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Gulls of the tidal Avon
Mute Swans at the AXA Centre, Stoke Gifford

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Preface

Following our plea in the preface of the previous edition of *Bristol Ornithology* (1999, 25:2), we are pleased to publish three more papers based on the research of two members. The papers in this issue are the result of substantial data gathered in the field over several years.

Matthew Rogers has spent over eight years in his study area on the River Avon and supplemented his own observations with a thorough search through the relevant local and national ornithological literature. From this knowledge base he has built up a picture of the status of waders and gulls on his local section of the River Avon.

John Aldridge's paper on the saga of the Mute Swans which use the pool at the AXA Centre, Stoke Gifford, was based on observations made over a briefer period of five years. It deals in intimate detail with the lives of all the swans which have visited the pool over the period. The story is far more complex than the casual observer could ever have guessed.

We had hoped to publish in this issue a comprehensive checklist and status of the bird species covered by the *Avon Bird Report*. This had to be put aside due to delays during preparation. Nevertheless, we still hope that the list will appear in a future issue.

Jane Cumming, Robin Prytherch and Lyndon Roberts
Bristol Ornithology Editorial Committee

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Waders of the tidal Avon at Sea Mills Reach

M.A.Rogers

Introduction

Twenty-one species of wader (*Charadriiformes*) have been recorded on the tidal River Avon, six of which use the river on a regular basis, whilst the remainder occur as occasional visitors. A systematic list of these waders will be presented, with some of the more regularly occurring species being discussed in greater depth. The paper will conclude with a discussion of how environmental changes have affected the status of some of these waders.

The tidal range in the Severn Estuary is the largest in Europe and the second highest in the World. At Avonmouth the astronomical tide has an extreme range of 14.8m, whilst the mean spring and neap tides have ranges of 12.3m and 6.5m respectively. The lower reaches of the River Avon are affected by these tidal conditions, changing from a muddy, freshwater channel to a turbid, brackish waterway, with the daily cycle of ebb and flood. At low tide stretches of intertidal mud are exposed along the banks of the river, attracting a variety of passage and wintering waders that feed on the abundant supply of invertebrate prey living in the sediment. Most of these waders are found along the shores of Sea Mills Reach, where they form compact communal roosts at high tide. The area was first surveyed by members of the Bristol Naturalists' Society's Ornithological Section in 1974 and is currently monitored as a sub-sector of the Severn Estuary under the Wetland Bird Survey (WeBS) scheme.

The Sea Mills Reach survey area is the stretch of the River Avon between Horse Shoe Bend, Shirehampton and the Northern Stormwater Outfall below Clifton Down (Fig. 1). A few extra-limital records are included in the systematic list. The locations are shown in the map on page 24.

The period covered by this paper is from 1911 to 2000. Counts have been extracted from the reports on *Somerset Birds* for 1911 to 1973, *Proceedings of the Bristol Naturalists' Society* for 1936 to 1982, Bristol Naturalists' Society, Ornithological Section, *Fieldwork Reviews,* for 1979, 1982 and 1985, the *Avon Bird Report* for 1983 to 2000 and records from WeBS for 1981 to 1993. WeBS is a joint scheme of the British Trust for Ornithology, the Wildfowl and Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee (the last on behalf of the Countryside Council for Wales, Department of the Environment Northern Ireland, English Nature and Scottish Natural Heritage).

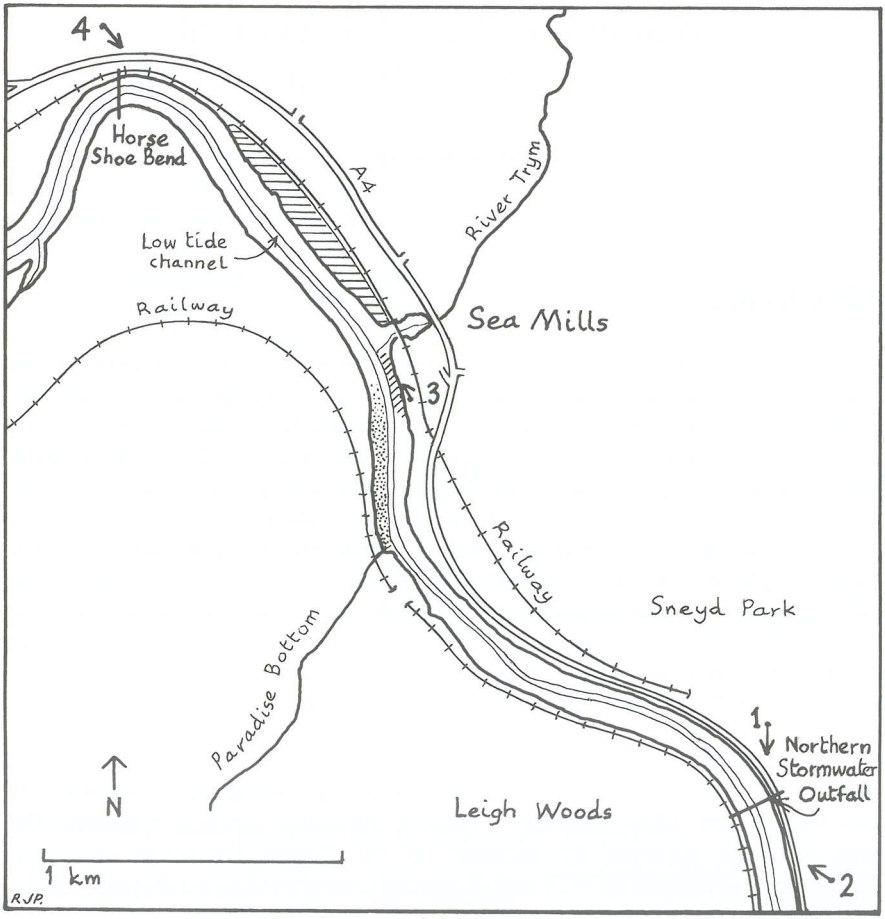


Fig. 1 *Map of the Sea Mills Reach study area on the River Avon, extending from Horse Shoe Bend in the north to the Northern Stormwater Outfall in the south, with the view points for Plates 1-4 shown. The stippled area indicates the Greenshank* **Tringa nebularia** *winter territory, diagonal hatching the bank favoured by Common Sandpipers* **Actitis hypoleucos** *and horizontal hatching the main saltmarsh at Sea Mills.*

Species List

Numbers in parentheses refer to the number of individuals on the given date. Place names in parentheses indicate records from outside the study area.

EURASIAN OYSTERCATCHER *Haematopus ostralegus* A very scarce visitor before 1993, since when sightings have become more frequent. The

recent increase in records is significant because the Oystercatcher population found on the Severn Estuary is small compared with many other British estuaries (Ferns, 1977).

1952 (1) 23 Mar (Pill)
1954 (1) 25 Feb
1958 (1) 12 Jan
1960 (1) 28 Aug
1964 (1) 1 Mar (Pill)
1969 (1) 2 and 31 Jan, (2) 20 Mar
1973 (1) 2, 18 and 24 Nov
1993 (1) 17 Jun (calling at night in the Avon Gorge)
1995 (3) 27 Jul
1997 (2) 17 and 20 Apr
1998 (2) 18 and 25 Feb, (2) 18 Jun, (1) 7 Jul, (2) 15 and 25 Jul
1999 (2) 18 Feb
2000 (2) 6 Feb, (2) 29 Mar, (1) 2 Jul (Avon Gorge)

LITTLE RINGED PLOVER *Charadrius dubius* A very rare visitor with just one record of two on 18 October 1976.

RINGED PLOVER *Charadrius hiaticula* A rare visitor, mainly during the winter months and particularly during cold spells. Davis (1936) stated that this species was sometimes seen up-river as far as Clifton Suspension Bridge

1933 (3) 6 Dec
1934 (6) 1 Feb
1936 (1) 18 Jan (Pill)
1978 (4) 21 Feb, (1) 6 Dec, (6) 19 Dec
1979 (4) 22 Jan (1+) 20 Nov
1980 (3) 20 Mar (1) 6 Nov
1981 (1) 11 and 16 Sep, (1) 19 Oct
1982 (5) 16 Jan
1996 (26) 19 Jan

GREY PLOVER *Pluvialis squatarola* A very rare visitor with just one recorded on 6 January 1939.

NORTHERN LAPWING *Vanellus vanellus* Fairly common outside the breeding season; flocks are present along the shores of Sea Mills Reach between June and March. There are isolated records from the Cumberland Basin - single

birds on 17 January 1982, 16 February 1985 and three birds on 19 January 1985. Lapwing numbers on the river fluctuate almost daily. There are three reasons for this:

1. Lapwings are less dependant on estuarine invertebrates as a source of food than other waders and they commute between the river and farmland to the west of Sea Mills Reach.
2. Numbers increase when Lapwing flocks are displaced from farmland by freezing conditions.
3. The roosting behaviour of the Lapwing is affected by the lunar cycle. Normally, Lapwings move to their traditional roost site at dusk, using one or more staging posts for intensive feeding en route. Thus, Lapwings are crepuscular until 2-3 nights before and after full moon when the birds remain feeding at the staging post all night and rest by day. Night feeding flocks are typically found on open ground, splitting into several daytime flocks that feed elsewhere (Milsom, 1984).

Over the 25 year period 1976-2000, monthly counts varied greatly (except in April and May) but when averaged out showed a distinct pattern (Fig. 2). After being absent in spring, numbers build up through summer then remain stable until November. There is a peak in December, with fewer later in the winter and a rapid decline to March. There was no clear indication of a change in numbers over the years.

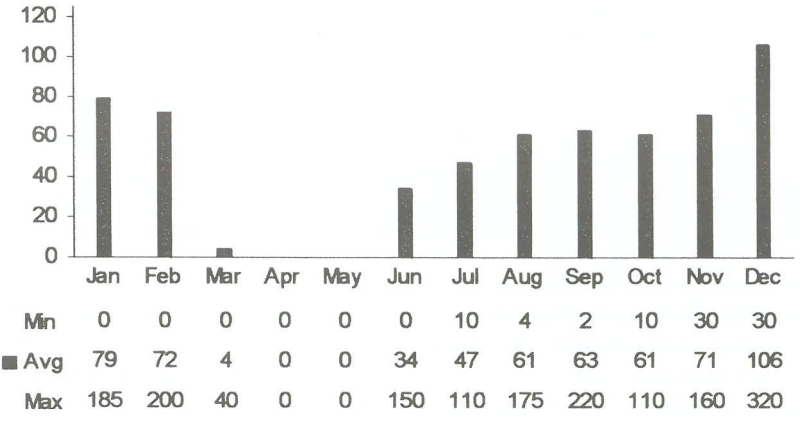


***Fig.** 2 Average numbers of Northern Lapwing* Vanellus vanellus *counted each month on the Sea Mills Reach, R.Avon, 1976-2000. The maximum and minimum counts are also shown to demonstrate the great variation between years.*

RED KNOT *Calidris canutus* A very rare visitor with just one record of 20 seen on 2 February 1954.

SANDERLING *Calidris alba* A very rare winter visitor recorded in only two years.

1950 (4) 29 Oct (Pill)
1996 (2) 29 Oct, (20) 6 Dec

CURLEW SANDPIPER *Calidris ferruginea* Very rare. The five records shown below are part of the unprecedented passage of Curlew Sandpipers that occurred through Britain and Ireland in the autumn of 1969 (Stanley and Minton, 1972).

1969 (4) 30 Aug, (14) 31 Aug, (6) 1 Sep, (1) 7 Sep, (5) 14 Sep

DUNLIN *Calidris alpina* A fairly common winter visitor, occurring in small flocks that only occasionally exceed 100 birds. Prior to 1976 the species was recorded only infrequently.

1934 (15) 3 Feb, small flock 26 Feb
1935 (39) 26 Dec
1936 (12) 8 Jan (Pill), (7) 8 Feb 1936
1939 (50) 2 Jan 1939
1941 (2 small flocks below Leigh Woods 5 Jan)
1954 (100) 2 Feb
1966 (1500) 29 Oct

Over the 25-year period 1976-2000 monthly counts in winter vary greatly. A trickle of birds was seen in autumn (Aug to Oct) with the bulk in November to February. The few seen in March were probably late departing birds (Fig. 3). There were high winter counts in 1976/77 (with a total of monthly counts of 419) but thereafter numbers (totals of monthly counts) declined to vary between 0 and 157 (average 56) until the winter of 1991/92 when numbers increased suddenly to 259, then varying between 148 and 434 (average 237) to 1999/2000.

Historical references to Dunlin on the tidal Avon are rare before 1976. In the late nineteenth century this species was "often seen on the banks of the Avon" (Anon., 1900). Davis (1936) substantiated this report by stating, "even the banks of the Avon, as far up as the Suspension Bridge, are, in winter, sometimes frequented by...Dunlin". From surveys carried out between 1976 and 1987 Rose (1987) observed Dunlin flocks on fewer than 10% of his visits to the tidal Avon, mainly during cold weather. He compared the few historical records with his own data and came to the conclusion that the numbers of Dunlin had decreased. It seems more likely that Dunlin numbers fluctuate periodically in response to environmental changes elsewhere that create unfavourable feeding conditions for this species. In 1990, for example, severe storm-driven tides removed

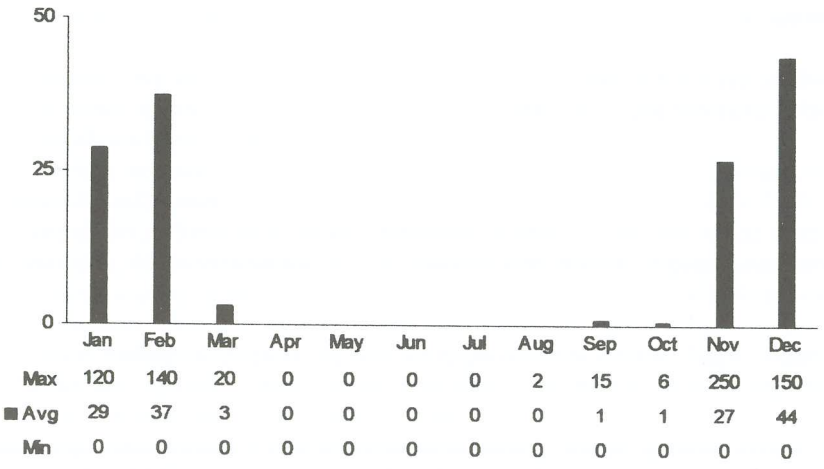
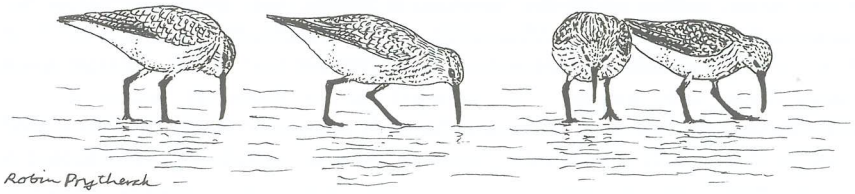


***Fig.** 3 Average numbers of Dunlin* Calidris alpina *counted each month on the Sea Mills Reach, R.Avon, 1976-2000. The maximum and minimum counts are also shown to demonstrate the great variation between years.*

much of the invertebrate-rich top layer of intertidal mud from the Severn Estuary, resulting in the mass exodus of Dunlin. Larger numbers of Dunlin were recorded on the tidal Avon shortly thereafter. A few were seen as far up-river as the Cumberland Basin (one bird on 17 February and seven birds on 15 December 1991)

However, one change has occurred since Davis' 1936 paper - the wintering range of this species on the tidal Avon has contracted and is now largely restricted to Sea Mills Reach. The most probable cause is the spread of the Common Cord-grass *Spartina anglica* (usually referred to as '*Spartina*'), which was first recorded on the banks of the tidal Avon in 1942 (Sandwith, 1943). The link between this invasive plant and a national decrease in the numbers of wintering Dunlin will be discussed later in this paper.



RUFF *Philomachus pugnax* Rare passage and winter visitor.

1933 (1) 14 Oct
1942 (1) 23-24 Feb
1948 (2) 20 Mar of which (1) to 23 Mar
1949 (1) 6 Feb
1976 (3) 18 Apr
1980 (1) 1 Oct, (1) 5 Dec
1981 (1) 12 Oct
1984 (1) 21 Mar
2000 (1) 16 Sep

JACK SNIPE *Lymnocryptes minimus* Very scarce winter visitor; only recorded in the last three decades.

1979 (1) 26 Jan
1980 (2) 2 Nov
1984 (1) 2 Feb
1986 (1) 20 Jan
1990 (1) 2 Feb
1995 (1) 19 Dec
1996 (1) 1 Jan
1998 (1) 18 Nov
1999 (1) 1 Jan

COMMON SNIPE *Gallinago gallinago* An occasional winter visitor to the saltmarsh at Sea Mills Reach, usually between one and five birds. A 'wisp' of up to 15 birds was present in February 1985, during cold weather. There was also an isolated record of a single bird seen along the New Cut on 19 January 1985. Snipe is probably a recent addition to the river's avifauna, exploiting the cover afforded by '*Spartina*', which has spread along the banks of the tidal Avon since 1942.

BLACK-TAILED GODWIT *Limosa limosa* A very rare visitor with just one record of a single within the study area on 29 November 1964. A further record, possibly the same individual, was recorded at Pill on 23 December.

BAR-TAILED GODWIT *Limosa laponica* A very rare visitor with just one record of three on 26 February 1947.

Plate 1 *The River Avon Gorge looking south from Sea Walls Road on The Downs (position 1 on Fig. 1) showing the Northern Stormwater Outflow, near on east bank of river, and the Clifton Suspension Bridge beyond.* (All photos: Robin Prytherch)

Plate 2 *The River Avon looking north-west from Sea Walls Road on The Downs; the Peregrine* Falco peregrinus *watch point (position 2 on Fig. 1), towards the south end of Sea Mills Reach where the Paradise Bottom stream enters the river (from the south-west).*

Plate 3 *The River Avon, Sea Mills Reach, looking north from the east bank just south of the mouth of the River Trym (position 3 on Fig. 1). The close west bank is the northern end of the Greenshank* Tringa nebularia *feeding territory and the near shore is a favoured area for Common Sandpipers* Actitis hypoleucos.

Plate 4 The River Avon, Sea Mills Reach, looking south above Horse Shoe Bend (position 4 on Fig. 1). The main area of saltmarsh is on the east bank.

WHIMBREL *Numenius phaeopus* A very rare visitor with only two records: 11 on 4 September 1966 and three on 12 May 1993.

EURASIAN CURLEW *Numenius arquata* Curlew was formerly a regular winter visitor to Sea Mills Reach, occurring in flocks of up to thirty birds. There are seven records before the 1975/76 winter period.

1933 (1) 14 Oct
1935 (1) 5 Jan, (1) 30 Nov, (2) 26 Dec
1961 (500) 30 Aug (Pill)
1964 (70) 22 Jul
1975 Up to 30 birds, Jan-Mar and Nov-Dec, Sea Mills

Over the 25 winters (Oct to Mar) from 1975/76 to 1999/2000 monthly counts revealed a striking trend (Fig. 4). In the early part of the period Curlew was a common bird on the river, then declined to become absent for the three winters of 1986/87 to 1988/89, although a few were present, not counted, in early 1987. Thereafter only a few, if any, were present. The reason for this decline is not known. Birds only very rarely occurred outside the winter period, in spring or autumn.

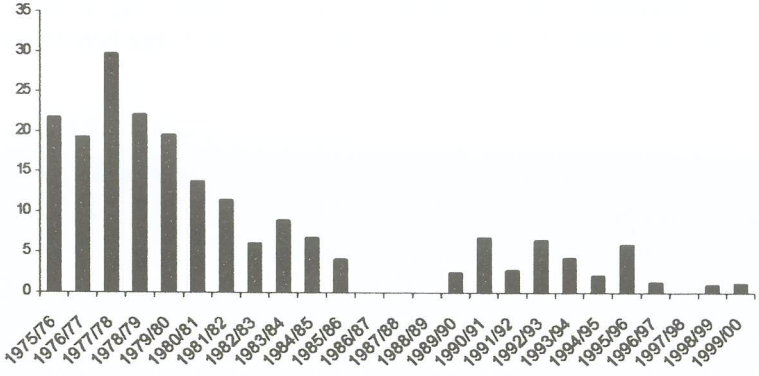


Fig. 4 *Average of the totals of counts of Curlew* Numenius arquata *on the Sea Mills Reach, R.Avon, for the six winter months (Oct to Mar) 1975/76 to 1999/2000.*

SPOTTED REDSHANK *Tringa erythropus* A very rare visitor.

1945 (1) 8 Oct (Hotwells)
1993 (1) 18 Sep, Sea Mills

COMMON REDSHANK *Tringa totanus* Redshank is the most numerous wader to be found on the tidal Avon, distributed up-river as far as Bath Bridge (B.M.J.Gray, *pers. comm.*). Most of the wintering population is found along the shores of Sea Mills Reach. Redshanks are present on the river between late June and April, but are far more numerous during the autumn and winter. The Icelandic race *robusta* probably also occurs in winter. A bird trapped near Pill in March 1961 had a wing length of 172mm, thus falling within the biometric range of this race (Prater *et al*, 1977). However, *robusta* is difficult to separate from the nominate *totanus* in the field. This is due to individual variation between birds and because the largely sedentary British population shows intermediate characteristics, forming part of a western hybrid zone in Europe (Hale, 1971).

Redshank feeding activity is both communal and solitary, nocturnal, diurnal and crepuscular, depending on climatic and tidal factors. During the day Redshanks forage independently, locating their prey by sight. At night and at very low temperatures, when prey becomes inactive, Redshanks work in close flocks, detecting prey by touch (Goss-Custard, 1969). Muddy river channels and the upper shore are favoured as feeding areas. Some adult birds hold feeding territories that they defend throughout the low tide period (Goss-Custard 1970, 1976). Redshank on the tidal Avon abandon these feeding territories and form flocks when raptors (predominantly Sparrowhawk *Accipiter nisus*) hunt over the river (*pers. obs.*, Cresswell 1994, Whitfield 1988). At Sea Mills Reach Redshanks also resort to rafting (*pers. obs.*, Ferns 1975) as an anti-predator response, usually during the highest spring tides that force them to roost nearer areas of human activity.

Recorded in eleven years before 1976:

1932 (11) 20 Mar, passing down the river Avon in small parties
1933 (25-30) 14 Oct, (20) 12 Dec (Sea Mills to Suspension Bridge) and (1) 4/5 Dec (Rownham Ferry)
1934 "Few", Sea Mills, 3 March, (3) Suspension Bridge. Numerous on the river Avon, disappeared between 6 March and 1 April. First birds back by 21 July
1935 "Small numbers early in the year". (70-100) 19 October
1936 Present in the Avon Gorge Oct-Dec
1937 (100) 27 Dec
1938 (100) 1 Oct
1945 ("A few" at Clifton Oct-Dec)
1947 (72) 13 Jul (opposite the mouth of the river Trym)
1967 (1) 3 Dec
1973 (32) Jan-Mar, (100) Oct-Dec

Over the 25 year period 1976-2000 monthly counts varied, but when averaged they show a clear pattern (Fig. 5), with fewest in late spring and a peak in October.

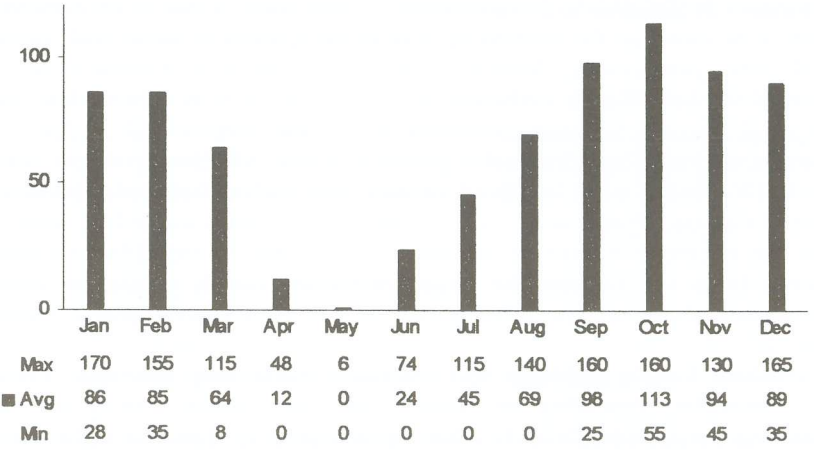


Fig. 5 *Average numbers of Redshank* Tringa totanus *counted each month on the Sea Mills Reach, R.Avon, 1976-2000. The maximum and minimum counts are also shown to demonstrate the great variation between years.*

Dan Powell / RSPB

COMMON GREENSHANK *Tringa nebularia* An uncommon passage migrant on the tidal Avon:

1965 (1) 16 May, (2) 17 Aug
1966 (1) 30 Oct
1978 (1) 5 Mar (Cumberland Basin)
1979 (1) 25 Oct
1983 (1) 31 Aug - 31 Oct
1987 (1) Spring
1993 (2) 14 May
1995 (1) 31 Oct
1998 (1) 23 - 30 Sep
2000 (2) 20 Aug - 30 Sep

Single birds have also over-wintered since 1990:

1990	1 Nov - 31 Dec
1991	1 Jan - 9 Nov (also over-summered)
1992	Early Jan - 18 Apr, 9 Aug - 31 Dec
1993	1 Jan - 10 Apr, 5 Aug - 31 Dec
1994	1 Jan - 26 Apr, 8 Aug - 31 Dec
1995	1 Jan - 20 Apr, 10 Aug - 31 Dec
1996	1 Jan - 4 May, 10 Jul, 17 Sep
1997	21 May, 29 Nov - 31 Dec
1998	1 Jan - 28 Feb, 25 Aug - 31 Dec
1999	1 Jan - 27 Apr, 18 Jul - 31 Dec
2000	1 Jan - 2 May, 23 Jul - 31 Dec
2001	1 Jan - 30 Apr, 16 Jul - 31 Dec

Greenshanks over-wintering in western Britain probably originate from the Scottish breeding population. Autumn passage occurs through Britain from mid-July to late October, numbers dropping sharply from late September. Most of these birds are trans-Saharan migrants, but a small proportion winter in the Western Palaearctic. The largest and most isolated wintering population in Western Europe is found in Britain and Ireland. The winter distribution in Britain is predominantly westerly, with small numbers present on many estuaries in south-west England, Wales and western Scotland. Very few winter in Eastern England. The Greenshanks wintering in western Britain disperse in late March and April when Scottish breeding territories are reoccupied. The main return movement of Fenno-Scandinavian birds takes place in May through south-east England, at least a month after the Scottish breeders have arrived (Prater 1979, 1981, Hutchinson 1986). The wintering birds on the tidal Avon usually depart in late April and return in early August. Wintering birds are regularly seen working their way down-river to the communal wader roost as the tide comes in and then moving back up-river when the tide ebbs, feeding continuously with the 'mowing' action typical of this species (*pers. obs.*, Burton, 1974). The individual observed most recently defends a feeding territory on the North Somerset side of the river (see Fig.1), a behaviour that the author has not seen documented in any ornithological literature (*pers. obs.*). The rarely used swimming abilities of this bird have also been observed, particularly during the highest spring tides (*pers. obs.*).

During the 10 years 1991-2000 Greenshanks occurred in all months with on average fewest sightings between May and July (only once in June) and most between August and November. Usually just a single is involved but two were counted in May 1993, October 1995, September 1998 and September 2000. Three birds were present in August 2000.

GREEN SANDPIPER *Tringa ochropus* A rare visitor, mainly in winter:

1949 (1) 27 Dec (Pill)
1966 (1) 14 Jul
1980 (4) Mar
1988 (1) 29 Sept
1994 (1) 21 Feb
1996 (1) 29 Mar
1998 (2) 19 Feb

COMMON SANDPIPER *Actitis hypoleucos* The Common Sandpiper is a regular double passage migrant on the tidal Avon and up to two birds have over-wintered on the river since January 1950. Historically, this species was described as "a regular visitor along the Avon banks in late summer and autumn" (Davis 1936). Over-wintering Common Sandpipers have been known for many years (Witherby et al 1940, Barnes 1956), but appear to have increased during the last fifty years. There is no evidence to show whether or not the British wintering birds originate from the British breeding population, which probably moves south to be replaced by Scandinavian birds. A strong autumn passage occurs from mid-July to early September. By the end of September few birds remain and there is a fairly stable wintering population of about fifty birds present, mainly in estuarine habitats. South-west England holds about 50% of the population of Common Sandpipers wintering in Britain and Ireland (Prater 1981, Preston 1986).

Wintering Common Sandpipers favour the inner reaches of estuaries where areas of exposed stone or gravel are present and show considerable winter site fidelity from year to year, solitary birds defending clearly defined feeding territories at low tide. The Common Sandpipers wintering at Sea Mills tend to frequent a 150 metre stretch of shoreline near the mouth of the River Trym (see Fig.1). At high tide they move up-river when this area is submerged. Once or twice, birds have been flushed from the fields just inland from the western bank of the river (*pers. obs.*). A Common Sandpiper which wintered at Cheddar reservoir in 1950/51 was observed searching for food in long grass during cold weather or extracting earthworms (lumbricidae) from sheep dung when milder conditions prevailed (King 1952).

There is one interesting reference to a Common Sandpiper seen carrying nesting material in the vicinity of the river in May 1969. The only confirmed local breeding records came from the Royal Portbury Dock area in 1981 and 1982 (Rose 1982, Upton 1984).

Compared to the other waders discussed in this paper, the historical record for this species on the tidal Avon is more complete:

1934 (1) 17 Apr, (1) 23 Jun
1935 (9) 21 Jul
1937 (4) 2 / (1) 14 Aug
1950 (1) 14 Jan / 12 Feb, (2) 23 Dec 1950 (Pill)
1951 (1) 18 Nov, (1) 28 Dec 1951 (Pill)
1952 (1) 23 Feb 1952 (Pill)
1958 (2) 9 Nov 1958 (Pill)
1959 (2) 22 Feb 1959
1960 (1) 7 Dec 1960 (Pill)
1965 (1) 3/24/31 Jan, 21/27 Feb, (8) 5 Sept, (2) 12/25/27 Dec
1966 (1) 16 Jan / 6 Feb / 6 Mar, (1) 17/25 Dec
1967 (1) 7/25 Jan, (1) 16/24/30 Dec
1968 (2) Jan - Mar, (31) 11 Aug, (16) 8 Sep
1969 (1) 17/23 Feb, 5 Mar, (2) 12 Mar, (22) 3 Aug, (1) 26 Dec
1970 (2) 25 Jan, (1) 6 Feb, (2) 24 Dec, (1) 26/31 Dec
1971 (3) Jan - early Mar, (18) Jul, (2) late Nov onwards
1972 (2) Jan - 2 Apr, (1) 22 Oct onwards
1973 (1) Jan - 26 Mar, (1) mid-Oct onwards
1974 29. (1) Jan - Mar, (1) Oct onwards

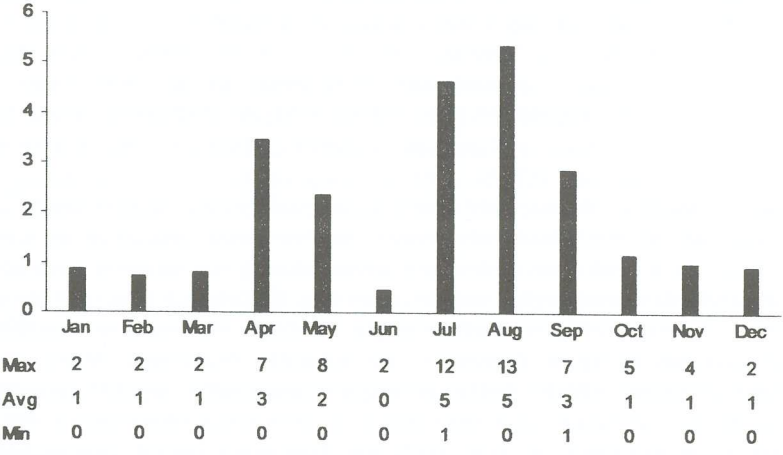


Fig. 6 *Average numbers of Common Sandpiper* Actitis hypoleucos *counted each month on the Sea Mills Reach, R.Avon, 1976-2000. The maximum and minimum counts are also shown to demonstrate the variation between years.*

There are also records of migrant birds from along the New Cut:

1963 (1) 4 Aug
1978 (3) 13 Aug, (1) 19 Nov
1980 (1) 14 Sep
1983 (1) 19 Nov
1985 (1) 24 Aug / 14 Sep / 16 Nov
1986 (1) 11 Jan / 29 Mar
1987 (1) 15 Mar / 12 Sep, (1) 21/29 Nov
1988 (1) 16 Jan (2) 17 Sep

Over the 25 year period 1976-2000 monthly counts varied, but when averaged they showed a clear pattern (Fig. 6). There was a small spring passage during April and May, but most were seen during July to September, which is no doubt a reflection of summer productivity.

Discussion

Pollution of the tidal Avon with domestic sewage has had the greatest impact on its shore-bird community. The tidal Avon has long been used for the disposal of human wastes, but as the population of Bristol grew so correspondingly did the volumes of effluent produced. By the late 1950's over 100 million litres of raw sewage per day was being discharged into the river from over fifty outfalls (Gray 1986). The meandering lower reaches of the tidal Avon, which slow the rate of flow, and the long 'flushing time' of the Severn Estuary (see Uncles 1984) maintained high concentrations of nutrients in the river water and sediments. The most visible symptom of such hypernutrification would have been the growth of extensive algal mats probably of enteromorpha, a species of green seaweed that can still be seen growing on the river mud during the summer. In addition, the bacteria which decompose organic matter would have consumed all of the dissolved oxygen in the water, resulting in anoxic conditions. Such problems were more severe during the summer because of reduced river flow and higher temperatures which stimulate bacterial activity. Increased densities of green macro-algae, coupled with anoxic conditions, would have led to major changes in the estuarine ecosystem. Much of the invertebrate fauna which needs to respire aerobically would have been eliminated, whilst opportunist animals, such as marine oligochaetes (sludge worms) which proliferate in organically enriched areas, would have colonised the intertidal mud in huge numbers (Pearson and Rosenburg 1978). Thus, the macrobenthic community would have been characterised by low species diversity and modest biomass, affecting all levels of the estuarine food chain, including the wading birds that prey on intertidal invertebrates.

Van Impe (1985) found that pollution of the Scheldt Estuary in the

Netherlands led to a greater food supply for wading birds, which responded by visiting the area in increasing numbers. Exceptionally large wader flocks were reported from the tidal Avon when pollution was at its worst. For example, flocks of 500 Curlew and 1500 Dunlin were present on the river in August 1961 and October 1966 respectively. An increase in the numbers of birds visiting estuarine habitats, therefore, does not always appear to be a good indication of environmental quality in human terms.

The condition of the tidal Avon started to improve after 1966 when much of Bristol's sewage was diverted to Avonmouth Treatment Works. Members of the Bristol Naturalists' Society's Ornithological Section began counting birds on the tidal Avon in 1974, in order to see what effects improving water quality might have on the river's avifauna. Gray (1986) compared data from counts made between 1974 and 1987 with ornithological records from the period when the river was grossly polluted. He came to the conclusion that significant changes had not occurred in the bird population. However, the diversion of discharges from outfalls on the river to the Treatment Works has been by means of a phased programme extending over many years. Thus, the rehabilitation of the tidal Avon has been a slow process and this is reflected in the data collected and observations made between 1976 and 2000. The following changes have taken place in recent years:

1. Post-breeding Redshanks now return to the river in late June; prior to 1984 they returned in September (H.E.Rose *pers. comm.*).
2. Greenshanks have over-wintered on the river since November 1990. This species was only recorded as a passage migrant before this date.
3. The Oystercatcher, last seen on the river in 1973, was recorded again in June 1993 and is now a regular visitor to the tidal Avon.
4. Common Sandpipers are now present virtually all year round - before 1968 they were mostly seen during the winter months.

The status of the Dunlin has also changed, but for a very different reason. As mentioned in its respective species account, the wintering range of the Dunlin on the tidal Avon has contracted during the past century. Dunlin flocks are now restricted to Sea Mills Reach in winter. Research by Goss-Custard and Moser (1988) established a link between a decrease in the numbers of Dunlin wintering in the British Isles and the spread of the Common Cord-grass *Spartina anglica*. *S. anglica* evolved from the hybridisation of the introduced North American species *S. alterniflora* and the European native *S. maritima*. '*Spartina*' has spread rapidly around the British and Irish coasts by both natural means and intentional planting and was first recorded on the banks of the tidal Avon in 1942 (Sandwith, 1942). This very invasive plant is a pioneer coloniser of bare mud, spreading vegetatively by horizontal underground rhizomes, as well as by seed. '*Spartina*' forms dense swards which raise sediment levels by the accretion of trapped silt and detritus, whilst its deep roots stabilise unconsolidated estuarine mud. Growing in a virtual monoculture, '*Spartina*' has

become the dominant species in many saltmarshes, accumulating its own detritus which results in eutrophic conditions. The soil which develops excludes fauna from the intertidal mudflats which '*Spartina*' fields encroach upon (Gray *et al* 1990).

The Dunlin is one of the wader species most affected by the '*Spartina*' invasion. Being small, Dunlin must feed almost continuously throughout the tidal cycle in order to meet their energy demands and make use of saltmarshes and the upper shore at high tide. Dunlin numbers have declined at the greatest rates in estuaries where '*Spartina*' has spread over most of the intertidal mudflats, reducing the available feeding areas and feeding time (Goss-Custard and Moser 1988). At Sea Mills Reach Dunlin flocks tend to use the shoreline along the Eastern bank of the river where '*Spartina*' is still rather sparse (*pers. obs.*). However, "islands" of '*Spartina*' are developing in the saltmarsh here, which will eventually spread to form dense swards. The possibility that Dunlin might one day be entirely excluded from the tidal Avon cannot be ruled out.

Waders are probably attracted to Sea Mills Reach by the abundant supply of invertebrate prey living in the sediment. The diets of these waders could be determined through the analysis of pellets and droppings collected from communal roosting sites (Goss-Custard and Jones, 1976). Surveys of the invertebrate fauna on the Southern shores of the Severn Estuary have been conducted in the past (Boyden and Little 1973, Little and Boyden 1976), but no similar studies have been made of the river banks along the tidal Avon. Clearly, further investigations are required into the feeding ecology of the waders that frequent Sea Mills Reach.

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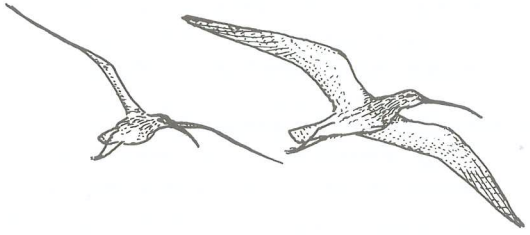


Robin Prytherch

Gulls of the tidal Avon

M.A.Rogers

> "The attraction of the river and the proximity of the coast combine to make gulls a conspicuous feature of the birdlife at all seasons of the year, and the movements of these birds in the region of the docks and the Avon provide a number of points of interest". Tetley, 1935.

This paper focuses on another important group of birds that frequent the tidal Avon - the gulls (Laridae). Gulls are best observed at low tide, congregating in large numbers where feeding opportunities arise, favoured areas being Sea Mills reach, the Northern Stormwater Outfall, the Cumberland Basin, between Bedminster and Bath bridges and Netham weir (see Fig. 1). At high tide most of these gulls disperse to more terrestrial habitats such as urban open spaces, city streets and farmland. During the winter, at dusk, gull flocks can be seen flying downriver to the coastal roost at Avonmouth.

Thirteen species of gull have been recorded on the tidal Avon, seven of which use the river on a regular basis, whilst the remaining six occur as occasional visitors. Excerpts from the early papers 'Gulls in the Bristol District' (Tetley, 1935) will be quoted in the following species accounts to compare the past and present status of each gull species. The paper will then conclude with a discussion on how the status of some of these gulls has been affected by environmental changes.

Species List

MEDITERRANEAN GULL *Larus melanocephalus*

1935: Not recorded

Present status: An uncommon but increasing winter visitor and passage migrant. The Mediterranean Gull was formerly a rare vagrant to Britain but increasing numbers were recorded during the twentieth century as this species expanded its range into north-west Europe. There were only four British records before 1940 but by 1960 between ten and twenty birds were being recorded annually (Sharrock, 1974). The first bird to be recorded in the former Avon area was a first-summer seen at Chew Valley Lake on 9 July 1966.

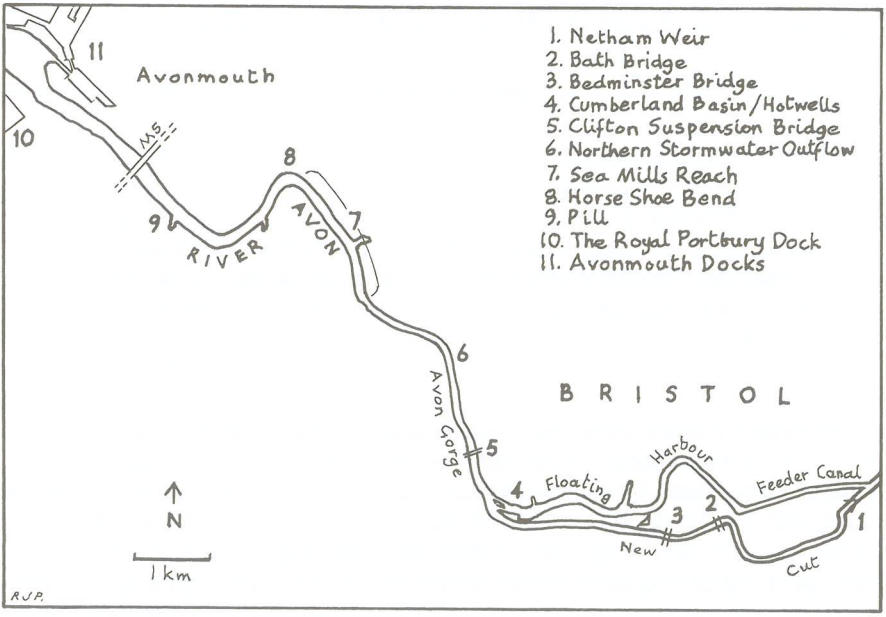


Fig. 1 *Map of River Avon showing the limits of the study area between the mouth of the Avon and Netham Weir.*

Mediterranean gulls have been present in the gull roost at Chew Valley Lake in increasing numbers since February 1975. Although Chew Valley Lake remains the principal site for this species, birds are being recorded with greater frequency at other local sites, including the tidal Avon:

1991	26 Feb, Avon Gorge (adult), 12 Mar, Avon Gorge (second-summer)
1994	9 Apr, Sea Mills (first-summer)
1999	13/18 Feb, Sea Mills (adult), 3 Nov, Sea Mills (2 adults), 4 Nov - 26 December, Sea Mills (adult), 2 Jan - 1 Mar 2000, Sea Mills (adult)
2000	12/29 Mar, Sea Mills/Pill (second-summer), 1 Oct, Sea Mills (first-winter)

The 2000/2001 winter was the most productive so far - four birds (three adults and a second-winter) seen at Sea Mills on 28 November 2000 was a new site record. The upward trend in numbers looks set to continue.

LAUGHING GULL *Larus atricilla*

1935: Not recorded.

Present status: Very rare Nearctic vagrant. A summer plumaged adult was seen between Bedminster and Bath Bridges on 28 June and 7 July 1999. First record for the former Avon area.

LITTLE GULL *Larus minutus*

1935: Not recorded.

Present status: An uncommon passage migrant. There are two records - single birds on 20 May 1985 (Cumberland Basin) and 21 July 1991 (Avon Gorge).

BLACK-HEADED GULL *Larus ridibundus*

1935: " Within the last thirty years, a great change has come over the Black-headed Gull in Bristol. At one time it was not a common bird, but it has increased greatly in numbers...these birds are always to be seen on the river at any time of year, the numbers fluctuating from very large in winter to much smaller in summer. Non-breeding adults are about during the summer and these are reinforced about July by young birds. From that time numbers increase rapidly and the winter maximum is reached. A number of notes made between November and March show a great preponderance of adults over immatures on the river, while round the Docks and the Tramways Centre this is much less marked, though immatures never seem to be in greater numbers than the adults".

Present status: Little change. Remains an abundant winter visitor and common passage migrant. Small numbers of non-breeding birds remain throughout the summer. The available data suggests that the tidal Avon is less important as a roosting and feeding area than it was fifty years ago. In January 1953, 15,000 birds were present at the Avonmouth roost but by 1993 only 3,350 were counted. King (1973) made detailed observations of the flight paths taken by Black-headed Gull flocks heading for the Avonmouth roost at dusk. Before 1953 flocks followed the River Avon into Bristol via Saltford and Keynsham. However, after the initial flooding of Chew Valley Lake in 1953 this flight path underwent a marked change. When the flocks reached Newton St. Loe, where the river turns north-west, some of the gulls deviated from this traditional route, flying overland in the direction of the new reservoir. A winter maximum of 1000 birds was recorded at Chew Valley Lake in 1954/55, but by 1993 numbers had grown to a remarkable 36,350 birds. The shift from coastal to inland sites is also reflected in the counts made on the tidal Avon between 1976 and 2000 (Fig. 3). Before 1985 flocks several thousand strong were regularly seen, but nowadays more modest numbers are recorded.

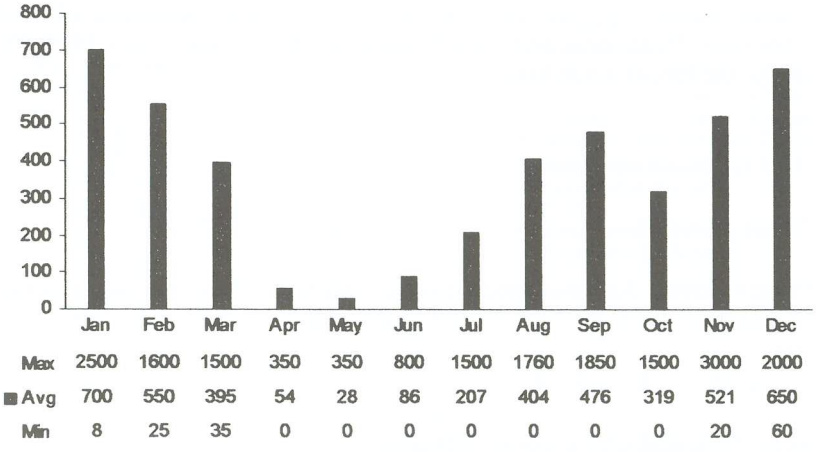


Fig. 2 *Average numbers of Black-headed Gull* Larus ridibundus *counted each month on the Sea Mills Reach, R.Avon, 1976-2000. The maximum and minimum counts are also shown to demonstrate the great variation between years.*

Over the 25-year period 1976-2000 the monthly counts showed a clear pattern when averaged (Fig. 2). Fewest were seen in late spring and early summer, then numbers increased from July to September before declining in October and increasing again to peak in December and January before declining

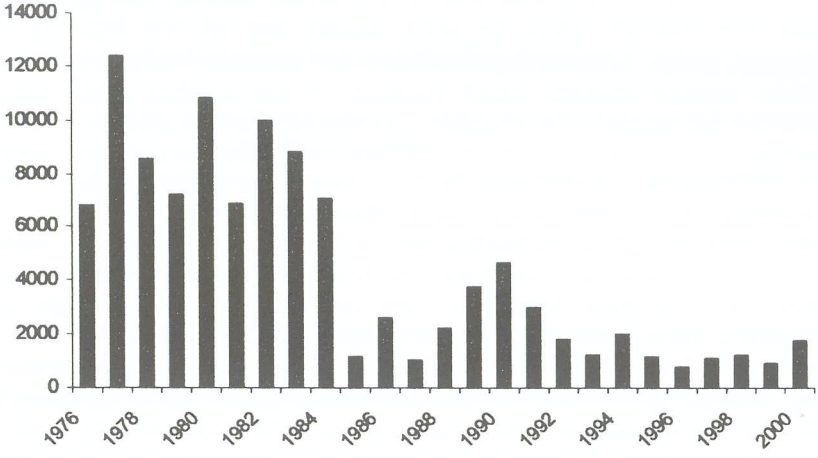


Fig. 3 *Annual totals of the monthly counts of Black-headed Gull* Larus ridibundus *on the Sea Mills Reach, R.Avon, 1976-2000.*

through February and March. This pattern could indicate separate late summer to early autumn passage and a wintering population. During the 25 years numbers have declined markedly (Fig. 3) with annual totals of monthly counts being highest (between 6,830 and 12,380) during the earliest nine years, fluctuating but low (usually around 2,000) for the remaining years, with a small peak around 1989 to 1991 (up to 4,660).

RING-BILLED GULL *Larus delawarensis*

1935: Not recorded.

Present status: Scarce Nearctic vagrant. A first-summer bird was seen at Sea Mills on the 19 March 2001. Ring-billed Gull was first recorded in Britain in 1973. Since then the number of records has increased dramatically and this species is now one of Britain's most regular trans-Atlantic vagrants. Most of these records are from coastal sites in Ireland, south-west England and Wales. There is a pronounced spring passage, peaking in late March, as birds move north (Vinicombe, 1985). This species was first recorded in the former Avon area on the 22 March 1980 when an adult bird was found at Chew Valley Lake, the most productive inland site for Ring-billed Gulls in Britain. To date, there have been a further 47 records. The Sea Mills bird was only the eleventh to be recorded away from Chew Valley Lake.

COMMON GULL *Larus canus*

1935: " ...a winter visitor. From August to April there are usually some on the Avon, and it is a noticeable point that a good place to find them is on the stretch of water immediately above Cumberland Basin. Here they seem to predominate whereas lower down they are far outnumbered, except that, in 1934, at Sea Mills, there was a great preponderance of these birds in March and April, as many as 200 being seen at once. These were evidently on migration northward. This was a very marked movement, not at all noticeable the following year, and probably they do not occur in anything like these numbers. Stragglers have been seen in June and July, evidently non-breeding birds".

Present status: A winter visitor in small numbers. The Common Gull appears to have largely deserted the tidal Avon and the Avonmouth roost. In 1953, 1000 birds were counted at Avonmouth but by 1993 only 10 were present. In sharp contrast 18,710 birds roosted at Chew valley lake in January 1993.

LESSER BLACK-BACKED GULL *Larus fuscus*

1935: " The British Lesser Black-backed Gull is mainly a summer visitor to this district. It has actually been recorded in every month of the year, but the bulk of the birds are seen from March to October, the rest being stragglers from the main body of this species which migrate to Europe and N.W. Africa. From about March to August or September there may be from ten to twenty adults on the Avon between Ashton swing bridge and Sea Mills, in the other months only one or two, but it is difficult to say if these are wintering or stragglers".

Present status: The local race *graellsii* is a common winter visitor, passage migrant and breeding resident. The Lesser Black-backed Gull was formerly a complete migrant with only occasional birds remaining in Britain during the winter. However, during the 1940's increasing numbers began to overwinter, prompting the British Trust for Ornithology to conduct a Lesser Black-backed Gull enquiry (Hickling 1984). During the winters of 1949/50 and 1959/60 up to 20 and 150 birds were counted in the Bristol area, mostly on the tidal Avon (Poulding, 1950, 1962). During the 1993 BTO gull roost survey 3310 birds were counted in the former Avon area. The Lesser Black-backed Gull has also become established as a breeding bird in urban areas during the last thirty years. In 1972 the first pair of roof nesting Lesser Black-backed Gulls bred in central Bristol. By the year 2000 approximately 900 pairs were nesting on rooftops in Bristol, Bath and Portishead (P. Rock *pers. comm.*).

Baltic Lesser Black-backed Gull *L. f. fuscus*
Scandinavian Lesser Black-backed Gull *L. f. intermedius*

Uncommon winter visitors and passage migrants. The first Scandinavian-type Lesser Black-back was seen at Sea Mills on 21 July 1934 (Rooke and Smith, 1934). There are eleven further records, 75% of which refer to the race *fuscus*. Buckingham (1998) casts doubt on the validity of many *fuscus* records. The plumage of *intermedius* is, like many other gulls, extremely variable. The upperpart tone on some birds can be as dark as *fuscus*. Most records of *fuscus* Lesser Black-backs lack corroborative descriptions.

One interesting record refers to a spring influx of up to fifty *intermedius* seen on the tidal Avon in 1984, evidently on migration northward. This phenomenon was first observed at Chew Valley Lake in the 1960's and was described by King (1972).

HERRING GULL *Larus argentatus*

1935: " The Herring Gull ..is, with the Black-headed Gull, the commonest on the Avon at all times of the year. The numbers increase in winter considerably, and young birds come up the river in late summer...".

Present status: The local race *argenteus* is a fairly common winter visitor, passage migrant and breeding resident. Early ornithological papers referred to this species as being "common" and "abundant" (Wheeler 1876, Anon. 1900, Davis 1947). However, the Herring Gull has undergone a marked decline during the last fifty years (Rose 1980). For example, at the Avonmouth roost 1500 birds were present in 1953 but by 1993 only 150 were counted. However, there was no corresponding increase at Chew Valley Lake during the same fifty-year period. Possible reasons why this species has virtually disappeared from the Bristol area during the winter will be discussed later in this paper. In 1972 the first two pairs of roof nesting Herring Gulls bred in central Bristol. By the year 2000 approximately 300 pairs were nesting on rooftops in Bristol, Bath and Portishead (P.Rock *pers. comm.*)

Scandinavian Herring Gull *L.a. argentatus*

1935: Not recorded

Present status: An uncommon winter visitor. There are three records of adult birds:

1937	Winter (Cumberland Basin)
1948	20 Feb (Avon Gorge)
1984	19 Feb (Avon Gorge)

The individual seen in 1948 appears to have originated from the Norwegian coast region:

"A Herring Gull with yellow legs seen by R.H.P. on the Avon, below Bridge Valley Road, on Feb. 20 may have been a variety of *L. a. argentatus* or an example of one of the yellow legged races. R.H.P also reports that the bird, viewed at very close range, was among other Herring Gulls and that, with most of its companions in winter dress, it could be easily picked out by its perfect adult summer plumage. The colour of the legs was compared with the normal flesh coloured legs of the surrounding Herring Gulls and with the greenish legs of a nearby Common Gull, while the mantle was noted as being a shade darker than in most *L. a. argentatus*, but paler than in *L. canus*. The further possibility of the bird being an *L. argentatus x L. fuscus* hybrid cannot be entirely overlooked " (Davis 1949).

At first glance this record could be interpreted as an early sighting of a Yellow-legged Gull *L .cachinnans*. Note, however, that Herring Gulls can acquire summer plumage by February. Furthermore, the mantle of this bird was described as being paler than that of a Common Gull. The upperpart tone of *L. cachinnans* is, in fact, close to that of *L. canus*, sometimes darker (M. Garner *pers. comm.*).

WESTERN YELLOW-LEGGED GULL *Larus cachinnans michahellis*

1935: Not recorded.

Present status: An uncommon passage migrant. The Yellow-legged Gull was formerly a scarce vagrant to south-east England (Dennis, 1995) but is now a regular late-summer/winter visitor to many other parts of Britain. This is due to the expansion of the breeding range of this species to the Atlantic coast of France (Yesou, 1991) and a corresponding increase in numbers along the southern North Sea coasts of Europe (De Mesel, 1990). The first bird to be recorded in the former Avon area was seen at Chew Valley Lake on 7 February 1978 (Vinicombe, 1981). Yellow-legged Gulls have been increasingly identified at other local sites, including the tidal Avon:

1990	8 Sep / 27 Oct (Sea Mills)
1992	16 / 24 Nov (Sea Mills)
1993	5 Aug / 2 Sep (Sea Mills)
1994	8 Aug - 24 Sep (Sea Mills)
1995	8 - 29 Aug (Sea Mills)
2000	12 / 29 Mar (Sea Mills)

All of the above records were of adult birds. The first five probably relate to the same returning individual.

ICELAND GULL *Larus glaucoides*

1935: " ...the Iceland Gull, unfortunately, can only be looked upon as a chance visitor. It breeds in the Arctic regions and comes further south in winter, and by some chance, very fortunate for the ornithologist, a young one wandered up the Avon and was first discovered in February 1933. Here it remained for more than two years, being seen at sufficiently frequent intervals to make certain it was the same bird. It was usually about Rownham Ferry or Cumberland Basin, but on two occasions it was seen at Barrow Gurney reservoirs and once at Blagdon".

The bird referred to by Tetley in his 1935 account provided ornithologists at the time with a rare opportunity to observe the sequence of plumages and moults, from first to third summer, of this species (Tetley, 1935b).

Present status: A scarce winter visitor. There are nine further records:

1939	31 Jan, Cumberland Basin (first-winter)
1946	6-15 Jan, Hotwells (first-winter)
1951	18-19 May, Bedminster (first-summer)
1954	1-4 March, Bedminster (fourth-summer)
1955	14-15 Feb, Bedminster (first-winter)
1965	18/27 Mar, Bath Bridge (first-summer)

1967 15/16/23 Mar, Bedminster (first-summer)
1983 12 Apr, Sea Mills (third-summer)
1989 25 Dec, Cumberland Basin (first-winter)

The more westerly distribution of the Iceland Gull in Britain during the winter (Hume, 1986) probably accounts for the fact that this species has occurred more frequently on the tidal Avon than the Glaucous Gull *L. hyperboreus*.

GLAUCOUS GULL *Larus hyperboreus*

1935: Not recorded.

Present status: Very scarce winter visitor. There are three records:

1939 27 Dec, Cumberland Basin (first-winter)
1940 1-11 Jan, Cumberland Basin (first-winter)
1950 15 Feb - 3 Mar 1950, Bedminster (first-summer)
1978 6 Feb 1978, Sea Mills Reach

GREAT BLACK-BACKED GULL *Larus marinus*

1935: " The Great Black-backed Gull is not common on the Avon above the Suspension Bridge. During the winter months there may be one or two at Sea Mills, but higher up they are rarely seen, though there seems to be a tendency for them to come up more frequently in recent years".

Present status: No change. Regular in small numbers, usually around the Sea Mills/Shirehampton area. The largest single count was of 18 birds seen on the 8 May 1974.

KITTIWAKE *Rissa tridactyla*

1935: Not recorded.

Present status: Scarce, storm-driven visitor. There are five records:

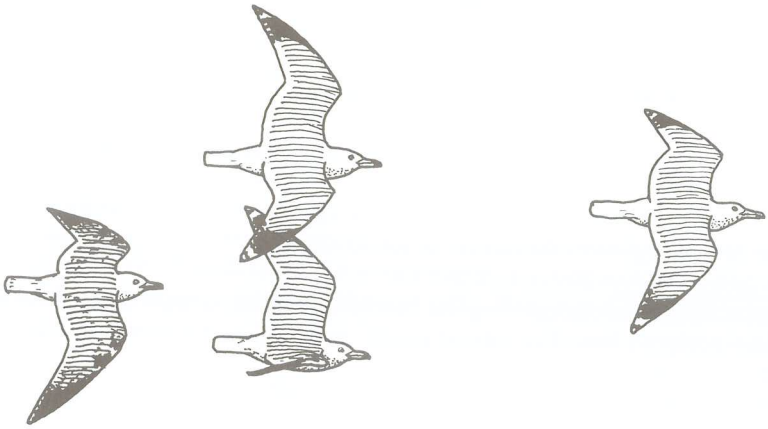
1954 26 Nov, Sea Mills (second-winter)
1957 14/15 Feb, Bedminster
1981 9 Dec, Sea Mills
1984 5 Jan, Sea Mills (first-winter)
1990 21 Feb, Sea Mills (adult)

Discussion

General Comments

Of the thirteen species of gull recorded on the tidal Avon, six (Laughing, Little, Ring-billed, Iceland, Glaucous and Kittiwake) occur as occasional visitors and two (Mediterranean and Yellow-legged) are being recorded in increasing numbers due to range expansion in North West Europe.

Of the remaining five "commoner" gulls, the status of the Great Black-backed Gull has not changed but Black-headed, Common and Lesser Black-backed Gulls have shown a marked tendency to winter further inland. This phenomenon is reflected in the national BTO Gull Roost Surveys conducted over the last fifty years (Bowes *et al,* 1984). In 1953, 18,000 gulls roosted at Avonmouth. By 1993 numbers had decreased to 3,536 birds. Shortly after its creation, Chew Valley Lake attracted approximately 1,700 gulls during the winter of 1954/55. By 1993 numbers had grown to a remarkable 59,000 birds, making this site the most important winter gull roost in the former Avon area.



Robin Prytherch

There is evidently some movement between Avonmouth and Chew Valley Lake according to the prevailing weather conditions. For example, in early 1980, when Chew Valley Lake was frozen, there was a mass exodus to the coast. On 7 January an exceptional 25,697 gulls roosted at Avonmouth (Upton, 1984). Although more gulls move to the coast during spells of severe freezing, most move south or west to unfrozen areas. The vast majority of gulls feed on farmland during mild, wet conditions that bring invertebrates close to the surface (Elkins, 1983). Winter rainfall has been around 15% higher during the last thirty years (N. Price *pers. comm.*).

Herring Gulls - a special case

A general increase in numbers of gulls wintering at inland sites does not explain the apparent increasing scarcity of Herring Gulls - the final, thirteenth species under discussion - in the Bristol area. There are two possible explanations for this:

1. Herring Gulls wintering in south-west England are predominantly local breeding birds. The Herring Gull colonies on Steep and Flat Holm in the Bristol channel were growing at a rate of more than 30% per annum up until 1974, when they peaked at 8113 and 4055 pairs respectively (Mudge, 1978b). As mentioned in its respective species account, Herring Gulls began nesting on rooftops in central Bristol in 1972. Monaghan and Coulson (1977) believed that rooftop gull colonies were founded by young migrants from densely populated natural sites. The Herring Gull colonies on the Holm islands then suffered a population crash, with abnormally high adult mortality being reported in 1976 and 1980 (Mudge and Ferns, 1982a). During the summer of 1976 large numbers of dead and dying birds were seen on Steep Holm, which was probably the result of an outbreak of botulism (A.J.Parsons *pers. comm.*). A neurotoxin, produced by the bacterium *Clostridium botulinum* Type C, was found in serum samples taken from gull corpses collected on Flat Holm during the summer of 1984. A strong correlation between the number of days when air temperatures exceeded 21 degrees centigrade and the incidence of gull mortality became apparent (Worrall, 1987). Refuse tips have been cited as the source of such outbreaks. It is thought that black rubbish bags, which came into use in 1972, act as culture vessels by providing the heat and anaerobic conditions that the bacterium requires to multiply (Lloyd *et al,* 1976). Research into the feeding ecology of the gulls in the Bristol Channel, conducted between 1973 and 1977, found that 68.9% of the Herring Gull population scavenged for waste meat at refuse tips during the summer (Mudge and Ferns, 1982b). The high rate of adult mortality led to low fledging success, with many gull chicks dying from starvation or from the ingestion of contaminated food regurgitated from the crops of the parent birds. Adult Herring Gulls which specialise in feeding on gull chicks during the breeding season (Parsons, 1971) would also have contracted the disease. The Herring Gull colonies on the Holm islands have hardly recovered from the massive decline in the mid-1970's, partly because large gulls have a slow reproductive rate and a long period of immaturity and partly due to the fact that periodic outbreaks of botulism still occur. Recent surveys have indicated that the numbers of breeding birds at coastal colonies in Britain and Ireland have been roughly stable or have continued to decrease (Walsh and Gordon, 1994).

Herring Gulls tended to be dominant over Lesser Black-backed Gulls at refuse tips (Mudge, 1978a). Therefore, only 48.2% of the Lesser Black-backed Gull population in the Bristol Channel fed at such sites during the summer (Mudge and Ferns, 1982b). As a result, mortality rates were lower amongst the Lesser Black-backed Gull colonies on the Holm islands. The numbers of

breeding birds at British and Irish colonies have remained relatively stable over the past decade and recent breeding success has been high (Thompson *et al*, 1998).

Lesser Black-backed Gulls also began to nest on rooftops in central Bristol in 1972. In 1976 there were 23+ pairs of Lesser Black-backs and 50-60 pairs of Herring Gulls. By 1980 both species were nesting in roughly equal numbers (c.50 pairs each). However, from 1983 onwards the Lesser Black-backed Gull population increased rapidly. Lesser Black-backs now outnumber Herring Gulls by a factor of more than 3:1 at the rooftop colonies in Bristol, Bath and Portishead (P. Rock *pers. comm.*).

Thus, it appears that the decline of the Herring Gull colonies on the Holm islands has affected the number of birds wintering in the Bristol area. The roof nesting Herring Gulls in central Bristol probably move south after the breeding season is over.

2. Herring Gulls also feed at sewage outfalls. A survey of the gulls on the tidal Avon conducted during the summer of 1951 found that "...the main feeding grounds of the district lie in this area, sewer outlets along the New Cut to Sea Mills attract concentrations not found elsewhere...chiefly adult and immature herring gulls" (Poulding, 1951). In the late 1950's over 100 million litres of raw sewage per day were being discharged into the tidal Avon from over fifty outfalls. However, from 1966 onwards much of Bristol's sewage was diverted to Avonmouth Treatment Works (Gray, 1986). As the volume of sewage being discharged into the river has decreased so have the number of Herring Gulls on the tidal Avon. Nowadays, only small numbers of Herring Gulls forage in the subtidal zone of the river bank or patrol city streets in search of food.

To conclude, thirteen species of gull have been recorded on the tidal Avon. Cold weather movements between Chew Valley Lake and Avonmouth will, no doubt, add more species to this total. For example, the American Herring Gull *L.a.smithsonianus* and Kumlien's Iceland Gull *L.g.kumlieni* have been seen at the former site in recent years. The Caspian Gull *L.c.cachinnans*, a recent taxonomic split from the Herring Gull subspecies complex, is another possibility. A storm-driven Sabines Gull *L.sabini* could also turn up - sea birds occasionally wander up-river during south-westerly gales. The dedicated gull watcher who habitually scans gull flocks will one day be rewarded by finding such a rarity on the tidal Avon.

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Mute Swans at the AXA Centre, Stoke Gifford

John Aldridge

Introduction

A pair of Mute Swans *Cygnus olor* were present on the lake at the AXA (formerly Sun Life) Centre, Stoke Gifford, South Gloucestershire, at the time that I commenced work there in February 1997. Initially the serenity of the birds in their natural surroundings gave the impression of a perfect world for them, as depicted in many photographic images, paintings and literature. However, as time progressed, this proved to be far from the truth.

The AXA Centre - the study site - was built as a greenfield development near to Parkway railway station and was opened in 1996. The office provides working space for 2,200 employees on a site covering 14 hectares, part of which is a large staff car park. The lake, which was dug out during the development of the site covers an area of approximately 1 hectare and is fed by a spring. It has a maximum depth of 11 metres and contains an island that can be reached by a footbridge. The island perimeter and approximately half of the water's edge consists of aquatic vegetation that was introduced in 1996 and has been allowed

Plate 5. *The AXA Centre study site. The pool in foreground with the island beyond and offices in background.* (Photo: John Aldridge)

to colonise naturally. It consists mainly of Common Reedmace *Typha latifolia*, and Yellow Iris *Iris pseudacorus*, Flowering-rush *Botumus umbellatus* and other water plants are also found. A wide variety of bushes and trees were planted and there are extensive lawns on the site. Staff are very aware of the presence of swans and appreciate them, often asking questions and becoming extremely concerned when there is any threat or conflict. The Royal Society for the Prevention of Cruelty to Animals (RSPCA) have been called by staff on a number of occasions when swans have become distressed.

As well as the Mute Swans the site also holds other bird species (the current site total is 87), insects and mammals. Breeding birds include Mallard *Anas platyrhynchos* (just once), Moorhen *Gallinula chloropus* and Coot *Fulica atra*. Little Grebes *Tachybaptus ruficollis* attempted to breed in 2000 and 2001 but were unsuccessful. Non-breeding water birds are not numerous and consist mainly of Mallard (maximum 21 on 24 November 2000). Cormorant *Phalacrocorax carbo*, Grey Heron *Ardea cinerea*, Canada Goose *Branta canadensis*, Pochard *Aythya farina*, Tufted Duck *Aythya fuligula*, Goldeneye *Bucephala clangula*, Goosander *Mergus merganser* and Water Rail *Rallus aquaticus* have been seen, but rarely for long periods. The site has proved to be significant for Odonata; to date 16 species have been recorded, the most numerous being Azure Damselfly *Coenagrion puella*. Red foxes *Vulpes vulpes* are regularly seen at night but there has been no evidence of them interacting with the swans.

The focus of this paper is on Mute Swans from 1997 to 2001. Swans have been present throughout the five-year study period and monitoring has taken place on a more or less daily basis, although weekends and holiday periods reduced coverage. A number of the swans observed had been ringed, and this made the tracking of their movement and interactions easy to follow. The presence at the site of individual birds is detailed in Table 1, with the histories of the ringed individuals summarised in Table 2.

Breeding activities

1997 The pair that was present in February 1997 wore colour rings E52 and E68. They remained through the spring and summer and bred successfully. A nest was built on the island and small brushwood was placed by sympathetic staff near to the nest as the amount of available natural material was thought to be insufficient. However, the pair did not use this material. Seven cygnets hatched on about 14 May (precise date uncertain) but this reduced to four by 20th. The likely cause of death was cold weather and heavy rain. No further problems were encountered by the family and they left together in late October.

1998 Pair E52/E68 returned on 26 February 1998 and it was assumed that, having seen off an overwintering juvenile, they would settle down to breed again. However, the pair flew off and was not seen again during 1998. Another

pair (the male carrying colour ring JHU) arrived on 23 February and started to take an interest in the site. The new pair became regular visitors rather than a resident pair. However, nest building did commence on 23 April in the reedmace, but unfortunately on top of a Moorhen's nest that contained a single egg at the time. No further nest building occurred during the spring although the pair continued their regular visits. It is likely that that they were a relatively inexperienced pair and that this was their first breeding season together; 23 April is a relatively late date to commence the breeding cycle if it is to be successful.

1999 JHU and partner returned from the last of several sorties on 10 March 1999 and settled down. First signs of nest building were noticed on the island on 16 March and the female was sitting from 1 April. Five eggs were laid and three hatched on 11 May, the remaining two being infertile. The adult pair left on 30 September, leaving the three juveniles behind. One of these died on 7 October. The adults returned on 14 October to be reunited with their remaining offspring, and were seen on and off until 4 November. The departure of the adults on 30 September was earlier than would normally be expected as families usually remain together through October, and it is normally the adults that chase the young off the water where they were raised. Their early departure is probably a sign of their relative inexperience.

2000 The spring and summer of 2000 was a period of conflict between pairs E52/E68 who bred in 1997, and JHU and partner who did so in 1999. Copulation between E52 and E68 was observed on 10 February but the pair left on 7 March. This left the site available and JHU and partner returned on 13 March to immediately commence nest building in the reedmace. E52/E68 returned on 20 March and attempted to oust the other pair. The conflict was never resolved, the net effect being that an egg was seen floating in the water on 6 April and neither pair bred successfully. It seems likely that there was insufficient suitable habitat for both pairs in the wider area due to increase in swan numbers. However, this cannot be proved without detailed knowledge of all the swans in the area.

2001 In spring 2001 E52/E68 were in complete control. Courtship display was noted on 7 February and nest building in the reedmace was noted from 12 March. The nest was a considerable construction about two feet above the water level and much surrounding vegetation was cleared during its construction. This involved much effort as swans cannot carry nest material, having to pass it from one point to another. The first egg was visible on 6 April, and eight were laid in total. Seven cygnets hatched on 15 May and the eighth egg proved to be infertile. The nest was immediately augmented with further material. 17 May was cold with heavy rain but, unlike 1997, the young were unaffected. The cygnets started to grow and the family was observed feeding together daily. On 12 June one of the cygnets was missing and the remaining egg was floating on

Plate 6. *The pair of Mute Swans* Cygnus olor *(E52/E68) on the study site with their seven new cygnets that hatched on 15 May 2001.* (Photo: John Aldridge)

the lake. The cause has not been established but, as there was no sign of the bird, it is likely that it had been taken by a predator, probably a Red Fox. The nest was still being used overnight and could have been reached from the bank.

What occurred on 17 June was a great surprise. The cygnets seemed to be thriving and their parents were experienced in successfully raising young. However, four died in the morning and the remaining three by the end of the day. The cause has never been proved. Many staff at the AXA Centre were distressed and the RSPCA was contacted with a view to determining the reason for the death of the cygnets, particularly if there was a problem such as water pollution that required immediate action. The RSPCA could not attend immediately but took the cygnets away on 20 July. Unfortunately all records of their visit and results of any autopsy were lost despite repeated attempts to contact them. The reason for the deaths is therefore a matter of conjecture. Possibilities that have been considered are:

Pollution in the water:

> This is most unlikely as young Coots and Moorhens survived; there were plenty of dragonflies and no signs of pollution, such as algae on the surface.

Inappropriate food:

> Birds were given bread despite staff being asked not to feed them. White bread provides little sustenance and the fact that the cygnnets died on a Sunday when staff were not present to provide them with food for two days makes this a possibility.

Vandalism

The gates are locked at the weekend and security staff saw nothing, so this can probably be discounted.

Genetic weakness

A theoretical possibility, but unlikely, as this pair completed a breeding cycle in 1997; the young reaching the stage where they were able to leave successfully.

Aggressive behaviour by the adults

Males are occasionally known to kill their young when they feel threatened by a visiting rival or if the young become sickly. There were visits by another pair after the cygnets hatched but the resident pair was well able to keep them away. Security staff did not report any such behaviour but on reflection, this seems to be the most likely cause.

The male, E68, left temporarily on 20 and 25 June and disappeared permanently on 1 July, leaving his mate on the lake.

Conflict and mortality

The lake was relatively quiet throughout 1997 and much of 1998. A juvenile bird was present between 27 October 1997 and 28 February 1998. The return of E52/E68 on 26 February coincided with the juvenile becoming distressed and it is believed that this was due to it being seen off by the returning pair. It was taken into care by the RSPCA following calls from staff.

On 4 November 1998, pair 20Z/U2776 with five juveniles arrived following a short flight from the nearby Ministry of Defence (MOD) headquarters and came into conflict with JHU and partner. The latter were despatched from the lake and failed to regain possession despite repeated attempts to do so on 5th, 6th and 11th. They returned on 30 November when 20Z/U2776 were missing and took the opportunity to attack the juveniles that had remained. Those juveniles left on the following day. JHU and partner left on 2 December and 20Z/U2776 returned once more with the five juveniles. Between 6 and 20 December male 20Z was often seen in light conflict with the palest juvenile. JHU and partner were once again seen off by 20Z on 10 December.

On 21 December E52/E68 returned (their first visit since 26 February) and came off worst in a serious conflict with 20Z/U2776 to the extent that the RSPCA were called and the birds were removed to the city docks to join the wintering herd there.

JHU and partner were in possession of the lake on 4 January 1999 but were again dispossessed by 20Z on 6th. The pattern was repeated between 12 and 19 January with 20Z again victorious.

E52/E68's stay in the city docks was short-lived and they returned from their involuntary sortie on 20 January 2000. They disappeared on 5 February without coming into conflict. JHU and partner returned on 8 February followed by E52/E68 on 15th. Another battle raged with E52/E68 winning possession of the

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Table 1. *Chronological account of individual Mute Swans* Cygnus olor *at the AXA Centre study site from Feb 1999 to Nov 2001.*

Key:

F	Present all month
P	Present for part of the month
C	Involved in conflict
X	Death occurred

1997	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E52		F	F	F	F	F	F	F	F	P		
E68		F	F	F	F	F	F	F	F	P		
E52/E68's juveniles					P/X	F	F	F	F	P		
Unidentified juvenile										P	F	F

1998	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E52		P/C										P/C
E68		P/C										P/C
Unidentified juvenile	F	F/C										
JHU		P	P	P	P	P	P		P	F	P/C	P/C
JHU's mate		P	P	P	P	P			P	F	P/C	P/C
20Z											P/C	P/C
U2776											P/C	P/C
20Z/U2776's juveniles											P/C	F
Others		P								P		

1999	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E52	P	P/C	P								P	F
E68	P	P/C	P								P	F
JHU	P/C	P/C	P	F	F	F	F	F	F	P	P	
JHU's mate	P/C	P/C	P	F	F	F	F	F	F	P	P	
JHU's juveniles					P	F	F	F	F	P/X	P	
20Z	P/C									P		
U2776	P/C									P		
20Z/U2776's 3 juveniles										P	P	F
Others		P	P							P		

***Table 1** (continued)*

2000	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E52	P/C	F/C	P/C	F/C	F/C	F/C	F	F	F/C	F	F	F
E68	P/C	F/C	P/C	P/C	P/C	P/C	P	F	F/C	F	F	F
JHU	P/C	P/C	P/C	P/C	P/C	P/C			P/C			
JHU's mate	P/C	P/C	P/C	P/C	P/C	P/C			P/C	P	P	P
20Z/U2776's 3 juveniles	F/C/X	F	P/C									
Others	P				P					P	P	

2001	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E52	F/C	F	F/C	F	F	F	F	F/C	F	F	P/X	
E68	F/C	F	F/C	F	F	P						
E52/E68's juveniles					P	P/C						
20Z	P/C											
U2776	P/C											
Unringed pair			P/C									
Z99963			P/C									
Others	P	P						P/C	P			

lake, which they retained until 6 March when they flew off. As discussed above, JHU and partner returned on 10 March and remained to breed. The outcome of the winter battles was that 20Z/U2776 proved to be the strongest, followed by E52/E68, with JHU and partner the weakest. It is therefore interesting that the weakest pair then succeeded in breeding. The arrivals and departures of 20Z/U2776 through the winter indicates that they were attempting to hold two winter territories, one at the study site and the other at the MOD headquarters, and were forced to fight to do so.

The three juveniles of JHU and partner that were abandoned on 30 September were joined by an adult female and three other juveniles on 6 October. Although no conflict was observed, one of the original juveniles died on 7 October. The cause was not established but the likelihood is that the early abandonment by its parents contributed to its death.

Conflict was next noted on 10 January 2000 when JHU and partner were fighting two of 20Z/U2776's juveniles (U2772 and U2774). There were also signs of a battle on the following day but exactly who had fought who was unclear. JHU and partner had clearly come off worst as they were hiding in the bushes. E52 was present but E68 was not (but could have been there earlier in the day); an unknown unringed adult was also present.

E52 and E68 were still on the lake on 17 January, the day when juvenile U2772 died. Again, the cause is unclear but it had been attacked a week earlier

and recent battles may have resulted in the juvenile having poorer feeding opportunities.

February and March 2000 was another period of conflict as discussed in the breeding section above. During nest building on 13 March the remaining juvenile (U2774) was seen off by JHU and hid in some bushes before flying off to a nearby sports field. The battle between E52/E68 and JHU and partner on 20 March was particularly ferocious and left E52 limping; E52 was never subsequently seen to leave the lake. Fighting between the two pairs occurred during April, May and June but July and August were quieter. Battle recommenced on 12 September when JHU and partner returned and all four adults were present to 15th. For a while it appeared that JHU and partner were the dominant pair, turning round the position of the previous winter and taking advantage of E52's injury. However, this eventually proved not to be so and JHU was not seen again after 15 September.

E52/E68 were joined by an unringed adult on 20 September 2000 and there were again signs that they would lose ownership of the lake but this did not happen. The unringed adult departed but returned temporarily on eight further occasions up to the end of 2000. The identity of this bird (and it is not possible to confirm that the same bird was always involved) was not proved but it is very likely that it was JHU's partner. It never remained for more than one day and was last seen on 7 December.

On 10 January 2001 pair 20Z/U2776 returned (their first visit since October 1999) but E52/E68 kept them off the lake and they were not seen again.

On 2 March 2001 an unringed pair flew in and came into conflict with E52/E68 but were quickly seen off. An immature bird (Z99963) arrived on 13 March and was later observed limping, and the RSPCA was called once more. An unringed pair flew in on 14 and 20 March but were again kept off the lake.

The next bout of fighting was on 25 August when a visiting adult took on E52 who was on its own. The second bird was also seen on 31 August, and 6, 14, 17 and 20 September. It may well have been JHU's partner but this is a matter of conjecture.

E52 was seen flying from the lake to the adjoining grassland on 15 October 2001, the first time that it had been seen in flight since the injury sustained in March 2000. It appeared to be unwell the following day but then picked up again. However, its leg injury began to tell further and the RSPCA were called. It was taken into care but was put down on 9 November as it was suffering from acute blood poisoning.

The demise of E52 left the lake devoid of swans so it was no surprise when an unringed pair arrived on 16 November. However, they did not stay. Neither did a single adult on 27 November.

Unrelated birds did not always come into conflict but this was only true when there was an adult/juvenile mix. In particular, in November 1999 E52/E68 arrived at the same time as two juveniles and it was assumed that this was a family party and the pair had bred elsewhere. However, the rings on the juveniles indicated that they were the offspring of U2776 and 20Z. The

impression that was gained suggested that the adults had adopted the juveniles as they lived peaceably together until 7 March 2000. Fighting did take place during this period and one of the juveniles died but this involved JHU and partner, not the 'adopting' adults.

Pair faithfulness

It is widely held that pair bonding is very strong in swans and that pairs mate for life. However, there are documented records of divorce and of birds having up to four mates in a lifetime (Birkhead, M. & Perrins, C. 1986, North West Swan Study). Studies at the AXA Centre tend to confirm that relationships within pairs are strong but that partners are not invariably together. Indeed, partners of all four identifiable pairs spent time apart.

JHU spent a day on the lake on 27 July 1998, a few weeks after its last appearance, and was next seen with its mate on 29 September. There was one other recorded separation of the pair, which was on 20 March 2000 following a battle when JHU's partner was on the lake with E52 (an unlikely couple!). JHU was not seen after 25 September 2000 although a single unringed adult that was seen on nine occasions is considered to be its mate. It is thought probable that JHU was seriously injured and became permanently parted from his mate, who made repeated attempts to find him.

20Z arrived on the lake on 2 December with five juveniles but no accompanying female. However, his partner joined her family the following day.

Female U2776 arrived on 5 October 1999 accompanied by a juvenile but then left. The following day she returned, this time with three juveniles, and they all flew to the MOD headquarters on 7th. The day after that U2776, her partner (20Z) and three juveniles arrived.

E52 flew in on 26 November 1999 without her partner, who joined her the following day. The injury that E52 sustained on March 2000 meant that she was never again able to leave the lake. However, her partner E68 had reasons for doing so. He was not on the lake on 13 April 2000, 3 May, 5 May, 8 May, 16 to 17 May, 22 to 26 May, 2 to 5 June, 7 to 8 June, 12 to 16 June, 3 to 4 July, and 10 to 13 July. His regular absences and returns suggest that he wanted to take his partner to another location but was unable to do so because of her injuries. Swans make great use of their legs during take-off from water, and it is therefore likely that the leg injury prevented her from reaching flight speed. E68 finally rejoined his partner on 14 July 2000 and they remained together into the 2001 breeding season. The death of the cygnets on 17 June 2001 was followed by the departure of E68 on 20th. Although he returned later in the day, he left again on 25th, returning on 26th. He finally left on 2 July and has not been seen since. Again, his departures and returns suggest that he wished to leave with his partner who was unfortunately unable to take flight.

Movement

Mute Swan movement in the United Kingdom is rarely lengthy; distances over 50 kilometres are not common, and only 3% of birds travel more than 100 kilometres (Birkhead, M. & Perrins, C. 1986). Movement between main river systems is small. The distances covered by the swans in this paper are therefore rather interesting. The distance between Worcester (where E52/E68 were ringed) and the study site is about 80 kilometres, which puts it well above the 'norm'. Britford (where JHU was last seen in the Hampshire area) to the study site is only a little short of this. 20Z was originally ringed at Worcester and made its way to Billinge Green Flashes, Cheshire (190 kilometres from the study site) and Walcot (135 kilometres) before arriving in South Gloucestershire. Worcester has a large winter herd of swans and the reason for

Table 2 *Ringing data summary of Mute Swans* Cignus olor *identified at the AXA Centre study site during the period 1997 to 2001. Ring numbers commencing with U, X or Z are BTO metal rings. The others are colour rings.*

E52(Female) E68 (Male)	Ringed in December 1996 on the River Severn at Worcester City Bridge, accompanied by 2 juveniles at the time (E55 and E57). Last seen there on 2 February 1996. Pair at AXA Centre from February 1997.
20Z / Z73435 (Male)	Hatched in 1993. 01.05.94 Colour ringed (black on orange) Worcester City 15.07.94 River Severn, Bewdley, Worcs 24.07.94 Billinge Green Flashes, Cheshire 06.08.94 River Severn, Monkmoor, Shrewsbury 20.08.94 As above 21.08.94 English Bridge, Shrewsbury 22.09.94 Shrewsbury Sewage Farm 16.10.94 As above 06.11.94 Pirton Pool, Worcs 16.11.94 Alscot Sugar Factory, Walcot, Shrops 24.11.94 Healings Mill, Tewkesbury 28.11.94 Lower Lode, Tewkesbury 04.12.94 Severn Ham, Tewkesbury 12.01.95 As above 21.05.95 River Wye, Bartonsham, Hereford 23.05.95 River Wye, Hunderton, Hereford Spring 1996 MOD, Abbey Wood, Bristol 01.04.97 MOD Abbey Wood, (nest building) 28.04.97MOD Abbey Wood (with female, nesting) 15.05.97 MOD Abbey Wood (with female and three cygnets)

Table 2 (continued)

U2776 (Female)	31.08.99 Ringed MOD Abbey Wood as an adult with its offspring 08.10.99 AXA Centre 29.11.00 Oil victim, Bradley Stoke Lake, taken into care by RSPCA 11.11.00 Released at Bradley Stoke Lake 10.01.01 AXA Centre 10.12.01 Road casualty, Moorend (3km from AXA Centre).
JHU / X0336 (Male)	Ringed as an adult in July 1997 at Charlton, Wiltshire. Last seen in the Hampshire area on 8th September 1997 at Britford, Salisbury. At AXA Centre from February 1998 to September 2000.
U2772 & U2774 (juveniles)	Ringed at MOD Abbey Wood on 23 August 1999 (two of a brood of 6).
Z99963	Ringed by the RSPCA on 11 March 2001 at Coal Pits, Bristol. Arrived at the AXA Centre 2 days later.

the lengthy movements may be that there are insufficient breeding sites in the area following an increase in swan numbers in recent years, causing birds to look further afield.

Casual records

In addition to the above, other swans have been seen from time to time, either in flight or briefly on the lake. There is no obvious pattern to the sightings. There have been two reports in January, three in February, one in March, one in May, three in October and one in November.

Interaction with other species

Although there was severe conflict between the swans, other species were normally untroubled. The 1998 pair built their nest on top of a Moorhen's nest but no aggravation between the species was actually observed. In 2001, a Coot 'annoyed' the female swan on the nest but repeatedly placed itself just outside the bird's reach. This was at the time that the cygnets were hatching, so may have been due to the Coot taking an interest rather than deliberately attempting to annoy the swan.

The Ministry of Defence, Abbey Wood, Mute Swans

The MOD, Abbey Wood, headquarters are one kilometre from the AXA Centre study site. The two buildings were completed at approximately the same

time and both have man-made lakes. The MOD lake has been dominated by male 20Z. He arrived with a partner in the spring of 1996 and the pair successfully raised a family. The female left with the cygnets but they were never seen again. Another pair arrived in the spring of 1997. 20Z saw off the male and took over the female; the pair has remained together at Abbey Wood during the study period, visiting the study site lake during the winter of 1998/99, autumn of 1999 and January 2001.

The pair was in the news in December 2000 when they and their three cygnets were rescued from Bradley Stoke Lake after a train derailed and spilt 200 gallons of diesel into the water. They were cleaned up and returned to Bradley Stoke lake once the spill had been dealt with. There were no lasting side-effects as five cygnets were raised successfully in 2001.

The wider context

The Wetland Bird Survey 1999-2000 concluded that Mute Swan numbers have reached new peaks in thirteen of the past fifteen years and that numbers are still increasing (Musgrove, A.J. *et al.*, 2000). This has been put down to the banning of the sale of lead weights in 1986. However, counts in Avon over the past ten years (Chew Valley Lake June to September, Bristol City docks September to March, and young at all sites) as published in the Avon Bird Report do not reflect the national trend and there is no obvious reason why this is so.

Conclusion

The lake at the AXA Centre study site has been a highly desirable one for Mute Swans during the study period. A German study (Hilprecht, 1970 in Birkhead, M. & Perrins, C., 1986) came to the conclusion that the minimum territory size is about 150 metres by 300 metres but the lake at the study site is significantly smaller than this. However, breeding success proves that nesting sites and nest material is adequate and that there is ample food for a family of swans. The many battles between birds prove that there is insufficient habitat for more than one pair at any time of year. Territorial behaviour has not occurred exclusively during the pre-breeding and breeding period but also during the winter. This may well be due to the small territory size and may also explain why one pair seemed to try to hold two territories (the MOD lake is also relatively small). Unrelated birds have co-existed happily when there was an adult/juvenile mix, and when adults appeared to adopt juveniles. The increase in swan numbers in the UK since the mid 1980s may have resulted in optimum numbers being present in the area, causing fierce competition for suitable sites. However, as *Avon Bird Report* data challenges this conclusion, it may be the building of new potential breeding sites that has created the conditions for potential conflict. The national increase in swan numbers may also be the reason

for long-distance movements of some of these birds. Pair bonding has proved to be strong but pairs do split up for short periods on occasions.

Acknowledgements

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Club Activities 1999 – 2001

During the period membership continued to grow. At the beginning of 1999 it was 640 rising to 681 at the end of 2001. It is worth noting that at the end of 1990 the figure was 446. Largely because of this rise in membership it has not been necessary to increase subscriptions for many years and the Club has remained in a healthy financial state.

Bird News has been published each month. Many people are involved in its production and distribution. Paul Marshall, Steve Hale, Tony Scott and Geoff Suter handled the monthly bird records. Various Committee Members were

responsible for Club News. Jean Lay put the whole thing together and, with her helpers, enveloped and distributed it.

Each year the Club also published the Avon Bird Report jointly with the Bristol Naturalists' Society. This is a superb publication, involving a tremendous amount of hard work. It is consistently among the best Bird Reports in the country and in 1999 was judged to be the best Annual Bird Report of the Year by *British Birds* journal. All those involved in its production are to be congratulated, particularly the Editor Andy Davis and Recorder Harvey Rose.

Club members strongly supported many local British Trust for Ornithology surveys during this period. The skills and enthusiasm of club members are greatly appreciated by the Avon region BTO organisers. The main survey of the BTO is the Breeding Bird Survey and in 2000, members covered 110 out of the 153 square kilometres surveyed.

The Club decided to commemorate the Millennium by making grants of £700 towards the cost of the Bernard King Hide at Chew Valley Lake, and £300 to the Avon Wildlife Trust as a contribution towards the cost of a hide at Clapton Moor Reserve. Other contributions were made, of £50 to the Somerset Wildlife Trust Lynchcombe Link Appeal and £50 to the AWT Weston Big Wood Appeal.

During **1999** a total of 36 day or evening field meetings were held including coach trips to the Exe Estuary, the Dorset coast and Portland. Most of these were well attended, especially those at new venues such as the Torridge Estuary.

The programme of midweek field meetings continued to grow in popularity with new venues and leaders being added throughout the year. Two new venues for weekend trips were Rutland Water and Humberside and these were very successful as was the one to Anglesey. A club holiday was planned to Shetland in May/June but had to be cancelled for lack of support.

The programme of indoor meetings was again well supported. David Cotteridge described his search to photograph *Sylvia* warblers, an account of the birds of the Exe Estuary was given by Malcolm Davies, and Julian Hughes, of the RSPB, outlined the ever present threats to Hen Harriers. Club member Roderick Leslie talked about the potential for birds of the Millennium Forests and bird artist John Gale spoke about the work of a bird illustrator. The Members' Evening in January produced a varied programme of high standard.

The Peregrine Watch was organised by Mike and Ruth Glover. Four birds successfully fledged and were seen by many visitors to the site. Bristol Water and Terra Nitrogen provided financial support and *BBC Wildlife* magazine provided a telephone.

At the previous AGM it had been agreed that a "Club Special Award" could be given to any member who contributed in a major way to the aims of the Club. Awards were given to Judy Copeland in recognition of her long and unstinting service; and to Steve Hale for the work he had done over many years in compiling the monthly bird records.

During the year a questionnaire was issued to all Members to ascertain their views and assist with planning for the future. 31% of the questionnaires were completed and returned.

A total of 35 day or evening field meetings were held in **2000** and most were well attended, despite the weather. The coach trips to Portland and the Exe Estuary were well supported as usual.

The programme of mid-week field meetings continued to flourish and expand with new leaders and venues being added to the itinerary. Weekend trips to Kent, Suffolk and Cornwall proved very successful but the pelagic trip planned for September could not take place as the ferry broke down just before the proposed trip!

Two holidays took place during year. The first to Shetland, was ably led by our most Northerly member, Wendy Dickson, who was able to show us some wonderful birds and give an insight into life on the Shetlands. The other holiday to Southern Spain was equally successful, with plenty of birds and the added excitement of torrential storms.

All indoor meetings were well attended with a varied selection of presentations. Talks began with a portrait of the New Forest by Mike Read, Andy Swash described spring migration in eastern China, Peter and Carol Leigh gave an account of birding in Florida and Brayton Holt's visit to the Taymyr Peninsula in Siberia contrasted with Club member John Sparks' experiences in Antarctica. At the AGM, Lance Tickell gave an entertaining talk about albatrosses. The Members' Evening in February produced a varied programme of high standard.

Mike and Ruth Glover again organised the Peregrine Watch but on this occasion the Peregrines failed to breed successfully. An investigation of the nest site itself did not give any clues as to why they were unsuccessful. Bristol Water and Terra Nitrogen provided substantial financial support to the Watch and *BBC Wildlife* magazine provided a telephone.

A "Club Special Award" was given to Jean Lay in recognition of her long service to the Club as Secretary, the production of *Bird News*, etc.

A full programme of day and evening field meetings was arranged in **2001**, but 13 of these had to be cancelled because of the Foot and Mouth Disease (FMD) outbreak, leaving a total of 22 events. Most of these were well attended but some of the more local ones were poorly supported.

The mid-week field meetings were again very well supported with an average attendance of 20 members. Unfortunately 12 of these meetings also had to be cancelled because of FMD. At the end of the year David Tombs stepped down as Organiser and was replaced by Margaret Swatton.

Three weekend trips were arranged to Norfolk, Flamborough and North Yorkshire. These were very popular, as was the pelagic trip from Plymouth to Santander. The Club holiday was to Islay in October.

The programme of indoor meetings included talks on skuas by Mike Langman and Roger Clarke outlined his extensive studies of Harriers. Charles Martin gave a fascinating account of the relationship between birds and the people of St. Kilda, Gillian Gilbert detailed the RSPB's Bittern Project and Robin Khan described how migrating raptors cross the Mediterranean Sea. After the AGM, Robin Prytherch gave an account of the Club's first pelagic trip across the Bay of Biscay. Again, the Members' Meeting produced a varied and interesting evening.

Richard Bland took over the running of the Peregrine Watch this year. As with other activities it was at first affected by the outbreak of FMD, but eventually got under way. There was some initial activity from the pair, but things then went very quiet and the decision was taken to cancel the watch. Later it became apparent that breeding had taken place but the nest was in a very sensitive site and it was decided not to reopen the Watch. Eventually two chicks fledged successfully.

Indoor Meetings

21.01.99 Members' Evening
18.02.99 David Cottridge - The Search for The Sylvia
18.03.99 Malcolm Davies - The Exe Estuary
09.09.99 Peregrine Watch Report
16.09.99 Julian Hughes, RSPB - Hen Harriers, For Ever Threatened?
21.10.99 Roderick Leslie – Birds of the Millennium Forests
18.11.99 John Gale – Bird Illustrating in East Africa
16.12.99 Annual General Meeting

20.01.00 Mike Read - The New Forest
17.02.00 Members', Peregrine Watch and Fieldwork Meeting
16.03.00 Andy Swash - Spring in Beidaihe, Eastern China
21.09.00 Peter and Carol Leigh - Florida
19.10.00 Brayton Holt - Taymyr: The Endless Day
16.11.00 John Sparks - The Antarctic
14.12.00 A.G.M. and Lance Tickell – I Thought I Saw an Albatross

18.01.01 Mike Langman - Skuas
15.02.01 Members Evening
15.03.01 Roger Clarke - Harriers
20.09.01 Charles Martin - The Birdpeople of St. Kilda
18.10.01 Gillian Gilbert, RSPB - Bitterns
15.11.01 Robin Khan - Migration of Raptors through the Mediterranean
13.12.01 Annual General Meeting

Nick Ayers *Honorary Secretary*