

FINAL REPORT FOR THE AUSTRALIAN GOVERNMENT DEPARTMENT OF THE ENVIRONMENT AND HERITAGE

INTRODUCED MAMMALS ON WESTERN AUSTRALIAN ISLANDS

IMPROVING AUSTRALIA'S ABILITY TO PROTECT ITS ISLAND HABITATS FROM FERAL ANIMALS

Published March 2004

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This report should be cited as:

Burbidge, A. A. (2004) Introduced mammals on Western Australian islands: improving Australia's ability to protect its island habitats from feral animals.

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Commonwealth Government or the Minister for the Environment and Heritage.

This project (ID number: 40977) was funded by the Australian Government Department of the Environment and Heritage through the national threat abatement component of the Natural Heritage Trust.

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INTRODUCTION

This report provides information to the Department of Conservation and Land Management (CALM) in relation to 'NHT project 40977 – A project that improves Australia's ability to protect its island habitats from feral animals'. This final report consists of two documents, both provided as hard copy and as electronic files. The first is this report, which describes the project and its outcomes. It is also provided as a Microsoft Word document file. The second is a Microsoft Excel 2000 spreadsheet containing the specified information on Western Australian islands.

In brief, the contract required the provision of information relating to Western Australian islands and the exotic mammals that have been recorded to occur on them. It also sought information on archipelagos where an exotic mammal may, once established on one island, disperse quickly to others (including small islets), information relating to legislation and management plans in place to regulate or control the introduction of feral mammals to WA islands and, where already available, information on the occurrence of feral animals on the offshore islands for other Australian States and Territories.

INFORMATION IN EXCEL FILE 'WA ISLANDS 1.XLS'

DATABASE 1

Database 1 is worksheet "all WA islands > 20 ha" in Microsoft Excel file 'WA islands 1.xls' and is a list of all marine islands and some estuarine islands in Western Australia with an area of equal to or greater than 20 ha. Islands that entirely comprise mangal or a mixture of mangal and mudflats have not been included. Islands that may be mostly mangal or mudflat but include some areas of land permanently above high water mark are included.

Column A 'ISLAND' provides the island's official name. Island names are consistent with the *Gazetteer of Australia 2002*. Information in brackets after the name is provided to assist locating the island where it is part of a group with no individual island names, eg, Doubtful Islands (near Bremer Bay, south coast of WA), which comprises three individual unnamed islands. Islands that have not been officially named are shown as 'unnamed' with information provided in brackets to aid their location.

Column B 'AREA' is the area of the island in hectares. Where available, areas have been taken from existing documents and databases; otherwise they have been calculated from 1:250 000 digitised maps using OziExplorer version 3.90 (D&L Software Pty Ltd). Areas highlighted in yellow denote islands with significant areas of mangal where the mangal has been included in the area calculation.

Columns C to H show the island's centroid latitude and longitude in degrees, minutes and seconds, while columns I and J show the island's centroid decimal latitude and longitude. The datum for the coordinates is GDA94. Data for named islands comes from the WA Department of Land Information gazetteer. Data for unnamed islands has been taken from digitised 1:250 000 maps using OziExplorer.

Column K 'ARCHIPELAGO/GROUP' provides the archipelago or group of islands of which the island is a part. This is left blank where the island is not part of an archipelago or group. Where the name used is unofficial, it is in quotation marks, eg, "Barrow". Note that subgroups may

exist, eg, the Herbert Islands in King Sound are part of the Buccaneer Archipelago. In such cases only the higher order group, in this case the Buccaneer Archipelago, is shown.

Column L 'LAND TENURE CATEGORY' provides the nationally consistent, broadly based classification of land tenure used by Geoscience Australia, which incorporates land tenure types currently in use by the relevant State/Territory and Commonwealth land administration agencies. It comprises 14 categories: Forestry reserve, Aboriginal freehold – National Park, marine reserve, nature conservation reserve, water reserve, defence land, Aboriginal reserve, other Crown land, mining reserve, vacant Crown land, freehold land, Crown leasehold (mainly pastoral), Aboriginal freehold and leasehold, and mixed lands.

Column M 'LAND STATUS' shows the Western Australian legal land status. If the island is reserved under the Land Administration Act, the reserve number is shown. The letter 'A' before a reserve number means that the reserve is Class A. No letter means that it is not Class A.

Column N 'VESTING/OWNERSHIP' shows vesting if the island is a reserve and vested (ie, the care, control and management of the reserve has been placed with a person (including a statutory authority)) pursuant to Section 46 of the *Land Administration Act 1997*, noting that the *Conservation and Land Management Act 1984* provides that all national parks, conservation parks and nature reserves are vested in the Conservation Commission of Western Australia. For unallocated Crown land and most freehold and leasehold land, this field is blank. The Western Australian Government has decided that CALM should assume responsibility for certain aspects of management of unallocated Crown land currently the responsibility of the Department of Land Administration, but the details are still subject to negotiation.

Column O 'CALM Region' shows the Department of Conservation and Land Management administrative region in which the island is situated.

Column P 'JOINED?' includes information where the island is known to be naturally or artificially joined to a larger land mass, eg, by a seasonal or semi-permanent tombolo, by mudflats at low tide or by an artificial causeway; otherwise it is shown as 'no'. Where there is a very narrow channel at low tide (which feral mammals may be able to cross), a comment to this effect has been entered where this information is available.

Column Q 'SURVEYED?' has a 'yes' if there has been, in my judgement, sufficient examination of the island by CALM or other scientists or other competent staff to be reasonably sure that exotic mammals do or do not occur there. Note that in many cases, the survey took place some years ago and the information may not be current.

DATABASE 2

Database 2 is worksheet "WA islands with exotic mammals" in file 'WA islands 1.xls'. It lists all Western Australian islands (of any size) where available information shows the presence of an exotic mammal at some date since European settlement (1829). Exotic has been defined to include mammals not indigenous to Australia and Australian indigenous mammals not native to the island. Multiple entries for an island are provided where more than one exotic mammal has been recorded.

Columns A to P inclusive are copies of information from Database 1.

Column Q 'EXOTIC MAMMAL' shows the species of exotic mammal recorded. The dingo (*Canis lupus dingo*) is treated as an exotic, having been taken to islands by Aborigines within the last 4 000 years. (Some island populations have probably hybridised with domestic dogs.)

Column R 'REFERENCES' shows reference numbers supporting the records of native and exotic mammals. Full references are provided in Database 6.

Column S 'STATUS/COMMENTS' provides relevant notes on the current status of the species and, where the information is available, how it came to be on the island.

DATABASE 3

Database 3 is worksheet 'WA islands, no exotic mammals' in spreadsheet 'WA islands 1.xls'. This database is a list of all WA islands > 20 ha where there are no known occurrences of exotic mammals. This list comprises all islands in Database 1, minus islands >20 ha in Database 2.

Columns A to P inclusive are copies of information from Database 1. Column Q 'SURVEYED?' is a copy of Column Q in Database 1.

DATABASE 4

Database 4 is worksheet 'Archipelagos' in spreadsheet 'WA islands 1.xls'. This worksheet provides information on archipelagos and island groups ('group', with a lower case 'g', is used for unnamed archipelagos; however, note that the three island Groups within the Houtman Abrolhos are officially-named Groups) where islands occur at distances apart of less than 3 km. Some major archipelagos contain numerous islands with a great variety of distances between them. In these cases, should a feral animal establish on any one island, an assessment needs to be made on a case by case basis. These archipelagos include the Buccaneer Archipelago, the Dampier Archipelago, Wallabi, Easter and Southern Groups in the Houtman Abrolhos, and the Archipelago of the Recherche.

Column A provides the archipelago or unofficial group name.

Columns B to I provide approximate centroid coordinates for the archipelago or group.

Column J provides the number of islands and islets within the archipelago or group.

It is difficult to provide definitive information about the natural spread of feral mammals between islands and between the mainland and islands in Australia due to limited data. A brief review follows.

Red Fox. Data from Abbott and Burbidge (1995) for all Australian islands shows that foxes have spread to islands up to 2.8 km from the nearest larger land mass (Table 1). However, in some cases, foxes may have crossed shorter distances of water by island hopping, or the distance may actually be much less at low tide. For example, Legendre Island is 2.8 km from Dolphin Island, but at low tide the distance may be somewhat shorter. How much assistance a swimming fox might get from tidal currents is also an unknown factor. A conservative view would be to assume that foxes are capable of crossing channels up to 3 km wide.

Table 1. Red fox occurrences on Australian islands where introduction occurred ‘naturally’, ie, they were ‘self-introduced’

| ISLAND | STATE | DISTANCE (km) |
|------------|-------|------------------|
| Dolphin | WA | 0.2 |
| Gidley | WA | 0.2 |
| Bird, East | SA | 0.7 |
| Eba | SA | 0.7 |
| Angel | WA | 1.0 |
| Bennison | VIC | 1.8 |
| Sunday | VIC | 2.1 |
| Depuch | WA | 2.5 |
| Germein | SA | 2.8 |
| Legendre | WA | 2.8 |

Cat. Most occurrences of feral cats on islands result from deliberate releases. There are few records where one can be reasonably certain that cats crossed channels naturally (Table 2). Legendre Island again provides the case where cats have crossed the largest channel. As with the fox, we should assume that cats can cross a channel up to 3 km wide.

Table 2. Feral cat occurrences on Australian islands where introduction occurred ‘naturally’, ie, they were ‘self-introduced’

| ISLAND | STATE | DISTANCE (km) |
|-------------|-------|------------------|
| Mutton Bird | NSW | 0.1 |
| Dolphin | WA | 0.2 |
| Gidley | WA | 0.2 |
| Angel | WA | 1.0 |
| Legendre | WA | 2.8 |

Black Rat. Data on black rat swimming distances in Australia are scarce. In the Montebello Islands black rats have crossed channels up to 1.4 km wide, possibly with tidal current assistance. In the Houtman Abrolhos, rats did not cross from Rat Island to Wooded Island, a distance of 3.4 km. Nor have they crossed the warmer waters between the Montebellos and the Lowendal Islands, a distance of 11.7 km. In New Zealand, black rats are known to have crossed channels of 1 km in much colder waters than exist in most of Australia. A conservative approach would be to assume that, in Australia, black rats can cross channels of up to 2 km.

House Mouse. Again, there is limited information on ‘natural’ introductions. In the Lowendal Islands of WA, *Mus* crossed channels of about 0.5 km between Varanus Island and Bridled and Beacon Islands. They have not crossed between Whitlock and Escape Islands in Jurien Bay, a distance of 1.0 km. From limited data, mice appear to be able to cross much smaller distances of ocean than black rats. A conservative approach might be to assume that, in Australia, *Mus* can cross channels of up to 0.8 km.

Rabbit. Rabbits do not seem to spread naturally across any significant water channel. The only records in WA are for distances under 200 m.

It is important to note that there are numerous islands, currently with no feral animals recorded on them, that have channels of less than 3 km from the mainland. These are too numerous to include in this project. Monitoring of such islands is important so feral mammals can be eradicated before widespread establishment and damage to biodiversity values.

DATABASE 5

Database 5 is worksheet 'Australian islands not WA' in spreadsheet 'WA islands 1.xls'. This database provides information on the known occurrence of exotic mammals on islands in Australia outside Western Australia. Information is taken from:

Abbott, I. and Burbidge, A.A. (1995). The occurrence of mammal species on the islands of Australia: a summary of existing knowledge. *CALMScience* 1(3), 259-324.

Minor updates and corrections have been made since the paper was published; however, the data will be incomplete and out of date.

OTHER INFORMATION PROVIDED

REFERENCES

Worksheet 'References' contains references supporting the occurrence of mammals on Australian islands. It is based on Abbott, I. and Burbidge, A.A. (1995), with updates and additions. Note that it includes references for native mammals on Australian islands as well as exotic ones.

AUSTRALIAN MAMMAL CHECKLIST

Worksheet 'Australian mammals' in spreadsheet 'WA islands 1.xls' is a list of indigenous and exotic Australian mammals. Note that it includes many species not found on islands.

NOTES

Worksheet 'Notes' in spreadsheet 'WA islands 1.xls' provides notes on all databases.

LEGISLATION AND MANAGEMENT PLANS

LEGISLATION

The major biodiversity conservation Acts in Western Australia are the *Wildlife Conservation Act 1950* and the *Conservation and Land Management Act 1984*.

Wildlife Conservation Regulations

Regulation 58 of the deals with 'releasing animals' anywhere (not only on Department of Conservation and Land Management (CALM)-managed lands) and states that

58. a person shall not—
- (a) abandon; or
 - (b) release from captivity or confinement in circumstances which may make the recovery of the bird or animal impossible or uncertain any bird or other animal, other than a homing or racing pigeon, without the prior permission in writing of the Executive Director.

Conservation and Land Management Act 1984

Section 106(a) of the deals with unlawful occupation of land.

106. A person shall not, except under a permit, licence, or lease under this Act, or a grant, lease, licence, or other authority from the Crown —
- (a) depasture any cattle on land to which this Part applies;

Penalty: \$4 000 and imprisonment for 6 months.

Conservation and Land Management Regulations 2002

[In these Regulations, ‘CALM land’ includes islands designated as national parks, conservation parks and nature reserves.]

Regulation 15 deals with bringing animals on to CALM land.

15. Without limiting section 106(a), and subject to regulations 16 and 17, a person must not, without lawful authority-
- (a) bring an animal on to CALM land; or
 - (b) allow an animal to enter or remain on CALM land.

Penalty: \$500.

Regulation 16 deals with dogs on CALM land.

16. (1) A person may bring a dog on to a designated area.
- (2) A person must control and manage a dog in a designated area in accordance with conditions specified on the signs erected in or in the vicinity of that area for the purposes of regulation 6(3).

Penalty: \$500.

Regulation 17 deals with horses on CALM land.

17. (1) A person may bring a horse on to a designated area.
- (2) A person must control and manage a horse in a designated area in accordance with conditions specified on the signs erected in or in the vicinity of that area for the purposes of regulation 6(3).

Penalty: \$500.

Agriculture and Related Resources Protection (Declared Animal) Regulations 1985

Regulation 12 of the ARRP Regulations deals with "Escape of declared animals"

12. If any animal in respect of which a permit is issued is liberated or becomes at large in any part of the State in respect of which it is a declared animal, the person who was in charge of the animal immediately before it was liberated or became at large shall, unless otherwise required by the Protection Board, immediately take all reasonable steps to recapture or destroy the animal, and he and the person to whom the permit was issued shall each notify the Protection Board forthwith.

Penalty: \$500

[The key to this regulation is that it only applies to declared 'pest' species and does not apply to domestic pets/stock or commensal animals that are not under someone's direct control. Rats, mice, cats and dogs would not be subject to this regulation.]

Two other Acts may provide some powers to regulate the release of exotic mammals on islands. These are the *Biological Control Act 1986* and the *Exotic Disease of Animals Act 1994*. These mirror their corresponding Commonwealth counterparts to the extent possible, i.e. they are part of a uniform legislation regime.

MANAGEMENT PLANS

Management Plans are prepared in accordance with the Conservation and Land Management Act. Management Plans have been approved for the following islands (see www.naturebase.net/national_parks/management/man_approved_plans.html)

Carnac Island Nature Reserve (August 2003)

Dampier Archipelago Nature Reserves (August 1990)

Jurabi, Bundegi Coastal Parks and Muiron Islands (Aug 2000)

Shannon and D'Entrecasteaux National Parks (Jan 1988) [includes islands in Broke Inlet]

Shark Bay Terrestrial Reserves (October 2000)

Shoalwater Islands Nature Reserve (October 1992)

Two Peoples Bay Nature Reserve (July 1996) [includes Coffin Island]

Walpole-Nornalup National Park (July 1992) [includes Newdegate Island]

DEMONSTRATION/COMMUNICATION ACTIVITIES

Draft databases have been reviewed by relevant CALM staff. No other communication or demonstration activities have been undertaken.

METADATA STATEMENT

A metadata statement for the datasets is provided at Attachment 1. It follows *ANZLIC guidelines: core metadata elements*.

ACKNOWLEDGEMENTS

I thank those CALM staff located in coastal Regions who reviewed information for their areas: Tim Willing, Peter Kendrick, Fran Stanley, Anthony Desmond and Rod Annear. I am grateful to Nathan Eaton from CALM's Information Management Branch for assistance in providing land tenure information and to Peter Mawson and Simon Hancocks for advice on legislation. Particular thanks go to Keith Morris for offering me a contract relating to biodiversity conservation on islands, a subject that has always fascinated me.

INTRODUCED MAMMALS ON WESTERN AUSTRALIAN ISLANDS

METADATA INFORMATION

| Category | Element | Comments |
|----------------------------|----------------------------------|---|
| Dataset | Title | WA islands > 20 ha with and without records of exotic mammals. |
| | Custodian | WA Department of Conservation and Land management |
| | Jurisdiction | Western Australia |
| Description | Abstract | Contains a list of all Western Australian islands > 20 ha, together with a subset of islands with records of exotic mammals. Coordinates are provided for each island, plus name of Archipelago or island group (if any) in which they are situated and information on land tenure. For each mammal record a reference is provided, together with comments where appropriate. |
| | Search Word(s) | Western Australian Islands, exotic mammals. |
| | Geographic Extent Polygon(s) | Whole of WA coastline. |
| Data Currency | Beginning date | July 2003. |
| | Ending date | March 2004. |
| Dataset Status | Progress | Completed. |
| | Maintenance and Update Frequency | As required. |
| Access | Stored Data Format | Microsoft Excel 2000 spreadsheet. |
| | Available Format Type | Microsoft Excel 2000 spreadsheet. |
| | Access Constraint | None. |
| Data Quality | Lineage | A brief history of the source and processing steps used to produce the dataset. |
| | Positional Accuracy | Centroid coordinates from DOLA information for named islands. For un-named islands centroid coordinates taken from digitised 1:250 000 map sheets . |
| | Attribute Accuracy | Very reliable. |
| | Logical Consistency | N/A. |
| | Completeness | Complete for all WA islands > 20 ha. |
| Contact Information | Organisation | Department of Conservation and Land Management |
| | Contact Position | Manager, Biodiversity Conservation Group, Science Division |
| | Mail Address 1 | PO Box 51 |
| | Mail Address 2 | |
| | Suburb or Place or Locality 1 | Wanneroo |
| | State or Locality 2 | Western Australia |
| | Country | Australia |
| | Postcode | 6946 |
| Metadata Date | Metadata Date | 1 March 2004 |
| Additional Metadata | Additional Metadata | N/A |