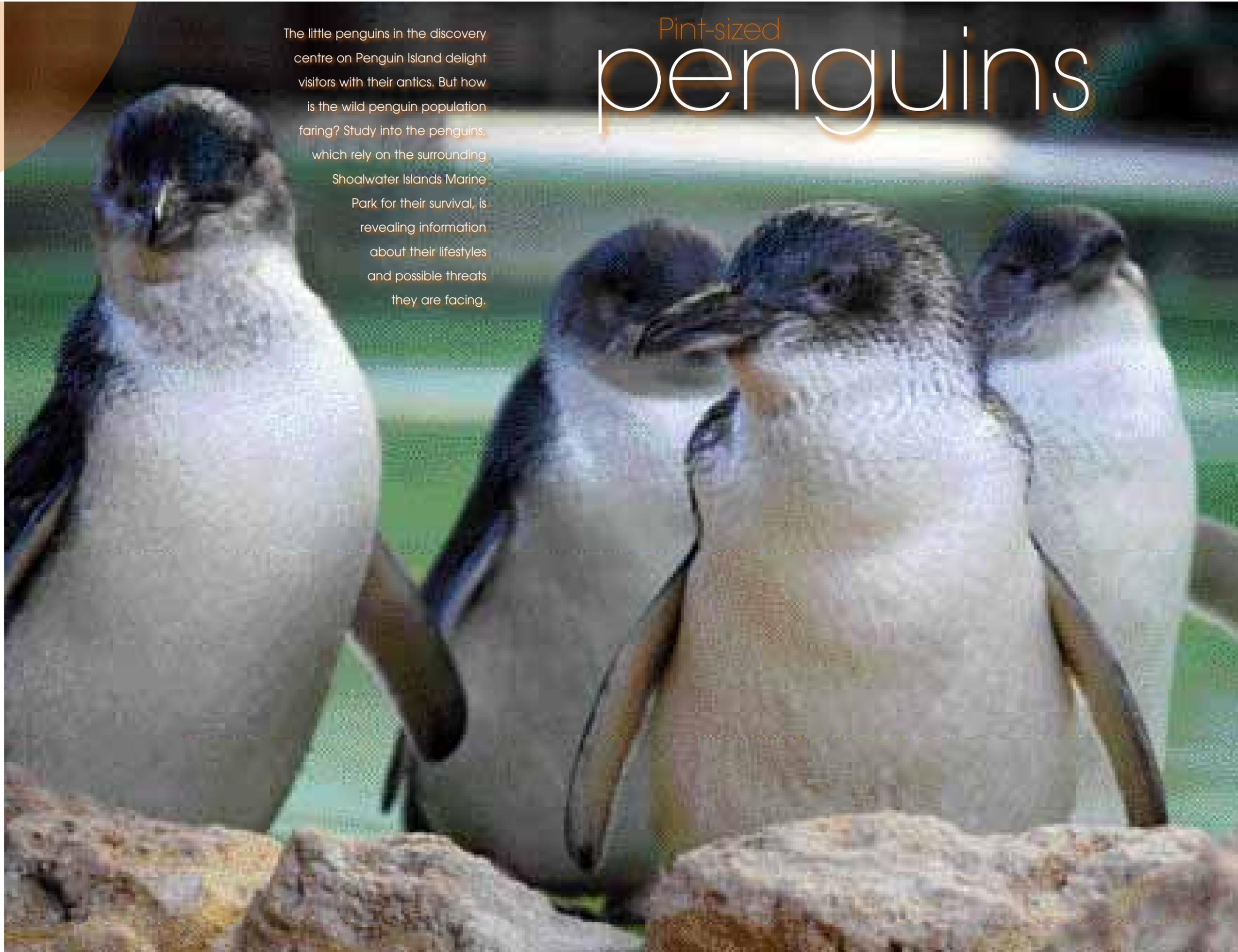


by Samille Mitchell

Pint-sized penguins

The little penguins in the discovery centre on Penguin Island delight visitors with their antics. But how is the wild penguin population faring? Study into the penguins, which rely on the surrounding Shoalwater Islands Marine Park for their survival, is revealing information about their lifestyles and possible threats they are facing.



There's a rustle in the bushes at Penguin Island, a flash of khaki trousers and Murdoch University scientist Belinda Cannell emerges from underneath the low scrub. Dusting herself off, she gets up, grabs her tool box and marches on to the next site where she drops to her knees and again pokes her head out of sight under the brambly growth.

Belinda is conducting her fortnightly check of the little penguin (*Eudyptula minor*) nesting boxes on Penguin Island, recording the presence of adult penguins, chicks and eggs and taking samples of the chicks' fluffy

covering of down. An assistant takes notes of the site number, the weight of the bird if encountered, its approximate age and whether it has been marked with a micro-chip.

It's a repetitive task that takes most of the day but Belinda tackles the task with enthusiasm. She's continuing a project that started more than 20 years ago and aims to understand more about these delightful creatures. Despite years of study, much about these birds remains unknown. And recent trends suggest the Penguin Island population could face decline if their food sources dwindle and boat traffic increases.

Penguin Island

The 12.5-hectare Penguin Island Conservation Park lies just 600 metres off the mainland coast near Rockingham. It is completely surrounded by the waters of the

Shoalwater Islands Marine Park, which features a combination of shallow waters, rocky reefs, islands and seagrass meadows—a diverse range of habitats that are important for little penguins and other seabirds and shorebirds as well as bottlenose dolphins, Australian sea lions and other marine life.

Penguin Island itself is home to Western Australia's biggest colony of little penguins, sometimes called fairy penguins or blue penguins. It is the northern-most little penguin colony in WA and the western-most in the world. Aside from small populations on Garden Island and Carnac Island, the next closest colony is at Albany in the south, though they have also been recorded at other destinations in the south-west. Despite Penguin Islands' position within a protected marine park, it lies in reasonably close proximity to heavy industry at Cockburn Sound.

The colony of little penguins on Penguin Island has been given the highest conservation status of the 256 major colonies of little penguins around Australia. This status was awarded after considering the population size, location, vulnerability and history of scientific research.

So why do little penguins favour Penguin Island and not other coastal habitats? The penguins remain close to the coast, rarely travelling more than 10 kilometres from the shore. Radio-tracking and satellite tagging of the Penguin Island penguins have revealed they mostly stay within the Murray Reef System, which lies roughly 10 kilometres from the coastline. They also need to be within 20 to 30 kilometres of a reliable food resource, to have few predators, and be exposed to few threats.

While the penguins face several threats, Belinda and her fellow researchers at Murdoch University and the University of New South Wales can only determine whether populations are stable, increasing or in decline if they know the size of the population. It is difficult to accurately determine the population of Penguin Island penguins because it is impossible to locate and check every natural nest on the island without damaging or destroying the tangled undergrowth in which the nests are made. However, one way of estimating the population is to mark the penguins, release them and see how many times they are recaptured. Penguins will often re-use the same nest site from year to year so the information gleaned from monitoring nest sites helps make population estimates. In addition, Belinda and her team conduct night beach counts at four different sites on the island, one site per night, and repeat this four times a year. They set up a temporary fence at a beach site that penguins use for arriving back at the colony.

Top right The urban spread of Rockingham with Penguin Island in the foreground.
Photo – Dennis Sarson/Lochman Transparencies

Right box inset A little penguin.
Photo – Michael James/DEC



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Main Little penguins at the Penguin Experience Island Discovery Centre.

Photo – Michael Pelusey

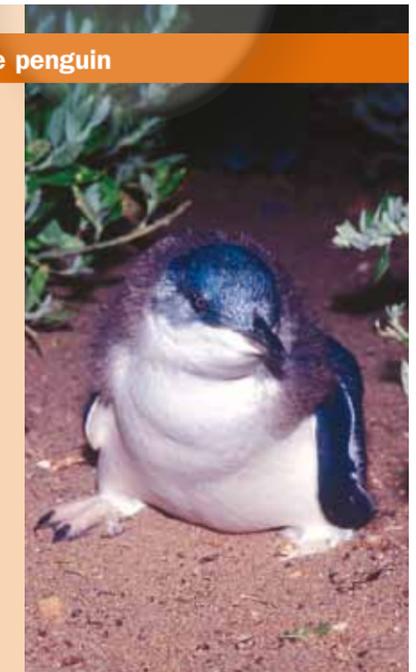
Inset and this page below Penguin Island.

Photos – Michael James/DEC



The little penguin

Little penguins are aptly named—they are the smallest of all penguins, growing to just 330 millimetres tall. They are also the only penguin to breed in Australia and the only one to wait until dark before returning to their colony. In the evening, they form groups and cross the beach to the sand dunes where they nest in crevices and burrows. On Penguin Island, the soft sand means burrows often collapse so they nest under the thick scrub instead. They signal time for the morning return to the oceans with a 'yap-yap' call before they regroup and waddle down paths to the beach and the sea.



Little penguins usually live for about six or seven years but have been recorded to live for up to 20 years. They reach sexual maturity at two years and choose their mate after a ritualised courtship.

Adults share incubation duties, one parent sitting on the eggs while the other feeds at sea. Eggs hatch after five weeks, after which the chicks grow rapidly. They are left by themselves at about two weeks old while both parents spend the day at sea catching enough food for their offspring. The young penguins leave the nest at eight weeks old. At Penguin Island, they take to the seas, only to return to their Penguin Island homes after at least one year. No one knows where they travel during this time. The adult penguins can lay two sets of eggs in a year, and depending on food availability, may raise both clutches. This ability to reproduce is important, especially as up to 70 per cent of the chicks die within the first year.

These superb swimmers 'fly' through the water using their modified wings, or flippers. They lie belly down on the surface of the water when at rest. The Penguin Island birds dive to depths between one and 20 metres, with a dive duration of about 10 to 30 seconds. Their dives here seem to be limited by the depths of water they are in, as little penguins elsewhere can dive up to 70 metres. These hard-working little birds can dive 150 times an hour in their search for food—a feat recognised in their scientific name, *Eudyptula*, which is Latin for 'good little diver'.



As the penguins come ashore they are corralled, marked, weighed and released. Information from this study over three years will help better assess the numbers of penguins which inhabit the island annually.

In addition, the Department of Environment and Conservation (DEC) has installed a video camera which records one of the beaches at night, enabling penguins to be counted as they come ashore. Data gleaned from the camera will help with any future studies into the Penguin Island population.

Research

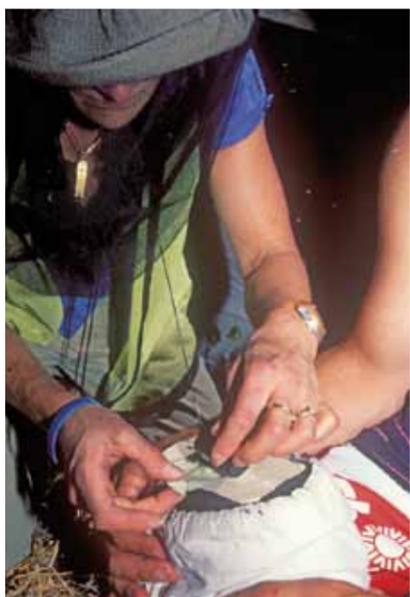
The Penguin Island study—funded by DEC, Australian Research Council Linkage, Fremantle Ports, Department of Defence, Tiwest and Winifred Violet Scott Trust—involves fortnightly checks of 126 man-made nest boxes and 58 natural nest sites on Penguin Island and 13 nest boxes on Garden Island. The nest boxes are particularly useful as they enable researchers to easily observe the penguins, eggs and chicks and access them to weigh and mark them for future identification. The penguins are marked by inserting a grain-sized micro-chip under the penguins' skin—the same way that dogs and cats are micro-chipped. The penguins are then simply scanned for identification. By monitoring nests with known individuals, Belinda and her team can determine when the penguins are breeding, how successful they are at raising chicks, how much weight the adults gain or lose during the breeding season and how well the chicks are growing.

Twenty years of study on Penguin Island and eight years on Garden Island has helped Belinda work out differences between years and potentially the cause of differences. For example, a late start to breeding, coupled with lower than average body weight or poor breeding success, is likely to indicate that fish abundance is lower than normal.

Top left Juvenile little penguins in a nest box.

Centre left Little penguins nest in thick scrub on Penguin Island.

Left Murdoch University scientist Belinda Cannell monitors and studies the Penguin Island penguin population.
Photos – Jiri Lochman



Above Penguin Island.
Photo – Samille Mitchell/DEC

Last year's research may reveal a troubling trend. It showed a much lower number of breeding birds (only 112 eggs were laid in the Penguin Island nest boxes in 2008, compared with 173 in 2007). However, as about 60 new boxes were added in 2006 and penguins are less likely to use the boxes immediately, these figures cannot be compared against longer-term averages. Belinda has also recorded greater fatalities in the past year, birds weighing less than average and moulting occurring much later than usual. Little penguins must reach a certain weight before moulting begins. These factors suggest the penguins may be eating less.

The argument that this is caused by a scarcity of food is lent further weight by satellite tagging of 30 birds over two years. During incubation, one of the parent birds usually leaves the nest for three to five days in search of food while the other parent incubates the eggs. When one parent returns, they swap roles, allowing the other parent to forage for food before returning to the nest. But recent tagging has shown the parents to be away from the nest for much longer than the usual three to five days—up to 13 days. This suggests the penguins may have to hunt longer and harder to find food, leaving their mate literally starving on the nest while they await their partner's return.

So what is causing the apparent demise in their food source?

Penguin diet

Past examinations of little penguins' stomach content has revealed they feed primarily on whitebait, pilchards, anchovies, garfish and blue sprat, with whitebait forming 60 to 80 per cent of the diet. So if penguins are failing to gain weight, it is likely that these species, particularly whitebait, may be less abundant.

However, determining what could be affecting these species is difficult. Department of Fisheries research showed an increase in juvenile salmon numbers last year. As older salmon eat smaller fish like whitebait, this could be having an effect on penguins. Past research has also shown a correlation in a strong Leeuwin Current and penguins weighing less than usual. However, while there are theories why the current and its warming, south-ward flowing waters have this effect, at this stage Belinda says there's no definitive answer.

Conservationists have expressed concerns that plans for a new boat ramp at Port Kennedy may further threaten penguin food sources. The proposed ramp is positioned near a whitebait nursery, potentially threatening whitebait populations—a major food source for the little penguins.

A precarious existence

Declining fish stocks are not the only threat facing little penguins. Like other marine creatures, they are prone to entanglement in fishing line and other debris (see 'Don't rubbish our marine wildlife' on page 40). Their tendency to make shallow dives and to rest on the surface of the water also makes them prone to boat strikes. Studies have revealed that some penguins spend almost 70 per cent of their time at sea in the top one to two metres of water. Belinda has reports of many penguins that have been killed or wounded from boat propellers. In fact, 30 per cent of the dead penguins Belinda studies have evidence of injury likely to have been sustained from watercraft. This problem is exacerbated in the Rockingham area as it is reported to have the second highest boat ownership per capita in WA—a trend that is increasing.

Water pollution may also be harming penguins. However, no study has been made into the effects of water quality on penguins. Oil spills and damage to nesting sites through storms or erosion also threaten little penguins and their habitats.



Left Beach renourishment program work on Penguin Island.

Below left Belinda Cannell checking one of the penguin nesting boxes.
Photos - Samille Mitchell/DEC



one satellite-tagged penguin to find its mate. Another penguin, however, spent five nights returning to the island but could not find its way to its nest and eventually gave up. Since the addition of the sand to the beach, consequent study has found that although penguins must travel over wide stretches of beach, they have successfully accessed the shore and their nests.

Penguins and people

Despite 20 years of study, much remains to be learned about these endearing birds. However, funding for the current study ends in September 2009. Further study would unlock more of the secrets about little penguins—information like where they go after they leave the nests and just how threatened they are. Stopping briefly near the azure waters of the Shoalwater Islands Marine Park that surround Penguin Island, Belinda speaks of her hope to learn more about these enigmatic birds.

“They need someone to be an advocate for them,” she says.

“With increasing urbanisation comes increasing threats. We humans recreate in the same waters the penguins rely on for survival. Without more information, we won’t be able to offer them the protection they deserve.”

Protecting penguins

Despite the threats facing these delightful creatures, ongoing study is providing guidance for management to protect the penguins on Penguin Island. DEC, which manages Penguin Island Conservation Park and the surrounding marine park, regularly consults with Belinda and other researchers when it conducts work on the island. It has installed boardwalks across the island to enable visitors to explore, without damaging the nests of penguins and other seabirds that are nestled in the undergrowth. In 1995, the Department of Conservation and Land Management opened the Penguin Experience Island Discovery Centre. The centre features a central enclosure which houses a small colony of penguins that have been rescued and nursed back to health. An army of dedicated volunteers and DEC staff mans the enclosure

and related interpretive displays and provides visitors with information about the penguins and their biology. By allowing the public to see and learn about the penguins here, they are discouraged from trampling across the island’s fragile vegetation in an attempt to find the secretive birds themselves.

DEC has undertaken a beach renourishment program on the south side of the island, adding some 10,000 cubic metres of beach sand on the beach in attempt to reduce erosion. Continued erosion was endangering the infrastructure on the island as well as the arrival point that some penguins use to access their nests. A combination of storms and high tides in 2007 resulted in a vertical wall of sand that the penguins could not climb up to get to their nests. Sand bags were originally put in place to help the penguins access their nest sites—a move which helped

Samille Mitchell is a Department of Environment and Conservation publications officer and *LANDSCOPE* editor. She can be contacted on (08) 9389 8644 or by email (samille.mitchell@dec.wa.gov.au).

Thanks to Dr Belinda Cannell from Murdoch University for her assistance with this article. Until September 2009, Belinda can be contacted on (b.cannell@murdoch.edu.au).