

RESEARCH ON SHOREBIRDS IN THE SEVERN ESTUARY, S.WALES / ENGLAND

by P.N.Ferns

The Severn has the largest tidal range of any estuary in Europe. At Avonmouth, for example, it sometimes exceeds 50 feet (15m). High current velocities are associated with this large movement of water. Consequently, the Estuary carries an unusually large burden of suspended sediment which interferes with the feeding mechanisms of suspension-feeding invertebrates, such as cockles Cerastoderma edule. The fauna of the mud-flats is thus dominated by deposit-feeding forms, and this in turn limits the range of prey available to shorebirds. This does not result in a decreased overall density of birds, but does mean that the numbers of certain species, such as Oystercatcher Haematopus ostralegus and Bar-tailed Godwits Limosa lapponica, are reduced.

Work on shorebirds at University College, Cardiff, started in 1973 with a study of the breeding and wintering gull populations of the inner Bristol Channel by G.P. Mudge. While perhaps the majority of the gull population foraged intertidally at the turn of the century, only about 49% of Great Black-backed Gulls Larus marinus, 13% of Lesser Black-backed Gulls L.fuscus, 12% of Black-headed Gulls L.ridibundus and 6% of Herring Gulls L.argentatus do so at the present time. In addition, small numbers (particularly of Black-headed Gulls), also feed at the numerous coastal sewage outfalls in the area. In 1976, the Nature Conservancy Council (NCC) funded a survey of the birds at outfalls in South Wales (Mudge 1976). Besides providing quantitative information on the gull populations, this survey also revealed quite large numbers of Shelduck Tadorna tadorna (723) and Pintail Anas acuta (247) feeding at the largest sewers. The diet of these ducks is completely unknown, but it is suspected that they may simply be taking advantage of increased invertebrate population densities in these areas of organic enrichment. More recent work on waders has shown that Dunlin Calidris alpina and Curlew Numenius arquata also feed in considerable numbers in the vicinity of these sewers, and work is currently in hand in association with C.J.Mettam to investigate the invertebrate populations of such areas.

Counts conducted during the Birds of Estuaries Enquiry (B.E.E.) have proved of the greatest value, not only in establishing the size of the total shorebird population, but also in analysing seasonal variations in the utilisation of different sites (Ferns, in press), and in relating these patterns to the overall distribution of invertebrate food resources. In 1977, the N.C.C. funded a detailed analysis of B.E.E. data (Ferns 1977) and followed this up with support for a field survey in 1978/79 of the use of different levels on the shore by feeding waders at several key sites (Mudge 1979). At the same time, a comprehensive survey of all the saltmarshes in the Estuary was undertaken at Bristol University (Smith 1979). Both the latter projects were carried out with the co-operation of the Severn Estuary Conservation Group - a body representing sixteen local and national organisations with an interest in the wildlife of the area and its conservation. All of these studies owe a great deal to the enthusiasm and hard work of amateur observers.

The Dunlin has always proved to be a difficult species on which to undertake feeding studies, mainly because of the problem of quantifying food intake on the basis of field observations. Work currently being undertaken at Cardiff by D.H.Worrall on seasonal variations in the diet, and on the intensity of feeding effort, promises to be a big step forward. At the same time, we are collecting regular samples of this species for the analysis of body composition. As part of these analyses, J.Anderson is determining cadmium, copper, lead and zinc levels. This will provide a valuable comparison with the results being obtained at Durham (Evans 1979) and will enable a contrast to be made between heavily contaminated sites (e.g. Avonmouth) and comparatively pollution-free ones (e.g. Berrow). The metal levels in the invertebrates which form the main diet of the Dunlin are also being measured, along with that of the sediment.

One of the fundamental gaps in our knowledge of wader foraging arises from the lack of any reliable method of estimating the energetic cost of different activities associated with feeding. Work on the Redshank Tringa totanus at Cardiff has attempted to shed some light on this problem by telemetering the heart rate of foraging birds (Ferns, MacAlpine & Goss-Custard 1980). The initial aim is to see if heart rate can be used as an index of the energy metabolism of birds feeding on a small laboratory mudflat.

An important background to all of these field studies being undertaken in the Severn is provided by the regular ringing programme of the Celtic Wader Research Group. One of the main interests of the Group has been the Dunlin, and all the biometric data for this species are currently archived on the Cardiff computer. This will greatly facilitate future analyses. In the early years attention was focussed on the spring passage of this species (Ferns & Green 1979), but more regular winter and autumn catches now have the highest priority. On the southern side of the Estuary, regular catching by N.A.Clark is providing valuable additions to this store of pooled data.

All of these studies have recently been given an added impetus by the proposal to construct a Severn Barrage for the generation of electricity from the power of the tides. At the moment, this proposal is in the Prefeasibility Study Stage and a decision has yet to be taken about whether a full Feasibility Study is worthwhile. Wader research for the Prefeasibility Study, funded by the Department of Energy, includes a more detailed survey of low tide feeding areas along the lines of the earlier N.C.C. project. This work is still in progress. If a barrage were to be constructed, one of the most important changes in the Estuary would be a reduction in the existing tidal range. If this were the only significant alteration to existing conditions, the task of predicting the effects on shorebirds would be relatively straightforward. However, there will undoubtedly be a complex interaction between changed salinities, substrate deposition, erosion and invertebrate population densities, which makes the task of prediction a formidable one. Unravelling the many and varied threads of this picture will be one of the major tasks of a full feasibility study, but for the moment, effort is being concentrated on identifying the extent and height of existing feeding grounds. Changes in the Estuary itself cannot be divorced from the complications that the barrage will have for the surrounding coastal levels (Ferns 1980). Land use changes on the levels are likely to accelerate as the requirement for pumped drainage increases and a further lowering of the water table becomes almost inevitable. This could have serious consequences for some inland feeding waders such as the Whimbrel Numenius phaeopus (Ferns, Green & Round 1979).

Future work needs to extend the range of species studied, as well as providing the information necessary for a proper assessment of the effects of a barrage. High on the list of priorities is the need for detailed studies of Shelduck, Redshank and Curlew. Besides being present in internationally important numbers, these species show a number of anomalous and interesting changes in distribution within the Estuary from year to year (Ferns, in press), which may be correlated with local variations in the availability of prey. However, the fundamentally important questions are the same in the Severn as they are in any other estuary, and amongst the more important of these are the following. What factors determine the density of foraging birds? Is the settlement of birds in a particular area density-dependent? Do birds forage optimally for energy or are other factors important in determining their choice of foods and feeding methods? How can estimates be obtained of prey availability, as opposed to mere prey density? Is the winter cycle of body condition, which appears to be similar in many species, adaptive or is it a direct consequence of variations in the birds ability to obtain food? These are the issues upon which attention will focus during the forthcoming years.

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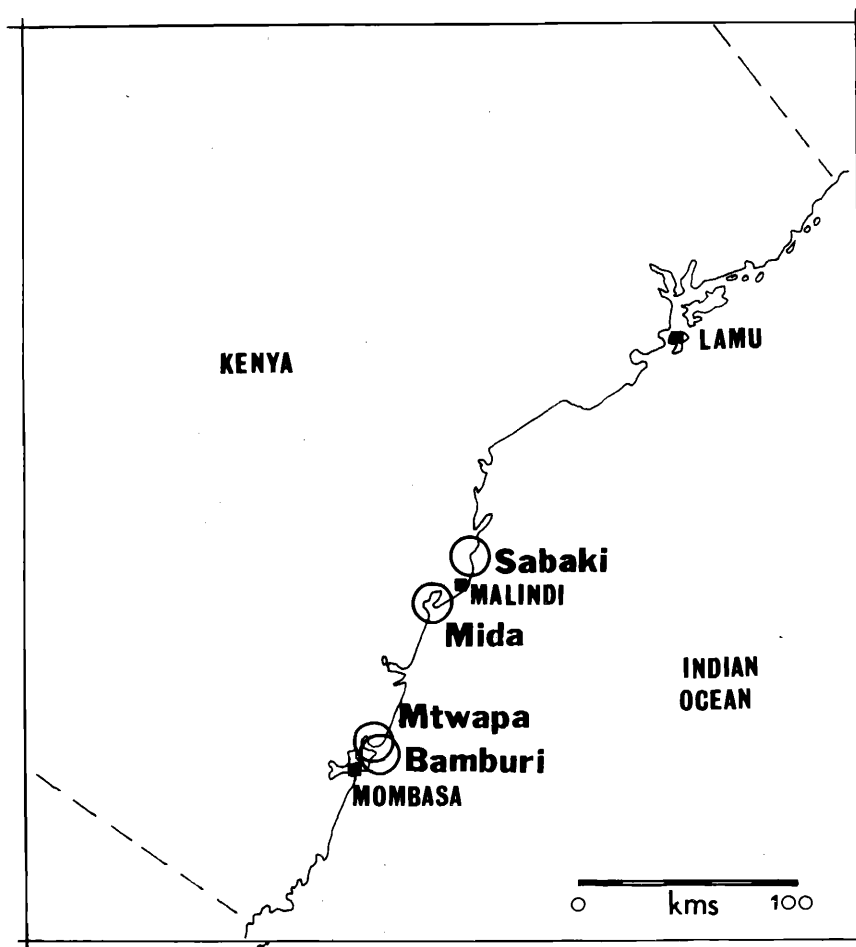


FIG. 1 STUDY SITES ON THE KENYAN COAST ○