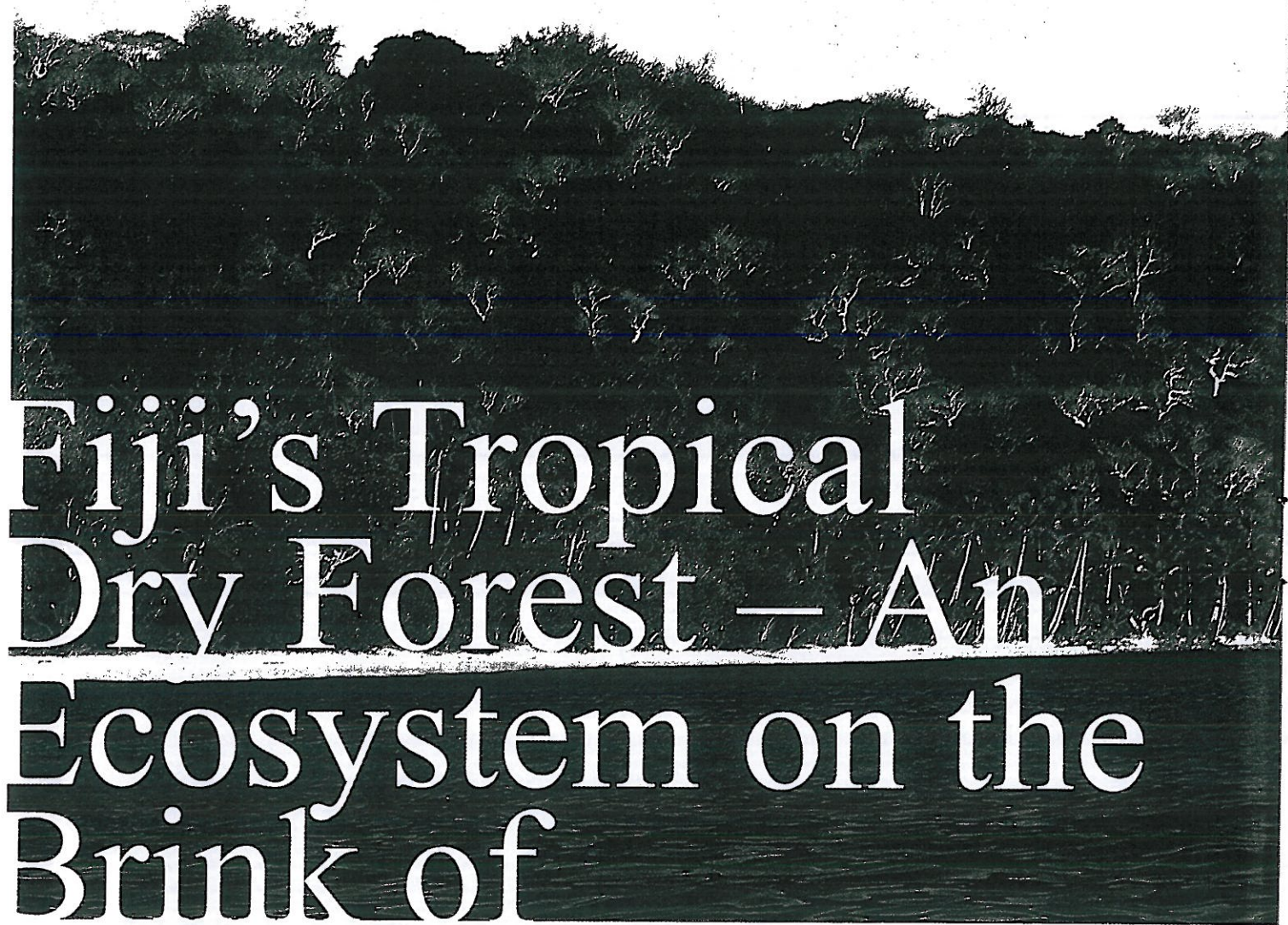


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Fiji's Tropical Dry Forest – An Ecosystem on the Brink of EXTINCTION

by Gunnar Keppel

All of us have heard a lot about tropical rain forests in Melanesia and the great threat they are under. But who has heard about tropical dry forest (TDF)? Very few, I assume. That is mostly because there is not much left of it. TDF is by many scientists considered to be the most threatened tropical ecosystem. In Fiji, for example, there is so little left, that until very recently, it had been overlooked by scientists. This article tells the story of Fiji's TDF; what it is, its discovery, what is left of it, the factors threatening its existence, the ways in which it is and should be protected.

As the name suggests, TDF are forests (i.e. a vegeta-

tion composed of trees that form a more or less continuous canopy) located in dry (with an average annual rainfall of less than 2,000 mm), tropical regions. They also have a dry season (months with less than 100 mm rainfall) that stretches over 3 months or more. Because of the lower rainfall, plants do not grow as tall as those in tropical rainforests and usually do not exceed 16m.

The climate affects the resident flora and fauna, which have adaptations to the dry conditions. Many plants evade annual droughts by shedding all or part of their leaves. This allows plants to reduce water loss through evaporation through the stomata in the leaves. While this minimizes water loss, such plants have to

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urvive on reserves that are stored in the stem and roots during this period, because leaves are essential for photosynthesis. Plants that shed their leaves regularly are known as deciduous.

It was not until this millennium that true tropical dry forest was discovered in Fiji. It all began with a BP conservation project that tried to find populations and suitable habitats of Fiji's crested iguana (*Brachylophus itiensis*), which is critically endangered. During this project it was found that the iguanas were always found in forests and that these forests are different from the other forest types known to occur in Fiji. Subsequent studies confirmed this and revealed the forests to have many deciduous trees and to be located in the driest places of Fiji.

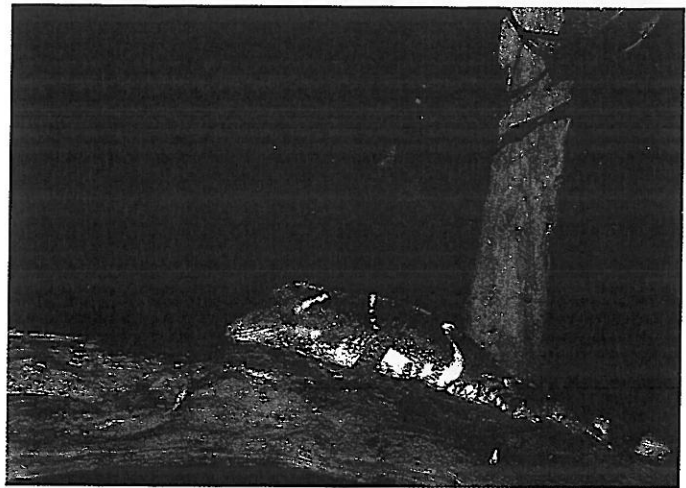
Mr. Marika Tuiwawa and I soon started a search for remaining forest patches throughout Fiji's dry zone and although many of those patches were mostly composed of non-native rain trees (*Albizia lebbbeck* and *Samanea saman*), found similar forests. We realized that this type of forest had not been previously reported from Fiji and that it conformed very well to the description of TDF in other countries.

Several trees are commonly found and characteristic of TDF. These include the helicopter tree (*Gyrocarpus americanus*, "wiriwiri"), *Mallotus tiliifolius* ("qetata"), *Antirhea inconspicua*, *Planchonella grayana* ("qalaka") and several lianas. Although the structure and characteristics of TDF in Fiji is very similar to that in other places, there are several organisms that are only found in Fiji's TDF and nowhere else. These include the Fiji crested iguana, and the trees *Guetarda wayaensis* and *ynometra falcata* (a legume).

Today very few, small patches of TDF remain on

Fiji's major islands, Viti Levu and Vanua Levu, and in the Yasawa Group. Because early naturalists did not note this forest type, it is likely that it had already been severely reduced by the time the first Europeans arrived. The likely reason for this is fire, as TDF are vulnerable to repeated fires. While most plants are adapted to recover from occasional fires, most will die if burned annually or biannually.

While fire was the major threat to Fiji's TDF in pre-European times, intensive sugarcane farming and extensive pine plantations now dominate Fiji's dry zone. Because fire is used as an important management tool for both these commercial crops, escaping fires probably destroyed many TDF remnants. Invasive, non-native organisms that were brought to Fiji since the arrival



Opposite: Inside the dry forest of Macuata Island. Note the numerous lianas.

Above right: The Fiji crested iguana (*Brachylophus vitensis*) is endemic to Fiji's dry forest. This picture was taken in the Yadua Taba sanctuary and also shows Pita Biciloa, the caretaker/ranger of the island.

of Europeans have since began to outcompete or kill native organisms, pose another major threat. Cats, for example, can kill and eat young iguanas, and mongoose will eat iguana eggs, which are laid on the ground. Trees like raintrees, leucaena and the African Tulip tree (*Spathodea campanulata*) grow faster than native trees and hence can outcompete them.

As a result, Fiji's TDF is now only found in small patches between 5 and 50 ha in size located on offshore islands or limestone escarpments. However, according to Dr. Thomas Gillespie of the University of California Los Angeles, who recently visited Fiji, the situation is worse in Hawaii and New Caledonia. On these islands even the remaining forest fragments have been severely disturbed and are about to disappear.

So what can we do to save the remaining patches of TDF in Fiji? Designing them as protected areas seems to be the only way forward, because sustainable management of the few remaining fragments is almost impos-

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to conserve another island that has good patches of TDF remaining. Another possibility is the restoration of degraded TDF. Marika and the Institute of Applied Sciences (IAS) are trying to initiate such a project and hope to remove invasive raintrees and increase the number of native dry forest species by planting.

Fiji's TDF are unique ecosystems that deserve urgent attention because of their rarity and the many factors threatening their existence. While much of this ecosystem has been destroyed, it is not too late to preserve some of the remaining patches for future generations.■

Below: View of the ocean from within the dry forest on Yadua Tabu. Note that several canopy trees are leafless.

