

Human disturbance to waterfowl on estuaries: conservation and coastal management implications of current knowledge

N.C. Davidson & P.I. Rothwell

Davidson, N.C. & Rothwell, P.I. 1993. Disturbance to waterfowl on estuaries: the conservation and coastal management implications of current knowledge. *Wader Study Group Bull.* 68: 97-105.

Current understanding of the patterns of recreational disturbance and its effects on waterfowl are summarised to give guidance for those concerned with recreational management in areas of high wildlife importance. Some implications of a general understanding of waterfowl ecology and population dynamics for researching and assessing human disturbance are described. Common threads about the known extent of effects and impact* of different activities are drawn together. Suggestions are made of some guiding principles for coping with potential recreational and waterfowl demands on estuaries in the future and for some future research needs.

N.C. Davidson, Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough, PE1 1JY, U.K.

P.I. Rothwell, The Royal Society for the Protection of Birds, The Lodge, Sandy, Beds. SG19 2DL, U.K.

INTRODUCTION

Under natural conditions part of a bird's time is spent reacting to danger, for example in the avoidance of predators. The actual behaviour and its duration varies considerably depending on circumstances, e.g. type of predator or location or stage in annual cycle. Responses may involve becoming immobile or crouching down, rushing for cover, or even approaching the predator in a distraction display when defending young. Many anti-predator responses, however, involve taking flight, a particularly costly activity in terms of energy expenditure. Waterfowl, especially on non-breeding grounds, mostly live in open habitats and so generally use flight as a response to being disturbed. Flying is of course also a major natural element of birds' lives but because it uses a lot of energy, the need to fly more (e.g. to escape disturbance) could affect survival.

The energetic costs of flight may be the major impact of disturbance, but this is only part of the issue. The immediate impact of disturbance is to cause birds to fly away. In response they could either (i) increase their energy intake at their present (disturbed) feeding sites when undisturbed, or (ii) move to an alternative feeding site. Any overall reduction in their energy intake as a result of these responses is the impact of disturbance on energy budgets and hence survival.

Interruptions to routines do not come only from natural predators. People doing a wide variety of activities in the same areas as birds have long been considered to

cause disturbance additional to any 'natural' disturbance. Areas of estuarine habitat are diminishing through the squeeze of land-claim coupled in some areas with rising relative sea-levels (Davidson *et al.* 1991; Burd 1992). At the same time increasing demand for recreational facilities on the coast is being focussed into this diminishing resource. Hence there is increasing potential for conflict arising through the overlapping needs of the birds on estuaries and use of estuaries by people for recreational and many other purposes.

Understanding the significance of such recreational disturbance is becoming increasingly important as more emphasis is placed on integrated planning in the coastal zone, for example through the development of estuary management plans. Yet knowledge of patterns of recreational activity and of the effects and impacts of such activity is often patchy and poor. Drawing together recent and new information from throughout Europe on the effects of recreation is intended to help this process (Davidson & Rothwell 1993).

This paper summarises the current understanding of the patterns of recreational disturbance and its effects and impacts on waterfowl to give guidance for those concerned with recreational management in areas of high wildlife importance. First we describe the implications of our general understanding of waterfowl ecology and population dynamics for researching and assessing human disturbance. We then draw together some common threads about the known extent of the effects and impact* of different activities, and suggest