Slings. Try suspending the bird in a sling made of cloth and suspended with a string so that the birds feet just touch the ground. The bird should be placed in a quiet place with subdued light to discourage struggling. If recovery proceeds the string is lengthened to gradually place more of the bird's weight on its legs. This process may take hours or even days. In the latter case the bird has to be fed. Suitable foods are chopped boiled eggs and tinned catfood preferably laced with meal-worms whose movement encourages the bird to peck. As the bird recovers take care not to panic it again - a bird which had recovered flapped, kicked and struggled and became cramped again necessitating further treatment. Warmth. Some success has followed immersing the bird's legs in warm water and massaging them gently for a period of up to 30 minutes. This presumably encourages blood flow.

References

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(Although the whole of this paper has been attributed to Derek Stanyard the guidelines and recommendations section takes into account observations and comments from many people. The following points were made in discussion and omitted in error from the above. During capture and handling of Curlews and other long-legged waders precautions should be taken to avoid folding the legs to the body. Such birds should not be carried in sacks or bags, but if this is unavoidable they should remain therein for a minimal time (less than 5 minutes). When handling the bird the legs should be allowed to dangle and not be folded to the body. These precautions appear to help prevent cramp. - Eds.)

SUMMARIES OF CURRENT RESEARCH ON WADERS

From time to time we have published brief descriptions of the current work undertaken by ringing groups or by workers in a particular area. Up to now these articles have not been concerned with programmes investigating ecological and other aspects of waders additional to ringing. The article below by Dr. Peter Evans describing studies centred on the Tees estuary is thus something of an innovation for the Bulletin. We hope that other research team organisers will provide similar outlines of their achievements, objectives and future plans. We think this will be particularly valuable and important in encouraging associated co-operative studies by other groups and individuals who may be able to collect additional supporting data. For example, team work on many sites will be required to work out the network or sequence of areas used by individual waders, a matter of great importance in studying 'turnover' and 'carrying capacity' as Peter Evans explains - The Editors.

SHOREBIRD RESEARCH ON THE TEES ESTUARY, NE ENGLAND

by P.R.Evans

Since the late autumn of 1970, a succession of research projects have been carried out, by members of the Zoology Department of Durham University, on shorebirds at Teesmouth, one of the most heavily polluted and industrialized estuaries in Britain. Our aim was to predict the effects on wintering shorebird populations of a 60% reduction in the area of intertidal land known as Seal Sands. Reclamation of the site took place in 1973 to provide storage and refinery facilities, following the development of the Ekofisk oilfield in the North Sea.

In 1971 and 1972 we surveyed the invertebrate populations on Seal Sands, established the life histories of the most important species, measured the average feeding time required by each shorebird species during a tidal cycle, and identified their preferred diets and feeding sites. From this information (ref.1) we predicted which bird species would be affected by the reduction in food resources resulting from removal of 60% of the intertidal land, and which species by the reduction in feeding time (since reclamation preferentially removed the feeding areas at higher tidal levels).

Between 1973 and 1975, i.e. during the winter of active reclamation and the two winters following it, we monitored the changes in numbers of birds feeding in Seal Sands (ref.2). These changes accorded qualitatively with most of our predictions based upon the reductions in food resources, but not so well with those based upon reduction in potential feeding time, because some species found suplementary feeding areas elsewhere in the estuary, which they used when Seal Sands were covered by the tide (ref.3).

Food resources which are not continually replenished can provide food for a certain number of 'animal-days' of use. If the number of days is predetermined, then the number of animals which can be supported by the resources can be calculated. (This is the basis of the concept of "carrying capacity" of grasslands for sheep and cattle in winter.) There is very little information from wild animal populations to indicate whether this concept has any practical value in ecological studies, though it forms the basis for several mathematical models of the natural regulation of animal populations.

Since the invertebrate populations which form the foods of shorebirds do not breed during most of the period when the birds are present, the opportunity exists for examining how birds adjust their numbers on intertidal land to the food resources. One of the most important findings of our studies in 1973-75 was that, when the food resources were cut by reclamation, the subsequent reduction in bird-days of use of Seal Sands resulted from reductions in the numbers of birds using the estuary, rather than in the period for which species stayed. This suggests that shorebirds regulated their numbers on the area when they settled, after their return from the breeding grounds. We attempted to measure, in the field, by direct observation, the quantity of food required by an average bird of each species each day, to determine how closely the number of bird-days of use of Seal Sands related to the maximum number of bird-days which the food resources could have supported. It proved possible to do this for only a few species, and the confidence limits on the estimates of daily food intake were wide. We suspected that this imprecision stemmed only in part from our sampling techniques, and chiefly reflected true differences in food requirements and foraging abilities between individual birds of a species. Another important finding from our 1973-75 studies was that the percentage reduction in numbers of birds, following the reclamation of part of Seal Sands, varied markedly between species, and that whenever several species took similar invertebrate foods, albeit by different foraging techniques, the largest-sized bird species of each group suffered the least reduction in numbers. This suggested that the behavioural reactions of one species to another may also be important in determining the number of each which settle in autumn.