

# Fraser Island's Fens

**While fens have existed on Fraser Island for thousands of years it was only in 1996 that scientists recognized them as such and appreciated their significance. With the saltmarshes, lakes and sandblows the fens are the only open spaces on Fraser Island bereft of trees, they are difficult to traverse by any means at all and very uninviting for humans. Fens are fundamentally based on peat and formed into a network of potholes which hold very acidic water. Yet it is this unfriendly acidic environment which establishes a habitat suitable for some of Fraser Island's endangered species including acid frogs and ground parrots and which has scientists fascinated about their very existence in this most unlikely climate, elevation and latitude.**

## Recognizing Fraser's Fens 1996

In March 1996 the Queensland Government hosted triennial the Conference of Parties to the Convention on Wetlands (better known as the Ramsar Convention) in Brisbane. That a Queensland Government should host this prestigious Ramsar Conference reflected a huge change in political attitudes towards the environment in Queensland at the end of the 20<sup>th</sup> Century.

For two decades the Bjelke-Petersen regime in Queensland had shunned and derided any international environmental conventions. This followed the battle to have Fraser Island included on the World Heritage List which began almost as soon as the Australia became the first nation to ratify the World Heritage convention in 1972. Premier Joh was paranoid in his belief that the World Heritage convention enabled the Commonwealth Government to take over any powers to protect the environment from State Governments. After his experience of seeing plans to exploit the minerals of both Fraser Island and Cooloola frustrated on environmental grounds he was particularly anxious to avoid any losing any more of his powers especially on environmental grounds. After being forced to accept the reality of the Commonwealth Government nomination of the Great Barrier Reef for World Heritage listing in 1982 not only did Joh publicly avow that "not one more inch of Queensland" would become World Heritage, but he refused to allow any Queensland sites to be nominated either as Biosphere Reserves or as Wetlands of International Significance under the Ramsar Convention.

It was only after the Fitzgerald Inquiry in Queensland that the political attitude of the Queensland Government changed and rather than regard all environmentalists as "enemy" they were began to be welcomed and wooed by the new regime in Queensland. It was ironical that one of the ploys to entice the Ramsar Conference to Queensland included agreement to nominate Great Sandy Strait as a Ramsar site. It was even more ironical that his old nemesis, John Sinclair, should host a post Ramsar Conference tour to Fraser Island which had caused Joh so much angst. Yet it was during this tour that Fraser Island's fens were first identified by

scientists and their significance appreciated.

There were 23 participants on the four day post Ramsar Conference tour. They from South Africa, New Zealand, Sweden, Finland, Belgium, Spain, Nicaragua, United Kingdom, Ireland, Scotland, and Hungary as well as Australia. Some were members of the International Mire Conservation Group (IMCG) which specializes in peat bogs and fens.

Part of the tour was an aerial survey of Fraser Island as the participants went to and from Lady Elliot Island to have a wonderful day trip on the Great Barrier Reef. As these peat bog and fen specialists returned to Dilli Village along the western (Hervey Bay) side of Fraser Island they were excited to see some intricate patterns of potholes in the peatlands below in the Wathumba Swamp and especially in a very large area behind Moon Point. (see below)



**Extensive area of fens north-east of Moon Point**

The pilots obligingly circled over the peatlands to enable a confirmation of their suspicions that these were indeed fens. These peat swamps had not previously been described either in the scientific literature or among the World Heritage values of Fraser Island. On the following two days the mire (peat) experts were able to examine some fens at much closer quarters on the ground although they did not get to the grandest developments behind Moon Point and they left a list of further research projects waiting to be pursued further.

## An Australian First:

No fens had previously recorded from anywhere in Australia so it was small wonder that the scientists, particularly the peat experts, led by English mire

expert, Dr Richard Lindsay should have been so excited. Aerial photos have since revealed some fens in Cooloola but nowhere else in Australia.

### **In the Global Context:**

According to Richard Lindsay the patterned fens of Fraser Island and Cooloola are globally unique. They are the only sub-tropical patterned fens and the only fens flowing into tidal wetlands in the world and they have distinctive faunal inhabitants such as fish, crayfish and earthworms that would not normally be found in such acid environments.

While similar patterned fens have been recorded in Scandinavia, Siberia and Canada in the northern hemisphere the only records from the southern hemisphere come from New Zealand. No fens have been previously recorded in a sub-tropical environment although there are extensive peatlands in Kalimantan (Borneo).

Fens have previously been associated with mosses and mossy bogs. Fens have also played a very significant economic role providing peat and open areas for transportation. The Fen Country of England is a well recognized centre of human activity from prehistoric times.

**Global Significance:** Although somewhat similar in appearance to patterned fens found in the Northern Hemisphere particularly in Scandinavia, Canada and Siberia, it is probable that those formed on Fraser Island are the oldest in the world, perhaps being 6,000 years old, possibly older. All other known fens occur at high altitudes (alpine areas of New Zealand) or high latitudes. Fraser's fens are at almost sea level and merge on the seaward side with mangrove forests. Such an association of ecosystems which have such contrasting locations is not known elsewhere in the world.

### **What are Fens?** (as described by the QPWS)

Fens are formed on undecomposed plant material (peat). The striking and intricate maze of pools and vegetated ridges result from differential peat growth rather than simple patchiness within the vegetation community.

Fens preserve a pre-historic picture of environmental changes through pollen grains and other material (including human remains) which have been trapped in the preservative peat over the millennia.

Many of the processes of how the pools form in the peat and become progressively deeper have yet to be explained. The Fraser Island fens are described as "string fens". They contain a maze of pools and vegetated ridges forming intricate patterns of surprising complexity. The study group which worked on Fraser Island's fens found pools up to 1.5 metres deep and small streams with sandy bottoms. It

is likely that the special hydrological conditions associated with the sand are important for the establishment of this type of fen.

### **Significance of Fraser's Fens:**

Fraser Island's fens are the only open landscapes apart from lakes and sandblows. They are therefore important and attract biota preferring a more acidic and/or open environment. They provide a sharp contrast to the forests and coastal features as well as habitat for a completely different flora and fauna. The structure of the fens provides important habitat for threatened species such as the ground parrot (*Pezoporus wallicus*) False Water Rat (*Xeromys myoides*) and acid frogs (e.g. *Litoria cooloolensis*, *Litoria freychinetti*).

It is significant that each of these animals are the subject of much special study. While False Water Rats had been previously known from Cooloola, it was only in May or June 1996 that they were first recorded from Fraser Island.

The "**patterned fens**" of Fraser Island and the adjacent Cooloola Coast are a unique type of wetland **mire**. Most of the world's mires are found at higher (colder) latitudes, where low temperatures, soil waterlogging and anaerobic conditions slow the rate of organic matter decomposition, resulting in the formation of peat. The patterned fens of Fraser Island and Cooloola are unique because they occur at subtropical latitudes, where average ambient temperatures and decomposition rates are much higher. These patterned fens are also the only known examples in the world of fens flowing into tidal wetlands.

Fraser Island fens occur as an elaborate series of peat ridges (**strings**) and pools (**flarks**) formed at the base of high dunes, where there is a constant and high volume surface flow of freshwater.



**A typical Fraser Island fen.**

*Small ponds in peaty environments such as this, full of mildly acidic water are replicated many times across this open landscape to form a unique ecosystems known as fens.*

