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Local regional, national and international importance of the wader populations of the Dee Estuary and at Point of Ayr, Clwyd

A report by the
British Trust for Ornithology

to

Nicholas Pearson Associates
on behalf of the
Hamilton Oil Company Ltd

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CONTENTS

List of Tables 4

List of Figures 4

SUMMARY 5

1. INTRODUCTION 7

2. SOURCES OF INFORMATION 8

Dee Estuary 8
Point of Ayr roost 9
Point of Ayr fields 10
Other Dee Estuary grasslands 10
Evaluation criteria 11

3. WADER NUMBERS ON THE DEE ESTUARY 12

4. POINT OF AYR WADER ROOST 15

5. POINT OF AYR FIELDS 18

Other Dee Estuary grasslands 21

ACKNOWLEDGEMENTS 22

REFERENCES 23

TABLES 24

FIGURES 33

LIST OF TABLES

1. Average peak and maximum counts of waders on the Dee estuary in two five year periods: (a) 1981/82-1985/86 and (b) 1986/87-1990/91 24

2. Waders with populations of national and international importance on the Dee Estuary 26

3. Wader numbers at the Point of Ayr, 1998/91 27

4. Waders with populations of national and international importance at the Point of Ayr 29

5. Counts of selected waders at the Point of Ayr and in the Dee Estuary during 1980/81-1984/85 29

6. Percentage of Dee Estuary wader totals occurring at the Point of Ayr 30

7. Use of fields at the Point of Ayr by waders in January-February 1992 31

8. Additional wader counts at the Point of Ayr fields during 1990-92 32

9. Maximum counts of waders in the Point of Ayr fields as percentages of numbers in the Dee estuary and at the Point of Ayr 32

LIST OF FIGURES

1. Dee Estuary 33

2. Point of Ayr fields 34

SUMMARY

1. This report describes the numbers of non-breeding waders using the Dee Estuary on the Welsh/English border and individual parts of the estuary and its adjoining grasslands, especially at the Point of Ayr, Clwyd.

2. The Dee Estuary regularly holds internationally important numbers of nine wader species: oystercatcher, ringed plover, grey plover, knot, dunlin, black-tailed godwit, curlew, redshank and turnstone. A further two species - sanderling and bar-tailed godwit - occur in nationally important numbers.

3. Wader roosts at the Point of Ayr regularly hold internationally important numbers of two species: oystercatcher and knot, with ringed plover and curlew occasionally reaching this level. The latter two species are nationally important, with dunlin, black-tailed godwit and redshank occasionally reaching nationally important levels.

4. The Point of Ayr roost is especially important within the Dee Estuary for oystercatcher, ringed plover, knot, bar-tailed godwit and curlew. For each of these species, the roost attracts at least 50% of the Dee Estuary totals in at least one season of the year.

5. Fields at the Point of Ayr attract numbers of curlew which are close to nationally important levels and are also noteworthy for redshank in a national context. It appears likely that many of the individuals of these two species which use the Point of Ayr roost also use the fields at times. Birds using the fields both feed and roost on them.

6. The fields also attract golden plover and lapwing in numbers which are not nationally important, but which complement the wader totals on the estuary, where these two species are relatively infrequent.

7. An assessment of the relative importance to the wader species of various sections of the fields at the Point of Ayr showed differing preferences between sections. The areas which appear to be most strongly favoured include the fields closest to the Point of Ayr estuary roost but also some further inland. These favoured areas include both those subject to a proposal for the development of a gas and oil terminal and those which would be affected by mitigation measures intended to benefit nature conservation should the development proceed.

8. Information on fields used by waders elsewhere around the Dee Estuary suggests that those at the Point of Ayr form the majority of suitable habitat of this type, but that some others on the Welsh side of the estuary may be of similar value.

9. The conclusions of this study are in some areas tentative. Within the timescale available for its preparation, it has not been possible to assimilate all of the available information, and the amount of information concerning wader use of fields around the estuary, both at the Point of Ayr and elsewhere, is limited.

1 INTRODUCTION

1.1This report describes the results of a study of ornithological data relating to the Point of Ayr, Clwyd, Wales. It was commissioned by Nicholas Pearson Associates on behalf of Hamilton Oil Company Limited, to provide an assessment of the importance of the wader populations of the area in a local, national and international context, in relation to proposals for the development of an gas and oil terminal.

1.2The Point of Ayr lies at the north-western corner of the Dee estuary (Figure 1). It consists of a spit at the eastward end of the Gronant and Talacre Dunes which form the north coast of Wales in this area. Immediately inland of the point there are housing and caravan parks, and behind these are fields of improved or semi-improved grassland which form a major focus of attention of this report. There is also a working colliery situated at the edge of the estuary about 1km south of the point.

1.3The Dee Estuary is large, being some 20km long and up to 9km broad, and measures over 10,000ha in area. The mud and sand flats exposed at low tide contain abundant invertebrates, on which many of the wintering birds feed. In some places, the estuary is bordered by saltmarshes including some at the Point of Ayr which are included within a reserve of the Royal Society for the Protection of Birds (RSPB). Previous studies of the birds of the Dee Estuary include those reported by Buxton (1978), Nature Conservancy Council (1978), Prater (1981), Mitchell (1986) and Mitchell *et al*. (1988).

1.4The objectives of this study concerned two main areas:

(a) the Point of Ayr wader roost; and
(b) the Point of Ayr fields.

1.5For each area, the study sought to evaluate the importance of the non-breeding wader populations using the site in the context of the Dee Estuary and nationally.

1.6The study has been carried out in a very short timescale. As a result, some relevant ornithological information has been acquired too late to be given full consideration within the report and other material may have been missed altogether. These points should be borne in mind when using the report.

2 SOURCES OF INFORMATION

2.1This section of the report describes the sources of data used in making the evaluations and draws attention to the more significant biases resulting from the methods used to obtain the various count data.

Dee Estuary

2.2For the Dee Estuary as a whole, data collected for the Birds of Estuaries Enquiry (BoEE) have been used to prepare a description of its current wader populations. The BoEE is Britain's national monitoring scheme for waders and wildfowl. BoEE counters conduct the simultaneous high water roost counts, on pre-selected dates in the middle of each month, of the numbers of all waders and wildfowl present. Counts for each section within an estuary are then summed to give a total count for that estuary. Further details of BoEE methods are given in Prater (1981).

2.3BoEE counts aim primarily to obtain data for the birds which use the intertidal areas of estuaries. They do not necessarily include birds using nearby freshwater wetlands or grasslands. For this reason, various waders - notably golden plover and lapwing but also in some areas other species including curlew and redshank - may be under-represented when peripheral grasslands are under consideration, as in the present case.

2.4BoEE counts are made at high tide. The distribution of waders at this time is very different from that at low tide when birds are spread out over the extensive intertidal mudflats.

2.5Studies of the low tide distributions of waders in the Dee Estuary have been made in 1975/76 (Buxton 1978) and in 1988/89 (Liverpool Bay Low Tide Counts, data held by BTO). Time has not permitted the assimilation of this information into the report.

2.6In many cases, counts of waders feeding in an estuary match fairly closely the roost counts. Some discrepancies do occur because of the difficulties of counting birds either at low water when they may be very distant or at roosts when they may be closely packed or when some may fly inland to areas which are not counted. A variant on this phenomenon involving the Dee concerns a trend which developed during the 1980s for knot and bar-tailed godwits which feed in the Dee and on the north Wirral shore. These species which formerly roosted in the Dee, now fly about 20km to the Alt estuary on the Lancashire coast to roost. This behaviour may be related to human disturbance at roosts on the Dee estuary (Mitchell *et al*. 1988).

2.7It is standard practice to analyse waterfowl population data by five year periods (Kirby *et al*. 1991). For this study, counts relating to two such periods are presented: (a) for 1981/82-1985/86 and (b) for 1986/87-1990/91. Data are presented separately for autumn (July-October), winter (November-March) and spring (April-June).

2.8Full sets of counts are available for the Dee Estuary for the autumn and winter periods, but no spring counts are available for 1982, 1983, 1984, 1990 and 1991. Thus the data presented in this report are for five year periods except for the spring counts where they are derived from two years' counts in the first period and three years' counts in the second.

2.9For all of the counts in this report, it is important to remember that the total number of birds which occur in a year will be in excess, and sometimes far in excess, of the maximum counts made on a single date. This is because of the turnover of birds using a site such as an estuary in response to migratory behaviour or weather-induced movements. The procedures for analysis of the data followed in this report do not attempt to ascertain total bird use of the estuary or individual sites, but follow standard evaluation methods which as far as possible involve the comparison of comparable sets of data.

Point of Ayr roost

2.10More detailed count data for the Point of Ayr are available from two main sources. First, there is the sectional count information of the BoEE; the Point of Ayr forms one of 22 counting sections of the Dee Estuary. These sections are of varying size and include the whole Dee Estuary and also the north Wirral shore as far east as Mockbeggar Wharf, Wallasey. Unfortunately, the sectional data were not retained centrally by the BTO until recently and it has been possible to obtain copies of the full Point of Ayr counts for only one year (1990/91), prior to the completion of this report.

2.11Mitchell (1986) includes summary data for selected species at the Point of Ayr roost for the years 1979/80-1984/85 covering the months September to March. These have been used to derive averages for winters during the five year period 1980/81-1984/85. Although covering a season (September-March) which does not match the BoEE seasons, Mitchell (1986) forms a valuable source of information on the patterns of wader use on the Dee and particularly at the Point of Ayr.

2.12Regular counts for the Point of Ayr RSPB reserve have been made since July 1988. The area of the reserve is smaller than the Point of Ayr section of the BoEE but generally the majority of roosting waders are found within it. Three years' data have been used for this study: 1988/89, 1989/90 and 1990/91.

2.13Some waders roost on the colliery spoil tip to the south of the reserve (see Figures 1 and 2). These are included within the Point of Ayr BoEE counts but not separated from those on the RSPB reserve. Some data relating specifically to the colliery area are, however, contained in Higginson (1991).

Point of Ayr fields

2.14Higginson (1991) reports the results of a survey during October 1990-March 1991 of wader use of the fields inland of the Point of Ayr. Information is provided for seven separate blocks of land. The results contain references to the maximum numbers of each species using each block and to general but unquantified levels of abundance; they do not contain any systematic count data.

2.15Detailed systematic counts of waders using the Point of Ayr fields have been made in January-February 1992 by Nicholas Pearson Associates (in prep.). Counts were made at half hour intervals on four dates: 22 and 23 January and 5 and 6 February. Eighteen counts were possible between dawn and dusk on each date and the numbers of each wader species were counted in each of over 70 fields. Conditions were markedly different between the January and February counts, the former being cold with ground frost and the latter mild. This ensured a range of conditions, but the sampling period was nevertheless very short. For this study, the data have been grouped for areas similar to those employed by Higginson (1991) but with some variations in extent and two lumped together, and an additional section to the west added. The sections as counted in 1992 are shown in Figure 2.

2.16A small number of additional incidental counts of waders using the fields have been made during winter 1991/92 by the RSPB, and on 18 November 1991 in some fields by Environmental Resources Ltd.

Other Dee Estuary grasslands

2.17Information has been sought on the extent and use by non-breeding waders of other grasslands adjoining the Dee Estuary. The only data which has been traced is contained in Higginson (1991), referring to three areas on the Welsh side of the estuary, south of the Point of Ayr (Figure 2).

Evaluation criteria

2.18Criteria for international importance of wetlands including estuaries have been agreed by the Contracting Parties to the Ramsar Convention on Wetlands of International Importance (Ramsar Convention Bureau 1988, Kirby *et al.* 1991). Under one

criterion, a wetland is considered internationally important if it regularly holds 1% or more of the individuals in a population of one species of waterfowl, while any site regularly holding a total of 20,000 or more waterfowl also qualifies. Britain's waders belong to the east Atlantic flyway population (Smit & Piersma 1989).

2.19 A wetland in Britain is considered nationally important if it regularly holds 1% or more of the estimated British population of one species of waterfowl (Kirby *et al*. 1991).

2.20 The qualifying levels used to determine international and national importance in the present study are those contained in Kirby *et al*. (1991).

3 WADER NUMBERS ON THE DEE ESTUARY

3.1 Table 1 presents summaries of counts of the non-breeding waders for the Dee Estuary for (a) 1981/82-1985/86 and (b) 1986/87-1990/91. Autumn, winter and spring data are shown separately for each period. For each season, average peak and maximum counts are shown. Average peak counts are the mean of the highest counts for each of the five years (except for spring data where fewer counts are available; see paragraph 2.8). Counts which are of at least national importance are shown in bold type.

3.2 Table 2 shows the percentages of the British and east Atlantic flyway populations of the species for which the average peaks reach levels of national or international importance.

3.3 Eleven wader species have regularly achieved levels of national importance in one season or another on The Dee estuary during the most recent five year period (1986/87-1990/91). Nine of these species regularly achieve international importance. The following paragraphs comment briefly on each of these species. For most species, levels of importance in the earlier period (1981/82-1985/86) were similar to those in the later period.

3.4 Oystercatcher numbers are very high throughout the autumn and winter periods. The monthly averages exceed 20,000 from August until February and the population is of international importance throughout this period, with regularly over 3% of the east Atlantic flyway population present. Fewer birds are present in spring but the numbers are still of national importance. The Dee Estuary is one of the top five estuaries in Britain for oystercatcher and only Morecambe Bay supports markedly higher numbers.

3.5 Counts of ringed plover are of most significance during autumn passage. Numbers are typically highest in August with a maximum of 1202 in August 1990 but many are present also in September and October. The autumn totals are of international importance. Numbers are lower during winter and spring, although there is a peak during May which sometimes reaches levels of national importance. The winter population is generally below 200 birds but occasionally rises to levels of national importance.

3.6 Grey plover counts are high from August until March, generally being highest in the mid winter months although there is some variation between years. The autumn and winter averages exceed 5% of the British population and in winter the estuary is internationally important for grey plover populations. Spring totals have been relatively low in recent years, but April counts in 1984 and 1985 revealed about 3% of the British population present. It is not clear why numbers have been lower since then.

3.7 Although some knot from the Dee are known to fly to the Alt to roost (Mitchell *et al*. 1988), numbers on the estuary are still high. Counts are highest in mid winter when they reach over 6% of the east Atlantic flyway population. Relatively few are present in spring but in autumn numbers have already built up to internationally important levels. The Dee ranks about seventh in importance for knot among British estuaries (Kirby *et al*. 1991).

3.8 The largest numbers of sanderling on west coast estuaries generally occur during autumn and especially spring passage but the Dee appears recently to have been less notable in this respect. Numbers in both autumn and winter achieve levels of national importance but recent data show no marked spring peak. The Dee is now among the five most important estuaries for wintering sanderling in Britain, assisted by particularly high levels in 1989/90 and 1990/91. Far larger numbers have been recorded on passage in the past. Prater (1981) reports over 6000 on both autumn and spring passage, totals which are of international importance.

3.9 Dunlin numbers are highest in mid winter, when they are of international importance, but the Dee population is of national importance also in autumn and spring.

3.10 The Dee estuary is about the fifth most important for wintering black-tailed godwit in Britain. Over 15% of the national population is present here during November to February. The total, of over 600 birds, also represents a little over 1% of the east Atlantic flyway population.

3.11 Bar-tailed Godwit numbers on the Dee Estuary are typically not especially high but occasional short-lived peaks in December make the site nationally important.

3.12 The Dee ranks seventh in importance among British estuaries for curlew. Average monthly peaks exceed 2000 for nine months of the year, from July to March, with the highest numbers in August and September when the population is of international importance.

3.13 Redshank numbers on the Dee in recent years have been higher than on any other estuary in Britain. Only in May and June are they not internationally important. The relative importance of the Dee has increased about twofold in terms of both national and international populations between the two five year periods studied. The estuary now supports up to 5.7% of the east Atlantic flyway redshank population and 11.3% of the British population.

3.14 In the earlier of the two five year periods under review, turnstone only occasionally reached national importance levels on the Dee. During 1986/87-1990/91 however, numbers of international importance occurred in autumn and winter, peaking in mid winter. The recent totals have taken the Dee Estuary to about sixth position in the list

of the most important sites (estuaries and open shores) in Britain for which counts of turnstone are available.

3.15 The BoEE data include some counts of lapwing which are of national importance but as mentioned earlier (paragraph 2.3), the estuary counts do not aim to provide accurate totals of the grassland waders in peripheral countryside. The true numbers of this species and of golden plover in the areas surrounding the Dee Estuary are probably considerably higher than the totals in Table 1 suggest.

3.16 Two species occurring in relatively small but nevertheless notable numbers in winter are spotted redshank and greenshank. These two species occur in Britain mainly as passage migrants and few remain in the winter. The recent average peaks of 11 spotted redshank and 6 greenshank exceed 1% of the British wintering populations. However, where 1% of the British wintering population is fewer than 50 birds, 50 is normally used as the qualifying level for national importance (Kirby *et al*. 1991).

3.17 Other species in Table 1 occur on the Dee Estuary in numbers of less than national importance. Some, such as little ringed plover and grey phalarope, are merely occasional vagrants to the area while others such as purple and common sandpipers are noteworthy in the county or regional context.

3.18 The average peak totals for all wader species combined for the Dee Estuary are 57,096 in autumn, 92,132 in winter and 15,625 in spring. These data are for 1986/87-1990/91. Those for the earlier five year period are similar except in autumn when the average peak was lower, at 49,954. The Dee is the sixth most important estuary in Britain for waders recorded by the BoEE.

3.19 The criterion of international importance relating to the overall waterfowl population is that a site should regularly hold at least 20,000 birds. The Dee Estuary clearly does this for waders alone, and it may be noted that the estuary also supports over 25,000 wildfowl in winter (Kirby *et al*. 1991).

4 POINT OF AYR WADER ROOST

4.1 Table 3 lists the average peak and maximum counts of all wader species occurring on the Point of Ayr RSPB reserve or BoEE counting section during three winters, 1988/89-1990/91. The data are presented in the same format as those for the whole Dee Estuary in Table 1 and for the same seasons. The two sets of figures are not strictly comparable, however. Firstly, different periods are involved, with Table 1(b) covering five years and Table 3 three years. Secondly, Table 3 includes counts made outside the synchronised BoEE count dates. The latter will tend to exaggerate peak totals relative to those in the BoEE data alone, since more short term fluctuations of wader numbers will be included.

4.2 Table 4 summarises the wader populations of greatest importance occurring at the Point of Ayr during the three year period.

4.3 Table 5 provides a set of data for the Point of Ayr roost, and for comparison equivalent data for the whole Dee Estuary, for an earlier five year period: 1980/81-1984/85. This information is derived from Mitchell (1986); the counts on which it is based are incomplete for the Point of Ayr in 1981/82 and the Dee in 1983/84.

4.4 The comments in the remaining paragraphs of section 4 refer to the more recent data unless stated otherwise.

4.5 Two species occur regularly in internationally important numbers: oystercatcher in autumn and winter, and knot in winter. In addition, ringed plover and curlew occasionally reach levels of international importance. Oystercatcher regularly achieves levels of national importance in spring, as do ringed plover and curlew in autumn. Maximum counts which exceed the qualifying level for national importance are found in wintering black-tailed godwit, curlew and redshank, and autumn passage dunlin and redshank.

4.6 The data for winters during 1980/81-1984/85 (Table 5) show that more species reached higher levels of importance than in the more recent counts. Black-tailed godwit regularly achieved levels of international importance, and curlew and redshank regularly achieved levels of national importance. Grey plover and dunlin occasionally achieved levels of national importance.

4.7 Although fewer species are of national or international importance at the Point of Ayr than in the whole Dee Estuary, the area nevertheless contributes significantly to the totals of many of the key species. For all waders combined, the Point of Ayr supported 27.6% of the average peak mid-winter numbers (December-February) during 1980/81-1984/85 (average peak counts: Point of Ayr 24,171, Dee Estuary 87,506, data from Mitchell 1986). Prater (1981) describes the Point of Ayr as one of the four major wader roosts in the estuary, and Buxton (1978) lists 13 roost sites in

all, mentioning that they varied in size and species composition between years and that the West Kirby roost was the single largest except in summer.

4.8 Table 6 shows, for the most important species on the estuary, the Point of Ayr average peaks for 1988/89-1990/91 (Table 3) as percentages of the Dee estuary average peaks for 1986/87-1990/91 (Table 1), and the Point of Ayr average peaks for 1980/81-1984/85 as percentages of the Dee estuary average peaks for the same period (Table 5).

4.9 The Point of Ayr roost is especially important for oystercatcher, ringed plover, knot, bar-tailed godwit and curlew. For each of these species, the roost supports over 20% of the Dee total in two or three of the seasons and over 50% in at least one season. Note though the anomalous figure of 109% for autumn bar-tailed godwits; this is a result of the use of data which are not wholly comparable. The proportion of oystercatcher using the Point of Ayr is especially impressive since it involves such large numbers.

4.10 Grey Plover, lapwing, spotted redshank and greenshank have 20% or more of the Dee totals at the Point of Ayr in one of the three seasons. For other species, the roost is relatively less important. Up to 17% of the dunlin can occur at the roost, but of the other species for which the estuary as a whole is nationally important, sanderling, black-tailed godwit, redshank and turnstone are particularly poorly represented at the Point of Ayr, with under 10% present. This does not mean that the Point of Ayr populations are insignificant; reference to Tables 3 and 4 indicates that, in the case of redshank especially, the low percentages are in some cases a reflection of the very large numbers elsewhere on the Dee.

4.11 There have apparently been considerable changes to the proportions of Dee Estuary birds using the Point of Ayr roost since 1980/81-1984/85 (Table 6). There have been more declines in relative roost use than increases. There has been a great increase in importance for knot, but marked declines for several species notably ringed plover, black-tailed godwit and redshank. The causes of these changes are unclear but human disturbance may be implicated in some cases (Buxton 1978, Mitchell 1986, Mitchell *et al*. 1988).

4.12 Although the majority of waders roosting in the Point of Ayr area roost on the shingle/sand spit close to the point itself, some birds use the colliery spoil tip. Count data referring specifically to this site are restricted to a few references in Higginson (1991). The regular occurrence of up to 1000 redshank is mentioned and occasional use by up to 1000 dunlin. These numbers represent, for redshank, 1.3% of the British population (0.8% if the high numbers are during autumn passage) and, for dunlin, 0.2% (or 0.5% on autumn passage). Smaller but unspecified numbers of knot and grey plover also occur.

4.13 The intertidal flats immediately to the east of the colliery tip attract noteworthy concentrations of waders shortly before and after high water. Higginson (1991) mentions the occurrence of up to 2000 oystercatcher (0.7% of the British population) and 600 curlew (also 0.7% of the British population), and smaller numbers of redshank, dunlin and knot.

5 POINT OF AYR FIELDS

5.1Table 7 presents a summary of the data on the use of fields behind the Point of Ayr by four wader species - golden plover, lapwing, curlew and redshank. A more detailed analysis of these data is being prepared by Nicholas Pearson Associates. A brief account of the methods used to collect the information is given in section 2 of this report; it should be remembered that the counts refer to four dates only, in January and February 1992.

5.2For each of the four species, Table 7 shows data for seven separate areas and for the total extent of the fields. The seven areas are sections 2, 3, 4, 5 & 12A combined, 6, 7 and 12B on Figure 2. The table also gives data for a central area within the fields (referred to as 'Centre' on Table 7 and hatched on Figure 2) in which mitigation measures associated with the proposed development would be employed. The areas of each of these land parcels is given, both in hectares and as a percentage of the total area of fields.

5.3For each species, the maximum count in each section is shown in the table. This gives a measure, albeit based on a small sample, of the peak usage of each section.

5.4The table also shows the 'bird/hours' for each section. These figures were calculated by adding the 72 half hour counts for each section and dividing the sum by two. This produces data which are non-parametric, since they are related to the length of time over which the survey was carried out rather than to actual numbers of birds using the fields. The data are, however, valuable in that they provide a measure of the cumulative use of sections, which allows comparison of their relative use by each species. The cumulative measurement is particularly helpful because of the intermittent use of many fields. The relative pattern of field use will be discussed in detail by Nicholas Pearson Associates.

5.5Finally, Table 7 gives the percentages of the means which were recorded as feeding in the fields, rather than simply roosting. The numbers of lapwing feeding in section 3 were not always recorded, and thus the percentage figures for this section and consequently for the total area are lower than the true values.

5.6Table 8 lists the maximum counts, from non-systematic counts made between July 1990 and February 1992, for seven of the sections described in Table 7, but with sections 5 and 12A split. These are used simply as a guide to localities where numbers may at times be significantly higher than suggested by the systematic counts of Table 7. The sources of these data are given in section 2 of this report.

5.7To assess the importance of the numbers of waders present on fields at the Point of Ayr in the context of wider geographical populations, it is considered valid to use the maxima rather than averages in view of the small sample available. Their use may

tend to exaggerate the importance of the area, but there is a high probability that further counts from the fields would reveal that larger numbers used them at times.

5.8 In a national context, the golden plover numbers at the Point of Ayr fields are least significant; the highest recorded count for the whole area (86) represents about 0.04% of the British population. For lapwing, the equivalent figure for the count of 1939 is 0.19%. For redshank and curlew, the counts are more important.

5.9 The highest redshank count, of 350 in section 12B alone, is about 0.47% of the British wintering population. A count of 0.20% has been recorded from section 6. The highest curlew count (810 in section 12B) is about 0.89% of the British population. Counts exceeding 0.1% have been recorded also from sections 2 (0.15%), 3 (0.45%) and 5 (0.13%).

5.10 In considering the importance of the fields in the contexts of the Dee Estuary and the Point of Ayr roost, it becomes increasingly doubtful whether a valid comparison can be made using the existing data. Apart from possible biases resulting from the differing methods of data collection, it is not clear whether or not the birds using the fields form part of the populations included in the BoEE counts or, in the case of the Point of Ayr, the RSPB reserve counts. If some or all of the birds using the fields are not included in the estuary-based counts, then it is not possible to determine the importance of the fields to estuary birds until the extent of interchange is known. It is nevertheless of interest to compare the various sets of data since this can help to make a number of points relating to the wider ornithological community.

5.11 As for the evaluation of the national context, the maxima using the fields have been selected as the basis for comparison. For the Dee Estuary as a whole, comparison is made with the winter average peaks for 1986/87-1990/91 (Table 1). For the Point of Ayr roost, comparison is made with both winter average peaks and winter maxima for 1988/89-1990/91 (Table 3). The results of this comparison are shown in Table 9.

5.12 From the extremely high ratios of the numbers of golden plover and lapwing between the fields and the Point of Ayr, it is safe to infer that the populations of these species using the fields in the main do not form part of the estuary-based counts. This was to be expected since these two species are primarily grassland feeders which relatively seldom occur on intertidal flats.

5.13 For curlew and redshank, the position is less clear. Interchange, notably of roosting curlew, between the RSPB reserve and section 12B of the fields has been observed (RSPB) but it is possible that some of the birds counted on the fields do not form part of the 'estuary populations' at least for some periods or in certain conditions. The high proportions of feeding birds which were using the fields (Table 7) suggests that the area may be a valuable feeding area which could be used either exclusively or for supplementary feeding at high tide. The detailed field use patterns being

analysed by Nicholas Pearson Associates may confirm that both of these strategies were in use at the time of the 1992 survey. If it is assumed that all of the birds on the fields form part of the 'estuary populations', the data suggest that up to 100% of the curlew and up to 57% of the redshank associated with Point of Ayr reserve and roost use the fields on some occasions. It is clear that the fields are a highly important area for roosting or feeding.

5.14 It is clear from comparison of the 'bird/hour' figures for each section (Table 7) that some sections are used by far more birds than others. Taking into account the differing areas of each section (by using the 'bird/hour' figures as a percentage of the total), some general conclusions may be drawn. This is a somewhat simplistic way to analyse the data but, given the limited nature of the sample, it is considered reasonable.

5.15 Golden plover strongly favoured section 6 and to a lesser extent section 5/12A and 12B. The highest density of lapwing use was in section 6, with section 3 and 5/12A also having above average densities. Curlew preferred the southern sections, 2, 4 and especially 3. Redshank very strongly favoured section 12B but also had above average densities in section 6.

5.16 The comments in the previous paragraph relate to the overall use of each section over the four dates of the survey. The importance of each section can be examined also in terms of the peak number occurring within it. The distribution of maxima in Table 7 follow a fairly similar pattern to that of the relative 'bird/hour' use, with two exceptions, as follows. One of the highest curlew counts was from section 12B which had a relatively low level of use overall; and the highest redshank count was in section 6 rather than in the strongly favoured section 12B. Both these high counts, however, were of roosting rather than feeding birds.

5.17 The additional field data, in Table 8, include several counts which are higher than the maxima recorded for the relevant sections during the co-ordinated survey in January-February 1992. The most noteworthy of these refer to section 12B, where the counts of 110 lapwing, 810 curlew and 350 redshank are markedly higher than the maxima shown in Table 7.

5.18 To summarise the assessment of the use of different sections, the available information indicates that sections 7, and to a lesser extent 2 and 4, are relatively little used by waders. The latter two sections are important for curlew but less so than the adjacent section 3 which also attracts fair numbers of lapwing. Section 6 is particularly important, within the context of the area, for golden plover and lapwing, and occasionally redshank. Section 5/12A is important for golden plover and lapwing and also can attract fairly large numbers of curlew. The use of sections 6 and 5/12A are quite similar and consequently the use of the central (mitigation) area (Figure 2), which includes 5/12A and part of 6, is closely similar to the two individual areas.

Section 12B is important, within the context of the area, for all four species and especially for redshank in terms of the level of use and curlew in terms of peak numbers present.

Other Dee Estuary grasslands

5.19 Information is very limited on other areas peripheral to the Dee Estuary which are used by waders. The only material traced in time for the preparation of this report is that contained in Higginson (1991) relating to three areas close to the west side of the estuary. These are shown on Figure 2 as Areas A, B and C.

5.20 Area A is 43.3 ha, in arable use in 1990/91. The only waders noted in this area during October 1990-March 1991 were 2 or 3 lapwing. However, 340 redshank were present in February 1990 when the field was flooded.

5.21 Area B is 65.0 ha, part grazed and part unvegetated in 1990/91. Higginson (1991) reports 'no significant' use of the fields by waders and no counts are given.

5.22 Area C is 45.6 ha of coastal grazing fields. The maximum reported counts of the four wader species are 110 golden plover, 500 lapwing, 200 curlew and 10 redshank.

5.23 With so few counts, it is difficult to give a firm evaluation of the importance of these other grasslands. Their total area is 153.9 ha which is about 60% of the area of the Point of Ayr fields. From present information they appear to attract fewer lapwing and curlew but they can attract more golden plover and redshank than the Point of Ayr fields. The most significant totals in a wider context are those for redshank (almost 0.5% of the British winter population) and curlew (about 0.2% of the British winter population). It is interesting to note that the high redshank count occurred on an arable field during flooding, perhaps indicative of the preference of this species for damper conditions.

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Table 1. Average peak and maximum counts of waders on the Dee estuary in two five-winter periods:

(a) 1981/81-1985/86 (b) 1986/87-1990/91

Data are shown separately for autumn (July-October), winter (November-March) and spring (April-June).

(a) 1981/82-1985/86

	Autumn		Winter		Spring	
	av.peak	max.	av.peak	max.	av.peak	max.
Oystercatcher	**26674**	**37200**	**33659**	**42505**	**4972**	**6362**
Little Ringed Plover	<1	1	0	0	1	2
Ringed Plover	**556**	**1260**	179	**287**	252	**351**
Golden Plover	88	290	393	760	0	0
Grey Plover	**1253**	**1395**	**1593**	**2070**	**686**	**712**
Lapwing	1972	3133	6589	8628	234	283
Knot	**4328**	**6140**	**23858**	**28390**	257	514
Sanderling	**490**	**1180**	**316**	**435**	172	197
Little Stint	2	7	0	0	0	0
Curlew Sandpiper	1	4	0	0	0	0
Purple Sandpiper	9	26	41	50	22	27
Dunlin	**5998**	**11645**	**17242**	**21950**	**5500**	**9285**
Ruff	2	4	1	4	0	0
Jack Snipe	<1	1	4	9	0	0
Snipe	55	110	178	550	3	6
Black-tailed Godwit	39	**131**	**775**	**1290**	18	35
Bar-tailed Godwit	105	238	**825**	**3480**	1	2
Whimbrel	6	15	3	15	1	3
Curlew	**4348**	**6690**	**2941**	**4680**	**1616**	**1730**
Spotted Redshank	10	21	6	17	<1	1
Redshank	**3769**	**5980**	**3830**	**4510**	**2822**	**4370**
Greenshank	31	73	<1	1	<1	1
Green Sandpiper	4	13	<1	1	0	0
Wood Sandpiper	0	0	0	0	0	0
Common Sandpiper	10	30	<1	1	1	2
Turnstone	194	304	257	**890**	241	438
Grey Phalarope	0	0	<1	1	0	0

continued...

Table 1 continued

(b) 1986/87-1990/91

	Autumn		Winter		Spring	
	mean	max.	mean	max.	mean	max.
Oystercatcher	**24598**	**30200**	**29990**	**35774**	**4524**	**7080**
Little Ringed Plover	0	0	0	0	<1	1
Ringed Plover	**695**	**1202**	158	**239**	226	**343**
Golden Plover	151	310	356	915	13	40
Grey Plover	**1198**	**2237**	**1560**	**2004**	73	131
Lapwing	2676	3490	6407	11136	266	412
Knot	**4584**	**16467**	**21158**	**44715**	371	1000
Sanderling	**477**	**811**	**574**	**1011**	255	**680**
Little Stint	4	15	0	0	<1	1
Curlew Sandpiper	9	27	<1	3	0	0
Purple Sandpiper	2	5	32	50	17	29
Dunlin	**8149**	**23127**	**17588**	**24670**	**2447**	**3700**
Ruff	8	25	3	7	1	3
Jack Snipe	<1	3	3	6	0	0
Snipe	62	94	151	288	3	5
Black-tailed Godwit	**464**	**1221**	**911**	**1600**	**52**	**152**
Bar-tailed Godwit	152	82	**725**	**2480**	10	30
Whimbrel	18	43	0	0	5	7
Curlew	**4364**	**5445**	**3125**	**3840**	**1776**	**2460**
Spotted Redshank	19	37	11	20	5	11
Redshank	**8529**	**10310**	**8441**	**9930**	**5112**	**6380**
Greenshank	44	66	6	22	<1	1
Green Sandpiper	6	14	0	0	0	0
Wood Sandpiper	<1	1	0	0	0	0
Common Sandpiper	13	24	0	0	2	5
Turnstone	**862**	**1010**	**925**	**1185**	**459**	**949**

Figures in bold exceed the qualifying levels for national importance.

Table 2. Waders with populations of national and inter-national importance on the Dee Estuary.

The table shows the percentages (where these reach or exceed 1%) of the relevant national (N) or inter-national (I) populations contributed by wader species on the Dee Estuary in autumn, winter and spring in (a) 1981/82-1985/86 and (b) 1986/87-1990/91.

	Period	Autumn		Winter		Spring	
		N	I	N	I	N	I
Oystercatcher	a	9.5	3.0	12.0	3.7	1.8	
	b	8.8	2.7	10.7	3.3	1.6	
Ringed Plover	a	1.9	1.1				
	b	2.3	1.4				
Grey Plover	a	6.0		7.6	1.1	3.3	
	b	5.7		7.4	1.0		
Knot	a	2.0	1.2	10.8	6.8		
	b	2.1	1.3	9.6	6.1		
Sanderling	a	1.6		2.3			
	b	1.6		4.1			
Dunlin	a	3.0		4.0	1.2	2.8	
	b	4.1		4.1	1.3	1.2	
Black-tailed Godwit	a			15.5	1.1		
	b	9.3		18.2	1.3	1.0	
Bar-tailed Godwit	a			1.4			
	b			1.2			
Curlew	a	4.8	1.2	3.2		1.8	
	b	4.8	1.3	3.4		2.0	
Redshank	a	3.1	2.5	5.1	2.6	2.4	1.9
	b	7.1	5.7	11.3	5.6	4.3	3.4
Turnstone	a						
	b	1.9	1.2	2.1	1.3	1.0	

Table 3. Wader numbers at the Point of Ayr, 1988-91.

The table shows the average peak and maximum counts for each species in autumn (July-October), winter (November-March) and spring (April-June).

		Autumn	Winter	Spring
Oystercatcher	av. peak	**14000**	**9600**	**2969**
	maximum	***17000***	***10000***	***3500***
Little Ringed Plover	av.peak	<1	0	0
	maximum	*<1*	*0*	*0*
Ringed Plover	av. peak	**430**	22	100
	maximum	***530***	*25*	*215*
Golden Plover	av. peak	12	26	<1
	maximum	*30*	*32*	*1*
Grey Plover	av. peak	60	86	16
	maximum	*90*	*152*	*23*
Lapwing	av. peak	283	387	61
	maximum	*500*	*570*	*180*
Knot	av. peak	327	**10133**	84
	maximum	*500*	***25000***	*84*
Sanderling	av. peak	7	34	1
	maximum	*10*	*50*	*3*
Little Stint	av. peak	2	0	0
	maximum	*4*	*0*	*0*
Curlew Sandpiper	av. peak	22	1	<1
	maximum	*53*	*3*	*1*
Purple Sandpiper	av.peak	1	<1	0
	maximum	*2*	*1*	*0*
Dunlin	av. peak	1367	2077	223
	maximum	***2500***	*4000*	*520*
Ruff	av. peak	1	0	<1

	maximum	*2*	*0*	*1*

continued...
Table 3 continued

Jack Snipe	av. peak	0	<1	0
	maximum	*0*	*1*	*0*
Snipe	av. peak	2	56	0
	maximum	*7*	*134*	*0*
Woodcock	av.peak	0	1	0
	maximum	*0*	*1*	*0*
Black-tailed Godwit	av. peak	12	25	2
	maximum	*17*	*57*	*4*
Bar-tailed Godwit	av. peak	166	61	3
	maximum	*480*	*150*	*4*
Whimbrel	av. peak	31	0	4
	maximum	*53*	*0*	*9*
Curlew	av. peak	**3300**	780	383
	maximum	***6000***	***1300***	*610*
Spotted Redshank	av. peak	3	1	1
	maximum	*6*	*1*	*2*
Redshank	av. peak	700	617	296
	maximum	***1200***	***1050***	*480*
Greenshank	av. peak	3	<1	1
	maximum	*9*	*1*	*1*
Green Sandpiper	av. peak	0	0	<1
	maximum	*0*	*0*	*1*
Common Sandpiper	av. peak	5	<1	2
	maximum	*6*	*1*	*5*
Turnstone	av. peak	3	<1	0
	maximum	*6*	*1*	*0*

Figures in bold exceed the qualifying levels for national importance.

Table 4. Waders with populations of national or inter-national importance at the Point of Ayr.

Using the data in Table 3, the table shows which species reach levels of international (I) or national (N) importance. When the level has been reached only occasionally, the relevant letter is shown in parentheses.

	Autumn	Winter	Spring
Oystercatcher	I	I	N
Ringed Plover	N(I)	-	-
Knot	-	I	-
Dunlin	(N)	-	-
Black-tailed Godwit	-	(N)	-
Curlew	N(I)	(N)	-
Redshank	(N)	(N)	-

Table 5. Counts of selected waders at the Point of Ayr and in the Dee Estuary during 1980/81-1984/85.

Average peak and maximum counts for winter (November-March) during the five year period are given for each area.

	Point of Ayr		Dee Estuary	
	av.peak	max.	av.peak	max.
Oystercatcher	15300	26000	32799	42046
Ringed Plover	42	122	129	200
Grey Plover	99	215	1496	2070
Knot	3552	10000	21777	28390
Sanderling	35	100	334	435
Dunlin	3680	10000	20741	29725
Black-tailed Godwit	299	1200	795	1290
Bar-tailed Godwit	50	150	1030	3480
Curlew	896	1200	2322	2545
Redshank	836	1300	3575	4495

Table 6. Percentage of Dee Estuary wader totals occurring at the Point of Ayr.

Period (a) involves recent years 1988/89-1990/91
(b) involves 1980/81-1984/85

See text for full derivation of figures.

	Autumn		Winter		Spring
	Period	(a)	(a)	(b)	(a)	
Oystercatcher		57		32	47	66
Ringed Plover	61		14	33		44
Golden Plover	8		7	-		5
Grey Plover		5		6	7	22
Lapwing		11		6	-	23
Knot		7		62	16	23
Sanderling		1		6	11	<1
Dunlin	17		12	17		9
Black-tailed Godwit		3		3	38	4
Bar-tailed Godwit		109		8	5	30
Curlew	76		25	39		22
Spotted Redshank		16		9	-	20
Redshank		8		7	23	4
Greenshank		7		12	-	30
Turnstone		<1		<1	-	0

Table 7.Use of fields at the Point of Ayr by waders in January-February 1992.

See text for full explanation of table.

Section	2	3	4	7	6	5/12A	Centre	12B	Total
Area (ha)	41.8	54.2	23.8	31.8	23.4	31.1	39.9	36.8	242.9
Area as %	*17*	*22*	*10*	*13*	*10*	*13*	*16*	*15*	
Golden Plover									
Maximum	1	1	0	0	75	39	75	47	86
Bird/hours	1	1	0	0	282	169	320	204	656
as % of total	*<1*	*<1*	*0*	*0*	*43*	*26*	*49*	*31*	
% feeding	100	100	-	-	64	79	57	54	65
Lapwing									
Maximum	290	850	5	123	1410	1170	1587	463	1939
Bird/hours	1161	5295	3	595	9509	4453	12506	2262	23276
as % of total	*5*	*23*	*>1*	*3*	*41*	*19*	*54*	*10*	
% feeding	14	42	100	64	69	77	72	60	60
Curlew									
Maximum	138	323	58	10	25	121	129	204	413
Bird/hours	1118	2214	573	36	137	422	636	345	4842
as % of total	*23*	*46*	*12*	*1*	*3*	*9*	*13*	*7*	
% feeding	88	87	99	60	89	93	91	73	88
Redshank									
Maximum	5	3	4	0	150	8	150	119	150
Bird/hours	42	8	16	0	116	17	121	335	532
as % of total	*8*	*1*	*3*	*0*	*22*	*3*	*23*	*63*	
% feeding	78	75	100	-	27	82	30	96	79

Table 8. Additional wader counts at the Point of Ayr fields during 1990-92.

The table shows the maximum count recorded in each of the sections during the period October 1990 to February 1992.

See text for details of sources of data.

Section	2	3	4	6	5	12A	12B
Golden Plover		2		44	25	12	35
Lapwing	20	650	200	400	160	466	1100
Curlew	110	409	118	194	32	49	810
Redshank	1					2	350

Table 9. Maximum counts of waders in the Point of Ayr fields as percentages of numbers in the Dee estuary and at the Point of Ayr.

Column (a) maximum count in Point of Ayr fields
(b) (a) as % of average peak for Dee estuary, 1986/87-1990/91
(c) (a) as % of average peak for Point of Ayr, 1988/89-1990/91
(d) (a) as % of maximum count for Point of Ayr, 1988/89-1990/91

	(a)	(b)	(c)	(d)
Golden Plover	86	24	330	269
Lapwing	1939	30	501	340
Curlew	810	26	104	62
Redshank	350	4	57	33

BTO Research Report No 88

Local regional, national and international importance of the wader populations of the Dee Estuary and at Point of Ayr, Clwyd

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Table 9Maximum counts of waders in the Point of Ayr fields as percentages of numbers in the Dee estuary and at the Point of Ayr.

Column legend should read as follows:

Column (a) maximum count in Point of Ayr fields
(b) (a) as % of average peak for Dee estuary, 1986/87-1990/91
(c) (a) as % of average peak for Point of Ayr, 1988/89-1990/91
(d) (a) as % of maximum count for Point of Ayr, 1988/89-1990/91