SEA TURTLES - KERMADEC IS.

G.H. BALAZS

Turtle protection plan

The Ministry of Agriculture and Fisheries is proposing to protect five species of marine turtles found in New Zealand waters and threatened with extinction.

The deputy group director of the fisheries division, Dr Robin Allen, says the ministry will recommend to the Minister of Fisheries, Mr Moyle, that legislation prohibiting the taking and possession of marine turtles be drafted under the Fisheries (Commercial Fishing) Regulations.

The proposed regulations would protect the turtles in all New Zealand's fishing zones, he said.

The green turtle, found around the Kermadec Islands, to the north of New Zealand, and the leatherback or luth turtle, which has been reported as far south as Foveaux Strait, have both been commonly sighted around New Zealand.

Two other species, the hawksbill turtle and the loggerhead turtle, are occasional visitors to North Island waters. There have also been a couple of rare sightings of the olive ridley or Pacific ridley turtle on Ninety Mile Beach.

Dr Allen says the proposal is in response to a request from the Department of Conservation to give the turtles full protection under the Fisheries Act.

Internationally, the turtles are threatened by being snared as a bycatch in fishing nets and have been the subject of concern over their possible extinction. There is also an international demand for their use in cosmetics and oils and for their skin.

100 YEARS AGO

from Herald files

The colony of Victoria has begun the year by taking the important step of establishing a penny postal service.

This may involve, as is anticipated, a loss of £100,000 in revenue during the first year; but the go-ahead colony of Victoria is prepared apparently to view that as a trivial matter in consideration of the benefits which it will confer on the colonists at large.

During 1886 the average of letter writing in Australasia was 44.67 letters per head; that of England 44.65.

In New Zealand we are the most copious of letter writers. We show an average of 67.89 letters; whilst Victoria shows 39.

These figures are the more curious, as Victoria has a post office to every sixty-one square miles of territory; New Zealand one to every ninety-six miles.

We can hardly expect just yet to be able to follow the example set by Victoria, but probably it will come in time, and, indeed, the world may look for a universal penny postage for letters between England and her colonies, combined with a system which will unite them with the postage systems of all the world.

— January 21, 1890

February 19, 1985 F/SWC2:GHB

Mr. S. McAllister
Raoul Island
c/o Meteorological Service
P. O. Box 722
Wellington, New Zealand

Dear Mr. McAllister:

I want to take this opportunity to thank you for the information you recently supplied on the sighting of sea turtles in the Kermadec Islands. With the assistance of personnel at the meteorological station on Raoul, I have been gathering information on these animals for the past 4 years. Eventually I hope to prepare a small paper on the subject, since sea turles in this area of the Pacific are not well known. Your contribution to this research effort is greatly appreciated.

I have enclosed several articles about sea turtles that you may find interesting. If I can ever be of assistance, please do not hesitate to contact me.

Sincerely,

George H. Balazs
Wildlife Biologist

Enclosure

cc: Balazs
HL

February 14, 1985 F/SWC2:GHB

Mr. Brian Woodock
34 Hungerford Rd.
Wellington, New Zealand

Dear Mr. Woodock:

I want to take this opportunity to thank you for the information you recently supplied on the sighting of sea turtles in the Kermadec Islands. With the assistance of personnel at the meteorological station Raoul, I have been gathering information on these animals for the past 4 years. Eventually I hope to prepare a small paper on the subject, since sea turles in this area of the Pacific are not well known. Your contribution to this research effort is greatly appreciated.

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Sincerely,

George H. Balazs
Wildlife Biologist

Enclosure

cc: Balazs
HL

Identical letters to:

Mr. J. Maxwell
142 Carlisk Road
Brouns Bay
Auckland, New Zealand

Mr. Glenn Hughes
75 Warspite Avenue
Porirup
Wellington, New Zealand

Mr. Norm MacDonald
c/o New Zealand Forest Service
Pureora, New Zealand

Mr. Guy Worwick
c/- Claris P. O. Great Barrier Is.
Hauraki Gulf, New Zealand

Mr. Ray Twomey
c/- Claris P. O. Great Barrier Is.
Hauraki Gulf, New Zealand

Sea temperature charts now available to NZ Fishermen

THE New Zealand Meteorological Service is producing weekly sea surface temperature charts for the NZ fishing industry.

The charts are prepared from data received from satellites and are available from meteorological branch offices and airports in New Zealand.

New receiving equipment was installed by the Service at its Kelburn headquarters in late 1980 and polar-orbiting meteorological satellites, operated by the United States, are now tracked by a three-metre diameter dish antenna.

The data received are computer processed to provide high-quality cloud pictures in both visible and infrared for use by forecasters. The infrared measurements are specially valuable since they indicate the temperature of the radiating surface, allowing the estimation of cloud-top temperature (and therefore height).

Fishing interest

Fishing interest arises in connection with infrared measurements made in cloudless conditions; the sea surface is then 'seen' by the satellite and its temperature measured.

Unfortunately the general cloudiness of the New Zealand area ensures that, on most days, large areas of sea are obscured. As a result surface temperature mapping from a single satellite pass is usually incomplete.

The problem has been overcome by using the computer to select and combine measurements. Instead of storing each individual satellite measurement, only the highest temperature from each eight km by eight km square of individual measurements is stored.

Up-to-date sea surface temperature charts — if they were available — could greatly reduce the time and money fishermen spend seeking tuna and other pelagic fish. This article by Dr Taylor of the New Zealand Meteorological Service describes the service provided to NZ fishermen. It is reprinted from the NZ Ministry of Agriculture and Fisheries' publication *Catch '82*.

After these daily charts have accumulated in the computer for a week they are combined in such a way that the warmest value for each square is selected from the seven available.

This results in a 'time-composite' picture representing the temperature of each eight km square by a shade of grey, from white (cold) to black (warm).

Residual contamination by cloud which persists throughout the week in the same position also appears white.

Only a small number of these pictures can be produced (MAF receives copies) and, in order to communicate the information to fishing interests in many different locations, an equivalent digital printout is transmitted to meteorological branch offices which serve a local fishing industry.

The temperatures themselves are generally a little colder than shipboard measurements because atmospheric water vapour absorbs some of the surface radiation before it reaches the satellite. The difference increases towards the north where there is a greater water vapour content in the atmosphere.

It is not necessary to apply an empirical correction at this stage since the main use of the charts is thought to be in identifying local warm or cold spots and locating strong temperature gradients, rather than in determining absolute values. (Conventional ship measurements of sea surface temperature continue to be archived and analysed for five-day and monthly periods, as in the past.)

Few fishing communities in the world receive this service as yet and the exact applications are largely unknown.

The New Zealand Meteorological Service is therefore interested in receiving feedback from the industry regarding experience in its use and suggestions for its improvement.

April 14, 1982

Mr. John Thompson
Meteorological Office
P. O. Box 722
Wellington, New Zealand

Dear John:

Thanks very much for the recent set of sighting reports for Raoul Island, and especially for the high-seas observation of a large turtle by the Union Rotoiti. If this latter report is published in "The Marine Observe," please send me a copy of the page upon which it appears. Since the turtle was so large, and the ship passed so close, I wonder if we could possibly get a species ID on the critter. It was probably a leatherback, and it would be good to have this confirmed. I have enclosed several of my species ID sheets for you to pass on to the crew of the vessel, when your time permits. As you know, the leatherback is so distinctive that the observers should easily be able to distinguish it when they see these drawings.

In October of last year I had the good fortune and pleasure to visit New Zealand's Tokelau Islands north of Samoa. I thought that you might be interested in the enclosed report that resulted from this short trip. Perhaps one of these days I can undertake a similar first-hand survey of the Kermadecs.

Best regards.

Sincerely,

George H. Balazs
Assistant Marine Biologist

mk
Enclosure

West Pacific Quake Measures 6.8

WASHINGTON (AP)—A severe earthquake, described as the largest since one off the coast of Chile early last month, occurred in a sparsely populated area of the Western Pacific on Thursday the U.S. Geological Survey said.

The earthquake's magnitude was estimated at 6.8 on the Richter scale. No reports of damage or casualities had been received, the survey said.

The quake centered in the Kermadec Islands about 1,000 miles northeast of New Zealand. A survey spokesman said that is a very active earthquake region.

L.A. TIMES

KERMADEC ISLANDS

See

Parsons 1962. The Green Turtle and Man

p 71 mentions that Vatoa (Capt. Cook's "Turtle Island") "... may be the home base for the greens that are reported to feed in substantial numbers off the Kermadec Islands (30°S) [Oliver].

A PROGRAMME TO EXTERMINATE INTRODUCED PLANTS ON RAOUL ISLAND

W. T. DEVINE

Department of Lands & Survey, Private Bag, Wellington 1, New Zealand

ABSTRACT

Raoul, the sole subtropical island possession of New Zealand, is jointly administered by the Ministry of Transport (meteorological station) and Department of Lands and Survey (nature reserve). Since abandonment of attempts at settlement many species of cultivated exotic plants have become pernicious weeds threatening the indigenous vegetation. The methods and results of trials aimed at eradication of some of these weed species are discussed.

THE ISLAND

Raoul Island (2938 ha) is the largest island of the Kermadec archipelago which is a territory forming part of New Zealand. It lies to the north-east of New Zealand at Lat. 29°S, Long. 177°W (Fig. 1). The climate is subtropical with sunshine hours averaging 2153 a year and a mean annual temperature of 19°C. Rainfall is distributed fairly evenly throughout the year, averaging 1473 mm over 191 days. Humidity on the island is high (annual mean 75%). The island is a complex volcano in which the central caldera, containing two large lakes, has been the site of three eruptions since the island was discovered by Admiral de Bruni D'Entre-casteaux in 1793. The most recent of these eruptions was in November 1964.

LAND TENURE AND CONTROL

An area of 2827 ha of Raoul was set apart in 1934 as a reserve for the preservation of indigenous flora and fauna and is subject to the provisions of the Reserves and Domains Act 1953. The Director-General of Lands of the New Zealand Department of Lands & Survey is responsible for the control and management of the reserve. The remaining 111 ha was set apart in 1938 under the provisions of the Public Works Act 1928 as a meteorological station (Fig. 2), now the responsibility of the New Zealand

Biol. Conserv. (11) (1977)—
Printed in Great Britain

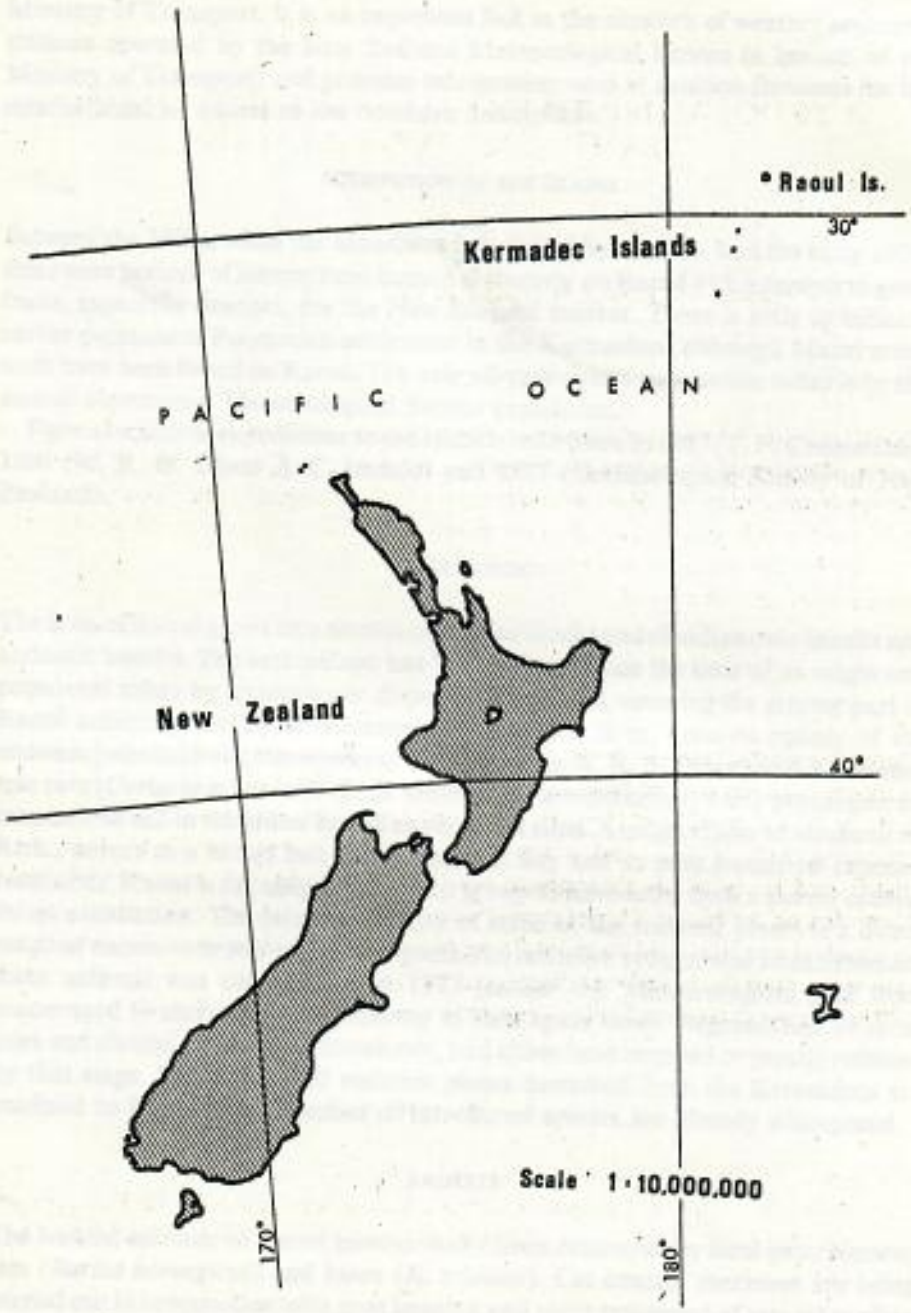


Fig. 1. The location of the Kermadec Islands in relation to New Zealand.

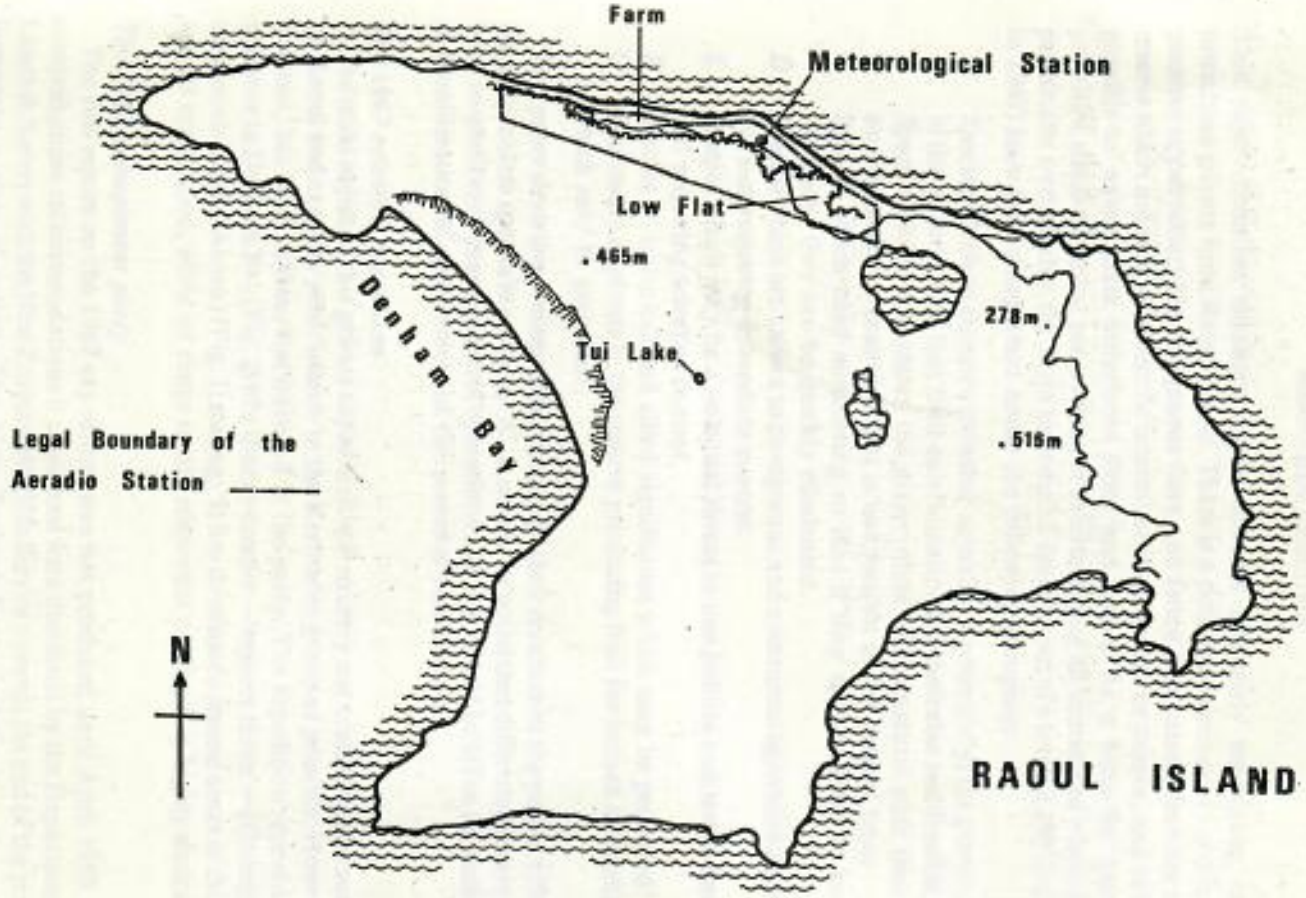


Fig. 2. The main features of Raoul Island.

Ministry of Transport. It is an important link in the network of weather reporting stations operated by the New Zealand Meteorological Service (a branch of the Ministry of Transport) and provides information used in aviation forecasts for the international air routes to the northern hemisphere.

OCCUPATION OF THE ISLAND

Between the 1800s, when the island was first visited by whalers, and the early 1930s there were periods of intermittent human settlement on Raoul with attempts to grow fruits, especially oranges, for the New Zealand market. There is little to indicate earlier permanent Polynesian settlement in the Kermadecs, although Maori stone tools have been found on Raoul. The only all-year-round occupation today is by the annual eleven-man Meteorological Service expedition.

Formal scientific expeditions to the Islands took place in 1887 (T. F. Cheeseman), 1890 (W. R. B. Oliver & T. Iredale) and 1967 (Ornithological Society of New Zealand).

VEGETATION

The flora of Raoul grows on a mantle of pumice blocks and obsidian over basalts and andesitic basalts. The archipelago has been isolated since the time of its origin and populated solely by transoceanic dispersal. The forest, covering the greater part of Raoul excepting the 20-ha Meteorological Station farm, consists mainly of the endemic pohutukawa (*Metrosideros kermadecensis* W. R. B. Oliver) with Kermadec tree tutu (*Coriaria arborea* W. R. B. Oliver var. *kermadecensis*) being prominent on pumice and tuff in the crater as well as on recent slips. A sedge, *Cyperus ustulatus* A. Rich., occurs as a broad belt along Denham Bay and as pure stands on exposed headlands. Raoul is the only island in the group to have more than a purely coastal forest association. The increasing rarity of some of the endemic plants is a direct result of excessive browsing by feral goats. An intensive programme to exterminate these animals was commenced in 1972 (earlier the Meteorological staff were encouraged to carry out goat shooting in their spare time). Regeneration of most trees and shrubs, including pohutukawa, had either been stopped or greatly reduced by that stage. Some of the 20 endemic plants described from the Kermadecs are confined to Raoul and a number of introduced species are already widespread.

ANIMALS

The seabird colonies of Raoul have virtually been destroyed by feral cats, Norway rats (*Rattus norvegicus*) and kiore (*R. exulans*). Cat control measures are being carried out in conjunction with goat hunting and some poisoning of rats takes place at the Meteorological Station.

PROGRAMME OBJECTIVES

This paper describes measures taken towards ultimately eradicating certain introduced plants from Raoul Island. There is a policy requirement to protect and preserve in perpetuity the indigenous flora and fauna and natural features of the reserve which are rare, of scientific interest or importance, or unique, and as far as possible to exterminate introduced flora and fauna. As a basis for assessing priorities, since a blanket programme of exterminating all introduced plants is not practicable or desirable, the main introduced species (out of a total of 150 identified in 1967) have been categorised under the following groupings:

A Species which so threaten (whether actually or potentially) the preservation of the natural state that their extermination is a desirable and feasible goal.

B Species which so threaten the preservation of the natural state that their extermination is desirable, but is not feasible at the present time.

C Species which need monitoring so that if they appear likely to become aggressive they can be quickly eliminated.

D Species which are known to be vigorous and sometimes aggressive elsewhere but not requiring immediate control.

E Species which may be a potential threat in one habitat and not in another and requiring selective control.

F Species of historical and allied significance which may be protected.

G Specimens of plants in the reserve producing fruit for human consumption which may be protected.

This paper describes treatment methods and their results over the period 1972–75 for the problem species in category 'A'. It should be noted that different persons have been involved each year in control operations and this should be taken into account in consideration of assessments of the previous year's works.

The 1967 *scientific expedition*

The main object of this private expedition was to carry out ornithological surveys on Raoul and as many other islands in the Kermadec group as possible. However a botanist, Mr W. R. Sykes, was included in the party. The expedition reported the presence in Denham Bay (Fig. 2) of a thorny creeper—'mysore thorn'—(*Caesalpinia decapetala* (Roth.) Alston) (Fig. 3) stating: 'It has dominated several areas of this flat and its eradication, while its range is still somewhat confined, is highly desirable'.

The 1970 *management party*

The full report on the 1967 expedition was not produced until April 1969. The comprehensive recommendations it contained were discussed by the Department of Lands & Survey with the New Zealand Wildlife Service towards the end of the year to formulate a plan of action. The New Zealand Ecological Society also urged

Fig. 3. Mysore thorn—a typical section of vine showing the sharp robust spines.

attention to active management of Raoul. During 1970 the Kermadecs were brought under the auspices of a scientific committee set up to advise the Department of Lands & Survey on certain aspects of outlying islands' administration and in 1970, with the assistance of the Royal New Zealand Navy and co-operation of the Meteorological Service, two officers of the department were able to visit Raoul in order to review the appropriateness of administrative policies being applied at that stage (which included doing nothing about interfering in the competition between introduced and indigenous plants). They were accompanied by two officers of the New Zealand Forest Service which had been asked to study the goat problem. Control of mysore thorn was recommended. Purple guava (*Psidium littorale* Raddi) and African olive (*Olea africana* Mill.) were subsequently brought to the Department's attention as 'potentially dangerous exotics which have become a problem on Norfolk Island'. The yellow guava (*P. guajava* L.), shore hibiscus (*Hibiscus tiliaceous* L.) and Mauritius hemp (*Furcraea foetida* L. Haw.) were also considered to be equally dangerous. The latter plant was initially identified as century plant (*Agave americana*) but properly classified in 1976.

TREATMENT OF THE MAIN PEST SPECIES

Mysore thorn

The presence of mysore thorn was first reported in 1938 and even then it was well established. The extent of the infestation was not, however, appreciated until the management party visited Raoul in 1972 when the thorn was estimated to cover some 16 ha in Denham Bay and a 1000 m^2 area in a ravine (Ravine 8) leading into the Bay. When control operations started in Denham Bay in 1974 it was more accurately estimated that the thorn formed dense thickets in an area of some 22 ha, extending through and over the pohutukawa forest to heights of 12–14 m, as well as on talus slopes extending up to 185 m above sea level (Fig. 4). There were also several smaller clumps, the main one covering some 1·1 ha. There were also large areas of pohutukawa forest and other vegetation completely free of thorn in the Bay.

Mysore thorn grows as a climbing tangle of stems up to 5 cm or more in diameter covered along their full length by sharp robust spines of up to 1 cm. The plant may have been introduced for a hedge but windfalls or movement of debris from cliffs backing the Bay probably provided sites for an accelerated rate of spread after attempts at farming in the Bay were abandoned. Its potentialities for long-distance spread are poor but the fact that plants had started mounting the cliffs at the rear of Denham Bay and were established at Ravine 8 was a cause for concern.

The widespread use of herbicide on mysore at Denham Bay was not initiated until it had been established that the indigenous flora, which might also be affected, was represented elsewhere on Raoul. It was also established that adverse effects on birdlife were unlikely.

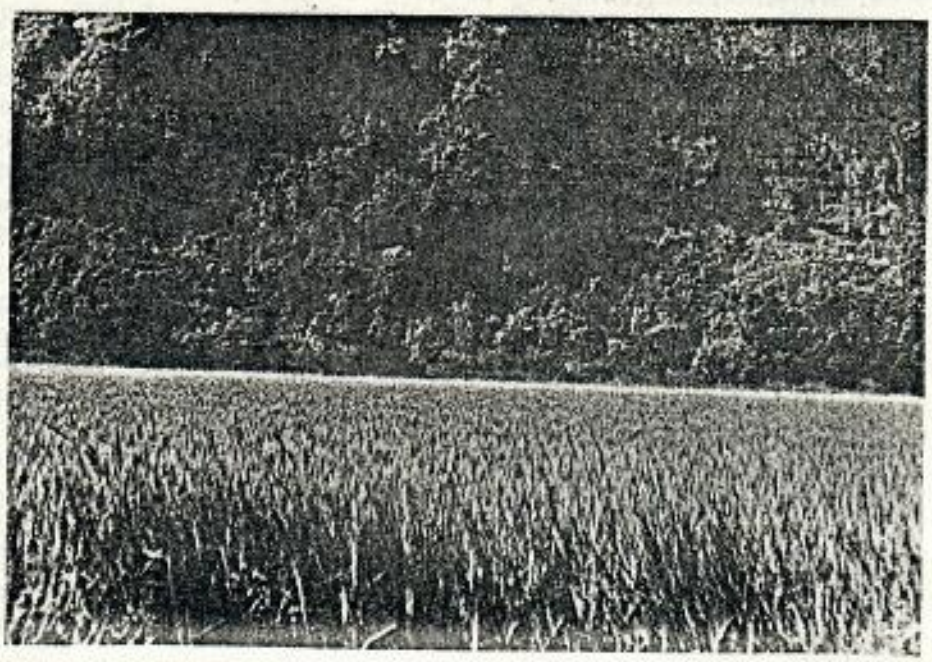


Fig. 4. Denham Bay—a view across the swamp of the talus slopes backing the Bay and up which mysore thorn is climbing.

The 1972–73 expeditions concentrated on trials in Ravine 8 using Tordon 2G granules spread by hand from paths slashed into the clump. There was re-sprouting after the 1972 treatment but in 1974 it was found that in the two trial areas (the 1972 one having been re-treated) there were only two living mysore seedlings (45 cm and 1 m tall). In both plots shoots from adjoining mature plants were beginning to encroach again but the only green vegetation was in a dense layer at the top 1·2 m thick. A few small indigenous ferns *Pteris comans* Forst.f. and exotic aroid lilies *Alocasia macrorrhiza* (L.) G.Don survived the herbicide application along with *Mysine* seedlings ranging up to 21 cm in height which were quite plentiful. Because of the success of the trials the Ravine 8 mysore clump was comprehensively poisoned by hand application of Tordon 2G granules in 1974. In 1975 all the vines were found to be dead except two at the centre. There were at least 30 small mysore seedlings growing in the clump and a further 9 subsequently germinated. The vines were poisoned and seedlings pulled.

The major concentrations of mysore in Denham Bay were not treated until 1974. A trial spraying of 4 ha using a rotary granular applicator (hopper) (for test of this implement see Test Report No. 53 of the New Zealand Agricultural Engineering Institute, Lincoln College, Canterbury, New Zealand, "The Whirl-Wide Rotary

Fig. 5. Trial plot DA1—showing partial success of 1974 aerial spraying. Note dead mysore on right hand side of photo in particular.

Granular applicator spreading Tordon 2G Inert Granules') and a Wasp helicopter from HMNZS *Waikato* was attempted but because of hopper failure only about 2 ha were treated at two different sites (trial plots DA1–2). Also, difficulties experienced with controlling the flow rate from the hopper meant that the intended application rate (112 kg/ha from a height of about 12–13 m above the canopy) was not followed.

Subsequent small-scale hand-spreading of granules over outliers of mysore around plot DA1 was also undertaken and in order to contain the spread of the plant within the Bay the outermost clumps were similarly dealt with. These ranged in size

grassed areas but was also scattered along forested ridges nearby. Trees grow as large as 12 m high with a 12 m spread and threaten the indigenous canopy by overshadowing. In 1972 the olive was poisoned together with the guava in the Station orchard and further trees were cut down in the following year. In 1975 it was found that the 1974 poisoning with Tordon 2G had in some areas achieved a good kill (mainly young plants) while in others the trees were obviously affected but still growing, or not affected at all. Some plots had a carpet of *Cassia floribundia* Cav. seedlings or other weeds growing round them while one had a young indigenous *Coprosma acutifolia* Hook.f. growing within it. During the 1975 expedition a large number of olive seedlings were pulled in the forest surrounding the Meteorological Station orchard and some of the larger trees were either cut down or ring-barked and

Fig. 6. Mauritius hemp growing near Tui Lake.

painted with the Tordon 520/diesel oil mix. It was estimated that it would take several years with the manpower available to eradicate the olive totally because of the large number of plants involved.

Mauritius hemp

This plant is large and flax-like with a spiny-edged leaf (Fig. 6). It may have been introduced for the making of sisal and is found in three sites on the Island. It was

up to about 2000 m². In the following year it was found that the mature mysore in plots DA1–2 was completely dead (Fig. 5). There was no seedling mysore regeneration in plot DA1 but considerable regrowth in plot DA2; the different response cannot be attributed with any certainty to the excess application of herbicide in DA1 resulting from hopper malfunction. There were only a few aroid lilies, ferns and mosses growing in either area. There was a variable result from the hand application trials in 1974. Aerial spraying in 1975 was concentrated on the largest and densest concentration of mysore (in excess of 22 ha) near the centre of the Bay. Financial considerations dictated that blanket coverage be restricted to roughly an average of half the total area. The strategy was decided of spraying in a pattern that would ensure opening up of the mysore canopy sufficiently to permit ground operations to be carried out in subsequent years aiming at total eradication. A total of 2886 kg of Tordon 2G granules was applied by a Wasp helicopter from HMNZS *Canterbury* using the rotary applicator. In six hours' flying time it was found possible to spray all the mysore visible from the air (it was in flower in late July). A 70 % success rate was expected. The aerial operation was followed up by ground spraying of herbicide with a 'Solo' motorised knapsack unit at selected sites. Tordon 520 'Brushkiller' was used in a diluted mix with water at a ratio of 1:20. Towards the end of the expedition re-growth was estimated at about 4 shoots/ha. It was also found that pohutakawa trees accidentally sprayed in 1974 through hopper malfunction were killed.

Purple guava and yellow guava

Guava is a shrub or small tree (maximum height 3½ m) with origins in tropical America and is naturalised in several islands of the Pacific where it is recognised as a pernicious weed. The fruit is edible and very high in vitamin C.

In 1973 most of the purple guava plants in the Meteorological hostel garden area were cut down and in 1974 Tordon 2G granules were applied by hand to six large yellow guava and a few seedlings (trial plots DG19–20) in Denham Bay. Cut plants developed suckers and treatment in 1974 on the north side of the Island (Meteorological Station property) consisted of trials by cutting the adult shrubs down and, for lack of alternative, painting the stumps with a mixture of about equal parts Tordon 2G granules and diesel oil (although the granules did not dissolve properly) and pulling of seedlings. In 1975 the results were found to be variable with less than 50 % success rate. Some further plants were cut and sprayed but most attention was given to the African olive. Plots DG19–20 in Denham Bay were found to show no sign of the 1974 poisoning. The shrubs were therefore ring-barked and painted with a 1:1 diesel oil/Tordon 520 mix.

African olive

It has been recognised since 1967 that this species was spreading widely along the fringes of the Meteorological Service farm and grew in abundance mainly in semi-

reported in 1973 that the species might be spreading. Near Tui Lake the plant forms a clump 30–40 m across with one large outlier. Sixteen kilogrammes of Tordon 2G granules were spread around the main clump in 1974 with little observed effect. In Denham Bay there were hemp clumps of varying size over a distance of some 300–400 m under the pohutukawa fringe on the edge of the beach. Half a dozen clumps were similarly treated there.

At Tui Lake in 1975 it was found that the plants had survived and the larger ones had gone to 'seed', although the flower stalks (which grow up to 12 m high) were misshapen and it was expected that viability would have been reduced. All the plants were pulled and stacked. In Denham Bay the infestation was found to be more extensive than first reported. However, treated plants were nearly dead, although

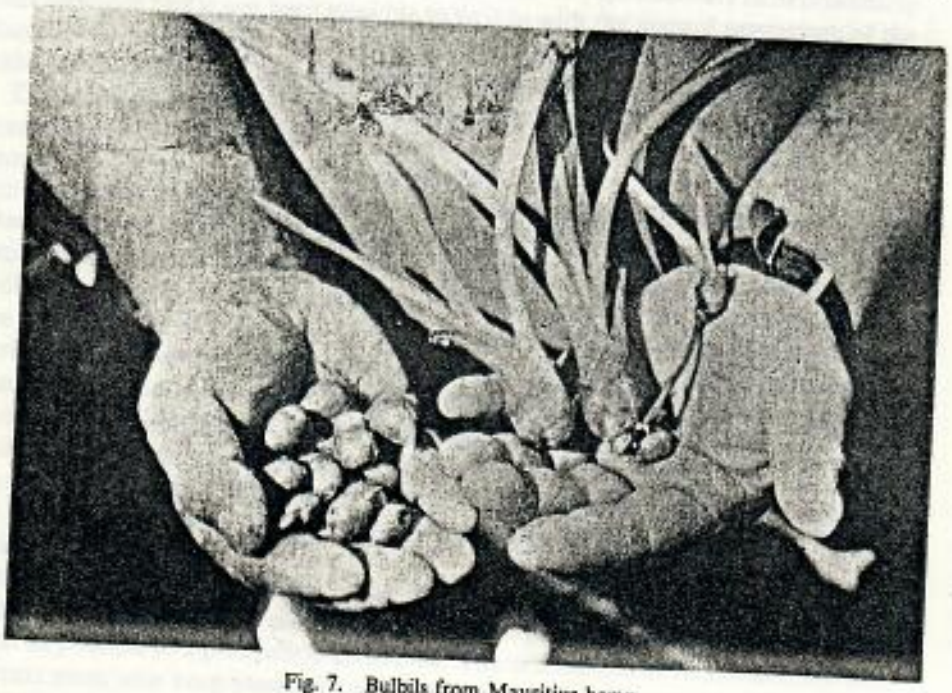


Fig. 7. Bulbils from Mauritius hemp.

there were many new shoots around the base. The adult plants were pulled and this method is to be used in future at both locations in preference to the use of herbicides. Thousands of bulbs were scattered round the plants and will be the source of regeneration (Fig. 7).

Shore hibiscus

The origin of this species is not clear but it is now a common tree of seashore and

forest in the South Pacific. It rarely reaches more than 10 m high and has large yellow flowers which turn reddish with age. The bark and wood are put to many uses. There are no direct observations of hibiscus seeding on the Island and the plants grow by layering and form a dense tangle of stems (Fig. 8). It is confined to Denham Bay in two clumps about 400 m^2 in extent and Low Flat (on the Meteorological Station).

It was first reported in 1974 as a potentially dangerous weed growing against pohutukawa trees, enveloping them and weighing them down by sheer bulk.

As a trial, one clump in Denham Bay was overflown in 1974 with Tordon 2G granules and was divided in two by the herbicide. Some old limbs were showing new shoots in 1975 and were possibly rooted outside the treated area. The ground was fairly bare, with mysore seedlings up to 1·3 m tall being the most common plant. There were also several ferns and mosses. Further aerial overspraying into this plot

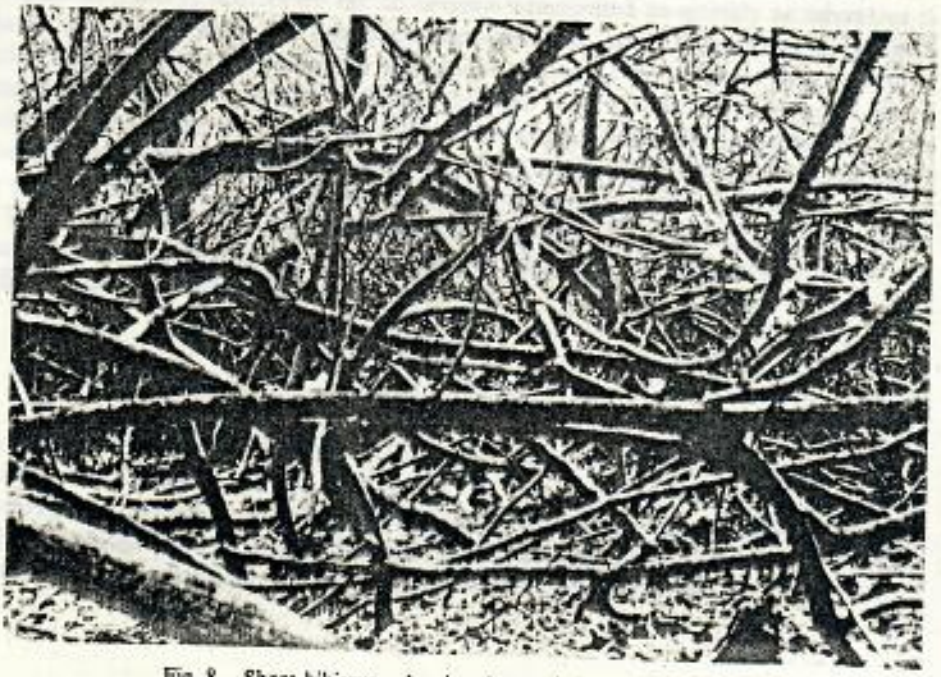


Fig. 8. Shore hibiscus—showing the tangled nature of the plant.

was carried out during the 1975 operation and was sufficient to kill most of the mysore seedlings but had little effect on the hibiscus. As a trial, Tordon 520 was sprayed on the seaward side of the clump to see if it was more effective than Tordon 2G. The other area of hibiscus in Denham Bay was treated for the first time. A trial was undertaken by ring-barking as many of the independent stems as could be identified and reached and by painting with a 1:1 mix of Tordon 520 and diesel oil.

The complex tangle of rooted trunks make it impossible to deal with each clump as a whole and control by this method will take a number of years. The hibiscus plants at Low Flat have not been included in the programme to date.

DISCUSSION

As Raoul Island is subject to dual administration, and it is necessary to treat exotic plants in the area as a whole in order to achieve total eradication, the co-operation of the New Zealand Meteorological Service (Ministry of Transport) has been a very important factor in the success of the programme being undertaken by the Department of Lands and Survey. The programme would also have been financially impracticable had it not been possible to fit it in with the normal operations of the Royal New Zealand Navy in territorial waters. Continued assistance will be needed, although further aerial spraying appears unnecessary in Denham Bay.

Denham Bay, the first site settled by Europeans and earliest abandoned, poses the greatest problem with category 'A' weeds as it contained infestation of all of these except the African olive and the only extensive areas of mysore thorn. Subsequent settlement was on the north side of the Island and continued occupation of the Meteorological Station farm (the last former private holding on the island) has probably kept some of the exotic plants in control, although escapes from the old orchard, especially of olive and guava, are a worsening problem. The initial result of the extensive use of herbicides in Denham Bay is likely to be an increase in the herbaceous vegetation at the expense of the pohutukawa forest. The former will be made up in the main of aroid lily, a category 'B' weed, and less important uncategorised weeds—along with indigenous ferns. It is expected that other indigenous species will regenerate and become dominant in time (e.g. Kermadec nikau (*Rhopalostylis cheesemanii* Becc.)) if follow-up control of the category 'A' weeds is undertaken until they are exterminated or kept in check by the indigenous vegetation.

Artificial seeding is not likely to speed up the process. The eradication of exotic plants is recognised as only one part of a programme to restore Raoul Island reserve as far as possible to a prehistoric condition. The eradication of feral mammals and rodents must also keep pace with allied management controls.

The exotic plant eradication programme has been developed on the basis of trial and error since the Kermadec Islands are the only truly subtropical portion of New Zealand (also the only part of the country where the category 'A' weeds as discussed here are known to occur) and no other comparable control operations are known from overseas literature. For example, there were some half a dozen trials on the best way to eradicate mysore thorn before a major use of herbicide over a wide area was arranged. These were undertaken partly to select the most economical methods but more importantly to test likely side-effects. Although there will be some loss of

indigenous vegetation as a result of the programme, this is more than compensated for by the gains achieved in reducing competition by pernicious weeds. In addition, the Raoul soil and climate almost certainly promote a more rapid breakdown of chemicals than in most places in mainland New Zealand, so the residues will be less persistent. Wildlife is not expected to be significantly affected and it is anticipated that indigenous regeneration will be accelerated when the goals of the goat control operation are nearer achievement.

CONCLUSIONS

Raoul Island shows the typical vulnerability of oceanic island ecosystems to the establishment of plants and animals from continental areas in particular. Because indigenous plant species often fail to become established as quickly as adventive plants on pioneer surfaces, major changes occur in open ecosystems. Suitable habitat on Raoul for the spread of introduced cultivars resulted from clearing and later abandonment of former naturally forested land by settlers during the last century. The subsequent browsing of the indigenous vegetation by feral goats would also have favoured the adventives, and their range on the island was further enlarged by erosion and the carrying of seeds by men, wind and birds.

The selective plant control programme instituted in 1972 is likely to achieve its goal provided annual operations are carried out and they are sustained over a sufficient period of years.

ACKNOWLEDGEMENTS

I wish to thank Mr W. R. Sykes, Dr J. C. Yaldwyn and Reserves Ranger G. Champness for their helpful comments on an earlier draft of this paper. Unpublished reports in the files of the Department of Lands and Survey Head Office, Wellington, were used in the main as reference material. I am grateful to Mr Champness for permission to reproduce photographs (Figs. 3–8).

Note article on Kermadec Is. in Bio. Conserv. 1977

from- The New Zealand off-shore Islands by G.A. KNOX

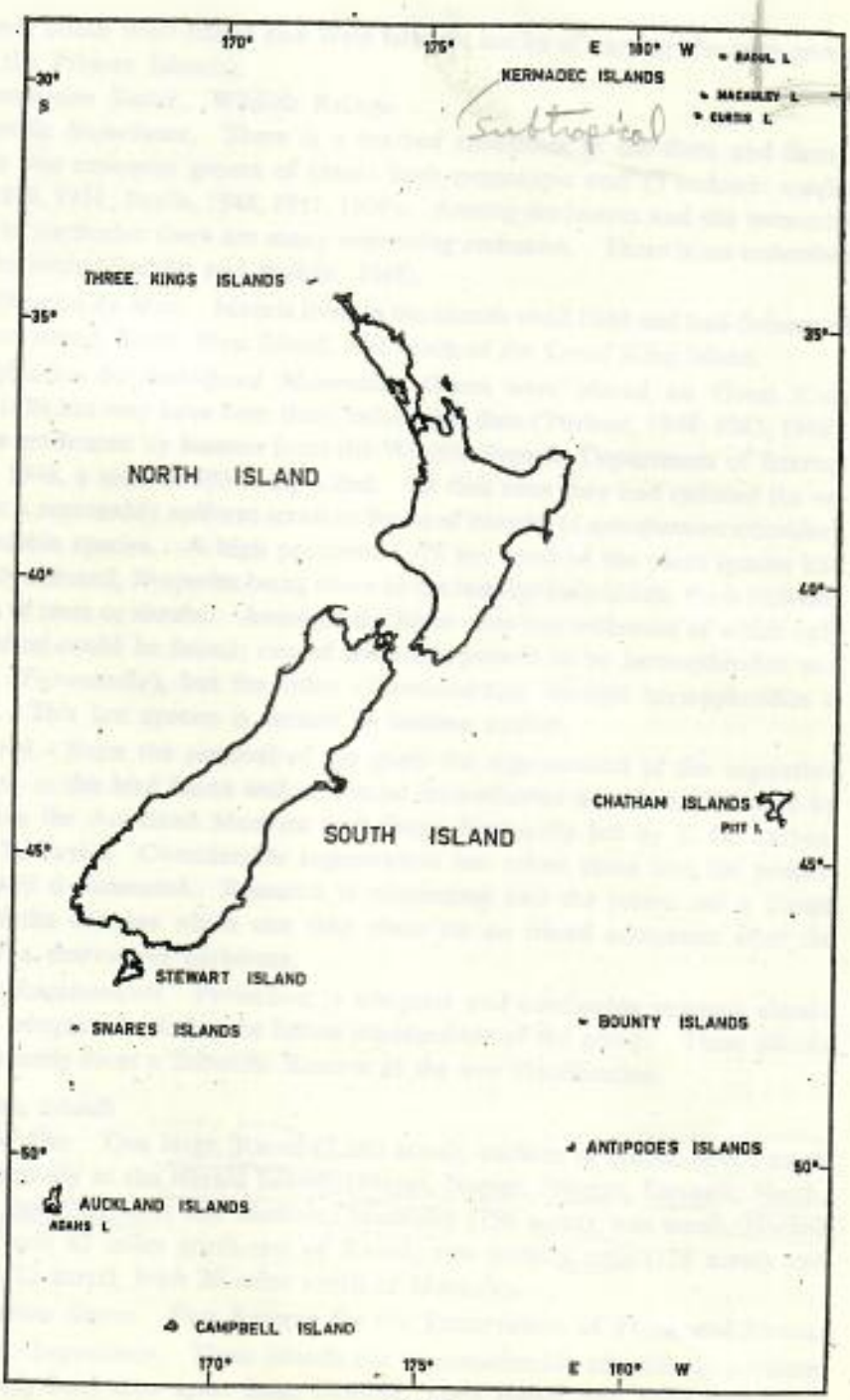


Fig. 1.

Kermadec - medium small Reserve for the Preservation of Flora and Fauna"

also - Draft Check List of Pacific Oceanic Islands - same issue

MICRONESICA 5(2) 465-491 1969 (DEC)

East Island, South West Island and West Island); stacks of varying size (one group forming the Princes Islands).

Conservation Status. Wildlife Refuge

Scientific Importance. There is a marked endemism in the flora and fauna. There are two endemics genera of plants both monotypic and 13 endemic species (Oliver, 1948, 1951; Baylis, 1948, 1951, 1958). Among the insects and the terrestrial molluscs in particular there are many interesting endemics. There is no endemism among the birds (Turbott and Buddle, 1948).

Modification by Man. Maoris lived in the islands until 1840 and had deforested North East Island, South West Island, and much of the Great King Island.

Modification by Introduced Mammals. Goats were placed on Great King Island in 1889 but may have been there before that date (Turbott, 1948, 1963, 1968). They were eradicated by hunters from the Wildlife Branch, Department of Internal Affairs in 1946, a total of 393 being killed. At that time they had reduced the vegetation to a reasonably uniform scrub or forest of kanuka (*Leptospermum ericoides*), a nonpalatable species. A high proportion (78 per cent) of the plant species had been greatly reduced, 19 species being down to the last few individuals, these included six species of trees or shrubs. Amongst the latter were two endemics of which only one individual could be found; one of these has proved to be hermaphrodite and self-fertile (*Tecomanthe*), but the other (*Plectormirtha*), though hermaphrodite is self-sterile. This last species is certain to become extinct.

Research. Since the removal of the goats the regeneration of the vegetation and changes in the bird fauna and terrestrial invertebrates have been followed by a team from the Auckland Museum and Otago University led by E. G. Turbott and G. T. S. Baylis. Considerable regeneration has taken place and the process has been well documented. Research is continuing and the resuts are a classic example of the changes which can take place on an island ecosystem after the removal of a destructive herbivore.

Future Requirements. Protection is adequate and continuing research should provide an adequate basis for the future management of the group. These islands should ultimately form a Scientific Reserve in the new classification.

2. *Kermadec Islands*

No. and Size. One large, Raoul (7,260 acres); outliers of Raoul, seven small known collectively as the Herald Islands (Meyer, Napier, Nugent, Daynell; North, South and East Chanter); one medium, Macauley (756 acres), one small, Hazard (17 acres), both 67 miles north-east of Raoul; two small Curtis (128 acres) and Cheeseman (12 acres), both 20 miles south of Macauley.

Consevation Status. Part Reserve for the Preservation of Flora and Fauna.

Scientific Importance. These islands are of considerable scientific importance being the only land area apart from Norfolk, Lord Howe, and Juan Fernandez at this latitude in the Pacific. The plants show Australian, New Zealand, and Polynesian relationships and include some 14 interesting endemics (Cheeseman,

1888; Oliver, 1910). There is little published work on the invertebrate fauna, but adequate collections are now being worked up. The birds are of great interest, the islands forming the breeding sites of a rich and interesting assemblage of seabirds including the following endemic species or subspecies; Kermadec allied shearwater, *Puffinus assimilis kermadecensis*; Sunday Island petrel, *Pterodroma externa cervicalis*; Kermadec petrel, *Pterodroma neglecta*; black-winged petrel, *Pterodroma hypoleuca nigripennis*; Kermadec storm petrel, *Pelagodroma marina albiclunis*; and grey ternlet, *Procelsterna cerulea albivitta*. Other Pacific seabirds breeding in large numbers on the islands include wedgetailed shearwater, *Puffinus pacificus pacificus*; Redtailed tropic bird, *Phaethon rubricanda roseotincta*; masked boby, *Sula dactylatra personata*; sooty tern, *Sterna fuscata*; white-capped noddy, *Anous tenuirostris minutus*; and the white tern, *Gygis alba royana* (Oliver, 1912; Sorenson, 1964; Edgar, et. al. 1965). Endemic land birds include the spotless crake, *Porzana tabuensis plumbea* and the Kermadec parakeet, *Cyanoramphus novaezelandiae cyanurus*.

Modification by Man. Since the 1800's when the islands were visited by whalers there have been periods of intermittant settlment on Raoul with attempts to grow exotic fruits, especially oranges, for the New Zealand market. Raoul is now occupied by the staff of a small Meterological Station and some farming is carried out. This occupation has resulted in the introduction and establishment of a large number of exotic plant species (Oliver, 1910; Sykes, 1965).

Modification by Introduced Mammals. Goats were introduced to Raoul and other islands in 1842, cats were found on Raoul in the 1860's, and Norway rats probably arrived much earlier in the whaling ships (Watson, 1956). The native rat, the kiore, is also present. Goats, cats, and rats are now numerous on Raoul and up to 1966 were abundant on Macauley. On the latter island some 3200 goats were destroyed by the Wildlife Branch, Department of Internal Affairs. Fortunately, none of these introduced mammals as yet occur on the other islands. On Raoul goats have so modified the vegetation that only the less palatable species alone are regenerating successfully apart from on a few inaccessable sites. The endemic *Hebe* was not found in 1967 and is possibly now extinct (Sykes, 1965; Merton, 1968). In addition exotics such as the unpalatable aroid (*Alocasia macrorrhiza*) has almost completely replaced the tree ferns on the wetter sites.

The rats and cats have had a devasting effect on the bird life of Raoul (Merton, 1968; Soper, 1968). Oliver (1912) recorded that the Kermadec Island petrel nested in tens of thousands and the young of this species in the past were harvested in large numbers by the settlers—12,000 being taken in 1889 (Cheeseman, 1891). In 1967 only two nests of this species were found. Both the wedge-tailed shearwater and the blackwinged petrel are drastically reduced in numbers and the rare endemic Sunday Island petrel is almost extinct. The originally huge Denham Bay sooty tern colony has been reduced to a fraction of its original size. In 1967 some 25,000 chicks were hatched, but very few survived the rat and cat predation. The endemic parakeet has been exterminated on Raoul many years since. The

list could be extended and the story is a very depressing one. Fortunately, there is still an abundant birdlife on the Herald Islands and recolonization of Raoul could take place from these islands if the predators were eliminated.

Scientific Research. As Soper (1968) points out these islands have been curiously neglected as far as natural historians are concerned. The only formal expeditions have been those of T. F. Cheeseman in 1887, W. R. B. Oliver and T. Iredale in 1890, and the Ornithological Society of New Zealand 1967 Expedition. This ten-man expedition carried out studies on the birds, introduced mammals, invertebrates, and vegetation of Raoul and Meyer Islands (Merton, 1968). When worked up the results should add much to our knowledge of these islands and highlight the needs for future research.

Future Requirements. Goats which had completely changed the Macauley Island ecosystem have now been eliminated and the changes which take place should be followed as has been done on the Three Kings. There is an urgent need for research on the introduced mammals on Raoul and the implementation of measures for their control and eventual elimination. Continuing ecological research will be needed as a basis for the future management of these islands. The Kermadecs have a high priority as scientific reserves and should have the maximum degree of protection.

THE SUBANTARCTIC ISLANDS

1. *Chatham Islands*

No. and Size. One large, Chatham (224,000 acres); one medium, Pitt (15,000 acres); five small, South Wast, (640 acres), Mangere, Little Mangere, Forty Fours, Sisters, numerous stacks.

Conservation Status. South East Island—Reserve for the Preservation of Flora and Fauna; Mangere—Reserve for the Preservation of Flora and Fauna.

Scientific Importance. These islands are not truly subantarctic lying on the northern fringe of the Subantarctic zone. The flora and fauna are a mixture of northern and southern elements. They are the most northerly breeding sites for a number of seabirds such as the Royal Albatross, with large colonies on the Sisters and Forty Fours. Of the 55 breeding birds, 13 are introduced and 18 species or subspecies are endemic to the group. The small South East Island now is the only refuge for three endemic species, the Chatham Island snipe, the Chatham Island petrel, and the shore plover. The latter species was once widely distributed throughout the New Zealand mainland and is now reduced to some 70 pairs (Fleming, 1939). Little Mangere now has the sole remaining populations of the Chatham Island yellow-crowned parakeet with about 100 individuals and the Chatham Island robin, estimated at 20 to 35 pairs in 1937.

Modification by Man. Polynesian ancestors of the original Moriori population reached the island possibly 1000 years ago, sealers and whalers, and Maoris arrived in the early 1800's and farming has been carried out continuously since their arrival. Farming has considerably modified the original vegetation on the

SURVEY OF SEA TURTLE FEEDING

PASTURES IN THE KERMADEC ISLANDS

(Project No. 9, Cost-$3,000)

The Kermadec Islands of New Zealand consist of 12 subtropical oceanic islands located at approximately 30°00'S, 178°30'W. The only human habitation in this area is the staff of a small meterological station. Four of the islands have been designated by New Zealand as "Reserves for the Preservation of Fauna and Flora", however only limited information is available on the natural history of the island group. This is particularly true with respect to the marine environment.

Although nesting is not known to take place, there are reports of aggregations of green turtles feeding in the nearshore waters. The origin of these turtles and the extent to which the area serves as developmental and resident feeding pastures is entirely unknown. A need exists to conduct a baseline survey of the area in order to determine what relationships and dependencies may exist with other green turtle aggregations in the Pacific.

Submitted by G. H. Balazs

Need SEASAT Records

Ministry of Agriculture & Fisheries

P.O. BOX 2298 WELLINGTON
NEW ZEALAND

DFI BUILDING
110 FEATHERSTON ST
PHONE 720367

Fisheries Laboratory
7-9 Donald McLean Street
Wellington 2 (899-405)

October 8 1976

George H. Balazs Jr
Marine Biologist
Hawaii Institute of Marine Biology
P.O. Box 1346
Coconut Island
Kanehoe
Hawaii 96744, U.S.A.

Dear George

In the knowledge that I am heading for the U.S.A. before the end of the year I have got together the information needed to enable you to initiate turtle observations, at least in the

Kermadecs.

Briefly the situation is as follows:

The Ministry of Transport have meteorological personnel on the islands (Raoul). They are replaced once a year around Oct/Nov (this would be the time for a personal visit utilizing their transport - "Archeron" owned by Mr A.J. Black, Dunedin, N.Z.). So I suggest that you could prepare explicit instructions as to what you want observed. These can be relayed in a number of ways:

1) Via Mr Bell, Ministry of Transport who is in direct radio contact.

2) Via air drop (the same person).

3) Via Martin Cawthron, Fisheries Research Division, 327 Willis Street, Wellington, N.Z.

Martin runs an on going project collecting data on whales. In this case he briefs the new personnel each year before they go up to Raoul. He has been doing this for the past 4 years very successfully. I have spoken to him and he will help you if required.

This year's people have already departed for Raoul which leaves the air drop and radio telephone as means open at this stage.

If you can crystalize the program and all its requirements - remembering that the men will be doing it in their leisure time - before mid November then I can act as agent initially. Failing this both Mr Bell and Martin Cawthron have expressed their willingness to relay stuff to Raoul.

With regards to a personal visit

As I stated above, personnel are transported once per year October/November. For such a trip, by yourself for example, initial agreement in principle would be required from a Mr Lorry Kenworthy, Dept Lands and Surveys, Wellington. From there is only conjecture on my part, but I assume that you could get a lift on the Acheron a private vessel which only stays for a few days before returning to N.Z. Accommodation, according to Mr Bell, would likely be available in a hostel on the Island due to the fact that reductions in staff have occurred.

re Turtle products in N.Z. so far:

1) Amoycan clear - Real Turtle Soup
   Amoy Canning Corp
   Singapore Ltd
   84b M.S. Bukit Timah Road

Amoy Canning Corp
Singapore Ltd
8th, M.S. Bukit Timah Road
Singapore, 21.
(7.7 fl.ozs. or 220 gms)

2) Becas - Real Turtle Soup

Bender and Cassell
Blackhorse Road
Lechworth
England

These are the two brands Ive seen so far in Wellington (1) in an Asian importing company store (2) the other in a delicatessen - there are bound to be others.

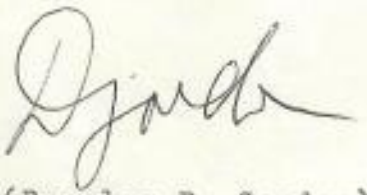
An enquiry about imported Turtle food products led from the Department of Trade and Industry to the Dept of Customs to the Dept of Statistics.

Apparently the imports are not broken down enough to indicate turtle origin. They would come in under "Soups and Broths" - Std international tarrif class no: 099-05-01 and/or Brussels tarrif nomenclature: 2105001.

A contact Ive been given but haven't followed up yet is Jock Moreland, C/- Dominion Museum, Wellington, N.Z. who may be a help with records of turtle sightings.

... I enclose another report of sightings. This gent is the Deputy Director, Fisheries Research Division - and tells me that some(?) sightings were made by the pilot spotting for the tuna seining operations this past season. The spotters may be receptive to briefings on turtles from someone like Dr Eggleston!

Arohanui



(Douglas B. Gordon)

Encl

The only tuffs from which fragments of hornblende-granite were actually taken were those ejected by the last, or present, large crater of Sunday Island, and the presence of all the boulders noticed on the sea-shore and elsewhere can be explained by the release of fragments consequent on the removal of the exposed face of sea-cliffs and surface of the tuffs by marine and subaerial denudation. My observation, therefore, support the opinions expressed by both Mr. Smith (1888, p. 344) and Professor Thomas (1888, p. 315)—namely, the presence of boulders of plutonic rocks on Sunday Island could be explained by the supposition that they have been brought up from great depths by volcanic agency.

In the foregoing description of the geological structure of Sunday Island, and attempt to deduce therefrom the history of the island, I have endeavoured to make it clear that (except for the inclusion in some of the lavas and tuffs of coral and hornblende-granite respectively, and some calcite no doubt derived from coral in the Herald Islets) Sunday Island and the adjacent Herald Islets are built up entirely of volcanic materials ejected from five principal points of eruption. The first eruptions were submarine, but shallow-water conditions obtained. Elevation then took place, and much lava flowed above sea-level. The land-surface was afterwards considerably denuded, and during a temporary subsidence volcano tuffs were deposited under water. Lava-flows were meantime becoming less frequent, and finally ceased, but the ejection of tuffs above sea-level, the last of which were entirely pumiceous, continued for a long period, so that the main portion of the islands at the present time consists of tuffs which are rapidly disappearing into the ocean. The geological structure of Sunday Island, therefore, shows it to be built up in comparatively recent times on a submerged base, and that it never exceeded its present dimensions more than can be accounted for by marine denudation.*

The biological evidence which, with apparent exceptions, seems to support the supposition of an oceanic origin for the Kermadec Islands will now briefly be reviewed.

From a study of the flora, Mr. Cheeseman was convinced that the Kermadec Islands have received their plants by transoceanic migration (Trans. N.Z. Inst., vol. 20, p. 163). My further investigations, as far as I am able to judge, confirm his views. I see no plants in the flora whose presence in the group cannot reasonably be attributed to the agency of ocean-currents (drifting logs), wind, and birds.

As illustrating classes including land-animals the *Gastropoda* and *Crustacea* may be mentioned. About eighteen terrestrial species of the former and fewer of the latter were collected. They agree in being all small, and in this respect what ought to be expected of members of these classes capable of crossing wide stretches of ocean, where floating trees have probably been the means of transport.

If the presence of migratory birds in numbers at certain seasons of the year is an indication of the spot being on an old shore-line, then the Kermadec Islands afford little evidence of this character for such a connection.

---

* The island Eua, in the Tonga Group, has, according to Mr. J. J. Lister, had a history closely parallel to that of Sunday Island as sketched in this paper. Gabbro occurs as boulders on the shore, while garnet and tourmaline are found in the volcanic tuffs (Lister, Quart. Jour. Geol. Soc., vol. 47, p. 590). Mr. H. I. Jensen's views with regard to Eua, however, are similar to Mr. Speight's concerning Sunday Island quoted above (Jensen, Proc. Linn. Soc. N.S.W., vol. 31, p. 641).

Occasionally stragglers find their way there, but no migratory birds can be considered regular visitors to the group.

The presence in the Kermadec Islands of the Pacific rat (*Mus exulans*), the candlenut-tree (*Aleurites moluccana*), and the Polynesian ti (*Cordyline terminalis*) is perhaps suggestive of a continental connection; but I have given reasons elsewhere for supposing these to be introduced by Natives, of whose occupation on Sunday Island there is ample evidence (Oliver, 1910, p. 137; also see p. 539 of this volume).

LIST OF WORKS REFERRING TO THE GEOLOGY OF THE KERMADEC ISLANDS.

1884. Sterndale: "Sunday Island." Appendix to Journals of the House of Representatives of New Zealand, A.-4, p. 64.
1887. Smith, S. Percy: "The Kermadec Islands; their Capabilities and Extent." Wellington.
1888. Smith, S. Percy: "Geological Notes on the Kermadec Group." Trans. N.Z. Inst., vol. 20, p. 333.
1888. Thomas, A. P. W.: "Notes on the Rocks of the Kermadec Islands." Trans. N.Z. Inst., vol. 20, p. 311.
1896. Speight, R.: "Notes on some Rocks from the Kermadec Islands." Trans. N.Z. Inst., vol. 28, p. 625.
1896. Smith, S. Percy: "Volcanic Activity on Sunday Island in 1814." Trans. N.Z. Inst., vol. 28, p. 47.
1910. Oliver, W. R. B.: "The Vegetation of the Kermadec Islands." Trans. N.Z. Inst., vol. 42, p. 123.
1910. Speight, R.: "Petrological Notes on Rocks from the Kermadec Islands; with some Geological Evidence for the Existence of a Sub-tropical Pacific Continent." Trans. N.Z. Inst., vol. 42, p. 241.

ART. XLVII.—*Notes on Reptiles and Mammals in the Kermadec Islands.*

By W. REGINALD B. OLIVER.

[*Read before the Philosophical Institute of Canterbury, 1st June, 1910.*]

THERE are neither land-reptiles nor land-mammals indigenous to the Kermadec Islands, the group presenting in this respect one of the main features of oceanic islands. When the islands were discovered rats were plentiful, but reasons will be given below for considering them as introduced through the agency of man. Two marine animals—the green turtle and the humpback whale—regularly visit the group, while others are occasional visitors.

Head and Body.	Tail.	Length of Head.	Ear.	Forearm and Hand.	Hind Foot.
		Males.			
Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
130	146	39	17·5	35	28·5
131	145	40	17	35	28
132	155	40	16·5	35	28·5
133	138	40	17·5	34	27·5
133	156	41	17·5	34	29
136	145	39	17·5	35	28·5
138	150	41	19	35	27
141	147	42	18	35	28
144	151	41	17·5	34	28
147	147	43	18·5	35	28·5
		Females.			
125	146	38	18	33	28
127	144	39	17	33	27
127	146	37	17·5	32	27·5
128	144	38	17·5	34	28
129	138	40	17	33	27
129	152	39	18	34	28
130	140	39	18	34	29
130	140	38	17·5	34	28
133	143	40	17·5	34	28
137	146	41	18	34	27·5

Thus the male is, on an average, larger than the female. Apparently in the female the tail is proportionately longer than it is in the male; but this is probably due to the fact that the males are the more pugnacious, and consequently have their tails bitten more frequently. A large number of specimens collected for examination had to be rejected because more or less of the end of the tail was missing.

Measurements of Skulls of Rats from Sunday Island; also Measurements of Skull of Rat from Funafuti for Comparison.

	Sunday Island.					Funafuti
	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
Greatest length	33·5	33·5	34·6	34·7	35·5	35·0 ?
,, breadth	15·5	16·4	16·8	16·0 ?	16·5	17·6
Nasals, length	13·2	13·0	13·5	13·0	13·5	14·0
,, greatest breadth ..	3·5	3·5	3·4	3·5	3·6	4·0
Interorbital breadth	5·4	5·5	5·5	5·5	5·5	5·5
Brain-case, breadth	13·5	13·5	13·8	14·0	14·0	13·6
Diastema	9·0	9·6	10·0	10·0	10·0	9·0
Anterior palatinal foramina ..	5·5	6·5	5·7	5·7	6·4	5·7
Condyle to incisor-tip ..	21·5	22·5	22·5	23·0	24·4	23·0 ?
Coronoid-tip to angle ..	9·5	10·0	9·5	9·8	10·0	9·2

Mr. R. S. Bell, of Sunday Island, informed me that besides the green turtle one or two individuals of another species, probably the hawksbill, have been noticed from the shore. Mr. T. F. Cheeseman, F.L.S., F.Z.S., mentions a water-snake, which, from the description given him by Mr. T. Bell, he supposes to be *Pelamys bicolor* (Cheeseman, 1888).

On several occasions during September, 1908, I observed dolphins in Denham Bay, Sunday Island. Mr. Bell says that the sperm whale has been seen from the north coast of Sunday Island. On one occasion a portion, about 2 ft. long, of a large cuttlefish was cast up on Low Flat Beach. This fragment was possibly the remains of an animal which a whale had made a meal from, as it is known that sperm whales kill and eat these gigantic cephalopods.

The following notes are mainly from material gathered during a ten months' stay on Sunday Island, in 1908, as a member of the scientific expedition which originated with Mr. W. L. Wallace, of Timaru.

Chelone mydas. (Green Turtle.)

A large female specimen of the green turtle was shot by Mr. R. S. Bell off the rocks at the south end of Denham Bay on the 23rd May, 1908.

Turtles were noticed chiefly during the summer months—January to March—often as many as five or six being seen at one time. An observer standing on the shore at a little height can watch them browsing on a species of alga (*Pterocladia capillacea*), which grows abundantly on rocks in water down to about 5 m. in depth. Apparently, whilst in Sunday Island waters turtles eat no other kind of food. Every few minutes they come to the surface for a few seconds to breathe, but on the slightest alarm these timid reptiles swim swiftly away. They do not breed in the Kermadecs, but go north to warmer regions.

Megaptera boops. (Humpback Whale.)

A few humpback whales were noticed in Denham Bay in the latter part of August, 1908. During September their numbers increased, while in October and November they were common all round Sunday Island; at Macauley Island also, on 12th November, a large number were seen. They had their calves with them, and probably were migrating southwards. During their northward migration they are not seen from Sunday Island.

Mus exulans. (Pacific Rat.)

Specimens of the Pacific rat examined on Sunday Island agree in every particular with those from Funafuti, as described by Mr. E. R. Waite, F.L.S. (1897, p. 174), except that the under-surface, including inside of limbs, is light buff, or sometimes pale grey; fur pale grey at base; upper surface of feet light buff, hairs short; hairless parts of feet pink.

Skulls of Sunday Island examples appear to be proportionately more slender than the skull of the Funafuti specimen. The zygomatic arch is less prominent, thus giving a smaller breadth, whilst the nasal bones are narrower. These differences are apparent in the table of measurements given below, where the corresponding figures recorded by Mr. Waite for the Funafuti specimen are given for comparison.

Of thirty-four specimens of rats from Sunday Island of which I have measurements, I select the ten largest of each sex as best showing the size of full-grown individuals:—

Habits.

During the first week in January, 1908, few rats were seen, but their numbers increased gradually, until in March and April they were plentiful.

In June rats were very numerous about our camp in Denham Bay, being seen frequently in the daytime, but more especially in the evenings, when they invaded our whares.* They searched everywhere for food, but did not gnaw into any of our boxes. Although naturally timid, they would explore every part of the whare if we kept quite still, and, as soon as the light was out, jump up on the table near which two of our party slept, and would sometimes even run over us as we lay in our bunks. We poisoned them periodically with arsenic, but it merely checked their numbers for a few days, after which they appeared as numerous as ever.

As showing the large number of rats that exist on Sunday Island, the following figures are given on the authority of Mr. R. S. Bell. He estimated that in three years 44,000 were killed by poisoning and other means, while on one occasion 173 were caught in a single night near the cultivations in Denham Bay by means of a trap made with a harbour-buoy.

The rats decreased in numbers during July. In August, on wet evenings but few were to be seen, but on fine nights a fair number came about our whares. During September and October very few were noticed.

That the rats disappear into the ground during the summer months seems certain, for on one occasion Mr. R. S. Bell accidentally dug out one of their burrows and discovered a number of rats which appeared somewhat sleepy and dazed on being turned out into the daylight. During their out-season they usually retire to their holes in the daytime; when surprised in the forest they immediately make for their burrows and disappear. It is probable that they breed in the ground, as young ones were noticed chiefly at the end of summer.

Their food consists principally of fruits. Bananas, oranges, passions, grapes, and figs all disappear before hordes of rats, and the settlers on Sunday Island must protect their fruit-trees if they wish to have any share of the fruit. A piece of tin nailed round the stem at a distance of about 2 ft. from the ground will prevent rats from climbing the tree, but bananas must be cut just as the first signs of yellow begin to appear in the fruit, and placed in some position where rats are unable to get at them.

Sunday Island rats are not strictly frugivorous, but, on the contrary, will eat any kind of food. Birds and their eggs, when they are to be obtained, are eaten, also the flesh and fat of goats, while specimens of rats I had gathered for examination when thrown out were usually devoured by their own kind. The beaches were constantly searched, and any fish or other animals cast up by the sea eaten by rats.

Origin of the Rat in the Kermadecs.

When first discovered by Europeans, Macauley Island was described as having a "great number of rats and mice" (Watts, 1789, p. 228). There is no similar record for Sunday Island, though this island is now overrun with the Pacific rat (*Mus exulans*), which could scarcely have been introduced by Europeans, who have been the only visitors to the group since its discovery, a little more than a hundred years ago, and who would have introduced,

* Huts made of a framework of poles, with sides and roofs of rushes, palm-leaves, or banana-leaves.

if any, the more widely distributed and powerful grey and black rats. These, however, are unknown in the Kermadecs.

Remarking on Lieutenant Watts's narrative, Mr. Cheeseman says, "This would seem to prove that the species, whatever it may be, is truly indigenous" (Cheeseman, 1888, p. 163). Mr. O. Thomas, in his note on some rats collected on Sunday Island, says that the Pacific rat "has probably travelled from island to island in Native canoes, or on floating logs, &c." (Thomas, 1896, p. 338). Now, if floating logs carried rats to the Kermadecs in the first instance, then the species would be truly indigenous, provided it had not been introduced through the agency of man to the country whence it migrated to the group.

The Kermadec Islands are, from a biological standpoint, oceanic in character. In order to reach the groups, therefore, rats must cross about six hundred miles (1,000 km.) of ocean, which is the distance to the nearest land. The time which would be taken by a floating tree drifting this distance negatives the possiblity of rats reaching the group in this manner.

The Pacific rat occurs in all the principal groups of islands in the Pacific Ocean. As many of the inhabitants of these islands used it as an article of food, it would often be carried intentionally from one island to another. Probably, however, it was more often carried accidentally in the Native canoes. Being a small, timid, and harmless animal, it would not be troubled much by the Native navigators, and this, possibly, may explain its wide distribution.

On Sunday Island there have been found from time to time stone axes of a similar pattern to those made by Maoris. Other evidence of Native occupation of the group is furnished by the large holes on the Terraces, which, from their position, number, and size, have evidently been made by some Native race. Probably they were chiefly *ruas*, or storehouses for food. In some of the larger holes, however, were large water-worn stones, no doubt brought from the beach below. These larger holes may be *kauais* where the Natives prepared their ti-root.

There is no doubt then that the Kermadec Islands were at one time inhabited by Natives, and it is by them, either accidentally or intentionally, that I consider the rat has in all probability been introduced.*

List of Works referring to Sunday Island Rat.

1789. Watts, Lieutenant: Chapter xx of "The Voyage of Governor Phillip to Botany Bay." London.

1887. Smith, S. P.: "The Kermadec Islands; their Capabilities and Extent," p. 24. Wellington.

1888. Cheeseman, T. F.: "On the Flora of the Kermadec Islands; with Notes on the Fauna." Trans. N.Z. Inst., vol. 20, p. 163.

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1897. Waite, E. R.: "The Atoll of Funafuti, Ellice Group" (Mammals). Mem. Aust. Mus., 3, p. 165.

* In my paper on the "Vegetation of the Kermadecs" (Trans. N.Z. Inst., vol. 42, p. 173) I have included the candlenut (*Aleurites moluccana*) and the Polynesian ti (*Cordyline terminalis*) in the list of introduced plants, as they are not distributed generally in the forest, but are found only in habitable parts of Sunday Island, where they appear to be survivors of the abandoned cultivations of a Native race.

Ag.—G. 101

New Zealand

Ministry of Agriculture and Fisheries

PO Box 2298
Wellington

January 9 1980

Mr George H Balazs
Deputy Chairman
UICN/SSC Marine Turtle Group
University of Hawaii at Manoa
PO Box 1346
Coconut Island
Kaneohe
HAWAII 96744

Dear George

Thanks for your note. First enquiries here reveal that Green Turtles can be seen almost any day feeding beyond the surf line of the beaches around Raoul Island in the Kermadecs Group. They are regular visitors throughout the year but are not observed to beach and lay eggs. Raoul, which is also known as Sunday Island, apparently has the best beaches for turtles. The other islands of the group are small and generally cliff bound. Mr Don Merton, of the Wildlife Divison of the Department of Internal Affairs, Bowen State Building, Private Bag, Wellington, New Zealand was on Raoul Island in 1963/64 and again in 1966/67. I also spoke to a Meteorological Officer who served on the Kermadecs for eighteen months but I guess he didn't see any turtles although he undertook many beach patrols and collected data on seabirds.

I am sure we can get more up to date information for you as staff on the island are quite willing to help out but I suggest that you send me some illuminated literature which I can pass on to the next party going up there with a request to collect more data for you.

From the Wildlife Officer's comments, the turtles may be transit feeding only but one would want to check on occurrence of turtle grass.

I shall expect to hear from you with a few "Honorary Turtle Observer" badges to encourage the lads on the Kermadecs.

All the best for 1980.

Val.

(Val Hinds)

PS Now begging to get more response from the Met Office through John Thompson who has served on Raoul and he maintains that he hasn't seen any turtles there but he will be having a radio patch with his people tomorrow on the island and will discuss turtles and let me know. Meantime, I'm away to sea myself on our vessel "W J Scott" for a week.

Could it be that there has been a change in turtle migrating patterns since 1967? The beach at Raoul is steeply shelving fine sand half a mile long just below the Met Station. The next relief met party does not go to Raoul until September 1980 but occasional airdrops and naval vessel visits are made on an unscheduled basis. Will keep trying!

We are also represented on the Outlying Islands Committee and when I hear from you I will put some feelers into that system.

V

(VH)

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Val Hinds
Assistant Director (Technical)
Fisheries Management Division,
Box 2298,
Wellington, New Zealand.

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Deputy Chairman
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Ref: 9/3/2/12

August 4 1980

Mr G H Balazs
Assistant Marine Biologist
Hawaii Institute of Marine
Biology
PO Box 1346
Coconut Island
Kaneohe
HAWAII 96744

Dear George

Thank you for your letter concerning the promotion of sea turtle conservation through the medium of postage stamps. I attach a copy of a letter from our Director of Postal Services for your interest; perhaps there will be an opportunity in the future.

The Survey Vessel "Monowai" is returning to New Zealand shortly and will be calling at Raoul Island en route, so I will send you any such information as has been collected by your"Honorary Turtle Observers" when it comes through.

With best regards

Val Hinds.

(V T Hinds)
Assistant Director (Technical)
Fisheries Management Division

Encl

Pacific Science (1961) 15(3): 347-351.

A Contribution to the Ecology of the Kermadec Islands

V. J. CHAPMAN[1]

IN 1956 and 1957, owing to the kindness of the Civil Aviation Department, to whom especial thanks are due, it was possible for two visits to be made to the Kermadec Islands. These visits were made under the aegis of the Botany Department, Auckland University, though on the first occasion the personnel included members from elsewhere. The first visit took place in May and June, 1956, and the members of the party were Dr. R. C. Cooper (botanist, Auckland Institute and Museum), P. L. Bergquist (Botany Dept.), and J. S. Edwards (Zoology Dept.). This party was originally expected to stay only a fortnight but, owing to circumstances beyond our control, they were there for a month. Transport facilities to the Kermadecs were generously provided by the Royal New Zealand Navy and return transport by the N. Z. Institute of Oceanography, to whom thanks are due. The second visit took place in October, 1957, when only one scientist could be accommodated on the normal supply vessel. The late D. Knowlton went on this occasion, and in the course of the three days available he was able to achieve much valuable work.

The original purpose of these visits was to set up permanent quadrats so that the regeneration of vegetation after the reduction of the goat population could be followed over a course of years. It is therefore hoped that further visits may be made in the future. The first visit in 1956 coincided with the end of a drive to eliminate the goats from the island, when some 1,500 goats were shot. About a hundred more were shot in 1956–57. As a result of these activities the goat population was reduced to the point where it could reasonably be hoped that it might be kept in check. Another purpose of the visits was to study more intensively the algal flora of the Kermadecs. It is true that earlier collections and lists had been made by the Gepps (1911) and by Cotton (1912), but in view of the importance of the Kermadecs in relation to sea temperatures and tropical influences, it was believed that a more intensive study would reveal the existence of more species of tropical affinities. This has indeed proved to be the case. Later, in another communication, it is intended to compare the flora of these islands with those from the North Cape region of New Zealand and Norfolk Island.

So far as the terrestrial flora is concerned, extensive lists were already in existence as a result of visits by Cheeseman in 1887 and by Oliver in 1909 to the islands. These earlier workers had collected methodically and extensively and there were no outstanding additions to be made to the earlier lists. One feature of interest was the way in which the taro, *Alocasia macrorrhiza*, had spread over the island since its introduction some time after 1909.

ALGAE

In the list that follows, algae recorded also by the Gepps (1911) are noted by *G* and those also recorded by Cotton by *C*. Algae newly added to the New Zealand flora are marked by †. Those not collected in 1956 or 1957 are marked by *.

MYXOPHYCEAE[2]

Chlorococcales

Anacystis thermalis (Menengh.) Dr. & Daily. Supralittoral fringe pool, Lava Pt.

Anacystis montana (Lightf.) Dr. & Daily. On rotten log, Green Lake; supralittoral fringe pool, Lava Pt.

Pleurocapsales

Entophysalis conferta (Kütz.) Dr. & Daily. Fleetwood Bluff, supralittoral fringe: on *Derbesia* 4–8 m. down, Meyer Is.

[1] The University of Auckland, New Zealand. Manuscript received November 7, 1960.

[2] I am grateful to Dr. F. Drouet for determinations of this group.

Nostocales

Lyngbya confervoides C. Ag. Fleetwood Bluff, supralittoral fringe; mid-littoral pool, Meyer I.; on *Pterocladia*, Lava Pt.

Lyngbya semiplena (C. Ag.) J. Ag. Fishing Rock, sheltered supralittoral pool, also Hutchinson's Bluff: on *Pterocladia*, Lava Pt.

Phormidium corium (Ag.) Gom. On *Pterocladia*, Lava Pt.

Phormidium autumnale (Ag.) Gom. Locality unknown.

Hydrocoleum glutinosum (Ag.) Gom. Fleetwood Bluff, sheltered crevice (mid-littoral), also supralittoral fringe.

Hapalosiphon laminosus Hansgirg. On fumarole orifice.

Tolypothrix tenuis Kütz. Supralittoral fringe pool, Lava Pt.

Scytonema hofmani Ag. On rotten log, Green Lake.

Amphithrix violacea (Kütz.) Born. et Flah. Fleetwood Bluff, supralittoral fringe.

Plectonema nostocorum Bornet. Supralittoral fringe pool, Lava Pt.

Calothrix crustacea Thur. Fishing Rock, sheltered supralittoral pool, also on wet concrete.

CHLOROPHYCEAE

Ulotrichales

G *Ulva lactuca* var. *rigida* (Ag.) Le Jol.

G **Ulva lactevirens* Aresch.

†*Enteromorpha kylinii* Bliding. The record of this species gives the alga a great discontinuity. In view of the relatively recent recognition of this species, however, it is likely that a wider distribution will be found for it than at present recorded. Supralittoral fringe, Hutchinson's Bluff, on rocks always wet with spray.

G * *Enteromorpha compressa* Grev.

Enteromorpha prolifera (Muel.) J. Ag. f. *crinata* (Roth.) comb. nov. Young plants which probably belong to this species. Supralittoral fringe, Meyer I.

Chaetophorales

Trentepohlia jolithus Wallr.

Oedogoniales

Oedogonium sp. } Neither fertile,
Bulbochaete sp. } Green Lake.

Siphonocladales

Lola tortuosa (Dillw.) Chapm. Fishing Rock, sheltered supralittoral pool.

Rhizoclonium hookeri Kütz. Fleetwood Bluff, on Pohutakawa log.

Rhizoclonium hieroglyphicum Kütz. emend Stockm. Waterfall near Hutchinson's Bluff; Blue Lake.

G C *Cladophora prolifera* (Roth) Kütz. This is recorded as *C. fusca* Marten by both the Gepps and Cotton. For a discussion on this matter the reader is referred to Chapman (1956). Deep mid-littoral pool, Lava Pt.; sublittoral, Meyer I. to 8 m.

Cladophora fracta (Dillw.) Kütz. var. *lacustris* (Kütz.) Brand ex Heering. Waterfall near Hutchinson's Bluff.

Cladophoropsis herpestica (Mont.) Chapm. Boat Cove, Fishing Rock.

†*Cladophoropsis membranacea* Borg.

†*Cladophoropsis membranacea* Borg. var. *repens* (J. Ag.) Phinney. I believe two plants have been confused here. There is a cushion-like *Cladophora*, *C. repens*, and there another plant which is clearly a *Cladophoropsis* in that the branches have no cells at the base. Supralittoral pool, Meyer I.

Microdictyon umbilicatum (Velley) Zanard. Only occurs elsewhere in New Zealand on Mayor I. (Chapman, 1956).

Dasycladales

†*Acetabularia parvula* Solms-Laubach. Mid-littoral pool, Fishing Rocks.

Siphonales

Derbesia novae-zelandiae Chapm. This was probably the plant that the Gepps recorded as *Vaucheria* sp. Pool in sublittoral fringe, pool mid-littoral, Fishing Rocks; sublittoral, 4–8 m., Meyer I.

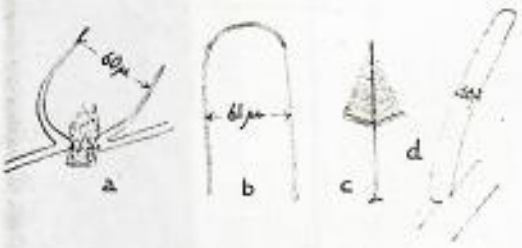

FIG. 1. *Bryopsis kermadecensis*. *a*, Base of pinnule showing constriction and plug of protoplasm; *b*, apex of pinnule; *c*, plant (× 2); *d*, pinnule.

† *Bryopsis kermadecensis* sp. nov. (Fig. 1). Plantis 1.5 cm. longis, axe primario distincto, simplici, 149–158 μ dia., pariete 6–6.5 μ crasso, partibus inferioribus nudis; pinnulis inferioribus caducis, pinnulis superioribus radialiter dispositis, basi constrictis, apici obtusis, 44–61 μ dia.

Plants 1.5 cm. long, main axis distinct, unbranched, 149–158 μ diam., wall 6–6.5 μ thick, lower part bare below; lower pinnules deciduous, upper pinnules radially arranged, constricted at the base, obtuse at the apex, 44–61 μ diam.

Type specimen in Lind. Herb. Auckl. Univ.

This species is very close to *B. derbesioides* Chapm., but differs in its smaller size and the greatly constricted bases of the branches. The diameter of the pinnules is also more uniform and the apices obtuse rather than tapering. It appears to be smaller than other species of *Bryopsis* recorded from the Australian mainland. For the present, therefore, it has been regarded as a new species, though extensive collecting will be necessary before any further decision can be made. On *Corallina* in sublittoral pool, Fishing Rocks.

G * *Codium dichotomum* (Huds.) S. F. Gray f. *novozelandicum* Dellow. This is the plant recorded by Gepp as *C. tomentosum*. (See Chapman, 1956.)

Codium adhaerens (Cabr.) Ag. var. *convolutum* Dellow. Sublittoral, Onerahi Bluff.

† *Caulerpa racemosa* (Forsk.) J. Ag. var. *peltata* (Lmx.) Eubank, Mid-tide pool, Fishing Rocks.

G *Caulerpa racemosa* (Forsk.) J. Ag. var. *uvifera* (Turn.) J. Ag. f. *intermedia* Web. van Bosse. Fishing Rock, mid-littoral pool: sublittoral, 12 m., and sublittoral fringe, Meyer I.

† *Caulerpa webbiana* Mont. Deep pool, mid-tide, Fishing Rock with *Corallina*; sublittoral, 12 m., Meyer I.

PHAEOPHYCEAE

Dictyotales

G *Dictyota prolificans* A. & E. S. Gepp. In red turf, Hutchinson's Bluff, mid-littoral.

C G *Taonia australasica* (Kütz.) J. Ag. Sublittoral, 4–8 m., Meyer I.

C G *Pocockiella nigrescens* (Sond.) Papenf. Pool, Boat Cove: in *Corallina* turf, sublittoral, Fishing Rocks.

Padina fraseri (Grev.) J. Ag. (Lindauer, 1957).

Hydroclathrus clathratus (Bory) Howe (Lindauer, 1957).

C * *Haliseris kermadecensis* Cotton

Sporochnales

C * *Perithalia capillaris* J. Ag.

Dictysiphonales

Colpomenia sinuosa (Roth.) Derb. et Sol. Fishing Rocks.

Fucales

C * *Sargassum sinclairii* Hook. f. & Harv. I think some doubt attaches to this identification.

G *Sargassum fissifolium* (Mert.) C. Ag. Fishing Rock, mid-tide pool: also in the sublittoral fringe, Lava Pt.

Carpophyllum phyllanthus, *C. plumosum*, *C. maschalocarpum*, *Durvillea antarctica*, and *Hormosira banksii* have all been recorded from the drift (Cotton, Gepp) but there is no evi-

dence that they grow there. The record of *Carpophyllum elongatum* is erroneous, as inspection of the material at Kew and the British Museum shows that the specimens are worn plants of *C. maschalocarpum* (Chapman, in press).

RHODOPHYCEAE

Bangiales

†*Porphyra denticulata* Levr. Previously only reported from Queensland. Sublittoral fringe, Lava Pt., and supralittoral fringe pool.

Nemalionales

G * *Chantransia* sp.

†*Nemalion helminthoides* (Velley) Batters. Very exposed rock faces, Fishing Rocks.

G * *Galaxaura laxa* Kjellm (as *Brachycladia marginata* Schm. in Gepp).

†*Galaxaura arborea* Kjellm. Mid-littoral pool, Meyer I.

†*Galaxaura rudis* Kjellm. Sublittoral, 16 m., Meyer I.

G †*Galaxaura fastigiata* Dcne. (as *G. lapidescens* in Gepp). Sublittoral, 3 m., Meyer I.

G *Asparagopsis taxiformis* (Delile) Collins & Hervey (= *A. sandfordiana*). Very common in sublittoral: extends into sublittoral fringe where exposure and wave action not great.

C G *Delisea fimbriata* (Lamour.) Mont. Sublittoral to 4–5 m., Meyer I. (= *D. pulchra, D. serrata*).

Chaetangium corneum J. Ag.

†*Chaetangium pulvinatum* Levr. Turf, mid-littoral, Fishing Rocks.

Gelidiales

G *Gelidium longipes* J. Ag. Fishing Rock. Mid-tide pool.

Gelidium crinale J. Ag. Turf, lower mid-littoral, Hutchinson's Bluff.

Gelidium pusillum Le Jol. Turf, lower mid-littoral, Hutchinson's Bluff.

Gelidium caulacantheum J. Ag.

C G *Pterocladia capillacea* (Gmel.) Born. et Thur. Fishing Rock, Lava Pt.: sublittoral, 4–8 m. Meyer I.

Cryptonemiales

G * *Peyssonnelia rubra* (Grev.) J. Ag.

C G *Corallina cuvieri* Lmx. Boat Cove (sparse); mid-tide pool, Fishing Rock.

G *Corallina officinalis* L. Mid-tide pool and sublittoral fringe, Fishing Rock; sublittoral, 4–8 m., Meyer I.

Jania rubens Lmx. Mid-tide pool and sublittoral fringe, Fishing Rock. This appears different from the local *J. micrarthrodia.*

G * *Amphiroa anceps* (Lmx.) Dcne.

GC * *Cheilosporum elegans* (Hook. f. & Harv.) Aresch.

Schmitziella cladophorae Chapm. On *Cladophora prolifera.*

Fosliella farinosa. On *Cladophora prolifera,* Lava Pt.

Gigartinales

C * *Plocamium costatum* J. Ag.

G C *Plocamium brachiocarpum* Kütz.

Plocamium angustum J. Ag. On *Pterocladia,* lower mid-littoral, Hutchinson's Bluff.

G * *Gracilaria confervoides* (L.) Grev. Drift.

Ceramiales

G *Martensia elegans* Hering. Sublittoral fringe in *Corallina* turf, Boat Cove: mid-tide pool, Fishing Rocks: sublittoral, 3 m., Meyer I.

Caloglossa leprieurii J. Ag.

G * *Nitophyllum decumbens* J. Ag. Drift.

G * *Euzoniella incisa* (J. Ag.) Falkbg.

G * *Spongoclonium brownianum* (Hook. f. & Harv.) J. Ag.

Microcladia novae-zelandiae J. Ag. Boat Cove, sparse.

G * *Laurencia forsteri* (Mert.) Grev. Drift.

†*Ceramium codii* (Richards) G. Mazoyer. On *Codium adhaerens.* The plants were not fruiting but habit and measurements agreed. Onerahi Bluff.

Centroceras clavulatum (C. Ag.) Mont. Epiphytic on *Pterocladia,* Hutchinson's Bluff; sublittoral, 12 m., Meyer I.

Total marine algae:	Myxophyceae	12
	Chlorophyceae	20
	Phaeophyceae	10
	Rhodophyceae	35

This is not an impressive list considering the variety of habitats available and the fact that the islands clearly lie in a zone where there is a mingling of cold and warm waters.

BRYOPHYTA

The mosses were kindly determined by the late Mr. G. O. K. Sainsbury and the liverworts by Mrs. Hodgson.

Musci

Fissidens pungens C. M. & Hpe.
Fissidens oblongifolius H. f. & W. First record for the Kermadecs.
Rhizogonium ?longiflorum (Mull.) Jaeg.
Rhizogonium spiniforme (Hedw.) Bruch. "Differs from type in having male flowers not synoicous and the perichaetial bracts lengthened. It looks as if some people would consider the Kermadecs plant to be a form of *R. longiflorum*."
Isopterygium minutirameum (C. M.) Jaeg.
Leucobryum candidum (Brid.) H. f. & W.
Echinodium hispidum (H. f. & W.) Jaeg.
Oxyrrhynchium compressifolium (Mitt.) Broth. "This is quite different from other allied forms (*Eurhynchium*) in New Zealand."
Papillaria flaxicaulis (Taylor) Jaeg.
Acanthocladium extenuatum (Brid.) Mitt. "Another first record" for the Kermadecs.
Rhacopilum ?pacificum

Hepaticae

Phaeoceros sp.
Chiloscyphus argutus Nees.
Lophocolea heterophylloides Nees.
Plagiochila sp.
Asterella sp.
Marchantia sp.
Radula sp.

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"Awawhare"
Whangaripo Valley Road
Rural Delivery #2
WELLSFORD
Northland
NEW ZEALAND

20 January 1985

Dear George:

Time flies, it's just over a month since our Tokelau joint screening effort — interesting what 30 years can do, isn't it? And since the pleasant Japanese lunch that you invited me to, I enjoyed it.

Between getting back home and last week I was pretty fully occupied with my final editorial tasks re Vol.2 of "Integrated Mosquito Control Methodologies" (Academic Press) — not least with preparing the index, a job which left me lamenting a former Newfoundland Secretary/Admin.Assistant, who was a tower of strength over this kind of chore. This time I even had to do the clean retype myself, while taking breaks for such farmlet activities as helping my wife to transfer calves from one designated grazing area to another (she's being very scientific about this) through the electric fence system that she installed herself, even down to slamming in the light holding posts, during my week in Hawaii. The calvesnow have great respect for the single gaudily coloured "live" tape. Even when you drop a couple of sections to the ground, the braver beasts carefully jump it. I had trouble with one 400-pounder today, who was rolling his eyes at me as I had him within inches of the temporarily disconnected tape, clearly trying to get the message across, "that thing's damned dangerous!" And only yesterday, there was a trip a couple of hundred feet (higher altitude, that is) up the hills behind our place, while I checked why our water had stopped coming out of the faucets. We have a spring-fed dam up there, in a pretty fern gully which offers marvellous chances of breaking an ankle or worse...this time, it was an eel in the pipe. Pleasures of country life!

I take it from the date on your 10 Jan. letter that you're back from the mainland trip. Many thanks for the turtle stamps that you enclosed. My New York friend will be delighted, I'm sure, and he probably won't have seen them — his interests re philately are rather broader than yours, covering zoology in general (even heraldry counts) and maps. Thank you, though, for helping to keep my "Punch" magazines flowing from him to me.

The addition to my address is one of the fruits of my wife's research into the history of our old house. It seems that in the 1890s it was known by the Maori name "Awawhare", which means "water house", or "house by the stream"; which is perfectly appropriate, as our western boundary is formed by the headwaters of the Hoteo River; so we've gone back to it in preference to the more prosaic name of "The Homestead" under which we purchased in late in '83.

Now, having typed this on an airletter form, I recollect that I'd put aside an Auckland War Memorial Museum NEWS article for you. Should you wish more detailed information, the person to write to is: G.S.Park, Director of the Auckland Institute and Museum, Private Bag, Auckland, New Zealand (mention my name if you wish, I'm a Member of the Institute).

Best regards and all good wishes for 1984 + 1,

Yours,

from Dr. Laird

Auckland War Memorial Museum NEWS

G.S. PARK, DIRECTOR

Auckland Institute and Museum
Private Bag, Auckland. Phone (09) 30-443
Registered at Post Office Headquarters
ISSN 0111-2252

Number Twenty
December 1984

Another Year

Another year seems to have flown past, and yet in retrospect it has seen quite a lot of activity at the Museum for Council and staff (both paid and voluntary). Good progress has been made in the development of the Maori gallery displays, and although there is little for the public to see, Council members were shown what has been achieved to date after a recent Council meeting. When you read this, the contractors and sub-contractors for the construction of the display cases in the western gallery will have completed their work, handing over to the Museum staff for the installation of the displays. We look forward to good progress being made on the completion of these displays during 1985.

Our volunteer guides have now completed a full year of guiding at the Museum, and most successfully too. I'd like to express the deep appreciation of the Museum to these volunteers who so willingly work so hard for the benefit of the Museum.

The Museum Shop and Coffee Lounge have undergone major refurbishing projects, as Council strove to ensure they maintained their high standards. Several staff have travelled overseas, on fieldwork, to conferences and to examine museum practices. Other overseas travellers have included the fifty-one objects from the Museum's collection included in the exhibition **Te Maori,** *and the statue of Kave which went to the Museum of Modern Art exhibition.*

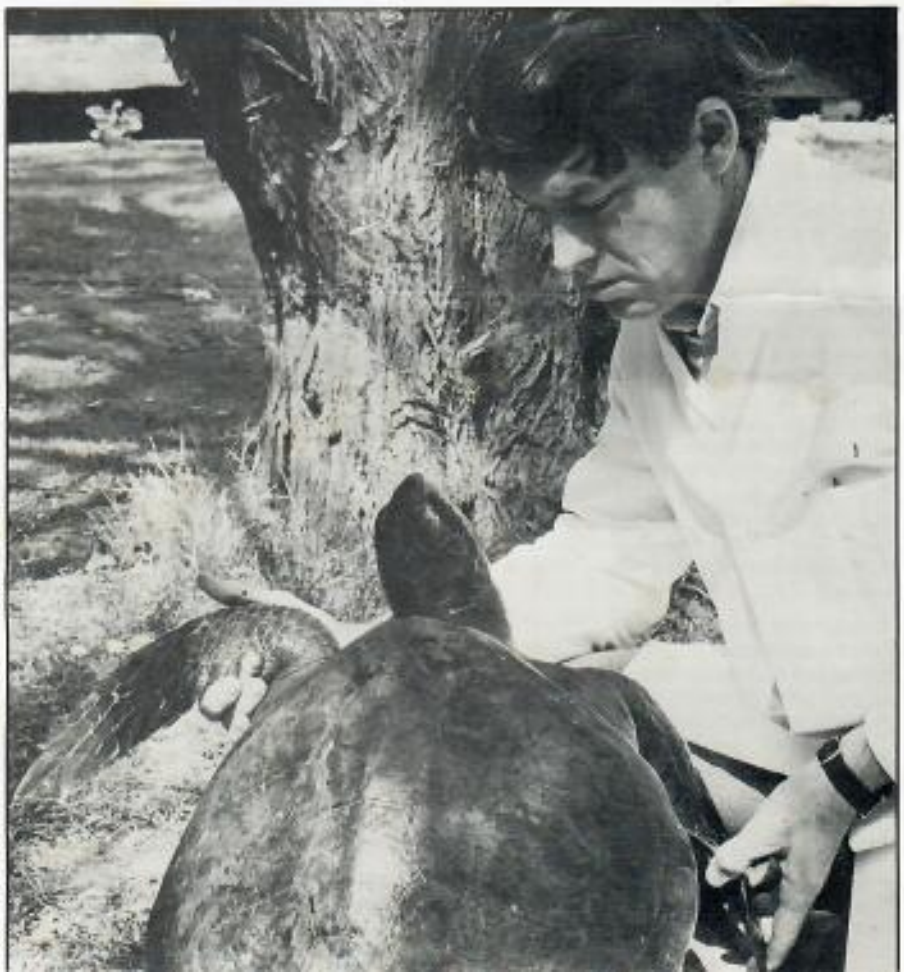
In all this activity and development, of course, the basic work of the Museum must continue. We've been open to visitors 364 days in the last year, we've answered hundreds of public and scientific enquiries, we've cared for the objects in our collections, we've kept the place clean and well cared for, we've offered reference services through the Library, we've deliberated and made submissions on a wide range of issues, we've shown thousands of visitors young and old through the Museum and enhanced their appreciation of what they see – all in all a very busy Museum year. May I express my appreciation to all those who've made this possible, the President and Council, the paid and voluntary staff, the members of the Institute and Museum, and the people of Auckland and beyond. Thank you all, and please accept my best wishes for a Merry Christmas and a Happy New Year.

Stuart Park

Turtle off Birkenhead Wharf!

A recent addition to the Museum's reptile collection is a fine specimen of a Green Turtle **Chelonia mydas.** It was found alive off the Birkenhead Wharf in October, but was sickly and died soon after. The turtle is a young one with a carapace half a metre long. The maximum carapace length for the species in South Pacific waters is about 1 metre.

The Green Turtle is one of four species that occasionally turn up in New Zealand waters. They are circumtropical and naturally are most regularly seen in northern parts of New Zealand. The few actually reported to museums probably indicate a much greater number that remain at sea and go unnoticed. Many are found sick or exhausted suggesting that they have strayed off course, but it is now believed that turtles may deliberately seek out temperate waters as feeding grounds. The Birkenhead specimen is a vaguely greenish colour, but the Green Turtle is said to derive its name from its fat which imparts a green colouring to soup. It is hoped that the specimen can be mounted for eventual display in the natural history galleries.



AUCKLAND INSTITUTE AND MUSEUM
Private Bag, Auckland 1 New Zealand
Telephone (09) 30-443 Director: G.S. Park MA AMA

loggerhead
Dup sent
3/16/85

Dr. G.H. Balazs
Southwest Fisheries Centre
Honolulu Laboratory
~~P.O. Box 3830~~
Honolulu
Hawaii 96812

22 Februaru,1985

Dear Dr. Balazs,

Thank you for your letter to the Director regarding marine turtles. I was interested to study the literature that you sent, and to learn from your letter that green turtles are common residents around the Kermadecs. Your deductions from the presence of the barnacle were also illuminating and this sort of information is very useful to me as I am currently writing a field-guide to New Zealand reptiles.

Another turtle came ashore near Auckland this summer but it seems that the local Polynesians ate it before it could be seized or photographed.

I will endeavour to examine the gut contents of the Birkenhead turtle and let you know the outcome. I am hoping that one of the taxidermists in Auckland will be proficient at mounting it. If I end up dissecting it myself do you have any hints on how best to open it up?

My field guide is to be published this year by William Collins and Sons Ltd. Do you have any good 35mm colour transparencies of the 4 turtles we get in New Zealand?* We would pay at least $NZ20 for the right to use each slide chosen.

Yours sincerely,

BRIAN GILL

Dr. B.J. Gill
Curator of Land Vertebrates

* especially Dermochelys & the Loggerhead.

BY AIR MAIL
PAR AVION

AEROGRAMME

Affix stamp here

PARNELL 27.2.85 N.Z.

NEW ZEALAND 00.40 POSTAGE

Dr. G.H. Balazs

Southwest Fisheries Centre

Honolulu Laboratory

P.O. Box 3830

Honolulu

Hawaii 96812

Second fold here

Approved by the New Zealand Post Office for posting in New Zealand to overseas or inland addresses. N.Z.P.O. authority No. 101.

Croxley

DRC A Dickinson Robinson Group Product

SENDER'S NAME AND ADDRESS

DR. B.J. Gill

Auckland Institute and Musuem

Private Bag, Auckland

To open slit here

First fold here

January 25, 1985 F/SWC2:GHB

Dr. G. S. Park, Director
Auckland Institute and Museum
Private Bag
Auckland, New Zealand

Dear Dr. Park:

Dr. Marshall Laird, a member of the Institute, recently sent me a copy of your December 1984 newsletter describing the collection of a green turtle off Birkenhead Wharf. As a researchers of Hawaiian and other Pacific sea turtles, I am interested in learning more about this specimen. As mentioned in the article, it is also my understanding that sea turtles are not very abundant in New Zealand waters. However, the green turtle is a common resident around Raoul in your Kermadec Islands. Nesting does not occur at this location, but the nearshore waters are used as foraging habitat. An early report in the literature suggests that the red benthic alga, Pterocladia capillacea, is the main food source around Raoul. This same vegetation is also extensively used for food by green turtles in the Hawaiian Islands.

The photo of the turtle in your newsletter clearly shows a large gooseneck barnacle attached to the carapace. This suggests that the turtle recently spent time floating in the pelagic environment. Green turtles of this size are not normally found offshore, and do not carry gooseneck barnacles. It therefore seems most likely that the turtle had been displaced from its normal nearshore foraging habitat, perhaps due to disease or some other problem. I would be interested to learn what was found in the turtle's stomach and intestines, and especially if any plastics or other synthetic items had been eaten.

I have enclosed several publications relating to sea turtles including a wall-sized identification poster. I look forward to hearing from you when your time permits.

Sincerely,

George H. Balazs
Wildlife Biologist

GHB:ey
cc: Balazs
HL

AUCKLAND INSTITUTE AND MUSEUM
Private Bag, Auckland 1 New Zealand
Telephone (09) 30-443 Director: G.S. Park MA AMA

Dr. G.H. Balazs
Southwest Fisheries Centre
Honolulu Laboratory
P.O. Box 3830
Honolulu
Hawaii 96812

12 March,1985

Dear George,

Thank you for your letter. The diagrams of the turtle dissection will be very useful. However, first I must see what can be done about having the specimen mounted, which is a problem as we have no taxidermist on our staff. I therefore doubt that I will be able to send you a humerous within a month or report on the gut contents in the immediate future.

I have now received the carapace and plastron of the second turtle I mentioned. It is a green turtle and the carapace measures 436 mm (straight-line with calipers). It was caught accidentally in a set-net at Leigh on the east coast 70km north of Auckland. Date of capture 7/2/1985. This has been a good summer for marine stragglers. Four yellow-bellied seasnakes were also found on a beach.

In my deep-freeze I have a third green turtle which was present when I commenced this job 3 years ago. It was presumably caught locally but alas is unlabelled. Greens seem to be more common here than loggerheads or hawksbills.

Your photos of the green and young hawksbill floating look excellent. If you will send me a slide of each for inclusion in my field guide I will be much obliged.

GT underwater

Best wishes,

Both Sent 4-13-85

BRIAN GILL

Brian J. Gill
Curator of Birds

BY AIR MAIL
PAR AVION

AEROGRAMME

Affix stamp here

AUCKLAND N.Z. 3-PM 14 MAR

Dr. G.H. Balazs

Southwest Fisheries Centre

Honolulu Laboratory

P.O. Box 3830, Honolulu

Hawaii 96812

Second fold here

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Croxley

ORG A Dickinson Robinson Group Product

19484

SENDER'S NAME AND ADDRESS

B.J. Gill, A.I.M.

Private Bag, Auckland, New Zealand

SEALING INSTRUCTIONS

Crease flap before moistening and seal side flaps first. For maximum adhesion, press down all flaps for a few seconds. If anything is enclosed, this form will be surcharged at rate for Air Mail Letters

First fold here

First fold here

July 26, 1985 F/SWC2:CHB

Dr. P. A. van der Sande
Lands and Survey Department
P. O. Box 5249
Auckland 1
New Zealand

Dear Mr. van der Sande:

Thank you for sending the photographs of a sea turtle taken by Mr. Jonathan Maxwell near Meyer Island. These are the first pictures I have been able to obtain for a positive species identification. The animal is a green turtle, Chelonia mydas. The speciman is quite interesting because the carapace is very light colored, and there is an abnormality to the scute count of the carapace (6 central scutes instead of 5). It was also worthwhile to have documentation of the turtle feeding on bluebottle jellyfish. From a brief published reported in the 1920's, we also know that turtles at this location feed on the red alga, Pterocladia capillacea. This is also a major food source for green turtles in the Hawaiian Islands.

When Mr. Maxwell returns from Raoul Islands, please convey my appreciation for the effort he went to in taking these pictures for me.

Sincerely,

George H. Balazs
Zoologist

cc: Balazs
HL

Kelly Tarlton's
UNDERWATER WORLD Ltd.

cold stunning

P.O. BOX 42-021
ORAKEI, AUCKLAND.
NEW ZEALAND.

TELEPHONES: 580-603, 580-602, 585-175

6th June 1986.

The Curator,
Sea Life Park,
Makapuu Point,
Waimanalo,
Hawaii 96795,
U.S.A.

Dear Sir/Madam,

I am employed at Kelly Tarlton's Underwater World, a new aquarium operating in Auckland city, and will shortly be visiting Hawaii and mainland U.S.A. on a tour to study aquarium design, water management and fish husbandry.

I am interested in learning about operations at your aquarium and would be very grateful if I could arrange to spend some time talking to you and your assistants. Our aquarium does not house mammals and I am interested primarily in the fish systems.

I will be in Hawaii on the 22nd and 23rd of June and in this time plan to also visit Waikiki Aquarium. I will try and contact you by phone or telex prior to this to confirm an arrangement.

I look forward very much to visiting your establishment.

Yours faithfully,
KELLY TARLTON'S UNDERWATER WORLD

Barbara J Cotton

Barbara J. Cotton
CURATOR

AUCKLAND INSTITUTE AND MUSEUM
Private Bag, Auckland 1 New Zealand
Telephone (09) 30-443 Director: G.S. Park MA AMA

30/4/86

Dr G.H. Balazs

Dear George,

My little field guide has now been published and I am pleased to enclose a copy and thank you once again for the use of your 4 turtle slides. I hope you like the way they came out.

Since writing to you last I have 3 more turtle records.

On 14/3/86 a Leathery (total length c. 1·75 m) was accidentally caught near Auckland.

On 25/3/86 a small Green (carapace 46·5 cm along curve) was found alive on an Auckland beach (died soon after).

On 23/4/86 another Green (carapace 49 cm along curve) was tangled in a net near Auckland.

I have both greens in the deep-freeze, awaiting autopsy. However, the bad news is that I haven't got around to dissecting these or the earlier specimens yet.

I hope things are well with you.

Best wishes,

BRIAN GILL

PS. Let me know if you want the 4 slides back. (As they were duplicates you may not be bothered, and I could use them in

AUCKLAND INSTITUTE AND MUSEUM
Private Bag, Auckland 1 New Zealand
Telephone (09) 30-443 Director: G.S. Park MA AMA

30/4/86

Dr G.H. Balazs

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I hope things are well with you.

Best wishes,

BRIAN GILL

PS. Let me know if you want the 4 slides back. (As they were duplicates you may not be bothered, and I could use them in talks.)

B.

August 29, 1986 F/SWC2

Ms. Barbara J. Cotton
Curator, Kelly Tarlton's
Underwater World
P. O. Box 42-021
Orakei, Auckland
New Zealand

Dear Ms. Cotton:

Mr. Steve Kaiser, Curator of the Reef Tank at Sea Life Park here on Oahu, recently asked me to respond to your inquiry concerning "cold stunning" of sea turtles. Although my work deals extensively with sea turtles, I have not been personally involved with such cases. Our ocean termperatures here in Hawaii fortunately never drop low enough for stunning to occur. However, the phenomenon has happened several times in Florida during recent years, as well as in New York late last year. Two descriptive articles have been enclosed which were available in my files. In addition, I am sending some literature covering our Laboratory's studies of Hawaiian sea turtles.

I would appreciate hearing from you about the sea turtles you have in your collection. I assume that you have encountered some cases of cold stunning.

You may be interested to know that I have corresponded several times with Mr. Brian Gill of the Auckland Institute and Museum. Brian has been recording cases of turtles stranded or accidentally caught in New Zealand waters. I am interested in what your turtles have been eating and especially if it involves plastic or other manmade debris.

Sincerely,

George H. Balazs
Zoologist

Enclosure

cc: Steve Kaiser, Sea Life Park
Brian Gill, Auckland Institute

bc: HL
Balazs

The Dominion 27 June 1987 pg. 6 New Zealand

Aquarium battles to save green turtle

STAFF at Kelly Tarlton's Underwater World are battling to save the life of a rare green turtle, but its chances of survival are slim.

The turtle, found washed up on a Christchurch beach two days ago, is suffering from a complication of respiratory diseases, probably pneumonia, tuberculosis and lung parasites.

"He is very sick. We haven't encountered this condition before in any of our animals," said the Auckland aquarium's curator, Barbara Cotton.

Valuable help was being provided by Auckland Zoo veterinarian David Folwell, Ms Cotton said.

However, very little was known about sea turtles and why they got beached, she said. Probably many were already sick.

It was unusual for turtles to be found so far south, particularly in winter, Ms Cotton said. But the animals did occasionally maroon themselves on New Zealand shores. Others were picked up by local fishermen.

The aquarium is already looking after a small loggerhead turtle that came ashore last year. It was suffering from a blinding eye infection.

Both turtles will be released if they recover.

NICKY FERIGO, assistant curator at Kelly Tarlton's Underwater World in Auckland, with the green turtle found washed up on a Christchurch beach.

Kelly Tarlton's UNDERWATER WORLD LTD

27th July, 1987

George H. Balazs
National Marine Fisheries Service,
Southwest Fisheries Centre, Honolulu Laboratory,
2570 Dole Street,
Honolulu, Hawaii 96822-2396

Dear Mr Balazs,

Thankyou for your letter and the information on sea turtles which you kindly sent to me last year. I apologise for not writing sooner but until recently we have had no information of any real use.

In the past two and a half years we have handled five sea turtle specimens at this aquarium. A summary of these accompanies this letter and briefly outlines our most recent and interesting find of a small piece of plastic in the gut of a Green Turtle. We have found only one case of what we believe to be the true'cold stunning'. This in a small Loggerhead which did not appear to be suffering from any other illness. We force fed this individual for a month before it began to feed voluntarily and is still in our care.

As our aquariums association with sea turtles develops we hear more and more reports of sightings around New Zealand coasts. It seems that there are more visiting our coasts then we originally thought. Many records involve beachings where disease and exhaustion is implicated. Virtually nothing is known about the natural occurance of healthy individuals in this region.

Our aquarium aims to be able to provide a suitable rehabilitation facility for sea turtles. We would also like to have an exhibit where small individuals can be displayed for a short period before release. (We are in a strong position to promote public awareness).

We are very inexperienced in the matter of turtle care and rehabilitation and would value any information in this area. One important aspect we are uncertain of at present relates to the chances of a turtle once released this far south. Should we be making efforts to ship them nearer to the tropics after rehabilitation? What effects does species and size have on this question? Also is their any accepted and humane way of tagging turtles which we release?

Any ideas or information that you could convey to me would be most gratefully accepted. If any more information arises down here I will certainly let you know.

Yours sincerely,

Barbara Cotton

AQUARIUM: TAMAKI DRIVE, AUCKLAND
P.O. BOX 42-021 ORAKEI, AUCKLAND, NEW ZEALAND. TELEPHONES: 580-603, 580-602, 585-175

JULY 1987 Turtle Summary to date:

April 1985 Green Turtle - Carapace length (C.L.) 450 mm
Accidentally hooked by strayline fisherman off Tiritiri matangi Island, Hauraki Gulf.
Died from chelonian TB after 15 months in aquarium.

September 1985 Hawksbill Turtle - C.L. 660 mm
Washed up at Whitianga (SE of Auckland) in Easterly storm.
Died four days after stranding from septicaemia. No gut contents.

July 1986 Loggerhead Turtle - C.L. 170 mm
Washed up at Piha Beach, West Auckland in Westerlies.
Probably 'coldstun' victim. Rehabilitated over two months and still held in aquarium as blind in one eye. Eventually hope to release north of New Zealand.

May 1987 Hawksbill Turtle - C.L. 435 mm
Caught in gill net near Rakino Island, Hauraki Gulf, Auckland.
Very emaciated and lethargic. Still being rehabilitated - will not feed voluntarily.

July 1987 Green Turtle - C.L. 450 mm
Washed ashore at Christchurch, South Island.
Died after three days at aquarium. Pneumonia and gut ulceration. Oedema of heart valves. Gut contents included approx. 50 tests of oceanic salp Salpa zonaria and one small piece of plastic sheet. This was clear polyethylene approx. 90 x 40 mm with ragged edges.

October 19, 1987 F/SWC2:GHB

Ms. Barbara Cotton
Underwater World, Ltd.
P.O. Box 42-021, Orakei
Auckland, New Zealand

Dear Barbara,

Enclosed is some additional literature and other information on the care and resuscitation of stranded sea turtles affected by cold stunning and related problems. I trust that you received the other items I sent a few weeks ago.

I understand that the staff veterinarian at Sea World in Orlando, Florida, Dr. Michael Walsh, has considerable practical experience caring for sick and injured sea turtles found in their region. Possibly you may want to write him direct at: Sea World
Interstate 4 and
Beeline Express
Way
Orlando, FL 32816

In your letter of July 27th you asked about the acceptability of tagging turtles that are to be returned to the wild. I believe that this question was answered to your satisfaction in the "Manual of Sea Turtle Research and Conservation Techniques" which I recently sent. If you would like to have a few tags to have on-hand for possible use, I would be willing to send them to you from our own supply. They would, of course, bear a "Hawaii" return address (along with an ID number). However, that shouldn't present any problem, and in fact may even increase the likelihood of a tagged turtle being reported if it is found again.

Your summary sheet on turtle strandings was very interesting and important. I appreciate your sending me a copy.

Sincerely,

George H. Balazs
Zoologist

GHB:gr

bcc: GHB
HL

Evening Post 21/2/89

Rare turtle trapped, drowns

The turtle, found dead after getting tangled in mussel lines in Tasman Bay, attracted onlookers (from left) Karla McDonald, Jodi McDonald, Nicloa Ladley, Hayley Baynes and Nigel Baynes.

Surprise discovery for girls

A rare Pacific leatherback turtle has been found drowned after being entangled in a mussel longline at Okiwi Bay, on Tasman Bay.

The 227kg animal, thought to be between 40 and 50 years old, was discovered by Karla McDonald and Nicola Ladley, both 13, of Wakefield.

Only 10 previous sightings have been recorded in New Zealand.

"Dad told us to swim out to clear what looked like a log from the mussel ropes," Karla said. "We were really surprised when we saw what it was. When we got back no one believed us at first."

John McDonald, who owns the mussel farm, said four or five ropes had to be cut to allow the turtle to be winched to shore.

"It's a bit of a shame it got caught like that, but then if it hadn't no one would have known about it," he said.

Department of Conservation Nelson regional advisory scientist Kath Walker said the turtle weighed at least 227kg.

"We tried to turn it over to identify its sex, but it was too heavy for two people. It was probably a male," she said.

It was the first time a Pacific leatherback had been sighted in the Marlborough Sounds.

Ms Walker said the species was normally found in tropical Pacific and Indian Ocean areas.

The Pacific leatherback was an endangered species because of "people pressure" on its eggs which were laid on beaches, Ms Walker said.

The turtle was so heavy it broke a winch on the boat which hauled it back to shore.

The body was unable to be buried on the beach so scientists arranged for it to be towed back out to sea. — NZPA

N.Z. file

Auckland Institute
and Museum

Private Bag 92018
Auckland
New Zealand

Telephone
09-309 0443

Facsimile
09-379 9956

3 February 1995

Dr G.H. Balazs
National Marine Fisheries Service
2570 Dole St.
Honolulu, Hawaii
USA 96822-2396

Dear George,

Re. turtle slides

You may remember that in 1986 I was the author of a field guide to New Zealand reptiles in which you kindly allowed to be reproduced, free-of-charge, four photographs of turtles - Leathery, Loggerhead, Green and Hawksbill.

I am now to do a second edition and I wonder if you will agree again to the use of these same four shots with credit as before. I have kept the original transparencies from last time so these can be used again and you do not have to send another copy.

We now have another species on the New Zealand list - Olive Ridley - and I wonder if you have a photograph of this species that I might use.

I hope your research is going well and look forward to hearing from you in due course.

Yours sincerely,

BRIAN GILL

B.J. Gill
Curator of Land Vertebrates

GHB

NEW ZEALAND PLACES A BAN ON THE CAPTURE OF SEA TURTLES

The New Zealand government, on July 30, announced a new fishery law banning the capture of sea turtles within the country's 200-mile zone. This law prohibits fishing vessels from keeping sea turtles captured within the 200-mile zone. In the event that sea turtles are caught, they are to be released into the sea unharmed. If the captured animal has suffered any injury, the fishermen will be held responsible for turning these injured animals over to the appropriate research laboratory. Furthermore, the law requires the reporting of any sea turtle captures. Any violation will result in a fine of NZ$10,000.

Katsuo-Maguro Tsushin No. 6124
Aug. 30, 1996

NEW ZEALAND

subject: Pterocladia lucida
P. capillacea

from KAM
early 1985

want to buy [for Agar]
$ 1-80 per kilogram Clean + Dry

Coast Biologicals Limited
P.O. Box 350 OPOTIKI
telephone 669 or 670
telex NZ 2919 Growth

---

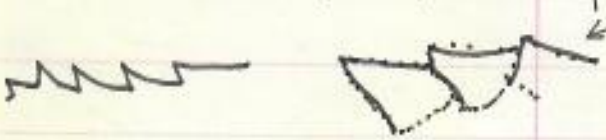
subject: turtle soup
Jensen's "Real Turtle Soup" with finest old Sherry. 400 ml, can $ 6.18 (NZ)
Jensen's Fine Foods GMBH
2200 Elmshorn
Bundesrepublik Deutschland
Product of W. Germany

seen on shelf of store "SPICE N' LIFE" Kerikeri, NZ
4 cans, sea turtle label.
Also in Gisborne, NZ. "Wheatsheaf" 6 cans. soup. $ 4.55

subject: turtle

"Turtle found alive at Ninety-Mile Beach. It is not uncommon for turtles to be washed up on NZ beaches." Mr. A.H. Taylor (Aratapo, NZ)

AK- carapace shell w/ head and neck skin still attached, PL, no flippers.



cannot see any scute plates on head or carapace (about 10" long)

---

subject: turtle

stuffed male green turtle on wall, verathoned

text "Green Island Turtle (Australia) Found stranded South Baylys Beach. Approx. 150 years old. Taxidermy by A. Devries"

(AK- est 32" carapace length)

Items contained at: The Northern Wairoa-Maori-Maritime & Pioneer Museum - Harding Park

Dargaville, NZ. P.O. Box 166, Dargaville, NZ

phone 7059, ex 63.

MINUTE SHEET Department:

Subject:

File No.

Date: 11-1-1982

To—

GEORGE.

Please find enclosed a few more sighting reports from Raoul Island I left Key are of interest.

Best wishes for 1982.

Regards

John Thompson.

METEOROLOGICAL OFFICE
P.O. Box 722 WELLINGTON
NEW ZEALAND

Item 504 16441A—49.000pads/7/78 PT

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by John Pickford Date 22.11.81 Time

Address & Tel. No. (optional) Raoul. Is.

Location (indicate on chart) X

Observation made from: / shore; ___ boat; or while ___ skin ___ SCUBA diving.

Estimated size (shell length ?

Turtle seen on: / surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.):

Other comments: Three seen at this location.

Once again these turtles were seen from a cliff and no marks or size could be estimated although two were described as very big.

Please return to -

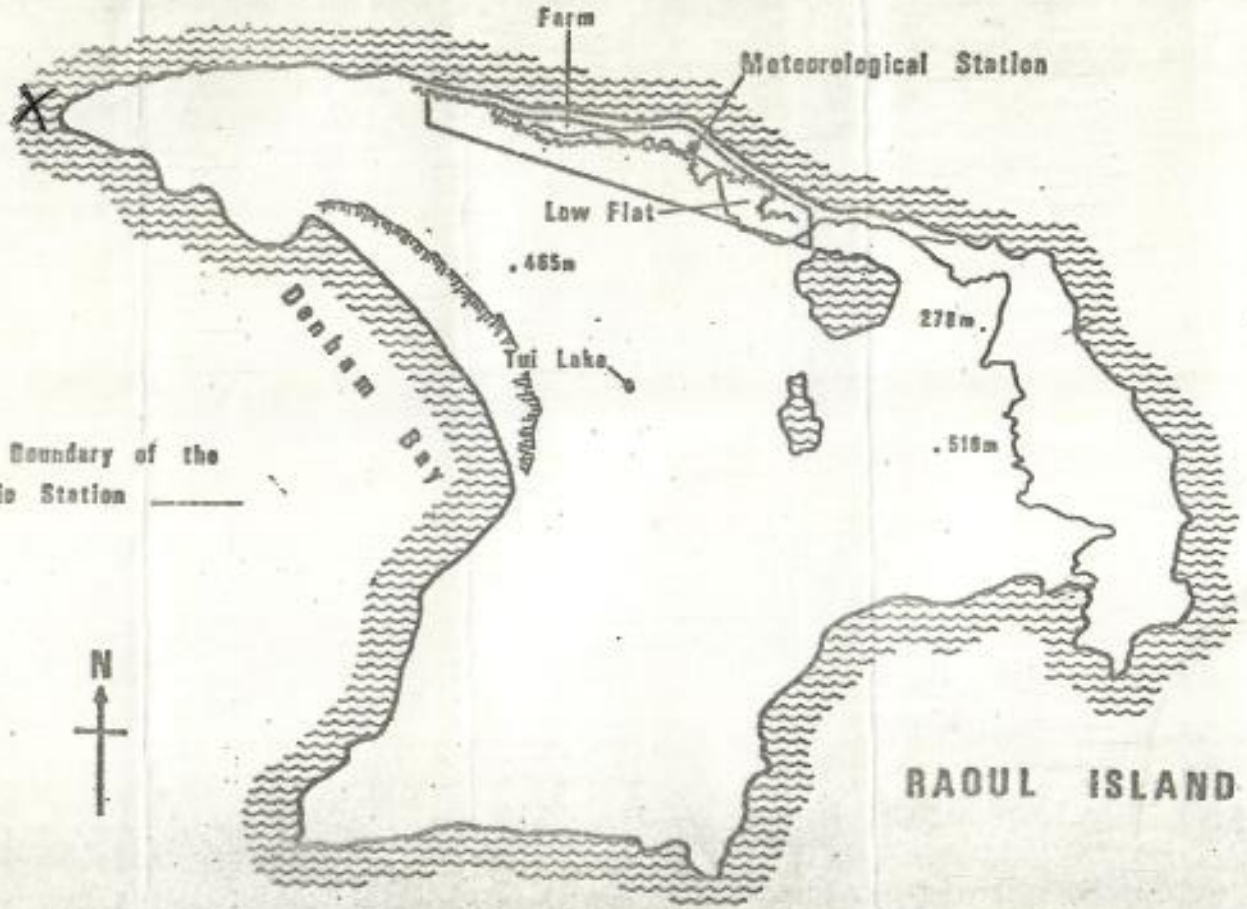


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by JOHN PICKFORD Date 26/11/81 Time —

Address & Tel. No. (optional) RAOUL ISLAND

Location (indicate on chart) X

Observation made from: — shore; ___ boat; or while ___ skin ___ SCUBA diving.

Estimated size (shell length ?

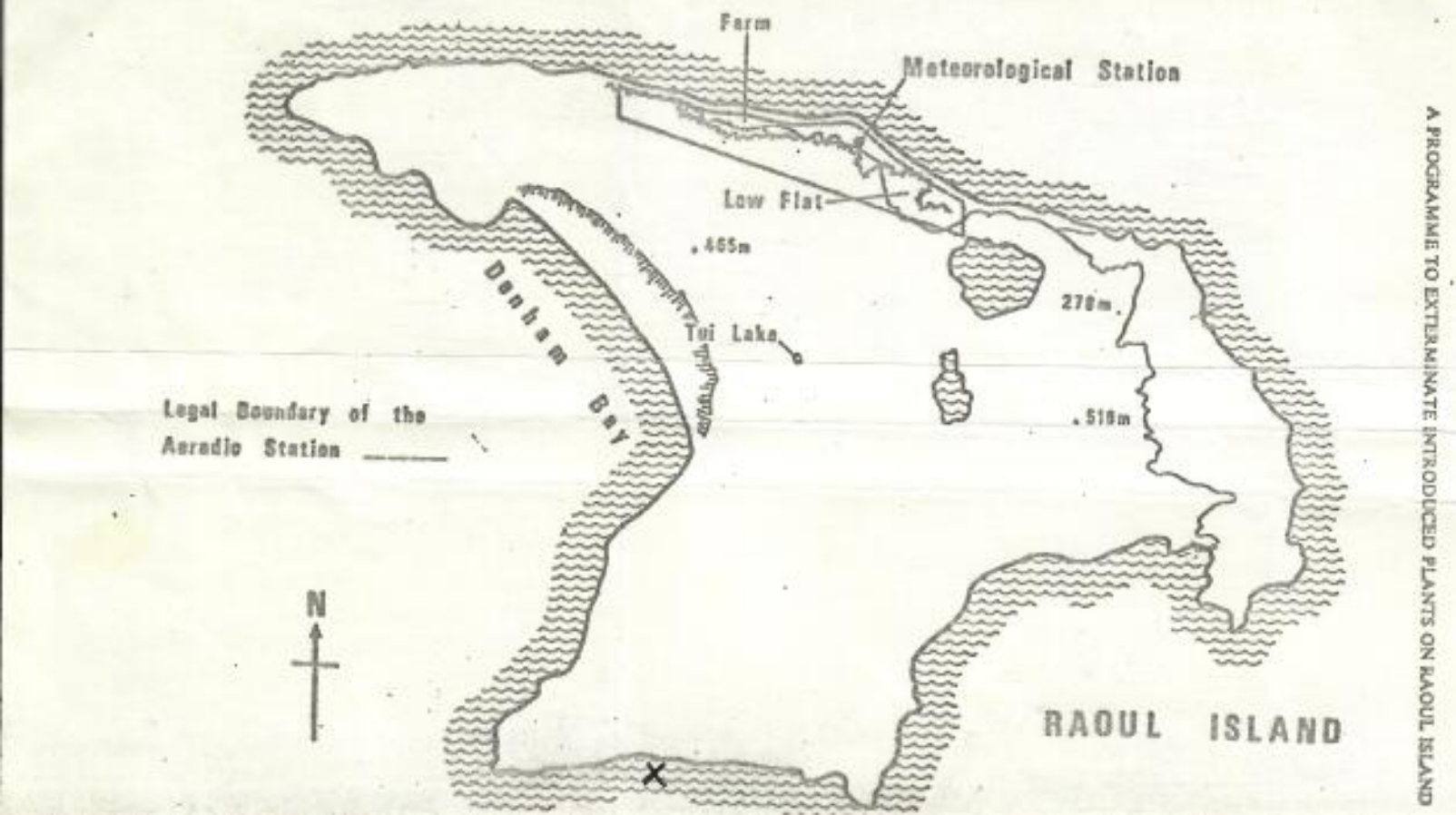
Turtle seen on: — surface; or at depth of approx. ___ ft.

TOO FAR AWAY TO MAKE ANY IDENTIFICATION.

3 TURTLES SEEN.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.):

Other comments:



A PROGRAMME TO EXTERMINATE INTRODUCED PLANTS ON RAOUL ISLAND

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by Rob Glennie Date 11/11/81 Time All day

Address & Tel. No. (optional) Raoul Island

Location (indicate on chart) X

Observation made from: ✓ shore; ___ boat; or while ___ skin ___ SCUBA diving.

Estimated size (shell length 6-7 ft.

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): Not close enough

Other comments:

There were approx. 12 in this group but unfortunately they are not close enough to see any features, merely flippers and heads breaking the surface.

This group was also present on the 12th, same number, same place.

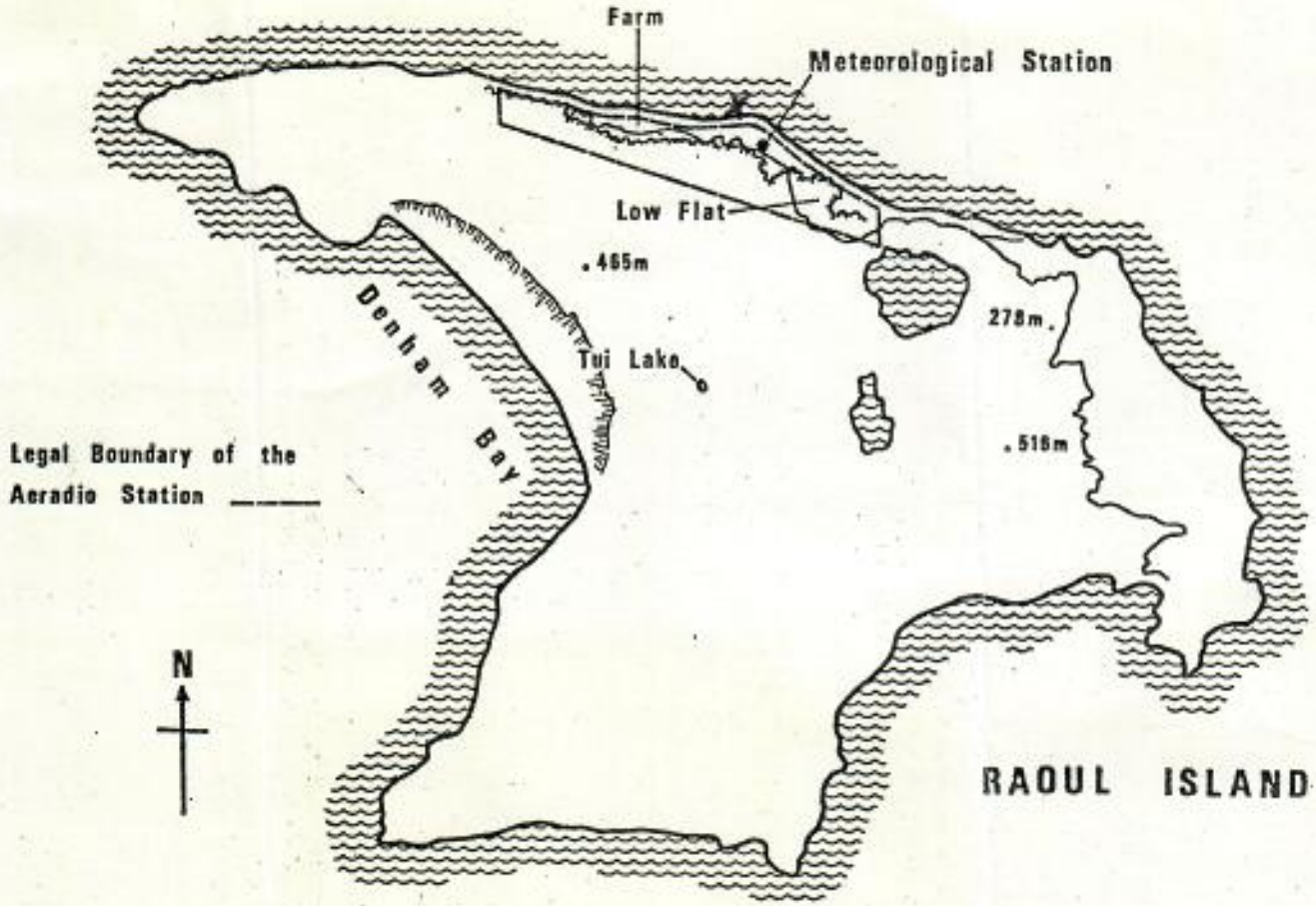


Fig. 2. The main features of Raoul Island.

Please return to—
GEORGE H. BALAZS
UNIVERSITY OF HAWAII

MINUTE SHEET Department: .....

Subject: Section: .....

File No. .....

49918A–150, ads/7/80 MK Date: 16/2/82.

To–

GEORGE.

A few more reports for you from Raoul Island. I am afraid that we are not getting much detail but all sightings are offshore and we do not get a very good look at them.

Regards

John Thompson.

Item 504

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by PETER MCCOSTIE Date 6-1-82 Time APPROX 12.00 pm

Address & Tel. No. (optional) RAOUL ISLAND.

Location (indicate on chart) 1 (X) 2 (X) 3 (X)

Observation made from: ___ shore;
✓ boat; or while ___ skin
___ SCUBA diving.

Estimated size (shell length 1:- 2-3FT, 2: 1FT 3: TWO TURTLES BOTH ABOUT 3-5 FT.

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): NOT ABLE TO GET CLOSE ENOUGH FOR A GOOD LOOK BUT WERE A BROWNY/GREEN COLOUR.

Other comments: AS WE APPROACHED NO 1 AND 2 THEY SANK THUS WE WERE UNABLE TO SEE THEM

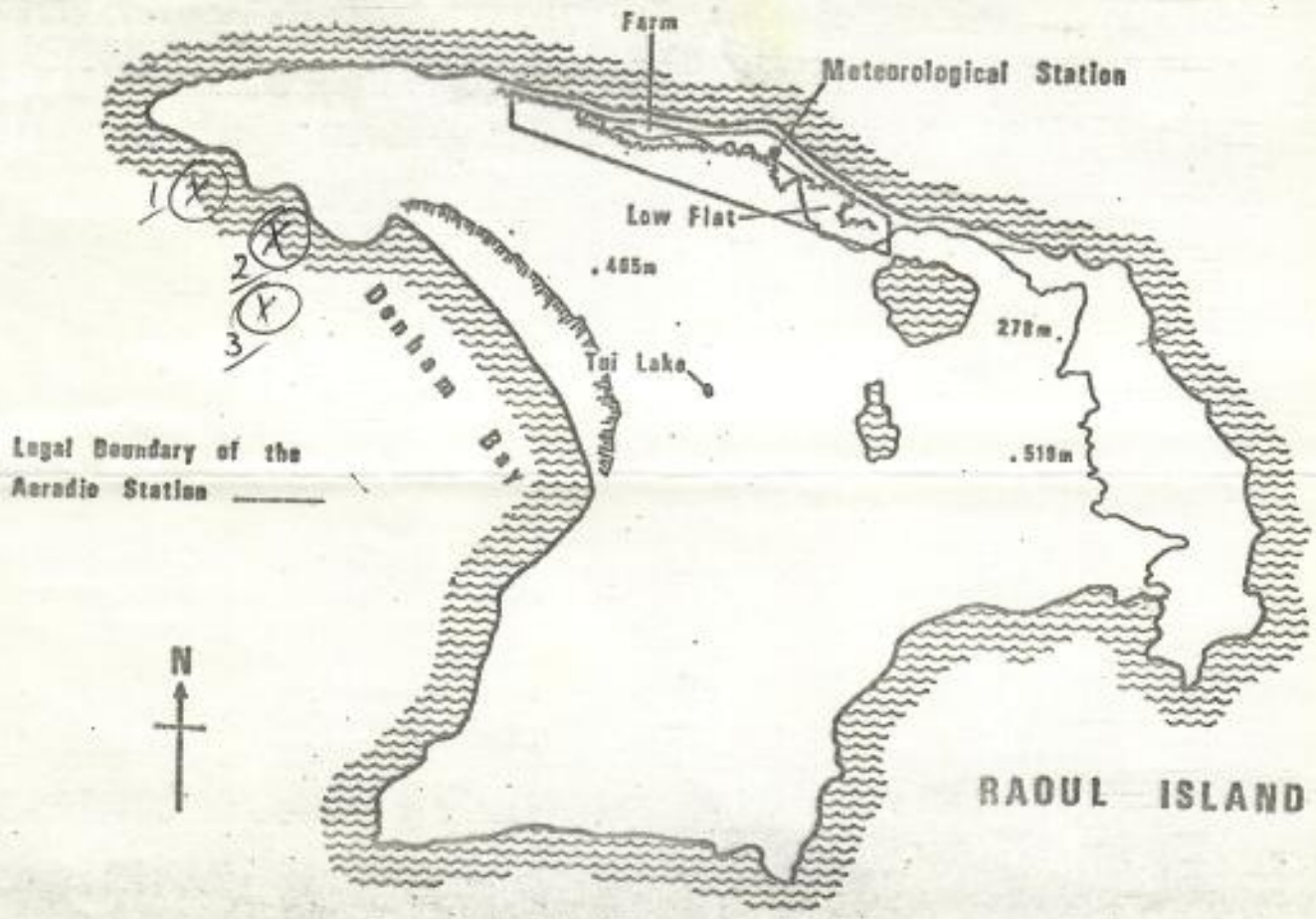


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by DAVE REES Date 7/1/82 Time 1400

Address & Tel. No. (optional) RAOUL ISLAND

Location (indicate on chart) X

Observation made from: ✓ shore;
___ boat; or while ___ skin
___ SCUBA diving.

Estimated size (shell length 3 FT.

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): _____

Other comments:
No characteristics available sorry. To far out.

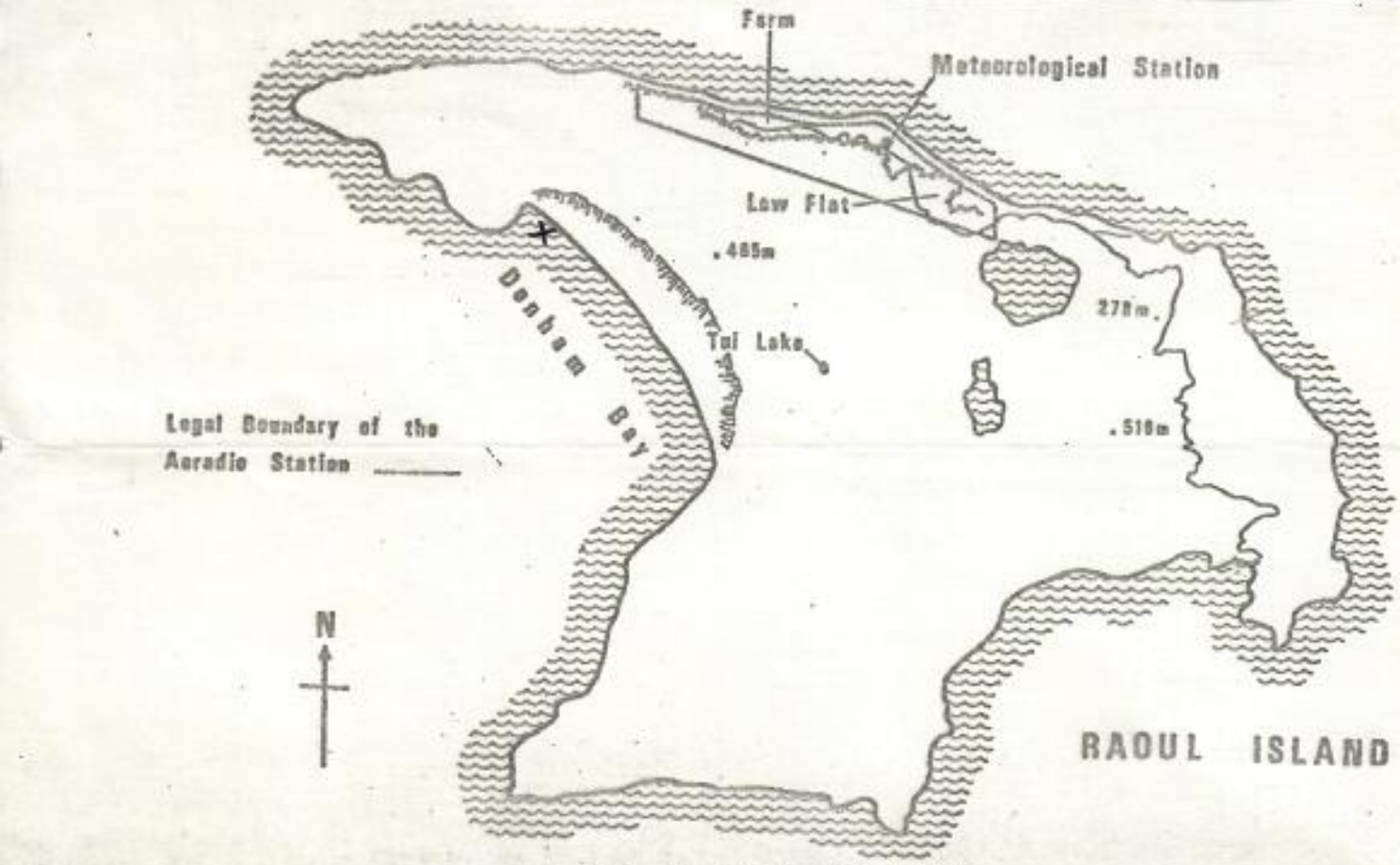


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by MIKE FRASER Date 22/1/82 Time 1100 - 1500

Address & Tel. No. (optional) RAOUL ISLAND

Location (indicate on chart) /

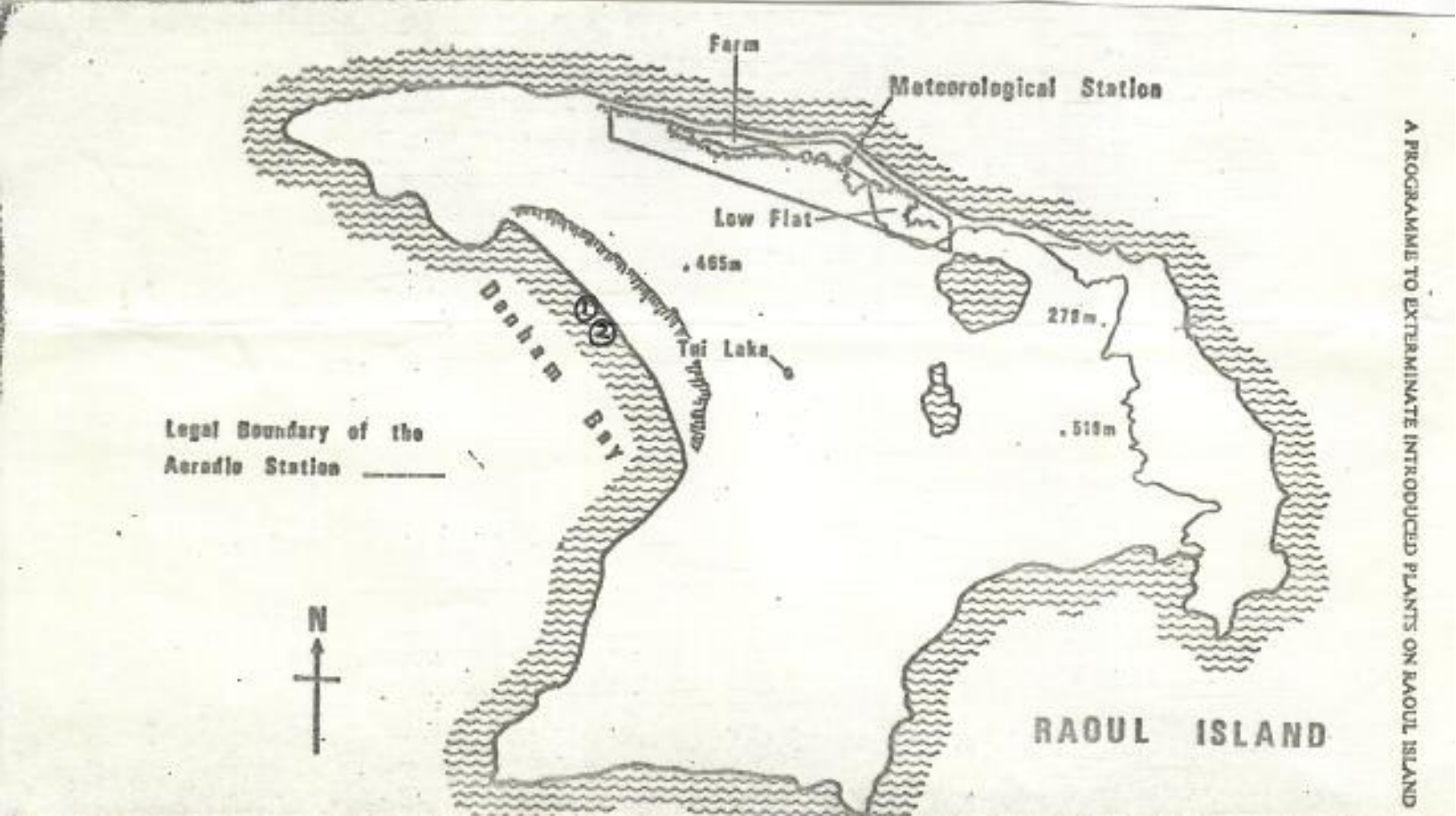
Observation made from: / shore; ___ boat; or while ___ skin ___ SCUBA diving.

Estimated size (shell length) (1) 4 FT. (2) 2 FT.

Turtle seen on: / surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): UNABLE TO SEE CLEARLY.

Other comments: I first saw them both together but the large one disappeared and the smaller one I saw three times after the next two dives. Couldn't see any markings on it as I was looking horizontally at it and could only see its head.



A PROGRAMME TO EXTERMINATE INTRODUCED PLANTS ON RAOUL ISLAND

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by PETER McCROSTIE Date 24/1/82 Time 1530 HR.

Address & Tel. No. (optional) RAOUL ISLAND

Location (indicate on chart) (1)

Observation made from: ✓ shore; ___ boat; or while ___ skin ___ SCUBA diving.

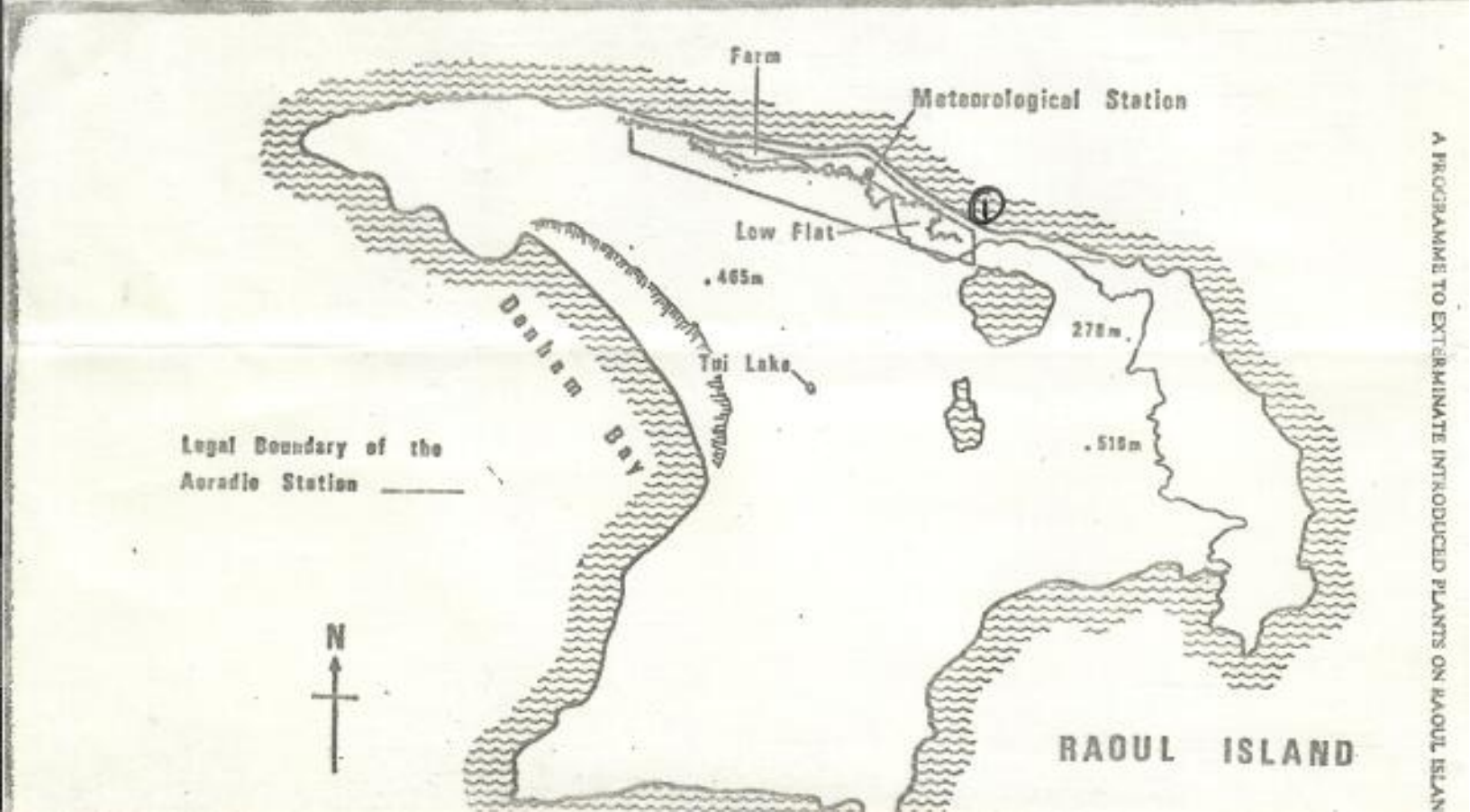
Estimated size (shell length 3-4 FT.

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): Not able to see, too far away.

Other comments:

Please return to -



A PROGRAMME TO EXTERMINATE INTRODUCED PLANTS ON RAOUL ISLAND

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by MIKE FRASER Date 20/2/82 Time 1500 hr.

Address & Tel. No. (optional) RAOUL ISLAND.

Location (indicate on chart) x (2)

Observation made from: — shore; ___ boat; or while ___ skin ___ SCUBA diving.

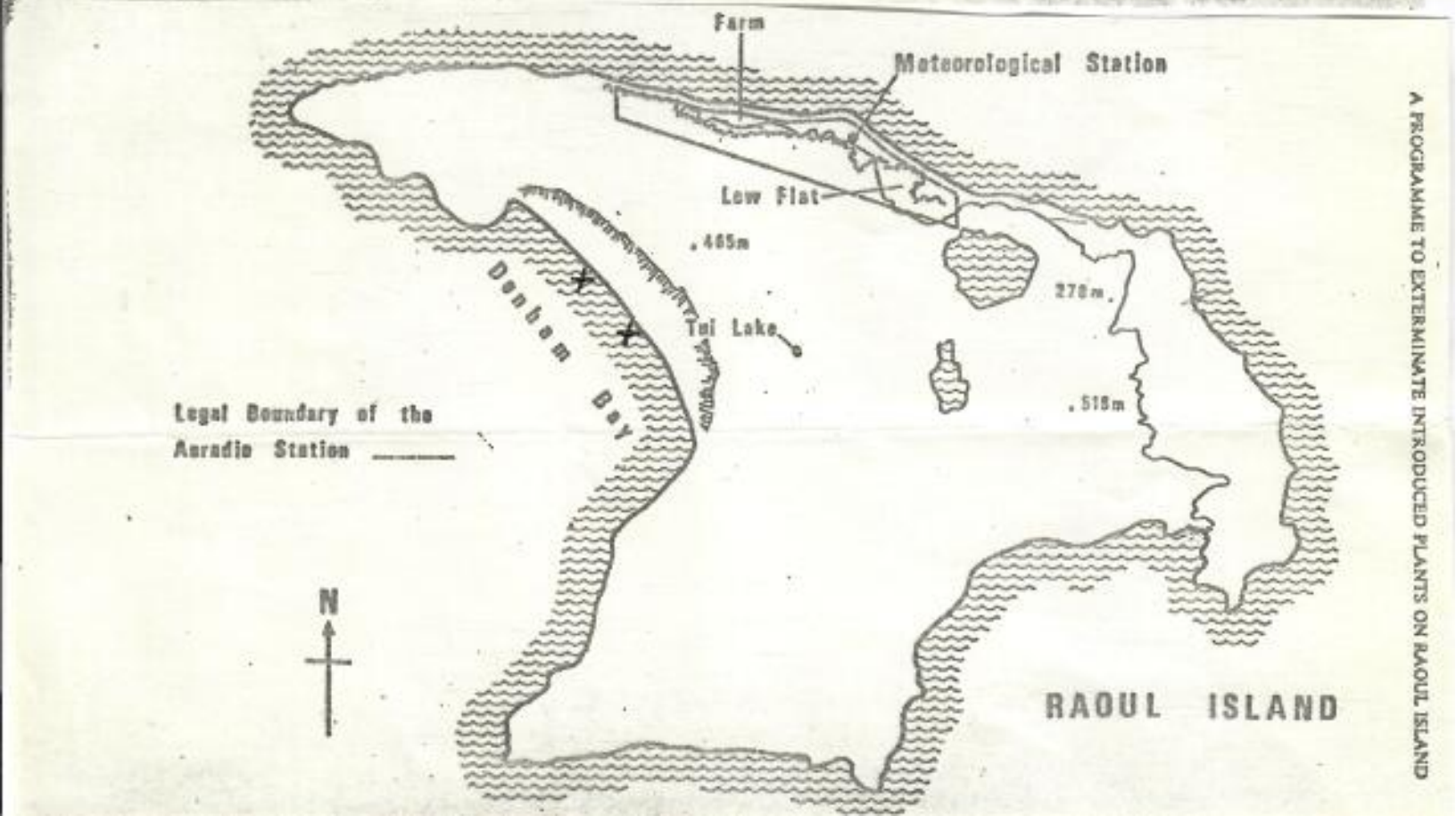
Estimated size (shell length ?

Turtle seen on: — surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.):

Other comments:

ONLY SAW ITS HEAD WHILE IT CAME TO THE SURFACE, SAW ME ON THE BEACH AND SUBMERGED AGAIN. ON BOTH OCCASIONS, NOT SEEN AGAIN.



A PROGRAMME TO EXTERMINATE INTRODUCED PLANTS ON RAOUL ISLAND

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by PETER MCCOSTIE Date 13-3-82 Time APPROX 1300 HRST

Address & Tel. No. (optional) RAOUL ISD.

Location (indicate on chart) ⊗

Observation made from: ✓ shore;
____ boat; or while ____ skin
____ SCUBA diving.

Estimated size (shell length 3-4 FT

Turtle seen on: ✓ surface; or at depth of approx. ____ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): GREEN SHELL COLOR

Other comments:
TWO TURTLES SWIMMING TOGETHER

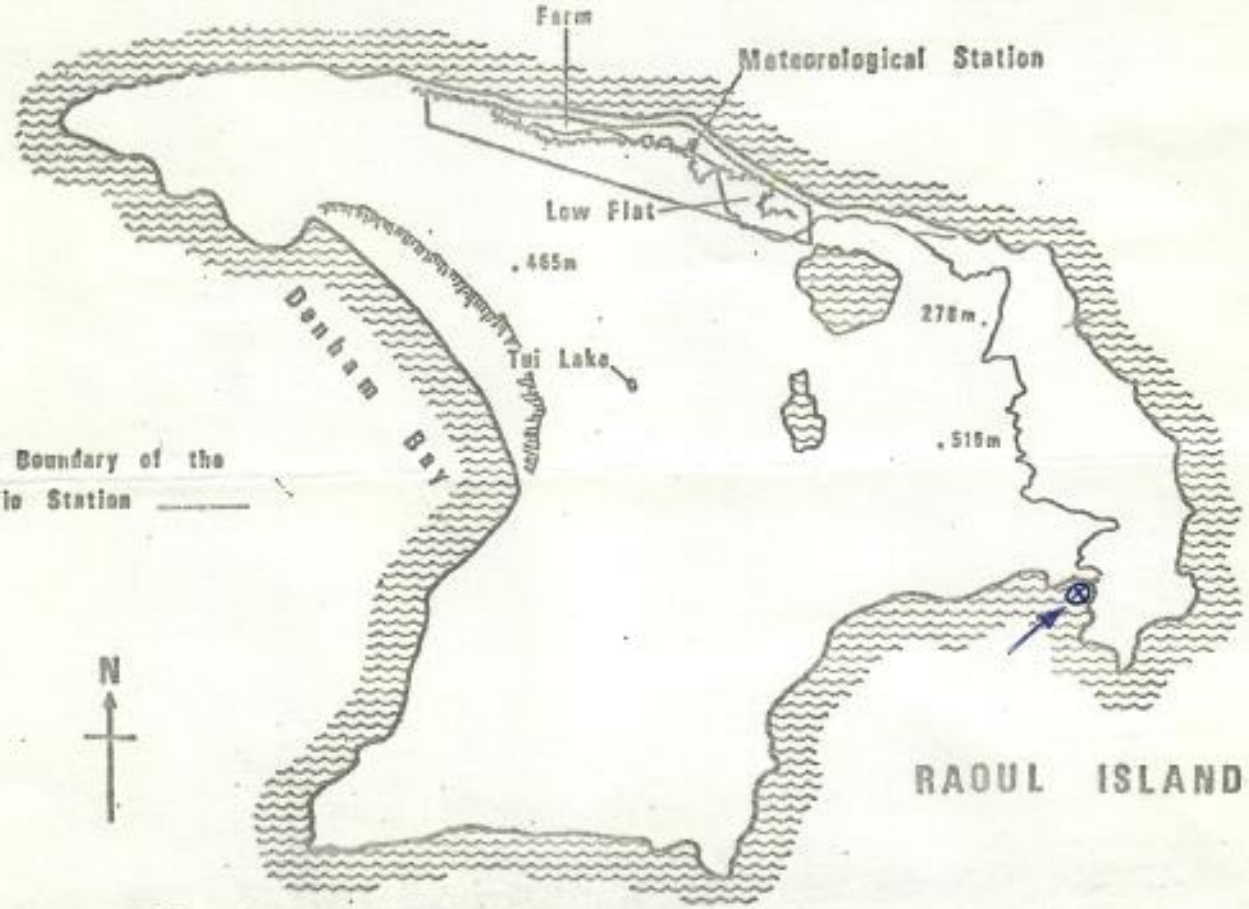


Fig. 2. The main features of Raoul Island.

S 11 Executive 3184

UNION STEAM SHIP COMPANY OF N.Z. LTD.

S .....

From UNION ROTOITI

Port, ... 19 .....

To THE DIRECTOR
N.Z. MET. SERVICES.

DEAR SIR,

PLEASE THE FOLLOWING REPORT IS FORWARDED FOR INCLUSION IN "THE MARINE OBSERVER" QUARTERLY JOURNAL :—

TASMAN SEA.

STEN UNION ROTOITI. CAPTAIN J.C.C. WARREN TAURANGA (NZ) TO SYDNEY.
OBSERVERS :— MR N.D. LEITH, SECOND OFFICER; MR M O'SHEA, RADIO OFFICER; AND MR M. GORDIA, THIRD ENGINEER.

17 FEBRUARY 1982. AT 0225 GMT A LARGE TURTLE (SHELL SIZE 1 METRE x ½ METRE) WAS OBSERVED SWIMMING ON THE SURFACE OF THE WATER, AND APPEARED TO BE FEEDING ON SOME FLOATING DEBRIS.

THE SHIP PASSED ABOUT 10 METRES FROM THE ~~ANIMAL~~ TURTLE, MAKING IDENTIFICATION EASY. IT DID NOT APPEAR TO BE AWARE OF THE SHIPS PRESENCE UNTIL ALMOST ASTERN WHEN IT RAISED ITS HEAD, THEN DIVED. SHIPS POSITION 34° 25'S, 170° 53'E.

COMMENT :— IT IS VERY RARE TO SIGHT A TURTLE SO FAR SOUTH.

MINUTE SHEET

Subject

Department: .....
Section: .....
File No. .....
Date: 8—7—82.

To— Weather Office.

Dear George.

Pleased find enclosed two reports of turtle sightings from Raoul Island. We dont appear to receive many sightings during the winter season but I guess they go elsewhere for the warmer climat.

Thank you very much for your interesting report on the Tokelaus. I visited Tokelaus two months after you but did not have more than two hours on each island.

I am returning for a six week period starting the first week in September to do the installation of some new equipment and some staff training.

If there is anything that I can do for you while I am there please let

me know.

I don't know if I mentioned this before but I was most interested on your report on the Tokelau's and the excellent hand carved turtles.

I was lucky to purchase one on Nukunonu it is about 18 inches across and very hard to tell from the real thing.

We have lived 18 years on the Pacific and my wife and I have collected fans and hand carved turtles, the one from Nukunonu

Item 503

49919E—120,000 pads/8/80 MK

MINUTE SHEET

Department: .....

Subject

Section: .....

File No. .....

Date: .....

To—

as the focus of the collection

The present met team on Raoul return home to New Zealand in September and we will brief the new boys on your requirements before they leave.

Regards.

John Thompson.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by ALISTAIR GILLESPIE Date 11-4-82 Time 1200 hr.

Address & Tel. No. (optional) RAOUL ISLAND

Location (indicate on chart) X (2)

Observation made from: ✓ shore;
___ boat; or while ___ skin
___ SCUBA diving.

Estimated size (shell length 1.5m

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.):
TO FAR AWAY

Other comments:

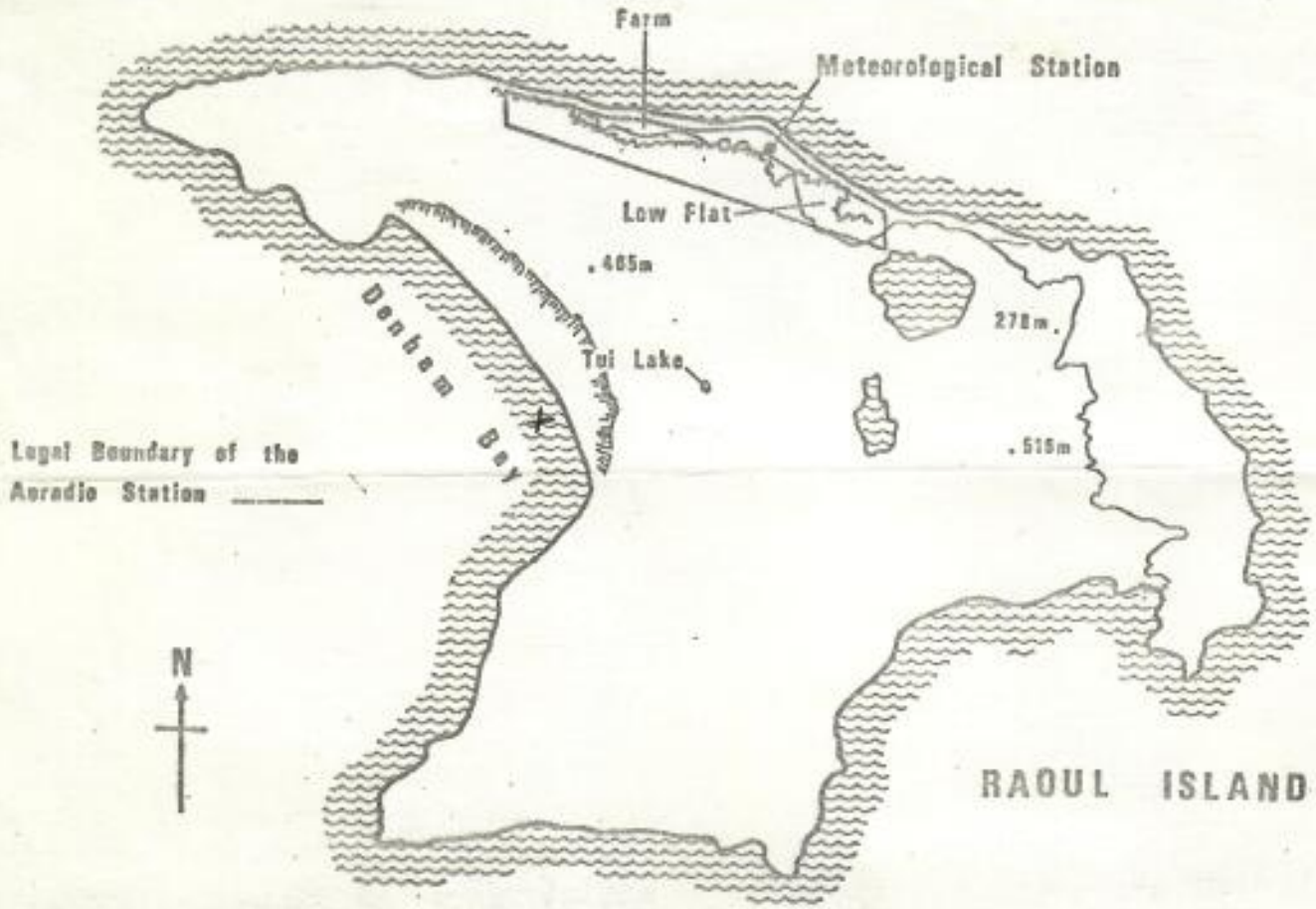


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by BRIAN HAGAN Date 30/4/82 Time 1200

Address & Tel. No. (optional) RAOUL ISLAND.

Location (indicate on chart) X ONE ONLY.

Observation made from: X shore;
___ boat; or while ___ skin
___ SCUBA diving.

Estimated size (shell length 0.5 METRE.

Turtle seen on: X surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): JUST FROM GENERAL VIEW & MAKING COMPARISONS WITH PHOTOS I'D SAY IT LOOKED CLOSEST TO A LOGGERHEAD.

Other comments: _____

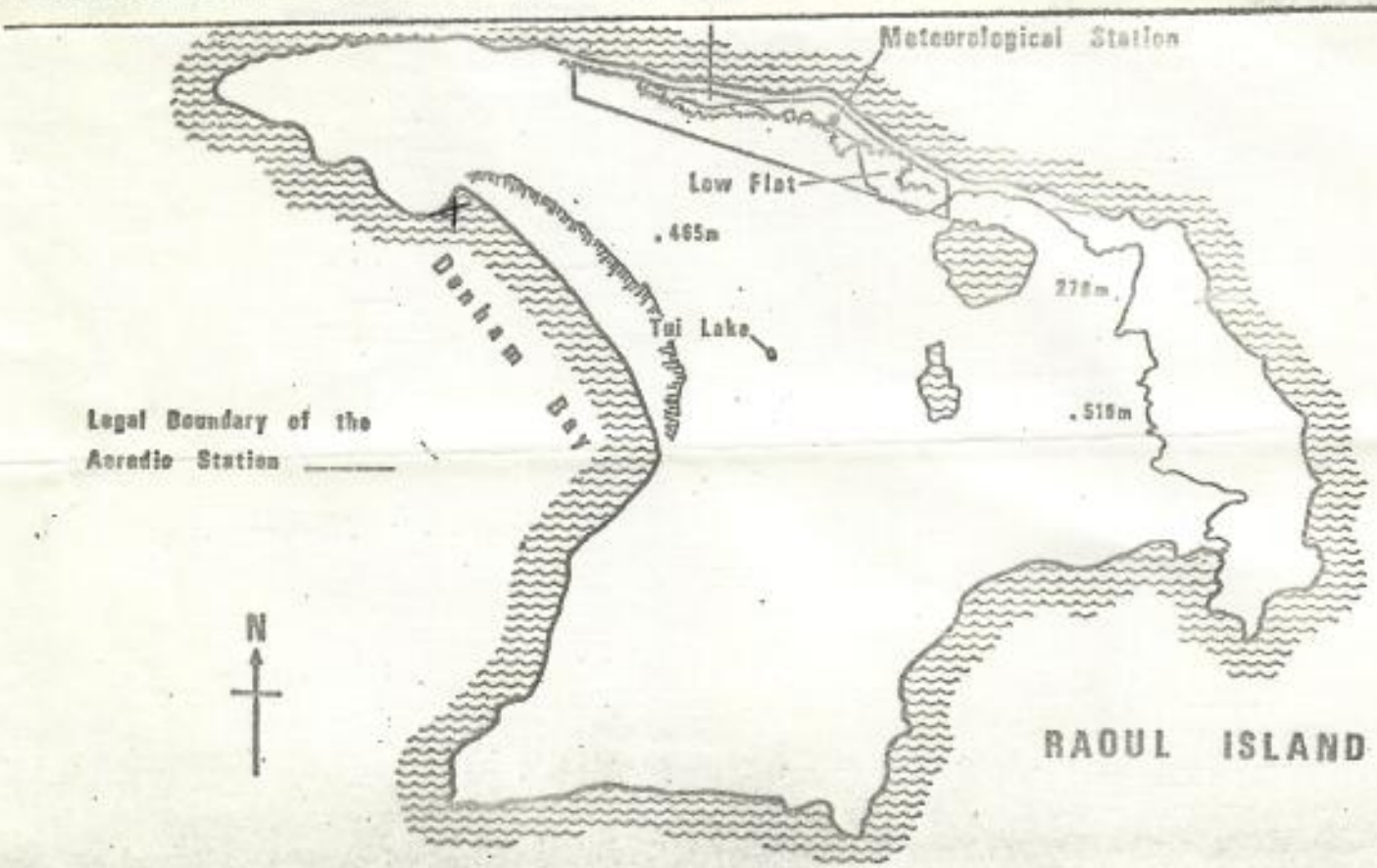


Fig. 2. The main features of Raoul Island.

MINISTRY of TRANSPORT

NEW ZEALAND METEOROLOGICAL SERVICE

P.O. BOX 722, WELLINGTON 1
TELEPHONE: 729-379
TELEGRAMS: METEO

SALAMANCA ROAD,
KELBURN,
WELLINGTON 1

22 July - 82.

Dear George,

Just a short note to thank you for the wall chart and to let you know that I will return from Tokelau's about 27 September and will spend up to 4 days on Apia. I will be staying at Aggie Grey's. I also intend to visit Lago Lago for a day so who knows we may cross.

Enclosed temperature records from some selected islands including Raoul, we do not take water ~~temperature~~ readings.

Regards
John Thompson.

J00019 RAOUL IS LAT. 29 15S LONG. 177 55W HT. 38 M.

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
RAINFALL. MILLIMETRES														
HIGHEST MONTHLY/ANNUAL TOTAL	1937-1975	464	731	601	311	335	297	323	275	241	234	309	377	2449
AVERAGE	1937-1975	112	151	137	121	145	162	164	145	113	91	80	99	1520
LOWEST MONTHLY/ANNUAL TOTAL	1937-1975	2	12	6	15	51	69	39	28	40	13	7	1	865
AVERAGE NUMBER OF DAYS WITH RAIN 1.0 MILLIMETRES OR MORE	1937-1974	8	10	11	12	14	14	15	14	11	9	7	8	133
MAXIMUM 1-DAY RAINFALL MM.	1937-1973	186	176	142	137	163	122	115	100	108	102	96	125	186
TEMPERATURE. DEGREES CELSIUS														
HIGHEST MAXIMUM	1940-1975	27.9	27.8	28.1	27.3	25.3	24.0	23.5	22.4	22.7	23.8	25.4	26.7	28.1
MEAN MONTHLY/ANNUAL MAXIMUM	1940-1975	26.2	26.6	26.4	25.3	23.7	22.2	21.2	21.0	21.3	22.4	23.7	25.2	26.9
MEAN DAILY MAXIMUM	1940-1975	24.1	24.8	24.3	23.2	21.4	19.8	18.7	18.7	19.1	20.3	21.6	23.1	21.6
NORMAL	1941-1970	21.6	22.4	21.9	20.7	18.8	17.3	16.2	16.0	16.3	17.5	18.8	20.5	19.0
MEAN DAILY MINIMUM	1940-1975	19.1	20.0	19.5	18.0	16.2	14.9	13.6	13.5	13.7	14.8	16.1	18.0	16.5
MEAN MONTHLY/ANNUAL MINIMUM	1940-1975	15.9	17.1	16.2	14.8	12.6	11.2	10.3	10.0	10.7	11.5	12.8	14.6	9.5
LOWEST MINIMUM	1940-1975	13.6	14.3	13.4	12.2	11.1	9.0	8.4	7.4	8.5	9.3	10.4	12.8	7.4
MEAN DAILY RANGE	1940-1975	5.0	4.8	4.8	5.2	5.2	4.9	5.1	5.2	5.4	5.5	5.5	5.1	5.1
MEAN DAILY GRASS MINIMUM	1941-1975	17.0	18.1	17.4	15.9	13.7	12.7	11.2	11.2	11.4	12.5	13.9	15.8	14.2
RELATIVE HUMIDITY (%)														
AVERAGE AT 9 A.M.	1937-1970	77	79	78	76	75	78	75	75	73	74	74	76	76
VAPOUR PRESSURE (MBS)														
AVERAGE AT 9 A.M.	1971-1975	22.5	23.7	23.0	20.2	18.1	17.5	15.4	16.1	16.1	17.3	18.7	21.1	19.1
SUNSHINE. HOURS														
HIGHEST	1940-1975	275	227	254	206	201	180	193	211	207	233	253	295	2275
NORMAL	1941-1970	209	169	171	165	153	128	156	165	161	191	196	207	2071
% OF POSSIBLE	1941-1970	51	48	47	50	49	44	50	50	47	50	50	50	49
LOWEST	1940-1975	140	91	89	105	99	84	121	108	104	114	138	126	1825
SPECIAL PHENOMENA														
AVERAGE NO. OF DAYS WITH HAIL	1971-1975	.	.	.	.	.	.	0.2	.	.	.	.	.	0.2
AVERAGE NO. OF DAYS WITH THUNDER	1971-1975	0.2	0.4	0.6	0.4	0.6	1.8	1.6	1.6	0.4	0.6	0.8	0.6	9.6

MINUTE SHEET

Department: MOT

Subject: Sea Turtle Sighting Reports

Section: DA

File No.:

49918A—15 pads/7/80 MK

Date: 5-10-82

To—

Mr. George A. Balazs
Hawaii

Returns from Raoul Is.

regards.

John Harper
Marine Mgt Officer
Wellington
NZ

Item 504

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by ROSS WHITING Date 11th & 13th AUGUST. Time 1330 - 1400 BOTH LOCAL TIMES.

Address & Tel. No. (optional) RAOU. ISLAND C/- ISLAND SERVICES N.Z.

Location (indicate on chart) _____

Observation made from: ✓ shore;
___ boat; or while ___ skin
___ SCUBA diving.

Estimated size (shell length 11th - BOTH 3.4 FEET, 13th - 3 FEET

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): SEEN FROM QUITE A DISTANCE - SHELL COLOUR TAN.

Other comments: _____

Please return to -

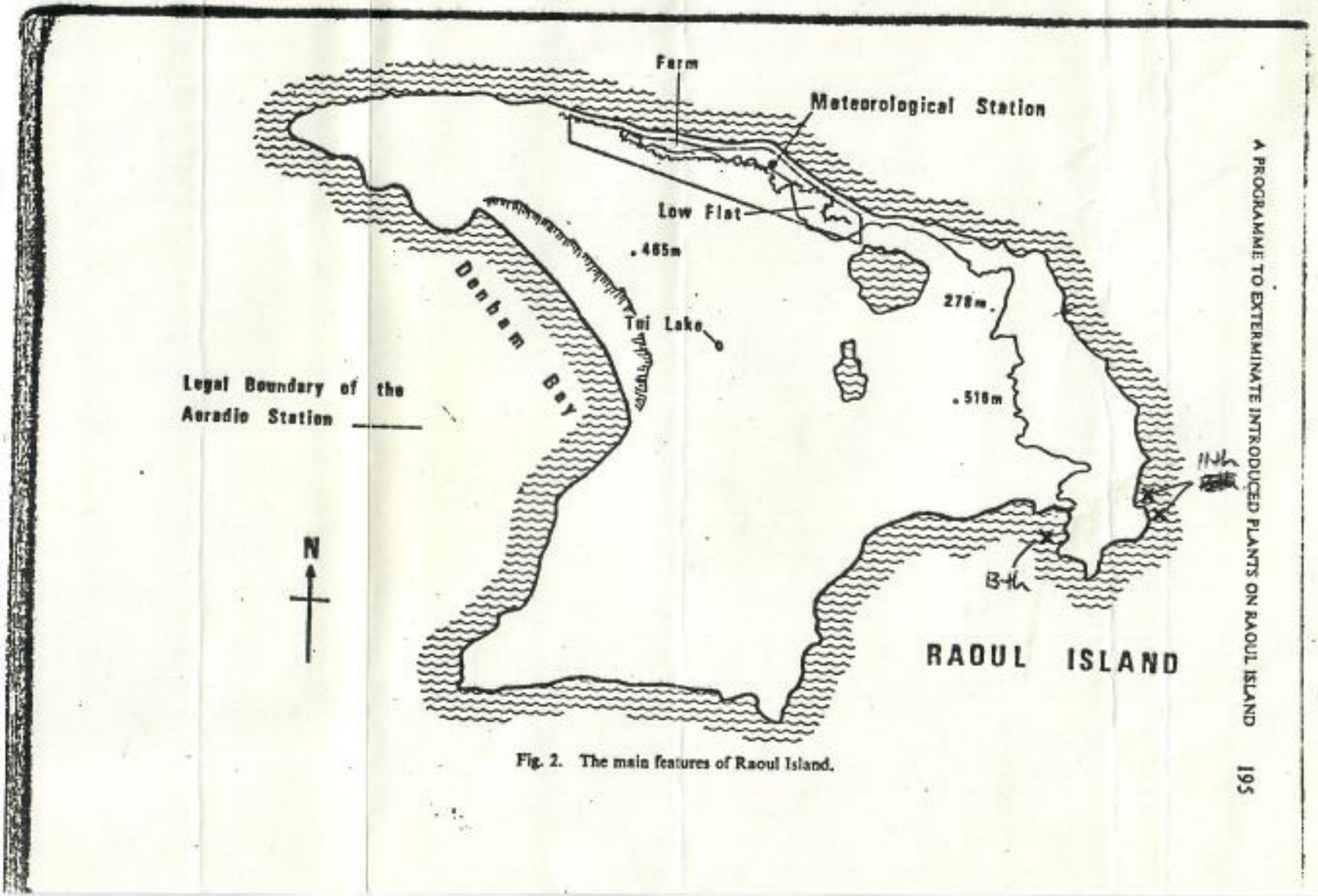


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by G. Sutton Date 28/7/82. Time 4.30 PM.
30/7/82 11.30 AM

Address & Tel. No. (optional) _____

Location (indicate on chart) _____

Observation made from: ___ shore;
___ ~~boat, or while ___ skin~~
___ ~~SCUBA diving~~.

Estimated size (shell length (2') (3')
1 2

Turtle seen on: ___ surface; ~~or at depth of approx. ___ ft~~.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): 1 — BROWN.
2 — APPEARED TO BE VERY RED.

Other comments: _____

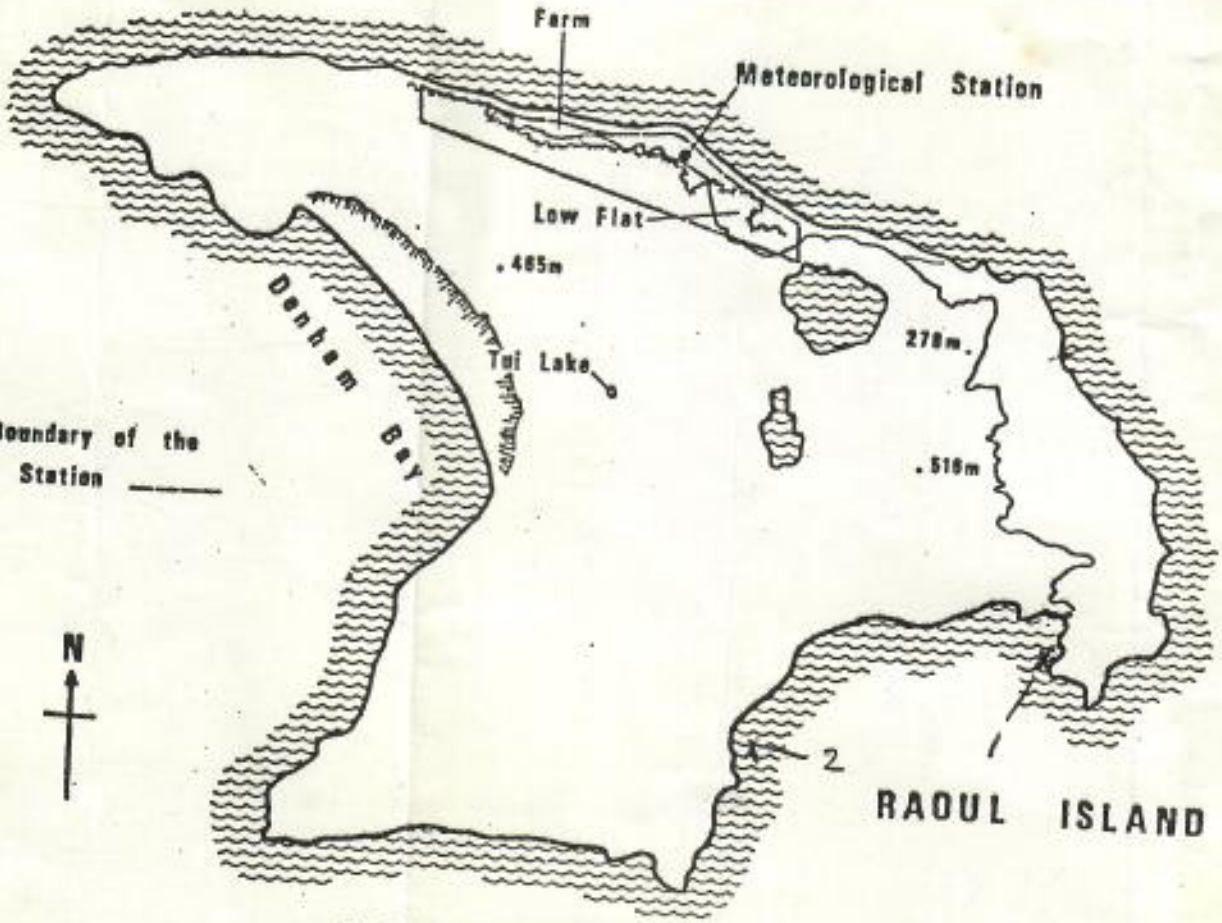


Fig. 2. The main features of Raoul Island.

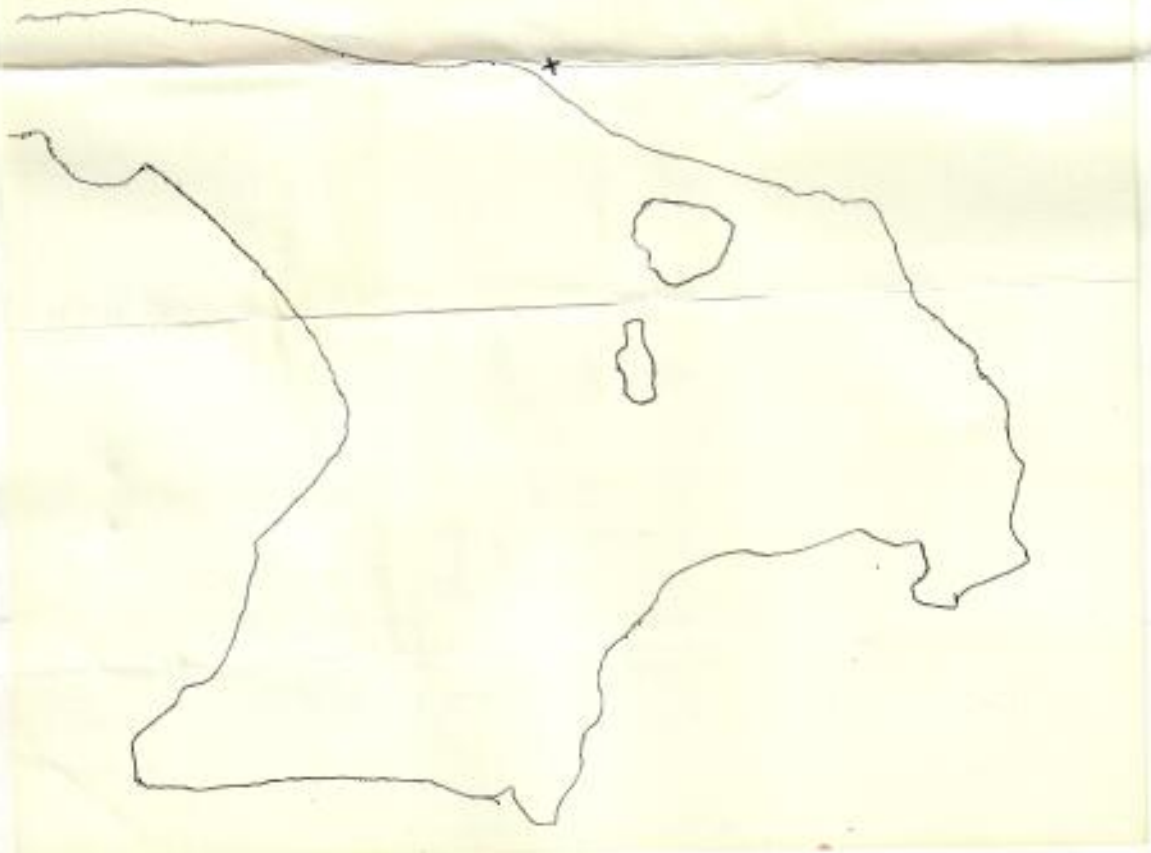
THE MINISTRY OF TRANSPORT

PRIVATE BAG WELLINGTON 1

TELEPHONES: 49 060; 40 488
TELEGRAMS: TRANSPORT

17/10/82.

One large turtle seen briefly by Mike Fraser. Fairly rough seas made any identification impossible.



Passed on to
Dr. M. Hinē · Fisheries Research Div MAF.

NEW ZEALAND METEOROLOGICAL SERVICE

JOHN HARRIS
MARINE METEOROLOGICAL OFFICER

TEL. 729 379
729 920 (AUTOMATIC)

P.O. BOX 722
WELLINGTON

TELEX 31392

MET 203
(1979)

10-11-82

With the Compliments

of the

Director of the New Zealand

Meteorological Service

pp.
John Harris

P.O. Box 722

Tel. 729 379
WELLINGTON

Telex 31392

MINUTE SHEET

Department: .....

Subject

Section: .....

File No. .....

Date 24.11.82

To—

Dear George.

Please find enclosed further turtle sightings from the boys at Kasal Island. I am still surprised that there are still so many turtles in this area of the South Pacific.

I have just returned from a six weeks stay at Nukunonu on the Tokelaus. I was on hand to see a turtle catching ceremony. Two turtles were observed mating outside the reef and were caught and brought ashore with some difficulty.

The cutting up live and the serving of portions was a very very sad affair, although a big event in Nukunonu was one I would not want to see again. I might add that the catch was the first in Nukunonu for about 6 months.

I spent some time in Apia on my return but did not get to Papalago so was unable to make any contact with you while you were there.

Kind regards.

John Thomson.

Item 503

83615D—75,000pads/6/82MK

List of Turtle sightings where mainly only numbers are seen due to distance and the observers are NZFS goat shooters who have mentioned seeing them.

Ray Scrimegeour.

① 18/8/82 — 1 seen at the mouth of Sunshine Valley.
② 7/9/82 — 1 seen at the south end of Denham Bay.
③ 10/9/82 — 2 seen at the south end of Denham Bay.

Ross Whiting.

④ 1/9/82 — 3 together just north of the Boat Cove landing.
⑤ 7/9/82 — 1 seen just off the Boat Cove landing.

Gary Sutton.

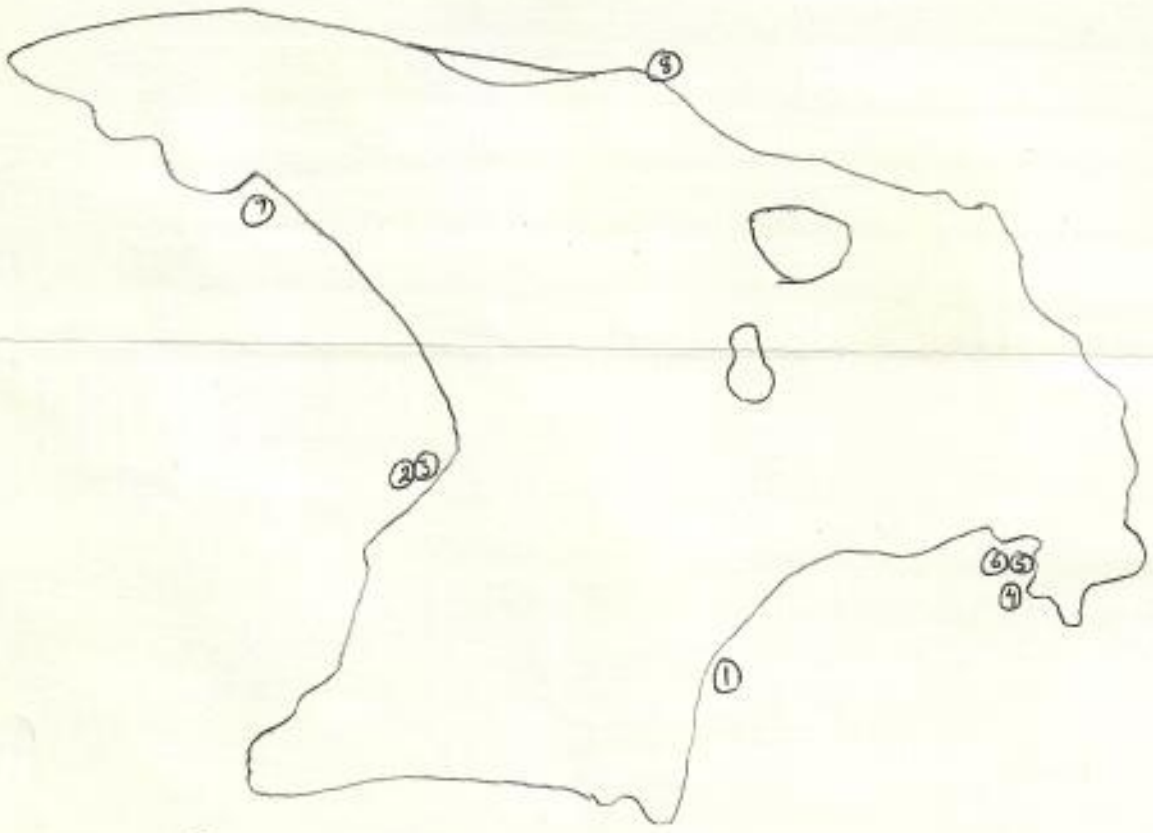
⑥ 30/8/82 — 1 seen just off the Boat Cove landing.

Norm MacDonald.

⑦ 10/9/82 — 1 seen at the Hutches end of Denham Bay. Estimated size at 1 metre. Observed colour, brown. About 100 metres off shore. Observed it while on the cliffs above the bay.

Mike Fraser(Ministry of Transport).

⑧ ~~12/9/82~~ — ~~1 observed for about 15 minutes, 50 metres off shore from hostel.~~ Appeared to be about 2 metres in length(biggest i've seen). It was too far away to observe a definite shell pattern, however the edges seemed to be clean. Also when its head appeared above the water i couldn't see a beak, as such. In my opinion from what diagrams and photos we have, it was possibly a Green Turtle.



MINISTRY of TRANSPORT

NEW ZEALAND METEOROLOGICAL SERVICE

P.O. BOX 722, WELLINGTON 1
TELEPHONE: 729-379
TELEGRAMS: METEO

SALAMANCA ROAD,
KELBURN,
WELLINGTON 1

November 9 1981.

Mr G.H.Balazs
Hawaii Institute of Marine Biology
Hawaii

Dear George:

I have just had a note from the new team on Raoul Island and enclosed three more turtle reports which may be of interest.

Kind regards

John J.Thompson

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by R.L. GLENNIE Date 22-10-81 Time 1100hrs

Address & Tel. No. (optional) RAOUL Is.

Location (indicate on chart) X

Observation made from: ✓ shore;
___ boat; or while ___ skin
___ SCUBA diving.

Estimated size (shell length Couldn't see it.

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): none available as head only appeared a couple of times and not seen again.

Other comments:

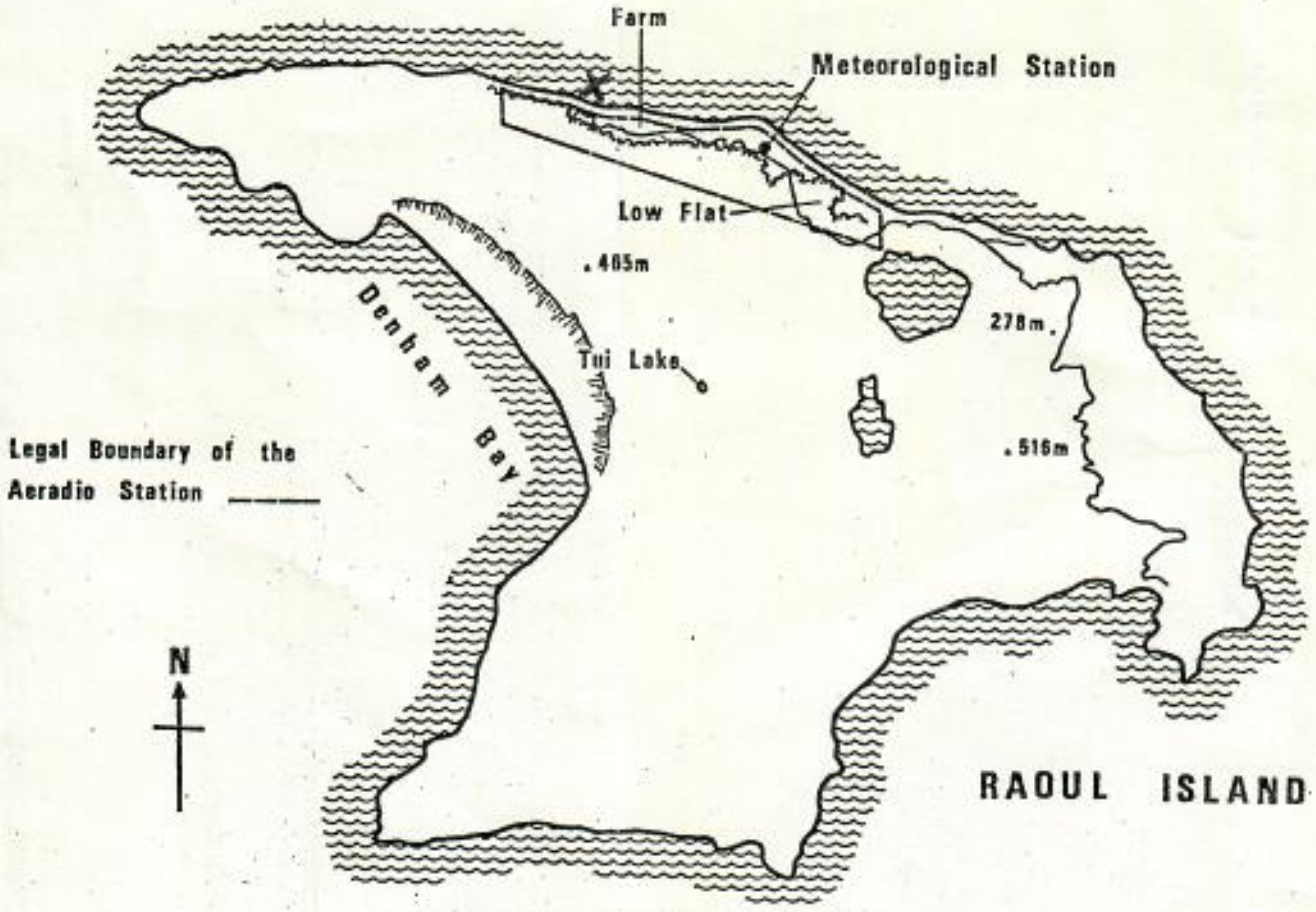


Fig. 2. The main features of Raoul Island.

Please return to -

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by PETER MACROSTIE Date 19-10-81 Time 1500

Address & Tel. No. (optional) C/- C.P.O. OVERSEAS BRANCH AUCKLAND.

Location (indicate on chart)_____

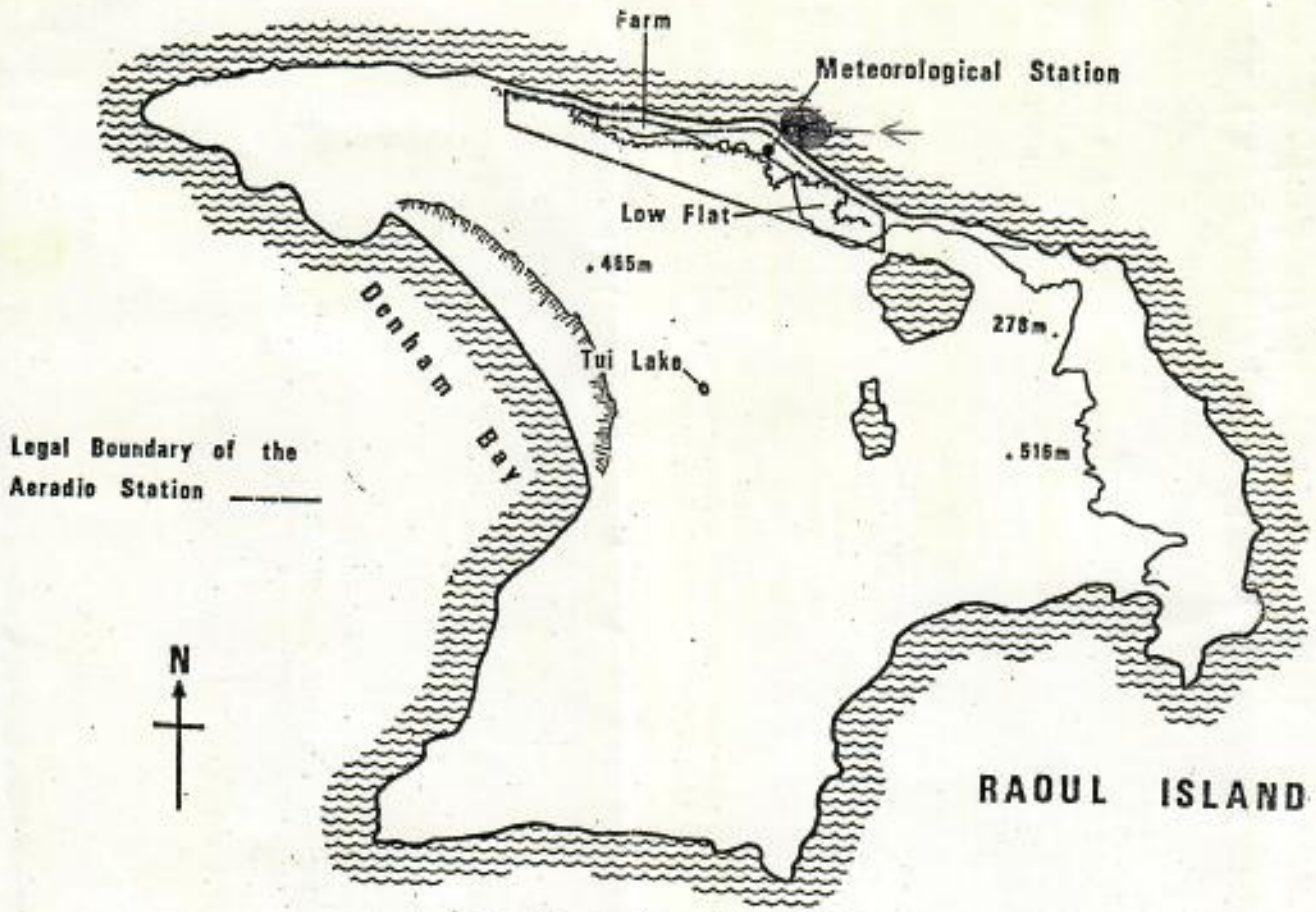
Observation made from: ✓ shore; ____ boat; or while ____ skin ____ SCUBA diving.

Estimated size (shell length 3-4 FEET

Turtle seen on: ✓ surface; or at depth of approx. ____ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): NOT CLOSE ENOUGH TO SEE ANY DISTINGUISHING CHARACTERISTICS

Other comments: THAT NIGHT THREE OF US WALKED ALONG THE BEACH BUT FAILED TO SIGHT ANYTHING



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Please return to -

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by C.F. Buchanan Date 16-10-81 Time 1200 hrs

Address & Tel. No. (optional) Raoul Island

Location (indicate on chart) _____

Observation made from: ✓ shore;
____boat; or while ____skin
____SCUBA diving.

Estimated size (shell length Largest 6 ft. others 4 ft.

Turtle seen on: ✓ surface; or at depth of approx. ____ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.):
Too far away to see anything.

Other comments:
Total of five turtles in this group

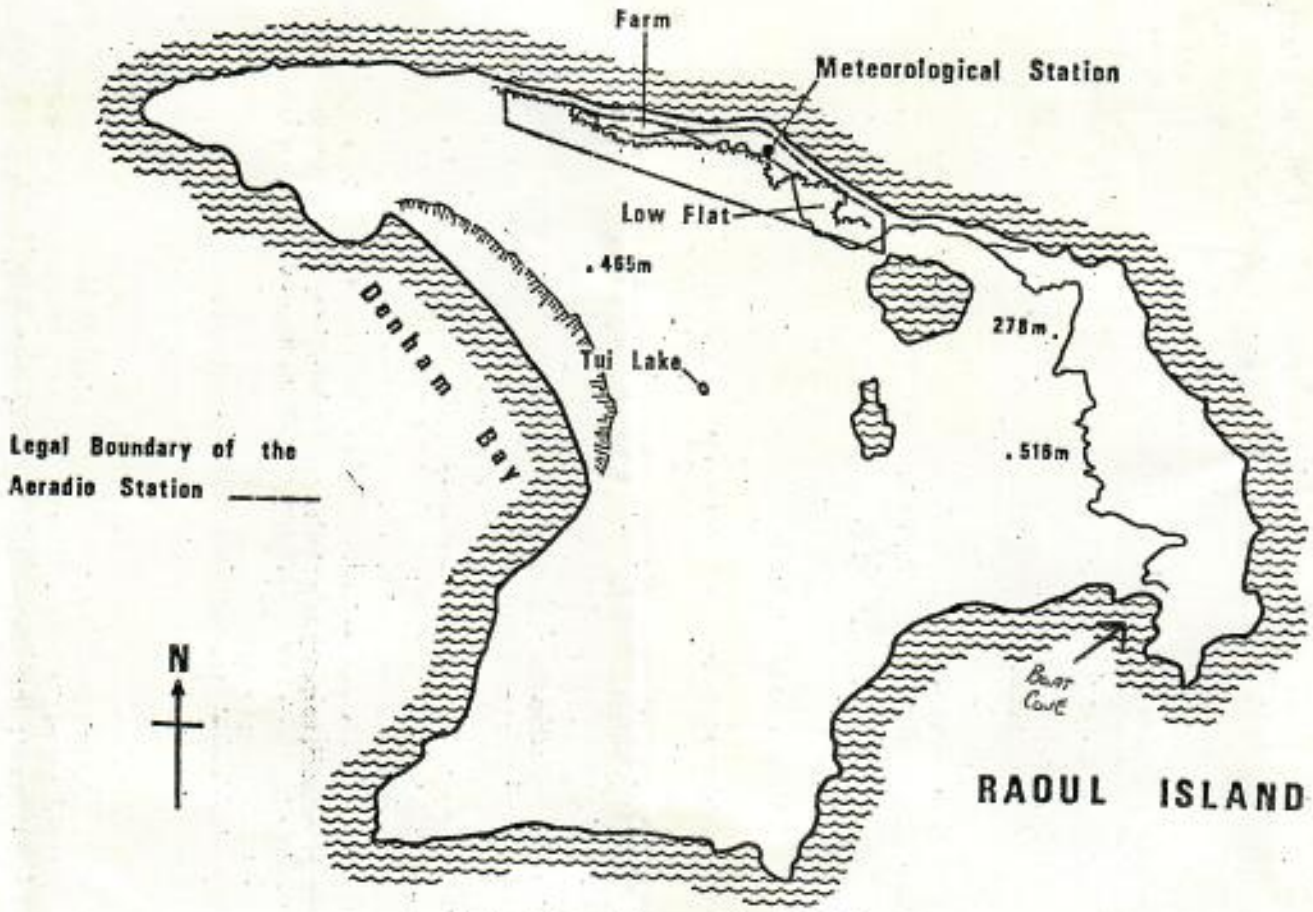


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by P. D. Gaze Date 13-11-80 Time 1800hrs

Address & Tel. No. (optional) DSIR NELSON

Location (indicate on chart) _____

Observation made from: ✓ shore; ___ boat; or while ___ akin ___ SCUBA diving.

Estimated size (shell length 75cm

Turtle seen on: ✓ surface; or at depth of approx. ___ ft. very briefly

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): Sorry !

Other comments: Just beyond breakers c 30m offshore

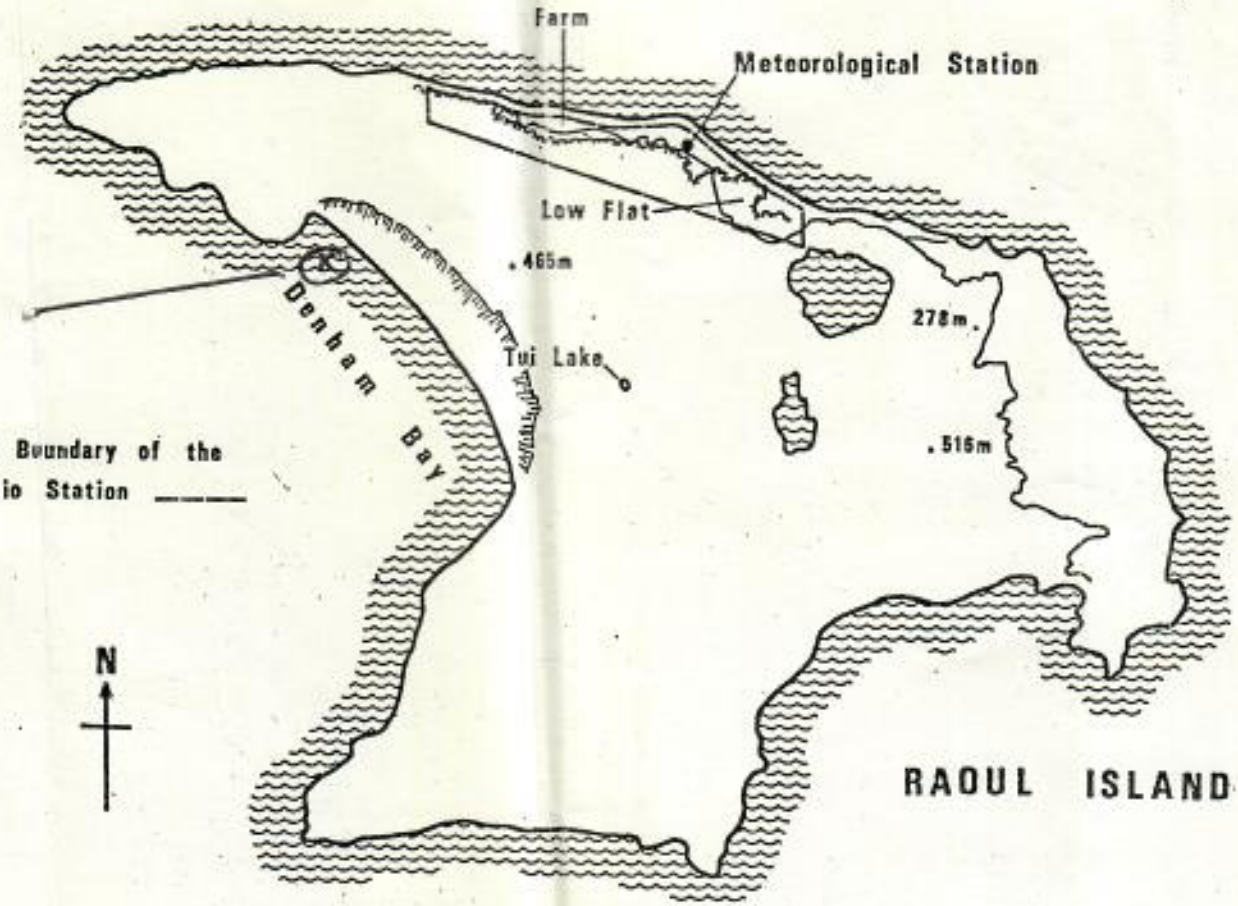


Fig. 2. The main features of Raoul Island.

Please return to -

MINUTE SHEET

Subject: TURTLE SIGHTING.

Department: .....

File No.: .....

Date: 1-2-80

To –

METEOROLOGICAL OFFICE
KELBURN. WELLINGTON
NEW ZEALAND.

GEORGE H. BALAZS.

During our yearly changeover of staff at Raoul Island I had a short discussion with the outgoing cook who was a keen fisherman and tramper at Raoul. He made the following comment which may be of interest to you.

"On the 10 March 1980 I sighted 11 turtles more or less together in Turtle Bay. They were feeding close inshore. It is my opinion that the turtles seen at Raoul Island do not come ashore to breed but only rest and feed on their way to the breeding ground"

Also please find enclosed two sighting reports by staff at Raoul.

Yours faithfully
John J. Thompson
Senior Technical Officer
Branch Office.

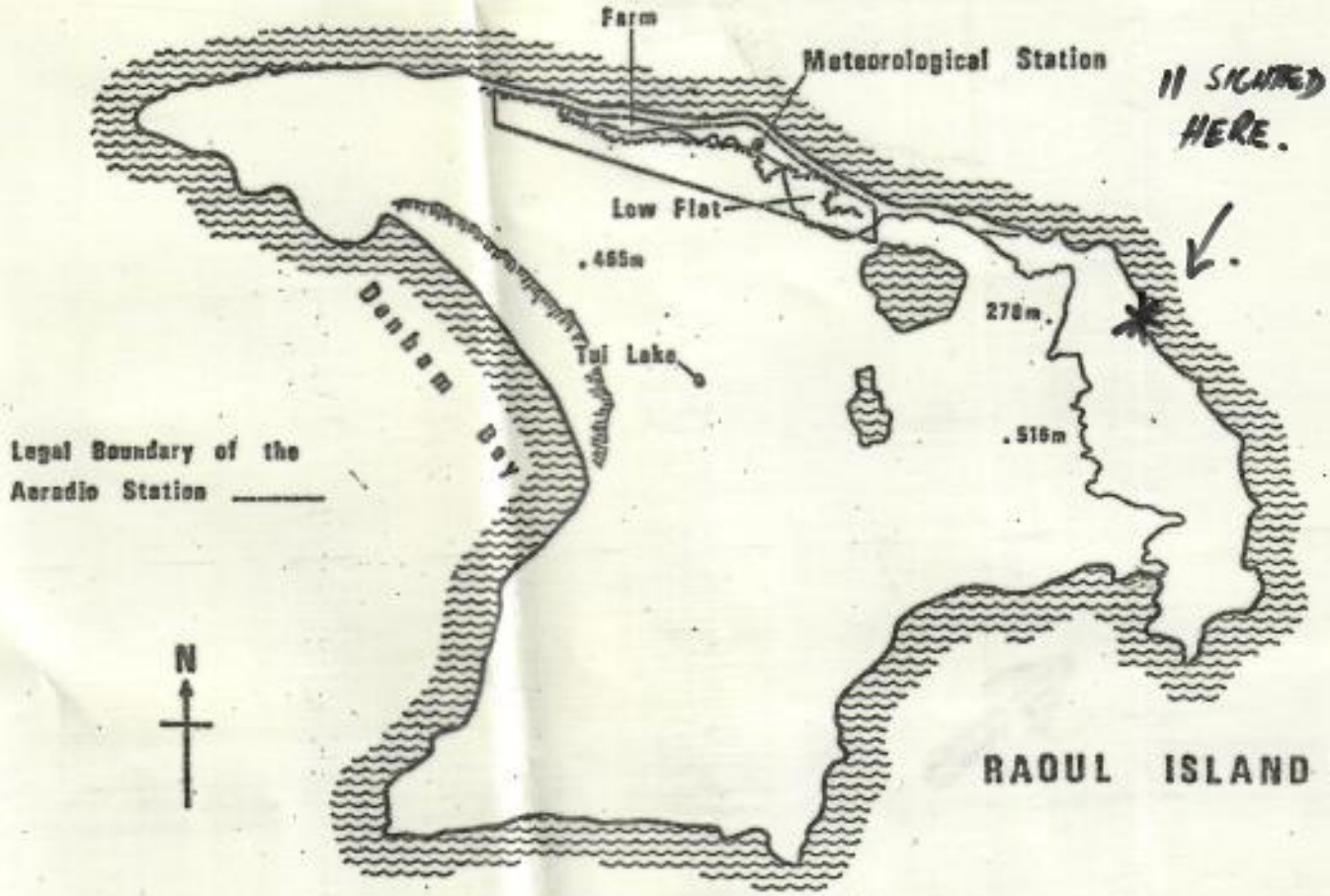


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by A,J. McDougall **Date** 29/10/80 **Time** 1415

Address & Tel. No. (optional) Raoul Is

Location (indicate on chart) Boat Cove

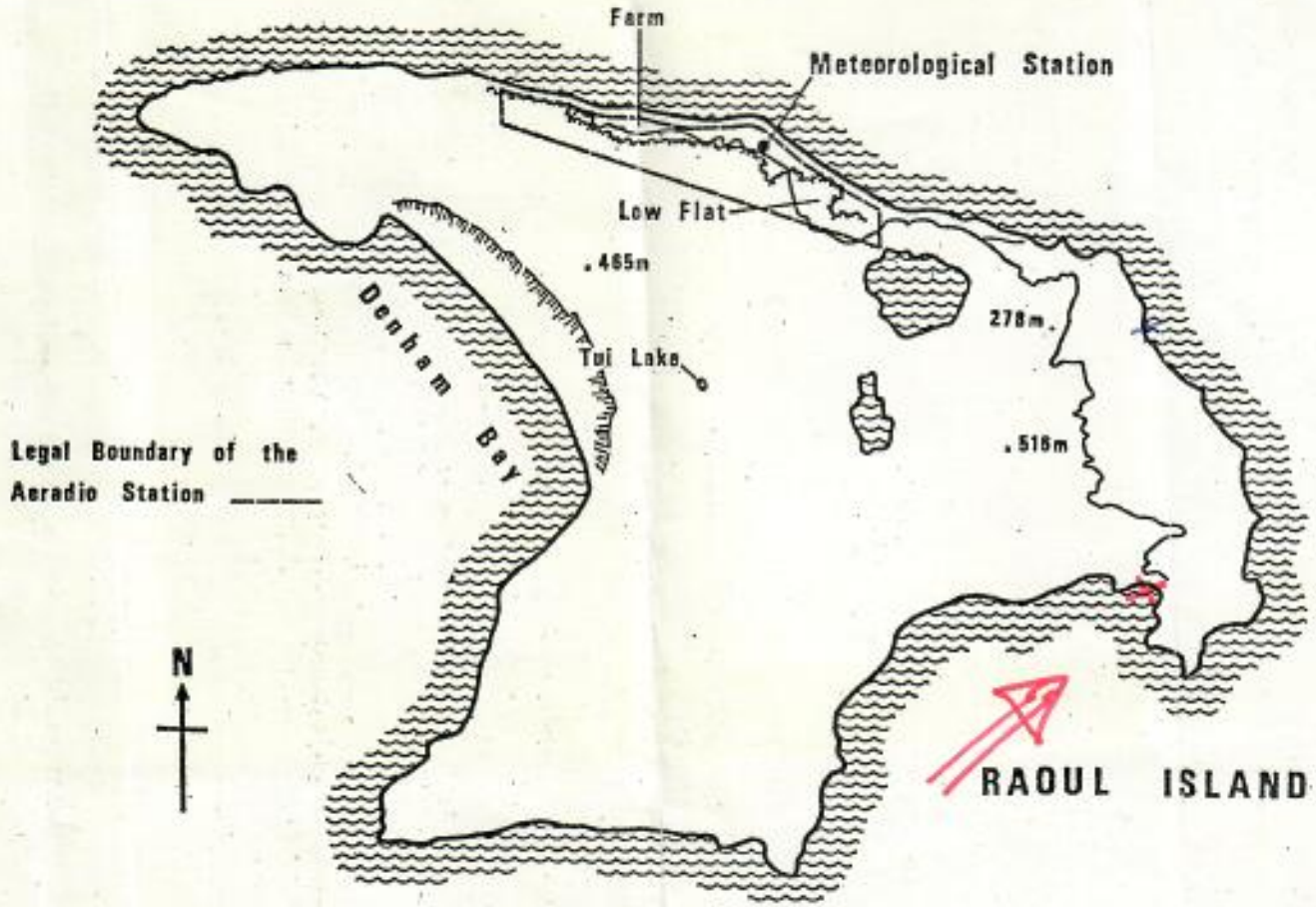
Observation made from: X **shore;**
____**boat; or while** ____**skin**
____**SCUBA diving.**

Estimated size (shell length 18 Inches

Turtle seen on: X **surface; or at depth of approx.** ____**ft.**

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): Small Green One Ten Ft offshore

Other comments: Dived when he/she saw us



A PROGRAMME TO EXTERMINATE INTRODUCED PLANTS ON RAOUL ISLAND

MINUTE SHEET

Subject:

Department:

File No.

Date: 9-6-81.

To—

Dear George,

Please find enclosed a turtle report from one of our reporting ships.

I have instructed our marine meteorological officer to enlist the support of ships in our area in reporting turtles enroute so we may be able to supply more information to complement the reports from Raoul Island.

Kind regards

John J. Thompson

S.T.O. Met Office

Kelburn, Wellington

Item 504

90608B—140,000 pads/2/77 D

RE

any plain language remarks amplifying the coded report, and notes and comm

PANAMA to S

TURTLES OBSERVED 7th DEC. 1980.

	TIME		
(1)	1450Z	LAT. 06° 02' N	83° 24' W.
(2)	1500Z	06° 00.8' N	83° 27' W
(3)	1537Z	05° 56.5 N	83° 38.7 W.

OBSERVERS R.J CROSSWELL 3/O R. LA

ALL THREE TURTLES WERE OF SIMILAR

LENGTH APPROX 1 METRE WIDTH 0.8 M.

ALL WITHIN 30 METRES OF VESSEL AND ALL ST

THEN PROCEEDED TO SWIM AWAY FROM SHIP

81504H—500 bks./7/76 MTC

MARKS

...nts on special meteorological observations or any other natural phenomena observed during th...

...SONEY,

COURSE 251° x 20.5 KTS

WIND CALM SWELL LOW SW.

TEMP. DRY 28.5 W. 25.4 SEA 28.0

PRESS 1013.3 CLOUD 3/8 CL 3

...YCOCK C/O J. BRENNAN A.B.

shell sections?

...APPEARANCE: EACH SHELL APPEARED TO HAVE 8 SECTIO...

LIGHT BROWN SHELL WITH SMALL BLACK PATCHES

...ATIONARY UNTIL DISTURBED BY VESSEL, WHEN THEY

...S CRESSWELL P.O.

MET...

With the Compliments

of the

Director of the New Zealand

Meteorological Service

Tel. 729 579
WELLINGTON

Telex 31...

MINISTRY of TRANSPORT

NEW ZEALAND METEOROLOGICAL SERVICE

P.O. BOX 722, WELLINGTON 1
TELEPHONE: 729-379
TELEGRAMS: METEO
TELEX: 31392

SALAMANCA ROAD,
KELBURN,
WELLINGTON 1

17 October 1981

Dear George:

Please find enclosed two reports on turtle observations from Raoul Island.

We have a new team on Raoul as of 1 October and they have all been briefed on your requirements.

Kind regards.

John Thompson.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by B. A. Hagan Date 13-9-81 Time Mid Afternoon

Address & Tel. No. (optional) _____

Location (indicate on chart) _____

Observation made from: ___ ~~shore~~; >100 ft up cliff.
___ boat; or while ___ skin
___ SCUBA diving.

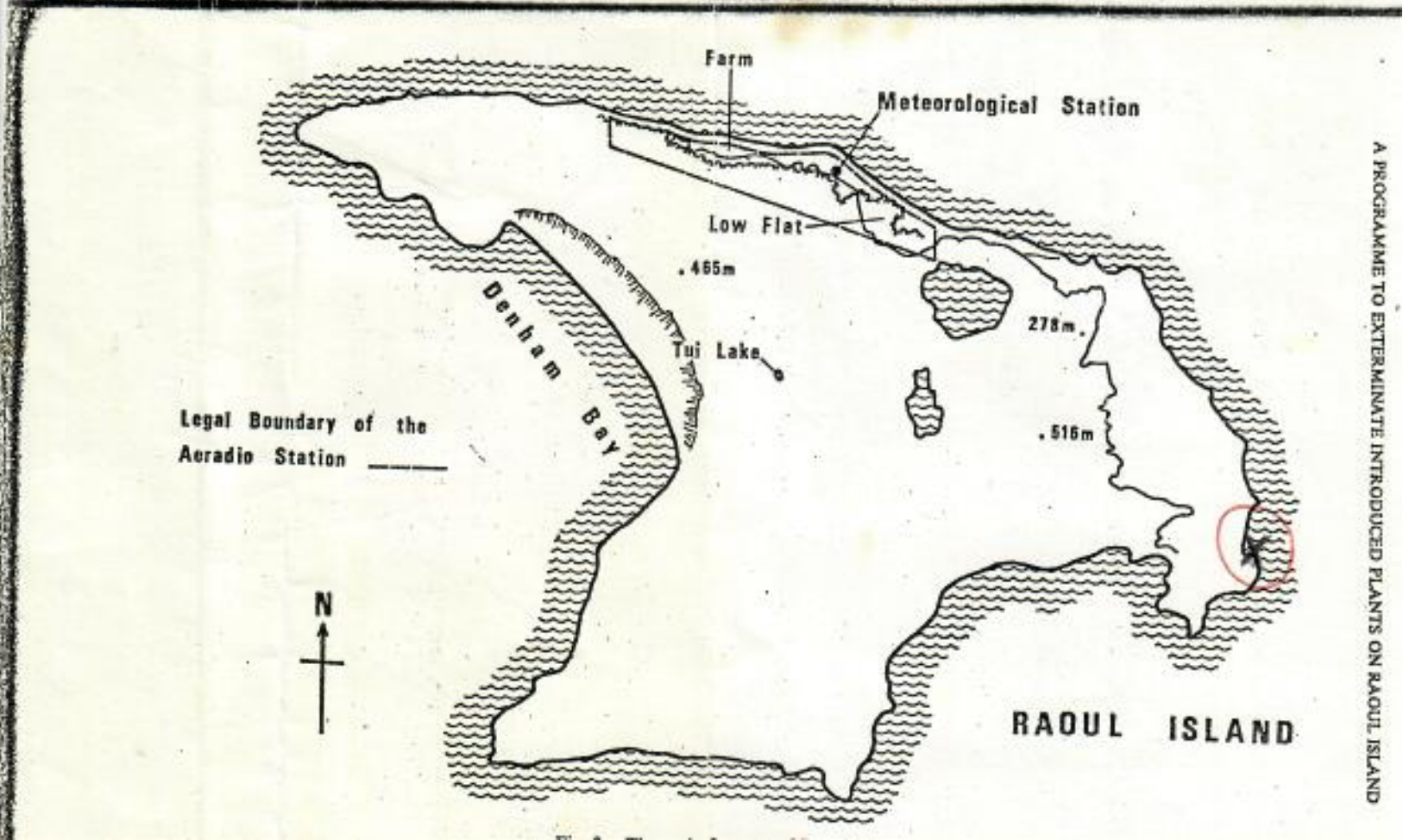
Estimated size (shell length 3 ft approx.

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): To far away for my limited eyesight and only seen very momentarily also sweat in eyes. Hot day.

Other comments: _____

Please return to -



SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by R GLENNIE Date 25-8-81 Time morning

Address & Tel. No. (optional) _____

Location (indicate on chart) _____

Observation made from: ✓ shore; ___ boat; or while ___ skin ___ SCUBA diving.

Estimated size (shell length 18"-2'

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): HAWKSBILL TURTLES SIX SIGHTED SAME DAY SAME TIME SAME PLACE SAME ISLAND.

Other comments: _____

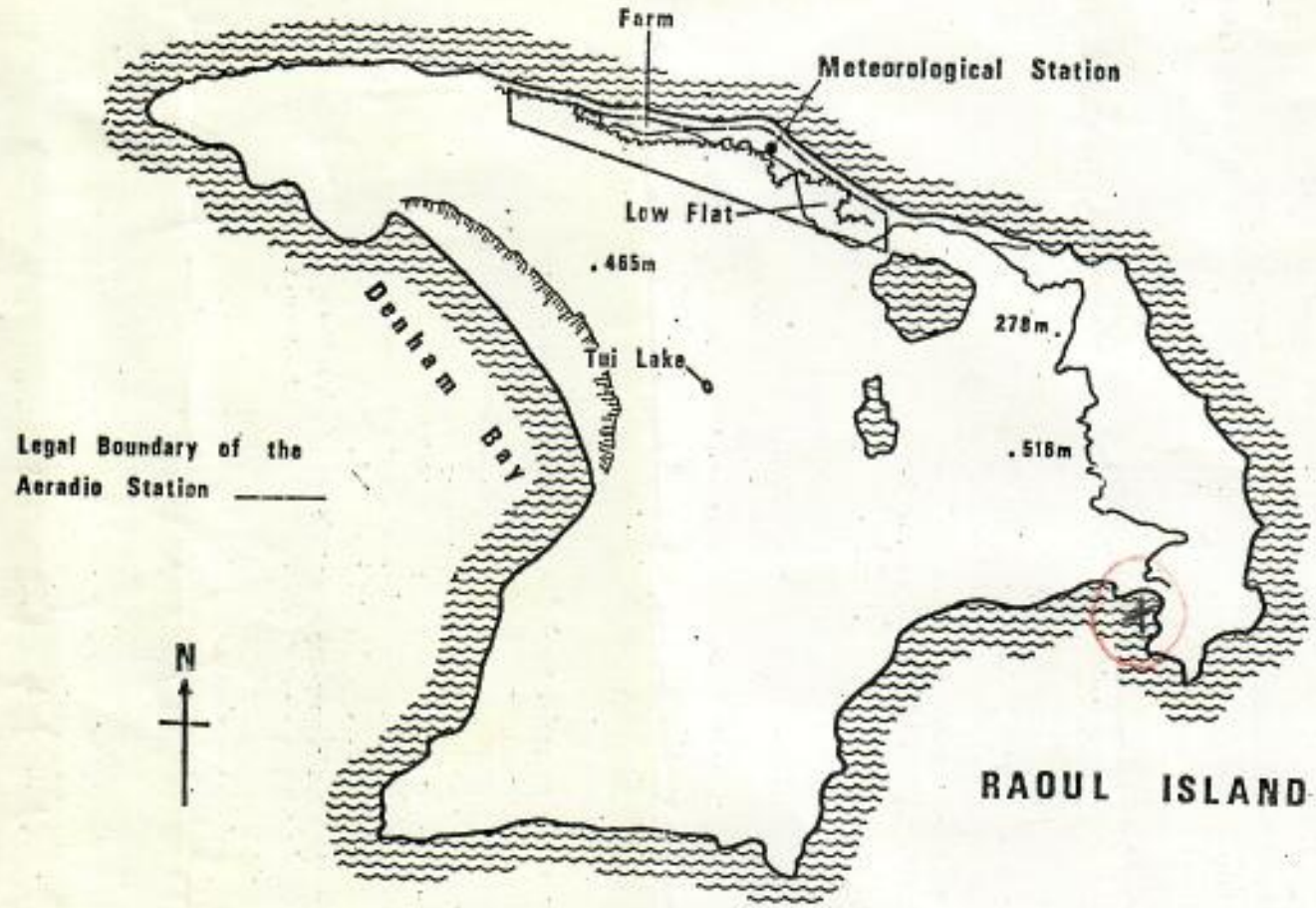


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by A ROBINSON Date 7 JULY 1980 Time 10-30 AM

Address & Tel. No. (optional) _____

Location (indicate on chart) BOAT COVE

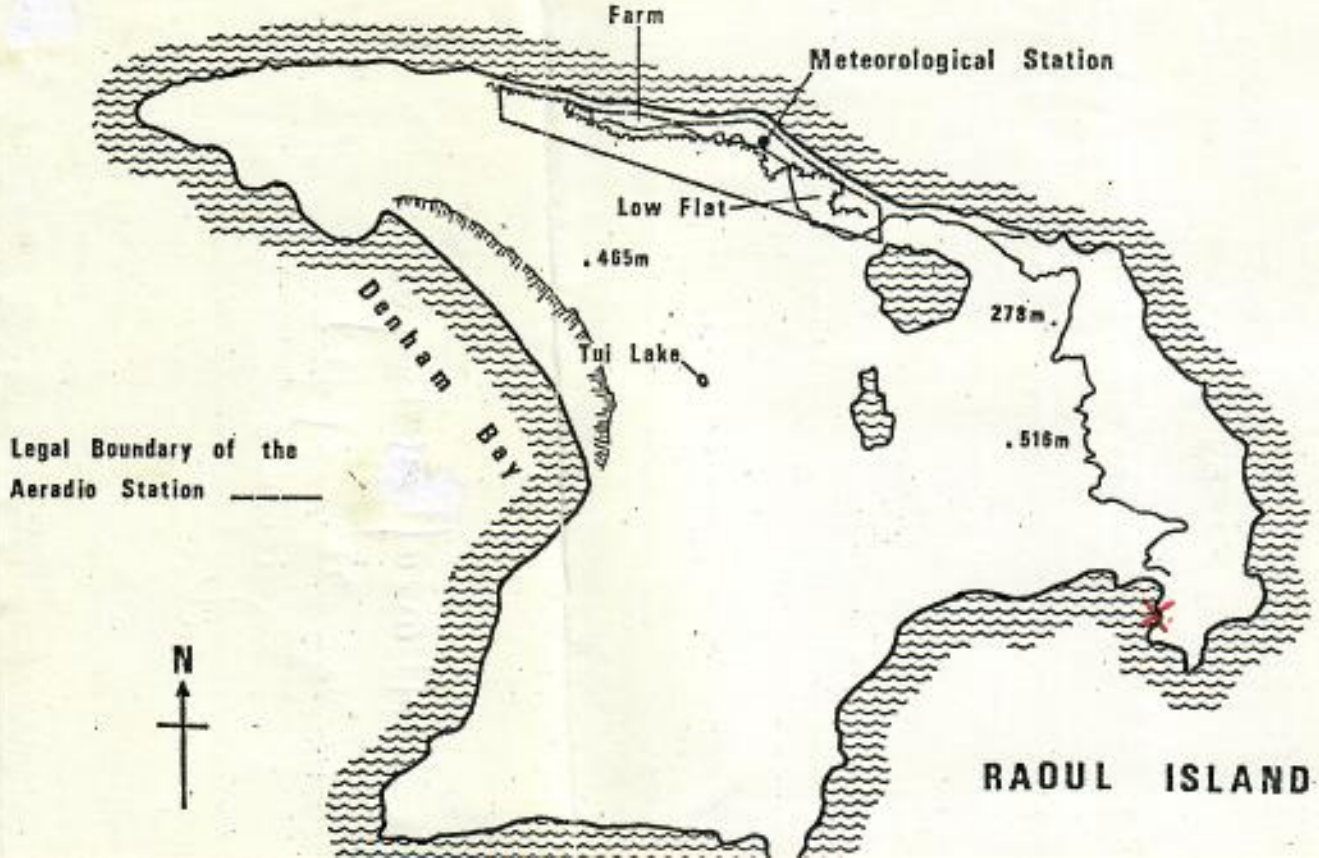
Observation made from: / shore; ____boat; or while ____skin ____SCUBA diving.

Estimated size (shell length 2 FOOT

Turtle seen on: / surface; or at depth of approx. ____ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): PROBABLY GREEN TURTLE

Other comments: PRESENT FOR SOMETIME. SURFACING AND DIVING



A PROGRAMME TO EXTERMINATE INTRODUCED PLANTS ON RAOUL ISLAND

MINUTE SHEET

Department: .....

Subject:

File No. .....

Date: 29/10/80

To—

VAL.

ONE MORE REPORT FROM RAOUL.
WE HAVE JUST CHANGED THE TEAM
AT RAOUL AND I THINK SOME MORE
BADGES WOULD SPUR THE NEW MEN
ON AND ALSO ANY COLOURED
POSTERS OF TYPES WOULD BE APPRECIATED.

REGDS.

John Shenton.

Item 504

OYLES 95341

Ministry of Agriculture and Fisheries

MEMORANDUM

TO:
FROM:
SUBJECT:
DATE:

Hello George,

Another contributor!

Note comment + action if you think worth while.

Val

Val Hinds
Assistant Director (Technical)
Fisheries Management Division

24/10/88. Regards to Harold Hirsch if you ever come in contact.

V.

WITH THE COMPLIMENTS OF
THE DIRECTOR
FISHERIES MANAGEMENT DIVISION
Telephone 720-367 P.O. Box 2298 Wellington New Zealand

L&S F15

PLEASE ADDRESS ALL REPLIES TO

Lands and Survey Department
P.O. Box 5249
AUCKLAND. 1

OFFICE

OUR REF:

YOUR REF:

2 July 1985

ND"

I am writing to you on behalf of Mr. Jonathan Maxwell who is at present working for the department on Raoul Island, in the Kermedec group. Jonathan has asked me to forward the enclosed photographs to you. These are the turtles frequently ~~seen~~ seen around Meyer Island near the water's surface feeding on Bluebottle jellyfish.

I hope that these photos will be of interest to you.

Yours Faithfully,

P.A. van der Sande

P.A. van der Sande
for

24291H—10,000pads/10/84 MK

L&S F15

DEPARTMENT
OF
LANDS AND SURVEY

PLEASE ADDRESS ALL REPLIES TO
Lands and Survey Department
P.O. Box 5249
AUCKLAND. 1
OFFICE
OUR REF:

YOUR REF:

2 July 1985

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P.A. van der Sande

P.A. van der Sande
for

24291H—10,000pads/10/84 MK

MEYER IS.
JONATHAN MAXWELL
"FEEDING ON BLUEBOTTLE JELLY FISH"

Ministry of Agriculture & Fisheries

P.O. BOX 2298 WELLINGTON
NEW ZEALAND

DFI BUILDING
110 FEATHERSTON ST
PHONE 720 367

Ref: 9/3/2/12

September 18 1980

Mr G H Balazs
Asst Marine Biologist
Hawaii Institute of Marine Biology
PO Box 1346
Coconut Island
Kaneohe
HAWAII 96744

Dear George

As a follow-up to my letter of August 4, herewith the ... material received from Raoul Island Turtle Watchers via the survey vessel "Monowai".

Hopefully they will continue their efforts.

With best regards.

Val Hinds.

(V T Hinds)
Assistant Director (Technical)
Fisheries Management Division

Encls

Val Hinds
~~Assistant Director (Technical)~~
Fisheries Management Division
MAF. BOX 2298
WELLINGTON, NEW ZEALAND

Ministry of Agriculture & Fisheries

P.O. BOX 2298 WELLINGTON
NEW ZEALAND

DFI BUILDING
110 FEATHERSTON ST
PHONE 720 367

Ref: 9/3/2/12

September 18 1980

Mr G H Balazs
Asst Marine Biologist
Hawaii Institute of Marine Biology
PO Box 1346
Coconut Island
Kaneohe
HAWAII 96744

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Val Hinds.

(V T Hinds)
Assistant Director (Technical)
Fisheries Management Division

Encls

Val Hinds
Assistant Director (Technical)
Fisheries Management Division
MAF. BOX 2298
WELLINGTON, NEW ZEALAND

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by B. G. COBURN Date 12/5/80 Time 0840

Address & Tel. No. (optional) _____

Location (indicate on chart) ④

Observation made from: ✓ shore; ___ boat; or while ___ skin ___ SCUBA diving.

Estimated size (shell length ≃ 30"

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): Green turtle.

Other comments: Seen for about one minute on surface. Turtle the submerged and was not sighted again.

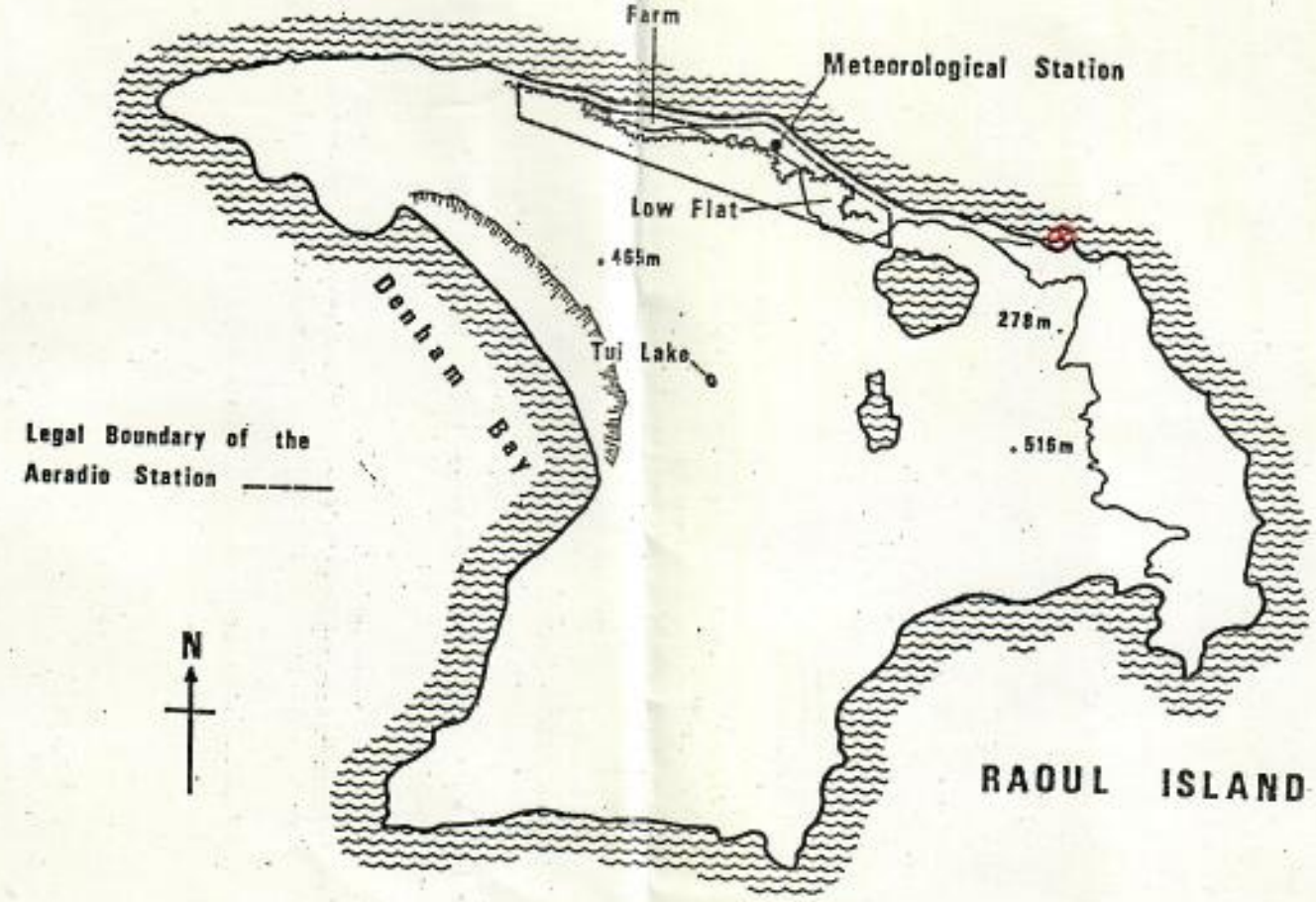


Fig. 2. The main features of Raoul Island.

Please return to -

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by S OGG Date 14/12/79 (Dec) Time

Address & Tel. No. (optional)

Location (indicate on chart) TURTLE BAY : RAOUL ISLAND

Observation made from: ✓ shore;
___ boat; or while ___ skin
___ SCUBA diving.

Estimated size (shell length 4 FEET

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.): GREEN TURTLE. UPPER SHELL HAD EVIDENCE OF CHIPPING OR FLAKING

Other comments: SEEN ON SURFACE SEVERAL FEET OUT ON ROCKY COAST

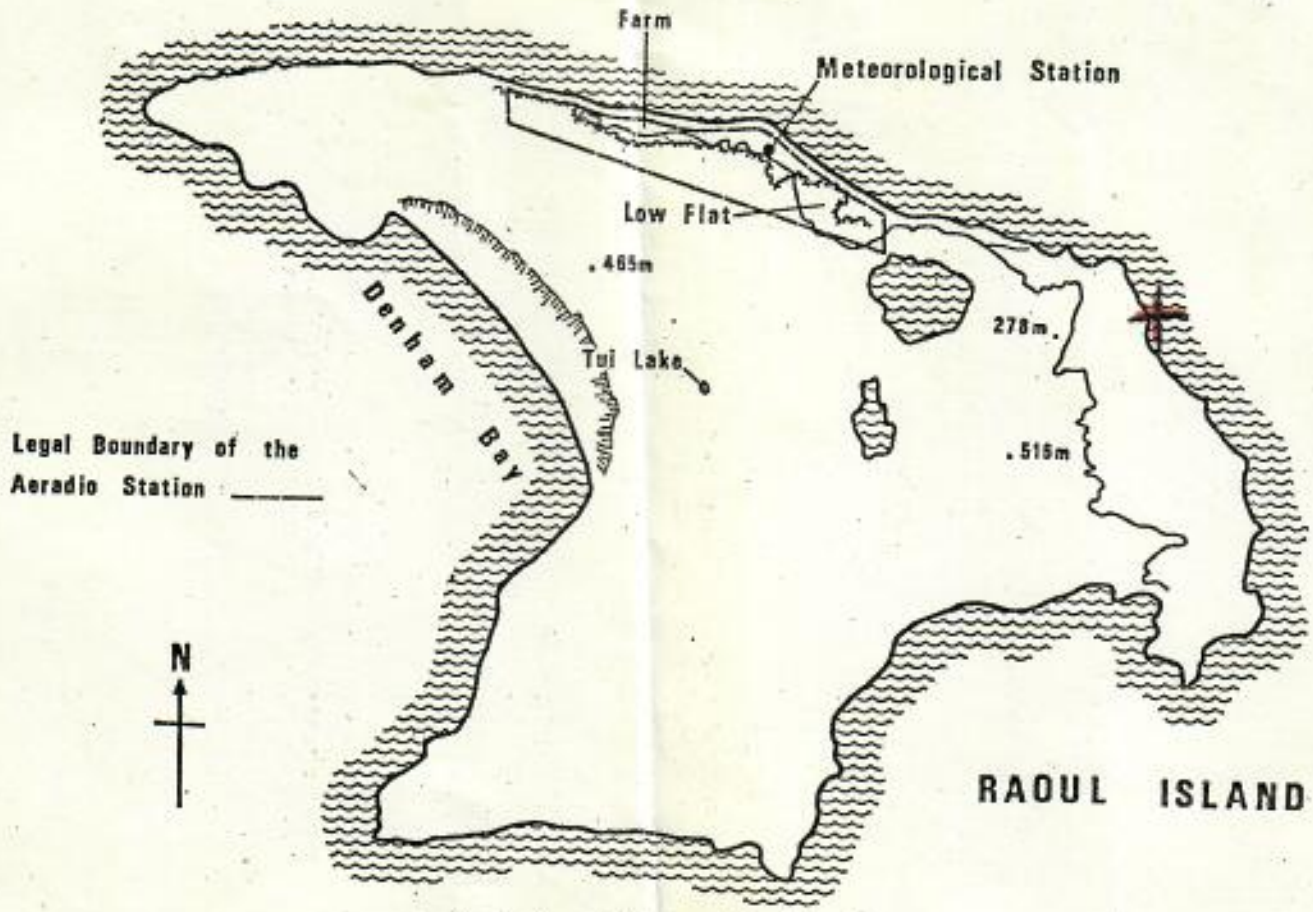


Fig. 2. The main features of Raoul Island.

SEA TURTLE SIGHTING REPORT

Thank you for your cooperation

(Please return to: George H. Balazs; Hawaii Institute of Marine Biology; P. O. Box 1346; Kaneohe, HI 96744; Tel. 247-6631)

Observation made by A. ROBINSON Date 17 JUNE 80 Time APPROX: 1500 HRS

Address & Tel. No. (optional) _____

Location (indicate on chart) X

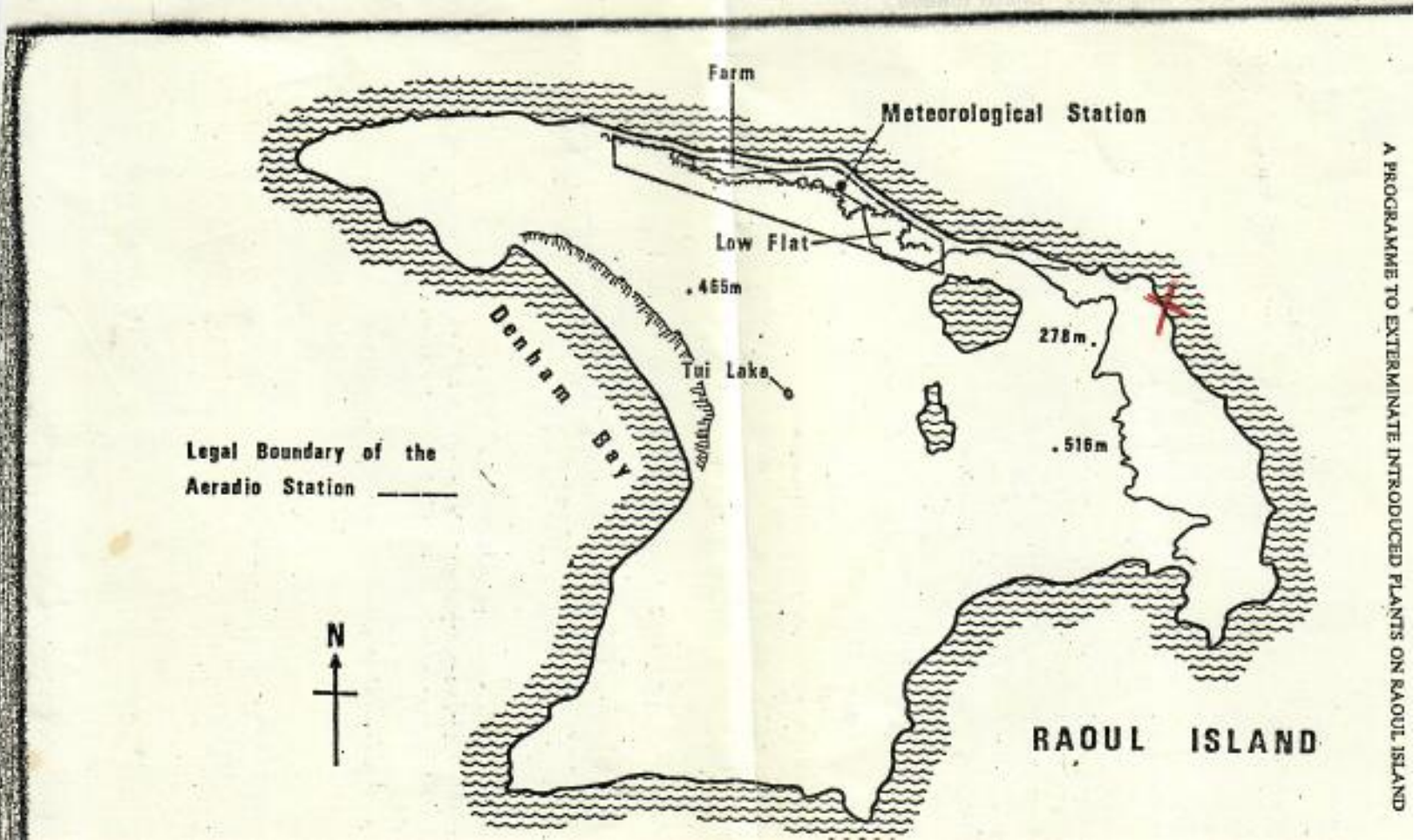
Observation made from: ✓ shore;
___ boat; or while ___ skin
___ SCUBA diving.

Estimated size (shell length 2 FEET

Turtle seen on: ✓ surface; or at depth of approx. ___ ft.

Distinguishing characteristics (species I.D. if known, long tail, shell color, tags, injuries, etc.):
PROBABLY GREEN TURTLES

Other comments: TWO SIGHTED 20 FEET OFF ROCKY SHORE IN THE BRAKER . BOTH SAME SIZE AND TYPE.



A PROGRAMME TO EXTERMINATE INTRODUCED PLANTS ON RAOUL ISLAND