



BOUNTIFUL BARROW

Barrow Island, off the Pilbara coast, was declared a nature reserve in 1908, long before most people had ever heard the words 'ecology' or 'conservation'.

by Keith Morris

and Andrew Burbidge

Keith Morris and Andrew Burbidge describe its importance as a site for mammal conservation.

Barrow Island is without doubt one of Australia's most important nature reserves. It is the second largest island in Western Australia, and supports 14 species of native mammals (of which six are listed as threatened), more than 100 species of birds, 54 species of reptiles and more than 250 species of plants. In addition, several species of rare subterranean cave-dwelling invertebrates are found in its caves and groundwater. Located 80 kilometres off the Pilbara coast north of Onslow, this 233-square-kilometre island is a producing oilfield, with more than 550 oil wells and the associated infrastructure, as well as a valuable conservation reserve. The intact array of mammals makes Barrow Island a special place for zoologists to visit.

HISTORY

Aboriginal people inhabited what is now Barrow Island prior to it becoming an island about 8000 years ago. However, there is no evidence of Aboriginal occupation after rising sea levels separated the island from the mainland. The earliest reported European sighting of Barrow Island was made by the crew of the ill-fated English ship *Tryal*, which ran aground and sank on a reef to the north of the island in 1629. The French navigator Baudin thought it was part of the

mainland, as he sailed along the north-west coast of Australia in 1803. Baudin named several prominent island landmarks, such as Cape Poivre, Flacourt Bay and Cape Dupuy. It wasn't until 1818 that Lieutenant Philip Parker King determined that Barrow was an island, and he named it after John Barrow, Secretary of the Admiralty at that time. In 1840, Lieutenant J L Stokes spent some time exploring and charting the east coast of Barrow Island in HMS *Beagle*, and he collected the first specimens of the Barrow Island euro and the spectacled hare-wallaby. The chart was completed in 1899, when Commander Coombe, in HMS *Penguin*, was commissioned to survey Mary Anne Passage, to the south of Barrow Island.

As the settlement of the Pilbara region expanded after the 1860s, Barrow Island was held under lease for turtle fishing and pastoralism, although there is no evidence that it was ever used for grazing sheep, goats or cattle. The pearling industry was also

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Clockwise from top left: Cliffs at Obe's Beach.

Photo – Marie Lochman
Barrow Island golden bandicoot.
Lufkin oil pump at work.
Slopes of island's interior covered by spinifex grassland.
Photos – Jiri Lochman

Below: Biggada Creek estuary.
Photo – Marie Lochman

expanding in the Pilbara, and several pearling camps were located on Barrow Island. Well-known naturalist J L Tunney collected mammals (including the black-flanked rock-wallaby, golden bandicoot and Barrow Island mouse) for the WA Museum and Lord Rothschild in 1900. In 1908, Barrow Island was declared an Aboriginal Reserve specifically for the treatment of venereal disease (as were two other important island nature reserves, Bernier and Dorre, offshore from Carnarvon). However, these plans did not proceed and, in the same year, the island was declared a reserve for 'Protection of flora and fauna'. In 1910, the reserve was declared Class A.

In 1917–18, F L Whitlock made two extended visits to the island, reporting mainly on the bird life. He was the first to note the presence of the introduced black rat on some of the islands close to





Above: The djoorri.

Right: The Barrow Island euro is smaller than euros on the mainland.
Photos – Jiri Lochman



Below right: A juvenile Barrow Island boodie.
Photo – Marie Lochman



the east coast of Barrow Island—these were probably introduced from pearling vessels.

In the 1950s, the island was visited by personnel associated with the testing of the first British atomic weapons and was, for a while, considered as a potential site for these tests. By this time, the value of Barrow Island to mammal conservation had been recognised and it was proposed that the native wildlife could be herded to the southern end of the island, a fence constructed across it (a distance of approximately 10 kilometres) and the atomic weapons detonated at the northernmost point. Fortunately, this option was not pursued and the atomic tests were carried out in the Montebello Islands, 40 kilometres to the north. In 1958, a joint CSIRO and WA Museum expedition to Barrow and adjacent islands collected six species of native mammals, including the first record of a fat-tailed antechinus for the island.

THE OIL INDUSTRY

In 1953, after West Australian Petroleum (WAPET) discovered oil at Rough Range near Exmouth, an expanded program of oil exploration began along the nearby, and geologically similar, Pilbara coast. The potential of Barrow Island as an oil reservoir was recognised in 1954 and extensive geological and seismic surveys commenced. The first well was drilled in 1964 and oil was produced soon afterwards. Commercial operations began in 1967 and the first shipment of

oil occurred in April that year. ChevronTexaco now operates the oilfield, which has more than 550 producing oil wells serviced by 1000 kilometres of road. There are also accommodation and other infrastructure to support 150 to 200 personnel who work and live on the island in two-week shifts. In 2000, some 668,000 kilolitres of oil were produced. Barrow Island is also used as a transport hub for the other producing oilfields on nearby Thevenard Island, Varanus Island and several offshore platform operations.

Well-known naturalist Harry Butler began his long association with Barrow Island in 1964–65, when he spent several weeks on the island recording wildlife and collecting specimens for the WA Museum. During this trip, he was

the first to collect the brushtail possum, boodie, djoorri (common rock-rat), rakali (water rat) and two species of bat on Barrow Island. Since that time, Harry has been a consultant to the oil company and has been responsible for ensuring that the valuable mammals (and other plants and animals) were not detrimentally impacted. The fact that the mammals are still abundant on the island is testimony to the success of his work and the willingness of WAPET, and now ChevronTexaco, to conserve Barrow Island's unique wildlife.

MAMMAL MONITORING

Under the existing petroleum lease that covers Barrow Island, there is only one brief condition requiring ChevronTexaco to protect, and 'not



unnecessarily destroy' the flora and fauna on the island. Fortunately, they have taken their environmental management responsibilities seriously and have produced a comprehensive environment management plan for their operations. One of the most important aspects of this plan is the enforcement of strict quarantine inspections and treatments for all equipment and supplies that are taken to the island by sea or air. The Department of Conservation and Land Management has also prepared Interim Management Guidelines for Necessary Operations on Barrow Island. One of the requirements of these guidelines was to regularly monitor the native mammals and to search for introduced species, particularly black rats and house mice. In 1998, a joint Department of Conservation and Land Management

and ChevronTexaco mammal monitoring project commenced.

The project involves trapping with three trap types (each suited to catching mammals in different size ranges) on five 'grids' located in different habitats and in different locations around the island. Spotlight traverses covering two routes, one within the oilfield and one mostly outside the oilfield, are also undertaken. These routes have been repeatedly counted since 1971.

The golden bandicoot has been found to be the most abundant mammal and previous work indicated that there are approximately 50,000 on the island. This species once occurred across the arid zone of Australia to western New South Wales, but is now restricted to four island populations and a small area of the north-west Kimberley. Recent taxonomic



research suggests that it is closely related to the quenda (also known as the southern brown bandicoot), which occurs in the south-west of WA, and may even be the same species. On Barrow Island, it occurs in all habitats, but is most common in the coastal, sandy areas. At night, it is a common visitor around the accommodation facilities.

The black-flanked rock-wallaby is the least abundant mammal on Barrow Island, with a total population of around 150 individuals. This species is restricted to the limestone cliffs and outcrops on, or near, the island's rugged west coast. Geneticists have found no genetic variation within this small population, a trait shared by several other island mammals around Australia.

As Barrow Island has no trees, the brushtail possum lives in termite mounds, caves and rockpiles, as did many mainland possums before the arrival of foxes and cats. Brushtails are common, and forced the introduction of covered rubbish bins around the main camp through their habit of sleeping in any 'pseudo hollow' that was made available.

The boodie, or burrowing bettong, was once widespread on the mainland, but is now known from only four islands off the WA coast (plus a few small mainland populations established recently with the protection of fences



Above left: Warning signs on the island's roads aid wildlife conservation.
Photo – Andrew Burbidge

Above: Accommodation block for oilfield personnel working on Barrow Island.
Photo – Marie Lochman

Left: Michael Hughes, from the department's Pilbara regional office, helps Keith Morris monitor the island's mammals.

Inset: Measuring a golden bandicoot.
Photos – Andrew Burbidge

Right: The black-flanked rock-wallaby is the least abundant mammal on Barrow Island.

Below right: The black rat, an introduced pest, has now been eradicated from Barrow Island.
Photos – Jiri Lochman

and fox control). Research by CSIRO scientists has indicated that Barrow Island supports the largest of the natural populations, with approximately 3400 individuals and at least 40 warrens. Their work has also suggested that there are approximately 1800 Barrow Island euros, a smaller subspecies of the more common mainland form, and approximately 10,000 spectacled hare-wallabies.

The small, inconspicuous dasyurid marsupials are less often encountered during the mammal monitoring trapping sessions. The planigale remained undetected on the island until 1978, and was recently shown to be a new species confined to the Pilbara. The genus *Pseudantechinus* (fat-tailed antechinuses) is also undergoing taxonomic revision, and a new Pilbara species has recently been described.

Despite its alternative English name, the djoorri is not common on Barrow Island. It is infrequently encountered and is not always restricted to rocky habitats. Another native rodent, the Barrow Island mouse, is more abundant and appears to be distributed across most habitats on the island. It is a subspecies of the relatively common western chestnut mouse, which occurs throughout the Kimberley and which has recently been discovered on Sholl Island, south-east of Barrow Island.

The mammal monitoring program indicates that the oilfield development has had no detrimental impact on the native mammal populations. It has found no signs that any introduced animals, particularly rats and mice, are established. Barrow Island remains possibly the largest land mass on Earth with no introduced mammals. However, this was not always the case.

RAT ERADICATION

Black rats were recorded by F L Whitlock on Double Island, one kilometre off the east coast of Barrow Island, in 1918. In 1976, a rat was found



in a white-bellied sea-eagle nest on Barrow Island, but was believed to have come from Double Island rather than from Barrow. In 1983, an inspection of the islands adjacent to Barrow confirmed the presence of black rats on North and South Double, Boomerang (which connects to Barrow at low tide), Pasco, Boodie and Middle Islands. Extensive trapping along the east coast of Barrow Island, near Boomerang, found no evidence of black rats.

However, in 1990, a black rat was trapped at the southern end of Barrow Island, near Middle Island. Given that there were pearling camps in this area, it was likely that the rats were introduced from careened pearling vessels 100 years earlier, rather than from oilfield operations, as this area is some distance from the current barge landing and accommodation facilities.

Following the successful eradication of black rats on other



THE MAMMALS OF BARROW ISLAND

Species	Conservation status
unnamed planigale (<i>Planigale</i> 'species 1')	not threatened
tan antechinus (<i>Pseudantechinus roryi</i>)	not threatened
Barrow Island golden bandicoot (<i>Isodon auratus barrowensis</i>)	vulnerable
northern brushtail possum (<i>Trichosurus vulpecula arnhemensis</i>)	not threatened
Barrow Island boodie (<i>Bettongia lesueur</i> Barrow Island subspecies)	vulnerable
Barrow Island spectacled hare-wallaby (<i>Lagorchestes conspicillatus conspicillatus</i>)	vulnerable
black-flanked rock-wallaby (<i>Petrogale lateralis lateralis</i>)z	vulnerable
Barrow Island euro (<i>Macropus robustus isabellinus</i>)	vulnerable
white-striped freetail bat (<i>Tadarida australis</i>)	not threatened
common sheath-tail bat (<i>Taphozous georgianus</i>)	not threatened
Finlayson's cave-bat (<i>Vespadelus finlaysoni</i>)	not threatened
rakali or water-rat (<i>Hydromys chrysogaster</i>)	not threatened
djoorri or common rock-rat (<i>Zyomys argurus</i>)	not threatened
Barrow Island mouse (<i>Pseudomys nanus ferculinus</i>)	vulnerable

The black flying fox (*Pteropus alecto*) has been reported on Barrow, but these records apparently represent vagrants.

Pilbara islands, including all of those near Barrow (except Middle Island), between 1981 and 1986 using pindone-impregnated oat baits, an eradication program was planned for Barrow Island soon after the discovery of black rats. Fortunately, the rats were found to be confined to only about 240 hectares of

the sandy, southern part of the 23,300-hectare island. However, there were several native mammals in this area that could take the bait, and a special bait station had to be designed to prevent golden bandicoots, possums, boodies, hare-wallabies and euros from being poisoned. This was accomplished by placing the baits in an enclosed plastic bucket with access holes large enough to allow entry by rats but not the other species. Unfortunately, the two native rodents could not be

excluded because of their smaller size, but they quickly reinvaded the baited area once the project was completed. More than 2000 bait stations were laid out and maintained over several weeks, a mammoth task that would not have been possible without the support of 20 volunteers and ChevronTexaco. This program was successful in eradicating rats from Barrow and Middle islands and, at that time, Barrow was one of the largest areas from which black rats had been eradicated anywhere in the world.

THE FUTURE

Barrow Island is likely to continue to play an important role in the utilisation of the State's oil and natural gas resources for many years to come. Any future developments will need to consider very carefully the enormous value of the island to nature conservation and possible impacts on those values—there is no place like it in Australia. The greatest risk to Barrow Island's unique assemblage of mammals, and to some other species, is the introduction of exotic species, such as foxes, cats, rats, mice, pest insects and disease organisms. To date, oil production has occurred without any significant effect on the island's mammal populations. Constant vigilance and care is needed to ensure that they remain unaffected.

The Barrow Island spectacled hare-wallaby is distinct from other populations.

Photo – Jiri Lochman



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Keith and Andrew have been associated with wildlife conservation and management of Barrow Island for 20 and 30 years respectively, and are leaders of the current mammal monitoring program.



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