'The Bear Essentials for Zoos'. *The Dominion Post*. **Henderson, Mark and Diana McCurdy**. © 2003. (p. B5)

The bear essentia

For years zoos have focused on stimulating hunting-like behaviours among their animals but a recent study suggests an even more important issue is space. By Mark Henderson and Diana McCurdy.

LARGE predators that roam across hundreds of miles in the wild suffer most severely in captivity, British scientists have discovered.

Polar bears, lions, tigers and cheetahs, which have huge hunting ranges in their natural habitats, have the highest rates of infant mortality when kept in zoos or safari parks, researchers at Oxford University found.

These species are also the most likely to show symptoms of stress and psychological disturbance, such as repetitive pacing, when confined in zoo enclosures.

The impact of confinement is so great that zoos must significantly improve their living conditions or stop keeping large, wide-ranging carnivores altogether, the scientists say.

The polar bear, which has an average hunting range of 80,000 square kilometres, an area roughly the size of Portugal, is particularly badly affected.

Its typical enclosure is one millionth of the size of the smallest territory found in the wild.

However, some predators, such as grizzly bears and snow leopards, adapt much more successfully to captivity and are thus better suited to zoos that cannot afford or spare the space for sufficiently large and varied enclosures.

The study, by Georgia Mason and Ros Clubb, of the university's Animal Behaviour Research Group, indicates strongly that the stress and welfare problems of carnivores in captivity occur largely because they are deprived of their naturally large territories.

This could have significant implications for animal welfare in zoos, as previous research has suggested that carnivores become stressed, often pacing around their cages for more than half their waking hours, because they are unable to satisfy their instinct to hunt.

"We were surprised by the results because until now we had always thought that not being able to hunt was the biggest problem for zoo carnivores," says Dr Clubb.

"Because of this, zoos have concentrated on stimulating hunting-like behaviours to try to improve their welfare. But our results suggest that it's even more important to give these animals more space, or the day-to-day changes in environment they'd experience if they were ranging naturally."

Dr Mason says that the findings, details of which were published this week in the journal *Nature*, mean that zoos must reconsider whether it is appropriate for them to keep certain animals. "If they can't modify the enclosures, they have to start selecting much more carefully the species they can keep," she says.

"Now we know the biological principles behind this, it may well be that for really large-range carnivores we have to spend a lot more time and money making their environment larger and more varied.

"That may be harder for smaller city zoos, but if you're a smaller city zoo without much space, why not keep grizzlies and leave the lions to the safari parks?"

IN THE study, which is partially funded by members of the Federation of Zoos and the International Zoo Veterinary Group, the researchers analysed details of the behaviour of 35 species in 42 zoos, and infant mortality data from 500 zoos and safari parks. This was then correlated with information on how large a territory these animals covered in the wild.

The researchers found a very pronounced link between the minimum territory of a carnivore, and the extent to which it thrives in captivity.

Polar bears, which have a minimum range of 1200sq km, have a 65 per cent infant mortality rate in captivity.

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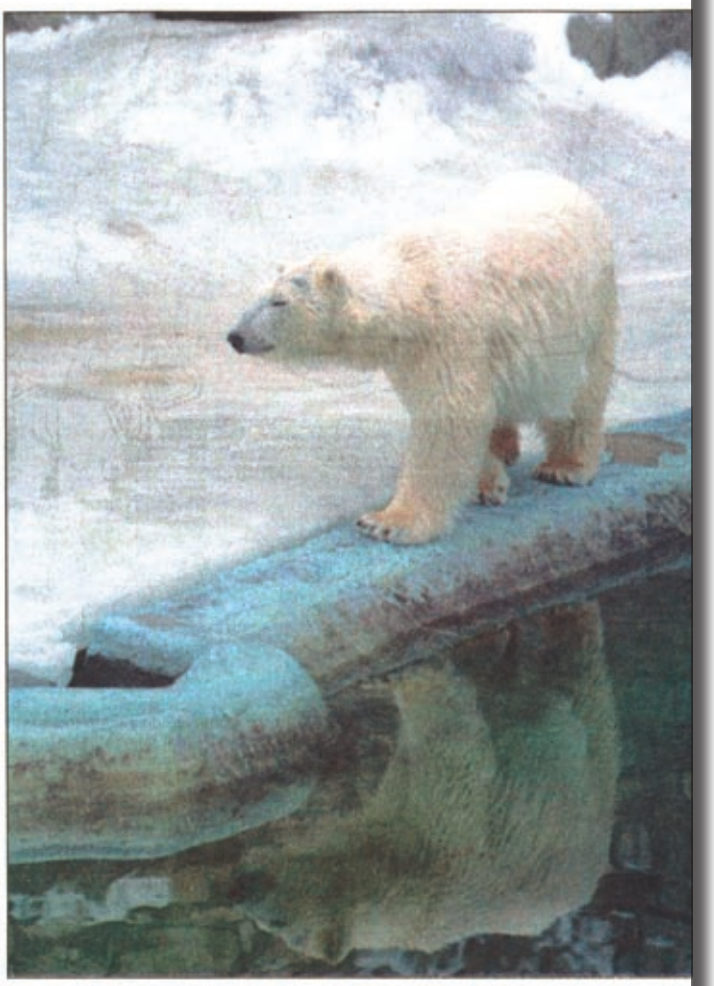

Wild at heart: Lions, cheetahs and tigers, like these two in a zoo in New Delhi, have a high rate of pacing and are badly affected by a lack of space in zoos.

Picture: REUTERS

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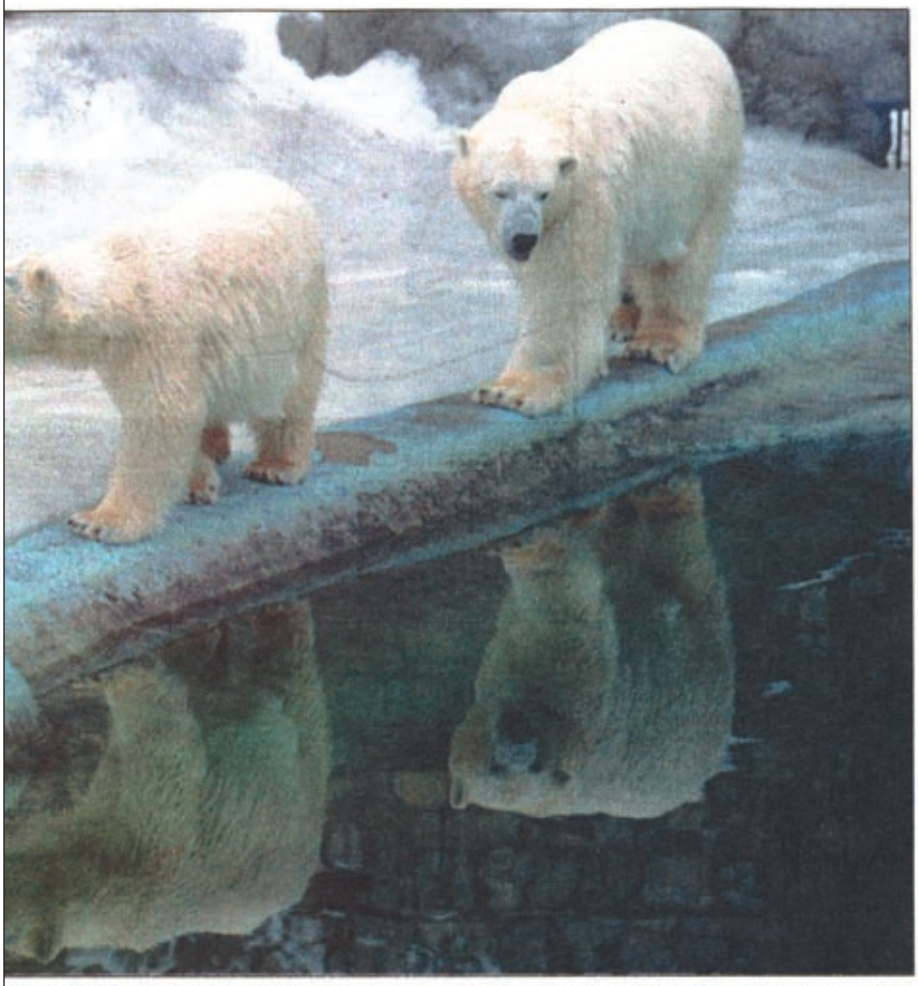

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Oxford Universities Animal Behaviour Research Group study

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When individual animals pace, they engage in this behaviour for 25 per cent of the time. Lions, which have a minimum range of 19.7sq km, do almost as badly, with an infant mortality rate of 42 per cent, and a pacing rate of 48 per cent. Cheetahs and tigers are also badly affected.

Species with smaller ranges do much better. The grizzly bear has a minimum range of 0.5sq km, has a pacing rate of 10.9 per cent, and has a median infant mortality rate of zero.

The snow leopard, another small-range carnivore, has a pacing rate of 7.4 per cent and infant mortality of 14.3 per cent. The Arctic fox, the red fox, the American mink and the Eurasian lynx also do well in captivity, and all have limited ranges.

Though the study focuses only on carnivores, Dr Mason says large herbivores with big ranges, such as elephants, may be affected in a similar fashion. She says British zoos are very sensitive to animal welfare, and most have phased out keeping polar bears — the carnivores that suffer most.

"I think zoos in principle are a good thing. Seeing real wild animals is fantastic for inspiring people to care about conservation and animal welfare. Some of these welfare problems can be sorted out."

MIRANDA STEVENSON, director of the Federation of Zoos, welcomes the study, though she says that some of its findings are misleading. Infant mortality rates, in particular, are very hard to compare to those in the wild. New Zealand zoo managers are also treating the report with some scepticism.

Unpredictable feeding regimes, Dr Stevenson says, have been shown to significantly reduce pacing in many carnivores and British breeding programmes, such as for the tiger, have had excellent results.

"The report does not suggest welfare levels within UK zoos are unacceptable, but seeks to address ways in which we can continue to improve the environments for captive animals in order to maintain the successful breeding levels achieved over recent years," says Dr Stevenson.

"Moreover, many species thrive in captivity, which reinforces the importance of captive breeding programmes for conservation."

Wellington Zoo life sciences manager Mauritz Basson says New Zealand zoos generally maintain high standards. This is partly because New Zealanders are very conscious of cruelty to animals. But also, from a purely pragmatic point of view, it is very difficult to import exotic animals into the country so we need to look after the ones we have, he says.

Mr Basson is sceptical of some of the British researchers' findings. He acknowledges polar bears are notoriously difficult to keep and breed, but attributes that more to their high level of intelligence than their penchant for roaming.

Lions, on the other hand, are notoriously lazy. They are quite content to lie in the sun all day, he says. The only time Wellington Zoo's lions pace is when they expect to be fed and the zoo varies their feeding times to prevent this happening.

Wellington Zoo is home to four lions, two tigers and two cheetahs, but none of them are used for breeding. It does not have a polar bear. None of the zoo's large carnivores display symptoms of stress or psychological disturbance, Mr Basson says.

He acknowledges that some of the infant mortality rates quoted in the study are, "bloody scary".

"Lions and tigers usually breed like rats."

A spokesman at Christchurch's Orana Wildlife Park says he is confident the large carnivores at the park are not stressed. The main lion enclosure at the park is 5.6sq km. The cheetahs are moved between 12 enclosures, the largest of which is 2.5 hectares.

"It is our experience that animals with psychological issues would display various forms of stereotypical behaviour, such as pacing, over-grooming. This does not happen at Orana Wildlife Park."

Animal welfare groups, however, say the results show that "zoos have to take a long, hard look at themselves".

Rob Atkinson, head of wildlife at Britain's RSPCA, says: "Most members of the public find something disturbing in seeing a large, magnificent animal such as a polar bear or lion confined in a small enclosure.

"They would be even more upset to know that such an animal may be incredibly stressed or psychologically damaged by such treatment and that cubs die prematurely as a result of it.

"Based on this research the RSPCA wants the keeping of naturally wide-ranging carnivores to be either fundamentally improved or phased out."

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