

## Makatea Island exploration leads to new phosphate discovery

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### ABSTRACT

Makatea Island lies 100 nautical miles from Tahiti, French Polynesia.

From 1906 until 1966 11 million tonnes of phosphatic sand was dug by hand from the karst environment of this elevated island.

1100 ha of land was left unrehabilitated/uninhabitable with around a million holes, some 45m deep.

Starting from 1996 consideration was given to methods for rehabilitation of the destroyed land on Makatea.

In 2010 progressive rehabilitation with exploitation of remnant phosphatic sand was the model selected for further study.

Identification of high quality remnant phosphate led to application to the French Polynesian Government in 2012 for an Exclusive Research Permit (EPR) over the previously mined area.

The EPR granted July 2014 enabled diamond drilling to commence but unacceptably high core loss and the identification of bedded phosphate in the walls of two holes necessitated a complete rethink on exploration method.

New method involved mapping and sampling a 100ha area by two teams of four local men trained for rope entry to confined spaces.

Each team was led by a geo-scientist trained in identification of phosphate and use of XRF.

In April/May 2015 the two teams entered and sampled some 250 karst holes discovering an unreported and unmined bed of phosphate.

This bed of phosphate pre-dated the development of the karst environment.

A fully explored bedded phosphate deposit in the lagoon of the island of Mataiva is the geological model for Makatea.

*Kopara* beds (cyanobacteria) that fixate phosphate from endo-upwelled fluoro-apatite rich seawater are the origin of the bedded phosphate (example Niau).

Formation of phosphatic sand is now shown by studies conducted by the University of Queensland to be also by bacteria.

Makatea bedded phosphate (low in heavy metals) is OMRI Certified as suitable input fertiliser for use in organic farming in USA and Canada.