

GULLS : POPULATION TRENDS AND EFFECTS ON OTHER FAUNA AND FLORA1. OVERSEAS EXPERIENCE

Before considering the gull situation in Australia, it is useful to look at Britain and Ireland, where the problem has been studied closely for a number of years.

1.1 The Species and Changes in Abundance

There are six species of gulls which breed regularly in Britain and Ireland. All have shown significant increases in breeding population over the past hundred years or so. The Herring Gull (Larus argentatus) has shown the most dramatic increase. Major colonies of this species have a continuing growth rate of 13 - 15% per annum (Sharrock, 1974). The England and Wales population of Black-headed Gulls (Larus ridibundus) is believed to have increased from 46,000 - 51,000 breeding pairs in 1958 to 100,000 - 110,000 pairs in 1973 (Sharrock 1974). The number of breeding pairs of Kittiwakes (Rissa tridactyla) increased by 49% over the period 1959 - 1969, and the species has apparently been increasing at this rate (roughly 50% per decade) for over half a century. The rate of increase of the Lesser Black-backed Gull (Larus fuscus) parallels that of the Herring Gull. Some colonies have doubled in size in only six or seven years. Numbers of Great Black-backed Gulls (Larus marinus) increased threefold from 1930 to 1956. Common Gull (Larus canus) numbers have also increased over the last 100 years.

1.2 Urbanisation

Rapid increases in gull populations have resulted in many traditional coastal nesting areas becoming saturated. This in turn has resulted in the establishment of new inland breeding colonies. Some of these colonies are on lakes, moorland or shingle banks, however many have established in urban areas, with nests perched on derelict buildings, warehouses and, increasingly, domestic property. The Herring Gull has shown the most dramatic trend towards urbanisation. This species was first recorded nesting on buildings in the 1920's. By 1970 there were at least 55 colonies on buildings, averaging 22 pairs per colony. The largest was 225 pairs (Cramp, 1971). From 1970 to 1976 the number of towns occupied doubled and there was a three-fold increase in the number of town-nesting birds.

1.3 Factors Responsible

A number of factors are thought to be responsible for this century's increase in gull numbers. Firstly, the gradual amelioration of the North Atlantic climate has probably contributed to the northern spread of some species. Secondly, a reduction in the level of persecution (collection of eggs and young, and shooting) since the nineteenth century has, no doubt, also contributed to the increase in numbers. Thirdly, gulls have learnt to exploit the ever-increasing quantities of edible waste produced by man. Fish offal, domestic refuse, and abattoir and sewage effluent have all become more available in recent times.

1.4 Effects on Other Species

Gulls are not simply scavengers. They are also natural predators, and the prey of some species may include other seabirds, their eggs and their young. Gulls are also kleptoparasitic, stealing food from other birds. Because of their larger size and more aggressive nature, some gulls are also capable of displacing other, smaller seabirds from favoured nesting sites. It is not surprising, therefore, that recent increases in numbers of some gull species have been to the detriment of certain other seabirds. The Herring Gull is the most troublesome in this regard. Due to its large size (equivalent to that of the Pacific Gull (L. pacificus) of Australia) and aggressive nature it is able to dominate most other seabirds, particularly the smaller terns. As Herring Gull numbers have increased, terns have been displaced from many of their traditional nesting areas. At first the terns were able to find other suitable nesting areas. However, as these have been progressively colonized by gulls, the terns have been pushed to sub-optimal sites where the risks of mammalian predation and flooding are greater. A notable example is The Isle of May (Firth of Forth, Scotland) where Common Terns (Sterna hirundo) numbered 5,000 - 6,000 pairs in the late 1940's. During the 1950's the number of Herring Gulls nesting on the isle increased dramatically and by 1956 they had completely displaced the terns, through competition for nest sites. Since then the terns have been ousted from island after island as gull numbers have continued to increase.

Other species of seabirds have also been adversely affected by increases in Herring Gull numbers. In some places the grassland in which Puffins, Manx Shearwaters and Storm Petrels burrow has been eroded following tussock pulling by displaying gulls. This does not appear to be a widespread problem however, and needs to be related to the fact that burrow-nesters themselves are often responsible for serious erosion of their own nesting habitat.

Only the larger species of gulls (Great Black-backed, Lesser Black-backed and Herring) have had a serious impact on other seabirds. Increases in populations of the smaller gulls (Common, Black-headed and Kittiwake) have proved troublesome in some areas (e.g. Minsmere) however on the whole they do not appear to have had substantial adverse effects on other species. In fact, in some instances, the opposite has been true. The Sandwich Tern (Sterna sandvicensis), for example, appears to seek out colonies of Black-headed Gulls in which to nest. The terns apparently benefit from the aggression shown by the gulls in protecting nests. There are several records of colonies of Sandwich Terns moving with Black-headed Gulls when the latter shifted breeding places. Experience at Havergate Island (Suffolk) suggests that Black-headed Gull colonies may also benefit Common Tern and Avocet(Recurvirostra avosetta) breeding (Brown 1958).

1.5 Terns

Most, if not all, species of British-breeding terns have declined in numbers in recent decades. Increasing populations of the larger gulls have no doubt contributed to this decline, however this is not considered to be the most important factor. Declines in tern numbers appear to be due primarily to an increase in the level of disturbance by humans. Beach-nesting species such as the Little Tern (Sterna albifrons) are most seriously affected and recently some moves have been made to fence-off regular breeding sites. Such protection has often been successful in increasing both breeding success and numbers nesting.

2. GULLS IN WESTERN AUSTRALIA

Seventy et al (1971) lists 30 species of seabirds nesting in Western Australia and adjacent islands. Two of these are gulls and 11 are terns.

In recent years, concern has been expressed about the apparent increase in Silver Gull (Larus novaehollandiae) numbers in this state, and the effects which this may be having on other species particularly terns. Though supportive data are limited there do appear to have been substantial increases in Silver Gull numbers in the vicinity of at least two coastal towns in W.A., Perth and Albany. Probable reasons for these increases, and measures which could be taken to reduce the size of colonies near Perth and Albany have been discussed elsewhere and are not considered in this paper. This paper simply considers the effects which increased Silver Gull numbers may have firstly, on the seabirds and habitats of Carnac and Green Islands, and secondly, on Australian seabirds in general.

2.1 Carnac Island

Eight species of seabirds have been recorded breeding on Carnac.

- i) Silver Gull (Larus novaehollandiae). This is by far the most abundant species. Several thousand pairs breed from mid-March to early November, with peaks in laying in April, June and August/September. In areas of highest nesting density the gulls kill the vegetation through defaecation and other activities. Over most of the nesting grounds, however, the condition and successional stage of the vegetation has not altered significantly since 1977 at least (J.N. Dunlop pers. comm.). In fact, over most of the island, the vegetation is apparently continuing to thrive, following extermination of the introduced rabbit population.
- ii) Wedge-tailed Shearwater (Puffinus pacificus). Carnac is the southernmost breeding station in W.A. The present population is believed to be well in excess of 100 breeding pairs. Shearwater burrows are dug in the soil beneath Frankenia and Rhagodia, and some damage to the vegetation results. The increasing population of Silver Gulls does not appear to have adversely affected this species however pertinent observations and data are lacking. The main threat to this colony is considered to be the collapse of burrows by humans.
- iii) Crested Tern (Sterna bergii). A colony of 100 - 200 pairs nests on the north end of the island from June to October. There has been little or no variation in colony size over the past three years at least. When left undisturbed, Crested Terns are apparently well able to defend their eggs and young against the slightly smaller Silver Gulls. In fact, the terns actually displace nesting gulls from their chosen area when they arrive to breed in June. Fledging success on Carnac is high relative to that of the gulls. Some egg predation by gulls does occur when terns are disturbed from their nests by human intrusion.

- iv) Bridled Tern (Sterna anaethetus). This species has bred on Carnac since 1921 at least. Present population is in the vicinity of 50 - 100 pairs, nesting in small caverns and crevices on cliff faces and slopes. Some nests are hidden in vegetation. Because of its choice of nest sites the species probably suffers little predation by gulls. Kleptoparasitism may however occur. Little is known of recent changes in population size.
- v) Caspian Tern (Hydroprogne caspia). A few pairs apparently breed each year. This is a much larger bird than the Silver Gull, and in undisturbed situations is unlikely to be directly affected by increases in gull numbers.
- vi) Little Penguin (Eudyptula minor). Breeds in spring. Because of its size, habits and temperament it is unlikely to be affected by gulls.
- vii) Pied Oystercatcher (Haematopus ostralegus). One or two pairs have been recorded nesting on the island's beaches in Spring. It is therefore prone to disturbance.
- viii) Pied Cormorant (Phalacrocorax varius). Hundreds of pairs nest on the island and on Flat Rock nearby. Numbers do not appear to have declined in recent times, and the species is unlikely to be affected by gulls.

2.2 Green Island (Oyster Harbour)

Four breeding species have been recorded.

- i) Silver Gull. Although data is scanty, numbers appear to have increased dramatically in recent years. Hundreds of pairs were recorded in 1974 and 1976, but in September 1977 some 4,000 to 5,000 pairs were nesting over the entire island.
- ii) Pied Oystercatcher. One or two pairs are recorded as breeding regularly. Nothing is known of nesting activity or success in recent years.
- iii) Caspian Tern. Two pairs apparently nest regularly. Again, nothing is known of success in recent years.
- iv) "Muttonbirds". In 1827 Lockyer stated that 3 dozen "muttonbirds" (presumably Puffinus carneipes) were caught on the island. There are no subsequent records of shearwaters breeding.

According to Abbot (1978) thirty-four species of plants have been found on the island, 20 of which are naturalized aliens. Dominant species are Australian Hollyhock (Lavatera plebeia) New Zealand Spinach (Tetragonia tetragonioides) and Red Inkweed (Phytolacea octandra). The influence of increased gull numbers on the vegetation has not been determined.

Summarising, there is no clear evidence that increases in gull populations on Carnac and Green Islands have been to the detriment of other nesting species. Because of their body size or choice of nest sites most species are unlikely to suffer significant predation of eggs and young by gulls, except when disturbed from their nests by human intruders. Some kleptoparasitism presumably occurs, however the level and significance of this is not known. At present, there is no evidence of gulls displacing other seabirds from their nesting territories. The effects of Silver Gull and Wedge-tailed Shearwater populations on the vegetation of Carnac Island has yet to be determined. Appropriate monitoring of vegetation condition and nesting activity is planned to commence in 1980 (Murdoch University).

2.3 Elsewhere

Elsewhere in Australia, no evidence has yet been produced which clearly demonstrates that increases in Silver Gull populations have been to the detriment of other species. In some eastern states colonies, increases in gull numbers have coincided with decreases in tern and storm petrel populations, however cause-and-effect has not been established. The prevailing view is that human disturbance, rather than the Silver Gull, has been responsible for the observed decreases. A recent study of seabird colonies in Victoria (unpublished) concluded that the most obvious threat to colonies was man, through destruction of habitat (particularly of burrow-nesters), disturbance and introduction of foxes and cats. Silver Gulls were not considered a threat, despite their increase in numbers.

2.4 Suggested Research

Experiences in Europe and North America (and to a lesser extent, in Australia) with seabird conservation in general, and the "explosive gull phenomenon" in particular, suggest that some research along the following lines would be desirable.

- i) Further research is required to determine whether or not expanding gull colonies in the vicinity of Perth and Albany (and perhaps other towns) pose a threat to other seabird colonies and their nesting habitat.
- ii) Some monitoring of seabird colonies most sensitive to disturbance is needed. The smaller terns, particularly the Fairy Tern (Sterna nereis), should be given high priority since
 - a) their choice of nesting sites makes them most vulnerable to human disturbance, and
 - b) overseas experience suggests that, of all the seabirds, the small terns are most likely to be adversely affected by increases in gull numbers.
- iii) Seabird colonies of exceptional interest or importance such as the Lesser Noddy (Anous tenuirostris) colony of the Abrolhos Islands and the Red-tailed Tropic Bird (Phaethon rubricaudus) colony on Sugarloaf Rock also warrant monitoring.

APPENDIX 1.

SIZE COMPARISON OF WESTERN AUSTRALIAN BREEDING GULLS AND TERNS

GULLS (2 SPECIES)

SIZE (Length)

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| 1. Pacific Gull (<i>Larus pacificus</i>) | 23-26 in. |
| 2. Silver Gull (<i>L. novaehollandiae</i>) | 16-17 in. |

NOTE: Herring Gull (*L. argentatus*) length is 22-26 in.

TERNs (11 SPECIES)

- | | |
|--|---------------|
| 1. Caspian Tern (<i>Hydroprogne caspia</i>) | 23½ in |
| 2. Crested Tern (<i>Sterna bergii</i>) | 17-19¼ in |
| 3. Sooty Tern (<i>S. fuscata</i>) | 17-18 in |
| 4. Bridled Tern (<i>S. anaethetus</i>) | 16¼ in |
| 5. Common Noddy (<i>Anous stolidus</i>) | 16 in |
| 6. Lesser Crested Tern (<i>S. bengalensis</i>) | 14½-16½ in |
| 7. Gull-billed Tern (<i>Gelochelidea nilotica</i>) | 14½-17 in |
| 8. Roseate Tern (<i>S. dougalli</i>) | 13½-15 3/4 in |
| 9. Lesser Noddy (<i>A. tenuirostris</i>) | 12-13½ in |
| 10. Whiskered Tern (<i>Chlidonias hybrida</i>) | 9½-10½ in |
| 11. Fairy Tern (<i>S. nereis</i>) | 8½-10½ in |

SEABIRD SPECIES RECORDED BREEDING IN W.A.	Nº OF EXTANT BREEDING COLONIES	BREEDING RANGE (W.A.)	OTHER AUST. STATES WITH BREEDING COLONIES	OTHER COUNTRIES	WA BREEDING SITES. (Sp. with < 10 colonies)
LITTLE PENGUIN (FAIRY PENGUIN) <u>Eudyptula minor</u>	30	Recherche Archipelago to Carnac Is.	N.S.W., Vic, Tas., S.A.	New Zealand	
GREAT-WINGED PETREL <u>Pterodroma macroptera</u>	13	Recherche Arch. to Albany [Abrolhos suggested]	—	Islands off Northern New Zealand, Kerguelen, the Crozets, Marion, Gough, + Tristan da Cunha Islands	
FLESHY-FOOTED SHEARWATER <u>Puffinus carneipes</u>	33	Recherche Arch. to Cape Hamelin	—	Islands round northern New Zealand, Lord Howe Is.	
WEDGED-TAILED SHEARWATER <u>Puffinus pacificus</u>	43	Carnac Is. to islands round Port Hedland	N.S.W., Qld, Coral Sea	islands in the tropical + sub-trop. Indian + Pacific Oceans.	
LITTLE SHEARWATER RACE <u>P. assimilis tunneyi</u> OTHER RACES	21	Recherche Arch. to Abrolhos Group	—	Tristan da Cunha, Gough, Lord Howe, + Norfolk Islands, the Kermadecs, Chatham Is. + those	

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				around northern N.Z., + in the north Atlantic.	
WHITE-FACED STORM-PETREL <u>Pelagodroma marina</u>	26	Recherche Arch. to Aboothos group.	N.S.W., Vic, Tas., S.A.	round islands of N.Z., Chatham + Auckland Islands. Remote breeding groups in the North Atlantic.	
LESSER FRIGATE-BIRD <u>Fregata ariel</u>	7	Bedout Is. to Ashmore Reef.	Northern Terr, Qld, Coral Sea	Tropical South Atlantic, Western Pacific + Indian Oceans (Cocos + Keeling Islands, New Caledonia.	Bedout Is., Laccapelle Islands (West Is), King Sound (Sunday + Swan Is), Adelie Is, Ashmore Reef (East + Middle Is).
RED-TAILED TROPIC-BIRD <u>Phaethon rubricaudus</u>	1	C. Naturaliste	Qld, Coral Sea	Lord Howe + Norfolk Islands, tropical Pacific + Indian Oceans (Christmas + Cocos Keeling Is).	Sugarloaf Rock + mainland opposite rock.

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BLACK CORMORANT <u>Phalacrocorax carbo</u>	not specified	South-West corner from Israelite Bay round the coast to the mouth of the Murchison River + inland to Avon R. Once seen at Millstream in North West.	Breeds over most of its range (except North-West Aust)	New Zealand, Asia, Africa, Europe + eastern North America.	inland freshwater localities
LITTLE BLACK CORMORANT <u>Phalacrocorax sulcirostris</u>	not specified	Australia-wide only in freshwater situations		Malay Archipelago, New Caledonia, Norfolk Is., N. Z.	
BLACK-FACED CORMORANT <u>Phalacrocorax fuscescens</u>	2	Recherche Arch.	S.A., Tas, Vic	—	Recherche Arch (Middle + Lion Is).
PIED CORMORANT <u>Phalacrocorax varius</u>	41	whole coastline of state north of Cape Naturaliste	Qld, N.S.W., Vic, S.A.	New Zealand	
LITTLE PIED CORMORANT <u>Phalacrocorax melanoleucos</u>	not specified	offshore Islands near Jurien Bay + inland freshwater locations	inland fresh- water rockeries in all states.	New Zealand, Lord Howe Is, Solomon Is., New Caledonia - Malay Arch.	

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BROWN BOOBY (GANNET) <u>Sula leucogaster</u>	6	Bedout Is (Port Hedland) to Ashmore Reef.	North Terr., Qld, Coral Sea.	breeds freely in tropical Atlantic, Pacific + Indian Oceans.	Bedout Is, Lacedpede Is (Middle Is), Adelie Is, Ashmore Reef (East, West and Middle Islands)
RED-FOOTED BOOBY <u>Sula sula</u>	1	Possibly Ashmore Reef	Qld, Coral Sea	Islands in tropical Atlantic, Pacific + Indian Oceans	Ashmore Reef (West Island).
MASKED BOOBY <u>Sula dactylatra</u>	2	Bedout Is and Adelie Is.	Qld, Coral Sea, North. Aust.	Lord Howe Is, Islands in tropical Atlantic, Pacific + Indian Oceans.	Bedout Is and Adelie Is.
AUSTRALIAN PELICAN <u>Pelecanus conspicillatus</u>	9	Peel Inlet to Cambridge Gulf	Qld, N.S.W. + Vic (no marine but perhaps along some river systems) Tas., S.A.	New Guinea	Peel Inlet (Creery Is + Nirimba Cay), Shark Bay (Pelican Is), Exmouth Gulf, Mangrove Is (Little Rocky Islet), North Turtle Is (off Port Hedland), Lacedpede Is (Middle Is),

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					Holothuria Reefs (Sandy Is), Cambridge gulf (Pelican Is).
SILVER GULL <u>Larus novaehollandiae</u>	51	Recherche Arch. to Montebello Islands.	Qld, N.S.W., Vic, Tas, S.A., North Terr.	New Caledonia, N. Z. area, South Africa.	
PACIFIC GULL <u>Larus pacificus</u>	43	Recherche Arch. to Shark Bay Islands	Tas, S.A.	—	
WHISKERED TERN (MARSH) <u>Chlidonias hybrida</u>	not specified	suitable freshwater swamps + brackish lakes throughout the state	around Aust, including Tas, but not arid interior	Africa, southern Europe, southern Asia, thru Indonesia to New Guinea.	
GULL-BILLED TERN <u>Gelochelidon nilotica</u>	not specified	suitable freshwater + coastal localities (only reported breed- ing in North of State)	thruout Aust but rarely seen in Tas.	the Americas, Europe, North Africa, Asia + Malay Arch.	
CASPIAN TERN <u>Hydroprogne caspia</u>	44	Israelite Bay to Dampier Arch.	Qld, Vic, Tas, S.A.	North America, Europe, Africa, Asia + N. Z.	

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ROSEATE TERN <u>Sterna dougalli</u>	11	Free Islets to Bedout Is.	Qld (North)	Eastern U.S.A., central America, some of West Indies, Azores, western + southern Europe, North Africa, parts of southern Asia, Seychelles, New Caledonia.	
CRESTED TERN <u>Sterna bergii</u>	30	Rocky Is (east of Hopetoun) to Lishmore reef.	Qld, N.S.W., Vic, Tas, S.A., North Terr., Coral Sea	South Africa, Red + Arabian Seas, Seychelles, Rodriguez + Chagos Islands, southern Asia, Philippines + Fiji.	
LESSER CRESTED TERN <u>Sterna bengalensis</u>	2	Bedout Is (probably), Adelie Is.	Qld (north) + northern Aust.	north-west Indian Ocean + Malay Arch.	Bedout Is (probably), Adelie Is.

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FAIRY TERN <u>Sterna nereis</u>	18	C. Leeuwin to Lacepede Islands	Vic, Tas, S.A.	N.Z. + New Caledonia	
SOOTY TERN <u>Sterna fuscata</u>	4	Abrolhos group to Ashmore Reef	Qld, Coral Sea	Islands in tropical + sub-tropical Indian, Pacific + Atlantic Ocean	Abrolhos group (Pelsart + Wooded Islands), Bedout Is + Ashmore Reef (East Is).
BRIDLED TERN <u>Sterna anaethetus</u>	38	C. Leeuwin to Admiralty Gulf.	Qld, S.A., North. Terr.	tropical + sub- tropical islands in the Indian, Pacific + western Atlantic Oceans	
COMMON NODDY <u>Anous stolidus</u>	4	Abrolhos group to Ashmore Reef.	Qld, Coral Sea,	tropical + sub- tropical islands in Indian, Pacific + Atlantic Oceans.	Abrolhos group (Pelsart Is), Bedout Is, Lacepede Islands (East Is), + Ashmore Reef (East Island).
LESSER NODDY <u>Anous tenuirostris</u>	1	Abrolhos Islands	—	Seychelles Islands	Abrolhos (Pelsart + Wooded Islands)