FIRE MANAGEMENT SYSTEM

Queensland Government
Queensland Parks and Wildlife Service

Bribie Island

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DPI Forestry
Queensland Government
Department of Primary Industries and Fisheries

CABOOLTURE SHIRE COUNCIL

QUEENSLAND FIRE AND RESCUE SERVICE

Queensland Government
Natural Resources, Mines and Energy

Firetegy

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This fire strategy was developed as a cooperative effort with representatives from key land management agencies responsible for fire management on Bribie Island, namely Qld Parks and Wildlife Service (QPWS), Caboolture Shire Council (CSC), Qld Dept of Natural Resources, Mines and Energy (NRM&E), Qld Fire and Rescue Service (QFRS) and Dept of Primary Industries – Forestry (DPI-F).

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The draft strategy was released for public comment in October 2003. This process enabled residents of Bribie Island and Bribie Island community groups to provide valuable input. From the thirteen submissions received many suggested changes have been incorporated into the final strategy.

Fire Strategy Development, Purpose and Review

The Bribie Island Fire Reference Group was responsible for the development of this strategy. The fire strategy aims to address the overall approach to fire management on Bribie Island. It will provide the basis for a cooperative approach to fire management across the entire island, leading to more effective management and engendering community support. The Bribie Island Fire Reference Group includes representatives from agencies responsible for fire management on Bribie Island - Queensland Parks and Wildlife Service (QPWS), Department of Primary Industries – Forestry (DPI-F), Caboolture Shire Council (CSC) and Queensland Department of Natural Resources, Mines and Energy (NRM&E). Queensland Fire and Rescue Service Bribie Island (QFRS), is responsible for protecting urban areas from fire and represents the community on fire issues. Traditional Owners are also included in fire management decisions.

The fire strategy provides the overall approach to fire management on Bribie Island. Each land management agency involved in this project has operational plans lying under this strategy that detail on ground operations. For example, the QPWS Wildfire Response Plan and Planned Burn Program together with fire reports detail specific operational activities and form part of the overall Fire Management System.

The Fire Reference Group will meet annually to discuss fire management issues, including fire trail maintenance schedules and the development of joint planned burn programs. The fire strategy will be updated where necessary at these meetings including the updating of fire history mapping and will be formally reviewed before 2014.

The lead agency responsibility at a particular fire will be determined by the location of the fire and the assets at risk. Individual agencies will address day-to-day operation and management issues within their own operational guidelines underlying the strategy.

1. Introduction

Bribie Island is located off the coast from Caboolture where it forms the north-western perimeter of Moreton Bay (Fig. 1) (QPWS 2001). It is14,300ha in size and with a maximum elevation of less than 10m, much of the island is either just above or below the water table, creating an extensive system of wetlands.

Bribie is linked to the mainland by a bridge spanning the narrow Pumicestone Passage. Urban development covers the southern end of the island. The island is a popular destination for retirement living with 28% of Bribie's population over the age of 65 (Hessian 1999). Resident population is expected to grow from 14,000 to 24,000 in the next 10 years (Hessian 1999). With the increasing population there will be an increasing urban and bushland interface, therefore it is important that any new development addresses fire management. The area is also a popular holiday destination with the population doubling during peak holiday periods.

The remainder of the island consists mainly of national park, proposed national park and state forest plantation. Pine plantation is currently being re-established in the centre of the island and is managed by DPI Forestry on state forest. National park covers 5580ha, which is approximately 40% of the island. Additional proposed national park is also around 5000ha (Refer Figure1, p.4).

Major vegetation types on the island are melaleuca open forest and wetland, and heath. The western side of the island supports extensive areas of intertidal mudflats, saltmarshes, mangroves and seagrasses. The eastern edge of the island supports fire-sensitive beach ridge scrub and dune communities.

The island is significant to various indigenous groups within the Region including the Gubbi Gubbi and Undumbi Aboriginal people. Rich in terrestrial and marine resources, Bribie Island was well used by local Aboriginal groups with campsites, middens, stone tool locations and carved and scarred trees at many locations (Q.DEH 1992). Gubbi Gubbi, (QC95/7) and the Undumbi people (QC 97/44) have lodged Native Title claims over parts of the island.

European heritage sites include several WWII gun emplacements in the dunes along the eastern beach (Q.DEH 1992).

1.1. Climate

Bribie Island experiences a subtropical climate with dry winters and most rain falling in summer. June to September are the driest months on average. Refer to Appendix 1 for Bribie rainfall records from 1996. The "normal" fire season is from around late September to March and peaking in November to December. This is variable and is more extreme when spring follows a very wet summer and dry winter. Planned burns are generally undertaken in July and August.

During summer, winds are generally from the south-east with northerly sea breezes in the afternoon. Westerly or south-westerly winds predominate in winter and early spring.

North-westerly winds are the most dangerous for fire management on the island (Marlow 1995). Extreme fire seasons occur periodically. For example, severe wildfires occurred on Bribie Island early in the summers of 1994 and 2001-2002.

1.2. Regional context

Bribie is the only island in Moreton Bay connected to the mainland by a bridge. The population of 14,000 is located at the southern end of the island. Fire prevention and management on the urban development and natural area interface will be undertaken in conjunction with neighbouring residents and the Queensland Fire and Rescue Service, Bribie Island (QFRS), which is responsible for urban fire management. QFRS represent the community on the Bribie Island Fire Reference Group. The Bribie Island Fire Reference Group was responsible for the development of this strategy.

Fire management for conservation on the national park is complicated by the extensive pine plantations located in the centre of the island. Fire management must include specific requirements for protecting the sustainable plantation timber. Joint fire management of national park and pine plantation is imperative.

Caboolture Shire Council and NRM&E are also major landholders of natural areas and open space over the populated southern end of the island.

Therefore, for effective fire management on Bribie Island, it is imperative that major landholders, land management agencies, the community and other identified stakeholders are considered and involved where appropriate.

1.3. Fire history

Refer to Map 3.

Bribie Island is subject to repeated unplanned fires. Before the late 1980s, unplanned fires were not a major issue on Bribie Island. Since the early 1990s, unplanned fires have burnt significant areas of the island at least every three to four years. This is particularly a problem on the southern populated end of the island, where natural areas are more accessible.

Bribie Island supports highly flammable vegetation types that abut densely populated residential and commercial areas, and the island has a history of large wildfires. For example, in 1994 a fire jumped the Pumicestone Passage from the mainland and burnt most of the island. Also, in 2002 much of the natural vegetation on the southern end of the island was subject to a high intensity wildfire. Many of the natural areas have burnt over the last three years. These fires have resulted in too-frequent burning of some vegetation communities, particularly on the southern end of the island. Repeated frequent burning may result in a reduction of species diversity.

Joint fire management is undertaken by QFRS, QPWS, NRM&E and CSC to protect the southern end of the island, particularly along the buffer between the park and housing. A history of co-operative fire management for Bribie Island exists between the major landholders. In 1991, representatives of Queensland Fire Services, (now QFRS), Department of Environment and Heritage (now QPWS), Department of Lands (now NR&M), Caboolture

Shire Council, CSR Softwoods and Weyerhauser (pine plantations) and the local community met to discuss fire management on Bribie Island. As a result, an integrated fire management plan was developed in 1994 by the Department of Lands and updated in 1997. This plan provides a basis for the QPWS integrated fire strategy around the residential area on the southern end of the island.

1.4. Objectives for fire management

The objectives of fire management on Bribie Island will be to:

- Prevent fire threatening life and property on the island;
- Maintain fire as a natural part of ecosystem function in fire-adapted communities;
- Create a mosaic pattern of planned burning so there is a range of ages since fire in each vegetation community/habitat, within the acceptable age class range for each community;
- Suppress unplanned fires occurring on natural areas of Bribie Island, unless they can be used to fulfil the objectives of the Planned Burn Program, and it is safe to use them for that purpose;
- Protect pine plantation from wildfire, particularly when trees are less than six years old;
- Maintain the integrity of indigenous values of the land;
- Protect cultural sites and culturally significant features from damage by fire;
- Protect sensitive dune communities from erosion through vegetation protection;
- Use fire to assist in weed reduction and other rehabilitation of degraded natural areas; and
- Manage fire together with all major landholders and fire managers.

This Strategy will identify fire management related issues for the protection of life and property, as well as cultural and natural resources. This information will then be used to develop a planned burn program and guide other fire management decisions and operations. It is further emphasised that protection of life and property will always be the priority for all agencies involved in the development and implementation of this Strategy.

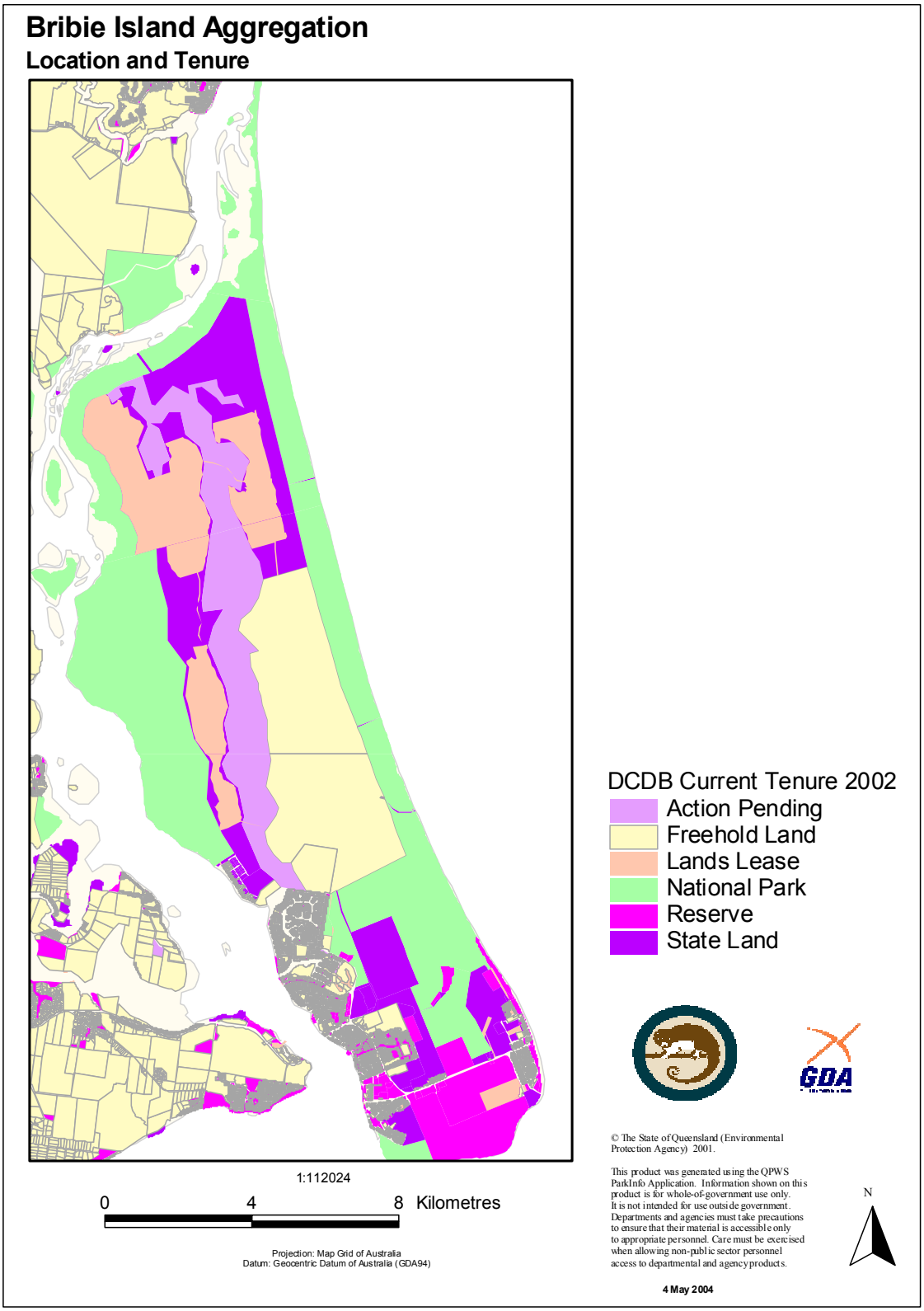

Figure 1 Location and Tenure of Bribie Island

2. Protection of Agency Property and Other Assets

QPWS
The park office is located at the southern end of the national park at White Patch.
Other park facilities such as campgrounds and toilets are at seven sites mainly around the coastline of the park.

DPI-F
Pine plantations occur in the middle of the fire planning area and require protection from high intensity fire, and all fire when less than about six years old. After pine reaches around six years old, planned burns and mechanical means will be used to maintain fuel loads at acceptable levels.

Caboolture Shire Council
CSC manages a number of parks and reserves throughout the Bribie community towards the southern end of the island.

NRM&E
NRM&E manages a number of reserves throughout the Bribie community and at the northern end of the island.

2.1. Objectives, risk assessment and guidelines

QPWS
Any campsites threatened by wildfire will be assessed and evacuated if necessary. Most can be reached by boat or 4WD along the beach. Visitor education on campfire management on protected areas is ongoing. Mown areas around the campsites will help to prevent campfires from escaping into surrounding areas. Wildfire Mitigation Zones buffer camping areas and will be managed to reduce fuel loads between the campsites and the surrounding Conservation Zones.

QPWS mows around most infrastructure to protect from fire. Planned burning will be undertaken periodically to help protect the QPWS Bribie office and shed as well as recreational infrastructure at picnic areas and campgrounds.

Proposals for fuel reduction burning will be assessed carefully by the Fire Referral Group in line with Fire Management System Guidelines. This will aim to balance environmental and cultural requirements with the protection of adjacent urban development and to mitigate the associated reduction in air quality, which is of concern to residents.

DPI-F
A minimum15 metre buffer zone will be developed and maintained by DPI-F around and within their entire boundary. In recognition of the increased fire risk to plantation from surrounding natural areas, the DPI-F will implement additional fire protection measures within the plantation area itself. This will comprise of some alternative fuel reduction measures in the early, fire vulnerable life of the plantation.

Proposals for fuel reduction burning will be assessed carefully in order to mitigate the associated reduction in air quality, which is of concern to residents.

Caboolture Shire Council
Reserve areas administered by CSC will be assessed and planned burns and other hazard reduction measures such as slashing will be undertaken as appropriate. CSC will continue to maintain fire trails within its area.

Proposals for fuel reduction burning will be assessed carefully in order to mitigate the associated reduction in air quality, which is of concern to residents.

NRM&E
Reserve areas administered by NRM&E will be assessed and planned burns and other hazard reduction measures such as slashing will be undertaken as appropriate. NRM&E will continue to maintain fire trails within their area. Any Vacant Crown Land will be assessed and fuel reduction undertaken if necessary.

Proposals for fuel reduction burning will be assessed carefully in order to mitigate the associated reduction in air quality, which is of concern to residents.

3. Protection of Private Property and the Bribie Community

Development, much of which abuts natural areas, is concentrated on the southern end of the island. Life and property protection is given highest priority when controlling wildfire and undertaking planned burning and other fire operations. The QFRS are responsible for managing fire in urban areas with assistance from the other agencies and volunteer fire brigades from the mainland when necessary. Detailed maps of fire management trails around urban areas are included (Maps 1a-1e).

Fire trails separate most urban development from natural areas. These are used to manage fire but cannot be relied on to stop a wildfire. Operational plans identify fire trail responsibilities and maintenance schedules for the island. Maintenance of fire trails is done in consultation with neighbouring landholders.

3.1. Objectives, risk assessment and guidelines

Major land management agencies, QPWS, DPI-F, NRM&E and CSC, will above all aim to minimise the risk of fire leaving natural areas, risking human life, and damaging or destroying neighbouring infrastructure and other resources. Similarly, the risk of fire entering Bribie's natural areas should be minimised. All agencies will co-ordinate fire management to minimise risk to life and property. This will be achieved through joint planning and on-ground fire management operations.

QFRS is primarily responsible for protecting private property and the community from fire and represents community views on the Fire Reference Group responsible for developing this Strategy. Any community concerns regarding fire management can be referred through QFRS to the Fire Reference Group. QFRS calls on mainland volunteer fire brigades for assistance when necessary. The development of a community initiated Bribie Island Rural Fire Brigade is supported by QFRS.

Educational brochures on bushfire safety around the home are available from the Bribie Island Fire Station. Community fire education meetings were run by QFRS at Bribie Island in November 2003 and will be ongoing. These address fire safety and minimising fire risk for residents.

The local community will be advised before any planned burning is undertaken to allow them to prepare, for example by taking in washing etc. This will be done via letterbox drops to immediate neighbours, and local paper and radio announcements. The agency leading the burn will be responsible for public communication.

Any hazard reduction burning proposals will be carefully assessed and undertaken in accordance with this fire strategy, targeting wherever possible weather conditions which expose residents to minimal reduction in air quality.

It is important to note however, that no amount of hazard reduction or construction of "control lines" can eliminate the risk of wildfire in natural areas. Much Australian native vegetation is fire-prone, and in many cases fire-promoting. Fuel in some vegetation communities will build up to a level capable of sustaining fire within months of being burnt, although the intensity of a subsequent fire is likely to be lower. Under extreme fire weather conditions, many fire-

adapted communities, even if recently subjected to a low intensity “hazard reduction burn” may carry a fire. It is reasonable, however, to manage natural areas to minimise the risk of fires leaving or entering under “normal” fire season conditions (see Section 1.1).

4. Flora

A flora list for Bribie Island is provided in Appendix 1.

The island protects a range of vegetation communities including mangroves, saltmarshes, *Melaleuca quinquenervia* forests, C*asuarina glauca* forests, eucalypt forests, heathlands and herb and sedge communities. Other communities include *Callitris columellaris* Bribie pine, *Corymbia intermedia* forests and coastal dune communities (Q.DEH 1992). The central swamp and associated freshwater wetlands are of particular importance as they are now some of the last remaining large wetland areas of this type, once widespread in southern Queensland (Q.DEH 1992).

Bribie supports three major vegetation types (Ford 2002):

***Melaleuca quinquenervia* open forest**. *Melaleuca quinquenervia* dominated open forests occur on the southern part of Bribie Island, mainly in low, poorly drained areas along the western side of the island. In areas that are only seasonally inundated, *Eucalyptus tereticornis* and *Lophostemon suaveolens* are frequently co-dominant with *M. quinquenervia*.

Three main *Melaleuca* forest types exist on the northern part of the island:

1. *Melaleuca quinquenervia* open forest found in semi-permanently and permanently flooded areas;
2. *Melaleuca quinquenervia - Eucalyptus robusta* open forest on the margins of wetlands; and
3. *Melaleuca quinquenervia - Eucalyptus tereticornis - Lophostemon suaveolens* open forest in areas that are seasonally inundated.

Heath and associated communities. The central southern part of the island is dominated by *Banksia oblongifolia - B. robur* open heath and *Banksia aemula* low woodland.

Eucalyptus open forest. *Eucalyptus* dominated open forests are found on the old dune systems, the fore dunes at the southern end of the island and in some places along the western coast. These forests are included in *C. intermedia - Lophostemon confertus - Callitris columellaris - Banksia* spp. open forest.

There are also minor areas of *C. intermedia - L. confertus - Banksia* spp. low open forest and *Acacia* spp. - *Casuarina equisitifolia* subsp. *incana* open scrub on the dunes on the eastern coast of Bribie Island. Areas of *M. quinquenervia - L. suaveolens - Eucalyptus* spp. woodland and closed sedgelands are found on the western side of the island.

Along the eastern side of the island, the foredunes are severely eroded, often to the extent that no frontal dune remains. Communities closely bordering dune areas (e.g. *M. quinquenervia* dominated areas) are often affected by exposure to prevailing winds.

Areas of beach ridge open scrub and *Acronychia imperforata* closed scrub occur on the far northern end of the island (Ford 2002).

4.1. Native species/communities of significance and/or potential indicator species

Of the species that have been recorded on Bribie Island, a number are of particular conservation significance. One vegetation community is also of particular conservation significance. These species and communities, together with a brief explanation of their significance, are listed in Table 1. Those that have the potential to be used as indicators in monitoring programmes are also identified (see also Section 9).

Table 1 Native flora species and communities of particular management significance with information on potential value as indicators in monitoring programmes.

Status codes E = Endangered (Schedule 2) under the Nature Conservation (Wildlife) Regulation 1994 (NCWR); V = Vulnerable (Schedule 3) under the NCWR; R = Rare (Schedule 4) under the NCWR; C = Common under the NCWR ; OC = Regional Ecosystem described as "Of Concern" in The Conservation Status of Queensland's Bioregional Ecosystems (Sattler and Williams 1999); EN = Regional Ecosystem described as "Endangered" (Sattler and Williams 1999).

Species/Community	Status code	Potential indicator?	Details
Callitris columellaris Bribie pine		Yes	Adults and juveniles killed by high intensity fire. Obligate seeder, may take up to 10 years to mature. Dominance may indicate long-term absence of fire. Useful as an indicator of inappropriate fire frequency.
Imperata cylindrica Blady grass	C	Yes	Resprouts from base. Dominance in understorey may indicate too frequent fire.
Pteridium esculentum Bracken fern	C	Yes	Resprouts from rhizome. Dominance in understorey may indicate too frequent fire.
Ricinocarpos pinifolius Wedding bush	C	Yes	Often an obligate seeder. Eliminated by too frequent fire. Requires at least 5 years to reach reproductive maturity.
Acacia baueri	V	Yes	*A. baueri* is a small acacia species found mainly in wet and dry heath. High intensity fires can kill it, but low intensity fires that do not kill the plant will stimulate flowering after fire. Flowers and seeds within 2 years.
Blandfordia grandiflora Christmas bells	R	Yes	Found in wet heath. Mainly flowers after fire. Unknown how long it can survive without fire.
Hakea actites		Yes	Adults killed by fire, seed bank released into ash bed after fire. Produces seed after a number of years.
Casuarina equisetifolia vsubsp. *incana*	C	Yes	Very sensitive to fire – should be protected as much as possible especially where it occurs on the dunes to decrease the risk of erosion.
12.3.5 *Melaleuca quinquenervia - Eucalyptus tereticornis - Lophostemon suaveolens* open forest	Of Concern	Yes	Fire intervals between 15 and 30 years. Planned burns should be conducted when substrate is wet to decrease the risk of peat fire (Watson 2001). These are the driest of *Melaleuca* communities and will burn readily.

4.2. Priority weeds in relation to fire management

Of the species that have been recorded on Bribie Island, 17 are weeds significant to fire management (Appendix 2). Those that are considered significant with respect to fire

management, either because they are promoted by a particular fire regime or because fire will be used as part of their management, are listed in Table 2 together with relevant details.

Table 2 Details of priority weeds in relation to fire management.

Scientific name	Common name	Details
Pinus caribaea var.	pine	Tree escaped from pine plantation and prevalent in rehab zones
Pinus elliotii	slash pine	tree
Asparagus densiflorus	asparagus fern	herb; smothering ground cover
Schinus terebinthifolius	broad-leaved pepper	Tall shrub or small tree with a high priority for control
Baccharis halimifolia	groundsel	medium to tall shrub
Bryophyllum delagoense	mother of millions	succulent herb
Bryophyllum tubiflorum	mother of millions	succulent herb
Lantana camara	lantana	shrub
Macroptilium atropurpureum	siratro	climber
Gloriosa superba	gloriosa	herb; climber
Wedelia trilobata	Singapore daisy	succulent herb; smothering ground cover
Senna pendula var. *glabrata*	Easter cassia	shrub
Cenchrus echinatus	Mossman River grass	graminoid
Sporobolus pyramidalis	giant rats tail grass	graminoid, P4
Sporobolus natalensis	rats tail grass	graminoid
Andropogon virginicus	whiskey grass	graminoid

4.3. Objectives, risk assessment and guidelines

Fire management objectives and desirable fire regimes for each recognised vegetation community are detailed in Table 3. Refer to Map 2 for vegetation mapping of Conservation Zones and associated fire regimes. The best available mapping has been used. Strategy maps will be updated as necessary.

Fire-sensitive communities on Bribie include salt marsh, coastal marsh, mangroves, dune communities, and beach scrub. Fire should be excluded from these communities because they do not require fire for regeneration and because fire may irreversibly alter the species composition and structure of the community. Where they abut fire-tolerant communities, exclusion of fire from a buffer zone around the fire-sensitive community should be attempted where possible, to ensure that the margins of the community are not scorched. Repeated scorching can lead to contraction of fire-sensitive communities and invasion by exotic plants. Riparian areas that are also fire-sensitive will be protected wherever possible from fire. The melaleuca wetland communities on the island however, require periodic fire (refer to recommended fire regime) for the maintenance of biodiversity.

Too-frequent fire in fire-adapted communities leads to simplification of the community by reducing the floristic and structural diversity of the ground and mid-strata. It also increases the risk of invasion by exotic plants. Conversely, infrequent fire can lead to the loss of fire-dependent species from the community as mature individuals senesce while the next generation are either not produced or are unable to establish. Many fire-adapted species will tolerate a wide range of fire intensities, whereas others have quite specific fire intensity requirements. In general, planned burns should be carried out under conditions required to achieve the desired fire intensity, rather than at “traditional” or “calendar” times. It is anticipated that most planned burns will require high soil moisture to facilitate rapid post-fire recovery, minimise the risk of erosion and promote “patchiness” within the burn area.

The mosaic approach to planned burning in fire-adapted communities is an effective means of providing the complex range of fire-intervals, intensities, seasons of burn and patch-sizes required to maintain floristic and structural diversity throughout communities and landscapes

Regular burning from roads, tracks and other similarly disturbed sites, is likely to create conditions suitable for the invasion and maintenance of populations of weeds, and their subsequent spread into adjacent, less disturbed habitat. This practice should be avoided wherever possible.

Table 3 Fire management objectives and preferred fire regimes for the vegetation communities. (refer to Map 2)

Regional Ecosystem	Plant community	Objectives	Fire regime	Conservation Zone
12.1.3 **No concern at present**	**Mangroves**. Mangroves have developed on the sheltered shores of the western side of the Island.	Protect from fire	Fire exclusion Mangroves are not often threatened by fire. These communities do not usually need active protection from fire.	C7
12.1.2 ***12.2.15*** **No concern at present**	**Littoral marsh**. This community consists of *Juncus kraussii* spp. *australiensis* herbland, *Sporobolus virginicus* closed grasslands and mudflats depending on the location.	Protect from fire	Fire exclusion. *Sporobolus virginicus* grasslands can burn especially during very dry conditions. Generally littoral marsh is very rarely threatened by fire. These communities do not need active protection from fire.	C7
12.2.14 **No concern at present**	**Strand and Foredune** vegetation compromising *Spinifex sericeus* grassland C*asuarina equisetifolia* woodland/open forest and with *Acacia leiocalyx, A. aulacocarpa, Banksia integrifolia* var. *integrifolia, Pandanus tectorius, Corymbia tessellaris, Cupaniopsis anacardioides, Acronychia imperforata.*	Protect from fire	Fire exclusion. These areas can burn and should be protected from fire as much as possible to prevent exposure and erosion of dunes and beach.	C6
12.2.5 **No concern at present**	**Beach ridge open scrub**. This unit is restricted to land adjacent to the sea, predominantly on dune (or beach ridge) and hind dune areas. Though this unit is represented as an open scrub, its structure and floristics vary with stand age and the degree of exposure to elements such as wind, salt, sand accretion and erosion. The predominant species on the frontal dune is *Spinifex sericeus*, other common ground layer species include *Ipomoea pes-caprae, Carpobrotus glaucescens, Sesuvium portulacastrum, Scaevola calendulacea, Eragrostis interrupta,*	Protect from fire where possible	Fire exclusion. Can easily burn but are highly fire sensitive – recovery is very poor/slow. Must protect from fire as much as possible.	C6

	Hibbertia scandens and *Oenothera drummondii*. *Casuarina equisitifolia* var. *incana* is one of the few low trees which grows in this situation (Map unit 17f). Dominant species on the leeward side of the dune or ridge crest are *Acacia disparrima, A. concurrens, A. leiocalyx, Acronychia imperforata, Banksia integrifolia* and *Cupaniopsis anacardioides* (Map Unit 17a). Occasionally *Alphitonia excelsa*, *Alectryon coriaceus* and *Lantana camara* (Map Unit 16b) .			
12.2.7 **No concern at present**	***Melaleuca quinquenervia* open forest and woodland.** This unit occurs on low lying and poorly drained areas. The canopy is dominated by *M. quinquenervia* although *Lophostemon suaveolens* and *Eucalyptus robusta* may also be present.	To develop a mosaic of different age classes and time since fire over the island.	Fire intervals between 15 and 30 years. Planned burns should be conducted when substrate is wet to decrease the risk of peat fire (Watson 2001). These communities may be difficult to burn under normal conditions but will readily burn in a wildfire. No fire retardants should be used for fire control in aquatic environments to prevent potential ecological damage (Thomas 2001).	C1
12.3.4 **No concern at present**	***Melaleuca quinquenervia - Eucalyptus robusta* open forest and woodland**.This unit is found along much of the eastern coast of the northern end of the Island. *M. quinquenervia* is dominant, with *Eucalyptus robusta* often present. The vegetation may grade into *M. quinquenervia* open forest or low open forest, and many areas are actually a mosaic of these community types. On the eastern edge of this unit, there may be small areas of Beach Ridge open scrub or *C. intermedia* - *L. confertus* - *Banksia* spp. low open forest, both of which are too small to be separately mapped.	To develop a mosaic of different age classes and time since fire over the island.	Fire intervals between 15 and 30 years. Planned burns should be conducted when substrate is wet to decrease the risk of peat fire (Watson 2001). These communities will burn more readily than 12.2.7.	C1
12.3.5 **Of Concern**	***Melaleuca quinquenervia - Eucalyptus tereticornis - Lophostemon suaveolens* open forest**. This unit is generally found on flat low lying areas which are seasonally inundated. Major areas of this type occur on the western side of the Island. In wetter situations, this unit grades into a mixture of *Melaleuca quinquenervia* and *Casuarina glauca* open forest, or *Melaleuca*	To develop a mosaic of different age classes and time since fire over the island.	Fire intervals between 15 and 30 years. Planned burns should be conducted when substrate is wet to decrease the risk of peat fire (Watson 2001). These are the driest of Melaleuca	C1

	quinquenervia open forest or a mosaic of these communities.		communities and will burn readily.	
12.2.5 **No concern at present**	***Corymbia intermedia - Lophostemon confertus - Callitris columellaris - Banksia spp*. open forest**. In many areas this unit appears to have been modified by fire to form a grassy woodland, which usually has a very dense ground cover of *Imperata cylindrica* var *major*.	To maintain the *Callitris* dominated communities with a range of age classes.	Fire intervals between 10-25 years to allow fire sensitive *Callitris columellaris* to grow large enough to survive medium intensity fire.	C4
12.2.5 **No concern at present**	***Corymbia intermedia - Lophostemon confertus - Banksia* spp. low open forest**. This unit occurs on the eastern side of Bribie Island on low dunes, and is intermediate in structure and floristics between *Banksia aemula* low woodland and *C. intermedia - L. confertus - Callitris columellaris - Banksia* spp open forest. Drainage lines within this unit consist of a canopy of *M. quinquenervia* with a dense ground cover of *Imperata cylindrica* var. *major, Pteridium esculentum*, *Blechnum indicum* and *Baloskion tetraphyllus*.	To develop a mosaic of different age classes and time since fire over the island maximising a diversity of species in the understorey.	Fires at a range of intervals between 7-25 years using a variety of intensities and season to achieve a mosaic of seral stages. Rake around habitat trees where possible.	C5
12.1.1 **No concern at present**	***Casuarina glauca* low open forest**. This unit is situated on the northern end of Bribie Island, and on Long Island in Pumicestone Passage. Canopy: The canopy is a pure stand of *Casuarina glauca*. Shrub layer: A sparse shrub layer about 2 m high contains *M. quinquenervia* and some *Baccharis halimifolia*. Ground layer: The ground layer is dominated by *Sporobolus virginicus*, *Fimbristylis ferruginea* may be present. A sometimes dense layer of *Casuarina* needles is carpets the ground.	Protect from fire especially where vegetation is preventing erosion of sensitive foredune vegetation.	Fire exclusion	C3
12.2.9 **No concern at present**	***Banksia aemula* low woodland**. This unit occurs in association with open heaths and *M. quinquenervia* woodland on flat to undulating terrain on Quaternary coastal dunes. The community is dominated by low trees, 5 - 7 m high, of *Banksia aemula*, but emergent trees of *C. intermedia, E. robusta* and *M. quinquenervia* may also be present.	To develop a mosaic of different age classes and time since fire over the island maximising diversity of	Fires at a range of intervals between 7-20 years, with an emphasis on intervals in 8-12 year range are recommended to maintain overall biodiversity. Planned burns in wet heaths should be conducted when the substrate is wet to avoid the risk	C2

		species and habitats.	of peat fire (Watson 2001).	
12.2.5 **No concern at present**	***Acronychia imperforata*** **closed scrub**. This unit is confined to the northern end of Bribie Island in close association with foredune vegetation The dominant species is *Acronychia imperforata*, though *Cupaniopsis anacardioides, Syzygium oleosum* and *Rapanea variabilis* are also common. *Banksia integrifolia* and *Pandanus* spp. occur occasionally.	Protect from fire where possible.	Fire exclusion. Can easily burn but are highly fire sensitive – recovery is very poor/slow. Must protect from fire as much as possible.	C6
12.2.5 **No concern at present**	***Acacia spp. - Allocasuarina littoralis*** **open scrub**. There are numerous small areas of this unit, but only a few are large enough to be mapped. They all appear to have resulted from the clearing and/or severe burning of open forest communities, particularly the *Eucalyptus racemosa* open forest. These communities usually consist of a mid-dense shrub layer up to 8 m high dominated by *Acacia leiocalyx* and/or *Aaulacocarpa* and *Allocasuarina littoralis*. *Alphitonia excelsa* is also commonly present. A low shrub layer is generally absent, while the ground layer varies from sparse to mid-dense and is dominated by *Imperata cylindrica* and *Pteridium esculentum*. In areas where *Allocasuarina littoralis* is common, there is usually a dense litter layer. Sparse emergent trees of *Corymbia intermedia, E. racemosa, C. tessellaris* and *Callitris columellaris* may also be present.	To observe the community when a less frequent, mosaic burning approach is applied.	Fires at a range of intervals b/w 7-25 years using a variety of intensities and season to achieve a mosaic of seral stages.	C5
12.2.12 **No concern at present**	***Banksia oblongifolia - Banksia robur*** **open heath**. This unit occurs on low sand plain in the central section of Bribie Island. This community is more open than the *Banksia aemula* heaths and although shrubs are still the dominant features, sedges and restiads and some herbs and grasses are conspicuous. The canopy is generally less than 2 m high and is often much lower as a result of poor drainage and/or the effects of fire. Floristically these heaths are very diverse with the main species belonging to the families Fabaceae, Myrtaceae, Epacridaceae, Rutaceae, Cyperaceae, Restionaceae, Proteaceae and Xanthorrhoeaceae. In many areas these heaths are characterised by one species emergent above the canopy. One of the most frequent species	To develop a mosaic of different age classes and time since fire over the island maximising diversity of species and habitats.	Fires at a range of intervals between 7-20 years, with an emphasis on intervals in 8-12 year range are recommended to maintain overall biodiversity. Planned burns in wet heaths should be conducted when the substrate is wet to avoid the risk of peat fire (Watson 2001). No fire retardants should be used for fire control in aquatic environments to prevent potential ecological damage (Thomas 2001).	C2

	is *Banksia oblongifolia* and, where there is waterlogging over an extended period of time, *Banksia robur*. Under particular local conditions, one or more of the other shrub species may also dominate the heath.			
12.2.15 **No concern at present**	***Gahnia sieberiana - Lepironia articulata - Baloskion pallens*** **closed sedgeland**. The species present and their position in sedge wetlands depend on the depth and permanence of the surface water. On the slightly higher ground on the periphery of the closed sedgeland grow many shrubby and herbaceous species, notably the shrubs *Leptospermum liversidgei, Baeckea frutescens* and *Melastoma malabathricum* subsp. *malabathricum*. *Melaleuca quinquenervia* and *Eucalyptus robusta* are common on the margins of these wetlands and on higher ground within them. Most sedgeland on Bribie is associated with melaleuca communities.		Fires at a range of intervals between 4-15 years, with an emphasis on intervals in 8-12 year range are recommended to maintain overall biodiversity. Planned burns should be conducted when the substrate is wet to avoid the risk of peat fire (Watson 2001) No fire retardants should be used for fire control in aquatic environments to prevent potential ecological damage (Thomas 2001).	C1
N/A	**Pine plantation - commercial**	Protect from all wildfire and from any fire in early growth.	Burn for site preparation before planting. Then fire exclusion until pines are 6 years old. After 6 years fuel reduction burn on average every 5 years as necessary.	SP

For more information on Regional Ecosystems refer to: Sattler, P.S. and Williams, R.D (eds.) (1999) *The Conservation Status of Queensland's Bioregional Ecosystems,* Environmental Protection Agency, Brisbane.

5. Fauna

A full list of vertebrate fauna recorded during surveys of Bribie Island is provided in Appendix 3Appendix 3. The surveys conducted to date can only be regarded as preliminary as a full range of seasons has not been sampled. Snakes and burrowing animals are particularly under-represented in the fauna data collected to date. Further systematic surveys sampling all faunal groups in a range of typical and atypical seasons are required to maximise the quality of the information upon which this Strategy is based.

5.1. Species of significance and/or potential indicator species

Of the fauna recorded on Bribie Island, three species are listed as Endangered, seven as Vulnerable and eight as Rare under the *Nature Conservation (Wildlife) Regulation 1994* (Marine animals not included). Species that have the potential to be used as indicators in monitoring programmes are identified in Table 4 (see also Section 9).

Table 4 Fauna species of significance with information on potential value as indicators in monitoring programmes.

Status codes: E = Endangered (Schedule 2) under the *Nature Conservation (Wildlife) Regulation 1994* (NCWR);V = Vulnerable (Schedule 3) under the NCWR; R = Rare (Schedule 4) under the NCWR; * = feral.
Indicator codes: Y = good potential indicator; N = not a potential indicator; D = possible, but difficult to use as an indicator.

Scientific name	Common name	Status code	Potential indicator	Details	Breeding Details
MAMMALS					
Xeromys myoides	Water mouse	V	.	This species has a very limited distribution, found along mangrove foreshores. They construct "mound nests" and burrow systems. They feed on marine crustaceans and fish which they forage for along the foreshore.	Breed all year.
REPTILES					
Ophioscincus truncatus	Skink	R		Inhabits dry sclerophyll forests, coastal heaths and rainforests in south eastern Qld.	Unknown.
Clamydosarus kingii	Frilled neck lizard	C		Arboreal living in dry schlerophyll forests and woodloands.	Unknown.
BIRDS					
Dromaius novaehollandie	Emu	C		Occasionally seen in centre of island and along the eastern beaches.	Breed between April and October.
Ephippiorhynchus asiaticus	Jabiru; Black-necked stork	R		Swamps, edges of lagoons, river sandbars, irrigated and flooded lands, across northern and eastern Australia.	Summer, autumn. October to May, nesting in a high position above water or near water.
Haliaeetus leucogaster	White-bellied sea-eagle	C		Coastal sea areas.	Breed in stick nests high off the ground. May to September
Pandion haliaetus	Osprey	C	Yes	Protect osprey's nest in dead tree near Second Lagoon.	
Lophoictinia isura	Square-tailed kite	R	.	Usually found in open eucalypt forest and woodland. Feeds in tree tops on small birds, insects and reptiles, often robs nests of other birds.	Winter – summer. Monogamous. Breeds July - Oct. Nest in a eucalypt 12-26 m above the ground.
Rallus pectoralis	Lewin's rail	R		Inhabits wetlands and tall lush grasses of moist paddocks along eastern and south eastern Australia.	Spring – summer. Aug to Dec, located in reeds and rushes up to 1 metre above water.

Numenius madagascariensis	Eastern curlew	R		A migratory species found on coastal mudflats, mangroves, islands, and estuaries in the Summer months.	N/A. Breeds in northern Asia, summer migrant to Australia.
Burhinus grallarius	Bush thick-knee	V		Open woodlands, with short and sparse grass, open semi-arid mulga, farm lands and golf courses.	Spring – summer. Aug to Jan, though often throughout the year. Nests on the ground making a shallow hollow.
Esacus neglectus	Beach stone-curlew	V		A declining species found beaches, islands, reefs, mangroves, and mudflats.	Summer. Breeding in Oct to Dec, nesting in a slight hollow on beaches.
Haematopus fuliginosus	Sooty oystercatcher	R		Resident on rocky shores throughout Australia.	Spring - summer. Variable breeding season, peaking between Sept to Jan. Nests are depressions in sand, or along rocks.
Sterna albifrons	Little tern	E		Coastal water, estuaries, and shallow inlets, salt and brackish lakes across northern coasts, from Perth to Adelaide.	Summer – autumn. Varying breeding season, from Aug to Dec in north, Jan to March in south. Scrape in sand forms the nest. Breeds in Sept to Dec in south and east, Mar to Jun in north.
Calyptorynchus lathami	Glossy black cockatoo	R		Feeds exclusively on Casuarina fruit.	Autumn – spring. Mar to Aug, nesting in hollow limbs and tree trunks, and often an isolated dead tree, 15-20 metres above the ground.
AMPHIBIANS					
Crinia tinnula	Wallum froglet	V		An acid frog restricted to coastal areas of southern Qld and northern N.S.W.	Breeds July to Aug in water with a pH of 4.3 - 5.2. Lays 33-118 eggs.
Litoria freycineti	Wallum rocketfrog	V	Yes	A coastal species found from SEQ to central NSW. Found in a wide variety of habitats including heath and forest.	Nocturnal, ground dwelling. Breeds in spring – early summer. This species may be threatened at the southern end of the island, which has been subjected to frequent medium to high intensity wild fires.
Litoria olongburensis	Wallum tree frog	V	Yes	North eastern N.S.W and south east Qld. Found in creeks and swampy lowlands in emergent vegetation.	This species may be threatened at the southern end of the island, which has been subjected to frequent medium to high intensity wildfires.

5.2. Objectives, risk assessment and guidelines

Fire will be managed to maintain and/or re-establish a diversity of habitats on natural areas of Bribie Island. If each habitat type is burnt patchily, mobile animals are able to seek refuge in unburnt areas. Mosaic burning also maximises structural and species diversity within a vegetation type and allows recolonisation. This subsequently supports a wider range of fauna. Details of the fire management requirements of significant fauna and/or indicator species are given in the Quick Reference Guide (Table 7).

In the fire-tolerant forest types (refer Section 2.4), it is critical to ensure litter and fallen logs are allowed to accumulate over substantial areas. The litter and fallen log habitats are essential for many ground-dwelling fauna (e.g. *Ophioscincus truncatus*) and provide prey species for many others (e.g. square-tailed kite).

It is also necessary to ensure there is variation in the structural complexity of the mid-strata between forested patches and within each vegetation community. This is the only way to provide for the diverse habitat requirements of many forest/woodland dwelling bird species as well as gliders and possums.

Mature trees, particularly those with hollows, are also critical habitat for many species. In general, fire that is too frequent, intense and widespread causes the destruction of old trees that contain hollows. Bribie Island supports many birds of prey and old dead trees are often prime nesting sites for them. For example, ospreys nest in a large dead tree near Second Lagoon. It takes many years (100 years or more for many eucalypts) for these to be replaced (Ambrose 1982; Mackowski 1984). Maintenance of habitat trees is an objective of fire management.

Too frequent and/or extensive burning in the fire adapted communities, particularly when there is little soil moisture, removes litter (such as fallen leaves, branches and logs) from the ground faster than it can be replaced, inhibits the development of a complex midstratum, increases the risk of losing habitat trees and leads to an over-representation of habitat in an early successional phase. These risks will be minimised by the use of fire regimes appropriate to the fire-adapted vegetation communities/habitats. Although difficult to achieve, the establishment of mosaic burning practices in these communities will also be attempted on Bribie Island. This in itself will provide habitat diversity and it will also minimise the risk of wildfire burning extensive areas of Bribie Island and reducing habitat to an even age. If possible, some areas will be left long enough unburnt to provide some patches of maximum structural diversity within a habitat type. In some cases it may also be necessary to identify and protect individual habitat trees e.g. osprey's nest.

Exclusion of fire from the fire-sensitive vegetation communities (refer Section 4.3) will directly benefit many species including the water mouse that requires mangroves or coastal marsh to live and forage. Mosaic burning in adjacent fire-prone habitat will minimise the risk of wildfire damaging this fauna habitat.

6. Cultural resources

Bribie Island is rich in both Aboriginal and non-indigenous cultural resources.
The island is significant to various groups including the Gubbi Gubbi and Undumbi Aboriginal people. Rich in terrestrial and marine resources, Bribie Island was well used by local Aboriginal groups especially on the Passage side near the Central Swamp, which was a good source of fresh water (Q.DEH 1992). The island is subsequently rich in Aboriginal cultural heritage with middens, stone tool locations and carved and scarred trees at many locations (Q.DEH 1992).

Sites on the western side of Central Swamp at the northern end of the island are of major archaeological significance and evidence suggests that they were major Aboriginal campsites during the past 2000 years (Hall 1991 *in* Q.DEH 1992).

The distribution pattern of Indigenous cultural heritage sites on Bribie Island is related to the Indigenous settlement and subsistence system. For example, a system of sand ridge and swales runs north south along Bribie Island. Wetlands, which provided food, are located in the swales, and the ridges provided higher areas to camp and travel along.

A bora ring (*Djur*) located on Bribie is part of a series clustered in the area that together formed part of ceremonial gatherings of Indigenous people from southern Queensland and northern NSW. They would also participate in large-scale fishing and hunting activities. The extensive mudflats of Pumicestone Passage provided an abundant source of shellfish.
The first known contact between Aboriginal people and Europeans on Bribie was in 1799 when Matthew Flinders landed at Skirmish Point (Q.DEH 1992).

European heritage sites include the historic lighthouses, the old fish cannery site and the WWII gun emplacements near the eastern beach. Several WWII gun emplacements are located in the dunes along the eastern beach. Some evidence remains of a fish cannery that operated in the early 1900s at the northern end of the island (Q.DEH 1992).

The island has a long history of grazing (over 100 years) and evidence of grazing use still exists particularly on the western side – cattledip, yards, fences and remains of huts and watering sites. Structures are predominantly timber and strategies are required to protect them from fire.

6.1. Objectives, risk assessment and guidelines

Fire management on Bribie Island will be conducted in consultation with Traditional Owners. Any significant cultural sites will be mapped and identified as Cultural Heritage areas on a Zoning Map. Any fire management activities such as track construction and planned burning will need to avoid these areas.

With respect to midden sites, fire may expose surface materials to erosion and intense fire may increase the breakdown of midden material. Where known midden sites occur in high fuel areas, efforts should be made to minimise fire intensity by hand clearing fuel from the immediate area (Blaik 2002).

It is important that any fire trail maintenance and construction avoids midden sites. Maintenance crews will be notified of any middens near existing fire trails. They will avoid damaging sites with any heavy machinery. For example, grader blades should be lifted when maintaining trails near middens.

The bora ring will continue to be minimally managed. No tracks will be constructed near it. If the site gets too overgrown, fuel reduction burning may be used.

Scar trees need to be identified and where possible raked around and protected before planned burning is commenced.

Protection zones will be used to minimise the risk of wildfire damaging the gun emplacements on the western beach. Any planned burns in this area will be lit off the edge of these structures to protect them.

7. Factors affecting fire behaviour and management

Bribie Island suffers from frequent fires. Some fires appear to be deliberately lit. This is especially a problem on the urban fringe towards the southern end of the island.

Flat topography makes it difficult to stop fires using ridges and gullies. As Bribie is low lying the water table is often above the surface, which can make many fire trails boggy and impassable.

There is a misconception that firebreaks can stop fires. No “firebreak” is guaranteed to stop a wildfire as shown in 1994 when a fire spotted over Pumicestone Passage. Fire trails are used on Bribie for fire management and are never relied on to stop a fire.

Most vegetation types on Bribie Island carry fire very easily. For example, melaleuca and heath communities carry very hot fires and will still burn when wet. A wet substrate can make fire management difficult when roads and tracks are boggy and unusable.

Much of the vegetation on Bribie has been subject to frequent fire and there is danger of losing species that require longer fire free intervals.

Pine plantations are sensitive to fire especially in the first years of growth, and recommended fire regimes for surrounding melaleuca communities may not always be compatible.

QPWS, DPI Forestry, CSC conduct on-ground fire management and NRM&E. QFRS assists at fires on the southern end of the island especially those that threaten houses.

The north-south linear nature of Bribie Island makes it difficult to manage fire and conduct mosaic burning.

8. Fire management zones

8.1. Introduction

Fire management zones are a means of identifying, planning and implementing the wide variety of fire management aims that may apply to a protected area. While each zone has a primary purpose, the zones and their management should be complementary and provide a cumulative benefit to management of the landscape as a whole.

A full description and explanation of the zoning scheme used in this Strategy is provided in Appendix 4.

8.2. Fire management zones

Fire management zones for Bribie Island are shown on Map 4. Details of the main fire management trails are also included. Details of each fire management zone are given below.

8.2.1 Protection zone

Protection zones are located as described below.

Table 5 Locations of *protection zones* and associated management regimes.
Numbers relate to the zoning map (Map 4).

Location	Management regime
P1: North Spit Day Use Area	Potential site for evacuation in event of wildfire.
P2: Lions Club Day Use Area	Mow area around infrastructure regularly – Caloundra Lions Club.
P3: Bribie Fort	Maintain a 5m cleared area around each fort linked by a track. This will be maintained manually by rake hoeing and brushcutting. Back burn away from each fort if necessary.
P4: Lighthouse Reach	Maintain existing fire trails and burn around Protection Zone if required.
P5: Ocean Beach Camping	Protect existing infrastructure from wildfire. Manage campsites to minimise the risk of fires originating from them. During a fire event any campsites will be assessed and evacuated if necessary.
P6: Lime Pocket Camping	Protect existing infrastructure from wildfire. Manage campsites to minimise the risk of fires originating from them. During a fire event any campsites will be assessed and evacuated if necessary..
P7: Mission Point Camping	Maintain mown areas and burn away from infrastructure to reduce fuel loads. Protect existing infrastructure from wildfire. Manage campsites to minimise the risk of fires originating from them. During a fire event any campsites will be assessed and evacuated if necessary.
P8: Poverty Creek Camping	Maintain short grass, burn away from infrastructure to reduce fuel loads. Protect existing infrastructure from wildfire. Manage campsites to minimise the risk of fires originating from them. During a fire event any campsites will be assessed and evacuated if necessary.
P9: Gallaghers Point Camping	Protect existing infrastructure from wildfire. Manage campsites to minimise the risk of fires originating from them. During a fire event any campsites will be assessed and evacuated if necessary.
P10: Light Beacon	Protect existing infrastructure from wildfire.
P11: Light Beacon	Protect existing infrastructure from wildfire.
P12: Second Lagoon School Camp Area	Prohibit campfires. During a fire event any campsites will be assessed and evacuated if necessary.
P13: White Patch QPWS Ranger Base	Maintain mown area around base, protection burn off Maud St as necessary.
P14: White Patch Residential	Maintain slashed fire trail behind Horace Street houses up to White Patch Esplanade. QFRS is primarily responsible for protection of any urban areas. Esplanade strip to be sectioned and fuel reduction undertaken as necessary.

	protection of any urban areas. Esplanade strip to be sectioned and fuel reduction undertaken as necessary.
P15, P16: Banksia Beach, Bellara and Bongaree Residential	Maintain slashed fire trail behind Pacific Harbour Development and the Arts Centre. Maintain other slashed fire trails. QFRS is primarily responsible for protection of any urban areas.
P17: Banksia Beach west of Haul Road	During a fire event assess and evacuate if necessary the School, Community Arts Centre and Bicentennial walking trails. Protect infrastructure, and maintain short grass. CSC, QFRS and QPWS are responsible for protecting this area.
P18: Woorim – Residential	Maintain any slashed fire trails. During a fire event the area will be assessed and evacuated if necessary. QFRS is primarily responsible for protection of any urban areas.
P19: CSC Water Reservoir	Maintain any slashed fire trails. Protect existing infrastructure from wildfire.
P20: House at Woorim	Maintain 8m slashed area around house. QFRS is primarily responsible for protection of any urban areas.
P21: Golf Course - Woorim	Maintain any slashed fire trails. Protect existing infrastructure from wildfire.
P22: CSC Water, Sewage infrastructure	Maintain any slashed fire trails. Protect existing infrastructure from wildfire.
P23: Bird Hide – Buckleys Hole	Maintain any slashed fire trails. Protect existing infrastructure from wildfire.
P24: Pacific Harbour Development	A proposed wetland area will be used as a buffer to protect residents from fire. QFRS responsible for protection of the urban areas. Hazard reduction burning or other methods of vegetation control will be undertaken on this buffer to protect neighbouring residences. Rehabilitated areas will be managed for conservation where possible. (refer to vegetation maps for recommended fire regimes)
P25: Barraud Quarry	Notify site manager of wildfire movement and consider evacuation if necessary.

8.2.2 Wildfire mitigation zone

Wildfire mitigation zones are located as described below. As described in Appendix 4, the fire regimes applied within these zones should be within the ecological requirements, but at the more frequent end of the range of acceptable frequencies, for each vegetation community.

Table 6 Locations of *wildfire mitigation zones* and associated management regimes.
Numbers relate to the Zoning Map (Map 4).

Location	Management regime
W1: Lighthouse Reach	QPWS Fuel reduction burns approximately every 3 years.
W2: White Patch south of Bottom Swamp crossing adjoining DPI Forestry, QM Properties Golf Course development, Wright's Creek and Horace Street	QPWS Maintain well established fire trail and fuel reduction burn approximately every 4 to 6 years.
W3: Around Ranger Station	Fuel reduction burning and slashing where necessary.
W4: Southern Buffer for Special Purposes Lease	Maintain slashed fire trail along southern side of the national park.
W5: Wetland buffer along Golf Course development	QM Properties/Body Corporate and CSC to maintain adequate fire protection within the residential development. Wetland area to be managed in accordance with the fire recommendations for the equivalent Conservation Zone providing life and property are not threatened.
W6: Special Purposes Reserve	Fuel reduction burning where necessary.
W7: First Ave - North	Mosaic fuel reduction burning where necessary to protect both north and south of this area.
W8: Behind residential area at Woorim	NRM&E to maintain existing fire trails and undertake fuel reduction burns as necessary.

8.2.3 Conservation zone

Much of Bribie Island falls within the c*onservation zone*.

A quick-reference guide for vegetation communities and/or habitats within the c*onservation zone* is given in Table 7. This table brings together the fire management requirements of all natural and cultural resources described in previous sections and provides specific guidelines for burning. Some vegetation communities have been grouped together into “fire associations” as their fire management requirements and fauna habitat characteristics are similar.

Conservation zone will cover most of the existing national park including areas around pine plantation and the central swamp, north of Southern Swamp Crossing.

Table 7 Quick reference guide for fire management requirements in the c*onservation zone*.
Numbers relate to the Zoning Map (Map 4).

	Vegetation community and/or habitat	**Significant species/cultural resources likely to be adversely affected by fire management**	**Management regime**
C1:	Sedgeland communities	• Too frequent fire will reduce diversity.	Fire intervals between 7 and 20 years with particular emphasis on 8-15 years with planned burns conducted on wet substrate to avoid the risk of peat fire.
C1:	*Melaleuca quinquenervia* communities	• Middens need to be protected from very intense fires and disturbance from trail maintenance. • Too frequent fire will prevent young trees reaching maturity.	Fire intervals between 15 and 30 years. Planned burns should be conducted when substrate is wet to decrease the risk of peat fire.
C2:	Closed/wet heath Dry Heath and/or *Banksia aemula* low woodland	• Too frequent fire will cause a reduction in plant diversity. • A range of fire frequencies is essential in maintaining plant diversity.	Fire intervals between 7 and 20 years with particular emphasis on 8-12 years with planned burns conducted on wet substrate to avoid the risk of peat fire.
C3:	*Casuarina glauca* communities	• Too frequent fire will kill the Casuarina before they are mature enough to withstand fire. • Intense fire will kill mature Casuarina and associated species. • It is important to prevent fire threatening areas where there is a high risk of erosion.	Fire intervals between 7-25 years. Try and protect these communities from severe fire particularly where there is a risk of erosion.
C4:	Open eucalypt forest with *Callitris columellaris*	• Mature dead hollow trees destroyed by intense fire. • High intensity fires will kill mature trees and seedlings.	Fire intervals between 10-25 years to allow fire sensitive *Callitris columellaris* to grow big enough to survive medium intensity fire.
C5:	Mixed eucalypt woodland or forest	• Mature dead hollow trees destroyed by intense fire.	Fires at a range of intervals between 7-25 years using a variety of intensities and season to achieve a mosaic of seral stages.
C6:	Foredune and beach ridge scrub communities	• These communities often prevent erosion of dunes along the eastern beach and should be protected from fire in all cases.	Fire exclusion. These areas can burn and should be protected from fire as much as possible to prevent exposure and erosion of dunes and beach.
C7:	Mangroves and saltmarsh communities	• These communities are not usually threatened by fire.	Fire exclusion.

8.2.4 Rehabilitation zone

Most of the ex-pine plantation/future conservation areas will be incorporated in the rehabilitation zone. The control of pine wildings is the most significant problem in theses areas where pine often dominates the ecosystem. A range of options is proposed for rehabilitating this area. These will be continually revised as work is undertaken and more is learnt about effective control.

1. Periodic hot fires may be used to kill older trees and seedlings. However, fuel loads may not reach high enough levels between fires to maintain a hot fire. This approach will be monitored and adjusted where necessary.
2. Slashing areas to remove pine followed by a hot burn to kill any remaining or resprouters.
3. Mechanical removal by bulldozing older pines and slashing areas. Slashing will be difficult in these areas with tree stumps and other obstructions that could potentially damage equipment.
4. Tall live standing pine may need to be individually cut down or pushed over. Existing dead pines are a safety hazard as they may fall at any time.
5. A combination of planned burning and mechanical removal using a chopper roller or heavy slasher to control the pine wildlings. Pine will not resprout if cut below the first branch.
6. Hand removal or poisoning followed by replanting of areas with native species has been undertaken by Wallum Action Group (WAG) in an area of ex-pine plantation near Poverty Creek. The plants used for revegetation were grown at the WAG community nursery on Bribie Island.

Table 8 Locations of *rehabilitation zones* and associated management regimes.
Numbers relate to the Zoning Map (Map 4).

Location	Management regime
Rh1: Bribie North 1 – most north east	Ex-pine plantation – manage to control pine wildlings as outlined above
Rh2: Bribie North 2 – north east	Ex-pine plantation – manage to control pine wildlings as outlined above
Rh3: Northern Swamp Crossing West	Ex-pine plantation – manage to control pine wildlings as outlined above
Rh4: Northern Swamp Crossing East	Ex-pine plantation – manage to control pine wildlings as outlined above
Rh5: Central Swamp Crossing West	Ex-pine plantation – manage to control pine wildlings as outlined above
Rh6: Central Swamp Crossing East	Ex-pine plantation – manage to control pine wildlings as outlined above

8.2.5 Reference zone

No reference zones have been established on Bribie Island, although they will be established within selected rehabilitation zones before planned burning to control pine wildings is undertaken. Refer to Section 1 for details of the research and monitoring programmes.

8.2.6 Exclusion zone

The objective for this zone is the total exclusion of fire. There are currently no exclusion zones for Bribie Island

8.2.7 Sustainable production zone

Table 9 Locations of *sustainable production zones* and associated management regimes.
Numbers relate to the Zoning Map (Map 4).

Location	Management regime
SP1: Pine plantation managed by DPI-F is located at the northwest end of the island.	Burn for site preparation before planting. Then fire exclusion until pines are approximately 4-7 years old. Then follow up burn on average between 2 and 5 years however, this is dependant on fuel loads, weather and growth rate of the pine.
SP2: Pine plantation managed by DPI-F is located at the northeast end of the island.	Burn for site preparation before planting. Then fire exclusion until pines are approximately 4-7 years old. Then follow up burn on average between 2 and 5 years however, this is dependant on fuel loads, weather and growth rate of the pine.
SP3: Pine plantation managed by DPI-F is located just west of the middle of the island.	Burn for site preparation before planting. Then fire exclusion until pines are approximately 4-7 years old. Then follow up burn on average between 2 and 5 years however, this is dependant on fuel loads, weather and growth rate of the pine.
SP4: Pine plantation managed by DPI-F is located just east of the middle of the island.	Burn for site preparation before planting. Then fire exclusion until pines are approximately 4-7 years old. Then follow up burn on average between 2 and 5 years however, this is dependant on fuel loads, weather and growth rate of the pine.

9. Fire research and monitoring

The following is a brief summary of fire research and monitoring programmes on Bribie Island.

Current: The Bribie Island Fire Monitoring Project commenced in 1995. Thirteen fire monitoring sites were established on the national park. Photo and vegetation monitoring were undertaken. Most of the sites were surveyed in 1995, 1998 and 2001.This project is ongoing.

Future: Fire monitoring sites will be established in the rehabilitation zones before any planned burns to remove pine wildlings are undertaken.

10. Access track system

Fire trails on Bribie Island are of varying width and construction as they are often used for purposes besides fire management. For example, the Pine Haul Road, although used to manage fire, is mainly used for access and management of the pine plantations. Fire trails close to urban areas are generally able to accommodate a 2WD vehicle and are often constructed leaving some vegetation to maintain aesthetic values for residents.
The minimum requirements for fire trails on Bribie Island is that they are wide enough for two vehicles to pass safely and have regular turning points where large vehicles can turn around. It must be noted that no fire trail can be relied on to stop or control a fire. The aim of fire trails is to provide access and safe areas for fire management to be undertaken.

Tracks can provide efficient means of access for fire management. All constructed tracks, result in some negative environmental impacts. Permanently constructed tracks/control lines have the potential to cause soil erosion and facilitate the establishment and spread of exotic plants. Temporary control lines, which are cleared when required (e.g. by slashing or hand-chipping) and allowed to revegetate when not in use, result in less environmental impact. As far as possible, permanent control lines should also serve other management purposes. All other control lines should be temporary.

The track system is shown on Map 1a and Maps 1b(i)-1b(vi). These maps detail the current fire management trail system as well as proposed access tracks. Once the proposed changes have been made, it will only be under exceptional circumstances that the system will be changed, particularly if the changes are to be permanent.

There are minor inconsistencies in the mapping of the trails between DPI-F plantation and national park particularly at the northern end of the island. These will be rectified in mapping updates to be completed annually.

10.1. New access tracks

Details of proposed fire management trails are also shown on Map 1. For example, at Bongaree the need for extra fire trails are identified. These will be only be developed if upgrades of existing trails are ineffective.

The need for a safe area at Whitepatch has also been identified. CSC will clear 1m bare earth beside the walkways at Whitepatch. This will allow residents who choose early evacuation safe access to the beach in the event of a wildfire. Hazard reduction burning between these trails will also be undertaken as necessary.

10.2. Track closures

Most fire management trails are used for other purposes such as access and land management. There are currently no track closures required for fire management on Bribie Island. Some existing trails are not considered essential for fire management purposes and will not be maintained. These may be reopened temporarily for fire management if necessary. Other tracks on national park and forestry areas may be closed as part of a separate road network consolidation process.

Many of the tracks on the centre of the island are used to manage pine plantation and national park. These will have restricted public access for a variety of reasons including public safety and the huge cost of maintaining heavily used roads.

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11.1. Personal communications

This Fire strategy was developed with representatives from key land management agencies responsible for fire management on Bribie Island -

- QPWS
- DPI-F Beerburrum
- QFRS Bribie Island
- NRM&E Caboolture
- CSC; and
- Traditional Owner representatives
-

Community input was obtained through QFRS Bribie Island and via formal public consultation on the Draft Bribie Island Fire Strategy and subsequent review process.

Appendix 1. Meteorological data for Bribie Island

YEARLY RAINFALL REGISTER	(Pumicestone Management Unit, Bribie Island)												
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
1996			53	97	332.5	70	34	18.5	53	35	124.5	179.5	997.0
1997	108	8	148.5	34.5	240.5	19.5	26.5	0	40.5	89	189	37	941.0
1998	143	70	51.5	184	178	27	50.5	99.5	116.5	7.5	120	125	1172.5
1999	180.5	531.5	330.5	100	145	283	131.5	101.5	69.5	272.5	116.5	215.5	2477.5
2000	109	152	99.5	95.5	117	60.5	24	28.5	1.5	154	77	92	1010
2001	34	276	131	80.5	46.5	31	6	6.5	32	74.5	146	95.5	959
2002	50	62	177.5	94	77	88	0	115	24	102	94.5	142	1026
2003	22	416	219	94.5	206.5	49.5	45.5	50.5	5.5	73	71.5	191	1445
2004	201	266	0	0	0	0	0	0	0	0	0	0	467
Monthly Average	105.9	222.7	151.3	97.5	167.9	78.6	39.8	52.5	42.8	100.9	117.3	134.7	

Appendix 2. Flora species recorded on Bribie Island.

Status: Presumed Extinct (PE), Endangered (E), Vulnerable (V), Rare (R), Common (C), Weed (*)

	Flora of Bribie Island		Mangroves	Saltmarsh	Foredunes	Melaleuca swamp	Sedgelands	Wet heath	Dry heath	Eucalypt woodland	Callitris communities	Littoral rainforest	Growth form
Dicotyledons													
Aizoaceae													
C	*Carpobrotus glaucescens*	pigface	✓		✓								succulent herb
C	*Sesuvium portulacastrum*	sea purslane			✓								succulent herb
Anacardiaceae													
*	*Schinus terebinthifolius**	broad-leaved pepper								✓	✓	✓	small tree
Annonaceae													
C	*Polyalthia nitidissima*	polyalthia											
Apiaceae													
C	*Centella asiatica*	pennywort											herb
C	*Platysace linearifolia*	narrow-leaf platysace											herb
C	*Platysace ericoides*	heath platysace						✓	✓				herb
C	*Trachymene incisa*	wild parsnip					✓	✓					herb
Apocynaceae													
C	*Parsonsia straminea*	common silkpod, monkey rope, monkeyvine								✓		✓	vine

Araliaceae														
*	*Schefflera actinophylla**	umbrella tree			✓	✓				✓	✓	✓	tree
Asclepiadaceae														
C	*Hoya australis*	native hoya, wax flower											vine
C	*Cynanchum carnosum*	Mangrove waxflower vine											
C	*Marsdenia fraseri*	narrow-leaved milk vine								✓		✓	vine
Asteracaceae														
*	*Ageratum houstonianum**	blue billygoat weed, floss flower			✓				▪	✓			herb
*	*Ambrosia artemisiifolia**	annual ragweed			✓	✓			✓	✓	✓	✓	herb
*	*Baccharis halimifolia**	groundsel bush		✓	✓	✓		✓	✓	✓	✓	✓	shrub
C	*Emilia sonchifolia*	emilia											herb
C	*Enydra fluctuans*												
*	*Sphagneticola trilobata**	Singapore daisy			✓	✓	✓	✓	✓		✓	✓	succulent herb
*	*Xanthium occidentale**	noogoora burr								✓			shrub
Avicenniaceae														
C	*Avicennia marina*	grey mangrove	✓										small tree
Baueraceae														
C	*Bauera capitata*	clustered bauera											
Bignoniaceae														
C	*Pandorea pandorana*	wonga vine											vine
Cactaceae														
*	*Opuntia stricta*	prickly pear		✓	✓	✓				✓			succulent shrub
Caesalpiniaceae														
*	*Senna pendula* var. *glabrata**												shrub

Casuarinaceae													
C	*Allocasuarina littoralis*	black sheoak								✓			small tree
C	*Allocasuarina torulosa*	forest oak, mountain oak, rose sheoak								✓			small tree
C	*Casuarina equisitifolia var. incana*	coast sheoak			✓								small tree
C	*Casuarina glauca*	swamp sheoak				✓				✓			small tree
Chenopodiaceae													
C	*Sarcocornia quinqueflora*			✓									succulent herb
Combretaceae													
C	*Lumnitzera racemosa*	black mangrove	✓										small tree
Convolvulaceae													
*	*Ipomoea cairica**	mile-a-minute	✓	✓	✓	✓				✓	✓	✓	vine
*	*Ipomoea indica**	coastal morning glory	✓	✓	✓	✓	▪			✓	✓	✓	vine
C	*Ipomoea pes-caprae*	goats-foot morning glory			✓								vine
C	*Polymeria calycina*	pink birdweed											
Crassulaceae													
*	*Bryophyllum tubiflorum**	mother of millions			✓					✓	✓		succulent herb
Dilleniaceae													
C	*Hibbertia acicularis*	guinea flower							✓				herb
C	*Hibbertia linearis*	guinea flower							✓	✓			small shrub
C	*Hibbertia salicifolia*	guinea flower							✓	✓			low shrub or climber
C	*Hibbertia scandens*	climbing guinea flower							✓	✓			vine
C	*Hibbertia stricta*	erect guinea flower							✓				small shrub

Droseraceae													
C	*Drosera peltata*	pale sundew						✓					herb
C	*Drosera pygmaea*	sundew						✓					herb
C	*Drosera spatulata*	spoon-leaf sundew						✓					herb
Elaeocarpaceae													
C	*Elaeocarpus obovatus*	hard quandong, mountain quandong										✓	tall shrub
C	*Elaeocarpus reticulatus*	blueberry ash, ash quandong							✓	✓		✓	tall shrub
Epacridaceae													
C	*Epacris microphylla*	coral heath							✓				small shrub
C	*Epacris obtusifolia*	common heath							✓				small shrub
C	*Epacris pulchella*	wallum heath						✓	✓				small shrub
C	*Leucopogon deformis*	small star beard heath							✓				small shrub
C	*Leucopogon leptospermoides*	tea tree beard heath							✓				small shrub
C	*Leucopogon margarodes*	drab beard heath							✓				Small/tall shrub
C	*Leucopogon pimelioides*	beard heath							✓				small shrub
C	*Leucopogon virgatus*	common beard heath							✓				small shrub
C	*Monotoca scoparia*	prickly broom heath							✓				small shrub
C	*Sprengelia sprengelioides*	sprengelia						✓	✓				small shrub
Euphorbiaceae													
C	*Excoecaria agallocha*	milky mangrove, bling-your-eye-mangrove	✓										small tree
C	*Glochidion ferdinandi*					✓				✓		✓	tall tree
C	*Glochidion sumatranum*	umbrella cheese tree				✓				✓		✓	tall tree

C	*Macaranga tanarius*	macaranga			✓					▪		✓	small tree
C	*Mallotus philippensis*	red kamala								✓		✓	small tree
C	*Poranthera microphylla*	small poranthera											
C	*Pseudanthus orientalis*												
C	*Ricinocarpos pinifolius*	wedding bush							✓	✓			tall shrub
Fabaceae													
C	*Aotus ericoides*	common aotus							✓				small shrub
C	*Aotus lanigera*	pointed aotus							✓	✓			small shrub
C	*Bossiaea heterophylla*	variable bossiaea							✓	✓			herb
*	*Crotalaria pallida**	streaked rattlepod			✓					✓	✓		small shrub
C	*Desmodium gunnii*												
C	*Desmodium heterocarpon*												
C	*Desmodium rhytidophyllum*												
C	*Desmodium varians*	slender tick trefoil											
C	*Dillwynia floribunda*	showy parrot pea							✓				small shrub
C	*Dillwynia retorta*	parrot pea							✓	✓			small shrub
C	*Glycine cyrtoloba*								✓				vine
C	*Gompholobium virgatum*								✓	✓			small shrub
C	*Hardenbergi violacea*	native sarsparilla vine				✓			✓	✓		✓	vine
C	*Kennedia rubicunda*	red kennedy pea, running postman							✓	✓		✓	vine
C	*Mirbelia rubiifolia*	heathy mirbelia							✓				herb
C	*Pultenaea myrtoides*	myrtle bush pea							✓				small shrub
C	*Viminaria juncea*	viminaria							✓				small shrub
Goodeniaceae													
C	*Goodenia stelligera*	fan flower or spiked						✓					herb

		goodenia											
C	*Scaevola calendulacea*	dune fan flower			✓					✓			herb
C	*Velleia spathulata*	wild pansies											herb
Haloragaceae													
C	*Gonocarpus micranthus* subsp. *ramosissimus*	raspwort or smoke bush											herb
Lamiaceae													
C	*Clerodendrum floribundum*	lollybush, thurkoo											
Lauraceae													
C	*Cassytha filiformis*	dodder laurel, devil's twine			✓				✓	✓			vine
C	*Cassytha glabella*				✓				✓	✓			vine
C	*Cassytha pubescens*	dodder laurel, downy devil's twine			✓				✓	✓			vine
C	*Endiandra sieberi*	hard corkwood								✓		✓	tall tree
Malvaceae													
C	*Hibiscus tiliaceus*	cotton tree, cottonwood, native hibiscus			✓							✓	medium tree
Melastomataceae													
C	*Melastoma malabathricum* subsp. *malabathricum*	black-mouth bush, blue tongue, native lasiandra				✓							tall shrub
Menyanthaceae													
C	*Villarsia exaltata*					✓		✓					herb
Menispermaceae													
C	*Stephania japonica* var. *discolour*	snake vine or tape vine			✓	✓				✓		✓	vine

Mimosaceae														
C	*Acacia disparrima* subsp. *disparrima*	southern salwood								✓			tall shrub
V	*Acacia baueri*	tiny wattle										✓	small shrub
C	*Acacia concurrens*	black wattle, curracubah, hickory wattle								✓			tall shrub
C	*Acacia disparrima* subsp. *disparrima*	southern salwood								✓			tall shrub
C	*Acacia leiocalyx subsp. leiocalyx*	black wattle, curracabah, Brisbane black wattle								✓			tall shrub
C	*Acacia penninervis var. longiracemosa*	mountain hickory, veined wattle								✓			tall shrub
C	*Acacia suaveolens*	sweet wattle							✓	✓			small shrub
C	*Acacia ulicifolia*	prickly moses							✓	✓			small shrub
Moraceae														
C	*Maclura cochinchinensis*	cockspur thorn, cockspur vine								✓		✓	vine
Myoporaceae														
C	*Myoporum acuminatum*	boobialla, coastal boobiallya, water bush			✓					✓		✓	small shrub
Myrsinaceae														
C	*Rapanea variabilis*	muttonwood								▪		▪	small tree
Myrtaceae														
C	*Angophora leiocarpa*	Sydney red gum, rusty gum, smooth-bark apple								✓			tall tree

C	*Austromyrtus dulcis*	midyim, midgen berry							✓	✓		✓	small shrub
C	*Baeckea frutescens*	weeping baeckea						✓	▪				tall shrub
C	*Baeckea imbricata*	spindly baeckea							✓				small shrub
C	*Callistemon pachyphyllus*	wallum bottlebrush						✓					small shrub
C	*Callistemon salignus*	white bottlebrush, willow bottlebrush								✓			tall shrub
C	*Corymbia intermedia*	pink bloodwood,								✓			tall tree
C	*Corymbia tessellaris*	Moreton Bay ash, carbeen								✓			tall tree
C	*Eucalyptus siderophloia*	grey ironbark								✓			tall tree
C	*Eucalyptus racemosa*	scribbly gum								✓			tall tree
C	*Eucalyptus robusta*	swamp mahogany, swamp messmate				✓				✓			tall tree
C	*Eucalyptus tereticornis*	blue gum, forest red gum, red irongum								✓			tall tree
C	*Homoranthus virgatus*	twiggy homoranthus							✓				small shrub
C	*Leptospermum juniperinum*	prickly tea-tree							✓				tall shrub
C	*Leptospermum liversidgei*	wild may, swamp may							✓				tall shrub
C	*Leptospermum polygalifolium*	tantoon, wild may, yellow tea-tree							✓				tall shrub
C	*Leptospermum semibaccatum*	wallum tea-tree							✓				tall shrub
C	*Leptospermum speciosum*	wild may							✓				tall shrub
C	*Leptospermum trinervium*	woolly tea-tree							✓				tall shrub
C	*Leptospermum whitei*	wild may							✓				tall shrub
C	*Lophostemon confertus*	brushbox, pink box								✓			tall tree
C	*Lophostemon suaveolens*	swamp box, swamp mahogany				✓				✓			tall tree

C	*Melaleuca nodosa*	pricklyleaf paperbark				✓		✓					tall shrub
C	*Melaleuca quinquenervia*	paper-barked tea-tree, swamp paperbark				✓				✓			tall tree
C	*Melaleuca sieberi*	Sieber's paperbark				✓							tall tree
C	*Melaleuca thymifolia*	thyme honeymyrtle						✓					tall shrub
C	*Ochrosperma lineare*	straggly baeckea						✓					small shrub
C	*Pilidiostigma rhytispermum*												
*	*Psidium guajava**	guava								✓			small tree
C	*Syzygium oleosum*	blue cherry, blue lilly pilly, scented satinash								✓		✓	small tree
Olacaceae													
C	*Olax retusa*								✓				small shrub
Onagraceae													
*	*Oenothera drummondii**	beach primrose			✓								herb
Passifloraceae													
*	*Passiflora suberosa**	corky passion vine			✓					✓	✓	✓	vine
*	*Passiflora subpeltata**	white passion vine			✓					✓	✓	✓	vine
Pittosporaceae													
C	*Pittosporum revolutum*	hairy pittosporum, rough pittosporum, yellow pittosporum										✓	small tree
Polygalaceae													
C	*Comesperma defoliatum*	leafless milkwort							✓	✓			small shrub
Proteaceae													
C	*Banksia aemula*	wallum banksia							✓	✓			tall shrub

C	*Banksia integrifolia*	coast banksia, honeysuckle oak							✓	✓			tall shrub
C	*Banksia oblongifolia*	dwarf banksia			✓				✓				small shrub
C	*Banksia robur*	broad-leaved banksia, swamp banksia						✓	▪				small shrub
C	*Banksia serrata*	red honeysuckle			✓				✓				tall shrub
C	*Conospermum taxifolium*	devil's rice							✓	✓			small shrub
C	*Hakea actites*								✓	✓			small shrub
C	*Persoonia cornifolia*								▪	✓			tall shrub
C	*Persoonia stradbrokensis*								▪	✓			tall shrub
C	*Persoonia virgata*	small-leaved geebung							✓				small shrub
C	*Strangea linearis*	strangea							✓				small shrub
Rhamnaceae													
C	*Alphitonia excelsa*	red ash, soap tree, soapbush				✓				✓		✓	small tree
Rhizophoraceae													
C	*Bruguiera gymnorrhiza* (?)	large leafed orange mangrove	✓										small tree
C	*Ceriops tagal* (?)	yellow mangrove	✓										small tree
C	*Rhizophora stylosa*	spotted mangrove, red mangrove	✓										small tree
Rubiaceae													
C	*Cyclophyllum coprosmoides*	coastal canthium, coastal coffee bush, supplejack											tall shrub
C	*Pomax umbellata*	dwarf's umbrella, pomax							✓				herb
C	*Psychotria loniceroides*	smooth psychotria										✓	small shrub

C	*Rubus parvifolius*	native raspberry, small-leaved bramble								✓			small shrub
Rutaceae														
C	*Acronychia imperforata*	beach acronychia			✓								small shrub
C	*Boronia falcifolia*	wallum boronia						✓					small shrub
C	*Boronia parviflora*	swamp boronia								✓			small shrub
C	*Boronia rosmarinifolia*	forest boronia								✓			small shrub
C	*Boronia safrolifera*	safrole boronia								✓			small shrub
C	*Phebalium woombye*	wallum phebalium							✓				tall shrub
C	*Zieria laxiflora*	wallum zieria							✓				small shrub
C	*Zieria smithii*	sandfly zieria										✓	small shrub
Santalaceae														
C	*Exocarpos cupressiformis*	cherry ballart, native cherry								✓	✓	✓	small tree
Sapindaceae														
C	*Alectryon coriaceus*	beach alectryon, beach birdseye			✓	✓				✓			small tree
C	*Cupaniopsis anacardioides*	beach tamarind, tuckeroo			✓								small tree
C	*Dodonaea triquetra*	large-leaved hop bush							✓	✓			tall shrub
Stackhousiaceae														
C	*Stackhousia viminea*	slender stackhousia							✓				
Stylidiaceae														
C	*Stylidium graminifolium*	grass trigger plant					✓	✓					herb
Solanaceae														
*	*Solanum americanum**	glossy nightshade							✓	✓		✓	small shrub

Tetragoniaceae													
C	*Tetragonia tetragonioides*	New Zealand spinach		✓	✓								herb
Thymelaceae													
C	*Pimelia linifolia* subsp. *collina*	queen of the bush, rice flower							✓				small shrub
Verbenaceae													
*	*Lantana camara**	lantana			✓	✓				✓	✓	✓	tall shrub
Monocotyledons													
Asparagaceae													
*	*Asparagus densiflorus**	asparagus fern		✓	✓	✓				✓	✓	✓	herb
				.	.	.				.	.	.	
Agavaceae													
*	*Agave sisalana**	sisal								✓			tall shrub
Antheriaceae													
C	*Caesia parviflora*							✓	✓	✓			herb
C	*Laxmannia gracilis*	slender wirelily						✓	✓	.			herb
C	*Sowerbaea juncea*	rush lily, vanilla plant						✓		.			herb
C	*Thysanotus tuberosus*	fringe lily							✓	✓			herb
C	*Tricoryne elatior*	yellow autumn lily						✓					herb
Asphodelaceae													
*	*Aloe saponaria**	aloe			✓								succulent herb
Blandfordiaceae													
R	*Blandfordia grandiflora*	Christmas bells			.			✓	✓				Herb or graminoid

Colchicaceae													
C	*Burchardia umbellata*	milkmaids			▪			▪	✓				herb
*	*Gloriosa superba**	Gloriosa lily			✓			▪	▪	✓	✓	✓	herb/climber
Commelinaceae													
C	*Commelina cyanea*	wandering jew			✓					✓		✓	herb
C	*Commelina diffusa*	wandering jew			✓					✓		✓	herb
C	*Murdannia graminea*	grass lily, murdannia											herb
Cyperaceae													
C	*Baumea articulata*	jointed twigrush					✓	✓					graminoid
C	*Baumea juncea*	bare twigrush					✓	✓					graminoid
C	*Baumea rubiginosa*	soft twigrush					✓	✓					graminoid
C	*Caustis blakei*	foxtail								✓			graminoid
C	*Caustis recurvata*	curly wigs					✓			✓			graminoid
C	*Cladium procerum*	leafy twigrush					✓						graminoid
C	*Cyperus breviculmis*						✓						graminoid
C	*Cyperus lucidus*						✓						graminoid
C	*Cyperus stradbrokensis*				✓		✓						graminoid
C	*Cyperus tenuiculmis*						✓						graminoid
C	*Eleocharis dulcis*	bulkuru, Chinese waterchestnut					✓						graminoid
C	*Fimbristylis ferruginea*						✓						graminoid
C	*Gahnia aspera*	cut sedge, razor grass, saw sedge					✓						graminoid
C	*Gahnia sieberiana*	sword grass					✓		✓				graminoid
C	*Lepidosperma laterale*	variable swordsedge											graminoid
C	*Lepidosperma longitundinale*	pithy swordsedge					✓		✓				graminoid

C	*Lepironia articulata*						✓						graminoid
C	*Ptilanthelium deustum*						✓						graminoid
C	*Rhynchospora corymbosa*						✓						graminoid
C	*Schoenus apogon*	fluke bogrush					✓						graminoid
C	*Schoenus brevifolius*	bogrush					✓						graminoid
C	*Schoenus calostachyus*	bogrush					✓						graminoid
C	*Schoenoplectus littoralis*						✓						graminoid
C	*Scleria levis*						✓						graminoid
Dracaenaceae													
*	*Sansevieria trifasciata**	mother-in-law's tongue			✓					✓			herb
Flagellariaceae													
C	*Flagellaria indica*	bull cane, supplejack, whip vine								✓		✓	vine
Haemodoraceae													
C	*Haemodorum tenuifolium*	bloodroot, blood lily						✓					herb
Hydrocharitaceae													
C	*Ottelia alismoides*												
Iridaceae													
C	*Patersonia fragilis*	native iris							✓	✓			herb
C	*Patersonia sericea*	native iris							✓	✓			herb
Juncaceae													
C	*Juncus kraussii* ssp. *australiensis*	sea rush			✓		✓						graminoid
Juncaginaceae													

C	*Triglochin striatum*	streaked arrowgrass					✓						graminoid
Philesiaceae													
C	*Eustrephus latifolius*	orange vine, wombat berry								✓		✓	vine
C	*Geitonoplesium cymosum*	scrambling lily								✓		✓	vine
Phormiaceae													
C	*Dianella caerulea*	blueberry lily, blue flax lily							✓	✓		✓	herb
C	*Dianella congesta*									✓		▪	herb
Poaceae													
C	*Alloteropsis semialata*	cockatoo grass											graminoid
C	*Brachiaria foliosa (?)*	leafy panic											graminoid
*	*Cenchrus echinatus**	Mossman River grass			✓				✓	✓		✓	graminoid
C	*Digitaria didactyla*	Queensland blue couch			✓								graminoid
C	*Entolasia stricta*	wiry panic			▪	✓				✓	✓	✓	graminoid
C	*Eragrostis interrupta*	love grass			✓				✓				graminoid
C	*Imperata cylindrica*	blady grass								✓			graminoid
C	*Leersia hexandra*	swamp rice grass						✓					graminoid
C	*Panicum effusum*												graminoid
C	*Paspalidium gausum*												graminoid
C	*Phragmites australis*	common reed				✓	✓	▪					graminoid
C	*Spinifex sericeus*	beach spinifex			✓								graminoid
*	*Sporobolus pyramidalis**	giant rats tail grass								✓			graminoid
*	*Sporobolus natalensis**	rats tail grass								✓			graminoid
C	*Sporobolus virginicus*	marine couch, saltwater couch, sand couch		✓									graminoid
C	*Themeda triandra*	kangaroo grass								✓			graminoid
Pontederiaceae													

*	*Eichhornia crassipes**	water hyacinth					✓						aquatic herb
Restionaceae													
C	*Baloskion pallens*						✓						graminoid
C	*Baloskion tetraphyllum*	spreading rope rush					✓	✓					graminoid
C	*Coleocarya gracilis*						✓						graminoid
C	*Empodisma minus*	spreading rope rush					✓	✓					graminoid
C	*Eurychorda complanata*	flat cord rush					✓						graminoid
C	*Hypolaena fastigiata*	tassel rope rush					✓						graminoid
C	*Leptocarpus tenax*						✓	✓					graminoid
C	*Sporadanthus caudatus*						✓						graminoid
Smilacaceae													
C	*Smilax australis*	austral sarsaparilla, barbed-wire vine				✓			✓	✓			vine
C	*Smilax glycophylla*					✓			✓	✓		✓	vine
Typhaceae													
C	*Typha orientalis*	broad-leaved cumbungi, bulrush					✓						graminoid
Xanthorrhoeaceae													
C	*Lomandra longifolia*	longleaf matrush, spinyhead matrush								✓			graminoid
C	*Xanthorrhoea fulva*	swamp grasstree						✓					small shrub
C	*Xanthorrhoea johnsonii*	forest grasstree								✓			tall shrub
C	*Xanthorrhoea latifolia*									✓			tall shrub
Xyridaceae													
C	*Xyris complanata*	hatpins, yellow-eye					✓	✓					herb
C	*Xyris juncea*	dwarf yellow-eye					✓	✓					herb

Conifers														
Cupressaceae														
C	*Callitris columellaris*	dune cypress								✓	✓		tall tree
Pinaceae														
*	*Pinus carrabea* var. *hondurensis**					✓			✓	✓	✓	✓	tall tree
*	*Pinus elliottii**					✓			✓	✓	✓	✓	tall tree

Ferns and fern allies														
Blechnaceae														
C	*Blechnum indicum*	bungwall, swamp water fern				✓		✓					fern
Dennstaedtiaceae														
C	*Pteridium esculentum*	bracken fern			✓	✓			✓	✓	✓	✓	fern
Pteridaceae														
C	*Acrostichum speciosum*	mangrove fern	✓										fern
Schizaeaceae														
C	*Lygodium microphyllum*	climbing maidenhair, snake fern				✓							fern
C	*Schizaea bifida*	forked comb fern							✓	✓			fern
Selaginellaceae														
C	*Selaginella uliginosa*	swamp selaginella						✓					herb

Appendix 3. Fauna species recorded on Bribie Island

Mammals, birds, reptiles and amphibians

Compiled by Lisa Ford, Ian Gynther and Harry Hines from Queensland Museum records, published and unpublished reports, records from EPA WildNet database and local naturalists. In the absence of detailed notes, records from the latter two sources were only accepted if they originated from two or more observers. This conservative approach may have resulted in omissions. We encourage people who have additional species records to provide them to us. The minimum information required is date of observation, details of the observer, the location (preferably with an accurate geo-reference), the species observed, number of individuals observed, and any notes on identification and/or behaviour that would assist in assessing the record.

Please report sightings of any additional species to QPWS Bribie Island (07) 3408 8451.

Code

E	endangered
V	vulnerable
R	rare
I	introduced
@	aviary escapee
*	beach washed
#	vagrant or transient

Code	Common name	Scientific name
	Mammals	
	short-beaked echidna	*Tachyglossus aculeatus*
	brush-tailed phascogale	*Phascogale tapoatafa*
	common planigale	*Planigale maculata*
	northern brown bandicoot	*Isoodon macrourus*
	koala	*Phascolarctos cinereus*
	squirrel glider	*Petaurus norfolcensis*
	common ringtail possum	*Pseudocheirus peregrinus*
	common brushtail possum	*Trichosurus vulpecula*
	eastern grey kangaroo	*Macropus giganteus*
	red-necked wallaby	*Macropus rufogriseus*
	swamp wallaby	*Wallabia bicolor*
	black flying-fox	*Pteropus alecto*
	grey-headed flying-fox	*Pteropus poliocephalus*
	little red flying-fox	*Pteropus scapulatus*
	common blossom-bat	*Syconycteris australis*
	yellow-bellied sheathtail-bat	*Saccolaimus flaviventris*
	Beccari's freetail-bat	*Mormopterus beccarii*
	east coast mastiff bat	*Mormopterus sp. 2*
	white-striped freetail-bat	*Nyctinomus australis*
	Gould's wattled bat	*Chalinolobus gouldii*
	chocolate wattled bat	*Chalinolobus morio*
	little bentwing-bat	*Miniopterus australis*
	eastern bent-wing bat	*Miniopterus schreibersii oceanensis*
	southern myotis	*Myotis macropus*
	eastern long-eared bat	*Nyctophilus bifax bifax*
	Gould's long-eared bat	*Nyctophilus gouldi*
	central eastern broad-nosed bat	*Scotorepens sp. (Parnaby)*
I	brown hare	*Lepus capensis*
	water rat	*Hydromys chrysogaster*
	grassland melomys	*Melomys burtoni*

Code	Common name	Scientific name
	fawn-footed melomys	*Melomys cervinipes*
I	house mouse	*Mus musculus*
	bush rat	*Rattus fuscipes*
	swamp rat	*Rattus lutreolus*
I	black rat	*Rattus rattus*
	pale field-rat	*Rattus tunneyi*
V	false water-rat	*Xeromys myoides*
I	dog	*Canis familiaris*
I	dingo	*Canis lupus dingo*
I	cat	*Felis catus*
I	red fox	*Vulpes vulpes*
I	horse	*Equus caballus*
I	pig	*Sus scrofa*
I	European cattle	*Bos taurus*
V	dugong	*Dugong dugon*
*V	humpback whale	*Megaptera novaeangliae*
*	melon-headed whale	*Peponocephala electra*
R	Indo-Pacific hump-backed dolphin	*Sousa chinensis*
	bottlenose dolphin	*Tursiops truncatus*
	Birds	
	emu	*Dromaius novaehollandiae*
	Australian brush-turkey	*Alectura lathami*
#	stubble quail	*Coturnix pectoralis*
	brown quail	*Coturnix ypsilophora*
	king quail	*Coturnix chinensis*
	magpie goose	*Anseranas semipalmata*
	plumed whistling-duck	*Dendrocygna eytoni*
	wandering whistling-duck	*Dendrocygna arcuata*
#	musk duck	*Biziura lobata*
	black swan	*Cygnus atratus*
	Australian wood duck	*Chenonetta jubata*
I	mallard	*Anas platyrhynchos*
	Pacific black duck	*Anas superciliosa*
	Australasian shoveler	*Anas rhynchotis*
	grey teal	*Anas gracilis*
	chestnut teal	*Anas castanea*
#	pink-eared duck	*Malacorhynchus membranaceus*
	hardhead	*Aythya australis*
#	great crested grebe	*Podiceps cristatus*
#	hoary-headed grebe	*Poliocephalus poliocephalus*
	Australasian grebe	*Tachybaptus novaehollandiae*
#	little penguin	*Eudyptula minor*
*	great-winged petrel	*Pterodroma macroptera*
*	black-winged petrel	*Pterodroma nigripennis*
*	fairy prion	*Pachyptila turtur*
*	wedge-tailed shearwater	*Puffinus pacificus*
*	short-tailed shearwater	*Puffinus tenuirostris*
*	fluttering shearwater	*Puffinus gavia*

Code	Common name	Scientific name
*	Hutton's shearwater	*Puffinus huttoni*
*	wandering albatross	*Diomedea exulans*
*	black-browed albatross	*Diomedea melanophrys*
*	shy albatross	*Diomedea cauta*
#V	red-tailed tropicbird	*Phaethon rubricauda*
	Australasian gannet	*Morus serrator*
	masked booby	*Sula dactylatra*
	brown booby	*Sula leucogaster*
	darter	*Anhinga melanogaster*
	little pied cormorant	*Phalacrocorax melanoleucos*
	pied cormorant	*Phalacrocorax varius*
	little black cormorant	*Phalacrocorax sulcirostris*
	great cormorant	*Phalacrocorax carbo*
	Australian pelican	*Pelecanus conspicillatus*
	great frigatebird	*Fregata minor*
	lesser frigatebird	*Fregata ariel*
	white-faced heron	*Egretta novaehollandiae*
	little egret	*Egretta garzetta*
	eastern reef egret	*Egretta sacra*
	white-necked heron	*Ardea pacifica*
	great egret	*Ardea alba*
	intermediate egret	*Ardea intermedia*
	cattle egret	*Ardea ibis*
	striated heron	*Butorides striatus*
	nankeen night heron	*Nycticorax caledonicus*
	little bittern	*Ixobrychus minutus*
	black bittern	*Ixobrychus flavicollis*
	glossy ibis	*Plegadis falcinellus*
	Australian white ibis	*Threskiornis molucca*
	straw-necked ibis	*Threskiornis spinicollis*
	royal spoonbill	*Platalea regia*
	yellow-billed spoonbill	*Platalea flavipes*
R	black-necked stork	*Ephippiorhynchus asiaticus*
	osprey	*Pandion haliaetus*
	Pacific baza	*Aviceda subcristata*
	black-shouldered kite	*Elanus axillaris*
R	square-tailed kite	*Lophoictinia isura*
	whistling kite	*Haliastur sphenurus*
	brahminy kite	*Haliastur indus*
	white-bellied sea-eagle	*Haliaeetus leucogaster*
	spotted harrier	*Circus assimilis*
	swamp harrier	*Circus approximans*
	brown goshawk	*Accipiter fasciatus*
R	grey goshawk	*Accipiter novaehollandiae*
	collared sparrowhawk	*Accipiter cirrhocephalus*
	wedge-tailed eagle	*Aquila audax*
	little eagle	*Hieraaetus morphnoides*
	brown falcon	*Falco berigora*
	Australian hobby	*Falco longipennis*

Code	Common name	Scientific name
	peregrine falcon	*Falco peregrinus*
	nankeen kestrel	*Falco cenchroides*
	brolga	*Grus rubicunda*
	buff-banded rail	*Gallirallus philippensis*
R	Lewin's rail	*Rallus pectoralis*
	bush-hen	*Amaurornis olivaceus*
	Baillon's crake	*Porzana pusilla*
	Australian spotted crake	*Porzana fluminea*
	spotless crake	*Porzana tabuensis*
	purple swamphen	*Porphyrio porphyrio*
	dusky moorhen	*Gallinula tenebrosa*
#	black-tailed native-hen	*Gallinula ventralis*
	Eurasian coot	*Fulica atra*
	painted button-quail	*Turnix varia*
	Latham's snipe	*Gallinago hardwickii*
	black-tailed godwit	*Limosa limosa*
	bar-tailed godwit	*Limosa lapponica*
#	little curlew	*Numenius minutus*
	whimbrel	*Numenius phaeopus*
R	eastern curlew	*Numenius madagascariensis*
	marsh sandpiper	*Tringa stagnatilis*
	common greenshank	*Tringa nebularia*
	terek sandpiper	*Xenus cinereus*
	common sandpiper	*Actitis hypoleucos*
	grey-tailed tattler	*Heteroscelus brevipes*
	ruddy turnstone	*Arenaria interpres*
	great knot	*Calidris tenuirostris*
	red knot	*Calidris canutus*
	sanderling	*Calidris alba*
	red-necked stint	*Calidris ruficollis*
	sharp-tailed sandpiper	*Calidris acuminata*
	curlew sandpiper	*Calidris ferruginea*
	broad-billed sandpiper	*Limicola falcinellus*
	comb-crested jacana	*Irediparra gallinacea*
	bush stone-curlew	*Burhinus grallarius*
V	beach stone-curlew	*Esacus neglectus*
	pied oystercatcher	*Haematopus longirostris*
R	sooty oystercatcher	*Haematopus fuliginosus*
	black-winged stilt	*Himantopus himantopus*
	red-necked avocet	*Recurvirostra novaehollandiae*
	Pacific golden plover	*Pluvialis fulva*
	grey plover	*Pluvialis squatarola*
	red-capped plover	*Charadrius ruficapillus*
	double-banded plover	*Charadrius bicinctus*
	lesser sand plover	*Charadrius mongolus*
	greater sand plover	*Charadrius leschenaultii*
	black-fronted dotterel	*Elseyornis melanops*
#	hooded plover	*Thinornis rubricollis*
	red-kneed dotterel	*Erythrogonys cinctus*

Code	Common name	Scientific name
#	banded lapwing	*Vanellus tricolor*
	masked lapwing	*Vanellus miles*
	pomarine jaeger	*Stercorarius pomarinus*
	Arctic jaeger	*Stercorarius parasiticus*
	silver gull	*Larus novaehollandiae*
#	laughing gull	*Larus atricilla*
	gull-billed tern	*Sterna nilotica*
	Caspian tern	*Sterna caspia*
	lesser crested tern	*Sterna bengalensis*
	crested tern	*Sterna bergii*
#	roseate tern	*Sterna dougallii*
	white-fronted tern	*Sterna striata*
#	black-naped tern	*Sterna sumatrana*
	common tern	*Sterna hirundo*
E	little tern	*Sterna albifrons*
#	fairy tern	*Sterna nereis*
#	bridled tern	*Sterna anaethetus*
#	sooty tern	*Sterna fuscata*
	whiskered tern	*Chlidonias hybridus*
	white-winged black tern	*Chlidonias leucopterus*
	common noddy	*Anous stolidus*
*	grey ternlet	*Procelsterna cerulea*
I	rock dove	*Columba livia*
	white-headed pigeon	*Columba leucomela*
I	spotted turtle-dove	*Streptopelia chinensis*
	brown cuckoo-dove	*Macropygia amboinensis*
	emerald dove	*Chalcophaps indica*
	common bronzewing	*Phaps chalcoptera*
	brush bronzewing	*Phaps elegans*
	crested pigeon	*Ocyphaps lophotes*
	peaceful dove	*Geopelia striata*
	bar-shouldered dove	*Geopelia humeralis*
#	superb fruit-dove	*Ptilinopus superbus*
	rose-crowned fruit-dove	*Ptilinopus regina*
	topknot pigeon	*Lopholaimus antarcticus*
V	glossy black-cockatoo	*Calyptorhynchus lathami*
	yellow-tailed black-cockatoo	*Calyptorhynchus funereus*
	galah	*Cacatua roseicapilla*
@	long-billed corella	*Cacatua tenuirostris*
	little corella	*Cacatua sanguinea*
	sulphur-crested cockatoo	*Cacatua galerita*
	cockatiel	*Nymphicus hollandicus*
	rainbow lorikeet	*Trichoglossus haematodus*
	scaly-breasted lorikeet	*Trichoglossus chlorolepidotus*
	musk lorikeet	*Glossopsitta concinna*
	little lorikeet	*Glossopsitta pusilla*
	Australian king-parrot	*Alisterus scapularis*
	red-winged parrot	*Aprosmictus erythropterus*
#	crimson rosella	*Platycercus elegans*

Code	Common name	Scientific name
#	eastern rosella	*Platycercus eximius*
	pale-headed rosella	*Platycercus adscitus*
@	Australian ringneck	*Barnardius zonarius*
#	red-rumped parrot	*Psephotus haematonotus*
R	turquoise parrot	*Neophema pulchella*
	oriental cuckoo	*Cuculus saturatus*
	pallid cuckoo	*Cuculus pallidus*
	brush cuckoo	*Cacomantis variolosus*
	fan-tailed cuckoo	*Cacomantis flabelliformis*
	Horsfield's bronze-cuckoo	*Chrysococcyx basalis*
	shining bronze-cuckoo	*Chrysococcyx lucidus*
	little bronze-cuckoo	*Chrysococcyx minutillus*
	common koel	*Eudynamys scolopacea*
	channel-billed cuckoo	*Scythrops novaehollandiae*
	pheasant coucal	*Centropus phasianinus*
	southern boobook	*Ninox novaeseelandiae*
	barn owl	*Tyto alba*
	tawny frogmouth	*Podargus strigoides*
	white-throated nightjar	*Eurostopodus mystacalis*
	Australian owlet-nightjar	*Aegotheles cristatus*
	white-throated needletail	*Hirundapus caudacutus*
	fork-tailed swift	*Apus pacificus*
	azure kingfisher	*Alcedo azurea*
	laughing kookaburra	*Dacelo novaeguineae*
	forest kingfisher	*Todiramphus macleayii*
	sacred kingfisher	*Todiramphus sanctus*
	collared kingfisher	*Todiramphus chloris*
	rainbow bee-eater	*Merops ornatus*
	dollarbird	*Eurystomus orientalis*
	noisy pitta	*Pitta versicolor*
	white-throated treecreeper	*Cormobates leucophaeus*
	superb fairy-wren	*Malurus cyaneus*
	variegated fairy-wren	*Malurus lamberti*
	red-backed fairy-wren	*Malurus melanocephalus*
	spotted pardalote	*Pardalotus punctatus*
	striated pardalote	*Pardalotus striatus*
	white-browed scrubwren	*Sericornis frontalis*
	large-billed scrubwren	*Sericornis magnirostris*
	mangrove gerygone	*Gerygone levigaster*
	white-throated gerygone	*Gerygone olivacea*
	brown thornbill	*Acanthiza pusilla*
	yellow-rumped thornbill	*Acanthiza chrysorrhoa*
	yellow thornbill	*Acanthiza nana*
	striated thornbill	*Acanthiza lineata*
	little wattlebird	*Anthochaera chrysoptera*
#	spiny-cheeked honeyeater	*Acanthagenys rufogularis*
	striped honeyeater	*Plectorhyncha lanceolata*
	noisy friarbird	*Philemon corniculatus*
	little friarbird	*Philemon citreogularis*

Code	Common name	Scientific name
#E	regent honeyeater	*Xanthomyza phrygia*
	blue-faced honeyeater	*Entomyzon cyanotis*
	noisy miner	*Manorina melanocephala*
	Lewin's honeyeater	*Meliphaga lewinii*
	yellow-faced honeyeater	*Lichenostomus chrysops*
	mangrove honeyeater	*Lichenostomus fasciogularis*
	white-throated honeyeater	*Melithreptus albogularis*
	white-naped honeyeater	*Melithreptus lunatus*
	brown honeyeater	*Lichmera indistincta*
	white-cheeked honeyeater	*Phylidonyris nigra*
	eastern spinebill	*Acanthorhynchus tenuirostris*
#	black honeyeater	*Certhionyx niger*
	dusky honeyeater	*Myzomela obscura*
	scarlet honeyeater	*Myzomela sanguinolenta*
#	crimson chat	*Epthianura tricolor*
	jacky winter	*Microeca fascinans*
#	red-capped robin	*Petroica goodenovii*
	rose robin	*Petroica rosea*
#	hooded robin	*Melanodryas cucullata*
	eastern yellow robin	*Eopsaltria australis*
	grey-crowned babbler	*Pomatostomus temporalis*
	eastern whipbird	*Psophodes olivaceus*
	varied sittella	*Daphoenositta chrysoptera*
	crested shrike-tit	*Falcunculus frontatus*
	golden whistler	*Pachycephala pectoralis*
	rufous whistler	*Pachycephala rufiventris*
	little shrike-thrush	*Colluricincla megarhyncha*
	grey shrike-thrush	*Colluricincla harmonica*
	black-faced monarch	*Monarcha melanopsis*
	spectacled monarch	*Monarcha trivirgatus*
	leaden flycatcher	*Myiagra rubecula*
#	satin flycatcher	*Myiagra cyanoleuca*
	shining flycatcher	*Myiagra alecto*
	restless flycatcher	*Myiagra inquieta*
	magpie-lark	*Grallina cyanoleuca*
	rufous fantail	*Rhipidura rufifrons*
	grey fantail	*Rhipidura fuliginosa*
	willie wagtail	*Rhipidura leucophrys*
	spangled drongo	*Dicrurus bracteatus*
	black-faced cuckoo-shrike	*Coracina novaehollandiae*
#	barred cuckoo-shrike	*Coracina lineata*
	white-bellied cuckoo-shrike	*Coracina papuensis*
	cicadabird	*Coracina tenuirostris*
	white-winged triller	*Lalage sueurii*
	varied triller	*Lalage leucomela*
	olive-backed oriole	*Oriolus sagittatus*
	figbird	*Sphecotheres viridis*
	white-breasted woodswallow	*Artamus leucorynchus*
#	masked woodswallow	*Artamus personatus*

Code	Common name	Scientific name
#	white-browed woodswallow	*Artamus superciliosus*
	dusky woodswallow	*Artamus cyanopterus*
	little woodswallow	*Artamus minor*
	grey butcherbird	*Cracticus torquatus*
	pied butcherbird	*Cracticus nigrogularis*
	Australian magpie	*Gymnorhina tibicen*
	pied currawong	*Strepera graculina*
	Torresian crow	*Corvus orru*
	regent bowerbird	*Sericulus chrysocephalus*
	satin bowerbird	*Ptilonorhynchus violaceus*
#	singing bushlark	*Mirafra javanica*
	Richard's pipit	*Anthus novaeseelandiae*
I	house sparrow	*Passer domesticus*
#	zebra finch	*Taeniopygia guttata*
	double-barred finch	*Taeniopygia bichenovii*
	red-browed finch	*Neochmia temporalis*
I	nutmeg mannikin	*Lonchura punctulata*
	chestnut-breasted mannikin	*Lonchura castaneothorax*
	mistletoebird	*Dicaeum hirundinaceum*
#	barn swallow	*Hirundo rustica*
	welcome swallow	*Hirundo neoxena*
	tree martin	*Hirundo nigricans*
	fairy martin	*Hirundo ariel*
	clamorous reed-warbler	*Acrocephalus stentoreus*
	tawny grassbird	*Megalurus timoriensis*
	little grassbird	*Megalurus gramineus*
#	rufous songlark	*Cincloramphus mathewsi*
	golden-headed cisticola	*Cisticola exilis*
	silvereye	*Zosterops lateralis*
I	common starling	*Sturnus vulgaris*
I	common myna	*Acridotheres tristis*
	Reptiles	
E	loggerhead turtle	*Caretta caretta*
V	green turtle	*Chelonia mydas*
*E	leatherback turtle	*Dermochelys coriacea*
	eastern snake-necked turtle	*Chelodina longicollis*
	Burton's legless lizard	*Lialis burtonis*
	common scaly-foot	*Pygopus lepidopodus*
	nobbi	*Amphibolurus nobbi*
	frilled lizard	*Chlamydosaurus kingii*
		Diporiphora australis
	bearded dragon	*Pogona barbata*
	sand monitor	*Varanus gouldii*
	lace monitor	*Varanus varius*
		Anomalopus verreauxii
		Carlia vivax
		Cryptoblepharus virgatus
		Ctenotus robustus

Code	Common name	Scientific name
	copper-tailed skink	*Ctenotus taeniolatus*
	pink-tongued lizard	*Cyclodomorphus gerrardii*
		Eulamprus tenuis
		Lampropholis delicata
		Lampropholis guichenoti
	fire-tailed skink	*Morethia taeniopleura*
R		*Ophioscincus truncatus*
	eastern blue-tongued lizard	*Tiliqua scincoides*
	carpet python	*Morelia spilota*
	brown tree snake	*Boiga irregularis*
	common tree snake	*Dendrelaphis punctulata*
	freshwater snake	*Tropidonophis mairii*
	golden crowned snake	*Cacophis squamulosus*
	yellow-faced whip snake	*Demansia psammophis*
	black whip snake	*Demansia vestigiata*
	black-bellied swamp snake	*Hemiaspis signata*
	red-bellied black snake	*Pseudechis porphyriacus*
	eastern brown snake	*Pseudonaja textilis*
	eastern small-eyed snake	*Rhinoplocephalus nigrescens*
	bandy-bandy	*Vermicella annulata*
*	olive sea snake	*Aipysurus laevis*
	Amphibians	
V	wallum froglet	*Crinia tinnula*
	ornate burrowing-frog	*Limnodynastes ornatus*
	brown-striped marshfrog	*Limnodynastes peronii*
	scarlet-sided pobblebonk	*Limnodynastes terraereginae*
	copper-backed broodfrog	*Pseudophryne raveni*
	green treefrog	*Litoria caerulea*
	bleating treefrog	*Litoria dentata*
	eastern sedgefrog	*Litoria fallax*
V	wallum rocketfrog	*Litoria freycineti*
	graceful treefrog	*Litoria gracilenta*
	striped rocketfrog	*Litoria nasuta*
V	wallum sedgefrog	*Litoria olongburensis*
	emerald-spotted treefrog	*Litoria peronii*
	laughing treefrog	*Litoria tyleri*
I	cane toad	*Bufo marinus*

Appendix 4. Fire Management Zones and Fire Management Areas

Vegetation communities and fauna habitats in Australia, and/or their distribution, have been shaped by fire. Natural areas can be managed to maintain the role of fire as an ecological process in these communities/habitats and to thereby restore or maintain their biological diversity.

Some of the most common reasons for managing a natural area with fire are listed below.

1. Protection of life, property and infrastructure.
2. Restoration, regeneration or maintenance of plant communities and fauna habitats.
3. Enhancement and/or maintenance of conditions suitable for particular flora/fauna species (e.g. rare and threatened species).
4. Maintenance or maximisation of diversity by maintaining a range of ages since fire for each vegetation type, including recently burnt areas, long unburnt areas and various ages in between.
5. Protection of cultural assets and natural assets other than those mentioned above.
6. Weed management including reducing the risk of invasion.
7. Minimisation of floristic changes in the ground stratum due to grazing by domestic or feral stock.

To achieve the aforementioned aims requires the development of an appropriate spatial and temporal mosaic across the reserve. This will not be achieved without considerable strategic planning and ongoing implementation of the plan/s. Whilst spatial mosaics can begin to be created reasonably quickly, the development of temporal mosaics requires a long-term strategy and commitment.

The two main levels or units of planning which will be used to facilitate the development of spatial and temporal mosaics and to manage fire in general are *fire management zones* and *fire management areas*. These are described below.

Fire management zones

The information presented here (unless otherwise referenced) draws on the work of Wouters 1996, Twyford 1995, Rose *et al.* 1999 and Clarke 1999. Rose *et al.* (1999) provide a valuable discussion of the importance and application of spatial patterns in the management of fire regimes for the protection of life and property, and the conservation of biodiversity.

Effective fire management requires an appropriate spatial and temporal application of fire regimes, and fire management zones offer a pragmatic way of identifying, planning and managing these patterns (Rose *et al.* 1999). Zones show at a glance the principal purpose/s (in terms of fire management) for any given part of a reserve and therefore the way in which the area will generally be managed for fire. Within any one zone there may be one to many vegetation communities/habitats and a range of appropriate fire regimes depending on the communities/habitats and purpose/s of the zone. Below is an outline of the principal purpose/s of each zone, guidelines for managing the zone and fire regimes that are appropriate within it. The following statement from Rose *et al.* (1999) should be heeded:

It is desirable that most fire management zones contribute in some way to both mitigation of unplanned fire and biodiversity conservation, even though this often involves more complex planning than the simpler approach of zones with (primarily) a single purpose. When all zones

are considered complementary, greater recognition is given to the cumulative benefits of management of each zone (across a landscape) with less reliance on the traditional 'sacrificial areas' to mitigate fire effects on assets.

Note: Not all zones will be necessary in all reserves.

Protection zone

Purpose

To create an area of reduced fuel to provide a high level of protection to life, property and infrastructure. The zone therefore typically abuts or surrounds property and key infrastructure, and in some cases the whole of an area may be designated as a *protection zone* (e.g. the whole yard area of the reserve headquarters rather than just a strip around it). It may also be used along sections of a boundary where fires are known to regularly enter or leave the reserve. In most cases it will not be possible, necessary or desirable to maintain a *protection zone* around the entire boundary of a reserve.

It may sometimes be necessary to create an area of reduced fuel around sensitive natural and cultural resources for which fire exclusion is critical. For example, a fire-sensitive community would be placed in an *exclusion zone* but to achieve this it may be appropriate to surround it and a buffer area with a *protection zone*.

Fuel can be reduced by burning or other means (e.g. mowing).

Guidelines

- Fuel loads will be managed to enable wildfires to be contained under fire weather conditions that are typical for a particular area and season.
- Tracks that allow ready access to fire fighting vehicles may be maintained in this Zone but the use of other features, such as fuel and vegetation moisture gradients, to contain fire is encouraged.
- All hazardous fuels that are likely to jeopardise wildfire suppression, in particular back-burning operations, must be removed from the area or if they are an essential part of the work environment they must be maintained according to work place health and safety standards (e.g. fuel-free zone around flammable chemicals).

Fire regimes

Intensity:	low
Season:	cooler months or any conditions that will ensure a low intensity burn
Frequency:	as often as there is sufficient fuel to carry a fire

Wildfire mitigation zone

Purpose

The location and management of this zone is aimed at increasing the likelihood of controlling a wildfire in strategically important areas within the reserve. The zone will often be located adjacent to a *protection zone* to provide maximum protection to life and property. The zone may also be used to reduce the potential for extensive areas to be burned in a wildfire and the likelihood of fires escaping from the reserve. It should, therefore act to slow the spread of

wildfire and thereby facilitate the implementation of wildfire suppression operations. It may be established along the boundary, particularly where the level of risk is too low to warrant a *protection zone*. Where consistent with the primary objectives of a *wildfire mitigation zone*, it should be managed to conserve biodiversity. *Wildfire mitigation zones* will be most effective when the surrounding fire-prone vegetation has been burned in a mosaic pattern (refer to *conservation zone*).

Guidelines

- Fuel loads are to be maintained in a mosaic pattern ranging from low to moderate.
- As far as possible the zone should be wider than the average spotting-distance to be expected in a normal fire season. Desirable width will vary from one location to another but may need to be up to 1 or 2km, in some sensitive high risk areas.
- Wherever practicable/acceptable this zone will be located to take advantage of natural fire control lines.
- The zone should be burned in sections to generate a mosaic burn pattern such that the vegetation is not simplified to a single age class but maintains the ecological values of a range of age classes (within the constraints of the primary purpose of the corridor).
- It is preferable for this zone to be bordered by well defined and accessible vehicle tracks on all sides, but in particular the edge along which most wildfire suppression activities are likely to be required.

Fire regime

Intensity: consistent with the ecological requirements of the vegetation communities
Season: consistent with the ecological requirements of the vegetation communities
Frequency: within the range acceptable for the ecological requirements of the vegetation communities but generally towards the shorter end of that range.

Conservation zone

Purpose

The purpose of fire management in this zone is to maintain the natural role of fire as an ecological process in vegetation communities and fauna habitats. Habitat diversity is critical to the maintenance of fauna diversity (Recher 1986). In fire-tolerant communities the most widely accepted means of achieving this is to burn in a highly variable mosaic (or patchwork) pattern. Each community needs to be broken up into a complex system of interlocking patches, each with a different fire history. These patches must provide a high degree of variation in fire-interval within each vegetation community (consistent with its ecological limits). Some of each community should be left for the maximum fire-free interval (consistent with its ecological limits) to facilitate formation of tree hollows, accumulation of litter and logs and to enhance soil formation and stability. How much should be left will depend on the regional context (e.g. the reserve may be surrounded by lands burned at short intervals), extent of the community and the requirements of the flora and fauna comprising the community. To establish such a mosaic requires use of natural as well as artificial fire control lines, taking advantage of suitable weather conditions (such as high soil moisture and dew), as well as considerable time and effort. Once established however, a mosaic is easier to manage because previously burnt patches act as barriers to assist with containment of each patch burn (Stanton 1993). Burning in this way also allows strategic selection of areas that can remain long unburnt without increasing the fire risk to life and property.

Management of this zone indirectly supplements the objectives of the other zones including the *protection zone* and the *wildfire mitigation zone*. Events and practices that are likely to promote weed invasion (e.g. lighting off road edges) should be avoided.

Guidelines

- This zone is usually located in areas remote from assets and property.
- The purpose of planned burns is to produce and/or maintain a mosaic pattern of vegetation with areas of varying age since fire. Ideally, areas of the same or similar age will be linked across the landscape to allow movement of fauna that may be dependent upon the particular habitat type created by a vegetation type of that age class.
- Strategically located tracks, natural fire control lines and previously burnt vegetation will be used to contain planned burns in this zone.
- As mosaic burning practices become well developed, the reliance on tracks and other constructed control lines should diminish, because fires (planned burns or wildfires) can be allowed to burn until they reach areas where the fuel has previously been reduced, and the fire can be more easily controlled (Stanton 1993).

Fire regimes

The fire regimes applied in this zone will vary according to the ecological requirements of the flora and fauna communities present in the zone and take into account the requirements of cultural resources.

Sustainable production zone

Purpose

The primary purpose of fire management in this one is to maintain and facilitate the sustainable production and use of one or more forest products. The outcomes of the zone may or may not be complimentary to those of other zones.

A *sustainable production zone* may be established for reasons including, but not limited to, the following:

- Sustainable timber production including promoting and protecting regeneration following timber harvesting, and protecting productive trees from damage or loss of yield
- Protecting and/or promoting plant species for sustainable collection of whole plants, plant parts (e.g. flowers/ fruits) or other plant products (e.g. honey)
- Maintenance of pasture for sustainable grazing whilst maintaining natural and cultural values
- Management of vegetation to facilitate access for timber harvesting

Guidelines

- This zone should be located within or near *protection* and/ or *wildfire mitigation zones*, unless the desired outcomes can be achieved in the absence of the protection afforded by the two latter zones.
- Strategically located tracks, natural fire control lines and previously burnt vegetation can be used to help contain planned burns in this zone.
- Management of the zone must give due regard to environmental and cultural outcomes.

- This zone may be permanent or temporary.

At times it may be difficult to determine whether an area should go into a *sustainable production zone* or, for example, a *conservation zone*. You should ask yourself the following question: "Is the **primary focus of fire management** (*not the focus of management generally*) in this area on maintaining the production or use of a forest product?" For example, is your fire management aimed at promoting and protecting regeneration of timber species; reducing the density of the shrub layer so as to promote growth and good form in the timber species; preventing the spread of rainforest into wet sclerophyll so as to maintain the wet sclerophyll timber resource, or promoting pasture for grazing? If the answer to those sorts of questions is yes, the area should go into a *sustainable production zone*. If however, the **primary focus of fire management** is conservation, even though timber resources are harvested from the area and/or it is grazed by cattle, you would place it in a *conservation zone*.

Sites in which beehives are located would be placed in a *protection zone* because the primary focus of fire management is to minimise the risk of the hives being destroyed. However, it would be appropriate to place an area in a *sustainable production zone* if it is being managed with fire to promote flowering and/ or protect the flowering resource for honey production.

Fire regime

The fire regimes applied in this zone will vary according to the product or sustainable use that is being protected or promoted in the zone. If possible the regimes should be compatible with or compliment those of a conservation zone.

Rehabilitation zone

Purpose

This zone should encompass areas that are intended to be included in another zone (e.g. *conservation zone, exclusion zone, sustainable production zone* or perhaps *wildfire mitigation zone*) in the future but whose current management is aimed at combating a threatening process that can not be addressed by the usual fire management practices used in the other zones to promote and maintain biodiversity or production values. Note that a *rehabilitation zone* is not used for an area that is being managed to promote regeneration for forest production purposes. Such an area would be managed as part of a *sustainable production zone.*

The following hypothetical scenario illustrates the use of a *rehabilitation zone* compared to a *conservation zone*.

Example only
There are two *Eucalyptus tereticornis* (blue gum) woodland communities on creek banks/flats in Park X. The first has a scattered infestation of rubbervine with few of the vines reaching the canopy. The infestation can be managed by an ongoing programme of spraying. The second is heavily infested with rubbervine to the point where the canopies are being smothered. The infestation is so severe that spraying, on its own, is not a viable option.

In general, the aim of fire management in these communities in Park X is to enhance fauna habitat by protecting habitat trees and the complex ground stratum. Therefore fire is either excluded from sites or patchy, infrequent, low intensity burns are used. This fire management is appropriate and achievable in the first blue gum

community and is combined with an annual weed programme to control the scattered rubbervine. The community is therefore placed in the conservation zone.

The biodiversity values of the second community are however, severely compromised by the rubbervine and will only get worse if something is not done soon. An intense fire or series of fires will set back the rubbervine to a point that will enable some hope of control through ongoing follow up with a spray program. While intense fire will also impact severely on the already weakened trees this is considered the better of two evils since it provides some hope for the community to recover over time. So the community is placed in a rehabilitation zone.

Guidelines

- The zone will only encompass areas where disturbance has resulted in a highly modified environment that is to be rehabilitated to its original state (or some other more natural state) and where fire exclusion or manipulation is required to achieve this aim.
- The zone should be bounded by fire control lines (preferably temporary if not natural) or a surrounding buffer should be burnt in such a way so as to minimise the risk of the *rehabilitation zone* being burned in an inappropriate way.

Fire regime

The fire regime will be determined by the particular needs of the community or communities within the zone.

Reference zone

Purpose

This zone is established to allow monitoring of the long-term effects of fire regimes, wildfires or fire exclusion on nature conservation values. Any *reference zone* established on a reserve should also have a documented and approved research and/or monitoring project/s. Not all reserves will require a *reference zone/s*.

Guidelines

- Representative areas of vegetation communities/habitats, of adequate size (the size required will depend on the research/monitoring programme to be undertaken), should be included in this zone.
- The zone, or buffer around the zone, must be bordered by existing roads, tracks or natural control lines to facilitate the exclusion of unplanned fires from the area.
- Wherever practicable/appropriate, the zone will be located in close proximity to *protection* and/or *wildfire mitigation zones* because the planned burning of these areas will maximise the protection of the *reference zone*.
- It is advisable to distribute the *reference zones* widely across a reserve to minimise the potential for all the areas to be burnt in a wildfire.
- Every reasonable precaution should be taken to ensure that *reference zones* can be adequately protected from unplanned fires.
- Active wildfire suppression will be carried out when *reference zones* are threatened unless a wildfire will achieve the purpose of the research/monitoring programme being undertaken in the zone.
- Ideally the fire history of each *reference zone* should be accurately known.
- A thorough (preferably quantitative) assessment of vegetation (and in some cases fauna and other biota) should be undertaken when the *reference zone* is first established.

Monitoring should thereafter be undertaken on a regular basis. Results from the monitoring programme must feed back into the Fire Strategy and Planned Burn Program.
- Monitoring environmental conditions, including weather, is a critical aspect of *reference zone* management.

Exclusion zone

Purpose

The objective for *exclusion zones* is the total exclusion of fire.

Guidelines

- The following community types will **generally** be included in this zone:
  - all rainforest types including coastal scrubs
  - mangroves, salt marshes, salt flats
  - coastal foredune communities
  - *Acacia* dominated communities

- The following community types may be included in this zone (alternatively they may be included in a *Conservation Zone*) at least for the 'life' of the Fire Strategy:
  - cypress forest (in certain areas)
  - riparian communities including those along dry creeklines
  - wet sclerophyll forests

- Communities should not be included in this zone if, although not planned to be burned, no attempt will be made to prevent wildfires entering them. However, an attempt to prevent a wildfire from entering an area is **not limited** to the efforts that are made on the day of a wildfire. For example, you may have patches of fire sensitive vegetation that are inaccessible by vehicle and would not be defended on the day if threatened by wildfire. Nevertheless, you consider that it is desirable to exclude fire from the patches and therefore deliberately conduct planned burns in the surrounding fire-prone vegetation in a way that will minimise the risk of a wildfire entering the rainforest patches should one occur. This sort of forward planning is considered a legitimate attempt to prevent a wildfire from entering an area and under these circumstances the area would be placed in an *exclusion zone.*

  - Similarly, planned burns can be conducted in ways that minimise the risk of fire sensitive vegetation (even small patches) being damaged by planned burns. For example: burning with good soil moisture; lighting up away from the edge of the fire-sensitive vegetation; burning downhill from, rather than up hill to, the fire-sensitive community; using aerial ignition to create many small patch burns in adjacent fire-prone communities rather than a single fire front.

- Many fire-sensitive communities (even when in small patches) are largely self-protecting because of their structure and microclimate, and/or position in the landscape (e.g. on rocky outcrops and in moist gullies) and will require little specific fire management to protect them. Nevertheless, where necessary and where possible, steps should be taken to reduce the risk of these communities being damaged in a planned burn (e.g. light the fire

away from the buffer; burn when soil moisture content is high) or wildfire (e.g. break-up surrounding vegetation by planned burning).

- A buffer zone, on both sides of the main bed of creeks/rivers, should be protected from fire to promote the recovery/development of riparian systems - these being critical fauna habitat. This may be difficult/impossible to achieve in the short term and it may therefore be more appropriate to leave such areas within a *conservation zone*. Steps should be taken, where possible, to reduce the risk of these communities being damaged in a planned burn (e.g. light the fire away from the buffer; burn when soil moisture content is high) or wildfire (e.g. break-up surrounding vegetation by planned burning).

- Assets, other than vegetation communities/habitats may be included in an *exclusion zone. e.g*. cultural sites for which fire exclusion is critical.

Fire regime

Exclude all fire from the zone. Manage surrounding fire-prone vegetation in a way that minimises the risk of either planned burns or wildfires impacting on the zone.

Fire management areas

In some reserves, or parts thereof, the use of fire management areas facilitates the implementation of the objectives of the zones. Fire management areas (sometimes previously known as blocks) are typically portions of a reserve which have logical natural, or other, boundaries such that it is helpful to manage that portion as a unit. For example, a catchment may be a useful management unit to designate as a fire management area. Similarly, a portion of a reserve that lies between two permanent access tracks or between an escarpment and a property boundary, may be sensibly managed as a fire management area. **It is critical that fire management areas are NOT managed in the traditional sense of blocks** - that is they should not be burned in their entirety, or on a rotational basis and the reliance on access tracks to contain fire should be avoided. Using access tracks, rather than features such as fuel or moisture gradients, to contain fires is a very real temptation but such practices may result in undesirable spatial patterns that lack variability (Rose *et al.* 1999).

A fire management area may include more than one fire management zone.

Fire management areas are tools to facilitate the implementation of the objectives of the zones - they do not have their own set of objectives or fire regimes.

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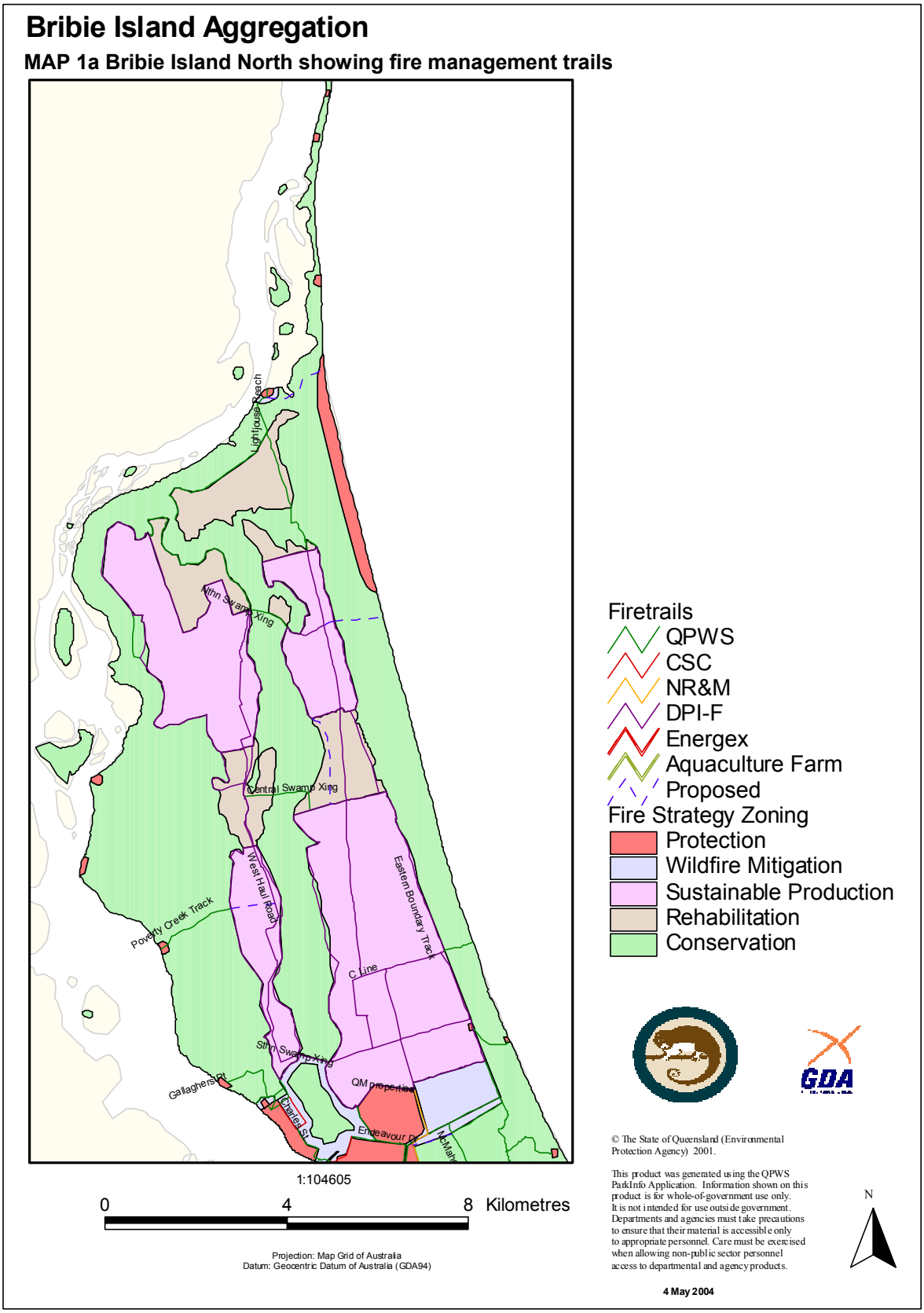
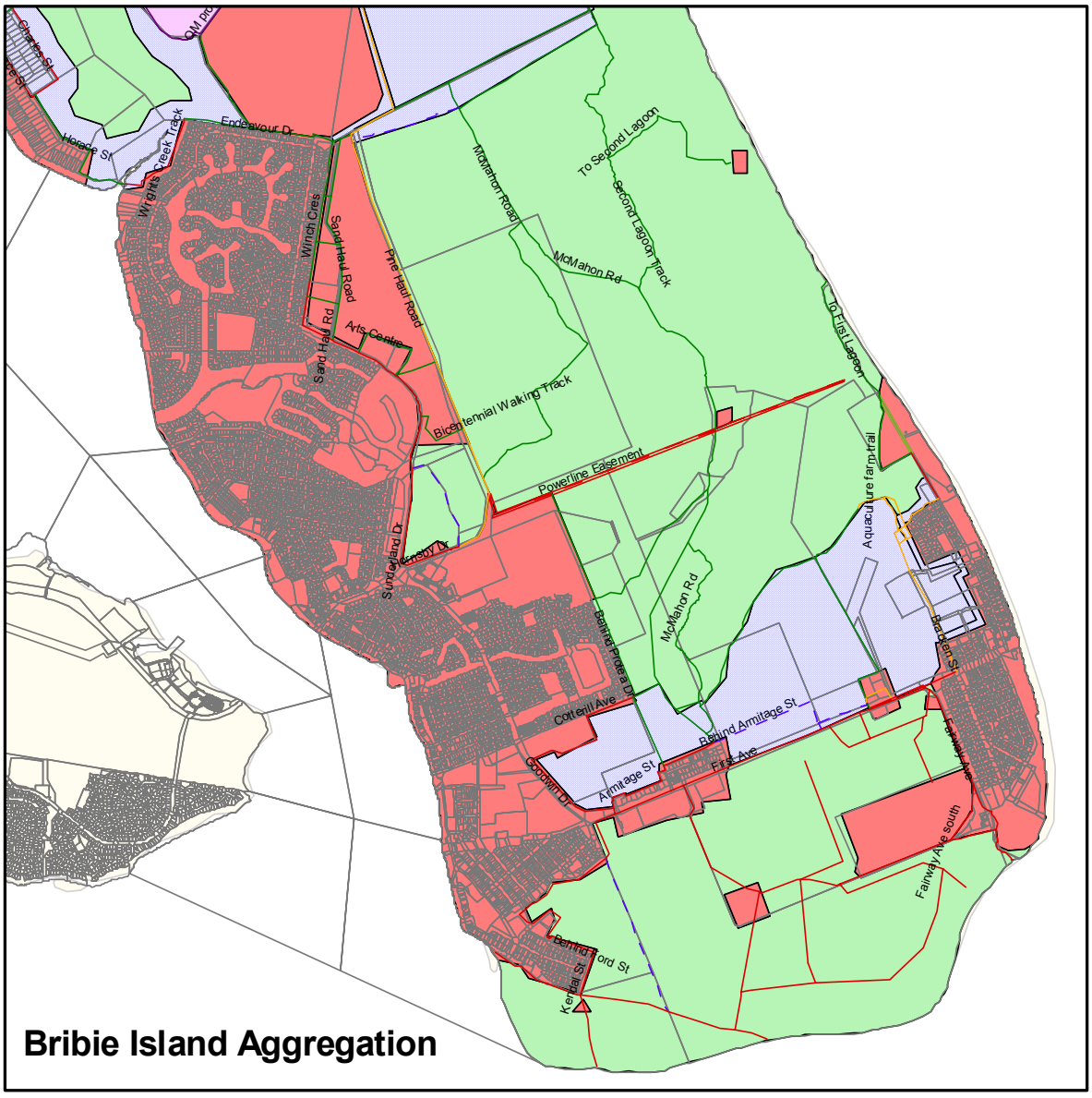
Map 1a of Bribie Island North showing fire management trails



Map1b Bribie Island South showing fire management trails



MAP 1b Bribie Island South showing fire management trails

Firetrails
- QPWS
- CSC
- NR&M
- DPI-F
- Energex
- Aquaculture Farm
- Proposed
- DCDB outlines

Fire Strategy Zoning
- Protection
- Wildfire Mitigation
- Sustainable Production
- Rehabilitation
- Conservation

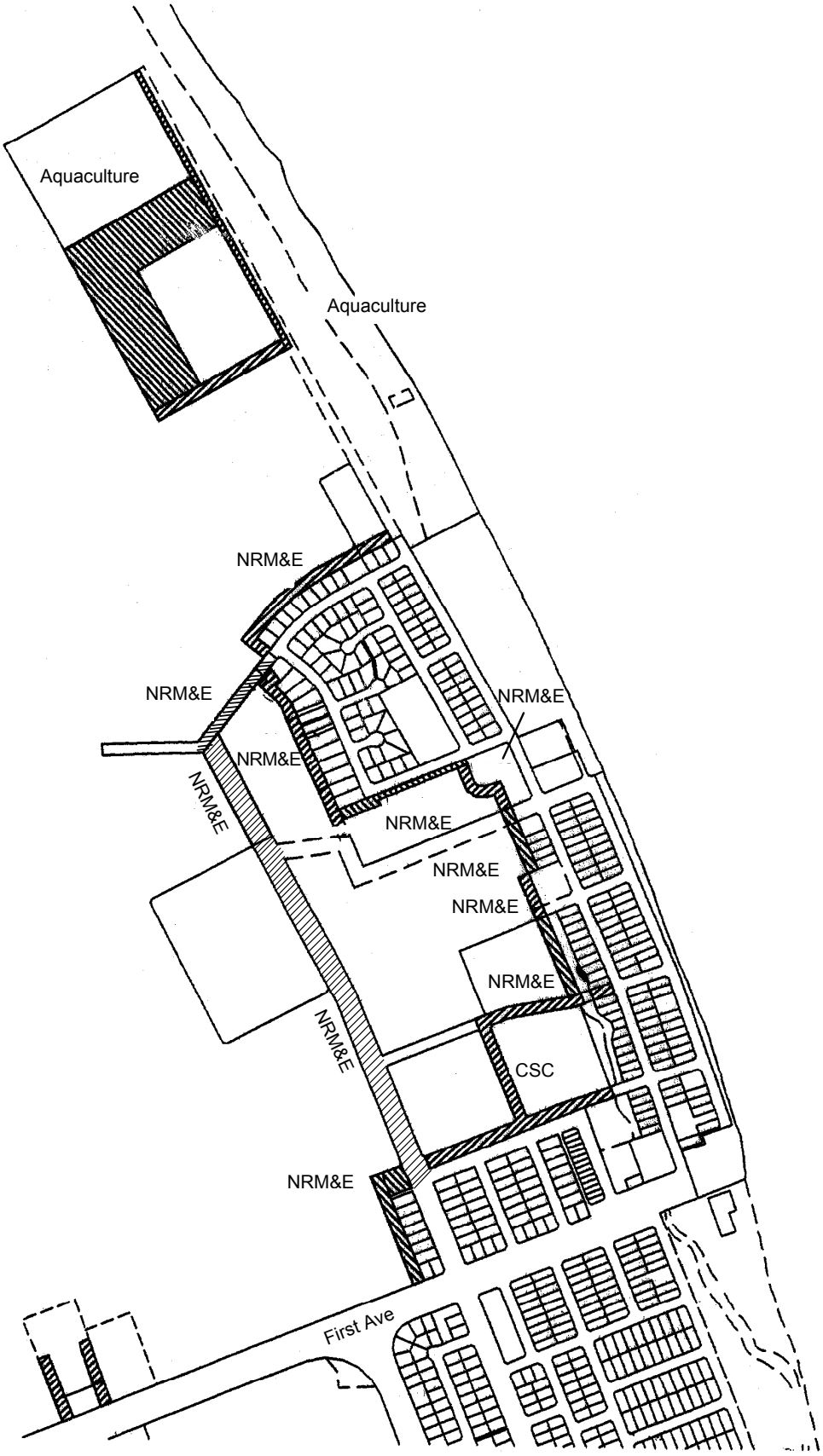
1:46118

0 1 2 Kilometres

Projection: Map Grid of Australia
Datum: Geocentric Datum of Australia (GDA94)

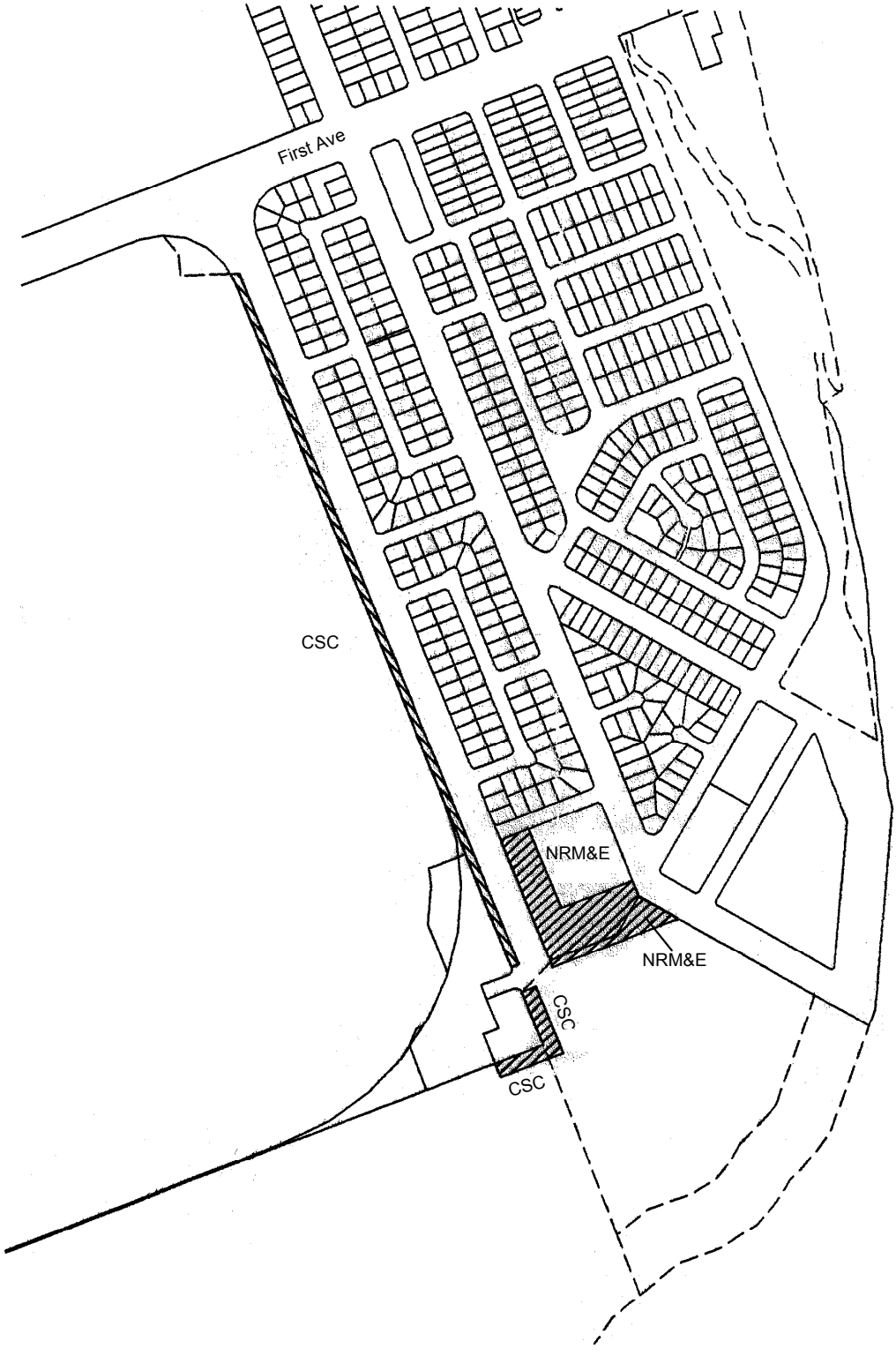
N

4 May 2004

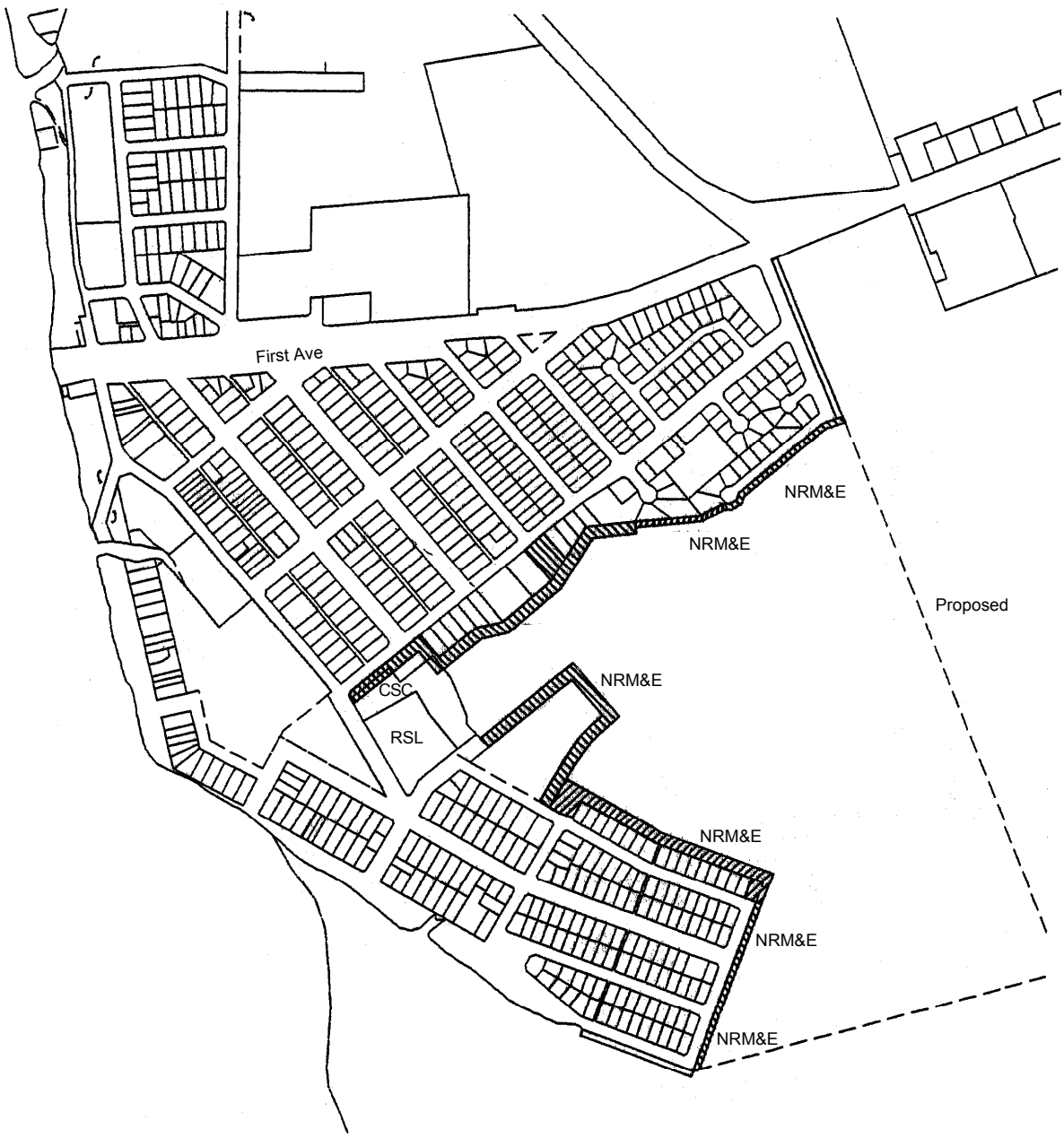


MAP 1b(i). FIRETRAILS – NORTH WOORIM

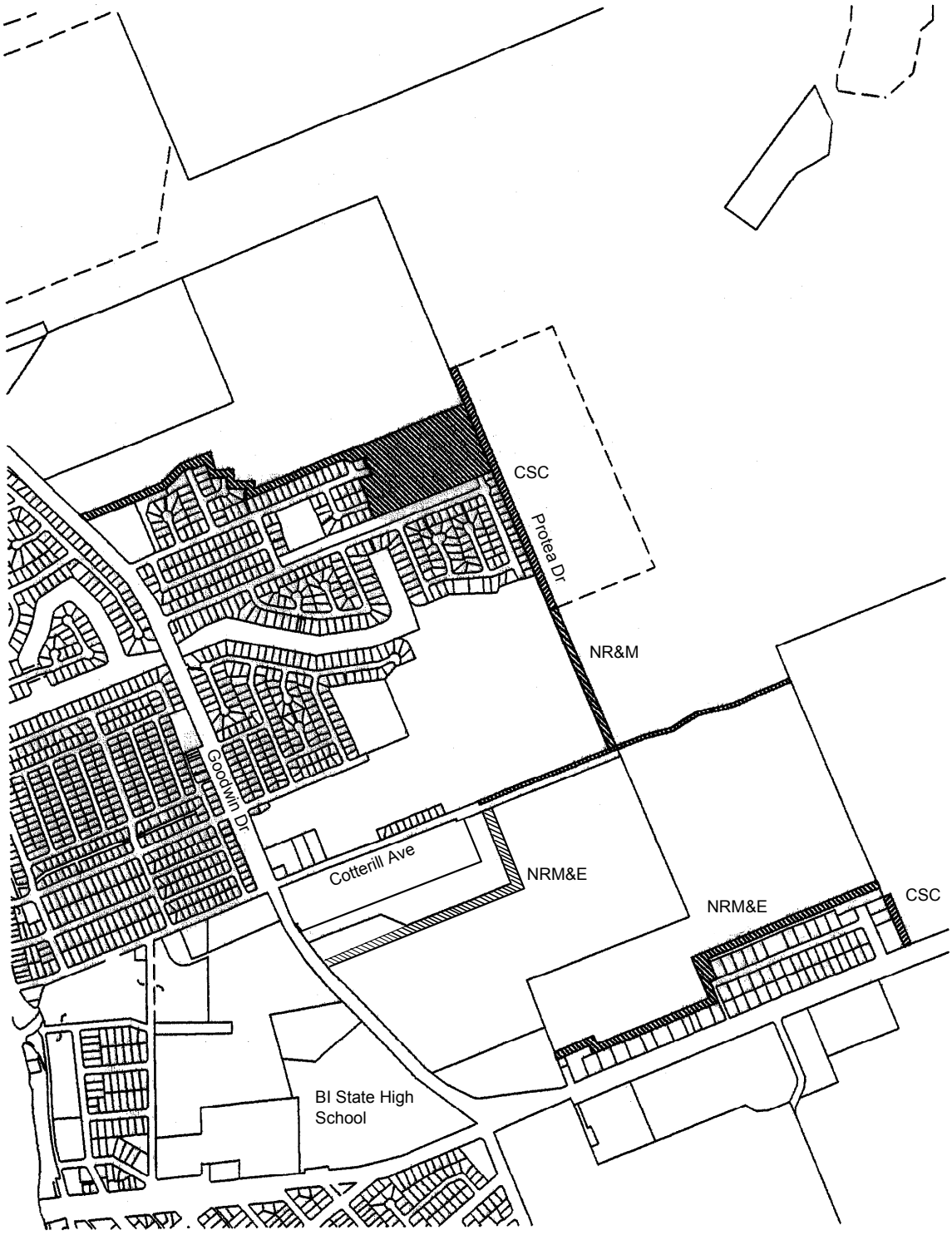
Revised from Marlow, D. (1995) The Integrated Fire Management Plan for Bribie Island
Qld Department of Lands



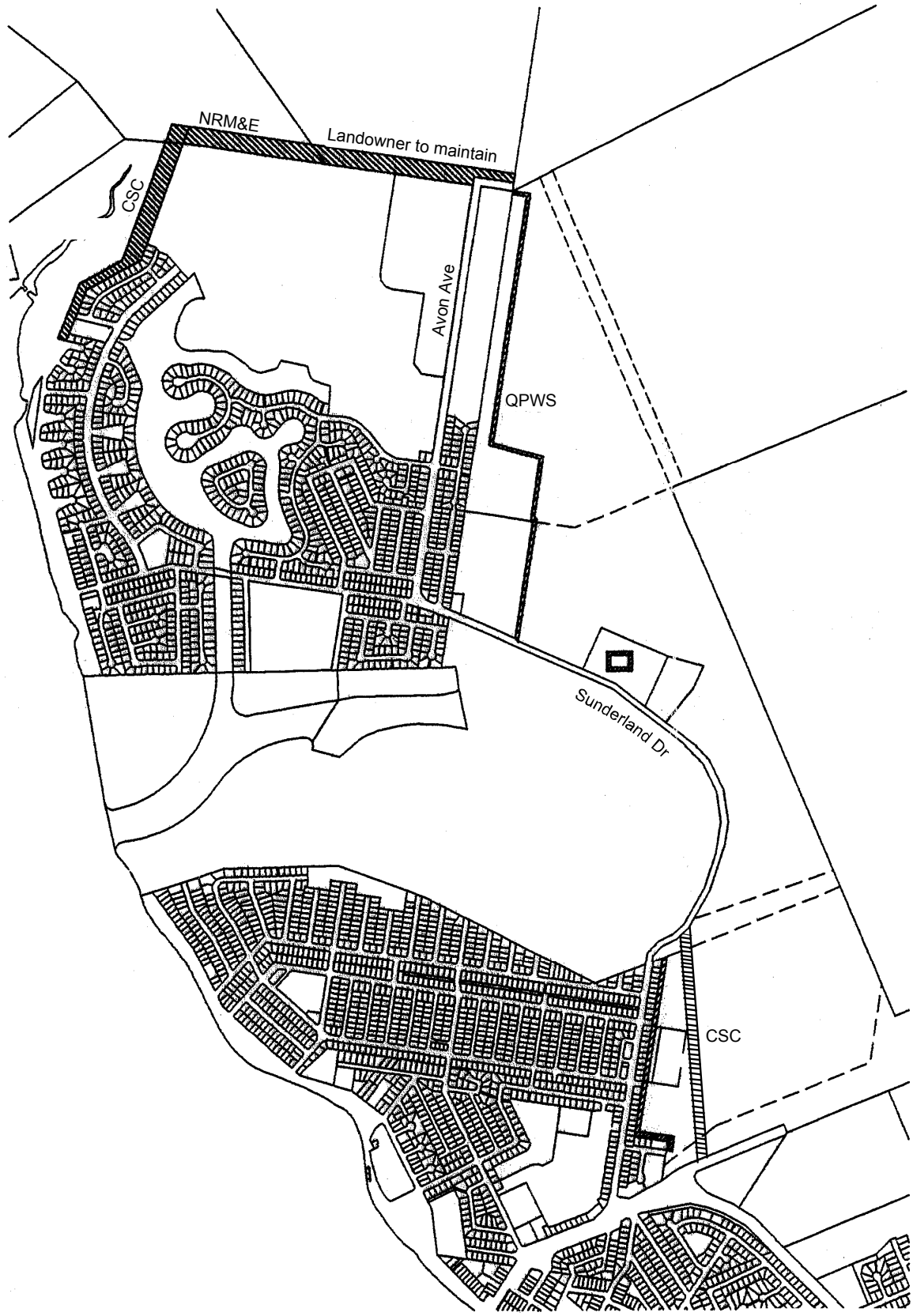
MAP 1b(ii). FIRETRAILS – SOUTH WOORIM
Revised from Marlow, D. (1995) The Integrated Fire Management Plan for Bribie Island
Qld Department of Lands



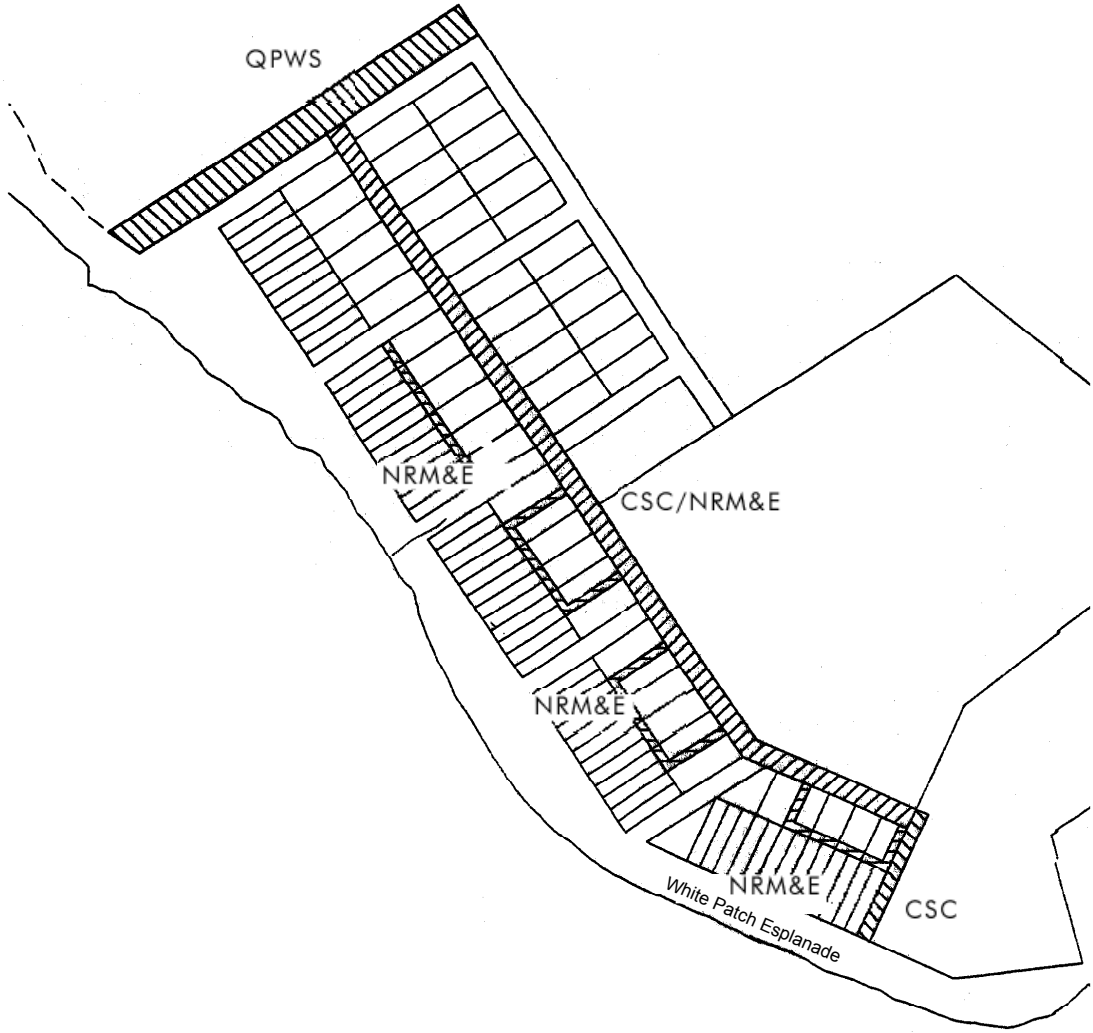
MAP 1b(iii). FIRETRAILS – SOUTH BONGAREE
Revised from Marlow, D. (1995) The Integrated Fire Management Plan for Bribie Island
Qld Department of Lands



MAP 1b(iv). FIRETRAILS – NORTH BONGAREE
Revised from Marlow, D. (1995) The Integrated Fire Management Plan for Bribie Island
Qld Department of Lands

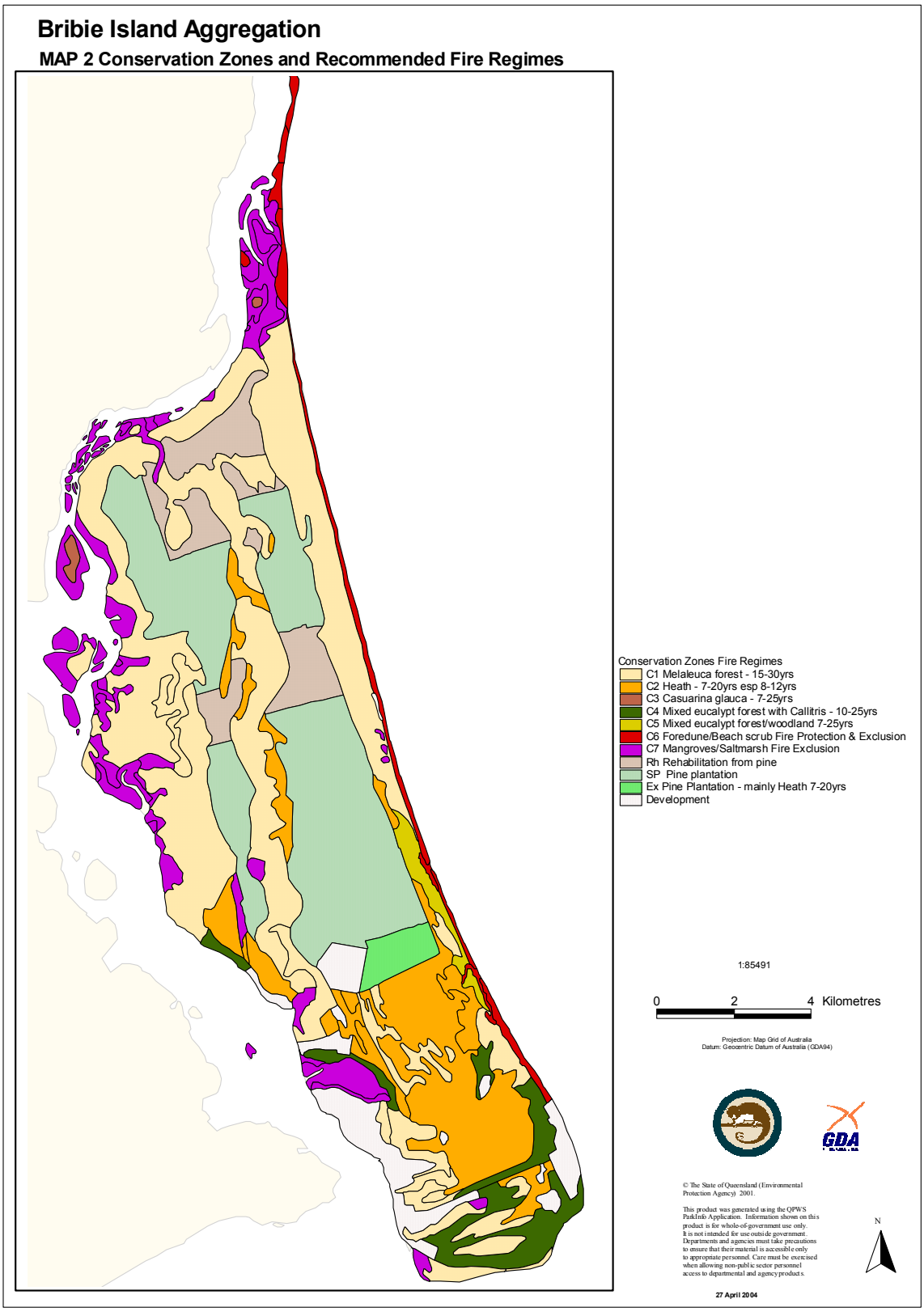


MAP 1b(v). FIRETRAILS – BELLARA / BANKSIA BEACH
Revised from Marlow, D. (1995) The Integrated Fire Management Plan for Bribie Island
Qld Department of Lands



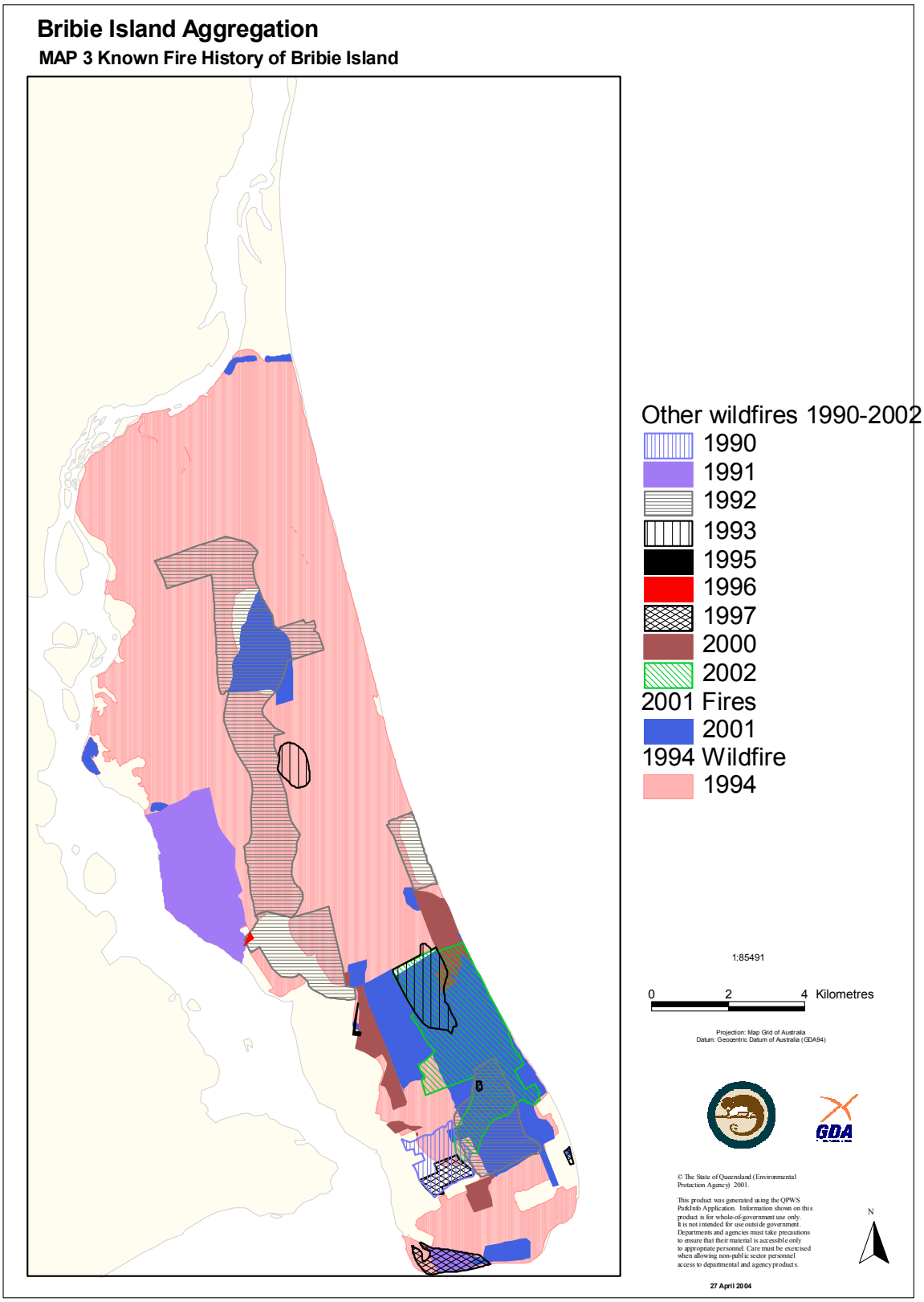
MAP 1b(vi). FIRETRAILS — WHITEPATCH
Revised from Marlow, D (1995) The Integrated Fire Management Plan for Bribie Island
Qld Department of Lands

Map 2. Vegetation map of Bribie Island showing fire regimes for each conservation zone

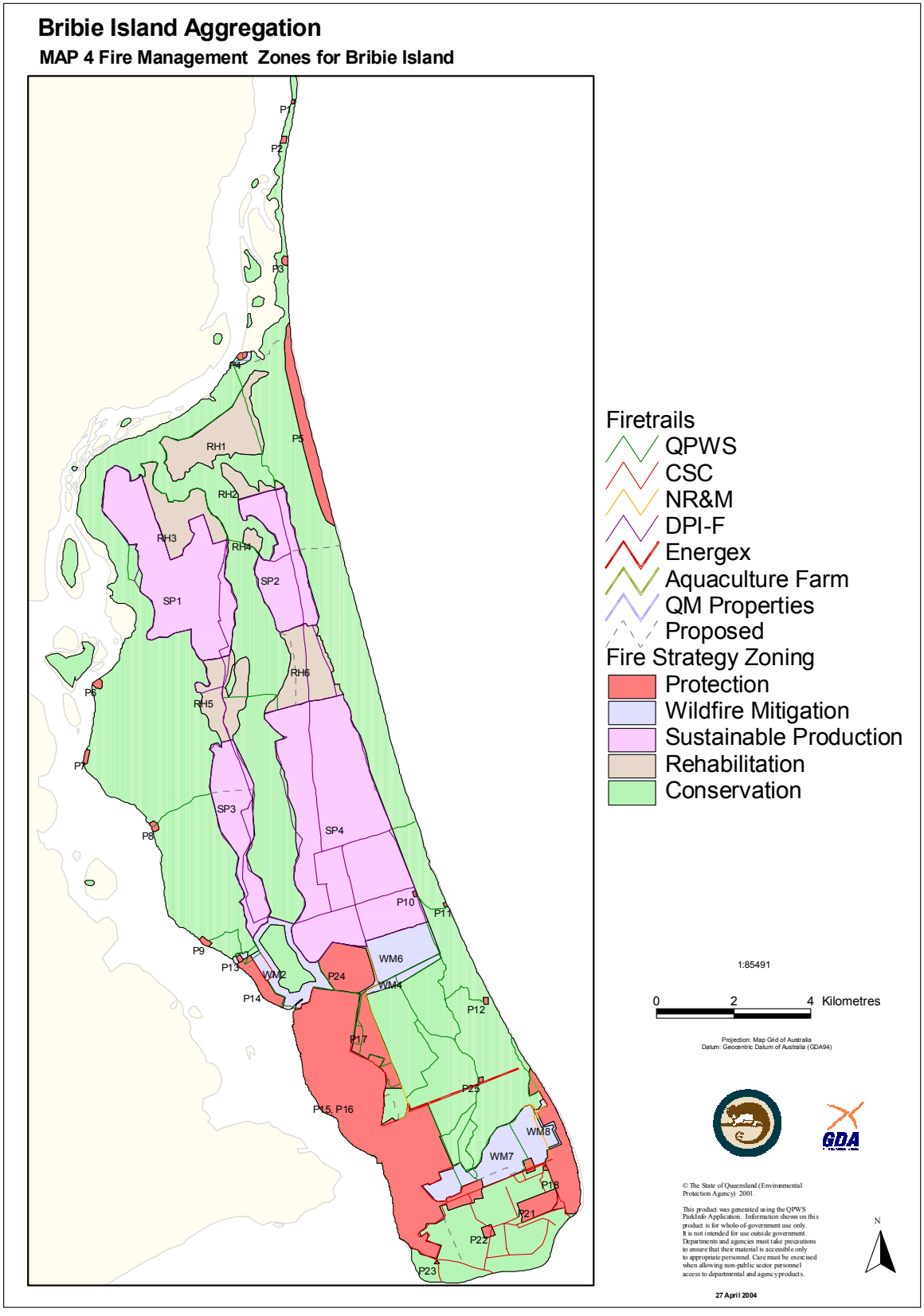


Note: Map derived from Department of Primary Industries 1976 Vegetation Mapping and matched to Environmental Protection Agency Regional Ecosystem Mapping 2003.

Map 3. Known fire history



Map 4. Fire management zones



Map 5. Aerial Photograph Bribie Island South, 11/3/2002