

MAINTAINING THE INTEGRITY OF FRASER ISLAND AND THE GREATER SANDY WORLD HERITAGE AREA

NEW, TWO-DAY AGENDA: 28-29 SEP 2006

WITH OPTIONAL 2-DAY FIELD TRIP THROUGH FRASER ISLAND WHA - 30 SEP - 1 OCT 2006

UNIVERSITY OF THE SUNSHINE COAST, SIPPY DOWNS (BUDERIM)

Please see the detailed list of abstracts and speakers below

PROGRAM

Day One – Thursday 28 September 2006

09:00 Opening and Welcome to Country

09:15 Fire – Including keynote address by Jeremy Russell Smith

Speakers: include Dr Jeremy Russell Smith – Keynote Address

11:30 Morning Tea

11:45 Dingoes

DINGO DIET AND PREY AVAILABILITY ON FRASER ISLAND by Ángel-E. Dafna, Ron Neller, Nick Baker - University of the Sunshine Coast and UQ

DINGOES –MANAGING WILDLIFE TOURISM ON FRASER ISLAND by Leah Burns, Griffith University

13:00 Lunch

14:00 Ants and Plants

NATIVE AND ALIEN ANT COMMUNITIES ON FRASER ISLAND by Collier, P. Nicholls, Z. Robinson, W. and Andersen, A. USC and CSIRO Tropical Ecosystems Research Centre
CLIMATE CHANGE AND FIRE HISTORY – A CLUE FROM HOLOCENE VEGETATION by Angus Tye - The University of Melbourne

15:30 Afternoon Tea

16:00 Water

SUBMARINE GROUNDWATER DISCHARGE FROM FRASER ISLAND: A NUTRIENT SOURCE FOR HERVEY BAY? By Ron Neller and Chris Crossland - University of the Sunshine Coast

MANAGING THE UNKNOWN – FRASER ISLAND'S GROUNDWATER RESOURCES by Kieran McAndrew - Griffith University

17:00 Official Opening – Art Exhibition on the Aesthetics of Fraser Island by Erwin Webber with drinks and nibbles

18:00 Conference Dinner

DAY TWO – FRIDAY 29 SEPTEMBER 2006

Workshops and Forum

09:00 Fire

10:00 Dingos
11:00 Morning Tea
11:30 Water
12:30 Poster Session
13:00 Lunch

Saturday 30 September and Sunday 1 October 2006

Optional Field Trip to Fraser Island (Cost \$200 per person)

Depart Sunshine Coast 08:00 Saturday

Return Sunshine Coast 17:00 Sunday

Earl Bird Bookings must be received by 1 September 2006

PRICES

Individual \$150

Group booking (Five or more persons booked and paid for at once) \$120

Community conservation group member or registered tertiary student \$100

(Registration must be accompanied by letter of nomination (preferably on letterhead) from a bona fide community conservation group, including the group name, ABN, address and contact phone number for at least one executive officer. Only one nomination per community conservation group).

Conference Dinner Thursday, 29 August *(tick to express interest)* \$50

Optional post-conference field trip – Sat 20 Sept and Sun 1 Oct \$200

An issues-based tour of Fraser Island, with commentary by John Sinclair (tick to receive further information – limited places available).

ABSTRACTS

KEYNOTE ADDRESS

JEREMY RUSSELL SMITH

MAINTAINING FIRE INTEGRITY

Dr Smith is one of Australia's leading fire ecologists. He works for the Bushfires Council of the Northern Territory and leads the fire program for the Tropical Savannas CRC. He has been involved with the development of the Arnhem Land Fire Abatement project since its inception in 1998.

DETERMINING A BASELINE FOR FRASER ISLAND "INTEGRITY"

JOHN SINCLAIR, HONORARY PROJECT OFFICER,

FRASER ISLAND DEFENDERS ORGANIZATION

The World Heritage Convention obliges member states to preserve the integrity of any of their inscribed World Heritage sites. In the case of Fraser Island, it is important to establish a

bench-mark for the integrity which is to be protected. It could be taken as being either when the island was nominated for World Heritage listing in 1991 or what it was like at its most natural state prior to the intrusions of modern civilizations which began early in the 19th Century. Since at the time of its nomination the Queensland Government was in the process of developing a Management Plan which sought to try to minimize the impacts of modern civilization on Fraser Island, it can be assumed that the bench-mark should be based on the landscape in Aboriginal times. Unfortunately, there are precious few written or photographic records to reveal just what constituted this pre-European contact benchmark.

Most of the changes to the integrity are reflected on the changes to Fraser Island's ecosystems. The earliest records and observations of the first people of European origin to visit Fraser Island have been examined to document what Fraser Island's natural landscape and biology may have been like prior 1836. It also documents the changes which have been recorded and observed over the period since European contact and, where possible, the agents of change which have been responsible.

The more significant changes to date are a result introductions of alien flora and fauna and the impact of changing the fire regime away from the prevailing Aboriginal practices developed over thousands of years. The industrial extraction of resources and even the tourist industry have also impacted on the natural ecosystems.

Although there is not yet any recorded extirpations of any plant species on Fraser Island due to the introduction of introduced plant (weed) species, there is evidence that many ecosystems have been altered. The advent of cane toads may have contributed to the extirpation of quolls and the reduction of many reptile populations. However, the most obvious changes to the ecosystems can be traced to the changed fire regime and the modification of the forests during 130 years of industrial logging.

Although Fraser Island is in large measure the product of climate changes and changing sea-levels over hundreds of thousands of years, there is little evidence yet of the impact of the current global climatic changes on Fraser Island beyond some coastal erosion which is much more evident on the western side of the island.

Some of the changes to the Fraser Island natural environment take many before they become obvious. By then the changes may be beyond reversal. Close monitoring of the environment and early identification of any changes affecting the ecosystems are therefore essential. It is therefore vital to have a clearer understanding and appreciation of the ecosystems which existed on Fraser Island prior to the advent of western civilization as a basis for meeting Australia's World Heritage obligations.

FRASER ISLAND WORLD HERITAGE AREA FIRE MANAGEMENT STRATEGY

COLIN LAWTON, SENIOR CONSERVATION OFFICER GREAT SANDY QPWS

Australian ecosystems have been evolving with fire for millions of years. Many flora and fauna species and communities are dependent on the periodic presence of fire, whilst some are not. The optimal fire regime (the season, frequency, intensity, type and spatial mosaic of fire)

varies between ecosystems, and there is no ideal or 'best fit' fire regime that will suit all species and communities.

In Australia, most natural areas cannot be expected to retain their biological diversity without active fire management. Fire is therefore one of the major land management tools used by conservation managers throughout Australia for the protection of life and property, to achieve conservation objectives, and to maintain Aboriginal cultural resources and practices. This deliberate use of fire in natural areas is almost always controversial.

Fraser Island is the largest sand island in the world and received World Heritage status in 1992 in recognition of its outstanding universal values. The island covers an area of approximately 165,175ha at high water mark, is approximately 120km long and between five and 25km wide. The highest point of elevation is the trig station south of Lake Bowarrady, which is 244m above sea level. Fraser Island is aligned roughly NNE and SSW, and lies between latitudes 24°41' and 25°50' south, and longitudes 152° 55' and 153° 20' east (DASETT 1991).

The area incorporates extensive areas of national park (163,053 ha), along with small areas of other tenures such as unallocated state land (1,349 ha), freehold land (372 ha), and leasehold land (48ha), with other reserves contributing the remaining 353 ha. Several small townships are situated along the east coast of the island, as are several holiday resorts (see Map 2 for tenure details).

Fire Management for Great Sandy District consists of a Fire Strategy, Wildfire Response Procedure, an annual Planned Burn Program and reporting loops (recording of fire events and fire monitoring).

A Fire Management Strategy has been finalised for Fraser Island. Development of the Strategy has been consistent with Agency guidelines. Extensive consultation has occurred with key interest groups. The Fire Strategy is the principle component of the Fire Plan for a protected area. The other components of the Fire Plan are the Wildfire Response Procedure and the Planned Burn Program.

The planning, approval, implementation and reporting processes for fire management in the Fraser Island Section of the Great Sandy National Park will follow the Queensland Parks and Wildlife Service (QPWS) Fire Management System (FMS) 2003.

The Fire Strategy provides the overall framework and direction for fire management on the park. It details the values of the park and surrounding lands, the long-term fire management aims and how these relate to on ground management. An acceptable range of fire regimes to suit the desired fire management objectives is provided. Although the principles of this strategy relate directly to the protected area estate they may also apply to other land tenures on Fraser Island if the fire operation is conducted under the control of a QPWS staff member or if the responsible agency wishes to adopt this system.

DINGO DIET AND PREY AVAILABILITY ON FRASER ISLAND

ÁNGEL-E. DAFNA*†, RON NELLER†, NICK BAKER‡

† UNIVERSITY OF THE SUNSHINE COAST, ‡ UNIVERSITY OF QUEENSLAND

The management of dingoes (*Canis lupus dingo*) on Fraser Island presents a serious issue regarding the balance of public safety and world heritage conservation. One of the most important and least understood aspects of this issue is the availability of prey and prey species relations with the dingo diet. This relationship is the focal point of this research.

To assess prey availability, three forest types were sampled during summer and winter 2005 using live trapping (12 sites) and track counting techniques (24 sites). Population estimations were obtained from statistical models (Nest) when possible, and with indices such as minimum number known to be alive (\hat{N}) and the Passive Activity Index (PAI). To investigate the diet of the dingo, 126 scats were collected. Prey remains were identified and the diet composition was described using presence-absence and weight of remains methods.

The most common species in the study area were *Rattus tunneyi* and *R. fuscipes*. The activity of rodents was different in the three habitats sampled and in the two seasons. A remarkably higher PAI was recorded for lizards in summer and bandicoots and antechinus in winter. The PAI was calibrated against population estimates for rodents, providing a simple and efficient monitoring tool for use by natural resource managers.

A generalist pattern for the diet of Fraser Island dingoes suggested a selective predatory behaviour towards bandicoots, in particular *Perameles nasuta*, and prey switching for secondary prey, such as rodents, according to temporal fluctuations in the abundance of these species. Fish and human-sourced food consumption has decreased since the 1990s but they are still an important part of dingo diet. The functional relationship between dingoes and bandicoots approaches to Type II and with rodents approaches Type III. The habitat suitability for dingoes is similar in the habitats sampled and prey availability is slightly higher in the Tall Wet Forest.

DINGOES – MANAGING INTERACTION WITH VISITORS

IRIS FLENADY, SENIOR CONSERVATION OFFICER, QPWS

MANAGING WILDLIFE FOR ECONOMIC AND SPECIES SUSTAINABILITY - A PRACTICAL APPROACH.

The dingoes on Fraser Island are considered to be one of the purest in Australia. Each year around 350,000 people visit this popular World Heritage Area off the coast of Qld. Most want to see a dingo in the wild. Losing the dingo could have serious economic repercussions for the tourism industry. The Environmental Protection Agency through the Queensland Parks and Wildlife Service (QPWS), the island's managing agency, uses the three "e's" (education, engineering and enforcement) as a foundation to their dingo management strategy, which provides for visitor safety, species survival and in the long-run, a major role in the sustainability of the tourism industry on Fraser Island. Here is an example of walking the fine line between the needs of conservation and industry, where co-operation is the only way forward.

SUBMARINE GROUNDWATER DISCHARGE FROM FRASER ISLAND: A NUTRIENT SOURCE FOR HERVEY BAY?

RON NELLER AND CHRIS CROSSLAND - UNIVERSITY OF THE SUNSHINE COAST

Submarine groundwater discharge (SGD) has been observed and utilised by people across several millennia. However, it is only in the last few decades that serious study has been directed at studying the magnitude and effects of flows. While our understanding of models and processes is at an early stage, there is clear evidence emerging from globally distributed local studies that SGD is a potentially significant source of nutrient to coastal marine ecosystems.

Fraser Island is characterised by apparently large reservoir of groundwater. Surface flows and shoreline seepage of groundwater is widely observed. In addition, the mainland coast contains defined aquifers discharging into Hervey Bay and, in some cases, estimates of volume flow and water quality have been monitored over several decades, for example, in the Burnett River catchments. Surface river flows and allied nutrient loads have been measured.

Groundwater discharge to the Bay undoubtedly makes a significant contribution to the nutrient requirements of benthic seagrass communities and water column plankton production, supplementing fluvial and ocean nutrient supplies. The relative importance of groundwater nutrient contributions from Fraser Island to the Hervey Bay ecosystems is being assessed by building a first-order nutrient budget for the Bay, identifying the key sources and loads of nutrients. We provide a progress report on current measurements of nutrient concentrations and flows of groundwater and submarine groundwater discharge from Fraser Island to Hervey Bay, and on the nutrient budget estimates.

MANAGING THE UNKNOWN – FRASER ISLAND'S GROUNDWATER RESOURCES

KIERAN MCANDREW - GRIFFITH UNIVERSITY

Managing Fraser Island's groundwater resource involves controlling the extraction of freshwater from it, and the disposal of effluent to it. The resource is described and the current situation and future management scenarios are explained and evaluated. While some studies have provided a basic investigation, a detailed hydrological study of Fraser Island's groundwater resources is yet to be undertaken. Some stakeholders believe that this information deficiency is an impediment to the sustainable management of this resource - it may be difficult to base management strategies on limited scientific information. The flipside regarding this information gap is the precautionary belief that further knowledge of the resource may ultimately lead to exploitation – many stakeholders remain sceptical as to the motives of scientific studies. Despite the debate, the recently passed Wild Rivers Act 2005 placed a moratorium on extractions of the groundwater. This announcement was met with disappointment from mainland water authorities who have long considered Fraser Island a future water supply option. The legislation's aim was Ecological Sustainability, and its implementation is in line with the concept of the Precautionary Principle. This decision will undoubtedly maintain the integrity of Fraser Island's groundwater. However, it is debateable

whether the application of this principle will be an environmental improvement on a wider scale, as it may result in mainland water authorities constructing new water supply options with an even greater potential to cause environmental harm, such as desalination plants or large dams.

NATIVE AND ALIEN ANT COMMUNITIES ON FRASER ISLAND

COLLIER, P. (1) NICHOLLS, Z. (1) ROBINSON, W. (1) AND ANDERSEN, A. (2)

*1. UNIVERSITY OF THE SUNSHINE COAST
2. CSIRO TROPICAL ECOSYSTEMS RESEARCH CENTRE*

The University of the Sunshine Coast has undertaken several recent studies in ants on Fraser Island. A 2004 study found more than 250 species of native ants in 16 sites spread across 8 different vegetation types on the island. In particular, the cypress pine groves and Banksia shrub lands had high native ant diversity.

At the same time, we located several infestations of the Coastal Brown ant, *Pheidole megacephala*. Most of these infestations are associated with human habitations such as at Dilli Village, Eurong Station and Orchid Beach. However, one infestation of these ants covering several hectares was located away from any habitations and near one of the major walking tracks on the Eastern side of the island. This infestation is a major case for concern as the invaders have displaced almost all of the native ants in the area and the infestation is expanding through native bush in very rugged terrain.

Overseas studies show that the consequences of this invasion for other invertebrates like spiders will be devastating. In 2005 we conducted an investigation into the native ant faunas associated with an area infested by Black Crazy ants, *Paratrechina longicornis* on the western side of the island. The infested area had significantly lower species richness, Shannon diversity and species evenness of native ants than adjacent uninfested areas. At this stage it is not possible to say whether the presence of the Black Crazy ants is the cause or the effect of lower native species richness. However, we supply descriptions of encounters observed between Black Crazy ants and some native arthropods including meat ants, dipterans and chilopods. We also describe plans for further research into the investigation of interactions between *Paratrechina longicornis*, *Pheidole megacephala* and other native arthropods.

CLIMATE CHANGE AND FIRE HISTORY – A CLUE FROM HOLOCENE VEGETATION

ANGUS TYE - THE UNIVERSITY OF MELBOURNE

Current understanding for vegetation change over long time frames on the large sand masses of South-East Queensland is based on the idea of retrogressive succession. What is not known is the rate at which this occurs. Fraser Island poses an ideal site to study this process due to the relative uniformity of the substrate, heterogeneous vegetation composition and availability of suitable sampling sites. Processes such as competition, recovery after fire and other disturbances all take place on a decadal time scales whilst soil, climate and human interactions may act over much longer timeframes. In particular, dominance of various taxa

depends to a large extent on interactions between climate, natural fire, and anthropogenic fire.

In an attempt to disentangle some of these factors, sediments were analysed for charcoal and pollen from a wetland situated on a boundary between a wet sclerophyll and heathland community, and from a wetland in a mixed woodland community. These two records have provided insights into the Holocene vegetation dynamics within the respective plant communities. It appears that regardless of variations in climate and the fire record; relatively stable plant community boundaries appear to have existed in approximately the same position throughout the Holocene with limited local compositional change.

WEEDS: WHAT WEEDS? Eurong Case Study.

STEPHANIE & JULIAN LYMBURNER

It has been estimated that weeds cost Australia about \$3 billion per year in control costs and lost production. Most of our weeds have been imported into Australia deliberately and legally.

Noxious weed is a legal term to describe a weed that has been declared by the Minister for Agriculture, noxious weed legislation varies between States.

Environmental weeds are weeds that invade bushland, wetlands, forest, dunal systems and other areas of native vegetation. There are advantages and disadvantages in declaring environmental weeds noxious. Generally, environmental weeds are more difficult to and costly to control than agricultural weeds, primarily because of the diversity of non-target vegetation in these situations.

There is a huge knowledge void surrounding environmental weeds because, comparatively little research has been done in this field. It is only in recent years that the community at large and the authorities have realised the need to protect and preserve our natural ecosystems. Many organizations and individuals are committed pursuing the control of environmental weeds. One of the major thrusts must be to raise community awareness and provide effective education.

The Eurong precinct provides us with an example of environmental weeds escaping into the surrounding landscape, disturbing the natural ecosystems.

Efforts to control and ultimately eradicate these weeds from the precinct and adjacent areas can only be achieved with:

A strategic plan of management targeting weed removal that also takes into account fire regimes.

Financial and on-ground support from local and State government departments.

An education program to assist the local community in understanding the need for weed removal and the need for ongoing control.

On-going support from local stakeholders for visiting volunteer groups.