The impact of tourism on coastal breeding waders in western and southern Europe: an overview

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This brief overview is an amended and updated version of a discussion paper that originally appeared as Pienkowski (1984). Since much of its contents remain relevant, and since it was of restricted circulation in its original form, it is reproduced in this volume. The paper summarises the various ways in which human recreational presence on coasts during the summer can affect breeding waders, lists possible protection measures, and outlines topics where further work is needed. In its original form the paper was intended to stimulate workshop discussion of the issues; many of its questions remain largely unanswered.

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INTRODUCTION

Many coastal conservation problems are relevant to waders simply because these birds happen to use areas whose habitat is changed by man. Impacts on breeding birds often arise because tourists are attracted to many areas because of their natural features of which waders may form a major part. Any problem that arises may be less concerned with changes in land use in areas that are of major concern for wintering waders (see e.g. Davidson *et al.* 1991) than with too many people wishing to visit areas as they are, and thereby changing them.

Although there has been some work in this field, much does not appear to be generally available. The main aim of this paper is therefore to draw together some of the current knowledge and to discuss what further work is needed, but it does not attempt a comprehensive review of the subject. Accordingly the paper consists basically of headings which may serve to focus attention on these two general points.

SOME SUGGESTED EFFECTS OF HUMAN PRESENCE

Increased leisure time, wealth, private transport and off-road vehicles have tended to increase the number and frequency of tourist visits to many coastal areas in Europe. Three main related effects on waders have been suggested. These are:

1. Reduction in breeding range e.g. of Ringed Plover *Charadrius hiaticula* (Parslow 1967) and Kentish Plover *C. alexandrinus* (Dybbro 1970). More recently Prater (1989) has noted that most of the remaining breeding population of Ringed Plovers in southern and eastern England are now restricted to areas such as nature reserves that are protected from human disturbance. Proof of such man-induced wide-scale changes are, however, almost impossible to obtain although correlational evidence may be very strong (Hilden 1983).

2. Reduction of breeding density. A review of earlier work, together with new observational and experimental studies (De Roos 1981) has demonstrated a depression, by the presence of tourists, in nesting densities of Oystercatcher *Haematopus ostralegus,* Kentish Plover (see also Schultz & Stock this vol.), Curlew *Numenius arquata*, and Redshank *Tringa totanus* in northern areas of the Netherlands, especially the island of Vlieland.

3. Reduction in breeding productivity. Evidence of this is more difficult to obtain but there is some relevant material. For example, the only simple correlates of nesting success by Ringed Plovers at Lindisfarne National Nature Reserve, north-east England, were distance from public access and frequency of visits by tourists (Pienkowski 1983b).

SOME FORMS OF POTENTIAL IMPACT

The presence of tourists can influence breeding waders in various ways, as set out below.

1. Habitat change. For example, erosion of dune, beach and saltmarsh habitats by people and especially by vehicles.

2. Disturbance: at feeding sites used by adults during laying or incubation; of incubation; or when adults are with young. Unintentional disturbance by tourists of beach-nesting birds is common (e.g. Pienkowski 1984; Buick & Paton 1989; Melvin *et al.* 1991) and may also occur in other habitats. Shelducks *Tadorna tadorna*, for example, nesting in rabbit-burrows in dunes may not return to their nests if people are present in the general area. Males of the same species defend feeding territories on nearby inter-tidal areas to allow rapid uninterrupted feeding by the female, which performs all the incubation. Human presence on these areas can totally prevent feeding, since other territorial birds prevent feeding in other areas (Pienkowski & Evans 1982).

3. Egg collecting. This still occurs despite being illegal, except under special licence, in most countries.

4. Trampling of eggs or young. As most waders rely on the camouflage of their eggs and young as a major element of defence against predators, and as young tend to crouch to avoid detection, accidental trampling is a common feature where there are many human visitors to a nesting area.

5. Introduction of dogs. The presence of dogs accompanying tourists increases many of the effects of human presence. Dogs may use scent-trails for finding nests, as well as chasing young.

6. Attraction of potential predators into the general area. This may occur as a result of easily accessible food such as picnic waste (Melvin *et al.* 1991) or even through the deliberate feeding of species such as gulls.

7. Unwitting aid to predators. The presence of humans can cause increased movement to and from the nest by incubating birds. There are some indications that predators may take advantage of these increased movements to locate nests (e.g. Pienkowski 1984). Under normal circumstances, many waders remain on the nest when avian predators are the sole immediate threat since their body camouflage is effective at concealing the location of the nest. There is also some evidence that the presence of humans in the rearing areas of young Shelducks may indirectly lead to increased depredation of ducklings (Pienkowski & Evans 1982).

These effects on breeding waders are often caused by general holiday-makers at the shore, but can also be caused by birdwatchers or bird-photographers. The effects may differ somewhat according to the behaviour of the people. In addition, frequency of visits and durations of stay appear to be two important elements.

HABITAT TYPES

The extent of likely problems as well as suitable protection measures may differ considerably in the various coastal habitats, as described below.

1. Tidal flats. Tidal flats probably present fewer problems than some of the other coastal habitats because nests do not occur here and the habitat is not greatly used by tourists, especially in the muddier areas. Some public usage does, however, occur, particularly on small coastal areas and sandy parts of the foreshore. In these places there is potential for disturbance to feeding adults and young (see above).

2. Saltmarshes, brackish marshes and salt-pans. Like tidal flats, in many places these areas are not greatly used by the public, but they can attract large numbers of birdwatchers and bird-photographers. All these habitats, even the higher and infrequently inundated tidal marshes, can be important breeding areas for waders (see e.g. Davidson *et al.* 1991).

3. Sand and shingle beaches. Waders breeding in this habitat are under the greatest pressure of disturbance from recreational coastal use (see above).

4. Sand dunes and links. Like beaches, these areas can suffer from being highly attractive in their own right to tourists, as well as often being used for access to adjacent beaches. In addition such areas are very vulnerable to direct habitat damage from erosion induced by visitor pressure.

SOME POSSIBLE PROTECTION MEASURES

Measures designed to protect breeding waders in coastal habitats fall into seven broad categories, as follows.

1. Enforcement of legal measures and public education. The former is mainly of importance in connection with egg-collection. In most areas this is, however, only a minor problem. Public education can also be of benefit in dealing with egg-collecting where it is a problem. It is also valuable in drawing attention to a wider public that birds do nest in the areas in which the tourists are using for recreation.

2. Exclusion of vehicles, dogs, etc. These may be useful measures that can be put into effect without causing major interference to public access. In some areas it may be possible to make provision for limited vehicle access for disabled persons, and for guide-dogs for the blind.

3. Public exclusion from small areas of colonial breeding.

4. Public exclusion from larger areas of dispersed breeding.

5. Redirection of public access. This group of measures is considered together, since exclusion of the public (where necessary) often works better and is more positive if those interested can view the birds concerned, and see the reason for the exclusion. Thus the use of nature trails directing members of the public to only part of a sensitive area have proved useful in many situations.

   Protection of colonially breeding species is obviously somewhat easier than dispersed breeders. Such measures are often used to restrict access to vulnerable breeding seabird colonies where such measures at the same time benefit breeding waders such as Ringed Plovers.

   Many waders present rather different, and often larger, problems as their breeding densities are low and require protection or access restriction on large areas. An interesting situation occurs along parts of the coasts of Germany and the Netherlands where a strip of brackish marshland occurs between a pair of sea-defence dykes. In many places these marshes are important breeding areas for species such as the Avocet *Recurvirostra avosetta* and many parts are designated as nature reserves. Good views of these marshes are available from roads running along the dykes and birds appear to become accustomed to the presence of people on the roads.

   Beaches, and to some extent dunes, are probably the most difficult areas in which to provide effective protection of large areas for dispersed breeding birds since there are high levels of demand for public tourist access to such areas, as well as for those particularly interested in natural history.

6. Compensatory exclusion or destruction of predators. The destruction of nest-predators such as Crows *Corvus corone* has sometimes been justified on the grounds that their populations may have been increased by human activities. This appears to be the case in an attempt to improve the breeding performance of Oystercatchers in Greece (Goutner 1983). The destruction of predators is, however, generally undesirable. Because the eggs of waders often form only a minor part of the diet of such predators (e.g. Pienkowski 1984), protection of the nest may be a more generally appropriate measure. In the case of birds nesting on a peninsula, electric fencing has proved to be an affective technique for preventing access by ground predators (Forster 1975).

7. Habitat manipulation. Habitat manipulation presents another way of enhancing the breeding success of coastal breeding waders. An example comes from Lindisfarne National Nature Reserve in north-east England where recent habitat changes have tended to support earlier views that the nesting density of Ringed Plovers is determined largely by the ease with which predators can find nests (Pienkowski 1983a,b). These studies found that Ringed Plovers nested far more densely in areas where much shingle (which is closely matched by egg camouflage) was present than where the ground was predominantly sand (Pienkowski & Pienkowski 1989). Since the number of breeding Ringed Plovers has decreased in recent years as the covering of sand has increased, the potential may exist for reversing this trend by addition of gravel.

SOME ASPECTS WHERE FURTHER STUDY IS NEEDED

1. Experimental work e.g. on the exclusion of various agents. A great number of features have been identified as possible factors affecting the breeding success of many wader species (e.g. Pienkowski 1983a, Hotker 1991) but there has been rather little experimental testing. If management techniques are to be attempted, a good understanding of the various interacting 'natural' and human-induced processes is desirable to avoid wasted effort.

2. Experimental work on possible management techniques. This can develop from 1 above, to assess the methods that are most economically effective and that cause minimum restrictions on the public (see e.g. Melvin *et al.* 1991).

3. Identification of changes due to 'natural' factors. Further research is needed here to avoid attributing disturbance effects to man, and then trying to overcome them, when other more natural factors are responsible. Several problems can be identified:

   a. many coastal habitats are subject to fairly rapid natural change (e.g. Parslow 1967;

Evans & Pienkowski 1984); and in some cases these are probably being exacerbated by currently rising global sea-levels (e.g. Davidson *et al.* 1991);

b. in Europe many wader species are at the edge of their ranges. This implies that they may rely naturally on immigration from the more central parts of their ranges, so observed changes are not necessarily the result of local processes. Peripheral populations are, however, of great importance since they ensure the maintenance of range and distribution of the species, a keystone of international conservation effort (see e.g. Hotker 1991); and

c. many of the species concerned are migrants, so that processes acting elsewhere outside the breeding season may be affecting their population, for example by loss of wintering habitat (e.g. Goss-Custard & Moser 1988).

4. Identification of sets of habitats required by particular species for breeding. As indicated above, combinations of habitats in close association may be needed for successful breeding by waders. These may include different habitats for feeding by adults, as nest-sites and for rearing the young. Local study is necessary to identify the sets of sites which must be considered as single units. Similarly, the areas that harbour the greatest concentrations of birds may not always be the most productive. For example, a study of Shelducks (Pienkowski & Evans 1982) found that the densest breeding areas appeared to be the least favoured and that these were the least productive of young. Dispersed breeders produced more young, some of which recruited into the dense populations which were probably not self-suppporting. Conservation activity was, however, concentrated at the sites holding densest Shelduck populations, partly because the above situation had not been known but possibly also because concentrations of birds made a more interesting spectacle for members of conservation organisations. A similar situation in which many wet grassland breeding waders in Europe now appear to be breeding with unsustainably low productivity is described by Beintema (1991).

5. Gathering of existing information. One further problem is that some of these studies which have already been undertaken have been funded locally or on a very small scale and have not subsequently been published. One of the objectives of this volume is to collate some of this previously inaccessible information.

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