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Myrlyn Owen, G. L. Atkinson-Willes and D. G. Salmon  
Excerpt  
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## Part I

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### Introduction

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# Introduction to the survey

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Two decades have passed since the publication, in 1963, of the First Edition of *Wildfowl in Great Britain* (edited by G.L. Atkinson-Willes, published by HMSO) – the first comprehensive survey into wildfowl habitats, stocks and prospects in Britain. Because of sparsity and irregularity of cover it proved impossible to include Ireland, either in the previous volume or in this work, but a separate study was carried out there recently (279).

The aim of the original survey was to provide a basis for conservation planning following the 1954 Protection of Birds Act and the formation by the then Nature Conservancy of the Wildfowl Conservation Committee to advise on wildfowl conservation and exploitation. Prior to this there had been much debate on the status of wildfowl and the effects of shooting, with conflicts arising largely from the lack of objectively gathered information on numbers and distribution. *Wildfowl in Great Britain* summarised the information collected during 14 years of Wildfowl Counts and provided a basis for future planning.

The volume more than adequately fulfilled its objectives and it continued until recently to provide basic data for cases of both national and local conservation. The last 20 years have, however, seen major changes not only in the habitat and conservation of wildfowl but also, partly as a result of this, in the status of most wildfowl species wintering in Britain. Following numerous requests from individuals and organisations for a new review the Nature Conservancy Council (NCC) and the Wildfowl Trust decided in 1979 that a complete reassessment should be undertaken. The volume of data meant that analysis was impossible except by computer and over the following two years all counts since 1960-61 were typed in and stored on a microcomputer at Slimbridge.

The broad outline of the survey follows closely that of 1963 but developments in techniques and in the extent of data available gave rise to changes of emphasis. Part I gives a summary of the techniques used to collect information relevant to the understanding of wildfowl populations, distribution and con-

servation. A much wider range of data is available to aid the present assessment than was the case in the early 1960s.

Part II, being a treatment of the country region by region, still forms the core of the survey. Although this section is longer than that in the First Edition because of the increased quantity of data, it is necessarily condensed. Summary tables are given wherever possible, providing not only the most recent data but also those from earlier years for comparison. Although the Wildfowl Counts scheme has provided the bulk of the information, the use of data from local bird reports and from special projects, published and unpublished, has been extensive. The growth in interest in active ornithology, fostered and initiated by such organisations as the British Trust for Ornithology (BTO) and the Royal Society for the Protection of Birds (RSPB) as well as the Wildfowl Trust, has been largely responsible for the increased volume of such data.

As was realised when the previous survey was carried out, it is impossible to consider the wildfowl of Great Britain in isolation. Most do not breed here and our stock is only part of the western Palearctic or north-west European population of the species. The species accounts in Part III include an assessment of the species in the range as a whole, based on data from the International Wildfowl Counts and other surveys organised through the International Waterfowl Research Bureau (IWRB). The seasonal movements of the birds have been analysed by the use of ringing recoveries as well as the monthly pattern of Wildfowl Counts. For those species breeding in Britain figures given by the Atlas survey of the BTO (542) have been combined with autumn and winter count data to give an up-to-date estimate of the breeding population.

Part IV discusses the conservation of wildfowl in a changing environment. Many of the changes are a direct result of man's activities and not all are deleterious. The increase in the area of inland waters, particularly as gravel pits and reservoirs, has had a major effect on many species, and the efforts of conservation and other organisations to maximise the

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value of these habitats by suitable management has played a large part. The success of conservation efforts has, in the case of geese, led to an increase in the conflict between farmers and the birds but the problems are now better understood and constant attempts are being made to alleviate them. Threats to sea ducks from oil pollution have increased following developments in the North Sea and the increase in tanker traffic. The loss of habitat through industrial and other development, particularly on estuaries, gives constant cause for concern.

As well as providing a better picture of the wildfowl situation in England, Scotland and Wales than has hitherto been possible, this survey also points out gaps in our knowledge. Some concern particular parts of the country such as north-west Scotland, notoriously difficult to cover, others the distribution of birds at certain times of year, particularly during the moult. What we need increasingly are ways of forecasting the effect of habitat loss or changes in its quality on wildfowl numbers and distribution.

Since such predictions are always complex because of the involvement of many factors outside the area of interest and because subtle social and behavioural mechanisms may be involved, they must be based on thorough and relatively long-term studies. Similarly, our understanding of population dynamics is very important in decision making in conservation, and since many wildfowl are relatively long-lived these studies take time. However, applied decisions must be based on a sound knowledge of bird biology and progress in this field must be maintained. Developments over the last twenty years have clearly illustrated the importance of detailed monitoring internationally, nationally and on a local scale. While this must be carried on and continually improved, we must also concentrate on detailed biological studies which enable us to interpret these masses of data in the interests of the birds. The present survey assesses the progress made in the last two decades and will, we hope, provide a stepping-stone for the next two.



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# Wildfowl Counts

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## *History and organisation*

The Wildfowl Count network was set up in 1947 by the International Wildfowl Inquiry Committee and a Central Organiser was appointed. The aim was to cover as many waters as possible once in each winter month, September – March. The network was made up of volunteer observers and coverage was inevitably incomplete, but special efforts were made to obtain regular counts from the most important sites. The Wildfowl Trust took responsibility for the counts in 1954 and the Organiser (G.L. Atkinson-Willes) moved to Slimbridge. By this time the number of waters counted had risen to more than 500 and about 700 volunteer counters were involved. By the early 1960s more than 2,000 waters had been covered at some time although the average number of counts received was 5-600 in each month.

An International Wildfowl Count scheme was set up by the International Waterfowl Research Bureau at Slimbridge in the mid 1960s, aiming to cover the whole of the western Palearctic range in January each year, and in some years in November or March. When these counts began, with the first full survey in 1967, there was a major impetus to increase the coverage in Britain even further and Regional Organisers recruited more observers. The usual number of counts made in January (the month with most complete coverage) rose to 1,100-1,300 and in other months to 700-900. By 1982, more than 4,000 waters had been covered at some time since 1960 and in the early 1980s more than 1,100 individual counters were involved. The original network consisted almost entirely of amateur volunteers but, as many of the most important areas became reserves, there was an increasing proportion of professional input. Nevertheless, the vast majority of counters are still amateurs carrying out the counts in their own time and travelling at their own expense. Even the Regional Organisers, who are responsible for a major part of the organisation, are still almost all amateurs.

A further boost to the count coverage occurred in 1969, when the Birds of Estuaries Enquiry was

launched by the British Trust for Ornithology (485). The Enquiry, though concentrating mainly on waders, includes all birds on estuaries by means of monthly counts organised in a similar way to the Wildfowl Counts. Many areas previously unrecorded for wildfowl have been covered. The wildfowl data from the Enquiry have been made available at all times to the Wildfowl Trust (which co-sponsored the scheme for some years), and have been used extensively in the present work.

The advent of the International Wildfowl Counts made the British figures, which represented coverage of only part of most populations and flyways, much more meaningful. Not only was it now possible to assess the importance of Britain as a wintering area for the different species but individual sites could be assessed in an international context (see p.527). The coverage of international counts in north-west Europe, the Mediterranean and North Africa has been remarkably good, with 13,380 sites being counted in January during the ten-year period 1967-1976 (24). Efforts have been concentrated on January counts, but surveys have also been conducted in November and March to assess changes in distribution at those times of year. These additional counts should be extremely valuable for assessing changes from year to year according to winter severity.

The monthly British counts received at Slimbridge used to be transcribed from the original forms into ledgers. Hand analysis of the whole of the data was too laborious so the assessment of trends from year to year was made using a sample of some 200 so-called "priority sites". Results from these were returned during the winter and trends assessed by comparison with numbers counted in a master year. Although most major concentrations were included in priority counts, the index proved to be a rather variable estimator of trends. Since the priority scheme was also rather costly, it came to an end in 1979-80.

Between 1978 and 1980 all counts from 1960-61 to 1979-80 were entered into a computer at Slimbridge

## Wildfowl Counts

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so that comprehensive analyses could be carried out for this survey. Seasonal counts were also entered as they were received from 1979-80 onwards and an analysis of each winter was made within a few months of the end of the season. Each counter now receives promptly a copy of an annual report (524). These reports also include wader counts organised by the BTO under the Birds of Estuaries Enquiry.

### *Accuracy and representativeness of the counts*

Wildfowl counters are experienced ornithologists, many of whom have been active as counters or involved in other bird surveys for many years. With the exception of a few sites, covered by organised teams of counters, bird concentrations are not large, seldom more than a thousand individuals of a single species. A test of accuracy involving 117 observers of varying experience estimating numbers in goose flocks showed that substantial errors were made even by experienced counters. Since there was no bias, however, errors tended to cancel each other out and the mean of all counts was within 10% of the true figure (332). These observers were asked to make their estimates within 30 seconds and would not be able to make repeat counts as under most field conditions. Another test on counts of waders (484), showed that there was consistent bias, with most observers overestimating numbers when these were small and underestimating large flocks. In another comparison of counts with photographs, underestimating error even with very large wader flocks averaged only 5% for experienced observers (229).

These tests would tend to exaggerate the errors under most conditions since birds are difficult to count on photographs in 30 seconds—the time allowed. Many counters make several counts, from different viewpoints or over a period of two or three hours. We can say with some confidence, therefore, that the Wildfowl Counts provide us with a reasonably accurate picture of wildfowl numbers and distribution. Where there are errors, numbers are likely to have been underestimated.

It is impossible using volunteers to make very frequent counts and a test using almost daily counts for three years at Durleigh Reservoir showed that numbers of wildfowl varied considerably over a monthly period and the counts made on the count dates deviated by up to 50% from the average for the whole month (332). The deviation varied with the species, being high for mobile species such as Pochard (51%) and low for the more sedentary ones such as Tufted Duck (25%) and Mute Swan (13%). However,

over a long series of counts fluctuations cancelled each other out and averages gave a good indication of the importance of the site. Most of the fluctuations were short term so that for most species fortnightly counts were no less variable than monthly ones. Even with weekly counts the numbers of Mallard and Tufted Ducks remained variable. Much of the variation was removed when adjacent waters were combined, indicating that local movements were partly responsible.

Monthly counts are too infrequent to give detailed information on site use by wildfowl, but very many more counts would be necessary to achieve this. The tests of accuracy that have been made indicate that when averages over a series are used the counts give a reliable and representative picture, especially when coverage of numerous adjacent sites is good.

### *Count coverage*

Because of their locations or habits some species pose severe problems for regular counting and attempts are made to cover these in ways other than by Wildfowl Counts. Geese are usually away from their estuarine or lake roost sites during the day and are frequently missed. Only for Brent Geese do the counts give a realistic picture. Although virtually all grey goose roosts are covered, no more than half the Greylag and Pinkfoot populations are ever included in the count totals. Grey geese are covered by an autumn census of roosts and feeding grounds, and in 1982 and 1983 a March count was also made. Because these geese are concentrated in autumn these censuses give an accurate total for the post-breeding population. Wildfowl Count data are used to indicate distribution at other times of year. There has been no regular census of Greenland Whitefronts, but a general picture of the situation in the 1970s has been drawn from all available count data (516). In 1983 coordinated counts were made in Ireland and in Scotland. European Whitefronts occur on very few sites and information is obtained from local observers.

Barnacle Geese are counted in autumn in the Solway and on Islay but the remainder of the Greenland population is censused only occasionally from the air. The first aerial survey of this species in Scotland was carried out in 1957 (79) and the population has been censused every four or five years since. Only about half the Canada Geese in Britain are counted in winter but there have been two complete summer censuses, organised by the Wildfowl Trust, in 1968 and 1976. Mute Swans are similarly censused in summer, the latest count being in 1978. Bewick's Swans are well covered by the counts but the scattered

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Whooper Swans are not. A special census of Whoopers in 1980 yielded just under twice as many as were included in Wildfowl Counts at the same time.

Sea ducks pose special problems in that not often are they easily counted from the shore. Regular aerial surveys are made in north-east Scotland by Aberdeen University and these results are included in the counts. Special boat surveys have also been carried out in connection with oil developments in the Moray Firth (361), and in the Northern Isles. It is very likely, however, that there are many flocks, especially off the west coast, which have never been found.

Regular counts in summer have not been attempted but a special survey of breeding ducks was carried out in the late 1960s (621). The Atlas survey of the BTO (542) was much more comprehensive but not quantitative. However, a combination of Atlas data with autumn counts of the most important breeding ducks does provide an estimate of population which is better than that achieved previously. A survey was carried out in 1980 on inland waters, but this did not provide data on national totals. However, a comparison of matched waters with the 1960s indicated increasing trends in most species (598).

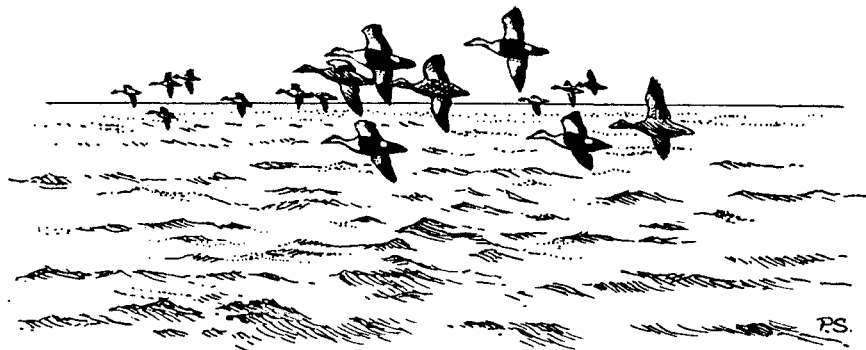
Coverage of moulting concentrations is patchy; many groups of moulting sea ducks are probably unknown and only recently have summer flocks of Shelducks been found moulting in some of our large estuaries (see p.394).

As indicated above, winter coverage in terms of sites counted has continually improved since the network was first established. Ideally, each site should be counted seven times in each season, but this level is achieved for rather a small proportion of

haunts, though usually the more important ones. Theoretically, the number of counts expected would be 140 for each site over a 20-year period. This is not the true figure for all sites since some were created during the period and others were lost and could not be counted. However, the proportion of the potential counts achieved gives an idea of the minimum quality of the coverage.

Of the 513,000 potential counts on the 3,663 sites between 1960-61 and 1979-80, 107,000 were actually made (21%). This seems an extremely low level of coverage but it is caused by very many sites in remote areas being counted only once or twice. In the early years counters were encouraged to explore their local waters for important places, and in many cases sites were visited once or twice and found to have no wildfowl, so coverage ceased. There is a substantial difference between months, with the coverage in the best month, January, being 27.2% as opposed to 16.8% in the worst, September. There are also regional differences, with January coverage in south-east England reaching 33% as opposed to 14% in the Scottish Highlands and Hebrides. The corresponding figures for September were only 23 and 8%.

Despite the apparent inadequacy of coverage, most large concentrations of birds are in well-counted areas, so the proportion of the total of each species on all sites which are counted each year is high—70-80% for most species (see p.342). This is because many ducks are very gregarious, concentrating on the larger sites which are well covered. Data are, however, not complete enough adequately to describe many of the less important areas in Part II.





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# Wildfowl ringing

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Knowledge of the origins and movements of wildfowl is essential if they are to be effectively managed or conserved. The Wildfowl Inquiry Committee was initially responsible for coordinating and stimulating efforts (591). By 1937 the ringing scheme had been transferred to the management of the BTO and all subsequent rings bore the address of the British Museum (Natural History).

The Wildfowl Trust was making a substantial contribution to the ringing effort soon after its establishment in 1946, and in 1954 responsibility for wildfowl ringing was transferred from the Wildfowl Inquiry Committee to the Trust. Table 1 gives the number of wildfowl ringed by the Trust and in Britain as a whole, to the end of 1981. Apart from the Mute Swan, the subject of a large number of local population studies, the Trust has been responsible for the vast majority of geese and swans ringed. Expeditions to the Arctic breeding grounds of Barnacle and Pink-footed Geese have added considerably to the total ringed by the Wildfowl Trust. The majority of ringed ducks have been marked at the Trust's trapping stations, but a few species have been the subject of special studies elsewhere. For example, most of the Eiders and many of the Shelducks have been marked in connection with population studies on the Ythan Estuary, Aberdeen, and the Goosanders have largely been caught by a ringing group in Northumberland (337).

The majority of marked birds have been ringed in the last two decades, largely as a result of new trapping stations coming into operation and new methods of catching yielding greater numbers of certain species. This is particularly true of inland diving ducks and swans (see below).

Table 1 also shows the recovery rates of ringed wildfowl. These are extremely high in comparison with rates for other birds, because many wildfowl are quarry species and most shot birds are retrieved and the rings reported. The rates shown in the table are minimal since many ringed birds are still alive, but the figures do allow comparison between species. Although protected, the sedentary and conspicuous

Mute Swan not surprisingly yields the highest recovery rate. The low recovery rate of the migratory Bewick's Swans might be expected since the winter mortality in England is only 10% of the annual mortality rate for the species (445). A much higher proportion of Whooper Swans should be recovered since they migrate shorter distances and nest in accessible places. However, as nearly all their ringing has been very recent the recovery rate is rather low.

Recovery rates for geese are generally high; those for the grey geese are total recoveries since very few have been ringed in the last 15 years. The low rates for Barnacle and Brent Geese reflect their long migrations into remote areas and the high proportion of their mortality outside Britain—about 60% of the annual mortality of Barnacle Geese (442). Both species are protected and it is unlikely that rings are returned from birds illegally shot even when this happens in Britain.

A relatively high proportion of ringed ducks are generally recovered; the overall recovery rate (i.e. when sufficient time has elapsed for all ringed ducks to have died) is around 20% for most species. The rates in the table are depressed for Gadwall, Pochard and Tufted Duck because much of the ringing of these species has been very recent. Despite its conspicuousness the protected Shelduck is much less likely to be reported than are quarry species.

Information from ringing recoveries has been used in this volume to compile maps which illustrate the origins of species wintering in Britain. These are presented in the species sections in Part III. This chapter presents historical information on the major ringing stations, and describes the catching and marking techniques used and the changes in emphasis and scope of the ringing effort over the years.

## *Catching methods and success*

### **Duck ringing**

The majority of ducks ringed in Britain have been caught in duck decoys, originally constructed to

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Table 1. Total numbers of ducks, geese and swans ringed by the Wildfowl Trust since establishment in 1946, the total ever ringed in Britain and the number of recoveries to the end of 1981. The Wildfowl Trust totals include geese caught and ringed by Trust expeditions overseas and a small number of geese and swans which have been marked with plastic rings only.

	Wildfowl Trust	British total	Recoveries	Recovery rate (%)*
Mute Swan	2842	35597	11961	33.6
Bewick's Swan	1201	1201	88	7.3
Whooper Swan	148	158	14	8.9
Pink-footed Goose	21716 <sup>+</sup>	11844	3489	29.5
Bean Goose	0	1	1	—
White-fronted Goose#	581	615	199	32.4
Greylag Goose	1786	2171	517	23.8
Canada Goose	1321	28858	5971	20.7
Barnacle Goose	3548 <sup>+</sup>	1781	192	10.8
Brent Goose\$	1217 <sup>3</sup>	249	35	14.1
Shelduck	446	5163	501	9.7
Mandarin Duck	0	33	3	—
Wigeon	4895	7571	1300	17.2
Gadwall	1875	2141	261	12.2
Teal	51199	66040	11808	17.9
Mallard	99192	123857	20905	16.9
Pintail	4323	5182	778	15.0
Garganey	393	417	68	16.3
Blue-winged Teal	1	1	1	—
Shoveler	1810	2043	358	17.5
Red-crested Pochard	8	26	6	—
Pochard	3403	3881	336	8.7
Tufted Duck	9725	12633	1516	12.0
Ring-necked Duck	2	2	1	—
Scaup	68	152	33	21.7
Eider	65	14808	1855	12.5
Long-tailed Duck	0	16	3	—
Common Scoter	1	41	5	—
Velvet Scoter	0	4	0	—
Goldeneye	24	99	11	—
Smew	9	9	0	—
Goosander	4	673	103	15.3
Red-breasted Merganser	8	74	8	—
Ruddy Duck	13	18	3	—
Total swans	4191	36956	12063	
Total geese	30169	45519	10404	
Total ducks	177464	244884	39863	
Grand total	211824	327359	51330	

\* Recovery rate is calculated on recoveries received to date (British total – excluding foreign-ringed birds). For species where ringing is continuing eventual recovery rate will be higher (see text).

+ Many caught overseas and marked with foreign rings.

# *A. a. albifrons* plus 3 *A. a. flavirostris*.

\$ *B. b. bernicla* plus 1 *B. b. hrota*.

<sup>3</sup> Most marked with plastic rings only.



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## Wildfowl ringing

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catch ducks for the market. The idea was first developed in the Netherlands and the word decoy is derived from the Dutch words “eende” (duck) and “kooi” (trap). The decoy consists of a small secluded pond, set in woodland, from which radiate four to eight “pipes”—curved extensions of the pond which are covered with netting hung over semi-circular hoops. The opening of the pipe may be 5-8m wide and the hoops 2-5m tall, tapering away from the pond to a small catching-up net, 15-20m away from the opening and out of sight of the pond (Fig 1). A series of overlapping reed screens about 2m high run along the outside of the curve and shorter screens, known as “dog leaps”, link the taller ones. The screens act in the manner of a sunblind so that the decoyman is visible to ducks in the pipe but is hidden from the pond, which remains undisturbed by catching operations.

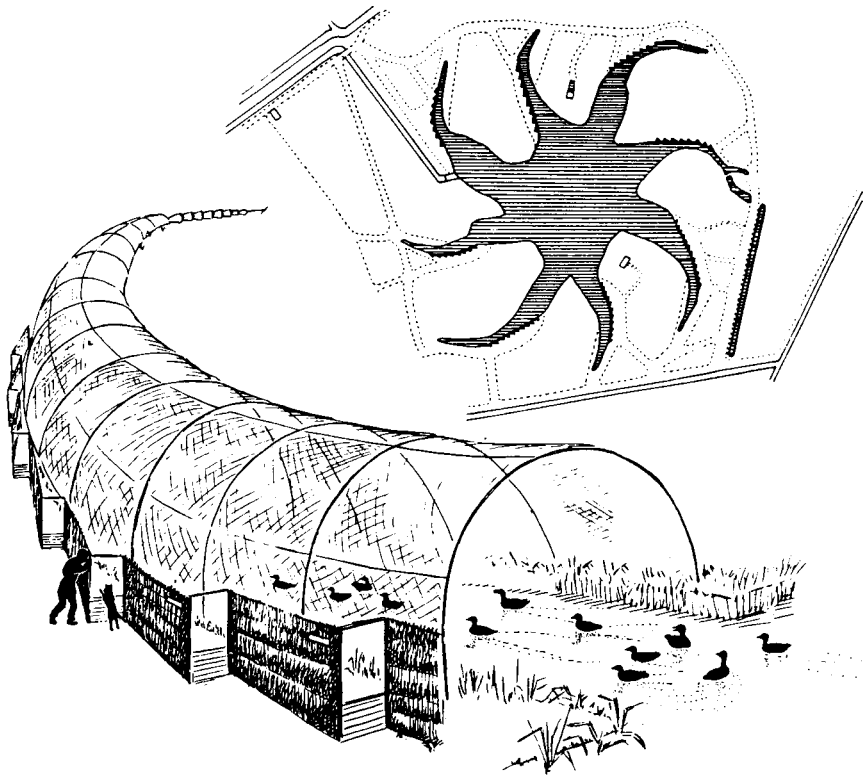
Decoys are established close to feeding grounds of ducks, which retreat to the pond to roost in safety. In many decoys tame ducks are kept in order to lure the wild birds onto the pond. The success of the

catching operation depends on the habit of ducks of “mobbing” predators. When a land predator approaches a pond all the ducks face it and follow its movement, though staying at a safe distance. The decoyman trains a dog, usually a brown medium-sized breed resembling a fox and traditionally known as “Piper”, to run between the screens, jumping over the dog leaps and showing itself to the ducks. As the dog moves along the pipe it leads the ducks away from the pond. The hidden decoyman watches through peep-holes in the screens and when the ducks are sufficiently far in he shows himself between the screens, causing the birds to fly or swim down the net tunnel and into the catching-up net (Fig 1). Ducks take off into the wind and catching is most successful when the wind blows down the pipe towards the pond. Each decoy has several pipes so that ducks can be caught under all wind conditions.

All mammalian predators elicit the mobbing response and success has been achieved using cats and ferrets and even stuffed foxes or stoats held on long poles and moved to simulate the live animal. Ducks can sometimes be lured far enough down the pipe merely by providing food, usually waste grain, weed seeds or potatoes.

The first decoys were built in the Netherlands in the late 16th century and as late as 1956 about a

Fig. 1. Plan view of Borough Fen Decoy, Cambridgeshire, and a diagram of the working of a single pipe. The “Piper” dog is shown jumping over one of the dog leaps while the decoyman watches the progress of the ducks up the pipe through a peep-hole in one of the reed screens. (Drawing by J.B. Blossom.)



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hundred remained in commercial operation, catching about 300,000 ducks annually. More than 200 were built in Britain, following the Dutch model, but most went out of use before this century. Some were taken over for ringing during the 1940s and 1950s and the last commercial decoy, at Nacton, Suffolk, was converted to a ringing station in 1967 (see below).

Because of the considerable work, upkeep and time involved in operation, most decoys used for ringing have been operated professionally, or by a decoyman who was employed at least partly for the purpose. As their effectiveness has declined some decoys have ceased operation because the costs could not be justified.

Ducks are also caught in baited traps, mainly based on the design developed at Abberton Reservoir, Essex (604). These traps were either 4m × 4m × 2m or 2m × 2m × 1.3m, and were designed to be moveable with reasonable ease by one or two people. The trap consists of a cage of wire-netting around a wooden frame, with one or more funnels for the ducks to enter and a door for the ringer to retrieve his catch. The funnels make entrance easy but once inside the ducks are unable to escape (Fig 2).

The trap is placed on the margin of a pond or lake so that the funnels are in the water. Where the water level is constant the trap can be fixed but where the level is variable, as at Abberton, the trap has to be

moved frequently. Bait in the form of corn or small seeds is regularly placed in the trap, with a little sprinkled outside to attract the birds to the vicinity. The traps are visited daily and the birds collected for ringing.

Incubating female ducks can be caught on the nest by cautious approach and the use of a hand net. Broods of Goosanders have been caught in Northumberland by erecting a mist net or wader net across a stream or river and driving the broods into it (337). Cannon and rocket nets can be used with success for duck catching, particularly at loafing sites where the birds are densely packed. Substantial numbers of Eiders, Shelducks and Wigeon have been caught in cannon nets. Spring-loaded clap nets were developed by the Wildfowl Trust to catch loafing ducks but have been little used. Pneumatically powered (“phutt”) nets, fired in a manner similar to cannon nets, have been tried but have not been used successfully for ducks.

More than 164,000 of the 177,466 ducks (92%) ringed by the Trust have been caught at only 5 stations, and the annual catches at these are given in Table 2. There follows a brief historical account of these and other stations used for duck catching.

### *Slimbridge, Gloucestershire*

Most of the catching at Slimbridge has been carried out in the Berkeley New Decoy, completed in 1843 (534). The decoy has 4 pipes, one at each corner of a small (0.35ha) pool, in plan view having the shape of a “skate’s egg”. It was used commercially until 1929, but although partly reconditioned in 1937 was little used

Fig. 2. The Wainwright duck trap used originally at Abberton and later at other ringing stations. This example has one funnel, but larger traps with multiple entrances are also in common use. (Drawing by J.B. Blossom.)

