A DESK STUDY OF THE AVAILABLE INFORMATION ON WINTERING WATERFOWL FEEDING IN THE WASH, LINCOLNSHIRE AND NORFOLK

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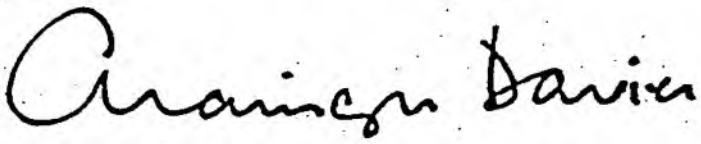
Foreword

This report of the available information on wintering waterfowl feeding in the Wash, Lincolnshire and Norfolk represents part of a much wider overall project in the NRA's Anglian Region.

Over the last three years data has been collected on the flora and birdlife which colonise the coastal defences of the whole Anglian Region. In addition, winter survey work on wildfowl and waders has been carried out on the Lincolnshire coast from Whitton on the Humber estuary to Gibraltar Point. The work was completed in 1990 while the current report aims to identify if the NRA can utilise current data to produce a report meeting the NRA Anglian Region's standards.

This report, following the first report on the Essex estuaries Blackwater, Crouch and Roach is soon to be followed by reports on the Blyth estuary in Suffolk, and of the Colne estuary and Salcott Channel (Essex). Further reports based on surveys carried out by other organisations in the late 1980's will be issued soon, covering the wintering wildfowl and waders of Hamford Water (Essex) and the Stour, Orwell and Deben in Suffolk. In coming years it is anticipated that surveys will be completed on all the major estuarial and coastal systems.

These data form a major operational tool. The information will be used to ensure that wherever the NRA undertakes essential work on flood defences, it does so with a sympathetic understanding of the needs of the wildlife of East Anglia's remarkable coastline.



Grainger Davies
Regional General Manager

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SUMMARY

Ecosurveys Ltd has been commissioned by National Rivers Authority Anglian Region to identify feeding waterfowl studies carried out on the Wash and determine to what extent they meet the Anglian Region standard for such studies: ten low water counts carried out between October and February inclusive, over one or two winters.

The Wash is acknowledged to have high nature conservation importance and carries a number of designations. The majority of the intertidal area comprises a Site of Special Scientific Interest and is designated as a Wetland of International Importance under the Ramsar Convention, and as a Special Protection Area under the EC Birds Directive. A large part of the area also forms a National Nature Reserve, and further areas are managed as reserves by the Royal Society for the Protection of Birds (RSPB) and Lincolnshire Trust for Nature Conservation.

Information on previous studies was first sought from the Institute of Terrestrial Ecology (ITE), English Nature (EN) and RSPB, followed by approaches to all other bodies and individuals suggested by these organisations. All studies identified were examined to determine whether they fulfilled the standard, and if so the availability of the data to the NRA.

Feeding studies of three wildfowl species, Pink-footed Goose, Brent Goose and Shelduck were identified. The two former cover only small areas and are still in progress, but once complete the data would meet the standard and would be available to the NRA. The Shelduck studies are considered below.. There are no low water feeding/distribution data on any other wildfowl.

Three feeding studies on waders, the latter two including also Shelduck, have been carried out by ITE. The earliest study included ten wader species, the two later only seven. In each case only the mudflats were counted and each area was counted only four times, only two of which were within the study period. The saltmarshes were not covered at any time, and the remaining wader species were not included.

Data from the first two studies are available, and were used to produce feeding distribution maps for the species covered. The third study is still in progress, but once completed these data also will be available to the NRA.

A further two studies examined passerine distribution. Wintering Twite were counted over two winters, as part of the Birds of Estuaries Enquiry, and a detailed study of passerines was carried out by the RSPB. These data would be available for a commercial fee.

It is concluded that for no species does the available data fully meet the NRA standard, and for most wildfowl, some waders and the saltmarsh areas there is no feeding information available at all.

To carry out a complete survey of the Wash, included mudflats and saltmarshes, twice each month for five winter months, would require some 410 man days of fieldwork.

A DESK STUDY OF THE AVAILABLE INFORMATION ON WINTERING WATERFOWL FEEDING IN THE WASH, LINCOLNSHIRE AND NORFOLK

1 INTRODUCTION

During the winter of 1989-90, Ecosurveys Ltd was commissioned by the National Rivers Authority (NRA) Anglian Region to undertake a survey of the coast of South Humberside and Lincolnshire from Whitton Ness south to Gibraltar Point (Steeping outfall) to identify the feeding areas of wintering waders and wildfowl. The data report on this survey was completed in March 1990, and the full four volume report was delivered in December 1990.

During the winter of 1991-92, a similar survey was carried out on the estuaries of the rivers Blackwater, Crouch and Roach in Essex. The data report on this survey was completed in March 1992 and the final draft of the extended report was delivered in October 1992.

During the winter of 1992-93 similar studies were commissioned on the estuaries of the Colne (Essex) and Blythe (Suffolk), whilst low water waterfowl counts previously carried out on the estuaries of the Deben and Orwell (Suffolk), Stour (Suffolk/Essex) and on Hamford Water (Essex) were re-analysed to convert the data to a standard format. This conversion was possible since in each case at least two low-water counts had been carried out each month between October and February within the previous five years. Waders and wildfowl on other areas of the Anglian Region coast had been counted and mapped at low water much less frequently, if at all. This report describes the results of a desk study to identify feeding waterfowl studies already carried out on the Wash (Lincolnshire/Norfolk), and to cost further work required to bring the available information to the standard established for other areas of the NRA Anglian Region coast. (See Appendix 1.)

2 BACKGROUND

2.1 IMPORTANCE OF THE WASH TO WADERS AND WILDFOWL

The importance of the Wash lies in the relationship between the intertidal habitats, that is the saltmarsh and mudflats, with their invertebrate animals and plant life which provide food for large numbers of breeding and wintering birds. (Doody, 1987).

Between August and the following May the Wash supports tens of thousands of waders and wildfowl. Some stay throughout the whole period while others move through the area on passage during autumn and spring. Although some of these birds summer or breed around the Wash, the majority leave to breed elsewhere. Counts of birds within the whole Wash area made for the Birds of Estuaries Enquiry (BoEE) during the winter, reveal the national and international importance of the Wash to waders and wildfowl. The mean peak counts for each species made between 1982 and 1987 are given in Appendix 2. Scientific names of species referred to in the text are given in Appendix 3.

2.2 PROTECTED AREAS WITHIN THE WASH

Due to the importance of the Wash area for wintering waders and wildfowl, and also breeding birds, on both a national and international scale, the whole area has been given several nature conservation designations.

The majority of the Wash area is a Site of Special Scientific Interest (SSSI). This SSSI, covering some 66,000 hectares, was first notified in 1972 under the National Parks and Access to the Countryside Act 1949.

Also, a large section of the Wash (some 9,899 hectares) was designated as the Wash National Nature Reserve in 1992 under the Wildlife and Countryside Act 1981.

The Wash is also designated as a 'Wetland of International Importance' or Ramsar Site under the Ramsar Convention of 1971 which aims to ensure that such sites are adequately conserved, and as a Special Protection Area under the E.C. 'Birds Directive' (EC 79/409), which aims to protect the most important areas for birds in Europe. Both these international designations took effect on 31 March 1988.

On a local scale the Wash has two RSPB reserves, at Snettisham in Norfolk and Frampton Marsh in Lincolnshire, and a further area of Frampton Marsh is managed by the Lincolnshire Trust for Nature Conservation, which means that these areas have protection from agricultural, industrial or tourist developments.

2.3 THREATS TO THE WASH ENVIRONMENT

Ever since the Roman times the Wash, as a natural resource, has been under threat from land claim for agriculture and in the region of 32,000 hectares of the original saltmarsh having been 'reclaimed' up to 1987. (Doody, 1987). Other threats, such as from reservoir plans, industrial plants, wind farms, barrage schemes and further land claim have been raised from time to time and similar plans will probably be placing pressure on the Wash environment for the foreseeable future.

3 METHOD

The study area covers the mudflats and saltmarshes of the Wash, between Wainfleet Haven, Lincolnshire and Heacham, Norfolk. (See Map 1.)

Information on all recent work on the feeding areas of wintering waterfowl within the Wash was sought in the first instance from organisations such as the Institute of Terrestrial Ecology (ITE), English Nature (EN) and the Royal Society for the Protection of Birds (RSPB). Other bodies, and individuals suggested by these contacts were also then contacted.

Information sought was the scope of each previous survey, whether it met the requirements of the NRA's previously commissioned work, who owned the data, its likely availability, and if available, the probable cost.

4 RESULTS

Results of all contacts made are documented in Appendix 4. Other references consulted are listed in section 6.

4.1 WILDFOWL

Species of wildfowl on which feeding counts have been carried out during the winter months are Pink-footed Geese, Brent Geese and Shelduck.

4.1.1 PINK-FOOTED GEESE

Since 1992, weekly roost/feeding counts of Pink-footed Geese have been made in the Snettisham area of Norfolk as part of a University of East Anglia research study. No data are available at present, but when available they would meet the NRA standard for the relatively small area surveyed.

4.1.2 BRENT GEESE

There have been two studies upon feeding Brent Geese for which counts have been made on a regular basis; the first was commissioned by English Nature and the second forms part of the BoEE counts. The BoEE is described in Appendix 5.

The first of these studies involved Kirton Marsh, Holbeach Marsh and Holbeach Range, all in Lincolnshire, where feeding Brent Geese have been counted every two weeks from October to May over the last three years (1990-1993). These data will not be available until they have been incorporated into an EN report and published. The data, when available, would meet the NRA standard for the areas covered.

The second study involved the area from the north side of the River Welland mouth northwards to Gibraltar Point where feeding Brent Geese have been counted monthly from October to December over the last seven years. These data, as part of the BoEE counts, have been sent to the Wildfowl and Wetlands Trust at Slimbridge, Gloucestershire, and are available for a commercial fee. These data would meet also the NRA standard for the areas covered.

4.1.3 SHELDUCK

Shelduck were surveyed by the Institute of Terrestrial Ecology across the mud flats of the Wash inter-tidal zone as part of their 1985-1987 study, described in Appendix 6. The Wash was divided into 70 sub-transects had a seasonal count made in Autumn, Winter and then Spring the following year.

Shelduck numbers and distribution are given in Appendix 7 and shown on maps 18 and 19.

Unfortunately, since the Shelduck were only counted on a seasonal basis for each sub-transect they do not meet the NRA standard of monthly counts over two winters or twice-monthly counts over one winter period.

Breeding Shelducks within the Wash area have also been surveyed since 1990 as part of the National Shelduck Survey, organised by the Wildfowl and Wetlands Trust, which entailed feeding counts but only during the spring and summer months. The data from this survey are available from the Wildfowl and Wetlands Trust, Slimbridge, at their normal commercial fee rate. However, the data do not meet the NRA standard because the survey was conducted during the spring and summer months.

4.2 WADERS

Three relevant studies have been identified which entailed surveys of feeding waders within the Wash. All three were undertaken by the Institute of Terrestrial Ecology.

4.2.1 ITE STUDY: FRESH-WATER RESERVOIR FEASIBILITY STUDY (1972-74)

The first study aimed to describe the distribution and diet of wading birds on their intertidal feeding ground on the Wash. The results were used to estimate the numbers of birds that would be directly affected by possible fresh-water reservoir construction on the east or south shore of the Wash. The survey was commissioned by the then Water Resources Board in 1982. The ten most numerous wading birds on the Wash were targeted as follows: Oystercatcher, Knot, Dunlin, Redshank, Curlew, Bar-tailed Godwit, Grey Plover, Turnstone, Ringed Plover and Sanderling.

Surveys of the feeding grounds were made between August and May (1972/73 and 1973/74) when the greatest numbers of waders were present. The intertidal feeding areas were sub-divided into a large number of regions on the basis of topographical features, the level of the shore and the nature of the substrate. The numbers of each species of wading bird in each region was counted directly whenever possible, but in most places only a rough estimate of numbers could be obtained.

During the two survey seasons most of the intertidal flats were surveyed at least twice. All the inner shore, where most of the birds fed, was surveyed six times. The section between Wolferton Creek and the River Nene, where all the proposed alternative reservoir schemes were situated, was surveyed, where possible, at three-weekly intervals. (Goss-Custard, Jones and Newbury, 1977).

Due to the nature of the survey methods employed for this study and especially as only a few small sections between Wolferton Creek and the River Nene were surveyed on a regular basis, the results of this study do not meet the standard as required by the NRA.

4.2.2 ITE STUDY: EFFECT OF LAND-CLAIM ON FEEDING WADERS AND SHELDUCK (1985-87)

This study is part of that detailed earlier within the Shelduck section and described in Appendix 6. Seven species of waders, Dunlin, Redshank, Knot, Grey Plover, Bar-tailed Godwit, Oystercatcher and Curlew were surveyed as part of this study.

The numbers of species counted and their distribution within the subtransects are given in Appendix 7 and shown in maps 2 to 17.

4.2.3 ITE STUDY: BIRD DISTRIBUTION AND SEDIMENTS WITHIN THE WASH (1990-92)

This new study commissioned by the Department of the Environment involved further survey work upon the 7 wader species as above and Shelduck. It is looking at the relationship between bird distribution and sediments within the Wash and hopes to refine the mathematical models created in the above study. It is anticipated that a 2 - volume report will be available from ITE by the end of 1993.

Since the study (survey work undertaken during 1990 and 1991/92) uses the same bird survey methods as in the last ITE study then the data available would not meet the NRA standard required.

4.3 PASSERINES

Although this desk study deals mainly with waterfowl, passerines, predominantly Twite, have also been surveyed along the Wash coastline in some detail.

4.3.1 BIRDS OF ESTUARIES ENQUIRY DATA (1972-74)

As part of the Wash Feasibility Study a Wash Wintering Twite Population Study was set up by the Ornithological Working Group, and this included regular counts (Wash Feasibility Study, 1974). Between October 1972 and March 1974 Twite were added to the list of birds to be counted for the Birds of Estuaries Enquiry. At twenty approximately even spaced places around the Wash Twite were counted each month at high tide from October 1972 to March 1974. The results, as totals for the whole of the Wash, are given within Appendix 8.

4.3.2 RSPB WASH PASSERINE STUDY (1985-87)

During the winters of 1985/86 and 1986/87 the RSPB undertook surveys of the passerines using the Wash saltmarshes. These surveys attempted to update and extend the knowledge of the numbers, distribution, habitat preferences and origins of passerines using the Wash.

To survey the passerines the Wash was divided into 70 parallel transects, from the sea wall to the seaward edge of the green marsh, each 1km apart and at right angles to an imaginary baseline drawn behind the sea wall. All passerines were counted in each 100m length of transect, and a total population estimate was made by multiplying the sum of all transect counts by 10. Population estimates for the five most commonly recorded species, Skylark, Twite, Reed Bunting, Rock Pipit and Lapland Bunting, are given in Appendix 8. The raw data gathered are available from the research department at the RSPB, The Lodge, Sandy, Bedfordshire, for which a commercial fee would be charged.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

Feeding counts exist for three wildfowl species, Pink-footed Goose, Brent Goose, and Shelduck. The counts made on Pink-footed Geese at Snettisham would meet the NRA standard. The data for Brent Geese recorded on the south-west and west coasts of the Wash reach the standard required by the NRA also. For Shelduck, the ITE study (1985-87) provides some useful data, but each subtransect only had seasonal feeding counts taken over one year which does not meet the NRA standard.

No information on feeding distribution exists for any other species of wildfowl, several of which, for example Wigeon, Teal, Mallard and Pintail winter in large numbers.

Feeding counts of waders have been fairly well covered by the various ITE studies but only seasonal counts were made and only the mudflats were studied. The adjacent saltmarshes which would also hold feeding waders such as Redshank and Curlew were not counted.

For passerines, some useful data has been collected but both the Ornithological Working Group and the RSPB studies did not meet the NRA standard because of size of survey transects (too large) and frequency of counts (too few) respectively.

5.2 RECOMMENDATIONS

To bring the available information, located by this desk study, to the standard already established for the NRA Anglian Region coast a substantial amount of winter fieldwork would be needed.

The work carried out by ITE covered some feeding waterfowl on the mudflats but additional survey work would be needed on a more frequent basis and also further species need to be targeted. These species would be Wigeon, Mallard, Teal, Pintail, Sanderling, Turnstone and Ringed Plover.

The saltmarsh areas of the Wash also need to be surveyed for feeding waterfowl.

In carrying out these additional surveys of waterfowl feeding on the mudflats and saltmarshes of the Wash, passerines could also be recorded to complement the surveys undertaken by the Ornithological Working Group (Wash Feasibility Study) and the RSPB.

5.2.1 SURVEY METHODS AND TIME ESTIMATES

The Wash coastline, along the sea wall from Wainfleet Haven to Heacham, is approximately 68.5km long.

To undertake a survey of the Wash, in accordance with the NRA standard, the mudflats/sandflats and saltmarsh areas would need to be divided into transects of approximately 2km in length measured along the seawall.

Separate surveys would need to be conducted upon the mudflats/sandflats and then the saltmarsh areas either during the same winter period or the following winter.

The 70 subtransects, as used by ITE would be used, and surveyed for targeted species either once a month from October to February over two winters or twice a month over one winter. Where it is not possible to count species upon an entire transect then numbers could be estimated from those which are seen.

It is estimated that 33 man-days per survey would be needed to survey the mudflats and sandflat areas, and a further 8 man-days per survey for surveying the saltmarsh areas, giving a total of 41 man-days per survey. As ten survey visits would be needed to obtain the data required to meet the NRA standard then 410 man-days should be allocated to undertake all the fieldwork.

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APPENDICES

APPENDIX 1

SURVEY METHOD USED BY ECOSURVEYS LTD WHICH MEETS THE NRA (ANGLIAN REGION) STANDARD

For estuaries surveyed along the Essex coast the estuaries were divided in ECWW (Essex Coast Wintering Waterfowl) sections, each generally consisting of four ECOA (Essex Coast) sections, as used in the NRA Anglian Region study of the Essex coast. Since each ECOA section is 500m long, most ECWW sections are 2km long; however in order to form ecologically sensible units at the heads or mouths of creeks or estuaries, a few ECWW sections comprise 3 or 5 ECOA sections.

Since all ECOA sections, and therefore ECWW sections, are measured along the sea wall, the presence of creeks, bays, headlands and saltmarshes lead to considerable variations in the intertidal area covered a defined by lines drawn perpendicularly out from the sea wall at each end of the unit to the low water mark. The direction of these lines has occasionally been adjusted slightly to provide ecologically sensible units. In addition, where birds were clearly using both shores of narrow creeks as a single unit, the ECWW section spanned the whole creek.

Each ECWW section was visited once in each fortnightly tidal cycle between the beginning of October and the end of February, a total of 10 visits to each section. All fieldwork was carried out during the period $\pm$ 2 hours of predicted low water. Dates for counts in different sections are given in appendix 3.

On each visit the surveyor noted the position, species, number and activity of all target species within the intertidal area on a 1:10,000 scale map of the section, a fresh map being used for each visit. Standard BTO species codes were used to record species, flocks being indicated by a line enclosing the area occupied by the flock. Loose, scattered flocks were indicated by a dashed line. Where at least one third of the flock were actively feeding, no activity code was used. Other activities were donated by a code letter after the count total as follows:

R: roosting (ie with head tucked under wing)
L: loafing
P: preening
B: bathing

Birds or flocks seen to move between ECWW section were indicated with an arrow. Time of the movement, and reason if this was obvious (eg 'chased by dog', moved up by tide' etc) were also noted.

On each map the observer's name, the date, start and finish times, brief weather note, any visible source of disturbance and the actual positions of the water line were also recorded.

APPENDIX 2

AVERAGE MAXIMUM COUNTS OF WILDFOWL AND WADERS IN THE WASH INTERTIDAL ZONE 1982-87. AND QUALIFYING POPULATION LEVELS FOR NATIONAL AND INTERNATIONAL IMPORTANCE

SPECIES	AVERAGE MAX. COUNTS	NATIONAL	INTERNATIONAL
Pink-footed Goose	6,362 **	1,100	1,100
Dark-bellied Brent Goose	19,465 **	900	1,700
Shelduck	19,111 **	750	2,500
Mallard	4,282	5,000	50,000
Pintail	2,980 **	250	700
Oystercatcher	25,000 **	2,800	9,000
Ringed Plover	1,022 **	300	500
Grey Plover	4,191 **	210	1,500
Knot	88,102 **	2,200	3,500
Sanderling	469 *	140	1,000
Dunlin	34,525 **	4,300	14,000
Bar-tailed Godwit	8,593 **	610	1,000
Curlew	3,691 **	910	3,500
Redshank	3,906 **	750	1,500
Turnstone	970 **	450	700

Reference for average maximum counts: Grimett & Jones, 1989.
Reference for qualifying levels for national and international importance: Stroud & Glue, 1991.

* National importance (>1% of British population)
** International importance (>1% of world population)

APPENDIX 3

SCIENTIFIC NAMES OF SPECIES MENTIONED IN TEXT

English Name	Scientific Name
Pink-footed Goose	*Anser brachyrhynchus*
Brent Goose	*Branta bernicla*
Shelduck	*Tadorna tadorna*
Wigeon	*Anas penelope*
Teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Pintail	*Anas acuta*
Oystercatcher	*Haematopus ostralegus*
Ringed Plover	*Charadrius hiaticula*
Grey Plover	*Pluvialis squatarola*
Knot	*Calidris canutus*
Sanderling	*Calidris alba*
Dunlin	*Calidris alpina*
Bar-tailed Godwit	*Limosa lapponica*
Curlew	*Numenius arquata*
Redshank	*Tringa totanus*
Turnstone	*Arenaria interpres*
Skylark	*Alauda arvensis*
Rock Pipit	*Anthus petrosus*
Twite	*Carduelis falvirostis*
Lapland Bunting	*Calcarius lapponicus*
Reed Bunting	*Emberiza schoeniclus*

APPENDIX 4

INDIVIDUALS AND ORGANISATIONS CONTACTED:

1 NAME: Martin Davies (RSPB Conservation Officer).
ADDRESS: RSPB (East Midlands Office),
The Lawn, Union Road, Lincoln LN1 3BU
TEL NO: (0522) 535596
DATE: 11.1.93/20.01.93/22.01.93
PURPOSE OF
CONTACT: To identify what RSPB low-water surveys had been done. He mentioned the local RSPB Warden - Paul Fisher, and the RSPB Regional Reserves Officer - Richard Powell, who could possibly have more information. Also mentioned recent RSPB "Estuary Inventory Project" which is recording the land uses of estuary coastal areas, which may of interest in the future. Also, some data on passerine numbers, especially Twite, using the Wash area is available from the RSPB at their normal commercial fee rate.
OUTCOME: No data of low-water feeding surveys available. Follow-up contacts and possibility of obtaining the passerine data.

2 NAME: Paul Fisher (RSPB Warden for Snettisham and Frampton Marsh)
ADDRESS: 13 Beach Road,
Snettisham, Kings Lynn, Norfolk.
TEL NO: (0485) 542689
DATE: 11.1.93
PURPOSE OF
CONTACT: Possibility of low-water feeding counts. Whole reserve was one survey unit for the Birds of Estuaries Enquiry (BOEE) wader and wildfowl counts.
OUTCOME: Only roost counts taken for BOEE, so no suitable data available.

3 NAME: Richard Powell (RSPB Regional Reserves Officer)
ADDRESS: RSPB (East Anglia)
97 Yarmouth Road, Thorpe St.Andrew, Norwich. NR7 0HF
TEL NO: (0603) 700880
DATE: 11.1.93
PURPOSE OF
CONTACT: Possibility of low-water feeding count surveys done in the Wash area by RSPB. Mentioned 5-yearly counts made - data given to ITE, also spot-counts on birds such as Redshank, Twite and Knot.
OUTCOME: No suitable data available from this source. Contact ITE.

4 NAME: Simon Delany (Special Surveys Officer)
ADDRESS: Wildfowl and Wetlands Trust,
Slimbridge, Gloucester, GL2 7BT
TEL NO: (0453) 890333
DATE: 11.1.93
PURPOSE OF
CONTACT: To find out about the national Shelduck survey. Feeding counts have been made in the Wash area, but only in May and July (1990-92). The Wash was divided into 3 sections for the survey. A commercial rate fee would be charged for the data.
OUTCOME: The Shelduck data is of little use since it was recorded during the summer.

5 NAME: Richard Heath (Brent Goose counter for English Nature (EN))
ADDRESS: 56 Pennytoft Lane,
Pinchbeck, Spalding, Lincs. PE11 3PQ
TEL NO: (0775) 767055
DATE: 11.1.93
PURPOSE OF
CONTACT: He has been making feeding counts of Brent Geese on saltmarshes over the last 3 years (every 2 weeks between October and May) on Kirton Marsh, Holbeach Marsh, and Holbeach Range all in Lincolnshire.
OUTCOME: Data not available until the Wash SSSI warden, Bob Lord, has incorporated it into an EN report.

6 NAME: John Walker (Brent Goose counter for EN & Wildfowl & Wetlands Trust)
ADDRESS:
TEL NO: (0507) 338038
DATE: 12.1.93
PURPOSE OF
CONTACT: Where and when he has been doing Brent Goose counts. Over the past 7/8 years he has carried out monthly feeding counts from September to March of Brent (also ageing them) from suitable viewing points up from the Welland Mouth to Gibraltar Point for the Birds of Estuaries Enquiry.
OUTCOME: Data available from Wildfowl & Wetlands Trust, with a commercial rate fee.

7 NAME: Carl Hawke (Gibraltar Point National Nature Reserve Warden)
ADDRESS: Gibraltar Point Field Station,
Skegness, Lincs. PE24 4SU
TEL NO: (0754) 762677
DATE: 12.1.93
PURPOSE OF
CONTACT: To see if any low-water feeding counts have been done in the Wainfleet Haven area. Only high-tide counts undertaken every day. He mentioned that Oystercatchers have been found dying recently.
OUTCOME: No suitable data available.

8 NAME: Bob Lord (EN Warden for The Wash)
ADDRESS: Marsh Cottage, Marsh Road,
Kirton, Boston, Lincs. PE20 1LY
TEL NO: (0205) 722411
DATE: 12.1.93
PURPOSE OF
CONTACT: To see if any low-water feeding counts have been done in the Wash area. He said that Mike Yates at ITE should be contacted. Also, he mentioned that Richard Heath had surveyed feeding Brent Geese, but data not available yet.
OUTCOME: Brent Goose data from Richard Heath available when it has been incorporated into an EN report. Contact Mike Yates.

9 NAME: University of East Anglia
ADDRESS: Department of Environmental Sciences,
U.E.A., Norwich, Norfolk.
TEL NO: (0603) 56161
DATE: 12.1.93
PURPOSE OF
CONTACT: Do they know of any research studies done in the Wash area involving feeding counts? They mentioned Jenny Gill at Snettisham, who is studying Pink-footed Geese.
OUTCOME: Contact Jenny Gill.

10 NAME: Jenny Gill (University of East Anglia Research Scientist)
ADDRESS: Snettisham Field Study Centre, Snettisham, Norfolk.
TEL NO: (0485) 210364
DATE: 12.1.93
PURPOSE OF
CONTACT: To find out what sort of research she is doing, and does it involve feeding counts. She is in her 3rd year of a 3-year study on Pink-footed Geese. Only weekly roost/feeding counts are taken at Snettisham.
OUTCOME: No data available at present which is suitable.

11 NAME: Mike Yates (ITE Scientist)
ADDRESS: Institute of Terrestrial Ecology,
Monks Wood Experimental Station, Abbots Ripton, Huntingdon, PE17 2LS
TEL NO: 048 73 381
DATE: 13.1.93 and 5.2.93
PURPOSE OF CONTACT: To see if any more data exists which is not within the ITE/DOE Report 'Wash Birds and Invertebrates'. Basically, he said all the data is within that report. A further survey was undertaken in November/December 1989/90/91 by ITE, which looks at bird distribution in relation to sediments in the Wash. This will probably be available near the end of 1993 once the DOE have accepted it. It is in 2 volumes and aims to refine the mathematical model created in the first report. The second call concerned survey work carried out by John Goss-custard (ITE) between 1972 and 74 looking at distribution and diet of wading birds in relation to a proposed water storage scheme.
OUTCOME: Use the data from the first report. Possibly obtain the second report later this year.

12 NAME: English Nature (Ornithological Section)
ADDRESS: Northminster House, Peterborough, PE1 1UA
TEL NO: (0733) 340345
DATE: 13.1.93
PURPOSE OF CONTACT: To see if any suitable data has been sent to them. They mentioned a contact with Mike Yates at ITE.
OUTCOME: No suitable data available. Contact Mike Yates.

13 NAME: Roger Ferguson (NRA Enforcement Officer and member of South Lincolnshire Wildfowlers Association).
ADDRESS: NRA, Aqua House Harvey Street, Lincoln, LN1 1TF
TEL NO: (0522) 513100
DATE: 13.1.93
PURPOSE OF CONTACT: To find if any members of South Lincolnshire. Wildfowlers Association have made any personal records of feeding birds. He mentioned that Alan Heath may have made some records.
OUTCOME: No suitable data available from this source; also, unable to trace Alan Heath.

14 NAME: Eva Lek (Joint Nature Conservation Committee (JNCC) ornithologist).
ADDRESS: JNCC, Monkstone House, City Road, Peterborough, PE1 1JY.
TEL NO: (0733) 62626
DATE: 20.01.93
PURPOSE OF CONTACT: To find out about a document entitled 'The Wash and its environment' and if it contained any relevant data or information.
OUTCOME: The document sounded very useful and a copy was ordered.

APPENDIX 5

BIRDS OF ESTUARIES ENQUIRY (BoEE)

The Birds of Estuaries Enquiry (BoEE) is co-sponsored by the British Trust for Ornithology (BTO), Joint Nature Conservation Committee, Royal Society for the Protection of Birds (RSPB) and Department of the Environment for Northern Island. It is organised by staff of the BTO Estuaries Unit, based at Thetford, Norfolk.

Co-ordinated counts of each estuary are made, largely by volunteer ornithologists on selected dates near the middle of each month, timed to coincide with the best (local) tidal conditions for censusing birds. All wildfowl and wader species are counted. So far as possible, counting teams aim to cover the entire year, from July through to the following midwinter months December to February.

APPENDIX 6

METHOD USED BY THE INSTITUTE OF TERRESTRIAL ECOLOGY AND OVERALL SURVEY PERIOD

For the purpose of surveying the feeding areas, the low water period was defined as spanning two hours before to two hours after low water during spring tides. The feeding areas were fully exposed then and the birds distribution was more or less stable. An area was walked and, by scanning through a telescope, a route that minimized disturbance was devised. Groups of birds were counted and, using a compass, their position was recorded. (ITE, 1988).

The Department of the Environment commissioned the above counts, together with seven wader species, to allow predications to be made of the effect of further marsh land-claim on the numbers of waders and Shelduck that feed on the intertidal flats of the Wash. This study was completed in 1988 as a document entitled 'Wash Birds and Invertebrates' which is freely available and has been the primary source of information for this desk study.

The period of each survey was as follows:

WEST SIDE

(Gibraltar Point to River Welland)

Autumn	28 August-12 September 1985
Winter	12 November-11 December 1985
	11 February-1 March 1986
Spring	21 April-27 April 1986

REMAINDER

(River Welland to Heacham)

Autumn	3 September-24 September 1986
Winter	14 November-31 December 1986
	22 February-4 March 1987*
Spring	11 April-29 April 1987

* There were very few Knot present during the first winter visit, but they reappeared on these areas in late winter. Consequently the whole area was resurveyed, for Knot only, during this period.

APPENDIX 7

DATA FROM INSTITUTE OF TERRESTRIAL ECOLOGY STUDY (1985-87)

WEST SIDE (AUTUMN AND WINTER 1985 COUNTS)

	Subtransects (Length of frontage in km)														
Species	1.1 (1.4)	1.2 (1.2)	1.3 (1.2)	2.1 (0.92)	2.2 (0.92)	2.3 (0.9)	3.1 (0.72)	3.2 (0.72)	3.3 (0.72)	4.1 (0.9)	4.2 (0.9)	4.3 (0.9)	5.1 (1.12)	5.2 (1.1)	5.3 (1.1)
Dunlin	63 35	356 301	333 1116	315 196	183 28	34 240	122 64	16 110	401 91	1031 92	120 34	175 387	288 250	351 132	97 320
Redshank	2 6	12 9	4 8	18 2	387 8	9 6	0 7	5 12	41 0	184 32	14 10	21 43	35 50	40 2	59 11
Knot	1055 391	1643 810	2477 83	471 117	198 0	0 404	0 0	0 0	15 456	614 340	0 66	45 330	205 31	49 507	0 51
Grey Plover	10 1	57 0	0 2	1 3	0 10	6 15	1 29	15 34	0 22	24 17	50 18	65 63	40 121	54 129	24 78
Bar-tailed Godwit	900 0	1191 88	360 841	769 84	347 59	17 177	48 26	1 115	38 89	251 30	32 28	64 79	116 44	336 9	141 17
Oystercatcher	0 0	0 9	97 32	794 392	1375 809	209 304	503 243	14 22	989 63	939 124	606 156	135 46	1839 547	1638 1228	750 658
Curlew	49 4	90 27	71 2	42 24	39 24	1 1	0 0	0 0	0 0	0 0	0 0	0 4	1 4	1 12	5 2
Shelduck	10 81	0 62	0 65	0 141	0 154	0 0	0 0	0 0	0 0	0 0	0 3	0 37	0 4	0 11	0 6

(NB. The autumn count is above the winter count in each block)

WEST SIDE (AUTUMN AND WINTER 1985 COUNTS)

	Subtransects (Length of frontage in km)														
Species	6.1 (1.0)	6.2 (1.0)	6.3 (1.0)	7.1 (0.65)	7.2 (0.65)	7.3 (0.65)	8.1 (0.64)	8.2 (0.64)	8.3 (0.64)	9.1 (0.6)	9.2 (0.6)	9.3 (0.6)	K.1 (1.2)	K.2 (1.68)	K.3 (1.76)
Dunlin	0 311	239 89	320 180	7 47	37 97	282 58	94 159	353 204	208 261	29 138	113 233	100 498	5 5	11 61	35 66
Redshank	3 12	37 3	60 0	1 0	6 0	6 26	18 13	46 15	15 21	27 8	20 10	30 20	0 3	15 16	27 4
Knot	0 149	12 962	1 376	0 1104	0 835	0 253	0 0	0 260	83 0	0 3	0 15	0 18	0 0	0 0	6 0
Grey Plover	13 62	25 57	29 38	1 1	8 20	18 53	8 14	8 8	11 51	10 11	6 16	40 41	2 0	15 10	13 24
Bar-tailed Godwit	2 8	21 13	31 9	0 0	1 6	1 3	4 9	1 1	5 2	5 2	2 11	0 13	0 0	6 8	3 6
Oystercatcher	125 129	271 310	63 280	5 38	0 5	6 18	49 70	9 38	0 16	15 70	12 50	17 120	4 0	3 3	0 0
Curlew	0 43	1 4	0 0	0 0	1 11	8 0	0 7	4 9	3 1	9 6	5 13	19 22	0 2	0 4	0 3
Shelduck	0 0	0 0	0 53	0 154	0 158	0 111	0 41	0 4	0 48	0 28	0 97	0 125	0 12	0 26	0 4

SOUTHWEST SIDE (AUTUMN AND WINTER 1986 COUNTS)

	Subtransects (Length of frontage in km)														
Species	10.1 (1.18)	10.2 (1.12)	10.3 (1.2)	11.1 (1.16)	11.2 (1.14)	11.3 (1.18)	12.1 (0.7)	12.2 (0.72)	12.3 (0.74)	13.1 (0.64)	13.2 (0.66)	13.3 (0.66)	14.1 (0.44)	14.2 (0.6)	14.3 (0.56)
Dunlin	382 307	1119 1129	618 316	185 360	479 478	253 1219	461 1074	184 80	75 67	75 48	25 81	60 46	99 35	15 48	0 6
Redshank	50 40	46 55	85 56	45 113	92 46	35 92	33 45	54 66	45 44	26 46	42 4	7 0	36 0	0 0	0 0
Knot	30 200	0 550	0 500	130 822	0 0	0 30	0 11	12 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Grey Plover	137 75	275 117	46 22	46 41	72 11	17 15	17 37	18 1	11 0	21 9	44 67	21 25	24 30	1 49	0 8
Bar-tailed Godwit	10 0	17 152	4 3	1 4	249 0	369 6	123 7	84 4	7 13	13 2	16 4	2 1	0 0	0 0	0 0
Oystercatcher	113 30	223 30	467 144	181 86	1005 260	765 325	95 82	72 184	101 204	222 98	28 149	12 147	46 181	0 213	0 35
Curlew	49 32	80 135	79 20	70 70	119 110	16 105	48 62	53 40	85 84	16 41	97 13	19 5	33 28	0 18	0 3
Shelduck	24 489	0 249	0 189	0 563	0 681	0 178	0 13	0 40	0 0	0 65	0 0	0 0	0 0	0 0	0 75

SOUTH-WEST SIDE (AUTUMN AND WINTER 1986 COUNTS)

	Subtransects (Length of frontage in km)		
Species	A.1 (0.74)	A.2 (0.8)	A.3 (1.06)
Dunlin	84 26	46 3	68 4
Redshank	2 7	17 0	0 0
Knot	0 0	0 0	0 0
Grey Plover	0 0	1 0	2 0
Bar-tailed Godwit	0 0	1 0	0 0
Oystercatcher	1 0	0 0	0 0
Curlew	0 0	0 0	0 1
Shelduck	0 19	0 32	3 12

SOUTH EAST SIDE (AUTUMN AND WINTER 1986 COUNTS)

	Subtransects (Length of frontage in km)											
Species	15.1 (1.14)	15.2 (1.12)	15.3 (1.12)	16.1 (0.9)	16.2 (0.94)	16.3 (0.92)	17.1 (0.66)	17.2 (0.7)	17.3 (0.66)	B.1 (0.6)	B.2 (0.68)	B.3 (0.7)
Dunlin	1030 794	957 232	281 195	143 347	49 531	276 177	345 49	334 0	287 91	20 0	100 0	80 0
Redshank	189 72	213 41	98 30	16 27	10 21	0 17	5 9	31 4	34 0	1 0	5 20	4 0
Knot	30 3460	87 2920	161 470	763 194	94 50	0 407	10 185	0 0	0 204	20 816	0 0	0 0
Grey Plover	43 104	157 9	158 7	59 9	39 2	41 54	42 7	11 0	69 16	7 0	33 0	26 0
Bar-tailed Godwit	12 86	6 0	6 0	4 0	0 0	5 10	0 0	0 0	3 0	3 0	1 0	0 0
Oystercatcher	700 111	900 184	305 52	11 24	13 4	380 80	0 0	0 0	21 3	0 0	0 0	0 0
Curlew	16 8	21 6	13 84	22 39	77 17	70 73	3 8	4 26	58 84	11 35	57 11	45 3
Shelduck	76 323	0 110	0 82	0 53	0 2	0 60	0 0	3 30	100 102	224 402	73 195	57 65

EAST SIDE (AUTUMN AND WINTER 1986 COUNTS)

	Subtransects (Length of frontage in km)									
Species	18.1 (1.5)	18.2 (1.1)	18.3 (1.1)	19.1 (0.82)	19.2 (0.82)	19.3 (0.8)	20.1 (1.06)	20.2 (1.2)	20.3 (1.2)	21.1 (5.5)
Dunlin	163 310	1655 574	377 17	23 119	291 0	135 6	800 326	1935 94	657 711	106 875
Redshank	5 5	17 17	19 15	0 3	0 3	3 1	63 3	47 4	122 48	405
Knot	0 0	10 36	68 270	2 370	0 800	1 0	8 0	12 0	2090 4800	11233 14522
Grey Plover	26 0	282 2	420 1	3 0	50 0	52 6	30 4	53 7	182 47	17 170
Bar-tailed Godwit	15 0	4 1	2 0	0 0	1 0	1 1	0 0	0 0	79 13	1852 135
Oystercatcher	0 0	0 0	0 0	0 2	10 0	0 18	0 21	0 28	3943 671	3430 5095
Curlew	12 41	106 53	26 23	0 2	0 8	0 14	4 11	15 2	66 30	599 168
Shelduck	525 145	325 212	343 247	394 255	240 131	0 106	38 1234	125 70	17 500	0 52

APPENDIX 8

TWITE NUMBERS FROM BOEE COUNTS TAKEN AROUND THE WASH

	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR
WINTER 72/73	8	243	1,445	2,150	2,190	4,510	357	6
WINTER 73/74	8	1,504	3,140	4,118	3,283	3,094	687	-

(Ornithological Working Group, 1974)

APPENDIX 9

PASSERINES ON WASH SALTMARSHES: POPULATION ESTIMATES

	FEB 1986	NOV/DEC 1986	JAN/FEB 1987
SKYLARK	31,713	16,203	26,268
TWITE	17,028	6,897	3,597
REED BUNTING	1,000	300	440
ROCK PIPIT	1,254	2,343	858
LAPLAND BUNTING	580	350	170

MAPS

1 Location of Study Area and Subtransects used by the Institute of Terrestrial Ecology

Coloured Species Distribution Maps:

2 All Waders: Autumn 1985 and 1986

3 All Waders: Winter 1985 and 1986

4 Dunlin: Autumn 1985 and 1986

5 Dunlin: Winter 1985 and 1986

6 Redshank: Autumn 1985 and 1986

7 Redshank: Winter 1985 and 1986

8 Knot: Autumn 1985 and 1986

9 Knot: Winter 1985 and 1986

10 Grey Plover: Autumn 1985 and 1986

11 Grey Plover: Winter 1985 and 1986

12 Bar-tailed Godwit: Autumn 1985 and 1986

13 Bar-tailed Godwit: Winter 1985 and 1986

14 Oystercatcher: Autumn 1985 and 1986

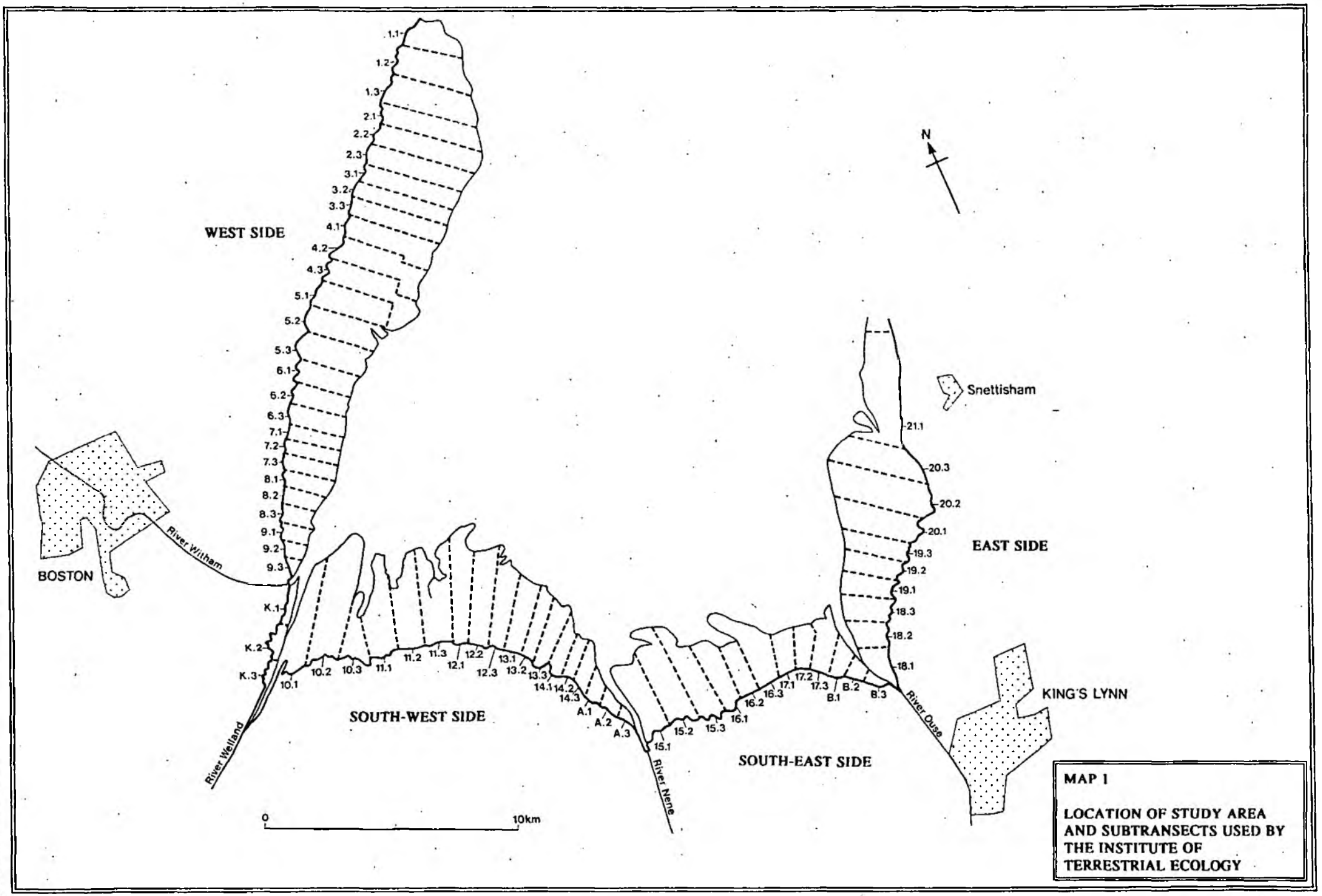
15 Oystercatcher: Winter 1985 and 1986

16 Curlew: Autumn 1985 and 1986

17 Curlew: Winter 1985 and 1986

18 Shelduck: Autumn 1985 and 1986

19 Shelduck: Winter 1985 and 1986

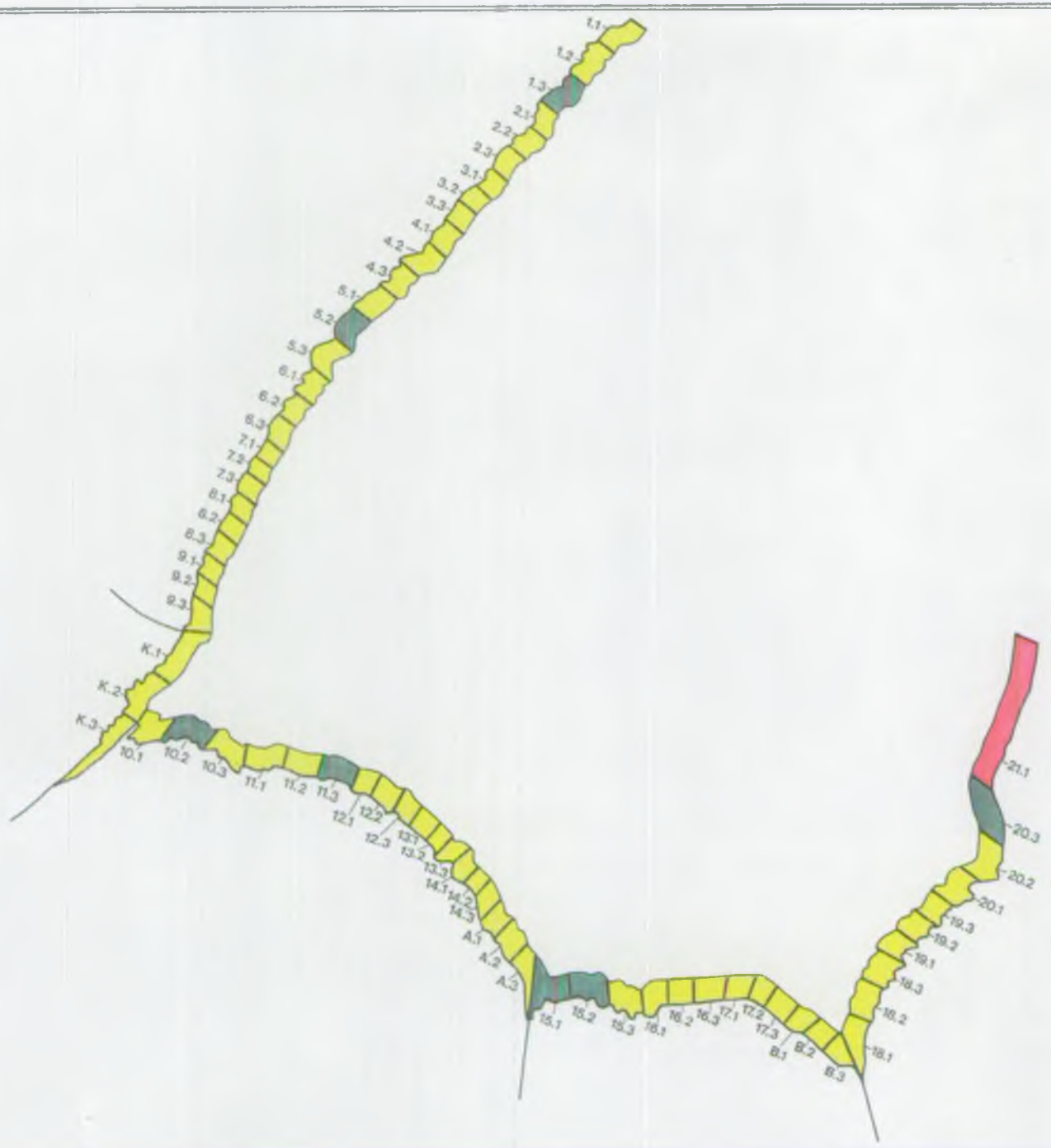


MAP 1

LOCATION OF STUDY AREA AND SUBTRANSECTS USED BY THE INSTITUTE OF TERRESTRIAL ECOLOGY

ECOSURVEYS LTD

ECOSURVEYS LTD



N

MAP 3 ALL WADERS
Winter 1985 and 1986

	<1% (1-1680)
	1-4.99% (1681-8383)
	5-19.99% (8384-33584)
	>20% (33584+)

Distribution in ITE sections, as a percentage of Average Maximum counts for the Wash

ECOSURVEYS LTD

ECOSURVEYS LTD

ECOSURVEYS LTD

MAP 6 REDSHANK
Autumn 1985 and 1986

	<1% (1-39)
	1-4.99% (40-195)
	5-19.99% (196-780)
	>20% (781+)

Distribution in ITE sections, as a percentage of Average Maximum counts for the Wash

ECOSURVEYS LTD

ECOSURVEYS LTD

ECOSURVEYS LTD

MAP 10 GREY PLOVER
Autumn 1985 and 1986

	<1% (1-42)
	1-4.99 (43-209)
	5-19.99% (210-838)
	>20% (839+)

Distribution in ITE sections, as a percentage of Average Maximum counts for the Wash

ECOSURVEYS LTD

MAP 11 GREY PLOVER
Winter 1985 and 1986

	<1% (1-42)
	1-4.99 (43-209)
	5-19.99% (210-838)
	>20% (839+)

Distribution in ITE sections, as a percentage of Average Maximum counts for the Wash

ECOSURVEYS LTD

MAP 12 BAR-TAILED GODWIT
Autumn 1985 and 1986

	< 1% (1-85)
	1-4.99% (86-429)
	5-19.99% (430-1718)
	>20% (1719+)

Distribution in ITE sections, as a percentage of Average Maximum counts for the Wash

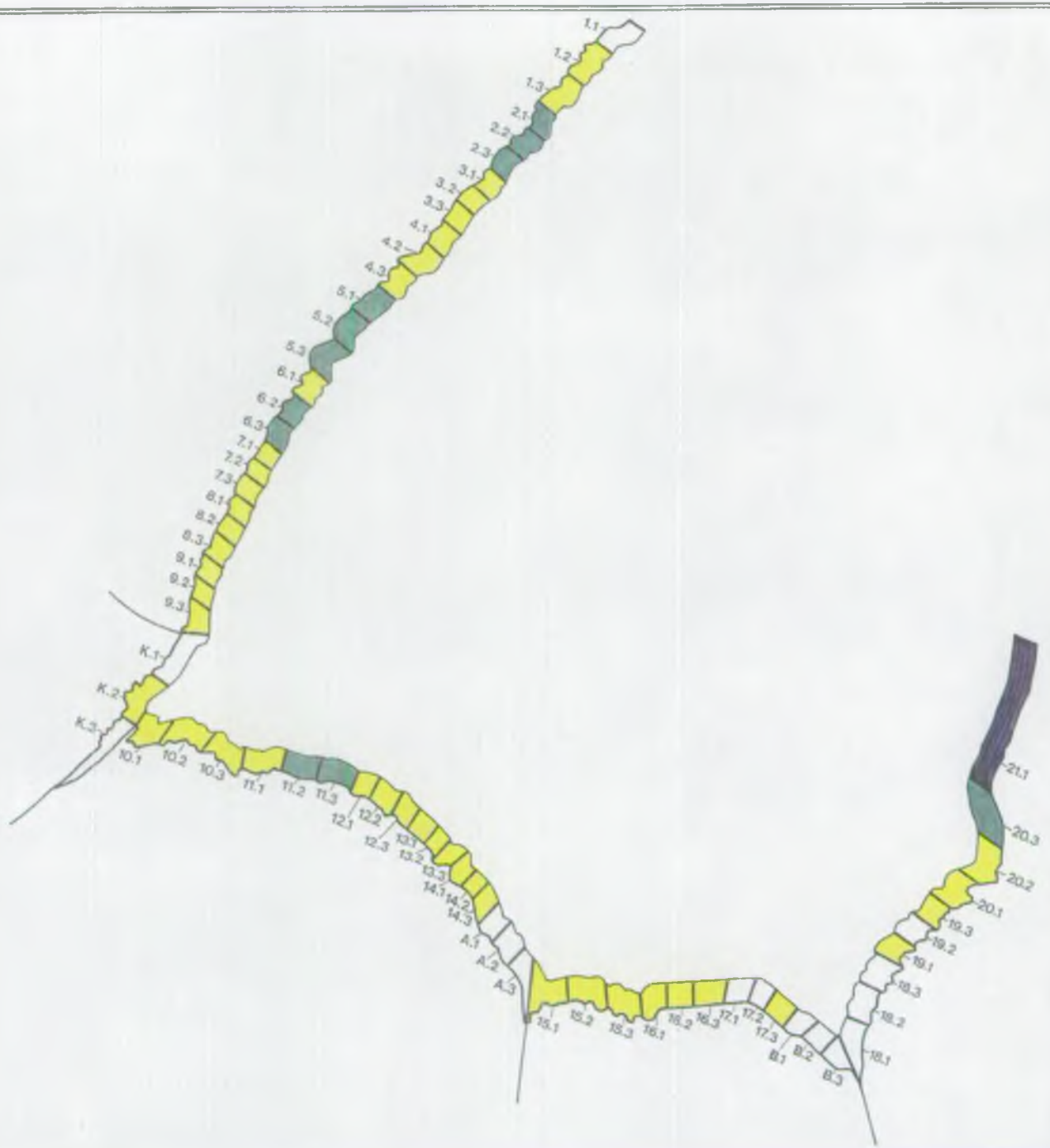
ECOSURVEYS LTD

MAP 13 BAR-TAILED GODWIT
Winter 1985 and 1986

	<1% (1-85)
	1-4.99% (86-429)
	5-19.99% (430-1718)
	>20% (1719+)

Distribution in ITE sections, as a percentage of Average Maximum counts for the Wash

ECOSURVEYS LTD



MAP 15 OYSTERCATCHER
Winter 1985 and 1986

	<1% (1-250)
	1-4.99% (251-1248)
	5-19.99% (1249-4998)
	>20% (4999+)

Distribution in ITE sections, as a percentage of Average Maximum counts for the Wash

ECOSURVEYS LTD

ECOSURVEYS LTD

ECOSURVEYS LTD


1.1
1.2
1.3
2.1
2.2
2.3
3.1
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4.1
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5.1
5.2
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6.2
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7.1
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8.1
8.2
8.3
9.1
9.2
9.3
K.1
K.2
K.3
10.1
10.2
10.3
11.1
11.2
11.3
12.1
12.2
12.3
13.1
13.2
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14.1
14.2
14.3
A.1
A.2
A.3
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15.3
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16.2
16.3
17.1
17.2
17.3
B.1
B.2
B.3
18.1
18.2
18.3
19.1
19.2
19.3
20.1
20.2
20.3
21.1
N
MAP 18 SHELDUCK
Autumn 1985 and 1986
< 1% (1-191)
1-4.99% (192-954)
5-19.99% (955-3820)
> 20% (3821+)
Distribution in ITE sections, as a percentage of Average Maximum counts for the Wash

ECOSURVEYS LTD