A suburb of National Parks and World Heritage status – Wildlife Conservation on Magnetic Island
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Thank you for the opportunity to speak at the 2008 National Wildlife Rehabilitation Conference.

This paper and conference presentation look at wildlife conservation on Magnetic Island. This topic was selected because when I moved to Townsville at the end of 2007 from the ever developing Gold Coast, I was amazed that such a beautiful island, so close to the mainland and with such easy access, could remain relatively undeveloped and, in some areas, relatively undisturbed.

To give a little background, I work for C&R Consulting, an environmental consulting firm who specialise in finding solutions to environmental problems, rather than simply reporting what others want to hear. C&R are in the process of establishing a new fauna arm of the business (the Terrestrial Ecology and Biodiversity Unit), which is incredibly exciting, because responsible environmental consultants have a huge role to play in environmental management and the conservation of Australia's precious wildlife!

C&R Consulting not only handle routine or day-to-day projects, but actively seek out challenging and highly sensitive projects that may sometimes be influenced by strong commercial or political agendas. We are also not afraid to involve ourselves in highly controversial issues and welcome scrutiny by our peers, the community, government and industry alike. Importantly, noting the location for this years' conference in Canberra, it fitting that C&R take a leaf out of the Public Service handbook in that we pride ourselves on providing frank and fearless advice.

We don't just sit in the office churning out reports, we get out amongst it, even if it means spending all weekend up to our ears in mud, literally, or spending the night out in the bush spotlighting wildlife (the perfect night out) or diving to conduct marine fauna surveys in terribly murky conditions with visibility less than 10 cm in front of your eyes.

C&R's philosophy is to work with our clients in a collaborative manner, rather than working for them, and it is our aim to educate rather than to simply inform. We believe that awareness leads to understanding, which in turn promotes appreciation and respect for the environment and ultimately leads to more successful environmental management. We hope to bring about attitudinal changes through increased understanding.

We work with many different government departments, including the Department of Environment, Water, Heritage and the Arts, Great Barrier Reef Marine Park Authority, Queensland Environmental Protection Agency and many local Councils, as well as industry, and our jobs can vary from highly sensitive environmental impact assessments to the development of environmental education programs or the establishment of scientific facilities and laboratories.

Back to the matter at hand – wildlife conservation on magnetic Island. Rather than looking at the rehabilitation of a particular species, this paper considers wildlife conservation on a broader scale, introducing the amazing biodiversity of Magnetic Island, a suburb of National Parks and World Heritage status, and outlining some of the great initiatives that have been put in place to manage this remarkable area.

Magnetic Island is situated 8km off the coast, just a 20 minute ferry ride from Townsville, Queensland's largest regional city. It is a mountainous and thickly wooded island covering approximately 57km^2 and rising about 500m above sea level at the peak of Mount Cook.

This small island is only 11km wide at its widest point and there is approximately 40km of coastline surrounding the island. However, the island boasts a huge diversity of habitat types and environmentally significant areas and features. Freshwater creeks meander through pockets of rainforest and woodland. Native vine thickets envelop rocky valleys and gullies. Where the rocky headlands meet the sea many secluded beaches and bays have been formed. The rocky headlands with magnificent granite boulders keep watch over the tropical waters of the Great Barrier Reef Marine Park and GBR World Heritage Area. Impressive coral communities cluster around the rocky headlands. A range of well-developed nearshore fringing reefs in the bays surrounding the island provide superb habitat for a myriad of marine fauna species.

Extensive mangrove habitat on the leeward side of the island forms integral habitat for the refuge and breeding of numerous terrestrial and marine species. Wide inter-tidal mud flats support a huge variety and abundance of marine organisms and provide exceptional foraging ground for wading birds, many of which are migratory species, traveling from as far as Siberia to winter along Australia's shores. Seagrass meadows flourish in the sheltered waters on the western side of the island, forming essential habitat for the Dugong, and support numerous species of marine flora, and other wildlife. These features are just some of the reasons that Magnetic Island was listed as a World Heritage Area in 1981.

Situated on the cusp of Queensland's wet tropics and the semi-arid tropics of the Townsville area, Magnetic Island is a refuge for biodiversity, by virtue of it's isolation from many threatening processes prevalent on the mainland. Boasting an incredible diversity of permanent, nomadic and migratory wildlife species, many of which are of local, regional, national and even international conservation significance, Magnetic Island provides a unique and outstanding opportunity for wildlife conservation and research.

Now just to put things in context, Magnetic Island really is a very unusual situation, in that local, state and federal government all have a vested interest in the management of the island and the surrounding area. The island is a suburb of the City of Townville, managed under Townsville City Council local laws. Over half the island (almost 55%) is National Park, and Magnetic is also listed as a World Heritage area, protected by the Commonwealth. The island currently supports a population of approximately 2,500 permanent residents with potential for much developmental expansion.

This is quite a concern, however, as aside from the diverse habitat features outlined above, the island also supports some highly significant wildlife species. An overview follows:

- Magnetic Island is home to almost 200 bird species, many of which are noteworthy from a conservation perspective;
- Terrestrial mammals, of which 19 species have been recorded so far, such as the allied Rock-wallaby, Koala and one species of microbat listed as vulnerable, call Magnetic Island home;
- At least 34 species of reptile have also been recorded on the island, including the rare Sadlier's Dwarf Skink (*Menetia sadlieri*), a small skink species recorded only on Magnetic Island;
- At least 13 species of amphibian occur within the varied forest habitats of this small island environment;
- In addition, approximately 600 native plant species are also know to occur on the island;
- A number of marine wildlife species of conservation significance also occur in the waters of the Great Barrier Reef surrounding the Island, such as the vulnerable Green Turtle (*Chelonia mydas*), the rare Snubfin Dolphin (*Orcaella heinsohni)* and vulnerable Indo-Pacific Humpback Dolphin (*Sousa chinensis*);
- The variety of marine environments surrounding Magnetic Island provide habitat for over 140 species of fish from at least 33 families. The currently healthy condition of the island's coral reefs supports an intact fish community from all trophic levels; and

Even though research on the wildlife of Magnetic Island is relatively limited to date, the above includes an impressive diversity of wildlife species.

What's so special about Magnetic Island in terms of wildlife conservation?

Twenty-two species of terrestrial plants and animals on the island are listed as endangered, rare or vulnerable under the *Queensland Nature Conservation Act 1992* (*Queensland Nature Conservation (Wildlife) Regulation 2006*).

The beach stone-curlew (*Esacus neglectus*) listed as vulnerable, the rare black-necked stork (*Ephippiorhynchus asiaticus*) and the endangered Little Tern (*Sterna albifrons*) are some examples.

A number of additional species are listed as endangered or vulnerable under the commonwealth *Environmental Protection and Biodiversity Conservation Act (EPBC) 1999.*

Marine turtles, sea snakes, several species of whales and dolphins and the endangered dugong are regularly seen in the waters surrounding Magnetic Island. The Island's value as dugong habitat has been acknowledged by declaration of the region as a Dugong Protection Area. The Dugong is recognised as a vulnerable species under State legislation and listed as an endangered species under Commonwealth legislation.

Dugongs are subject to a range of human threats in Australia, including entanglement in shark mesh and gill nets, loss and degradation of important habitat such as seagrass meadows, and collisions with boats, which is a real concern when considering the rapid growth of marine development along Queensland's coast, and in particular in Townsville, industrial and recreational marine development.

The rare and also rarely sighted snubfin dolphin, so named for it's stubby dorsal fin, is known to live in the waters surrounding Townsville and Magnetic Island. The snubfin dolphin was only described as a new species in 2003, and is thought to be the first new species discovered in more than two decades which is only found in Australian waters.

It is believed that up to 100 snubfin dolphins may live in the Townsville region and marine mammal researchers have recently voiced concerns that there may be the real possibility that the snubfin dolphin could become regionally extinct. This species, like the dugong, is under threat from pressures such as increased boating activity, decreased water quality as a result of land-based development, over-fishing, and marine development, such as new marinas etc.

The rare Indo-pacific Humpback Dolphin also occurs in the waters surrounding Townsville and Magnetic Island. They too are subject to a range of human threats in Australia, including entanglement, depletion of feeding resources due to over-fishing, water quality impacts and collisions with boats. Aside from these examples of significant marine wildlife (and that by no means should be considered the extent of significant marine wildlife species in this region), a number of terrestrial species of high conservation significance are also found on the Island.

A few examples include a recent confirmed sighting of the endangered Northern Quoll (*Dasyurus hallucatus*), previously thought to be extinct on Magnetic Island (probably as a result of the introduction of the cane toad). This quoll was found at Horseshoe Bay in 2005, in a wood pile in the garden of resident Magnetic Island scientist Gavin Ryan. One can only imagine his excitement when he moved some logs and discovered the quoll hiding out behind it! A new branch of the Quoll Seekers Network (QSN) has recently formed in North Queensland, and it may be a safe assumption to expect that Magnetic Island will be on the cards for future northern quoll surveys and research.

Magnetic Island is home to Northern Australia's largest colony of koalas living in the wild. Between the late 1800s and the 1930s, the koala population suffered huge declines due to events and pressures such as bushfires, disease, habitat loss and hunting, with millions of koalas being killed for the international fur trade.

Taking action against this many naturalists took koalas to island sanctuaries where their population could improve and at the same time develop a tourist venture. On Magnetic Island, the District Inspector of Stock relocated 18 koalas from Bowen to the Island in 1932. It is unknown whether koalas occurred naturally on the island before 1932, and hence the issues of koala conservation on Magnetic Island has become a rather controversial issue. The Magnetic Island koala population now comprises several hundred individuals and there is some concern as to whether this small island can sustain such a large population, or whether the koalas may indeed create severe environmental degradation on this sensitive island ecosystem. Regardless, they are an Australian icon and their conservation is necessary. Perhaps this isolated island koala population may offer another opportunity for some valuable research.

The water mouse (*Xeromys myoides*), known to occur on the Island, is listed as vulnerable in Queensland and nationally (*Environment Protection and Biodiversity Conservation Act 1999*). In the past 30 years, local population reductions and disappearances have been recorded in Queensland and the Northern Territory. The water mouse is mostly threatened by habitat loss, fragmentation and degradation. This has resulted from urban development, sand mining, land reclamation, swamp drainage, feral animals, and a range of other activities. Due to it's isolation from the mainland, and therefore exclusion of some of these threatening processes, Magnetic Island may offer a fine opportunity for the conservation of this species.

Threats to Magnetic Island's Wildlife

While Magnetic Island currently boasts an amazing diversity of wildlife species and associations, these wildlife species are subject to a range of human impacts which threaten their survival, some of which have already been touched upon. The following section briefly outlines some of the major pressures which are particularly relevant to Magnetic Island.

Increased tourism pressures are a real concern for the wildlife and the environment of Magnetic Island. As mentioned, Magnetic Island is only a stones' throw from Townsville on the mainland. Yet it offers everything that many of the larger, offshore island destinations have. Superb internationally renowned dive sites for the marine enthusiast, (including the famous wreck of the "Yongala" off Cape Bowling Green near Magnetic Island, quoted as the best wreck dive in Australia and one of the top 5 in the World). A number of World War II sites and forts provide a point of interest, and the island is incredibly rich in indigenous cultural history. There are many walking tracks for the nature lover, resorts and beaches for the holiday maker to name but a few. So the many impacts of tourism are a real consideration in terms of wildlife conservation and environmental protection. A couple of impacts to note include increased road traffic which can lead to increased wildlife-traffic interactions and incidents and greater numbers of road-killed wildlife, and increased travel to and from the island results in increased vessel movement, more disturbance to the marine environment, and more potential for boat strike incidents on species such as the dugong.

However, on the flip side, there are many eco tourism ventures and resorts on Magnetic Island undertaking some great work to promote environmental education and awareness, and working towards conservation. These businesses do have a vested interest in the environment, afterall, as it may be the primary source of their income in some cases.

Developmental pressures also threaten Magnetic Island's delicate ecosystems and wildlife. Townsville is currently one of Australia's development 'hotspots'. It has one of the highest economic and residential growth rates in Australia, with some of this reflected on Magnetic Island. The pressure of coastal development has, in recent years, begun to make a significant impact on the island. At present many millions of dollars in development are planned for the island and the impact of these has led to considerable opposition from some residents who fear the effects this development will have on the environmental values of Magnetic Island's lowlands. In addition, increased coastal development along Townsville's coast can also have environmental impacts on the marine environment, affecting Magnetic Island.

Unmanaged, this expansion has the capacity to threaten not only the natural values of the Island but also and surrounding areas of the Great Barrier Reef Marine Park and World Heritage area, through both direct and indirect impacts.

When it comes to development on Magnetic Island, the question we all really need to ask is simple. What environmental impacts will this increased development really have and to what extent? What is the sustainable carrying capacity of a World Heritage island such as Magnetic Island, and how will an increased population, and all the associated issues, such as expansions in infrastructure, extended clearing of natural vegetation and other associated matters impact on the World Heritage values that earned the island it's listing back in 1981? Food for thought.

Weeds and feral animals have the potential to cause devastating environmental impacts. On Magnetic Island, feral animal such as pigs, feral cats and goats, predate on native species and also damage and outcompete native species for resources. Invasive plants including Lantana (*Lantana camara*) and Rubber Vine (*Cryptostegia sp*) (Weeds of National Significance), rapidly invade the delicate environment, especially along creek lines and other disturbed areas. Unfortunately, many of these species have been introduced for their ornamental value, and have jumped the garden fence to become bushland bullies on Magnetic Island.

Domestic pets are recognised as one of the key threats to Magnetic's wildlife. Magnetic Island is a suburb of Townsville, and as such the local laws of the Council apply over the island. As such it is permissible to keep domestic pets on freehold land, provided dogs are kept on a leash whenever in a public place and that cats are not allowed to roam outside. However, it is often not practical of logistically possible to enforce these regulations on the island, and it is believed that domestic dogs and cats have been responsible for the demise of many native animals on the island over the years. Domestic animals such as cats and dogs can have a tremendous impact on our native wildlife, particularly in an area as environmentally sensitive as Magnetic Island.

A number of other human related impacts also affect the wildlife of Magnetic. Natural events such as fires, cyclones and climate change impacts also have the potential to greatly affect wildlife populations.

These are just a few of the threats facing the wildlife on Magnetic Island.

So whose responsibility is it to management wildlife on Magnetic Island, and how can the island be managed effectively to ensure long-term wildlife conservation?

It is everybody's responsibility. Some examples of initiatives and programs currently being implemented and undertaken on Magnetic Island to enhance wildlife conservation are outlined below.

Wildlife Reflector Program

In the early 2000's, Townsville City Council worked in close consultation with Magnetic Island resident and wildlife carer, Jenny Mulcahy, to coordinate the installation of wildlife reflectors along some of the main roads of Magnetic Island. This program is an Australian trial following years of research overseas during which time a reflector was developed in an effort to reduce the number of animals killed on roads each year.

The reflectors are installed on both sides of the road and are activated by headlights of approaching vehicles. They reflect light into the surrounding bush producing an optical warning fence that causes the animal to freeze but is unnoticeable to the driver of the vehicle. As soon as the vehicle has passed the reflectors become inactive and the wildlife can then cross the road safely. While no confirmed data and statistics on the success of the program were available at the time of preparing this paper, anecdotal information suggests the program has been successful in reducing the number of road-killed animals in the areas in which the reflectors have been installed.

Nelly Bay Habitat Reserve and Interpretive Centre

The Nelly Bay Habitat Reserve was established in 1996 as a conservation reserve by the Townsville City Council, again with the help of community efforts and expertise. The Habitat reserve boasts high levels of ecological and conservation values by providing a protected area that links Nelly Bay's highlands and lowlands to join with the Great Barrier Reef Marine Park, part of the Great Barrier Reef World Heritage Area. The habitat reserve was initially developed to protect and manage the remnant vegetation and native bird life which inhabit

the area. A number of interpretive features have been incorporated into the reserve, including viewing platforms and paved trails through the natural bushland.

The interpretive centre features educational material on a range of environmental themes and also features original artwork showcasing the distinctive flora, fauna and landscapes of Magnetic Island.

Government authorities

The Queensland Parks and Wildlife Service manage the day-to-day operations and management of the Magnetic Island National Park. The island rangers have a prominent presence on the island, and one positive example of hands on work which is being undertaken for the direct conservation of wildlife on the island, is the protection of sea turtle nests.

The Great Barrier Reef Marine Park Authority have implemented a number of policies, strategies and management plans to ensure the protection of this unique and highly significant marine environment. One document to note is the new Reef Water Quality Protection Plan, developed to help protect the reef from land based sources of pollution.

Community Involvement

A number of community and other non-governmental groups have been formed both on Magnetic Island and in the Townsville region, working towards the sustainable management of the island and Townsville's coastal environments. One of the most relevant groups to mention in terms of wildlife rehabilitation is the Magnetic Island Nature Care Association Inc.

Based on Magnetic Island, the Magnetic Island Nature Care Association Inc. care for sick, injured and orphaned animals found on the island. The group have also worked to establish the Magnetic Island Wildlife Site, a web based tool providing an array of information on the wildlife of Magnetic Island.

The Magnetic Island Nature Care Association Inc also worked in close collaboration with the Magnetic Island Community Development Association Inc. (made up of a group of well renowned scientists who also form part of the Magnetic Island resident community) to prepare a brilliant report detailing Magnetic Island's World Heritage Values.

Industry

With an ever increasing awareness of the environment, and the strict conditions now placed upon developers to ensure environmental protection and management during and post development, it is encouraging to see a shift in the thinking and behaviour of industry groups involved with development on Magnetic Island.

One example that C&R Consulting are highly familiar with, having worked closely with the developer on this project to enhance environmental protection on Magnetic Island, is the Horseshoe Bay Boardwalk.

In Horseshoe Bay, the dunes, lagoon and ephemeral wetland system separate the beach from a rapidly expanding residential sector. Local access to the beach is typically via the shortest and easiest option, through the ephemeral wetland system during the dry season or over the dunes, causing extensive environmental damage to this sensitive area.

In order to protect the ecosystem values of this unique site, the developers were required to construct an elevated pedestrian boardwalk through the ephemeral lagoon and wetland system to provide controlled access to the beach at horseshoe bay, a popular destination for tourists and residents alike. C&R were fortunate to be assigned the job of assessing the environmental impact of the proposed boardwalk and developing mitigation measures to reduce the boardwalk's impact on the sensitive ecosystem of Horseshoe Bay.

During the construction of the boardwalk, C&R observed an impressive attitudinal change in the construction workers, which may well be attributed to the amount of time spent working closely with these staff to provide an understanding of the sensitive environment of Magnetic Island. These staff even requested the opportunity to redirect the boardwalk alignment slightly in order to conserve the nesting and shelter sites (which they fondly referred to as little 'units') of some of the local wildlife which they had identified during the course of the construction.

While it really is fantastic to see many developers are now considering and implementing environmentally sustainable initiatives into building design and construction, and it's certainly a huge step forward, again one fundamental question must be asked.

Shouldn't we really be looking at the bigger picture?

In terms of sustainability, although each new house, each new resort, each bungalow or camp site may be more environmentally sensitive than the infrastructure of preceding generations, each new 'sustainable development' still has an impact on the environment and in turn the wildlife of this magical place. How much pressure can we keep placing on this World Heritage Island before we start to lose some of the unique values that earned Magnetic Island it's listing as a World Heritage Area in the first place?

Magnetic Island is a fine example of an island that is recognised for it's environmental values, with a range of challenges associated with ensuring all environmental issues are addressed and managed properly, involving a number of stakeholders on so many different levels, all levels of government, community and industry. However, as we have just seen, there are some really positive examples and initiatives being implemented to ensure the protection and conservation of our wildlife for many years to come, and some of these initiatives may just set a benchmark for future environmental management and wildlife conservation on the island. Perhaps it's just the start, there's plenty we can all do from here, but it really is a pretty good start!

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