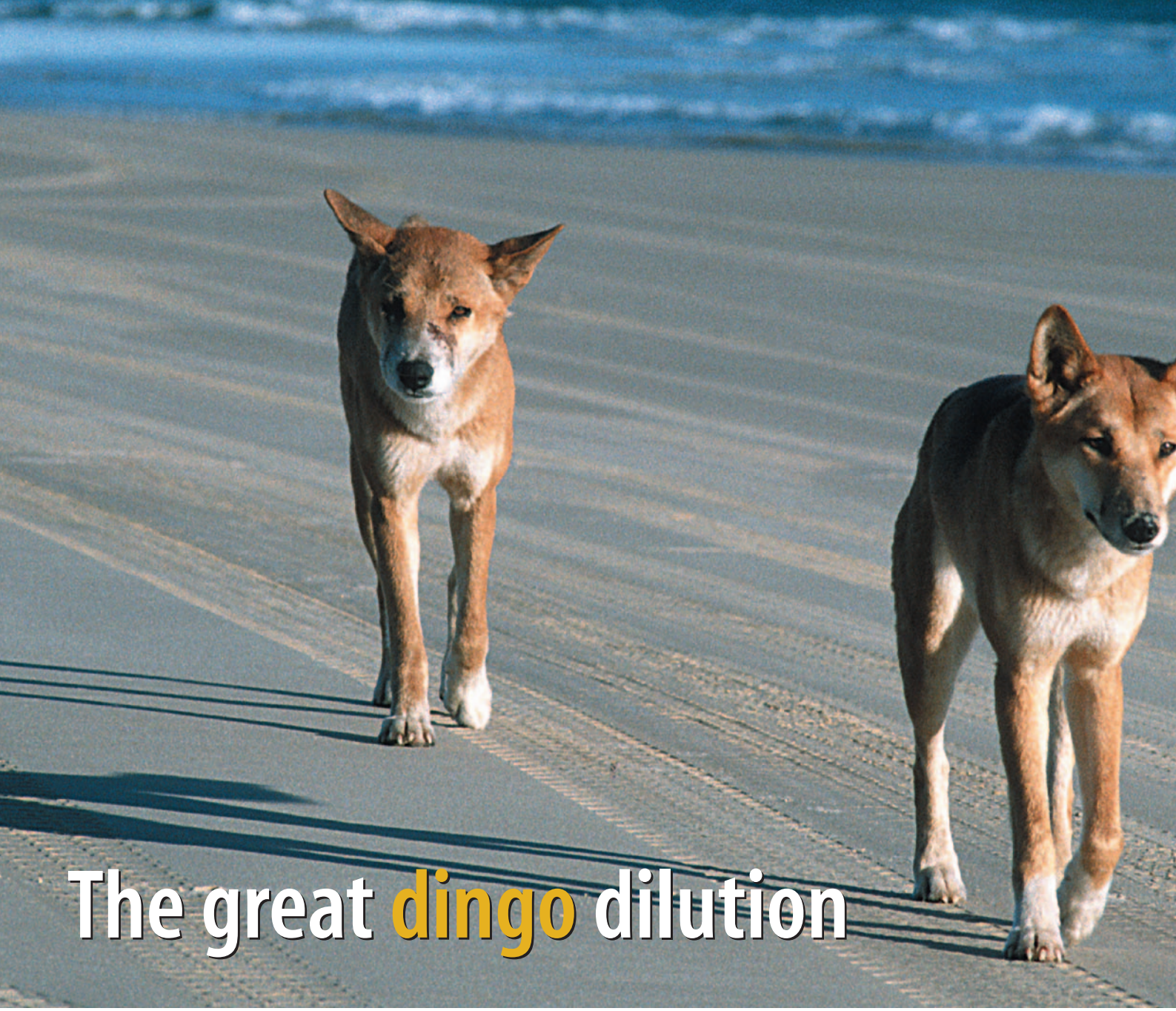

The great dingo dilution

Australia's only wild dog, the iconic dingo, has survived a couple of hundred years of persecution – from shooting, trapping and poisoning. Ironically, it is now at grave risk of disappearing. The greatest threat isn't so much over-hunting or the usual culprit, habitat destruction; it's the friendly domestic dog. **Steve Davidson** reports.

By reducing domestic gene flow in areas where introgression rates are lowest, wild populations could continue to evolve within their contemporary environment.

The true-blue dingo is quietly becoming invisible. Its native gene pool has been slowly but surely diluting through 'hybridisation' or inter-breeding between feral dogs and wild dingoes (*Canis lupus dingo*). Sadly – or not, it is now difficult to find a purebred dingo in the wild.

Geneticists call this phenomenon – the flow of genes from another population – 'introgression', and about 80% of the wild dogs along Australia's eastern seaboard are thought to be dog-dingo hybrids.

Yet, while there are still some dogged stockowners who hold the view that 'the only good dingo is a dead dingo', there are actually two quite differing schools of scientific thought on the significance of this inter-breeding pressure.

The obvious view is one of required conservation, to manage the species' purity through minimising hybridisation. That is, where possible, to endeavour to cull out those individuals that are more like domestic dogs, while protecting those that are pure or nearly pure dingoes. This should prove easy enough on, say, Fraser Island in Queensland, where dingoes are confined and introgression of domestic dog genes can be controlled, but it is not so practicable elsewhere across the dingo's range.

Recently, however, wildlife ecologist Dr Laurie Corbett of Earth-Water-Life Sciences Pty Ltd, and previously CSIRO, has expressed a very different opinion. He advocates accepting that the dingo has changed due to introgression, and that we move on, appreciating the often less-than-pure dingo for what it does in ecosystems.

He suggests, rather than focusing just on the animal's appearance, we should value where and how it

Nick Alexander

Pure dingo populations are now the exception rather than the rule, especially on the east coast, and that if cross-breeding continues, dingoes could reach extinction within 50 years.

were captured and bred in mainland Asia.

The molecular biologists have also come to the startling conclusion that Australian dingoes were descended from just a few dogs that arrived in this way in a single founding event. So similar is the mitochondrial DNA of all modern dingoes, it is even possible that they originated from just one pregnant female introduced from the north. From there, soon after arriving, the dogs increased and went feral.

The DNA analyses indicate that male domestic dogs have been mating successfully with dingo bitches, but that dingo dogs haven't been crossing with domestic

Nick Alexander

A Fraser Island dingo laps the water of Lake McKenzie. The island's isolated population is relatively pure, with controlled hybridisation rates.

lives, and its entrenched cultural and economic values. This is a controversial, perhaps even, heretic, view to those who wish to preserve the genetic purity, and uniqueness, of the dingo.

Dr Alan Wilton, a molecular biologist at the University of New South Wales (UNSW), believes it may be too late to save the dingo in the wild. His genetic data support the findings of Dr Allan Newsome of CSIRO Sustainable Ecosystems and Corbett's earlier work on skulls.

The data indicate that pure dingo populations are now the exception rather than the rule, especially on the east coast, and that if cross-breeding continues, dingoes could reach extinction within 50 years.

With colleagues in Europe, Wilton has studied the genetics of dingoes since 1996, examining the DNA of some 2000 dingoes from various parts of Australia. He says the results confirm earlier research indicating that the dingo ancestor was brought to Australia from the islands now known as Indonesia, possibly by traders, who must have travelled with dogs either for food or as pets. The DNA studies suggest this introduction happened about 5000 years ago. These first dingoes were domesticated, long before that, from wolves that

females. Wilton has now developed 20 independent DNA fingerprinting tests to help distinguish dingoes from dingo-dog hybrids and offers to test samples (blood, tissues or mouth swabs) at UNSW to raise funds for dingo research.

Corbett's perspective is different. He has long suggested that inter-breeding between dingoes and domestic or feral dogs is an insidious threat to dingo populations and points out that once hybrids become more prevalent, inherent behavioural differences that initially minimise crossbreeding in remote areas become less and less preventative.

However, Corbett has reservations about the molecular methods of identifying dingo purity because modern dingo DNA reference material is used as a baseline rather than pre-European material that is unequivocally pure dingo.

Nonetheless, traditional measures used to distinguish dingoes, hybrids and domestic dogs – based on skull morphology, pelt colour and breeding patterns – also indicate that genetic dilution of dingo gene pools is widespread. Using these criteria, hybrids apparently exist in all populations throughout Australia, but especially in the south and east of the country.

David Jenkins.

The familiar appearance of a pure-bred ginger dingo. Are all Australian dingoes descendants of a few dogs, and maybe just one female, introduced from South-East Asia?

David Jenkins.

Far right: Most wild dogs in eastern Australia are now dingo-dog hybrids. This stumpy-tailed dog was caught in the bush as a pup, raised in captivity, and used as a working dog by a professional trapper.

David Jenkins.

Dingoes occur in several colour morphs, including ginger, white and black individuals, and some dingo-dog hybrids look identical to pure dingoes. These skins came from hybrids trapped around Kosciuszko National Park.

Corbett found, for example, that only 74% of 180 skulls examined from seven major regions across Australia could be classified as dingo, and no populations contained 100% dingo skulls. Furthermore, the proportion of hybrids appears to be increasing. In north-east Victoria, 49% of populations were classified as fair dinkum dingoes in the 1960s but this had fallen to 17% just 20 years later.

He reckons hybridisation simply means that dingoes now exist in a different form to that of their recent ancestors. So why and how do we protect the dingo and what, exactly, are we protecting?

As a top predator, the dingo has an important role in ecosystems, regardless of genetic purity. They have probably exacerbated the demise of several prey species, including the thylacine, and now help to regulate populations of macropods, emus, feral goats and feral pigs.

Corbett and his colleague, Dr Mike Daniels of the University of Oxford, say that conservation measures for dingoes 'should focus on their intrinsic and functional value rather than concentrating on their precise definition or concerns about genetic purity.' Essentially, the dingo's genetic integrity has already been lost, although the significance of this, given that the introgressed genes come from a domestic form of the same species, is worthy of debate according to Daniels and Corbett.

On the other hand, scientists such as Wilton argue that maximising genetic purity is an essential aspect of dingo conservation. Hybrids are also likely to have an adverse effect on other native wildlife because they may have more litters per year than dingoes. This means that where hybrids replace dingoes, predation pressure probably increases as the hybrid dogs feed their additional pups.

Corbett and Daniels do conclude that, in practical terms, it is desirable and logical to stem the flow of domestic genes into wild dingo populations. Firstly, it may be possible to identify areas where introgression is lower and limit the process in the future. Secondly, by reducing domestic gene flow, wild populations would continue to evolve within their contemporary environment.

Thirdly, where predation on livestock is an issue, measures to reduce numbers of feral domestic dogs would address some of the concerns of sheep graziers about dog attacks on stock.

In the context of tourism, promoting wild-type dingoes would fulfil public expectations. Domestic dogs gone feral are unlikely to have quite the same appeal to visitors as true-blue howling dingoes.

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