Breeding bird surveys at Lintzgarth and Thornhope in springs 2016 & 2017

Conducted on behalf of the trustees of the Philip Wayre Wildlife Trust

Purpose

The purpose of the surveys was to establish a baseline population estimate of the abundance of key species of ground-nesting birds at Lintzgarth and Thornhope Moors in Weardale, Co. Durham. Both sites are holdings of the Philip Wayre Wildlife Trust. The survey was also intended to define a distinct method, which could be readily repeated in future years to minimise potential biases between observers and survey effort.

Methods

Possible survey methods were discussed with Lindsay Waddell (Trustee) in spring 2016 prior to survey commencement. Given the relatively small size of each the plots (Lintzgarth 168 ha, Thornhope 118 ha), it was decided that a complete survey of the ground, as opposed to a transect-based sample survey, would be most appropriate. Accordingly the survey was conducted using a bespoke modified form of the technique that has become known as the Brown & Shepherd survey (Brown & Shepherd 1993). The survey was originally designed particularly for upland breeding waders (Charadriiformes), an important group on both of the sites in question.

The survey employs a constant search effort per unit area of ground, and recommends that 20-25 minutes are spent in each 500 x 500 m grid cell on unenclosed moorland. Whilst constant search effort was maintained, due to the high density of birds present, time spent in each cell was not constrained to that specified, instead survey duration generally exceeded that stated. The observer followed a survey route throughout the sites so that all parts of the site were approached to within at least 100 m. At regular 100-200 m spaced

intervals along the survey route, the observer scanned the area with binoculars, listened for songs or display calls and annotated the position of all birds onto a provided series of 1:10,000 maps. Accuracy of plotted bird positions was helped by using a hand-held Geographical Positioning System (GPS). All birds seen or heard whilst using each site were recorded. Birds seen flying over the site, but not necessarily using it, were not recorded. Surveys were only conducted during weather of high visibility, i.e. no low cloud, no precipitation and when winds speeds were low.

The original method recommends that censuses are undertaken between 08.30 and 18.00, thus avoiding the main periods of rapidly changing bird activity, with waders (and other bird groups) exhibiting dawn and dusk peaks in activity. Instead, because surveys were confined to one site per day and each site could be covered during the recognised post-dawn period of peak bird activity, surveys were commenced at or shortly after dawn and were concluded by 09.30. In 2017, one of the visits to Thornhope was conducted in the evening. Birds tend to change their behaviour during the course of the breeding season and hence their detectability also changes. To encompass this variation, each site was surveyed on two occasions: an early visit (early-April to mid-May) and a later visit (mid-May to late- June). The expectation was that this would improve overall detectability. The first visit was timed to coincide with the peak of territorial activity, including display flights, amongst breeding waders. The second was timed to coincide with when most waders were expected to have dependent chicks and hence adults were alarm calling and most detectable to observers. In 2016, surveys were conducted at Lintzgarth on 1st and 22nd May and at Thornhope on 2nd and 23rd May. In 2017 the respective dates were 15th April and 21st May and 23rd April and 31st May.

Typically, Brown & Shepherd (1993) derive population estimates for each species using combined data from both visit maps. However they considered that wader pairs were separate from one-another only if at least 1000 m apart on the different visit maps. Given the high density of waders observed at these sites, adoption of this interpretation would be impractical, hence, for the purpose of reporting, overall species abundance was recorded as the number of individuals seen on each visit to each site. Within-site bird distribution and abundance was recorded as the number of sightings within each land unit, defined by the land parcel identification number on the Rural Payment Agencies' Rural Land Register (RLR)

Map. Original site-survey maps for each visit have been retained by the observer, but are available on request.

Results

Survey results are expressed solely in tabular form (see Tables 1-4). Overall species abundance for each site-visit in 2017 is provided in Table 1. A comparison of maximum species counts in both years is presented in Table 2. Breakdowns of abundance of gamebirds and waders in each year within each land unit on Lintzgarth and Thornhope respectively are given in Tables 3 and 4. Note that due to the values in Table 3 & 4 being the maximum number of individuals in each land unit from the two visits, the values from each land unit when summed need not agree with site totals specified within Tables 1 & 2. Any discrepancy is likely to be accounted for birds moving between land units between visits.

Discussion

Waders: The Brown & Shepherd method, described in detail in Brown & Shepherd (1993) has been specifically designed for surveying wading birds, especially over large blocks of upland moorland and associated hill farms. Species abundance estimates emanating from this method generally compare favourably with those derived from intensive studies of the same species. Its defined methodology render it acceptable for repeated use across observers with limited scope for bias due to the deployment of constant effort and route spacing structure across sites. However, even within wading birds, its use in estimating breeding numbers differs between species, depending on differences in species detectability. For example, whilst the technique should provide acceptable population estimates for conspicuous species such as lapwing, redshank, golden plover and curlew, it will under-estimate numbers of cryptic species such as snipe, which has low flushing distances. The latter can only be readily surveyed by repeated visits to count drumming birds, which varies markedly in relation to weather, with highest counts often on days of low cloud, drizzle and poor visibility (Green 1985).

At both sites surveyed, the numbers of each species of wader tended to be comparable between survey visits, indicating a reasonable level of consistency between visits and a reliable estimate of population size. The only exception being markedly more curlew observed on visit 2 at Lintzgarth compared to visit 1 in both survey years. This variation may have arisen because the estimated density of curlew at Lintzgarth was very high indeed, thus rendering consistency of results difficult due to a potentially high risk of repeat sightings of the same individual. In addition, curlew are highly mobile and may move their chicks across plot boundaries to favoured brood rearing areas That the second visit yielded more curlew than the first is predictable as the second visit was deliberately timed to when curlew and most other waders have chicks and their detectability was consequently higher. Neither the overall numbers of waders, nor the positions of birds relative to each part of the plot, showed little difference between the two survey years at either site. Given that waders are long-lived species with a high level of breeding site faithfulness similar counts would have been expected across years. That the data indicate this to be the case suggests that sufficiently accurate and repeatable estimates of population size have been achieved, thus forming sound baseline data against which to base any future population trends.

Gamebirds: The two survey visits gave contrasting numbers of individuals for both grouse species; red and black. Whilst B&S is not designed for game birds, the diurnal timing of the first survey coincided with when male red grouse were at their most vocal and were conducting territorial display flights, and also with peak attendance of black grouse males at leks. Indeed, all males observed on all site-visits were actively lekking, with 13 males on the main lek (12 in 2017) and several secondary leks of 1-2 males at Lintzgarth and a lek with a maximum of eight males at Thornhope, which had split into subsidiary leks of 4,3 and 1 male respectively in 2017.

The survey also gave sex-related biases in detectability for grouse. In both years, few female red grouse were observed on the first visit due to females incubating, whereas both fewer males and females were seen on the second visits due to secretive behaviour associated with the presence of chicks. In contrast, the first visit provided similar numbers of female black grouse to males, with females actively feeding prior to commencement of incubation, which occurs later in the season than with red grouse. By the second visit, fewer female black grouse were observed and it is likely than this visit coincided with peak incubation.

More accurate counts of red grouse could be derived by using pointing dogs, with a late-March count to determine the number of breeding pairs and a post-breeding count in late-July to determine numbers of adults and young should harvesting be a consideration. Lintzgarth has a particularly high density of female black grouse, with 18 and 27 females seen on the first visits in 2016 and 2017 respectively. This high number of females will have been attracted by flowering cotton grass, which occurs in profusion following evident reductions in sheep grazing pressure on the higher moorland slopes.

Both sites are noted for their reasonably high numbers of grey partridge, with shooting conducted at Lintzgarth and also adjacent to the holding at Thornhope. The survey however only picked up 1-2 pairs on each site-visit in 2016 and only sightings at Thornhope in 2017. Partridge have low flushing distances and are visually difficult to detect. Better estimates of abundance would only be obtained by systematic listening for calling birds at dusk, particularly if call-back tape recordings were used to glean responses.

Passerines: Meadow pipits were the most common bird at both sites, but it was agreed that due to their high abundance, they would not be included within the surveys. Skylark were the second most common passerine after pipits. Skylark registrations were usually, but not solely, those of singing males, whose activity, even within a single morning, changed in relation to weather. All other passerines were included, but it should be noted that their detectability may have been limited due to the 100 m spacing of the search routes. Their inclusion should be noted as an indication of presence at each site rather than absolute abundance.

Future surveys

Two consecutive years of survey have provided a reasonably consistent estimate of population size for both sites, with numbers of birds seen typically being consistent across visits and years. These data are suitable as a baseline measure of species abundance against which any future changes may be gauged. Any future changes in abundance may be driven either by on-site changes, for instance through changes in aspects of site management or through changes away from the site as part of wider long-term species declines. The accuracy of baseline datasets can always be increased by further years of survey, but I

would recommend that two years in this instance is sufficient. The only caveat being potentially spending more time specifically intensifying the methods underpinning the estimate of curlew numbers, whose extraordinarily high densities made the accuracy of counts more questionable at Lintzgarth. That aside, I would recommend repeat surveys, using the methods adopted here, at 3-5 year intervals to gauge population change.

References

Brown, A. F. & Shepherd, K.B. 1993. A method for censusing upland breeding waders. Bird Study, 40, 189-195.

Green, R.E. 1985. Estimating the abundance of breeding snipe. Bird Study, 32, 141-149.

David Baines, Edge End, Middleton-in-Teesdale (June 2017)

Table 1. Bird species abundance (expressed as individuals seen) on each of two visits to Lintzgarth and Thornhope in spring 2017 (m = male, f = female).

	Lintzgarth		Thornhope	
Species	Visit 1	Visit 2	Visit 1	Visit 2
Greylag goose	5	2	4	0
Mallard	9m	3m	2m	1f
Kestrel	0	1	0	0
Buzzard	0	0	1	1
Red grouse	6m 1f	6m 1f	19m 8f	1m
Black grouse	17m 27f	15m 2f	8m 4f	6m
Grey partridge	0	0	4	0
Pheasant	1f	0	3m 2f	1m
Curlew	40	78	13	12
Lapwing	32	40	6	9
Golden plover	9	18	4 (flock45)	6
Redshank	2	5	2	4
Snipe	7	5	8	2
Woodcock	3	2	0	0
Oystercatcher	4	11	2	2
Carrion crow	2	1	1	0
Rook	0	1	0	0
Jackdaw	0	3	0	0
Wood pigeon	0	0	3	2
Stock dove	0	1	0	0
Wheatear	0	0	2	0
Skylark	14	21	12	9
Meadow pipit	Y	Y	Y	Y
Grey wagtail	0	0	1	0
Reed bunting	0	2	4m	4m
Willow warbler	0	0	7	6

Wren	0	0	5	2
Chaffinch	0	0	0	1
Siskin	0	0	2	0
Linnet	0	0	0	2
Redpoll	0	0	0	2
Cuckoo	0	0	0	1
Blue tit	0	0	1	0
Robin	0	0	1	1
Blackbird	0	0	1	0
Ring ouzel	0	0	1	0

Table 2. Bird species abundance (expressed as maximum individuals seen) from two visits to Lintzgarth and Thornhope in 2016 and 2017 (m = male, f = female).

	Lintzgarth		Thornhope	
Species	2016	2017	2016	2017
Greylag goose	5	5	2	4
Mallard	2m	9m	2m 1f	2m 1f
Buzzard	1	0	0	1
Kestrel	0	1	0	0
Red grouse	9m 1f	6m 1f	6m 1f	19m 8f
Black grouse	19m 18f	17m 27f	8m 5f	8m 4f
Grey partridge	4	0	4	4
Pheasant	1f	1f	3m 6f	3m 2f
Curlew	62	78	17	13
Lapwing	38	40	15	9
Golden plover	15	18	8	6
Redshank	8	5	4	4
Snipe	6	7	8	8
Woodcock	0	3	1	0
Oystercatcher	6	11	1	2
Carrion crow	2	2	0	1
Rook	0	1	0	0
Jackdaw	12	3	0	0
Stock dove	0	1	4	0
Wood pigeon	0	0	0	3
Wheatear	2	0	2	2
Skylark	23	21	13	12
Meadow pipit	Y	Y	Y	Y
Tree pipit	0	0	1	0
Pied wagtail	1	0	0	0

Grey wagtail	0	0	0	1
Reed bunting	1	2	1	4m
Willow warbler	0	0	8	7
Chiffchaff	0	0	1	0
Wren	0	0	4	5
Goldfinch	0	0	1	0
Chaffinch	0	0	1	1
Siskin	0	0	0	2
Linnet	0	0	0	2
Redpoll	0	0	0	2
Goldcrest	0	0	1	0
Cuckoo	0	0	2	1
Blue tit	0	0	1	1
Great tit	0	0	1	0
Robin	0	0	2	1
Blackbird	0	0	0	1
Ring ouzel	0	0	0	1

Table 3. Wader and gamebird species abundance at Lintzgarth broken down into numbered spatial land units (see Rural Land Register Map. Values are maximum numbers per unit across visits in 2016 and 2017.

	1371	0232	1505	5242	1635	0406	2561	3961	4676	6374
Red grouse										
2016	9	1	0	0	0	0	0	0	0	0
2017	6	0	2	0	0	0	0	0	0	0
Black grouse										
2016	34	2	4	0	0	1	0	0	0	0
2017	36	3	4	0	0	1	0	0	0	0
Grey partridge										
2016	0	0	0	0	0	2	2	0	2	0
2017	0	0	0	0	0	0	0	0	0	0
Curlew										
2016	46	6	1	4	1	1	1	2	0	0
2017	56	6	2	6	0	4	3	1	1	0
Lapwing										
2016	8	8	2	6	10	1	3	6	2	0
2017	4	6	0	5	5	4	11	8	0	0
Golden plover										
2016	12	1	2	1	0	0	0	0	0	0
2017	16	2	0	0	0	0	0	0	0	0
Redshank										
2016	4	0	2	0	0	0	2	0	0	0
2017	4	1	0	0	1	0	1	0	0	0
Snipe										
2016	1	2	1	0	1	0	2	0	0	0
2017	1	0	1	0	3	2	2	0	0	0
Oystercatcher										
2016	0	4	0	0	2	0	2	0	0	1
2017	0	4	0	0	2	0	2	0	3	0

Table 4. Wader and gamebird species abundance at Thornhope broken down into numbered spatial land units (see Rural Land Register Map. Values are maximum numbers per unit across visits in 2016 and 2017.

	Year	1089	6493	5843	1655	9070	3608
Red grouse	’16	3	0	4	1	0	0
	‘17	11	1	12	3	0	0
Black grouse	’16	0	8	3	0	0	0
	’17	5	8	1	0	3	0
Grey partridge	’16	4	0	0	0	0	0
	’17	0	2	2	0	0	0
Curlew	’16	4	4	6	3	0	0
	’17	4	2	6	2	0	0
Lapwing	’16	6	7	3	1	0	0
	’17	2	6	1	0	0	0
Golden plover	’16	0	0	8	1	0	0
	’17	0	0	6	0	0	0
Redshank	’16	0	4	0	0	0	0
	’17	0	4	0	0	0	0
Snipe	’16	6	1	2	1	0	0
	’17	4	2	2	2	0	0
Oystercatcher	’16	1	0	0	0	0	0
	’17	0	2	0	0	0	0