The status and distribution of non-native plants on the gazetted and territorial islands off the north coast of Western Australia

MICHAEL THOMAS LOHR [1,2], CHERYL ANNE LOHR [1]*, GREG KEIGHERY [3] AND VICKI LONG [4]

[1] Department of Parks and Wildlife, Science and Conservation Division, Woodvale Research Centre, Wanneroo WA 6946, Australia

[2] Edith Cowan University, School of Natural Sciences, Joondalup, WA 6027, Australia

[3] Department of Parks and Wildlife, Science and Conservation Division, Kensington WA 6151, Australia

[4] Vicki Long & Associates (VLA), Karratha WA 6714, Australia

* Corresponding author: cheryl.lohr@dpaw.wa.gov.au

ABSTRACT

Non-native plants pose a substantial threat to island ecosystems in Australia and worldwide. A better understanding of weed distributions is necessary to more effectively manage natural resources on islands. To address this need for Western Australian islands, we created a database of all available records of non-native plants on these islands. Here we report on records from all islands located along the coast of the Pilbara and Kimberley regions in the northern half of Western Australia as well as territorial islands including Christmas Island, the Cocos Islands and the islands of Ashmore Reef. From 2936 individual records, a total of 403 non-native plant species were recorded on 100 Pilbara islands, 51 Kimberley islands and 21 territorial islands. Some of the species are known to be serious environmental weeds. We provide some information on the invasive characteristics and management of 14 environmental weeds for oceanic islands and 12 environmental weeds for continental islands. Developing management plans to address these species, as well as surveying islands adjacent to known infestations, should be a conservation priority for north coast islands. Improved biosecurity procedures and enforcement could prevent the establishment of new island weed populations and reduce future costs associated with the management of active infestations.

Keywords: Australian territorial islands, Kimberley, non-native plants, Pilbara

INTRODUCTION

Deleterious effects of non-native plants on native biodiversity and ecosystem function have been documented worldwide (Vila et al. 2011). Introductions of non-native species represent a substantial component of anthropogenic global environmental change and disproportionally affect islands (Vitousek et al. 1997). The Conservation Commission of Western Australia (2010) identified the establishment of non-native plants on conservation reserve islands as a significant issue affecting island biodiversity. Among the major knowledge gaps that the Conservation Commission listed as impairing effective management of island reserves was a lack of review of weed occurrence and control methods.

Islands along the north coast of Western Australia (WA) have a sporadic history of disturbance and deliberate plant introductions. Islands in this region range from unnamed, occasionally submerged rocks to Barrow Island in the Pilbara, which covers over 23,500 ha. Islands in the Pilbara Region fall into two broad categories, low sand cays with limestone pavement or outcrops, and continental rocky islands consisting of granophyre and basaltic ridges or rock piles (Morris 1990). Islands in the Kimberley Region are highly variable but dominated by rugged landscapes of blocky sandstone (Gibson et al. 2012). Between the sheer size of the management regions along the north coast (Pilbara >50 million ha, Kimberley >46 million ha) and budgetary constraints, many islands along the north coast have not been formally surveyed by biologists.

Recommended citation: Lohr MT, Lohr CA, Keighery G, Long V (2016) The status and distribution of non-native plants on the gazetted and territorial islands off the north coast of Western Australia. *Conservation Science Western Australia* **10**: 8 [online]. https://www.dpaw.wa.gov.au/CSWAjournal

History of island use and disturbance

There is abundant archaeological evidence of previous occupation of the north coast islands by Aboriginal people and use of island resources by south-east Asians. Aboriginal people utilised northern coastal areas long before rising sea levels isolated islands from the Australian mainland (Souter et al. 2006). Some groups were exclusively island-based (O'Connor 1989). Recently, archaeological evidence has indicated that Aboriginal people used sand cays that formed after the rise in sea levels (Paterson & Van Duivenvoorde 2013). Today, local Aboriginal communities continue to use island resources (Jones 2004).

South-east Asians also visited Australian islands to collect marine resources. Makassarese, in particular, visited Kimberley islands between the late 17th century and 1907 to collect trepang (*Holothurians* [L.]; O'Connor & Arrow 2008). These visits frequently involved interactions with local Aboriginal groups and the set-up of large, albiet temporary, camps for processing marine resources (Morwood & Hobbs 1997). Occasionally, non-native plant species, particularly tamarind (*Tamarindus indica*) were introduced by Makassans at camp sites (O'Connor & Arrow 2008).

The first recorded European to visit the Kimberley or Pilbara islands was the Englishman William Dampier in 1688 and 1699 respectively (Dampier 1697; George 1971; O'Connor & Arrow 2008). Following reports of good grazing land and abundant pearl shell in the coastal regions of the Pilbara by FT Gregory in 1861 (Gregory & Gregory 1884), settlers established the towns of Roebourne in 1866 and Cossack in 1872 (MacIlroy 1979). The Kimberley proved more challenging for European settlers. The first attempts at settlement and establishing sheep stations at Camden Harbour (1863–1865) failed due to the difficult terrain, climate and hostility between settlers and the Worora Aboriginals (Speck et al. 1964). European pearlers worked on the west Kimberley coast from the 1860s (Moore 1994) but it was not until the 1880s that the first sheep and cattle stations were established (Stewart et al. 1970). The Cocos Keeling Islands were discovered in 1609 by Captain William Keeling and first settled in 1826 by English merchant Alexander Hare. The islands housed a coconut industry that only ceased in 1987. The islands became a part of Australia in 1984 (Shire of Cocos Keeling Islands 2015).

WA's northern islands have been fished sporadically on a commercial basis since the late 1800s for trepan, pearl shell, turtles, tuna and whales (Morwood & Hobbs 1997; Jones 2004; Paterson 2006). The Dampier Archipelago, particularly the islands around the Flying Foam Passage, became a major pearling area between 1870 and 1900, with up to 1173 people including Europeans, Malays, Chinese and Aboriginals living on Gidley Island and working to harvest pearls and pearl shell (*Pinctada maxima*; Paterson 2006). Similarly, the Frenchman D'Antoine lived on Tyri Island in the Kimberley with more than 50 Aboriginal people who assisted him in the enterprise of collecting marine resources (O'Connor & Arrow 2008). Turtles were taken commercially in northern WA between 1869 and 1973. Exclusive turtle fishing rights over particular areas included islands such as Barrow, Delambre, Thevenard and Depuch and the Montebello Archipelago. Although illegal, turtles were frequently captured on the beach (Halkyard 2009). Between 1901 and 1936 a turtle meat canning company operated at Cossack. Similarly, islands along the Kimberley coastline became turtle fishing sites with the Broome Turtle Preserving Company holding an exclusive licence for the Lacepede Islands and Adele Island (Halkyard 2009). From 1870 to 1872, a whaling station was established on Malus Island in the Dampier Archipelago to process humpback whales (*Megaptera novaeeangliae*; MacIlroy 1979). Historic documents and grave sites suggest that whalers used many other north-west islands (Paterson 2006).

A pastoral settlement was established on West Lewis Island circa 1880 and occupied for approximately two decades (Durlacher 1900). The lease associated with the settlement included East and West Lewis, Enderby, Rosemary, Angel, Gidley, Dolphin and Legendre islands (The West Australian 1883). Several cattle stations were established in the east Kimberley in the Ord River catchment in the 1880s, namely Argyle, Lissadel and Rosewood stations. By the 1890s cattle were being exported live from Wyndam to the Philippines (Stewart et al. 1970). Pastoral settlements do not appear to have been established on Kimberley islands.

Islands have also been an important resource for the mining sector. The first written record of Christmas Island is from 1615. The island was subsequently 'discovered' by the English East India Company in 1643, and the first recorded landing was made by William Dampier in 1688. Christmas Island was not settled until after large quantities of guano-based phosphate were discovered in 1888 by George Clunies-Ross. Phosphate mining began in 1987 with the formation of Christmas Island Phosphate Company Ltd, with the island exporting phosphate since 1901 (Commonwealth of Australia 2002, National Archives of Australia 2016). The Christmas Island phosphate mine was run by the British Phosphate Commission from 1920–1981, a company that also operated phosphate mines on Nauru and Ocean Island (Bailey 1987).

Iron ore, salt, natural gas and oil are produced and exported from various locations along the Pilbara coast. In 1960 the Australian Government eased restrictions on iron-ore exports, which resulted in the rapid development of the Pilbara iron-ore industry. First, Hamersley Iron Pty Ltd built the town and port of Dampier on the Burrup Peninsula (also known as Dampier Island or Murujuga) in 1965. Since then, Mistaken, East-Mid Intercourse, East Intercourse and Preston islands and the Burrup Peninsula have been permanently connected to the mainland via causeways linking deep-water ports to mainland industries. In the Kimberley, Koolan Island (1965–1993) and Cockatoo Island (1957–1986) were mined for iron ore. After the

Koolan Island mine was closed in 1993, its main pit, which was mined to a depth of 80 m below sea level, was filled with water. A town of 850 people was established on Koolan Island in association with the mine (Keighery et al. 1995). The Koolan Island mine reopened in 2006, but was closed again in 2014 when the seawall collapsed, flooding the pit.

Historically, there was very little recreational activity on Pilbara islands as the population of the region was small (~1000 people) and the islands were relatively inaccessible. From 1965–1976, as industrial activities further developed, the population of the Pilbara increased tenfold, which led to an increase in recreational activities on nearby islands (Morris 1990). As of 2014 the population has made another sixfold increase to approximately 67,000 people in the Pilbara and 40,000 in the Kimberley (Australian Bureau of Statistics 2015) again resulting in increased visitation and impacts to the islands. This included 20 recreational shacks that were constructed by local residents on Enderby, Malus, East Lewis and West Lewis islands. In 1980 The Dampier Archipelago Recreation Advisory Committee decided to limit shack development to West Lewis and Malus islands (Woods 1980). These shacks are now leased to local residents by the Department of Parks and Wildlife (Parks and Wildlife). Shacks on Delambre Island (3) and Goodwyn Island (1) were removed in 1984. Parks and Wildlife still maintains shacks on Rosemary Island, and Hermite Island in the Montebello Archipelago for research purposes. The North West Game Fishing Club also maintains a shack on Rosemary Island. Rosemary also had an airstrip which was used until 1983. It was blown up with explosives in 1985 (Morris 1990). Boat ownership rates are extremely high in the Pilbara. In the 1980s, 10% of people owned a boat (Morris 1990). Today, approximately 6700 boats are registered in the Pilbara (Department of Transport 2014). Islands are also visited during the cooler months by organised marine charters and cruising yachts (Morris 1990).

In contrast to the Pilbara and the Kimberley, the human population on the territorial islands has been relatively constant. Christmas Island has a resident population of approximately 2000 people (Commonwealth of Australia 2002),while the Cocos Keeling Archipelago has a population of approximately 450 (around 150 on West Island (Pulu Panjang) and around 300 on Home Island).

Other less obvious uses of the north-west islands include the establishment of religious missions and marine navigation infrastructure, and military activities. Sydney Hadley established a non-denominational mission at Sunday Island in 1899, which remained operational until 1962 and housed 30 to 60 Aboriginal children. He received supplies from Derby once every three months (O'Connor & Arrow 2008; Glaskin 2007). Fourteen Pilbara islands and nine Kimberley islands have marine navigation infrastructure. The Jarman Island lighthouse offshore from Cossack was first built in 1887 with a lightkeeper in residence from 1888. The Kimberley lighthouses were installed in the 1950s and 1960s (O'Brien 1998). Today, offshore lighthouses are typically maintained once or twice per year by a small crew travelling by helicopter. Christmas Island and the Cocos Keeling Islands became targets for military activity during the two World Wars due to their strategic position in the Indian Ocean. Christmas Island was invaded by the Japanese in 1942 and occupied until 1945. Supplies, equipment and machinery were brought onto the island from Japan during this time. Anecdotal evidence suggests some plant species were introduced to the island during this time also, for example *Mucuna albertisii* (Swarbrick & Hart 2000) and possibly *Muntingia calabura*. Similarly, from 1944 to 1946 the Cocos Keeling Islands were home to thousands of military personnel (Shire of the Cocos Keeling Islands 2015). Between 1952 and 1956 the Montebello Islands north of Barrow Island were used by the British military to test three nuclear weapons. Nuclear blasts occurred on Alpha and Trimouille islands, and military infrastructure including buildings and roads were built on Hermite Island (Burbidge et al. 2000).

As island use increases, the potential for non-native species to arrive and establish on islands also increases. While many introduced species will not establish a breeding population, the constant biosecurity risk suggests that any program to reduce the impact of non-native plants on islands needs to focus on monitoring access sites. To provide a baseline for such monitoring and address the knowledge gap in island weed occurrences identified by the Conservation Commission of Western Australia, we collated baseline information summarising current knowledge of the distributions of non-native plants on the islands along the north coast of WA. This information will help to facilitate and direct future research and management efforts, as well as identify more specific gaps in existing knowledge of weed distributions.

METHODS

We gathered data on the distribution and prevalence of non-native plants on Western Australian islands from a variety of sources and entered and processed it using Microsoft Access® (Lohr & Lohr 2016). We discuss the distribution of non-native plants on north coast islands in this manuscript. Distribution of non-native plants on west coast and south coast islands are published in Lohr & Keighery (2016) and Lohr & Keighery (2014) respectively. We defined north coast islands as all islands within the tenure of Parks and Wildlife's Pilbara and Kimberley regions. In addition, Christmas Island and the Cocos Keeling Archipelago were included. These Indian Ocean Territories are managed by the Australian Government in collaboration with local government on the islands.

This area covers all the islands in WA waters from Bulbarli Point to the Northern Territory (NT) border. We used a list of 682 named and gazetted north coast

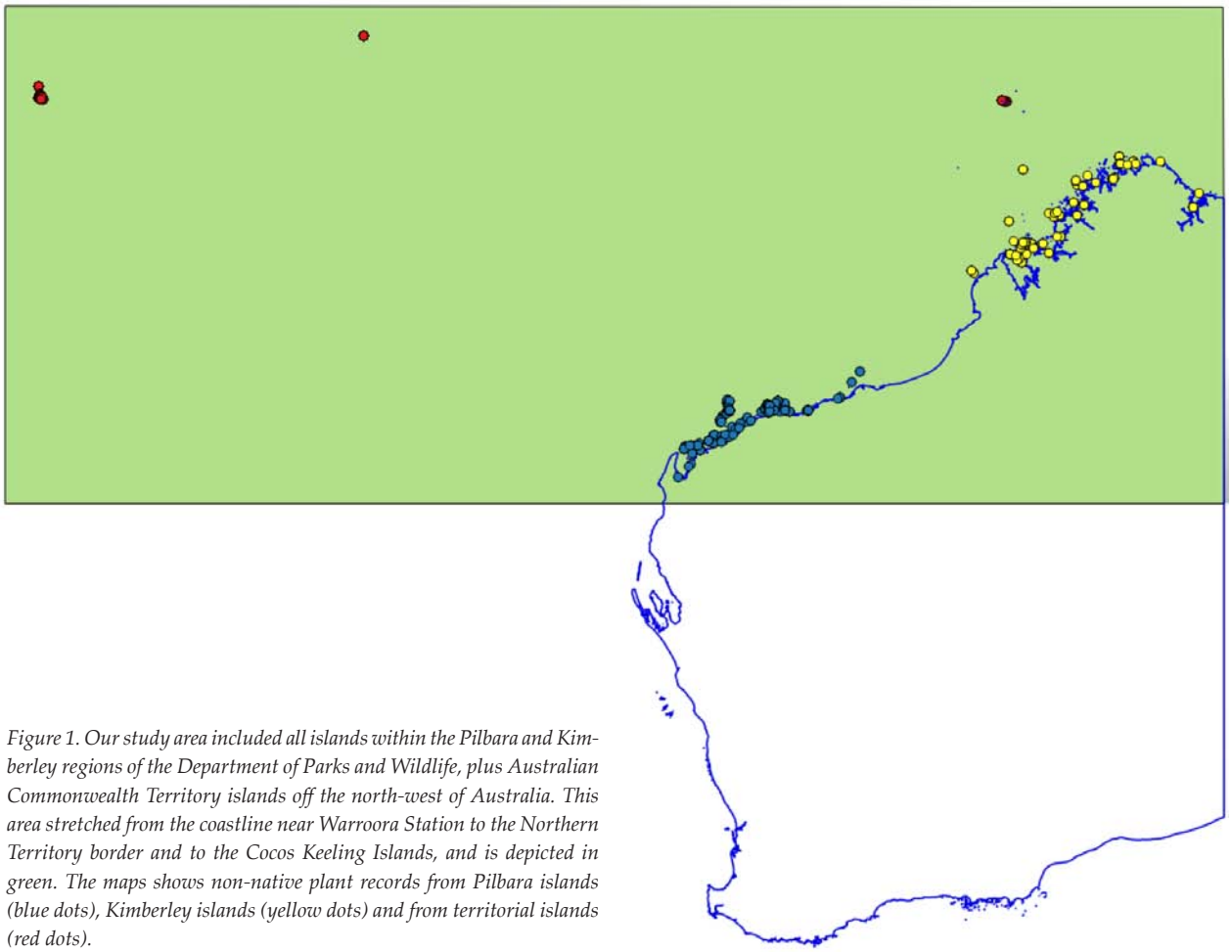

Figure 1. Our study area included all islands within the Pilbara and Kimberley regions of the Department of Parks and Wildlife, plus Australian Commonwealth Territory islands off the north-west of Australia. This area stretched from the coastline near Warroora Station to the Northern Territory border and to the Cocos Keeling Islands, and is depicted in green. The maps shows non-native plant records from Pilbara islands (blue dots), Kimberley islands (yellow dots) and from territorial islands (red dots).

islands to guide the search for records. Sources included Western Australian Herbarium (WAH) records, published journal articles, government and contractor reports, personal accounts from experts and surveys. Given the diversity of data types used, we define a non-native plant record as any non-native plant specimen or any observation that has been formally reported. The term specimen is used to refer to vouchered plant specimens. We excluded records that did not contain taxonomic identification to the species level (i.e. specimens only identified to genus). We cross-referenced non-native plants present on the islands against existing weed lists and prioritisations to help clarify the current or potential negative environmental impacts of the non-native plants. These lists included:

- Department of Parks and Wildlife Regional Weed Prioritisation for both the Pilbara and Kimberley regions;
- Australian Plant Census (APC 2014) state distribution data;
- Australian Plant Name Index database (APNI 2012);
- IUCN '100 of the World's Worst Invasive Alien Species' list (Lowe et al. 2000);
- Department of Agriculture and Food's (WA) Western Australian Organism List (http:// www.agric.wa.gov.au/bam/western-australianorganism-list-waol), which enumerates the state's declared and prohibited plants;
- Department of the Environment National Environmental Alert List (http:// www.environment.gov.au/biodiversity/invasive/ non-native plants/non-native plants/lists/alert.html);
- a list of all weed species officially targeted for biocontrol;
- a list of weed risk rankings from Groves et al. (2003) Weed Categories for Natural and Agricultural Ecosystem Management; and
- Pacific Island Ecosystems at Risk's list of risk assessments for plants in Australia.

Statuses in these lists are reported for each species recorded on north coast islands. While some records were associated with specific coordinates, the coordinates were often inaccurate enough that the coordinates did not fall within the boundaries of the island the record was associated with. For this reason, we used island centroid coordinates to depict the

Table 1

Number of non-native plant records per island, recorded number of non-native plant species, and island type for islands along the north coast of Western Australia. Island groups for the Kimberley are based on the Native Title Determinants and Claims (National Native Title Tribunal 2016).

Island name	Region	Island group	Type of island	No. species recorded
Adele	Kimberley	Isolated	Oceanic	2
Adolphus	Kimberley	Balanggarra	Estuarine	9
Alcatraz (Cone Bay)	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	19
Augustus	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	2
Berthier	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	2
Bigge	Kimberley	Uunguu	Continental	2
Boongarie (Boongaree)	Kimberley	Uunguu	Continental	4
Browse	Kimberley	Isolated	Oceanic	3
Byam Martin	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	2
Caffarelli	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	1
Carlia (South East Osborn)	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	1
Carronade	Kimberley	Balanggarra	Continental	1
Champagny	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	1
Cockatoo	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	37
Coronation	Kimberley	Uunguu	Continental	3
Dunvert	Kimberley	Dambimangari/Buccaneer Archipelago	Continental	2
East Montalivet	Kimberley	Uunguu	Continental	1
Edeline	Kimberley	Mayala/Buccaneer Archipelago	Continental	3
Gibbings	Kimberley	Mayala/Buccaneer Archipelago	Continental	2
Henrietta	Kimberley	Mayala/Buccaneer Archipelago	Continental	1
Hidden	Kimberley	Mayala/Buccaneer Archipelago	Continental	2
Irvine	Kimberley	Mayala/Buccaneer Archipelago	Continental	2
Jungulu	Kimberley	Dambimangari	Continental	2
Katers	Kimberley	Uunguu	Continental	1
Kingfisher	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	3
Koolan	Kimberley	Dambimangari/Buccaneer Archipelago	Continental	87
Lacepede (East)	Kimberley	Lacepede Islands	Continental	2
Lacepede (Middle)	Kimberley	Lacepede Islands	Continental	4
Lachlan	Kimberley	Mayala/Buccaneer Archipelago	Continental	6
Lacrosse	Kimberley	Balanggarra	Continental	1
Lesueur	Kimberley	Balanggarra	Continental	1
Long (Buccaneer)	Kimberley	Mayala/Buccaneer Archipelago	Continental	3
Mary	Kimberley	Uunguu	Continental	1
Mermaid	Kimberley	Mayala/Buccaneer Archipelago	Continental	1
Middle Osborn	Kimberley	Uunguu	Continental	2
North Maret	Kimberley	Uunguu	Continental	1
Northwest Molema	Kimberley	Dambimangari	Continental	1
Pecked (Peckhard)	Kimberley	Mayala/Buccaneer Archipelago	Continental	1
Saint Andrew	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	3
Sir Graham Moore	Kimberley	Balanggarra	Continental	6
South Maret	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	1
South West Osborn	Kimberley	Uunguu	Continental	2
Storr	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	3
Sunday (Buccaneer Archipelago)	Kimberley	Bardi Jawi	Continental	28
Tanner	Kimberley	Mayala/Buccaneer Archipelago	Continental	1
Troughton	Kimberley	Uunguu	Continental	11
Un-named	Kimberley	Dambimangari/Collier Bay	Continental	1
Uwins	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	1
Wargul Wargul	Kimberley	Uunguu	Continental	3
Woku Woku	Kimberley	Uunguu	Continental	1
Wulalam	Kimberley	Dambimangari/Bonaparte Archipelago	Continental	4
464	Pilbara	Lowendal Islands	Continental	1
474	Pilbara	Lowendal Islands	Continental	1
(D)	Pilbara	Lowendal Islands	Continental	1
(J)	Pilbara	Lowendal Islands	Continental	1
(L)	Pilbara	Lowendal Islands	Continental	1
(N)	Pilbara	Lowendal Islands	Continental	1

Island name	Region	Island group	Type of island	No. species recorded
(P)	Pilbara	Lowendal Islands	Continental	1
(S)	Pilbara	Lowendal Islands	Continental	1
(T)	Pilbara	Lowendal Islands	Continental	1
(V)	Pilbara	Lowendal Islands	Continental	1
497 (near Rosemary)	Pilbara	Dampier Archipelago	Continental	1
Abutilon	Pilbara	Lowendal Islands	Continental	2
Airlie	Pilbara	Onslow Islands	Continental	5
Alpha	Pilbara	Montebello Islands	Continental	2
Angel	Pilbara	Dampier Archipelago	Continental	7
Ashburton	Pilbara	Onslow Islands	Continental	1
Barrow	Pilbara	Barrow	Continental	22
Beacon	Pilbara	Lowendal Islands	Continental	1
Bedout	Pilbara	Turtle Islands	Continental	2
Bessieres	Pilbara	Onslow Islands	Continental	1
Boodie	Pilbara	Barrow	Continental	3
Bridled	Pilbara	Lowendal Islands	Continental	2
Burnside	Pilbara	Exmouth Gulf	Continental	1
Crocus	Pilbara	Montebello Islands	Continental	1
Dampier	Pilbara	Dampier Archipelago	Continental	19
Delambre	Pilbara	Dampier Archipelago	Continental	2
Depuch	Pilbara	Forestier Islands	Continental	2
Direction	Pilbara	Onslow Islands	Continental	2
Dixon	Pilbara	Dampier archipelago	Continental	2
Dolphin	Pilbara	Dampier Archipelago	Continental	6
Doole	Pilbara	Exmouth Gulf	Continental	1
Double, South	Pilbara	Barrow	Continental	1
Downes	Pilbara	Port Hedland	Continental	1
Eaglehawk	Pilbara	Dampier Archipelago	Continental	2
East	Pilbara	Great Sandy Nature Reserve	Continental	1
East Intercourse	Pilbara	Dampier Archipelago	Continental	4
East Lewis	Pilbara	Dampier Archipelago	Continental	3
East Mid Intercourse	Pilbara	Dampier Archipelago	Continental	1
Enderby	Pilbara	Dampier Archipelago	Continental	6
Finucane	Pilbara	Port Hedland	Continental	2
Flat	Pilbara	Onslow Islands	Continental	1
Fortescue	Pilbara	Great Sandy Nature Reserve	Continental	2
Gidley	Pilbara	Dampier Archipelago	Continental	3
Great Sandy	Pilbara	Great Sandy Nature Reserve	Continental	2
Haycock	Pilbara	Dampier Archipelago	Continental	1
Hearson	Pilbara	Dampier Archipelago	Continental	2
Hermite	Pilbara	Montebello Islands	Continental	4
Hope	Pilbara	Exmouth Gulf	Continental	1
Intercourse	Pilbara	Dampier Archipelago	Continental	2
Jarman	Pilbara	Roebourne	Continental	4
Large	Pilbara	Great Sandy Nature Reserve	Continental	2
Large Fly	Pilbara	Exmouth Gulf	Continental	1
Legendre	Pilbara	Dampier Archipelago	Continental	8
Little Rocky	Pilbara	Mangrove Islands	Continental	1
Locker	Pilbara	Onslow Islands	Continental	2
Long (Passage Group)	Pilbara	Great Sandy Nature Reserve	Continental	2
Malus Large	Pilbara	Dampier Archipelago	Continental	3
Malus Middle	Pilbara	Dampier Archipelago	Continental	2
Malus North	Pilbara	Dampier Archipelago	Continental	2
Malus West	Pilbara	Dampier Archipelago	Continental	2
Mardie	Pilbara	Great Sandy Nature Reserve	Continental	1
Middle Barrow	Pilbara	Barrow	Continental	4
Middle Mangrove	Pilbara	Mangrove Islands	Continental	2
Middle Mary Anne	Pilbara	Mary Anne Group	Continental	1
North Mangrove	Pilbara	Mangrove Islands	Continental	1
North Muiron	Pilbara	Muiron Islands	Continental	5

Island name	Region	Island group	Type of island	No. species recorded
North Sandy	Pilbara	Onslow Islands	Continental	2
North Turtle	Pilbara	Turtle Islands	Continental	1
North West	Pilbara	Montebello Islands	Continental	1
Pallet Rock	Pilbara	Lowendal Islands	Continental	1
Parakeelya	Pilbara	Lowendal Islands	Continental	1
Pasco	Pilbara	Barrow	Continental	2
Passage	Pilbara	Great Sandy Nature Reserve	Continental	2
Peak	Pilbara	Exmouth Gulf	Continental	1
Potter	Pilbara	Great Sandy Nature Reserve	Continental	2
Pup	Pilbara	Great Sandy Nature Reserve	Continental	1
Renewal	Pilbara	Montebello Islands	Continental	1
Rosemary	Pilbara	Dampier Archipelago	Continental	9
Round (near Serrurier)	Pilbara	Onslow Islands	Continental	1
Round (Passage Group)	Pilbara	Great Sandy Nature Reserve	Continental	1
Serrurier	Pilbara	Onslow Islands	Continental	3
Solitary (passage)	Pilbara	Great Sandy Nature Reserve	Continental	2
South Mangrove	Pilbara	Mangrove Islands	Continental	2
South Muiron	Pilbara	Muiron Islands	Continental	5
Steamboat	Pilbara	Great Sandy Nature Reserve	Continental	2
Table	Pilbara	Onslow Islands	Continental	1
Thevenard	Pilbara	Onslow Islands	Continental	18
Thringa	Pilbara	Great Sandy Nature Reserve	Estuarine	1
Tidepole or Sam's	Pilbara	Dampier Archipelago	Continental	4
Trimouille	Pilbara	Montebello Islands	Continental	2
Varanus	Pilbara	Lowendal Islands	Continental	27
Walcott	Pilbara	Dampier archipelago	Continental	1
Weld	Pilbara	Mary Anne Group	Continental	2
West	Pilbara	Great Sandy Nature Reserve	Continental	1
West Intercourse	Pilbara	Dampier Archipelago	Continental	5
West Lewis North	Pilbara	Dampier Archipelago	Continental	2
West Lewis South	Pilbara	Dampier Archipelago	Continental	5
West Mid Intercourse	Pilbara	Dampier Archipelago	Continental	1
West Moore	Pilbara	Forestier Islands	Continental	3
False	Pilbara	Mary Anne Group	Continental	1
Ashmore Reef (East)	Territory	Sahul Shelf	Oceanic	6
Ashmore Reef (Middle)	Territory	Sahul Shelf	Oceanic	6
Ashmore Reef (West)	Territory	Sahul Shelf	Oceanic	10
Christmas	Territory	Christmas Island	Oceanic	253
Direction (Pulu Tikus) (Cocos Keeling)	Territory	Cocos Keeling Group	Oceanic	15
Horsburgh (Pulu Luar)	Territory	Cocos Keeling Group	Oceanic	15
North Keeling	Territory	Cocos Keeling Group	Oceanic	9
Pulu Ampang	Territory	Cocos Keeling Group	Oceanic	1
Pulu Ampang Kechil	Territory	Cocos Keeling Group	Oceanic	1
Pulu Blan Madar	Territory	Cocos Keeling Group	Oceanic	1
Pulu Cheplok	Territory	Cocos Keeling Group	Oceanic	1
Pulu Kambing	Territory	Cocos Keeling Group	Oceanic	2
Pulu Kelapa Satu	Territory	Cocos Keeling Group	Oceanic	1
Pulu Kembang	Territory	Cocos Keeling Group	Oceanic	1
Pulu Labu	Territory	Cocos Keeling Group	Oceanic	1
Pulu Maraya	Territory	Cocos Keeling Group	Oceanic	1
Pulu Pandan	Territory	Cocos Keeling Group	Oceanic	1
Pulu Siput	Territory	Cocos Keeling Group	Oceanic	1
Pulu Wak-Idas	Territory	Cocos Keeling Group	Oceanic	1
South (Pulu Atas)	Territory	Cocos Keeling Group	Oceanic	6
West (Pulu Panjang) (Cocos Keeling)	Territory	Cocos Keeling Group	Oceanic	79

known ranges of non-native plants. For each species, we provide data on distribution, plant listings, abundance and the potential ecological threats posed by the plant when this information is available.

RESULTS

We collected a total of 2936 individual records of non-native plants on islands. A total of 403 species of non-native plants were recorded on all islands along the north coast with 294 species on territorial islands, 139 species on Kimberley islands, and 61 species on Pilbara islands. Only 13 non-native species were recorded in all three island groups; 53 species were recorded on both territorial and Kimberley islands; 30 were recorded on Kimberley and Pilbara Islands; while 21 species were recorded on territorial and Pilbara islands (Appendix 1). Of the 682 named and gazetted islands we searched for, only 100 Pilbara islands, 51 Kimberley islands and 21 territorial islands had records of introduced plants being present. The low number of islands with weeds is partially an artefact of the limited number of Kimberley islands that have been surveyed (~100 of the 405 named Kimberley islands). Only 24 Kimberley islands have been subject to a thorough biodiversity survey (Gibson et al. 2012). In the Kimberley Region the islands with the most weed species recorded were Koolan (86 species), Cockatoo (36 species) and Sunday (28 species) islands in the Buccaneer Archipelago, and Alcatraz Island (19 species). In the Pilbara Region, the islands with the most weed species recorded were Varanus Island (27 species), Barrow Island (22 species), Burrup Peninsula (19 species) and Thevenard Island (17 species). Australian territorial islands with the most weed species recorded were Christmas Island (252 species), and West Island (Pulu Panjang) in the Cocos Keeling Archipelago (78 species; Table 1). Some 238 non-native plants on north coast islands were not ranked in the 2013 Parks and Wildlife weed prioritisation process because at the time they were not known to occur on Parks and Wildlife tenured land.

Table 2

Key to non-native plant ranking and recommended management actions from Department of Parks and Wildlife regional non-native plant prioritisations.

Code	Non-native plant ranking
VH	Very high (objective is eradication)
H	High (objective is eradication or control to reduce)
M	Medium (objective is control to reduce or containment)
L	Low (objective is containment at key sites only)
N	Negligible (no action to be undertaken but may include monitoring only)
Code	**Recommended management action**
A	No action (the non-native plant species ranking is so low as to not warrant any investment in regional strategic management actions)
B	Monitor only (aims to detect any significant changes in the species' non-native plant risk or management ability)
C	Improve general non-native plant management (aims to minimise non-native plant impact and maintain the overall biodiversity, social, cultural and economic values in the region through improved general non-native plant management)
D	Protect priority sites (aims to prevent spread of non-native plant species to key sites/assets of high biodiversity, social, cultural or economic value)
E	Targeted control to reduce infestations at priority sites (may include biocontrol) (aims to significantly reduce the impact of a non-native plant species on key sites/assets of high biodiversity, social, cultural or economic value through targeted management)
F	Contain regional spread (aims to prevent the ongoing spread of the non-native plant species in the region)
G	Reduce regional infestations (may include biocontrol) (aims to significantly reduce the extent of the non-native plant species in the region)
H	Regional eradication (aims to remove the non-native plant species from the region)
I	State-wide eradication (aims to remove the non-native plant species from the state)

Annotated list

The regions named below refer to Parks and Wildlife management regions. Codes for regional weed prioritisations and recommended management actions are given in Table 2.

Acacia ampliceps (salt wattle) – Recorded on Varanus Island in the Pilbara Region. This species is native to mainland WA but was introduced to Varanus Island as part of the landscaping in the late 1980s. It has since escaped from the garden area and is persistent throughout other parts of the island. This species has showed a capacity for invasion of disturbed areas and formation of dense thickets in mainland areas of the Pilbara Region including the Burrup Peninsula. It should be targeted for management on Varanus Island.

Acacia auriculiformis (earleaf acacia) – Recorded on Christmas Island. Listed as cultivated with low invasive potential but also noted to be present in disturbed areas (Swarbrick 1997). Native to the NT, Queensland (Qld) and probably the eastern Kimberley.

Acacia bivenosa (two-veined wattle) – Recorded on Cockatoo Island in the Kimberley Region and on Thevenard Island in the Pilbara Region. Native to WA but probably not to Cockatoo Island. Its status on Thevenard Island is questionable. On Cockatoo Island three plants were observed to be growing in a disturbed area near the rehabilitated old metal dump but were not found growing elsewhere on the island (Floyd 2010). On Thevenard Island, a single small population is found on one of the early seismic lines from the 1960s and has not spread from this area. *A. bivenosa* is common on all adjacent Pilbara sand cays but its restriction to a

disturbed area on Thevenard Island suggests that it is probably an accidental introduction.

Acacia coriacea (wirewood) – Recorded on Varanus Island in the Pilbara Region and in the Lacipede Islands in the Kimberley Region. This species is native to the adjacent mainland but has been introduced to Varanus Island and persists only as a garden plant (Apache Energy Ltd 2012). A WAH specimen identified as *A. coriacea* subsp. *coriacea* was collected in 1949 from the Lacepede Islands. The Lacepede Islands are outside the normal range of this plant. It may have been introduced deliberately as a shade plant, but appears to have died out (RIP Prince pers. comm.) by 1990.

Acacia elachantha – Recorded on Cockatoo Island in the Kimberley Region. Native to WA but not to Cockatoo Island. Identification of plants referred to as *A. elachantha* on Cockatoo Island is uncertain (Floyd 2010). One record notes that it was seen growing in cultivation as an ornamental at the accommodation village but was also at locations referred to as 'BHP Waste Dump 1 and Dump 2' where it presumably had grown from discarded garden waste (Floyd 2010).

Acacia saligna (black wattle) – Recorded on Koolan Island in the Kimberley Region. Native to south-west WA. Only recorded once on a 2008 survey but not on subsequent surveys (Wiseman 2013). Probably an accidental introduction by mine workers.

Acalypha arvensis (copperleaf) – Recorded on Christmas Island as questionably naturalised but no specimens are known (Swarbrick 1997).

Acalypha indica (Indian nettle) – Recorded on Christmas Island and Home and Direction islands in the Cocos. Common in disturbed areas on all islands where it is recorded. Not known on the Australian mainland.

Acalypha lanceolata lanceolata – Recorded North Keeling and Home islands in the Cocos Islands and on Christmas Island. Found in disturbed areas. Specimens from all three islands have been identified as *A. lanceolata* var. *lanceolata*. Noted as common in the Flying Fish Cove area of Christmas Island by 1904 (Swarbrick 1997). One report states that eradication on North Keeling Island could be achieved fairly easily (Claussen & Slip 2002). Interestingly, *A. lanceolata* var. *lanceolata* is listed as a Priority 1 species in the Kimberley Region of WA (Western Australia Herbarium 1998-), meaning it is native to the region and only known from one or a few locations which are potentially at risk (Parks and Wildlife 2015).

Acetosa vesicaria (Ruby dock) – Recorded on Burrup Peninsula in the Pilbara Region from a WAH specimen collected in 1987. At the time it was collected, the species was believed to have been recently introduced to the Burrup Peninsula by the iron ore railroads. Prioritised as M (D, E, F, G) in the Pilbara Region. Common arid zone weed in WA (Hussey et al. 2007). *Acetosa vesicaria* (L.) is more recently known as *Rumex vesicarius* L. Schuster et al. (2015).

Adenanthera pavonina (red sandalwood tree) – Recorded on Christmas Island and on the main atoll of the Cocos Islands (specific islands not identified). One specimen in the WAH was collected from Christmas Island in 1996. Swarbrick and Hart (2000) list it as a major environmental weed on Christmas Island and noted that it was once widespread in rehabilitation areas as a result of deliberate planting. However, an extensive control program has been initiated (Swarbrick 1997) and these trees have been removed in recent years. A report to Parks Australia recommended eradication of this species in the Cocos Islands but did not elaborate on whether it was naturalised or not (Claussen & Slip 2002).

Aerva javanica (kapok) – Recorded on 28 islands in the Pilbara Region. One of the most widespread and invasive non-native plants of the Pilbara islands. In the Montebello Islands, only one record of *A. javanica* was known in the 1990s but it is now widespread on many islands in the group (Lohr et al. 2014). An end to the control program for *A. javanica* on Thevenard Island has led to rapid increases in numbers across the island. Unless controlled, this species is likely to colonise more islands in the Pilbara Region and increase in density on islands where it altready exists. *A. javanica* is capable of rapidly invading Pilbara islands and has dislaced native flora and fauna on adjacent coastal areas of the Pilbara Region. Prioritised as L (D) in the Pilbara Region but control and prevention of establishment on Pilbara islands should be a high priority.

Aerva lanata (mountain knotgrass) – Recorded on Home Island in the Cocos Islands. Williams (1994) lists it as introduced on the Cocos. Flora of Australia Online (n.d.) lists it as native but states that it was recorded once in a disturbed site near the kampong on Home Island. Probably not native to the Cocos.

Agave americana (sentry plant) – Recorded on Cockatoo and Koolan islands in the Kimberley Region. Cockatoo Island records are from a horticultural specimen in the resort area (Handasyde 2002). Prioritised as N (A, B) in the Kimberley Region. Can form dense monocultures via suckering but spreads very slowly.

Ageratum conyzoides (goatweed) – Recorded on Christmas Island as early as 1900 (Flora of Australia Online n.d.). Common throughout the island, particularly in disturbed areas. Naturalised in the Kimberley but not known from any islands.

Albizia lebbeck (lebbek) – Native to vine thickets in the Kimberley but naturalised from ornamental plantings elsewhere in WA. Recorded as persisting from old plantings at the abandoned mission on Sunday Island in the Kimberley (Lyons et al. 2014). Escaped into drainage reserves around Karratha but at this stage has not expanded beyond the town boundaries. Prioritised as L (C) in the Kimberley Region.

Aleurites moluccanus (candlenut) – Recorded on Christmas Island. Swarbrick (1997) noted that this species was widespread on the island as a result of

planting as part of reforestation efforts. Listed as a major environmental weed (Swarbrick & Hart 2000). Removal from disturbed areas in the national park was recommended but island-wide eradication was not deemed feasible (Swarbrick 1997). Seeds have thick hard shells and have been observed to be moved by water into at least one intact rainforest location (Swarbrick & Hart 2000).

Allamanda cathartica (golden trumpet) – Recorded on Koolan Island in the Kimberley Region and Christmas Island. Commonly cultivated ornamental vine. A WAH specimen from 1993 notes it as having a scattered distribution along a creekline on Koolan Island but it has not been recorded on the island since 1995 (Wiseman 2013). Present in cultivation on Christmas Island but not known to be naturalised (Swarbrick 1997). Prioritised as FAR in the Kimberley Region.

Allium odorum (Chinese chives) – Recorded on Christmas Island. Common edible garden plant. Known to be cultivated on Christmas Island as early as 1904 and has escaped into areas adjacent to gardens (Swarbrick 1997). Not likely to become a serious environmental weed.

Aloe vera (aloe) – Horticultural specimens recorded on Alcatraz and Cockatoo islands in the Kimberley (Handasyde 2002). No records of naturalised populations on north coast islands but has occasionally been recorded as naturalised from dumped garden waste in WA. Prioritised as N (A, B) in the Kimberley Region.

Alternanthera bettzickiana (calico plant) – Listed as present on Christmas Island in Flora of Australia Online n.d. Online (n.d.) but appears to be a cultivated garden plant rather than truly naturalised (Swarbrick 1997).

Alternanthera brasiliana (Brazilian joyweed) – Recorded on Koolan Island in the Kimberley Region. First recorded in 2013 (Wiseman 2013). Prioritised as L (B, C, D) in the Kimberley Region. Commonly planted ornamental that has escaped cultivation in numerous locations in the NT and Qld and a suspected sleeper weed (Queensland Government 2014). Few records in WA at present. Koolan Island plants should be closely monitored and eradication should be considered if they appear to be spreading.

Alternanthera pungens (khaki weed) – Recorded on Christmas Island. First noticed on the golf course in 1959 (Swarbrick 1997). WAH specimens and records from 1986 and 1996 indicate that it had remained localised to the area around the golf course. Sharp spiny seeds make this plant a serious amenity weed in lawns and recreational areas. Present in mainland WA but not known from islands in the Pilbara or Kimberley regions which are mostly too dry for this species to survive.

Alternanthera sessilis (sessile joyweed) – Questionably naturalised on Christmas Island. Flora of Australia Online (n.d.) states that 'The only specimen seen was from a rainwater run-off area associated with a quarry'. This plant is cultivated as a leafy green and has become naturalised in Qld, suggesting that the plant on Christmas Island could be a garden escape. However, Flora of Australia Online (n.d.) also notes that the lone specimen of *A. sessilis* was collected in the same location where the first specimen of *Eclipta prostrata* was recorded.

Alysicarpus ovalifolius (alyce clover) – Recorded on five islands in the Kimberley Region. A weed of lawns, gardens and coastal areas (Hussey et al. 2007). Prioritised as N (A) in the Kimberley Region.

Alysicarpus vaginalis (white moneywort) – Recorded on Home Island in the Cocos Islands, and Christmas Island. Widespread on Christmas Island on roadsides and in disturbed areas (Swarbrick 1997) with WAH specimens from multiple locations on the island. Flora of Australia Online (n.d.) describes it as a rare and localised weed in the Cocos Islands. Sometimes cultivated as a livestock forage crop in the tropics. Also recorded on Koolan Island in the Kimberley Region, where it is prioritised as N (A). The record from Koolan Island (Williams et al. 2013) cites Keighery et al. (1995) as the ultimate source of the record for this species. A Koolan Island specimen at the WAH associated with the original Keighery et al. (1995) record was later re-identified as *A. ovalifolius*. *A. vaginalis* probably does not actually occur on Koolan Island.

Amaranthus cruentus (redshank) – Recorded on Christmas Island. Only collected once in 1904 (Swarbrick 1997). A commonly cultivated species which may originally have been brought to Christmas Island as an ornamental (Flora of Australia Online n.d.). Probably no longer present on Christmas Island.

Amaranthus dubius (red spinach) – Recorded on Christmas Island. Flora of Australia Online (n.d.) describes it as 'known from a single collection' but Swarbrick (1997) states that it is naturalised around gardens and disturbed areas. It was collected on a Northern Australia Quarantine Strategy (NAQS) survey in 2000 and was described as a minor weed with scattered populations in disturbed areas (NAQS 2000). Commonly cultivated in north-east Asia as a leafy vegetable (Grubben 1994) and has likely escaped into adjacent disturbed areas on Christmas Island.

Amaranthus spinosus (spiny amaranth) – Recorded on Christmas Island. Flora of Australia Online (n.d.) describes it as a probable spontaneous weed and notes a single specimen collected in 1968. It is not mentioned by Swarbrick (1997) but may be the species referred to as '*Amaranthus* sp.' which is said to be grown as a garden vegetable. This species is not naturalised in mainland WA and is a prohibited species.

Amaranthus tricolor (Joseph's coat) – Recorded on Christmas Island. Popular edible and ornamental plant in the tropics (Palmer 2009). Swarbrick (1997) regarded it as questionably naturalised but noted that it was cultivated in gardens.

Figure 2. Recorded distribution of non-native plant species on islands in the Exmouth Gulf, Western Australia. Black dots indicate the centroid of an island with named non-native plant populations. Islands have grey fill, mainland has white fill.

Amaranthus viridis (green amaranth) – Recorded on 17 islands in the Pilbara Region, Koolan (specimen) and Troughton islands in the Kimberley Region, and Christmas Island (specimen). Flora of Australia Online (n.d.) lists it as native to Christmas Island but refers to it as a weedy species that is common on waste ground. Perhaps this is the reason that it is conspicuously absent from Swarbrick's (1997) treatment of the non-native flora of Christmas Island. Palmer (2009) suggested it is probably native to Europe while Hussey et al. (2007) described it as originally from North America. *A. viridis* has not been documented on Koolan Island since its first record on the island was published by Keighery et al. (1995), despite numerous subsequent plant surveys, and may no longer be present. The native plant *A. undulatus* was erroneously recorded as *A. viridis* on Barrow Island and many Pilbara island records may be the result of the same identification error. Prioritised as N (A, B) in the Pilbara Region and N (A) in the Kimberley Region.

Amorphophallus paeoniifolius (elephant foot yam) – Recorded on West Island of Ashmore Reef. A single plant was noted to be growing near a camp site on the north shore of the island but was not seen again on later visits to the area (Pike & Leach 1997). Presumed to have been planted and later eaten by Indonesian fishermen (Pike & Leach 1997).

Amphineuron opulentum (opulent fern) – Recorded on Christmas Island. Found in rainforest clearings and along tracks through rainforests (Flora of Australia Online n.d.). Notes with a WAH specimen collected in 1987 state that it was found on a track in primary rainforest.

Anacardium occidentale (cashew tree) – Horticultural specimen recorded on Alcatraz Island in the Kimberley Region. Swarbrick (1997) listed this plant as cultivated on Christmas Island but included the text '? rehab areas' in a description of its distribution. Not currently recognised as naturalised in WA but two specimens from the WAH were collected in the Kimberley Region in 1999, and the descriptions of their localities seem to indicate that the plants are naturalised. The area adjacent to the cultivated specimen on Alcatraz Island should be monitored for seedlings.

Andrographis paniculata (green chirayta) – Recorded on Christmas Island. Naturalised on roadsides and used as a medicine (Flora of Australia Online n.d.; Swarbrick 1997). Reported to be 'apparently not cultivated' (Flora of Australia Online n.d.) and 'possibly cultivated' (Swarbrick 1997).

Annona muricata (soursop) – Recorded on Christmas Island. Cultivated as early as 1904 (Swarbrick 1997). Now both cultivated and commonly naturalised along rainforest tracks (Swarbrick 1997).

Annona reticulata (custard apple) – Recorded on Christmas Island. Cultivated as early as 1904 (Swarbrick 1997). Now a number of naturalised stands are present (Flora of Australia Online n.d.).

Antigonon leptopus (coral vine) – Recorded on Koolan Island in the Kimberley Region and Christmas Island. Listed as a minor environmental weed on Christmas Island by Swarbrick and Hart (2000). A perennial vine that grows over and outcompetes native shrubs and small trees (Swarbrick 1997). Dense growth of this species in sea cliffs may be negatively impacting native land crab migrations (Swarbrick & Hart 2000). There is some concern that it plays an important role in facilitating feral honeybees. *A. leptopus* is difficult to control as it resprouts from tubers after foliar application of glyphosate (CIMFR 2015). Prioritised as L (C) in the Kimberley Region. Not known to be present on any Pilbara island but it is present in gardens in Karratha and has the potential to spread to islands in the Dampier Archipelago. Considering its detrimental impacts on biodiversity on Christmas Island, the difficulty of controlling it, and its limited distribution in WA, efforts should be made to control *A. leptopus* on Koolan Island and consideration should be given to increasing its priority level across the Kimberley.

Apluda mutica (Mauritian grass) – Recorded on West Island in the Cocos Islands. Williams (1994) lists it as naturalised on the Cocos. Flora of Australia Online (n.d.) lists it as native but states that it is only known from the northern part of West Island in 'regrowth on roadsides in coralline sand'. Probably not native to the Cocos Islands.

Arctotheca calendula (cape weed) – Recorded on Barrow Island in the Pilbara in 1993 and again as a single plant in 2012. The single plant observed in 2012 was collected and this species has not been observed on the island since. This record is the northern most record of this species in WA. Prioritised as N (A, B) in the Pilbara Region.

Areca catechu (areca palm) – Recorded on Christmas Island. Described as cultivated but present in some rehabilitation areas by Swarbrick (1997). Swarbrick and Hart (2000) later recommended using felling as a method of managing this species in rehabilitation areas where it was said to be regenerating, suggesting that it is to some degree naturalised. This has occurred in recent years (CIMFR 2015).

Aristolochia elegans (calico flower) – Recorded on Christmas Island by the synonym *A. littoralis*. Flora of Australia Online (n.d.) notes that it is naturalised in secondary rainforest while Swarbrick (1997) describes it as naturalised on cliffs. A commonly planted tropical ornamental that has escaped cultivation in several tropical areas in Australia and overseas.

Artemisia vulgaris (mugwort) – Recorded on Christmas Island, where it iswidespread in a variety of disturbed habitats (Swarbrick 1997). There is some ambiguity as to whether specimens from Christmas Island are *A. vulgaris* or *A. verlotiorum* (Flora of Australia Online n.d.).

Arundo donax (giant reed) – Recorded on Tidepole (Sam's) Island and in the Cleaverville beach camping area in the Pilbara Region, Koolan Island in the Kimberley Region, and Christmas Island. Common in roadside ditches near settled areas on Christmas Island (Swarbrick 1997). Probably intentionally introduced as a source of material for making brooms (Flora of Australia Online n.d.) and may still be 'semicultivated' (Swarbrick 1997). On Koolan Island a WAH specimen was taken from a single 6 m clump on a highly disturbed hillside near the old townsite in 2005. Five small populations are now known on the island and are being controlled (Williams et al. 2013). Listed by the IUCN as one of the world's 100 worst invasive species (Lowe et al 2000). Can spread rapidly and form dense monocultures in wetland areas. Prioritised as L (B, C, D) in the Pilbara Region and L (B, C) in the Kimberley Region.

Asparagus densiflorus (asparagus fern) – Recorded as cultivated on Christmas Island. On the Australian mainland this name is thought to be misapplied to individuals belonging to the species *A. aethiopicus* but *A. densiflorus* may exist in cultivation on the mainland (Batchelor and Scott 2006). The identity of plants in cultivation on Christmas Island is not clear. However, a number of species in the genus *Asparagus* – including *A. aethiopicus* – have been listed as weeds of national significance and some have become serious environmental weeds in Australia and overseas. Plants tentatively identified as *A. densiflorus* on Christmas Island should be monitored and any naturalising populations should be eradicated.

Aster subulatus – see *Symphyotrichum squamatum.*

Asystasia cf. chelonoides – Recorded on Christmas Island. A specimen in the WAH notes that this species is locally abundant at a location near Drumsite on the 'feral margins of a garden'. Probably an escaping ornamental.

Asystasia gangetica (Ganges primrose) – Recorded on Christmas Island and persistent in gardens in Karratha. Can form dense spreading mats that smother low vegetation and are difficult to control. Both an environmental and agricultural weed overseas. Flora of Australia Online (n.d.) notes that it is a likely garden escape but has not been recorded since 1912. However, the WAH holds naturalised specimens of this species collected on Christmas Island in 1996 and 2000. Noted only as a garden escape by Swarbrick (1997) and not mentioned in a later work on environmental weeds on Christmas Island (Swarbrick & Hart 2000) but it is listed by Parks Australia as a common weed for Christmas Island (CIMFR 2015). Despite being listed as a NAQS target and a national environmental alert species, this species is designated as permitted by DAFWA. The

status of this species should be changed to prohibited to reflect the risk it poses to agricultural and native ecosystems in WA and NAQS efforts already under way to prevent it from establishing in WA.

Austroeupatorium inulifolium (austroeupatorium) – Recorded on Direction, Home and West islands in the Cocos Islands. This species is a NAQS target and is listed as prohibited in WA. Strangely, the only reference to this species being present on the Cocos Islands is from (Williams 1994) and *A. inulifolium* is not mentioned in a later NAQS report on the status of weeds in the Cocos (NAQS 2000). The record by Williams (1994) may be the result of a misidentification of the superficially similar plant *Chromolaena odoroata*, which is listed in subsequent literature on the Cocos Islands. Williams collected a specimen of *C. odorata* in 1986 (CBG 8601874) that is housed at the Centre for Australian National Biodiversity Research and is noted to have been identified in 2007. It seems likely that this specimen was originally identified incorrectly as *A. inulifolium* and that the name *A. inulifolium* as used in Australia is misapplied to specimens of *C. odoroata*. Dodd et al. (2012) note that *C. odoroata* on West Island was previously misidentified as *Eupatorium inulifolium*, which is a synonym of *A. inulifolium*.

Axonopus compressus (broadleaf carpet grass) – Recorded on Christmas Island. Naturalised from plantings as a lawn grass (Swarbrick 1997). Invading disturbed areas near settlements and forest margins (Flora of Australia Online n.d.). There seems to be some confusion regarding the identification of the species present on Christmas Island. All available record sources including two WAH specimens use the name *A. compressus*. However, the Australian Plant Name Index (2014) lists both *A. compressus* and *A. fissifolius* as naturalised on Christmas Island. Examination of material from Christmas Island held in major herbaria could help determine which species is present.

Azadirachta indica (neem) – Recorded on Alcatraz Island in the Kimberley Region. A WAH specimen from 2005 indicated that there was one mature tree that was a horticultural planting and this appeared to be self-seeding in the area. A later survey in 2014 found three large trees and noted one escaped individual in granite on the western end of the island (Holmes 2014). Notes from this survey also mentioned that a caretaker had cut down a few neem trees in the past (Holmes 2014). Prioritised as M (D, E, F) in the Kimberley Region. This species appears to be rapidly naturalising in the Kimberley Region and shows potential to become a major woody weed in the tropics (Hussey et al. 2007). Because this species produces bird-dispersed berries, a single mature specimen is potentially a threat to adjacent islands and the mainland as well. It grows well in dry infertile soils and has allelopathic and toxic properties whose effects on wildlife are being investigated (Csurhes and Edwards 1998). Prompt removal of this population is recommended while eradication is still feasible. *A. indica* is increasingly planted in Karratha gardens and some roadsides. It has the potential to become a problem on nearby islands of the Dampier Archipelago where suitable habitat exists.

Barleria cristata (Philippine violet) – Recorded on Christmas Island. Flora of Australia Online (n.d.) states that it was introduced around 1960 as an ornamental hedge plant. Now naturalised along roadsides and disturbed areas (Swarbrick 1997).

Barleria lupulina (hop-headed barleria) – Recorded on Christmas Island. Often cultivated as an ornamental house plant (Flora of Australia Online n.d.). Naturalised along roadsides (Swarbrick 1997).

Barringtonia asiatica (fish poison tree) – Recorded on Christmas Island. Probably introduced to Christmas Island after 1950 (Swarbrick 1997). Apparently planted along Flying Fish Cove and in some disturbed areas where some mature plants are producing stands of seedlings (Swarbrick 1997). Swarbrick and Hart (2000) list it as a minor environmental weed on Christmas Island. Swarbrick (1997) recommended removal from disturbed areas inside the national park as part of replanting native species but recommended against control in other areas because its impacts are minor and its spread is slow. This species has been removed from rehabilitation areas in recent years (CIMFR 2015). Listed in Flora of Australia Online (n.d.) as native in the Cocos Islands.. This status may need to be re-examined in light of its apparently naturalised status on Christmas Island.

Basella alba (climbing spinach) – Recorded on Christmas Island. Both cultivated as a leaf vegetable and naturalised on coastal terraces (Swarbrick 1997).

Bauhinia corymbosa (orchid tree) – Recorded on Koolan Island in the Kimberley Region. The record implies that it exists on the island only as ornamental plantings (Wiseman 2013). Not recorded as naturalised anywhere in Australia.

Bauhinia monandra (pink orchid tree) – Recorded on Christmas Island. Commonly cultivated garden tree that has naturalised along roads and in disturbed areas (Swarbrick 1997). Listed as a major environmental weed by Parks Australia but ranked as low risk relative to other listed species (CIMFR 2015).

Bidens bipinnata (Spanish needles) – Recorded on Adolphus, Koolan and Wargul Wargul islands in the Kimberley Region and the Burrup Peninsula in the Pilbara Region. Barbed seeds stick to clothing and fur and are dispersed by a variety of animals including humans. Prioritised as L (B, C) in the Kimberley and Pilbara regions.

Bidens pilosa (cobbler's pegs) – Recorded on Christmas Island and six Kimberley islands. Sometimes identified as *B. pilosa* var. *minor* on Christmas Island. Barbed seeds stick to clothing and fur and are dispersed by a variety of animals including humans. Common weed in a variety of disturbed habitats on Christmas Island (Flora of Australia Online n.d.; Swarbrick 1997). Prioritised as L (B, C) in the Kimberley Region.

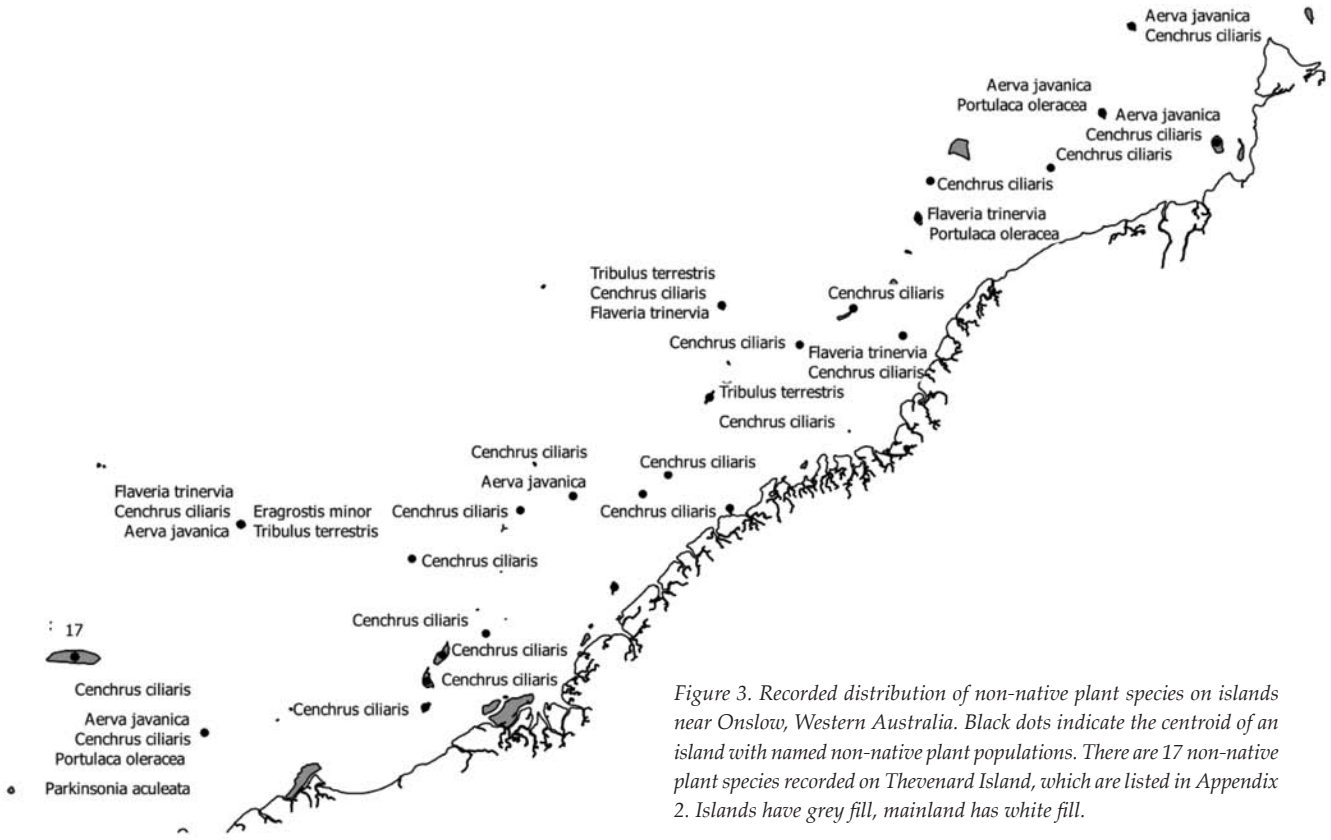

Figure 3. Recorded distribution of non-native plant species on islands near Onslow, Western Australia. Black dots indicate the centroid of an island with named non-native plant populations. There are 17 non-native plant species recorded on Thevenard Island, which are listed in Appendix 2. Islands have grey fill, mainland has white fill.

Bixa orellana (lipstick tree) – Recorded on Christmas Island. Cultivated and naturalised shrub introduced around 1970 (Swarbrick 1997). Flora of Australia Online (n.d.) notes that it has naturalised at Drumsite where its seeds have been transported by water down drainage channels

Boerhavia coccinea (hogweed) – Recorded on Home Island in the Cocos Islands and on Christmas Island. Native to mainland WA with presumably native populations on Pilbara and Kimberley islands. Both WAH specimens from Christmas Island are from roadsides and the description of the Home Island specimen refers to it as 'ruderal'. Not currently listed as present on Christmas Island or in the Cocos by the APC (2014) or any other available source. The Cocos specimen was collected by DG Williams in 1986 but is not listed in the comprehensive account of the vegetation of the Cocos Islands published by Williams in 1994. These specimens might need to be re-examined to determine whether they truly represent *B. coccinea* or, perhaps, are misidentified examples of the similar species *B. diffusa*.

Boerhavia diffusa (spreading hogweed) – Recorded in Flora of Australia Online (n.d.) as naturalised on the main atoll of the Cocos Islands and native on Christmas Island. Williams (1994) recorded this species as an introduced plant on Horsburgh, West and Home islands in the Cocos Islands. The text in Flora of Australia Online (n.d.) seems to indicate that this species grows in disturbed soils and is often associated with human habitation in both Christmas Island and the Cocos Islands. The APC (2014), however, considers it native on both the Cocos Islands and Christmas Island. Strangely, this entire genus is conspicuously absent from Swarbrick's (1997) comprehensive list of introduced plant species on Christmas Island. The status of this plant on Christmas Island and the Cocos Islands needs to be revisited.

Boerhavia erecta (erect spiderling) – Recorded on Christmas Island. First identified on Christmas Island as part of a NAQS survey in 2000. A specimen was collected and is housed at the WAH. The specimen notes indicate that it was from a population of about six plants found along a mowed road margin near the Chinese Cemetery. *B. erecta* is a NAQS target species not known from the Australian mainland and has proved to be a serious agricultural weed in some crops overseas. The original report from the survey that first identified this species on Christmas Island recommended eradication of this population (NAQS 2000).

Bothriochloa bladhii (Australian bluestem) – Recorded on West Island in the Cocos Islands and Christmas Island. Native to WA but populations on territorial islands are apparently non-native. Most records and specimens on Christmas Island and West Island are from roadsides.

Bothriochloa pertusa (hurricane grass) – One WAH specimen from Koolan Island in the Kimberley Region. Noted as being common in the administration block

lawn. An introduced pasture grass with an expanding range in the Kimberley Region (Hussey et al. 2007). Prioritised as L (C) in the Kimberley Region.

Bougainvillea spectabilis (great bougainvillea) – Recorded on Koolan Island in the Kimberley Region and Christmas Island. Only in cultivation on Koolan Island (Wiseman 2013). Also cultivated on Christmas Island but persisting in areas of former habitation as well (Swarbrick 1997). Popular ornamental in the tropics.

Brassica nigra (black mustard) – Recorded on Christmas Island. Swarbrick (1997) listed this species by the synonym *Sinapis nigra* and noted that it had not been reported on the island since 1904 and was possibly locally extinct.

Breynia disticha (snow bush) – Recorded on Home Island and West Island in the Cocos Islands. Ornamental plant often used as a hedge in the tropics. A WAH specimen was collected from near a house at the quarantine station and the description notes that it was locally common and that many seedlings were present near mature plantings. Has become naturalised from old plantings via suckering in some areas of Hawaii. Listed by Swarbrick (1997) only as a cultivated plant on Christmas Island.

Bryophyllum pinnatum (air plant) – Recorded on Home Island in the Cocos Islands. Flora of Australia Online (n.d.) notes that it is a garden escape mainly found in disturbed areas on Home Island. *B. pinnatum* is a prohibited plant in WA but is known to be cultivated as an ornamental in the state. It spread vegetatively and has become a serious environmental weed in some parts of its naturalised range including Qld, New South Wales (NSW) and several South Pacific islands. Naturalised populations of *B. pinnatum* in the Cocos Islands should be controlled. While this species has the potential to become a problematic environmental weed in Western Australia, particularly for Kimberley islands, controlling populations in the Cocos Islands will probably not be effective at preventing infestations on the WA mainland unless known cultivated and naturalising populations in WA are also removed.

Caesalpinia pulcherrima (poinciana) – Recorded on Christmas Island. Ornamental plant cultivated on Christmas Island prior to 1904 (Swarbrick 1997). A WAH specimen from 1996 notes that it is commonly naturalised along roadsides.

Cajanus cajan (pigeon pea) – Recorded on Christmas Island. Both cultivated as food and questionably naturalised (Swarbrick 1997). A WAH specimen from 1996 is from a single plant found at the edge of a garden and presumably represents a recent garden escape.

Calopogonium caeruleum (jicama) – Recorded on Christmas Island. Introduced to Christmas Island at Field 21 as a legume cover crop as part of mine rehabilitation activities and now naturalised in other areas of the island (Swarbrick 1997). Swarbrick (1997) considered management of this plant on Christmas Island to be unnecessary because it was shaded out once trees in rehabilitation areas reached a certain height. However, it has since been reported to grow to the tops of mid-sized trees and interfere with forest regeneration (NAQS 2000). This species is listed as a major weed threat in disturbed areas of Christmas Island (CIMFR 2015).

Calopogonium mucunoides (calopo) – Recorded on Christmas Island. Like *C. caeruleum*, it is a recent introduction that was imported to provide erosion control in mine rehabilitation areas and has naturalised outside the areas where it was originally cultivated (Swarbrick 1997).

Calotropis procera (apple of Sodom) – Recorded on Adolphus and Lacross islands in the Kimberley Region. Listed in the Western Australia Organism List as a category C3 Declared Pest. Originally planted as a garden ornamental, it is now a serious weed in the Kimberley (Hussey et al. 2007). Contact with the sap can cause dermatitis and it is toxic to livestock (Hussey et al. 2007). Prioritised as L (B, C) in the Kimberley Region. Becoming prevalent in the Pilbara Region in a variety of habitats from river beds (De Grey River) to stony hill slopes (Karratha hills) and has the potential to invade islands of the Dampier Archipelago.

Canavalia ensiformis (jack bean) – Recorded on Koolan Island in the Kimberley Region. The WAH only has two specimens of *C. ensiformis* that were collected in Western Australia and both were collected from a remote station in the Kimberley in 1952. The Koolan Island record is from a single 2008 survey and has not been reported from other surveys before or since (Wiseman 2013). It seems possible that this record actually refers to the native species *C. rosea* which has been collected on Koolan Island (Keighery et al. 1995).

Canna indica (Indian shot) – Recorded on Christmas Island. Cultivated as a garden ornamental by 1904 (Swarbrick 1997). Now naturalised near gardens and in a number of patches along the railway near Drumsite (Flora of Australia Online n.d.).

Capsicum frutescens (African bird's eye chilli) – Recorded on Christmas Island. Commonly cultivated for food worldwide. Flora of Australia Online (n.d.) stated that its status on Christmas Island was uncertain and it could not be determined whether it was cultivated or naturalised. However, Swarbrick (1997) noted that it was naturalised in rainforest edges and rehabilitation areas.A more recent document lists it among the significant non-native plants of disturbed areas, albeit in the lowest threat category (CIMFR 2015).

Cardamine hirsuta (hairy bittercress) – Recorded on Christmas Island. A weed of nurseries and gardens (Swarbrick 1997).

Cardiospermum halicacabum (balloon plant) – Recorded on Adolphus Island in the Kimberley Region and on Christmas Island. A vine that can overgrow and shade out native vegetation and an agricultural weed

in some legume crops. One WAH specimen collected on Christmas Island is identified as *C. halicacabum* var. *halicacabum*. Present on Christmas Island by 1904 (Flora of Australia Online n.d.), where it is now found on roadsides, rainforest margins and in abandoned quarries. One WAH specimen was collected from a forest rehabilitation area and it is listed as a threatening weed of rehabilitation areas (CIMFR 2015). Naturalised status in northern Australia is to some degree in question. *C. halicacabum* is considered to be a pre-European introduction in the NT (Australian Plant Name Index 2004). Prioritised as L (B, C, D) in the Kimberley Region.

Carica papaya (papaya)– Recorded on North Keeling Island in the Cocos Islands and Christmas Island. Commonly planted fruit tree in the tropics and known to be cultivated on Alcatraz Island in the Kimberley. Reported to be naturalised on Christmas Island by 1904 and now present in disturbed areas and on roadsides (Swarbrick 1997). Suspected to be a main host for fruit flies on Christmas Island (NAQS 2000). Claussen & Slip (2002) recommended the eradication of this plant on North Keeling Island and suggested that it could be achieved over several years by leaving dense clusters of immature plants to self-thin and applying herbicide to the cut stump of mature fruiting trees. Not currently recognised as naturalised on mainland WA but a specimen lodged in the WAH was taken from a population described as growing in woodland on the mainland in the Kimberley Region. Alcatraz Island individuals should be monitored to ensure that they do not naturalise.

Cascabela thevetia (yellow oleander) – Recorded on Koolan Island. A WAH specimen collected in 1993 notes that it had a scattered distribution in eucalyptus woodland. Commonly grown as an ornamental but it is extremely toxic to humans and livestock. Prioritised as L (B, C, D) in the Kimberley Region. Martin et al. (2006) list *C. thevetia* among those species that negatively impact rangeland biodiversity. At present, Koolan Island is one of only two locations where this plant is known to have naturalised in WA. Consideration should be given to controlling this plant on Koolan Island to prevent its spread to other areas.

Cassia fistula (golden rain tree) – Recorded on Koolan Island. Commonly grown as an ornamental tree. Prioritised as N (A, B) in the Kimberley Region. Keighery et al. (1995) listed this species as naturalised on Koolan Island but a more recent source indicates that it only exists as ornamental plantings (Wiseman 2013).

Castilla elastica (Panama rubber tree) – Recorded on Christmas Island. Originally planted around 1900 as part of plans to develop commercial rubber production on Christmas Island (Swarbrick 1997). Original trees are now large and seedlings have spread up to 0.5 km into adjacent rainforest via dispersal of fruit by birds (Swarbrick & Hart 2000). Swarbrick and Hart (2000) list it as a major environmental weed on Christmas Island and specify that it poses a serious threat to intact rainforest. While ambivalent on how to manage the original plantings, Swarbrick (1997) recommended the removal of all other individuals. This species is also listed as a major threatening weed in a few locations on Christmas Island but is apparently easily controlled (CIMFR 2015).

Casuarina equisetifolia (coastal she-oak) – Recorded on Home and West islands in the Cocos Islands, Thevenard Island in the Pilbara Region, and Cockatoo Island in the Kimberley Region. On Thevenard Island, it is reported to be naturalised from plantings originally intended to provide a windbreak. This record is almost certainly an error and probably refers to plantings of athel pine (*Tamarix aphylla*). On Cockatoo Island, it was only recorded as a cultivated plant within the garden area at the resort (Handasyde 2002). Not prioritised in either the Pilbara or Kimberley regions. Flora of Australia Online (n.d.) notes that *C. equisetifolia* subsp. *equisetifolia* was described as naturalised on Home Island in the Cocos Islands as early as 1890 and that it was originally introduced over 50 years earlier. Williams (1994), however, stated that large trees were planted near settlements on Home and West islands but did not appear to be spreading to additional islands or producing any saplings. The status of *C. equisetifolia* on the Cocos appears to be introduced but not truly naturalised.

Catharanthus roseus (rosy periwinkle) – Recorded on Cockatoo, Koolan and Sunday islands in the Kimberley Region and on Christmas Island. On Cockatoo Island *C. roseus* was observed in the garden area of the resort but was listed as a weed (Handasyde 2002). Presumably it had naturalised to some degree from ornamental plantings. A WAH specimen was collected on Koolan Island in 1993 and associated notes stated that *C. roseus* was very common on road verges. However, this species has not been recorded in subsequent surveys (Wiseman 2013). Individuals on Sunday Island are the result of previous plantings and do not appear to be naturalised (Lyons et al. 2014). On Christmas Island it is listed as both cultivated and naturalised in gardens and disturbed areas (Swarbrick 1997). Flora of Australia Online (n.d.) notes a record of this species from 1912 but suggests it may have been from a cultivated plant. Prioritised as N (A, B) in the Kimberley Region.

Ceiba pentandra (kapok tree) – Recorded on Christmas Island and the main atoll of the Cocos Islands. A large tree with wind-dispersed seeds surrounded by cotton-like fibres. Introduced in many tropical regions for commercial harvest of the soft fibres. Swarbrick and Hart (2000) list it as a minor environmental weed on Christmas Island, as does the CIMFR (2015). Swarbrick (1997) described small populations in two areas of the island and recommended its eradication as a potentially invasive threat to rehabilitation areas. Claussen & Slip (2002) recommended eradication of this species in the Cocos Islands but did not list specific islands where it occurred.

Celosia argentea (plumed cockscomb) – Recorded on Christmas Island. Flora of Australia Online (n.d.) states that it was known to be present on Christmas Island as early as 1897 and was listed as cultivated in 1904. Notes associated with a WAH specimen collected in 1996 state that it is abundant along disturbed roadsides. Swarbrick (1997) describes it as naturalised and questionably cultivated in gardens, roadsides and disturbed areas.

Cenchrus biflorus (Indian sandbur) – Recorded on Koolan and Troughton islands in the Kimberley Region. Notes associated with a WAH specimen collected on Troughton Island in 1991 describe it as frequent on disturbed ground around the base. Records from Koolan Island come from surveys in 2004 and 2005 and are somewhat ambiguous listing the species as '*Cenchrus ?biflorus*'. Prioritised as N (A, B) in the Kimberley Region. Widespread on the mainland of the Kimberley Region, especially the western portion (Hussey et al. 2007).

Cenchrus brownii (slimbristle sandbur) – Recorded on Browse Island in the Kimberley Region, East, Middle and West islands of Ashmore Reef, and Christmas Island. Comments associated with a WAH specimen collected on West Island in 2003 refer to *C. brownii* as infrequent but Pike and Leach (1997) state that it is more common on West Island than on East and Middle islands. A common weed of roadsides and disturbed areas on Christmas Island (Swarbrick 1997). The only record of *C. brownii* on Browse Island is from a WAH specimen collected there in 2004. This species is currently listed as excluded on Florabase (Western Australian Herbarium 1998-) and WA Census but should be added based on the WAH specimen. Efforts should be made to prevent its spread to other islands or the WA mainland.

Cenchrus ciliaris (buffel grass) – Recorded Home and West islands in the Cocos Islands, East and West islands of Ashmore Reef, seven islands in the Kimberley Region, and 49 islands in the Pilbara Region. Peak and Table islands in the Pilbara Region are both believed to be free of *C. ciliaris* as of 1997 (Kendrick 1997). Recently recorded (by one of us) as abundant on Round Island (near Serrurier Island) in 2015. Naturalised across vast areas of Australia. It is commonly grown as a pasture grass in arid regions but is a serious environmental weed that competes with native vegetation and increases fire frequency and intensity. It was reported in the Cocos Islands from a paddock adjacent to the quarantine station and at a market garden and was recommended as a target for control along with several other weedy grasses (NAQS 2000). A WAH specimen was collected on East Island of Ashmore Reef in 1977 where it was not common at the time. A more recent source notes that it was formerly present around the old well but is no longer thought to be on the island (Pike & Leach 1997). In 2009, two plants were observed on Cockatoo Island in the Kimberley Region at a former metal dump site associated with the mine and mapping and eradication of the population was recommended (Floyd 2010). However, many more plants were located on subsequent surveys (Brameld and Atkinson 2012). A few scattered individuals were located on Tanner Island in the Kimberley Region and were thought to have been unintentionally introduced by staff servicing the lighthouse (Dixon 2012). An eradication has been planned for this population (Dixon 2012). Along with *Aerva javanica*, it is one of the most widespread and problematic environmental weeds of the Pilbara islands. Control operations have been initiated on Barrow, Thevenard and Varanus islands. It was believed to have been eradicated on Airlie Island but has now returned to pre-control densities. On West Lewis Island, in the Pilbara Region, *C. ciliaris* was observed to be heavily grazed by a translocated population of Rothschild's rock wallabies (*Petrogale rothschildi)* in the area immediately surrounding their colony while spinifex in the area showed little sign of grazing (Cheryl Lohr, pers. obs.). *C. ciliaris* is difficult to control by conventional methods. Further investigation of dynamics between *C. ciliaris* and native grazers is warranted to determine long-term trends in *C. ciliaris* abundance on islands where native mammals have been marooned. Prioritised as L (D) in the Pilbara Region and L (B, C) in the Kimberley Region.

Cenchrus echinatus (Mossman River grass) – Recorded on Alcatraz, Koolan and Sunday islands in the Kimberley Region, on Middle and West islands of Ashmore Reef, on Home and West islands in the Cocos Islands, and on Christmas Island. The presence of this species on Christmas Island is supported by a single government report (Beeton et al. 2010) which does not list the similar species *C. brownii* that is known to be present on Christmas Island and may be erroneous. Prioritised as L (B, C) in the Kimberley Region. Occurs in the coastal towns of Dampier, Onslow, Exmouth and Karratha so has the potential to reach Pilbara offshore islands. This species has seriously degraded seabird nesting habitat on Laysan Island (Flint and Rehkemper 2002) and Lehua Islet in the Hawaiian Islands. Consideration should be given to controlling it on islands with important populations of nesting seabirds, including the islands of Ashmore Reef. Claussen & Slip (2002) recommended eradication of this species in the Cocos Islands. A recent report indicates that only about 20 plants were present on Alcatraz Island as of July 2014 (Holmes 2014). Eradication of this population should be considered while feasibility is still high and costs would be relatively low.

Cenchrus pedicellatus (kyasuma grass) – Recorded on Koolan Island in the Kimberley Region and West Island on Ashmore Reef. Known on West Island on Ashmore Reef from a single WAH specimen collected in 1995. Its distribution on West Island was described as 'sparse'. Plants on Koolan Island have been identified as *C. pedicellatus* subsp. *unispiculus*. Presently being mapped and controlled in some areas on Koolan Island (Wiseman 2013). Listed as an alert species in the Kimberley regional weed prioritisation.

Figure 4. Recorded distribution of non-native plant species on islands near Barrow Island, Western Australia. Black dots indicate the centroid of an island with named non-native plant populations. There are 19 non-native plant species recorded on Barrow Island, which are listed in Appendix 2.

Cenchrus purpureus (elephant grass) – Recorded on Koolan Island in the Kimberley Region. Recorded once in a 2008 survey but not in any subsequent surveys. Prioritised as FAR in the Kimberley Region. Capable of forming tall dense stands that exclude other vegetation. A serious weed of creeklines in parts of the Kimberley Region (Hussey et al. 2007). Control is advised if this species is still present.

Cenchrus setaceus (fountain grass) – Recorded on Thevenard Island and the Burrup Peninsula in the Pilbara. Dates of records on Thevenard Island range from 1999 to 2011 (Long et al. 2011). It has not been seen since 2011 and is presumed to have been eradicated. *C. setaceus* was recorded on Mermaid Marine lease on the Burrup Peninsula in 1999 and is also presumed to have been eradicated. Not commonly recorded in the Pilbara. A serious weed in other parts of WA where it can alter nutrient cycling, outcompete native vegetation, and increase fire risk (Western Australian Herbarium 2014). Eradication of any new island populations is recommended.

Cenchrus setiger (birdwood grass) – Recorded on Cockatoo and Koolan islands in the Kimberley Region and Varanus Island and the Burrup Peninsula in the Pilbara Region. Recorded in a number of locations on Cockatoo Island in 2012 (Brameld & Atkinson 2012). Notes associated with a WAH specimen indicated that *C. setiger* was common on roadsides near the settlement on Koolan Island in 1993. Its presence on Koolan Island was confirmed by subsequent surveys, one as recent as 2013 (Wiseman 2013). In 2011, it was noted to be increasing in abundance on Varanus Island in the Pilbara. Capable of outcompeting *C. ciliaris* in semi-saline soils (Vicki Long pers. obs.). Prioritised as L (D) in the Pilbara Region and L (B, C) in the Kimberley Region. Serious weed of streambeds in the Pilbara and Kimberley (Hussey et al. 2007).

Centaurium erythraea (common centaury) – Recorded on Barrow Island in the Pilbara. Only recorded once in an unpublished report in 1993 (Mattiske and Associates 1993). This species is not known to occur in the region and this record may represent a misidentification of the similar native plant *Schenkia australis*.

Centrosema molle (centro) – Recorded on Christmas Island. Often listed by the synonym *C. pubescens*. Widespread in rehabilitation areas, roadsides and other disturbed habitats (Swarbrick 1997). A major threatening weed in disturbed areas because it is spreading and grows throughout the dry season (CIMFR 2015).

Chloris barbata (swollen fingergrass) – Recorded on five islands in the Kimberley Region, Varanus Island in the Pilbara Region, West Island in the Cocos Islands,

and Christmas Island. Notes associated with WAH specimens from the early 1990s refer to *C. barbata* as 'frequent' on Troughton Island and 'very common' on Koolan Island. A 2012 weed survey found *C. barbata* at numerous locations throughout Cockatoo Island (Brameld and Atkinson 2012). Also widespread on Alcatraz Island (Holmes 2014). However, it was apparently eradicated from Varanus Island in the Pilbara Region (Apache Energy Ltd 2012) where it was found mainly in moister soils on road verges. Common and widespread in disturbed areas of Christmas Island (Flora of Australia Online n.d.). Not recorded on any of the Cocos Islands other than West Island but eventual invasion of other islands is likely. Common in Karratha and therefore has a high potential to spread to islands of the Dampier Archipelago. Incipient populations on other islands should be controlled.

Chloris gayana (Rhodes grass) –Recorded on Koolan Island in the Kimberley. Notes associated with a 1992 WAH specimen state that *C. gayana* was present but rare at the old dump site. This species has not been recorded on Koolan Island since 1995 (Wiseman 2013). Found in disturbed areas in some parts of the Kimberley Region where it is prioritised as FAR.

Chloris virgata (feather fingergrass) – Recorded on North Murion (Peak) and North Murion islands in the Pilbara Region and Cockatoo and Koolan islands in the Kimberley Region. Prioritised as FAR in both regions. Widespread on Cockatoo Island in disturbed areas near roads and buildings (Floyd 2010).

Chromolaena odorata (Siam weed) – Recorded on Christmas Island and Home and West islands in the Cocos Islands. A record of *Austroeupatorium inulifolium* on Direction Island from Williams (1994) is probably the result of misidentification of *C. odorata.* Prior to 2012, it was not found on any of the other Cocos Islands except Home and West islands (Dodd et al. 2012). However, more recent surveys have now found it rapidly expanding on Horsburgh Island (Director of National Parks 2014). Present on Home and West islands since at least 1985 (Dodd et al. 2012). In 2010, infestations on Home and West islands totalled 0.95 km^2 and 6.23 km^2 respectively (Dodd et al. 2012). Siam weed is currently being controlled on the Cocos Islands with the ultimate goal of eradicating it completely (Department of Agriculture and Food WA 2013). By April 2012, 90% of *C. odorata* on Home Island had been removed including all mature plants (Dodd et al. 2012). Some residents in the Cocos report a decrease in allergic reactions and asthma associated with the reduction in Siam weed abundance (Department of Agriculture and Food WA 2013). A small, but well-established population was discovered on Christmas Island in 2010 (Dodd et al. 2012), but was immediately destroyed. Listed as a potentially major threatening weed on Christmas Island (CIMFR 2015), although no living adult individuals are currently known. At time of writing, a small number of seedlings (<10) were still appearing after each wet season, although these were being routinely destroyed soon after emergence (CIMFR 2015). It is hoped the seedbank will be exhausted before 2020. Island-wide searches are conducted for this species at least two to three times per year by national park staff, but it has not yet been found in any location other than the original infestation (CIMFR 2015). A serious agricultural and environmental weed with high invasive potential if transported to mainland WA (Claussen & Slip 2002), and it is listed as a prohibited plant in WA. *C. odorata* is included on the National Environmental Alert List and the IUCN (2000) list of 100 of the world's worst invasive species. It is an official biological control target in Australia. A number of biological control organisms have been released overseas in attempts to control it but none have been released in Australia yet (Day and McFadyen 2012). If chemical and mechanical control efforts fail, biological control of this species should be considered.

Chrysopogon aciculatus (lesser spear grass) – Recorded on West Island in the Cocos Islands and on Christmas Island. Probably introduced to Christmas Island at the former South Point settlement as a lawn grass (Flora of Australia Online n.d.; Swarbrick 1997). Naturalised in lawns, gardens and at the golf course (Swarbrick 1997). On West Island in the Cocos Islands it is a weed of grassy or sandy areas (Flora of Australia Online n.d.). Can be a problematic agricultural and amenity weed because sharp seeds can imbed themselves in the skin of livestock and clothes.

Citrullus lanatus (watermelon) – Recorded on Barrow Island in the Pilbara Region. Probably the result of workers spitting out watermelon seeds. Prioritised as L (B, C, D) in the Pilbara Region.

Citrus × *aurantiifolia* (key lime) – Recorded on Christmas Island. Listed as *C. aurantiifolia* on Christmas Island but considered by Australian Plant Name Index to be a hybrid (APNI 2014). Cultivated on Christmas Island for its fruit by 1904 and now naturalised in gardens and along rainforest tracks (Swarbrick 1997). Cultivated in the Cocos Islands but not known to be naturalised (Flora of Australia Online n.d.).

Citrus maxima (pomelo) – Recorded on Christmas Island. Cultivated by 1904 (Swarbrick 1997) for its fruit and planted at secret locations throughout the island by Chinese miners (APNI 2014). Now naturalised in gardens and rainforest edges (Swarbrick 1997), often at a considerable distance from intentionally planted trees (APNI 2014). Swarbrick (1997) suggested birds as a possible dispersal mechanism for the large fruits but large robber crabs (*Birgus latro*) are apparently capable of moving the fruits over 100 m (APNI 2014).

Citrus microcarpa (calamondin) – Recorded on Christmas Island. Probably a hybrid of two species in two different genera and often referred to by the name ×Citrofortunella macrocarpa. Found in rainforest clearings but even specimens in forest settings appear to be old plantings and do not appear to reproduce on their own (Flora of Australia Online n.d.; Swarbrick

1997). Probably not truly naturalised. Also cultivated in gardens for its fruit (Swarbrick 1997).

Clausena excavata (clausena) – Recorded on Christmas Island. Possibly introduced early in the history of Christmas Island by Chinese labourers who mistook it for the superficially similar edible plant *Murraya koenigii* (Swarbrick & Hart 2000; Flora of Australia Online n.d.). Listed as a major environmental weed on Christmas Island (Swarbrick & Hart 2000; CIMFR 2015). Plants are capable of producing bird-dispersed fruit at about two years of age (CIMFR 2015). Prefers disturbed areas but is capable of invading intact forest (CIMFR 2015). *C. excavata* is capable of forming dense stands and outcompeting native regeneration on roadsides and disturbed rainforest where sufficient light is available (Swarbrick 1997). Swarbrick (1997) recommended an ambitious control program to remove the two infestations known at the time.

Clausena lansium (wampee) – Recorded on Christmas Island. Originally introduced to the island by Chinese labourers for its fruit (Flora of Australia Online n.d.) but it is unclear whether it is still cultivated (Swarbrick 1997). Now naturalised in secondary vegetation north of Drumsite (Swarbrick, 1997; Flora of Australia Online n.d.).

Cleome gynandra (stinkweed) – Recorded as naturalised on Koolan Island in the Kimberley Region and on Middle Island of Ashmore Reef. Listed as native on North Keeling Island and on Christmas Island by Flora of Australia Online n.d. (Flora of Australia Online n.d.) but APC lists it as naturalised on Christmas Island (APNI 2014). On Christmas Island it grows in disturbed areas and in the Cocos Islands it is known only from North Keeling (Flora of Australia Online n.d.). However, more recent surveys failed to find *C. gynandra* on North Keeling Island (Claussen & Slip 2002). On Middle Island of Ashmore Reef, it is suspected to have been intentionally planted by Indonesian fishermen near the well and has spread to a larger area (Pike & Leach 1997). *C. gynandra* has been photographed but not collected on Koolan Island (Greg Keighery pers. comm.) and has not been recorded on any surveys following the closure of the mine. The native status currently assigned to this species in the Cocos Islands may need to be re-examined in light of its use as a food plant in north-east Asia.

Cleome rutidosperma (purple cleome) – Recorded on Christmas Island. A NAQS survey in May–June 2000 found this species to be a minor weed with a scattered distribution in disturbed areas on Christmas Island but noted that it grew far more aggressively in Darwin (NAQS 2000). A serious environmental and agricultural weed in some tropical countries. Listed as a prohibited species in WA and an official NAQS target. Its widespread distribution on Christmas Island probably precludes eradication but *C. rutidosperma* should be controlled in a manner that minimises the risk of its introduction to mainland WA.

Clerodendrum calamitosum (white butterfly) – Recorded on Christmas Island. Escaped garden ornamental found in disturbed areas (Swarbrick 1997) and rainforest edges (Flora of Australia Online n.d.).

Clerodendrum indicum (tubeflower) – Recorded on the Cocos Islands. Williams (1994) listed this species as introduced on the Cocos Islands but did not specify which island. Flora of Australia Online (n.d.) notes that it is cultivated on Home Island in the Cocos Islands but does not list it as naturalised.

Clitoria ternatea (bluebell vine) – Recorded on Augustus, Cockatoo, Koolan and Sunday islands in the Kimberley Region, the Burrup Peninsula in the Pilbara Region, and on Christmas Island. An escaped garden ornamental. In the Kimberley islands it is usually recorded along creek beds and in disturbed areas. On Sunday Island it was recorded around the old mission (Handasyde 2002). One of the locations where it was found on Cockatoo Island was the green waste tip (Floyd 2010) suggesting that it had been spread through garden waste. Found in drainage lines on the Burrup Peninsula and has the potential to invade similar habitat on adjacent islands in the Dampier Archipelago. Widespread in a variety of disturbed habitats on Christmas Island (Swarbrick 1997). Prioritised as N (B) in the Kimberley Region.

Cocos nucifera (coconut) – Recorded as non-native on Rosemary Island in the Pilbara Region, Sunday Island in the Kimberley Region, East, Middle and West islands of Ashmore Reef, and on Christmas Island. Regarded as native in the Cocos Islands where it is cultivated in large plantations (Flora of Australia Online n.d.). Reported to be rare along the beach on Rosemary Island in 1987 (Long 1987). Recorded as present at the 'Trochus Camp' on Sunday Island in 2002 (Handasyde 2002). *C. nucifera* is no longer present on East Island of Ashmore Reef since the death of a single individual planted near the well (Pike & Leach 1997). This species survives on West Island where a single individual is planted near some Indonesian graves and another individual persists near an old camp site on the north shore (Pike & Leach 1997). Three individuals were planted in the 1970s near the well on Middle Island (Pike & Leach 1997). The status of *C. nucifera* on Christmas Island is somewhat ambiguous. It was cultivated on Christmas Island by 1904 and is widely planted in gardens, parks and rehabilitation areas throughout the island (Swarbrick 1997). It is listed by the APC (2014) as questionably naturalised on Christmas Island (APNI 2014), but Swarbrick (1997) lists it as both naturalised and questionably native and Flora of Australia Online (n.d.) suggests that a large dense stand behind Dolly Beach may represent a native population (Flora of Australia Online n.d.).

Coffea liberica (Liberian coffee) – Recorded on Christmas Island. Cultivated on the island since at least 1904 (Swarbrick 1997). Swarbrick (1997) does not list this species as naturalised but notes that it is present in rehabilitation areas. This species has naturalised

and become invasive in intact rainforest in Qld and numerous Pacific islands. Given the similarity of habitat on Christmas Island, it should be monitored to determine if management is necessary.

Colocasia esculenta (taro) – Recorded on Sunday Island in the Kimberley Region and Christmas Island. On Sunday Island *C. e.* var. *esculenta* was originally cultivated as a food crop at the site of the abandoned mission and has naturalised in the area (Lyons et al. 2014). Commonly grown in gardens on Christmas Island and has escaped into adjacent disturbed areas (Swarbrick 1997).

Commelina benghalensis (tropical spiderwort) – Recorded on Christmas Island. Found in gardens, disturbed areas, and roadsides (Swarbrick 1997; Flora of Australia Online n.d.).

Conyza bonariensis (flax-leaf fleabane) – Recorded on Barrow Island in the Pilbara Region, Home and West islands in the Cocos Islands, and on Christmas Island. A common weed in disturbed areas throughout WA. Persisted in moist soil under an office on Barrow Island for many years but last recorded in 2013. On Christmas Island, it is common in disturbed areas, gardens, roadsides and in old quarries (Swarbrick 1997; Flora of Australia Online n.d.). In the Cocos Islands, it is mainly found in disturbed areas around settlements and on roadsides (Flora of Australia Online n.d.).

Conyza sumatrensis (Guernsey fleabane) – Recorded on Varanus Island in the Pilbara Region and on Christmas Island. A record from 2011 states that it has not been observed on Varanus Island since 2001 (Apache Energy Ltd 2012) but it was recorded again in 2013. Common weed of disturbed areas in south-west WA. Not otherwise known from the Pilbara Region. On Christmas Island, *C. sumatrensis* is only recorded as present by Swarbrick (1997) but it is reported to be widespread in disturbed areas.

Cordia curassavica (black sage) – Recorded on Christmas Island. First noticed in the 1960s near the weather station (Swarbrick 1997). Swarbrick and Hart (2000) list it as a major environmental weed on Christmas Island. Described as 'very invasive on Christmas Island' and present in all disturbed areas without canopy cover (NAQS 2000). Listed as a NAQS target. Biological control organisms have already been developed for this species overseas and have been successful in controlling infestations in Malaysia and Mauritius (Simmonds 1980; Fowler et al. 1999). Swarbrick and Hart (2000) also suggested the use of biological control organisms on *C. curassavica* on Christmas Island. Reduction of the abundance of this plant on Christmas Island through biological control would aid current reforestation efforts while reducing the risk of this serious environmental weed reaching mainland Australia. Two sources mention its presence in gardens (Swarbrick 1997; Flora of Australia Online n.d.) and its occasional use as an ornamental probably warrants listing *C. curassavica* as a prohibited species in WA.

Cordia subcordata (kerosene wood) – Recorded on Boodie and Barrow islands in the Pilbara Region. Native to coastal parts of the eastern Kimberley Region along the north coast of Australia to the east coast of Qld. Records from Boodie and Barrow islands are the only ones known from the Pilbara Region and are highly disjunct from the rest of the range in Australia. The only record relating to the presence of *C. subcordata* on Barrow Island is from a WAH specimen collected in 1980. However, this species does not presently occur on Barrow Island and the specimen is probably an incorrectly labelled sample from the Boodie Island population (Peter Kendrick pers. comm.). On Boodie Island, *C. subcordata* is found in a single dense patch (about 45 m × 75 m) on sand dunes near the northern portion of the east coast. Some old stumps appear to have been intentionally cut in the past (Keith Morris pers. comm.). This population was most likely introduced for shade or firewood by Macassans or pearlers prior to the 20th century.

Cordyline ?petiolaris (broad-leaved palm lily) – Recorded on Christmas Island. Not known to be naturalised but recorded as cultivated in rehabilitation areas (Swarbrick 1997). This plant should be monitored because the species identification is uncertain and other species in this genus have proven to be invasive in rainforests on similar islands in the Pacific.

Crassocephalum crepidioides (fireweed) – Recorded on Christmas Island. Already common on Christmas Island when it was first collected in 1981 (Flora of Australia Online n.d.). Found in rehabilitation areas and most other kinds of disturbed habitat (Swarbrick 1997). Listed as a prohibited species in WA.

Crotalaria pallida (rattlepod) – Recorded on Christmas Island. Flora of Australia Online (n.d.) identifies the plants on Christmas Isalnd as belonging to the variety *C. pallida* var. *obovata*. A widespread weed in most types of disturbed habitat on Christmas Island (Swarbrick 1997). Suspected of being toxic to livestock (Flora of Australia Online n.d.).

Crotalaria retusa (rattleweed) – Recorded on Home Island in the Cocos Islands. Naturalised in disturbed areas around the village (Flora of Australia Online n.d.). Williams (1994) lists it as introduced in the Cocos Islands by the synonym *C. retusa* var. *retusa* but does not specify which island it is present on. Native in the Kimberley Region.

Cryptostegia madagascariensis (rubbervine) – Recorded on Cockatoo and Koolan islands in the Kimberley Region. On Cockatoo Island it was reported from the resort area in 2002 (Handasyde 2002); it was also reported to be common in an abandoned garden west of the administration centre in 1995 in the notes with WAH specimen. It has been reported from several sites on Koolan Island. It was first recorded from a WAH specimen collected in 1992 and has been reported as recently as 2013 (Wiseman 2013). Populations outside the old town site have been mapped and are the target of ongoing management (Wiseman 2013). *C.*

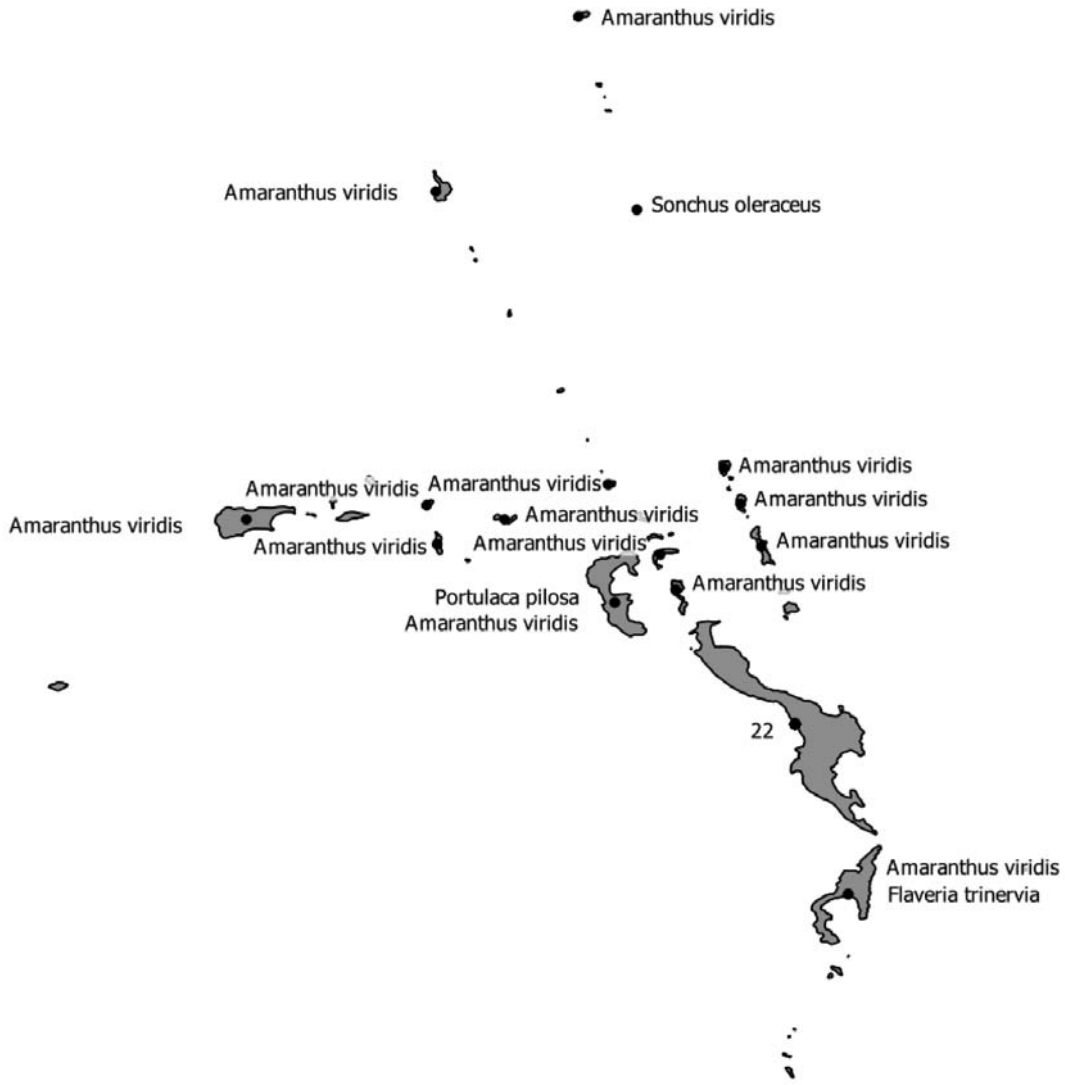

Figure 5. Recorded distribution of non-native plant species on the Lowendal islands, Western Australia. Black dots indicate the centroid of an island with named non-native plant populations. There are 22 non-native plant species recorded on Varanus Island, which are listed in Appendix 2.

madagasariensis is a strangler vine that threatens the ecosystems of Kimberley islands as it is capable of smothering canopy trees and understory vegetation. The sap is toxic to livestock and it has wind-dispersed seeds (Penniman et al. 2011). Hence, it is a declared pest in WA with a control category of C3. Prioritised as L (B, C, D) in the Kimberley Region. *C. madagasariensis* is frequently introduced as an ornamental and is common in gardens in Karratha and potentially a threat to islands in the Dampier Archipelago.

Cucumis melo (honeydew melon) – Recorded as a weed on eight islands in the Kimberley Region and two islands in the Pilbara Region. Identified as *C. melo* subsp. *agrestis* on some islands. Prioritised as L (B, C, D) in the Pilbara Region. Though cultivated forms are occasionally seen in some locations, this species has recently been determined to be native to WA based on early records in remote areas and traditional use and names for this species among Aboriginal peoples (Telford et al. 2011).

Cyanthillium cinereum (little ironweed) – Recorded on Direction, Home, Horsburgh and West islands in the Cocos Islands as well as on Christmas Island. Some records refer to it by the synonym *Vernonia cineria*. Found in most types of disturbed habitat in both Christmas Island and the Cocos Islands (Flora of Australia Online n.d.). Also occurs on some Kimberley islands but is native to northern parts of mainland WA.

Cycas revoluta (sago palm) – Horticultural specimen recorded on Alcatraz Island in the Kimberley Region in 2002. No evidence it has naturalised.

Cynodon dactylon (Bermuda grass) – Recorded on Barrow, Thevenard and Varanus islands in the Pilbara Region; Koolan and Sunday islands in the Kimberley Region; Home, Horsburgh, and West islands in the

Cocos Islands; and on Christmas Island. Hussey et al. (2007) regard this species as native to the Kimberley Region but, at present, the Western Australian Herbarium (1998-) and the APC (2014) treat this plant as non-native to WA. On Thevenard Island in the Pilbara Region, it was intentionally planted on the runway along with *Cenchrus ciliaris.* Last recorded on Thevenard Island in 2010 but potentially could re-emerge after heavy rainfall. Planted as a as grass cover for ovals on Barrow Island and was last recorded in 2011. Also planted as a lawn grass outside the mess area on Varanus Island where it was still present as of 2013. Widely used as a lawn grass and as forage for livestock but often becomes invasive on edges of wetlands (Hussey et al. 2007). Prioritised as L (D) in the Pilbara Region.

Cynodon radiatus – Recorded on North and West islands in the Cocos Islands by the synonym *C. arcuatus*. Found in open grassy areas in the Cocos Islands. A WAH specimen collected in 2000 described this species as common on West Island.

Cyperus aromaticus (Navua sedge) – Recorded on Home Island in the Cocos Islands and on Christmas Island. On Home Island it is known only from a single WAH specimen collected on the east side of the Clunies-Ross mansion in 2000. Text associated with the specimen described *C. aromaticus* as abundant. On Christmas Island it is frequently recorded by the synonym *Kyllinga polyphylla* and is common in a variety of disturbed areas, especially on limestone rubble (Swarbrick 1997; Flora of Australia Online n.d.).

Cyperus brevifolius (Mullumbimby couch) – Recorded on Christmas Island. Known from a single WAH specimen collected in 1986 on the edge of the road and lawn near the entrance to the golf course.

Cyperus compressus (annual sedge) – Recorded on Christmas Island. Found mainly on roadsides and in disturbed areas around houses (Flora of Australia Online n.d.).

Cyperus cyperoides (Pacific island flatsedge) – Recorded on Christmas Island under the synonym *Mariscus macrocarpus*. Found in moist disturbed areas (Swarbrick 1997) but not common on Christmas Island (Flora of Australia Online n.d.).

Cyperus iria (rice flat sedge) – Recorded on Christmas Island. Only known on Christmas Island from an early record which described it as a recent introduction (Flora of Australia Online n.d.). Not recorded on Christmas Island since 1904 (Swarbrick 1997).

Cyperus kyllingia (nut grass) –Recorded on Christmas Island by the synonym *Kyllinga nemoralis*. Frequent on roadsides and in lawns (Flora of Australia Online n.d.). One of the two specimens cited by Flora of Australia Online (n.d.) as the basis for this species being recorded on Christmas Island (R.Shivas 842 PERTH) has been re-identified as *C. brevifolius*. *C. kyllingia* is prohibited in WA.

Cyperus polystachyos (manyspike flatsedge) – Recorded on Sunday Island in the Kimberley and West Island in the Cocos Islands. Native to eastern Australia. A weed of disturbed wetlands. Recorded in the Cocos by the synonynym *Pycreus polystachyos* (Williams 1994). Flora of Australia Online (n.d.) and the APC (2014) list this species as native in the Cocos Islands. Williams (1994), however, indicated that it was non-native in his list of plant species found in the Cocos Islands. Prioritised as FAR in the Kimberley Region.

Cyperus rotundus (purple nutsedge) – Recorded on Christmas Island. Swarbrick (1997) recorded it as a weed of gardens and disturbed areas on Christmas Island. The two WAH specimens from Christmas Island were both collected from roadsides. Primarily a weed of disturbed areas but it is highly competitive with native vegetation and very difficult to control once established due to reproduction via tubers (Stoller & Sweet 1987). Care should be taken not to spread this species through contaminated soil.

Dactyloctenium aegyptium (Eqyptian crowfoot grass) – Recorded on Koolan and Troughton islands in the Kimberley Region, on Barrow Island in the Pilbara Region, on Home and West islands in the Cocos Islands, and on Christmas Island. Notes associated with a WAH specimen collected in 1991 describe it as common around the base on Troughton Island. Recorded on Koolan Island once by Keighery et al. (1995) but has not been recorded on any subsequent surveys. Barrow Island has only a single record from 2011 and it has not been detected since.

Datura leichhardtii (thorn apple) – Recorded as rare on Enderby Island in the Pilbara from a WA museum specimen collected in 1987. A declared pest in WA with a control category of C3. Prioritised as L (B, C, D) in the Pilbara Region. Highly toxic to livestock and humans.

Datura wrightii/Datura metel (sacred datura/devil's trumpet) – Recorded on Christmas Island. Both are declared pests in WA with a management category of C3. One WAH specimen of *D. wrightii* was collected in 1986 from disturbed ground along the road to the waterfall. Flora of Australia Online (n.d.) lists *D. metel* as native but states that specimens from Christmas Island appear similar to *D. wrightii* (Flora of Australia Online n.d.). Even if plants on Christmas Island are, in fact, *D. metel*, this species was first observed adjacent to cultivated areas in 1906 and may have been an early introduction to the island (Flora of Australia Online n.d.). Additional work is necessary to determine which species is present on Christmas Island and whether it is native to the island.

Delonix regia (flame tree) – Recorded on Koolan Island in the Kimberley Region and on Christmas Island. A commonly planted ornamental street tree in the tropics. On Koolan Island it has naturalised and notes associated with a 1993 WAH specimen state that it is found along roadsides and in creeklines. Prioritised as N (A, B) in the Kimberley Region. It was cultivated on Christmas

Island by 1904 and is now widespread across the island (Swarbrick 1997). Swarbrick and Hart (2000) list *D. regia* as a major environmental weed on Christmas Island. It was planted extensively to revegetate mined areas and has formed dense monocultures in some disturbed areas (Swarbrick & Hart 2000). It is somewhat invasive in forested areas and produces large amounts of long-lived seed (CIMFR 2015). Trees are relatively easy to control and most have been removed in rehabilitation areas in recent years (CIMFR 2015).

Desmanthus virgatus (slender mimosa) –Recorded on West Island in the Cocos Islands. Found in the paddock of the quarantine station in 2000 (NAQS 2000). A WAH specimen taken on this survey probably incorrectly assigns the record to Home Island. Not currently listed for the Cocos Islands by the APC (2014). A commonly planted forage crop that probably arrived in the gut of livestock previously held in the quarantine paddock.

Desmodium tortuosum (dixie tick trefoil) – Recorded on Cockatoo and Koolan islands in the Kimberley. Found in the resort area on Cockatoo Island (Handasyde 2002) and common to abundant at various disturbed sites on Koolan Island according to notes from WAH specimens collected in 1992 and 1993. However, it has not been recorded on Koolan since 1995 (Wiseman 2013). Found in disturbed areas throughout the Kimberley Region where it is prioritised as L (B, C, D).

Desmodium triflorum (creeping tick trefoil) – Recorded on West Island in the Cocos Islands and on Christmas Island. Naturalised in grasslands, lawns, gardens and disturbed areas on Christmas Island (Flora of Australia Online n.d.; Swarbrick 1997).

Desmostachya bipinnata (salt reed-grass) – Recorded on West Island in the Cocos Islands. A weed of disturbed grassy areas (Flora of Australia Online n.d.). Specimens held at the Australian National Herbarium were collected in 1986 from both the airport verge and inside the fence at the quarantine station. Both locations are likely points of entry for introduced plants.

Digitaria ciliaris (crabgrass) – Recorded on Trimouille and Varanus islands in the Pilbara Region and six islands in the Kimberley Region. Despite control efforts, this species persists in landscaping and under air conditioners on Varanus Island. Information associated with a WAH specimen collected in 1996 indicates that it occurs in dense stands in depressions on Middle Island in the Lacepede Island Group in the Kimberley Region. On Sunday Island in the Kimberley Region, *D. ciliaris* was recorded around the old mission area (Handasyde 2002). On Champagny Island in the Kimberley, *D. ciliaris* is known from a 1992 WAH specimen but was not found in a 2014 survey of the island (Greg Keighery pers. Comm.). Prioritised as N (A) in the Pilbara Region.

Digitaria milanjiana (Madagascar crabgrass) – Recorded on West Island in the Cocos Islands. This species was first recorded in the Cocos Islands in 2000 from paddocks near the quarantine station. NAQS recommended mowing the paddock, treating it with glyphosate, and planting trees to supress growth and spread of this and other weedy grasses that were present (NAQS 2000).

Digitaria setigera (East Indian crabgrass) – Recorded on Direction, Home and West islands in the Cocos Islands and on Christmas Island. Listed as a weed in the Cocos Islands by Williams (1994). Listed as native to the Cocos Islands as well as Christmas Island but simultaneously described as growing in disturbed open sites in the Cocos Islands and 'colonising roadsides and disturbed land' on Christmas Island (Flora of Australia Online n.d.). Flora of Australia Online (n.d.) justifies its native status on Christmas Island on the basis that it was recorded on sea cliffs two years after settlement of the island but does not offer a justification for its listing as native on the Cocos Islands. The status of this species on Christmas Island and the Cocos Islands needs additional clarification.

Diplotaxis tenuifolia (perennial wall-rocket) – Recorded once on Barrow Island in the Pilbara Region. A single plant was found growing near the accommodation block and was eradicated. This is by far the northernmost record of this species in Australia.

Dipteracanthus prostratus (bell weed) – Recorded on Christmas Island. Flora of Australia Online (n.d.) identifies it by the synonym *Ruellia prostrata* and notes that it is common along roadsides north of Waterfall and may be non-native. APC (2014) lists it as questionably naturalised on Christmas Island. It is conspicuously absent from Swarbrick's (1997) list of introduced plants on Christmas Island.

Echinochloa colona (jungle rice) – Recorded on Adolphus and Koolan islands in the Kimberley Region and on Christmas Island. It has not been recorded on Koolan Island since 1995 (Wiseman 2013). Prioritised as L (B, C, D) in the Kimberley Region. Flora of Australia Online (n.d.) lists it as non-native to Christmas Island and occasional around the Flying Fish Cove settlement but notes that it has not been collected recently. Swarbrick (1997) stated that it had not been seen since 1904 and listed it as possibly extinct. Usually found in wet disturbed areas.

Eclipta prostrata (false daisy) – Recorded on Christmas Island. Most sources indicate only a single collection of this species on Christmas Island from a drain at a limestone quarry (Flora of Australia Online n.d.; Swarbrick 1997). However, a WAH specimen of *E. prostrata* was subsequently collected in 2000 at a different location above a low sea cliff where it was described as infrequent. Usually found in wet areas.

Egeria densa (large-flowered waterweed) – Recorded on Christmas Island. Swarbrick (1997) recorded this species as cultivated in a water tank at an administrator's residence but was not certain of the identification. *E. densa* is a prohibited species in WA. It is a serious aquatic weed known to negatively impact native fauna and

boating and is highly invasive in freshwater systems. Efforts should be made to positively identify the plants in question if they still exist and to eradicate them if they are *E. densa*.

Eichhornia crassipes (water hyacinth) – Recorded on Christmas Island. Swarbrick (1997) recorded this species as cultivated in a water tank at a nursery. *E. crassipes* is a prohibited species in WA. It is also listed as a Weed of National Significance and included in the IUCN list of the world's 100 worst invasive species (Lowe et al 2000). Listed as a threatening weed on Christmas Island (CIMFR 2015) but its current distribution is restricted to the town areas. A serious weed of aquatic systems capable of extremely rapid reproduction. Known to negatively impact native aquatic plants and animals via shading and oxygen depletion. It can also negatively impact fishing, boating and other water-related activities. Any existing populations, including those in cultivation, should be eradicated.

Elaeis guineensis (African oil palm) – Recorded on Christmas Island. In cultivation prior to 1904 and now present in rehabilitation areas (Swarbrick 1997). Local populations are noted to be sterile and controllable by felling (Swarbrick & Hart 2000).

Eleusine indica (goosegrass) – Recorded on Koolan Island in the Kimberley Region, Home and West islands in the Cocos Islands, and on Christmas Island. A common pantropical weedy grass found in disturbed and cultivated areas. On Koolan Island, WAH specimens were collected on roadsides in the town area in 1993 but this species has not been recorded on Koolan island since 1995 (Wiseman 2013). Prioritised as FAR in the Kimberley Region. Already naturalised on Christmas Island by 1870 (Flora of Australia Online n.d.; Swarbrick 1997). Almost all records from the islands listed are from roadsides.

Eleutheranthera ruderalis (ogiera) – Recorded on Home and West islands in the Cocos Islands and on Christmas Island. Found on roadsides in both the Cocos Islands and on Christmas Island (Flora of Australia Online n.d.). Widespread on Christmas Island (Swarbrick 1997) but relatively rare in the Cocos Islands (Flora of Australia Online n.d.).

Emex australis (double gee) – Recorded on Barrow Island. Previously described as widespread on the island (ChevronTexaco 2005) but no longer present. Prioritised as N (A, B) in the Pilbara Region. A declared species on the Western Australian Organism List. Officially targeted for biological control but attempted introductions of control organisms have not succeeded (Yeoh et al. 2012). However, one native pathogen and an accidentally introduced aphid have reduced the impacts of this weed in some areas (Yeoh et al. 2012). A serious amenity weed due to the presence of spiny fruits that can harm humans and animals if stepped on.

Emilia sonchifolia (lilac tasselflower) – Recorded on West Island and Home Island in the Cocos Islands. Flora of Australia Online (n.d.) does not list it as naturalised in the Cocos Islands but the text is not clear about its status. Williams (1994) listed it as a weed on the Cocos. It was only recorded by Williams (1994) on West Island and all specimens from the Australian National Herbarium are from Home and West islands, the two most developed islands. It is found mainly around settlements and on roadsides (Flora of Australia Online n.d.) and should probably be listed as naturalised.

Eragrostis amabilis (bunchgrass) – Recorded on Koolan Island in the Kimberley Region; West Island on Ashmore Reef; Direction, Home, North and West islands in the Cocos Islands; and on Christmas Island. A WAH specimen collected on Koolan Island in 1993 was identified as *E. amabilis* var. *amabilis* and the species was noted to be common. However, it has not been recorded on Koolan Island since 1995 (Wiseman 2013). Prioritised as N (A, B) in the Kimberley Region. On West Island on Ashmore Reef, *E. amabilis* is found along a path to an old well site and appears to have been introduced by humans (Pike & Leach 1997). Williams (1994) lists it as naturalised in the Cocos (by the synonym *E. tenella*) but it is currently considered to be native on Christmas Island and the Cocos lslands (APNI 2014). Flora of Australia Online (n.d.) describes its condition on the Cocos Islands as 'a rare weed of disturbed open areas in coralline sand' but strangely designates it as native. Flora of Australia Online (n.d.) also indicates that it is found in disturbed areas like roadsides, railways and lawns on Christmas Island but also lists it as native in that location. The native/naturalised status of this species on both Christmas Island and the Cocos Islands needs to be re-evaluated.

Eragrostis cilianensis (stinkgrass) – Recorded on East Island of Ashmore Reef from a single WAH specimen collected in 2003. Reported to be common on sandy rises behind the beach.

Eragrostis minor (little lovegrass) – Recorded on Airlie, North Murion, South Murion and Thevenard islands in the Pilbara. Typically a weed of disturbed or cultivated areas.

Eragrostis pilosa (Indian lovegrass) – Recorded on Christmas Island. Widespread and found on roadsides, cleared areas, and gardens (Flora of Australia Online n.d.; Swarbrick 1997).

Eriochloa meyeriana – Recorded on West Island in the Cocos Islands. A rare weed found in disturbed areas (Flora of Australia Online n.d.).

Eucalyptus camaldulensis (river red gum) – Recorded on Varanus and Barrow islands in the Pilbara in 2011. Noted to be restricted to the garden area. Unclear whether this record refers solely to a horticultural specimen or to naturalising plants. Planted on Barrow Island but no naturalised plants have been observed. Native to WA but not naturally found on Varanus or Barrow islands. Prioritised as N (A, B) in the Pilbara Region.

Euphorbia cyathophora (dwarf poinsettia) – Recorded on Cockatoo and Koolan islands in the Kimberley Region, Home and West islands in the Cocos Islands, and on Christmas Island. On Koolan Island, WAH specimens have been collected from both disturbed areas (near a sewage plant) and bushland (below a waterfall in a steep valley). Noted to be present around the resort area on Cockatoo Island (Handasyde 2002). Prioritised as L (B, C, D) in the Kimberley Region. Common in disturbed areas in the two inhabited Cocos Islands (Williams 1994; Flora of Australia Online n.d.). Widespread on Christmas Island in rehabilitation sites as well as a variety of disturbed habitats (Swarbrick 1997). Common ornamental in the tropics which has escaped cultivation in many coastal areas and islands worldwide.

Euphorbia heterophylla (fireplant) – Recorded on West Island in the Cocos Islands and Christmas Island. The only record of this species from the Cocos Islands is from a WAH specimen collected by Williams in 1986. The specimen notes described *E. heterophylla* as dominant outside the boundary fence of the quarantine station on West Island. Strangely, this plant was not included in the collector's published list of species present in the Cocos Islands (Williams 1994). APC (2014) does not currently list this species for the Cocos (APNI 2014). Naturalised on Christmas Island prior to 1904 and now common, though controlled, in a variety of disturbed habitats (Swarbrick 1997).

Euphorbia hirta (asthma-plant) – Recorded on seven islands in the Kimberley Region; Direction, Home Horsburgh and West islands in the Cocos Islands; West Island on Ashmore Reef; and Christmas Island. Collections from the Kimberley islands are mostly from disturbed areas adjacent to human infrastructure (e.g. a mining operation, a resort, a pearling company, an abandoned mission, a lighthouse). Prioritised as L (B, C) in the Kimberley Region. Notes with a 1995 WAH specimen collected on West Island of Ashmore Reef state that it was originally only around the well at the centre of the island. It was later documented to be spreading to other parts of the island (Pike & Leach 1997). Notes with a WAH specimen collected in 1986 describe *E. hirta* as common at the West Island settlement in the Cocos Islands. On Christmas Island, *E. hirta* was first recorded as naturalised in 1897 (Swarbrick 1997) and recorded as abundant in 1906 (Flora of Australia Online n.d.). It is now widespread in a variety of disturbed habitats (Swarbrick 1997).

Euphorbia prostrata (prostrate spurge) – Recorded on Varanus Island in the Pilbara Region; Direction, Home and West islands in the Cocos Islands; and on Christmas Island. A single specimen was recorded in a lawn on Varanus Island and removed. It was initially identified as *Euphorbia* sp. but later as *E. prostrata*. Records as common on Christmas Island by 1906 (Flora of Australia Online n.d.). A weed of disturbed habitats and gardens.

Euphorbia pulcherrima (poinsettia) – Recorded on Christmas Island. Not listed as naturalised, but said to be persisting from cultivated specimens in previous habitations (Swarbrick 1997). It has the potential to become naturalised in tropical areas but is unlikely to spread rapidly.

Euphorbia thymifolia (dwarf spurge) – Recorded on Christmas Island. Reported to be naturalised on the island by 1904 (Swarbrick 1997). Found in heavily disturbed open habitats.

Euphorbia tirucalli (Indian tree spurge) – Recorded on Cockatoo Island in the Kimberley Region. A WAH specimen collected on Cockatoo Island in 1993 is one of only two specimens collected in WA. The specimen notes indicate this species was locally common at the Cockatoo Island town site near the boat ramp. *E. tirucalli* is used as an ornamental in some arid areas and the population on Cockatoo Island is probably the result of escapes from ornamental plantings. Prioritised as an alert species in the Kimberley Region. The current status of this plant on Cockatoo Island is unclear but, given its status as an alert species for the Kimberley Region, any plants still present should probably be removed.

Ficus benjamina (weeping fig) – Horticultural specimens recorded on Cockatoo Island in the Kimberley (Handasyde 2002). Persisting for long periods of time from historical plantings in some areas of WA but not known to have truly naturalised in the state.

Ficus elastica (rubber fig) – Recorded on Christmas Island. Swarbrick and Hart (2000) and the CIMFR (2015) both list it as a threatening environmental weed on Christmas Island. Roughly 20 trees were planted in rehabilitation areas during the 1980s; some formed dense systems of aerial roots to the detriment of adjacent vegetation (Swarbrick and Hart 2000). As of 2000, none of the trees had flowered and it was not known whether the wasp species necessary for pollination was present on Christmas Island (Swarbrick 1997). Swarbrick (1997) expressed concern that if seed production were to occur, this species could be dispersed by birds and strangle native vegetation. Swarbrick and Hart (2000) recommended eradication of this species from Christmas Island and suggested prohibiting growing it on private land. In recent years, any trees found outside of the town area have been successfully poisoned and destroyed (CIMFR 2015). This species is widely grown as an ornamental worldwide and is not known to have naturalised (Starr et al. 2003).

Flaveria trinervia (speedyweed) – Recorded on 22 Pilbara islands and Adolphus Island in the Kimberley. Some records refer to this species by its synonym *F. australasica*. This species was previously considered to be native to Australia but it has since been determined that the entire genus is native to the Americas (Bean 2009). Despite its non-native status, *F. trinervia* was collected from the northern coast of Australia as early as 1802 and appears to have been introduced to Australia prior to European colonisation (Bean 2009). A common weed in the Pilbara Region.

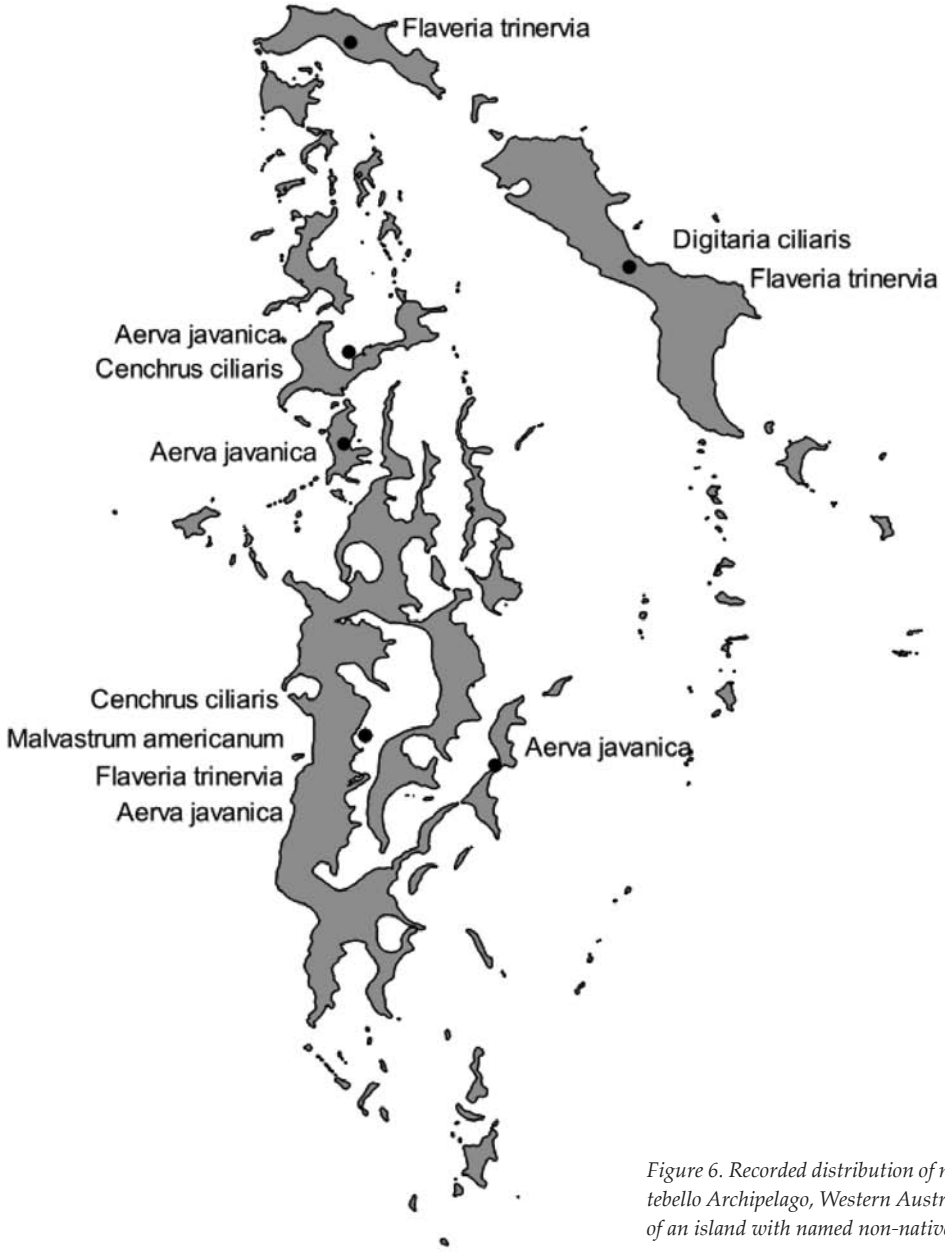

Figure 6. Recorded distribution of non-native plant species in the Montebello Archipelago, Western Australia. Black dots indicate the centroid of an island with named non-native plant populations.

Gliricidia sepium (quickstick) – Recorded on Koolan Island in the Kimberley and on Christmas Island. A garden escape that has invaded the old townsite and adjacent creekbeds. Plans exist to control two new populations near the airstrip and the village (Wiseman 2013). Prioritised as L (B, C, D) in the Kimberley Region. On Christmas Island, Swarbrick (1997) listed it as cultivated but also noted it was present in rehabilitation areas. Not known to be naturalised on mainland WA.

Gomphrena celosioides (soft khaki weed) – Recorded on Christmas Island. Present in lawns and along roadways (Swarbrick 1997). Spreading rapidly in irrigated areas of the Kimberley Region (Hussey et al. 2007) but not known from any Kimberley islands.

Gossypium barbadense (extra long staple [ELS] cotton) – Recorded on Christmas Island as *G. barbadense* var. *acuminatum*. Present in rehabilitation areas as well as roadsides and other disturbed areas (Swarbrick 1997).

Gossypium hirsutum (Mexican cotton) – Recorded on Cockatoo and Koolan islands in the Kimberley Region and Tidepole (Sam's) and Barrow islands in the Pilbara Region. On Cockatoo Island, only four mature plants were observed in the garden area of the resort in 2002. On Barrow Island, it was recorded once at the accommodation block and is presumed eradicated. Has escaped commercial cultivation and naturalised in some areas of the Kimberley and Pilbara. Prioritised as an ALERT species in the Pilbara Region. Seen in drainage lines around Karratha and has the potential to invade similar habitat in the Dampier Archipelago.

Heliotropium indicum (Indian heliotrope) – Recorded on Christmas Island. Found on roadsides and first

recorded in 1984 as being present only in a few small patches (Swarbrick 1997). Common tropical weed of disturbed areas.

Hevea brasiliensis (rubber tree) – Recorded on Christmas Island. It was originally planted in three or four locations on the island around 1900 for rubber production (Swarbrick 1997). Swarbrick (1997) noted that saplings and small trees were present around some of these historical plantations but did not consider it likely to become 'a severe competitor with native rainforest plants'. However, in a later publication, Swarbrick and Hart (2000) list it as a major environmental weed on Christmas Island and recommend its eradication while the population is still restricted to a small area.

Hibiscus sabdariffa (carcade) – Recorded on Sir Graham Moore Island in the Kimberley. Located on the edge of a melaleuca swamp near a previously inhabited area and believed to be deliberately planted.(Lyons et al. 2014). Garden escape that has naturalised in creekbeds elsewhwere in the Kimberley (Hussey et al. 2007). Prioritised as L (B, C, D) in the Kimberley Region.

Hibiscus schizopetalus (coral hibiscus) – Recorded on Koolan Island in the Kimberley Region for the first time in 2013 (Wiseman 2013). Not known to be naturalised anywhere in Australia. This record originates from a single plant that probably survives from ornamental plantings at the old townsite and does not appear to be truly naturalised (Cheryl Hamence pers. comm.).

Hippobroma longiflora (star of Bethlehem) – Recorded on West Island in the Cocos Islands. Flora of Australia Online (n.d.) describes *H. longiflora* as a roadside weed in coconut plantations. Text associated with a WAH specimen collected at 'the West Island Farm' describes it as common where it was collected 'inside a chook run'. A highly toxic tropical weed of disturbed areas.

Hydrocotyle novae-zelandiae (Brazilian pennywort) – Recorded on Christmas Island and known from a single WAH specimen collected in 1993. Specimen notes stated that *H. novae-zeelandiae* was present in mined areas and stripped areas that had not been mined in Field 6. The immediate environment was noted to be harsh and open with a hard surface.

Hymenaea verrucosa (amber tree) – Recorded on Christmas Island. Swarbrick (1997) recorded this plant as a possible garden escape and stated that it was present in a disturbed area near the golf course.

Hyptis capitata (knobweed) – Recorded on Christmas Island. Found in rehabilitation areas and disturbed areas (Swarbrick 1997). Collected from several different locations across the island.

Hyptis suaveolens (pignut) – Recorded on Koolan and Sir Graham Moore islands in the Kimberley. On Koolan Island it occurs primarily within the old townsite and along adjacent tracks to recreation areas (Wiseman 2013). Populations on Koolan Island have been thoroughly mapped but are not currently being controlled. A tropical weed of roadsides and degraded pastures. Prioritised as L (D) in the Kimberley Region.

Imperata cylindrica (blady grass) – Recorded on West Island in the Cocos Islands and on Christmas Island. Flora of Australia Online n.d. states that it was introduced to Christmas Island for medicinal purposes by the Chinese community. Swarbrick (1997) is equivocal and also suggests the possibility that it could have been an accidental introduction. On Christmas Island it is naturalised in mowed areas and in towns. One WAH specimen collected in 1996 was from a patch 20 × 300 m along a track under power lines. Swarbrick and Hart (2000) list *I. cylindrica* as a minor environmental weed on Christmas Island. It is unlikely to spread extensively because it is quickly shaded out in areas that are not regularly mowed but it could encroach on adjacent forest if fire kills nearby trees (Swarbrick 1997). On West Island in the Cocos Islands it exists as a single large patch along a road in a coconut plantation (Flora of Australia Online n.d.). Native in mainland WA.

Indigofera hirsuta (hairy indigo) – Recorded on Home Island in the Cocos Islands and Christmas Island. Williams (1994) lists it as non-native on the Cocos Islands. Flora of Australia Online n.d. lists it as native on Cocos Islands and Christmas Island but states, 'on Christmas Is. it grows among limestone pinnacles and in poor soil in disused quarries and on cleared ground, often with the two invasive *Mimosa* species, *M. invisa* and *M. pudica*'. Listed as native in mainland WA but naturalised in the adjacent NT according to the APNI (2014). The status of this plant on Christmas Island and the Cocos Islands needs clarification.

Ipomoea aquatica (water spinach) – Recorded on Christmas Island. Listed as naturalised on Christmas Island in Flora of Australia Online (n.d.) but the text indicates it is intentionally cultivated as a vegetable. Swarbrick (1997) lists it as questionably naturalised on Christmas Island and reports cultivation as early as 1904 in springs at Ross Hill Gardens. Unlikely to become a problematic environmental weed.

Ipomoea batatas (sweet potato) – Recorded on Christmas Island. Commonly grown for its edible tuber throughout the tropics. Recorded as cultivated on Christmas Island as early as 1904 and now naturalised in disturbed areas and areas of former habitation (Swarbrick 1997). The CIMFR (2015) list this plant along with several other weedy *Ipomoea* species as a major weed of disturbed areas and Flora of Australia Online (n.d.) noted that it was 'common in waste places and regarded as something of a nuisance in such areas'.

Ipomoea cairica (coast morning glory) – Recorded on Pasco Island (near Barrow Island) in the Pilbara Region and on Christmas Island. The Pasco Island record originated in Buckley (1980) and is probably the result of a misidentification. Florabase (Western Australia Herbarium 1998–) does not contain records of this species in the Pilbara Region and the occurrence of a

species, which is typically spread via garden waste, on an isolated, dry, rocky island seems unlikely. *I. cairica* is prioritised as an ALERT species in the Pilbara Region. On Christmas Island it has naturalised in a variety of disturbed habitats since it was initially introduced to gardens at South Point around 1960 (Swarbrick 1997). *I. cairica* is capable of rapidly climbing and smothering adjacent vegetation. Flora of Australia Online n.d. estimated that it covered 120–160 ha of mined-out quarries but this figure is likely to have changed since the publication date of 1993. The CIMFR (2015) lists this plant with several other weedy *Ipomoea* species as a major weed of disturbed areas.

Ipomoea hederifolia (scarlet morning glory) – Recorded on Christmas Island, where it was first collected in 1963 (Flora of Australia Online n.d.). Flora of Australia Online n.d. says it was confined to a single locality along a cleared roadside while Swarbrick (1997) gave its distribution as '2 Mile Post on railway from S Point'.

Ipomoea muelleri (poison morning glory) – Recorded on Varanus and Thevenard islands in the Pilbara Region. First recorded on Varanus Island in 2011. Unsuccessful attempts have been made to eradicate this plant on both islands. Both invasions are the result of imported gravel used around infrastructure. Native to the Pilbara region but not naturally found on Varanus or Thevenard islands.

Ipomoea nil (ivy morning glory) – Recorded on Berthier, West Montalivet, East Montalivet, Descartes and North West Osborn islands in the Kimberley Region and on Christmas Island. On Christmas Island, it was first recorded in 1963 and is now extremely common and widespread on roadsides (Flora of Australia Online n.d.). The CIMFR (2015) lists this plant with several other weedy *Ipomoea* species as a major weed of disturbed areas. The status of *I. nil* in the Kimberley Region is not clear. It is presently classified as naturalised in WA by a variety of sources (Johnson 2012; APNI 2014) and appears to be native to the tropical Americas. However, this species is currently recognised as native in its adjacent range in the Northern Teritory (APNI 2014) and was listed as native in Wheeler (1992). It was collected in Qld as early as 1845. Additonally, several of the Kimberley islands where this species is present have no other weed species recorded. Notes associated with one *I. nil* specimen from the WAH even refer to the vegetation in the area where it was collected as 'pristine'. Probably the most likely scenario is that *I. nil* was introduced by humans to the Australasian region prior to European colonisation, as suggested by Austin et al. (2001). Additional work to understand its origins in northern Australia is necessary before this species can be effectively managed.

Ipomoea obscura (obscure morning glory) – Recorded on Home Island in the Cocos Islands and Christmas Island. Flora of Australia Online (n.d.) lists this species as native to Christmas Island but describes it as growing on waste ground on the fringes of habitation. Swarbrick (1997) did not list this species in his comprehensive list of the non-native flora of Christmas Island. The CIMFR (2015) lists this plant with several other weedy *Ipomoea* species as a major weed of disturbed areas. It is also described as a major weed of roadsides on Christmas Island in a NAQS report (NAQS 2000). The same report recorded *I. obscura* on Home Island in the Cocos for the first time and suggested that this population probably originated from Christmas Island. Eradication of this species in the Cocos Islands is recommended (Claussen & Slip 2002). The status of this species on Christmas Island requires additional clarification.

Ipomoea quamoclit (cardinal vine) – Recorded on Koolan Island in the Kimberley Region and on Christmas Island. On Koolan Island it has been collected from the old townsite, adjacent creeklines, and disturbed areas around a plant nursery and probably originated from ornamental plantings at the old townsite. Prioritised as L (B, C, D) in the Kimberley Region. On Christmas Island it was cultivated by 1982 and has escaped into adjacent roadsides and disturbed areas (Swarbrick 1997).

Ipomoea triloba (littlebell) – Recorded on Christmas Island. First naturalised specimen collected in 1963 and subsequently discovered naturalising in other disturbed areas and roadsides (Flora of Australia Online n.d.; Swarbrick 1997). The CIMFR (2015) lists this plant with several other weedy *Ipomoea* species as a significant weed of disturbed areas.

Ischaemum muticum (drought grass) – Recorded on Horsburgh Island in the Cocos Islands and on Christmas Island. Williams (1994) lists it as a non-native plant in the Cocos Islands. Flora of Australia Online (n.d.) lists it as native to both Christmas Island and the Cocos Islands but states that on both islands where it occurs, it has a limited distribution and is only found growing in coconut plantations. Due to a limited distribution and lack of records outside of highly altered agricultural systems, the current native status of *I. muticum* on Christmas Island and the Cocos Islands should be re-evaluated.

Islolepis marginata (course club-rush) – Erroneously recorded on Barrow Island in the Pilbara Region. The specimen associated with this record was later redetermined as *Bulbostylis barbata* (Cate Tauss pers. comm.). Prioritised in the Pilbara Region as M (D, E, F, G).

Jasminum sambac (Arabian jasmine) – Recorded on Christmas Island and in the Cocos Islands. Recorded as cultivated on Christmas Island as early as 1904 (Swarbrick 1997). Persisting around former residences where it was cultivated (Flora of Australia Online n.d.) but probably not truly naturalised. Flora of Australia Online (n.d.) states that *J. sambac* was introduced to Christmas Island by Cocos Islanders but no other records indicate the presence of this species in the Cocos Islands.

Jatropha curcas (physic nut) – Recorded on Christmas Island. Notes associated with a WAH specimen collected in 2000 state that only a small population of about 20 plants was present on the island in the northern portion of Drumsite. NAQS (2000) indicated that *J. curcas* was probably a sleeper weed on Christmas Island and that this population should be eradicated. Listed as a major threatening weed on Christmas Island although its abundance is still quite low and it is currently being controlled (CIMFR 2015). An official biological control target but no work has been done towards developing biological control organisms for this species. A prohibited species in WA.

Jatropha gossypiifolia (bellyache bush) – Recorded on Koolan Island in the Kimberley. Found in gullies and creek beds near the old town site (Wiseman 2013). Small outlying populations are currently being monitored and controlled (Wiseman 2013). Prioritised as L (B, C) in the Kimberley Region. Listed as a WONS. A declared plant in WA with a management category of C3. Official biocontrol target but the only biocontrol organism released to date failed to establish (Heard et al. 2012b). Toxic to livestock and a problematic invader of tropical creek beds. It can alter fire regimes, increase erosion, and reduce native biodiversity in areas it invades (Heard et al. 2012b). Not recorded from the Pilbara islands but it is common in drainage lines in Karratha and has the potential to invade similar habitat on islands in the Dampier Archipelago. Island populations should be eradicated when possible.

Justicia gendarussa (willow-leaved justicia) – Recorded on Christmas Island. Flora of Australia Online (n.d.) lists it as naturalised at South Point from specimens cultivated by the Chinese community. Swarbrick (1997) referred to the population as a 'garden remnant' indicating that it is merely persisting from former cultivation.

Khaya senegalensis (African mahogany) – Recorded on Alcatraz (Cone Bay) and Cockatoo islands in the Kimberley. Handasyde (2002) specified 'Maxima Pearling Company' and the resort area, respectively, as locations for these plants but does not note whether the plants were naturalised or horticultural specimens. Holmes (2014) recorded large *K. senegalensis* trees shading houses on Alcatraz Island. However, a naturalised specimen of this species held at the WAH was collected in 1996 in vine forest at the 'Cone Bay Hermits Camp'. *K. senegalensis* has naturalised in creeklines elsewhere in the Kimberley and areas around ornamental plantings should be monitored for seedlings. Consideration should be given to removing plantings if they appear to be naturalising. Prioritised as FAR in the Kimberley Region.

Kigelia pinnata (sausage tree) – Recorded on Koolan Island in the Kimberley Region. Planted as an ornamental on Koolan Island (Wiseman 2013) and not known to have naturalised anywhere in Australia.

Koelreuteria ?paniculata (goldenrain tree) – Recorded on Koolan Island in the Kimberley Region. Cultivated as an ornamental on Koolan Island. Not known to have naturalised in Australia but the closely related species *K. elegans* ssp. *formosana* is listed on the National Environmental Alert List and appears to have the potential to become a serious weed in Australia. Plantings on Koolan Island should be definitively identified and monitored to ensure they do not naturalise.

Lablab purpureus (hyacinthbean) – Recorded on Christmas Island. Originally introduced for use as a vegetable prior to 1904 (Swarbrick 1997). Sources from the 1990s describe it as 'recently naturalised' in disturbed areas including roadsides and quarries (Swarbrick 1997; Flora of Australia Online n.d.).

Lagenaria siceraria (bottle gourd) – Recorded on Christmas Island. A commonly cultivated species grown for food and containers. Cultivated on Christmas Island by 1904 and questionably naturalised in disturbed areas adjacent to gardens (Swarbrick 1997; Flora of Australia Online n.d.).

Lantana camara (lantana) – Recorded as present on Cockatoo Island in the Kimberley in 2002. The records state that it was present in the garden area of the resort but did not specify if it was naturalised or cultivated (Handasyde 2002). A Weed of National Significance and a declared pest in WA with a control category of C3. Listed by the IUCN as one of the 100 worst invasive species in the world (Lowe et al 2000). Prioritised as L (B, C, D) in the Kimberley Region. It reduces the quality of pastures across its range and has become a serious environmental weed in many locations. Found in drainage lines surrounding Karratha (Nickol Bay flats and Karratha hills) so has the potential to invade islands of the Dampier Archipelago. Weedy lantana in Australia is probably a hybrid between several *Lantana* species and is highly variable in morphology and physiological tolerances (Day 2012). This species is an official biocontrol target and many agents have been released in eastern Australia with varying degrees of success (Day 2012). This population of lantana should be eradicated regardless of whether records on Cockatoo Island represent horticultural or naturalised specimens.

Leontodon saxatilis (lesser hawkbit) – Recorded on Barrow Island in the Pilbara Region. The record is from a single plant collected as a WAH specimen in recently disturbed soil in 2010. This record is well out of its normal range in WA where it is primarily a weed of lawns in the south-west. Probably introduced accidentally on contaminated equipment and unlikely to establish in the Pilbara except in highly disturbed areas.

Lepidium virginicum (least pepperwort) – Recorded on West Island and North Island in the Cocos Islands. The text associated with one WAH specimen refers to it as infrequent around the West Island Farm. Also recorded from disturbed sites around the settlement (Flora of Australia Online n.d.).

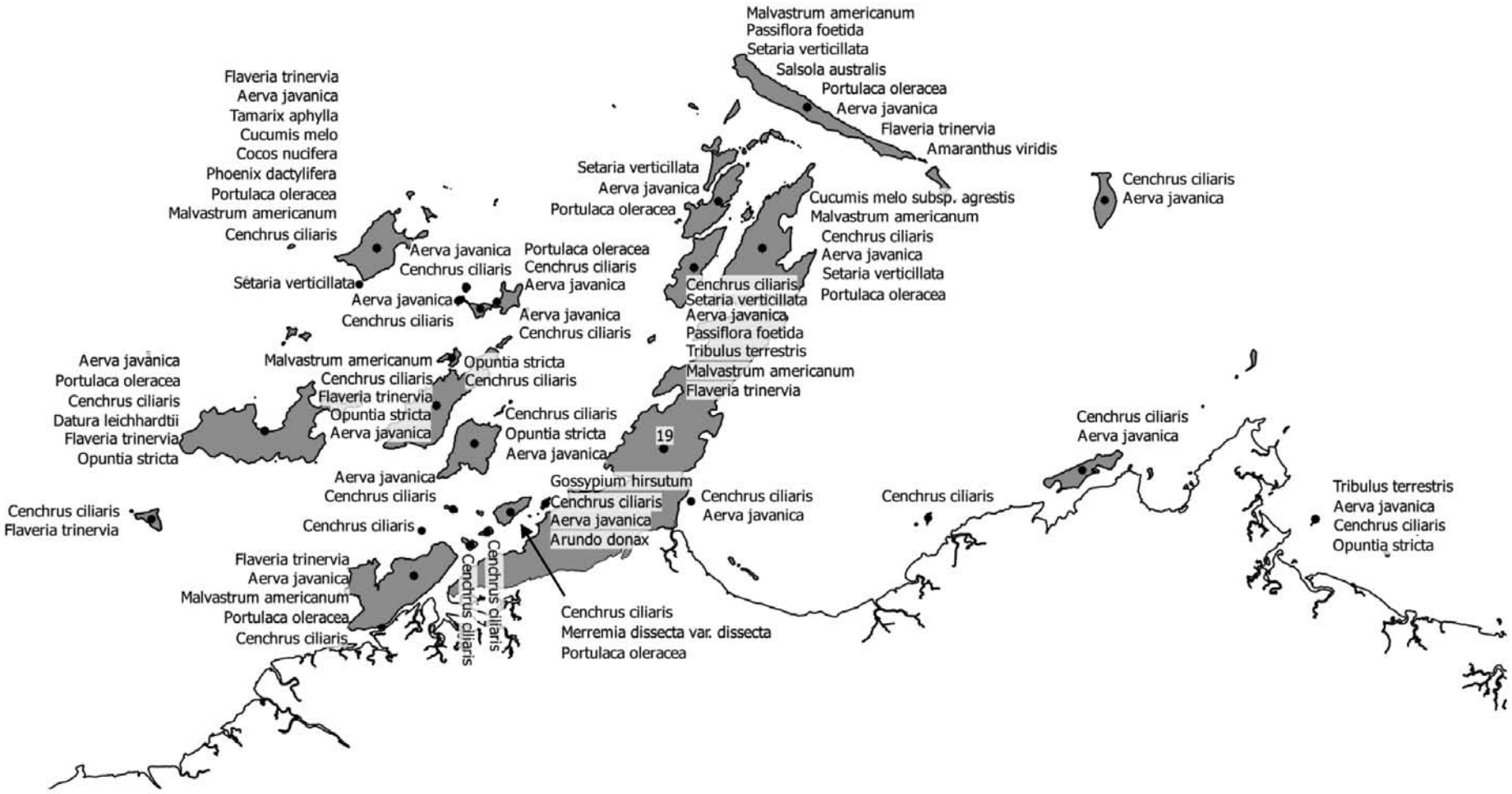

Figure 7. Recorded distribution of non-native plant species on islands near Karratha, Western Australia. Black dots indicate the centroid of an island with named non-native plant populations. There are 19 non-native plant species recorded on Dampier Island (Burrup Peninsula), which are listed in Appendix 2. Islands have grey fill, mainland has white fill.

Leucaena leucocephala (white leadtree) – Recorded on Alcatraz, Cockatoo, Koolan and Sunday islands in the Kimberley Region; Home Island in the Cocos Islands; and Christmas Island. Koolan Island specimens have been identified as *L. leucocephala* subsp. *leucocephala*. Historically, there has been control of this species on Koolan Island but at present efforts are restricted to mapping the extent of the population, which includes several large dense patches (Wiseman 2013). Control of *L. leucocephala* was recommended as a priority on former mining areas on Cockatoo Island (Brameld and Atkinson 2012) but notes associated with a WAH specimen taken from the settlement area in 1998 described it as common in disturbed areas. Swarbrick and Hart (2000) list it as a minor environmental weed on Christmas Island but it has since been described as a major problem in disturbed fields with seeds germinating for up to 12 years after control (CIMFR 2015). Introduction of biological control organisms to Christmas Island has been suggested as an option for reducing its abundance (NAQS 2000). Flora of Australia Online (n.d.) notes that, on Christmas Island, the vigour of some plants has been reduced by defoliation by insects. Further examination of the identity of this insect species and its suitability for long-term control of *L. leucocephala* could prove useful in managing this plant more effectively. Claussen & Slip (2002) recommended management and eventual eradication of this species in the Cocos Islands. Prioritised as L (D) in the Kimberley Region. Listed by IUCN as one of the world's 100 worst invasive species (Lowe et al 2000). Due to its invasive tendencies, ability to outcompete native vegetation, and long persistence in seedbanks, new small populations of *L. leucocephala* on previously uninfested islands should be controlled aggressively. However, it should be noted that many years of follow-up monitoring will likely be required. Not recorded on Pilbara islands but well established along drainage lines in and around Karratha. High potential to invade rocky gullies on islands in the Dampier Archipelago.

Leucas zeylanica (Ceylon slitwort) – Recorded on Christmas Island. Listed as native by Flora of Australia Online (n.d.) and not included on Swarbrick's (1997) extensive list of the non-native flora of Christmas Island but presently listed by APC (2014) as sparingly naturalised on Christmas Island (APNI 2014). A WAH specimen collected by Swarbrick in 1996 was taken from open and highly disturbed areas on compacted stockpile soil in a 'failed' mine rehabilitation area. Specimen notes list it as occasional in the area. A limited distribution and collection history as well as presence in highly altered sites all support APC's listing of this species as naturalised.

Linum ?usitatissimum (flax) – Recorded once on Varanus Island in the Pilbara Region. Only seen once outside a room in the accommodation block and presumed eradicated. Likely to have arrived on a worker's shoe.

Lonicera japonica (Japanese honeysuckle) – Recorded on Christmas Island. The only reference to this plant being present on Christmas Island is from Swarbrick (1997) who mentions cultivated plants in gardens. This species has naturalised in many locations where it has been introduced. It is considered a serious invasive weed throughout much of its non-native range and is capable of smothering and outcompeting adjacent vegetation. *L. japonica* poses a serious threat to forest rehabilitation efforts and all cultivated and naturalised plants should be eradicated.

Ludwigia hyssopifolia (water primrose) – Recorded on Christmas Island. One specimen was collected on Christmas Island in 1904, presumably arriving as a contaminant in imported rice (Flora of Australia Online n.d.). The specimen had produced seed but apparently failed to establish as this plant has not been collected on Christmas Island since then.

Lycopersicon esculentum (tomato) – Recorded on Barrow, Thevenard and Varanus islands in the Pilbara Region and on Christmas Island. A common garden vegetable worldwide. Occasionally encountered on Varanus Island and last recorded in 2010 (Apache Energy Ltd 2012). On Pilbara islands, seeds germinate easily from food waste but the climate is too dry for plants to persist. Cultivated on Christmas Island since at least 1904 and occasionally escaping into disturbed areas adjacent to gardens (Swarbrick 1997).

Macroptilium atropurpureum (purple bush-bean) – Recorded on Alcatraz and Sunday islands in the Kimberley Region; Home, Horsburgh, and West islands in the Cocos Islands; and on Christmas Island. Naturalised around settlements in the Cocos Islands (Flora of Australia Online n.d.). Often cultivated as a forage crop in the tropics but has become a serious weed in orchards in the Kimberley Region (Hussey et al. 2007). Prioritised as L (C) in the Kimberley Region. Not native to Christmas Island and probably imported with grass seed used on the airport and golf course (Flora of Australia Online n.d.) prior to a collection in 1986. The CIMFR (2015) considers it a potential sleeper weed and commented on its extremely rapid growth and impact on forest rehabilitation efforts. Not documented in the Pilbara islands but recently recorded as present in many drainage lines around Karratha and has the potential to invade similar habitat on islands in the Dampier Archipelago.

Macroptilium lathyroides (wild bush-bean) – Recorded on Koolan Island in the Kimberley. One WAH specimen was identified to the varietal level as *M. lathyroides* var. *semierectum* and recorded as common on waste ground near the administration block. Initially introduced to the Kimberley to improve pasture, it has become a problematic weed in some areas and is difficult to control with herbicides (Hussey et al. 2007).

Magnolia champaca (champak) – Recorded on Christmas Island. Not listed in APC (2014) or Flora of Australia Online (n.d.). There is one WAH record from a 10-m-tall tree at Margaret Knoll in 1993 but it is not clear if this is a naturalised or cultivated plant.

Malvastrum americanum (spiked malvastrum) – Recorded on 11 islands in the Pilbara Region and Koolan Island in the Kimberley Region. Recorded by the synonym *M. spicatum* on some islands. Plants on Hermite Island were identified as the now obsolete subspecies *M. a. stellatum*. Common weed across the Kimberley, Pilbara and Gascoyne regions (Hussey et al. 2007). Notes with a 2011 record from Varanus Island report an increase in abundance on the island since 2000, but most increases in the Pilbara islands are short-lived and associated with increased rainfall. Prioritised as N (B) in both the Pilbara and Kimberley regions.

Malvastrum coromandelianum (false mallow) – Recorded on Christmas Island. Common and widespread in disturbed areas of Christmas Island since the early 1900s (Swarbrick 1997). A common pantropical weed.

Mangifera indica (mango) – Recorded on Cockatoo, Gibbings, Koolan and Sunday islands in the Kimberley Region and on Christmas Island. The Cockatoo Island record is from the resort area but is listed as a minor weed and not a cultivated specimen (Handasyde 2002). Similarly, mango trees present on Sunday Island are recorded from around the old mission area and listed as a minor weed (Handasyde 2002). *M. indica* is also recorded as naturalised on Koolan Island (Wiseman 2013) and Gibbings Island (Holmes 2014). On Gibbings Island, two trees over 10 m high were documented with more than 12 seedlings nearby (Holmes 2014). Prioritised as N (A, B) in the Kimberley Region. Flora of Australia Online (n.d.) lists *M. indica* as cultivated on Christmas Island but cautioned that it could become naturalised in the future. Swarbrick (1997) lists it as both cultivated by 1904 and naturalised. At present APC (2014) assigns this species the ambiguous status of 'incipiently naturalised' on Christmas Island (APNI 2014). This species is not likely to rapidly invade new areas but is capable of growing into very large trees that compete for space with native vegetation and create deep shade that supresses growth of other plants. Naturalising individuals should probably be controlled in areas with conservation value on both Christmas Island and in the Kimberley Region.

Mangifera odorata (fragrant mango) – Recorded on Christmas Island. Apparently a hybrid between *M. indica* and *M. foetida* (Teo et al. 2002) though not currently recognised as such in Australia. Recorded as naturalised on Christmas Island by Flora of Australia Online (n.d.) and described as common with many self-sown individuals, particularly in areas of previous cultivation. Not listed by Swarbrick (1997) even as a cultivated species, perhaps due to confusion with *M. indica*.

Manihot esculenta (tapioca) – Recorded on Christmas Island. Probably introduced to Christmas Island around 1900 (Swarbrick 1997). Cultivated for its edible tuber and now naturalised and widespread in disturbed areas (Flora of Australia Online n.d.; Swarbrick 1997).

Manihot glaziovii (ceara rubbertree) – Recorded on Christmas Island. Intentionally introduced for rubber production around 1900 (Swarbrick 1997) or 1910 (Flora of Australia Online n.d.). Recorded as very common in some areas, particularly in marginal or second-growth rainforest (Flora of Australia Online n.d.; Swarbrick 1997). Care should be taken to clean vehicles and construction equipment when clearing vegetation or conducting road maintenance as its seeds are believed to be spread via contaminated machinery (Flora of Australia Online n.d.). Listed as a threatening weed of disturbed areas but said to be easily controlled (CIMFR 2015).

Medicago polymorpha (burr medic) – Recorded on Barrow Island in the Pilbara Region. In 2010 a single plant was found in recently disturbed soil and collected as a WAH specimen. A common weed of lawns in the south-west of WA but not frequently found along the north coast. Prioritised as N (B) in the Pilbara Region.

Megathyrsus maximus (guinea grass) – Recorded on Koolan Island in the Kimberley Region and West Island in the Cocos Islands. One WAH specimen from Koolan Island was identified to the varietal level as *M. maximus.* var. *maximus*. Recorded by the synonym *Urochloa maxima* on West Island, where it was found growing in a paddock at the quarantine station in 2000. NAQS recommended control of this and other weedy grasses in the quarantine paddocks (NAQS 2000). Two WAH specimens were collected from Koolan Island. The notes with the 1998 specimen report that it occurred infrequently, while the notes with the 2005 specimen describe it as locally abundant. Originally imported to WA as a pasture grass, *M. maximus* has naturalised in the Kimberley as well as around Perth and Albany (Hussey et al. 2007). This plant is listed as permitted in WA but a hybrid between this species and *M. infestus* is prohibited, with a control category of C1. Guinea grass has become a serious environmental and agricultural weed overseas and is known to increase erosion rates and fire frequency in some habitats. Control of this species is recommended.

Melia azedarach (bead-tree) – Recorded on Sunday Island in the Kimberley Region and on Christmas Island. Native to some areas of the Kimberley Region but individuals on Sunday Island appear to be persisting from ornamental plantings at the old mission and not truly naturalised (Lyons et al. 2014). *M. azedarach* is apparently an early introduction to Christmas Island where large trees were present by 1906 but described as non-native (Flora of Australia Online n.d.). Listed as a serious threat to disturbed forest areas if not controlled (CIMFR 2015). This species is conspicuously absent from Swarbrick's (1997) list of non-native plants on Christmas Island, perhaps reflecting a belief that it was native.

Melinis minutiflora (molasses grass) – Recorded on West Island in the Cocos Islands. A WAH specimen was collected from a paddock at the old quarantine station in 2000. Probably arrived as a contaminant in hay imported to feed animals held at the old quarantine

station (NAQS 2000). NAQS recommended control of this and other weedy grasses in the quarantine paddocks (NAQS 2000).

Melinis repens (natal red top) – Recorded on Home and West islands in the Cocos Islands; Alcatraz, Cockatoo, Irvine and Koolan islands in the Kimberley Region; Varanus Island in the Pilbara Region; and on Christmas Island. On Christmas Island it is sometimes recorded by the synonym *Rhynchelytrum repens*. On Christmas Island, Flora of Australia Online (n.d.) characterised this species as a relatively recent introduction at the time of publication in 1993, and noted that it was spreading along roadsides and in recently mined areas. In the Cocos Islands, it has been documented in a paddock adjacent to the quarantine station on West Island. NAQS recommended control of this and other weedy grasses in the quarantine paddocks (NAQS 2000). On Cockatoo Island, *M. repens* is common and widespread in disturbed areas and is expected to eventually invade all areas of the island following fire (Floyd 2010). *M. repens* was probably introduced to Irvine Island in the Kimberley Region in the 1960s as a result of exploration activities. It has been found at several locations on the island and is being targeted for eradication (Dixon 2012). WAH specimens of *M. repens* from Koolan Island describe it as abundant along road edges and dominant in some sections of road verge and lawns. Keighery (2010) included this species in a list of six non-native plants that pose a particular threat to Pilbara island ecosystems. Prioritised as L (D, E) in the Pilbara Region and FAR in the Kimberley Region. Large infestations are difficult or impossible to manage and priority should be given to early detection and eradication of small establishing island populations.

Melochia pyramidata (pyramidflower) – Recorded on Lachlan and Long Islands in the Kimberley. Primarily a weed of creekbeds and irrigated areas (Hussey et al. 2007). Prioritised as L (B, C, D) in the Kimberley Region.

Merremia aegyptia (hairy woodrose) – Recorded on Cockatoo Island in the Kimberley Region. A WAH specimen of this species was collected from a disturbed area near the administration centre in 1995 and it was reported growing in the resort area in 2002 (Handasyde 2002). A garden escape and potentially a problematic environmental weed in vine thickets. Prioritised as M (D, E, F) in the Kimberley Region. If populations on Cockatoo Island are still small, this species could be an important priority for eradication.

Merremia dissecta (noyau vine) – Recorded on Cockatoo and Koolan islands in the Kimberley and East Intercourse Island in the Pilbara. Records from East Intercourse and Koolan islands specify that it is *M. d.* var. *dissecta*. On Cockatoo Island, a population was located at the green waste tip and was noted to be a garden escape that could potentially colonise other areas of the island (Floyd 2010). Recorded in drainage lines outside Karratha on Nickol Bay flats. Prioritised as L (D) in the Kimberley Region and H (H, I) in the Pilbara Region. Capable of growing over and smothering adjacent vegetation and should be controlled on islands where it occurs.

Micrococca mercurialis (Mercury doughwood) – Recorded on Cockatoo Island in the Kimberley Region from a single collection held by the State Herbarium of South Australia. Collected on the west side of the town site in 2000. Prioritised as FAR in the Kimberley Region. Not currently recognised as naturalised in WA.

Mikania micrantha (bitter vine) – Recorded on Christmas Island. Included on the IUCN world's 100 worst invasive species list (Lowe et al 2000). Listed as a NAQS target and officially prohibited in WA. Swarbrick (1997) suggested that it had likely been introduced to Christmas Island around 1982–1987. Swarbrick and Hart (2000) stated that it was widespread along roadsides in the central part of the island noted that its wind-dispersed seeds were being further distributed along roadsides by wind generated by passing mine trucks. They listed it as a major environmental weed on Christmas Island (Swarbrick & Hart 2000). This species is also listed as a major weed of forest rehabilitation areas and is described as having exploded across the island, including in gaps in undisturbed forest (CIMFR 2015). A NAQS survey found it to be common in forest margins on the north side of Christmas Island and noted that it could not be easily eradicated (NAQS 2000). Several biological control organisms have been evaluated and released elsewhere in the world and would likely be extremely helpful in reducing the abundance of *M. micrantha* on Christmas Island. The rust fungus *Puccinia spegazzinii* has been used successfully to control *M. micrantha* in Fiji and Papua New Guinea (Day 2012). *P. spegazzinii* is highly host specific and is the most effective biological control for *M. micrantha* that has been evaluated to date (Day 2012). It should be considered for release on Christmas Island. Butterflies of two species in the genus *Actinote* have been used with some success as biological controls for *M. micrantha* in Sumatra and would have the added benefit of attacking *Chromolaena odorata* (Day 2012). Interestingly, a report from the NAQS described defoliation of *M. micrantha* by caterpillars (NAQS 2000). Efforts should be made to identify the species that the caterpillars belong to prior to considering the introduction of *Actinote* species to Christmas Island.

Mimosa invisa (giant sensitive plant) – Recorded on Christmas Island. All populations of *M. invisa* in mainland Australia have been redetermined as *M. diplotricha*. Re-examining the identification of Christmas Island plants is critical to successful management and should be a priority. First recorded on Christmas Island at South Point in 1963 and later spread by drill line surveying (Swarbrick 1997). Despite early suggestions of eradication, it had become a major problem by 1973 (Flora of Australia Online n.d.). Now widespread in rehabilitation areas and disturbed habitats across the plateau (Swarbrick 1997). Currently recognised as a major problem in forest rehabilitation areas (CIMFR 2015). Listed as an official biological control target

Figure 8. Recorded distribution of non-native plant species on islands near Port Hedland, Western Australia. Black dots indicate the centroid of islands with named non-native plant populations. Islands have grey fill, mainland has white fill.

in Australia. A highly effective and species-specific biological control organism (the psyllid *Heteropsylla spinulosa*) has been developed for use on *M. diplotricha* and has been released in Australia and Papua New Guinea (McFadyen 2012). In the likely event that Christmas Island plants are of the same species as plants now identified as *M. diplotricha* on mainland Australia, consideration should be given to introducing *H. spinulosa* to Christmas Island.

Mimosa pudica (sensitive plant) – Recorded on Christmas Island. One WAH specimen was identified as *M. pudica* var. *unijuga*. First recorded from South Point in the early 1960s and now widespread in a variety of disturbed habitats (Swarbrick 1997). Not a particularly problematic environmental weed but it can be a serious amenity weed due to its prostrate growth habit and long spines that leave infected wounds in bare feet (Flora of Australia Online n.d.). Prohibited in WA.

Mirabilis jalapa (marvel of Peru) – Recorded on Christmas Island. A popular ornamental plant in the tropics with a history of escaping into disturbed areas. Listed by Swarbrick (1997) as cultivated and questionably naturalised.

Momordica charantia (bitter melon) – Recorded on Christmas Island, where it was known to be cultivated by 1904 (Swarbrick 1997). Flora of Australia Online (n.d.) lists it as native but notes that it 'grows in disturbed areas and in forest margins' and is 'a common tropical weed, perhaps an introduction'. Swarbrick (1997) included this species on a list of non-native flora and listed it as cultivated and questionably naturalised. Given its long history of cultivation as a vegetable on Christmas Island and throughout Asia, as well as its occurrence in disturbed areas, *M. charantia* is probably not native to Christmas Island.

Moringa oleifera (benzoil tree) – Recorded on Cockatoo and Koolan islands in the Kimberley Region, on West Island in the Cocos Islands, and on Christmas Island. Prioritised as an ALERT species in the Kimberley Region. Notes from a WAH specimen collected on Cockatoo Island in 1995 describes this species as rampant but the only other record of this species on Cockatoo Island merely mentions that it was present in the resort area (Handasyde 2002). Notes with a 1993 WAH specimen collected on Koolan Island indicate that *M. oleifera* was abundant along road verges. On Christmas Island it is characterised as a garden escape (Swarbrick 1997). Flora of Australia Online (n.d.) described *M. oleifera* as not fully naturalised on Christmas Island but notes that it occurs frequently in undergrowth around inhabited areas as a result of rooting branches dumped as garden waste. Apparently cultivated commercially in the Cocos Islands (Cocos Tropical Foods 2013). This species has been documented invading a wide variety of habitats throughout the tropics worldwide but spreads slowly. Monitoring and removal of naturalising individuals should be sufficient to protect areas with conservation value.

Mucuna albertisii (D'Albertis creeper) – Recorded on Christmas Island. It was introduced between 1935 and 1945, possibly during the Japanese occupation of Christmas Island (Swarbrick & Hart 2000). At one point, it was the dominant plant over about 1 km of rainforest margin where it overgrew and smothered adjacent vegetation up to 10 m in height (Swarbrick 1997). By 2000, an aggressive control program had reduced its population below the threshold of detection (Swarbrick & Hart 2000; NAQS 2000). Swarbrick and Hart (2000) and CIMFR (2015) list it as a major weed on Christmas Island. It is still present and being controlled in one small area. Any individuals encountered should be destroyed and the immediate area monitored for seedlings.

Mucuna pruriens (velvet bean) – Recorded on Christmas Island. Flora of Australia Online (n.d.) lists this species as native to Christmas Island but notes that it is only found in one locality on the north coast. A NAQS survey found two plants adjacent to a chicken farm near the Settlment and recommended eradication (NAQS 2000). The status of this species on Christmas Island needs to be re-evaluated but its infrequent occurrence in disturbed areas suggests that it is probably non-native. The individuals observed in the NAQS survey had severely irritating hairs on their pods unlike some cultivars already present in Qld and the NT (NAQS 2000). Varieties possessing these hairs can cause serious discomfort in humans and can harm livestock when ingested. *M. pruriens* is listed as a NAQS target and is a prohibited species in WA.

Muntingia calabura (strawberry tree) – Recorded on Direction, Home and West islands in the Cocos Islands and on Christmas Island. Cultivated and naturalised in the Cocos Islands and Christmas Island (Flora of Australia Online n.d.). Swarbrick and Hart (2000) list it as a minor environmental weed on Christmas Island, as does the CIMFR (2015). It is easily controlled by cutting and poisoning with glyphosate (CIMFR 2015). Widespread on Christmas Island in a variety of disturbed areas such as tracks, gardens and rehabilitation areas (Swarbrick 1997). Bird-dispersed fruit allows this species to quickly colonise disturbed areas (CIMFR 2015) and probably facilitates fruit flies (NAQS 2000). It is likely to be present in the seedbank in many areas across the island including in primary rainforest (Swarbrick 1997), but does not persist under a shaded canopy. Swarbrick (1997) asserted that *M. calabura* was not a significant environmental weed and actually facilitated regrowth of native rainforest species by shading out other non-native plants. Some of the species it supresses, including *Leucaena leucocephala* and *Cordia curassavica*, are capable of establishing persistant and monotypic stands and are substantially more difficult to manage. In disturbed areas *M. calabura* can also attract frugivorous bats and birds which deposit seeds of native plants and subsequently act as a nursery plant for native seedlings that ultimately displace it. In these circumstnaces, its presence can facilitate increases in native biodiversity by

more rapidly transitioning the area to a later successional state dominated by native vegetation. Claussen & Slip (2002) recommended eradication of this species in the Cocos Islands. Prohibited in WA.

Murraya koenigii (curry tree) – Recorded on Christmas Island. Commonly cultivated because the leaves are used as a seasoning in curries. Common in gardens and disturbed areas around settlements on Christmas Island (Flora of Australia Online n.d.).

Musa acuminata (banana) – Recorded on Sunday Island in the Kimberley. Spreading along the valley floor and drainage lines from old plantings near the abandoned mission (Lyons et al. 2014). *Musa* hybrids were cultivated on Christmas Island since before 1904 with remnant plants and garden escapes in areas of previous habitation and in rainforest clearings (Swarbrick 1997).

Myristica fragrans (nutmeg) – Recorded on Christmas Island. Listed as cultivated but present in rainforest clearings (Swarbrick 1997). Not listed as naturalised in any other source.

Nephrolepis biserrata (giant swordfern) – Recorded on Christmas Island. Native to Christmas Island but listed as a minor environmental weed in one publication because it is known to outcompete rainforest seedlings in regenerating rainforest as well as increasing the incidence of fire in revegetation plots (Swarbrick & Hart 2000).

Nephrolepis multiflora (Asian swordfern) – Recorded on Christmas Island. Native to Christmas Island but listed as a minor environmental weed in one publication because it is known to outcompete rainforest seedlings in regenerating rainforest as well as increasing incidence of fire in revegetation plots (Swarbrick & Hart 2000).

Nerium oleander (oleander) – Recorded on Koolan Island in the Kimberley Region. Listed as naturalised in the results of several reports from 2009 to 2013 (Wiseman 2013). Probably naturalised from former ornamental plantings at the old townsite. Prioritised as N (A, B) in the Kimberley Region. Toxic if ingested.

Nicotiana tabacum (tabacco) – Recorded on Christmas Island. Referred to as an occasional spontaneous garden escape (Flora of Australia Online n.d.) or a questionably naturalised garden remnant (Swarbrick 1997). Previously and perhaps currently cultivated for local production of cigarettes (Flora of Australia Online n.d.).

Ocimum americanum (hoary basil) – Recorded on Christmas Island. Questionably naturalised on roadsides and other disturbed areas (Swarbrick 1997). Cultivated in gardens as a medicinal plant and first collected as a garden escape along Waterfall Road in 1982 (Flora of Australia Online n.d.). This specimen may need to be re-examined to ascertain the naturalised status of this species on Christmas Island, as it is difficult to distinguish *O. americanum* from *O. basilicum*, which has also been collected in the same area.

Ocimum basilicum (great basil) – Recorded on Christmas Island. *O. basilicum* is known to be cultivated on Christmas Island (Swarbrick 1997) but doubt has been expressed regarding its status as naturalised (Flora of Australia Online n.d.). A WAH specimen of this species was collected on Christmas Island in 2000. It was taken from a population of six plants found on the margin of the track to 'the Waterfall landing'. This specimen has recently been redetermined according to a recent revision of *Ocimum* in Australia (Conn 2014) and the original identification was confirmed.

Ocimum tenuiflorum (holy basil) – Recorded on Christmas Island. A WAH specimen of this plant was collected in 1996 at Drumsite on the side of the road near houses. Only a single plant was present and the specimen notes included the text '?garden escape'. Not listed in Swarbrick's (1997) list of cultivated and naturalised plants on Christmas Island, perhaps due to a misidentification of the specimen by Swarbrick when it was collected (it was re-identified in 2001 and confirmed in 2014).

Oldenlandia corymbosa (flat-top mille graines) – Recorded on Koolan Island in the Kimberley Region; Direction, Home and West islands in the Cocos Islands; and on Christmas Island. Recorded as 'very common along road verges' in the notes of the WAH specimen collected on Koolan Island in 1993. A WAH specimen collected on Home Island in the Cocos in 1986 was previously misidentified as *O. galioides* but was recently redetermined as *O. corymbosa* var. *corymbosa*. DG Williams, who collected the specimen, later listed *O. corymbosa* as the only member of its genus present in the Cocos Islands (Williams 1994). Formerly considered native in WA but almost certainly alien to all of Australia. A common weed of disturbed areas in both the Cocos Islands and on Christmas Island.

Oldenlandia pumila – Recorded on Christmas Island. Found mainly on roadsides on the north-east part of the island (Flora of Australia Online n.d.).

Operculina turpethum (St Thomas lidpod) – Recorded on Dunvert Island in the Kimberley Region from a WAH specimen collected in 2005. The native/naturalised status of this plant in WA was unclear when it was collected, but it is now considered native in WA and is also listed as native in Qld and the NT. The northern Kimberley is probably the western limit of this species' native range in Australia.

Opuntia stricta (prickly pear cactus) –Recorded on East Lewis, Enderby, Jarman, West Lewis North and West Lewis North islands in the Pilbara Region. A declared pest in WA north of the 26th parallel with a control category of C3. Also designated as a Weed of National Significance and listed by the IUCN as one of the world's 100 worst invasive species (Lowe et al 2000). Prioritised as VH (H, I) in the Pilbara Region. Keighery (2010) included this species in a list of six non-native plants that pose a particular threat to Pilbara island ecosystems. Prior to the introduction of highly-successful biocontrol agents, *O. stricta* was the most serious weed in Australia (Parsons and Cuthbertson 2001; Hosking 2012). In 1986,

populations of *O. stricta* on East Lewis and both West Lewis islands were infected with cochineal insects as a means of biological control (Morris 1990). By 1988 it was apparent that the biological control was having an effect but herbicide would be required to complete the eradication (Morris 1990). In 2003, prickly pear was treated with herbicide on both East Lewis and West Lewis Islands. Apparently eradicated from Enderby Island by 1985 (Morris 1990). It was previously believed that *O. stricta* had been eradicated from the Dampier Archipelago (Keighery 2010) but some may still persist. *O. stricta* was confirmed to still be present on Jarman Island as of February 2015 (Vicki Long pers. obs.). Plants appear to have been damaged by biological control organisms but new sprouts and healthy fruits were also observed. Complete eradication of this species in the Pilbara islands should be a high priority as it displaces native vegetation and can negatively impact nesting sea turtles.

Opuntia sp. – Three unidentified *Opuntia* species have been recorded as cultivated on Christmas Island (Swarbrick 1997). These species need to be identified and eradicated as the majority of *Opuntia* species are listed as weeds of national significance and many have the potential to become invasive on Christmas Island.

Oxalis barrelieri (lavender sorrel) – Recorded on Christmas Island. Cultivated as an ornamental in shrines and gardens and naturalised on roadsides and other disturbed areas (Flora of Australia Online n.d.; Swarbrick 1997).

Oxalis corniculata (creeping woodsorrel) – Recorded on Christmas Island. Flora of Australia Online (n.d.) lists Christmas Island populatons by the synonym *O. corniculata* subsp. *corniculata*. First observed on Christmas Island in 1959 (Swarbrick 1997). Widely naturalised in gardens and disturbed areas, particularly in lawns where the grass is mowed frequently (Flora of Australia Online n.d.; Swarbrick 1997).

Pachyrhizus erosus (jicama) – Recorded on Christmas Island. Both cultivated as a vegetable and naturalised on Christmas Island (Swarbrick 1997). Naturalised in disturbed areas along roadsides and also on cliffs and terraces (Flora of Australia Online n.d.).

Paederia foetida (skunkvine) – Recorded on Christmas Island. Listed as a NAQS target species. An escaped ornamental that is now present in disturbed areas and areas of former habitation (Swarbrick 1997). A NAQS (2000) survey found this species growing over and smothering low trees behind Drumsite and at Grant's Well and described it as being as bad as *Mikania micrantha* in its smothering effects. *P. foetida* is listed as a threatening weed of disturbed areas and is controlled if found (CIMFR 2015). *P. foetida* has proven to be a serious environmental weed elsewhere in the world and has been targeted for biological control in Florida and Hawaii. It has the potential to seriously impact rehabilitation fields and prevent forest regeneration along roadways and in clearings. Efforts should be made to reduce abundance of this plant island-wide while it is still confined to a few areas, with the ultimate goal of eradication.

Panicum coloratum (blue panicgrass) – Recorded on Koolan Island in the Kimberley Region. Reported as present in a single survey on Koolan Island in 2005 (Wiseman 2013). Prioritised as FAR in the Kimberley Region.

Panicum repens (creeping panic) – Recorded on Home Island in the Cocos Islands and on Christmas Island. A serious weed in many tropical areas that can form dense mats capable of smothering adjacent vegetation. Flora of Australia Online (n.d.) lists this species as native to the Cocos Islands but describes only a single collection near the village. Williams (1994) listed *P. repens* as a non-native species in the Cocos Islands. A more recent report to Parks Australia also lists it as a weed (Claussen & Slip 2002). Not currently recognised as present on Christmas Island (APNI 2014) but a single specimen housed at the Centre for Australian National Biodiversity Research was collected in 2000 near the entrance to the casino. Populations on both Christmas Island and the Cocos Islands are likely naturalised.

Panicum trichoides – Recorded on Christmas Island. This species has not been documented on Christmas Island since 1904 and is now thought to be extirpated from the island (Swarbrick 1997).

Papaver somniferum (opium poppy) – Recorded on Barrow Island in the Pilbara Region. A single plant was found growing from a crack in the concrete near the mess hall in 2006. It was collected as a specimen and lodged at the WAH. No records are known from Barrow Island since then. A garden escape cultivated in some areas as an ornamental.

Parkinsonia aculeata (palo verde) – Recorded on Adolphus Island in the Kimberley Region and North Mangrove Island in the Pilbara Region. The record on North Mangrove Island notes that only one plant was present on the north end of the island and had likely arrived through wave dispersal. It is thought to have been introduced to Adolphus Island by major floods of the Ord River (Lyons et al. 2014). A Weed of National Significance and a declared pest in WA with a control category of C3. It is prioritised as L (B, C) in the Kimberley Region and M (D, E, F, G) in the Pilbara Region where it has become increasingly abundant and widespread over the past 10 years. This species is a serious environmental weed in the Kimberley and Pilbara regions. It forms dense thorny thickets around waterways and wetlands which can dam up waterways, cause erosion and lower water tables, displace native vegetation, and reduce access to water for fauna. It also degrades pastoral values by preventing the movement of cattle (Hussey et al. 2007). Long-distance dispersal is likely through animal movement. (Parsons & Cuthbertson 2001) and being able to float, via floodwaters resulting from heavy seasonal rains. It was officially targeted for biological control but the two

agents released in the 1990s have not been effective at controlling *P. aculeata* (van Klinken 2012). Several other species are currently being evaluated for potential release (van Klinken 2012). *P. aculeata* is increasing in number and spread along the Maitland River and has the potential to colonise and survive well in Burrup rock gullies and islands of the Dampier Archipelago, as water from the Maitland River reaches these islands during floods. Eradication of island populations is recommended. Parkinsonia is an extremely hardy shrub that has invaded the dry monsoonal and semi-arid regions of WA.

Parthenium hysterophorus (ragweed) – Recorded on Christmas Island. Has been removed from most of 24 originally colonised sites in the north-east section of the island as part of an eradication effort that began in 2008 (Dodd et al. 2012). Prohibited in WA and listed as a Weed of National Significance. Ragweed is an aggressive invasive of disturbed environments. It seeds prolifically but appears to be limited to heavier fertile soils, which limits its risk status on Pilbara islands. Ragweed presents a major health hazard to humans through contact dermatitis and asthma (Parsons & Cuthbertson 2001). Hence, it is listed as a threatening weed on Christmas Island (CIMFR 2015). An official biological control target in Australia with nine species of control organisms released with varying degrees of success (Dhileepan & McFadyen 2012). A serious agricultural and environmental weed that can cause severe dermatitis and respiratory problems (Dhileepan & McFadyen 2012).

Paspalum conjugatum (hilograss) – Recorded on Christmas Island. Noted to be recently naturalised on Christmas Island in 1906 but now widespread and present in most disturbed areas across the island (Flora of Australia Online n.d.).

Paspalum urvillei (Vasey's grass) – Recorded on Koolan Island in the Kimberley Region. Only recorded once on a 2005 survey and the plant was tentatively identified as *Paspalum ?urvillei*. This species is not otherwise recorded from the Kimberley Region. This record is probably the result of a misidentification but, if *P. urvillei* is present on Koolan Island, it should be controlled due to its history of becoming invasive elsewhere in Australia.

Paspalum vaginatum (salt water couch) – Recorded on North Island in the Cocos Islands. Several sources consider this species native to the Cocos Islands (Williams 1994; Flora of Australia Online n.d.). However, other sources maintain that its native range is relegated to tropical portions of the Americas (Hussey et al. 2007). It is native to the Kimberley and Pilbara regions of Western Australia (Keighery 2016). There is widespread disagreement among Australian states and territories regarding the native/naturalised status of this plant in the Cocos Islands. Until this is resolved, no recommendations can be made regarding management of this species in the Cocos Islands.

Passiflora foetida (stinking passionfruit) – Recorded on the Angel, Barrow, Dampier and Legendre islands in the Pilbara Region; 33 islands in the Kimberley Region; West Island in the Cocos Islands; and on Christmas Island. Identified as *P. foetida* var. *hispida* in many records from the Kimberley and Pilbara regions. A fast-growing vine that climbs over and smothers low vegetation and small trees. Additionally, it has been recorded on rockpiles on the Burrup Peninsula where it smothers rockpile vegetation which is listed as a Priority Ecological Community. *P. foetida* is capable of invading intact ecosystems but is facilitated by disturbance. Because it is dispersed by birds, it has been able to establish in relatively remote and undisturbed islands in the Kimberley Region that otherwise have no weed records (Preece et al. 2010). Probably the most serious weed species in the Kimberley islands. Because of the threat posed to biodiversity across the Pilbara and Kimberley regions recommendations have been made that research into biological control is urgently needed (Conservation Commission of Western Australia 2010). It has not yet been listed as an official biological control target. Prioritised as H (H, I) in the Pilbara Region and L (D) in the Kimberley Region. In the Pilbara Region, it is likely to spread from the Burrup Peninsula to adjacent islands in the Dampier Archipelago. Populations on Pilbara islands should be eradicated. Common and widespread throughout disturbed areas of Christmas Island (Flora of Australia Online n.d.). Lack of shade tolerance probably limits its invasive potential on Christmas Island. Likely to spread from West Island to other Cocos Islands.

Peltophorum pterocarpum (copperpod) – Recorded from Koolan Island in the Kimberley Region. Popular tropical ornamental tree that has escaped cultivation at several sites in WA. Probably originally planted as a street tree but both records of *P. pterocarpum* on Koolan Island indicate that it is naturalised (Keighery et al. 1995, Wiseman 2013).

Peperomia pellucida (pepper elder) – Recorded on Christmas Island. Not documented as present since 1906 and possibly extirpated (Flora of Australia Online n.d.).

Peristrophe bivalvis – Recorded on Christmas Island. Persisting at the site of a previous garden and probably not truly naturalised (Flora of Australia Online n.d.; Swarbrick 1997).

Phaseolus lunatus (lima bean) – Recorded on Christmas Island. Reported to be cultivated as a garden vegetable by 1904 (Swarbrick 1997) and now commonly naturalised on roadsides and disturbed areas (Flora of Australia Online n.d.).

Phoenix dactylifera (date palm) – Recorded on Rosemary Island in the Pilbara Region. A 1987 record notes that it was found on the beach and was rare at the time (Long 1987). Prioritised as M (D, E, F, G) in the Pilbara Region. *P. dactylifera* can form dense thickets near wetland areas (Hussey et al. 2007) but is less likely to spread in the

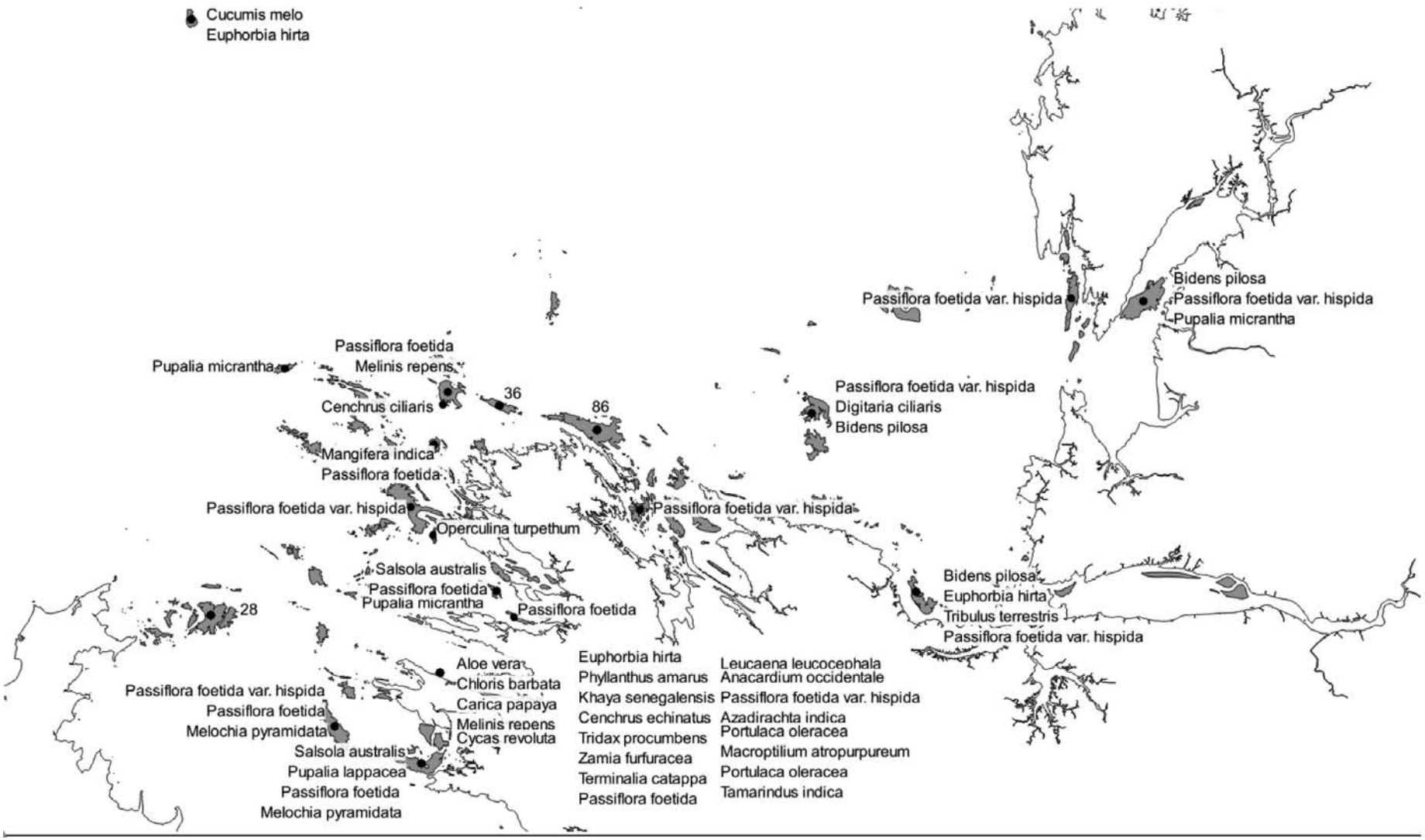

Figure 9. Recorded distribution of non-native plant species on islands near Derby, Western Australia. Black dots indicate the centroid of islands with named non-native plant populations. Islands have grey fill, mainland has white fill. There are 86 non-native plant species recorded on Kooland Island, 36 on Cockatoo Island and 28 on Sunday Island, which are listed in Appendix 2.

dry environment of Rosemary Island. This population should be re-evaluated and controlled if necessary.

Phyla nodiflora (frog fruit) – Recorded on Sir Graham Moore and Sunday islands in the Kimberley Region and on Horsburgh and West islands in the Cocos Islands. Kimberley specimens are identified as *P. nodiflora* var. *nodiflora*. Some populations of *P. nodiflora* in the Kimberley Region are probably native (Hussey et al. 2007) but the status of specific populations documented on Sir Graham Moore and Sunday islands is suspect due to previous human occupation at those sites. Flora of Australia Online (n.d.) reports that *P. nodiflora* has naturalised around the settlement from lawn plantings. It appears to have spread to Horsburgh Island (Williams 1994), which is not inhabited. Due to widespread cultivation as an ornamental and a lawn plant, this species is likely to establish on more islands in WA in the future. Current research into biological control of *P. canescens* and non-native populations of *P. nodiflora* may eventually be useful in managing established populations (Julien et al. 2012). A serious agricultural weed in grazing systems and a problematic environmental weed in seasonally flooded areas.

Phyllanthus acidus (star gooseberry) – Recorded on Christmas Island. Cultivated as a fruit tree and recently naturalised in a variety of disturbed habitats (Swarbrick 1997). A WAH specimen was collected from secondary forest at the central area workshop as early as 1986. Flora of Australia Online (n.d.) also notes that it is cultivated but not naturalised in the Cocos Islands.

Phyllanthus amarus – Recorded on Alcatraz and Koolan islands in the Kimberley Region, West Island in the Cocos Islands, and on Christmas Island. Naturalised on Christmas Island by 1897 and now common in most disturbed habitats (Swarbrick 1997). Notes with a WAH specimen collected in 1986 by DG Williams on West Island in the Cocos Islands record it as common, and it was listed as a native species in a subsequent publication (Williams 1994). Flora of Australia Online (n.d.) describes it as 'a weed of disturbed places around the settlement' on West Island. Cocos Island specimens of this species may need to be re-examined as some evidence suggests that they may be misidentified specimens of *P. debilis* (see below). Notes with a WAH specimen collected on Koolan Island in 1993 indicate that it was common in lawns and along road verges at the old townsite but it has not been recorded in any subsequent surveys on the island (Wiseman 2013). Prioritised as L (B, C, D) in the Kimberley Region.

Phyllanthus debilis (niruri) – Recorded on West Island in the Cocos Islands. Not recorded in any literature as present in the Cocos Islands. Known from a single WAH specimen that was redetermined as *P. debilis* in 2012. Most collections of this species in Australia have been misidentified as *P. amarus* (Hunter & Bruhl 1997), calling into question the identity of the *Phyllanthus* species present in the Cocos Islands.

Physalis angulata/*Physalis minima* (balloon cherry/pygmy groundcherry) – Recorded on Adolphus, Koolan and Sunday islands in the Kimberley Region; Dampier and Varanus islands in the Pilbara Region; Direction, Home, Horsburgh, North and West islands in the Cocos Islands; and on Christmas Island. Plants on Christmas Island and the Cocos Islands are classified as *P. minima* in Flora of Australia Online (n.d.) but the text acknowledges possible confusion with *P. angulata*. APC (2014) considers the use of *P. minima* in these areas be a misapplication and lists *P. angulata* as naturalised in these territories and in WA (APNI 2014). A key to *Physalis* in Australia states that *P. angulata* is 'undoubtedly an early introduction from the Americas' (Bean 2006). A widespread but occasional weed on Christmas Island and in the Cocos Islands (Flora of Australia Online n.d.). One report noted a low dispersal rate on North Keeling Island in the Cocos Islands due to a lack of animal vectors and stated that *P. angulata* could easily be eradicated (Claussen & Slip 2002). Recorded on Varanus Island from a single WAH specimen collected in 2012. Found in rocky areas just above high tide mark on the Burrup Peninsula, which shows its ability to establish in coastal situations. Prioritised as FAR in the Pilbara Region and N (B) in the Kimberley Region.

Piper aduncum (spiked pepper) – Recorded on Christmas Island. Flora of Australia Online (n.d.) states that it is naturalised in an area of secondary vegetation near Drumsite and was probably unintentionally introduced as a contaminant in machinery or materials, while Swarbrick (1997) specified that it was cultivated in gardens and found in abandoned gardens and disturbed areas, indicating an origin as a garden escape. Regardless, a NAQS (2000) report noted that it was a serious weed in Papua New Guinea and was likely a sleeper weed on Christmas Island. The report recommended eradication of *P. aduncum* on Christmas Island (NAQS 2000). This is probably prudent, as this species has proven to be a problematic environmental and agricultural weed in tropical areas and is targeted for eradication on the Hawaiian Island of O'ahu which has a similar climate. Listed as a threatening weed on Christmas Island (CIMFR 2015) and a NAQS target species.

Piper betle (betel) – Recorded on Christmas Island. Swarbrick (1997) characterised it as a garden remnant found in a former garden near Drumsite, but Flora of Australia Online (n.d.) stated that the population contained both male and female plants and appeared to be self-sustaining. Commonly cultivated throughout north-east Asia and used as a mild stimulant.

Piper sarmentosum – Recorded on Christmas Island. In cultivation as an edible plant and questionably naturalised at a former garden site (Swarbrick 1997). Not currently recognised as naturalised anywhere in Australia.

Pithecellobium dulce (monkeypod) – Recorded on Christmas Island. First planted on the golf course as

an ornamental tree and later planted at Drumsite and in some rehabilitation areas (Swarbrick 1997). *P. dulce* is bird-dispersed and thorny, and its seedlings are capable of growing through thick fern cover, making it a serious threat to rehabilitation areas (Swarbrick 1997). Swarbrick and Hart (2000) list it as a major environmental weed on Christmas Island. However, a more recent report notes that, although a major weed, it is easily controlled and refer to it as a sleeper weed (CIMFR 2015). Eradication of this species from Christmas Island (Swarbrick & Hart 2000; NAQS 2000) and legislation banning the cultivation of this plant on private property (Swarbrick & Hart 2000) have both been suggested. If control measures are taken, follow-up monitoring may be necessary because the seeds are thought to persist in the seedbank for long periods of time (Swarbrick 1997).

Pityrogramma calomelanos (silver fern) – Recorded on Christmas Island. Flora of Australia Online (n.d.) lists it as *P. calomelanos* var. *calomelanos* and states that it was first recorded on Christmas Island in the late 19th century and is now naturalised in disturbed areas and rainforest clearings. Possibly cultivated as well (Swarbrick 1997).

Plantago major (broadleaf plantain) – Recorded on Christmas Island. Naturalised in gardens and disturbed areas (Swarbrick 1997).

Pluchea indica (Indian camphorweed) – Recorded on Christmas Island. First documented on the island in the 1980s on cliffs near the wharf at Flying Fish Cove (Flora of Australia Online n.d.; Swarbrick 1997). The population was estimated to be between 100 to 200 plants in 1997, and was expected to spread to other disturbed saline coastal areas and sea cliffs (Swarbrick 1997). Swarbrick and Hart (2000) list it as a minor environmental weed on Christmas Island and recommended eradication while its distribution was still limited to waste areas around the wharf.

Plumeria obtusa (Singapore graveyard flower) – Recorded on Sunday Island in the Kimberley. Persisting from ornamental plantings around the old mission and an outstation site but not naturalised (Lyons et al. 2014). Not recorded as naturalised anywhere in WA.

Polycarpon tetraphyllum (four-leaved allseed) – Recorded on Thevenard Island in the Pilbara numerous times between 1987 and 2011. Potentially still present. Prioritised as FAR in the Pilbara. Records on Thevenard appear to represent the northernmost extent of this weed's distribution in WA. Common garden weed in south-west WA.

Polyscias fruticosa (ming aralia) – Recorded on Christmas Island. Flora of Australia Online (n.d.) notes that this species is both cultivated and sporadically naturalised in areas with secondary vegetation. Swarbrick (1997) did not include this species in his list of naturalised and cultivated non-native plants on Christmas Island. However, two congeners (*P. guilfoylei* and *P. scutellaria*) were listed as cultivated (Swarbrick 1997). This discrepancy is suspicious and calls into question which *Polyscias* species is naturalised on the island.

Porana volubilis (horse-tail creeper) – Recorded on Christmas Island. Believed to be introduced to the island in the 1960s and is listed as naturalised but the only specimen collected was growing over an abandoned shed near a settlement (Flora of Australia Online n.d.). Swarbrick (1997) lists it as a cultivated plant and garden remnant.

Portulaca oleracea (common purslane) – Recorded on 13 islands in the Pilbara Region; six islands in the Kimberley Region; Home, North and West islands in the Cocos Islands; one or more islands of Ashmore Reef; and on Christmas Island. Mainland WA contains both native and non-native populations of *P. oleracea*. Populations in south-west WA are probably non-native but many populations in the Pilbara and Kimberley regions are likely to be native. The status of island populations in these regions is not well understood. Some island records in the Pilbara and Kimberley regions may also be misidentified *P. intraterranea*, a native species. Prioritised as FAR in the Pilbara Region. *P. oleracea* is listed as naturalised in the Cocos Islands by the APNI (2014). Williams (1994) collected a specimen of *P. oleracea* growing in a vegetable garden on Home Island in the Cocos Islands and recorded it as 'not cultivated' but listed the species as native to the Cocos Islands in a later publication. Widespread in open and grassland areas of North Keeling Island but in low numbers (Claussen & Slip 2002). Listed in Flora of Australia Online (n.d.) as being naturalised on Ashmore Reef but the specific island or islands are not mentioned. Recorded as non-native on Christmas Island in 1904 and said to be abundant around Flying Fish Cove and at Waterfall but has not been documented since then (Flora of Australia Online n.d.; Swarbrick 1997). The common use of *P. oleracea* as a vegetable leads Flora of Australia Online (n.d.) to speculate that it may have been extirpated through consumption by the local populace.

Portulaca pilosa (hairy pigweed) – Recorded on Barrow, Bridled and Varanus islands in the Pilbara Region, Middle and West islands of Ashmore Reef, and on Christmas Island. At present, this taxon contains at least three entities present in WA. One is a non-native annual with cerise pink flowers which corresponds to true *P. pilosa* from the Americas (only collected from Wyndham, Kununurra and Derby in mainland WA). The others are yellow-flowered plants that usually occur in undisturbed habitat and are almost certainly native. A WAH specimen collected on West Island of Ashmore Reef in 1977 is noted as having yellow flowers and a tuberous root which suggests that Ashmore Reef populations are likely native. Similarly, a specimen collected on Bridled Island in the Pilbara Region in 2013 also had yellow flowers, indicating probable native status. Unfortunately, flower colour is not listed for the Barrow Island specimen and its status on the island remains unclear. On Christmas Island it is listed

as naturalised and primarily occurs in gardens and around habitation and is occasionally cultivated (Flora of Australia Online n.d.).

Pritchardia pacifica (Fiji fan palm) – Recorded on Cockatoo Island in the Kimberley in 2002. A horticultural specimen. Not known to be naturalised anywhere in WA.

Prosopis glandulosa × *Prosopis velutina* (mesquite) – Recorded on Carey and Potter islands in the Pilbara Region (Peter Kendrick pers. comm.). The Potter Island record is from an old sight record but more recent surveys in 2000 did not locate any (Vicki Long, pers. obs.). At least four species of Mesquite (*Prosopis spp.*) and an unknown number of hybrids have naturalised in Australia. Adjacent mainland areas are known to have *Prosopis* infestations and pods are likely to have floated to the islands following floods generated by cyclones. Parentage of *Prosopis* hybrids in WA is currently unclear and some hybrid populations may include contributions from the species *P. juiflora* and *P. pallida* (APNI 2014). Regardless, all *Prosopis* species are prioritised as M (D, E, F, G) in the Pilbara Region and are listed as Declared or Prohibited in WA. All *Prosopis* species are listed as weeds of national significance and *P. glandulosa* is listed by the IUCN as one of the world's worst invasive species (Lowe et al 2000). Prosopis forms extensive, dense, thorny, monotypic thickets in semi-arid and arid areas especially along watercourses (Csurhes and Edwards 1998) that impede livestock movement, and damages groundwater supplies and native biodiversity assemblages (Zachariades et al. 2011). The entire genus is officially listed as a target for biological control. A moth in the genus *Evippe* has been released and appears to be substantially reducing seed production and growth of *Prosopis* populations in the Pilbara (van Klinken 2012). Two immature *Prospis* ?*pallida* seedlings were removed from Potter Island in June 2016. Surveys of Carey Island and other nearby islands should be conducted to determine whether *Prosopis* is present and the level of infestation. Consideration should be given to introducing the *Evippe* moth if uninfested *Prosopis* is present and immediate removal of all individuals is not feasible.

Psidium cattleianum (strawberry guava) – Recorded on Christmas Island. First documented on Christmas Island in the early 1960s (Flora of Australia Online n.d.). Cultivated and now naturalised in rainforest margins (Swarbrick 1997). When found in rehabilitation fields or relinquished mine areas, this species is actively controlled by poisoning (CIMFR 2015). Listed by the IUCN as one of the world's 100 worst invasive species (Lowe et al 2000). A serious weed of wet tropical and subtropical ecosystems that is capable of invading intact ecosystems and forming dense monocultures. A major host for several economically-damaging fruit fly species. *P. cattleianum* poses a serious threat to native biodiversity on Christmas Island and should be controlled island-wide. A biological control insect (*Tectococcus ovatus*) has been released to mitigate the impacts of *P. cattleianum* in the Hawaiian Islands and could potentially be used as part of control efforts on Christmas Island. *P. cattleianum* is commonly sold as a fruit tree in WA. Sale and transportation of this plant in Western Australia should be restricted to prevent infestations in tropical portions of WA including the north coast islands.

Psidium guajava (yellow guava) – Recorded on Christmas Island and the Cocos Islands. A commonly cultivated fruit tree in the tropics that has escaped cultivation on both the Cocos Islands and Christmas Island. Flora of Australia Online (n.d.) lists this species as cultivated in the Cocos Islands but not naturalised. However, Williams (1994) included this species on a list of non-native plants of the Cocos Islands, implying that it is naturalised. Unfortunately, the island or islands where it was naturalised were not specified. Apparently introduced to Christmas Island shortly after initial settlement (Swarbrick 1997) where it is now found along tracks and in rehabilitation areas with sufficient light and listed as a minor environmental weed (Swarbrick 1997; Swarbrick & Hart 2000; CIMFR 2015). Suspected to be one of the main hosts of fruit flies on Christmas Island (NAQS 2000).

Psophocarpus tetragonolobus (winged bean) – Recorded on Christmas Island. Cultivated as a vegetable and now naturalised in old quarries (Flora of Australia Online n.d.).

Pterocarpus indicus (New Guinea rosewood) – Recorded on Christmas Island. Swarbrick (1997) noted that it was cultivated as a shade tree and was widely planted in rehabilitation areas but warned that it might naturalise. A subsequent publication listed it as a major environmental weed on Christmas Island and stated that seedlings had been observed (Swarbrick & Hart 2000). CIMFR (2015) also lists it as a threatening weed of disturbed areas but notes that it is currently in low numbers and is easily controlled.

Pueraria phaseoloides (tropical kudzu) – Recorded on Christmas Island. Listed in Flora of Australia Online (n.d.) as *P. phaseoloides* var. *javanica*. Swarbrick (1997) designated it as cultivated and questionably naturalised in rehabilitation areas and disturbed areas, whereas Flora of Australia Online (n.d.) listed it as naturalised and stated that despite being recently introduced it was 'growing vigorously, producing copious seed'. This species and its congeners have a history of being invasive elsewhere in the world and are capable of rapidly covering and smothering adjacent vegetation. This species should be closely monitored.

Pupalia lappacea (forest burr) – Recorded on Lachlan Island in the Kimberley Region. Naturalised in Kimberley vine thickets (Hussey et al. 2007). Sharp burrs make it an amenity weed as well as an environmental weed. Prioritised as L (B, C, D) in the Kimberley Region.

Pupalia micrantha (pupalia) – Recorded on seven islands in the Kimberley Region. Notes with the WAH

specimens indicate that it was infrequent on Carronade Island in 1998 and common on North West Osborn Island in 1993. Also produces sharp burrs. Prioritised as L (B, C, D) in the Kimberley Region.

Quisqualis indica (Chinese honeysuckle) – Recorded on Cockatoo Island in the Kimberley. Notes with a WAH specimen collected in 1993 describe it as locally common around the boat ramp at the town site. Probably an escaped ornamental. Flora of Australia Online (n.d.) lists it as native on Christmas Island but notes that it grows in disturbed rocky areas that cannot support tree growth. Additionally, no fruits have been observed from this species on Christmas Island and the insect necessary for pollination may not even be present. In light of these facts and the common usage of this species as an ornamental in the tropics, the categorisation of this species as native to Christmas Island seems questionable.

Ricinus communis (castor oil plant) – Recorded on Direction, Home and Horsburgh islands in the Cocos Islands and on Christmas Island. Used for the production of castor oil but chemical constituents of the seed coat are extremely toxic. Found on roadsides and in disturbed areas of both Christmas Island and the Cocos Islands (Flora of Australia Online n.d.). Swarbrick and Hart (2000) list it as a minor environmental weed on Christmas Island. A red variety is cultivated as an ornamental and for medicinal use on Christmas Island (Flora of Australia Online n.d.). Claussen and Slip (2002) recommended eradication of this species in the Cocos Islands.

Rivina humilis (pigeonberry) – Recorded on the Horsburgh, North Keeling, North and West islands in the Cocos Islands and on Christmas Island. Considered an environmental weed throughout much of its non-native range and can spread rapidly through bird-dispersed seeds. Prefers moist shaded sites but grows in other disturbed areas as well. On the Cocos Islands it is reported to be common in coconut plantations and disturbed areas (Flora of Australia Online n.d.). Claussen and Slip (2002) described this plant as 'widespread and in high densities in the understorey' on North Keeling Island and noted that eradication would be difficult. Not currently recognised as naturalised on Christmas Island in any literature but a WAH specimen was collected on Christmas Island in 2000. Specimen notes stated that it was common around a temple near South Point. If the abundance of *R. humilis* on Christmas Island is still low, attempts should be made to eradicate it. This plant is currently not naturalised in WA but is listed as a permitted species under the synonym *R. portulaccoides*. *R. humilis* poses a threat to biodiversity on both islands and the mainland of WA and should be re-designated as prohibited.

Robinia pseudoacacia (black locust) – Recorded on Koolan Island in the Kimberley Region and on Christmas Island. An early coloniser of disturbed areas that promotes the growth of other non-native plants by increasing nitrogen levels in the soil. A serious environmental weed in a number of Australian states. Reports noted its presence on Koolan Island in 2005 and again in 2008 (Wiseman 2013). *R. pseudoacacia* has not been previously documented north of the Perth area (Western Australia Herbarium 1998–) and these records imply that its range in the state has the potential to expand dramatically. Specimens of these plants should be collected and this population should be assessed for possible eradication. Swarbrick (1997) lists *R. pseudoacacia* as questionably cultivated on Christmas Island. Text associated with a WAH specimen collected in1996 state that it was present in a few clumps around the wharf area. This species has the potential to negatively impact forest rehabilitation efforts and should be eradicated before it has a chance to fully naturalise on Christmas Island.

Rottboellia cochinchinensis (itchgrass) – Recorded on Christmas Island by the synonym *R. exaltata*. Flora of Australia Online (n.d.) lists it as native to Christmas Island and refers to it as present on the north-eastern coastal terrace, but it is recorded as a weed in a report from a NAQS survey, which found it growing around the casino. The report recommended control of the small number of individuals at the casino and eventual eradication (NAQS 2000). Its status on Christmas Island requires clarification. Irritating hairs found on its leaves and stems make it unpalatable to livestock and an unpleasant amenity weed.

Ruellia tuberosa (minnieroot) – Recorded on Koolan Island in the Kimberley Region. A WAH specimen collected in 1993 was collected from an old unwatered garden at the former townsite. *R. tuberosa* is an ornamental that has escaped cultivation elsewhere in northern WA (Hussey et al. 2007). Prioritised as N (A, B) in the Kimberley Region.

Saccharum officinarum (sugarcane) – Recorded on Christmas Island. Commonly cultivated in the tropics for commercial sugar production. Swarbrick (1997) states that *S. officinarum* was cultivated on Christmas Island in 1904 but died out at some point. Flora of Australia Online (n.d.) does not list this species as naturalised on Christmas Island but notes that specimens of *S. spontaneum* found on Christmas Island have 'have unusually broad leaves, suggesting some degree of hybridisation with *S. officinarum*, or some affinity with *S. arundinaceum*'. Two Christmas Island specimens of *S. officinarum* are currently held at the WAH, one of which was previously identified as *S. spontaneum*. It is not clear which species of *Saccharum* is present on Christmas Island.

Saccharum spontaneum (wild sugarcane) – Recorded on Christmas Island. Swarbrick (1997) describes this species as naturalised in gardens, roadsides and previous settlements. Flora of Australia Online (n.d.) states that it is has naturalised from garden plants introduced by the Chinese community and is now widespread in secondary vegetation. However, one

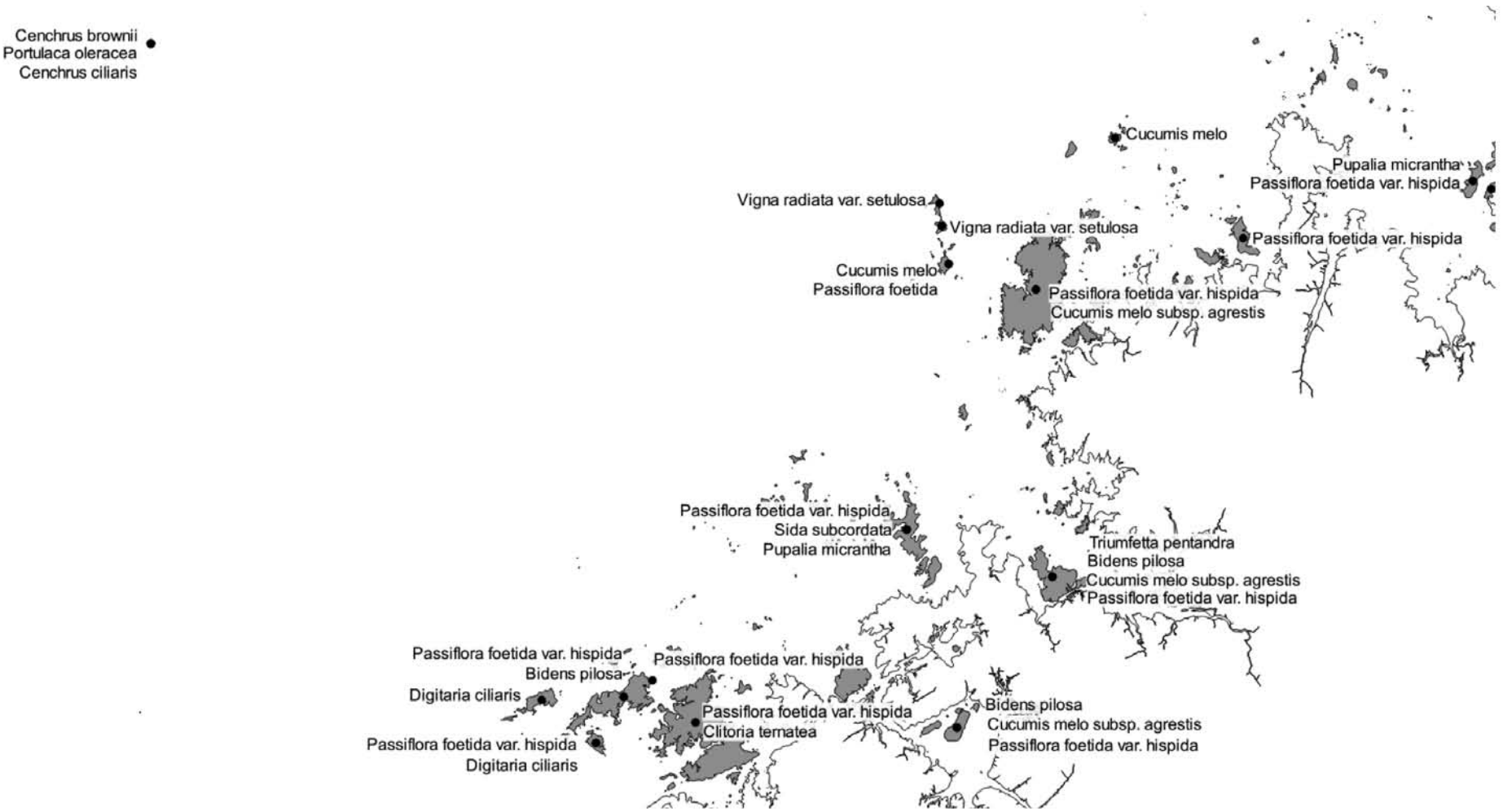

Figure 10. Recorded distribution of non-native plant species on islands along the mid-Kimberly coast, Western Australia. Black dots indicate the centroid of islands with named non-native plant populations. Islands have grey fill, mainland has white fill.

of the two specimens of this species cited by Flora of Australia Online n.d. (R. Shivas 813) is held at the WAH and was redetermined by AA Mitchell as *S. officinarum* in 2004 (WAH 2014). It is not clear what species of *Saccharum* is present on Christmas Island.

Salsola australis (roly-poly) – Recorded as a weed by the misapplied name *S. tragus* on Legendre Island in the Pilbara Region and Lachlan and Sunday islands in the Kimberley Region. Present on most Pilbara islands but records were not detected as part of this project because they were assigned native status. Multiple forms or distinct species are present in WA (Borger et al. 2008). Despite previous designation as a non-native weed, all forms appear to be native (Borger et al. 2008). Because of the tendency to outcompete other vegetation in disturbed areas and rehabititation sites, this species is often treated as a weed despite its current native status.

Sansevieria trifasciata (mother-in-law's tongue) – Recorded on Christmas Island. Swarbrick (1997) listed it as cultivated and a garden remnant in areas of previous habitation. However, a specimen collected in 2012 and held at the Centre for Australian National Biodiversity Research was from a localised clump of plants that was recorded as 'not cultivated'. *S. trifasciata* is frequently found naturalised from garden waste in similar climates elsewhere in the world.

Sauropus androgynus (star gooseberry) – Recorded on Home Island in the Cocos Islands and on Christmas Island. Cultivated as a leaf vegetable and now locally naturalised in a few areas on both islands (Flora of Australia Online n.d.; Swarbrick 1997). Williams (1994) listed this species as naturalised in the Cocos Islands but did not specify which islands.

Schefflera actinophylla (octopus tree) – Recorded on Christmas Island. Native to Qld and the NT but known to be an extremely serious environmental weed in wet and mesic tropical areas elsewhere in the world. Widely planted in WA but not known to have naturalised. Introduced to Christmas Island as an ornamental tree by 1963 and now invading adjacent disturbed rainforest via bird-dispersed seed (Swarbrick 1997). Swarbrick and Hart (2000) and CIMFR (2015) list it as a major environmental weed on Christmas Island. Concern has been expressed that its hemi-epiphytic growth habit might allow it to establish in inaccessible rainforest canopy, making it difficult to control (Swarbrick & Hart 2000). *S. actinophylla* poses a serious threat to native biodiversity on Christmas Island. We agree with Swarbrick (1997) that it should be removed from cultivation and eradicated from the island if possible.

Schizolobium parahyba (Brazilian firetree) – Recorded on Koolan Island in the Kimberley Region. Only known from planted specimens (Wiseman 2013). These trees should be monitored carefully, as this species is known to have naturalised in tropical areas overseas.

Scoparia dulcis (goatweed) – Recorded on West Island and Pulu Kambing on the Cocos Islands and on Christmas Island. A weed of disturbed areas and roadsides on both Christmas Island and the Cocos Islands (Flora of Australia Online n.d.). Also common on mine sites on Christmas Island (Swarbrick 1997).

Senna alata (candletree) – Recorded on Koolan Island in the Kimberley Region and on Christmas Island. A declared pest in WA with a control category of C3. Prioritised as N (A) in the Kimberley Region. Notes with WAH specimens collected on Koolan Island in 1993 describe populations near the old town site and at the base of a waterfall along a flowing creek. Probably originated as an ornamental at the old town. This plant is being actively controlled on Koolan Island and no new plants were detected on surveys in 2013 (Wiseman 2013). Monitoring should continue on Koolan Island to ensure eradication. Swarbrick (1997) recorded *S. alata* as persisting in an old garden. This species could potentially naturalise on Christmas Island and remaining individuals in the old garden should be removed.

Senna occidentalis (coffee senna) – Recorded on Home Island in the Cocos Islands and on Christmas Island. Present in disturbed areas on Home Island in the Cocos Islands and spreading along roadsides and disturbed areas on Christmas Island (Flora of Australia Online n.d.).

Senna planitiicola (arsenic bush) – Recorded on Barrow Island in the Pilbara Region. On Barrow Island it is known only from a single WAH specimen collected in 2012 that was originally identified as *Senna? occidentalis*, but has since been re-detetermined as *S. planitiicola*. The specimen was collected from a 1.4 m shrub on a rocky ledge near the high water line. A few other small populations have been observed on Barrow Island but do not appear to be invading and may be a historical introduction by pearlers coming from the Kimberley region (Vicki Long pers. obs.). Although this species is native to the Kimberley region, it has seldom been recorded in the Pilbara Region.

Senna surattensis subsp. *sulfurea* (glossy shower) – Recorded on Christmas Island. Often treated as *S. sulfurea*. Native to mainland WA, NT and Qld. Flora of Australia Online (n.d.) described a single population that had established on a terrace near the shoreline at 'North West Point' and was producing large numbers of seedlings. Swarbrick and Hart (2000) and CIMFR (2015) list it as a minor environmental weed on Christmas Island and describe it as a localised rainforest weed that should be eradicated while the population is still small.

Sesbania bispinosa var. *bispinosa* (spiny sesbania) – Recorded on Christmas Island. A single collection was made of a plant growing with *Leucaena leucocephala* on a roadside (Flora of Australia Online n.d.; Swarbrick 1997). APC (2014) lists it as doubtfully naturalised.

Sesbania cannabina (prickly sesban) – Recorded on Varanus and Thevenard islands in the Pilbara Region; East, Middle, and West islands on Ashmore Reef; and

on Home and Horsburgh islands in the Cocos Islands. Native to northern parts of Australia. On Varanus Island, *S. cannabina* is believed to be an introduction from the mainland (Apache 2012). It was seen only once in 2003 and is now presumed eradicated (Apache 2012). Similarly, seedlings were detected on Thevenard Island in 1998 and 2014 and identified as introductions from mainland WA. *S. cannabina* is catalogued as naturalised on the islands of Ashmore Reef (Flora of Australia Online n.d., Australian Plant Name Index 2014; APC 2014) but other sources list this species as native to Ashmore Reef (Pike & Leach 1997; Russell et al. 2004). The status of this species on Ashmore Reef should probably be changed to native. Cocos Islands specimens are often identified as *S. cannabina* var. *cannabina*. In the Cocos Islands, it is typically found in disturbed areas and in strand forest (Flora of Australia Online n.d.).

Sesbania grandiflora (hummingbird tree) – Recorded on Horsburgh Island in the Cocos Islands and on Christmas Island. Flora of Australia Online (n.d.) notes that this species 'is planted to rehabilitate mined areas or sometimes cultivated in gardens on Christmas Is.', but does not designate it as naturalised. Williams (1994) listed it as naturalised on Horsburgh Island in the Cocos and two collections at the Australian National Herbarium from 1986 reference the presence of a small clump of *S. grandiflora* on the island. Not presently recognised for either location by the APC (2014) or APNI (2014).

Setaria pumila (yellow foxtail) – Recorded on Koolan Island in the Kimberley Region. One WAH specimen identified as *S. pumila* subsp. *pumila* was described as sparsely distributed in very wet disturbed ground around the administration block. All other WA records are from the south-west of the state.

Setaria sphacelata (African bristlegrass) – Recorded on Koolan Island in the Kimberley Region and on Christmas Island. On Koolan Island it is known from a single Australian National Herbarium specimen collected in 1992 from the administration block. On Christmas Island, *S. sphacelata* was listed by Swarbrick (1997) as questionably naturalised in a disturbed area. Not currently recognised on Christmas Island by the APNI (2014).

Setaria verticillata (hooked bristlegrass) – Recorded on nine Pilbara islands. A common weed of disturbed areas throughout WA. Prioritised as L (D) in the Pilbara Region.

Sida acuta (common wireweed) – Recorded on North Keeling Island in the Cocos Islands and on Christmas Island. Flora of Australia Online (n.d.) and the APC (2014) list *S. acuta* as native on both islands but it is probably native to the Americas (Barker 1998). *S. acuta* was listed as naturalised on North Keeling Island by Williams (1994) but was not detected on the island in a later survey (Claussen & Slip 2002). On Christmas Island it is common along roadsides and tracks (Flora of Australia Online n.d.). Effective biological control organisms have been developed for this species and have been released on mainland Australia and in several other countries (Heard et al. 2012a). Consideration should be given to using these organisms to reduce the abundance of this plant on Christmas Island.

Sida rhombifolia (arrowleaf sida) – Recorded on Christmas Island, sometimes by the synonym *S. rhombifolia* subsp. *rhombifolia*. Flora of Australia Online (n.d.) and the APC (2014) both list this species as native to Christmas Island. However, Flora of Australia Online (n.d.) also notes that it is 'very common where natural vegetation has been cleared'. This species is probably native to Africa and India and is not native to Australia (Bean 2007). It should probably be listed as naturalised on Christmas Island. Effective biological control organisms have been developed for *S. rhombifolia* and have been released in mainland Australia and several other countries (Heard et al. 2012a). Consideration should be given to using these organisms to reduce abundance of this plant on Christmas Island.

Sida subcordata – Recorded on Coronation Island in the Kimberley. Only known in WA from a few coastal sites in the Kimberley and apparently recently introduced to northern Australia (Barker 1998). Barker (1998) expressed concerns regarding similarities between *S. subcordata* and other weedy *Sida* species and stated that it too could become a problematic weed. Island populations should be assessed for potential control or eradication. Prioritised as FAR in the Kimberley Region.

Solanum americanum (glossy nightshade) –Recorded on Direction Island in the Cocos Islands and on Christmas Island. Flora of Australia Online (n.d.) lists this species as native on Christmas Island and the Cocos Islands. However, in the text it is said to be found in 'stunted marginal growth' on Christmas Island and is referred to as a 'rare weed' in the Cocos Islands. APC (2014) lists it as native on both Christmas Island and the Cocos Islands, but Swarbrick (1997) recorded it as naturalised in a variety of disturbed habitats on Christmas Island and Williams (1994) listed it as an introduced plant in the Cocos Islands. *S. americanum* is also listed as a moderately threatening weed of disturbed areas on Christmas Island (CIMFR 2015). A recent genetic study suggests that Australian material currently attributed to *S. americanum* is actually *S. nodiflorum* (Manoko et al. 2007). Populations on Christmas Island and Direction Island in the Cocos Islands need to be re-evaluated in light of this information.

Solanum nigrum (black nightshade) – Recorded on Barrow Island and the Burrup Peninsula in the Pilbara Region. Common weed throughout WA. Dispersed by birds and is likely to be present on other islands. Prioritised as L (C) in the Pilbara Region.

Sonchus asper (prickly sow-thistle) – Recorded on Varanus Island in the Pilbara Region. Only one record from 2011 but the record notes that it 'continues to persist', suggesting that it has been present on the island for some time (Apache Energy Ltd 2012). Mostly a weed

of south-west WA. This record probably represents the northernmost known occurrence of this species in WA.

Sonchus oleraceus (common sowthistle) – Recorded on Home Island in the Cocos Islands, four islands in the Pilbara Region, and on Christmas Island. One record from the Cocos Islands in 1885 but no modern references to its presence on any Cocos Islands (Flora of Australia Online n.d.). Widespread in disturbed areas and mine sites on Christmas Island (Swarbrick 1997). Notes with WAH specimens describe *S. oleraceus* as common in both disturbed areas and in native vegetation on the Pilbara islands where it occurs. Given its capacity for long-distance wind dispersal, *S. oleraceus* is likely to be present on other Pilbara islands where it has not yet been recorded. Prioritised as N (B) in the Pilbara Region. One of the most common and widespread non-native plants in WA. Preliminary work on developing biological control organisms has identified fungal pathogens that may be suitable for use as mycoherbicides in the future (Scott and McCarren 2012).

Sorghum bicolor (sorghum) – Recorded on Koolan Island in the Kimberley Region, West Island in the Cocos Islands, and on Christmas Island. On Koolan Island, it is known from a single WAH specimen collected in 1997 at the edge of the old townsite. Prioritised as L (C) in the Kimberley Region. It was previously cultivated for stock feed on West Island in the Cocos Islands and has occasionally escaped cultivation (Flora of Australia Online n.d.). On Christmas Island, *S. bicolor* is not cultivated but naturalised plants are found in disturbed areas (Flora of Australia Online n.d.; Swarbrick 1997).

Sorghum halepense (Johnson grass) – Recorded on Christmas Island. Notes with a WAH specimen collected in 2000 state that this species is common near the phosphate driers at Drumsite. The APC (2014) does not currently recognise this species as present on Christmas Island. *S. halepense* is often considered a serious agricultural weed because, when stressed, plants can contain enough cyanide to kill livestock if ingested. This species is difficult to distinguish from *S. propinquum*, which has also been recorded on Christmas Island (Flora of Australia Online n.d.). Efforts should be made to determine which species is actually present. If *S. halepense* is present on Christmas Island in small numbers it should be eradicated.

Sorghum propinquum – Recorded on Christmas Island. Listed as native on Christmas Island by Flora of Australia Online (n.d.) but the text says it was 'collected once on the edge of the main Drumsite to Settlement road, growing in the gutter'. The fact that *S. propinquum* is represented by a single specimen collected in a disturbed habitat casts some doubt on its status as a native plant. Additionally, *S. propinquum* is difficult to distinguish from *S. halepense* (Flora of Australia Online n.d.), a naturalised species that has also been collected from Christmas Island. Specimens of both species should be re-examined to determine which species is present on Christmas Island.

Spathodea campanulata (African tuliptree) – Recorded on Koolan Island in the Kimberley Region, Christmas Island, and on the main atoll of the Cocos Islands. Listed by the IUCN as one of the world's 100 worst invasive species (Lowe et al 2000). A 2008 report noted a cultivated specimen on Koolan Island but none were found in a 2013 weed survey (Wiseman 2013) suggesting that it may have been eradicated, but follow-up surveys should confirm this. Claussen and Slip (2002) recommended eradication of this species in the Cocos Islands but did not specify which island or islands it was present on or whether it was naturalised. On Christmas Island, *S. campanulata* is both naturalised and cultivated as an ornamental tree (Swarbrick 1997). Swarbrick and Hart (2000) list it as a major environmental weed on Christmas Island and refer to it as 'the most serious weed of rehabilitation areas'. This species is listed as a threatening weed of disturbed areas (CIMFR 2015). The wind-dispersed seeds of *S. campanulata* frequently allow seedlings to establish in areas without mature trees, but it is easily controlled by herbicide treatment (CIMFR 2015). Because wind-dispersed seeds can travel great distances from their tree of origin, even cultivated plants pose a serious threat to rehabilitation areas and should be removed, if possible. Swarbrick and Hart (2000) recommended controlling and, if possible, eradicating *S. campanulata* on Christmas Island.

Spermacoce remota (woodland false buttonweed) – Recorded on Direction, Home and West islands in the Cocos Islands and on Christmas Island. Often listed by the synonym *S. assurgens*. A common weed of disturbed areas on Christmas Island and in the Cocos Islands (Flora of Australia Online n.d.).

Sphagneticola trilobata (Singapore daisy) – Recorded on Cockatoo and Sunday islands in the Kimberley Region and on Christmas Island. Often recorded by the synonym *Wedelia trilobata*. Listed by the IUCN as one of the world's 100 worst invasive species (Lowe et al 2000). *S. trilobata* forms dense spreading mats that smother adjacent vegetation and prevent regeneration of native species. Text associated with a WAH specimen collected on Cockatoo Island in 2002 states that it was growing in a garden area at the resort. Handasyde (2002) listed *S. trilobata* as a minor weed on Cockatoo Island, implying that it has naturalised. Probably introduced to Sunday Island as an ornamental planting at the former mission. On Christmas Island it is cultivated in gardens and has escaped from abandoned former gardens (Swarbrick 1997). Flora of Australia Online (n.d.) notes that it 'spread rapidly when the gardens were abandoned, soon covering them', but goes on to state that it is 'particularly useful as a ground-cover or edging plant'. *S. trilobata* is a serious environmental and agricultural weed in a variety of tropical habitats and agricultural systems and should be removed from cultivation and eradicated from all islands where it occurs if possible.

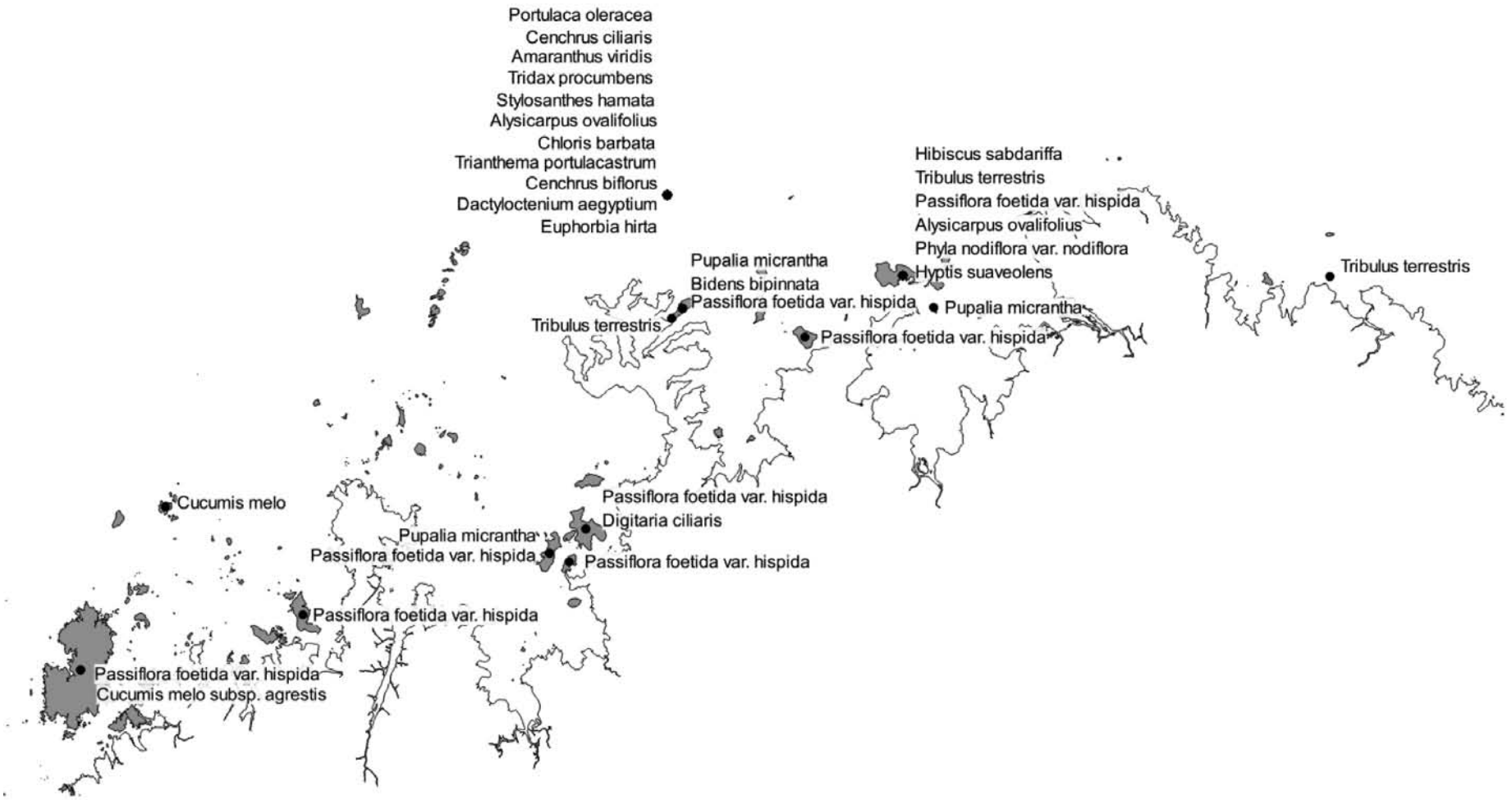

Figure 11. Recorded distribution of non-native plant species on islands along the north Kimberly coast, Western Australia. Black dots indicate the centroid of islands with named non-native plant populations. Islands have grey fill, mainland has white fill.

Sporobolus fertilis (smutgrass) – Recorded on Home and West islands in the Cocos Islands and on Christmas Island. Flora of Australia Online (n.d.) lists *S. fertilis* as native on both the Cocos Islands and Christmas Island but describes it as occurring in cleared and disturbed habitats. Williams (1994), however, listed it as naturalised in the Cocos Islands. Its occurrence only in disturbed habitats and a lack of early collections suggests that this species is not native to Christmas Island either. This species is a serious environmental and agricultural weed in eastern Australia and has been the target of biological control research but no organisms have been released to date (Palmer 2012). This species should be listed as prohibited in mainland WA, where it is not known to occur, to prevent it from being accidentally or intentionally imported from Christmas Island or the Cocos Islands.

Stachytarpheta cayennensis (blue snakeweed) – Recorded on Cockatoo and Koolan islands in the Kimberley Region and on Christmas Island. A WAH specimen collected on Cockatoo Island in 1967 was designated as 'horticultural' in the specimen notes and a subsequent record describes its location as the resort area (Handasyde 2002), suggesting it may be cultivated but not naturalised. However, on Koolan Island in 1993, WAH specimens were collected from naturalised individuals that were said to be common in creeklines below the townsite. Despite being well-collected on Christmas Island, *S. cayennensis* is not mentioned by Swarbrick (1997) in his comprehensive list of naturalised and cultivated plants on Christmas Island, and is not currently recognised as present by the APC (2014) or APNI (2014). By 1984, it was described as a 'common colonising herb on old mined land and roadsides' in notes associated with an Australian National Herbarium specimen Christmas Island. Listed as a common weed of disturbed areas on Christmas Island (CIMFR 2015).

Stachytarpheta jamaicensis (blue porterweed) – Recorded on Direction, Home, Horsburgh and West islands in the Cocos Islands and on Christmas Island. Common in disturbed areas on Christmas Island and the Cocos Islands where it was first collected in 1897 and 1879 respectively (Flora of Australia Online n.d.; CIMFR 2015).

Striga asiatica (Asiatic witchweed) – Recorded on West Island in the Cocos Islands. Collected once outside the boundary fence of the quarantine station (Flora of Australia Online n.d.) but not found in surveys in May and June of 2000 (NAQS 2000). A prohibited plant in WA and a NAQS target species. Sometimes recorded incorrectly as *S. angustifolia*.

Stylosanthes guianensis (Brazilian stylo) – Recorded on Koolan Island. The WAH specimen that formed the basis for the single published record (Keighery et al. 1995) appears to have been re-identified as *S. hamata* several years later. *S. guianensis* is probably not truly present on Koolan Island.

Stylosanthes hamata (Caribbean stylo) – Recorded on Koolan, Troughton and Sunday islands in the Kimberley Region and Thevenard Island in the Pilbara Region. Prioritised as N (B) in the Kimberley Region and listed as an ALERT species in the Pilbara Region. Notes with a WAH specimen collected on Koolan Island in 1993 state that *S. hamata* was abundant along tracks. Continued and regular attempts to eradicate this species on Thevenard Island in the Pilbara Region have not been successful. Tropical fodder crop that has naturalised across the Kimberley (Hussey et al. 2007).

Stylosanthes humilis (Townsville stylo) – Recorded on Christmas Island. Accidentally introduced with grass seed imported for the golf course (Flora of Australia Online n.d.) and now naturalised on roadsides and in disturbed areas (Swarbrick 1997).

Stylosanthes scabra (shrubby stylo) – Recorded on Koolan and Sunday islands in the Kimberley Region. A WAH specimen from Koolan Island was collected in 1998 on a roadside near the old settlement and was noted as being infrequent. On Sunday Island, *S. scabra* was recorded near the old mission (Handasyde 2002). Prioritised as N (B) in the Kimberley Region.

Symphyotrichum subulatum/squamatum (annual saltmarsh aster) – Recorded on Christmas Island. Both Swarbrick (1997) and Flora of Australia Online (n.d.) list it as naturalised in disturbed areas and on roadsides by the synonym *Aster subulatus*..However, Flora of Australia Online (n.d.) also notes that the species has been widely referred to as *A. squamatus.* Three specimens from Christmas Island lodged at the WAH have been identified as *S. squamatum*. Difficulty in determining the species present on Christmas Island is compounded by disagreement about the taxonomy of these non-native plants on a national level and confusion about which species are established in different parts of Australia. Re-examination of specimens housed in major herbaria could help alleviate this confusion and more accurately delineate the distribution of taxa within the genus *Symphyotrichum* in Australia and its territories.

Synedrella nodiflora (nodeweed) – Recorded on Home Island in the Cocos Islands and on Christmas Island. Naturalised on Christmas Island by 1890 (Swarbrick 1997). Now widespread and common in disturbed areas (Flora of Australia Online n.d.). A weed of cultivated areas and roadsides in the Cocos Islands.

Syzygium spp. (lillipillies) – Recorded in the Cocos Islands and on Christmas Island. There is much ambiguity as to which species are present in both areas and which are naturalised from plantings in rehabilitation areas on Christmas Island. Flora of Australia Online (n.d.) states that *S. grande, S. samarangense* and *S. cumini* are all cultivated in both the Cocos Islands and on Christmas Island. Claussen and Slip (2002) included *S. jambos* in a list of noxious plants encountered on the main atoll of the Cocos Islands but did not indicate whether it was cultivated or naturalised.

Swarbrick and Hart (2000) list *Syzigium* spp. as a minor environmental weed on Christmas Island and note that several *Syzigium* species are naturalised on the island as a result of use in revegetation projects and spread of seeds by frugivorous animals. Swarbrick (1997) lists *S. cumini*, *S. grande*, *S. jambos* and *S. samarangense* as species that are cultivated and may be naturalised from plantings in rehabilitation areas on Christmas Island. *Syzygium cumini* is an invasive environmental weed in similar habitats on islands in the Pacific and should be removed from natural areas on Christmas Island. Mature plants of *Syzigium* spp. are easy to control but emerging seedlings require multiple subsequent trips after initial control of mature trees (CIMFR 2015). Efforts should be made to collect and correctly identify the *Syzygium* species present in disturbed areas on Christmas Island.

Tamarindus indica (tamarind) – Recorded on Alcatraz and Koolan islands in the Kimberley Region, Christmas Island, and on the main atoll of the Cocos Islands. Swarbrick (1997) noted that it was cultivated on Christmas Island by 1904 but was uncertain as to whether it was native or naturalised. Flora of Australia Online (n.d.) states that it is naturalised along a shore terrace and in old quarries. Plants on Koolan Island (Wiseman 2013) and Alcatraz Island (Handasyde 2002) were not listed as cultivated despite being noted as horticultural specimens by the same surveys in other areas and hence are probably naturalised. Prioritised as FAR in the Kimberley Region. Claussen and Slip (2002) included *T. indica* in a list of noxious plants encountered on the main atoll of the Cocos Islands but did not indicate whether it was cultivated or naturalised.

Tamarix aphylla (Athel tamarisk) – Recorded on Rosemary and Thevenard islands in the Pilbara Region and on Christmas Island. Cultivated in gardens on Christmas Island. A 1987 record describes it as rare and occurring on the beach on Rosemary Island (Long 1987). The earliest record of *T. aphylla* on Thevenard is from 1979 and indicated that it was irrigated and present on the resort lease (Pennings 1979). A subsequent record from 1981 stated that instructions had been given to replace *T. aphylla* with *Acacia coriacea* (Sokolowski 1981). *T. aphylla* was still recorded as being present around the settlement in 1985. This species is still present on Thevenard Island and is still confined to the Mackeral Islands Resort. Listed as a Weed of National Significance and a declared pest in WA with a statewide control category of C3. Prioritised as M (D, E, F, G) in the Pilbara Region. Not currently a target for biological control in Australia but closely related *Tamarix* species have successfully been managed using an insect in the United States. All island popualtions should be closely monitored.

Taraxacum khatoonae (dandelion) – Recorded on Varanus Island in the Pilbara. A record from 2011 indicated that its occurrence had increased over time (Apache 2012). A common weed in lawns, this record probably represents the northernmost documented occurrence of this species in WA. All *Taraxacum* species in WA have been identified as *T. khatoonae* (Scarlett 2015).

Tarlmounia elliptica (curtain creeper) – Recorded on Cockatoo Island in the Kimberley Region. Originally recorded by the synonym *Vernonia elliptica* as a horticultural specimen in the resort area in 2002 (Handasyde 2002). The specimen that formed the basis of this record is held at the WAH and was later redetermined as *Vernonia elaeagnifolia*, another synonym of *T. elliptica*. The specimen notes indicate that it was spreading vigorously into adjacent bushland. This species has naturalised in Qld but is not currently recognised as naturalised in WA. Cockatoo Island plants should be monitored and controlled if necessary.

Tecoma stans (yellow bells) – Recorded on Koolan Island in the Kimberley Region, Christmas Island and on the main atoll of the Cocos Islands. Claussen and Slip (2002) recommended eradication of this species in the Cocos Islands but did not specify what islands it was present on or whether it was naturalised or cultivated. On Christmas Island it was first planted as an ornamental tree in the mid 1980s and has since spread rapidly in a variety of disturbed habitats (Swarbrick 1997). It interferes with regeneration of native plants in disturbed areas but does not appear to invade intact forest (Swarbrick 1997). Swarbrick and Hart (2000) list it as a major environmental weed on Christmas Island. WAH specimens have been identified as *T. stans* var. *stans*. Notes associated with the specimens indicate that this species has escaped from ornamental plantings at the old townsite and had become locally common and formed a thicket by 1995. Prioritised as FAR in the Kimberley Region.

Terminalia catappa (tropical-almond) – Horticultural specimens are recorded on Alcatraz and Cockatoo islands in the Kimberley Region (Handasyde 2002). While, native to Christmas Island and the Cocos as well as parts of the NT and Qld, this species has become an invasive pest on shorelines in some tropical and subtropical regions and can disperse easily in ocean currents via floating seeds. Removal of these cultivated specimens is recommended.

Theobroma cacao (cocoa tree) – Recorded on Christmas Island. Swarbrick (1997) recorded this species as cultivated on Christmas Island but also noted that it was present in rainforest clearings. Naturalised status uncertain.

Thunbergia laurifolia (blue trumpet vine) – Recorded on Christmas Island. While it only occurs at a few locations around town, and none of the specimens collected are from clearly naturalised situations, it is listed by CIMFR (2015) as a threatening weed of disturbed areas. T. laurifolia is a commonly grown ornamental vine that is capable of growing over and smothering adjacent vegetation and included on the National Environmental Alert List. All cultivated plants as well as any naturalised populations that may exist should be eradicated.

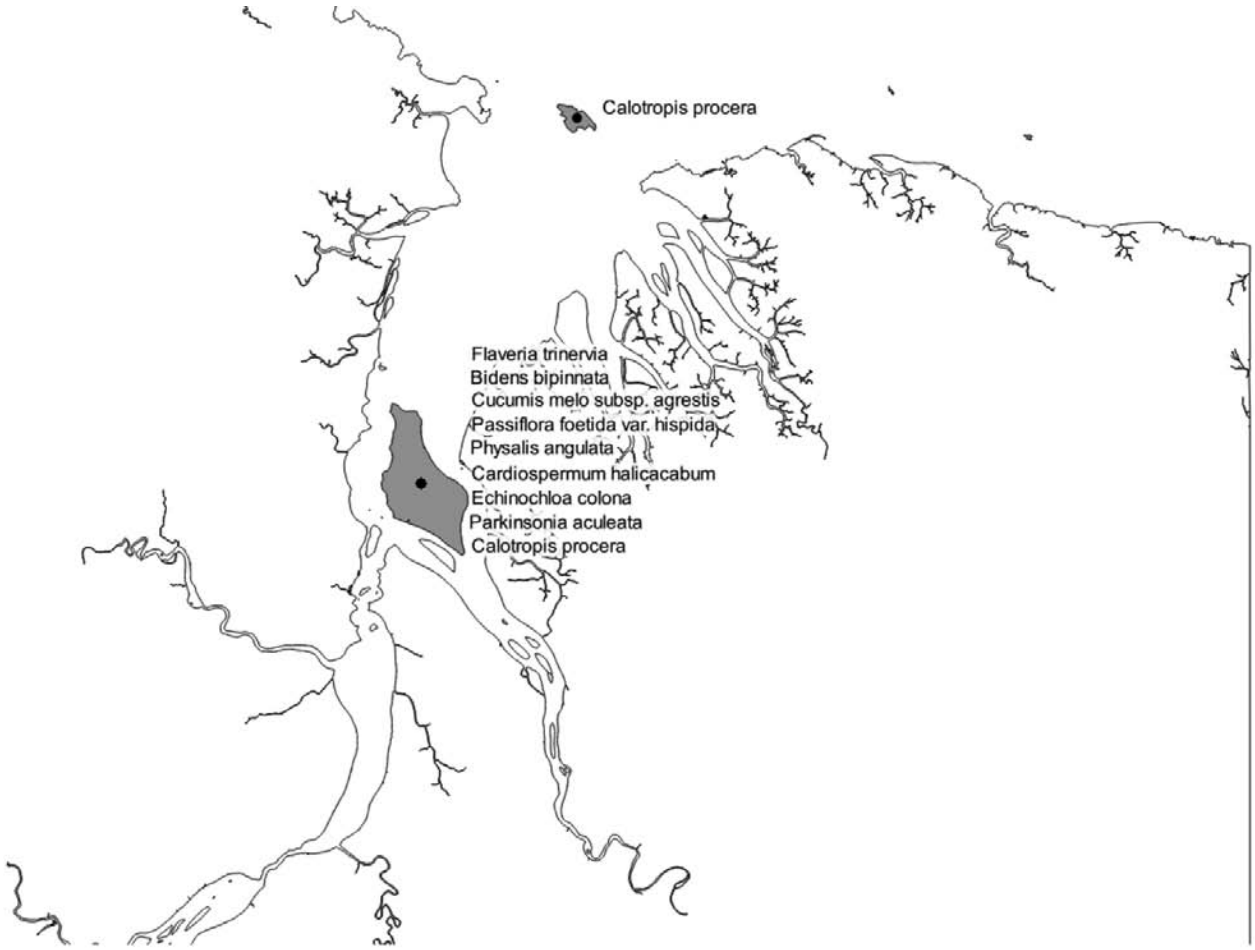

Figure 12. Recorded distribution of non-native plant species on islands along the east Kimberly coast, near Kununurra, Western Australia. Black dots indicate the centroid of islands with named non-native plant populations. Islands have grey fill, mainland has white fill.

Tinospora baenzigeri – Recorded on Christmas Island. Swarbrick (1997) listed it as naturalised in marginal rainforest but noted that it was possibly native. Possibly introduced accidentally because it was mistaken for *T. crispa* (Flora of Australia Online n.d.).

Tinospora crispa – Recorded on Christmas Island. Swarbrick (1997) listed it as naturalised in marginal rainforest but noted that it was possibly native. Probably introduced for medicinal purposes (Flora of Australia Online n.d.).

Tithonia diversifolia (Mexican sunflower) – Recorded on Christmas Island where it was probably introduced to the South Point settlement (Flora of Australia Online n.d.). Naturalised on roadsides and in disturbed areas (Swarbrick 1997), often forming dense monotypic stands (Flora of Australia Online n.d.). *T. diversifolia* is listed as a significant weed of disturbed areas but is apparently easy to control using manual and chemical techniques (CIMFR 2015). Often cultivated in the tropics as an ornamental and has become invasive in many overseas areas where it has been introduced.

Tradescantia spathacea (Moses-in-the-cradle) – Recorded on Home and West islands in the Cocos Islands and on Christmas Island. Several sources list it by the synonym *Rhoeo spathacea* (Flora of Australia Online n.d.; Swarbrick 1997, Williams 1994). A commonly cultivated ornamental that has naturalised from garden waste at several locations on Christmas Island (Flora of Australia Online n.d.). Mainly spreads vegetatively via rhizomes and is extremely shade tolerant.

Trema tomentosa (poison peach) – Recorded on Christmas Island where it was introduced in the late 19th century (Flora of Australia Online n.d.; Swarbrick 1997). Mainly found along rainforest tracks and edges (Flora of Australia Online n.d.).

Trianthema portulacastrum (desert horsepurslane) – Recorded on Troughton Island in the Kimberley Region and Dampier and Finucane islands in the Pilbara Region. Notes with a WAH specimen collected in 1991 state that it was common on Troughton Island in disturbed ground around the base, whereas only a single plant was present on Finucane Island in 1984 and came from an area of disturbed dunes. Typically only found on severely disturbed sites. Prioritised as L (B, C) in the Kimberley Region and an ALERT species in the Pilbara Region.

Tribulus cistoides (Jamaican feverplant) – Recorded on East, Middle and West islands of Ashmore Reef. Flora of Australia Online (n.d.) lists it as native to Ashmore Reef (ABRS 2014) but Pike and Leach (1997) list it as non-native. Regardless, dense patches are known to be present on East and Middle islands (ABRS 2014).

Tribulus terrestris (bindii) – Recorded on five islands in the Kimberley Region and eight islands in the Pilbara Region. Multiple forms occur in Australia. Some populations in northern Australia may be a distinct native species while other forms in northern areas are almost certainly non-native plants (Scott 2012). Prioritised as L (B, C, D) in the Pilbara Region and N (B) in the Kimberley Region. An official biological control target but no releases of biological control organisms have occurred due to concerns about impacts on closely related native species (Scott 2012). Hard burrs with sharp spines that can puncture bicycle tires and footwear make it a serious amenity weed.

Tridax procumbens (coatbuttons) – Recorded on five islands in the Kimberley Region; Dampier and Varanus islands in the Pilbara Region; Home, Horsburgh and West islands in the Cocos Islands; and on Christmas Island. Widespread and common in disturbed areas on most islands where it occurs. Continued attempts to eradicate *T. procumbens* on Varanus Island have not been successful. In Texas it has been observed invading and outcompeting buffel grass and is a serious agricultural weed in some tropical areas (Graves 2000). *T. procumbens* is capable of spreading rapidly via wind-dispersed seeds. Detection and control of small new infestations on previously uncolonised islands should be a high priority in the Kimberley and Pilbara regions. Prioritised as FAR in the Kimberley Region.

Trifolium micranthum (slender trefoil) – Recorded on Koolan Island in the Kimberley Region. Known on the island from a single report in 2008 (Wiseman 2013). This species has not been frequently collected in Australia and the Koolan Island record is well north of any other Australian records.

Triphasia trifolia (limeberry) – Recorded on Home, North Keeling and North islands in the Cocos Islands and on Christmas Island. On North Keeling Island plants are located near a temporary settlement (Flora of Australia Online n.d.). Not a serious weed on North Keeling Island and could be eradicated fairly easily due to a lack of the animal vectors which typically spread its seeds (Claussen & Slip 2002). Conspicuously absent from Swarbrick's (1997) list of non-native plants on Christmas Island, perhaps because it was presumed to be native. On Christmas Island it only occurs 'on a scree slope behind Flying Fish Cove where the instability of the soil does not allow tall trees to establish themselves securely and gaps are constantly created in the canopy' (Flora of Australia Online n.d.). However, *T. trifolia* has shown the capacity to invade intact native forests on Pacific and Indian Ocean islands with similar climates and should be monitored closely if not removed outright.

Triumfetta pentandra – Recorded on Boongarie (Boongaree) Island in the Kimberley Region via a single WAH specimen collected in Prince Frederick Harbour in 1973. Prioritised as L (C) in the Kimberley Region. Mostly found in disturbed areas around settlements in the Kimberley Region (Hussey et al. 2007).

Turnera ulmifolia (yellow alder) – Recorded on Koolan Island in the Kimberley Region, 17 islands in the Cocos Islands, and on Christmas Island. The most widespread weed of the Cocos Islands where it is present on all islands except North Keeling, and is abundant on most islands where it has established (Williams 1994). Recorded as naturalised on Christmas Island along the beach at Flying Fish Cove by 1904 and now common on roadsides and disturbed areas (Swarbrick 1997). Also listed as a common weed of disturbed areas on Christmas Island (CIMFR 2015). Text associated with several WAH specimens collected on Koolan Island state that *T. ulmifolia* is common around the old townsite. No naturalised specimens have been collected elsewhere in WA. Prioritised as L (B, C, D) in the Kimberley Region. Given that it is the only weed in the Cocos Islands that has managed to spread to all islands of the main atoll and is still extremely limited in its distribution in WA, the Koolan Island population should probably be eradicated if possible to eliminate its threat to other Kimberley islands and the mainland of WA.

Urochloa brizantha (palisade grass) – Recorded on West Island in the Cocos Islands. Listed by the synonym *Brachiaria brizantha*. Characterised by Flora of Australia Online (n.d.) as a rare roadside weed.

Urochloa humidicola (koronivia grass) – Recorded on West Island in the Cocos Islands where it was included in a list of non-native plants found in a paddock at the disused animal quarantine facilities (NAQS 2000). It was recommended that the paddock be mowed and treated wth glyphosate to eliminate these species (NAQS 2000). Notes with a WAH specimen collected at the site in 2000 refer to it as abundant. It is not clear if this species was subsequently treated and eradicated.

Urochloa mosambicensis (bushveld signal grass) – Recorded on Koolan Island in the Kimberley Region, West Island in the Cocos Islands, and on Christmas Island. Notes from a WAH specimen collected on Koolan Island in 1993 state that it was common along a creek but it has not been recorded on any subsequent surveys (Wiseman 2013). Prioritised as N (B) in the Kimberley Region. On West Island in the Cocos Islands *U. mosambicensis* was listed as one of several weedy grasses found growing in a paddock at the old animal quarantine station (NAQS 2000). Notes with a WAH specimen collected in 2000 state that it was infrequent near sheds at the quarantine station. Mowing the area around the quarantine station and treating it with glyphosate to prevent this and other weedy grasses from spreading was recommended (NAQS 2000). On Christmas Island *U. mosambicensis* is naturalised along roadsides (Swarbrick 1997) and is belived to have been

introduced from Australia (Flora of Australia Online n.d.).

Urochloa mutica (para grass) – Recorded on West Island in the Cocos Islands and on Christmas Island. It is sometimes listed by the synonym *Brachiaria mutic* and is a major invasive pest of freshwater wetlands in many tropical countries. On West Island in the Cocos Islands *U. mutica* was listed as one of several weedy grasses found growing in a paddock at the old animal quarantine station (NAQS 2000). Notes with a WAH specimen collected at the site in 2000 characterise it as abundant. Mowing the area around the quarantine station and treating it with glyphosate to prevent *U. mutica* and other weedy grasses from spreading is recommended (NAQS 2000). On Christmas Island, A WAH specimen was collected near the casino and was described as abundant. Other sources list it as relegated to areas immediately north of the adjacent waterfall (Flora of Australia Online n.d.) or 100 m north of the resort carpark (Swarbrick 1997). Regardless, it appears to be fairly localised on Christmas Island at present. *U. mutica* is capable of forming floating mats and choking waterways and poses a serious threat to native vegetation. This species should be controlled to prevent its spread on both islands.

Urochloa ramosa (browntop millet) – Recorded on Christmas Island. Listed by the synonym *Brachiaria ramosa*. Swarbrick (1997) recorded this species as questionably naturalised on Christmas Island and gave its location as on the 'disturbed area N of seacliff' along Gaze Road. Flora of Australia Online (n.d.) lists it as naturalised on Christmas Island but only cites a single record from the same area. A different specimen of *U. ramosa* is held at the Australian National Herbarium and was collected at the Chinese Cemetary in 1965. Possibly more widely distributed on the island than indicated in the literature.

Urochloa reptans (creeping panic grass) – Recorded on Christmas Island. Listed by the synonym *Brachiaria reptans*. Widespread on roadsides and in disturbed areas around settlements (Flora of Australia Online n.d.). Native in northern parts of WA.

Urochloa subquadripara (green summer grass) – Recorded as a weed on Cockatoo Island in the Kimberley Region where it is recorded as naturalised at the resort (Handasyde 2002), and on Christmas Island. Listed as native on mainland WA. This species is native in the Kimberley Region and is known to be present and classified as a native on other Kimberley islands. Listed by the synonym *Brachiaria subquadripara* on Christmas Island where it is naturalised in disturbed areas and on roadsides (Swarbrick 1997).

Vachellia farnesiana (sweet acacia) – Recorded on the Cocos Islands where it was collected from an island in the main atoll in 1836. It was recorded again in 1885 but is now apparently extirpated from the Cocos, possibly as a result of clearing of vegetation for coconut plantations (Flora of Australia Online n.d.).

Vallaris glabra (bread flower) – Recorded on Christmas Island where it is listed as cultivated at Drumsite by Swarbrick (1997). Flora of Australia Online (n.d.) lists it as naturalised but the text seems to imply that it was formerly cultivated in gardens at South Point and is presently found in gardens at Drumsite. It is not clear whether this species is truly naturalised on Christmas Island.

Vigna radiata (mung bean) – Recorded on Christmas Island and North Maret and South Maret islands in the Kimberley Region. Records from North Maret and South Maret islands are listed as *V. radiata* var. *setulosa*. This variety is a synonym of *V. radiata* var. *sublobata* and is native to northern Australia (Sangiri et al. 2007). The notes with the WAH specimen collected on North Maret Island describe the vegetation it was collected in as pristine. Kimberley populations should be considered native. On Christmas Island, domesticated plants (black gram) and wildtype plants (green gram) are treated separately as *V. mungo* and *V. radiata*, respectively. The domesticated type appears to be a relatively recent introduction to the island (Flora of Australia Online n.d.). It is cultivated for food and found as a garden escape in adjacent disturbed areas (Swarbrick 1997). The wild type is described by Flora of Australia Online (n.d.) as being consistant with *V. radiata* var. *sublobata*. Swarbrick (1997) notes that it is also cultivated on Christmas Island and lists it as a garden escape that is questionably naturalised. The only specimen of this species obtained from Christmas Island appears to be a wild variety, based on seed morphology. The relatively recent collection date and location along a track near an old quarry suggest *V. radiata* has naturalised to some extent (Flora of Australia Online n.d.).

Vitex trifolia (simpleleaf chastetree) – Recorded on Home and West islands in the Cocos Islands and on Christmas Island. Flora of Australia Online (n.d.) suggests that populations present on Christmas Island and the Cocos Islands are probably *V. trifolia* var. *subtrisecta*; a subspecies frequently cultivated as a hedge. Williams (1994) listed *V. trifolia* as native to the Cocos Islands. However, notes with an Australian National Herbarium specimen collected by Williams on West Island in 1986 state that its occurrence was occasional and mainly in gardens. On Christmas Island, *V. trifolia* was said to be cultivated prior to the Second World War but is aparrently no longer cultivated (Flora of Australia Online n.d.). Swarbrick (1997) listed it as questionably naturalised on Christmas Island but specimen notes from a 1987 specimen held at the WAH indicate that there is a truly naturalised population near Waterfall that was forming more or less pure stands.

Washingtonia filifera (desert fan palm) – Recorded on Thevenard Island in the Pilbara Region in 1985 (Leprovost et al. 1987) where it was probably a cultivated specimen associated with the Mackeral Islands Resort. Prioritised as VH (H, I) in the Pilbara Region. This species is commonly planted as an ornamental and spreads via bird-dispersed seeds in the Kimberley and

Pilbara regions. If the Thevenard Island population is still present, it should be removed.

Xanthosoma sagittifolium (arrowleaf elephant's ear) – Recorded on Christmas Island. Swarbrick (1997) listed it as questionably naturalised and noted that it was cultivated and found as a garden remnant. However, Flora of Australia Online (n.d.) stated that it is naturalised at several locations on Christmas Island, particularly in wetter areas.

Zamia furfuracea (cardboard palm) – Recorded on Alcatraz Island in the Kimberley Region. Noted as being a cultivated horticultural specimen (Handasyde 2002). A popular ornamental that is unlikely to naturalise.

Zea mays (maize) – Recorded on Middle Island of Ashmore Reef. Last seen in 1984 and suspected to have been planted by Indonesian fishermen as a food crop (Pike & Leach 1997). Probably no longer present on the island.

Zephyranthes rosea (rosy rain lily) – Recorded on Direction Island and Home Island in the Cocos Islands where it has naturalised from ornamental plantings (Flora of Australia Online n.d.). A common garden escape in tropical areas worldwide.

Zoysia matrella (Manila grass) – Recorded on Christmas Island and on Home and West islands in the Cocos Islands. Some records from Christmas Island and the Cocos Islands classify populations under the synonym *Z. matrella* subsp. *matrella.* On Christmas Island, *Z. matrella* is designated as naturalised by Flora of Australia Online (n.d.) but is not listed by Swarbrick (1997) in an extensive list of the non-native plants. This species is common as a lawn grass and is naturalised along roadsides around settled areas (Flora of Australia Online n.d.). *Z. matrella* is considered to be native in the Cocos Islands (Flora of Australia Online n.d., Williams 1994) but all available records are from the two islands with permanent settlements and most specimens are from disturbed sites. At present, the status of this species on Christmas Island and the Cocos Islands is not clear.

DISCUSSION

Geographically, the islands along the north coast of Australia fall into three obvious groups: oceanic territorial islands, Kimberley islands and the Pilbara islands. The territorial islands have a tropical marine climate characterised by relatively consistent trade winds and climate. The Kimberley islands have a tropical monsoon climate with two distinct seasons (Gibson et al. 2012). The Pilbara islands have a semi-desert tropical climate with 9–11 months of dry weather per year (McKenzie et al. 2009). Only 13 of the 403 weed species listed occur on islands within all three groups.

While much of the variation in weed diversity among island groups must be attributed to environmental variables, human movement and island use will have influenced weed dispersal. Historically, the territorial islands have close ties and trade with Asia and little to no biosecurity until recently (Beeton et al. 2010). The continental Kimberley and Pilbara islands have greater ties to the Australian mainland and, excluding the few examples mentioned earlier, have been largely uninhabited by European settlers. Islands along the north-west coast with the greatest number and diversity of weeds all exhibit similar disturbance attributes associated with weed invasion. In the Kimberley Region, Koolan and Cockatoo islands contain mine sites, on Sunday Island a mission was active for 63 years, and Alcatraz Island (also known as Turtle Island) is the home of Marine Produce Australia© Cone Bay Ocean Barrumundi fish farm. Similarly, in the Pilbara, Varanus Island, Barrow Island, the Burrup Peninsula and Thevenard Island all house infrastructure for resource extraction companies. The Burrup Peninsula, which now includes the town of Dampier, is linked to the mainland and the City of Karratha via a causeway. The Australian territorial islands with the most weed species were Christmas Island, which has been exporting phosphate since 1901 and has a population of approximately 2000 people (Commonwealth of Australia 2002), and West or Pulu Panjang Island in the Cocos Keeling Archipelago, which has approximately 141 inhabitants.

The weeds that pose the greatest threat to the integrity of north coast island ecosystems varied between the oceanic and continental islands. In 2015 the CIMFR Program used information on distribution patterns and the spread of Christmas Island's major weed species over the past 20 years, information on the biology and threatening characteristics of each species, as well as the success of control actions for each species to derive a threat score (in draft form at time of writing; see Table 3). The threat score describes the potential and realised threat of invasion of primary rainforest and the significant alteration of the ecosystem on Christmas Island. A score of 10 means the species has the potential to aggressively displace native species and irreparably alter the vegetation community composition (CIMFR 2015). The CIMFR weed rankings may be transferable to other oceanic islands.

The 14 species identified by the CIMFR Program (Table 3) share seven similar characteristics:

1. They have multiple reproductive strategies or produce tens of thousands of diasposes per plant. For example, *Chromolaena odorata* (Siam weed) produces >80,000 windborne seeds/plant that also have tiny barbs that allow them to stick to clothing, footwear, animals, vehicles and machinery (Claussen & Slip 2002); *Mikania micrantha* produces 40,000 windbourne seeds, which have a high germination rate; *Antigonon leptopus* reproduces by seed and vegetatively (Invasive Species Compendium 2016).
2. Their diaspores are frequently dispersed over a long-distance. *Castilla elastica* and *Cordia curassavica*, for example, produce prolific amounts of seed and

fruit, which is attractive to frugivores (Swarbrick & Hart 2000; Invasive Species Compendium 2016).

3. Their seeds may remain dormant for long periods of time and/or the seeds have high germination and survival rates in a wide variety of habitats. For example, *Delonix regia* produces seeds which may remain dormant in the soil for 2–3 years; *Clausena excavate* is tolerant of dense shade; *Antigonon leptopus* can occupy coastal sand dunes, riparian areas or monsoon vine thickets (Invasive Species Compendium 2016).
4. They have rapid growth rates; e.g. Siam weed has a phenomenal growth rate of 20 mm/day or 5 m/year (Claussen & Slip 2002).
5. They aggressively outcompete native vegetation; e.g. Siam weed can climb to a height of 20 m, and has alleopathic properties, which allows it to outcompete pastures, crops and native vegetation (Claussen & Slip 2002); *Antigonon leptopus* alters and fire regimes (Invasive Species Compendium 2016).
6. They alter ecosystems functions; e.g. *Adenanthera pavonine* is a nitrogen-fixing legume that alters soil fertility and potentially opens intact forest to other invasive plants (Invasive Species Compendium 2016).
7. Their species characteristics make control extremely difficult; e.g. *Ficus elastica* forms impenetrable masses of aerial roots and spreading branches and can germinate in tree crowns and grow downwards (Swarbrick & Hart 2000).

Table 3

Draft ranking of threat scores for the top 14 'worst' weeds on Christmas Island (CIMFR 2015). These scores have not been finalised and are subject to change by CIMFR.

Species	Threat Score
Chromolaena odorata	10
Clausena excavata	10
Adenanthera pavonia	8.5
Antigonon leptopus	8.5
Delonix regia	8.5
Mikania micrantha	8.5
Castilla elastica	8
Cordia curassavica	8
Ficus elastica	8
Manihot glaziovii	8
Mucuna albertsii	8
Aleurites moluccana	7
Pterocarpus indicus	7
Spathodea campanulata	7

CIMFR draft data re-used with permission (A Grigg).

The species that pose the greatest threat to the Pilbara and Kimberley islands were determined (by GK and VL) to be *Cenchrus ciliaris, Passiflora foetida, Aerva javanica, Opuntia stricta, Prosopis glandulosa x Prosopis velutina,* and *Parkinsonia aculeate*. *Cryptostegia madagasariensis, Bryophyllum pinnatum, Themeda quadrivalvis, Andropogon gayanus* and *Azadirachta indica* are additional threats identified for Kimberley islands. *Parthenium hysterophorus* is currently considered a high risk species for oceanic islands, moderate risk for Kimberley islands, and low risk for Pilbara islands. Some of these species are not yet present or rarely encountered on the islands (e.g. *Andropogon gayanus, Themeda quadrivalvis, Bryophyllum pinnatum, Azadirachta indica*). However, they are all highly invasive and could become logistically uncontrollable within a short period of time. Other species, particularly *Cenchrus ciliaris* are already widespread (79 islands) and have proven very difficult to control without intense and sustained effort (Dixon et al 2002; Flint & Rehkemper 2002; Daehler & Goergen 2005). Lohr et al (2015) developed an island-weed ranking system that takes into account both the conservation value of an island and the logistical constraints against controlling some weeds. They narrowed the list of priority species for control on Pilbara islands to primarily *Aerva javanica, Opuntia stricta* and *Passiflora foetida*. Developing management plans for these 26 species and further clarifying their distributions and ability to disperse among islands will be an important step in mitigating the impacts of non-native plants on north coast islands.

ACKNOWLEDGEMENTS

This study was funded by the Gorgon Barrow Island Net Conservation Benefits Fund. Department of Parks and Wildlife staff members have generously contributed their time to this project. Kellie Passeretto provided much helpful assistance regarding the regional prioritisation list. Keith Morris, Sophie Moller and Paul Gioia all contributed valuable suggestions that helped develop the structure of the database underpinning this work. Alasdair Grigg provided valuable insight into the weeds of Christmas Island and other Territory Islands. We especially thank Julia Percy-Bower at the WAH for her patience and assistance in helping to clarify the native/naturalised status of various species. We also thank Andrew Mitchell for his helpful comments.

REFERENCES

Australian Bureau of Statistics (2015) ABS.Stat: Annual estimated resident population, Statistical Area Level 2. Commonwealth of Australia. Available at http://stat.abs.gov.au//Index.aspx?QueryId=1269# [accessed 24 August 2015].

de Figueiredo RA, de Oliveira AA, Zacharias MA, Barbosa SM, Pereira FF, Cazela GN, Viana JP, de

Camargo RA (2008) Reproductive ecology of the exotic tree *Muntingia calabura* L. (Muntingiaceae) in southeastern Brazil. *Revista Arvore*, **32**, 993–999.

Apache Energy Ltd. (2012) 'Varanus Island compression project: Section 38 Environmental Referral under the Environmental Protection Act 1986 EA-00-RI-217'.

APC (2014) Australian Plant Census. Commonwealth Government Australia, Canberra. Available at https://www.anbg.gov.au/chah/apc/ [accessed 29 August 2015].

APNI (2014) Australian Plant Name Index database, Centre for Australian National Biodiversity Research, Commonwealth Government Australia, Canberra. Available at http://www.cpbr.gov.au/cgi-bin/apni [accessed on 19 August 2014].

Austin DF, Kitajima K, Yoneda Y, Qian L (2001) A putative tropical American plant, *Ipomoea nil* (Convolvulaceae), in pre-Columbian Japanese art. *Economic botany* **55**, 515–527.

Bailey E (1987) Reviewed work: The Phosphateers: A history of the British Phosphate Commissioners and the Christmas Island Phosphate Commission by R. Maslyn Williams, Barrie MacDonald. *The Polynesian Society* **96,** 146–150.

Barker RM (1998) Sida section Sida in Australia: a revised key, a newly non-native species, *S. subcordata* Span., and name changes for *S. rohlenae var. mutica* (Benth.) Fryxell and S. magnifica Domin. *Journal of the Adelaide Botanic Gardens* **18**, 33.

Batchelor KL, Scott JK (2006) Review of the current taxonomic status and authorship for Asparagus non-native plants in Australia. *Plant Protection Quarterly* **21**, 128–130.

Bean AR (2006) Physalis (Solanaceae) in Australia-nomenclature and identification. *Australian Systematic Botanical Society Newsl*etter **127**, 6–9.

Bean AR (2007) A new system for determining which plant species are indigenous in Australia. *Australian Systematic Botany* **20**, 1–43.

Bean AR (2009) The Australian Flaveria (Asteraceae): its correct name and origin status. *Australian Systematic Botany Society Newsletter* **140**, 2–3.

Beeton RJS, Burbidge A, Grigg G, Harrison P, How R, Humphreys W, McKenzie N, Woinarski J (2010) 'Final Report of the Christmas Island Expert Working Group to the Minister for Environment Protection, Heritage and the Arts'.

Borger C, Yan G, Scott JK, Walsh M, Powles S (2008) *Salsola tragus* or *S. australis* (Chenopodiaceae) in Australia – untangling the taxonomic confusion through random amplified microsatellite polymorphism (RAMP) and cytological analysis. *Australian Journal of Botany* **56**, 600–608.

Brameld A, Atkinson T (2012) 'Cockatoo Island Weed Survey'. Astron Environmental Services. Unpublished report.

Buckley RC (1980) 'Barrow Island: the Vegetation of Bandicoot Bay, North End, Middle, Boodie and Pascoe Island'. Report to WAPET.

Burbidge AA, Blyth JD, Fuller PJ, Kendrick PG, Stanley FJ, Smith LA (2000) The terrestrial vertebrate fauna of the Montebello Islands, Western Australia. *CALMScience* **3**, 95–107.

ChevronTexaco (2005) 'Gorgon Development on Barrow Island Technical Report C1: Flora and Vegetation'. Report No. R03201

CIMFR (2015) 'Weed list for Christmas Island'. Unpublished report by Christmas Island Minesite to Forest Rehabilitation Program, Christmas Island National Park, Parks Australia, Commonwealth of Australia.

Claussen J, Slip D (2002) 'The Status of Exotic Plants on the Cocos (Keeling) Islands, Indian Ocean. Parks Australia North'. Unpublished report.

Cocos Tropical Foods (2013) New plantings of Moringa. Available at http://www.cocostropicalfoods.com.au/1/post/2013/02/new-plantings-of-moringa.html [accessed 9/12/2014].

Commonwealth of Australia (2002) Christmas Island National Park, management plan. Department of Environment and Heritage, Commonwealth of Australia.

Commonwealth of Australia (2012) Parthenium weed (*Parthenium hysterophorus* L.) strategic plan 2012–17. Weeds of National Significance, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.

Conn BJ (2014) Ocimum (Lamiaceae) in Australia and Papua New Guinea. *Telopea* **17**,169–181.

Csurhes S, Edwards R (1998) National Weeds Program, Potential Environmental Weeds in Australia, Candidate Species for Preventative Control. Environment Australia, Canberra, ACT, Australia. Available at: http://cutlass.deh.gov.au/biodiversity/invasive/weeds/publications/books/pubs/potential.pdf [accessed 9 October 2015].

Daehler CC, Goergen EM (2005) Experimental restoration of an indigenous Hawaiian grassland after invasion by buffel grass (*Cenchrus ciliaris*). *Restoration Ecology* **13**, 380–389.

Dampier W (1697) *A New Voyage Round the World*. James Knapton, London.

Day M (2012) *Lantana camara* L.-lantana. In *Biological Control of Weeds in Australia*, (eds M Julien, R McFadyen, J Cullen), pp. 334–346. CSIRO Publishing, Collingwood Victoria.

Day M, McFadyen RC (2012) *Chromolaena odorata* (L.) King and Robinson – chromolaena. *Biological control of Weeds in Australia.* (ed Julien M, McFadyen R, Cullen J), pp. 162–169, CSIRO Publishing, Collingwood, Victoria.

Department of Agriculture and Food WA (2013) Siam Weed Control Continues on Cocos Islands. Available at https://www.agric.wa.gov.au/news/media-release/siam-weed-control-continues-cocos-islands [accessed 28/01/2014].

Department of Transport (2014) *Marine Safety Registration Statistics*. Department of Transport, Fremantle.

Dhileepan K, McFadyen RE (2012) *Parthenium hysterophorus* – Parthenium. In *Biological control of weeds in Australia* (ed Julien M, McFadyen RE, Cullen J), pp 448–462, CSIRO Publishing, Collingwood, Victoria.

Director of National Parks (2014) *Pulu Keeling National Park, Cocos (Keeling) Islands: Biosecurity Plan*. Director of National Parks, Canberra.

Dixon IR, Dixon KW, Barrett M (2002) Eradication of buffel grass (*Cenchrus ciliaris*) on Airlie Island, Pilbara coast, Western Australia. In *Turning the Tide: The Eradication of Invasive Species* (eds CR Veitch, MN Clout), pp. 92–101. IUCN SSC Invasive Species Specialist Group, IUCN, Gland Switzerland and Cambridge UK.

Dixon N (2012) 'Irvine Island Iron Ore Project Interim Weed Eradication Program 2012'. Pluton Resources Limited. Unpublished report. February 2012.

Conservation Commission of Western Australia (2010) Status Performance Assessment: Biodiversity Conservation of Western Australian Islands. Phase II – Kimberley Islands. Final Report, Perth. Available at http://conservation.wa.gov.au/media/8919/final%20version_14april2010.pdf [accessed 29 August 2016].

Dodd J, Reeves AW, Eldershaw V (2012) Overcoming weed eradication challenges in the Indian Ocean Territories. *Eighteenth Australasian Weeds Conference*, 263–266.

Durlacher JS (1900/2013) Landlords of the Iron Shore. Hesperian Press, Carlisle Western Australia.

Flint E, Rehkemper C (2002) Control and eradication of the non-native grass, *Cenchrus echinatus*, at Laysan Island, Central Pacific Ocean. In *Turning the Tide: The Eradication of Invasive Species* (eds CR Veitch, MN Clout), pp. 110–115. IUCN SSC Invasive Species Specialist Group, IUCN, Gland Switzerland and Cambridge UK.

Flora of Australia Online (n.d.) Oceanic Islands excluding Norfolk and Lord Howe Islands. Australian Biological Resources Study, Canberra. Available at http://www.environment.gov.au/biodiversity/abrs/online-resources/flora/50/index.html.

Floyd R (2010) 'Cockatoo Island Rehabilitation Planning – September 2009'. Unpublished Report. Outback Ecology, Perth.

Fowler SV, Ganeshan S, Mauremootoo J, Mungroo Y (1999) Biological control of weeds in Mauritius: past successes revisited and present challenges. In *Proceedings of the X International Symposium on Biological Control of Weeds*, pp. 4–14. Montana State University, Bozeman Montana.

George AS (1971) The plants seen and collected in north-western Australia by William Dampier. *Western Australian Naturalist* **11**, 173–178.

Gibson LA, Yates S, Doughty P (2012) Biodiversity values on selected Kimberley islands, Australia. *Records of the Western Australian Museum Supplement* **81**, 1–280.

Glaskin K (2007) Claim, culture and effect: property relations and the native title process. In *The Social Effects of Native Title: Recognition, Translation, Coexistence* (eds BR Smith, F Morphy), CAEPR Monograph No. 27, Australian National University, Canberra.

Graves WG (2000) Weed-initiated pest risk assessment for: FNW-*Tridax procumbens* L. USDA, APHIS. Laredo, Texas, 06/21, 2000.

Gregory AC, Gregory FT (1884) *Journal of Australian Exploration*. James C Beal, Government Printer, Brisbane. (Facsimile edition 1981 Hesperian Press).

Groves RH, Hosking JR, Batianoff GN, Cooke DA, Cowie ID, Johnson RW, Keighery GJ, Lepschi BJ, Mitchell AA, Moerkerk M, Randall RP, Rozefelds AC, Walsh NG, Waterhouse BM (2003) *Weed Categories for Natural and Agricultural Ecosystem Management*. Bureau of Rural Sciences, Canberra. Available at http://smtp.auricht.com/dewnr/data/Weed_Categories_Groves_etal.pdf [accessed 30th August 2016].

Grubben GJH (1994) Amaranthus L. In *Plant Resources of South-East Asia Vol. 8. Vegetables* (eds JS Siemonsma, K Pilvek), pp. 82–86. Pudoc Scientific Publishers, Wageningen.

Halkyard B (2009) 'Exploiting green and hawksbill turtles in Western Australia. A case study of the commercial marine turtle fishery, 1869–1973: A HMAP Asia Project Paper'. Working Paper No. 160. Report to Murdoch University, Perth, and National Library of Australia, Canberra.

Handasyde T (2002) 'Botanical report for AQIS–NAQS survey, 12–18 May, 2002: Buccaneer Archipelago – Karracatta Bay to Cockatoo Island'. Report to Department of Conservation and Land Management.

Heard T, Day M, Julien M, Mcfadyen R, Cullen J (2012a). *Sida acuta* Burm. f-spinyhead sida *Sida rhombifolia* L.-paddy's lucerne *Sida cordifolia* L.-flannel weed. In *Biological Control of Weeds in Australia* (eds M Julien, R McFadyen, J Cullen), pp. 544–554. CSIRO Publishing, Collingwood Victoria.

Heard T, Dhileepan K, Bebawi F, Bell K, Segura R (2012b) *Jatropha gossypiifolia* L.–bellyache bush. In *Biological Control of Weeds in Australia* (eds M Julien, R McFadyen, J Cullen), pp. 324–333. CSIRO Publishing, Collingwood Victoria.

Holmes J (2014) 'Dambimangari Aboriginal Corporation Weed Survey'. Unpublished report.

Hosking JR (2012) *Opuntia* spp. In *Biological Control of Weeds in Australia* (eds M Julien, R McFadyen, J Cullen), pp. 431–435. CSIRO Publishing, Collingwood Victoria.

Hunter JT, Bruhl JJ (1997) Three new species of *Phyllanthus* (Euphorbiaceae: Phyllantheae) for the Northern Territory, one new species for Western Australia, and notes on other Phyllanthus species occurring in these regions. *Nuytsia* **11**, 147–163.

Hussey BMJ, Keighery GJ, Dodd J, Lloyd SG, Cousens RD (2007) *Western weeds: A Guide to the Weeds of Western Australia*. Weed Society of Western Australia, Perth.

Invasive Species Compendium (2016) Invasive Species Compendium: Datasheets, maps, images, abstracts and full text on invasive species of the world. Available at http://www.cabi.org/isc/search/?q=&types=7,19&sort=DateDesc [accessed 19 April 2016].

Johnson RW (2012) New species and subspecies of *Ipomoea* L.(Convolvulaceae) from northern Australia and a key to the Australian species.*Austrobaileya* **8**, 699–723.

Jones, DS (2004) The Burrup Peninsula and Dampier Archipelago, Western Australia: an introduction to the history of its discovery and study, marine habitats and their flora and fauna. *Records of the Western Australian Museum Supplement* **66**, 27–49.

Julien M, Sosa A, Traversa G (2012) *Phyla canescens* (Kunth) Greene–lippia. In *Biological Control of Weeds in Australia* (eds M Julien, R McFadyen, J Cullen), pp. 463–471. CSIRO Publishing, Collingwood Victoria.

Keighery GJ, Gibson N, Kenneally KF, Mitchell AA (1995) Biological inventory of Koolan Island, Western Australia 1. Flora and vegetation. *Records of the Western Australian Museum* **17**, 237–248.

Keighery G (2010) The naturalised vascular plants of the Pilbara region, Western Australia. *Records of the Western Australian Museum Supplement* **78**, 299–311.

Keighery GJ (2016) Status of *Paspalum distichum* L. and *P. vaginatum* SW. (Poaceae) in Western Australia. *The Western Australian Naturalist* **30**, 181–184.

Kendrick P (1997) 'Visit to Serrurier, Flat, Round, Peak and Table Islands'. Unpublished report to Department of Conservation and Land Management, Western Australia.

LeProvost, Semeniuk, and Chalmer. (1987) 'Environmental review and management programme: Vol. 2, Technical appendicies for Saladin Oilfield Development. Report prepared by LeProvost, Semenuik & Chalmer for West Australian Petroleum Pty. Limited.

Lohr M, Keighery G (2014) The status and distribution of alien plants on the islands of the south coast of Western Australia. *Conservation Science Western Australia* **9**, 181–200.

Lohr C, Van Dongen R, Huntley B, Gibson L, Morris K (2014) Remotely monitoring change in vegetation cover on the Montebello Islands, Western Australia, in response to introduced rodent eradication. *PloS One* **9**, e114095.

Lohr C, Passeretto K, Lohr M, Keighery G (2015) Prioritising weed management activities in a data deficient environment: the Pilbara islands, WesternAustralia. *Heliyon* **1**, e00044.

Lohr M, Keighery G (2016) The status and distribution of naturalised alien plants on the islands of the west coast of Western Australia. *Conservation Science Western Australia* **10**, 1–43.

Lohr M, Lohr C (2016) Weeds on Western Australia's islands: A historical database with records spanning from 1913 to 2014. Version 1. ÆKOS Data Portal, doi: 10.4227/05/56D79D59C41D3. Available from http://www.aekos.org.au/dataset/229076 [accessed 26 Apr 2016].

Long VL (1987) 'Dampier Archipelago flora survey'. Prepared by Astron Engineering for the Department of Conservation and Land Management, Perth, Western Australia.

Long V, Bott A, Kruger J (2011) Thevenard Island Flora and Vegetation Monitoring Report by Astron Environmental Services Pty Ltd. prepared for Chevron Australia Pty Ltd.

Lowe S, Browne M, Boudjelas S, De Poorter M (2000) 100 of the world's worst invasive alien species. A selection from the Global Invasive Species Database. The Invasive Species Specialist Group (ISSG), a specialist group of the Species Survival Commission (SSC) of the World Conservation Union (IUCN). Available at http://www.issg.org/pdf/publications/worst_100/english_100_worst.pdf [accessed 6th September 2016].

Lyons MN, Keighery GJ, Gibson LA, Handasyde T (2014) Flora and vegetation communities of selected islands off the Kimberley coast of Western Australia. *Records of the Western Austra lian Museum. Supplement* **81**, 205–243.

MacIlroy J (1979) 'Dampier Archipelago historic sites surveys 1979'. Report prepared for the Australian Heritage Commission, Canberra.

Manoko ML, van den Berg RG, Feron RM, van der Weerden GM, Mariani C (2007) AFLP markers support separation of *Solanum nodiflorum* from *Solanum americanum sensu stricto* (Solanaceae). *Plant Systematics and Evolutio* **267**, 1–11.

Martin TG, Campbell S Grounds S (2006) Weeds of Australian rangelands. *The Rangeland Journal* **28**, 3–28.

Mattiske & Associates (1993) 'State of knowledge on vegetation, Barrow Island'. Report prepared for West Australian Petroleum Pty Ltd, Perth.

McFadyen RC (2012) *Mimosa diplotricha* C. Wright ex Sauvalle–giant sensitive plant. In *Biological Control of Weeds in Australia* (eds M Julien, R McFadyen, J Cullen), pp. 373–377. CSIRO Publishing, Collingwood Victoria.

McKenzie NL, van Leeuwen S, Pinder AM (2009) Introduction to the Pilbara biodiversity survey, 2002–2007. *Records of the Western Australian Museum Supplement* **78**, 3–89.

Moore R (1994) The management of the Western Australian pearling industry, 1860 to the 1930s. *The Great Circle* **16**, 121–138.

Morris K (1990) *Dampier Archipelago Nature Reserves Management Plan 1990–2000*. Management Plan No. 18. Department of Conservation and Land Management, Perth.

Morwood MJ, Hobbs DR (1997) The Asian connection: preliminary report on Indonesian trepan sites on the Kimberley coast, N.W. Australia. *Archaeology in Oceania* **32**, 197–206.

National Archives of Australia (2016) Christmas Island – Fact sheet 157. National Archives of Australia, Commonwealth of Australia. Available at http://www.naa.gov.au/collection/fact-sheets/fs157.aspx [accessed 12 April 2016].

NAQS (2000) Northern Australia Quarantine Strategy survey of Cocos (Keeling) Islands and Christmas Island 21 May to 3 June 2000. Prepared for Department of Transport and Regional Services, Commonwealth of Australia. Available at http://www.ga.gov.au/webtemp/image_cache/GA21004.pdf [accessed 29 August 2016].

National Native Title Tribunal (2016) Native Title Determinants ESRI shapefile (National Native Title Register). Commonwealth of Australia. Available at http://www.ntv.nntt.gov.au/intramaps/download/download.asp [accessed 28 June 2016].

O'Brien P (1998) Lighthouses of Western Australia. Available at http://members.upnaway.com/~obees/lights/index.htm [accessed 17 September 2015].

O'Connor S (1989) Contemporary island use in the west Kimberley, Western Australia, and its implications for archaeological site survival. *Australian Aboriginal Studies* **2**, 25–31.

O'Connor S, Arrow S (2008) Boat images in the rock art of northern Australia with particular reference to the Kimberley, Western Australia. In *Islands of Inquiry: Colonisation, seafaring and the archaeology of maritime landscapes. Terra Australis* **29**, 397–408. Australian National University, Canberra.

Palmer J (2009) A conspectus of the genus *Amaranthus* (Amaranthaceae) in Australia. *Nuytsia* **19**, 107–128.

Palmer B (2012) *Sporobolus spp*. – weedy sporobolus grasses. In *Biological Control of Weeds in Australia* (eds M Julien, R McFadyen, J Cullen), pp. 569–575. CSIRO Publishing, Collingwood Victoria.

Parks and Wildlife (2013) How does Parks and Wildlife manage weeds? Weed prioritisation process. Department of Parks and Wildlife, Western Australia. Available at http://www.dpaw.wa.gov.au/plants-and-animals/plants/weeds/156-how-does-dpaw-manage-weeds [accessed 21 May 2014].

Parks and Wildlife (2015) Conservation codes for Western Australian flora and fauna. Department of Parks and Wildlife, Government of Western Australia. Available at https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/conservation_code_definitions.pdf [accessed 12 April 2016].

Parsons WT, Cuthbertson EG (2001) Noxious weeds of Australia, 2nd ed. CSIRO Publishing, Collingwood Victoria.

Paterson A (2006) Towards a historical archaeology of Western Australia's northwest. *Australasian Historical Archaeology* **24**, 99–111.

Paterson A, Van Duivenvoorde W (2013) The sea, inland: Aboriginal rock art depictions of boats from the Western Pilbara. *The Great Circle* **35**, 55–82.

Penniman TM, Buchanan L, Loope LL (2011) Recent plant eradications on the islands of Maui County, Hawaii. In *Island Invasives: Eradication and Management* (eds CR Veitch, MN Clout, DR Towns), pp 325–331. IUCN, Gland Switzerland.

Pennings P (1979) 'Patrol of island reserves on PV Freycinet'. Unpublished report for the Department of Environment and Conservation, Karratha.

Pike GD, Leach GJ (1997) *Handbook of the Vascular Plants of Ashmore and Cartier Islands*. Parks Australia, Canberra.

Preece N, Harvey K, Hempel C, Woinarski JCZ (2010) Uneven distribution of weeds along extensive transects in Australia's Northern Territory points to management solutions. *Ecological Management and Restoration* **11**, 127–134.

Queensland Government (2011). Coral berry: *Rivina humilis*. Weeds of Australia Biosecurity Queensland Edition. Available at: http://keyserver.lucidcentral.org/weeds/data/080c0106-040c-4508-8300-0b0a06060e01/media/html/Rivina_humilis.htm [accessed 9 October 2015].

Queensland Government (2014) Purple Joyweed: *Alternanthera brasiliana*. Non-native plants of Australia Biosecurity Queensland Edition. Available at http://keyserver.lucidcentral.org/non-native plants/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Alternanthera_brasiliana.htm [accessed 28 August 2014].

Russell BC, Neil K, Hilliard R (2004) 'Ashmore Reef National Nature Reserve and Cartier Island Marine Reserve: Marine and Terrestrial Non-native Species Prevention and Management Strategy'. Report for Department of Environment and Heritage, Caberra, Australia.

Sangiri C, Kaga A, Tomooka N, Vaughan D, Srinives P (2007) Genetic Diversity of the Mungbean (Vigna radiata, Leguminosae) genepool on the basis of microsatellite anaysis. *Australian Journal of Botany* **55**, 837–847.

Scarlett, N.H. (2015) *Taraxacum*. In *Flora of Australia*, 37 (1), (ed A Wilson, pp. 95–112. CSIRO Publishing, Collingwood Victoria.

Schuster TM, Reveal JL, Bayly MJ, Kron KA (2015) An updated molecular phylogeny of Polygonoideae (Polygonaceae): Relationships of Oxygonum, Pteroxygonum, and Rumex, and a new circumscription of Koenigia. *Taxon* **64**, 1188–1208.

Scott JK (2012) *Tribulus terrestris* L. – caltrop. *Biological Control of Non-native plants in Australia*, 576–580. CSIRO Publishing, Collingwood Victoria.

Scott JK, McCarren K (2012) *Sonchus oleraceus* L.– sowthistle. In *Biological Control of Non-native Plants in Australia.* (eds JK Scott, M Julien, R McFadyen, J Cullen), pp. 563–567. CSIRO Publishing, Collingwood Victoria.

Shire of Cocos Keeling Islands (2015) History. Available at http://www.shire.cc/en/history.html [accessed 9 October 2015].

Simmonds FJ (1980) Biological control of *Cordia curassavica* [Boraginaceae] in Malaysia. *Entomophaga* **25**, 363–364.

Sokolowski RES (1981) 'Thevenard Island nature reserve No 33174: Inspection report on Lease No 3116'. DEC Karratha archived file.

Souter C, Paterson A., Hook F (2006) The assessment of archaeological sites on Barrow Island and the Dampier Archipelago, Pilbara, Western Australia: a collaborative approach. *Bulletin of the Australasian Institute for Maritime Archaeology* **30**, 85–92.

Speck NH, Wright RL, Rutherford GK, Fitzgerald K, Thomas F, Arnold JM, Basinski JJ, Fitzpatrick EA, Lazarides M, Perry RA (1964) *General Report on Lands of the West Kimberley Area, W.A.* CSIRO Land Research Series No. 9. Australia.

Starr F, Starr K, Loope L (2003) '*Ficus elastica*'. Unpublished Report. United States Geological Survey – Biological Resources Division.

Stewart GA, Perry RA, Paterson SJ, Traves DM, Slatyer RO, Dunn PR, Jonesm PJ, Sleeman JR (1970) *Lands of the Ord–Victoria Area, Western Australia and Northern Territory*. CSIRO Land Research Series No. 28. Australia.

Stoller EW, Sweet RD (1987) Biology and life cycle of purple and yellow nutsedges (*Cyperus rotundus* and *C. esculentus*). *Weed Technology* **1**, 66–73.

Swarbrick JT (1997) 'Environmental weeds and exotic plants on Christmas Island, Indian Ocean: a report to Parks Australia'. JT Swarbrick, Weed Science Consultancy.

Swarbrick JT, Hart R (2000) Environmental weeds of Christmas Island (Indian Ocean) and their management. *Plant Protection Quarterly* **16**, 54–57.

Telford IRH, Sebastian PM, Bruhl JJ, Renner SS (2011) *Cucumis* (Cucurbitaceae) in Australia and eastern Malesia, including newly recognized species and the sister species to *C. melo*. *Systematic Botany* **36**, 376–389.

Teo LL, Kiew R., Set O, Lee SK, & Gan YY (2002) Hybrid status of kuwini, *Mangifera odorata* Griff. (Anacardiaceae) verified by amplified fragment length polymorphism. *Molecular Ecology* **11**, 1465–1469.

The West Australian (1883, August 21) Classified Advertising: For sale; The leases of Dampier Archipelago. The West Australian, p. 2.

USDA (2013) Weed risk assessment for *Cordia curassavica* (Jacq.) Roem. & Schult. (Boraginaceae) – Black sage. United States Department of Agriculture, Animal and Plant Health Inspection Service. Available at https://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/Cordia_curassavica_WRA.pdf [accessed 19 April 2016].

van Klinken RD (2012) Prosopis spp. – mesquite. In *Biological Control of Weeds in Australia*. (eds M Julien, R McFadyen, J Cullen J), pp. 477–485. CSIRO Publishing, Collingwood Victoria.

Vila M, Espinar JL, Hejda M, Hulme PE, Jarosik V, Maron JL, Pergl J, Schaffner U, Sun Y, Pysek P (2011) Ecological impacts of invasive alien plants: a meta-analysis of their effects on species, communities and ecosystems. *Ecology Letters* **14**, 702–708.

Vitousek PM, D'Antonio CM, Loope LL, Rejmanek M, Westbrooks R (1997) Introduced species: a significant component of human-caused global change. *New Zealand Journal of Ecology* **21**, 1–16.

Western Australian Herbarium (2014) FloraBase—the Western Australian Flora. Department of Parks and Wildlife. http://florabase.dpaw.wa.gov.au/

Wheeler JR (1992) *Flora of the Kimberley Region*. Department of Conservation and Land Management, Perth.

Williams DG (1994) Vegetation and flora of the Cocos (Keeling) Islands. *Atoll Research Bulletin* **404**, 399–414.

Williams CMJ, Biswas TK, Marton L, Czako M (2013) *Arundo donax*. In *Biofuel Crops: Production, Physiology and Genetics* (ed BP Singh), pp. 249–270. CABI, Oxfordshire.

Wiseman K (2013) 'Annual Weed Montioring 2013 Koolan island Iron Ore Operations'. Unpublished document prepared by Martinick Bosch Sell Pty Ltd for Mount Gibson Mining Limited.

Woods PJ (1980) 'A report to the Dampier Archipelago Recreation Advisory Committee on the suitability of certain sites on Malus and West Lewis Islands

for shack development'. Department of Parks and Wildlife, Western Australia.

Yeoh PB, Julien MH, Scott JK (2012) *Emex australis* Steinheil – doublegee and *Emex spinosa* (L.) Campdera – lesser jack. In *Biological Control of Weeds in Australia*. (eds M Julien, R McFadyen, J Cullen), pp. 477–485. CSIRO Publishing, Collingwood Victoria.

Zachariades C, Hoffman JH, and Roberts AP (2011) Biological control of mesquite (*Prosopis* species) (Fabaceae) in South Africa. African Entomology 19, 402–415.

APPENDIX 1

403 species of non-native plants recorded on islands along the north coast, and the number of islands that they occur upon within each region.

	Number of islands			
Non-native plant species	**Kimberley**	**Pilbara**	**Territorial**	**Total**
Acacia ampliceps		1		1
Acacia auriculiformis	1		1	2
Acacia bivenosa	1	1		2
Acacia coriacea		1		1
Acacia coriacea coriacea	1			1
Acacia elachantha	1			1
Acacia saligna	1			1
Acalypha arvensis			1	1
Acalypha indica			3	3
Acalypha lanceolata			3	3
Acalypha lanceolata lanceolata			3	3
Acetosa vesicaria		1		1
Adenanthera pavonina			1	1
Aerva javanica		39		39
Aerva lanata			1	1
Agave americana	2			2
Ageratum conyzoides			1	1
Albizia lebbeck	1			1
Aleurites moluccana			1	1
Allamanda cathartica	1			1
Allium odorum			1	1
Aloe vera	2			2
Alternanthera bettzichiana			1	1
Alternanthera brasiliana	1			1
Alternanthera pungens			1	1
Alternanthera sessilis			1	1
Alysicarpus ovalifolius	5			5
Alysicarpus vaginalis	2		2	4
Amaranthus cruentus			1	1
Amaranthus dubius			1	1
Amaranthus spinosus			1	1
Amaranthus tricolor			1	1
Amaranthus viridis	2	17	1	20
Amphineuron opulentum			1	1
Anacardium occidentale	1			1
Andrographis paniculata			1	1
Annona muricata			1	1
Annona reticulata			1	1
Antigonon leptopus	1		1	2
Apluda mutica			1	1
Arctotheca calendula		1		1
Areca catechu			1	1
Aristolochia elegans			1	1
Artemisia vulgaris			1	1
Arundo donax	1	1	1	3
Asparagus densiflorus			1	1
Asystasia chelonoides			1	1
Asystasia gangetica			1	1
Austroeupatorium inulifolium			2	2
Axonopus compressus			1	1
Axonopus fissifolius			1	1
Azadirachta indica	1			1
Barleria cristata			1	1
Barleria lupulina			1	1
Barringtonia asiatica			1	1
Basella alba			1	1
Bauhinia corymbosa	1			1
Bauhinia monandra			1	1
Bidens bipinnata	3	1		4
Bidens pilosa	6		1	7

Non-native plant species	Number of islands: Kimberley	Pilbara	Territorial	Total
Bixa orellana			1	1
Boerhavia coccinea			2	2
Boerhavia diffusa			2	2
Boerhavia erecta			1	1
Bothriochloa bladhii			2	2
Bothriochloa pertusa	1			1
Bougainvillea spectabilis	1		1	2
Breynia distichia			1	1
Bryophyllum pinnatum			1	1
Caesalpinia pulcherrima			1	1
Cajanus cajan			1	1
Calopogonium caeruleum			1	1
Calopogonium mucunoides			1	1
Calotropis procera	2			2
Canavalia ensiformis	1			1
Canna indica			1	1
Capsicum frutescens			1	1
Cardamine hirsuta			1	1
Cardiospermum halicacabum	1		1	2
Carica papaya	1		2	3
Cascabela thevetia	1			1
Cassia fistula	1			1
Castilla elastica			1	1
Casuarina equisetifolia	1	1	1	3
Casuarina equisetifolia subsp. *equisetifolia*			1	1
Catharanthus roseus	3		1	4
Ceiba pentandra			1	1
Celosia argentea			1	1
Cenchrus biflorus	2			2
Cenchrus brownii	1		4	5
Cenchrus ciliaris	7	68	3	78
Cenchrus echinatus	3		4	7
Cenchrus pedicellatus	1		1	2
Cenchrus pedicellatus subsp. *unispiculus*	1			1
Cenchrus purpureus	1			1
Cenchrus setaceus		2		2
Cenchrus setiger	2	2		4
Centaurium erythraea		2		2
Centrosema molle			1	1
Chloris barbata	5		2	7
Chloris gayana	1		1	2
Chloris virgata	2	2		4
Chromolaena odorata			2	2
Chrysopogon aciculatus			2	2
Citrullus lanatus		1		1
Citrus aurantifolia			1	1
Citrus maxima			1	1
Citrus microcarpa			1	1
Clausena excavata			1	1
Clausena lansium			1	1
Cleome gynandra			1	1
Cleome rutidosperma			1	1
Clerodendrum calamitosum			1	1
Clitoria ternatea	4	1	1	6
Cocos nucifera	1	1	3	5
Coffea liberica			1	1
Colocasia esculenta			1	1
Colocasia esculenta var. *esculenta*	1			1
Commelina benghalensis			1	1
Conyza bonariensis		4	2	6
Conyza sumatrensis			1	1
Cordia curassavica			1	1
Cordyline petiolaris			1	1
Crassocephalum crepidioides			1	1

Non-native plant species	Number of islands			
	Kimberley	Pilbara	Territorial	Total
Crotalaria pallida			1	1
Crotalaria retusa			1	1
Cryptostegia madagascariensis	2			2
Cryptostegia madagascariensis var. *glaberrima*	2			2
Cucumis melo	4	2		6
Cucumis melo subsp. *agrestis*	5	1		6
Cyanthillium cinereum			4	4
Cycas revoluta	1			1
Cynodon arcuatus			2	2
Cynodon dactylon	2	3	3	8
Cyperus aromaticus			2	2
Cyperus brevifolius			1	1
Cyperus compressus			1	1
Cyperus cyperoides			1	1
Cyperus kyllingia			1	1
Cyperus polystachyos	1		1	2
Cyperus rotundus			1	1
Dactyloctenium aegyptium	2		2	4
Datura leichhardtii		1		1
Datura wrightii			1	1
Delonix regia	1		1	2
Desmanthus virgatus			1	1
Desmodium tortuosum	2			2
Desmodium triflorum			2	2
Desmostachya bipinnata			1	1
Digitaria ciliaris	6	2		8
Digitaria milanjiana			1	1
Digitaria setigera			2	2
Dipteracanthus prostratus			1	1
Echinochloa colona	2		1	3
Eclipta prostrata			1	1
Egeria densa			1	1
Eichhornia crassipes			1	1
Elaeis guineensis			1	1
Eleusine indica	1		2	3
Eleutheranthera ruderalis			2	2
Emilia sonchifolia			1	1
Eragrostis amabilis	1		4	5
Eragrostis amabilis var. *amabilis*	1			1
Eragrostis cilianensis			1	1
Eragrostis minor		4		4
Eragrostis pilosa			1	1
Eriochloa meyeriana			1	1
Eucalyptus camaldulensis		1		1
Euphorbia cyathophora	2		2	4
Euphorbia heterophylla			2	2
Euphorbia hirta	7		5	12
Euphorbia prostrata			3	3
Euphorbia pulcherrima			1	1
Euphorbia thymifolia			1	1
Euphorbia tirucalli	1			1
Ficus benjamina	1			1
Ficus elastica			1	1
Flaveria trinervia	1	23		24
Gliricidia sepium	1		1	2
Gomphrena celosioides			1	1
Gossypium barbadense acuminatum			1	1
Gossypium hirsutum	2	1		3
Heliotropium indicum			1	1
Hevea brasiliensis			1	1
Hibiscus sabdariffa	1			1
Hibiscus schizopetalus	1			1
Hippobroma longiflora			1	1

Non-native plant species	Number of islands			
	Kimberley	Pilbara	Territorial	Total
Hydrocotyle novae-zeelandiae			1	1
Hymenaea verrucosa			1	1
Hyptis capitata			1	1
Hyptis suaveolens	2			2
Imperata cylindrica			2	2
Indigofera hirsuta			1	1
Ipomoea aquatica			1	1
Ipomoea batatas			1	1
Ipomoea cairica		1	1	2
Ipomoea hederifolia			1	1
Ipomoea muelleri		2		2
Ipomoea nil			1	1
Ipomoea obscura			2	2
Ipomoea quamoclit	1		1	2
Ipomoea triloba			1	1
Ischaemum muticum			1	1
Jasminum sambac			1	1
Jatropha curcas			1	1
Jatropha gossypiifolia	1			1
Justicia gendarussa			1	1
Khaya senegalensis	2			2
Kigelia pinnata	1			1
Koelreuteria paniculata	1			1
Lablab purpureus			1	1
Lagenaria siceraria			1	1
Lantana camara	1			1
Leontodon saxatilis		1		1
Lepidium virginicum			2	2
Leucaena leucocephala	4	1	2	7
Leucaena leucocephala subsp. *leucocephala*	1			1
Leucas zeylanica			1	1
Ludwigia hyssopifolia			1	1
Lycopersicon esculentum		3	1	4
Macroptilium atropurpureum	2		3	5
Macroptilium lathyroides	1			1
Macroptilium lathyroides var. *semierectum*	1			1
Magnolia champaca			1	1
Malvastrum americanum	1	13		14
Malvastrum coromandelianum			1	1
Mangifera indica	4		1	5
Mangifera odorata			1	1
Manihot esculenta			1	1
Manihot glaziovii			1	1
Medicago polymorpha		1		1
Megathyrsus maximus	1		1	2
Megathyrsus maximus var. *maximus*	1			1
Melia azedarach	1		1	2
Melinis minutiflora			1	1
Melinis repens	4	1	2	7
Melochia pyramidata	2			2
Merremia aegyptia	1			1
Merremia dissecta	2			2
Merremia dissecta var. *dissecta*	1	1		2
Mikania micrantha			1	1
Mimosa invisa			1	1
Mimosa pudica			1	1
Mirabilis jalapa			1	1
Momordica charantia			1	1
Moringa oleifera	2		1	3
Mucuna albertisii			1	1
Mucuna pruriens			1	1
Muntingia calabura			3	3
Murraya koenigii			1	1
Musa acuminata	1			1

Non-native plant species	Number of islands			
	Kimberley	Pilbara	Territorial	Total
Myristica fragrans			1	1
Nephrolepis biserrata			1	1
Nephrolepis multiflora			1	1
Nerium oleander	1			1
Nicotiana tabacum			1	1
Ocimum americanum			1	1
Ocimum basilicum			1	1
Ocimum tenuiflorum			1	1
Oldenlandia corymbosa			3	3
Oldenlandia pumila			1	1
Operculina turpethum	1			1
Opuntia stricta		5		5
Oxalis barrelieri			1	1
Oxalis corniculata			1	1
Pachyrhizus erosus			1	1
Paederia foetida			1	1
Panicum coloratum	1			1
Panicum trichoides			1	1
Papaver somniferum		1		1
Parkinsonia aculeata	1	1		2
Parthenium hysterophorus			1	1
Paspalum conjugatum			1	1
Paspalum urvillei	1			1
Paspalum vaginatum			1	1
Passiflora foetida	11	3	2	16
Passiflora foetida var. *hispida*	26	1		27
Peltophorum pterocarpum	1			1
Peperomia pellucida			1	1
Peristrophe bivalvis			1	1
Phaseolus lunatus			1	1
Phoenix dactylifera		1		1
Phyla nodiflora			2	2
Phyla nodiflora var. *nodiflora*	2			2
Phyllanthus acidus			1	1
Phyllanthus amarus	2		2	4
Phyllanthus debilis			1	1
Physalis angulata	3	2	5	10
Piper aduncum			1	1
Piper betle			1	1
Piper sarmentosum			1	1
Pithecellobium dulce			1	1
Pityrogramma calomelanos			1	1
Plantago major			1	1
Pluchea indica			1	1
Plumeria obtusa	1			1
Polycarpon tetraphyllum		1		1
Polyscias fruticosa			1	1
Porana volubilis			1	1
Portulaca oleracea	7	13	3	23
Portulaca pilosa		2	1	3
Pritchardia pacifica	1			1
Psidium cattleianum			1	1
Psidium guajava			1	1
Psophocarpus tetragonolobus			1	1
Pterocarpus indicus			1	1
Pueraria phaseoloides javanica			1	1
Pupalia lappacea	1			1
Pupalia micrantha	7			7
Quisqualis indica	1			1
Ricinus communis			4	4
Rivina humilis			5	5
Robinia pseudoacacia	1		1	2
Rottboellia			1	1
Ruellia tuberosa	1			1
Saccharum officinarum			1	1

Non-native plant species	Number of islands			Total
	Kimberley	Pilbara	Territorial	
Saccharum spontaneum			1	1
Salsola australis	3	1		4
Sanseviera trifasciata			1	1
Sauropus androgynus			2	2
Schefflera actinophylla			1	1
Schizolobium parahyba	1			1
Scoparia dulcis			3	3
Senna alata	1		1	2
Senna occidentalis		1	2	3
Senna sulphurea			1	1
Senna surattensis subsp. *Sulfurea*			1	1
Sesbania bispinosa			1	1
Sesbania cannabina		1	4	5
Sesbania grandiflora			2	2
Setaria pumila	1			1
Setaria pumila subsp. *pumila*	1			1
Setaria sphacelata			1	1
Setaria verticillata		9		9
Sida acuta			1	1
Sida rhombifolia			1	1
Sida subcordata	1			1
Solanum americanum			2	2
Solanum nigrum		2		2
Sonchus asper		1		1
Sonchus oleraceus		5	2	7
Sorghum bicolor	1		2	3
Sorghum halepense			1	1
Sorghum propinquum			1	1
Spathodea campanulata	1		1	2
Spermacoce remota			3	3
Sphagneticola trilobata	2		1	3
Sporobolus fertilis			1	1
Sporobolus indicus var. *major*			2	2
Stachytarpheta cayennensis	2		1	3
Stachytarpheta jamaicensis			4	4
Striga asiatica			1	1
Stylosanthes guianensis	1			1
Stylosanthes hamata	3	2		5
Stylosanthes humilis			1	1
Stylosanthes scabra	2			2
Symphyotrichum squamatum			1	1
Symphyotrichum subulatum			1	1
Synedrella nodiflora			2	2
Syzygium cumini			1	1
Syzygium grande			1	1
Syzygium jambos			1	1
Syzygium malaccense			1	1
Syzygium samarangense			1	1
Tamarindus indica	2		1	3
Tamarix aphylla		2	1	3
Taraxacum officinale		1		1
Tecoma stans	1		1	2
Tecoma stans var. *stans*	1			1
Terminalia catappa	2			2
Theobroma cacao			1	1
Thunbergia laurifolia			1	1
Tinospora baenzigeri			1	1
Tinospora crispa			1	1
Tithonia diversifolia			1	1
Tradescantia spathacea			2	2
Trema tomentosa			1	1
Trianthema portulacastrum	1	2		3
Tribulus cistoides			3	3
Tribulus terrestris	5	9		14
Tridax procumbens	5	2	3	10

Non-native plant species	Number of islands			Total
	Kimberley	Pilbara	Territorial	
Trifolium micranthum	1			1
Triphasia trifolia			3	3
Triumfetta pentandra	1			1
Turnera ulmifolia	1		17	18
Urochloa brizantha			1	1
Urochloa humidicola			1	1
Urochloa mosambicensis	1		2	3
Urochloa mutica			2	2
Urochloa ramosa			1	1
Urochloa reptans			1	1
Urochloa subquadripara	1		1	2
Vallaris glabra			1	1
Vernonia elliptica	1			1
Vigna mungo			1	1
Vigna radiata			1	1
Vigna radiata var. *setulosa*	2			2
Vitex trifolia			2	2
Washingtonia filifera		1		1
Xanthosoma sagittifolium			1	1
Zamia furfuracea	1			1
Zephyranthes rosea			2	2
Zoysia matrella subsp. *matrella*			1	1
Number of non-native plant species	139	61	294	

APPENDIX 2

List of non-native plant species found on the islands with the greatest number of weeds species.

Island	Number non-native plants	Non-native plant species
Koolan	91	*Acacia auriculiformis* *Acacia saligna* *Agave americana* *Allamanda cathartica* *Alternanthera brasiliana* *Alysicarpus ovalifolius* *Alysicarpus vaginalis* *Amaranthus viridis* *Antigonon leptopus* *Arundo donax* *Bauhinia corymbosa* *Bidens bipinnata* *Bothriochloa pertusa* *Bougainvillea spectabilis* *Canavalia ensiformis* *Cascabela thevetia* *Cassia fistula* *Catharanthus roseus* *Cenchrus biflorus* *Cenchrus ciliaris* *Cenchrus echinatus* *Cenchrus pedicellatus* *Cenchrus pedicellatus* subsp. *unispiculus* *Cenchrus purpureus* *Cenchrus setiger* *Chloris barbata* *Chloris gayana* *Chloris virgata* *Clitoria ternatea* *Cryptostegia madagascariensis* *Cryptostegia madagascariensis* var. *glaberrima* *Cucumis melo* *Cucumis melo* subsp. *agrestis* *Cynodon dactylon* *Dactyloctenium aegyptium* *Delonix regia* *Desmodium tortuosum* *Echinochloa colona* *Eleusine indica* *Eragrostis amabilis* *Eragrostis amabilis* var. *amabilis* *Euphorbia cyathophora* *Euphorbia hirta* *Gliricidia sepium* *Gossypium hirsutum* *Hibiscus schizopetalus* *Hyptis suaveolens* *Ipomoea quamoclit* *Jatropha gossypiifolia* *Kigelia pinnata* *Koelreuteria paniculata* *Leucaena leucocephala* *Leucaena leucocephala* subsp. *leucocephala* *Macroptilium lathyroides* *Macroptilium lathyroides* var. *semierectum* *Malvastrum americanum*
Cockatoo	38	*Acacia elachantha* *Agave americana* *Aloe vera* *Alysicarpus ovalifolius* *Alysicarpus vaginalis* *Casuarina equisetifolia* *Catharanthus roseus* *Cenchrus ciliaris* *Cenchrus setiger* *Chloris barbata* *Chloris virgata* *Clitoria ternatea* *Cryptostegia madagascariensis* *Cryptostegia madagascariensis* var. *glaberrima* *Desmodium tortuosum* *Euphorbia cyathophora* *Euphorbia hirta* *Euphorbia tirucalli* *Ficus benjamina* *Gossypium hirsutum* *Khaya senegalensis* *Lantana camara* *Mangifera indica* *Megathyrsus maximus* *Megathyrsus maximus* var. *maximus* *Melinis repens* *Merremia dissecta* *Merremia dissecta* var. *dissecta* *Moringa oleifera* *Nerium oleander* *Panicum coloratum* *Paspalum urvillei* *Passiflora foetida* *Passiflora foetida* var. *hispida* *Peltophorum pterocarpum* *Phyllanthus amarus* *Physalis angulata* *Portulaca oleracea* *Robinia pseudoacacia* *Ruellia tuberosa* *Schizolobium parahyba* *Senna alata* *Setaria pumila* *Setaria pumila* subsp. *pumila* *Sorghum bicolor* *Spathodea campanulata* *Stachytarpheta cayennensis* *Stylosanthes guianensis* *Stylosanthes hamata* *Stylosanthes scabra* *Tamarindus indica* *Tecoma stans* *Tecoma stans* var. *stans* *Tridax procumbens* *Trifolium micranthum* *Turnera ulmifolia* *Urochloa mosambicensis*

Island	Number non-native plants	Non-native plant species
		Leucaena leucocephala
		Mangifera indica
		Melinis repens
		Merremia aegyptia
		Merremia dissecta
		Moringa oleifera
		Passiflora foetida
		Pritchardia pacifica
		Quisqualis indica
		Sphagneticola trilobata
		Stachytarpheta cayennensis
		Terminalia catappa
		Tridax procumbens
		Urochloa subquadripara
		*Vernonia elliptic*a
Sunday (Buccaneer Archipelago)	28	*Albizia lebbeck*
		Alysicarpus ovalifolius
		Catharanthus roseus
		Cenchrus ciliaris
		Cenchrus echinatus
		Chloris barbata
		Clitoria ternatea
		Cocos nucifera
		Colocasia esculenta var. *esculenta*
		Cynodon dactylon
		Cyperus polystachyos
		Digitaria ciliaris
		Euphorbia hirta
		Leucaena leucocephala
		Macroptilium atropurpureum
		Mangifera indica
		Melia azedarach
		Musa acuminata
		Passiflora foetida
		Passiflora foetida var. *hispida*
		Phyla nodiflora var. *nodiflora*
		Physalis angulata
		Plumeria obtusa
		Salsola australis
		Sphagneticola trilobata
		Stylosanthes hamata
		Stylosanthes scabra
		Tridax procumbens
Alcatraz	19	*Aloe vera*
		Anacardium occidentale
		Azadirachta indica
		Carica papaya
		Cenchrus echinatus
		Chloris barbata
		Cycas revoluta
		Euphorbia hirta
		Khaya senegalensis
		Leucaena leucocephala
		Macroptilium atropurpureum
		Melinis repens
		Passiflora foetida
		Phyllanthus amarus
		Portulaca oleracea
		Tamarindus indica
		Terminalia catappa
		Tridax procumbens
		Zamia furfuracea
Varanus	22	*Acacia ampliceps*
		Acacia coriacea
		Aerva javanica
		Amaranthus viridis
		Cenchrus ciliaris
		Cenchrus setiger
		Conyza bonariensis
		Cucumis melo
		Cynodon dactylon
		Digitaria ciliaris
		Eucalyptus camaldulensis
		Flaveria trinervia
		Ipomoea muelleri
		Lycopersicon esculentum
		Malvastrum americanum
		Melinis repens
		Physalis angulata
		Portulaca pilosa
		Sonchus asper
		Sonchus oleraceus
		Taraxacum officinale
		Tridax procumbens
Barrow	19	*Arctotheca calendula*
		Cenchrus ciliaris
		Centaurium erythraea
		Citrullus lanatus
		Conyza bonariensis
		Cynodon dactylon
		Flaveria trinervia
		Leontodon saxatilis
		Lycopersicon esculentum
		Malvastrum americanum
		Medicago polymorpha
		Papaver somniferum
		Passiflora foetida var. *hispida*
		Portulaca oleracea
		Senna occidentalis
		Setaria verticillata
		Solanum nigrum
		Sonchus oleraceus
		Tribulus terrestris
Dampier (Burrup Peninsula)	19	*Acetosa vesicaria*
		Aerva javanica
		Bidens bipinnata
		Cenchrus ciliaris
		Cenchrus setaceus
		Cenchrus setiger
		Centaurium erythraea
		Clitoria ternatea
		Conyza bonariensis
		Leucaena leucocephala
		Malvastrum americanum
		Passiflora foetida
		Physalis angulata
		Solanum nigrum
		Sonchus oleraceus
		Stylosanthes hamata
		Trianthema portulacastrum
		Tribulus terrestris
		Tridax procumbens

Island	Number non-native plants	Non-native plant species
Thevenard	18	*Acacia bivenosa* *Aerva javanica* *Casuarina equisetifolia* *Cenchrus ciliaris* *Cenchrus setaceus* *Conyza bonariensis* *Cynodon dactylon* *Eragrostis minor* *Flaveria trinervia* *Ipomoea muelleri* *Lycopersicon esculentum* *Polycarpon tetraphyllum* *Sesbania cannabina* *Sonchus oleraceus* *Stylosanthes hamata* *Tamarix aphylla* *Tribulus terrestris* *Washingtonia filifera*
Christmas	253	*Acacia auriculiformis* *Acalypha arvensis* *Acalypha indica* *Acalypha lanceolata* *Acalypha lanceolata lanceolata* *Adenanthera pavonina* *Ageratum conyzoides* *Aleurites moluccana* *Allium odorum* *Alternanthera bettzichiana* *Alternanthera pungens* *Alternanthera sessilis* *Alysicarpus vaginalis* *Amaranthus cruentus* *Amaranthus dubius* *Amaranthus spinosus* *Amaranthus tricolor* *Amaranthus viridis* *Amphineuron opulentum* *Andrographis paniculata* *Annona muricata* *Annona reticulata* *Antigonon leptopus* *Areca catechu* *Aristolochia elegans* *Artemisia vulgaris* *Arundo donax* *Asparagus densiflorus* *Asystasia chelonoides* *Asystasia gangetica* *Axonopus compressus* *Axonopus fissifolius* *Barleria cristata* *Barleria lupulina* *Barringtonia asiatica* *Basella alba* *Bauhinia monandra* *Bidens pilosa* *Bixa orellana* *Boerhavia coccinea* *Boerhavia erecta* *Bothriochloa bladhii* *Bougainvillea spectabilis* *Caesalpinia pulcherrima* *Cajanus cajan* *Calopogonium caeruleum* *Calopogonium mucunoides* *Canna indica* *Capsicum frutescens* *Cardamine hirsuta* *Cardiospermum halicacabum* *Carica papaya* *Castilla elastica* *Catharanthus roseus* *Ceiba pentandra* *Celosia argentea* *Cenchrus brownii* *Cenchrus echinatus* *Centrosema molle* *Chloris barbata* *Chromolaena odorata* *Chrysopogon aciculatus* *Citrus aurantifolia* *Citrus maxima* *Citrus microcarpa* *Clausena excavata* *Clausena lansium* *Cleome rutidosperma* *Clerodendrum calamitosum* *Clitoria ternatea* *Cocos nucifera* *Coffea liberica* *Colocasia esculenta* *Commelina benghalensis* *Conyza bonariensis* *Conyza sumatrensis* *Cordia curassavica* *Cordyline petiolaris* *Crassocephalum crepidioides* *Crotalaria pallida* *Cyanthillium cinereum* *Cynodon dactylon* *Cyperus aromaticus* *Cyperus brevifolius* *Cyperus compressus* *Cyperus cyperoides* *Cyperus kyllingia* *Cyperus rotundus* *Dactyloctenium aegyptium* *Datura wrightii* *Delonix regia* *Desmodium triflorum* *Dipteracanthus prostratus* *Echinochloa colona* *Eclipta prostrata* *Egeria densa* *Eichhornia crassipes* *Elaeis guineensis* *Eleusine indica* *Eleutheranthera ruderalis* *Eragrostis pilosa* *Euphorbia cyathophora* *Euphorbia heterophylla* *Euphorbia hirta* *Euphorbia prostrata* *Euphorbia pulcherrima* *Euphorbia thymifolia* *Ficus elastica* *Gliricidia sepium*

Island	Number non-native plants	Non-native plant species	Island	Number non-native plants	Non-native plant species
		Gomphrena celosioides			*Phaseolus lunatus*
		Gossypium barbadense acuminatum			*Phyllanthus acidus*
					Phyllanthus amarus
		Heliotropium indicum			*Physalis angulata*
		Hevea brasiliensis			*Piper aduncum*
		Hydrocotyle novae-zeelandiae			*Piper betle*
		Hymenaea verrucosa			*Piper sarmentosum*
		Hyptis capitata			*Pithecellobium dulce*
		Imperata cylindrica			*Pityrogramma calomelanos*
		Ipomoea aquatica			*Plantago major*
		Ipomoea batatas			*Pluchea indica*
		Ipomoea cairica			*Polyscias fruticosa*
		Ipomoea hederifolia			*Porana volubilis*
		Ipomoea nil			*Portulaca oleracea*
		Ipomoea obscura			*Portulaca pilosa*
		Ipomoea quamoclit			*Psidium cattleianum*
		Ipomoea triloba			*Psidium guajava*
		Jasminum sambac			*Psophocarpus tetragonolobus*
		Jatropha curcas			*Pterocarpus indicus*
		Justicia gendarussa			*Pueraria phaseoloides javanica*
		Lablab purpureus			*Ricinus communis*
		Lagenaria siceraria			*Rivina humilis*
		Leucaena leucocephala			*Robinia pseudoacacia*
		Leucas zeylanica			*Rottboellia*
		Ludwigia hyssopifolia			*Saccharum officinarum*
		Lycopersicon esculentum			*Saccharum spontaneum*
		Macroptilium atropurpureum			*Sanseviera trifasciata*
		Magnolia champaca			*Sauropus androgynus*
		Malvastrum coromandelianum			*Schefflera actinophylla*
		Mangifera indica			*Scoparia dulcis*
		Mangifera odorata			*Senna alata*
		Manihot esculenta			*Senna occidentalis*
		Manihot glaziovii			*Senna sulphurea*
		Melia azedarach			*Senna surattensis* subsp. *Sulfurea*
		Melinis repens			*Sesbania bispinosa*
		Mikania micrantha			*Sesbania grandiflora*
		Mimosa invisa			*Setaria sphacelata*
		Mimosa pudica			*Sida rhombifolia*
		Mirabilis jalapa			*Solanum americanum*
		Momordica charantia			*Sonchus oleraceus*
		Moringa oleifera			*Sorghum bicolor*
		Mucuna albertisii			*Sorghum halepense*
		Mucuna pruriens			*Sorghum propinquum*
		Muntingia calabura			*Spathodea campanulata*
		Murraya koenigii			*Spermacoce remota*
		Myristica fragrans			*Sphagneticola trilobata*
		Nephrolepis biserrata			*Sporobolus indicus* var. *major*
		Nephrolepis multiflora			*Stachytarpheta cayennensis*
		Nicotiana tabacum			*Stachytarpheta jamaicensis*
		Ocimum americanum			*Stylosanthes humilis*
		Ocimum basilicum			*Symphyotrichum squamatum*
		Ocimum tenuiflorum			*Symphyotrichum subulatum*
		Oldenlandia corymbosa			*Synedrella nodiflora*
		Oldenlandia pumila			*Syzygium cumini*
		Oxalis barrelieri			*Syzygium grande*
		Oxalis corniculata			*Syzygium jambos*
		Pachyrhizus erosus			*Syzygium malaccense*
		Paederia foetida			*Syzygium samarangense*
		Panicum trichoides			*Tamarindus indica*
		Parthenium hysterophorus			*Tamarix aphylla*
		Paspalum conjugatum			*Tecoma stans*
		Passiflora foetida			*Theobroma cacao*
		Peperomia pellucida			*Thunbergia laurifolia*
		Peristrophe bivalvis			*Tinospora baenzigeri*

Island	Number non-native plants	Non-native plant species	Island	Number non-native plants	Non-native plant species
		Tinospora crispa *Tithonia diversifolia* *Tradescantia spathacea* *Trema tomentosa* *Tridax procumbens* *Turnera ulmifolia* *Urochloa mosambicensis* *Urochloa mutica* *Urochloa ramosa* *Urochloa reptans* *Urochloa subquadripara* *Vallaris glabra* *Vigna mungo* *Vigna radiata* *Vitex trifolia* *Xanthosoma sagittifolium* *Zoysia matrella* subsp. *matrella*			*Eleusine indica* *Eleutheranthera ruderalis* *Emilia sonchifolia* *Eragrostis amabilis* *Eriochloa meyeriana* *Euphorbia cyathophora* *Euphorbia heterophylla* *Euphorbia hirta* *Euphorbia prostrata* *Hippobroma longiflora* *Imperata cylindrica* *Indigofera hirsuta* *Ipomoea obscura* *Lepidium virginicum* *Leucaena leucocephala* *Macroptilium atropurpureum* *Megathyrsus maximus* *Melinis minutiflora* *Melinis repens* *Muntingia calabura* *Oldenlandia corymbosa* *Passiflora foetida* *Phyla nodiflora* *Phyllanthus amarus* *Phyllanthus debilis* *Physalis angulata* *Portulaca oleracea* *Ricinus communis* *Rivina humilis* *Sauropus androgynus* *Scoparia dulcis* *Senna occidentalis* *Sesbania cannabina* *Sonchus oleraceus* *Sorghum bicolor* *Spermacoce remota* *Sporobolus fertilis* *Sporobolus indicus* var. *major* *Stachytarpheta jamaicensis* *Striga asiatica* *Synedrella nodiflora* *Tradescantia spathacea* *Tridax procumbens* *Triphasia trifolia* *Turnera ulmifolia* *Urochloa brizantha* *Urochloa humidicola* *Urochloa mosambicensis* *Urochloa mutica* *Vitex trifolia* *Zephyranthes rosea*
West (Pulu Panjang)	84	*Acalypha indica* *Acalypha lanceolata* *Acalypha lanceolata lanceolata* *Aerva lanata* *Alysicarpus vaginalis* *Apluda mutica* *Austroeupatorium inulifolium* *Boerhavia coccinea* *Boerhavia diffusa* *Bothriochloa bladhii* *Breynia distichia* *Bryophyllum pinnatum* *Casuarina equisetifolia* *Casuarina equisetifolia* subsp. *equisetifolia* *Cenchrus ciliaris* *Cenchrus echinatus* *Chloris barbata* *Chloris gayana* *Chromolaena odorata* *Chrysopogon aciculatus* *Conyza bonariensis* *Crotalaria retusa* *Cyanthillium cinereum* *Cynodon arcuatus* *Cynodon dactylon* *Cyperus aromaticus* *Cyperus polystachyos* *Dactyloctenium aegyptium* *Desmanthus virgatus* *Desmodium triflorum* *Desmostachya bipinnata* *Digitaria milanjiana* *Digitaria setigera*			