

## 7. MAINLAND VEGETATION OF AITUTAKI

D.R. Stoddart

Though only incidental observations were made on the main island of Aitutaki, few observations on its vegetation have appeared in the literature since Bligh's notes in 1789, and this chapter therefore places on record notes on the vegetation types and their distribution, with emphasis on coastal areas. The greater part of Aitutaki is actively managed by man, and no areas escape human interference: the vegetation units described, therefore, are largely human artefacts, just as many of their component species have been introduced by man, either in pre-contact or more recent times.

The vegetation can conveniently be considered in categories defined by topography: (a) the coastal flat and beaches; (b) the slopes to higher ground, which in places reach the coast to form promontories or cliffs; (c) inland plateaux and rolling ground, largely cultivated and occupied by villages; and (d) hills, steep slopes and crags. Most information is available for the first of these categories, though collections and observations were made in all of them (Figure 35). Comparable types have been described from the lowlands of Rarotonga by Cheeseman (1903), Wilder (1931), and Philipson (1971).

### COASTAL FLAT AND BEACHES

The coastal flat is discontinuously developed, being most extensive southwards from Nikaupara on the seaward coast and northwards from Vaipeka to Te O on the lagoon coast. Elsewhere it may be absent and basalt slopes reach directly to the sea. The coastal flat is an aggradation terrace of calcareous and volcanic sands, but even where the sands are dark coloured the calcium carbonate content is likely to be high.

#### Northwest coast

At Marutea the beach is exceptionally wide, reaching 50 m, with a zone of pioneer species (Triumfetta procumbens, Heliotropium anomalum, juvenile Casuarina) up to 35 m wide. The coastal flat is covered with an open woodland of Guettarda (9 m tall), Cocos, Hibiscus, trees of Tournefortia, and Pandanus, in a scrub of Scaevola taccada 1-1.5 m tall, with some Suriana and Sophora, and a ground cover of Triumfetta, Heliotropium, Ipomoea macrantha, and grasses (Sporobolus africanus, Panicum reptans). This sector may be regarded as the northern end of the Ootu peninsula, in effect a tied motu, rather than part of the mainland proper.

The coastal flat narrows southwards and the ground rises

steeply from the sea to the crags of Maungapu Hill. At Vaiuoe there is a narrow beach, with a beach-crest zone of Paspalum 10 m wide, backed by a mixed woodland of coconut and Casuarina with Hernandia and Hibiscus. Other outpost species of scattered distribution along this sector include Triumfetta, and juvenile Scaevola, Sophora, Hibiscus and Casuarina. Vigna marina extends back into the woodland. The flat widens south of Perekiatu, but consists of low-lying volcanics as well as aggradation deposits; and it is continuously occupied by settlements from Perekiatu to Nikaupara.

#### Southwest coast

The coastal flat in this sector extends in shallow embayments between low rocky points or promontories; small streams flow out into the bays. Between Rapae and Rangiteia the coastal flat is 50-100 m wide and covered with coconut woodland with Hibiscus and Hernandia. Beginning here and becoming more continuous further south is a coastal fringe of Casuarina with some Hibiscus and Calophyllum and occasional Pandanus. The beach outpost vegetation consists of grasses and seedlings of Suriana and Sophora.

Between Rangiteia and Pata the flat is 90-100 m wide. It is again covered with coconut and Hibiscus woodland reaching about 15 m, with several other trees, including Hernandia (to 20 m), Leucaena, Pandanus and Morinda citrifolia (6-8 m), with, rarely, Inocarpus fagifera. The ground cover consists of Fimbristylis cymosa, Cyperus, Hippobroma, Stachytarpheta, Mimosa pudica, and Sida rhombifolia. Groves of Pandanus and Casuarina have little ground vegetation; near streams Pandanus grows luxuriantly with Cyperus alternifolius 1.5 m tall beneath. The beaches are narrow at the promontories (3 m wide) and wider (to 10 m) in the bays. The main beach vegetation is a meadow of Paspalum with Fimbristylis.

Southwards to Aretere the flat reaches a width of 120 m. There is a coastal fringe of Casuarina, then a zone 30-50 m wide of coconut-Hibiscus woodland with low Casuarina; and finally a zone of massive Barringtonia and Hernandia with ferns beneath. Pandanus and Inocarpus are also present. Ground cover in the coconut woodland consists of grasses, Vigna marina, Hippobroma, and seedlings of Sophora. The grasses include Cenchrus echinatus. There is no beach in this sector: the edge of the coastal flat is cliffed and eroding, and Casuarina roots are exposed on the shore.

At Tekoutu Point there is a thicket of Hibiscus, passing back into a mixed woodland of Cocos, Hernandia and Hibiscus. The ground cover consists of Cenchrus, Vigna, Triumfetta and ferns; other trees present are Guettarda, Casuarina and Pandanus; and there are tall shrubs on the coast of Sophora, some 6 m tall. South of the point the erosion is replaced by aggradation. There is a wide lobe of recent sand, with pioneer

Ipomoea pes-caprae and Fimbristylis; grasses; a shrub zone of Scaevola and Sophora 1.5 m tall, with juvenile Casuarina; and on the coastal flat a mixed woodland of Cocos, Hibiscus, Leucaena, Casuarina, Pandanus and Guettarda.

#### Southeast coast

Approximately from Tekoutu to Teaitu the coastal flat has very similar characteristics: it is narrow, has a well-developed Casuarina fringe, and is covered with coconut woodland passing back into a broadleaf woodland. Immediately east of the point the flat is narrow and cliffed. The Casuarina fringe is 20 m wide, with occasional coastal Pandanus. Big trees of Hernandia reach the sea at one point, with spreading low branches. The coconut woodland contains occasional trees of Hernandia, Calophyllum and Leucaena. Sophora is the only shrub. The ground surface under the coconut woodland is mainly bare, with scattered Hippobroma, Triumfetta, Vernonia cinerea and Vigna marina. Ferns and Psilotum grow on coconut boles. Inland the coconut woodland is replaced by a Hibiscus woodland with Morinda and Pandanus.

At Vaiotango the coconut-Hibiscus-Guettarda woodland is about 100 m wide. Tall Scaevola (5 m) and Sophora grow near the shore, with Ipomoea indica, Hippobroma, Vigna and Triumfetta beneath the woodland. There are scattered tall trees of Calophyllum. Hibiscus and Pandanus are less important here than further south. Inland the woodland is replaced by Barringtonia and Guettarda, or Casuarina. At Vaiokora the Casuarina coastal fringe is re-established, and is here 20 m wide. The coconut woodland contains Calophyllum, Hibiscus, Leucaena, Morinda and Pandanus, with Scaevola, Sophora and Hippobroma. At Teruarei the Casuarina fringe is interrupted in places by Hernandia and some Pandanus. The coconut woodland is 70-85 m wide, with massive Hernandia and Calophyllum and much Morinda. The ground cover is again sparse, and is dominated by Hippobroma and Thelypteris forsteri. At Teaitu the Casuarina fringe is more continuous, with occasional trees of Hernandia, Guettarda and Barringtonia. Occasional Calophyllum and Barringtonia are found in the woodland of Cocos, Pandanus and Hernandia, with shrubs of Sophora and Scaevola and Hippobroma on the ground. These brief notes indicate the essential uniformity of vegetation in this sector.

Towards the Tautu jetty the coast erosion becomes less marked and the coastal flat widens to 100 m. The Casuarina fringe gives way to Hibiscus thicket and grass turf, with Hernandia and Pandanus on the flat. Pemphis, uncommon on most of the mainland coast, grows along the whole length of the old jetty.

#### East coast

North of the Tautu jetty the coastal flat is interrupted

by a cliffy sector where volcanic rocks reach the coast, but it is resumed north of Vaipae. At Vaipae itself the flat is narrow but the coast is fringed by a very distinctive band, 10-15 m wide, of a wet Paspalum marsh with Echinochloa colonum and Cyperus cyperoides (Plate 36). Immediately inland of this is a thicket of Hibiscus and Pandanus, with ferns, intersected by almost tunnel-like paths leading to the village.

At Vaipeka the coastal flat has widened to 200-270 m (Plate 37). The Paspalum fringe is continuous at the seaward margin, and the flat itself is much lower than on the west side of the island. Shrubs of Pemphis and Hibiscus occur intermittently along the shore. The coconut woodland on the outer part of the flat is 40-50 m wide. There are trees of Hernandia and Hibiscus and occasional Morinda, with sedges beneath. It is more apparently a managed coconut plantation than that around the south coast. Moving north the flat widens to 300 m, and the coconut woodland to 60-70 m. Other trees noted include Casuarina, Pandanus, Morinda and occasional Calophyllum. At the northern end of the main island, at Te O, however, the flat narrows to 10-15 m and is then replaced by a low beach ridge separating the lagoon proper from the barachois (Plates 38 and 39). Pemphis covered with Cassytha and largely dead Hibiscus occur on the ridge. The barachois itself is unvegetated, except for scattered islands covered with a scrub of Pemphis 2 and in places 3 m tall. Juvenile Casuarina, Cyperus and Fimbristylis were also seen on these islands. Pemphis scrub extends round the margins of the barachois and is continuous with that along the lagoon shore of the Ootu peninsula.

#### SLOPES TO HIGHER GROUND

The inner edge of the coastal flat is uniformly marked by a transition from coconut or broadleaf woodland to dense Hibiscus tiliaceus thicket. In the northwest this is narrow, because of the steepness of the ground. In the southwest, at Pata and Aretere the Hibiscus is less dense, with Morinda, Leucaena and Calophyllum: there is frequently a wet taro patch on the inner coastal flat at the junction with higher ground. A similar pattern extends round the south coast, with Hibiscus, Morinda and Pandanus thicket often separated from the flat by taro patches. On the lagoon coast at Vaipae the thicket is particularly dense, reaches a height of 8-9 m, and is composed of little but Hibiscus: this continues north to Te O.

In places the volcanic slopes reach the sea. On the west coast the largest such case is at Perekeiatu (Black Rocks). The margins of this spur support a woodland of Hernandia, Hibiscus and Casuarina, with some Pandanus. Small Scaevola bushes and Vigna marina form the beach vegetation. On the spur itself tall Calophyllum woodland reaches the sea. The vegetation is very similar to that of Moturakau and Rapota previously described.

Between Arutanga and Rapae volcanic rocks again reach the shore, and the coastal flat is narrow or non-existent. The slopes are covered with a thicket of Hibiscus 6-10 m tall, with a woodland of coconut, breadfruit and kapok behind. There is a narrow zone of Paspalum meadow along the foot of the Hibiscus zone. Ipomoea littoralis was collected beneath the Hibiscus. Low basalt points outcrop to the south, for example at Pata, but these are mainly inconspicuous. At Aretere, however, the point consists of basalt boulders 0.5 m in diameter. Dense Hibiscus thicket reaches the sea.

On the lagoon shore, north of Tautu jetty, the coastal flat narrows and disappears, and is replaced by a cliff up to 8 m high, with an intermittent sloping platform beneath up to 20 m wide, all cut in weathered red clays. Hibiscus and Calophyllum grow on the flat with massive Barringtonia, Calophyllum and Pandanus on the cliff and slopes above.

#### INLAND PLATEAUS

Most of the inland part of the main island consists of rolling ground 15-50 m above the sea. It is extensively cultivated and settled, and is either occupied by plantations of banana, citrus, and coconuts; groves of mango, breadfruit, Inocarpus, Eugenia jambos, and Carica; or secondary vegetation. Large areas are covered by Ocimum suave, and by a low scrub of Sida rhombifolia. Larger trees include old gnarled Hibiscus at Arutanga, tall Ceiba pentandra, and Hernandia up to 50 m high (most are 15-20 m). Calophyllum reaches 20 m, scattered massive Barringtonia 10-15 m, and at Vaipae there is a huge ancient banyan. There are dense local groves of Pandanus varieties (Plate 35) and Cordyline. All form a patchwork mosaic with cultivated useful and decorative plants. Useful trees include Aleurites moluccana, Persea americana, and Terminalia catappa, besides those already mentioned. The very wide variety of decorative trees includes Acacia farnesiana, Adenanthera pavonina, Araucaria heterophylla, Barringtonia asiatica, Bauhinia monandra, Caesalpinia pulcherrima, Delonix regia, Erythrina variegata, Plumeria, Poinsettia, Spathodea campanulata, and doubtless many others. Decorative shrubs, by no means confined to the villages proper, include Acalypha godseffiana, Acalypha wilkesiana, Bougainvillea, Clerodendrum speciosissimum, Crotalaria pallida, Hibiscus hybrids, Ocimum suave, Nerium indicum, Tabernaemontana divaricata, and again many others.

The greatest diversity, however, is in the introduced decorative and weedy herbaceous flora in this inland zone. Fosberg's list in this Bulletin includes over a dozen species in each category. Many food plants are also introduced; some are included in Fosberg's list; others are listed by Johnston (1967).

## HILLS AND CRAGS

The main vegetation on the slopes of Maungapu Hill, the highest point on the island, consists of a grass, Sorghum bicolor, growing to 2 m, and a shrub reaching the same height, Crotalaria pallida (Plate 34). Other shrubs include Triumfetta rhomboidea and Sida rhombifolia. Coconuts rise to immediately below the summit. Before 1942, when they were cleared by troops building military installations, it is said they extended over the summit itself at 119 m. Weedy species now extend over the whole hill and no trace of native vegetation remains. These weeds include Mimosa pudica, which is very common, Vernonia cinerea, Sporobolus africanus, Dactyloctenium aegyptium, Passiflora rubra, Emilia sonchifolia, Euphorbia hirta, and Stachytarpheta urticifolia. It is clear that no areas of indigenous vegetation comparable to those of higher islands like Rarotonga survive on Aitutaki. Bligh's reference to "lawns" on the hills in the eighteenth century suggests that the process of transformation of the vegetation is an old one.

## DISCUSSION

A few points of interest may be noted, particularly in contrasting the main island vegetation with that of the motus. Two tree species from the motus are absent from the main island (Pisonia grandis, Cordia subcordata), and one of the most common is restricted and relatively rare (Guettarda speciosa). Similarly the most common shrubs of the motus are absent from the main island. These include Corchorus torresianus, Timonius polygama and Euphorbia chamissonis. Capparis cordifolia is also absent. Scaevola, Suriana and Pemphis are restricted and uncommon, in sharp contrast to the motus, and only Sophora is more common on the main island than on the motus, of the plants characteristic of the latter. The absence on Aitutaki of Coccoloba uvifera, which is a common introduced tree on the coast of Rarotonga, may be noted. The marked disparity in numbers of weedy species between the mainland and the motus on Aitutaki has already been noted.

## REFERENCES

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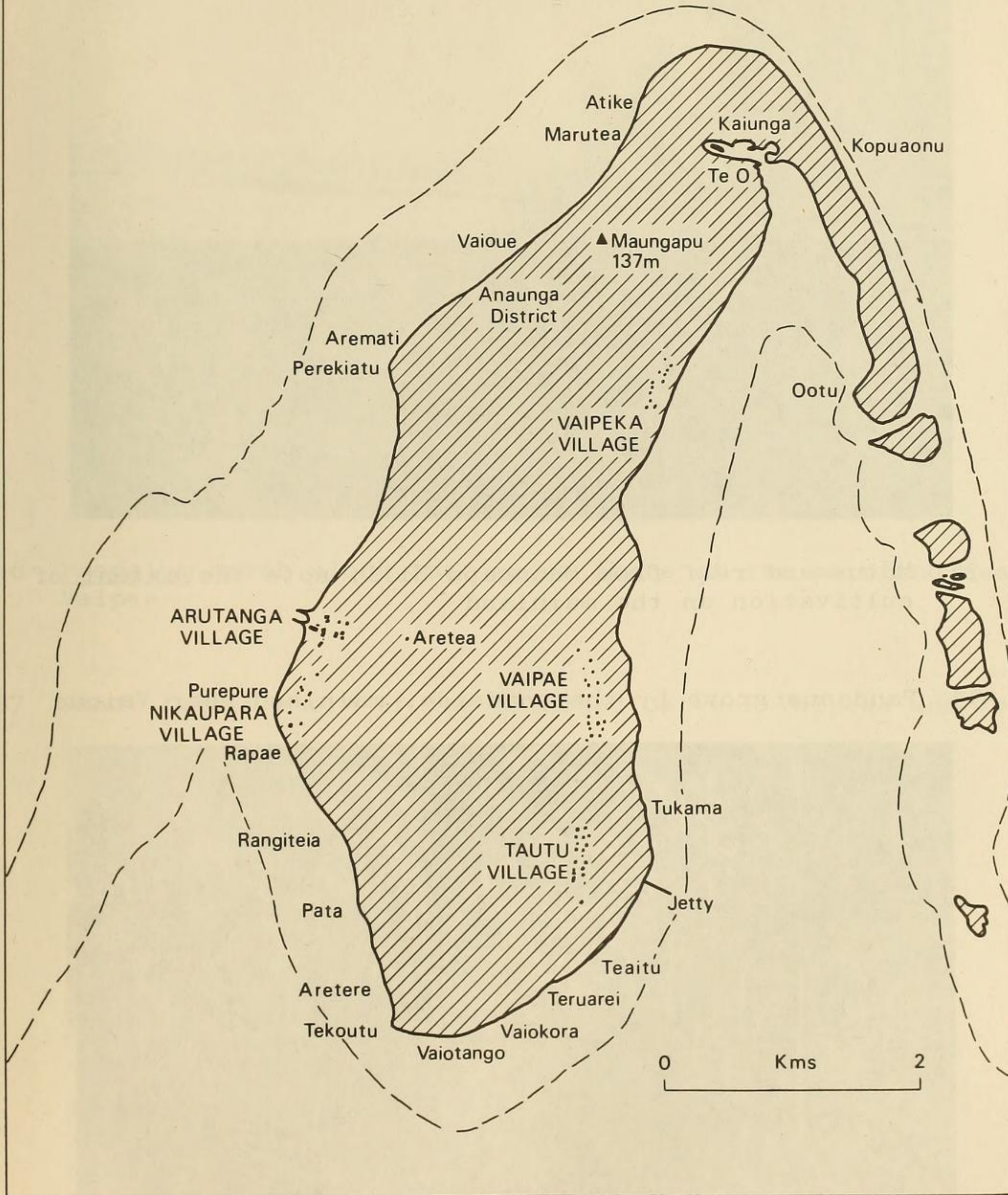


Figure 35. Aitutaki mainland vegetation localities



34 Motus and reef from Maungapu Hill; note the extent of cultivation on the mainland

35 Pandanus grove by the roadside, mainland near Vaioue







36 Paspalum marsh along the lagoon shore of the mainland near Vaipae

37 Sandy lagoon shore of the mainland between Vaipeka and Te O





38 Barachois at Te O

39 Barachois and lagoon beach ridge at Te O

