

# THE REEF HERON (*Egretta sacra*) IN NEW ZEALAND

By A. T. EDGAR

## ABSTRACT

This paper presents the results of 1975-76 Reef Heron enquiry in the form of a general account of the Reef Heron in New Zealand, summarised locality reports with two maps and a discussion of the present status of the species.

## INTRODUCTION

The 1975-76 Reef Heron enquiry started as a Northland Regional project, initiated by Mrs K. Reynolds and designed to determine the present status of Reef Herons in the six northern counties of New Zealand and to collect information on nesting, behaviour, feeding habits, etc. The proposed working programme was submitted to OSNZ Field Investigation Committee for approval and guidance. Regional Representatives suggested that the scope of the enquiry should be widened to cover the whole of New Zealand, at least with regard to status and distribution.

Accordingly, records of Reef Herons taken from *Notornis*, other local publications and the OSNZ Recording Scheme were listed by regions and sent to Regional Representatives with a request for additional records and recent sightings. Nest Record cards were examined and details recorded. Further information was kindly provided by the National, Auckland and Canterbury Museums and by the N.Z. Wildlife Service.

An account of the Reef Heron in New Zealand includes notes on plumage, colour of soft parts, habitat, field characters and general habits, food, feeding habits and breeding. Summarised locality reports, compiled from information received, are supplemented by two maps. The results of the enquiry confirm that, at least in some areas, the Reef Heron population has shown a marked decline over recent years. Factors which may have contributed to this decline are discussed.

Names of contributors are listed, and identified in the text by initials. References to *Notornis* (including *N.Z. Bird Notes*) and its predecessor *Reports & Bulletins (1939-1942) of Ornithological Society of New Zealand* are given thus — (13/153) = *Notornis* Volume 13, page 153; RB15 = *Reports & Bulletins*, page 15.

It is evident that some observers find difficulty in distinguishing between the Reef Heron (*Egretta sacra*) and the White-faced Heron

(*Ardea novaehollandiae*). The plumage of both species is generally blue-grey. An old local name for the Reef Heron is "Blue Heron," and in Australia the White-faced Heron is sometimes loosely called "Blue Crane." The two species may be found together in harbours and estuaries but the Reef Heron is almost exclusively a coastal bird; the White-faced Heron also frequents inland waters, swamps, ponds and ditches and often congregates in paddocks. The White-faced Heron may nest in mangroves but generally prefers to nest high in tall trees; the Reef Heron nests along the coastline, usually in caves and crevices, sometimes in the shelter of overhanging pohutukawas or thick coastal vegetation. There are several easily observed field characters which, once appreciated, should eliminate confusion. The White-faced Heron has an upright stance, long legs, pale grey plumage with a wash of purplish-brown on the breast and an extensive white area on the face. The Reef Heron has a more crouching gait, shorter legs, a heavier bill, slaty grey plumage and no white on its face; a narrow white stripe on chin and throat is rarely visible in the field. In flight, the two-tone wing of the White-faced Heron (dark flight feathers contrasting with pale grey wing coverts) is distinctive. A flying Reef Heron appears to be all one colour.

The range of the Reef Heron extends from southern Asia to Australia, eastern Polynesia and New Zealand. The species is dimorphic, having a white and a dark phase. Both phases occur in the tropical parts of its range, in proportions which vary with the locality, but the white phase is not known to occur in New Zealand.

#### PLUMAGE

Adult, general colour slaty grey, darker above, tinged brown on the lower surface. A variable white patch or line on chin and throat, sometimes extending down the foreneck. Elongated feathers on the nape; narrow lanceolate bluish grey ornamental plumes, up to 180 mm long, on the back; similar feathers on the lower neck, overlapping the breast.

Immature, general plumage browner and duller, especially on the upper surface. No plumes.

Field observers frequently comment on the marked variation of plumage colour in different individuals. Partly this may be due to light conditions — on a dull day a bird may appear very dark, in strong light it may appear light bluish grey — but the general plumage of individuals can in fact vary from slaty grey to almost black and this is not always dependent on age, light or plumage condition. Birds in fresh plumage may have a "bloom" which, seen in strong light, gives the impression that the general colour of the bird is much lighter than it really is. Birds in worn plumage tend to become browner and

this probably also applies to museum specimens. GAT\* examined eight study skins in the Canterbury Museum and commented on the brownish nature of their plumage. One specimen had no plumes and could have been a young bird but the other seven had plumes and were presumably adult. In the field, however, it is probably safe to assume that a bird is immature if it shows a strong brownish tinge on the upper surface and wing coverts.

The white throat patch is inconspicuous in the field, though it can be seen if the bird is observed from below and stretches its neck and is obvious when the bird points its bill upwards in the process of swallowing some large food item.

In some birds it reaches up to the chin, in others the actual chin is dark; in first year birds the patch may be short and not fully developed (FCK). Buller (1888), writing of a first year bird, stated "gular streak, instead of being narrow throughout, expanded in the middle." MJT recorded a throat patch c. 30 mm broad, on a bird observed at Warkworth. In Canterbury Museum specimens (GAT) the patches fitted into two fairly easily recognisable shapes, narrow and broad; lengths of patches were — one male, 70 mm; three females, 60, 87, 88 mm; three, unsexed but with plumes, 62, 65, 70 mm; one, unsexed, no visible plumes, 93 mm. Moon (1960) described a breeding pair in which the male throat patch was c. 90 mm and that of the female only c. 25 mm. There seems to be much individual variation, not necessarily connected with age or sex.

## OTHER FEATURES

### *Iris*

Generally recorded and described as yellow to golden yellow. Moon (1960) said — "varies from light orange to red," and described a mated pair he watched and photographed over a long period, the female of which had an orange red iris while that of the male was more yellow. JFS reported a bird at Huia on 8 July 1976: its iris, caught in sunlight, showed a glowing red.

### *Naked skin on lores*

Generally described as greenish yellow. I have notes of a February bird which had greenish brown lores and of a June bird of which the lores were grey, with no green or yellow tinge. FCK commented "with immature birds the colour is grey, as it is with many adult birds during the non-breeding season. In the breeding season it varies between bluish green and yellowish green and is more yellow than green at the height of the season, i.e., before egg-laying."

---

\* For names of informants see under "List of Contributors . . ."

### *Bill*

Adult, dark yellow, shaded with brown on culmen and sides, horn coloured at the tip. Immature, dark brown (Oliver 1955).

There is general agreement that bill colour of immature birds is brown, sometimes with a greyish or greenish tinge.

Field notes indicate that there is considerable variation in bill colour of adults during spring and summer. Descriptions recorded range from brown to brown tinged yellow, yellowish brown with yellow tip, dull yellow, yellow, very yellow, almost orange and ochreous yellow with a touch of tan. FCK considers that the amount and intensity of yellow colouring depends on age and the time of year; with adults in breeding season the bill can look very yellow but there is always some brown present; outside the breeding season the bills of adults and those of immatures are brown, with the lower mandible somewhat lighter than the culmen; or can be all greyish brown with only a lighter stripe along the cutting edges. Field notes for the February-June period give support to this; e.g., in a secluded bay in the Far North bill colour of two (presumably the same two) birds was recorded as dull brown in March, pale yellow in August. Bills recorded as grey (DJB, April), slate-grey, slightly tinged green (AJG, November) and olive (SQ, December) may have been those of young birds.

D. C. Watson (21/391) recorded Reef Herons with white bills at Warkworth and Raglan. Could this perhaps have been a trick of the light? Many observers have been plagued and puzzled by the way strong or reflected light can cause a false impression of the colour of bill, legs and even lower plumage of shore birds. PGS wrote of two *Aurere* herons in July 1976 — "beaks and legs at 50 yards distance, in sunlight, appeared to my eyes to be slaty grey with a yellowish tinge; when the birds finally flew, with the sun behind them, feet and beak were obviously yellow."

### *Feet*

Adult, greenish yellow, claws horn; immature, yellow (Oliver 1955). The colour of the tarsus is variable in adults. In some birds it appears grey or greyish green, with or without a tinge of yellow; in others it is described as olive, olive yellow, yellowish olive-green, yellowish green or greenish yellow. The scles (i.e., toes from below, as seen when a bird flies away from the observer) are yellow. In some examples the upper surface of the toes is yellow and this yellow colour may extend to the lower part of the tarsus above its junction with the toes. These may perhaps be cases in which the yellow of young birds is fading to the greener shades of maturity. Most adults have the front of the tarsus patched or mottled with black to some degree and this mottling may extend on to the upper surface of the toes. FCK commented that this is caused by an individually varying amount

of black pigment in the scales, which is present in most birds, sometimes dense and regularly distributed, giving the front of the tarsus a very dark, almost blackish appearance, but often not present in every scale and therefore not so obvious, as it forms only irregular black patches. Usually the exposed portion of the leg is one general colour but sometimes the tibia and joint may be darker than the tarsus.

#### Measurements

Bill 80-92, Wing 285-295, Tail 100-108, Tarsus 76-90, Mid-toe 65-70 mm (Oliver 1955).

#### HABITAT

Normally the Reef Heron is a bird of coastal rocks and the tide line, preferring sheltered situations in bays and estuaries which provide good sites for crevice nesting and also suitable conditions for intertidal feeding. Inshore islands which satisfy these requirements are a favoured habitat; the more exposed offshore islands are not, probably because their coasts, though suitable for nesting, are generally unsuitable for feeding. Long sandy beaches are usually avoided except when their continuity is broken by sizeable rocky outcrops. Inside harbours and estuaries Reef Herons frequent sandy beaches and tidal mudflats as well as rocky shores and in northern harbours may be seen feeding under the mangroves. Sometimes they feed up tidal rivers, e.g., Hatea river, upstream from Port Whangarei; Clevedon river, 3½ km upstream from the mouth; and (MJT) Mahurangi river as far inland as Warkworth. Usually rather a shy bird, but individuals which have become attached to urban localities such as Warkworth, the upper reaches of Manukau harbour and the Wellington wharf area, or which frequent stretches of coastline bordered by main highways, seem to lose all fear of pedestrians and passing traffic.

Inland records are few and some of them doubtful. Smith (1889: 221) recorded the Reef Heron as common in the summer and autumn, when eels and grayling are plentiful, in the Arnold and Lake Brunner. As far as I know there have been no subsequent records from this area and this may be one of the early instances of confusion between *Egretta sacra* and *Ardea novaehollandiae*. Buller (1888) recorded a pair seen by Captain Mair on Lake Taupo in October 1875 and a personal sighting of one at Lake Rotoiti in October 1884. In July 1961 HRMcK and others (9/200) saw one, and later two Reef Herons on the shores of Lake Taupo, on the stones of the groyne or paddling along the sandy beach; one was seen to catch a fish, probably a "cockabully." In April 1974 RMW (21/355) saw one fishing for smelt at Twin Streams, Lake Rotoiti; when waves broke over its tarsal joint it rushed back to the beach, then dashed forward for another fish; a White-faced Heron was further along the beach. CHL saw a bird at Lake Rotoiti in May 1974. Two 1962 records from inland Waikato, one of a single bird in July at

Rukuhia, near Hamilton (LT) and one of two birds on floodwater at Hinuera, south of Matamata, in October (W. Renouf) were probably correct identifications. In November 1975 IAN reported a single bird on the river bank at Athenree gorge, Bay of Plenty. In ten years of observation at Lake Horowhenua, a few kilometres inland from Manawatu coast, EBJ has recorded single birds on four occasions.

#### FIELD CHARACTERS AND GENERAL HABITS

Like other herons, the Reef Heron flies with neck drawn back and legs extended under the tail. Flight appears slow, but is powerful, with regular leisurely downward wing beats; usually on a steady course only a metre or so above the water but sometimes at an altitude of 40-50 m when changing ground — e.g., three birds flying over the sea from Whatipu to a point some kilometres up the coast towards Piha, individuals flying round Manukau north head in the direction of some point well inside the harbour and (MJT) a bird at Waiwera, flying from the coast to some destination well upstream, which had reached an altitude of 50 m by the time it flew over the main highway bridge. Capable of sustained flight from mainland to offshore islands such as Little Barrier (c. 22km) and longer flights would have been necessary to reach some of the more distant islands where it has been recorded as a straggler. At Rangaunu Bay, on a falling tide, when birds were leaving the sandspit for their feeding grounds, I have seen Reef Herons fly up the harbour with the Godwit mobs, soon to be out-distanced by the faster flying waders.

Movement from pool to pool or from one rock perch to another by short flights is a somewhat laboured performance. Take-off is slow, with legs dangling and neck partly outstretched; hardly is the bird airborne, neck drawn back and legs outstretched, than it is time to re-adjust for landing. Longer flights often end with a short glide during which the feet are brought forward and lowered. The bird then generally stands erect for a moment in the alert position, head up, bill horizontal and long feathers smoothed down, before settling to its normal crouching stance.

Reef Herons feed mainly on fish, also on crustacea and molluscs. Small flat fish form a large proportion of food taken; at Onehunga BB watched adults taking flounders up to 125 mm. Larger fish (herrings, etc.) are sometimes taken.

R. Mander reported seeing Reef Herons at 180 m. a.s.l. on Stephens Island on several days in March 1961, apparently catching skinks and geckos. This is perhaps exceptional. Reef Herons do, however, sometimes feed on coastal paddocks. At Kerikeri, in January 1967, I watched one searching for and apparently finding food items on the edge of a paddock which bordered a mangrove swamp. At Paua, in March 1976, a number of Black-backed Gulls were feeding on a coastal paddock and among them, also actively feeding, was a Reef Heron. The following month one was seen in the same paddock,

about 60 m from the water's edge, but on this occasion it was not feeding and its presence in an unusual situation may have been due to strong wind, to which its normal high tide perch on a jetty was very exposed.

Feeding normally occurs from some time after till some time before full tide. Food is obtained from rock pools, shallow lagoons, water runnels or pools in the mudflats where fish are left by the receding tide, along the shoreline, at the mouths of freshwater streams and in riverbeds some distance upstream. High tide is usually the time for rest and preening but sometimes, perhaps when food supply is at a low level, birds may be seen working over pools on rock shelves and shellbanks when the tide is full.

Daily routine varies in different localities according to circumstances. Where a good feeding ground is adjacent to a rock roost the routine is simple. Many northern harbours have rocky shores around their entrance but widen out to mudflats with beaches of mud or sand. In Whangaroa harbour most of the herons find all they need at the northern end and only a few seem to feed on the flats further south. KR commented on how difficult it is to pick up a Reef Heron resting on the rocks, often almost invisible till a glint of sunlight on its bill betrays its presence. In Whangarei harbour CWD has diligently observed the movements of herons, generally up the harbour on a falling tide and down the harbour on a rising tide; some birds, however, seem to frequent the upper reaches of the harbour for much of the year, except probably in the breeding season, and the same applies to Parengarenga harbour and inlets in the Bay of Islands. Where rocky roosts are not readily available close to the feeding ground herons may loaf at high tide on sandbanks or perch on boats, jetties, bridge rails, posts of a sea fence, maimais, dead trees, trunks and lower branches of living trees along the coastline and, in Rangaunu Bay, on the tops of small growing mangroves; in built-up areas like Wellington waterfront, on wharves and sea walls.

The heron catches fish in its bill; small fish are swallowed without delay and fish up to about bill length (85 mm) may be dealt with in this way. A larger fish (over 100 mm), gripped about 40 mm from the end of its tail and flapping wildly, was held while the bird ran with it to the shore, where it was flipped round and swallowed head first. At Warkworth weir MJT saw a 100 mm fish similarly carried a few steps back from the water's edge before being swallowed; the heron then took three sips from a pool.

Feeding behaviour includes a range of tactics and techniques designed to suit different types and sizes of prey, condition under which they have to be hunted, state of water and degree of light. The "stand and wait" method characteristic of some species of heron whereby a solitary bird stands motionless at the edge of or in shallow water until its prey comes within striking distance is not, in my

experience, used by the Reef Heron. I have, however, seen herons waiting on the tideline when parties of Little Black Shags were herding shoals of small fish into the shallow water.

FHB described the behaviour of a heron on Pepin Island spit, the shoreline of which dips steeply into deep water; it patrolled about 100 m along the spit, flew back to its starting point and repeated the process twice, keeping its feet on the dry stones but successfully capturing some fish. PGS recorded a bird which moved quickly over rocks at Koutu Point with rapid stabs of the bill from time to time, then flew to a rocky point and fished off the side of the rock shelf. At Maraetai RC watched a bird working along the rocky outcrops, stopping at each for a few minutes and then flying on to the next outcrop; five minutes later it was followed by another bird which repeated the actions of the first. From Coromandel JG noted several instances of birds flying in to rocks, investigating them and then flying on. This restless method of hunting by repeated short flights seems to be related to the periods when the tide has recently started to ebb, or when it is rising towards the full. Birds so engaged may assume an erect posture on first landing, scan, and then settle down to a hunting position or may adopt a hunting position immediately after landing and stand erect only when about to fly.

Stance of a foraging heron may be a crouch with body held very low and neck much retracted, suitable for situations requiring stealthy movement; a low stalk with body horizontal and neck drawn back, head level with the body, movement slow and deliberate; or an upright stalk with body at a slight angle to the horizontal, neck curved but not retracted, head well above the level of the body and movement usually more rapid than in the low stalk. The upright stalk may be used in shallow water or in water up to the depth of the tarsal joint. Individual birds may change from one position to another in the course of their hunting and frequently stand erect between periods of stalking. Periods of slow deliberate movement may be interrupted by sudden bursts of activity with repeated quick stabs of the bill, as when a bird which has been working slowly along the edge of a tidal stream dashes out into midstream when a shoal of small fish passes by, and then returns to feed in the shallows (HMM), or when a bird hunting in deeper water makes periodic short runs.

In crouch and low stalk wings may be held close to the body, or slightly extended. The final pounce on a fish is often aided by a flip of the wings. Sudden wing movements, as if to restore balance, are often observed, in running water, in pools or in tidal water about 80 mm deep. Two birds at Kerikeri went through the erect-quick run-low stalk routine; one of them then fluffed its feathers, raising the breast plumes above the level of the body in the process, and raised first one wing and later the other before resuming its stalk. This may have been a comfort movement; shortly afterwards two quick



wing flaps caused a shoal of small fish to scatter fanwise. At Mill Bay I watched a party (two adults and two young birds). The adults stalked with their wings spread like a cloak, with periodic short runs, forward jumps and stabs with the bill. The young birds used the same run-jump-stab procedure but did not spread their wings. This spread-winged hunting has been recorded by various observers (PJ, HRMcK, MJT) and I have seen it on a number of occasions. It has been suggested that it may have two purposes, either to create a patch of shade which could attract fish or to help the bird's vision by cutting out reflection from the surface of the water.

Reef Herons seldom go into water deep enough to wet the feathers of the tibia, but birds fishing off the edge of a rock shelf may plunge after their prey so that the head and part of the body is immersed. In such a situation I saw one bird washed off the rock three times by small waves; each time it clambered back again, not without considerable scrambling and wing flapping.

In autumn and winter the Reef Heron is generally a solitary bird and if two are present in an area they tend to feed some distance apart. In early spring birds of a pair may still feed separately but within sight of each other. At this time of year it has been noticed that birds which could previously be closely approached tend to become restless, shy and nervous. Once nesting is underway, some feeding areas which have been regularly used during autumn and winter may be temporarily forsaken, presumably because the birds find sufficient food closer to the nest site. In late summer family parties of two adults and one to three young birds feed together. On mudflats south of Dargaville BSC watched a young bird approaching and chasing two adults, as if begging for food; the adults rejected its plea and danced out of its way with wings half spread. This went on for some time, but when disturbed by a passing dinghy the party broke up and the three birds dispersed over the mudflat and fed singly. In recent years post-breeding concentrations of 10-11 birds have been seen on high tide roosts at Parengarenga, Rangaunu, Bay of Islands and elsewhere. These congregations may occur in winter, e.g., eleven birds at Mill Bay, Manukau, in June (RBS).

Voice has been well described as a guttural croaking, often accompanied by bill snapping in the breeding season, and the alarm as a guttural "crraw." Outside the breeding season Reef Herons are generally silent, but a low croaking can sometimes be heard when one bird flies in to join another on rocks or tidelines, and the alarm note when a bird is suddenly startled by an intruder. Buller (1888) reported — "in the breeding season I have heard these birds mewing like kittens as they hovered overhead and were evidently concerned about their nests."

Patches of powder down on the breast and behind the thighs are characteristic of the plumage of herons. This soft friable disintegrating material gives off minute dusty particles. The bird plunges its bill into the powder down patches and the adherent dust assists in removal of fish slime and oil from the plumage. Herons spend much time preening. Mocn (1960) described how the feathers were first puffed out and shaken, then each tail and wing feather meticulously combed down its full length with the bill; the whole process lasted more than twenty minutes. In winter 1976 PGS watched two birds preening for about fifteen minutes, an hour after high tide, on a beach at Doubtless Bay.

On its feeding ground the immediate reaction of a Reef Heron to any intruder is the alert display as already described. If the intruder is human the heron may fly away, or merely make a short flight over the water and land again further along the coastline. If a quartering Harrier flies over, a heron may point its bill upwards till the Harrier has passed. On arrival of the other bird of a pair it will usually raise the feathers of its crown and lower them again once recognition is completed. When a Little Egret frequented Kerikeri Inlet for several months in 1965 the local Reef Heron at first displayed some hostility, sometimes advancing on the egret with crest feathers raised, but as time went on this wore off and the two birds fed near each other without any sign of enmity. White-faced Herons generally seem to be tolerated; I have seen one displaced from a rock shelf which at that time was the favoured high tide roost of the Reef Heron. RC described an incident at Tapu (Coromandel) in September 1976 which was probably the result of a Reef Heron's defending its breeding territory. A White-faced Heron flew 20 metres above the shoreline, closely followed by a Reef Heron. As the birds passed the observer both swept up in a dramatic aerial movement; the Reef Heron wheeled back and flew low over the water for some 300 metres to land on a small rocky island; the White-faced Heron lost altitude and continued its flight along the tideline. Occasionally a heron chases oystercatchers which land near it; a kingfisher which perched on a stone on the mudflat close to a feeding heron was also chased away. Red-billed Gulls move aside when a heron approaches them. JJ saw two city pigeons chased off "dolphins" on Aotea quay. An uneasy relationship exists between Reef Herons and Black-backed Gulls. At Mission Bay MJT watched a heron feeding undisturbed through a flock of 50 roosting gulls. At Paua, a heron feeding on a coastal paddock adopted a crouching stance and advanced towards a flock of feeding gulls in a menacing manner; the gulls parted and moved aside. Two herons fishing on a Manukau sandspit were harried by gulls but did not give up their catch (BB); at Wellington Wodzicki (1/24) recorded a fight which ended with the gull getting the heron's fish. At Waiheke Blundell (7/77) reported flying young herons being constantly harried by gulls and S. Chamberlin saw two young herons at Whangaparaoa being attacked by nesting gulls. HRMcK noted that at Frenchman's

Gap and Koi Rock Reef Heron young were successfully reared only yards away from small but dense Black-backed Gull colonies. L. Wagener studied a heron nest in an open cave on a stack at Houhora heads; of two chicks, one died and the other survived till nearly ready to leave the nest, but was later found killed and partly eaten, almost certainly by a Black-backed Gull.

Moon (1960) described display between adult birds when one returned to the nesting territory. The birds approached one another with head, neck and back feathers erected, uttering raucous squawks which were accompanied by much bill snapping and stretching and lowering the neck. The crest feathers may be erected at any time of the year, during the process of recognition, while bathing, or (MJT) while feeding from rocks. Crest, neck and back plumes are raised in threat display; KR recalled the behaviour of three herons on the rocky shore at Parua Bay. As she swam underwater towards them the birds ran down to the water's edge with hackles raised, retreating when she surfaced; this performance was repeated several times.

Courtship flights involve swooping, banking and chasing movements very different from the normal sedate progress of a flying Reef Heron. At a point on Houhora harbour about 6 km from the nearest likely nesting area, two birds were so engaged, one of them carrying a stick in its bill. In spring and early summer when one bird is pursuing another in the air, the pursuing bird may fly for short distances with its neck extended, not drawn back. In the Bay of Islands I have seen this only occasionally with Reef Herons but it is commonly observed with the much more numerous White-faced Herons at this season of the year. On the flats a courting pair stalk around together, often with pronounced arching of the neck and plumes raised; CWD described the antics of a pair which indulged in a sort of courtship dance before taking flight. In spring I have twice, in different localities, noted three apparently adult birds together, two of them stalking round each other with neck extended or curved, one or both with dorsal plumes raised, and the third bird in what appeared to be a submissive crouching attitude.

### BREEDING

The Reef Heron has an extended breeding season. A. R. Harris recorded a nest with two eggs at Portobello on 29 August 1953; Moon (1960) noted clutches as late as February but considered that these late nests are the result of earlier failures. A check of nest record cards and other material made available to me during this enquiry indicates that the main egg-laying period is from September to December with a few January records; peak laying seems to be in October.

Preferred nesting sites are caves, rock clefts, crevices between or behind rocks and boulders and rock shelves sheltered by overhang.

D. W. Hadden recorded a nest in a horizontal crevice which allowed only 200-250 mm of depth for the sitting bird. Nests in such situations may be from just over a metre up to eleven metres above high water mark. Cliff-side vegetation provides shelter for nests under clumps of flax or *Astelia banksii*, among the roots of pohutukawa trees and occasionally on their branches (RAF, MH, J. Lambert). Oliver (1955) recorded a nest two metres above water level on a horizontal branch of a matipo. On small islands in Hauraki Gulf and elsewhere DVM found a number of nests under canopies of taupata (*Coprosma repens*) or taupata and *Hymenanchera*, and two nests in open situations among rushes. Nests may be placed in rotting hulks; beams and stringers of wooden wharves and jetties, where these still exist, provide acceptable sites which are sometimes used, even if some distance from the sea, as at Kohukohu in Hokianga harbour. AP recorded a nest in an old maimai. Several pairs may nest on one small islet but it would probably be unusual to find occupied nests less than 6 metres apart.

The nest is a platform of sticks and twigs up to 600 mm in length, sometimes with a little dry seaweed. In some nests dry grass, flax leaves and rushes are also used. A. R. Harris described an Otago nest made of light sticks, seaweed, silver tussock, fragments of manuka and toitoi — all material which could have been washed up by the tide. At Pukerua Bay C. N. Challies recorded a nest of dried willow twigs and in the following season another nest, three metres from the site of the first, was made of the same material, which could only have been obtained as driftwood. A new nest is a shallow structure but if the same nest is used for several years the end result may be a bulky pile of sticks 460 mm deep.

Eggs, elliptical, pale greenish blue. Clutch, 2-3, occasionally 4. I have only one record of a 4-egg clutch (AP, Bay of Plenty, January). In records available to me the ratio of 3-egg to 2-egg clutches is as 4:3. The actual ratio in favour of 3-egg clutches is probably considerably higher, as many of the 2-egg nests were only inspected once and the clutch may have been incomplete at the time of recording. Eggs are laid at intervals of up to two days. Both sexes incubate. Incubation starts when the first egg is laid, so chicks may vary in size. Incubation period is recorded as 25-28 days. Chicks are sparsely covered with dark grey down. Many more nest record cards than the somewhat meagre number now available would be needed to give any acceptable figure for hatching and fledging success. For what it is worth, the records show 15 observations of 3 chicks, three 3-egg clutches which produced two chicks and one which produced one chick. Of ten two-egg clutches for which records are available, six produced two chicks and two produced one chick; two were deserted. There are also 15 records of two chicks and three of one chick, but with no information as to size of clutch. Two single eggs were found deserted;

one of these desertions was by a bird which had laid in a dark crevice behind a large rock and was obviously very scared when flushed off its egg on a previous visit.

According to Moon (1960), chicks are brooded by one of the parents for the first few days but left unattended for progressively longer periods as they develop. When the chicks are small the parents, after returning from the feeding ground, perch for up to half an hour near the nest, presumably to pre-digest the food. Once on the nest, the parent stands upright for about two minutes, with neck stretched upwards; the neck gradually thickens and swallowing movements develop; the parent then lowers its head, its bill is seized crosswise by the chick; the parent regurgitates the food, which appears to be guided into the chick's throat by the parent's tongue. In the early stages one or both parents remain near the nest, but when the chicks are about three weeks old the parents leave the vicinity after feeding is over, and Moon was able to approach the chicks which promptly disgorged their meal; he found that the usual meal per chick at that age was up to 18 fish, mostly flounder about 30 mm long; as soon as he returned to the hide the chicks retrieved their meal. As the chicks developed, the pre-feeding waiting period was reduced and eventually they were fed with whole undigested fish. WSS recorded a well grown chick as disgorging a mullet 100 mm long.

The chicks are fully fledged and ready to fly 5-6 weeks after hatching. From about the third week they are able to leave the nest and wander among the rocks around it. W. T. Parham found that 3-4 week old chicks, when disturbed, hid in rock crevices; older chicks did not trouble to hide but made threatening motions with their bills when approached. C. N. Challies watched chicks which were hatched in a nest 9 m a.s.l. on a large rock; at three weeks one chick left the nest when approached, the second stayed on the nest. At four weeks both had left the nest and were in a rock crevice 2½ m above the waterline, where they were found again on the next visit a week later. The following day the second chick was still in the crevice, the first had climbed to a rock shelf 7 m higher up; it was the stronger chick, and flew at six weeks, a day or two before the second.

Young birds just starting to fly are closely attended by the parents, but soon become capable of fending for themselves, feeding actively, jumping, playing, chasing and croaking. The family party stays together for a few weeks. A. R. Harris noted that two young birds which flew on November 7, though quite independent, were still closely associating with the parents on February 7.

#### SUMMARISED LOCALITY REPORTS

List of contributors to 1975-76 enquiry

I. G. Andrew, G. Arnold, M. L. Barlow, C. R. Barnicoat, B. D. Bell, D. J. Bettesworth, A. Blackburn, D. F. Booth, F. H. Boyce,

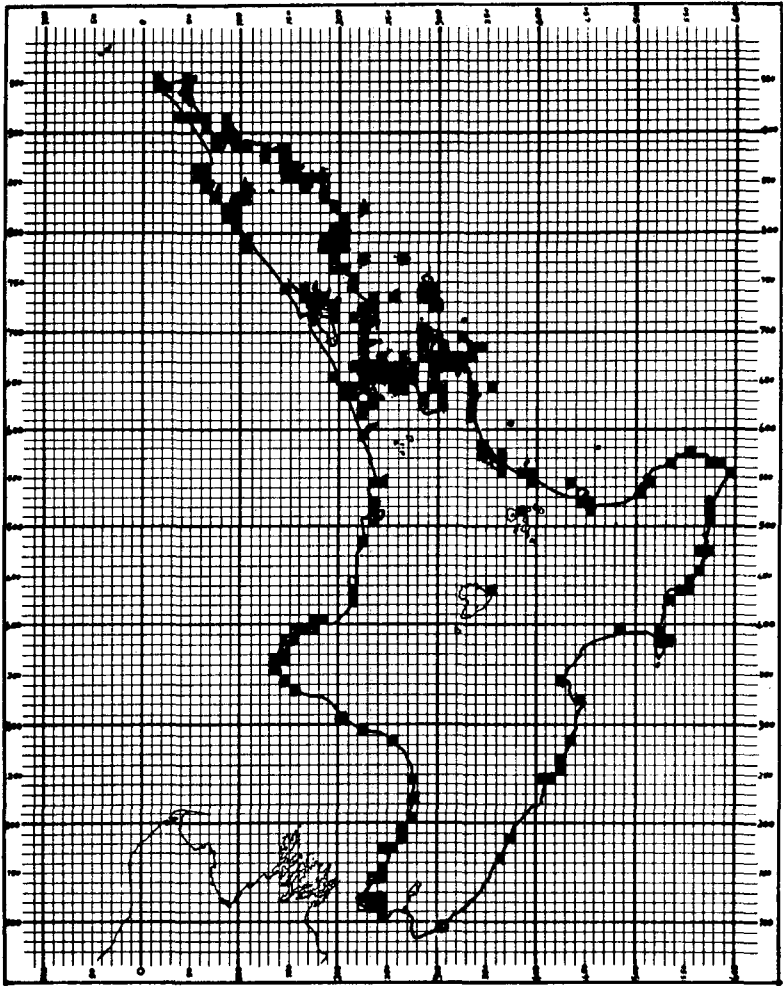
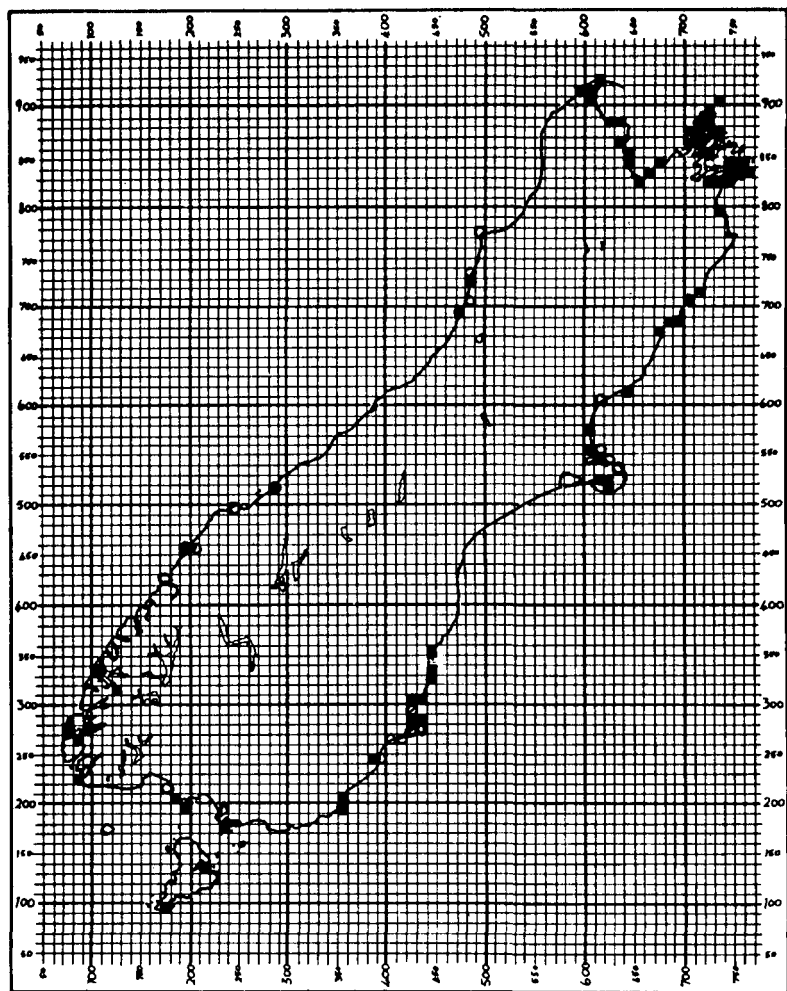


FIGURE 1 — Records of Reef Heron in New Zealand



K. Brash, B. Brown, J. A. Brown, P. C. Bull, B. J. Burch, D. E. Calvert, E. C. M. Calvert, T. R. Calvert, W. Campbell, W. F. Cash, C. N. Challies, S. Chamberlin, S. Chambers, P. Child, R. Child, G. Clifford, J. F. Cockrem, D. Cook, B. S. Cooksey, S. Cotter, R. S. Cowan, J. A. Cowie, D. E. Crockett, M. P. Daniel, A. F. Davis, C. W. Devonshire, A. T. Edgar, G. Eller, M. L. Falconer, Sir Robert A. Falla, Sir Charles A. Fleming, K. Fletcher, R. Floyd, P. Fooks, G. Foreman, R. Froggatt, J. Gaunt, A. J. Goodwin, A. Gordon, A. H. Gordon, E. Graham, K. Green, R. Guest, A. Habraken, H. Hagen, J. Hamel, J. M. Hamilton, E. H. Harlow, K. Harlow, P. C. Harper, M. N. Hawthorn, B. D. Heather, J. C. Henley, V. H. Hensley, F. Hollay, L. Howell, P. A. G. Howell, M. Hows, J. R. Jackson, R. W. Jackson, T. Jackson, J. Jenkins, P. Jenkins, I. W. Johnson, A. B. Jones, E. B. Jones, M. P. Kearns, J. L. Kendrick, J. C. S. Kennedy, F. C. Kinsky, R. E. Lambert, R. Larritt, S. Lauder, D. A. Lawrie, J. A. Lees, T. G. Lovegrove, R. Lowes, C. M. Lusk, N. B. Mackenzie, E. Madgwick, J. McCallum, G. K. McKenzie, H. R. McKenzie, R. V. McLintock, Mrs Marfurt, R. G. Marquand, W. Mawson, D. G. Medway, D. V. Merton, B. Miller, P. J. Miller, J. A. Mills, J. L. Moore, M. Moore, P. A. Moore, H. M. Morgan, A. M. Munro, G. Nicholson, I. A. Nicholson, R. J. Nilsson, C. F. J. O'Donnell, M. F. O'Shea, K. L. Owen, A. Palliser, R. J. Pierce, A. T. Poulton, N. Prickett, S. Quin, S. M. Reed, K. Reynolds, M. Ross, W. S. Sanderson, C. Schiska, H. L. Secker, J. H. Seddon, D. Shand, R. B. Sibson, J. F. Skinner, M. H. Smith, P. G. Smith, S. C. Sparrow, R. R. Sutton, M. J. Taylor, L. Templer, R. Thomas, J. S. Thomson, S. Thomson, K. V. Todd, G. A. Tunncliffe, E. G. Turbott, M. K. Twyman, D. A. Urquhart, C. R. Veitch, D. M. Walter, R. M. Weston, R. W. Wheeler, D. M. Whyte, L. W. Whiteley, H. Willis, J. F. Wisnesky, A. Wright.  
E & O E.

#### Mangonui County

One at Te Werahi, January 1977 (ATP). 1976, a single bird and a pair at Tapotupotu (HMM, FH, WM) and two birds at Spirits Bay (GE). One at Kerr Point 1971 (JCSK).

From 90 Mile Beach the only records are from the Bluff, where single birds were seen on various occasions 1962-70 and once a bird at Bluff Rocks and a second bird on the tideline about 6 km to the south (ATE). At the south end of the beach there are 1969 records from Ahipara, round the rocky coast of Tauroa and Reef Point and southwards to Hukatere stream (EM). Herekino harbour entrance, sightings in 1973 and 1976 (ATE, PGS).

On the east coast nests were found in rock clefts at Ohau (Coal) Point in 1968 and a bird was seen on a beach a few km further north (ATE). A. H. Watt (2/116) reported a gathering of 30 birds at Parengarenga harbour in winter 1946; as far as we know White-faced Herons had not arrived in the Far North in 1946 so there seems no reason to doubt the validity of this record. Subsequent counts from



Parengarenga refer to the Paua-Te Pua Point peninsula within the harbour, frequently visited because it is a well known wader roost; up to 11 Reef Herons were recorded in 1947-1969 by various observers and 10 were present in 1971 (ATE), but no more than 5 birds have been recorded on any one day 1972-1976.

In Parengarenga harbour maximum counts of White-faced Herons rose from 18 and 25 in 1968 and 1969 to 65 in March 1970, 70 in January-March 1972 and 80 in April 1975 and February 1976; numbers present fluctuate widely during the January-July period each year and a high count on one visit may be followed by much lower counts on subsequent visits; few birds (usually less than a dozen) have been recorded in the August-December period each year from 1968 to 1975.

Reef Herons sometimes use Kokota sandspit (South head, Parengarenga harbour entrance) as a high-tide loafing area. No records from the sandy sweep of Great Exhibition Bay, but a 1972 sighting further south at Rarawa beach (CS). L. J. Wagener (13/153) found evidence of two breeding pairs on Simmonds Islands and two nests in the cliffs near Farmer's Point, in 1965; in the same year a pair nested on a basalt stack at Houhora Heads. Inside Houhora harbour Reef Herons have been seen regularly 1962-1976 near Houhora Tavern and Pukenui wharf (ATE); the population in the harbour and on the adjacent outer coast appears to be stable.

At Rangaunu Bay in August 1953 J. Prickett (5/218) reported 26 Reef Herons flying out of the harbour as the tide became full. Along the shore at Kaimaumau eleven were feeding in 1961, 6 in 1969 and lesser numbers 1971-1975 (ATE). There are unconfirmed reports of up to 11 birds seen in Rangaunu Bay and near Rangiputa in 1976 (VHH). Two birds have been noted on several occasions 1975-76 in Awanui channel, just north of Unahi (MH). White-faced Herons are plentiful in Rangaunu Harbour, seasonal maximum perhaps 200 birds.

Karikari Bay, sightings of 1-3 birds 1967-76 (ATE, GE). G. P. Adams (18/47) reported a 1968 sighting on Moturoa island, west of Cape Karikari.

Doubtless Bay, 1971 sightings at Whatuwhiwhi (rocky coastline at the north end of Tokerau Beach) and of four birds on Tokerau beach (ATE); 1976 and 1977, two birds at the mouth of Awapoko river, near Aurere (PGS, ATE). Frequent sightings of one to three birds at Taipa 1953-77 (various observers); breeding reported at Cable Bay 1953 (B. Ashby) and 1975 (ST). Regular in Mangonui harbour, 5 birds seen in 1961 (ATE), 4 in 1976 and 1977 (TRC, RWJ). Probably three breeding pairs along the coastline from north of Mangonui to Cooper's Beach (MNH).

### Whangaroa County

Taupo Bay, a pair frequently reported by various observers, 1966-76.

KR investigated Whangaroa harbour by launch in January 1975 and January 1976 and recorded at least 15 birds in the northern third of the harbour (Pekapeka Bay to the Heads, Waihe-Peach Island-Kingfish Point-Owanga) where the shore line is generally rocky with some sandy beaches, and mangrove in the estuary of Wairakau stream. In the southern two-thirds of the harbour birds have been observed feeding on the flats near the mouth of Kaeo river (AHG), from the coast road and near the township (ATE *et al.*). White-faced Herons are present in the harbour but in small numbers, perhaps 20-30 birds.

Stephenson (Mahinepua) Island — D. E. Crockett found two pairs in 1974 and in 1975.

Cavalli Islands — R. B. Sibson (5/112) recorded a nest on Motukawanui and a bird on Motukawaiti (Step Island). In 1975 D. E. Crockett found a pair on each of these islands and AHG reported one bird flying from Kahangaroa islet, west of Step Island, to the south end of Matauri Bay on the mainland, where birds have been seen on various occasions 1966-75.

Takou Bay — sightings of one or two birds on various occasions 1962-69 (ATE).

### Bay of Islands

Birds still breed at Black Rocks, on islets north of Moturoa (D. E. Calvert) and off Paihia (GC), probably on Urupukapuka, Waewaetorea (KR) and elsewhere in the bay. Sightings reported from most of the islands, along the southern shore at Rawhiti, from Parekura Bay round to Manawaora Bay and Tapeka Point; up Russell Inlet near Russell, Waitangi, Te Haumi and Opuia; at Marriott Island in Waikare Inlet (KR). Recorded on the north coast at Rangihoua Bay and Te Pahi Islands, at Akeake Point at the entrance to Mangonui Inlet (KR), up Mangonui Inlet at Tangitu (BB); at Motupapa (Cocked Hat island) at the entrance to Kerikeri Inlet and at a number of points in Kerikeri Inlet as far up as the mouths of Kerikeri and Waipapa rivers. There are records from about 30 localities in the Bay and its inlets; total numbers are difficult to assess because of movement of individual birds from island to island, island to mainland, up and down the inlets. On two occasions in 1975 congregations of Reef Herons were observed, once 8 birds at Day Point, west of Moturoa (D. E. Calvert) and once 10 birds at Black Rocks, east of Moturoa (KR). These gatherings probably represented the population of the area around Moturoa and if we add, say, 3 pairs which are apparently resident in the three inlets and, say, 4 pairs from the main islands and southern coast to the 10 birds seen at Black Rocks, a conservative estimate of total population would be 24 birds.

White-faced Herons are seasonally abundant in the inlets, up to about 50 in each of Kerikeri and Mangonui inlets and up to 40 at Parekura Bay (WC); most of them breed on the adjacent mainland but one or two pairs breed on Moturoa (D. E. Calvert).

#### Hokianga County

Sightings at Whangape harbour, 1966 (RSC) and 1976 (PGS).

Hokianga harbour — a fair population in the lower reaches; in January 1976 at Omapere eight birds were seen, flying singly across the harbour to North Head, also two at South Head and two at Pakanae (EHH). There are 1976 records of two birds between Omapere and Opononi and a single bird at Koutu Point (PGS), where four were sighted in October 1975 (KB). On the western side KG recorded six birds in April 1976 between North Head and Rangi Point. Further up the harbour there are records from Motuti, Rawene in 1972 and 1973, and Kohukohu — two adults opposite the township and a very young bird on Mill Wharf, 1967 (ATE); one bird up Mangamuka river near Umawera in 1967 (JAL). A moderate population of White-faced Herons exists along the length of the harbour.

South of Hokianga Heads, two birds in 1971 north of Waimamaku rivermouth (R. Froggatt) and in 1968 two south of the river (ATE) where PGS saw a single bird in 1976. One at Kawerau in 1973 (D. E. Crockett).

#### Hobson County

The outer coastline consists of a long sandy beach from Waipoua to Kaipara North Head. The only Reef Heron records are from Maunganui Bluff and Aranga beach just to the south, and a bird at Pinaki (half way between Bayly's beach and Kaipara North Head) which may have flown across Poutu peninsula from the sheltered waters on its eastern side (W.C., D. E. Crockett, 1974). From this inner shoreline Reef Herons were reported from Poutu in 1963 (MR), Kelly's Bay in 1975 (MPK) and Tangitiki Bay in 1977 (BSC).

#### Whangarei County

In contrast to the scanty records from the long sandy stretches of Northland west coast there are numerous locality records from the more varied eastern coastline south of Cape Brett; Whangamumu, 1969 and subsequently (D. E. Calvert); Bland Bay, April 1976 (PJM, KH); Whangaruru harbour, one to three birds seen at intervals 1954-1976 (various observers); Oakura, 1976 (DMW); Mokau, 1973 (WC); Helena Bay, 1972 (HH); Tauranga Kawau, 1975 (WC); Whananaki, 1974-76 (WC, PJM, KH); Matapouri Bay, 1971, and between Matapouri and Tutakaka, 1976 (PGS). Ngunguru esuary and river, one or two birds 1969-76 (various observers); Ngunguru Bay between Horahora and Pataua, 1972 (PGS); Pataua, 1968 (BB),

1971 (PJM, AMM) and in 1975 numerous sightings throughout the year of one or two birds, feeding in pools, on the estuary and upstream from the footbridge; of three birds seen in January 1976 one was probably immature (DS). Ocean Beach, north of Bream Head, 1975 (AG) and 1977 (PJM); Peach Cove and Smuggler's Bay, west of Bream Head, 1975 (PJM).

In Whangarei harbour the traditional nesting place is Aubrey's (Passage) island off Reotahi. WSS reported 16 nests in 1943-44; 5 nests in October 1975 (KR) and in the same year birds were seen along the coastline at Urquhart's Bay, Taurikura and Munro Bay (KG). Parua Bay was a breeding place in 1948 and in March 1949 MH counted 10 birds on the beach and in pools; only two birds noted in 1975 (KG), one in April 1977 (PJM). Further west birds were observed in 1975-76 at Rangitahi and CWD reports birds which regularly feed on the Tamaterau and Waikaraka flats and fly up and down the harbour with the tides. Hatea river is a regular haunt; birds have been seen feeding or flying along the shore on the western side of Onerahi peninsula (MPK, EHH), at Awaroa river mouth, Port Whangarei and on the river bank near a boat yard on Port Road (EHH, TGL); regularly on the mud beach and among mangroves at Carrot Island (KR), sometimes at the city rubbish dump (JCSK), in a shallow tidal creek in the city commercial area (MPK) and once flying over Bank Street in the city (MKT). Single birds occur at Portland; a few formerly frequented the mudflats at Hewlett's but apparently not since about 1960 (AMM); Marsden Bay, 1977: one at Marsden Point 1968 (BB).

AJG reported seven Reef Herons at Ruakaka in 1955 (6/198) but only one or two birds have been recorded of recent years. Regular at Waipu around the river mouth, Spit and Johnson's Point 1961-1976 (many observers) but only 1-3 birds.

White-faced Herons are quite numerous along the coast of Whangarei county, flocks of 25 or more often seen on coastal paddocks, in season. Around the harbour they occur mostly around the mangrove areas and on the southern side, where up to 80 have been counted in the first half of the year.

#### North Auckland

The 1965 Kaipara harbour survey located 14 birds on the eastern side of the harbour and in its inlets; eight in Northern Wairoa estuary from Ruawai to Tinopai, two in Otamatea estuary, four in Tauhoa river (HRMcK, 12/75). Recent records from Tinopai, two birds in 1974 (D. E. Crockett); Batley, 1973 (PGS); Tapora (Okahukura peninsula) 1975 and 1976 (AH, LH); one up Oruawhero river at Port Albert, 1976 (AJG).

Muriwai beach, no record. Up to three birds at Bethells (Te Henga) 1951-61 and at Whatipu 1950-67 (ATE).

On the east coast single birds reported at Mangawhai, 1976 (DW), Te Arai (Mapping Scheme) and Pakiri, 1954 (AJG). Buddle (RB15) notes three pairs at Goat Island, Leigh in 1937; birds still breeding there 1976 (RT). Sightings at Ti Point, 1960 (ATE) and in Whangateau harbour near Omaha 1960 (ATE) and 1976 (LH). A Mapping Scheme record from Kawau Bay. On Kawau Island C. F. Parsonson (8/68) reported 8-10 birds in 1958; recent records of two in 1971 (BB) and one in 1976 (PAM).

A 1976 sighting at the entrance to Mahurangi harbour (CS); a long way up the river, at Warkworth, one near the boat ramp in 1947 (D. G. Dawson, 21/391) and in 1976 one downstream from the main road bridge, Elizabeth Street (MJT) and one behind the County office, Baxter Street (LH).

Wenderholm, one in 1976 (RC) and 1977 (MJT). Waiwera, reports of one to three birds 1961-1975 (various observers). Hatfield's Beach, recorded 1950, recent sightings 1974 and 1975 (BB, KR). Orewa, reported regular in 1943; seven seen in the creek in 1950 (N. Macdonald, 4/42), regular sightings 1975-1977 (DFB). Whangaparaoa peninsula, probably breeding at Frenchman's Gap. Matakataia Bay, 1975 (S. Chamberlin) and 1976 (LH).

#### Waitemata harbour, Tamaki river and strait, Firth of Thames

A 1975 sighting in the river at Albany (AJG). Recorded near the Western motorway, 1961 (ATE); a Mapping Scheme record from Te Atatu. Auckland waterfront, 1976-77 sightings at Westhaven, at Herne Bay (CS), Freeman's Bay (FH, WM), Hobson Bay, Mission Bay and along the rocky shore Kohimarama-St Heliers (MJT). Regular 1975-76 at Tahuna Torea reserve, Glen Innes; Purewa Creek, 1967-73; Farm Cove, Pakuranga, 1970 (SMR). RAF recorded a nest at Buckland's Beach in 1932.

Six birds recorded at Shelly Park, Howick, 1951; six at Turanga Creek, Whitford, 1952 (N. Macdonald, 4/180, 5/218); one to three birds recorded at a number of half-yearly counts in the area Howick-Whitford during 1965-74; frequent sightings at Whitford in 1976 (SMR). Omana Beach-Maraetai, singles 1964-67, 1973-74 (BB *et al.*) and two birds in 1976 (RC).

HRMcK wrote — "when we had 15-20 herons on Pakihi Island in 1940-43 there were always some of the mud and sand flats from Maraetai to Kawakawa Bay; very few now." A 1974 record from Duder's Beach (BB), a Mapping Scheme record from Wairoa river and a 1975 record from Mataitai (AJG). Kawakawa Bay, 1960-67, one to three; 1967-73, one or two; 1974-76, singles, one seen in 1975 apparently a bird of the year (BB, AJG, HRMcK).

A scarce bird on the western shore of Firth of Thames, but singles recorded 1961-71 at Whakitiwai, two at Wharekawa, north of

Whakitiwai, 1976 (SC) and singles 1960-1976 at Kaiaua (various observers). Miranda coast, records of one or two birds 1971-74 (BB, WFC) and three in March 1977 (R. Lowes) Thames estuary (Orongo-Parawai-Thames) three in 1965, singles 1970-75. Thames-Thornton Bay, 3 in 1967, one in 1975, and one at Whakatete Bay 1976 (AJG). Single birds at Te Puru, 1967 (BB) and 1970 (DAL), at Waiomu 1964 (ECMC), at Tapu 1976 (RC, AJG, R. Floyd) and at Te Mata 1967 (BB).

White-faced Heron counts in Firth of Thames 1965-69, average 61, maximum 141; 1970-76, average 116, maximum 208 in 1972.

#### Islands — North Auckland and Hauraki Gulf

Three Kings — no record.

Poor Knights — 1953, one on Aorangi (BDB). 1973, rarely seen on Tawhiti Rahi and Aorangi, two on Archway Island (CRV). 1975, up to six reported (PCH).

Hen and Chickens — 1948, one at Old Woman's Cove, Hen Island (RBS). 1962, a pair probably breeding on Hen, one bird at Big Chicken (Skegg, 11/71). 1971, one on Lady Alice Island, one on Manihaha Island (CRV).

Mokohinau — about 1889 Sandager (1890: 288) wrote — "one or two visit Mokohinau annually for several months at a time. There is one here now (August) which I have seen nearly every day since February." November 1973, one on Burgess Island, one on an islet north of Maori Bay Island (CRV).

Little Barrier — apparently a casual visitor. 1962, one offshore (ATE); one reported 1975 (JFW).

Great Barrier — recorded in 1868 at Port Fitzroy by Hutton (Oliver 1955). Further records from Port Fitzroy area 1960 (BDB), two in 1965 (AJG), two or three in 1972 (SMR). Whangaparapara, 1960 (BDB), 1965 (AJG), 1976 (GKMCK). Tryphena, two in 1960 (BDB). Mapping Scheme records from Tryphena and Whangapoua areas.

Cuvier — no record.

Rangitoto — in 1916-1936 they nested regularly on the stone stairway inside the tower of Rangitoto beacon, getting in and out through narrow ventilation slots (RAF). 1975, one at wharf, one at Islington Bay, where MJT reported a 1977 sighting.

Motutapu — two in April 1950 (N. Macdonald, 4/42).

Rakino — 1974-1976 sightings, one or two birds (SMR).

Motukorea = Brown's Island — 1976, two flying close inshore (MJT).

Motuihe — two pairs in 1941 (PCB, RB 47); one seen 1976 (JG).

Waiheke — records from the main island at Oneroa beach, 1962 (DFB), Thumb Point, 1963 and Te Matuku Bay, 1964 (AJG), Man o' War Bay, 1975 (HRMcK), Arran Bay (IAN) and Connell Bay (BB) in 1976.

Nests or evidence of nesting on at least five rocky islets off Waiheke in 1975 (RBS). Bred on Motukaha 1949 (RBS); on Crusoe Island 1964 and 1965 (DVM). Koi Rock in Rocky Bay is a traditional nesting site, 6 nests in 1947 (HRMcK), 3 in 1948 and 2 in 1949 (RBS), 4 in 1960, 3 in 1963, 2 in 1965 (DVM); birds still present in 1974 (BB). Three Sisters Rocks, 7 nests in 1947 (M. L. Johnson, 3/92), flying young in 1955 (M. J. Breen, 7/77), 4 birds seen in 1975 (AJG). Tarakihi, present 1961-62, breeding 1964 (DVM). Frenchman's Gap, nine birds, including two lots of flying young, in 1966 (HRMcK), sightings in 1975-76 (IAN).

Ponui — three nesting sites known in 1943 (T. M. Roberts, 1/24); sightings in 1967, two at Scully's reef in 1975 (BB, HRMcK), one at Ponui point in 1976 (JG).

Pakihi Island, off Kawakawa Bay, was a noted stronghold in 1940-43; up to 20 birds recorded in the area, once eleven on a barge, once eighteen on a single pohutukawa tree (HRMcK). Numbers have decreased. In 1976 JMcC reported frequent sightings of a pair and a single bird.

#### Manukau Harbour

On the northern shore, 4 birds at Huia 1960-61 (ATE), up to 3 birds 1974-76 (JFS). Cornwallis, 1951, seven on the wharf (N. Macdonald 4/180); 1971, one on the beach and 1973, one at Malcolm's Bay (JFS). Mill Bay, regular 1960-1963, up to 10 birds (ATE, RBS), present 1976 (FH, WM). Parau, single birds 1961-63 (ATE) and 1977 (CS).

Around Onehunga and below Mangere bridge frequent records by various observers, 1-3 birds in 1946-58, 1-2 birds 1967-75. At Puketutu and outside the sea wall at Mangere ponds 3-4 birds recorded 1955-66, singles in 1972 (BB, SMR). Records from Ihumatao 1958-59 and 1976 (CS), Puhinui Creek-Weymouth 1968, Papakura Inlet 1969 (BB).

On the southern shore recent records from Urquhart's 1973, Kidd's 1974, Kirk's 1971, Yates Dam 1970, Pollok Spit and Bottletop Bay 1975, Clarks Beach 1974.

Waiuku river, regular records of 1-2 birds 1964-1976 (IWJ, DAL). Te Toro 1968 and 1972 (BB, DAL). RBS found 2-3 birds on Awhitu beach in 1942 but none in 1976. Records from Graham's beach 1968 and 1972, Big Bay 1965-1967, Orua Bay 1968 (BB, DAL).

In 1974 HRMcK and DAU estimated the population of Wattle Bay and Big Bay at 6-7 birds. Recorded at Manukau South Head 1972 (MPD).

Half-yearly bird counts in Manukau Harbour show that in the period 1965-1968 the average winter count of White-faced Herons was 111 and the average summer count 268 birds. 1969 December count was surprisingly high at 689 but thereafter numbers apparently stabilised and for 1970-1975 winter counts averaged 352 and summer counts 348. Perhaps the unusually close agreement between winter and summer counts in this area may be due to presence of abundant resting sites close to the harbour shores.

#### Coromandel Peninsula and offshore islands

In an October-November 1971 survey of islands off Coromandel Harbour CRV reported single birds at Matariki group (south of Manaia Harbour) and at Rangipukea Island (off Te Kouma Harbour); a pair with one juvenile on Cow Island (automatic light), a pair and an old nest at Motukakarikitahi and a single bird at Motuokino. In January 1976 JG reported one bird at Te Kouma Point; at Coromandel swell entry, two pairs nesting on Rat Island and one bird on the rocks on the Whanganui side of the gap; one in a deep bay north of Whanganui Island and one which flew from Waimate Island and landed on the spit at Motukopake. One at Coromandel wharf, January 1975 (BDH). Long Bay, just north of Coromandel town, single birds in 1962 (JMH) and January 1976 (CS). May 1976, about one in each bay round Coromandel harbour, solitary at this season (RAF). Okahu Point, between Coromandel and Papaaroha, 1976, one (BB).

Motukawao Island Group — two nests on Moturua, 1963 (C. A. McCall). November 1971, a nest on the northernmost of three Ngamotukaraka stacks, sightings on the southernmost stack and on Motukaramarama (CRV). January 1976, two birds on Happy Jack = Motukahaua (IAN).

North of Colville, at Waiaro, one in 1964 (BDB), one in 1974 (BB); 1961, three at Te Hope (JLK); Port Jackson, one in 1962 (JMH) and in 1964 (BDB).

On the east coast, singles at Kennedy's Bay 1962 (JMH) and at Wairiri beach 1964 (BDB). Whangapoua harbour, records of one or two birds 1962-1976 (various observers). Kuaotunu, one in 1967 (HRMcK), one in 1975 (PAM).

Mercury Bay, Devil's Point, April 1977 (JHS); regular at Buffalo Beach 1975-76, usually one bird, two in October 1975; Whitianga estuary 1975-76 (ABJ) and 1977 (JHS). Cook's Bay 1975 and 1977 (RWJ, SCS); singles in 1975 at Wharekaho beach and Tarapatiki stream (RWJ).



Tairua estuary, August 1975, two pairs (PF). Pauanui, one in 1964 (BDB). Storm Beach, January 1976, two (IAN). Wharekawa harbour, regularly reported at Opoutere 1964-1977; three in January 1974, a pair with two juveniles in January 1975, four near harbour mouth in November 1975 (BB); four regular in estuary, January 1976 (GN), 6 in February 1977 (JHS).

White-faced Herons — Whangapoua, January 1976, 28; Whitianga 1975, 20 on estuary, 30 on adjacent paddocks; Tairua, 200 in December 1975 (ABJ); Wharekawa harbour, reported population has increased since about 1972 and in 1975-76 was about 100 birds (BB, GN).

Whangamata, three in 1954 (R. Shanks, 6/91); 1963, found in both estuaries (J. Lambert); estuary rocks, 1976 (R. Floyd). Islands off Whangamata — August 1971, 4 on Hauturu (JAB); November 1972, one on Hauturu, a pair nesting on Whenuakura; two seen, also two old nests, on a stack between Hauturu and Whenuakura islands (CRV).

Mercury Islands — P. D. G. Skegg recorded in 1962 one or two pairs along the south coast of Great Mercury, plus a sighting at Coralie Bay (10/163) and in December 1965 one bird seen around Red Mercury on two successive days (19/365). Recorded around Korapuki Island, 1974 (G. R. F. Hicks *et al.*, 22/209).

Alderman Islands — November 1972, reported on Ruamahuanui island and Middle Chain (DVM): none seen January 1977 (JHS).

#### Bay of Plenty

Tauranga Harbour is sheltered by Matakana Island, which stretches from opposite Bowentown in the north to opposite Tauranga and Mount Maunganui in the south. Bowentown, 1974, one (JFC); Bowentown heads, seaward side, 1976, 3 birds (GA). One at Athenree 1968 (RWJ); one some distance up river in Athenree gorge, 1975 (IAN). Tanner's Point, 3 in 1973, 2 in 1975 (JFC). Katikati, one in 1962 (D. Jenner).

In the inner harbour, M. Hodgkins (2/41, 3/12) recorded pairs and parties of up to 8 birds in January-March period, 1945-49, feeding in the harbour and apparently flying to roost on Karewa Island; also birds fishing from rocks at Mt Maunganui and nesting on Rabbit Island (Motuotaua). Karewa lies about 6 km offshore from Matakana and is a wildlife sanctuary. In December 1952 B. Sladden counted 28 on the rocks and in August 1954, 17 (5/218, 6/198); 18 in November 1963 (DVM); on a short visit in November 1972 JCSK found 3 nests, six adults and at least one well-grown chick. Motuotaua is less than one km from Mt Maunganui beach and is a scenic reserve, KF described it as rocky, with many caves and a dense tree and scrub cover, a roosting place for great flocks of starlings and for large numbers of feral pigeons which feed around a flour mill in the dock area. B.

Sladden in 1952 recorded 22 nests, 18 adults and 12 feathered young; in October 1954 he found 3 nests with eggs, others building (5/218, 6/198). Several nests were found in 1972. The breeding population of both islands has decreased over the years but is still probably considerably higher than 1976 sightings of 5 birds at Karewa (GA) and 3 at Motuotaua (JHS) might indicate.

Inside the Tauranga end of the harbour RVMcL in 1962 recorded upwards of a dozen birds along the foreshore, in Welcome Bay, at Matapihi and at Rat Island (Motuopahi). In 1976 AP recorded 6 birds at Sulphur Point, and KF has noted birds at the above localities plus Maungatapu, Coronation Pier, Otumocetai rail bridge and flats; estimated the winter population of the eastern end of the harbour and town waterfront at 5 pairs, commented on the extreme scarcity of young birds, and suggested that herons may be deterred from nesting in otherwise suitable breakwater areas by the presence of large numbers of rats.

Kaituna cut, possibly breeding 1976 (KF). Maketu, several records of single birds or a pair 1974-1977 (DJB, AB, RWJ). Little Waihi, records of one or a pair, 1970-75, (RWJ, AP).

Whakatane, a nest at the heads in 1954 (C. D. Blomfield, 6/198); 1976 sightings at the harbour entrance and in the town area (AFD, KF), and one in April 77 (PJM). Ohope 1976 (RMW). Ohiwa harbour, 15 reported in 1949 (PCB); 11 in one inlet 1958 (W. T. Parham, 8/201); 7 at Kutarere in 1962 (H. D. London); regular in 1975, probably 3 pairs, up to 8 birds seen (AP), breeds on Ohakana island (RMW).

Mapping Scheme records from the vicinity of Motu river mouth, Te Kaha and Whangaparaoa Bay, south of Cape Runaway.

Buller (1888) recorded breeding on Rurima rocks and quoted Captain Mair's account of some 30 birds and a number of nests on Whale Island (Motuhora). JCSK saw two birds at Rurima rocks in November 1972. I have had no reports from Mayor Island, Motiti, Motunao, Motuhora or White Island.

#### Cape Runaway - Poverty Bay

Lottin Point, one in April 1976 (GF). Mapping Scheme records from Hicks Bay (where also recorded by HRMcK), from Horoera map square and from East Cape (where also recorded by AW in 1964); from Whereponga map square and from Waipiro Bay (where AB reported three pairs nesting and odd pairs along the coastline in 1963). Tokomaru Bay, two in April 1976 (GF). Tolaga Bay, four birds at Uawa estuary, April 1976 (GF); Pourewa Island, a 1955 nest reported by AB, and a Mapping Scheme record from the same map square. Pakarae river mouth, two in 1954 (AB). Whangara, December 1975 (JCH). Tatapouri, 1953 (J. D. Cochrane) and 1960

(J. W. Bain). Gisborne, in Waikanae Creek, 1953 (J. D. Cochrane); in the harbour, 1959 (J. W. Bain); in Taruheru stream and Waimata river 1971-75 (AB). Muriwai lagoon, one or a pair recorded at intervals 1955-1963 (AB).

#### Hawke's Bay - Wairarapa

Recorded from Mahia 1947-1955 (W. J. Phillips, D. H. Brathwaite). Opoutama beach, one in April 1976 (GF). Mapping Scheme records from the northern half of Mahia peninsula and from Pukenui beach map square just north of Mahia; also a record from Wairoa.

Reef Herons were noted at Napier (Westshore) in 1950 and 1954 (D. H. Brathwaite) and one in March 1977 (KVT). One recorded at Black Reef, Cape Kidnappers, in October 1976 (KVT). Kairakau beach, two birds noted in August 1974; on a day of strong wind and a wild sea, they were near a pool of surface water on a paddock behind the beach (KVT); in May and December 1975, single birds in the same area, near the mouth of Mangakuri stream (SQ). In May 1971 CAF recorded single birds at Pourerere and at Black Head. Porangahau, October 1975, four birds flew up the beach; previous sightings of single birds (LWW).

Wairarapa Mapping Scheme records from the area of Mataikona river mouth and from Castle Point. Castle Point is a breeding place of long standing, at least from 1934 to 1959; 5 nests in 1945 (J. M. Cunningham, 2/41), eight nests in 1959 (CNC, 8/201); sightings of one or two birds in 1974 and 1976 (SQ).

On 27 November 1975 CNC visited the site of the former nesting colony at Castle Rock. The seaward side of the rock was searched from its northern end for about three-quarters of its length; this included the area where Reef Herons nested in the past. No nests were found. One adult bird was seen flying past the rock on the seaward side; none were seen on the rocks above high tide mark as on previous visits. Several roosting areas were however seen, mainly under overhanging rocks well above high tide mark.

There is a December 1945 record of two birds at Te Awaiti (R. A. Daniell, 2/41).

#### Waikato

Waikato Heads and Port Waikato have been a good area for Reef Herons for many years and a total of seven birds was recorded in May 1975 (BB, BJB). In 1955 C. Peart (6/198) put the population of Raglan harbour at about 12 birds; 1969-77 records of pairs and single birds at a number of different localities within the harbour and at its entrance, and evidence of recent breeding activity at the known nesting area on the north side of the harbour in February 1977 (JHS).

For Aotea harbour HRMcK mentioned limestone stacks across from the end of Pakoka road as a favoured locality and there is a 1951 record (6/91) of 23 birds flying from the islets. No recent records from this harbour but a sighting at Toreparu beach in September 1971 (RGM) is in the same map square.

Kawhia harbour, regular; 9 birds reported in 1955 (6/198), sightings in 1963-73 (LT); 1976 and 1977 sightings along the shoreline at Kawhia township and on Totara Bank at the south-westerly end of the harbour (JHS).

There is a Mapping Scheme record from Marakopa; HRMcK mentioned Reef Herons at Awakino but I have no recent records.

#### Taranaki

Two birds at Mokau river in 1961 (JLK) but no recent reports. A 1968 record from Mohokatino river mouth (BDB); Tongaporutu area, a 1961 sighting (HRMcK) and a Mapping Scheme record.

A fair Reef Heron population is carried along 50 km of coastline from west of Waitara to Cape Egmont. Taranaki members (DJB, REL, Mrs Marfurt, DGM, NP, RWW) have reported recent sightings from about 15 localities. One or two birds have been seen at Epiha road, west of Waitara; at the mouths of Waitara, Waiiongona and Waiwakaiho rivers, Bell Block beach, Kawaroa foreshore; breeding reported at Moturoa (Sugar Loaf Islands); sightings on the coast south of Schnapper Rock, at five localities in the Tataramaika - Okato area between Timaru road and Komene road; three birds Bayly road - Cape Egmont, single birds just south of Cape Egmont; a sighting in Opunake Bay.

M. G. Macdonald and M. Bysouth recorded a 1963 nest near Pihama, south of Opunake; HRMcK reported a 1961 sighting at Patea.

#### Wellington West Coast, Wellington Harbour

Waitotara estuary, singles reported 1948, 1960 and in 1967 (DGM). Wanganui, apparently uncommon; one at the estuary in 1948 (3/92); one in the river March 1966, the first seen in three years (EBJ); one at South Mole May 1970 (MFO'S); one at Castlecliff in December 1975 (DW).

Single birds at Rangitikei estuary in 1961 (IGA) and 1972 (JLM); at Manawatu estuary north head in 1963 (IGA) and flying over the sea wall in March 1976; occasional at Lake Horowhenua, where one seen in 1975 was the fourth sighting in 12 years of observation (EBJ).

Mapping Scheme records from the coast near Waikawa beach and Otaki. Waikanae, single birds recorded 1941-42 (K. A. Wodzicki, 1/15); formerly not uncommon, but recent records of single birds in April and June 1971 and two birds in February 1975 (CAF).

Kapiti Island, about four pairs nesting in 1941 (K. A. Wodzicki, RB91); the Wilkinsons (1952) noted that several pairs breed on the island each season. June 1976, sightings just north of Rangatira flats (MLF).

Pukerua Bay, breeding 1953-1960 (CNC); two birds in July 1974 (MLF). Mana Island, eggs in 1960 (B. Enting). A Mapping Scheme record from Titahi Bay area. Sightings in Porirua harbour 1955 (BDH) and 1974 (EBJ).

Ohariu Bay 1943 and 1946 (HLS). Makara beach and estuary 1975 (JRJ), MLF). Tongue Point 1947 (HLS). Island Bay, June 1975 (JRJ). Lyall Bay, 1946 (HLS).

The 1975-76 Wellington Harbour Survey organised by MLF and carried out by Wellington members has produced sightings at points all round the harbour. Monthly shoreline counts vary from one to nine birds, the highest count being in September 1975 when singles were seen at Palmer Head, Point Dorset, Ngauranga, Point Howard and Eastbourne and four birds at Day's Bay. Birds have been noted on other counts or by individual observers at Moa Point, at Karaka, Scorching, Evans and Oriental Bays; in the wharf area, at Aotea quay, the floating dock, Kaiwharawhara, Petone area, Lowry and Mahina Bays and towards Pencarrow. The population within harbour limits has been estimated at six pairs. Two pairs are known to have nested on Somes Island, other pairs probably on Leper Island, Ward Island and around Palmer Head; possibly also in the wharf area and near Pencarrow. Young birds banded on Somes Island were sighted at Petone wharf in March 1976 (S. Cotter).

#### Marlborough, Sounds and coastline

Stephens Island, two birds in March 1961 (R. Mander) and a Mapping Scheme record. D'Urville Island, 1969 sightings at Port Hardy, Greville harbour, and at three points between Ragged Point and the southern tip of the island; breeding (ATE); 1961 records from Ohaua Bay and from Tinui and Puangangi Islands in the Rangitoto group (BDB) and a 1957 record from French Pass (E. W. Dawson). Inner Chetwode, 1961 (BDB) and April 1972 (MHS). Port Ligar, April 1974 (SCS). Forsyth Island, breeding on Bird Island 1958 (DVM). Maud Island, April 1972 (MHS).

Queen Charlotte Sound, 1971, flying from Motuara to Long Island (JRJ). A Mapping Scheme record from Endeavour Inlet. Ruakaka Bay, 1976 (CFJO'D). An old record from Anakiwa (CAF) and a Mapping Scheme record from the same map square. Picton flats and Karaka Point, 1969 (KVT).

Tory Channel, 1949 records from Whekenui (E. W. Dawson) and Perano Head (ATE); Port Underwood, two birds in 1943 (J. R.

Eyles). Mapping Scheme records from Perano Head and Port Underwood map squares.

One at Wairau Bar, Blenheim, 1961 (ATE); 1976, one at Paparoa Point (15 miles north of Kaikoura) and 1975, one at Rakautara (JAC). Kaikoura Peninsula has been a Reef Heron haunt for many years; one or two birds recorded at Point Kean and South Bay on a number of occasions 1963-1976 and previously (JAC, JAM, RG, KLO). Further south they have bred at Riley's Rock (HRMcK); sightings at Goose Bay, 3 in 1969 (JAC), 4 in 1977 (ATP) and at Oaro 1965 and 1975 (HRMcK, EG, RG).

#### Nelson

Tasman Bay, records from Pepin Island sandspit, 1975 (FHB), Boulder Bank, two in 1974 (CRB); Tahunanui, 1967 (ATE); several 1975-76 records from Motueka and Moutere Inlet (FHB, PAGH, KLO); 1973-77 records from Marahau (CFJO'D, TJ, KLO, CS).

Golden Bay, recent records from Wainui Inlet (FHB), Tata lagoon (JST), Ligar Bay (KVT) and west of Tarakohe (BM); a Mapping Scheme record from Collingwood; Pakawau Inlet, 1976 (EG); Puponga, 1974-77 (SMR, ATE, KLO, ATP).

Whanganui (Westhaven) Inlet, 1966-67 sightings include one of three birds at North Head (IGA).

#### West Coast, Fiordland

A 1922 record from Cape Foulwind (R. S. Sutherland). Two at Fox River mouth, 1957 (L. Angus, 7/193); one at Punakaiki, 1963 (T. Hartley-Smith); Bullock Creek to 17 Mile Bluff, very small numbers, 1954 (J. G. Penniket, 6/171); one a mile south of Port Elizabeth, 1964 (R. W. Crack).

Haast lagoon, often seen up to 1964 (D. Greaney). Jackson Bay to Big Bay, four, 1947 (P. L. Moore, 3/20); occasional at Jackson Bay 1964 (D. Greaney). Martin's Bay, March 1976, two (ATP). One at Anita Bay, Milford Sound, 1952 (CAF, 5/89). Doubtful Sound 1963 (W. T. Poppelwell); a Mapping Scheme record from far up the Sound in the vicinity of Hall Arm. Dusky Sound, one at Anchor Island harbour, 1974 (CAF); Mapping Scheme records from this area, also from Heron Island and the vicinity of Long Island. A dead bird at Puysegur Point, October 1975 (AW).

#### Canterbury

Present distribution limited by location of suitable rocky shores — Banks Peninsula and north of Pegasus Bay (RG).

Motunau river mouth, a pair in 1975 (J. R. Eyles) and in 1954 (D. E. Crockett); one on the beach, 1974 (RG). The shore line of

Motunau Island appears suitable, but on twelve visits each of several days, 1969-77, none has been seen (CNC).

D. E. Crockett reported ten birds at Waipara mouth, April 1954, and six at Waimakariri estuary, May 1961, and confirmed that he considers his identification was correct. These may have been post-breeding congregations. No recent records from either area.

Heathcote-Avon estuary, regular at least from 1946 till 1976; up to seven in 1954 (G. Guy, 6/91); two-three 1959-1964 (PAGH); numerous sightings in McCormack's Bay 1973-1976 (GAT, HW *et al.*). Sumner Head, 1958 and Amuri Bluff, 1965 (JRJ). Godley Head, one in September and October 1976, the only sightings in five years (CNC). Banks Peninsula, 1946-47, seen in small numbers during the year at various points from Heathcote estuary to Lake Forsyth; a nest found near Pigeon Bay (RAF, 2/159); an old Canterbury Museum specimen from Little Akaloa (GAT). Probably present in a number of bays around the peninsula, but no recent sightings (RG). Recorded on Akaroa harbour 1948, 1954 and in 1972 (PC, RG). A Mapping Scheme record from Lake Forsyth area. Not recorded from Lake Ellesmere (GAT).

#### Otago

Reported at Kakanui 1950, 1963, 1964; two at Aore Point 1971 (MHS). Goat Island, Moeraki (HRMcK). Katiki beach 1975 (RJN). Shag Point, 1973 (RG). Waikouaiti, two in 1968 (JH). Merton-Karitane, eight reported in May 1949 (L. E. Walker, 3/205), only one-two birds noted 1955-71 (JH *et al.*). Blueskin Bay, 1947-50 records from Warrington and Waitati (G. Guy) and a 1964 sighting (J. Watt). Purakanui Bay, 1946-49 records of one-three birds (I. Tily) and in January 1949 one at Purakanui Bay and five north of Long Beach (I. McArthur, 3/205).

Aramoana, records of one-two birds 1957-67; 1973, one flying 30 m above the flats (RJP). Commonly seen around harbour and inlets 1939-40 (B. J. Marples, RB15); scattered records — Dowling Bay, Deborah Bay, West harbour — 1949-68 (various observers). Nesting at Te Anawaewae Point, Portobello, 1935; sightings of two-four birds, including a juvenile, 1953-55 (A. R. Harris, 6/91, 198). One flying over the sea near Wheeler's Rock, 1975 and 1976 (AW); two pairs near Taiaroa Heads 1971 (JH). Pipikaretu, 1968; one at Ryan's beach 1975 (RG). Papanui Inlet, 1946 and 1972. Anderson lagoon, three in September-November 1964 (J. Watt). One at St Clair, 1963 and one at Green Island lagoon 1962 (W. T. Poppelwell); Kaikorai stream, 1947 and 1951 (2/159, 5/89). Breeding on Taieri island 1941-43 (B. J. Marples, RB47, 1/75); one at Taieri mouth 1965 (W. T. Poppelwell) and a Mapping Scheme record from this map square. One on the tidal flats at Akatore, 1947 (I. Tily, 2/159).

Sandy Bay, south of Nugget Point, March 1977, two (TJ). Hayward's Point, Pounaweia, 1954, five (6/91); present on Catlins coast 1970 (JH); False Island, March 1973 (DC).

#### Southland, Stewart Island, Solander Islands

Single birds recorded from around the Bluff (Stirling Point and Ocean Beach) 1967-70 (MLB, RRS) and in August 1976 (MHS). One at Pahia 1970 (MLB); two at Waihoaka, Toetoe Bay, 1949 (O. Sansom, 3/205). HMM lived on Centre Island, south of Colac Bay, from September 1973 till May 1975; only one Reef Heron was seen, in August 1974; it stood on a rock off the southern shore for 15-20 minutes and then flew towards the mainland.

Stewart Island, 1940-41, birds generally present as far south as Port Pegasus (CAF, RB57). D. E. Crockett reported a pair and a single bird at two localities in Paterson Inlet in 1957. Seldom recorded of recent years; there is a Mapping Scheme record from Port Pegasus area and PJM saw a single bird in Paterson Inlet, December 1976.

Solander Islands, a pair in December 1947, not seen in July 1948 (RAF, 3/55).

#### Chatham and Auckland Islands

Has been observed at Chatham Islands. Straggler to Auckland Islands (Oliver 1955). I have had no record from either locality.

#### DISTRIBUTION MAPS

The maps have been prepared from material listed in locality reports. Blacked-in map squares indicate 1960-1977 records; squares marked with a circle are those from which there are old records but no report for the period 1960-1977.

The maps show that Reef Herons are most abundant along that part of New Zealand coastline which is washed by south-going surface currents arising from the movement of sub-tropical water in the Trade Wind Drift. These are the West Auckland current as far as Waikato (where gaps in distribution correspond with presence of long sandy beaches), the East Auckland current (Auckland east coast, Coromandel and Bay of Plenty) and the East Cape current which meets the coast some miles south of East Cape but then deflects and lies offshore.

Further south, cooler surface currents flow northwards along the coast of both islands and eastwards into Cook Strait and through Foveaux Strait as far as Otago. It will be seen that Reef Herons are present in moderate numbers in Taranaki, Wellington area, Marlborough Sounds and Nelson, but scarce on the rest of South Island coast and on the east coast of North Island as far north as Mahia. Possibly



the distribution pattern on S.I. West Coast might be somewhat altered if more observers were available.

### DISCUSSION

Locality reports make dull reading, but serve their purpose if they record available information on the present distribution and abundance of Reef Herons and some evidence of the decline in numbers which has occurred between 1940 and 1977, hence providing a yardstick by which local observers can measure future trends.

The Field Investigation Committee suggested that some effort should be made to record the number of White-faced Herons, if this species is suspected of affecting the Reef Heron. Figures for White-faced Herons are included in locality reports for northern harbours.

Because White-faced Herons have increased and Reef Herons have decreased over recent years it is tempting to assume that one species is displacing the other and causing its decline. I suggest that this is not so. In the early years of their establishment in New Zealand White-faced Herons were found mainly along the coast but Mapping Scheme records show that they are now well distributed over the whole country and reports indicate that they continue to colonise inland localities. On the intertidal flats of northern harbours and inlets they feed in fair numbers for part of the year but are usually comparatively scarce or absent during the breeding season; at all times of the year they find much of their food on grassland or around freshwater lakes, dams and streams. It is interesting to note that Wellington Harbour Survey recorded only one White-faced Heron on five monthly counts August-December 1975.

There is no competition for nest sites — the Reef Heron is a crevice-nester, the White-faced Heron a tree-nester. When individuals of both species are feeding on tidal flats there appears to be no antagonism, which would surely be observed if there was serious competition for food items.

We tend to think of the decline in Reef Heron population as having started about 1940, but Hutchison (1901: 217) wrote in 1900 — “the Blue Heron has disappeared from here. They were to be seen on Napier beach about 40 years ago but have moved now to the quieter refuge of the Kidnappers and Mahia.”

New Zealand is the south-eastern limit of range of the Reef Heron, which is mainly a bird of the tropical and sub-tropical zone. It may be that conditions for survival in this peripheral area have, by natural causes, become less favourable than they used to be. It is certain that changes brought about by the activities of man have had an adverse effect on the species. Disappearance of wooden wharves,

reclamation of tidal land, deepening of channels, water pollution, proliferation of power-driven boats and consequent disturbance of nesting sites have all affected the Reef Heron's life style and reproductive capacity.

The Reef Heron is not yet a rare bird. In some areas there has been satisfactory adjustment to changed conditions. Numbers may continue to decline, or may stabilise by better breeding success at traditional sites or occupation of new ones in undisturbed localities. I hope that the results of this enquiry will encourage members who live in coastal areas to continue their observations and keep track of future developments. Records from additional localities and any other relevant information should be submitted for inclusion in Classified Summarised Notes.

#### ACKNOWLEDGEMENTS

I am grateful to Sir Robert Falla, F. C. Kinsky, G. A. Tunnicliffe and E. G. Turbott for helpful correspondence and discussion; to R. B. Sibson, and to others who have read and commented on parts of the manuscript; to Peter Gaze for Mapping Scheme records and David Crockett for loan of Nest Record cards; to officers of the Wildlife Service for numerous island records; to Mrs K. Reynolds, by whose initiative this enquiry was undertaken, for her practical help during the whole of the exercise; and to upwards of 150 members of the OSNZ who have contributed information, answered queries and provided me with a massive correspondence file from which this report has been compiled.

#### LITERATURE CITED

- BULLER, W. L. 1888. A History of the Birds of New Zealand. (2nd ed.) London: The Author.  
 HUTCHISON, F. 1901. Scinde Island, from a naturalist's point of view. Trans. Proc. N.Z. Inst. 33: 213-221.  
 MOON, G. J. H. 1960. Focus on New Zealand Birds. (2nd ed.) Wellington: Reed.  
 OLIVER, W. R. B. 1955. New Zealand Birds. (2nd ed.) Wellington: Reed.  
 SANDAGER, F. 1890. Observations on the Mokohinau Islands and the birds which visit them. Trans. Proc. N.Z. Inst. 22: 286-294.  
 WILKINSON, A. S.; WILKINSON, A. 1952. Kapiti Bird Sanctuary. Masterton: Masterton Printing Co. Ltd.

A. T. EDGAR, *Inlet Road, Kerikeri*