

RESEARCH ON WADERS AND COASTAL DEVELOPMENT SCHEMES BY THE INSTITUTE OF TERRESTRIAL ECOLOGY

John Goss-Custard

*The Institute of Terrestrial Ecology (ITE) is one of the scientific research establishments run by the UK Government-funded Natural Environment Research Council. John Goss-Custard conducts research on waders for ITE. In recent years he and colleagues have focussed particularly on long-term studies on the ecology and behaviour of Oystercatchers *Haematopus ostralegus* on the Exe estuary in south-west England, whilst based at ITE's Furzebrook Research Station in Dorset. Many of the findings of this work are proving applicable to questions of identifying the impact of the increasing numbers of proposed development projects that currently affect British coasts, and especially estuaries.*

A number of development schemes have been suggested for several estuaries in southern Britain, each of which could affect the waders by either removing or changing their winter feeding grounds. Our task has been to try and predict how each of these developments might affect the numbers of waders, both locally within the estuary itself and in the wider context of the population as a whole. This article summarises the issues arising in each case.

LAND-CLAIM ON THE WASH

The Wash is an enormously important site for migrating and wintering waders of many species on the east coast of England. The mud and sand flats are fringed by green salt marsh which, when converted to agricultural use by building a sea-wall around it and draining it, provides highly productive land. The problem this poses for waders is that a new marsh then develops seawards of the new sea-wall and covers the upper mudflats. However it is believed that the low water mark would remain fixed. This inevitably means that the width of the shore would also be reduced so that the area available for the birds to feed would be reduced. If the process continued, little of the remaining flats would eventually remain.

Our aim is to try and predict how successive land-claims of this kind would, in the long-term, affect the birds. Our approach is to work through the following connected chain of questions:

- how does shore-width affect the substrates?
- how do the substrates affect the abundance of the invertebrates? and, finally,
- how does the abundance of the invertebrates affect the abundance of the birds?

We are fortunate that the width of the shore varies enormously around the Wash, so there is much natural variation to exploit in answering these questions. We are aiming to provide a model whose function will be to predict the numbers of birds of each species that would use a shore of a given width. If we succeed, it should then be possible to simulate the effect of land-claim continuing progressively down the shore.

Mick Yates of ITE Monks Wood Research Station and myself are doing the bird work, while Selwyn McGrorty and Ed Rispin of Furzebrook Research Station are doing the work on invertebrates and sediments. The project ends in September 1988.

A BARRAGE ACROSS THE TAFF

The proposed project here is to construct a barrage across the mouth of the Taff estuary at Cardiff in south Wales. This would create a lagoon around which housing and industrial development could proceed, as part of an inner city restoration. The problem for the waders, of course, is that a permanent lagoon would remove the feeding grounds where significant numbers of Dunlin *Calidris alpina* feed in winter. This could be serious, because the numbers of this species has been declining rapidly in Britain over the last 10-15 years.

We were asked to predict whether the Dunlin and Redshank *Tringa totanus* displaced by the lagoon would be able to settle elsewhere in the Severn estuary, south-west Britain or in Britain as a whole. In part this involved deploying the evidence that competition occurs between birds on the feeding grounds and that this would constrain the numbers of birds that could settle elsewhere. But we were able to go further than this. Mike Moser of the British Trust for Ornithology (BTO) suggested to me that the decline in Dunlin numbers might be linked to the spread of the marsh grass *Spartina* which, by colonising the upper mudflats, could remove feeding areas.

We tested this idea by relating the rate of changes in bird numbers in several dozen British estuaries to the amount by which *Spartina* had changed its abundance over the period. This information on bird numbers was based entirely on the results of the Bird of Estuaries Enquiry (BoEE). The detailed results for Dunlin are to appear in the *Journal of Applied Ecology* in 1988. The main finding was that Dunlin numbers have gone down steeply in estuaries where *Spartina* has spread, but not where it has stayed stable or has never been present. This is significant because it provides evidence that (1) loss of upshore feeding areas in an estuary reduces Dunlin numbers and (2) the displaced Dunlin do not re-establish themselves in other estuaries where *Spartina* has not spread. It also suggests that, if *Spartina* were to be controlled, the decline in the Dunlin population might be checked.

Selwyn McGrorty and myself worked on this project, with much help from Mike Moser at the BTO.

A BARRAGE ACROSS THE SEVERN ESTUARY

Acid rain and the disaster at Chernobyl have certainly increased the interest in the possibility of generating electricity by alternative means. One strong candidate in Britain is to use the energy of the tides to drive generators placed in a barrage built across an estuary. Several estuaries are being considered, notably those of the river Mersey in north-west England and of the river Severn in south-west England and south Wales. ITE is involved in a study of the possible ecological consequences of the latter.

The barrage is planned to work by allowing the tide to pass through gates in the barrage on flood tide. When the tide starts to recede, the gates are shut to allow a head of water to

develop upstream of the barrage as the tide goes out below it. When a sufficient head of water has built up, the water in the basin is allowed to drive the generators and so generate electricity.

The effects on the ecosystem in general, and birds in particular, would be complex. By holding back the receding tide, the barrage would reduce the area of the mudflats available to birds at low tide upstream of the barrage and reduce the time available for them to feed. But there is another side. The Severn estuary is a high energy estuary with unstable mud and sand flats and very turbid water, both conditions that many invertebrates find difficult to deal with. By obstructing the strong tidal currents, the barrage could make the environment more suitable to invertebrates and so increase the density of food available in the reduced areas that remain. There is therefore both a debit and credit side to the effects of the barrage on the waders and it is our job to develop a methodology which will enable us to predict the net effects of these two opposing factors on the birds.

Barry Pearson, Ed Rispin and myself are involved in this project which, also involves scientists from several other institutions.

DRILLING FOR OIL IN POOLE HARBOUR

Drilling for oil in Poole Harbour, Dorset in the south of England is set to increase many fold and there is concern that this might disturb the birds, including waders. We are therefore comparing the behaviour and distribution of birds before, during and after the work is being done, to measure any effect the work has on the birds.

This project is being conducted by Barry Pearson and myself.

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NEW WORLD SECTION

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SOME UNUSUAL OBSERVATIONS OF DUNLINS IN WASHINGTON

Joseph B. Buchanan

Buchanan, J.B. 1987. Some unusual observations of Dunlins in Washington. *Wader Study Group Bulletin* 51: 62-63.

Three unusual observations concerning Dunlins wintering in western Washington are described. These involve retention of breeding plumage, pre-copulatory type mounting, and cavity entering.

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The Dunlin *Calidris alpina* is one of the most intensively studied Calidridine species in the world. Much of the current knowledge of the ecology of this species has been summarized by Cramp and Simmons (1983). In this note I will describe 3 unusual occurrences during winter in western Washington: 1. retention of breeding plumage, 2. precopulatory-type mounting, and 3. cavity entering. To my knowledge, none of these occurrences have been reported for this species in North America during winter.

MOLT

On 18 November 1979, a brightly-coloured individual was observed in a mixed flock of Dunlins and Sanderlings *C. alba* on the outer beach at Leadbetter Point National Wildlife

Refuge (124°05'W, 46°37'N), on the outer coast of Washington state. The belly of this bird was approximately 90% black with only a few scattered white feathers showing, a plumage characteristic typical of an adult in breeding plumage, although juveniles occasionally exhibit this feature (Cramp and Simmons 1983). The plumage of the head and mantle appeared faded, the head predominantly a light rust, and the mantle a dull brown with light buff-rusty feather margins. This aspect of the plumage is typical of juveniles (Prater et al. 1977, Cramp and Simmons 1983) and it seems likely that the bird was a juvenile with an inordinately large black belly patch.

Dunlins of the subspecies *pacifica* molt almost entirely before departure from the Arctic. Adults molt flight feathers beginning in June,