Breeding Waders in Northern Ireland

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Description and Summary of Results
In the later 20th Century breeding waders such as Curlew *Numenius arquata*, Snipe *Gallinago gallinago* and Lapwing *Vanellus vanellus* have exhibited marked population declines or range contractions across much of western Europe, and these declines have been attributed to land drainage, intensification of arable and grassland farming, afforestation and increased predation.
Breeding Lapwing in England and Wales, for example, declined by over 49% in the 11 years 1987-1998 (two BTO surveys), exceeding the threshold rate of decline for classification as a Red-listed Bird of Conservation Concern. The decline of Lapwings was steepest in western pastoral areas (Wales and SW England) and was attributed particularly to increased intensification of arable and grassland agriculture and the loss of spring tillage and mixed farming enterprises. The BTO breeding atlases of 1968-1972 and 1988-1991 suggested declines in breeding Curlew across the midlands, SW England, Wales and SE Ireland, and of Snipe throughout southern England, Wales and the southern half of Ireland.
Northern Ireland has historically supported important populations of breeding waders. High annual rainfall and saturated gley/peat soils combine with steep slopes to reduce the potential for arable intensification. Indeed, only 6% of the land area is cultivated while 85% is occupied by improved rye *Lolium perenne/L. multiflorum* grassland (34%), permanent pasture (26%) or uncultivated land (25%), ie mainly rough grazing. Damp grasslands and species-rich pastures have provided key breeding habitats for Lapwing, as well as Snipe on wetter swamp and fen habitats, whilst extensive peatlands formed the stronghold of breeding Curlew. In a survey in 1987 (reported by Partridge & Smith 1992: *Irish Birds* 4: 497-518), Curlew and Snipe populations in Northern Ireland were estimated to represent 10% and 14% respectively of the Britain and Ireland population, and there were over 5000 pairs of Lapwing. However, subsequent work suggested that these important breeding wader populations were declining from the loss of peatlands, mechanized cutting, drainage of wetland sites, afforestation and increasingly intensive grassland management.
The Breeding Waders in Northern Ireland Survey requested the resurvey of the 147 tetrads which had been selected for the 1987 survey. In the event 106 were covered in 1999 (63 of them twice), and over 90% of these were at least 75% covered (mean 87%). Large areas of dense forests and urban areas were considered covered and given a zero count. The total area surveyed (87% of 106 tetrads) was 369km^2 compared to 552km^2 in 1987 representing approximately 2.7% of the total land area of Northern Ireland.
The survey estimated there were 1771 pairs of Lapwing (0.44 pairs per tetrad *cf* 1.4 pairs in 1987), a 66% decline across Northern Ireland. The majority of these were recorded west of Lough Neagh particularly in Co. Tyrone. In Co. Antrim and Co. Down, pairs were recorded in only four of the 38 tetrads covered (*cf* 70% occupancy in 1987). The species positively selected marshland, upland rough grassland, unimproved grassland and arable habitats.

Just over 2000 breeding pairs of Curlew were estimated (0.52 pairs per tetrad *cf* 1.37 pairs in 1987), a 58% decline. The highest breeding concentrations were also recorded from Co. Tyrone with a notable absence within the Lough Erne basin, previously an area of high density. Pairs were recorded from only two out of 20 tetrads in Co. Antrim (*cf* 80% of 34 tetrads in 1987). There was relatively strong selection for bog/mire or unimproved grassland.

Snipe were the most abundant and widespread breeding wader in Northern Ireland in 1999 -- estimated at *c*. 4000 pairs (0.97 pairs per tetrad *cf* 1.58 in 1987) although the decline was not statistically significant. Snipe occurred all over but were most numerous west of Lough Neagh (45% of tetrads) *cf* only 16% in Co. Antrim and Co. Down. They preferred fens and marshes.

The survey also recorded nine individual Redshank *Tringa totanus*, but this was not enough to make any meaningful estimates of the total population.

Methods of Data Capture

In 1987 one tetrad (2-km square) was randomly selected for survey from each of the 147 land-based 10-km squares in Northern Ireland. These same squares were selected for the 1999 survey. Observers were asked to visit their tetrad twice, first between 9 April and 17 May, by which time the majority of breeding waders were expected to be on territories, and second between 18 May and 21 June. On each visit, observers were asked to cover as much of their designated tetrad as possible (the 'field by field' method), recording all waders seen or heard onto a 1:10000 site map. Inaccessible areas could be viewed from lanes or vantage points and, as in 1987, observers were requested to be particularly thorough in searching areas of potential wader habitat, such as wet flushes or unimproved grassland. Expansive areas of open moorland or grassland were covered by walking parallel transects approximately 200-250m apart. The habitat type that each wader was found using was recorded, using defined habitat categories such as Improved Grassland, Saltmarsh, Cereals, Stubble etc. Observers also estimated the proportion of each 1-km square within their tetrad that was covered by one of a number of different habitat types.

Purpose of Data Capture

To estimate the numbers of three species of breeding wader, Lapwing, Curlew and Snipe, in Northern Ireland in 1999 and to compare these to the population estimates in 1987.

Geographic Coverage

Northern Ireland. A sample tetrad was randomly selected from each of 147 10-km squares containing land. The same tetrads were used in the 1999 survey as had been used in 1987.

Temporal Coverage

All fieldwork was in the breeding season of 1999. Two visits were made to each tetrad: 9 April to 17 May, and 18 May to 21 June.

Other Interested parties
The survey was commissioned by the Environment and Heritage Service of Northern Ireland, and was carried out, mainly by volunteers, with the help of the RSPB office in Northern Ireland.

Organiser(s)
Ian Henderson

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Publications
The main report of the survey is published as:
Henderson, I.G., Wilson, A.M., Steele, D. & Vickery, J.A. 2002. Population estimates, trends and habitat associations of breeding Lapwing *Vanellus vanellus*, Curlew *Numenius arquata* and Snipe *Gallinago gallinago* in Northern Ireland. *Bird Study* 49: 17-25.
Some extra details were in the research report:
Henderson, I.G., Wilson, A.M. & Steele, D. 1999 (published in 2000). Population estimates and habitat associations of breeding waders in Northern Ireland, 1999: the results of an extensive survey. *BTO Research Report* 234: 1-40. (This also includes copies of the recording card and fieldworker instructions.)
The survey was noticed in *BTO News* number 227.

Available from NBN?
No.

Computer data -- location
BTO Windows network central area.

Computer data -- outline contents
Data directory contains a list of tetrads and the details of habitat and counts of birds in each 1-km square of each counted tetrad. Also a few copies of electronic documents. All the visit maps used by the observers were scanned to pdf copies for Kerry Colhoun to use for the repeat survey run by RSPB in 2013.

Computer data -- description of contents
The data directory contains 3 datafiles:
Habitat.txt Columns are:
1-5 Tetrad ID: identified by grid reference of bottom left (SW) corner; 7-9 ?? (not read in by SAS program);
11 Visit (1 or 2): observers were asked to visit each tetrad twice, the first 9 April to 17 May, the second 18

May to 21 June 1999; 13-15 Coverage: area of the tetrad covered by the observer; 23-24 Habitat: US -- unimproved grassland grazed (or recently) by Sheep, UC -- ditto Cattle, UH -- ditto Horses, UK -- ditto Unknown, UG -- unimproved grassland ungrazed, IS IC IH IK IG ditto but improved grassland, RS -- upland rough grazing stock present, RN -- ditto no stock present, HM -- Heather Moorland, MA -- Marsh/Swamp/Fen, BO -- Bog, SA -- Saltmarsh, WA -- Water body (lake, river etc), WC -- Winter Cereal, SC -- Spring Cereal, NC -- Non-cereal (root crops, brassicas), BA -- Bare Soil, ST -- Stubble, WO -- Woodland/ Scrub, BU -- Buildings (town. village, farm), OT -- Other (specified on paper form);
26-28 a; 30-32 b; 34-36 c; 38-40 d all contain the proportion of each 1-km square, within their tetrad, that was covered by one of a number of different habitat types. a=NW, b=NE, c=SW, d=SE. Areas of "standing water", including lakes, bog and marsh, and flooded or water-logged ground and areas of woodland or scrub were also indicated on the map.
Species.txt Columns are:
1-5 Tetrad ID; 7 visit; 9-10 hab; 12-13 lb lapwing breeding; 15-16 lt lapwing total count including assumed non-breeding status; 18-19 cb and 21-22 ct ditto Curlew; 24-25 rb and 27-28 rt ditto Redshank; 30-31 sb and 33-34 st ditto Snipe; 36-37 ob1 and 39-40 ot1 ditto Other species 1; 42-43 ob2 and 45-46 ot2 ditto Other species 2; the last line of each tetrad record is: 1-10 as before (duplicated); 12-13 Total Lapwing; 18-19 Total Curlew; 24-25 Total Redshank; 30-31 Total Snipe; 36-37 Total Other species
ULSTER.DIS.txt: A list of 105 tetrads to be covered
DOCS directory Electronic copies of various documents and reports.

Information held in BTO Archives

1 Transfer Case containing all data.

Notes on Access and Use

Other information needed

Notes on Survey Design

Specific Issues for Analysis

For the purpose of the survey, and comparable to 1987, breeding pairs were identified as incubating birds, singles or pairs of birds encountered away from sea shorelines or estuaries, or individuals displaying, mobbing or assuming other territorial behaviour. Flocks of more than four waders were recorded as individuals rather than breeding pairs and were assumed to be non-breeding birds. Population estimates were calculated as in the previous survey to ensure comparability. Thus, the total number of pairs of each species recorded in the tetrad survey and the area of land covered (from the proportion of each tetrad covered by the observer) was used to calculate both mean species density and total breeding population for Northern Ireland, effectively by multiplying up the birds on the area covered (369 km^2, or 1/37th) to the total land area available. Confidence limits for population estimates were calculated using a proportionately random bootstrap procedure. A relative measure of habitat preference (not absolute numbers for each habitat in Northern Ireland) was calculated for seven habitat categories (bog/mire, marsh/fen, heather moorland,

upland rough grassland, unimproved grassland, improved grassland and combined arable habitats). This was calculated using the formula:

$$\text{Preference index} = 100 \times \log_{10} (\text{observed pairs}/\text{expected pairs})$$

(the expected pairs was calculated by assuming that pairs were distributed randomly across habitats in direct proportion to the available area of each habitat.)