INTER ESTUARINE MOVEMENTS OF SHOREBIRDS
(Abstract of contribution to the WSG Nottingham meeting)

by Patrick J. Dugan

The use, by individual shorebirds, of a network of estuaries rather than a single estuary during one winter is an area of wader biology attracting increasing attention at the present time. The important conservation implications of such movements are becoming more fully realised. During the winter of 1979-80 many Wader Study Group members will be involved in marking waders at the Tees and Forth estuaries, the Wash and Dutch Waddenzee to investigate movements between these and other areas. As background to this study present knowledge of the use of a network of east coast estuaries by Knot Calidris canutus, Bar-tailed Godwit Limosa lapponica and Grey Plover Pluvialis squatarola is outlined.

Data from the Birds of Estuaries Enquiry show the annual pattern of use by Knot of the estuaries of north-eastern Britain (Humber, Tees, Lindisfarne and Forth) and the Wash. Numbers of birds on all the north-eastern estuaries show similar patterns. Numbers increase from late October and early November to a mid-winter peak followed by a decline to the pre-increase level by the end of March. On the Wash numbers rise between October and November to a mid-winter plateau and decline to the October level by March. Analyses of ringing recoveries have attempted to establish the origins and destinations of these birds' movements. However, interpretation of recoveries in winters subsequent to the one of ringing (further analysis in progress) is extremely difficult and the results open to question; therefore only recoveries within the winter of ringing are presented. Recoveries of this nature on the Humber (2) and Tees(1) of birds ringed on the Wash demonstrate that some of the birds on the north-eastern estuaries come from the Wash. However, these recoveries only give information on two inter-estuarine links and are too few to enable confident statements on the origins of all the birds to be made. Further, in most cases the recoveries are not sufficiently soon after ringing for the timing of the movements to be determined with accuracy and assessment of when and consequently why the movements occur is not possible. In the absence of other within-winter recoveries interpretation of the count data is thus open to considerable speculation.

To overcome some of these problems Knot were colour marked in 1978/79 in a pilot study of the role of the Tees estuary in a network for this species. Two distinct movements of birds from the Tees to the Forth in late December and late January and one, possibly via the Forth, to the south-west coast of Scotland were detected. The study is being expanded in 1979/80.

Counts of Bar-tailed Godwits from the East coast show a marked decrease in numbers on the Wash between September and October coinciding with an increase of similar magnitude in numbers using north-eastern estuaries. One ringing recovery from the Wash to the Humber in the same winter indicates some movement to the North from the Wash. However more data are needed to confirm that the correlation between change in numbers in the different areas is due to interchange of individuals. Movements between the Tees and Lindisfarne were demonstrated by sightings of a colour-marked individual on the Tees in September and on Lindisfarne in late winter of the same season. Again more data are required.

Counts of Grey Plover show the existence of fluctuations in numbers not attributable to autumn or spring passage in population levels on different estuaries. Nothing is known of the movements of birds resulting in these changes in numbers.

Investigation of the questions raised in this study is in progress through the dyeing scheme underway this winter (see elsewhere in this Bulletin). It is hoped to report on the results of this later.

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THE "CRAMP, STRESS MYOPATHY, OVER-STRAINING" SYNDROME IN CAPTURED LARGE WADERS

Recent developments and rising interest in catching Curlews Numenius arquata in Britain has once again high-lighted this problem. In the following note Derek Stanyard reports on recent experiences. Discussions at the WSG autumn meeting added further information - including the observation that not everyone read all of Bulletin 24 where a review of a paper from South Africa (van Heerden 1977) contained many of the comments which were later put forward as unique observations at the meeting! We suggest that interested readers and prospective Curlew catchers refer back to that note (Green 1978) before reading on.

Undoubtedly Curlew trapping presents special problems and every would-be catcher must be prepared to make special arrangements when their capture is planned. A design for a suitable keeping cage is given after Derek Stanyard's note followed by guidelines which we hope will be helpful to Curlew catchers. We should be pleased to receive further information to hand on to our readers.

FURTHER NOTES ON CURLEW CRAMP AND KEEPING CAGES

by D.J.Stanyard

Introduction

The recent increase in catching large waders, particularly Curlew Numenius arquata, has high-lighted the problem referred to by British ringers as 'the cramp condition'. Various people have theorised on its possible causes but so far there are no definite conclusions apart from van Heerden's (1977) report. With one Curlew study in progress and further ones planned by west coast groups it is appropriate for the Wader Study Group to discuss the problem and draw on past experiences to set out guidelines for future activities.

Report on two catches of Curlew made by SCAN in autumn 1979 at Aber, Gwynedd, Wales

During August and September this year SCAN (a wader ringing group active in North Wales) made two catches of Curlew - one of 50, the other of 60 birds. On both occasions we operated with a team of eleven persons and expertise varied from six experienced cannon netters in August to ten in September. Both catches were made under similar circumstances. Four nets

were set in clap net pattern (i.e. in adjacent opposing pairs) on a field which had been cut for silage. It was situated near the coast. On both occasions the weather was sunny and warm. Being aware of past problems of Curlew cramp we constructed a high keeping cage (1 m) in which the birds could stand with headroom (details follow later). On both dates we fired over approximately 100 birds. Some escaped because the nets did not extend completely. All the trapped birds were extracted from the nets within 20 minutes of firing and put in the specially contructed cage. When ringing/ processing started about 20% of the birds were found to be sitting down in the cage and these were dealt with first. The majority of these were 'bad-goers' when released. They stumbled and flapped alternately and did not immediately fly off. The problem appeared to be leg cramp. However, with one exception in the first catch and two in the second, all the birds eventually flew off. The recovery time varied from 5 minutes to 1½hours. The remainder of the birds (80% of the catch) stood up and walked about all the time they were in the cage and flew well when released after ringing and processing.

Discussion

It appears that the cramp condition is caused before the birds are placed in keeping cages and may be largely dependent on the length of time the birds are under the net. However, the condition could be brought on later if the birds are placed in low keeping cages, like those usually used for small waders, where they would be unable to stand. Other possible contributory factors have been described (WSG Bulletin 24 page 24).

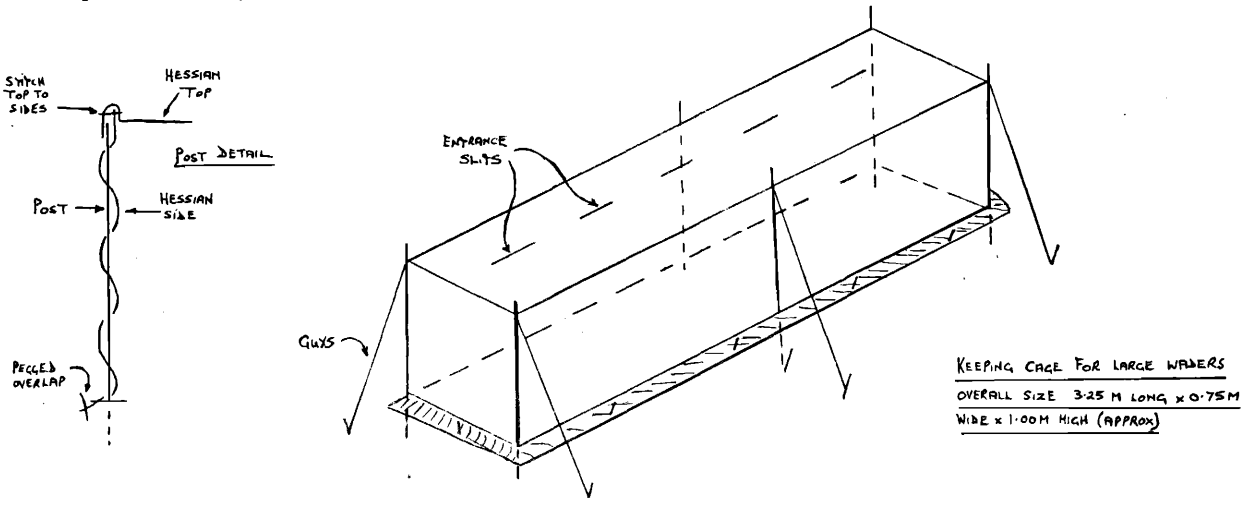
It is interesting to note that the casualty in the first catch had a considerably lower moult score than average for the catch. In the second catch the two casualties were the least advanced in wing moult having primary scores of 23 and 32 compared with the catch average of 44. The fact that these birds were less advanced in moult might indicate poorer condition or merely reflect a late start perhaps following late breeding. That they were casualties may be purely coincidental. Perhaps other ringers have noticed a similar relationship?

Notes on the construction of a SCAN-type keeping cage

In anticipation of a sizeable catch of Curlew and in accordance with WSG recommendations, SCAN made a suitable keeping cage. We later found this to be similar to the one described by Bainbridge in WSG Bulletin 16 but larger. The cage was made from three of the hop-sacks familiar to many British cannon-netters as material for covering a catch (each sack when opened out is a strip of hessian approximately 1 x 4m). Two strips were sewn together end-to-end to form a continuous band of material. This was stretched round four 1m high corner posts (12mm steel or alloy) to form a rectangle 3.25 x 0.75m standing about 1m high. A series of slits were cut in the corners and mid parts of the sides, posts pushed through (see figure) and sewn in position. About 10cm of hessian was left at the top of the sides as attachment for sewing on a roof. Similarly a 10cm flap was left at the base for pegging to the ground. The third piece of sacking was sewn in to form a roof. A number of slits cut in the top formed entrances through which the birds are put. When erecting the cage the hessian is kept as taught as possible and guys attached between the poles and pegs in the ground to give extra rigidity. The bottom flap is pegged to the ground or covered with soil, sand, etc. to reduce the risk of the birds escaping. Two or three people can erect the cage in about 5 minutes and it can house about 75 Curlews or similar sized birds. (note: partitions may help to prevent birds trampling on each other? - Eds.)

Guidelines and recommendations when catching Curlews

1. Speed of operation. Special efforts should be made to remove captured Curlew from either cannon or mist nets as quickly as possible after capture. They should be 'processed' and released as soon as possible.
2. Numbers caught. The speed and efficiency of extracting trapped birds from cannon nets does not necessarily increase proportionately to the number of extractors although obviously an adequate number is essential. Such things as the density of the birds under the net and the number of nets fired determines the number of people who can work efficiently at the same time. We suggest that catches should be limited to about 100. Mist netting many Curlews simultaneously, especially over water, is hazardous because the birds are very heavy. Individual birds drag and tighten the net round other Curlew or smaller waders and may injure them. Even tightly stretched nets may droop into water under the weight of a few birds. Hence if a large catch is a possibility only a few nets should be used and the birds removed immediately after capture. Curlew in wing-moult (especially the outer primaries) tend to become more entangled than birds not in moult and take longer to extract. Extra care is needed to avoid damage to the growing feathers. This should be remembered and taken into account when assessing catch size. Birds caught on short grass become more entangled than on stubble which supports the net above crouching birds.
3. Organisation. In all cases sufficient experienced extractors should be available to take birds from the net rapidly. They should be aware of the dangers of working too close together when excessive pulling on the net by people crowding together may well slow down the operation and injure the birds. All personnel should be aware of the Curlew cramp problem. When cannon netting some people should be allocated the task of erecting the cage by the net immediately after firing while the others are covering the catch with light-weight material to stop the birds flapping and struggling under the net. The simultaneous activities followed by rapid extraction save time and reduce the period for which the birds are in the net. Heavy covering material which may force or encourage the birds to crouch or to push upwards should be avoided. Those curlew which are found sitting down in the keeping cage should be ringed, processed and released first.
4. Treating the cramp condition. When cramped birds are released they should be given time to recover without harassment or chasing them. If they fail to recover various treatments can be tried.



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

Bainbridge, I.P. 1975. Curlew, cramp and keeping cages. WSG Bulletin 16:6-8.

Green, G.H. 1978. Leg paralysis in captured waders. WSG Bulletin 24: 24

Heerden, J.van. 1977. Leg paralysis in birds. Ostrich 48: 118-119

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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.