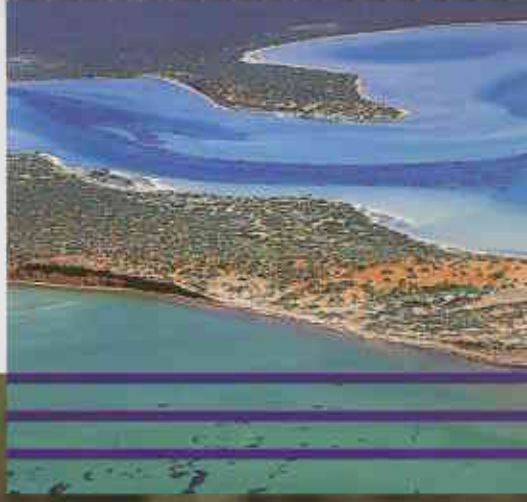
Shark Bay
marsupial heaven

Conservation pursuits are changing the face of Shark Bay, thanks to a varied crew of biologists, locals from Useless Loop, and the resident pointy-nosed marsupials.



by Jacqueline Richards, Colleen Sims and Andre Schmitz

Pastoralism, fishing and mining have traditionally been the economic mainstays of the Shark Bay region. Prior to the 1970s, the region had, as the expression goes, largely lived off the sheep's back. Pastoral pursuits, including stocking with sheep, goats and cattle, are still carried out as the primary income source on stations such as Hamelin, Tamala, Woodleigh and Dirk Hartog. The pearling industry made a significant contribution before the Second World War, and the fishing of snapper and whiting have provided an income for many local families for the last century. A less traditional industry—that of sea salt processing—has also been run by the Shark Bay Salt Joint Venture (SBSJV) at the remote, closed community of Useless Loop, on Heirisson Prong, and within the boundaries of Carrarang Station, since 1962.

However, despite these continuing pursuits and their importance to the regional economy, tourism is now the fastest growing industry in the area, and is focused strongly on the region's unique natural environment. The Monkey Mia dolphins, which have interacted with people for more than 40 years, may have made Shark Bay famous to international tourists, but it is the myriad of other natural features that have brought ecotourism to the forefront in the last decade.

World Heritage values

Shark Bay was inscribed with World Heritage status in December 1991, highlighting the natural values of the region and ensuring its status as an area of outstanding universal value. The reasons for the World Heritage listing were many and varied, but it was for the outstanding examples of four key natural phenomena that the global importance of the area was recognised (see 'Shark Bay World Heritage Property' on pages 50–56). And it was the last of these—habitat for threatened plants and animals—that is of most interest here.

The myriad natural features of the area may be important from a tourism perspective but, from a conservation perspective, it is the fact that they form a safe haven for mammals, allowing them to survive here but nowhere else, that makes the Shark Bay region one of the jewels in the Western Australian crown.

The mammals

The little-known western barred bandicoot, burrowing bettong, banded hare-wallaby and rufous hare-wallaby are all extinct on mainland Australia, and survive as remnant wild populations on Bernier and Dorre islands—on the northern boundary of Shark Bay. Likewise, the Shark Bay mouse, a small native rodent, is extinct on the mainland, but survives only on

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Main Western barred bandicoot.
Photo – Jiri Lochman
Inset Shark Bay.
Photo – Col Roberts/Lochman Transparencies

Above left Shark Bay Project Eden, solar-powered, vermin-proof electrified fence.
Photo – Jiri Lochman

Left Paul Brown (CALM Denham), Jacqueline Richards (CSIRO) and Rebecca Armstrong (Useless Loop) trap greater stick-nest rats on Salutation Island for translocation to Heirisson Prong.
Photo – Marie Lochman

Top Western coastline of Heirisson Prong.
Photo – Jiri Lochman

Above left Measuring the head length of a burrowing bettong.
Photo – Jacqueline Richards

Above The predator-proof barrier fence at Heirisson Prong, with the causeway out to the salt-loading area at Useless Loop.
Photo – Sally O'Neill/CSIRO

Bernier Island. It is the fifth in a suite of small to medium sized mammals that have disappeared from the mainland.

The first of the four threatened marsupials is the diminutive western barred bandicoot (*Perameles bougainville*), also known as the marl. It is the smallest of the bandicoots, weighing in at about 250 grams. Like their relatives, they nest among litter beneath shrubs, and consume a variety of invertebrates, some plant matter and the occasional unsuspecting skink.

At last count, there were only about 4,000 western barred bandicoots surviving in the wild on Bernier and Dorre islands—though their numbers can fluctuate widely depending on environmental conditions. The species had disappeared from mainland Australia by the 1930s, due primarily to predation by introduced European foxes and feral cats. In recent years, much of southern WA, including Shark Bay, has been subject to drought, resulting in a decline in many populations of native mammals. The western barred bandicoot population is also thought to have declined during this period, but fortunately the species has a track record of quick recovery once environmental conditions improve. However, as if the species did not have enough problems to cope with already, the Bernier Island population was recently diagnosed with a 'papilloma-like syndrome', an as-yet-unknown viral infection that debilitates bandicoots with wart-like growths and skin lesions, and ultimately results in death (see 'Western barred bandicoot: warts and all', *LANDSCOPE*, Spring 2003). The Dorre Island population is thought to be free of the disease, though regular monitoring for the next couple of years is required to be certain.

The burrowing bettong, or boodie (*Bettongia lesueur*), is a rat-kangaroo that displays the unusual trait of constructing warrens, in a fashion very similar to the European rabbit. It was last collected on the mainland in 1942, although some older Aboriginal people still remember it from the 1950s in central Australia. A smaller subspecies survives on Barrow and Boodie islands off the north-west coast of Western Australia. It is regarded as omnivorous, supplementing roots, tubers, flowers and seeds with the occasional insect or scavenged rabbit carcass or turtle egg when environmental conditions are harsh. There are about 5,000 surviving in the wild on the four islands.

The banded hare-wallaby (*Lagostrophus fasciatus*) is the only survivor of a large group of extinct browsing wallabies—one relative from two million years ago weighed in at more than 100 kilograms and 50 times the size of its surviving cousin. This group is characterised by its lower and upper

incisors biting together, a naked muzzle and a banded rump. It disappeared from the mainland before the bandicoot and bettong, with the last specimen recorded in 1906. The 10,000 banded hare-wallabies remaining in the wild on offshore islands are reliant on dense thickets of scrub for shelter (which disappeared on the mainland in the face of heavy grazing by livestock), and are herbivorous, feeding on grasses, herbs and shrubs.

The rufous hare-wallaby or mala (*Lagorchestes hirsutus*) belongs to a separate genus, but was given a similar common name due to the hare-like speed and ability to jump, common to both species. The rufous hare-wallaby is distinguished by its red coat colour. The last mainland populations tragically became extinct in the wild as late as 1987 and 1991 in the Tanami Desert, due to fox predation and wildfire. It is herbivorous and lives in scrapes underneath shrubs. There are thought to be about 7,000 remaining on the two islands, although, like all these marsupials, their populations fluctuate with periods of drought and plenty.

Finally, the Shark Bay mouse or djoongari (*Pseudomys fieldi*) is a small, long-haired rodent, occurring only on Bernier Island. It is thought to have an omnivorous diet of vegetation and

Above Western barred bandicoot pouch young at Heirisson Prong. The species can produce up to 12 young per year. *Photo – Jacqueline Richards*

Top left Rufous hare-wallaby.

Centre left Shark Bay mouse. *Photos – Jiri Lochman*

Left Banded hare-wallaby. *Photo – Marie Lochman*

Right CALM officers Bruce Ward and Alex Robinson set Victor soft-catch fox traps at Francois Peron National Park. *Photo – Jiri Lochman*

invertebrates, and lives in shallow burrows among coastal dunes. In 1992, there were estimated to be about 6,000 individuals in the sole remaining island population. Since that time, other populations have been established on three other islands.

A conservation 'coat of many colours'

In close proximity to the islands, there are now vast tracts of land within Shark Bay that are mostly devoid of livestock, and where native plants and animals can recover and flourish. These include the former Peron pastoral lease (now Francois Peron National Park), a 200-square-kilometre portion of Carrarang Station, long unutilised for stock because of its fragile high dunes, and Faure Island, a pastoral lease now managed for conservation. The five threatened mammal species have been the subject of a variety of recovery actions at these sites over the last decade.

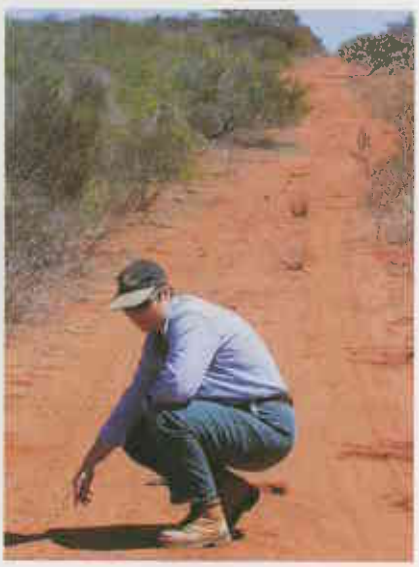
The region is host to three very different models of conservation in action. The projects have similar conservation aims and are separated only by a short boat ride, but the organisations that run them are very different. Clearly, there are various ways of achieving good conservation outcomes, and Shark Bay demonstrates how these different approaches can complement each other.

Heirisson Prong

Heirisson Prong is a long, narrow peninsula that juts out into the tranquil waters of Shark Bay. A project began here in 1989 as a partnership between the Useless Loop community, the SBSJV and the CSIRO. The vision of a small group of locals saw a section of the Carrarang pastoral lease set aside for the purpose of conservation, with management of the area carried out by the local community. CSIRO was commissioned to conduct research on threatened mammals, encompassing reintroduction techniques and the control of introduced predators, and pioneering the use of peninsulas to maximise the area set aside for conservation, while minimising the need for predator-proof fencing.

A short 1.8-kilometre fence saw 12 square kilometres set aside for the reintroduction of burrowing bettongs, western barred bandicoots and greater stick-nest rats (*Leporillus conditor*), another species of native rodent extinct from mainland Australia since the 1930s. A very enthusiastic and active local community group, the Useless Loop Community Biosphere Project Group (ULCBPG) and CSIRO worked to eliminate foxes and feral cats. Bettongs were reintroduced in 1992, and more than 1,000 have been born on site. The population has persisted for more than ten years, despite some heart-stopping fluctuations in numbers following incursions by predators. Similarly, bandicoots and stick-nest rats have persisted despite some periods of intense predation from invading feral cats. The size of each of the populations has fluctuated widely, but all were still in existence in 2003 and on the increase.

The key to the success of the reintroduction project has been the involvement and cooperative efforts of dedicated individuals from the local community, mining company and CSIRO. Australian and overseas tourists from the international volunteer organisation Earthwatch Institute have also provided an important source of enthusiasm, willing hands and vital funds. The model has worked, albeit with a number of hiccups—the constant battle to rid the peninsula of reinvading feral cats; the occasional



dramatic killing sprees of foxes that breach the fence; and the destruction of the predator-proof fence during Cyclone Vance in March 1999. However, the fence has been replaced, fox incursions are now a rare event and, after considerable effort, the feral cats appear to have been removed once more, so the future looks promising for the threatened mammal populations at Heirisson Prong.

Project Eden

The Department of Conservation and Land Management's (CALM's) Project Eden began in 1994, and to some extent was modelled on the Heirisson Prong project (see 'Return to Eden', *LANDSCOPE*, Autumn 1995). This time, however, a 3.4-kilometre fence provided a 1050-square-kilometre area for conservation, an enormous increase in both scale and vision. The original aim was to remove foxes, feral cats, sheep and goats from the entire site, and reintroduce a community of native mammal and bird species that formerly occurred in the area. Foxes and feral cats were controlled with aerial baiting using 1080, and on-ground trapping. Sheep and goats were culled using aerial and ground shooting programs. Foxes are now rarely seen, the sheep are gone, goats are few and far between, and the feral cat population has been reduced by 50–75 per cent of its former abundance.

Top left Leigh Whisson and Martin Copley from AWC release a burrowing bettong on Faure Island in June 2003.
Photo – AWC

Centre far left Project Eden Manager Colleen Sims examines a western barred bandicoot for signs of disease.
Photo – Blair Parsons/CSIRO

Centre left Colleen Sims checks for feral cat tracks in Francois Peron National Park.
Photo – Sue McKenna

Left Bryan Cane, local Useless Loop resident and mechanical fitter for SBSJV, sets a cat trap at Heirisson Prong.
Photo – Jacqueline Richards

Right A greater stick-nest rat climbs out of its nest.

Below right Useless Loop Primary School children distribute sunflower seeds for greater stick-nest rats on the first night in their new home at Heirisson Prong. *Photos – Jiri Lochman*

These control measures have allowed the successful reintroduction of malleefowl (*Leipoa ocellata*) and bilbies (*Macrotis lagotis*), and have seen an increase in native animals such as the echidna (*Tachyglossus aculeatus*), bungarra (*Varanus gouldii*), thorny devil (*Moloch horridis*), and the threatened thick-billed grasswren (*Amytornis textilis*) and southern woma python (*Aspidites ramsayii*). However, keeping the feral cat population down in such a vast area proved to be a stumbling block in achieving the grand vision of reconstructing an entire ecosystem. A trial release of a small number of banded and rufous hare-wallabies was carried out in 2001. The animals survived and bred in the rejuvenated habitat for almost a year, but could not persist in the presence of feral cats. The woylie (*Bettongia penicillata*) was reintroduced to Peron Peninsula in 1997 and, despite being at the limit of its natural range and suffering from drought and feral cat predation, has persisted for six years, albeit at low numbers.

Project Eden is just one of the projects that fall under the banner of CALM's Western Shield program (one of the world's most expansive conservation initiatives) to aid native animal recovery in Western Australia. As on Heirisson Prong, the achievements of Project Eden have been substantial, but tempered by ongoing threats from predation by feral cats and the poor survival of the most vulnerable species. Research into the control of feral cats is continuing, as are plans to continue research and trials of new reintroduction techniques at the site. Meanwhile, another option has become available for the more vulnerable species—Faure Island.

Faure Island

The Australian Wildlife Conservancy (AWC) is a private non-profit organisation dedicated to the conservation of Australia's wildlife, with 12 properties across Australia protecting a diverse range of ecosystems and threatened fauna. In particular, AWC seeks to play a role in fighting the fauna extinction crisis through the recovery of threatened species. With donor support, AWC acquires land of high conservation value, and implements practical conservation programs that produce tangible results.

Faure Island is a 58-square-kilometre pastoral lease located within Disappointment Reach, in the Shark Bay World Heritage Area, that was acquired by the AWC in 1999. The island provides a perfect location to undertake the translocation of threatened mammals as, unlike Heirisson Prong and Peron Peninsula, the chance of reinvasion by cats and other feral animals is minimal. Therefore, reintroduced threatened mammals have much greater security and better chances of long-term persistence.

Faure Island has always been free of foxes and rabbits. But, as a working pastoral lease, the island had resident sheep and feral goats and a population of feral cats—thought to have become established there during the late nineteenth century following visits by pearlers and pastoralists. With the change from pastoralism to conservation, sheep removal began in 1999, and more than 1,500 goats were removed or culled. The eradication of feral cats was a more difficult task. So, in 2001, the AWC

Above Faure Island's pristine beach.
Photo – Barry Wilson

Above right A *LANDSCOPE* Expeditions volunteer releases a hopping mouse caught during trapping.
Photo – Sue McKenna

Right Jeff Short (CSIRO) and Atticus Fleming (AWC) transfer a burrowing bettong from Heirisson Prong to Faure Island to start a new colony.
Photo – Blair Parsons/CSIRO

contracted the expertise of CALM scientists, who have researched feral cat control in WA for the last decade. The results were spectacular. CALM successfully baited and rid the island of feral cats within weeks. This was no small achievement, considering that Faure Island is the third largest island in the world from which cats have been eliminated. The way was now clear to embark on the translocation phase.

Four of the five species from Bernier and Dorre islands were identified as prime candidates. Burrowing bettongs and Shark Bay mice were translocated in winter 2002 and, after 12 months, both species were firmly established in their new island home. Future plans to release western barred bandicoots and banded hare-wallabies to the island should result in the creation of an important predator-free sanctuary for these mammals on the brink of extinction, and a supply of animals for other conservation sites throughout Australia.

Future options

The conservation of the threatened Shark Bay mammals has progressed in leaps and bounds. Perhaps the main reason for this success has been the continuing cooperative effort between government, community and private industry. But where to from here?

There are powerful synergies in having three major conservation projects at Shark Bay. This is already evident in the exchange of knowledge, skills and animals between projects. With the projects working to achieve very similar aims, the linkages between the organisations involved will continue to improve. There are many options, including merging captive breeding facilities into one location, the continued exchange of animals between sites, joint expeditions to monitor remnant and reintroduced populations and, perhaps, sharing inter-project staff who could facilitate the flow of knowledge between the projects.

Further down the path, Shark Bay's Edel Land Peninsula may become a national park. Large, trackless wilderness areas of towering dunes, dense acacia shrublands, and fresh water in subsurface reservoirs within the swales, may provide a future home for threatened Shark Bay marsupials, should the means for broadscale feral cat control on the mainland be found.

Shark Bay's change in focus to conservation and ecotourism has brought immediate economic benefits to the region, and has secured its place as Australia's premier marsupial haven, at the cutting edge of arid ecosystem conservation. The success shared by all the projects has ensured that the prognosis for the future survival of these threatened Shark Bay mammals is a little more secure.

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Regulars

Erratum

The photograph in the Autumn 2004 issue of *LANDSCOPE* (mid left, page 52) is the rare *Diuris purdiei* not *Diuris corymbosa* as stated in the caption.

The photograph in the Summer 2003-04 issue of a snail on p. 56 and p. 61 was incorrectly captioned. The photo is of the introduced predatory snail *Oxychilus* sp., which is thought to be at least partly responsible for the extinction of the Pemberton and Albany snails, and is a threat to many of our native terrestrial snails.

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