

BIRDS KILLED BY AIRCRAFT IN THE UNITED KINGDOM
1966-76

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ABSTRACT

Bird remains from 1541 birdstrike incidents have been identified at least to ordinal level and the results analysed. This paper presents and discusses the data obtained. Small gulls and lapwings, which habitually feed on short grassland, predominated and most strikes involved species weighing 0.5 Kg or less. Numbers of birdstrikes are shown to vary with the seasonal distribution and abundance of birds; the most important factor being the influx on to airfields after breeding and the arrival of winter visitors.

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INTRODUCTION

Birdstrikes

In the United Kingdom a birdstrike occurs once in about every 1500 flights by civil aircraft (Civil Aviation Authority¹). An executive jet crashed in 1973 following a collision with gulls at Norwich Airport and in 1975 six occupants of a passing car were killed and a crew member injured when a similar type of aircraft, on take-off from Dunsfold, crashed after encountering a flock of lapwings* (Department of Trade²). World-wide, several fatal accidents, two involving large airliners, have resulted from birdstrikes.

It is usually only on landing or take-off that civil aircraft fly at the lower altitudes where birds are numerous; consequently over 90% of birdstrikes to such aircraft occur on or very close to airfields (CAA¹). In the Royal Air Force, on the other hand, about 300 strikes are recorded annually (Directorate of Flight Safety [RAF]³) and, as a result of high speed, low flying commitments, about 40% of these strikes occur "en route" (Directorate of Flight Safety [RAF]⁴), where higher collision speeds can cause greater damage. Jet engines are particularly vulnerable to damage by bird ingestion. Military training and combat aircraft generally have fewer engines than transport aircraft and recently several sophisticated military aircraft have been destroyed as a result of birdstrikes, fortunately without loss of life. In the United Kingdom, therefore, most birdstrikes occur in the vicinity of airfields and various bird control techniques exploiting the behaviour and ecological requirements of the important species are in use or under development (Brough⁵, Wright⁶).

Need for Identification

Identification of the species posing the greatest hazards is necessary before effective counter-measures can be devised and introduced. Also quantitative data on the relative frequencies with which birds of different weights are struck are required by aeronautical engineers when designing aircraft structures better able to withstand typical birdstrikes.

Before 1966 no systematic identification of bird remains from birdstrikes was attempted and reports available before that date are unreliable, being based largely on identifications made by laymen who have used ambiguous terms such as "seagull", "kite-hawk", "finch-type" or even "roc". Since 1966 remains of birds from a variety of sources have been examined by ornithologists at Pest Infestation Control Laboratory and this paper records the findings.

METHODS AND LIMITATIONS

Sources of specimens

Bird remains were received from the Royal Air Force, Army, Royal Naval Air Service, Ministry of Defence (Procurement Executive), United States Air Force, commercial airlines, civil airfields, engine manufacturers and servicing companies. Military sources provided more samples than civil, probably on account of more unified communications channels, but London (Heathrow) Airport contributed a disproportionately large number of incidents compared with other airfields. Heathrow Airport has been treated separately because of several unique attributes. It virtually forms an oasis of short mown grassland in an area of urban development close to a reservoir complex used as a roost site by a quarter of a million gulls (Sage,⁷).

*Scientific names of species mentioned in the text are given in Table I

Because air traffic movements were the highest and reporting standards of the best, it submitted remains from 20% of the total incidents. The number of specimens received from the different sources cannot be taken to reflect the relative frequency of birdstrikes, because within each group only a proportion of establishments submitted remains.

Birds found dead or dying on airfields in circumstances which suggested they had been struck by an aircraft or injured by its slipstream, even though no strike had been reported, have been included in the analysis as they give further indications of the potentially hazardous species on airfields. Twenty per cent of the incidents submitted were of this nature.

Bias in samples submitted

Motivation to submit remains varies between individuals. Large birds, which cause spectacular damage to aircraft, motivate people more strongly than small birds which often cause negligible damage and leave insignificant remains. There has, therefore, been a bias against the submission of small birds, though to a decreasing extent as a wider interest has been taken in the problem. For example, incidents involving species weighing 150g or less increased from 9% in 1968 to 30% in 1976. The probability of receiving remains from "en route" birdstrikes was low because frequently no remains, or none which the finder believed capable of identification, adhered to the aircraft to be recovered. Bird remains from strikes on airfields, however, stood a good chance of being found by runway inspection teams, whether or not pilots were aware that strikes had occurred.

One or more individuals may be killed when an aircraft passes through a flock. As many as 107 black-headed gulls were killed in one strike. Occasionally several species may be involved, eg. lapwing, dunlin and black-headed gull on one occasion. At least 2850 birds were killed in the 1541 incidents from which remains were received. Frequently, however, only a sample of the casualties was sent for identification and it is likely that many more individuals were involved in some strikes than the data suggest.

Identification procedures

Samples submitted for identification ranged from whole birds to one or two feathers or the macerated, tobacco-like, material recovered from jet engines dismantled for repair following bird ingestion. Whole birds were readily identified, but fragmented samples often required comparison with skins or reference to published literature. Single feathers or macerated remnants were problematical, but microscopic examination, using techniques based on the feather classification described by Chandler⁸ and adapted by Day⁹, usually enabled identification to at least ordinal level. An order is a major taxonomic group, eg. Order Columbiformes comprises the pigeons and doves; Order Anseriformes, geese, ducks and swans. Circumstantial evidence, such as date and location, often narrowed the possibilities to a few or even a single species and allowed weight ranges to be suggested. For example, sparse fragments of white feathers recovered from a strike in August with a bird described by the pilot as being "white and gull-like" proved to belong to the Order Pelecaniformes. As the gannet is the only white representative of this order commonly found in Britain, and as the strike occurred close to the large gannetry at Bass Rock, there is no reasonable doubt that the bird was of this species.

RESULTS AND DISCUSSION

Presentation of results

The birds identified, the mean weights of species and the numbers of incidents in which each species was involved are shown in Table I. The relative frequency

of incidents with the more important species in different locations is given in Table II and seasonal variations are shown in Table III. Species that are important because of their frequent involvement, large size or flocking habit are discussed.

Greater significance has been read into numbers of incidents than total numbers of birds as it is believed that the former provide truer comparisons of relative risk at different times and places. A single strike involving a large number of birds could otherwise be misleading.

Gulls

Gulls were involved in 43% of all incidents (Table I) and because of multiple strikes, accounted for 51% of the birds identified.

Black-headed gulls were involved in more incidents (18%) than any other species; next came common gulls, which made up 10% of the incidents. Most of the strikes with these species occurred on airfields and very few involved aircraft "en route" (ie. away from the airfield as shown and defined in Tables II, IIIa and b). These small gulls frequent short-cropped grassland and often congregate on airfields to feed and rest. They also feed at refuse tips, particularly when food on agricultural land is in short supply in winter.

Incidents involving black-headed gulls generally reached a peak in September and declined towards the end of the year. It is known that black-headed and common gulls are most abundant in Southern Britain from December to February, but peak numbers of strikes with black-headed gulls were in autumn. This may have been connected with seasonal variation in food availability on airfields. Earthworms, Lumbricidae, and craneflies, Tipulidae, are commonly taken by both species (Vernon¹⁰). Earthworms are active in the upper layers of the soil and abundant through the autumn, but activity and numbers decrease with low temperatures or dry surface soil (Edwards and Lofty¹¹). Adult craneflies mostly emerge during August and September (Vernon¹²). In 1972 and 1973, when they were extremely numerous, they were seen to be eaten by flocks of black-headed gulls at Heathrow (pers. obs.). The examination of gut contents and pellets obtained at that time showed that the gulls had been feeding exclusively on craneflies.

Strikes involving common gulls on Scottish and coastal airfields were more numerous than those with black-headed gulls. In Southern Britain common gull strikes were generally scarce, except at Heathrow where there was a peak in November. In the London area common gulls are known to arrive later than black-headed gulls and occur in smaller numbers (Meadows¹³, Smith¹⁴). As the winter progresses and soil invertebrates become scarcer, it may be that black-headed gulls forsake airfields in favour of refuse tips earlier than common gulls, which persevere longer with grassland feeding and resort to tips only in severe weather (Vernon¹⁵).

Herring gulls were involved in 5.3% of the incidents and lesser and great black-backed gulls together totalled 2.9%. At coastal sites these large gulls usually feed on the shore or at fish docks, but inland in Southern Britain they subsist almost exclusively on refuse. They do not appear to feed on inland airfields to any extent and use them primarily as loafing areas. Herring gull strikes "en route" exceeded those on airfields, probably because much military low flying occurs in northern and coastal areas, where this species is more numerous, than inland in the South where most airfields are located.

Few gull strikes occurred on airfields in Southern Britain during the breeding season, but strikes with black-headed, common and herring gulls increased on Scottish airfields where they are known to breed (Tables II and IIIa, b and c.). From July onwards, strikes increased in all locations as birds dispersed from their colonies

and the first Continental immigrants arrived. During the summer, many gulls moult and spend a relatively large amount of time resting on open areas, such as airfields. At this time they appear to be lethargic and are reluctant to move, either for aircraft or in response to dispersal attempts (pers. obs.) and missing flight feathers may impair their ability to evade aircraft. In general, strikes with all species peaked in the autumn and decreased as the winter progressed as gulls made little use of airfields at this time, as stated above. In March and April, gulls from the Continent which have wintered in the UK depart and British birds return to their colonies so that numbers on airfields greatly diminish.

Lapwings

The lapwing was the second most frequently struck species and occurred in 14% of all incidents. Lapwings often feed, roost and breed on airfields and are perhaps more frequently present on airfields than any other species except the skylark. Nearly all incidents, for which locations were known, occurred on airfields (Table II). Lapwings were involved in over 20% of the airfield strikes inland and in Southern Britain, but were less important at Heathrow and coastal airfields, with very few strikes in Scotland. The overall seasonal pattern of strikes (Table III d.) showed a build-up from May to a maximum in October, with a progressive fall-off through the winter. Unlike gulls, lapwings do not feed on refuse tips, but mostly frequent farmland and damp areas. Flocks begin to form in early June after breeding. Migrants passing through the UK and winter visitors arrive from late May onwards, but chiefly September to mid-November (Spencer¹⁶). The reduction in strikes after November possibly reflected the departure of birds on passage or a move away from airfields, following a reduction in food supply similar to that postulated for gulls. Spencer commented that lapwings, when moulting, gathered in quiet places remote from disturbance and spent much of their time feeding and preening. Birds struck in June, July and August may, therefore, like gulls, have been frequenting airfields because they provided ideal moulting grounds. Strikes in May, ie. before flocks should have formed, could have been due to parent birds being struck when following chicks which had wandered into aircraft movement areas. Lapwing chicks leave the nest shortly after hatching, long before they are able to fly, and show a marked tendency to freeze at the approach of danger. Agitated parents have been observed flying constantly over chicks in the path of landing aircraft (A J Backx pers. comm.) and could not be scared away.

Other waders

The golden plover (1% of incidents) has similar habits to the lapwing, but in the UK breeding is mainly restricted to upland areas where there are few airfields. In winter the population is more generally distributed and greatly increased by immigration. They then occur on airfields and this is reflected by strikes occurring in autumn and winter (Tables II and III e.). Among the rest of the wader species which, in contrast to lapwings and golden plover, are mostly shorebirds, oystercatchers were involved in over a quarter of the incidents. This species has a mainly coastal distribution and feeds on coastal airfields. Eleven out of fifteen airfield strikes with oystercatchers were in Scotland (Tables II and III f.) and none was known to have occurred "en route". Little seasonal variation, other than a suggestion of spring and autumn peaks, was evident. In contrast, of 22 incidents with other wader species, where the location was known, ten involved aircraft "en route" and most occurred in spring and autumn (Table II and III g.).

Woodpigeons

Strikes involving woodpigeons occurred mainly on airfields in Southern Britain (Table II). Clover Trifolium spp. and other weeds in airfield grass swards apparently attract woodpigeons, but no seasonal strike pattern was evident.

Domestic and feral pigeons

Homing pigeons could only be positively distinguished from feral birds when rings were included in the remains. Nearly all the incidents occurred on airfields and the majority of the ringed birds were struck at Heathrow (Table II). Strikes involving homing pigeons were, with one exception, confined to the period March to August (Table IIIh.). According to the Royal Pigeon Racing Association (pers. comm.), training of birds commences in March and ends in September, with most competition flying between May and August. Feral birds showed no seasonal distribution, being often resident around airfield buildings.

Other species

A few other species, each accounting for only a small proportion of the total incidents, were of some significance locally or at specific times.

Five of the six incidents involving dabbling ducks (mainly freshwater, surface-feeding ducks) were at Heathrow. This airport is in an area of wet gravel pits and reservoirs which provide suitable wildfowl habitat. Other Anseriformes struck were sea ducks at coastal airfields in Scotland.

Of twenty-seven kestrel incidents, seventeen were at Heathrow, where the banks of nearby sewage lagoons form attractive hunting grounds; none was known to have occurred "en route". In contrast, buzzards were struck mainly by low flying aircraft in mountain and moorland areas. The buzzard is largely confined to hill and moorland areas in Western England, Wales and Scotland where it spends long periods soaring in thermals to considerable heights to locate prey and carrion over a wide area (Tubbs¹⁷).

Strikes with common and Arctic terns (offshore birds which breed mainly on sand and shingle coasts), included a number of juvenile birds and occurred between May and July at one airfield in NE Scotland where both species bred.

Swifts, which occur in Britain only in the summer, were struck mainly in the four-month period of May to August, but none was in Scotland (Tables II and IIIh.).

Among passerines (perching birds) the skylark, which frequents open grassland and cultivated ground, was struck most frequently, closely followed by the starling. Skylark incidents occurred mainly on inland airfields in Southern Britain and showed a summer peak following breeding and another in autumn at a time when immigration of Continental birds occurs (Table IIIh.). Starlings showed little seasonal variation (Tables II and IIIh.), which is perhaps surprising because of the large autumn influx of Continental birds. Some airfields, however, have large breeding populations (pers. obs.), which may have tended to equalise the summer and winter strike rates. Almost half of the incidents involving thrushes, which include many winter visitors to the UK, where the location was known, occurred away from airfields. Incidents peaked in October (Table IIIh.), suggesting thrushes may be particularly involved in birdstrikes when on autumn passage.

Strikes with corvids (members of the crow family) occurred throughout the UK, (Table II) both on airfields and "en route". More carrion crows were struck than the more numerous and gregarious rooks. Most airfields have a resident population of several pairs of crows throughout the year, but rook numbers vary from airfield to airfield according to season (Bridgman¹⁸). Both species scavenge, but crows are attracted to runways to feed on dead insects around the lights and the carcasses of birds killed by aircraft. Incidents peaked in June and July, (Table IIIh.) reflecting an influx of corvids on to airfields after breeding.

Seasonal variations in birdstrikes

Many factors influence the frequency of birdstrikes but two of the most important are the number of birds in the country as a whole, but especially on airfields, and the density of air traffic. Many of our resident birds and winter visitors are relatively large, flocking species like gulls and lapwings which prefer open habitats and are, therefore, attracted to airfields outside the breeding season, where they hazard aircraft. Summer visitors, by contrast, are mostly small, less social species, few of which find airfields a suitable habitat. Military flying is at a fairly constant rate throughout the year, but civil flights are more frequent during the summer holiday season. A number of factors, therefore, interact to produce the overall seasonal variations in incidents summarized in Table IIIj.

Weights of birds struck

Table IV shows the frequency distribution of incidents according to bird weight. Mean weights for each species have been estimated from published and other data, but it must be stressed that individual variations and those due to age, sex, season, condition and geographical origin may, especially for the smaller birds, affect average values by plus or minus 50%.

Because of the large number of waders, small gulls, pigeons, swifts and passerines, 86% of the incidents involved species with an average weight not exceeding 0.5 Kg. Birds weighing up to 1 Kg. accounted for a further 12% with only 2% heavier still. Gannets (mean wt. 3.5 Kg.) were the heaviest birds identified.

Some species are commonly involved in multiple strikes and ten or more birds were known to have been killed in each of twenty-nine strikes. Often only a small sample of the birds killed was submitted for identification. For example, approximately 350 gulls were said to have been picked up from an airport after several strikes on one day when only one common and three black-headed gulls were received for identification. The greatest mass of birds positively identified from one strike was 107 black-headed gulls, representing a live weight of about 32 Kg.

CONCLUSION

The majority of birds killed by aircraft in the UK were of species which find suitable habitat for feeding, loafing or in some cases, roosting or breeding on airfields. These mainly included gulls, especially black-headed and common gulls, lapwings, pigeons, corvids, skylarks and starlings. The preponderance of these species resulted in most of the strikes involving birds weighing 0.5 Kg or less. However, frequent multiple strikes made this more serious than it might at first seem.

Strikes to aircraft "en route" included a greater variety of less frequently struck, larger species, and as higher aircraft speeds are involved than in the airfield environment there is a greater potential for damage.

Total numbers of birds and the density of air traffic influence the frequency of strikes at different times of year. However, strikes remained high after the peak air traffic density suggesting that the most important factor was the influx of British and Continental birds on to airfields after breeding and through the autumn. As, even during this period, the majority of strikes occurred on airfields rather than to aircraft "en route", it appears that birds on migratory flights, with the possible exceptions of some waders and thrushes, were relatively unimportant in strikes, although migrants obviously influenced numbers present on airfields.

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TABLE I BIRDS IDENTIFIED FROM STRIKES WITH AIRCRAFT 1966-1976

	Mean weight (g)	Incidents		Birds	
		No.	%	No.	%
Identified only as "Bird"		1	-	1	-
Manx shearwater <u>Puffinus puffinus</u>	400	1	-	1	-
Gannet <u>Sula bassana</u>	3500	3	-	3	-
Identified only as Ciconiformes		1	-	1	-
Grey heron <u>Ardea cinerea</u>	1400	3	-	3	-
Identified only as Anseriformes		3	-	3	-
Mallard <u>Anas platyrhynchos</u>	1100	4	-	5	-
Teal <u>A. crecca</u>	350	1	-	1	-
Wigeon <u>A. penelope</u>	700	1	-	1	-
Shelduck <u>Tadorna tadorna</u>	1200	1	-	1	-
Bider <u>Somateria mollissima</u>	2000	1	-	1	-
Buzzard <u>Buteo buteo</u>	800	12	0.8	12	-
Sparrowhawk <u>Accipiter nisus</u>	200	2	-	2	-
Kestrel <u>Falco tinnunculus</u>	200	27	1.8	27	-
Red-legged partridge <u>Alectoris rufa</u>	420	4	-	4	-
Partridge <u>Perdix perdix</u>	400	14	0.9	24	-
Pheasant <u>Phasianus colchicus</u>	1000	3	-	3	-
Identified only as Rallidae		1	-	1	-
Water rail <u>Rallus aquaticus</u>	130	1	-	1	-
Identified only as Charadriiformes		9	-	9	-
Identified only as "wader"		7	-	7	-
Cystercatcher <u>Haematopus ostralegus</u>	550	16	1.0	51	1.8
Lapwing <u>Vanellus vanellus</u>	200	215	14.0	428	15.0
Ringed plover <u>Charadrius hiaticula</u>	60	5	-	5	-
Golden plover <u>Pluvialis apricaria</u>	200	21	1.4	39	1.4
Snipe <u>Gallinago gallinago</u>	115	5	-	5	-
Jack snipe <u>Lymnocyptes minimus</u>	65	1	-	1	-
Woodcock <u>Scolopax rusticola</u>	300	2	-	2	-
Curlew <u>Numenius arquata</u>	800	8	-	8	-
Dunlin <u>Calidris alpina</u>	60	7	-	22	-
Great skua <u>Stercorarius skua</u>	1400	1	-	1	-
Identified only as "gull"		81	5.3	81	2.8
Great black-backed gull <u>Larus marinus</u>	1600	15	1.0	17	-
Lesser black-backed gull <u>L. fuscus</u>	850	29	1.9	41	1.4
Herring gull <u>L. argentatus</u>	1000	81	5.3	91	3.2
Common gull <u>L. canus</u>	420	159	10.3	285	10.0
Little gull <u>L. minutus</u>	120	1	-	1	-
Black-headed gull <u>L. ridibundus</u>	300	284	18.4	936	32.8
Kittiwake <u>Rissa tridactyla</u>	400	1	-	1	-
Identified only as "tern"		1	-	1	-
Common tern <u>Sterna hirundo</u>	120	14	0.9	19	-
Arctic tern <u>S. paradisea</u>	100	4	-	6	-

TABLE I BIRDS IDENTIFIED FROM STRIKES WITH AIRCRAFT 1966-1976 (Contd)

	Mean weight (g)	Incidents		Birds	
		No.	%	No.	%
Sandwich tern <u>S. sandvicensis</u>	210	1	-	1	-
Identified only as Columbiformes		16	1.0	16	-
Stock dove <u>Columba oenas</u>	270	5	-	6	-
Feral and homing pigeon <u>C.livia</u> var	400	64	4.2	87	3.1
Woodpigeon <u>C. palumbus</u>	500	82	5.3	117	4.1
Collared dove <u>Streptopelia decaocto</u>	220	1	-	1	-
Budgerigar <u>Melopsittacus undulatus</u>	40	1	-	1	-
Senegal parrot <u>Poicephalus senegalus</u>	150	1	-	1	-
Barn owl <u>Tyto alba</u>	350	7	-	7	-
Little owl <u>Athene noctua</u>	170	2	-	2	-
Long-eared owl <u>Asio otus</u>	260	3	-	3	-
Short-eared owl <u>A. flammeus</u>	380	1	-	1	-
Swift <u>Apus apus</u>	40	86	5.6	102	3.6
Identified only as Passeriformes		32	2.1	32	1.1
Skylark <u>Alauda arvensis</u>	40	60	3.9	71	2.5
Swallow <u>Hirundo rustica</u>	18	16	1.0	20	-
House martin <u>Delichon urbica</u>	18	8	-	8	-
Sand martin <u>Riparia riparia</u>	14	2	-	6	-
Identified only as Corvidae		7	-	7	-
Carion crow <u>Corvus corone</u>	550	17	1.1	17	-
Rook <u>C. frugilegus</u>	400	13	0.8	13	-
Jackdaw <u>C. monedula</u>	210	3	-	3	-
Jay <u>Garrulus glandarius</u>	150	1	-	1	-
Great tit <u>Parus major</u>	18	1	-	1	-
Identified only as "thrush"		17	1.1	17	-
Mistle thrush <u>Turdus viscivorus</u>	120	8	-	8	-
Fieldfare <u>T. pilaris</u>	100	5	-	5	-
Song thrush <u>T. philomelos</u>	80	3	-	3	-
Redwing <u>T. iliacus</u>	60	11	0.7	11	-
Blackbird <u>T. merula</u>	95	4	-	4	-
Wheatear <u>Oenanthe oenanthe</u>	25	1	-	1	-
Meadow pipit <u>Anthus pratensis</u>	18	7	-	7	-
Pied wagtail <u>Motacilla alba</u>	22	1	-	1	-
Starling <u>Sturnus vulgaris</u>	85	57	3.7	86	3.0
Greenfinch <u>Carduelis chloris</u>	30	4	-	6	-
Linnet <u>Acanthis cannabina</u>	18	11	0.7	12	-
Chaffinch <u>Fringilla coelebs</u>	22	6	-	6	-
Yellowhammer <u>Emberiza citrinella</u>	30	3	-	3	-
House sparrow <u>Passer domesticus</u>	30	5	-	5	-
TOTAL:	1541			2850	

TABLE II. Percentage occurrence of various birds according to location of incident

	Location - number of incidents in brackets						
	1 Airfield (1065)	2 En route (179)	3 Inland (579)	4 Coastal (194)	5 Scotland (149)	6 S. Britain (634)	7 Heathrow (309)
Oystercatcher	1.4	-	0.3	6.7	7.9	0.6	-
Lapwing	16.5	3.4	22.8	9.8	4.3	22.9	8.7
Golden plover	1.3	1.7	1.4	2.6	0.7	1.9	0.3
Other waders	1.2	6.7	0.9	3.6	2.9	1.3	0.3
Herring gull	3.8	11.7	3.1	6.7	9.4	2.8	3.2
Common gull	12.6	6.7	7.1	18.0	29.5	5.5	18.4
Black-headed gull	22.7	4.5	19.2	11.3	15.8	17.5	35.3
Feral pigeon	1.7	1.1	1.7	0.5	1.4	1.4	2.3
Homing pigeon	3.2	0.6	1.6	1.0	-	1.7	7.4
Woodpigeon	4.4	3.4	5.7	6.2	-	7.1	1.0
Swift	4.1	7.3	3.8	1.5	-	3.9	6.5
Corvids	2.4	2.2	3.6	2.6	1.4	3.8	-
Starlings	2.3	8.4	2.8	2.6	2.9	2.7	1.3
Other passerines	9.9	12.3	15.0	8.2	1.4	17.5	1.6
Other species	12.8	29.6	11.1	18.6	22.3	10.9	13.6

Locations are defined as follows:-

1. Airfield. Strikes which occurred within the airfield boundary ie. within the perimeter fence, but excluding aircraft on approach, climb-out and in the airfield circuit. This category enables typical species on airfields to be compared with species struck elsewhere (ie. by aircraft en route).
2. En route. Strikes which occurred away from an airfield (q.v.) and its immediate vicinity ie. excludes aircraft on approach, climb-out and in the airfield circuit. Nearly all involved low flying military aircraft.
3. Inland. Strikes on airfields more than one statute mile from the coast cf. coastal. But excluding Heathrow (q.v.).
4. Coastal. Strikes on airfields at least partly within one statute mile of the coast. Coastal roosting gulls may penetrate many miles inland daily, but this category is intended to include only airfields so close to the coast that the movements of seabirds and waders have a direct and immediate effect on the birdstrike hazard.
5. Scotland. Strikes on airfields in Scotland.
6. Southern Britain. Strikes on airfields in the UK excluding Scotland and Heathrow.
7. Heathrow. Strikes at London (Heathrow) Airport.

The definition of airfield in numbers 3-7 has been widened in comparison with 1 and 2 to include strikes in the immediate vicinity of airfields as it enables a comparison of typical birdstrike species in each of these categories. Most Scottish airfields are also coastal and the percentages for species in these two locations are broadly similar.

TABLE III. Monthly variations in numbers of incidents

For definitions of locations see Table II.

a. Black-headed gull

LOCATION \ MONTH	MONTH											
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
TOTAL	17	11	21	8	3	7	22	22	66	42	34	27
AIRFIELD	16	11	16	7	2	3	10	17	50	30	31	23
EN ROUTE	-	-	2	1	1	-	-	2	1	1	-	-
INLAND	9	3	7	6	-	-	11	6	22	20	12	6
COASTAL	-	-	-	1	1	3	1	6	6	1	2	1
SCOTLAND	2	-	-	-	-	2	4	4	5	1	2	1
S. BRITAIN	7	3	7	7	1	-	2	8	23	26	12	6
HEATHROW	7	6	9	-	1	-	2	2	30	11	17	16

b. Common gull

LOCATION \ MONTH	MONTH											
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
TOTAL	18	9	12	4	6	5	13	12	18	21	22	16
AIRFIELD	17	9	10	3	6	3	6	11	16	17	20	14
EN ROUTE	1	-	2	-	-	1	1	-	1	4	2	-
INLAND	11	2	4	2	1	-	2	3	4	7	2	3
COASTAL	1	1	-	1	5	3	3	5	9	5	2	-
SCOTLAND	1	1	1	2	2	2	2	7	9	6	3	-
S. BRITAIN	11	2	3	1	1	-	2	1	4	6	1	3
HEATHROW	2	6	6	-	-	-	1	3	3	4	16	11

c. Herring gull

LOCATION \ MONTH	MONTH											
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
TOTAL	8	3	3	5	4	11	11	9	10	4	7	4
AIRFIELD	7	1	-	2	1	4	6	3	6	2	2	2
EN ROUTE	1	-	2	2	3	4	2	2	1	-	2	1
INLAND	4	-	-	1	-	2	2	2	2	1	3	-
COASTAL	-	-	-	1	1	1	4	1	3	1	1	-
SCOTLAND	2	-	-	1	-	2	1	2	2	2	-	-
S. BRITAIN	1	-	-	1	1	2	3	1	3	-	4	-
HEATHROW	2	1	-	-	-	-	-	-	1	1	1	2

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TABLE III. Monthly variations in numbers of incidents

d. Lapwing

LOCATION \ MONTH	MONTH											
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
TOTAL	19	8	8	1	8	11	25	15	27	42	34	16
AIRFIELD	14	8	3	-	7	8	21	12	23	40	28	12
EN ROUTE	-	-	2	-	-	1	1	-	1	-	1	-
INLAND	13	7	4	-	3	5	17	10	20	28	18	7
COASTAL	1	-	-	-	2	-	1	1	2	7	4	1
SCOTLAND	-	-	-	-	2	-	-	-	1	2	-	1
S.BRITAIN	14	7	4	-	3	5	18	11	21	33	22	7
HEATHROW	-	1	-	-	2	3	3	1	2	5	6	4

e. Golden plover

LOCATION \ MONTH	MONTH											
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
TOTAL	6	1	-	-	-	-	2	2	6	1	-	3
AIRFIELD	4	1	-	-	-	-	1	2	3	1	-	2
EN ROUTE	1	-	-	-	-	-	1	-	2	-	-	-
INLAND	3	-	-	-	-	-	1	1	1	1	-	1
COASTAL	1	1	-	-	-	-	-	1	2	-	-	-
SCOTLAND	-	-	-	-	-	-	-	-	1	-	-	-
S.BRITAIN	4	1	-	-	-	-	1	2	2	1	-	1
HEATHROW	-	-	-	-	-	-	-	-	-	-	-	1

f. Oystercatcher

LOCATION \ MONTH	MONTH											
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
TOTAL	-	1	3	1	1	1	1	3	-	2	1	1
AIRFIELD	-	1	3	1	1	1	1	3	-	2	1	1
EN ROUTE	-	-	-	-	-	-	-	-	-	-	-	-
INLAND	-	-	1	-	1	-	-	-	-	-	-	-
COASTAL	-	1	2	1	-	1	1	3	-	2	1	1
SCOTLAND	-	1	3	1	1	1	1	-	-	1	1	1
S.BRITAIN	-	-	-	-	-	-	-	3	-	1	-	-
HEATHROW	-	-	-	-	-	-	-	-	-	-	-	-

TABLE III. Monthly variations in numbers of incidents.

e. Remaining waders

LOCATION	MONTH											
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
TOTAL	-	1	5	3	2	-	2	2	1	2	5	2
AIRFIELD	-	1	-	-	-	-	2	2	1	2	5	2
EN ROUTE	-	-	3	2	1	-	-	1	-	1	2	-
INLAND	-	-	-	-	-	-	-	1	-	-	2	1
COASTAL	-	1	-	-	-	-	-	-	1	1	-	-
SCOTLAND	-	1	-	-	-	-	2	1	-	-	2	-
S. BRITAIN	-	-	-	-	-	-	-	-	-	-	1	-
HEATHROW	-	-	-	-	-	-	-	1	1	1	-	-

h. Other species

SPECIES	MONTH											
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Feral pigeon	2	1	1	2	4	1	2	4	2	1	1	2
Homing pigeon	-	-	2	3	3	7	7	4	2	1	1	2
Swift	-	-	-	-	12	20	7	14	-	-	1	-
Skylark	1	3	4	3	4	1	2	6	1	-	-	-
Starling	9	2	9	2	2	9	6	2	3	17	9	-
Thrushes	1	4	3	3	5	7	2	6	1	8	6	1
Corvids	1	1	-	2	2	1	2	1	-	16	6	2

j. Total incidents

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	NO DATE
100	74	95	73	77	160	187	180	194	188	177	104	48

TABLE IV. Weights of birds involved in strikes

Bird Weight (g)	Incidents	
	Number	Percentage
Up to 100	309	21.3
101 - 200	298	20.6
201 - 300	299	20.6
301 - 400	102	7.0
401 - 500	245	16.9
501 - 600	33	2.3
601 - 700	1	-
701 - 800	20	1.4
801 - 900	29	2.0
901 - 1000	84	5.8
1001 - 1100	4	-
1101 - 1200	1	-
1201 - 1300	-	-
1301 - 1400	4	-
1401 - 1500	-	-
1501 - 1600	15	1.0
1901 - 2000	1	-
3401 - 3500	3	-

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