguis</i>	2		52					
19			<i>Chorata laevis</i>	2		53					
20			<i>Platynerium bifurcatum</i>	1		54					
21			<i>Juncus carica</i>	1		55					
22			<i>Commelina cyanea</i>	2		56					
23	C		<i>Galathea hedyotis</i>	2		57					
24			<i>Sanitax australis</i>	1		58					
25			<i>Flagellaria indica</i>	1		59					
26	C		<i>Sarcocaulis simplicifolia</i>	2		60					
27			<i>Stephania japonica var. timorensis</i>	1		61					
28			<i>Alyxia lindii</i>	2		62					
29			<i>Arthropodium tenella</i>	2		63					
30			<i>Pisonia bruniensis</i>	1		64					
31			<i>Trochis scandens</i>	1		65					
32	C		<i>Elakodendron curtispadale</i>	1		66					
33						67					
34						68					

Stratum: U1 = Tallest tree sub-stratum; U2 = Sub-canopy layer, second tree layer; U3 = Sub-canopy layer, third tree layer; M1 = Tallest shrub layer; CA = Cover Abundance Scale (Modified Braun Blanquet)
 Next shrub layer; M3 = Third shrub layer; G1 = Tallest ground species; G2 = Ground
 Growth Form: Tree, Mammillate tree, Shrub, Yumellie shrub, Zehesath shrub, Cocheneod shrub, Gutsack grass, Heilmock grass, Heilmock grass, Dood 2 = cover less than 5% of site and uncommon
 grass, Inseidgr, Rhodh, Elett, Fofth, Lavine, Anoyed, Papain, Xranthommoes, Unsamptre shrub
 3 = cover of 6-20% of site
 4 = cover of 21-50% of site
 5 = cover of 51-75% of site
 6 = cover of 76-100% of site
 C/A: Cover Abundance - Modified Braun Blanquet - Alternative to Cover and Abundance

Rapid floristic vegetation survey pro forma

Lord Howe Island RAPID veg proforma

Site no: RP 069 Date 21/1/2013 Recorder: PR
 WPT 022 PR

East: 507490 North: 6511948 GDA94 Zone 57 Plot size: 20x20m

Location: LHI valley of Sladons Geology: Basalt Calcarenite Aspect: 350
 Slope: 5° Photo notes Photo bearing

Notes (e.g. landscape, soil drainage/depth, disturbance)

Stratum	Height	% PFC	Dominant species (in order of importance)
Upper tree/canopy	7m	60	1. <i>Cryptocarya</i> <i>trip.</i> CA 4. 2. <i>Drypetes</i> <i>deplacoi</i> CA 2. 3. <i>Elaeodendron</i> CA 2. 4. <i>Lagunaria</i> CA 2. 5. <i>Ocotelea</i> CA 2. 6. CA
Lower tree/mid storey	3m	30	1. <i>Ocotelea</i> 2. <i>Celtis</i> 3. <i>Cryptocarya</i> <i>trip.</i>
Shrub	1.5m	20	1. <i>Celtis</i> 2. <i>Ocotelea</i> 3. <i>Pouzolzia</i>
Ground	0.3m	50	1. <i>Parsonsia</i> <i>howeana</i> 2. <i>Acyranthes</i> 3. <i>Stephania</i>

Significant weeds/threatened species

Additional notes/comments: Lowland mixed forest. Adjacent to Howe forest. Edge
 Final community type: disturbed due to storm-related tree fall

Appendix 2 List of plant species recorded in floristic sites

Status: * = Exotic taxon; TSC-E = listed as Endangered under the TSC Act.

Status	Scientific name	Authority	Family	Common name
	<i>Achyranthes aspera</i>	L.	Amaranthaceae	Chaff Flower
	<i>Actites megalocarpus</i>	(Hook.f.) Lander	Asteraceae	Dune Thistle
	<i>Adiantum hispidulum</i>	Sw.	Pteridaceae	Rough Maidenhair Fern
	<i>Aegiceras corniculatum</i>	(L.) Blanco	Myrsinaceae	River Mangrove
*	<i>Ageratina adenophora</i>	(Spreng.) R.M.King & H.Rob.	Asteraceae	Crofton Weed
	<i>Alyxia ruscifolia</i>	R.Br.	Apocynaceae	Christmas Bush
	<i>Alyxia squamulosa</i>	C.Moore & F.Muell.	Apocynaceae	Climbing Fishbone Fern
	<i>Apium prostratum</i> subsp. <i>howense</i>	P.S.Short	Apiaceae	Sea Celery
*	<i>Araucaria heterophylla</i>	(Salisb.) Franco	Araucariaceae	Norfolk Island Pine
	<i>Arthropteris tenella</i>	(G.Forst.) J.Sm. ex Hook.f.	Tectariaceae	
*	<i>Asparagus aethiopicus</i>	L.	Asparagaceae	Ground Asparagus
*	<i>Asparagus plumosus</i>	Baker	Asparagaceae	Climbing Asparagus
	<i>Asplenium goudeyi</i>	D.L.Jones	Aspleniaceae	
	<i>Asplenium milnei</i>	Carruth.	Aspleniaceae	
	<i>Asplenium polyodon</i>	G.Forst.	Aspleniaceae	Sickle Spleenwort
	<i>Asplenium surrogatum</i>	P.S.Green	Aspleniaceae	
*	<i>Aster subulatus</i>	Michx.	Asteraceae	Wild Aster
	<i>Atractocarpus stipularis</i>	(F.Muell.) Puttock	Rubiaceae	Green Plum
	<i>Atriplex cinerea</i>	Poir.	Chenopodiaceae	Grey Saltbush
	<i>Avicennia marina</i> subsp. <i>australasica</i>	(Walp.) J.Everett	Acanthaceae	Grey Mangrove
	<i>Baloghia inophylla</i>	(G.Forst.) P.S.Green	Euphorbiaceae	Brush Bloodwood
*	<i>Bidens pilosa</i>	L.	Asteraceae	Cobbler's Pegs
	<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.	Blechnaceae	Strap Water Fern
	<i>Brachyscome segmentosa</i>	C.Moore & F.Muell.	Asteraceae	Lord Howe Island Daisy
*	<i>Bromus catharticus</i>	Vahl	Poaceae	Prairie Grass
*	<i>Cakile edentula</i>	(Bigelow) Hook.	Brassicaceae	American Sea Rocket
	<i>Calanthe triplicata</i>	(Willemet) Ames	Orchidaceae	Christmas Orchid
	<i>Calystegia soldanella</i>	(L.) Roem. & Schult.	Convolvulaceae	
	<i>Canavalia rosea</i>	(Sw.) DC.	Fabaceae	Coastal Jack Bean
	<i>Carex breviculmis</i>	R.Br.	Cyperaceae	
	<i>Carex brunnea</i>	Thunb.	Cyperaceae	Greater Brown Sedge
	<i>Carpobrotus glaucescens</i>	(Haw.) Schwantes	Chenopodiaceae	Pigface
	<i>Cassinia tenuifolia</i>	Benth.	Asteraceae	Bully Bush
	<i>Celtis conferta</i> subsp. <i>amblyphylla</i>	(F.Muell.) P.S.Green	Ulmaceae	Cotton-wood
	<i>Cephalomanes bauerianum</i>	(Endl.) P.S.Green	Hymenophyllaceae	
*	<i>Cerastium glomeratum</i>	Thuill.	Caryophyllaceae	Mouse-ear Chickweed
*	<i>Chenopodium murale</i>	L.	Chenopodiaceae	Nettle-leaf Goosefoot

Status	Scientific name	Authority	Family	Common name
	<i>Chionanthus quadristamineus</i>	F.Muell.	Oleaceae	Blue Plum
*	<i>Chloris gayana</i>	Kunth	Poaceae	Rhodes Grass
	<i>Cyclosorus dentatus</i>	(Forssk.) Ching	Thelypteridaceae	
*	<i>Cirsium vulgare</i>	(Savi) Ten.	Asteraceae	Spear Thistle
	<i>Clematis glycinoides</i>	DC.	Ranunculaceae	Headache Vine
	<i>Commelina cyanea</i>	R.Br.	Commelinaceae	Native Wandering Jew
*	<i>Conyza parva</i>	Cronquist	Asteraceae	
	<i>Coprosma huttoniana</i>	P.S.Green	Rubiaceae	
	<i>Coprosma lanceolaris</i>	F.Muell.	Rubiaceae	
	<i>Coprosma prisca</i>	W.R.B.Oliv.	Rubiaceae	Goatwood
	<i>Coprosma putida</i>	C.Moore & F.Muell.	Rubiaceae	Stinkwood
	<i>Coprosma sp. nov</i>		Rubiaceae	
	<i>Corybas spp.</i>		Orchidaceae	
	<i>Cotula australis</i>	(Sieber ex Spreng.) Hook.f.	Asteraceae	Carrot Weed
	<i>Crassula sieberiana</i>	(Schult. & Schult.f.) Druce	Crassulaceae	Australian Stonecrop
	<i>Crinum pedunculatum</i>	R.Br.	Amaryllidaceae	River Lily
	<i>Cryptocarya gregsonii</i>	Maiden	Lauraceae	Black Plum
	<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>	R.Br.	Lauraceae	Blackbutt
	<i>Cyathea brevipinna</i>	Baker ex Benth.	Cyatheaceae	Tree Fern
	<i>Cyathea howeana</i>	Domin	Cyatheaceae	Tree Fern
	<i>Cyathea macarthurii</i>	(F.Muell.) Baker	Cyatheaceae	Tree Fern
	<i>Cyathea robusta</i>	(C.Moore) Holttum	Cyatheaceae	Tree Fern
*	<i>Cyclospermum leptophyllum</i>	(Pers.) Sprague ex Britton & P.Wilson	Apiaceae	Slender Celery
	<i>Cynodon dactylon</i>	(L.) Pers.	Poaceae	Blue Couch
	<i>Cyperus lucidus</i>	R.Br.	Cyperaceae	Leafy Flat Sedge
	<i>Dendrobium gracilicaule</i> var. <i>howeanum</i>	Maiden	Orchidaceae	
	<i>Dendrobium moorei</i>	F.Muell.	Orchidaceae	
	<i>Dianella intermedia</i>	Endl.	Phormiaceae	Flax Lily
	<i>Dietes robinsoniana</i>	(C.Moore & F.Muell.) Klatt	Iridaceae	Lord Howe Wedding Lily
*	<i>Digitaria ciliaris</i>	(Retz.) Koeler	Poaceae	Summer Grass
	<i>Diplazium melanochlamys</i>	(Hook.) T.Moore	Athyriaceae	
	<i>Dodonaea viscosa</i> subsp. <i>burmanniana</i>	(DC.) J.G.West	Sapindaceae	Hop Bush
	<i>Doodia caudata</i>	(Cav.) R.Br.	Blechnaceae	Rasp Fern
	<i>Dracophyllum fitzgeraldii</i>	C.Moore & F.Muell.	Epacridaceae	Fitzgerald
	<i>Drypetes deplanchei</i>	(Brongn. & Gris) Merr.	Putranjivaceae	Greybark
	<i>Dysoxylum pachyphyllum</i>	Hemsl.	Meliaceae	Island Apple
	<i>Echinopogon caespitosus</i> var. <i>caespitosus</i>	C.E.Hubb.	Poaceae	Hedgehog Grass
*	<i>Ehrharta erecta</i>	Lam.	Poaceae	Panic Veldtgrass
	<i>Elaeocarpus costatus</i>	M.Taylor	Elaeocarpaceae	
	<i>Elaeodendron curtispiculum</i>	Endl.	Celastraceae	Tamana
	<i>Elatostema reticulatum</i>	Wedd.	Urticaceae	Rainforest Spinach
	<i>Euchiton involucratus</i>	(G.Forst.) Holub	Asteraceae	

Status	Scientific name	Authority	Family	Common name
*	<i>Euphorbia cyathophora</i>	Murray	Euphorbiaceae	Painted Spurge
*	<i>Euphorbia paralias</i>	L.	Euphorbiaceae	Sea Spurge
	<i>Exocarpos homalocladus</i>	C.Moore & F.Muell.	Santalaceae	Grass Tree
	<i>Ficinia nodosa</i>	(Rottb.) Goetgh., Muasya & D.A.Simpson	Cyperaceae	Club Rush
	<i>Ficus macrophylla</i> subsp. <i>columnaris</i>	(C.Moore) D.J.Dixon	Moraceae	Banyan
	<i>Flagellaria indica</i>	L.	Flagellariaceae	Whip Vine
	<i>Gahnia howeana</i>	R.O.Gardner	Cyperaceae	
	<i>Geitonoplesium cymosum</i>	(R.Br.) A.Cunn. ex Hook.	Luzuriagaceae	Scrambling Lily
TSC-E	<i>Geniostoma huttonii</i>	B.J.Conn	Loganiaceae	
	<i>Geniostoma petiolosum</i>	C.Moore & F.Muell.	Loganiaceae	Boar Tree
	<i>Grammitis nudicarpa</i>	Copel.	Polypodiaceae	
	<i>Grammitis wattsi</i>	Copel.	Polypodiaceae	
	<i>Guioa coriacea</i>	(Radlk.) Radlk.	Sapindaceae	Cedar
	<i>Hedyscepe canterburyana</i>	(C.Moore & F.Muell.) H.Wendl. & Drude	Arecaceae	Big Mountain Palm
	<i>Hibiscus tiliaceus</i>	L.	Malvaceae	Cottonwood Hibiscus
	<i>Homalanthus populifolius</i>	Graham	Euphorbiaceae	Bleeding Heart
	<i>Howea belmoreana</i>	(C.Moore & F.Muell.) Becc.	Arecaceae	Curly Palm
	<i>Howea forsteriana</i>	(C.Moore & F.Muell.) Becc.	Arecaceae	Kentia Palm
	<i>Huperzia varia</i>	(R.Br.) Trevis.	Lycopodiaceae	Long Clubmoss
*	<i>Hydrocotyle bonariensis</i>	Lam.	Apiaceae	Kurnell Curse
	<i>Hydrocotyle hirta</i>	A.Rich. ex R.Br.	Apiaceae	Hairy Pennywort
	<i>Hymenophyllum howense</i>	Brownlie	Hymenophyllaceae	
*	<i>Hypochaeris radicata</i>	L.	Asteraceae	Catsear
	<i>Ipomoea brasiliensis</i>	(L.) Sweet	Convolvulaceae	Beach Bean
*	<i>Ipomoea cairica</i>	(L.) Sweet	Convolvulaceae	Coastal Morning Glory
	<i>Jasminum didymum</i> subsp. <i>didymum</i>	G.Forst.	Oleaceae	Jasmine
	<i>Jasminum volubile</i>	Jacq.	Oleaceae	Stiff Jasmine
	<i>Korthalsella rubra</i>	(Tiegh.) Engl.	Viscaceae	Jointed Mistletoe
	<i>Lagunaria patersonia</i> subsp. <i>patersonia</i>	(Andrews) G.Don	Malvaceae	Sallywood
	<i>Lastreopsis nephrodioides</i>	(Baker) Tindale	Dryopteridaceae	
	<i>Lepidium howei-insulae</i>	Thell.	Brassicaceae	Mustard & Cress
TSC-E	<i>Lepidorrhachis mooreana</i>	(F.Muell.) O.F.Cook	Arecaceae	Little Mountain Palm
	<i>Leptospermum polygalifolium</i> subsp. <i>howense</i>	Joy Thomps.	Myrtaceae	
	<i>Leucopogon parviflorus</i>	(Andrews) Lindl.	Ericaceae	
*	<i>Lilium formosanum</i>	A.Wallace	Liliaceae	Formosan Lily
	<i>Lobelia anceps</i>	L.f.	Lobeliaceae	
*	<i>Lobularia maritima</i>	(L.) Desv.	Brassicaceae	Sweet Alyssum
	<i>Lordhowea insularis</i>	(Benth.) B.Nord.	Asteraceae	
	<i>Luzula longiflora</i>	Benth.	Juncaceae	
	<i>Machaerina insularis</i>	(Benth.) T.Koyama	Cyperaceae	
	<i>Macropiper excelsum</i> subsp. <i>psittacorum</i>	(Endl.) Sykes	Piperaceae	Kava
	<i>Macropiper hooglandii</i>	I.Hutton & P.S.Green	Piperaceae	Kava

Status	Scientific name	Authority	Family	Common name
	<i>Marsdenia rostrata</i>	R.Br.	Apocynaceae	Common Milk Vine
	<i>Melaleuca howeana</i>	Cheel	Myrtaceae	Tea Tree
	<i>Melanthera biflora</i>	(L.) Wild	Asteraceae	
	<i>Melicope contermina</i>	C.Moore & F.Muell.	Rutaceae	
	<i>Melicope polybotrya</i>	(C.Moore & F.Muell.) T.G.Hartley	Rutaceae	
*	<i>Melilotus indicus</i>	(L.) All.	Fabaceae	King Island Mellilot
*	<i>Melinis minutiflora</i>	P.Beauv.	Poaceae	Molasses Grass
	<i>Metrosideros nervulosa</i>	C.Moore & F.Muell.	Myrtaceae	Mountain Rose
	<i>Metrosideros sclerocarpa</i>	J.W.Dawson	Myrtaceae	Hill Rose
	<i>Microlaena stipoides</i> var. <i>stipoides</i>	(Labill.) R.Br.	Poaceae	Weeping Meadow Grass
	<i>Microsorium pustulatum</i> subsp. <i>howense</i>	(Tindale & P.S.Green) Bostock	Polypodiaceae	Kangaroo Fern
	<i>Microsorium scandens</i>	(G.Forst.) Tindale	Polypodiaceae	Fragrant Fern
	<i>Mucuna gigantea</i> subsp. <i>gigantea</i>	(Willd.) DC.	Fabaceae	Burny Bean
	<i>Muehlenbeckia complexa</i>	(A.Cunn.) Meisn.	Polygonaceae	Wire Vine
	<i>Myoporum insulare</i>	R.Br.	Scrophulariaceae	Boobialla
	<i>Myrsine mccomishii</i>	(Sprague) Jackes	Myrsinaceae	
	<i>Myrsine platystigma</i>	F.Muell.	Myrsinaceae	
	<i>Negria rhabdothermoides</i>	F.Muell.	Gesneriaceae	Pumpkin Tree
	<i>Nephrolepis cordifolia</i>	(L.) Presl	Lomariopsidaceae	Fishbone Fern
	<i>Nicotiana forsteri</i>	Roem. & Schult.	Solanaceae	
	<i>Ochrosia elliptica</i>	Labill.	Apocynaceae	Red Berrywood
*	<i>Oenothera tetraptera</i>	Cav.	Onagraceae	
	<i>Olea paniculata</i>	L.	Oleaceae	Maulwood
	<i>Olearia ballii</i>	(F.Muell.) Hemsl.	Asteraceae	Mountain Daisy
	<i>Olearia mooneyi</i>	(F.Muell.) Hemsl.	Asteraceae	Pumpkin Bush
	<i>Ophioglossum pendulum</i>	L.	Ophioglossaceae	Ribbon Fern
	<i>Oplismenus imbecillis</i>	(R.Br.) Roem. & Schult.	Poaceae	Creeping Beard Grass
*	<i>Oxalis corniculata</i>	L.	Oxalidaceae	
	<i>Oxalis rubens</i>	Haw.	Oxalidaceae	
	<i>Pandanus forsteri</i>	C.Moore & F.Muell.	Pandanaceae	Forky-tree
	<i>Pandorea pandorana</i> subsp. <i>austrorcaledonica</i>	(Bureau) P.S.Green	Bignoniaceae	Boat Vine
	<i>Parietaria debilis</i>	G.Forst.	Urticaceae	Native Pellitory
*	<i>Parietaria judaica</i>	L.	Urticaceae	Pellitory
	<i>Parsonsia howeana</i>	J.B.Williams	Apocynaceae	
*	<i>Paspalum dilatatum</i>	Poir.	Poaceae	Paspalum
*	<i>Paspalum mandiocanum</i>	Trin.	Poaceae	Broadleaf Paspalum
	<i>Pellaea paradoxa</i>	(R.Br.) Hook.	Pteridaceae	Sickle Fern
*	<i>Pennisetum clandestinum</i>	Hochst. ex Chiov.	Poaceae	Kikuyu
	<i>Peperomia tetraphylla</i>	(G.Forst.) Hook. & Arn.	Peperomiaceae	Four-leaved Pepper Plant
	<i>Peperomia urvilleana</i>	A.Rich.	Peperomiaceae	
	<i>Phragmites australis</i>	(Cav.) Trin. ex Steud.	Poaceae	Native Reed
*	<i>Physalis ixocarpa</i>	Brot. ex Hornem.	Solanaceae	Ground Cherry

Status	Scientific name	Authority	Family	Common name
	<i>Pimelea congesta</i>	C.Moore & F.Muell.	Thymelaeaceae	
	<i>Pisonia brunoniana</i>	Endl.	Nyctaginaceae	Punkwood
	<i>Pittosporum erioloma</i>	C.Moore & F.Muell.	Pittosporaceae	Hedge Laurel
*	<i>Pittosporum undulatum</i>	Vent.	Pittosporaceae	Snowdrop Tree
	<i>Planchonella howeana</i>	(F.Muell.) Pierre	Sapotaceae	
*	<i>Plantago lanceolata</i>	L.	Plantaginaceae	Plantain
	<i>Platyterium bifurcatum</i>	(Cav.) C.Chr.	Polypodiaceae	Elkhorn
*	<i>Poa annua</i>	L.	Poaceae	Winter Grass
	<i>Poa poiformis</i> var. <i>poiformis</i>	(Labill.) Druce	Poaceae	Coast Tussock Grass
	<i>Polyscias cissodendron</i>	(C.Moore & F.Muell.) Harms	Araliaceae	Island Pine
	<i>Polystichum whiteleggei</i>	Watts	Dryopteridaceae	
	<i>Portulaca oleracea</i>	L.	Portulacaceae	Purslane
*	<i>Potentilla indica</i>	(Jacks.) Th.Wolf	Rosaceae	Indian Strawberry
*	<i>Psidium cattleyanum</i> var. <i>cattleyanum</i>	Sabine	Myrtaceae	Cherry Guava
	<i>Psilotum nudum</i>	(L.) P.Beauv.	Psilotaceae	Skeleton Fork-fern
	<i>Psychotria carronis</i>	C.Moore & F.Muell.	Rubiaceae	Black Grape
	<i>Pteris microptera</i>	Mett. ex Kuhn	Pteridaceae	
	<i>Pterostylis curta</i>	R.Br.	Orchidaceae	
	<i>Pterostylis</i> spp.		Orchidaceae	
	<i>Pyrosia confluens</i> var. <i>confluens</i>	(R.Br.) Ching	Polypodiaceae	Horseshoe Felt Fern
*	<i>Richardia</i> spp.		Rubiaceae	
	<i>Rumex brownii</i>	Campd.	Polygonaceae	Swamp Dock
	<i>Sarcomelicope simplicifolia</i> subsp. <i>simplicifolia</i>	(Endl.) T.G.Hartley	Rutaceae	Yellow Wood
*	<i>Senecio elegans</i>	L.	Asteraceae	Purple Groundsel
	<i>Senecio howeanus</i>	Belcher	Asteraceae	
	<i>Sesuvium portulacastrum</i>	L.	Aizoaceae	Ice Plant
	<i>Smilax australis</i>	R.Br.	Smilacaceae	Lawyer Vine
*	<i>Solanum nigrum</i>	L.	Solanaceae	Blackberry Nightshade
*	<i>Sonchus oleraceus</i>	L.	Asteraceae	Sow Thistle
	<i>Sophora howinsula</i>	(W.R.B.Oliv.) P.S.Green	Fabaceae	Lignum Vitae
	<i>Spinifex sericeus</i>	R.Br.	Poaceae	Spinifex
*	<i>Sporobolus africanus</i>	(Poir.) Robyns & Tournay	Poaceae	Parramatta Grass
	<i>Sporobolus virginicus</i> var. <i>virginicus</i>	(L.) Kunth	Poaceae	Saltwater Couch
*	<i>Stenotaphrum secundatum</i>	(Walter) Kuntze	Poaceae	Buffalo Grass
	<i>Stephania japonica</i> var. <i>timoriensis</i>	(DC.) Forman	Menispermaceae	Snake Vine
	<i>Symplocos candelabrum</i>	Brand	Symplocaceae	
	<i>Syzygium fullagarii</i>	(F.Muell.) Craven	Myrtaceae	Scalybark
*	<i>Taraxacum officinale</i>	Weber	Asteraceae	Dandelion
	<i>Tetragonia tetragonioides</i>	(Pall.) Kuntze	Aizoaceae	Native Spinach
	<i>Tmesipteris truncata</i>	(R.Br.) Desv.	Psilotaceae	
*	<i>Torilis nodosa</i>	(L.) Gaertn.	Apiaceae	Knotted Hedge-parsley
	<i>Triglochin striata</i>	Ruiz & Pav.	Juncaginaceae	Water Ribbons
	<i>Trophis scandens</i> subsp. <i>megacarpa</i>	(P.S.Green) P.S.Green	Moraceae	Burny Vine
	<i>Tylophora biglandulosa</i>	(Endl.) F.Muell.	Apocynaceae	
*	<i>Vicia sativa</i>	L.	Fabaceae	Common Vetch

Status	Scientific name	Authority	Family	Common name
	<i>Vigna marina</i>	(Burm.) Merr.	Fabaceae	Dune Bean
	<i>Wahlenbergia insulae-howeii</i>	Lothian	Campanulaceae	
	<i>Westringia viminalis</i>	B.J.Conn & M.E.Tozer	Lamiaceae	
	<i>Xylosma maidenii</i>	Sleumer	Flacourtiaceae	
TSC-E	<i>Xylosma parvifolia</i>	Jessup	Flacourtiaceae	Mountain Xylosma
	<i>Zanthoxylum pinnatum</i>	(J.R.Forst. & G.Forst.) W.R.B.Oliv.	Rutaceae	Yellow Wood
	<i>Zygogynum howeanum</i>	(F.Muell.) Vink	Winteraceae	Hotbark