

## SOME ASPECTS OF THE BREEDING BIOLOGY AND BEHAVIOR OF THE GREAT BLACK-BACKED GULL

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Three species of gulls nest on Walney Island, Cumbria, England: Herring (*Larus argentatus*), Lesser Black-backed (*L. fuscus*), and Great Black-backed (*L. marinus*) gulls. The last-named species has received little attention. Although my main research dealt with Herring and Lesser Black-backed gulls, whenever time permitted I studied the Great Black-backed Gulls. My main objective was to provide baseline information on the small but expanding population of this species on the island.

### METHODS

Observations were made between 4 March and 5 August 1973, and 4 March and 31 July 1974. Behavioral observations were made from 2 portable blinds, each located near clusters of nests. Nests were visited irregularly; at times daily, sometimes not for 2 or 3 days. During each visit records were kept of the nest contents. Food from the nestlings was obtained by sticking my finger in their gullets and extracting the contents. This method was used in 1973. No food was obtained from the nestlings in 1974, though food items found within 1 m of the center of the nests were collected. To determine the influence of the tides on the foraging rhythm of adults, I counted from the blinds all the Great Black-backed Gulls I could see on their territories at 30-min intervals. These counts were made only in the period prior to egg-laying.

### RESULTS AND DISCUSSION

*Nests.*—The Great Black-backed Gulls nested around the ponds resulting from dredging for gravel (Fig. 1). Most nests (31) were placed on slightly elevated positions on gravel piles and ridges; others (19) were placed on flat grassy or sandy soil. Heaps or flat areas with large stones were especially preferred. The nests were placed close to the edge of the ponds. The mean distance from the water edge of 51 nests was 4.94 m (SD = 2.82, range = 1.21–12.19 m). Only 2 nests were located further from the water (39.32 and 45.72 m). Including these 2 nests, the mean distance from the water of all 53 nests was 6.36 m (SD = 7.70).

Although several pairs nested isolated from the others, clusters of nests were apparent (Fig. 1). The mean distance between nests ( $N = 37$ ) in such clusters was 21.62 m (SD = 10.31, range = 6.10–49.68 m). Nesting close together appeared to be more a matter of choice than a shortage of nesting sites. It appeared that nest-sites were traditional—most of the nests ( $N = 21$ ) in 1974 were placed in exactly the same position or within 4 m of the 1973 locations.

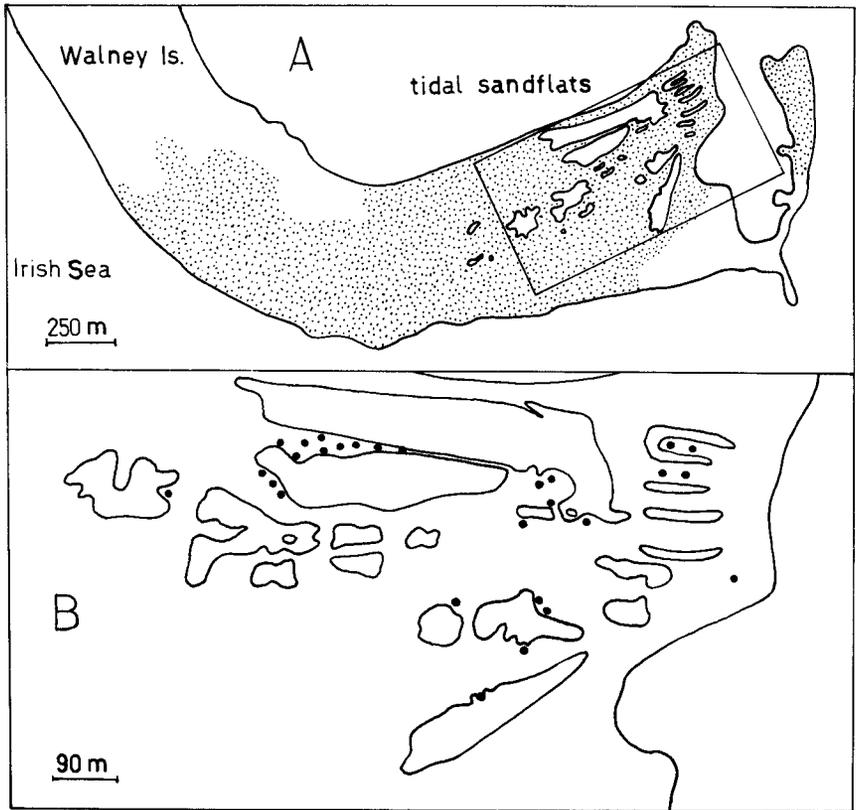


FIG. 1. A. The south end of Walney Island, Cumbria. The stippled area indicates the nesting distribution of Herring Gulls and Lesser Black-backed Gulls. The clear spaces within the rectangle represent ponds. B. An enlarged map of the ponds showing the location of 28 Great Black-backed Gull nests in 1974.

Nest material was collected on or off the territory. Much of it was stolen from the nests of Herring and Lesser Black-backed gulls. Early in the season Herring and Lesser Black-backed gulls set up territories and started to build nests near the Great Black-backed Gulls. However, as the season progressed a large clear space developed around each Great Black-backed Gull nest. This resulted from hostility shown by the Great Black-backed Gulls towards the other 2 species, i.e., the continuous depredations on their nest material, or the complete take-over of their nests.

*Breeding success.*—In recent times Great Black-backed Gulls have nested on Walney Island since 1952 (1 pair, Barnes, cited in Davis 1958). By 1957, 2 pairs nested on the island. This number had increased to 28

TABLE 1  
SUMMARY OF GREAT BLACK-BACKED GULL BREEDING DATA

	1973		1974	
	Number	Percent	Number	Percent
Nests <sup>1</sup>	28		28	
Eggs laid	75	100.00	82	100.00
Eggs per nest	2.68		2.92	
Eggs hatched	41	54.67	32	39.02
Eggs hatched per nest	1.46		1.41	
Eggs not hatched	12	16.00	16	19.51
Eggs lost before hatching	22	29.33	34	41.47
Young fledged of egg hatched	17	41.46	19	59.38
Young fledged per nest	0.61		0.68	
Young lost before fledging	24	58.54	13	40.62
Young fledged of eggs laid		12.75		15.58
Percent of successful nests <sup>2</sup>		60.70		39.30

<sup>1</sup> Including all clutches even if not completed.

<sup>2</sup> Nests that produced at least one fledgling.

breeding pairs in 1973 and 1974 (Table 1). This increase is even more spectacular than the population explosion shown by the other 2 gull species on the island (Verbeek 1977).

The first egg was laid in 1973 on 19 April and in 1974 on 20 April. In both years first eggs of Herring and Lesser Black-backed gulls were found about 1 week earlier. On Skomer, Wales, the first egg of Great Black-backed Gulls was laid on 22 April 1962, that of Herring Gulls on 25 April (Harris 1964). On Sandy Point, Rhode Island, Great Black-backed Gulls started to lay eggs 15 days earlier than did Herring Gulls (Erwin 1971). About  $\frac{1}{5}$  of the eggs failed to hatch (Table 1). In addition, about  $\frac{1}{3}$  of the eggs were lost prior to hatching. I suspect that in both years some illegal egg collecting was responsible for this, but the main reason for the loss of eggs in 1974 was the death of adults (see below). Three additional nests in 1974 were lost because of gravel dredging operations.

One nest in 1973 contained 1 Herring Gull egg and 1 Great Black-backed Gull egg. These 2 eggs were incubated by Herring Gulls. The egg of the Great Black-backed Gull disappeared prior to hatching; the Herring Gull egg hatched. Two other nests had 2 Herring Gull eggs and 1 Great Black-backed Gull egg each. These eggs were also incubated by Herring Gulls. The eggs of the Great Black-backed Gull did not hatch in either case. One Great Black-backed Gull pair had 2 eggs of their own and 1 egg of either Herring or Lesser Black-backed gulls, which disappeared. These mixed

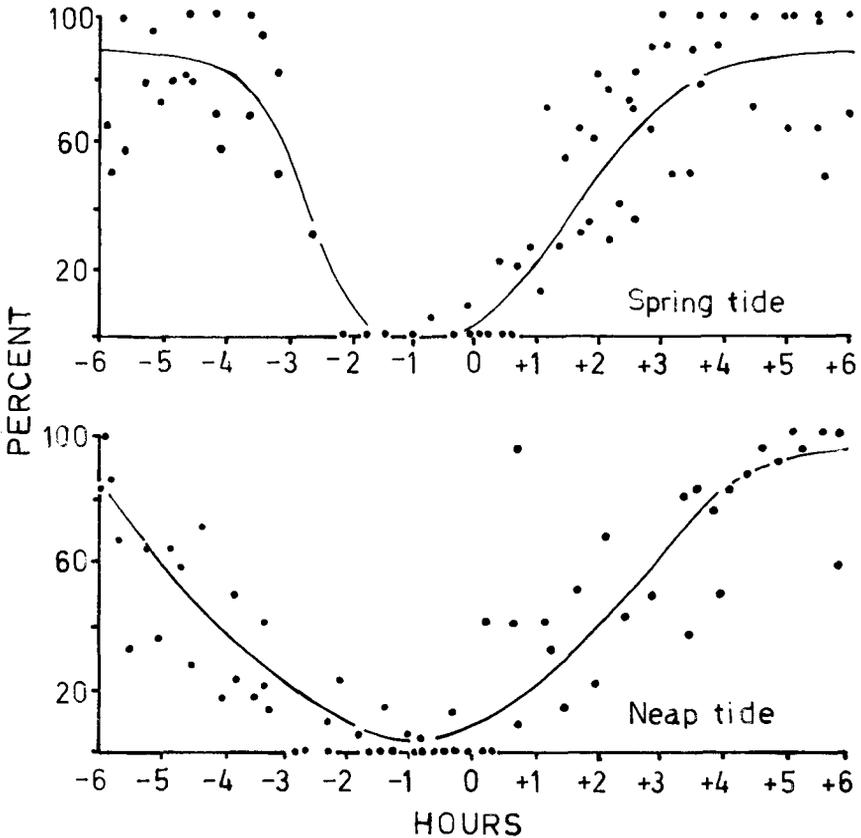


FIG. 2. Percent of Great Black-backed Gulls present on their territories during spring and neap tides. Zero hour indicates the time of extreme low water.

clutches probably resulted because the Great Black-backed Gulls temporarily or permanently usurped the nests of the other species.

Deaths among adult Great Black-backed Gulls occurred in groups. One adult was found on 5 April 1974. Two more adults were found on 6 April; 1 dead, the other incapable of flight; it later recuperated. On 18–19 May 1974, 6 adults were found dead. Two other birds died, both in 1973—an adult on 24 March and an immature bird on 30 March. The latter had broken a wing by flying into a telephone wire. Although no obvious causes of death were found after autopsies, considering that most of the birds died close together (5 and 6 April, 18 and 19 May), I suspect that they might have fed on some poisonous material, perhaps at the nearby garbage dump.

*Food and feeding habits.*—The foraging rhythm of the Great Black-backed Gull was strongly influenced by the tides (Fig. 2). At low water, both during spring and neap tides, very few or no birds remained in the colony prior to egg-laying. One member of a pair usually indicated its intention to depart for the feeding area by a repeated (once every 10 sec in 1 case) *wok* or *wow* call. Both sexes used the call note for this purpose.

Detailed analyses of the food habits of Great Black-backed Gulls have been made by Davis (1958), Harris (1965), Threlfall (1968), and Kock (1974). In my study, 74 of 133 gullet samples had fish remains, 3 had gull chicks, and 1 had refuse. The other stomachs were apparently empty. In 103 food pellets found around nests, 95 included fish, 22 refuse (mainly bones), 19 crabs, 14 gull chicks (unidentifiable), 8 shellfish, 1 rabbit, 1 Starling (*Sturnus vulgaris*), and 1 land snail. Both Harris (1965) and Threlfall (1968) report large numbers of Manx Shearwaters (*Puffinus puffinus*) and Leach's Petrels (*Oceanodroma leucorhoa*), respectively, being taken. In the absence of other avian prey species on Walney Island, I had expected that the Great Black-backed Gulls would have taken a heavier toll of the Herring and Lesser Black-backed gull chicks. Considering that an estimated 47,000 pairs of these gulls nested on the island, relatively few chicks were taken.

Much of the food of the Great Black-backed Gulls was obtained by stealing it from Herring Gulls and to a lesser degree from Lesser Black-backed Gulls. Many times on the garbage dump I have seen Great Black-backed Gulls merely approach Herring Gulls feeding on some large food item and take it away. I think that on the garbage dump Great Black-backed Gulls fed exclusively by parasitizing the other 2 gull species, especially Herring Gulls. Similarly, in the intertidal regions, Great Black-backed Gulls obtained much of their food by stealing. Even 1-year-old birds displaced adult Herring Gulls with impunity. In the colony, Great Black-backed Gulls often stole food from neighboring Herring Gulls when the latter were engaged in courtship feeding.

Kock (1974) mentions that Great Black-backed Gulls do feed a great deal from commercial fishing vessels, although during 2 days I spent on a trawler on the Irish Sea I saw none among the many gulls attending the vessel when the net was brought up. Several Great Black-backed Gulls were present in the fish harbor at Fleetwood on 30 July 1973.

*Behavioral observations.*—On 6 occasions I have seen Great Black-backed Gulls flying to where 2 Herring Gulls were locked in combat. At the approach of a Great Black-backed Gull, the Herring Gulls stopped their fight and left. Once, a Herring Gull was briefly chased in the air by a Great Black-backed Gull. On 3 May 1974 an obviously incapacitated Herring Gull flew awkwardly over the colony and was immediately at-

tacked and knocked out of the air by another Herring Gull. As the victim hit the ground a Great Black-backed Gull rushed to the bird and gave it a violent blow on the back with its bill. The Herring Gull managed to fly away and was not pursued.

Among gulls, birds that behave "abnormally" attract the attention of others (Goethe 1939, Tinbergen 1967), and are often treated roughly. For instance, a Herring Gull, entangled in some twine on the Walney Island garbage dump making it fall repeatedly, was viciously attacked by other Herring Gulls. Perhaps then the attraction of Great Black-backed Gulls may be based on this interest in "abnormal" behavior. Secondly, an abnormally behaving gull may also be an easy source of food.

As stated, Great Black-backed Gulls on Walney Island prefer to nest near water. On several occasions I have seen both sexes, alone or together, gathering nest material and then walking to the water and swimming out on the ponds with the material in their bills. Once on the water, the material is dipped under. In the process of dipping it, some or all of the straws may be lost. On occasion the birds returned with the wet straws and deposited them on the nest. Not all nest material was taken to the water and wetted. I observed the following: between 8 March and 2 April (prior to serious nest building) 5 birds went to the water with nest material and lost it there, 2 birds did not go to the water with their nest material, and none of them deposited nest material on a future nest; between 3 and 14 April, 7 birds took nest material to the water, 2 of them lost it there, and the other 5 placed the wet straw on their nests; 2 birds did not soak their nest material; on 21 April, a 2-year-old Great Black-backed Gull (interscapular feathers just turning black) carried straws in its bill to the water and lost them there. In 5 instances where Herring Gulls were nesting 1–2 m from the edge of the water, these birds did not dip their nest material. One of them deposited a beakful of grass on the edge of the pond, then went into the water to wash its bill, returned to pick up the grass and proceeded to the nest. Wetting nest material may make it stick together better. This may be important considering the Great Black-backed Gull's preference for exposed and therefore windy nest sites.

I have observed 9 cases where individual Herring Gulls have been attracted to Great Black-backed Gulls when the latter were in the preliminary stages of courtship feeding. In 2 of these cases the Herring Gulls merely stood by, apparently looking for spoils. In the other cases the Herring Gulls in question went through various stages of the courtship begging ritual, including "mewing," "head tossing," and "facing away" (Tinbergen 1967). The following are some edited examples taken from my field notes. On 14 April 1973, "a male Great Black-backed Gull lures his mate who follows him while mewing. Next to the female and following her

is a 3-year-old Herring Gull who also mews." On 8 March 1973, "a female Great Black-backed Gull lands near her mate and faces away. He mews and walks to the nest-site. She departs and after flying a semi-circle she lands again. He keeps mewing. Then she flies up 5 more times, each time followed by a Herring Gull who lands and departs when the female Great Black-backed Gull does so, and who also faces away from the male when it lands." Lastly, on 13 April 1974, "a female Great Black-backed Gull head-tosses and walks behind a male Great Black-backed Gull who has a large lump of food in his throat but who appears reluctant to feed her. In the meantime a Herring Gull arrives and follows the pair. Three times the Herring Gull is chased away (twice by the male, once by the female). Following each chase the Herring Gull flies a semi-circle and lands again near the pair, which is followed by facing away and head-tossing." These observations pertain to 2 pairs of Great Black-backed Gulls and 2, possibly 3, Herring Gulls, including a 3-year-old bird. I never saw Lesser Black-backed Gulls behave in this manner.

My first impression was that the Herring Gulls were interested in the spoils of courtship feeding. However, only in 2 of the 9 observations did they succeed in obtaining small fragments of the regurgitated food. The effort the Herring Gulls expended and their active participation in the courtship feeding ritual leads me to conclude that these birds were interested primarily in the male Great Black-backed Gull. All the instances here reported occurred in that part of the colony where I found clutches of eggs belonging to Great Black-backed and Herring gulls. Although I did not see any successful raising of Herring Gull chicks by Great Black-backed Gulls, it is possible that this occurs occasionally. Thus I suggest that the Herring Gulls which behaved as described were imprinted on the Great Black-backed Gulls after having been incubated and raised by them. The occurrence of hybrids (Jehl 1960, Andrieu 1972) between these species suggests that on occasion mixed pairs are formed. This probably has its origin in the occasional take-over of Herring Gull nests by Great Black-backed Gulls.

#### SUMMARY

In 1973 and 1974 I studied the nesting success of 28 pairs of Great Black-backed Gulls on Walney Island, Cumbria, England. This represented the entire breeding population of this species on the island. Most of the nests were placed on slightly elevated positions, close to the water's edge. Much of the nest material was robbed from the nests of Herring Gulls and Lesser Black-backed Gulls. Several nests were found containing eggs of Herring Gulls as well as those of Great Black-backed Gulls. This probably resulted from a temporary or permanent take-over of the nests by the Great Black-backed Gulls. Nesting success was low in 1974, mainly because of the deaths of adults. Poison, possibly obtained on a nearby garbage dump, was suspected. Much of the food was obtained intertidally and much of it

was stolen, mainly from Herring Gulls. Food samples obtained from the young as well as food remains collected near the nests showed that fishes form the main diet of the young. Behavioral observations of Great Black-backed Gulls interfering in fights among Herring Gulls, and apparent interspecific courtship between Great Black-backed and Herring Gulls are described.

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