Fraser Island Inspiring Research

For decades Fraser Island has been a popular target for people undertaking research projects. It is not possible to properly manage a resource as valuable as Fraser Island without having a comprehensive understanding of the natural resource. Unfortunately the research which is done on Fraser Island is not coordinated and much of it isn't even reported or made available to managers and the advisory committees. FIDO is most concerned that there needs to be more coordination of the research and the dissemination of more information of any research undertaken there.

Knowledge of Research Outcomes: While much valuable research continues to be undertaken on Fraser Island, it is not achieving the best outcome. Few people even know what research programs are being and have been undertaken on the island, let alone the outcomes and what has been learnt from the respective studies. With the continuing turnover of personnel within the EPA's management team, there is a strong probability that some important work will be repeated because nobody was aware that a relevant study was done a long time ago. There is a possibility of "the wheel being reinvented" simply because there was nobody familiar with all the important work which has already been done.

Research Programs: Almost all of the research work on Fraser Island has been carried out without any cost to the Fraser Island budget. It is largely carried out by academics and funded by their respective institutions or by specific research grants. However, much of the research is ad hoc and opportunistic. There is now an urgent need to identify gaps in our knowledge of Fraser Island so that a set of priorities can be established for new programs needed to provide additional data and information to aid future decision making.

Coordination Needed: FIDO wants to see a Research Coordinator for the Great Sandy Region who will: (a) maintain a list of all research work undertaken and ensure that any outcomes are provided to the EPA (something which isn't always done at present) (b) circulate abstracts of any research which has been done, and (c) circulate a list of priority research projects which management would like to see undertaken to assist in better decision making, Some projects are very simple. For example, for more than 20 years, FIDO has wanted to know the height of the *Melaleuca quinquinerva* above Little Wabby Lake. This may be actually higher than Tasmania's highest *Eucalyptus regnans*, and would make it the world's tallest flowering plant and add to Fraser Island's World Heritage values if confirmed. Unfortunately, the EPA has never bothered to undertake this relatively simple project.

University of Sunshine Coast: The establishment of excellent laboratories for a Research Station at the Kingfisher Resort and the operation of Dilli Village by the University of the Sunshine Coast is a very positive step forward in learning much more about this world wonder. Unfortunately though, the EPA's bureaucratic rules are preventing many minor research projects proceeding.

Scientific and technical studies

While the EPA has trouble identifying and providing information on Fraser Island research projects, there was an interesting summary in the recent Federal Evalaution of the Fraser Island World Heritage Area.

The original nomination document noted that the degree of scientific interest in the Great Sandy Region was reflected in the large number of studies undertaken, which underscored the value of the nominated area as an extensive 'natural laboratory'. The high level of scientific interest in the area has continued since listing. Fraser Island research undertaken by organizations and consultants is listed below.

- Biological control of Melaleuca and Lygodium
- Biological control of Lantana and Groundsel
- Dingo genetics
- Dispersal mechanisms and population genetic structure in habitat restricted species
- Distribution database of Queenland's Coleoptera
- Effect of aestivation on muscle function/locomotor performance in frogs
- Endangered frog research program
- Flora population genetics
- Ground Parrot distribution and population genetics
- Insects of the Gondwanian lines
- Interactive key to the grasses of Australia
- Invertebrate fauna research
- Managing threatened wildlife at risk from fire in a World Heritage Area: how do prescribed burns affect population viability.
- Managing wildlife on Fraser Island
- Marine mammal histopathology
- Marine turtle reproduction and population biology
- Morphological evolution in rainbow fish
- Population genetic structure of Sand Yabby *Cherax robustus*
- Population genetics of freshwater turtles
- Fraser Island Review of Universal Value
- Social behaviour and ecology of Allodapine Bees in Great Sandy
- Taxonomic status of Double Eyed Fig Parrots
- Taxonomic studies of ground hunting spiders and insects
- Thermoluminescence dating of sediment samples
- Vouchering orchid species records for southeast Queensland
- Spiders of southeast Queensland
- Marine fishes of Fraser Island
- Effects of fire interval on the relative abundance of three native rodent populations in foredune complex vegetation on Fraser Island
- Effects of sand mining on the reptile community
- Effects of relative usage on Fraser Island Lake nutrient concentrations
- Genetic links between Hoop, Kauri and Woolemi pines

This list is not comprehensive but gives a reasonable indication of research previously and presently being conducted in the World Heritage area.

The Importance of Fraser Island's Dingoes

The importance of Fraser Island's dingo population has been highlighted in an article, "The Great Dingo Dilution" by Steve Davidson published in the January-March, 2004 of the CSIRO's "ECOS" magazine. The sub-title and the theme are "*the domestic dog is crossing out the dingo*". An A4 poster on the DNA studies of Fraser Island dingoes is also accompanies this MOONBI.

The Article advises that pure dingo populations in Australia 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. However the article states: *"Fraser Island's isolated dingo population is relatively pure with controlled hybridization rates."* It was FIDO which first advocated the banning of domestic dogs on Fraser Island to preserve the genetic purity of the island's dingo population in the 1970s. The following are extracts from the article:

The iconic Australian 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. 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)*. It is now difficult to find a pure bred 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.

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 lives, and its entrenched cultural and economic values. This is a controversial, perhaps even, heretical 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 says that 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.

DNA of some 2000 dingoes from various parts of Australia confirm earlier research which indicates 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 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 females.

Based on skull morphology, pelt colour and breeding patterns hybrids apparently exist in all populations throughout Australia, but especially in the south and east of the country. 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.

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 Daniels argue 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.'* They 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 (such as Fraser Island) and limit the process in the future. Secondly, by reducing domestic gene flow, wild populations would continue to evolve within their contemporary environment.

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.

One of fewer than 200 dingoes on Fraser Island, possibly the last bastion for genetically pure Australia dingoes. Photo: Ian Morris