

Mitiaro Fan Palm (*Iniao*)
(*Pritchardia mitiarioana*)
Species Status Report 2020



Cover photos: Adult Mitiaro Fan Palm (*Iniao*), and the fruit. (McCormack, G. 2009-2017).

Author: Te Ipukarea Society, PO Box 649, Rarotonga Cook Islands.

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Summary

The *Iniao*, or Mitiaro Fan Palm, was previously considered to be endemic to Mitiaro. However, a fan palm found in the Tuamotu group of islands in French Polynesia was reclassified in 2007 as the same species. Despite this, it is still considered a threatened species within the Cook Islands due to its limited national range and population size, although it is not listed on the IUCN Red List to provide an internationally recognized threat ranking.

As such, it was included in the project design of the Ridge to Reef (R2R) project as one of four terrestrial priority species requiring conservation support. Baseline information for the start of the R2R project in 2015 put the number of *Iniao* plants found in Mitiaro at 375, with an end-of-project target of 'no net decline' in population size.

A survey in 2017 updated this figure to 395 (McCormack, pers.comm). Following a further survey in 2019 by the National Environment Service (NES) R2R team, the number of plants is now estimated to be between 500 and 600. The increase is largely attributed to more efficient survey technology, i.e. the use of a drone in place of Google Images, which allowed for higher resolution images of clusters in very difficult terrain. The range of *Iniao* clusters was also confirmed to stretch further south than in earlier surveys. As such, the project targets of no net decline in the Mitiaro population have been achieved.

Mitiaro Fan Palm background

The Mitiaro Fan Palm (*Pritchardia mitiaroana*), locally known as *Iniao*, is from the genus *Pritchardia* (family Arecaceae). The generic name honors William Thomas Pritchard (1829-1907), who was the first British consul to Fiji in 1958 (Quatrochi, 2000).

This genus includes 27 species that can be found on tropical Pacific Ocean islands in Fiji, Samoa, Tonga, Tuamotus, and most diversely in Hawaii, which has 24 species (Chapin et al, 2004).

In the Hawaiian Archipelago, these palms are found from sea level to 1200m elevation in dry to wet forests on volcanic soils, whereas in the South Pacific they are mainly lowland species inhabiting uplifted coral limestone (Butaud and Hodel 2017). Elsewhere in the Pacific there is *P. pacifica*, presumably from Fiji but known exclusively from cultivated specimens, *P. thurstonii* from Fiji and Tonga, and *P. mitiaroana*, which was believed to be endemic to Mitiaro in the Cook Islands (Butaud and Hodel, 2017). However, two species previously reported as endemics in Makatea

and Niau Islands in the Tuamotu Archipelago in French Polynesia, have now been re-classified as *P. mitiaroana* (Hodel 2007). This means the *Iniao* can no longer be listed as a Cook Islands endemic. It is however the only native palm tree found in the Cook Islands, apart from the coconut (*Cocos nucifera*).

According to “The Flora of the Cook Islands” (Sykes, 2016), the *Iniao* is a small tree ranging in size from 4 to 6m in height, with a trunk diameter of around 35cm, when mature. Other authors suggest that the tree can grow up to 10m in height (Hodel, 2007). The crown of the tree has up to 25 fan shaped fronds and produces fruits of between 5 and 7mm in diameter that become dark brown or black (Sykes, 2016). It has a smooth trunk, moderate to dark gray, with a slight bulge in the middle. It emits a hollow, resonating, drum-like sound when knocked on (Hodel, 2007). Underneath these trees there is a thick layer of dead, fallen leaves from the palms (Hodel, 2007). The pictures below show some of the features of the *Iniao*



Image 1. Showing *Iniao* fruits, which become dark as they mature. (Photo credit NES)



Image 2. The author in 2011 with experienced local guide Julian Aupuni. This picture shows the size of the *Iniao*, the smooth trunk, and the way the palm fronds cover the ground beneath the trees, reducing the chance for seedling to take root (Photo credit Ana Tiraa)

Population history and distribution

The first written record of the *Iniao* on Mitiaro was by the Reverend William Wyatt Gill in 1985 (Gill 1985, in Sykes, 2016). It was not described botanically until 1995, by Dransfield and Ehrhart and was for many years considered to be endemic to Mitiaro. However, its distribution has been clarified by Hodel (2007) who found that the two *Pritchardia* palm species from French Polynesia, previously thought to be island endemics, are in fact the same species as the *P. Mitiaroana* of Mitiaro. As a result, Plants of the World Online, managed by the Kew Royal Botanic Gardens,

states on their website that “this species identification is accepted, and its native range is Cook Islands (S. & SW. Mitiaro) and Tuamotus (Makatea, Niau).

However, there remains a possibility that the palms may yet be endemic to their individual islands. This is because the report combining the species (Hodel 2007) was published in Palms journal, which is not a peer reviewed publication. A phylogenetic study of all the related South Pacific *Pritchardia*, would provide a higher level of certainty (Meyer, pers comm).

On Mitiaro, *Pritchardia mitiarioana* occurs as scattered, dense colonies, or plots. The most recent survey was conducted by National Environment Service (NES) in 2019. The palms previously were thought to be restricted to the south west corner of the island. However, the 2019 survey by NES found several plots further south than previously recorded (NES, 2019 unpublished). The difficult terrain in the inland makatea of Mitiaro means that a thorough island wide survey has not yet been undertaken. The picture below shows the current known distribution of the *Iniao* in Mitiaro.

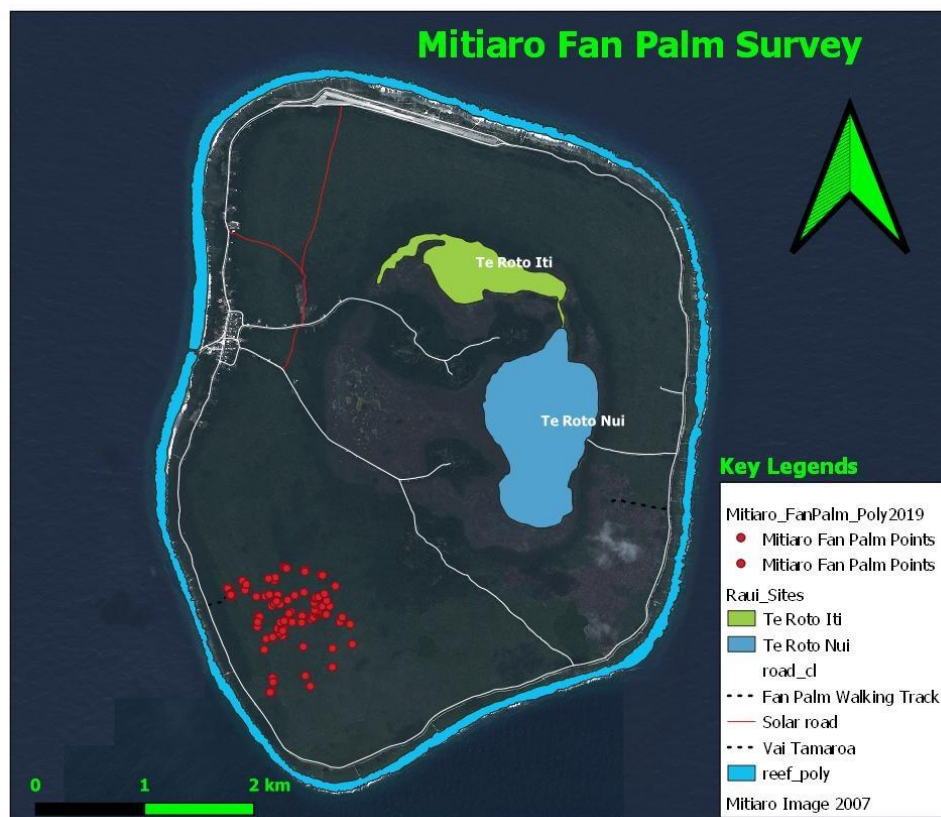


Image 3. The *Iniao* clusters are confined to the south and south west corner of Mitiaro (Photo courtesy of National Environment Service)

Current Population

Previous population estimates have been based on field trips and Google Earth imaging, with ground truthing where possible, although limited due to the difficult terrain. These provided a general overview, particularly as the quality of these images has improved over time. However, cloud cover has often been an issue with general satellite imaging to date (Weeks, pers.comm).

The most recent attempt to survey the numbers of *Iniao* in Mitiaro was by a team from the NES in 2019 funded by the Ridge to Reef Project (R2R). A drone was used to get closer to the plots than during previous surveys, and therefore allowed for more detailed pictures and videos. The picture below shows a typical drone shot with evident clusters of palms.

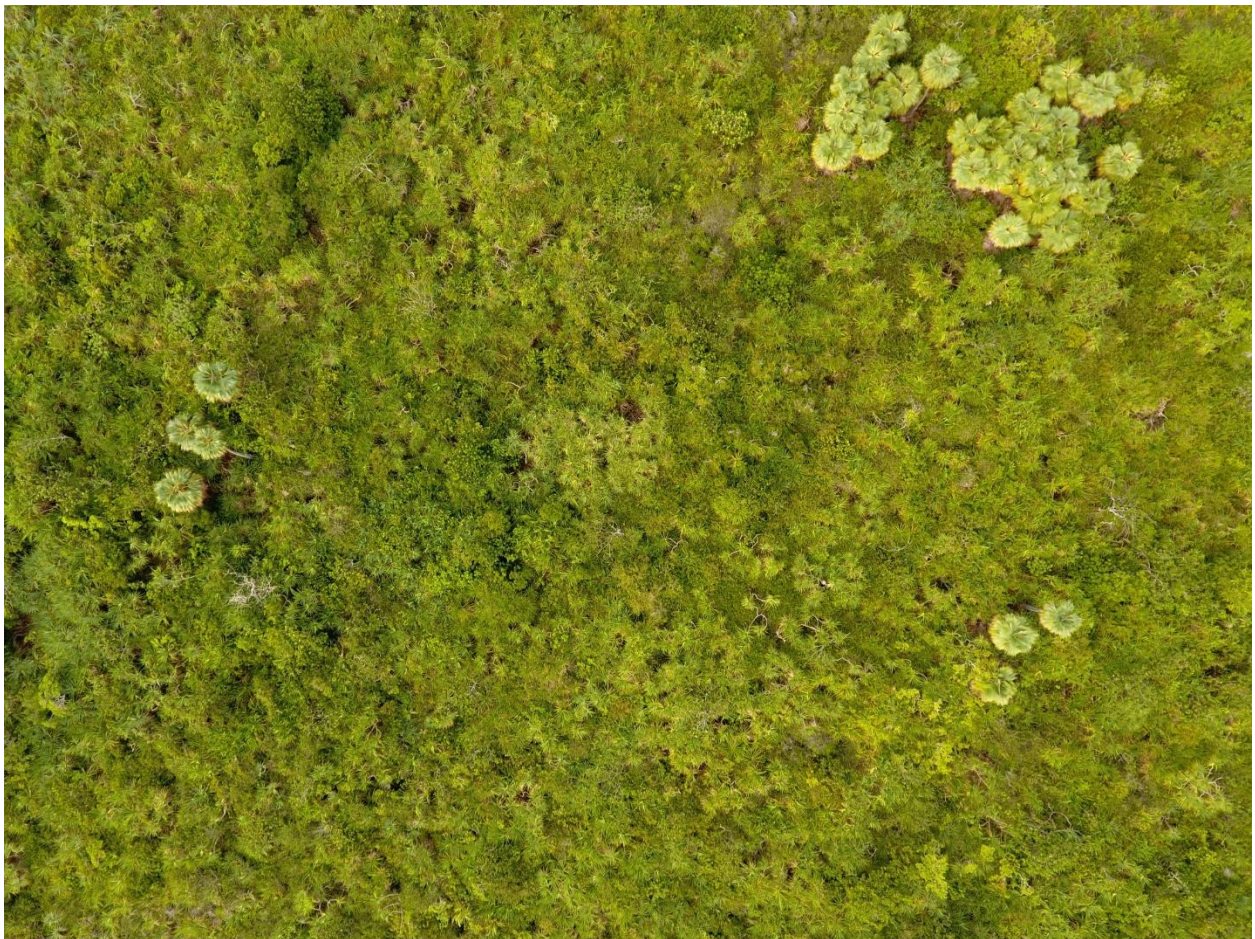


Image 4. Typical drone shot used to estimate numbers of *Iniao*. The clusters are clearly visible. Photo courtesy of National Environment Service,

An analysis of the videos resulted in the R2R team being able to identify a greater number of palms, as compared to earlier counts from Google Earth and aerial photography.

The previous best population estimate of the *Iniao* in 2017 of 395 (McCormack, pers.comm) has now been revised to more than 500 palms. This is based on a physical count of 491, which did not include new shoots that were observed around the palm sites that were visited on foot. Additionally, there were also a number of clusters that could be seen in the distance on the video footage, but were out of the range of the drone, and therefore counts were not possible (Weeks, pers.comm). A conservative estimate would now be between 500 and 600 adult palms, with an unknown number of juvenile shoots.

For comparison, the other location with significant numbers of this species, Niau, in the Tuamotus, has about 1000 individuals including numerous juvenile plants (Meyer, pers.comm).

The other island in the Tuamotus where *P. mitiaroana* is present is Makatea. However, the phosphate mining and accompanying destruction of vegetation probably also devastated the populations of this palm, as there are relatively few individuals existing there today (Meyer, pers comm).

Recommendations for management

While a large proportion of the genus *Pritchardia* is on the verge of extinction in other locations, and will most likely continue to decline in the wild without active conservation management (Chapin et al, 2004), *P. mitiaroana* would currently appear to be in a less precarious situation, for a number of reasons. These include:

- Mitiaro received a grant in 2008 from Seacology, a U.S.-based international environmental not-for-profit organisation focused on protecting the endangered species, habitats and cultures of islands worldwide. The grant was for improvements to community infrastructure and provided on the condition that the island ensured protection of 1200ha of forest, including the plots of *Inaio*, for 10 years. This has since been extended for a further 10 years (Seacology, 2020).
- Human access to the sites is exceedingly difficult, due to the harsh makatea landscape. The NES survey found no evidence (other than old graffiti on tree trunks at the two accessible sites) of any human-induced threats to this area (NES 2019, unpublished).

However, these factors are insufficient to justify complacency, as a number of threats remain. These include invasive species, such as vines, insect pests, feral pigs, goats, as well as disease or fire. Regular monitoring should be encouraged to ensure an early response should a threatening situation arise. The following recommendations for management were made by the NES team after their 2019 survey (NES, 2019, Unpublished):

- A more intensive and detailed survey of this area should be conducted, over 5 days or more, to better map this area and provide a more definitive estimate of total *Iniao* numbers, so that a more detailed map can be produced, against which future surveys can be compared.
- Seed bank – collect and securely store *Iniao* seeds to protect against any potential future disasters. Discussions need to be held with Ministry of Agriculture, as well as overseas seed banks and palm experts, to determine the feasibility of this.
- Signage –a new sign is required, similar to those already in place for the Sandalwood, to inform the public about the significance of the *Iniao* and why it needs protection.
- Enhanced access should be provided for locals at limited specified site(s), to see more easily the *Iniao*. This would assist them in better understanding what they are protecting. This access could be through cultivating the *Iniao* in gardens closer to the village settlement (as has already been done by at least one individual), and also by showing them clear images and drone footage of the palms and the extent of their presence in the makatea.
- Habitat research - conduct more research into the habitat to understand if there are other areas in Mitiaro where the palm could become established.
- Every 3-6 months a working group, organized by the Mitiaro NES Environment Officer or the Island Council, should carry out a cleaning of the 2 accessible *Iniao* sites in order to clear the ground under the palms of dead fronds allowing seeds to become more easily established.
- Island Council & the NES Environment Officer should continue local education and protection measures to discourage graffiti or damage of the accessible sites.
- The most accessible *Iniao* site could be used as a nursery to provide a head-start for young *Iniao* plants, which could then be transplanted elsewhere, either as insurance populations or for interpretation for locals and tourists. This may also reduce the desire of people to head in to the makatea and reduce the risk of damage from visitors to the accessible *Iniao* sites.

In addition, it would be useful to clarify the issue of endemism by conducting a phylogenetic study on the Mitiaro fan palm and the *Pritchardia* found in the Tuamotu islands. Initial contact has been made by Te Ipukarea Society with the Chief of the Research Department of the French Polynesia Government, Jean-Yves Meyer, as well as with the leader of the Palm Specialist Group of the IUCN Species Survival Commission. Both were willing to collaborate on a more detailed assessment of the *Iniao*, as well as possibly other species shared between French Polynesia and the Cook Islands.

Conclusion

The R2R baseline figure for the *Iniao* at the start of the project in 2015 was recorded as 375 mature individuals. Subsequent surveys completed since then in 2017 and 2019, supported by R2R, have confirmed increases against this baseline figure. This is largely attributed to more accurate and detailed imagery of the habitat area, in addition to evidence of new growth (although these young shoots were not included in final count estimates) as well as no current disturbances identified to the existing population. This has resulted in latest estimates of between 500-600 individuals within the Mitiaro *Iniao* population. This demonstrates that there has been 'no net decline' in the population of this species at the selected site over the course of the project, thus achieving the project target.

SRF #	Description of Indicator	End-of-project target level	End-of-project indicator	Target status
14b.4	Conservation of priority species at selected sites: Mitiaro Fan Palm (375)	No net decline in population	Total Mitiaro population: 500-600	Achieved

Table 1. Showing the relevant Strategic Results Framework (SRF) indicator number and status pre and post R2R.

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