
The population history of Grey Plovers *Pluvialis squatarola* in the Solent, Southern England

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Since winter 1970/71 the numbers of Grey Plovers *Pluvialis squatarola* present in Britain in winter have increased by a factor of about seven. This article reviews the recent increase in The Solent, an estuarine system on the central south coast of England, and attempts to place it in an historical context using pre-1970 documentary evidence and the counts for two components of The Solent which began respectively in 1952 and 1964. For the first half of the 20th century the wildfowling diaries of William Mudge are of particular interest for their degree of quantification. I conclude that in The Solent the recent increase is without precedent this century and that the Grey Plover was comparatively scarce there before the 1950s or 1960s, the period immediately preceding the more dramatic increase of the 1970s and 1980s. I conclude with a plea for the information about other potentially important diaries and similar material which may help to shed light on the history of wader numbers.

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INTRODUCTION

Since the start of the British Trust for Ornithology's Birds of Estuaries Enquiry (BoEE) in 1970/71 the numbers of Grey Plovers counted in Britain in winter (November-March) have increased from a peak of 5,569 in winter 1970/71 to 40,403 in winter 1988/89. Because counting effort has not been wholly consistent these numbers are not, however, the most satisfactory measure of change. The BTO Index of wintering numbers, based on January counts and set at 100 in the arbitrarily chosen winter of 1972/73, is an attempt to overcome the problem. In the case of the Grey Plover *Pluvialis squatarola* the Index rose from 90 in January 1971 to 386 in January 1989. Using the BoEE data, Moser (1988) showed that in some estuaries numbers increased faster than the national population, and that estuaries were being filled sequentially, reflecting the relative preference of the birds. By 1985/86 almost half of the estuaries examined in his analysis appeared to be at or near their carrying capacity for Grey Plovers.

Status summaries for the Grey Plover in the numerous avifaunas of English coastal counties published in the late 19th century and the first half of the 20th century suggest that then the Grey Plover may have been a comparatively scarce autumn and spring migrant, with few birds present in mid-winter in Britain until comparatively recently. However, the problem with this source of information is that it invariably represents opinions rather than counts and moreover does not tell us the extent to which estuaries were visited by bird-watchers. This article reviews the recent increase in the numbers of Grey Plovers occurring in The Solent, an estuarine system on the central south coast of England, and attempts to place it in a historical context using a wider range of sources. It is part of wider studies of the history of estuarine bird populations.

THE SOLENT

The Solent is derived from the dismemberment of an ancient river system by the post-glacial marine transgression. Rising



sea level has drowned the valley of the Solent River which once flowed eastward between what are now the Isle of Wight and the Hampshire shore, and penetrated far up its tributaries to produce the modern disposition of estuaries and tidal basins ("harbours") around the main waterway (Figure 1). The largest of the harbours, Portsmouth, Langstone and Chichester, are the drowned parts of an extensive coastal plain which was drained by networks of small streams. In many respects the three harbours can be regarded as a single biological system comprising connected intertidal basins with narrow exits to The Solent. There is daily interchange of waders, including Grey Plovers, between the harbours, some birds feeding in one and roosting in another at high water.

Of 9,060 ha of intertidal sediment in The Solent, 6,191 ha are mudflats, 729 ha are sandflats, 430 ha are ancient saltmarshes and 1,170 ha are cord-grass *Spartina* marshes. Of the *Spartina* marshes about 650 ha are in an advanced state of degeneration. In the estuaries and harbours most of the

sediments are dominated by fine silt and clay (<63µm diameter) rich in organic matter and with a sulphide-blackened anoxic layer 0.5-1.5 cm below the surface. The mudflats are mostly very soft and negotiable safely only wearing patters. There are extensive eelgrass *Zostera* beds and abundant green algae, mostly *Enteromorpha* and *Ulva lactuca*. In the more exposed places, mainly around the mouths of Langstone and Chichester Harbours and at the eastern end of the Isle of Wight, there are sandflats (particle diameter mostly 150-300 µm, sulphide layer below 5 cm). On the upper shore in sheltered estuaries and harbours saltmarshes, mostly of medieval origin, occur locally but are mostly now receding through wave attack at their terminal cliffs. Somewhat downshore extensive *Spartina* marshes (mainly *anglica* but also other forms) developed from the late 19th century onwards, but these, too, are now generally in recession. Over large areas the former *Spartina* marsh platforms are now denuded of plants and are slumping and eroding back to an approximation of the pre-*Spartina* mudflat profile (Goodman &

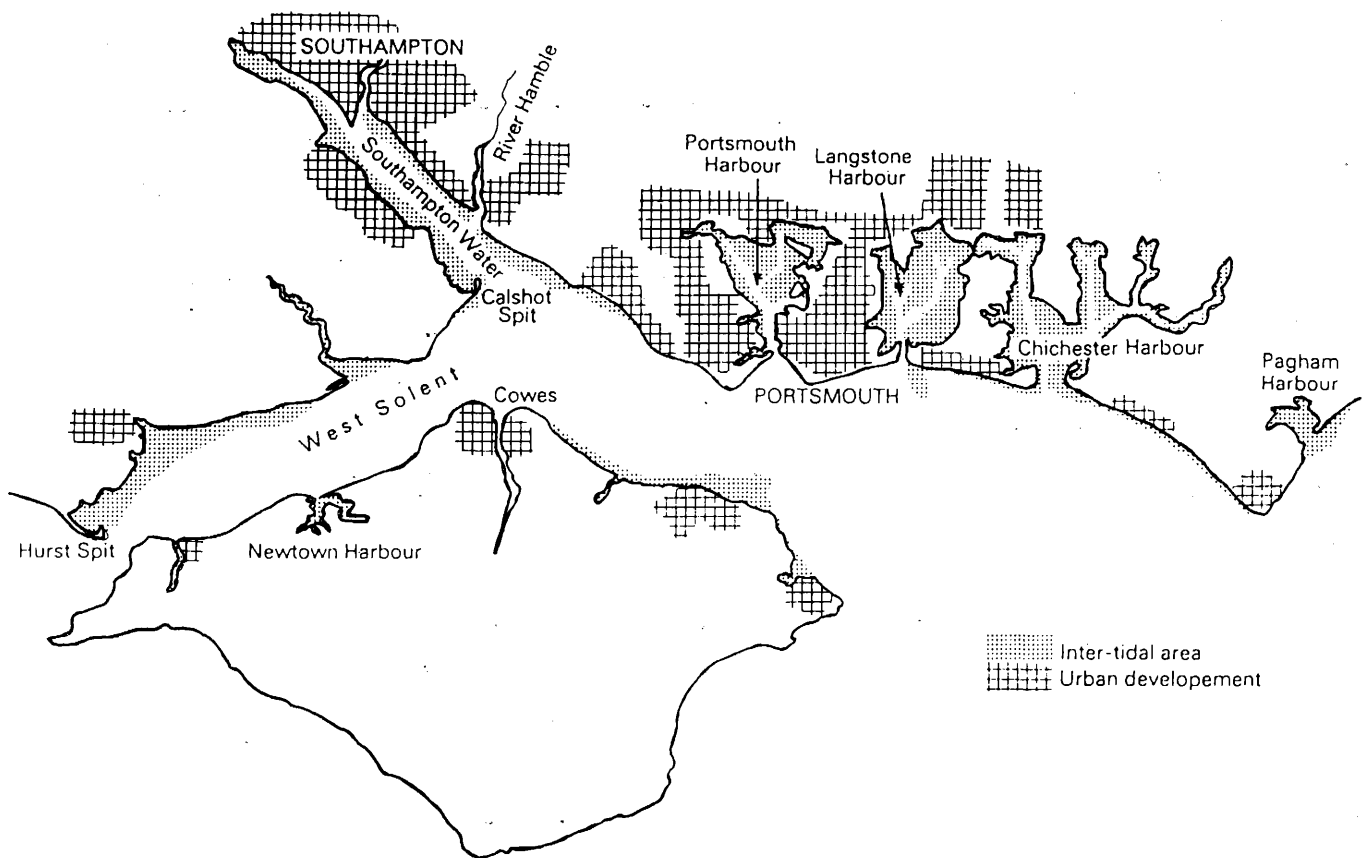


Figure 1. The Solent.



Williams 1961; Haynes & Coulson 1982; Tubbs 1980, 1984).

Winters on the central south coast of England are normally mild. Densities of benthic invertebrates are high. For example, in eleven studies of mudflats in Portsmouth, Langstone and Chichester Harbours average densities of 73,111 animals m⁻² were found in mid to upper shore muds; 24,943 m⁻² in mid to lower shore muds; and 75,405 m⁻² in algae-covered muds. The fauna in the last habitat was, however, dominated by one species, the gastropod *Hydrobia ulvae* and the mud beneath the densest weed blankets was often relatively impoverished. A total fauna of about 70 species occurs in Solent mudflats, of which 11 species are numerically dominant and usually comprise most of the biomass.

SOURCES OF DATA

In addition to the BoEE counts, carried out monthly since 1970/71, counts of estuarine birds (at least one count each month) in The Solent were begun by D.F. Billet, C.J. Henty, G.H. Rees and me in 1952/53 in Langstone Harbour. These form an unbroken series of counts to the present time and are still organised by David Billett. In Chichester Harbour monthly autumn and winter counts co-ordinated with those in Langstone began in 1963/64. In the Beaulieu River estuary in the West Solent, J.H. Taverner began at least monthly counts in 1962/63. All these counts were of birds at high water roosts. In addition to these sources are numerous records of the occurrence of Grey Plovers in The Solent published in the *Hampshire Bird Report* (published annually since 1957); the *Sussex Bird Report* (1949–present); the *Proceedings of the Hampshire Field Club & Archaeological Society* (1932–1957); and the *Proceedings of the Isle of Wight Natural History & Archaeological Society* (1948–present).

Before the start of the Langstone Harbour counts there were few bird-watchers to contribute to the printed sources mentioned above, but it seems that Grey Plovers were considered scarce enough for all records to be published or for groups of records to be summarised. Numbers of observers increased from the mid-1950s. However, the data in the annual *Bird Reports* other than those derived from regular high water roost counts are difficult to interpret because it is not possible to determine whether they represent the whole population in an estuary, nor on how many occasions birds were not seen at all. In this respect it is useful to be able to supplement the printed records with those in the MS records of B.J. Ringrose, a bird-watcher who visited the West Solent between 1932 and 1937, and the MS notes of Peter Day, who was a frequent visitor to the Keyhaven estuary in the West Solent in the

1940s and 1950s. The former are in my possession and the latter in that of the Day family. More important are the MS diaries of William Mudge, a wildfowler (and incidentally one of the first professional photographers) who shot and recorded what he saw in Southampton Water and the Beaulieu River estuary during 1889–1915 and 1919–1953. He recorded the number of occasions and usually the length of time he was in the field as well as much of what he saw and all of what he shot.

Earlier, between 1813 and 1850 the West Solent was shot by Colonel Peter Hawker, who left a diary of his exploits (Hawker 1893). He owned a cottage (still called Hawker's Cottage) at Keyhaven which he used as his base for a wildfowling season of 1–2 months each winter between November and March. His main quarry was Brent Geese *Branta bernicla* and Wigeon *Anas penelope* but he shot at and usually killed literally every bird he encountered, although it is not always clear from the Diaries whether he recorded them so meticulously as the wildfowl he pursued.

POPULATION HISTORY

Grey Plovers begin to arrive in The Solent in July. These are mostly adults in breeding plumage. Numbers reach a peak in September, October or November (August in 1971), then usually decline, increasing to a second peak which most often occurs in February (Tubbs 1977, 1980; Kirby & Tubbs 1989). Figure 2 shows the recent population history of Grey Plovers in The Solent as portrayed by both "autumn" (July–November) and "winter" (December–April) peaks. For Grey Plovers separation of the two peaks portrays trends in The Solent more realistically than the November–March peaks usually used in making comparisons between estuaries (see e.g. Salmon *et al.* 1989).

Autumn peaks in The Solent increased from 530 in 1970/71 at the commencement of the BoEE, to 4,967 in 1982 and 4,866 in 1986 (89% increase), falling to 3,178 in 1987 and 3,021 in 1988 (83% increase). Winter peaks increased from 688 in 1970/71 to 5,517 in 1988/89 (87.5% increase). The 5,517 Grey Plovers recorded in February 1989 represented 14.3% of the national total in that month (Figure 2).

Is there any evidence that different Solent estuaries were filled preferentially by Grey Plovers during the population increase, as appears from Moser's (1988) national analysis?

Carrying capacity is most likely to be reflected in the densities of birds at low water feeding grounds. However, the BoEE



and most earlier counts are for high water roosts. This poses no problems of analysis where birds both roost and feed in the same estuary, but in The Solent this is not so - there is considerable interchange between estuaries during each tidal cycle. Large numbers of Grey Plovers which feed in Langstone Harbour roost in Chichester Harbour. Many from Portsmouth Harbour roost in Langstone Harbour. In the western parts of the system most birds roosting in the Beaulieu River estuary feed in Southampton Water, whilst there are similar interchanges between Newtown Harbour and the Beaulieu Estuary and between the North West Solent and the estuaries of the Isle of Wight. In his analysis of changes in Grey Plovers numbers in different estuaries, Moser (1988) considered Portsmouth Harbour, Langstone Harbour, Chichester Harbour, the Beaulieu Estuary and the North-West Solent as self contained units. The regular interchanges of feeding and roosting birds emphasises, however, the interdependence of the Solent estuaries, which are best seen as a unified ecological system.

Notwithstanding the inter-estuary exchanges, the long run of counts from high water roosts in Langstone Harbour helps to place the recent increase in The Solent in perspective (Figure 3). When counts began, numbers were very small and they remained below 500 in both autumn and winter until autumn 1968. After this there was a trough in numbers before an increase again in the early 1970s. Since then they have remained comparatively stable. Numbers of Grey Plovers at high water roosts in Chichester Harbour since 1963/64, when comprehensive counts began there, have been consistently higher than in the Langstone Harbour roosts (Figure 4). A number of pre-1963/64 counts are included in Figure 4. These are for single roosts and serve only to illustrate that at least 400-500 birds sometimes roosted in the Harbour in the ten years before comprehensive counts began.

In both Chichester and Langstone Harbours there was a pulse of higher numbers in the late 1960s, more pronounced at the Chichester Harbour roosts than in Langstone, followed by a distinct trough in the years around the start of the BoEE. I can offer no explanation but I would comment that winters 1969/70, 1970/71 and 1971/72 were mild on the south coast of England and thus the trough is unlikely to be related to cold weather. In contrast it may be noticed that the very severe winter of 1962/63, and the cold but less severe winter of 1961/62, were marked by reduced winter peaks of Grey Plovers in Langstone Harbour. I am unable to identify any other correlations between numbers of Grey Plovers and severe winter weather in Figures 2, 3 and 4.

In the two decades preceding the BoEE, numbers of Grey

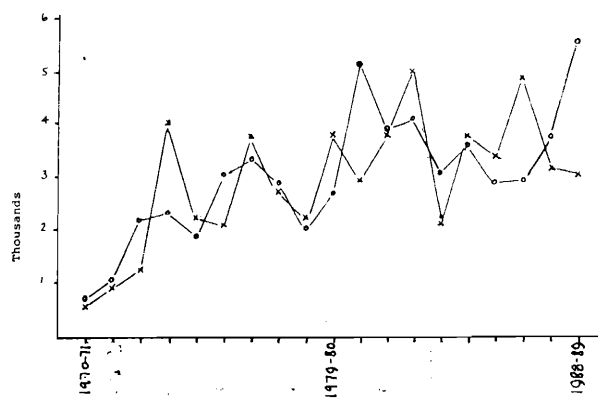


Figure 2: Peak autumn and winter counts of Grey Plovers *Pluvialis squatarola* in The Solent

+ + autumn (July-November)
o o winter (December-April)

Figure 2 Peak autumn and winter counts of Grey Plovers *Pluvialis squatarola* in the Solent.

Plovers reported in The Solent other than in Langstone and Chichester Harbours were small. The Beaulieu River estuary is best documented. Here, two or more counts were made each month from 1861 to 1978 by J.H. Taverner (unpub.), since when the estuary has been counted monthly for the BoEE. Between 1961 and 1979 the mean peak autumn count (July-November) was 41 (range 10–71) and the mean peak winter count (December-April) was 53 (range 25–80). Numbers did not exceed 100 until winter 1977/78 and then increased to 480 in autumn 1988 and 605 in winter 1988/89. Throughout this record, the estuary appears to have served as a roost for birds feeding in Newtown Harbour (Isle of Wight) or Southampton Water or both. The only published record of Grey Plovers in the Beaulieu estuary in the 1950s is of 9-10 birds on 14 October 1950.

Elsewhere in the western parts of The Solent there appears to be only one record of more than 100 Grey Plovers between 1950 and 1970, but numbers smaller than that occurred annually in Newtown Harbour on the Isle of Wight shore, and between the Lymington River estuary and Hurst Spit. In excess of 100 were recorded in Southampton Water and Portsmouth Harbour for the first time in 1969 and 1970 respectively.

Moving further back in time, I have found 128 records of Grey Plovers in The Solent, either published or in the MS notes of B.J. Ringrose, referring to the period 1932-1953. Four records are general statements ("up to 20 birds both ends of year"; "Portchester [Portsmouth Harbour] early autumn every year"; "a few in Langstone Harbour"; "all along the coast") which evidently summarise numbers of records. Of the total of 128, only seven records are of 10 or more birds and of these, only four records are of 20 or more birds. The maximum number



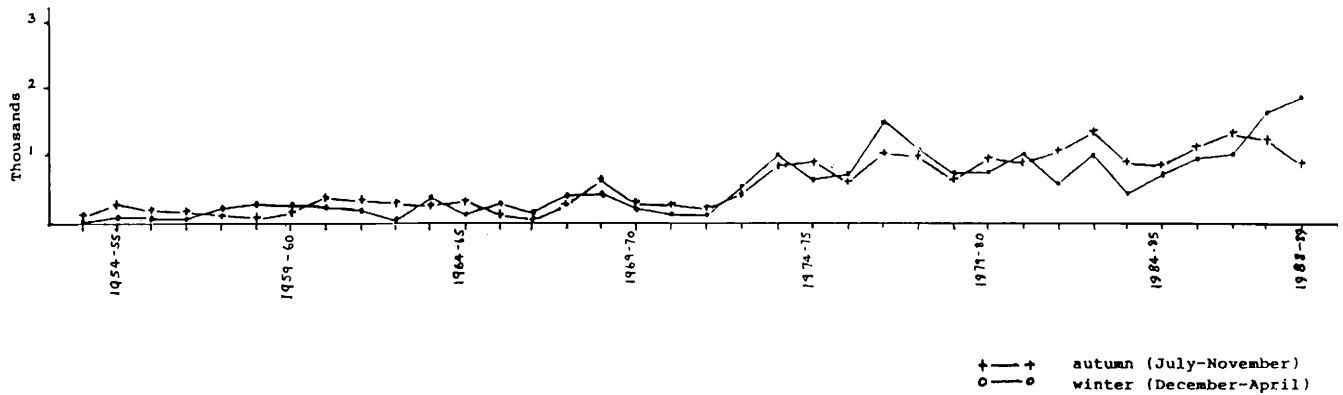


Figure 3. Peak autumn and winter counts of Grey Plover *Pluvialis squatarola* in Langstone Harbour.

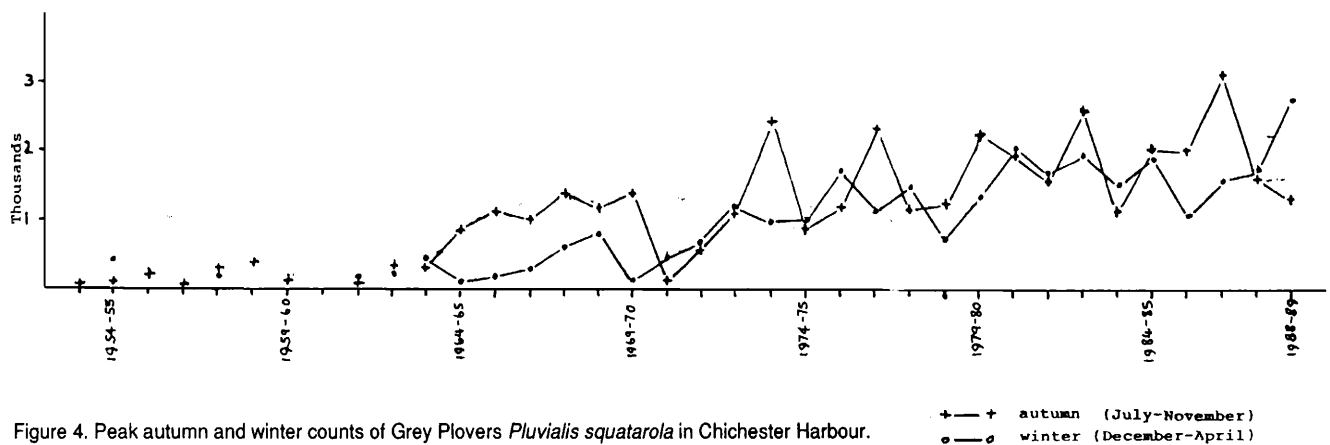


Figure 4. Peak autumn and winter counts of Grey Plovers *Pluvialis squatarola* in Chichester Harbour.

recorded was 35 (maximum of 16 records in 1947) or "35-40" (two records of similar size in 1936). The data are too fragmentary to derive trends or to determine the periodicity of occurrence during the year. They suggest that the species occurred regularly but in small numbers.

The diaries of William Mudge are illuminating. He shot both from a gunning punt and from ashore in Southampton Water and the Baeulieu River estuary from January 1898 until at least February 1952, with a gap in the record from 1906 to 1919 and another in winter 1930/31. He shot mainly ducks and waders from a punt in the intertidal zone and hence the most vulnerable quarry species were those which (like Grey Plovers) fed on mudflats and roosted on saltmarshes. In the 42 seasons for which there are records, he killed 15,228 ducks, brent geese, waders and a few grebes, divers, cormorants and herons. Of these, 9,988 were waders of 17 species. He shot only 145 Grey Plovers (1.5% of waders; 0.95% of all birds). Of these, 129 were shot after the 1939-40 season (maximum in any season = 40 in 1943-44; mean of 13 seasons after 1939/40 = 10). In the 29 seasons before 1940/41, Grey Plovers were shot in only eight (Figure 5). Thus there is a strong suggestion that Grey Plovers were less common before 1940/41 than afterwards. To some extent, shooting totals reflected deliberate quarry selection - William

Mudge particularly sought Lapwing *Vanellus vanellus* and Curlew *Numenius arquata* - but most of his punt shots were made at assemblies of waders irrespective of species. Thus, considering the potential vulnerability of Grey Plovers to a punt gunner, the low percentage of the species in the total bag is likely to reflect low numbers present. Comparable totals of Oystercatchers *Haematopus ostralegus* (145), Turnstone *Arenaria interpres* (105), Knot *Calidris canutus* (143) and Black-tailed Godwit *Limosa limosa* (109) were shot and I believe these, too, reflect the former status of these species in The Solent. The numerically dominant quarry species shot by William Mudge were Lapwing (2,559), Dunlin *Calidris alpina* (3,842), Redshank *Tringa totanus* (1,550) and Curlew (1,136).

Between 1920/21 and 1952/53 (but excluding 1930/31, for which there is no clear record) William Mudge shot on 1,273 days (mean = 40 days/season; range 7-76). On many days he went out twice, at dawn, and again in the evening after a working day. He was seldom out for less than two hours and it was usually much longer. The MS is such that it is not possible to derive similar information for the pre-1921 period. Besides the birds he shot, he recorded the approximate size of the flocks he stalked and the occurrence of species or flock sizes he thought unusual. The largest group of Grey Plovers



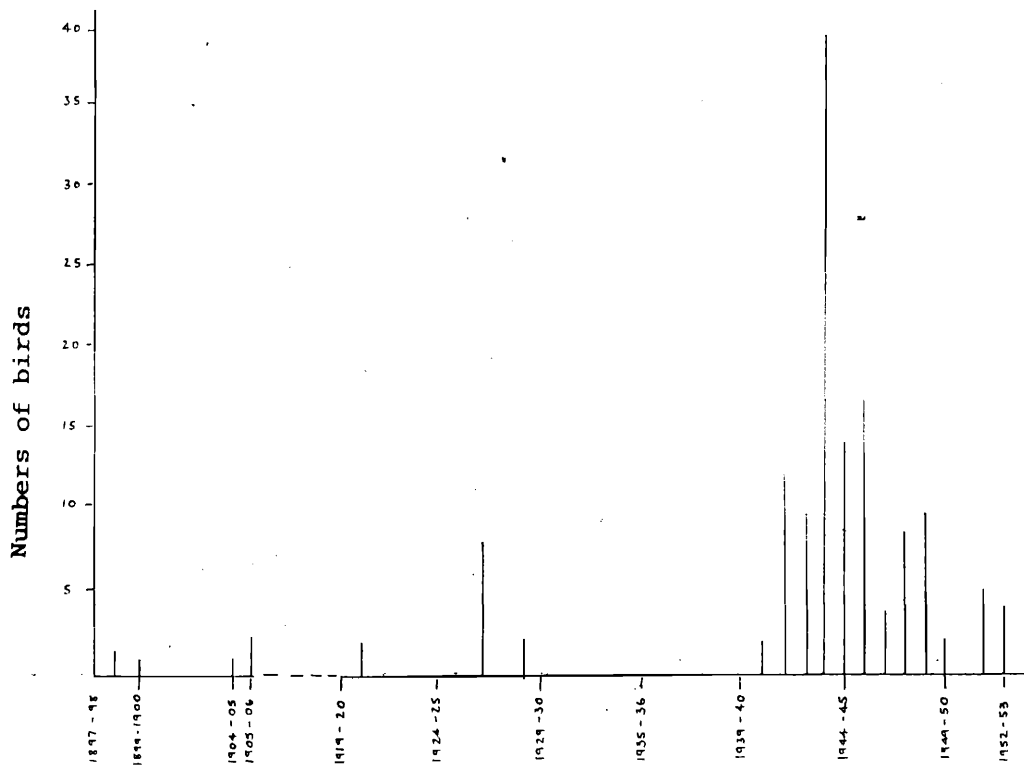


Figure 5. Numbers of Grey Plovers *Pluvialis squatarola* killed by William Mudge in The Solent 1897-1953.

recorded in the dairies is 10. This is consistent with the small number shot and supports the suggestion that the species was relatively scarce.

The former comparative rarity of Grey Plovers is further suggested by a comment of Kelso (1913). J.E.H. Kelso MD bird-watched and shot on Hayling Island and the adjoining harbours of Chichester on its east side and Langstone on its west, in the early years of this century. He summarised his observations in *Notes on Some Common and Rare British Birds* (an unbeatable title) from which it is clear that he placed a high value on accuracy. Hence, his summary that "This bird is not common on Hayling." should be regarded as accurate. Somewhat earlier, Kelso & Munn (1905) described the Grey Plover as "A spring and autumn visitor to our [Hampshire and Isle of Wight] coasts." without elaboration.

In 37 winters between 1813/14 and 1849/50 Colonel Peter Hawker recorded shooting only 16 Grey Plovers in the West Solent out of a total of 17,753 waders and wildfowl. Some Grey Plovers may have been included in the 260 unspecified "plovers" he recorded shooting, although it is plain from the dairies that "plover" was the name normally reserved to the

Lapwing *Vanellus vanellus*. The small numbers of Grey Plovers recorded shot should be regarded with caution, for there appears to have been winters or parts of winters when not all the waders shot were recorded: as quarry, Colonel Hawker regarded them as inferior to geese, swans and ducks. Nevertheless, there is nothing in the dairies to suggest that the Grey Plover was other than a regular wintering species in small, probably very small numbers in the West Solent.

CONCLUSIONS

From the limited data I conclude that the post-1950s increase in the numbers of Grey Plovers occurring in The Solent is unprecedented there in this century. The English county avifauna of the late 19th and early 20th centuries support the idea that this may be the case nationally. Until the 1940s or 1950s Grey Plovers were probably comparatively scarce.

In discussing the causes of the national population increase, which appears to be reflected internationally, Moser (1988) concluded that it has most probably resulted from an improvement in conditions for Grey Plovers on or on their way to and



from their breeding grounds. It seems to me that hunting may have played an important role in limiting Grey Plover numbers and the same may be true of other waders (Tubbs 1977). From his diaries we know that William Mudge, for example, was only one of a large number of punt gunners, some of them full-time professionals during the winter season, shooting all species of waders and wildfowl in Southampton Water for the market until the 1950s. From my own experience of Langstone Harbour in the early 1950s and from an interview survey of former wildfowlers who shot there in the 1950s and before (N. Horton, unpub.) the Harbour was intensely hunted for waders and wildfowl until well into the 1950s. Though the cause of the increase in the numbers of Grey Plovers cannot be certainly demonstrated I believe it would not have been possible without the cessation of autumn and winter shooting mortality which followed the protection conferred on the species in Britain by the Protection of Birds Act 1954 and by protection subsequently elsewhere in Europe.

The sudden increase in the numbers of Grey Plovers killed by William Mudge coincides with the Second World War, when there were several restrictions on the use of firearms, especially on the coast, and many hunters were preoccupied elsewhere. William Mudge was able to continue hunting, although he spent shorter periods in the field. His annual bags, however, increased. Between 1941/42 and 1948/49 there is a marked peak not only in the numbers of Grey Plovers he killed but in the total numbers of all waterfowl he killed each season. The total numbers of wildfowl and waders killed in 1942/43 and 1943/44 exceed those in any other season after the first decade of the century for which he left a record. In the early years of the century his hunting effort was especially intensive. It is also possible that birds were more numerous then. The increased numbers of birds killed during the Second World War may reflect the release of populations from the dampening effect of hunting, or it may mean that populations were unchanged but that fewer hunters were able to kill more birds. Probably both factors were involved. It is a pity that William Mudge was himself preoccupied elsewhere and unable to indulge his passion for wildfowling during the First World War.

Figure 6 suggests a possible population history of the Grey Plover in The Solent, based on the sources referred to in this article. By implication, this picture may be of more general relevance.

As mentioned in the Introduction this article reports part of wider studies of the history of estuarine bird numbers. Sources such as the diaries of William Mudge, though limited in the interpretation they permit, provide some of the best

evidence of relative bird numbers, hunting pressure and environmental conditions before the modern era of systematic counting. I end with a plea for any information about the whereabouts of comparable documentary sources to Mudge's diaries, especially for the estuaries of southern and eastern England.

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