

THE BIRDS OF KOORAGANG ISLANDPreliminary Report

BY

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Kooragang is a newly formed and newly named island of approximately 6500 acres, situated between the North and South arms of the Hunter River approx. 1 mile upstream from the port of Newcastle and consists of the former Walsh, Spectacle, Dempsey, Moschetto and Ash Islands joined together by an industrial reclamation scheme. Large sections of the island are rapidly becoming industrialised and consequently the displacement, population densities and adaptation of birds to the change in environment and ever decreasing food availability is of particular interest.

In 1969 observations were made as frequently as possible and from 1970 to date regular visits have been made every week. The route has been kept as constant as possible and the area has remained essentially the same. To ensure a high degree of accuracy in our sightings 7 and 10 x 50 binoculars are used to aid in locating, identifying and counting all birds readily visible in the open. The obtaining of necessary information required for our studies has been made difficult by the limited number of people available to cover such a large area in detail. This combined with a shortage of time has not allowed behavioural aspects to be studied in great detail, although casual observations have been made. Assistance has been received from other observers who have at times contributed valuable information on sightings and nesting sites.

Regular counts have been made of all the birds observed without regard to their being residents (e.g. Willy Wagtail) or passage migrants (e.g. Swift). Most birds are readily recognised as to species, but some species, especially in their non-breeding plumages, cannot be distinguished with confidence. Therefore when any doubt has existed, uncommon species have been included in the common species which they resemble. Thus counts of Sharp-tailed Sandpiper may have included Pectoral Sandpiper; Red-necked Stints may have included Long-toed Stint, and in bad light some Grey Teal may have been confused with Chestnut Teal and vice versa.

Weather conditions at times considerably affected our counts as in rainy periods birds either sought shelter or moved to more favourable feeding areas.

The Birds of Kooragang Island (cont.)

During the past years 163 species have been recorded of which 49 have been found breeding on the island and 8 found breeding in the near vicinity.

Migratory birds, however, form the bulk both in numbers and species. At times it is not unusual to observe large flocks of either ducks or waders numbering up to 1000 birds.

The large number of species present is due mainly to the variety in habitat existing on the island i.e. reed swamps, mangrove swamps, salt marshes, open grassland and tidal mudflats.

For centuries the estuaries of the Hunter River have been silting up gradually. On their banks and on the mudflats in the middle of the streams extensive tidal marshes developed into excellent wildfowl habitat; however, as far as wildfowl is concerned, the reclamation scheme will destroy these favourable haunts.

The mudflats now only account for a small percentage of the island's area and mainly extend from the Stockton Bridge along the North arm of the Hunter River into Fullerton Cove (see map 1). Foodwise, the tidal mudflat is by far the most important of all the habitats existing on the island, for it supports approx. 1/3 of all the species present. The dominant species present on the tidal mudflat is a group called "Waders", such as Curlews, Plovers and Sandpipers. Although 5 species have been found breeding on the island, the majority of waders are migrants from Asia, Siberia and Alaska, and one species, the Double Banded Dotterel from New Zealand. Some are very regular visitors, in either summer or winter, others are rare stragglers at the limit of or outside of, their normal geographic range.

Some birds are irregular nomads, whose movements are controlled by local conditions and shifts in the food supply. Ducks, for instance, can be included in this category. As the conditions inland become unfavourable, large numbers of ducks can be seen on the island and other coastal drought refuge areas.

Factors favouring the concentrations of waterfowl are:

- a) A sufficient food supply; food being in accessible situations for the species concerned.

The Birds of Kooragang Island (cont.)

- b) Shallow waters; waters of sufficient size; cover and absence of disturbance.*

Several of these factors are related in various ways. Most food plants for example depend on shallow waters; here they are accessible to Waterfowl. Extensive waters usually are safe day-time resting places for nocturnal feeders and the presence of cover may compensate for the effect of strong wind over these waters. Waterfowl concentrations are largely dependent on suitable vegetation for food and shelter. In our study area there are few areas left where vegetation can start afresh when the existing ones are depleted or cultivated. We are therefore faced with the problem of looking to other areas containing similar habitats and conserving whatever possible. Swamp areas in close proximity to Kooragan Island well worth considering and suitable to large waterfowl concentrations are Hexham, Woodberry & Beresfield Swamps.

As reproduction takes place at the time of year when it is most advantageous for each particular species, the breeding season for most species on the island varies, generally extending over the period August-March, with the exception of the Black Swan, which is an early breeder and starts nesting as early as June and sometimes May.

Hérons and Egrets all nest in the Mangroves on Kooragang. Their food mainly consists of fish, frogs and insects which abound in the area especially during the months November-early April when their numbers reach a peak. These peaks come at a time when the young Egrets and Herons are most vulnerable and require large amounts of food to sustain their rapid growth rate. From reliable sources we received information that in the early 1960's breeding species were abundant and now only 10 years later our investigations have shown a rapid decline in numbers. Both the Egret and Night Heron colony, for example, ten years ago consisted of approx. 100 pairs each; last year only 40 nests were occupied by Egrets, while no Nankeen Night Herons were found breeding. These remaining nests are now threatened with destruction by continuing reclamation.

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- * The area has been frequently disturbed in different ways:
- a. disturbances by shooters greatly affecting our counts;
 - b. disturbances by illegal dumping of rubbish;
 - c. disturbances caused by road construction and reclamation causing severe damage to the whole ecology.

The Birds of Kooragang Island (cont.)

Destruction of suitable habitat and natural food supply causes many species to narrow their already limited territorial boundaries or to desert the area.

The habitat selection is of vital importance for the existence of a species, for if they do not select the right sort of habitat the chances of rearing a successful brood are minimised.

By studying the ecology of a species we will undoubtedly gain some knowledge of its requirements and hence be in a better position to attempt to preserve suitable areas.

Within reasonable distance of Kooragang Island, the next best suitable area we could possibly foresee for waders would be the Fullerton Cove area (see map 1), which, however, we have little chance of preserving unless a concerted effort is made by locals and conservationists in the very near future.

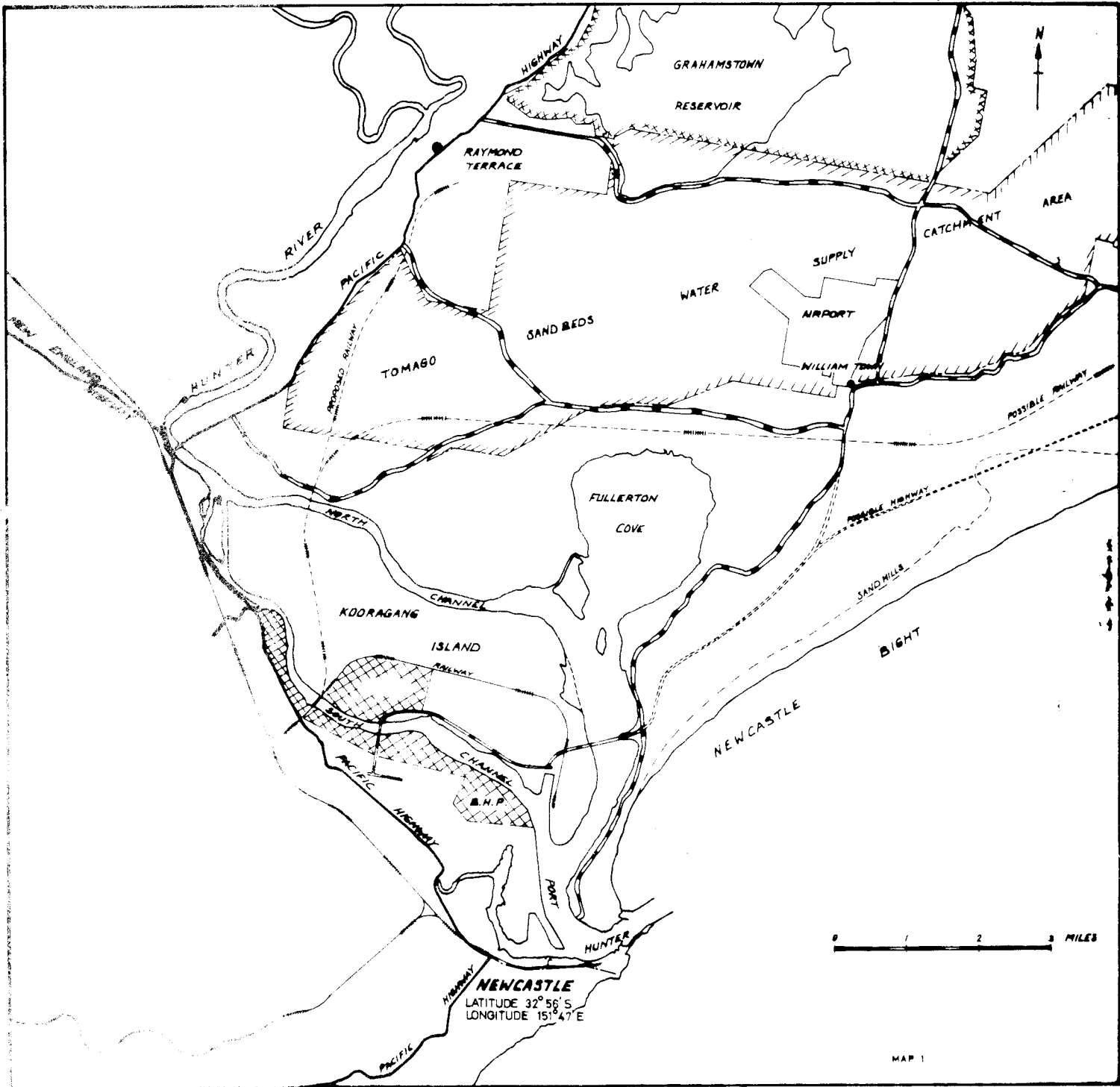
It is unfortunate that such a rich and varied faunistic area as Kooragang Island, which has attracted people from many countries and all over Australia, will be completely "destroyed"; however, it was planned as an industrial complex and reclamation was well in progress before its ecological value as a sanctuary was realised.

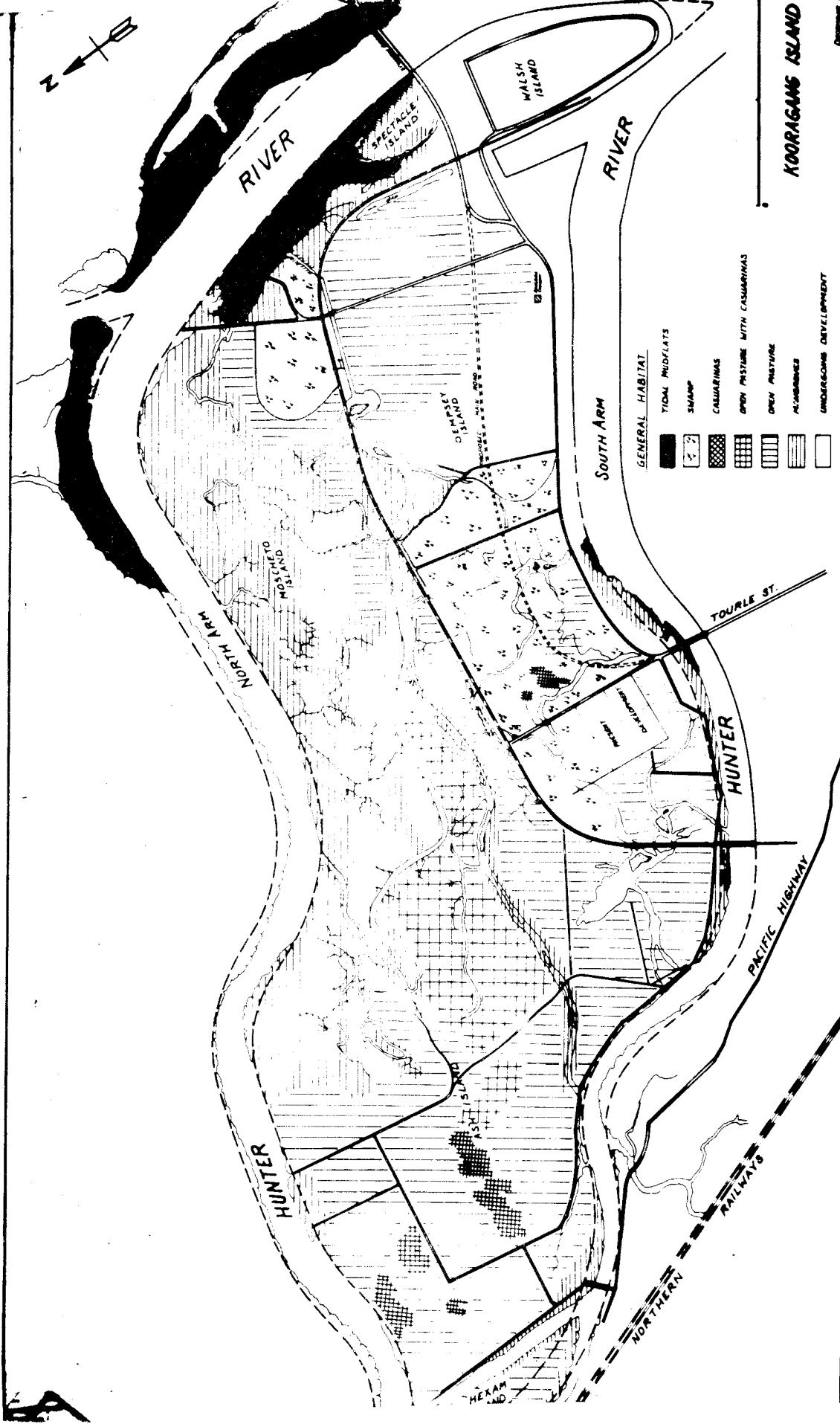
Now, in 1972, with several industries firmly established on the island, the filling of swamps by the B.H.P. with sludge from the coal washery, the pumping in of sand from channel dredging operations, suffocating the mangroves in which the Egret colony is located, the new Stockton Bridge and construction of the associated highway, the life of the island seems doomed to an extremely short duration.

ACKNOWLEDGEMENTS

We are grateful for the assistance and co-operation received from many people, particularly Messrs C. Holmes and D. Gosper, who kindly made available their observation records, and the B.H.P. watchmen, who were always quick to act to prevent illegal shooting.

We wish to convey our gratitude to our wives, who have endured many hardships, and without their understanding and consideration this report would not have been possible.





May, 1972

Hester Natural History

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SPECIES		RECORDED BEFORE 69	BREEDING	1969/1970	1970/1971	1971/1972	MAX. NO.	AVERAGE NO.	PROBABILITY OF OBSERVATION IN %
GREAT CRESTED GABBE	PODICEPS CRISTATUS			0	0	=	1	1	1
LITTLE GABBE	PODICEPS NOVAEHOLLANDIAE		*	-	-	+	150	35	53
AUSTRALIAN PELICAN	PELICANUS CONSPICILLATUS			-	-	+	250	54	31
BLACK CORMORANT	PHALACROCORAX CARBO			-	+	+	48	5	41
LITTLE BLACK CORMORANT	PHALACROCORAX SULCIROSTRIS			+	-	+	50	7	37
PIED CORMORANT	PHALACROCORAX VARIUS			-	-	+	25	6	24
LITTLE PIED CORMORANT	PHALACROCORAX MELANOLEUCOS			+	+	+	60	14	95
DARTER	ANNINGA RUF A			0	0	+	3	1	8
LITTLE EGRET	EGRETTA GARZETTA		?	-	+	+	20	6	44
PLUMED EGRET	EGRETTA INTERMEDIA		*	+	=	-	50	8	38
WHITE EGRET	EGRETTA ALBA		*	=	+	-	180	21	67
CATTLE EGRET	ARDEOLA IBIS	00		0	0	00	6	6	2
WHITE-FACED HERON	ARDEA NOVAEHOLLANDIAE		*	-	+	=	160	30	100
PACIFIC HERON	ARDEA PACIFICA			0	0	+	2	1	4
NANKKIN NIGHT HERON	NYCTICORAX CALEDONICUS		*	-	+	+	200	18	30
MANGROVE BITTERN	BUTORIDES STRIATUS		*	0	=	=	4	2	21
JABIRU	XENORHYNCHUS ASIATICUS	00		0	0	00	1	1	1
GLOSSY IBIS	PLEGADIS FALCINELLUS	00		0	0	=	12	4	7
WHITE IBIS	THRESKIORNIS MOLUCCA			-	+	+	390	31	56
STRAW-NECKED IBIS	THRESKIORNIS SPINICOLLIS			+	+	-	150	20	42
ROYAL SPOONBILL	PLATALEA LEUCORODIA			-	-	+	100	23	40
YELLOW-BILLED SPOONBILL	PLATALEA FLAVIPES			0	-	+	28	4	24
BLACK SWAN	CYGNUS ATRATUS		*	-	-	+	260	46	49
BLACK DUCK	ANAS SUPERCILIOSA		*	-	-	+	500	82	53
GREY TEAL	ANAS GIBBERIFRONS		?	0	-	+	60	21	17
CHESTNUT TEAL	ANAS CASTANEA		*	-	-	+	1100	150	60
BLUE-WINGED SHOVELER	ANAS RHYNCOTIS		?	+	0	-	10	3	8
PINK-EARED DUCK	MALACORHYNCHUS MEMBRANACEUS			0	0	=	12	8	3
WHITE-EYED DUCK	AYTHYA AUSTRALIS			0	0	=	50	10	17
WOOD DUCK	CHENONETTA JUBATA			+	0	-	60	8	2
MUSK DUCK	BIZIURA LOBATA		?	0	-	=	5	2	27
BLACK-SHOULDERED KITE	ELANUS NOTATUS			0	-	=	3	2	13
WHISTLING KITE	HALIASTUR SPHENURUS		**	=	+	+	7	2	80
AUSTRALIAN GOSHAWK	ACCIPITER FASCIATUS			=	=	=	1	1	14
COLLARED SPARROWHAWK	ACCIPITER CIRROCEPHALUS			0	0	=	1	1	1
WEDGE-TAILED EAGLE	AQUILA AUDAX			=	0	=	1	1	1
WHITE-BREASTED SEA-EAGLE	HALIAEETUS LEUCOGASTER		**	-	=	=	6	2	43
SWAMP HARRIER	CIRCUS APPROXIMANS			-	=	=	3	2	41
PEREGRINE FALCON	FALCO PEREGRINUS			=	0	=	1	1	5
LITTLE FALCON	FALCO LONGIPENNIS			=	0	=	1	1	1
NANKKIN KESTREL	FALCO CENCHROIDES		*	=	=	=	4	2	40
BROWN FALCON	FALCO BERIBORA			-	-	+	6	2	47
STUBBLE QUAIL	COTURNIX PECTORALIS	00		0	0	0			
BROWN QUAIL	COTURNIX YPSILOPHORUS	00		0	00	=	1	1	1
MARSH CRAKE	PORZANA PUSILLA		*	=	0	0	2	1	
SPOTTED CRAKE	PORZANA FLUMINEA		*	+	=	=	8	1	12
DUSKY MOORHEN	GALLINULA TENEBROSA		*	-	-	+	100	20	50
SWAMPHEN	PORPHYRIO PORPHYRIO		*	-	-	+	50	11	50
COOT	FULICA ATRA		*	0	0	+	200	31	26
PIED OYSTERCATCHER	HAEMATOPUS OSTRALEGBUS		**	0	-	+	23	5	15
SPUR-WINGED PLOVER	VANELLUS NOVAEHOLLANDIAE		*	-	+	-	60	13	57
BANDED PLOVER	VANELLUS TRICOLOR	00		0	00	0	1	1	1

SPECIES		RECORDED BEFORE '69	BREEDING	1969/ 1970	1970/ 1971	1971/ 1972	MAX. No	AVERAGE No	PROBABILITY OF OBSERVATION IN '76
RED-KNEED DOTTEREL	CHARADRIUS CINCTUS		*	+	0	+	49	8	9
RED-CAPPED DOTTEREL	CHARADRIUS RUFICAPILLUS		*	-	-	+	90	23	34
RINGED PLOVER	CHARADRIUS HIATICULA	00		0	0	0	1	1	
DOUBLE-BANDED DOTTEREL	CHARADRIUS BICINCTUS			0	0	+	40	23	10
MONGOLIAN SAND-DOTTEREL	CHARADRIUS MONGOLUS			0	+	+	500	85	22
LARGE SAND-DOTTEREL	CHARADRIUS LESCHENAUPTII	00		0	0	=	2	1	3
BLACK-FRONTED DOTTEREL	CHARADRIUS MELANOPS		*	-	-	+	18	5	30
EASTERN GOLDEN PLOVER	PLUVIALIS DOMINICA			-	-	+	250	35	23
TURNSTONE	ARENARIA INTERPRES			-	-	+	30	7	29
JAPANESE SNIPE	GALLINAGO HARDWICKII			=	-	=	3	2	8
LITTLE WHIMBREL	NUMENIUS MINUTUS	00		=	0	0	1	1	
WHIMBREL	NUMENIUS PHAEOPUS			-	=	+	21	3	40
EASTERN CURLEW	NUMENIUS MADAGASCARIENSIS			-	+	+	300	32	48
LITTLE GREENSHANK	TRINGA STAGNATILIS	00		0	0	0			
GREENSHANK	TRINGA NEBULARIA			-	-	+	200	19	48
WOOD SANDPIPER	TRINGA GLAREOLA			0	-	+	6	4	3
COMMON SANDPIPER	TRINGA HYPOLEUCOS			0	0	=	4	1	8
GREY-TAILED TATTLER	TRINGA BREVIPES			=	-	+	19	7	39
TEREK SANDPIPER	TRINGA CINEREA			-	-	+	200	22	19
KNOT	CALIDRIS CANUTUS	00		0	0	=	30	16	7
GREAT KNOT	CALIDRIS TENUIROSTRIS	00		0	0	=	12	7	4
SHARP-TAILED SANDPIPER	CALIDRIS ACUMINATA			+	-	=	450	91	34
PECTORAL SANDPIPER	CALIDRIS MELANOTOS			0	0	=	1	1	1
RED-NECKED STINT	CALIDRIS RUFICOLLIS			-	+	=	500	84	37
CURLEW SANDPIPER	CALIDRIS FERRUGINEA			-	-	+	900	130	40
SANDERLING	CALIDRIS ALBA	00		0	0	0	1	1	
BROAD-BILLED SANDPIPER	LIMICOLA FALCINELLUS			0	-	+	180	17	15
BLACK-TAILED GODWIT	LIMOSA LIMOSA			0	-	+	800	146	19
BAR-TAILED GODWIT	LIMOSA LAPPONICA			-	-	+	500	80	35
RUFF	PHILOMACHUS PUGNAX	00		0	0	00	1	1	1
WHITE-HEADED STILT	HIMANTOPUS HIMANTOPUS		*	+	-	+	350	25	33
RED-NECKED AVOCET	RECURVIROSTRA NOVAEHOLLANDIAE	00		0	0	0	5	5	5
ARCTIC SKUA	STERCORARIUS PARASITICUS			0	0	=	1	1	2
DOMINICAN GULL	LARUS DOMINICANUS	00		0	0	0	1	1	
SILVER GULL	LARUS NOVAEHOLLANDIAE			-	-	+	600	158	100
WHISKERED TERN	CHLIDONIA HYBRIDA			+	-	0	30	8	2
WHITE-WINGED BLACK TERN	CHLIDONIAS LEUCOPTERA			0	=	=	28	8	16
CASPIAN TERN	HYDROPROGNE CASPIA			-	=	=	4	2	14
GULL-BILLED TERN	GELCHELIDON NILOTICA			-	+	=	27	4	19
COMMON TERN	STERNA HIRUNDO			00	-	+	300	92	12
WHITE-FRONTED TERN	STERNA STRIATA	00		0	0	0			
LITTLE TERN	STERNA ALBIFRONS			-	-	+	150	26	27
BLACK TERN	STERNA NIGER	00		0	0	0	1	1	
CRESTED TERN	STERNA BERGII			-	+	-	50	9	30
TOP-KNOT PIGEON	LOPHOLAIMUS ANTARCTICUS			0	=	0	25	25	1
BAR-SHOULDERED DOVE	GEOPELIA HUMERALIS		?	00	-	+	6	2	28
PEACEFUL DOVE	GEOPELIA STRIATA	00		0	0	0			
CRESTED PIGEON	OLYPHAPS LOPHOTES			0	0	00	3	2	3
LITTLE LORIKEET	GLOSSOPSITTA PUSILLA			0	0	=	30	30	1
GALAH	CACATUA ROSEICAPILLA			0	=	0	3	2	3
COCKATIEL	NYMPHICUS HOLLANDICUS	00		0	0	0			
EASTERN ROSELLA	PLATYCERCUS EXIMIUS			0	=	=	2	2	6

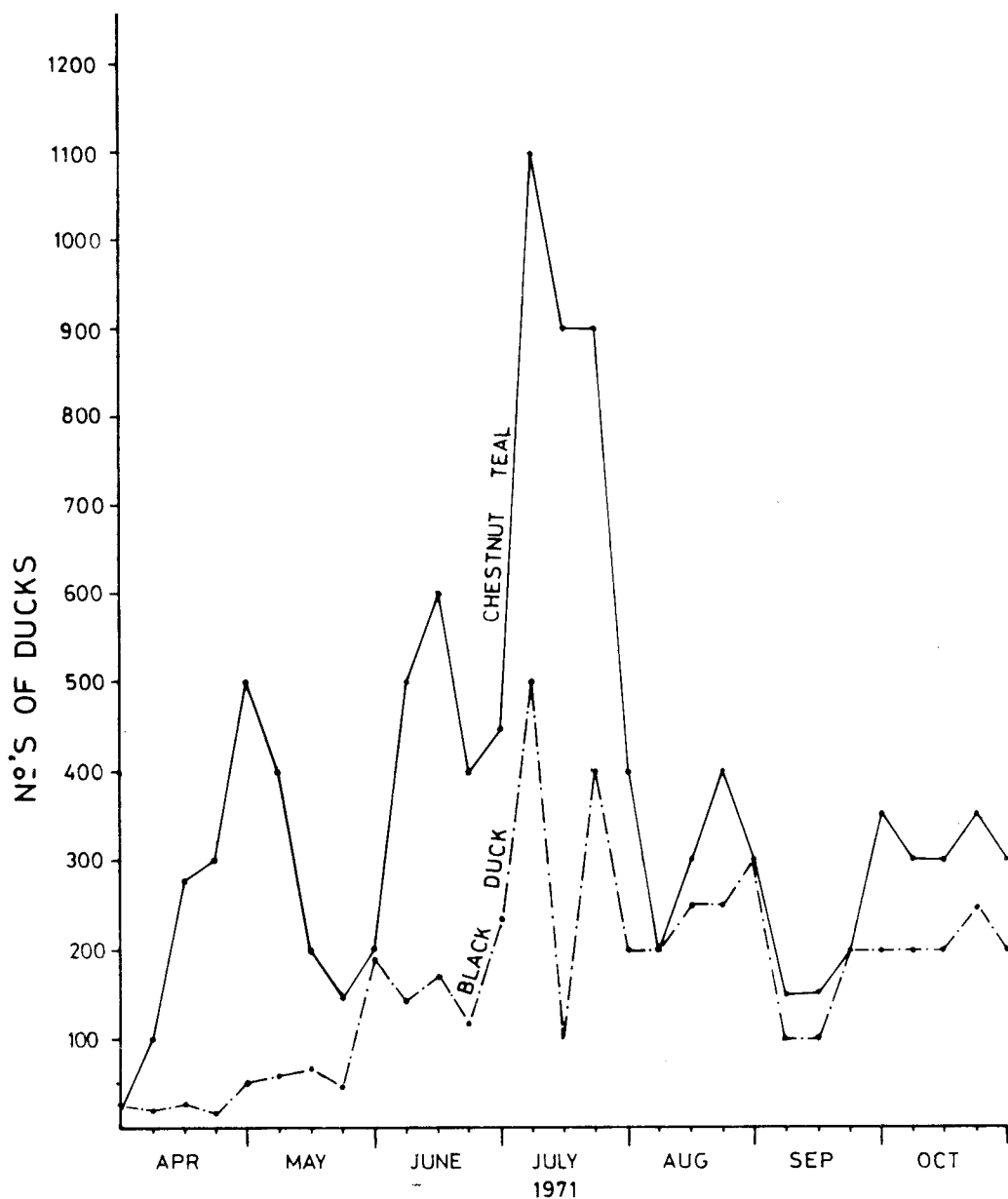
SPECIES		RECORDED BEFORE 69	BREEDING	1969/ 1970	1970/ 1971	1971/ 1972	MAX. Nº	AVERAGE Nº	PROBABILITY OF OBSERVATION IN %
RED-RUMPED PARROT	<i>PSEPHOTUS HAEMATONOTUS</i>			-	-	+	50	7	25
PALLID CUCKOO	<i>CUCULUS PALLIDUS</i>	00		0	0	0	1	1	
FAN-TAILED CUCKOO	<i>CACOMANTIS PYRRHOPHANUS</i>			0	=	=	1	1	3
BLACK-EARED CUCKOO	<i>CHRYSOCOCCYX OSCULANS</i>			0	0	=	1	1	1
HORSFIELD BRONZE CUCKOO	<i>CHRYSOCOCCYX BASALIS</i>			0	0	=	1	1	2
GOLDEN BRONZE CUCKOO	<i>CHRYSOCOCCYX PLAGOSUS</i>		*	=	=	+	4	1	17
KOEL	<i>EUDYNAMYS SCOLOPACEA</i>	00		0	0	0			
SPINE-TAILED SWIFT	<i>APUS PACIFICUS</i>			0	-	+	500	150	3
AZURE KINGFISHER	<i>ALCYONE AZUREA</i>			0	=	0	1	1	3
LAUGHING KOOKABURRA	<i>DACELO GIGAS</i>		**	=	=	=	3	1	16
SACRED KINGFISHER	<i>HALCYON SANCTA</i>		*	-	+	-	20	4	49
AUSTRALIAN BEE-EATER	<i>MEROPS ORNATUS</i>	00		0	0	0			
WELCOME SWALLOW	<i>HIRUNDO NEOXENA</i>		*	-	-	+	250	70	48
TREE MARTIN	<i>PETROCHELIDON NIGRICANS</i>		?	0	-	+	50	15	18
FAIRY MARTIN	<i>PETROCHELIDON ARIEL</i>		*	+	+	+	150	50	30
AUSTRALIAN PIPIT	<i>ANTHUS AUSTRALIS</i>		*	-	=	+	40	7	52
BLACK-FACED CUCKOO-SHRIKE	<i>CORACINA NOVAEHOllandIAE</i>		**	-	=	=	10	3	14
CICADA-BIRD	<i>EDOLISOMA TENUIROSTRE</i>	00		0	0	0			
WHITE-WINGED TRILLER	<i>LALAGE TRICOLOR</i>	00		0	0	0			
GOLDEN-HEADED FANTAIL-WARBLER	<i>CISTICOLA EXILIS</i>		*	-	+	=	10	4	38
LITTLE GRASSBIRD	<i>MEGALURUS GRAMINEUS</i>		*	+	=	+	11	3	49
REED WARBLER	<i>ACROCEPHALUS AUSTRALIS</i>		*	-	+	+	9	4	43
BROWN SONGLARK	<i>CINCLORHAMPHUS CRURALIS</i>		*	+	0	=	3	1	6
SUPERB BLUE WREN	<i>MALURUS CYANEUS</i>		*	=	=	=	16	6	52
VARIEGATED WREN	<i>MALURUS LAMBERTI</i>	00	*	0	=	=	1	1	3
WHITE THROATED WARBLER	<i>GERYGONE OLIVACEA</i>	00		0	0	0			
MANGROVE WARBLER	<i>GERYGONE LEVIGASTER</i>		*	0	=	=	4	2	23
LITTLE THORNBILL	<i>ACATHIZA NANA</i>		*	0	=	=	9	5	8
BROWN THORNBILL	<i>ACANTHIZA PUSILLA</i>		*	-	=	=	7	2	43
YELLOW-TAILED THORNBILL	<i>ACANTHIZA CHRYSORRHOA</i>		*	0	+	-	6	2	7
WHITE-BROWED SCRUB-WREN	<i>SERICORNIS FRONTALIS</i>		?	0	=	=	2	1	6
WHITE-FRONTED CHAT	<i>EPTIANURA ALBIFRONS</i>		*	+	-	+	50	13	51
ROSE ROBIN	<i>PETROICA ROSEA</i>	00		0	0	0			
GREY FANTAIL	<i>RHIPIDURA FULIGINOSA</i>		*	+	=	=	9	3	46
RUFIOUS FANTAIL	<i>RHIPIDURA RUFIFRONS</i>			=	0	0	1	1	1
WILLIE WAGTAIL	<i>RHIPIDURA LEUCOPHRYS</i>		*	=	=	=	13	3	55
LEADEN FLYCATCHER	<i>MYIAGRA RUBECULA</i>		*	0	=	=	4	2	13
RESTLESS FLYCATCHER	<i>SEISURA INQUIETA</i>			0	=	=	1	1	2
BLACK-FACED FLYCATCHER	<i>MONARCHA MELANOPSIS</i>			0	0	=	1	1	3
RUFIOUS WHISTLER	<i>PACHYCEPHALA RUFIVENTRIS</i>		*	0	=	=	4	2	31
GREY SHRIKE-THRUSH	<i>COLLURICINCLA HARMONICA</i>		*	=	=	=	3	1	29
MISTLETOE BIRD	<i>DICAELUM HIRUNDINACEUM</i>			0	0	=	1	1	5
GREY-BREASTED SILVEREYE	<i>ZOSTEROPS LATERALIS</i>		*	-	-	+	30	9	52
BROWN HONEYEATER	<i>LICHMERA INDISTINCTA</i>		*	0	+	=	4	1	21
YELLOW-FACED HONEYEATER	<i>MELIPHAGA CHRYSOPS</i>			0	-	+	13	12	2
NOISY FRIAR-BIRD	<i>PHILEMON CORNICULATUS</i>	00		0	0	0			
STRIPED HONEYEATER	<i>PLECTORHYNCHA LANCEOLATA</i>		*	0	0	=	2	2	2
ZEBRA FINCH	<i>POEPHILA GUTTATA</i>		**	=	0	0	30	21	
OLIVE-BACKED ORIOLE	<i>ORIOULUS SAGITTATUS</i>			0	0	00	1	1	1
SOUTHERN FIGBIRD	<i>SPHECOTHERES VIEILLIOTI</i>	00		0	0	0			
MAGPIE LARK	<i>GRALLINA CYANOLEUCA</i>		*	-	+	=	30	9	53
PIED BUTCHER BIRD	<i>CRATICUS NIGROGULARIS</i>			=	0	0	2	2	1

SPECIES		RECORDED BEFORE '69	BREEDING	1969/ 1970	1970/ 1971	1971/ 1972	MAX. No.	AVERAGE No.	PROBABILITY OF OBSERVATION IN %
<i>GREY BUTCHER-BIRD</i>	<i>CRATICUS TORQUATUS</i>		**	=	=	=	3	1	10
<i>BLACK-BACKED MAGPIE</i>	<i>GYMNORHINA TIBICEN</i>		*	=	=	=	2	3	40
<i>AUSTRALIAN RAVEN</i>	<i>CORVUS CORONOIDES</i>		*	+	-	+	40	13	90
INTRODUCED SPECIES									
<i>HOUSE SPARROW</i>	<i>PASSER DOMESTICUS</i>		*				8	3	100
<i>GOLD FINCH</i>	<i>CARDUELIS CARDUELIS</i>		*				50	9	46
<i>STARLING</i>	<i>STURNUS VULGARIS</i>		*				1300	300	100
<i>INDIAN MYNA</i>	<i>ACRIDOTHERES TRISTIS</i>		**				1	1	1
<i>DOMESTIC PIGEON</i>	<i>COLUMBA LIVIA</i>		?				40	-	-

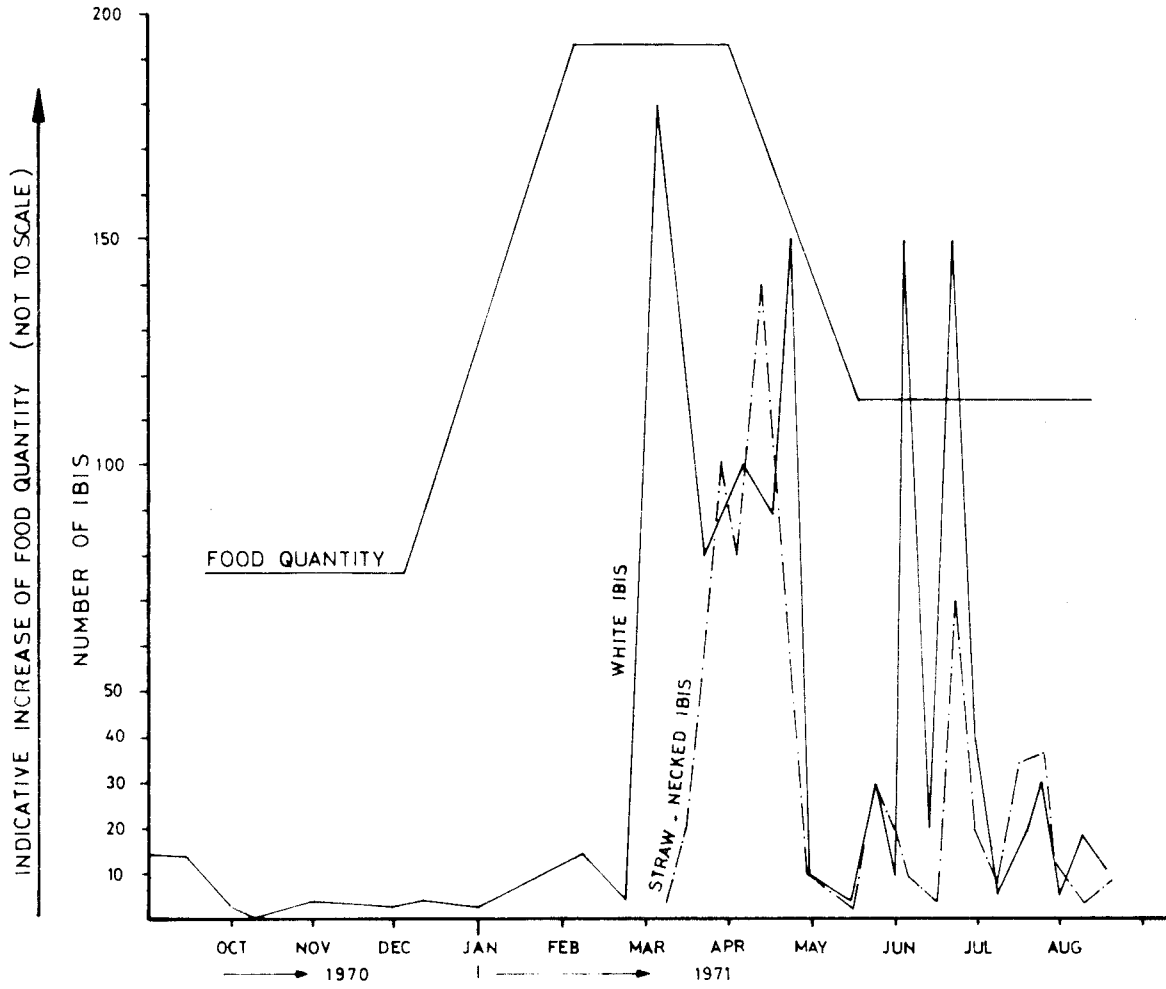
LEGEND

- * Found breeding on Kooragang Island
- ** Found breeding in near vicinity
- ? Breeding on the Island needs to be confirmed
- = Average numbers seen during year
- + More than average numbers seen during year
- Less than average numbers seen during year
- 0 Not observed during year
- 00 Recorded on the Island by other observers

Probability of observations taken over a 100 week period, starting 1st May, 1970



FLUCTUATION IN NUMBERS OF CHESTNUT TEAL AND BLACK DUCK DUE TO CLIMATIC CHANGES AND DISTURBANCES



FLUCTUATIONS IN NUMBERS BETWEEN WHITE AND STRAW-NECKED IBIS IN RELATION TO FOOD AVAILABILITY

