

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

Introduced Animals on Northern Territory Islands: improving Australia's ability to protect its island habitats from feral animals.



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Introduction

Islands play a significant role in the conservation of Australia's flora and fauna. The isolation of islands protects their inhabitants from threatening processes occurring on the mainland. Within the Northern Territory much of the information on island biota has been collected ad hoc, and is not based on intensive systematic surveys. However, intensive fauna and flora surveys have been conducted on the Tiwi Islands (Woinarski *et al.* 2003), the Wessel and English Company Islands (Woinarski 1998), the Sir Edward Pellew Islands (Johnson and Kerle 1991; Taylor *et al.* 2004a) (although only the major islands in the group were studied during both surveys), Groote Eylandt (Webb 1992) (although this study only surveyed a small area on the western side of the island) and Indian Island (Wilkins *et al.* 1999). Many other major islands (Maria, Bickerton and islands off Groote Eylandt) and island groups (Vernon, Goulburn, Peron, Sir George Hope, Cunningham and Crocodile Islands) remain unsurveyed.

Methodology

Islands were determined by editing a GIS spatial layer of tenure within the Northern Territory. All areas outside the extent of the coastline were selected to create an island shapefile. The associated tenure table contained information on island name, centroid coordinates, tenure, ownership and area. Topographic maps were assessed to identify if islands were joined to the mainland (artificially or naturally) and to confirm they were true islands. True islands were considered to be separated from the mainland and remain above the sea at all times. Islands that were identified as partly exposed reefs or that were completely inundated at high tide were eliminated from the sample.

Records of introduced vertebrate animals on islands were obtained from the Northern Territory Fauna Atlas (unpublished), a previous national database of mammal distributions on islands (Abbott and Burbidge 1995), and collation of unpublished records from DIPE staff and other local experts. Species observations from the atlas were intersected over Northern Territory islands, to obtain a fauna list for each island, with all

records of introduced fauna being selected. Records of exotic ant species were obtained from Alan Andersen of CSIRO, Darwin.

All information on island characteristics and feral animals were collated into four databases. Descriptions of the databases associated with this report can be found in the Appendix.

Northern Territory Islands

The Northern Territory has a total of 398 islands, of which 215 are larger than 20 hectares: these are the islands for which data were collected. A large proportion of these islands occur within four major archipelagos; the Crocodile (17 islands), Wessel and Cunningham (21 islands), English Company (11 islands) and the Sir Edward Pellew (30 islands) groups.

The majority of islands (168) are Aboriginal freehold land. Thirteen islands are maintained in some form as Northern Territory conservation reserves (see Legislation) and another three islands are part of Kakadu National Park. Seventy-two islands remain un-named and do not occur within the Gazetteer of Australia (Geoscience website <http://www.ga.gov.au/map/names>).

Exotic Animals

Thirty-one islands (14%) within the Northern Territory currently have or have had at least one introduced fauna species, with sixteen vertebrate and nine invertebrate introduced species having been recorded. However, this number is likely to increase as the Cane Toad *Bufo marinus* continues to expand its range in northern Australia.

The feral species recorded on the most islands are: dog (13 islands), cat (10 islands), asian house gecko (9 islands), cane toads (8 islands), goat and cattle (7 islands each). Some large islands have few or no exotic animal species (fig 1). Bickerton Island has no

introduced species recorded, however, it should be noted that this island has not been scientifically surveyed. Dogs are the only introduced species to occur on Marchinbar Island (20 860 ha) in the Wessel archipelago and an eradication program is planned to commence later this year. Bathurst Island, part of the Tiwi islands has only two introduced vertebrate species recorded, pigs and cattle.

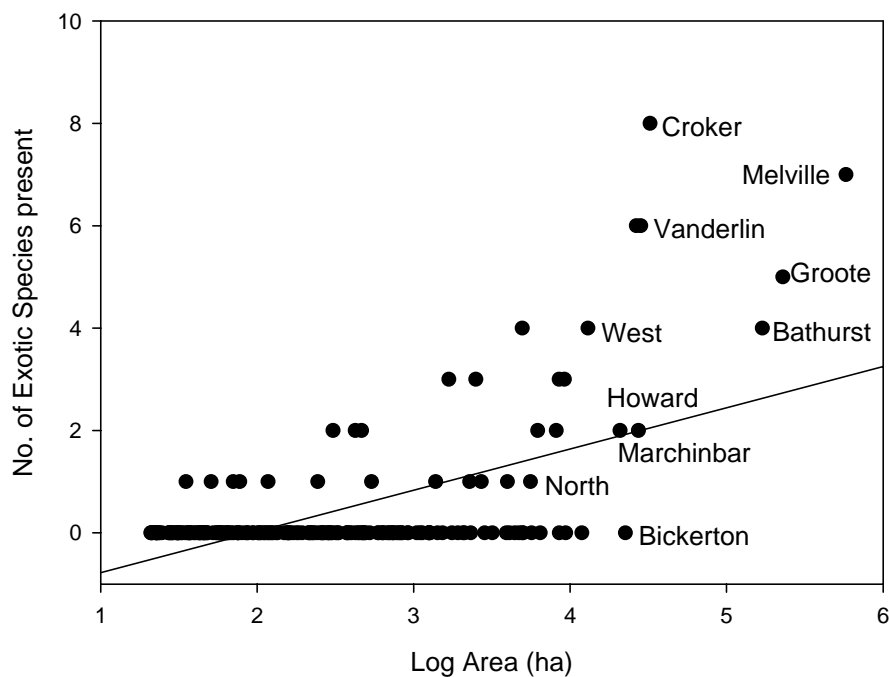


Figure 1: The relationship of islands size (log area ha) and the number of exotic species present on the island, showing the best line of fit.

Historically, introduced species frequently occur on islands permanently inhabited by humans or on islands close to the mainland, where species have been able to cross naturally. The Cane toad has already colonized many, if not all islands in the Sir Edward Pellew archipelago, washed out onto the islands from the mouth of the McArthur River in large floods during the 2002/2003 season. The Northern Territory Government has implemented an extensive education program to prevent Cane Toads reaching islands, and to communicate more widely the value to biodiversity of islands generally.

Few eradication programs have been conducted on islands off the Northern Territory coast. Dogs were successfully eradicated from Wigram Island in the late 1990s at the

request of the traditional owner and because of concerns about their impacts upon biodiversity. Two eradication programs are planned to begin later this year. The Gumurr Marthakal Rangers from Elcho Island will be carrying out a dog baiting program on Marchinbar Island, to protect the Northern Territory's only Golden Bandicoot population. The Mabunji Sea Rangers from Borroloola have received funding to eradicate goats from West Island in the Sir Edward Pellew archipelago. The NT DIPE is currently working with the Tiwi Land Council to attempt to eradicate a population of feral pigs introduced to Melville Island within the last decade (pers comm. K. Saalfield). Other species introduced to islands have died out naturally, with cattle and goats having been unable to persist on Black Craggy Island in the Sir Edward Pellew group.

Natural Spread of Exotic Animals

There are many factors that will affect the likelihood of islands being naturally invaded by exotic animals, including; the swimming ability of the invading species, distance of the island from the mainland, distance to the nearest landmass, tides and currents, and location of large rivers on the mainland. As archipelagoes contain many islands with varying distances between them, it is hard to provide information about the natural spread of exotic animals between islands. If an exotic animal were to establish itself on an island, an evaluation would need to be made on a case by case basis.

Here I provide a brief review of the information available on the natural spread of exotic animals from the mainland to islands in the Northern Territory (see WA database for Australia wide information).

Cane Toad. There have been several observations of cane toads spawning in brackish water, calling on tidal mudflats, swimming in the sea and crossing 600 m of salt water between two islands (see Lever 2001). The cane toad is known to occur on eight islands in the Northern Territory, five of which occur within the Sir Edward Pellew Islands. These islands were colonised by cane toads in late wet season of 2001/02 (Steve Johnston pers. comm.) after several heavy rainfall events. It appears the toads were swept out to

sea in the floodwaters of the McArthur River, the delta of which is adjacent to the islands. Toads have now been recorded on all of the major islands in the group (West, South West, Centre, North and Vanderlin) (Taylor *et al.* 2004). It is not known how many of the smaller islands in this group have cane toads. North Island is the most distant of the larger islands in the group from the mainland (28 km).

The other three islands with intermittent cane toad records are Elcho, Howard and Milingimbi islands. Elcho and Howard Island are located close to the mainland, being at the closest point 0.96 and 0.1 km from the mainland where cane toads are known to occur. However, strong currents in these narrow channels may provide some barrier to invasion. Like islands in the Sir Edward Pellews, Milingimbi Island occurs in a river delta and is close to the mainland (0.38 km) and is therefore highly vulnerable to cane toad invasion.

Cats and Dogs: All known occurrences of feral cats and dogs on islands in the Northern Territory are because of deliberate releases. (See WA database for examples natural spread of cats to Australian islands).

Water Buffalo, Deer and Pigs: Water buffalo have been recorded moving across channels between Crocker Island (2.26 km) and Inglis Island (3.03 km) from the mainland. As many of the Northern Territory's islands are within a few kilometers of the mainland we should assume that water buffalo are capable of crossing a channel of up to 4 km wide. Sambar Deer have also become established on Crocker Island after crossing the channel from the mainland. There are no known records of pigs crossing channels from the mainland in the Northern Territory.

Legislation

The Territory *Parks and Wildlife Conservation Act (2005)* applies to parks declared under section 12. The only island reserve declared under section 12 is North Island (Barranyi National Park). A further seven islands are located within the boundary of Gurig Gunak

Barlu National Park. Legislatively, these islands fall under the *Cobourg Peninsular Aboriginal Land, Sanctuary and Marine Park Act (2000)*. However, as stated within that act, Parts IV and VIII and sections 112, 113, 115, 118 and 119 of the *Territory Parks and Wildlife Conservation Act (2005)* apply to the sanctuary as though it were a park within the meaning of that Act.

Indian and the Vernon islands, although conservation reserves are not declared and thus are not subject to the requirements of the Conservation Act. These reserves are protected and managed under the *Territory Parks and Wildlife Conservation By-laws (2002)*. Part of Channel Island is managed as a conservation reserve through an agreement with the Power and Water Authority under Section 74 of the *Territory Parks and Wildlife Conservation Act (2005)*. A further three islands are protected under federal legislation as part of Kakadu National Park.

An amendment is being drafted to the *Territory Parks and Wildlife Conservation Act (2005)*. That will make provision for the declaration of feral animal exclusion areas and will make it an offence to transport designated feral animals into the exclusion areas.

Management

Management plans are only required for islands declared under section 12 of the *Territory Parks and Wildlife Conservation Act (2005)*. The *Barranyi (North Island) National Park Draft Plan of Management (2004)* (<http://www.nt.gov.au/ipe/pwcnt>) includes management outcomes for control of feral animals within the parks, but does not specify any plans of management to deal with the intentional or unintentional introduction of feral animals to the island. There is currently no formal plan of management for Gurig Gunak Barlu National Park, and thus no management dealing with the intentional or unintentional introduction of feral animals to islands.

The three islands that form part of Kakadu National Park are maintained under the *Kakadu National Park Plan of Management 1999-2004*. Regular monitoring takes place

on these three islands. This includes annual turtle surveys for both nesting data and data on levels and sources of predation on nests, and fauna surveys which have revealed no introduced animals are currently present on these three islands. Some introduced plants are present on these islands, but not to levels of concern. There are also regular patrols along the coastal area of the park, including the islands. A new plan of management for the Park is currently in preparation which will consider strategic directions for the management of coastal and marine areas of the park, including these islands (Parks Australia, pers. comm.).

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Appendix: Description of Databases

Database 1

Database 1 is a Microsoft Excel worksheet listing all islands within the NT, (both marine and estuarine) with an area equal to or greater than 20 ha. Following the format of the WA islands database, islands that are comprised wholly of mangrove or a mixture of mangrove and mudflats were not included. Islands largely made up of mangrove and/or mudflats but including areas of land permanently above the high tide mark are included.

Column A 'ISLAND NAME' is the island's official name. Island names are consistent with the Gazetteer of Australia (Geoscience website <http://www.ga.gov.au/map/names>). Islands that have not been officially named are denoted as 'unnamed' with information of their location provided. Islands that have no official name, but have been provided with a name for research are denoted as 'unnamed' with the name given to the island and the accompanying reference the name was used in provided in brackets.

Columns B and C show the island's centroid decimal latitude and longitude, provided in the datum GDA94. Data for all islands comes from the Northern Territory cadastral information, provided by the Northern Territory Land and Information Service.

Column D 'ARCHIPELAGO/GROUP' gives the archipelago or group of islands of which the island is part. This column is left blank where the island is not part of a group.

Column E 'INDNAME' provides the indigenous name of the island, recognized by the traditional aboriginal people of the area. Many of indigenous names were obtained from traditional owners during surveys of the islands by staff from the Parks and Wildlife Commission of the Northern Territory. This column is left blank where the indigenous name of the island is unknown.

Column F 'GAZETTEER' displays a 'yes' if the island is included in the Gazetteer of Australia 2002 (Geoscience website <http://www.ga.gov.au/map/names>).

Column G 'AREA_HA' is the area of the island in hectares. The area of all islands was obtained from Northern Territory cadastral information.

Column H 'LAND TENURE CATEGORY' supplies the nationally consist broad based classification of land tenure used by Geoscience Australia, comprising of 14 land tenure types currently in use by the relevant State/Territory and Commonwealth land administration agencies.

Column I 'LAND STATUS' displays the legal land status for the Northern Territory.

Column J 'OWNERSHIP' shows the organization or group that owns or is responsible for the management of the island. A large number of NT islands are aboriginal owned. This column lists the aboriginal land trust or association responsible for the island. For all

islands not listed as aboriginal freehold, where a government agency is responsible, the agency is listed. Islands owned as part of a pastoral lease are listed as 'private'.

Column K 'NT BIOREGION' shows the NT bioregion in which the island is located.

Column L 'JOINED?' lists information where the island is known to be naturally or artificially joined to another land mass. Islands may be naturally joined by mudflats at low tide or artificially by a bridge etc; otherwise it is shown as 'no'. If there is a very narrow channel at low tide (that may be traversed by feral animals), this has been noted recorded.

Column M 'SURVEYED?' contains a 'yes' if there has been, based on my judgment, an adequate assessment of the island to provide a reasonable assurance that feral animals are present or absent from the island. It should be noted that in many circumstances the islands were surveyed many years ago and the information may not be current. Also, as the Cane Toad moves across the Northern Territory, the number of islands invaded by this feral species is likely to increase. It is likely that there are more islands that have been reached by this species, where reports are unconfirmed.

Database 2

Database 2 provides a list of all Northern Territory islands with an area equal to or greater than 20 ha, where available information shows the presence of an exotic vertebrate and/or ant species, at some stage since European settlement. Exotic species are defined as species not indigenous to Australia.

Unlike the WA database native species not native to the islands have not been included. Only one native species has been introduced onto islands in the Northern Territory. In 2003, the Northern Quoll *Dasyurus hallucatus* was introduced onto Astell and Pobasso islands, part of the English Company islands off the north-eastern coast of Arnhem Land, because of the impending threat of the cane toad *Bufo marinus* as it invaded the Northern Territory.

An island will have multiple entries where more than one exotic species has been recorded.

Columns A to J inclusive are copied information from Database 1.

Column K 'EXOTIC VERTEBRATE SPECIES' shows the exotic vertebrate species present on the island. Common and scientific names are provided for each species. Following the WA database the dingo (*Canis lupus dingo*) is treated as an exotic. Many island populations have hybridized with domestic dogs, thus where the distinction between the two species is unclear the exotic species is listed as 'Dog or Dingo' along with the scientific name for the dingo provided.

Column L 'EXOTIC ANT SPECIES' shows the exotic ant species present on the island. Common and scientific names are provided for each species.

Column M 'REFERENCES' lists the reference numbers providing the records of the exotic vertebrate and ant species. Full references are provided in Database 5.

Column N 'STATUS/COMMENT' supplies relevant notes on the current status of the exotic species and where available information on how the species came to be on the island.

Database 3

Database 3 is a Microsoft Excel spreadsheet listing all islands within the NT with an area equal to or greater than 20 ha, with no known occurrence of exotic species. This list includes all islands from Database 1, minus the islands occurring in Database 2.

Columns A to L are copied from Database 1.

Database 4

Database 4 is a Microsoft Excel worksheet lists information on island archipelagos and groups off the Northern Territory coastline. The major archipelagos (Sir Edward Pellew, Wessel, Cunningham, English Company and Crocodile) contain many islands with varying distances between them.

Column A 'ARCHIPELAGO / ISLAND GROUP' provides the archipelago or group name.

Column B and C show the archipelago's centroid decimal latitude and longitude. (Obtained from the Geoscience website <http://www.ga.gov.au/map/names>).

Column D 'NUMBER OF ISLANDS AND ISLETS' provides the number of islands and islets within the archipelago or group. For the major archipelagos the number of islands is considered an approximation, as the cadastral information used as a GIS layer had several entries for many of the islands.

A review of information about the spread of feral animals on islands in the Northern Territory is discussed in the report above.